WEST COAST BASING OF THE MV-22

Final
Environmental Impact Statement

Volume II
Chapters 6 through 12
Appendix A

October 2009

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Appendices

A Public Outreach

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Chapter 6

Impacts of MV-22 Training Operations

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6.0 IMPACTS OF MV-22 TRAINING OPERATIONS

Regardless of which basing alternative is ultimately selected, the MV-22 would conduct training and readiness operations and special exercise operations within DoD-controlled airspace and DoN/USMC training ranges located on the West Coast. This includes operations at MCB Camp Pendleton (section 6.1), the Bob Stump Training Range Complex (Chocolate Mountain Aerial Bombing and Gunnery Range [Chocolate Mountain Range], Barry M. Goldwater Range [BMGR]-West, R-2510 and R-2512) (section 6.2), MCAGCC (section 6.3), and various MTRs (section 6.4). No new or modified restricted areas, MTRs, OLFs, DZs, or CAL sites are included in this EIS, and no construction or improvements are proposed at any range facility at this time. Proposed training impacts described below would apply to all basing alternatives, except the No Action Alternative. Proposed operations would not impact the following resource areas at any of the proposed training locations, as briefly noted below in the respective sections: Socioeconomics, Ground Traffic and Transportation, and Infrastructure and Utilities.

Training activity in Special Use Airspace, such as Bob Stump Training Range Complex, MCB Camp Pendleton, and MCAGCC, is quantified in terms of missions/sorties, but can also be quantified in terms of operations. In this section, use of a specific LZ, DZ, and CAL site or other landing site is quantified as an operation within Special Use Airspace. This operation could include several typical activities at the subject site such as hovering, landing, loading/unloading, and taking off. These operations are only associated with the named area itself and would typically be combined with airfield flight operations to represent a mission/sortie. For MTRs, each one-way trip represents an operation. For consistency with methods used for airfield estimates provided in Chapter 3 through 5, it was estimated that one MV-22 squadron would be deployed at all times. Therefore, noise modeling and other quantitative analyses are based on estimated flight activity from nine squadrons of MV-22 aircraft.

6.1 MCB CAMP PENDLETON

6.1.1 Introduction

MCB Camp Pendleton (see Figure 1.1-1) is one of the DoD's busiest training installations. With more than 125,000 acres of varied terrain and over 17 miles of shoreline, MCB Camp Pendleton has 31 training areas, five impact areas, more than 100 live-fire facilities, five amphibious assault landing beaches, and approximately 230 square miles of Special Use Airspace (MCB Camp Pendleton 2007a). The base's varied topography, combined with its amphibious training areas, inland training ranges, and airspace, offers maximum flexibility for Marine Air Ground Task Forces and other service units that require a realistic combat training environment. Each year nearly 60,000 military personnel from all services use MCB Camp Pendleton's many ranges and training facilities to maintain and sharpen their combat skills (MCB Camp Pendleton 2007a).

Special Use Airspace at MCB Camp Pendleton includes restricted airspace (R-2503) established to support military training and ground weapons firing per agreement with the FAA (MCB Camp Pendleton 2007a). This restricted airspace overlies most of MCB Camp Pendleton, including all of the inland training ranges. Additional information regarding existing and proposed training operations at MCB Camp Pendleton is discussed in section 6.1.2 (Airfields and Airspace).

6.1.2 Airfields and Airspace

Affected Environment

Description of Special Use Airspace

MCB Camp Pendleton's Special Use Airspace consists of four restricted areas established to support military training and ground-weapons firing per agreement with the FAA. R-2503 is subdivided into R-2503A, R-2503B, R-2503C, and R-2503D. R-2503A overlies MCB Camp Pendleton's coastal area and extends 1 nm off shore from the surface to 2,000 feet MSL (Figure 6.1.2-1). The eastern boundary of R-2503A connects with the western boundary of R-2503B. The airspace in R-2503B extends from the surface to 15,000 feet MSL and overlays MCB Camp Pendleton's Impact Areas (Figure 6.1.2-1). The lateral boundaries of R-2503C and R-2503D are consistent with R-2503A and R-2503B, but extend the vertical range available up to 11,000 and 27,000 feet, respectively, as required (MCB Camp Pendleton 2007a).

MCB Camp Pendleton Range Control is the primary controlling agency for operations within all the Special Use Airspace overlying MCB Camp Pendleton. By Letter of agreement, MCAS Camp Pendleton Air Traffic Control Facility controls limited air station operations when the air station is open. When the air station is closed, this airspace reverts back to the control of MCB Camp Pendleton Range Control or the FAA, as appropriate.

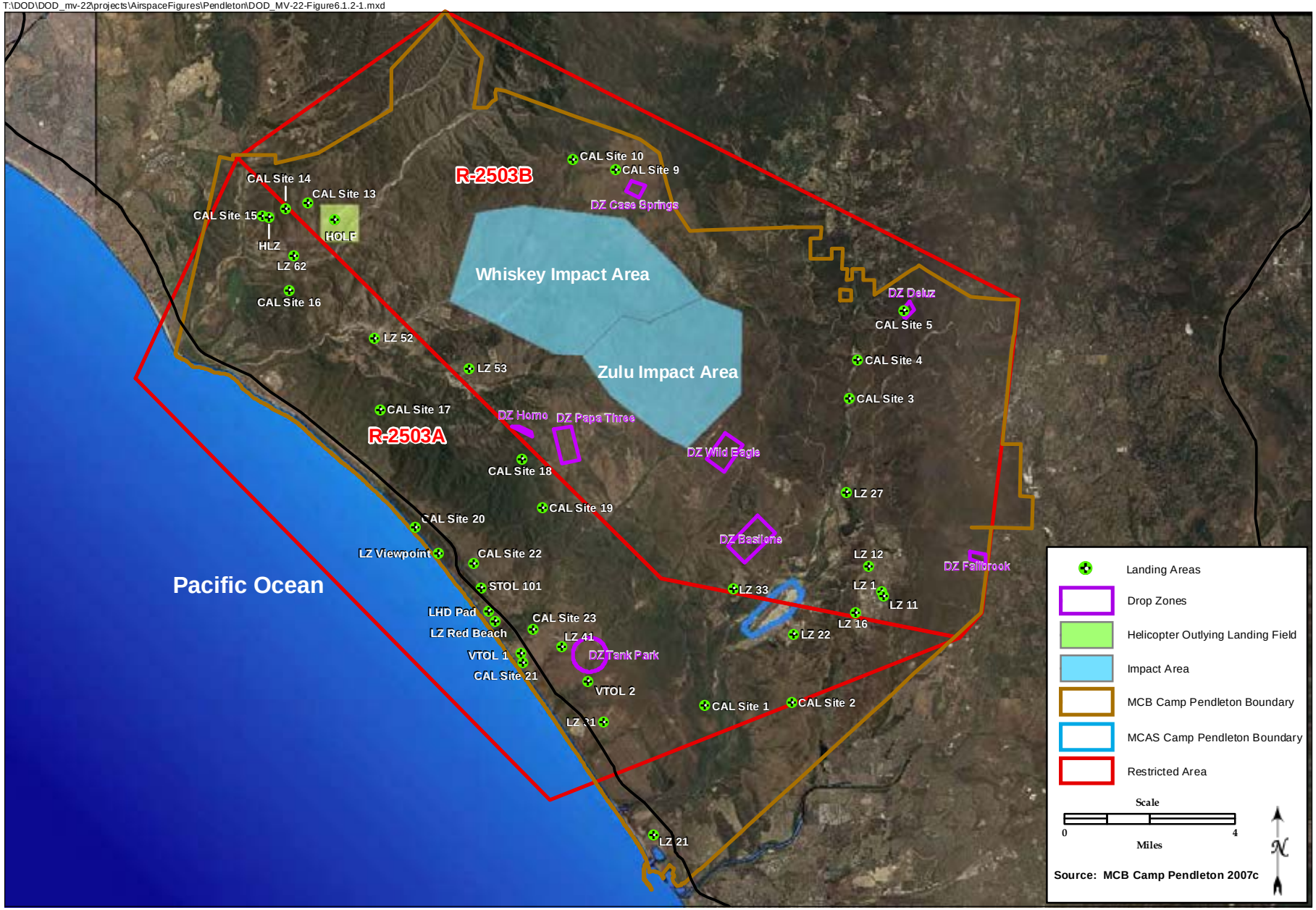
Current Operations

Rotary wing operations at MCB Camp Pendleton include ordnance delivery (e.g., rockets, gunnery), air-launched anti-armor missile training, night vision goggle training, parachute drops of supplies and personnel, vertical replenishment from ship-to-shore and shore-to-ship operations, external load training, door gunner training, low altitude anti-aircraft defense training, and TERF route operations (MCB Camp Pendleton 2007a). Take-offs and landings by rotary aircraft are usually conducted from established LZs, CAL sites, Vertical/Short Take-Off and Landing (V/STOL) pads, the Helicopter Outlying Landing Field (HOLF) and simulated amphibious assault ship flight decks (LHA pads) (Figure 6.1.2-1). In addition, helicopters may take-off and land at other designated areas within the training areas (MCB Camp Pendleton 2007a). Rotary wing operations are typically conducted 200 to 700 feet above ground level, depending upon the training scenario and the number of aircraft involved. A breakdown of existing rotary wing and fixed wing operations at MCB Camp Pendleton is shown in Table 6.1.2-1.

Flight operations involving fixed wing aircraft include close air support, command and control, air reconnaissance, transport of troops and equipment, parachute operations for the deployment of personnel and equipment, vertical and short take-off and landings, and low altitude anti-aircraft defense training (MCB Camp Pendleton 2007a). Additionally, AV-8Bs (Harriers) can perform take-offs and landings at the V/STOL pads. Parachute operations occur within designated DZs (see Figure 6.1.2-1). Fighter and attack aircraft conduct close air support activities with live and inert ordnance in the Zulu impact area located in the center of the base (MCB Camp Pendleton 2007a). Aviation live-fire training events are restricted to the designated impact areas.

At peak periods, a military aircraft, usually a helicopter, takes off or lands within the R-2503 airspace every two minutes. Additionally the commercial airway (V-23) located over the MCB Camp Pendleton coastline is considered the busiest in southern California. At peak periods, a commercial aircraft operates in this airspace every two minutes. The close location of intensively used commercial airspace with MCB Camp Pendleton's Special Use Airspace requires constant vigilance and visibility to maintain the mandated airspace training and operational requirements.

T:\DOD\DOD_mv-22\projects\AirspaceFigures\Pendleton\DOD_MV-22-Figure6.1.2-1.mxd



MCB Camp Pendleton Special Use Airspace and Range Facilities

FIGURE

6.1.2-1

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Table 6.1.2-1. Existing Annual Aircraft Operations at MCB Camp Pendleton

	Rotary Wing					Fixed Wing		Total
	CH-46	**CH-53**	**AH-1**	**UH-1**	**H-60**	**AV-8B**	**F/A-18**	
TERF Route	464	114	504	230	88	-	-	**1,400**
Close Air Support	-	-	-	-	-	39	29	**68**
Ingress/Egress	134	46	1,304	624	8	99	81	**2,296**
Transition	7,962	1,011	2,709	1,572	591	8	34	**13,887**
CAL sites	1,435	448	1,711	1,936	260	-	-	**5,790**
Drop Zones	2,062	521	757	387	61	-	3	**3,791**
HIP/Holding Positions	656	65	600	373	28	-	-	**1,722**
HOLF, HLZ, LHD	4,120	540	19,010	11,442	281	-	-	**35,393**
Whiskey Impact Area	24	4	163	89	3	7	11	**301**
Zulu Impact Area	135	7	163	67	-	32	60	**464**
Landing Zones	1,833	436	461	396	167	-	-	**3,293**
STOL pads/other pads	907	29	473	241	102	-	-	**1,752**
Total	19,732	3,221	27,855	17,357	1,589	185	218	**70,157**

Notes:
Includes USMC, DoN, and other DoD and civilian aircraft.
TERF = Terrain-following, CAL = Confined Area Landing; HIP = Helicopter Initial Points; HOLF = Helicopter Outlying Landing Fields; HLZ = Heavy Lift Zone; LHD = Landing Helicopter Dock; STOL = Short Take-off and Landing
Operations numbers based on estimates developed for the noise modeling (see section 6.1.8).
See Appendix C for details.

Environmental Consequences

Training Range Impacts

Established Special Use Airspace would not be expanded or modified with implementation of the proposed training operations. The introduction of up to ten squadrons of the MV-22 to the training environment within MCB Camp Pendleton and the reduction of CH-46E operations would result in a small increase (1,895) in annual operations (Table 6.1.2-2), which represents a three percent increase in operations compared to existing conditions. This increase is primarily due to the estimated increase of about 7,000 annual operations at the HOLF to conduct MV-22 FCLP operations. However, most landing areas would see a reduction in use compared to existing conditions (Table 6.1.2-3).

Table 6.1.2-2. Proposed Change in Annual Range Operations at MCB Camp Pendleton

Operation Type	Addition of MV-22 Operations	Reduction of CH-46 Operations[1]	Change in Operation over Existing Conditions
TERF Route	-	-444	-444
Close Air Support	-	-	-
Ingress/Egress	-	-134	-134
Transition	5,343	-3,471	+1,872
CAL sites	165	-1,431	-1,266
Drop Zones	42	-2,026	-1,984
HIP/Holding Positions	-	-642	-642
HOLF, HLZ, LHD	11,332	-4,213	+7,119
Whiskey Impact Area	-	-23	-23
Zulu Impact Area	-	-12	-12
Landing Zones	84	-1,817	-1,733
STOL pads/other pads	42	-900	-858
Total	**17,008**	**-15,113**	**+1,895**

Notes:
1 This reduction relates to only USMC/DoN CH-46 operations, not those by other DoD or civilian agencies. The proposed MV-22 FCLPs would occur at the HOLF at MCB Camp Pendleton instead of the airfield.
TERF = Terrain-following, CAL = Confined Area Landing; HIP = Helicopter Initial Points; HOLF = Helicopter Outlying Landing Fields; HLZ = Heavy Lift Zone; LHD = Landing Helicopter Dock; STOL = Short Take-off and Landing
See Appendix C for details.

Table 6.1.2-3. Breakdown of Proposed Change in Annual Operations for Each Landing Area at MCB Camp Pendleton

Landing Area	Addition of MV-22 Operations	Reduction of CH-46 Operations[1]	Change in Operation over Existing Conditions
CAL Site 1	6	-4	+2
CAL Site 2	5	-10	-5
CAL Site 3	15	-92	-77
CAL Site 4	15	-290	-275
CAL Site 5	6	-106	-100
CAL Site 9	15	-75	-60
CAL Site 10	5	-10	-5
CAL Site 13	5	-7	-2
CAL Site 14	15	-10	+5
CAL Site 15	6	-7	-1
CAL Site 16	6	-11	-5
CAL Site 17	5	-28	-23
CAL Site 18	6	-96	-90
CAL Site 19	6	-80	-74
CAL Site 20	15	-192	-177
CAL Site 21	5	-196	-191
CAL Site 22	15	-192	-177
CAL Site 23	14	-25	-11
HLZ	738	-500	+238
HOLF	9,854	-2,736	+7,118
LHD PAD	740	-873	-133
LZ 1	12	-2	+10
LZ 11	4	-3	+1
LZ 12	4	-10	-6
LZ 16	4	-8	-4
LZ 21	4	-247	-243
LZ 22	4	-9	-5
LZ 27	4	-2	+2
LZ 31	4	-35	-31
LZ 33	4	-18	-14
LZ 41	4	-26	-22
LZ 52	4	-70	-66
LZ 53	11	-470	-459
LZ 62	15	-624	-609
LZ Red Beach	3	-	+3
LZ VIEWPOINT	3	-282	-279
PAD 1 (VTOL 1)	14	-556	-542
PAD 2 (VTOL 2)	14	-113	-99
STOL 101	14	-231	-217
DZ Basilone	4	-31	-27
DZ Case Springs	7	-406	-399
DZ Deluz	4	-492	-488
DZ Fallbrook	7	-15	-8
DZ Horno	6	-24	-18
DZ Papa 3	4	-923	-919
DZ Tank Park	4	-133	-129
DZ Wild Eagle	4	-1	+3

Notes:
CAL = Confined Area Landing; HOLF = Helicopter Outlying Landing Fields; HLZ = Heavy Lift Zone; LHD = Landing Helicopter Dock; VTOL = Vertical Take-off and Landing; STOL = Short Take-off and Landing; LZ = Landing Zone; DZ = Drop Zone
See Appendix C for details.

The reason for the decrease in proposed operations within many of the landing areas at MCB Camp Pendleton is due to the fact that the MV-22 can fly farther than the CH-46 and can reach destinations like the Bob Stump Training Range Complex easier than the CH-46. This will allow the MV-22 squadrons to take advantage of a wider selection of training ranges, instead of relying on MCB Camp Pendleton for the majority of their training needs. As a result, some of the training that previously occurred at MCB Camp Pendleton would now occur elsewhere. Another reason for the difference between the current CH-46 training operations and those proposed for the MV-22 is due to the fact that some MV-22 operational components would entail flying in a fixed wing mode, which is something the CH-46 cannot do. Therefore, training scenarios sometimes differ from previous CH-46 training operations.

Proposed airspace training operations would be consistent with existing airspace operations, because the MV-22 would operate at existing range facilities used by other rotary wing and fixed wing aircraft. For example, MV-22 landing operations would be limited to the existing CAL sites, HOLF, LZs, V/STOL pads, and DZs shown on Figure 6.1.2-1 and Table 6.1.2-3, except under emergency conditions. The MV-22 would conduct operations similar to those currently conducted by the CH-46E and other rotary wing and fixed wing aircraft at MCB Camp Pendleton. Even with the proposed increase in annual operations at the HOLF, the overall airspace management at MCB Camp Pendleton would not change as a result of the new aircraft (see section 6.1.16 [Safety and Environmental Health] for information regarding aircraft mishap response and other safety issues). No significant impact would occur.

MITIGATION MEASURES

Because there would be no significant impact on range operations, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities, and MCB Camp Pendleton operations would continue at the current level. Therefore, no impact would occur.

6.1.3 Land Use

Affected Environment

The basic affected environment for land use described in section 4.3 (MCAS Camp Pendleton Land Use) also applies to MCB Camp Pendleton.

Existing airspace training operations at MCB Camp Pendleton comply with established range management and safety plans, the base master plan, the base operations map, Range Compatibility Use Zone (RCUZ) guidelines, and the INRMP. MCB Camp Pendleton has the primary scheduling authority for all airspace training operations at the base.

Environmental Consequences

Training Range Impacts

Established airspace training footprints would not be expanded with implementation of the action alternatives. Airspace training operations would be consistent with existing airspace operations and would comply with the established range and land use management plans mentioned above. Furthermore, safety guidelines, and existing range management and land use plans would be updated to address MV-22 operations. The only significant noise exposure increase would be an approximate 3 dB increase proposed at or in proximity to the HOLF (see section 6.1.8 [Noise]). However, the 65 dB CNELmr noise contours are wholly contained within MCB Pendleton so there are no off-range people or housing units exposed to CNELmr greater than or equal to 65 dB. Therefore, there would be no increased noise exposure greater than 65 dB CNEL to neighboring land uses, and noise levels would be consistent with land use compatibility guidelines for the installation. No significant impacts to land use would occur as a result of airspace operations at MCB Camp Pendleton.

MITIGATION MEASURES

Airspace operations at MCB Camp Pendleton would not result in significant impacts to land use; therefore, no mitigation measures would be required.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and no impacts to land use would occur.

6.1.4 Socioeconomics

The proposed training operations at MCB Camp Pendleton do not include any change in personnel at MCB Camp Pendleton, and there would be no new construction or improvements at the established LZs, DZs, and other range facilities. Therefore, the proposed action would have no socioeconomic impact on the local communities, and no socioeconomic impacts would occur.

6.1.5 Community Facilities and Services

The proposed training operations at MCB Camp Pendleton do not include any change in personnel at MCB Camp Pendleton, and there would be no new construction or improvements at the established LZs, DZs, and other range facilities. Therefore, existing conditions would remain unchanged, and no impacts to community facility and services would occur. Additional information regarding aircraft mishaps and general fire issues can be found in section 6.1.16 (Safety and Environmental Health).

6.1.6 Ground Traffic and Transportation

The proposed training operations at MCB Camp Pendleton do not include any ground transportation support. Additionally, no new construction or improvements are proposed at the established LZs, DZs, and other range facilities. Therefore, the proposed action would have no impact on the traveled roadway system, and no impacts to ground transportation would occur.

6.1.7 Air Quality

Affected Environment

Section 4.7 (MCAS Camp Pendleton Air Quality) provides background information regarding NAAQS and the CAAQS (see Tables 4.7-1). In California, the California ARB delegated authority for enforcing both the federal and state air pollution standards to regional air agencies.

The description of the air quality affected environment within the proposed MV-22 training and operational areas of MCB Camp Pendleton is similar to the information provided in section 4.7 (MCAS Camp Pendleton Air Quality). However, due to their more rural nature, ambient pollutant levels in these areas would be somewhat lower compared to the MCAS Camp Pendleton site.

Environmental Consequences

Training Range Impacts

Air quality impacts were reviewed for significance in light of federal, state, and local air pollution standards and regulations. For the purposes of the present analysis, if project emissions were projected to exceed a threshold requiring a conformity determination in the SDAB (i.e., 100 tons per year of VOC, NO_x, or CO), further analysis was conducted to determine whether impacts were significant. In such cases, if emissions conform to the approved SIP, then impacts would be less than significant. In the case of criteria pollutants for which the SDAB is in attainment of NAAQS, the analysis looked at whether the magnitude and location of project emissions reasonably would be expected to cause a significant adverse impact to air quality.

Air quality impacts associated with the proposed training operations within the MCB Camp Pendleton range areas were determined by comparing the net change in emissions between current CH-46 and future MV-22 training operations. The analysis evaluated existing and proposed aircraft training operations that occurred below 3,000 feet (914 meters) above ground level.

Operational data used to calculate current CH-46 and future MV-22 emissions were obtained from the USMC (USMC 2007, Wyle 1999). Factors used to calculate aircraft combustive emissions were obtained from the DoN (AESO 2001a, 2001b, 2001c, and 2001d). Details of emission source data and calculations used to estimate aircraft training emissions are included in Appendix B of this EIS.

Table 6.1.7-1 presents a summary of the resulting annual operational emissions that would occur from the proposed MV-22 training operations at MCB Pendleton. These data show that full replacement of the current CH-46 operations within the MCB Pendleton ranges in year 2017 would reduce annual emissions of VOC and CO and would increase NO_x emissions that are below the conformity *de minimis* threshold of 100 tons per year. The SDAB is in attainment for SO_2, PM_{10}, and $PM_{2.5}$ and the nominal operational emissions of these criteria pollutants are only a small fraction of their conformity *de minimis* levels in a nonattainment area (100 tons per year). Therefore, training operations at MCB Pendleton would not produce significant adverse impacts to air quality, and impacts for some pollutants would be beneficial.

Table 6.1.7-1. Annual Emissions Due to MV-22 Training Operations within the MCB Pendleton Ranges

Activity	Air Pollutant Emissions (tons) [1,2]					
	VOC	CO	NOx	SOx	PM10	PM2.5
MV-22 Operations	0.08	3.70	101.59	2.87	11.32	11.32
CH-46 Operations	-7.67	-41.49	-8.38	-0.85	-3.81	-3.81
Net Change from Existing Conditions	**-7.59**	**-37.79**	**93.22**	**2.02**	**7.51**	**7.51**
Conformity *De Minimis* Level	**100**	**100**	**100**	**NA**	**NA**	**NA**

Notes
1. Year 2017 emissions.
2. "-" indicates reduction in pollutant.

The project conformity determination for the MV-22 proposed action within the SDAB is summarized in section 7.3.6 and is presented in complete form in Appendix B of this EIS.

MITIGATION MEASURES

Since the proposed training operations at MCB Camp Pendleton would produce less than significant air quality impacts, no mitigation measures are required.

No Action Alternative

Under the No Action Alternative, MCB Camp Pendleton aircraft training operations would continue at current levels. Therefore, the No Action Alternative would not produce any new air quality impacts compared to existing conditions.

6.1.8 Noise

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although exposure to very high noise levels can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, the perceived importance of the noise, its appropriateness in the setting, the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual.

Aircraft are not the only sources of noise in an urban or suburban environment, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also contribute to or detract from the everyday quality of life. Nevertheless, aircraft are readily identified by their noise output and are typically given special attention. Consequently, aircraft noise often dominates analyses of environmental impacts. Additional background information on noise, including its effect on many facets of the environment, is provided in Appendix C.

Noise Metrics

Noise and sound are expressed in logarithmic units of decibels (dB). A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB; sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 to 140 dB are felt as pain (Berglund and Lindvall 1995). The minimum change in the sound level of individual

events that an average human ear can detect is about 3 dB. On average, a person perceives a doubling (or halving) of the sound's loudness when there is a 10 dB change in sound level.

All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or hertz (Hz). To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. It is common to add the "A" to the measurement unit in order to identify that the measurement has been made with this filtering process (dBA). In this document, the dB unit refers to A-weighted sound levels. "C-weighting" is typically applied to impulsive sounds such as sonic boom or ordnance detonation and is denoted by the units "dBC."

In accordance with DoD guidelines and standard practice for environmental impact analysis documents, the noise analysis herein utilizes the following (A-weighted) noise descriptors or metrics: Maximum Sound Level (ALM), Sound Exposure Level (SEL), Day-Night Average Sound Level (DNL) and Community Noise Equivalent Level (CNEL). ALM and SEL describe single noise events whereas DNL and CNEL are time-averaged metrics describing the cumulative noise environment of individual noise events over longer periods, usually up to 24 hours. DNL and CNEL account for single-event noise levels and also weight or penalize those levels depending on the time period in which they occur, weighting evening and nighttime sounds up to 10 dB. CNEL is specific to California and DNL is applicable to the remaining 49 states. The Onset-Rate Adjusted Monthly variant of DNL and CNEL, denoted L_{dnmr} and CNELmr, respectively, are specifically utilized for describing aircraft noise exposure from Special Use Airspace operations. Each descriptor, along with other noise metrics, is described in more detail in Appendix C.

Noise Modeling

In accordance with DoN AICUZ guidelines (DoN 2002a), the noise exposure area is divided into three noise zones. Noise Zone I (less than 65 dB DNL/CNEL) is essentially an area of low or no impact. Noise Zone II (65 dB DNL/CNEL to less than 75 dB DNL/CNEL) is an area of moderate impact where some land use controls are needed. Noise Zone III (greater than or equal to 75 dB DNL/CNEL) is the most severely impacted area and requires the greatest degree of compatible land use controls.

As noise from future aircraft operations cannot be physically measured in the present, this EIS computes and estimates the noise generated by aircraft operations and compares exposures from operational alternatives. Analysis of aircraft noise exposure and compatible land use around DoD airfields and airspace areas are typically accomplished using the following computer programs: NOISEMAP (Wyle 1998), the Rotorcraft Noise Model (RNM) (Wyle 2007a), and MOA-Range NOISEMAP (MR_NMAP) (Wyle 1997). These programs are described in detail in Appendix C, and it is important to note that their computations draw from a spectral database of actual aircraft noise measurements. These programs are most appropriate for comparing "before-and-after" noise impacts, which would result from proposed changes or alternative actions, when the calculations are made in a consistent manner. The model allows noise predictions for such proposed actions without the actual implementation or noise monitoring for those actions.

For airfield environments, lines of equal noise level (i.e., contours of DNL or CNEL) associated with the aforementioned Noise Zones are typically plotted from the output of NOISEMAP and RNM. For airspace environments, L_{dnmr}/CNELmr contours are plotted and/or tabulated from the MR_NMAP program, depending on the magnitude of the exposure. This EIS shows contours and tabulated levels, as appropriate.

Noise levels from flight operations exceeding ambient noise typically occur beneath main approach and departure corridors, in local air traffic patterns around the airfield, and in areas immediately adjacent to parking ramps and aircraft staging areas. As aircraft in flight gain altitude, their noise contribution drops to lower levels, often becoming indistinguishable from the ambient. This EIS focuses only on aircraft noise levels (not the non-aircraft ambient) and their change due to operational alternatives.

Affected Environment

The airspace associated with MCB Camp Pendleton is primarily R-2503 (Figure 6.1.2-1). The existing aircraft noise environment (or noise baseline) for MCB Camp Pendleton airspace was established in a 2006 aircraft noise study entitled "Noise Study for MCB Camp Pendleton, California" (WR 05-07; Wyle 2006b). In order to establish the most accurate baseline noise environment for this EIS, minor changes were made to the previously modeled existing condition under the WR 05-07 study to ensure consistency between the current computer modeling effort and the previous study. These changes included adjusting the precise locations of many of the modeled landing sites/areas (e.g., LZs, DZs, etc) to reflect their actual locations on the ground to ensure a more accurate noise signature relative to the base boundary. Additionally, other minor changes were made for helicopters in several of the previously modeled airspaces/landing sites that included data entry errors and/or calculations (number rounding) that occurred in the previous study. In addition, F-14 Tomcat operations were removed from the EIS's modeling effort because F-14 aircraft were retired from service in 2006 and are therefore no longer part of the existing noise baseline.

The resultant data and associated modeling effort serve as the new baseline for MCB Camp Pendleton for this EIS. Only aircraft noise was modeled for this EIS, whereas the previous study included noise generated by small arms or large caliber weapons.

To accurately reflect the projected change in the baseline noise environment at MCB Camp Pendleton, noise modeling of MCB Camp Pendleton included route-type and area-type flight operations. The following factors were considered in the analysis of noise levels from existing and proposed operations: number of flight operations (by aircraft type and period of day), flight areas (definition/location) and/or flight tracks, flight profiles (duration, altitude distribution, power setting, airspeed) and lastly, climatological data. These factors are described in detail in Appendix C. Modeled flight operations are summarized below.

Flight Operations

For route-type operations, the baseline condition for MCB Camp Pendleton modeled approximately 17,700 annual operations as shown in Table 6.1.8-1. Appendix C shows the modeled airspace. Route modeling consisted of the following:

- TERF routes,

- A close air support track,
- Ingress/egress routes within MCB Camp Pendleton, and
- Transition routes within MCB Camp Pendleton.

For area-type operations, the baseline condition for MCB Camp Pendleton modeled approximately 20,500 annual operations as shown in Table 6.1.8-2. Modeled areas consist of the following: CAL sites, DZs, Helicopter Initial Points (HIPs) or Holding Positions, the Heavy Lift Zone (HLZ), impact areas, general LZs (e.g., LZ 1, 6, 8), and Short Take-off and Landing (STOL) Pads and other pads. Appendix C shows the modeled airspace. Being more route-like in utilization and in proximity to the MCAS Camp Pendleton, the Temporary Alternative Landing Area (TALA) was modeled as part of the air station environment (see section 4.8 and Appendix C regarding TALA operations and modeling).

Table 6.1.8-1. Existing Annual Route-Type Operations for MCB Camp Pendleton Airspace

Aircraft Type	Period	TERF Routes	Close Air Support	Ingress/ Egress	Transition	Total
USMC AV-8B		-	39	99	8	146
USMC F/A-18C/D		-	12	33	27	72
Navy F/A-18C/D		-	17	48	7	72
USMC AH-1		504	-	1,304	2,709	4,517
USMC UH-1		230	-	624	1,572	2,426
USMC CH-46E		442	-	134	3,372	3,948
Navy CH-46E		2	-	-	99	101
USMC MV22		-	-	-	-	-
Navy H-60		88	-	8	591	687
U.S. Air Force (Modeled as CH-46)		2	-	-	21	23
Other USA DoD (Modeled as CH-46)		4	-	-	153	157
USMC CH-53E		114	-	46	1,011	1,171
Civilian Law Enforcement Modeled as CH-46		8	-	-	249	257
Civilian Medical Evacuation Modeled as CH-46		-	-	-	147	147
Other Civilian Modeled as CH-46		6	-	-	3,921	3,927
Total	**Day**	700	51	1,721	10,414	12,886
	Evening	700	17	575	3,473	4,765
	Night	-	-	-	-	-
	Total	**1,400**	**68**	**2,296**	**13,887**	**17,651**

Notes:
TERF = Terrain-following
See Appendix C for details.

The HOLF was modeled like an airfield separately from the airspace routes and areas because of the nature of the HOLF operations with its airfield-like flight tracks. Modeled traffic includes ingress routes, pattern work (e.g., FCLPs) and egress routes as shown in Table 6.1.8-3. Appendix C presents the details of the HOLF modeling.

Table 6.1.8-2. Existing Annual Area-Type Operations for MCB Camp Pendleton Airspace

Aircraft Type	Period	CAL Sites	DZs	HIPs or Holding Positions	HLZ/ LHD	Impact Areas	LZs	STOL Pads and Other Pads	Total
USMC AV-8B		-	-	-	-	39	-	-	39
USMC F/A-18C/D		-	-	-	-	30	-	-	30
Navy F/A-18C/D		-	3	-	-	41	-	-	44
USMC AH-1		1,711	757	600	1,142	326	461	473	5,470
USMC UH-1		1,936	387	373	426	156	396	241	3,915
USMC CH-46E		1,421	2,009	625	1,354	32	1,787	890	8,118
Navy CH-46E		10	17	17	19	3	30	10	106
USMC MV22		-	-	-	-	-	-	-	-
Navy H-60		260	61	28	281	3	167	102	902
U.S. Air Force (Modeled as CH-46)		-	3	-	-	-	1	-	4
Other USA DoD (Modeled as CH-46)		4	7	10	10	-	7	7	45
USMC CH-53E		448	521	65	216	11	436	29	1,726
Civilian Law Enforcement Modeled as CH-46		-	1	-	-	-	1	-	2
Civilian Medical Evacuation Modeled as CH-46		-	-	1	-	-	4	-	5
Other Civilian Modeled as CH-46		-	25	3	1	124	3	-	156
Total	**Day**	4,053	2,848	1,292	2,414	603	2,306	1,226	14,742
	Evening	1,737	943	430	1,035	162	987	526	5,820
	Night	-	-	-	-	-	-	-	-
	Total	**5,790**	**3,791**	**1,722**	**3,449**	**765**	**3,293**	**1,752**	**20,562**

Notes:
CAL = Confined Area Landing; DZ = Drop Zone; HIP = Helicopter Initial Points; HLZ = Heavy Lift Zone; LHD = Landing Helicopter Dock; STOL = Short Take-off and Landing
See Appendix C for details.

Most of the route and area operations are from DoN/USMC helicopter traffic (primarily by AH-1W Super Cobra and CH-46E Sea Knight) and a majority (79 percent) of the modeled route-type operations is on the transition routes. A majority (28 percent) of the modeled area-type operations is within the selected CAL sites. Operations associated with the HOLF outnumber route- and area-type operations by more than 50 percent. Of the total modeled MCB Camp Pendleton airspace operations, CNEL evening flight operations account for about 28 to 29 percent of all flight operations while there are no nighttime flight operations.

Modeling was based on the busiest month, using a 30 days of flying per month; meaning flights were estimated to occur every day, 7 days a week during the busiest month.

Table 6.1.8-3. Existing Annual Aircraft Operations for MCB Camp Pendleton HOLF

Aircraft Type	Period	Ingress	Egress	FCLP*	Total
USMC and Navy CH-46E		228	228	2280	2,840
USMC CH-53E		27	27	270	324
USMC AH-1		1,489	1,489	14,890	17,868
USMC UH-1		918	918	9,180	11,016
USMC MV22		-	-	-	-
Total	**Day**	**1,864**	**1,864**	**18,640**	**22,368**
	Evening	**798**	**798**	**7,980**	**9,576**
	Night	**-**	**-**	**-**	**-**
	Total	**2,662**	**2,662**	**26,620**	**31,944**

Notes:
FCLP = Field Carrier Landing Practice or other landing operations
See Appendix C for details.

Noise Exposure

- Using the data described above and in Appendix C, the MR_NMAP computer model was used to calculate and plot the CNELmr contours for annual average busy-month airspace operations. Similarly, the RNM computer model was used to calculate and plot the CNEL contours for annual average daily operations associated with the HOLF. The CNELmr terminology, instead of CNEL, is used herein. The resulting noise levels from both models (MR_NMAP and RNM) were summed to compute the overall cumulative noise environment. Figure 6.1.8-1 shows the 65 to 80 dB CNELmr contours, in 5 dB increments, for the existing condition. Modeled activity does not generate 85 dB CNELmr or greater. As interpreted from this figure, most of the noise exposure from existing aircraft is associated with the use of the CAL sites (area-type operations).
- As noted in the graphic, all estimated noise exposure greater than or equal to 65 dB CNELmr is wholly contained within the bases' boundary. As a result, no off-base sensitive receptors such as housing, hospitals or places of worship are affected by existing aircraft operations. With no sensitive receptors affected off-base, indoor speech interference and sleep disturbance analyses were not conducted.

Environmental Consequences

Prior to discussing the potential impacts due to the proposed training operations, the following information provides general modeling parameters involving the MV-22 aircraft at MCB Camp Pendleton.

- Detailed flight operations by type of operation, CNEL period, general airspace utilization and flight profiles were derived from data provided by the USMC (USMC 2008a, 2008b), and is based on best estimates by MV-22 operators for this new aircraft.
- Due to MCB Camp Pendleton's remote location, no representative noise-sensitive receptors were identified or analyzed.

Proposed Training Impacts

Although MCB Camp Pendleton would be used more frequently by MV-22 aircraft if they are home-based at MCAS Miramar or MCAS Camp Pendleton than if they were home-based at MCAS Yuma, the maximum tempo of activity was analyzed for the purposes of the EIS. It is estimated that one squadron would be deployed from its base at all times. Therefore the noise modeling estimates flight activity from nine squadrons of MV-22 aircraft and the removal of CH-46E aircraft activity at MCB Camp Pendleton. The nine squadrons of MV-22 aircraft would consist of seven active duty squadrons and two reserve squadrons.

Table 6.1.8-4 shows the numbers of proposed annual MV-22 flight operations for route- and area-type operations, respectively. Proposed MV-22 route-type operations would total approximately 5,400 annually, with 31 percent during the CNEL evening period and 10 percent during the CNEL nighttime period.

Table 6.1.8-4. Proposed Annual MV-22 Airspace Training Operations at MCB Camp Pendleton

Airspace	Day	Evening	Night	Total
Route-type Operations				
TERF Routes	-	-	-	-
Close Air Support	-	-	-	-
Ingress/ Egress	-	-	-	-
Transition	3,153	1,659	531	5,343
Subtotal	3,153	1,659	531	5,343
Area-type Operations				
CAL Sites	132	33	-	165
Drop Zones	33	9	-	42
HIPs or Holding Points	-	-	-	-
HLZ / LHD	813	517	148	1,478
Impact Areas	-	-	-	-
Landing Zones	66	18	-	84
STOL Pads and other pads	33	9	-	42
Subtotal	1,077	586	148	1,811
Total	**4,230**	**2,245**	**679**	**7,154**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
TERF = Terrain-following Route; CAL = Confined Area Landing; HIP = Helicopter Initial Points; HLZ = Heavy Lift Zones; LHD = Landing Helicopter Dock; STOL = Short Take-off and Landing
See Appendix C for details.

Proposed MV-22 area-type operations would total approximately 1,800 annually, with 29 percent during the CNEL evening period and 10 percent during the CNEL nighttime period. A majority of the modeled area-type operations for the MV-22 at MCB Camp Pendleton would consist of HLZ/LHD activity.

Table 6.1.8-5 shows the numbers of proposed annual MV-22 flight operations for the HOLF. Operations from baseline activity would remain the same except CH-46 flights would be deleted.

Proposed MV-22 HOLF operations would total approximately 9,900 annually, with 20 percent during the CNEL evening period and 10 percent during the CNEL nighttime period.

Table 6.1.8-5. Proposed Annual MV-22 HOLF Training Flight Operations at MCB Camp Pendleton

Operation	Day	Evening	Night	Total
Ingress	575	164	82	821
Egress	575	164	82	821
FCLP	5,748	1,643	821	8,212
Total	**6,898**	**1,971**	**985**	**9,854**

Notes:
FCLP = Field Carrier Landing Practice
See Appendix C for details.

As listed in Tables 6.1.8-1 and 6.1.8-2, approximately 15,000 modeled flight operations by DoN/USMC CH-46E aircraft would be removed from MCB Camp Pendleton. The modeled flight operations for all other modeled aircraft types (e.g., the AH-1W, UH-1N, CH-53E, and other aircraft modeled as CH-46) would remain unchanged relative to the Baseline/No Action scenario.

Using the data described above and in Appendix C, the MR_NMAP computer model was used to calculate and plot the CNELmr contours for annual average busy-month airspace operations. Similarly, the RNM computer model was used to calculate and plot the CNEL contours for annual average daily operations associated with the HOLF. The CNELmr terminology, instead of CNEL, is used herein. The resulting noise levels from both models (MR_NMAP and RNM) were summed to compute the overall cumulative noise environment. Figure 6.1.8-2 shows the 65 to 80 dB CNELmr contours, in 5 dB increments, for the proposed training operations. Modeled activity would not generate 85 dB CNELmr or greater. As interpreted from this figure, most of the noise exposure from proposed aircraft operations would be associated with use of the CAL sites (area-type operations).

The removal of the DoN/USMC CH-46E operations and addition of the MV-22 operations would cause a net decrease in noise exposure relative to the baseline condition to all but five of the modeled airspace routes/areas. The airspace with the largest decrease would be LZ 31, whose distributed CNELmr would decrease by approximately 6 dB. Distributed CNELmr would increase for LZ 01, LZ 37, CAL Site 14 and DZ Wild Eagle by 9 dB, 4 dB and less than 1 dB, respectively, but with resultant CNELmr less than 65 dB CNELmr. CNELmr for the HOLF in proximity to its runways would increase by approximately 3 dB and by approximately 1 dB further away near the proposed 65 dB CNELmr contour, relative to the baseline condition.

The 65 dB CNELmr noise contours are wholly contained within MCB Pendleton so there would be no off-range people or housing units exposed to CNELmr greater than or equal to 65 dB. Therefore, no significant noise impacts would occur.

MITIGATION MEASURES

Because there would be no significant impacts, no mitigation measures would be required.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, the noise exposure for the No Action Alternative would be identical to the noise exposure for the baseline condition, and no noise impact would occur.

6.1.9 Infrastructure and Utilities

The proposed training operations at MCB Camp Pendleton would not include new construction or improvements at the established LZs, DZs, and other range facilities. Therefore, existing conditions would remain unchanged, and no impacts to infrastructure and utilities would occur.

6.1.10 Aesthetics and Visual Resources

The proposed training operations at MCB Camp Pendleton would not include new construction or improvements at the established LZs, DZs, and other range facilities. The only new visual component would be the MV-22 aircraft, itself, within an established military training environment. The MV-22 would utilize the same flight paths and range facilities as existing aircraft. Except during take-offs and landings, the MV-22 would fly more often in fixed wing mode, which is higher and faster than typical rotary wing aircraft. This would lessen any perceived visual impact from the MV-22. Although rotorwash from MV-22 landings and hovering may cause dust plumes, such occurrences are consistent with existing military training. Therefore, no impacts to aesthetics and visual resources would occur.

6.1.11 Hazardous Material Management

The proposed training operations at MCB Camp Pendleton would not include new construction or improvements at any LZs, DZs, and other range facilities. The MV-22 would be incorporated into existing training scenarios on MCB Camp Pendleton. Only existing range facilities at MCB Camp Pendleton would be used by the MV-22, and these would be used in the same or similar fashion to current training by rotary wing and fixed wing aircraft. In addition, aircraft would not be maintained or fueled at any LZ at MCB Camp Pendleton. Therefore, operational impacts would not occur with respect to hazardous materials in association with airspace operations.

6.1.12 Topography, Geology, and Soils

Affected Environment

Special Use Airspace overlies most of MCB Camp Pendleton, including all of the inland training ranges. Training exercises/operations are currently conducted in existing training areas, ranges, and authorized LZ/DZs throughout MCB Camp Pendleton.

The landforms of MCB Camp Pendleton are the result of the underlying geology. The higher land areas are typically composed of plutonic and metavolcanic surface rocks, whereas the coastal plain is primarily composed of sedimentary rocks near the surface. Pre-Tertiary granitic, igneous, and metamorphic basement rock formed the Santa Margarita Mountains. Overlying the basement rock are Tertiary sedimentary rocks. The intermontane area is underlain by the La Jolla Group, which is composed of soft sandstone and shale, of marine origin, that were deposited in the Eocene epoch.

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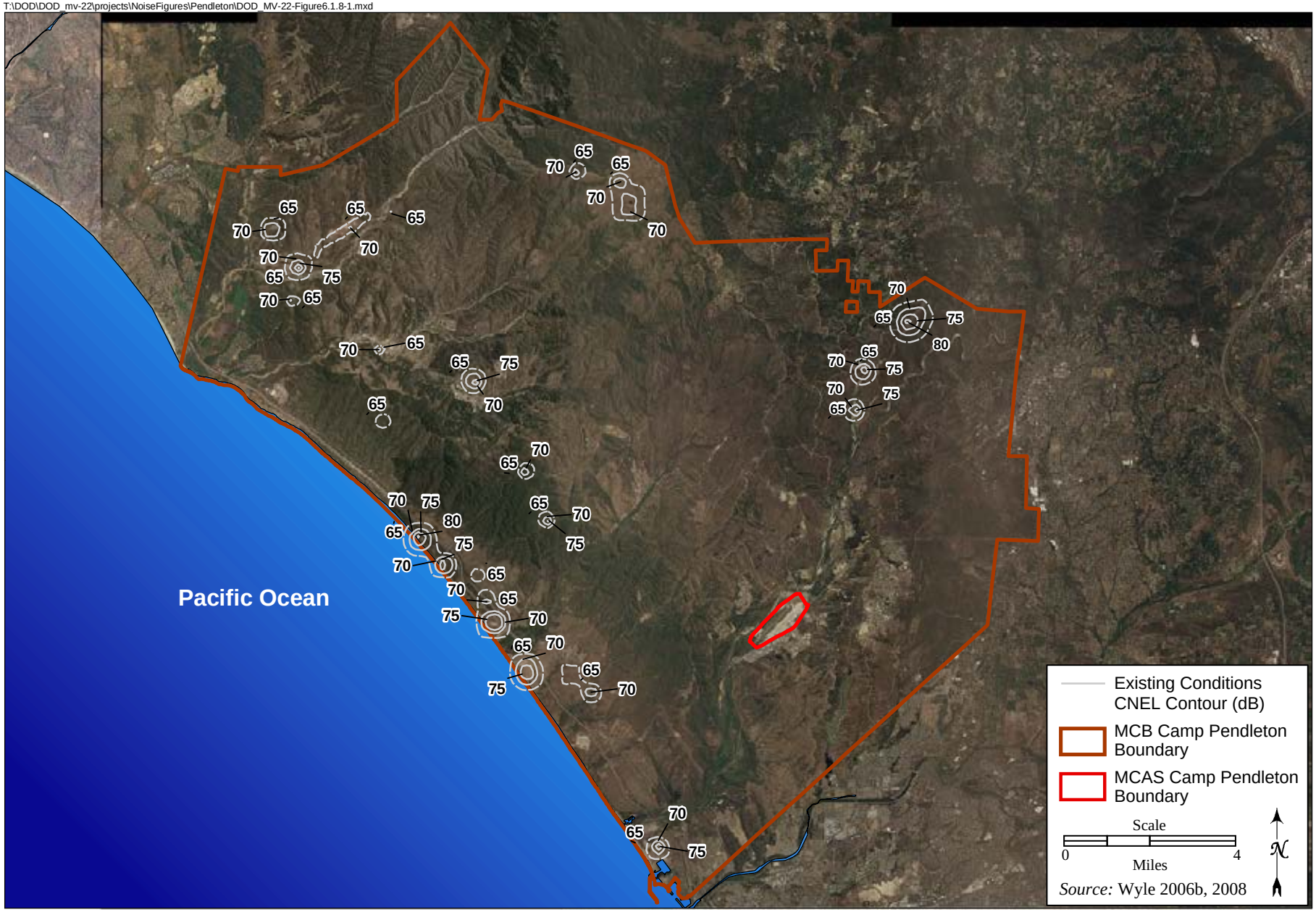

Aircraft Noise Contours from Airspace and HOLF Operations at MCB Camp Pendleton for Existing Conditions

FIGURE

6.1.8-1

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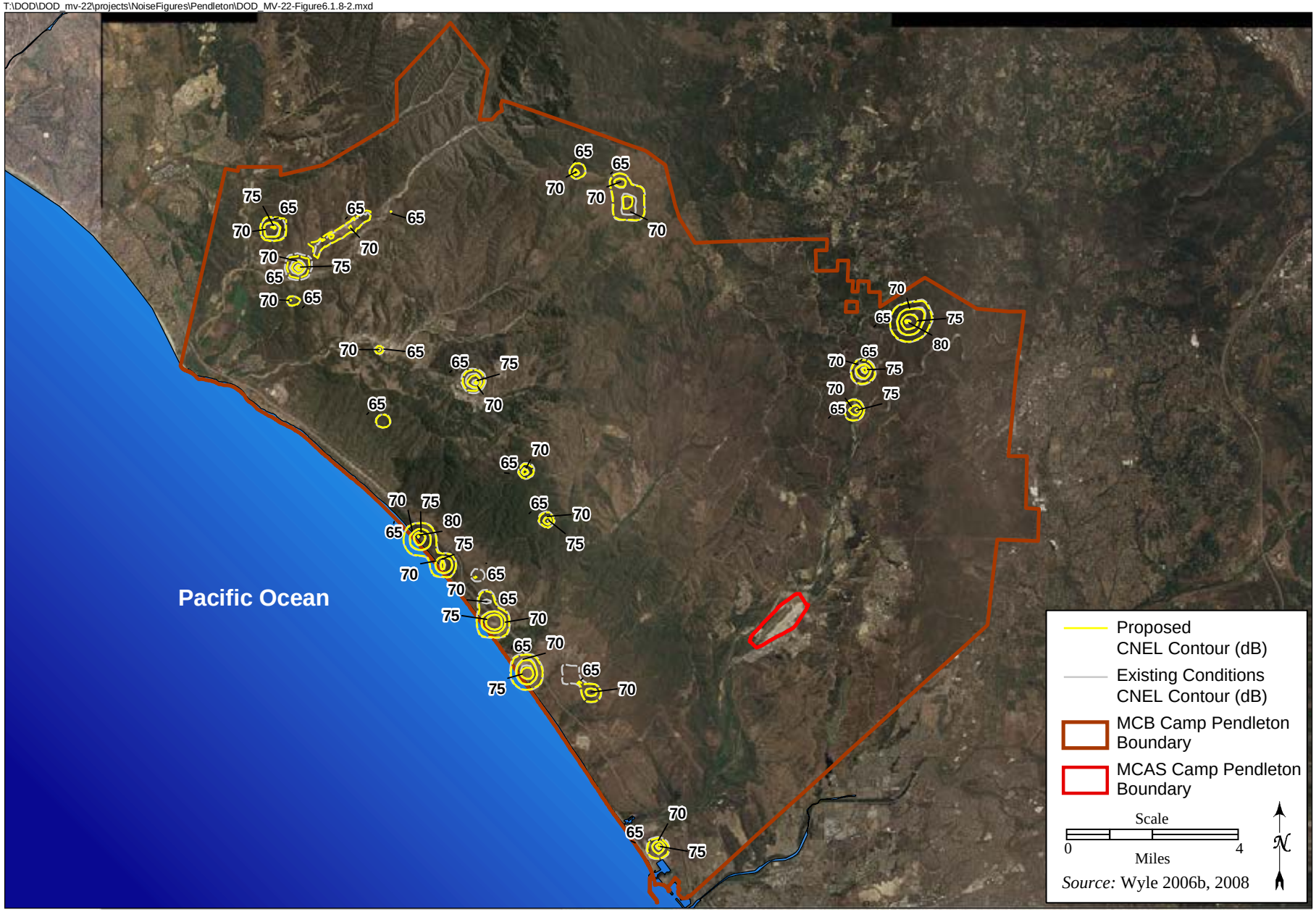

Aircraft Noise Contours from Airspace and HOLF Operations at MCB Camp Pendleton for Proposed Training Operations

FIGURE

6.1.8-2

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The San Onofre Hills are formed by the San Onofre Breccia. This formation consists of resistant middle Miocene conglomerates, sandstones, shale, and breccia. Locally, the San Onofre Breccia is unconformably overlain by the Monterey and Capistrano formations that are primarily middle Miocene to lower Pliocene marine shales and siltstones. The Capistrano Formation is locally overlain by the San Mateo Formation, which consists of middle Pliocene to Pleistocene massive sandstones, with conglomerate, sandstone, and siltstone interbeds. Unconsolidated, Quaternary terrace and alluvial deposits underlie the coastal plain and stream valleys. A small area of the coastal plain consists of Pleistocene, fine-grained windblown sand dune deposits.

MCB Camp Pendleton is located within the Peninsular Ranges Geomorphic Province. The Peninsular Ranges can generally be separated into two distinct topographic components: (1) the northwest-trending mountain ranges, foothills, and intervening valleys that comprise the eastern and central portions of the province; and (2) the coastal plain that occupies the western portion of the province. The coastal plain consists of numerous marine and non-marine terraces, which are dissected by stream valleys. MCB Camp Pendleton straddles both topographic components of this geomorphic province. The eastern landforms are moderately to highly dissected and steep, with the majority of the MCB Camp Pendleton area exceeding a 15 percent slope.

The soils of San Diego County and MCB Camp Pendleton were surveyed and mapped in 1973 by the Soil Conservation Service of the USDA, working in cooperation with other federal agencies. Soils on MCB Camp Pendleton can be divided into four geographic provinces and further classified by their parent material and include (1) alluvial fans and plains; (2) coastal plain terraces; (3) coastal plain upland; and (4) foothill upland. Throughout the MCB Camp Pendleton upland area, there is a range of weatherability that affects the rate of soil erosion. For example, sandstones in the San Mateo (62) Area (coastal plain region) are soft, whereas the granodiorite occurring in the DZ Case Springs area is relatively resistant to weathering. The softer parent materials tend to produce more erodible soils; however, other factors may be overriding, such as how much time natural forces have had to act on the soil materials. The potential for erosion is a greater concern during the rainy season (mid-November through mid-April). Also, during periods of heavy precipitation in areas with clay soils, the unpaved trails often become muddy and difficult to traverse except in four-wheel drive vehicles.

Environmental Consequences

Training Range Impacts

Activities in the airspace that could affect geological resources include minor erosion associated with downdraft from vertical take-offs and landings, as well as use of the MV-22 machine gun at approved locations. Impacts would occur in localized areas of disturbance from hovering and landing of aircraft, resulting in dust and debris being scattered and/or becoming airborne. Similarly, machine gun fire could result in localized vegetation removal and soil disturbance. No new construction or improvements at any LZs, DZs, and other range facilities are proposed. The MV-22 would be incorporated into existing training scenarios on MCB Camp Pendleton. Existing range facilities at MCB Camp Pendleton would be used by the MV-22, and these would be used in the same or similar fashion to current rotary wing and fixed wing aircraft.

Many general procedures to minimize impacts to geological resources on MCB Camp Pendleton are already in place and would continue to be implemented as part of any training scenario. These

procedures are derived from existing plans, programs, regulations, and are associated with various agency consultations. MCB Camp Pendleton Range and Training Regulations (Base Order P3500.1N) (MCB Camp Pendleton 2008b) would apply to all use of the MV-22 on MCB Camp Pendleton. Soil erosion is further minimized through the implementation of terms and conditions of applicable Biological Opinions (BOs), including the BO for Programmatic Activities and Conservation Plans in Riparian and Estuarine/Beach Ecosystems on MCB Camp Pendleton (USFWS 1995a), and by implementation of the measures contained in the MCB Camp Pendleton Soil Erosion Management Practice Handbook (MCB Camp Pendleton 2000) and the INRMP (MCB Camp Pendleton 2007a). Because of the localized nature of the impact and the ongoing management and minimization of training impacts on geological resources, no significant impact would occur.

MITIGATION MEASURES

Because there would be no significant impact on geological resources, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Due to lack of changes to existing conditions, no geologic impacts would occur.

6.1.13 Water Resources

Affected Environment

Special Use Airspace overlies most of MCB Camp Pendleton, including all of the inland training ranges. Training exercises/operations are currently conducted in existing training areas, ranges, and authorized LZ/DZs throughout MCB Camp Pendleton.

Headwaters at MCB Camp Pendleton originate on the western slopes of the Peninsular Ranges. Mountain ridges divide MCB Camp Pendleton into seven watersheds (i.e., primary drainages), including Aliso, Horno/Coastal, San Luis Rey, Santa Margarita, Las Flores, San Onofre, and San Mateo. The San Luis Rey River drains the southern portion of the base into the adjoining Pacific Ocean. The two largest watersheds, Santa Margarita and San Mateo, form broad alluvial plains, which are the primary sources of groundwater on MCB Camp Pendleton. The alluvial plains lead downslope into estuarine lagoons and narrow tidal barriers, which impound low stream flows that are breached during storm event high flows. The three largest estuaries are situated at the mouths of Santa Margarita, Las Flores, and San Mateo creeks (MCB Camp Pendleton 2007a).

Lower elevations at MCB Camp Pendleton receive an average of 14 inches (36.6 cm) of rain annually; however, over the last 129 years, annual precipitation has varied from 5 to 38 inches (12.7 to 96.5 cm). The potential for large floods is particularly high because of this extreme variability of precipitation and runoff. Peak discharges will likely increase in future years due to the effects of expanded urbanization in the upper watersheds. During the summer months and periods of extreme drought, the frequency of extremely low flows within creeks is particularly high throughout MCB Camp Pendleton. It is not unusual for some of the major drainages to be dry from July through October (MCB Camp Pendleton 2007a).

Environmental Consequences

Training Range Impacts

Introduction of up to ten squadrons of the MV-22 to the training environment within MCB Camp Pendleton could cause minor erosion associated with downdraft from vertical take-offs and landings, as well as use of the MV-22 machine gun at approved locations. Impacts would occur in localized areas of disturbance from hovering and landing of aircraft, resulting in dust and debris being scattered and/or becoming airborne. Similarly, machine gun fire could result in localized vegetation removal and soil disturbance. Such localized erosion could be exacerbated by high-intensity rainfall.

Many general procedures to minimize erosion related water quality impacts on MCB Camp Pendleton are already in place and would continue to be implemented as part of any training scenario. These procedures are derived from existing plans, programs, regulations, and are associated with various agency consultations. MCB Camp Pendleton Range and Training Regulations (Base Order P3500.1N) (MCB Camp Pendleton 2008b) would apply to all use of the MV-22 on MCB Camp Pendleton. Soil erosion is further minimized through the implementation of terms and conditions of applicable BOs, including the BO for Programmatic Activities and Conservation Plans in Riparian and Estuarine/Beach Ecosystems on MCB Camp Pendleton (USFWS 1995a), and by implementation of the measures contained in the MCB Camp Pendleton Soil Erosion Management Practice Handbook (MCB Camp Pendleton 2000) and the INRMP (MCB Camp Pendleton 2007a). Because of the localized nature of the impact and the ongoing management and minimization of training impacts on water resources, no significant impact would occur.

MITIGATION MEASURES

Because there would be no significant impact on water resources, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Due to lack of changes to existing conditions, no water resources impacts would occur.

6.1.14 Biological Resources

This section describes the biological resources that may directly or indirectly be affected by the proposed MCB Camp Pendleton training component of the West Coast basing of the MV-22. The proposed training operations would occur in various project areas (i.e., landing areas and other range facilities, including LZs, DZs, CAL sites, HLZ, HOLF, LHD pad, and STOL sites) at MCB Camp Pendleton. MV-22 aircraft would also operate within Special Use Airspace associated with MCB Camp Pendleton (see section 6.1.2 for details). Incorporation of the MV-22 into this training environment is a result of the proposed action and would occur independent of which basing alternative is carried forward.

Biological resources include all native and introduced plant and animal species and the habitats, including wetlands, within which they occur. The definition of specific resources and their distribution within the base and in the vicinity of the project are discussed below under the *Affected Environment* section. Key sources of baseline information for this section include the 2007 INRMP

for MCB Camp Pendleton (MCB Camp Pendleton 2007a), and references therein; natural resources data contained in the MCB Camp Pendleton GIS as of June 2008 (MCB Camp Pendleton 2008a); threatened and endangered species monitoring reports; MCB Camp Pendleton natural resources staff; annual operations and noise characteristics data developed for the proposed action; existing habitat-specific BOs related to all training on MCB Camp Pendleton; and other environmental documents for recent actions on MCB Camp Pendleton.

Affected Environment

Affected Ecosystems

As noted above, incorporation of the MV-22 into the existing training environment would be limited to specific LZs, DZs, CAL sites, and other range facilities described below:

Confined Area Landing Sites. These are landing areas designed for a precision approach used when the intended point of landing is surrounded by obstacles, such as buildings and high trees. At MCB Camp Pendleton, CAL sites are generally undeveloped and support native and non-native plant communities, with some level of disturbance resulting from many years of ongoing training.

Special Sites. The three proposed Special Sites (HOLF, HLZ, and LHD pad) are designed to reduce the need to use the runways on the air station to complete programmed training requirements. They are paved or otherwise developed, and the majority of all MV-22 operations would occur at these locations.

Landing Zones. LZs are the actual point where aircraft land; these can either be developed (e.g., concrete pad) or unpaved. Eleven of the 15 LZs identified for MV-22 operations are paved or otherwise developed; the remaining four are undeveloped and support native or non-native plant communities.

Drop Zones. DZs are the area above and around a location used for parachute drops or "fast rope" (rappelling down ropes from the aircraft) maneuvers. Some sites can also be used for cargo drops. MV-22 aircraft may touchdown within a DZ while ground training is occurring.

Table 6.1.14-1 presents a list of the specific proposed landing areas and other range facilities that would be used by the MV-22 and describes the vegetation and wildlife habitat within and adjacent to each of these sites. This table was developed based on the MCB Camp Pendleton Aviation Range and Training Inventory (DoN 2005b), aerial photography review, and MCB Camp Pendleton natural resources GIS (MCB Camp Pendleton 2008a). The Aviation Range and Training Inventory lists information about each site including the geographic coordinates, dimensions of the site, and safety and environmental constraints. Figure 6.1.14-1 provides a general overview of the vegetation on MCB Camp Pendleton and depicts the locations of the existing landing areas and other use facilities that would be used for MV-22 training operations.

Table 6.1.14-1. List of Training Sites, Landing Zones and Other Range Facilities at MCB Camp Pendleton and their Associated Habitat Type.

Range Facility	Landing Site Dimensions	Habitat Type/ Development	Surrounding Habitat Type
CONFINED AREA LANDING (CAL) SITES			
CAL Site 1	125 x 187 feet (38 x 57 meters)	Undeveloped/ Grassland	CAL Site 1 is in open grassland (mapped as native grassland) surrounded by coastal scrub and native grassland habitat. Riparian habitat (the Santa Margarita River) is about 328 feet (100 meters) east of this site.
CAL Site 2	112 x 151 feet (34 x 46 meters)	Undeveloped/ Grassland	CAL Site 2 is on a hilltop vegetated with non-native grassland, surrounded by grassland and shrublands. There is a pond, with riparian habitat, about 492 feet (150 meters) downslope to the southeast of this site.
CAL Site 3	105 x 171 feet (32 x 52 meters)	Undeveloped/ Grass/Bare ground	CAL Site 3 is in a small area of non-native grassland surrounded by coastal scrub and chaparral. There is a disturbed area on the south east side of the site and a riparian corridor about 328 feet (100 meters) to the southeast, east and northeast. There are also several large trees (potential raptor habitat) close to the CAL Site 3. Bats have been reported to occur south of this site.
CAL Site 4	89 x 220 feet (27 x 67 meters)	Undeveloped/ Disturbed- Bare ground (sand and gravel)	CAL Site 4 is on a bare area with sand and gravel surrounded by coastal scrub and riparian vegetation. This site is within the floodplain of DeLuz Creek that supports riparian habitat. The site is surrounded by tall trees (potential raptor habitat). Bats have been reported to occur west of this site.
CAL Site 5	361 x 607 feet (110 x 185 meters)	Undeveloped/ Disturbed- Bare ground/ Grass	CAL Site 5 is disturbed from ongoing training and occurs on a ridge top that is sparsely vegetated with grasses and is surrounded by grassland and chaparral. It is located within DZ DeLuz.
CAL Site 9	361 x 525 feet (110 x 160 meters)	Undeveloped/Grass	CAL Site 9 is in native grassland and is surrounded by native grassland. There is a pond, with open water, and a drainage supporting riparian vegetation about 820 feet (250 meters) to the west and south of the site and Engelmann oak woodland to the northwest. Bats have been reported about 164 feet (50 meters) to the southwest of this site.
CAL Site 10	82 x 82 feet (25 x 25 meters)	Undeveloped/Grass /Bare ground	CAL Site 10 is grassland on a ridge top surrounded by chaparral and coastal scrub.
CAL Site 13	492 x 492 feet (150 x 150 meters)	Undeveloped/Grass	CAL Site 13 is grassland in open area surrounded by native grassland coastal scrub. There is a riparian area (tributary to San Mateo Creek) about 1,148 feet (350 meters) west of this site. Vernal pools also present outside southeast edge of zone.
CAL Site 14	295 x 459 feet (90 x 140 meters)	Undeveloped/Grass	CAL Site 14 is sparely vegetated grassland surrounded by open grassland and coastal scrub. Vernal pools are present on north side of area.

Table 6.1.14-1. List of Training Sites, Landing Zones and Other Range Facilities at MCB Camp Pendleton and their Associated Habitat Type.

Range Facility	Landing Site Dimensions	Habitat Type/ Development	Surrounding Habitat Type
CONFINED AREA LANDING (CAL) SITES (CONTINUED)			
CAL Site 15	131 x 230 feet (40 x 70 meters)	Undeveloped/Grass	CAL Site 15 is grassland surrounded by native grassland and coastal scrub. A concrete pad and dirt road are to the east of the site. The site is adjacent to a vernal pool.
CAL Site 16	98 feet wide (30 meters)	Undeveloped/Grass	CAL Site 16 is within a firebreak surrounded by grassland and coastal scrub.
CAL Site 17	49 x 131 feet (15 x 40 meters)	Undeveloped/Grass/shrubs	CAL Site 17 is within a firebreak or dirt road on a ridge top surrounded by coastal scrub.
CAL Site 18	121 x 151 feet (37 x 46 meters)	Undeveloped/Grass	CAL Site 18 is a small area of grassland surrounded by mostly coastal scrub.
CAL Site 19	171 x 289 feet (52 x 88 meters)	Undeveloped/Grass	CAL Site 19 is a grassland area, surrounded by coastal scrub and native grassland.
CAL Site 20	148 x 148 feet (45 x 45 meters)	Developed (concrete)	CAL Site 20 is on a concrete pad at the end of a paved road between the freeway and the shoreline. It is surrounded by coastal scrub habitat, and coastal bluff scrub is to the west of the site.
CAL Site 21	574 x 607 feet (175 x 185 meters)	Undeveloped/Grass/bare ground	CAL Site 21 is in disturbed grassland between the freeway and the shoreline. It is surrounded by non-native grassland and coastal bluff scrub to the west. There are vernal pools present outside the zone.
CAL Site 22	No information provided	Undeveloped/Disturbed- Grass	CAL Site 22 is in disturbed non-native grassland with some scattered small shrubs in area. There are power lines in the vicinity of the site that may provide opportunities for raptor foraging.
CAL Site 23	197 x 279 feet (60 x 85 meters)	Undeveloped/Grass/ bare ground	CAL Site 23 is a bare/grassy area surrounded by non-native grassland, coastal scrub, riparian habitat (part of Las Flores Canyon watershed), and disturbed areas to the southeast. Vernal pools are also present in area. Power lines and tall trees are also present in the vicinity and may provide raptor habitat or foraging opportunities.
SPECIAL SITES			
HLZ	600 x 600 feet (180 x 180 meters)	Developed (asphalt)	The HLZ is in an open area surrounded by bare ground, with native grassland and shrubland outside of the existing paved area. Vernal pools are present in the vicinity.

Table 6.1.14-1. List of Training Sites, Landing Zones and Other Range Facilities at MCB Camp Pendleton and their Associated Habitat Type.

Range Facility	Landing Site Dimensions	Habitat Type/ Development	Surrounding Habitat Type
SPECIAL SITES (CONTINUED)			
HOLF	Runway, taxiways, grass landing areas	Developed (concrete and dirt)	The HOLF is an existing runway surrounded by cleared areas; natural areas are present outside the cleared zone including a riparian area (tributary drainage to San Mateo Creek) 984 feet (300 meters) to the southeast. Vernal pools are south and east of the runway. Between the runways of the HOLF and the area surrounding it is a 60-acre mitigation site that was a requirement from the HOLF BO. Significant restoration is planned for FY10 to meet the obligations in the HOLF BO. Effective coordination is required in order to conduct MV-22 training operations and intensive habitat restoration. Since one of the runways is grass, it needs to be mowed monthly to reduce wildfire ignitions that may impact the mitigation site. Stephen's kangaroo rats were also historically present in this area prior to development of the HOLF.
LHD PAD	115 x 820 feet (32 x 250 meters)	Developed (steel matting)	The LHD Pad is on a paved (runway) between the freeway and the shoreline, surrounded by non-native grassland. Vernal pools are present 164 feet (50 meters) to the south of the site.
LZ 1	246 x 545 feet (75 x 166 meters)	Developed/Grass (mowed)	LZ 1 is an open field surrounded by development. The site is used as a sports field, and there is also a football field to the south (high human activity). There are also light poles and tall trees in the area that could support raptors.
LANDING ZONES (LZ)			
LZ 11	328 x 492 feet (100 x 150 meters)	Developed/Grass (mowed)	LZ 11 is in an open field (football field) southeast of LZ1 (high human activity). There are also light poles and tall trees in the area that could support raptors.
LZ 12	82 x 148 feet (25 x 45 meters)	Undeveloped/Grass	LZ 12 is a grassland area with developed areas to the north, east and south and open natural areas, including grassland and coastal scrub, to the west. There are power lines southwest of the site that may provide opportunities for raptor foraging.
LZ 16	180 x 853 feet (55 x 260 meters)	Developed (paved)	LZ 16 is very open with disturbed areas (paved areas and few buildings) to the east and non-native grassland and coastal scrub to the west. There are tall trees to the north and power lines to the west and south of the site (potential raptor habitat and foraging opportunities).
LZ 21	197 x 492 feet (60 x 150 meters)	Developed/Grass (mowed)	LZ 21 is in an area used as a ball field with estuarine habitat to the south, west and northwest and disturbed areas (including the freeway and developed areas) to the northeast, east and southeast. There are light poles to the north and power lines to the southeast and northeast (potential raptor foraging).

Table 6.1.14-1. List of Training Sites, Landing Zones and Other Range Facilities at MCB Camp Pendleton and their Associated Habitat Type.

Range Facility	Landing Site Dimensions	Habitat Type/ Development	Surrounding Habitat Type
LANDING ZONES (LZ) (CONTINUED)			
LZ 22	262 x 574 feet (80 x 175 meters)	Developed (paved)	LZ 22 is surrounded on all sides by developed areas (buildings and pavement); non-native grassland and coastal scrub are outside the developed areas. There are palm trees on all sides of the site (potential raptor foraging opportunities).
LZ 27	102 x 102 feet (31 x 31 meters)	Developed (paved and concrete)	LZ 27 is a pad at the end of a paved road and is surrounded by open grassland and coastal scrub. There is a riparian area about 1,640 feet (500 meters) south of the site.
LZ 31	75 x 75 feet (23 x 23 meters)	Developed (paved)	LZ 31 is a paved pad surrounded by grassy fields and developed areas. There are power lines nearby that may provide raptor foraging opportunities.
LZ 33	187 x 682 feet (57 x 208 meters)	Undeveloped/ Grass/disturbed	LZ 33 is in a disturbed area close to the MCAS Camp Pendleton airfield. There are disturbed/developed areas to the north, east and southeast, and natural areas, including grassland and small areas of coastal scrub, to the south and west. The site is located near a tributary of Santa Margarita River (about 492 feet [150 meters] south of LZ). There are trees to the south and power lines to the north/northeast that may provide habitat or foraging opportunities for raptors.
LZ 41	187 x 328 feet (57 x 100 meters)	Developed/Grass (mowed)	LZ 41 is in a disturbed grassy area (sports field or other activity) with developed areas to the north and east and grassland to the west and south. There is a riparian area 656 feet (200 meters) (unnamed coastal drainage) south of the site. Power lines are present in the vicinity and may provide foraging opportunities for raptors.
LZ 52	295 x 492 feet (90 x 150 meters)	Developed (paved)	LZ 52 is a pad with developed areas to the north and east and natural areas (grassland, coastal scrub, coast live oak woodland) to the south and west. A large riparian corridor (San Onofre Creek) touches southwest corner of pad. A 6-foot fence surrounds the site, and there are power lines to the north and tees to the southeast that may provide foraging opportunities for raptors.
LZ 53	197 x 755 feet (60 x 230 meters)	Developed (paved)	LZ 53 is a pad surrounded by grassland, coastal scrub and small areas of coast live oak woodland. San Onofre Creek is about 1,640 feet (500 meters) south of the site.
LZ 62	262 x 344 feet (80 x 105 meters)	Undeveloped/ Disturbed- Grass	LZ 62 is in a disturbed grassy area surrounded by grassland shrubland with a large riparian corridor (San Mateo Creek) 328 feet (100 meters) to the south.
LZ Red Beach	197 x 607 feet (60 x 185 meters)	Undeveloped/ Disturbed (hard soil)	LZ Red Beach is close to but not on beach. It is mostly in an open area with non-native grassland and coastal scrub vegetation. The site is adjacent to an estuary and vernal pools. The site is near Las Flores Canyon, which supports riparian habitat.

Table 6.1.14-1. List of Training Sites, Landing Zones and Other Range Facilities at MCB Camp Pendleton and their Associated Habitat Type.

Range Facility	Landing Site Dimensions	Habitat Type/ Development	Surrounding Habitat Type
LANDING ZONES (LZ) (CONTINUED)			
LZ VIEWPOINT	131 x 295 feet (40 x 90 meters)	Developed (concrete)	The LZ Viewpoint site is on a pad at the end of a road between the freeway and the shoreline and is surrounded by coastal scrub and near coastal bluff scrub. Vernal pools are present in the vicinity of this site.
PAD 1 (VTOL 1)	Runway, taxiways, grass landing areas	Developed (matting)	VTOL 1 is within existing runway/parking areas between the freeway and shoreline and is surrounded by non-native grassland. Coastal bluff scrub is to the west and vernal pools are in the vicinity of the site.
PAD 2 (VTOL 2)	144 x 144 feet (44 x 44 meters)	Developed (matting)	VTOL 2 is a small pad at the edge of a riparian corridor (unnamed drainage), surrounded by non-native grassland, native grassland and coastal scrub. Vernal pools are present in the vicinity of this site. There are also small trees to the north of the pad that may provide habitat for raptors.
SHORT TAKE-OFF AND LANDING (STOL) SITES			
STOL 101	52 x 2969 feet (17 x 905 meters)	Developed (concrete)	STOL 1 is within a runway that parallels the freeway, which is 656 feet (200 meters) southwest of the site. There is also a railroad adjacent to the east side of the runway at this location; grassland and coastal scrub are present on both sides of runway. Vernal pools are present in the vicinity.
DROP ZONES (DZ)			
DZ Basilone	2123 x 3192 feet (647 x 973 meters)	Grassland	DZ Basilone is native grassland habitat with small drainages that support riparian vegetation at the southeast corner and outside northern edge of zone (appear to be small, isolated drainages). Vernal pools are also present outside northeast corner of the zone.
DZ Case Springs	1591 x 1640 feet (485 x 500 meters)	Grassland	DZ Case Springs is in native grassland area; there is a pond with open water and drainage with riparian vegetation at the southwest corner of the zone.
DZ Deluz	1312 x 1591 feet 400 x 485 meters	Grassland/ shrubland	DZ Deluz is in an area with native grassland, coastal scrub and chaparral with a small area of Engelmann oak woodland. The site is bisected by a dirt road. There is a riparian area about 656 feet (200 meters) south of the zone.
DZ Fallbrook	984 x 2461 feet (300 x 750 meters)	Grassland/ shrubland	DZ Fallbrook is in area of non-native grassland and coastal scrub; drainages outside of the zone to the north and south are part of San Luis Rey watershed.
DZ Horno	656 x 2297 feet (200 x 700 meters)	Grassland/ shrubland	DZ Horno is non-native grassland, coastal scrub, and coast live oak woodland. There is drainage with riparian vegetation at southeast edge of the zone.
DZ Papa 3	2191 x 4265 feet (668 x 1300 meters)	Grassland/ riparian	DZ Papa 3 is mostly vegetated with non-native/native grassland with some areas of coastal scrub and coast live oak woodland. There is a drainage supporting riparian vegetation bisecting the zone.

Table 6.1.14-1. List of Training Sites, Landing Zones and Other Range Facilities at MCB Camp Pendleton and their Associated Habitat Type.

Range Facility	Landing Site Dimensions	Habitat Type/ Development	Surrounding Habitat Type
DROP ZONES (DZ) (CONTINUED)			
DZ Tank Park	2100 foot radius (640 meter radius)	Grassland/ shrubland (disturbed)	DZ Tank Park is non-native grassland with coastal scrub and vernal pools. The site appears to be somewhat disturbed with "lines" of bare ground throughout the site. There are developed areas to the northwest.
DZ Wild Eagle	2461 x 3937 feet (750 x 1200 meters)	Grassland, riparian	DZ Wild Eagle is native grassland with a tree-lined riparian area in the middle of the zone. Vernal pools are present in and outside of the southeast corner of the zone.
Sources: GIS layers; MCB Camp Pendleton 2007a; DoN 2005b.			

Additionally, a discussion of all major habitat types on MCB Camp Pendleton is included to provide context. MCB Camp Pendleton has identified four major ecosystems that occur within the installation for the purpose of planning and management: estuarine and beach (these two are grouped in the ecosystem conservation plan), riparian, and upland ecosystems. Appendix F includes a list of plant species known to occur on MCB Camp Pendleton and identifies the habitat in which the species occurs, as well as other information about the plant such as sensitive species status. Federally listed threatened or endangered species that have the potential to occur within or adjacent to range facilities that would be used by the MV-22 are discussed in the *Sensitive Species* section following the habitat descriptions.

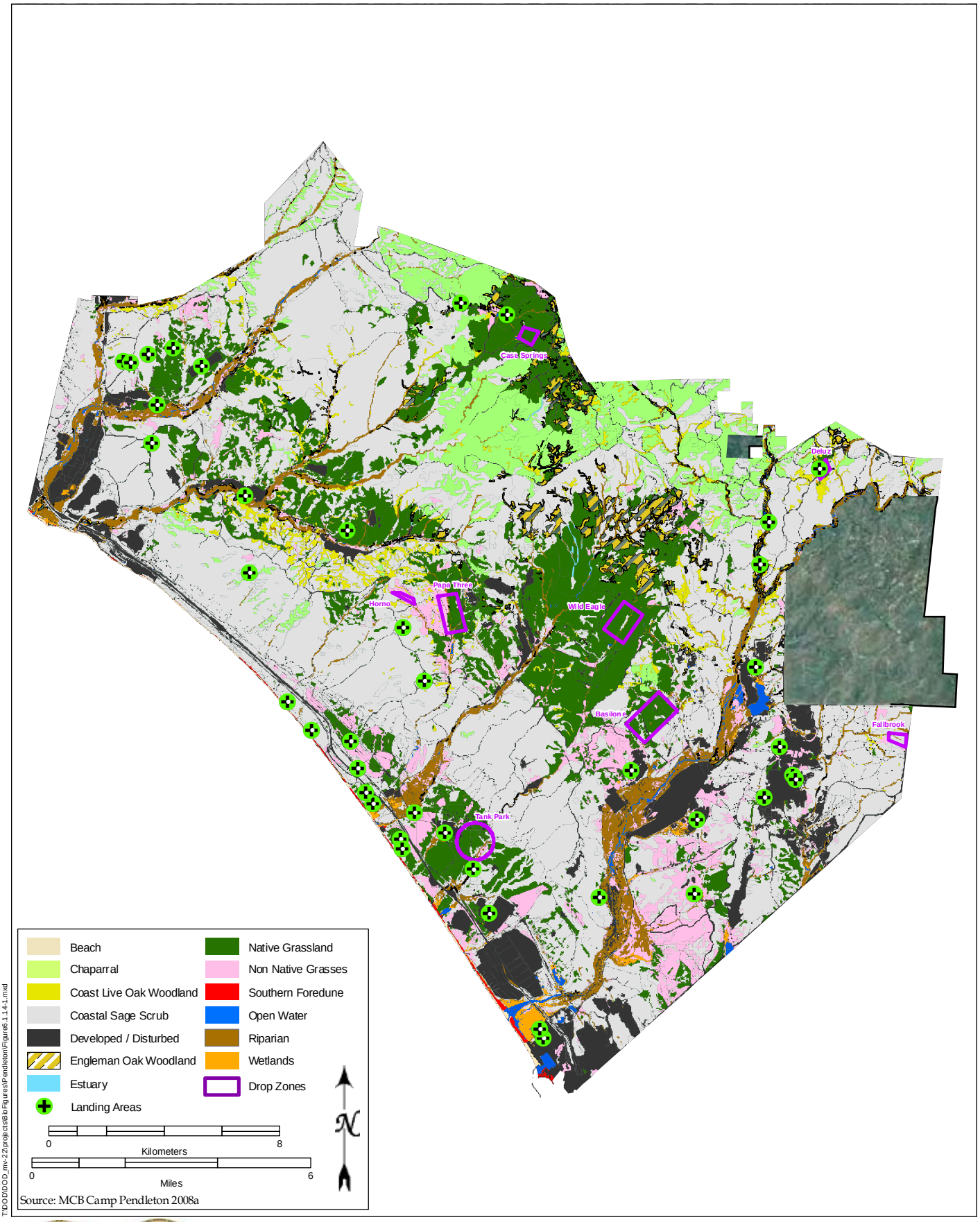
The following descriptions for plant communities and common wildlife on MCB Camp Pendleton are summarized from the MCB Camp Pendleton INRMP (MCB Camp Pendleton 2007a).

ESTUARINE AND BEACH ECOSYSTEM

The estuarine and beach ecosystem on MCB Camp Pendleton includes approximately 17 miles (30 km) of undeveloped coastline and 319 acres (129 ha) of habitat including beaches, coastal lagoons, and river estuaries, such as the Santa Margarita River estuary, and creek mouths of Cocklebur, French, Aliso, Las Flores, San Onofre, and San Mateo Creeks. On MCB Camp Pendleton, the coastal strip is mostly a narrow stretch of sandy beach lying below bluffs cut into the coastal mesas. There are about 25 acres (10 ha of foredunes, classified as southern foredunes, which are sparsely vegetated with low-growing dune plant species. The regularity of tidal influence as well as hydrological regimes of the streams that empty along the shoreline influence the habitats supported by the base's coastal estuaries and lagoons. The Santa Margarita River estuary is the largest on the base and supports salt marsh, brackish marsh/willow swamp, salt flats and coastal sand dunes, which in turn support several federally and state listed species that rely on the estuarine and beach ecosystems.

RIPARIAN

Riparian ecosystems cover approximately 8,200 acres (3,318 ha) on MCB Camp Pendleton and contain several habitat types including riparian woodlands, riparian scrublands, fresh water marshes, and open water/gravel and occur in drainages, seepages, and riverine areas where water availability is high (MCB Camp Pendleton 2007a). Vegetation associated with riparian areas is generally dominated by willows (*Salix* spp.), cottonwoods (*Populus* spp.), and sycamores (*Platanus racemosa*).



FIGURE

Vegetation Types on MCB Camp Pendleton

6.1.14-1

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Riparian zones are home to numerous common and sensitive wildlife species, including least Bell's vireo (*Vireo bellii pusillus)* and southwestern willow flycatcher (*Empidonax traillii extimus)*.

WETLANDS (IN UPLANDS) AND VERNAL POOLS

On MCB Camp Pendleton, wetlands are found along the margins of riparian areas or artificial lakes, such as Case Springs, and in temporarily flooded areas such as isolated ephemeral wetlands and vernal pools. Isolated ephemeral wetlands are temporary bodies of water that form where there are depressional features in the landscape that do not readily drain. These features can form in a variety of habitat types and a variety of soil types, usually underlain by a hardpan or other subsoil layer that prevent the rainwater from percolating through the soil. The amount and length of time of ponding is highly dependent on the amount and frequency of rainfall.

Vernal pools are a type of isolated ephemeral wetlands with very specific hydrologic characteristics. The vernal pools on MCB Camp Pendleton are considered an important resource regionally because they are among the few remaining examples of this habitat that still exist in San Diego County. There are 2,407 vernal pools mapped throughout MCB Camp Pendleton. Some vernal pools on MCB Camp Pendleton are known to support federally and state listed threatened or endangered species, including two species of fairy shrimp (San Diego fairy shrimp and Riverside fairy shrimp) and two federally listed vernal pool endemic plant species (San Diego button-celery and spreading navarretia). Thread-leaved brodiaea is a federally listed plant species associated with vernal pool mesas (as well as perennial and annual grasslands and coastal sage scrub), but does not occur in vernal pools.

UPLANDS

Other undeveloped areas on-base make up the uplands ecosystem. MCB Camp Pendleton supports large expanses of native and non-native grasslands; shrublands such as chaparral and coastal scrub; and oak woodlands dominated by Engelmann or coast live oak. Disturbed or developed areas are also present on the base and include ruderal or weed-dominated areas (including areas dominated by arundo, eucalyptus, tamarisk or other invasive non-native species), mowed or maintained fields, and bare ground, paved roads and pads, as well as residential or support facilities.

There are two main types of shrublands in California and on MCB Camp Pendleton: chaparral and coastal sage scrub types. Chaparral is dominated by evergreen species with small, dark green, leathery, sclerophyllous leaves. Chaparral type habitats tend to occur at higher elevations where temperatures are cooler and there is more moisture. Coastal sage scrub is dominated by smaller summer deciduous shrubs with soft, grayish leaves. Coastal sage scrub occurs at lower elevations with higher temperatures and more pronounced summer drought. At MCB Camp Pendleton, there are several chaparral and coastal sage scrub types that are characterized by the dominant plant species in the plant community, including scrub oak. There is also a mixed community that includes species typical of both coastal sage and chaparral types.

There are two species of tree-sized oak at MCB Camp Pendleton: coast live oak and Engelmann oak. Oaks can occur as scattered individuals, within a matrix of shrubs or grasses, or as dense stands with little understory. Oaks also can occur in the uppermost margins of riparian zones. Coast live oak is widely distributed in California and also at MCB Camp Pendleton. Coast live oak occurs as pure stands, on the fringes of riparian woodlands, scattered in grassland or coastal sage scrub, and as an

element of the Engelmann oak woodland. Engelmann oak rarely occurs as pure stands. On MB Camp Pendleton, Engelmann oaks tend to be more abundant in drier and more open situations.

Wildlife

The large natural areas of MCB Camp Pendleton support a variety of fish and wildlife species. In addition to hundreds of invertebrates, MCB Camp Pendleton has documented the presence of more than 50 mammalian, 30 reptilian, ten amphibian, 300 avian, and 60 fish species. Most of the fish and wildlife species on-base are considered native to the region but some are also exotic. As with the plants, some exotic wildlife species are invasive and may be causing the decline or local extirpation of native species (e.g., as a result of competitive exclusion, habitat alteration, predation, nest parasitism, etc.). Many wildlife species are resident on the base and can be found throughout the year. While other wildlife species visit the base seasonally, such as migratory birds like the least Bell's vireo or, periodically, mountain lions that come and go as they travel throughout their large home ranges (MCB Camp Pendleton 2007a). Wildlife on MCB Camp Pendleton, including sensitive species, is managed based on their habitat associations through the Estuarine and Beach Ecosystem Conservation Plan (MCB Camp Pendleton 2007a, Appendix B), and Riparian Ecosystem Conservation Plan (MCB Camp Pendleton 2007a, Appendix C).

Common species expected to occupy the upland habitats are typical of coastal sage scrub and open grassland habitats, including the side-blotched lizard (*Uta stansburiana*), California towhee (*Pipilo crissalis*), Bewick's wren (*Thryomanes bewickii*), sage sparrow (*Amphispiza belli*), Anna's hummingbird (*Calypte annae*), and deer mouse (*Peromyscus maniculatus*). Coastal sage scrub habitat is important because it contains a variety of rare and endangered species including the California gnatcatcher (*Polioptila californica*) and the coastal cactus wren (*Campylorhynchus brunneicapillus couesi)* (MCB Camp Pendleton 2007a).

Common species expected to occur within the riparian and wetland habitats include garter snake (*Thamnophis* spp.), marsh wren (*Cistothorus palustris*), lesser goldfinch (*Carduelis psaltria*), bushtit (*Psaltriparus minimus*), yellow warbler (*Dendroica petechia*) (a California species of special concern [CSC]), red-winged blackbird (*Agelaius phoeniceus*), mallard (*Anas platyrhynchos*), Bullock's oriole (*Icterus bullockii*), black-headed grosbeak (*Pheucticus melanocephalus*), and raccoon (*Procyon lotor*). When cottonwood-willow riparian scrub reaches four to five years of age, it begins to exhibit the structural diversity required by breeding least Bell's vireos. The vireo, along with southwestern willow flycatchers and many other species, may continue to use this diverse community for another 10 to 20 years. Gradually, the canopy of the maturing willows and cottonwoods begins to shade out the diverse understory of vascular plants required by these birds. While older riparian gallery forests are valuable to many other species, they do not provide suitable vireo and flycatcher habitat (MCB Camp Pendleton 2007a).

The Santa Margarita River estuary is MCB Camp Pendleton's largest estuary and supports four major habitat types: salt marsh, brackish marsh/willow swamp, salt flats, and coastal sand dunes. These habitats support about 148 plant species, nine species of reptiles and amphibians, 24 fish species, 184 bird species, and 17 mammalian species, including several federal and state listed species, such as the California brown pelican (*Pelecanus occidentalis*), California least tern (*Sternula antillarum browni)*, light-footed clapper rail (*Rallus longirostris levipes)*, western snowy plover (*Charadrius alexandrinus nivosus)*, tidewater goby (*Eucyclogobius newberryi)*, and Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) (MCB Camp Pendleton 2007a).

Landscape (or habitat) linkages are open space natural areas that provide connectivity among and between habitat patches, and provide locations for native plants and seasonal or year round habitat for wildlife. Linkages may also provide wildlife corridors for the movement of individuals or populations between habitat areas. In general, wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. Wildlife corridors can be viewed as being local (e.g., within MCB Camp Pendleton) or regional and often follow major drainages and open ridgelines. The identification, conservation, and protection of landscape linkages and wildlife corridors are essential to the long term sustainability of many species in the southern California region (MCB Camp Pendleton 2007a).

Threatened, Endangered and Sensitive Species

Among the many native fish and wildlife species for which MCB Camp Pendleton provides habitat are two mammalian, one amphibian, eight avian, two fish, and two invertebrate species that are federally listed as threatened or endangered species. Additionally there is one avian species, the western yellow-billed cuckoo (*Coccyzus americanus*) (also state listed endangered), designated as a candidate species for federal listing under the ESA. A number of other federally listed threatened or endangered wildlife species are known to occur in the region, such as the Quino checkerspot butterfly (*Euphydryas editha quino*), but have never been identified on MCB Camp Pendleton. Other federally listed threatened or endangered wildlife species, including California red-legged frog (*Rana aurora draytonii*), have been historically recorded on-base but not recently, despite survey efforts. Most (96 percent) of the avian species on-base are included on the list of migratory birds (CFR, Title 50, Section 10.13) and protected by the Migratory Bird Treaty Act (MBTA) and Executive Order 13186, described in detail below under the *Established Plans, Measures, and Procedures Applicable to All Training on MCB Camp Pendleton* section.

Table 6.1.14-2 below is a list of the federally listed plants and animal species that occur in the project area, including their preferred habitat type and identification of the landing areas and other range facilities where the species has been identified. The discussion below provides summaries of the natural history and distribution of the species occurring or potentially occurring within or in the vicinity of the proposed project areas, summarized from Appendix F of the MCB Camp Pendleton INRMP (MCB Camp Pendleton 2007a).

Below are summaries of the natural history and distribution of federally listed threatened and endangered plant and animal species occurring or potentially occurring in the project areas. Each summary concludes with an identification of the project areas where the species has been documented or may potentially occur.

Table 6.1.14-2. Federally Listed Rare, Threatened and Endangered Plant and Animal Species Known to Occur or Potentially Occurring in the Vicinity of the Proposed Action (MCB Camp Pendleton)

Scientific Name Common Name	Status	Habitat	Known Occurrence in Project Areas
Plants			
Brodiaea filifolia thread-leaved brodiaea	FT, SE, 1B	This species typically occurs on heavy soils in open grasslands, at the edges of vernal pools, coastal sage scrub, and in flood plains.	Thread-leaved brodiaea is known to occur on MCB Camp Pendleton (currently, there are 257 known populations of this species and non-project specific surveys are ongoing). This species occurs 400 meters north/northeast of CAL Site 13 and in the northeast corner of DZ Wild Eagle, south of CAL site 23. Surveys for this species have not been completed for all proposed landing sites.
Eryngium aristulatum var. *parishii* San Diego button-celery	FE, SE 1B	This species is typically associated with vernal pools.	There are 62 vernal pools on MCB Camp Pendleton known to contain San Diego button-celery, and these are limited to the Wire Mountain area. This species is not known to occur north of the Santa Margarita River. This species has not been reported from any of the project sites, although it may occur in vernal pools in the vicinity of sites south of the Santa Margarita River.
Navarretia fossalis spreading navarretia	FT, 1B	This species occurs in vernal pool habitat, although it also occupies alkali playa and alkali grassland habitats that experience periodic inundation with water.	Spreading navarretia has been reported from fourteen vernal pools on MCB Camp Pendleton. None are reported in the vicinity of the proposed landing sites, although the species has not been adequately inventoried.
Animals			
FISH			
Eucyclogobius newberryi tidewater goby	FE, CSC	This species occurs in coastal brackish water habitats, typically in the lower reaches of coastal rivers, streams, and lagoons.	Tidewater gobies are known to occur at the mouth of several major drainages on MCB Camp Pendleton. It is reported from the vicinity of CAL Site 23.
Oncorhynchus mykiss steelhead	FE, CSC	Steelhead enter creeks after the first substantial rains, spawn in gravelly creek beds, and return to the ocean. Young rear in streams for about two years.	On MCB Camp Pendleton, steelhead are a known occupant of San Mateo Creek.
INVERTEBRATES			
Streptocephalus woottoni Riverside fairy shrimp	FE	This species occurs in vernal pools, preferring deep, cool water pools.	MCB Camp Pendleton has at least 111 vernal pools that support Riverside fairy shrimp. This species is reported from vernal pools outside CAL Site 13 and in CAL Site 23 and DZ Tank Park; additional location data are being collected for this species.
Branchinecta sandiegonensis San Diego fairy shrimp	FE	San Diego fairy shrimp occur in vernal pools and other ephemeral freshwater habitats, including basins, road cuts, and ditches. This species prefers smaller, shallow pools typically with a depth range of 2-12 inches.	MCB Camp Pendleton has 279 vernal pools that support San Diego fairy shrimp. This species is reported from vernal pools in CAL Site 23 and DZ Tank Park, and near PAD 1; additional location data are being collected for this species.

Table 6.1.14-2. Federally Listed Rare, Threatened and Endangered Plant and Animal Species Known to Occur or Potentially Occurring in the Vicinity of the Proposed Action (MCB Camp Pendleton)

Scientific Name Common Name	Status	Habitat	Known Occurrence in Project Areas
AMPHIBIANS			
Bufo californicus arroyo toad	FE, CSC	The arroyo toad is typically associated with gravelly or sandy washes, stream banks, riverbanks, and arroyos and their adjacent uplands.	On MCB Camp Pendleton, arroyo toad occurs in the Santa Margarita River, San Onofre Creek, and San Mateo Creek watershed. CAL Site 1, CAL Site 3, and CAL Site 4 are within Arroyo toad habitat. Also found near disturbed sites in the vicinity of watersheds, including HLZ, HOLF, LZ 27, LZ 33, LZ 52, LZ 62, and DZ Deluz. Arroyo toad can occur associated with most major drainages on-base.
BIRDS			
Coccyzus americanus occidentalis western yellow-billed cuckoo	FC/ST	Nests in riparian habitats, primarily woodlands with willows and cottonwoods or mesquite thickets.	Has been observed on MCB Camp Pendleton as a transient. No breeding habitat for this species is known to exist on MCB Camp Pendleton.
Vireo bellii pusillus least Bell's vireo	FE, SE, CSC	This species primarily inhabits dense willow-dominated riparian habitats with lush understory vegetation, nesting in the understory and using taller trees for foraging and singing perches.	On MCB Camp Pendleton, least Bell's vireo habitat is found in most of the creeks or drainages that support riparian habitat. It is found near CAL Site 1, CAL Site 2, CAL Site 3, CAL Site 4, CAL Site 23, LZ 52, DZ Papa 3, and DZ Tank Park (east side); and in riparian areas near the HOLF, LZ 27 (500 meters south), LZ 33 (150 meters south), LZ 41 (200 meters south), LZ 53 (500 meters south), LZ 62 (south), LZ Red Beach (Las Flores Canyon), PAD 2, DZ Basilone (northeast edge), and DZ Wild Eagle (east and south). Presence is assumed in all major riparian corridors.
Empidonax traillii extimus southwestern willow flycatcher	FE, SE	The southwestern willow flycatcher breeds in patchy to dense riparian habitats along rivers, streams, or other wetlands, usually with some surface water present (USFWS 2002b).	On MCB Camp Pendleton, southwest willow flycatcher potentially occurs in many of the creek and drainages that support dense willow and mulefat habitat; however, breeding has only been consistently observed on the Santa Margarita River, which supports a key population for this species. Habitat for this species occurs in CAL Site 1 and near CAL Site 23, and LZ 62 (south). Presence is assumed in all major riparian corridors.
Polioptila californica coastal California gnatcatcher	FT, CSC	This species prefers open coastal sage scrub habitat with California sagebrush.	California gnatcatcher is found in many of the coastal scrub habitats on MCB Camp Pendleton. Several of the project landing sites are within (CAL Site 1, 2, 14, 15, 20, 21, 23, LZ 27, LZ Red Beach, PAD 2, STOL 101, DZ Basilone [eastern half], and DZ Tank Park) or in the vicinity of habitat for this species (CAL Site 16 [west], CAL Site 22 [east and west borders], HLZ [surrounding], LHD PAD [100 meters south], LZ 12 [northwest], LZ 16 [50 meters north, west and south], LZ 41, and DZ Deluz [southwest edge]).
Pelecanus occidentalis californicus California brown pelican	FE, SE	Brown pelicans occupy coastal habitat, foraging in the ocean as well as in shallow estuaries and other nearshore waters.	On MCB Camp Pendleton, the California brown pelican feeds in shallow estuary waters and uses sand spits and offshore sandbars for daily loafing and as nocturnal roost areas. It does not breed on the base.
Sternula antillarum browni California least tern	FE, SE	This species occupies coastal waters, nesting on open sand beaches along the California coast.	On MCB Camp Pendleton, California least tern nesting sites are located on the beaches at the mouths of the North Beach, French, and Aliso Creeks and the mouth and salt flats of the Santa Margarita Estuary. This species nests in the estuary in the vicinity of LZ 21.

Table 6.1.14-2. Federally Listed Rare, Threatened and Endangered Plant and Animal Species Known to Occur or Potentially Occurring in the Vicinity of the Proposed Action (MCB Camp Pendleton)

Scientific Name Common Name	Status	Habitat	Known Occurrence in Project Areas
BIRDS (CONTINUED)			
Rallus longirostris levipes light-footed clapper rail	FE, SE	This species occupies fresh and saltwater marshes, preferring saltwater marshes dominated by pickleweed or freshwater marshes dominated by cattails and bulrushes with intermixed willows.	There are a few reported historic occurrences of this species on MCB Camp Pendleton, most recently south of the estuary at the mouth of the Santa Margarita River. LZ 21 is in the vicinity of habitat for this species.
Charadrius alexandrinus nivosus western snowy plover	FT, CSC	This species occurs in coastal habitat, typically on or near sandy beaches. This species prefers to nest on sand spits, dune-backed beaches, open areas around estuaries, and beaches at river mouths.	Western snowy plover is known to breed on the beaches of MCB Camp Pendleton. LZ 21 is in the vicinity of a known nesting location for this species.
MAMMALS			
Dipodomys stephensi Stephens' kangaroo rat	FE, ST	This species occupies slightly disturbed coastal sage scrub and annual grassland, preferring areas with low (less than 30 percent) perennial cover that support native annuals in the herbaceous layer.	Stephens' kangaroo rat occurs at scattered locations on MCB Camp Pendleton. This species was historically found near the HOLF, although latest trapping efforts did not detect any individuals (Evans, personal communication 2008). This species habitat is found near DZ Wild Eagle (within 100 meters west and north of boundary, and also in a small portion of the eastern boundary), and also DZ Basilone. Comprehensive surveys have not been completed for this species, and suitable habitat likely occurs at many locations in the vicinity of proposed landing sites.
Perognathus longimembris pacificus Pacific pocket mouse	FE, CSC	This species has been found in coastal sage scrub and annual grassland communities. Evidence suggests that the Pacific pocket mouse prefers disturbed coastal sage scrub with reduced shrub density.	This species is reported to occur in three general locations on MCB Camp Pendleton, two at the northwestern boundary of the base and one larger location in the southeastern part of the base. Specific occurrences near training sites include one within the southeast edge of the DZ Tank Park site, one near CAL Site 1 (500 meters west and southwest), and one near PAD 2 (northwest).

Status:
Federal Status (determined by U. S. Fish and Wildlife Service):
FE Federally Listed Endangered
FT Federally Listed Threatened
FC Federal Candidate for listing as threatened or endangered.
DE Delisted as Federally listed as Endangered
PDL Proposed for Delisting as Federally Threatened or Endangered
State Status (determined by California Department of Fish and Game):
SE California State Listed Endangered
ST California State Listed Threatened
CSC California Special Concern Species
California Native Plant Society (CNPS) Listing:
List 1B Plants rare, threatened or endangered in California and elsewhere.
List 4 Plants of limited distribution (a watch list).
Sources: MCB Camp Pendleton INRMP (MCB Camp Pendleton 2007a); MCB Camp Pendleton GIS (MCB Camp Pendleton 2008a); MCB Camp Pendleton Aviation Range and Training Inventory (DoN 2005b).

THREAD-LEAVED BRODIAEA

Thread-leaved brodiaea (*Brodiaea filifolia)* was listed by the USFWS as a threatened species on 13 October 1998 (USFWS 1998f). On 13 December 2005, the USFWS issued its final critical habitat for thread-leaved brodiaea. A total of 597 acres (242 ha) in Los Angeles and San Diego Counties was listed. All locations on MCB Camp Pendleton were excluded under Sections 4(a)(3) and 4(b)(2) of the ESA (USFWS 2005b). The installation has prepared and maintains a current INRMP, and critical habitat designation can be exempted for military installations where the USFWS determines that the approved INRMP (2007) for the installation provides a benefit to the species. As a result, there is no critical habitat for thread-leaved brodiaea on MCB Camp Pendleton. No recovery plan has been developed.

Thread-leaved brodiaea is a perennial herb that produces leaves and flower stalks from dark-brown, fibrous-coated underground corms (underground bulb-like storage stem that lacks succulent leaves). Corms are dormant in the summer but begin growing after the first significant fall rains saturate the soil. Leaves grow slowly throughout the winter. At the time of flowering, generally early summer, the leaves of *Brodiaea* are dead or nearly so and next season's corms are mature. The flower stalks are 8 to 16 inches tall with several narrow basal leaves that are shorter than the stalks. The flowers bloom from May to June and are arranged in a loose flower cluster. The fruit is a capsule. Thread-leaved brodiaea is usually found in herbaceous plant communities that occur in open areas on clay soils, soils with clay subsurface, or clay lenses within loamy, silty loam, or alkaline soils, and elevations of 100 feet (30 meters) to 2,500 feet (765 meters), depending on soil. Thread-leaved brodiaea is threatened by urbanization, foot traffic, offroad vehicles, grazing agriculture and watershed alteration (drainage) (MCB Camp Pendleton 2007a).

The historical range of thread-leaved brodiaea extends from the foothills of the San Gabriel Mountains at Glendora (Los Angeles County), east to Arrowhead Hot Springs in the western foothills of the San Bernardino Mountains (San Bernardino County), and south through eastern Orange and western Riverside Counties to Carlsbad in northwestern San Diego County, California. Fifty-one populations of thread-leaved brodiaea are presumed extant. These populations are clustered in the expanding cities of Vista, San Marcos, and Carlsbad (9 populations), in the vicinity of the Santa Rosa Plateau (6 populations) and the remaining 36 populations scattered throughout Orange, Los Angeles, Riverside, San Bernardino, and San Diego counties. On MCB Camp Pendleton, there are over 257 known populations of thread-leaved brodiaea based on current data.

At the proposed project areas, known occurrences of this species include the northeast corner of DZ Wild Eagle, south of CAL site 23, and 400 meters north/northeast of CAL Site 13 (Figure 6.1.14-2). However, surveys have not been conducted for all the project areas, and this species has the potential of occurring in any herbaceous habitat with suitable soil conditions.

SAN DIEGO BUTTON-CELERY

San Diego button-celery (*Eryngium aristulatum* var. *parishii)* was listed as endangered on 3 August 1993 (USFWS 1993a). San Diego button-celery occurs in vernal pools and is included in the recovery plan for the listed species of southern California vernal pools (USFWS 1998a). San Diego button-celery is a perennial or biennial herb arising from a taproot. The flowers occur on stems and have rigid spiny bracts. The species is threatened region-wide by urbanization, foot traffic, off-road

vehicles, grazing agriculture and watershed alteration (drainage). Critical habitat has not been proposed for this species (MCB Camp Pendleton 2007a).

San Diego button-celery ranges from Riverside County (Santa Rosa Plateau), California, south to northern Baja California, Mexico. In 1979, San Diego button-celery was known from 65 pool groups and by 1986 the species remained in 61 pool groups (USFWS 1993a). Currently, this species occurs in northern San Diego County on MCB Camp Pendleton and in San Marcos, Carlsbad, and Ramona (MCB Camp Pendleton, 2007a). On MCB Camp Pendleton, there are 62 vernal pools known to contain San Diego button-celery and these are limited to the Wire mountain area. This species does not occur north of the Santa Margarita River. This species has not been reported from any of the project sites. However, surveys have not been conducted for all the project areas, and this species has the potential of occurring in any vernal pool habitat, including those that have not been mapped, south of the Santa Margarita River.

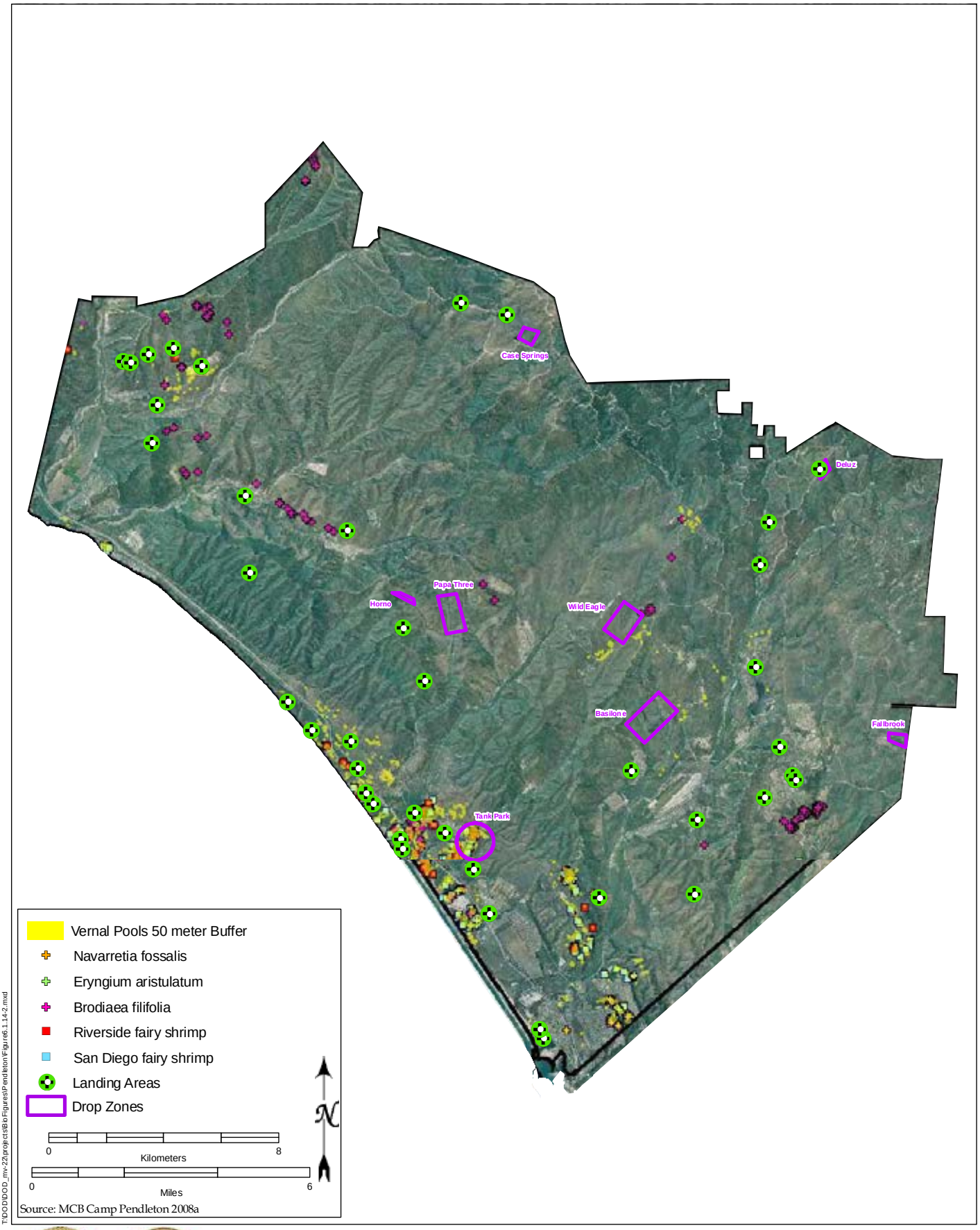
SPREADING NAVARRETIA

Spreading navarretia (*Naverretia fossalis*) was listed as threatened on 13 October 1998 (USFWS 1998f). In response to a court order, critical habitat for this species was proposed on 7 October 2004 (USFWS 2004d). The USFWS proposes to designate 4,301 acres of spreading navarretia essential habitat as critical habitat in San Diego and Los Angeles Counties. Sixty-seven acres of essential habitat within ''mission-critical'' training areas (Stuart Mesa area/Oscar One training area on MCB Camp Pendleton) have been excluded from the proposed critical habitat designation pursuant to

Section 4(b)(2) of the ESA. Critical habitat designation can be exempted for military installations where the USFWS determines that the approved INRMP (2007) for the installation provides a benefit to the species. As a result, there is no critical habitat for spreading navarretia on MCB Camp Pendleton. Spreading navarretia is included in the approved recovery plan for the listed species of southern California vernal pools (USFWS 1998a).

Spreading navarretia is a spreading annual herb that occurs in vernal pools. Stems are approximately four to six inches long, and mostly bare on the lower portions. Leaves are divided into linear segments. Flowers (April-June) are white to pale lavender, borne in small, flattopped, leafy clusters. Spreading navarretia is threatened by urbanization, foot traffic, offroad vehicles, grazing agriculture and watershed alteration (drainage) (MCB Camp Pendleton 2007a).

Spreading navarretia is known from widely disjunct and highly restricted populations extending from the Santa Clarita region of Los Angeles County, east to the western lowlands of Riverside County, south through coastal and foothill San Diego County, and as far south as San Quentin in northern Baja California, Mexico. Fewer than 30 populations exist in the U.S. Of the 30 populations that are known to exist in the U.S., nearly 60 percent are concentrated in three locations in southern California: Otay Mesa in southern San Diego County, the San Jacinto River in western Riverside County, and Hemet in Riverside County. On MCB Camp Pendleton, spreading navarretia has been found in 14 vernal pools basewide, ten of these are in the Wire Mountain housing development area, three pools within the Oscar One training area, and one pool in the Del Mar-21 Area (MCB Camp Pendleton 2007a). This species has not been reported within or adjacent to the proposed project areas (Figure 6.1.14-2). However, surveys have not been conducted for all of MCB Camp Pendleton including some of the LZs/DZs/CAL sites proposed for use by the MV-22, and this species has the potential of occurring in any vernal pool habitat including those that have not been mapped.



Known Occurrences for Vernal Pools and Listed Plant and Fairy Shrimp Species on MCB Camp Pendleton

FIGURE

6.1.14-2

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RIVERSIDE FAIRY SHRIMP

The USFWS listed the Riverside fairy shrimp (*Streptocephalus woottoni*) as endangered on 3 August 1993 (USFWS 1993a). Final critical habitat was published for the Riverside fairy shrimp on 30 May 2001. On 30 October 2002 the Washington DC Circuit Court vacated the published critical habitat. Critical habitat was then proposed again on 27 April 2004 (USFWS 2004a). Final critical habitat was published on 12 April 2005. All areas owned and operated by MCB Camp Pendleton were excluded from listing in accordance with Section (4)(a)(3) of the ESA. Critical habitat designation can be exempted for military installations where the USFWS determines that the approved INRMP for the installation provides a benefit to the species. As a result, there is no critical habitat designated for Riverside fairy shrimp on MCB Camp Pendleton. A recovery plan has been approved for the listed species of southern California vernal pools, which includes the Riverside fairy shrimp (USFWS 1998a).

Riverside fairy shrimp occur in vernal pools which are seasonal shallow pools that are filled by winter and spring rains that usually begin in November and continue into April or May. They may occur in natural vernal pools as well as human-made depressions that temporarily impound water. Mature male Riverside fairy shrimp are approximately 0.5 to 1.0 inch long (USFWS 2005c) and the females are approximately 0.5 to 0.87 inch in total length. Fairy shrimp are free-swimming filter feeders that are threatened by loss and degradation of habitat due to urbanization.

The Riverside fairy shrimp was once thought to have the most restricted distribution of any fairy shrimp, but now are found to be more widespread. The five original pools from which it was collected are all in western Riverside County in an area about 13 by 7 km, between elevations of 1,142 and 1,355 feet (348 and 413 meters), near Temecula and Rancho California. Subsequent localities have been found in Los Angeles, Orange, San Diego, and Ventura Counties, California. Its total range extends from coastal southern California south to northwestern Baja California, Mexico (USFWS 2000c).

There are 111 known Riverside fairy shrimp pools known to occur on MCB Camp Pendleton. A basewide survey conducted by RECON in the 1997/1998 wet season identified the coastal mesas on MCB Camp Pendleton as supporting one of the largest known populations of this species, with at least 81 pools occupied by fairy shrimp (73 with Riverside fairy shrimp and eight with both Riverside fairy shrimp and San Diego fairy shrimp [*Branchinecta sandiegonensis]*) (MCB Camp Pendleton 2007a). In the vicinity of the project areas, the Riverside Fairy Shrimp is known to occur in vernal pools outside CAL Site 13 and in CAL Site 23 and within DZ Tank Park (Figure 6.1.14-2). However, fairy shrimp surveys are ongoing, and this species has the potential of occurring in any vernal pool habitat including those that have not had protocol shrimp inventories conducted.

SAN DIEGO FAIRY SHRIMP

The San Diego fairy shrimp (*Branchinecta sandiegonensis*) was federally listed as endangered on 3 February 1997 (USFWS 1997a). Critical habitat (4,025 acres) for the San Diego fairy shrimp was designated on 23 October 2000 (USFWS 2000a). On 11 June 2002, the U.S. District Court for the Central District of California granted the Service's request for a remand of the San Diego fairy shrimp critical habitat designation. Existing critical habitat designated for the San Diego fairy shrimp remains in place until such time as a new, final regulation becomes effective. However, critical habitat designation can be exempted for military installations where the USFWS determines

that the approved INRMP (2007) for the installation provides a benefit to the species. As a result, there is no critical habitat designated for this species on MCB Camp Pendleton. The San Diego fairy shrimp is included in the approved recovery plan for the listed species of southern California vernal pools (USFWS 1998a).

The San Diego fairy shrimp is a small freshwater shrimp that occurs in vernal pools. Vernal pools are seasonal shallow pools that are filled by winter and spring rains that usually begin in November and continue into April or May. The San Diego fairy shrimp is a small, delicate freshwater shrimp with large stalked compound eyes, no carapace, and 11 pairs of swimming legs. Adult male San Diego fairy shrimp range in length from 0.4 to 0.6 inches and the females are 0.4 to 0.5 inches long. San Diego fairy shrimp are threatened by loss and degradation of habitat due to urbanization. The San Diego fairy shrimp is threatened by habitat destruction from urban and water development, flood control, highway and utility projects, as well as conversion of wildlands to agricultural use. Changes in hydrologic pattern, overgrazing, and off-road vehicle activity also imperil this species (MCB Camp Pendleton 2007a).

San Diego fairy shrimp are restricted to vernal pools in coastal southern California south to extreme northwestern Baja California, with San Diego County supporting the largest number of remaining occupied vernal pools (USFWS 2000a). The USFWS (2000a) estimated at the time of listing that fewer than 200 acres of occupied vernal pool habitat remained in San Diego County, of which an estimated 70 percent was estimated to occur on DoD lands (USFWS 2003b). The San Diego fairy shrimp is found in San Diego County from MCB Camp Pendleton, inland to Ramona, and south through Del Mar Mesa, Kearney Mesa, Proctor Valley, and Otay Mesa, and into northwestern Baja California, Mexico. In Baja California, it has been recorded at two localities (Valle de las Palmas south of Tecate and Baja Mar, north of Ensenada). Small populations occur in Orange County, and a single isolated female was reported from a vernal pool in Isla Vista, Santa Barbara County, California (USFWS 1998b). On MCB Camp Pendleton, the San Diego fairy shrimp shares the same coastal strip distribution as the Riverside fairy shrimp. However, within this limited range, especially in the southwestern part of the base, the San Diego fairy shrimp occurs more often than either Lindahl's fairy shrimp (*Branchinecta lindahli)* or Riverside fairy shrimp. On-base, San Diego fairy shrimp appears to be locally abundant in natural vernal pools and in man-made pools that have not been disturbed in several seasons (MCB Camp Pendleton 2007a). San Diego fairy shrimp occur primarily in Victor, Oscar One, and Oscar Two training areas and in the Wire Mountain housing area. There are 279 known San Diego fairy shrimp pools on MCB Camp Pendleton. Basewide survey efforts conducted by RECON in the 1997/1998 wet season indicated that 216 pools were occupied by San Diego fairy shrimp, eight of which are also occupied by Riverside fairy shrimp (MCB Camp Pendleton 2007a). In the vicinity of the project areas, the San Diego Fairy Shrimp is known to occur in vernal pools in CAL Site 23 and DZ Tank Park, and near PAD 1 (Figure 6.1.14-2). However, fairy shrimp surveys are ongoing, and this species has the potential of occurring in any vernal pool habitat including those that have not been mapped.

TIDEWATER GOBY

The tidewater goby (*Eucyclogobius newberryi*) was federally listed as an endangered species by the USFWS on 4 February 1994 (USFWS 1994e). On 20 November 2000, the USFWS designated ten coastal stream segments, totaling approximately nine linear miles of rivers, streams, and estuaries in Orange and San Diego Counties as critical habitat for the tidewater goby (USFWS 2000d) including 1,014 acres on MCB Camp Pendleton, 39 acres of which occur on lands leased from the

base. On 28 November 2006, the USFWS proposed to exclude critical habitat designation for the tidewater goby on MCB Camp Pendleton (USFWS 2006a) in accordance with Section 4(a)(3)(B)(i) of the ESA. The installation has prepared and maintains a current INRMP, and critical habitat designation can be exempted for military installations where the USFWS determines that the approved INRMP for the installation provides a benefit to the species. As a result, there is no critical habitat designated for tidewater goby on MCB Camp Pendleton. A final recovery plan for the tidewater goby was published in December 2005 (USFWS 2005d).

The tidewater goby is a small fish, rarely exceeding 2 inches in length and is characterized by large pectoral fins, a blunt elongated tail, and a ventral sucker-like disk formed by the complete fusion of the pelvic fins (USFWS 2005d). The goby's body is a mottled dark olive color and is nearly translucent. Tidewater gobies are a California endemic species and are unique in that they are restricted to coastal brackish water habitats (USFWS 2000d). The spawning season of the tidewater goby extends from 1 April to 30 June or possibly as late as November/December. Tidewater gobies primarily feed on small benthic invertebrates, crustaceans, including aquatic insect larvae, snails, and shrimp. Tidewater gobies occupy lagoons, estuaries, or stream mouths, and are absent from areas where the coastline is steep and streams do not form lagoons or estuaries. The major threats affecting the tidewater goby are loss of wetland habitat, flooding and drought (MCB Camp Pendleton, 2007a).

Historically, the tidewater goby ranged from Tillas Slough (mouth of the Smith River, Del Norte County) near the Oregon border to Agua Hedionda Lagoon (northern San Diego County). Overall, gobies are not present in all habitats year-round, and their distribution and density may vary seasonally and spatially. On MCB Camp Pendleton, the extirpation and recolonization of gobies fluctuate yearly between lagoons. Tidewater goby presence/absence surveys are conducted annually in the following lagoons: San Mateo, San Onofre, Las Flores, Hidden, Aliso, French, Cocklebur, and the Santa Margarita (MCB Camp Pendleton 2007a). Within southern California, the San Mateo, San Onofre, and Las Flores Creeks are considered by the USFWS the largest and most persistent populations of tidewater gobies in the region, potentially serving as important source populations for dispersal into ephemeral estuaries and streams in the area (USFWS 2000d). Within MCB Camp Pendleton and in the vicinity of the project area, the tidewater goby is known to occur in the vicinity of CAL Site 23 (Figure 6.1.14-3).

SOUTHERN STEELHEAD

The southern California evolutionarily significant unit (ESU) of the southern steelhead trout (*Oncorhynchus mykiss*) was federally listed as an endangered species by the National Marine Fisheries Service (NMFS) on 18 August 1997 (NMFS 1997) and by the USFWS on 17 June 1998 (USFWS 1998g). On 1 May 2002, the National Oceanic and Atmospheric Administration (NOAA) and NMFS issued a final rule to extend the southern-most range of the southern California steelhead trout from its then southern boundary of Malibu Creek to the U.S./Mexico border (NMFS 2002). Critical habitat was designated for the original southern California ESU of steelhead on 16 February 2000 (NMFS 2000). As the result of a court-approved consent decree, the NMFS issued a final rule effective 30 April 2002, that removed critical habitat designations for 19 salmon and steelhead ESUs that included the southern California steelhead trout (NMFS 2003). On 2 September 2005, NOAA and NMFS published a final rule designation of critical habitat for the steelhead in California (NMFS 2005). Critical habitat was not proposed for designation on MCB Camp Pendleton. The installation has prepared and maintains a current INRMP, and critical habitat designation can be exempted for military installations

where the USFWS determines that the approved INRMP for the installation provides a benefit to the species. There is no critical habitat for southern steelhead on MCB Camp Pendleton.

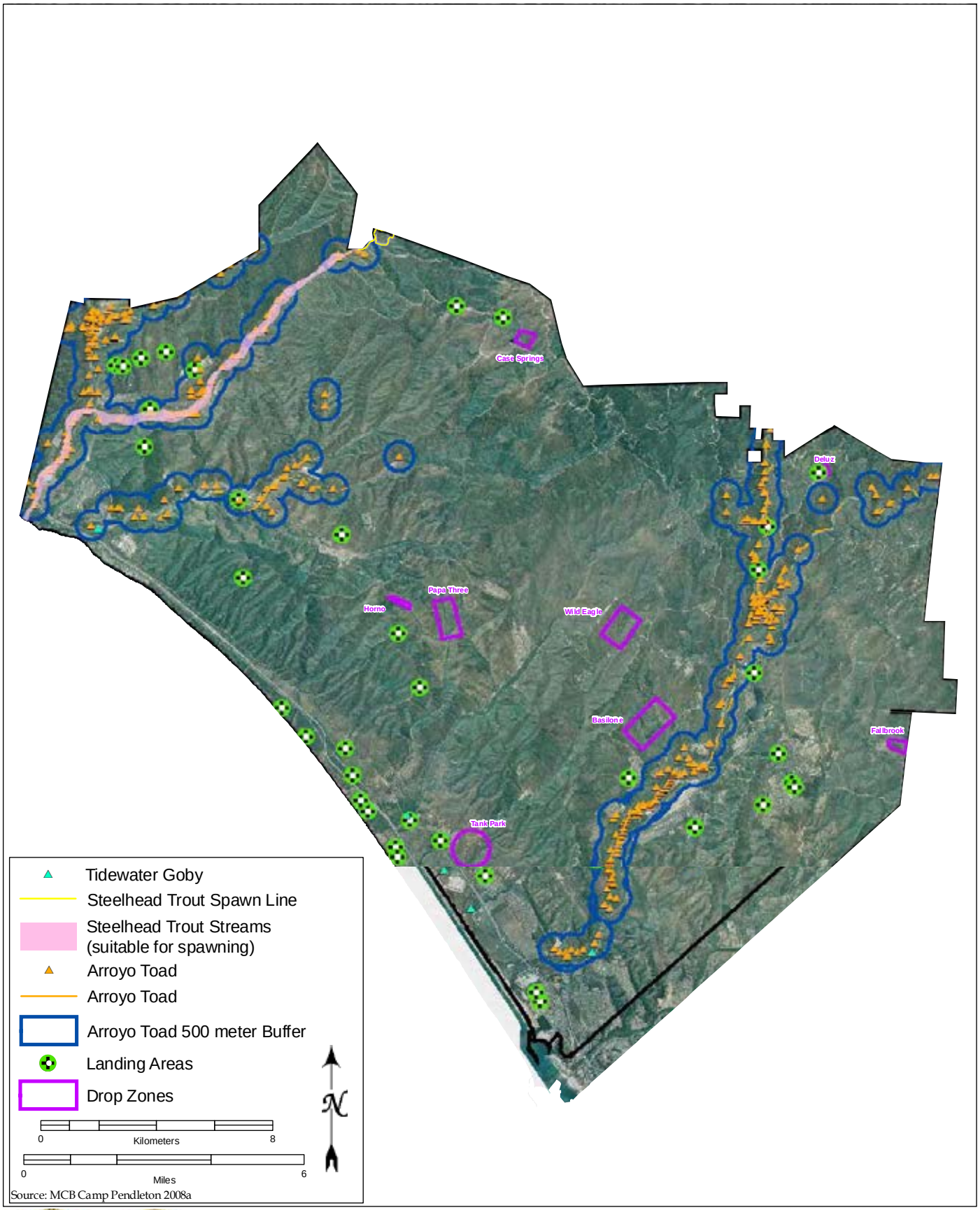
Steelhead are sea-run rainbow trout with an average length of 20 to 30 inches. A mature steelhead weighs approximately eight to nine pounds but can reach as much as 36 pounds. The body of the steelhead is somewhat compressed with a rounded snout and a large mouth. The spawning male experiences minor changes to its head, mouth and color. Typically, steelhead migrate to marine waters after spending one to four years in freshwater and spawn between December and June in southern California when seasonal streams have adequate flow volumes. The major threat affecting the southern steelhead trout populations is loss of watershed habitat either from development, blocked access to headwater spawning areas, and dewatering of streams by diversions and groundwater pumping.

Historically, the steelhead ranged throughout the eastern Pacific Ocean from the Kuskokwim River in Alaska to the Rio del Presidio in Baja California. Southern steelhead (those occurring south of San Francisco Bay) were formerly found in coastal drainages as far south as the Santo Domingo River in northern Baja California and were present in streams and rivers of Los Angeles, Orange, and San Diego counties (McEwan and Jackson 1996). In 1946, Hubbs reported steelhead making runs in San Mateo, San Onofre, and San Juan Creeks and in the San Diego, San Luis Rey, and Tijuana Rivers of Orange and San Diego Counties (McEwan and Jackson 1996). Presently, the species distribution extends from the Kamchatka Peninsula, east and south along the Pacific coast of North America, to at least San Mateo Creek on MCB Camp Pendleton. Steelhead had thought to be extirpated from much

of its historic range in southern California; in fact, the San Mateo Creek population had previously been classified by some researchers as extinct (MCB Camp Pendleton 2007a). In 1999, the first reoccurrence of a juvenile steelhead was observed in San Mateo Creek (CDFG 2000b). Between 3 March and 3 September 1999, 78 steelhead/rainbow trout observations were made (CDFG 2000b). In 2000, the numbers of steelhead observed declined from 3 adults and 17 juveniles observed in June to only one juvenile seen in November (MCB Camp Pendleton 2007a). In cooperation with NMFS and CDFG, existing pools were monitored beginning in summer 2001 and throughout 2002 to determine if trout were able to survive in San Mateo Creek (MCB Camp Pendleton 2007a). Steelhead are almost completely extirpated from coastal watersheds south of Malibu Creek, with the exception of their recent observations in Topanga Creek and San Mateo Creek, and they occur only sporadically or in extremely low abundance in those streams. As discussed previously, most of the coastal rivers and streams south of Malibu Creek are highly impacted or modified and no longer support steelhead. In the vicinity of the project areas, the southern steelhead trout is a known occupant of San Mateo Creek. LZ 62 is about 100 meters north of San Mateo Creek (Figure 6.1.14-3).

ARROYO TOAD

A detailed description of the Arroyo toad (*Anaxyrus [Bufo] californicus*) is provided in the *Sensitive Species* discussion under section 4.14.1 (MCAS Camp Pendleton Basing Alternatives). As stated in that section, the arroyo toad is typically associated with gravelly or sandy washes, stream banks, riverbanks, and arroyos and their adjacent uplands. Breeding activity has been observed from February to June depending on temperature and precipitation (Sullivan 1992; Sweet 1993).



Known Occurences for Listed Fish Species and Arroyo Toad on MCB Camp Pendleton

FIGURE

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Breeding occurs in quiet, clear backwaters of streams as waters recede from the floods of the wet season. Adult toads spend the fall and early winter months in burrows in upland habitats near washes and streams. Burrows are shallow, and are usually located in sandy soils on terraces adjacent to streams (USFWS 1994c).

According to Holland and Sisk (2000) and the *Proceedings of the 2000 California Arroyo Toad Symposium* held at MCB Camp Pendleton, occupied upland habitat can extend 3,937 to 4,921 feet (1,200 to 1,500 meters) from the riparian-upland ecotone; however, upland habitat use is poorly understood. January to September is the most active period.

Within MCB Camp Pendleton and in the vicinity of the project area, the arroyo toad is known to occur in several of the major streams and tributaries including the Santa Margarita River, San Onofre Creek, and San Mateo Creek watersheds. Project areas CAL Site 1, CAL Site 3, and CAL Site 4 are within the 300 meters buffer for Arroyo toad and sites HLZ, HOLF, LZ 27, LZ 33, LZ 52, LZ 62, and DZ Deluz project areas are near habitat for this species (Figure 6.1.14-3).

COASTAL CALIFORNIA GNATCATCHER

A detailed description of the coastal California gnatcatcher (*Polioptila californica*) is provided in the *Sensitive Species* discussion in section 4.14 (MCAS Camp Pendleton). On MCB Camp Pendleton, the coastal California gnatcatcher's distribution extends from the north end to the south end of the base and inland where the appropriate habitat occurs. Occupied gnatcatcher habitat is contiguous from the northern boundary along the coast to the southern part of the base. Concentrations exist in the northern (State Park), coastal, and southern (inland) areas. The gnatcatcher occurs almost exclusively in the coastal sage community, but can also be found in adjacent chaparral and riparian habitats. The breeding season of the gnatcatcher extends from late February through July, with peak nesting activities occurring from mid-March through May. Over the years intensive survey efforts on MCB Camp Pendleton have resulted in an increase in known gnatcatcher populations. The 2006 population of gnatcatchers included 642 pairs in 805 locations (2003 population included 286 pairs at 316 locations); however, gnatcatchers are known to be susceptible to substantial variability in population size based on weather-related phenomena (Griffith Wildlife Biology 2008).

In the vicinity of the project areas, the California gnatcatcher habitat occurs within or near many of the project areas (Figure 6.1.14-4): CAL Sites 1 ,2, 14, 15, 20, 21, 23, LZ 27, LZ Red Beach, PAD 2, STOL 101, DZ Basilone (eastern half) and DZ Tank Park; and near CAL Site 16 (west), CAL Site 22 (east and west borders), HLZ (surrounding), LHD PAD (100 meters south), LZ 12 (northwest), LZ 16 (50 meters north, west and south), LZ 41, and DZ Deluz (southwest edge).

LEAST BELL'S VIREO

A detailed description of the least Bell's vireo (*Vireo bellii pusillus*) is provided in the *Sensitive Species* discussion under section 4.14.1 (MCAS Camp Pendleton Basing Alternatives). On MCB Camp Pendleton, the least Bell's vireo arrives in the area from mid-March to early April and leaves for its wintering ground in southern Baja California in August (Franzreb 1989). Vireos primarily inhabit dense willow-dominated riparian habitats with lush understory vegetation, nesting three to four feet (1 to 1.2 meters) above the ground in understory and using taller trees for foraging and singing perches (Salata 1981). Vireos nesting on the edge of riparian habitat or in riparian corridors less

than 150 feet (46 meters) wide have been observed foraging up to 180 feet (55 km) away from the willow-riparian edge in coastal sage scrub and chaparral (Kus and Miner 1989).

On MCB Camp Pendleton, least Bells' vireo habitat is found in most of the creeks or drainages that support riparian habitat (Figure 6.1.14-5). It is found in the following sites: CAL Site 1, CAL Site 2, CAL Site 3, CAL Site 4, CAL Site 23, LZ 52, DZ PAPA 3, and DZ Tank Park (east side); and in riparian areas near the HOLF, LZ 27 (500 meters south), LZ 33 (150 meters south), LZ 41 (200 meters south), LZ 53 (500 meters south), LZ 62 (south), LZ Red Beach (Las Flores Canyon), PAD 2, DZ Basilone (northeast edge), and DZ Wild Eagle (east and south).

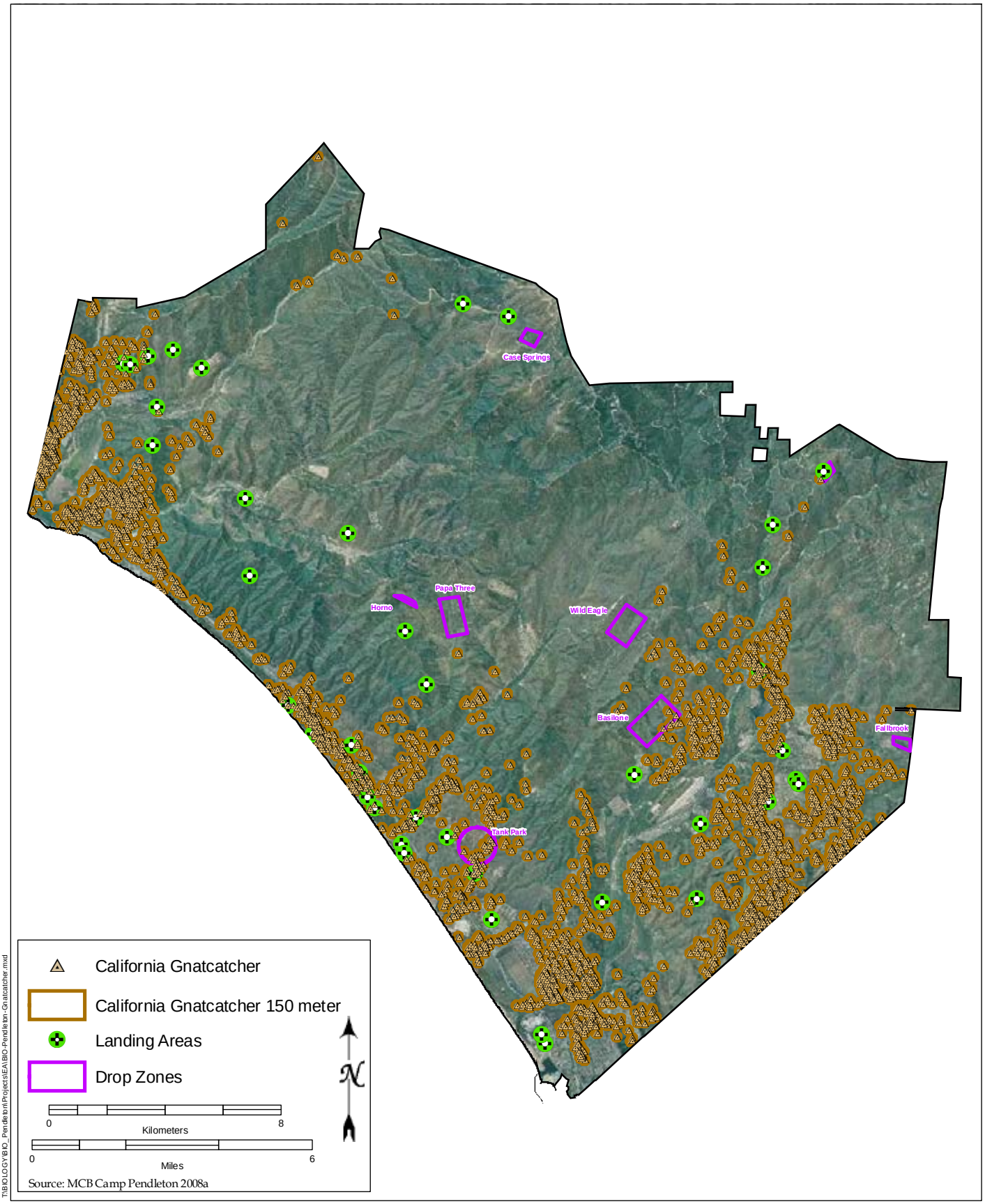
SOUTHWESTERN WILLOW FLYCATCHER

A detailed description of the southwestern willow flycatcher (*Empidonax traillii extimus*) is provided in the *Sensitive Species* discussion under section 4.14.1 (MCAS Camp Pendleton Basing Alternatives). The southwestern willow flycatcher is a neotropical migrant. It arrives in breeding habitat as early as mid-May and may be present until mid-August. The breeding range of this flycatcher extends from southern California, east to western Texas, north to extreme southern Utah and Nevada, and south to extreme northern Baja California del Norte and Sonora (Unitt 1984). This species inhabits riparian areas along rivers, streams, and other wetlands. It nests in typically even-aged, structurally homogeneous, dense stands of trees and shrubs approximately 13 to 23 feet (4 to 7 meters) tall with a high percentage of canopy cover and dense foliage from 0 to 13 feet (0 to 4 meters) above the ground (Brown 1988; Sedgewick and Knopf 1992) often near standing water (Zeiner et al. 1990). Nesting willow flycatchers in San Diego County prefer willow and mulefat (*Baccharis* spp.) thickets (Unitt 1987) and invariably nest near surface water or saturated soil (Philips et al. 1964). A much broader range of vegetation can be used during migration and outside of the breeding season (Unitt 1987).

Suitable habitat occurs throughout the riparian communities on MCB Camp Pendleton and the Southwest willow flycatcher potentially occurs in many of the creek and drainages that support dense willow and mulefat habitat. Breeding has only been consistently observed on the Santa Margarita River; however, isolated incidents of breeding have occurred on San Mateo and Las Pulgas Creeks. While transient willow flycatchers can be observed in riparian areas throughout the MCB Camp Pendleton, typically these birds cannot be identified to subspecies, and it is therefore unknown how many of the observed willow flycatchers are indeed Southwestern Willow Flycatchers. Known occurrences of this species occur in CAL Site 1 and near CAL Site 23, and LZ 62 (south) (Figure 6.1.14-4).

CALIFORNIA LEAST TERN

The California least tern (*Sternula antillarum browni*) was federally listed as an endangered species by the USFWS in 1970 (USFWS 1970a, 1970b). On 14 February 2007, the USFWS announced completion of a 5-year review for the California least tern and 11 other species under section 4 (c)(2)(B) of the ESA to ensure that the classification of a species as threatened or endangered on the List of Endangered and Threatened Wildlife and Plants is accurate and based on the best scientific and commercial data. Based on the review, the California least tern was recommended for reclassification to downlist from endangered to threatened status (USFWS 2006c). No critical habitat has been designated for this species, and the recovery plan has been revised several times (USFWS 1980, 1985a).



Known Occurences for Coastal California Gnatcatcher on MCB Camp Pendleton

FIGURE

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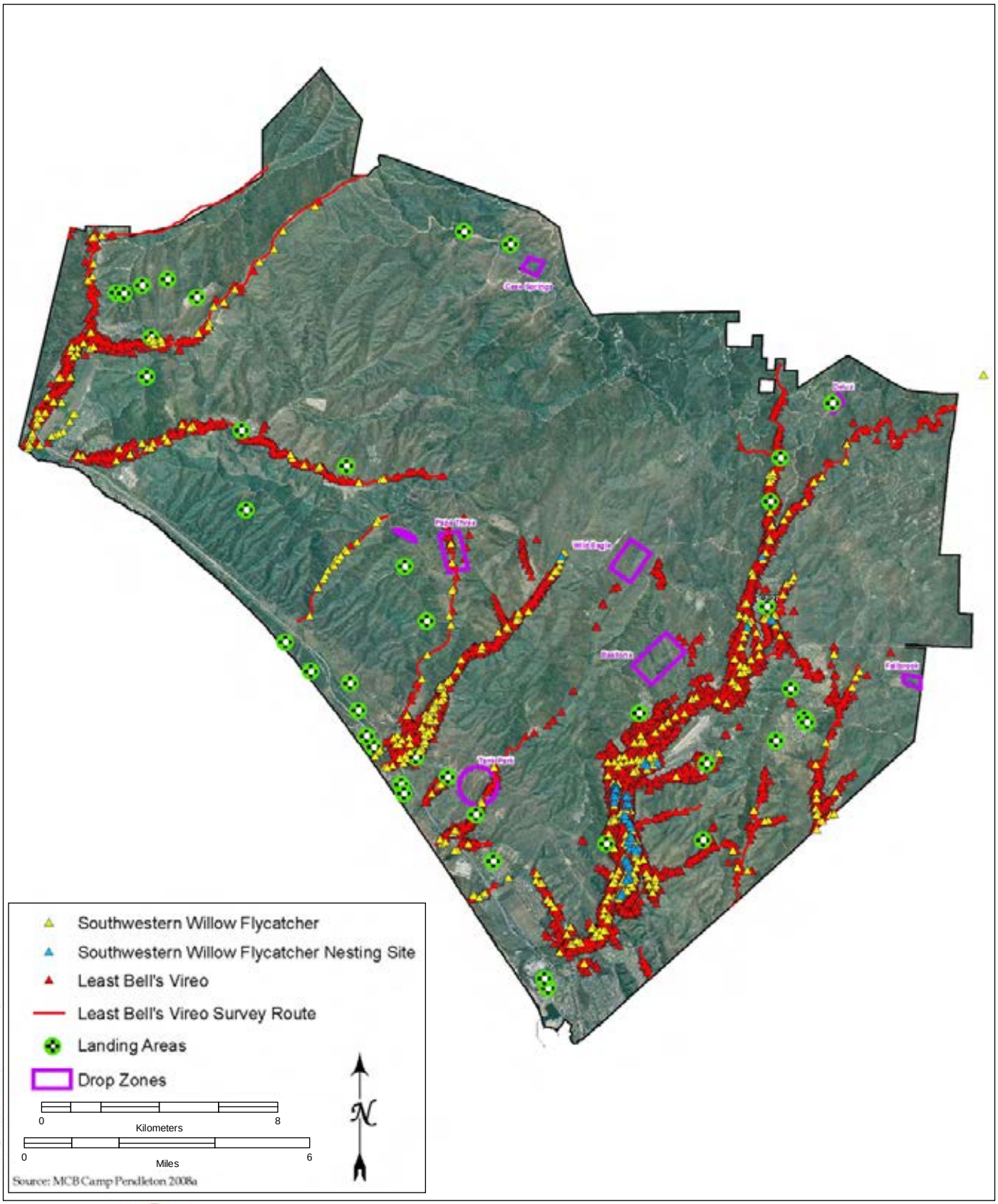

Known Occurrences for Least Bell's Vireo and Southwestern Willow Flycatcher on MCB Camp Pendleton

FIGURE

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Least terns are the smallest members of North American terns measuring about nine inches long with a 20-inch wingspan. The least tern has a distinctive black cap and loral stripe contrasting with a white forehead. The remaining upperparts are gray with white underparts. In flight, a black wedge on the outer primaries is conspicuous, also the short, deeply forked tail. It has a dark-tipped, orange-yellow bill and orange-yellow legs. The sexes are similar except the loral stripe is wider in the male (MCB Camp Pendleton 2007a).

The California least tern is a migratory bird that historically nested in large beach colonies along the coastline from southern Baja, Mexico to central coastal California. Over time, California least tern nesting habitat has been drastically reduced as a result of regional urbanization. Nesting is currently limited to San Francisco Bay and areas along the coast from San Luis Obispo County to San Diego County. The largest concentrations of breeding pairs nest in Los Angeles, Orange, and San Diego Counties. During the 1973 listing, the statewide tern population totaled 625 pairs (Obst and Johnston 1992 in Caffrey 1993). Since then, intensive management practices have resulted in an increase in the tern population; in 1992 the statewide tern population was up to 2,106 nesting pairs (MCB Camp Pendleton 2007b; Caffrey 1993) and in 2003 a statewide record-high total of 6,688 pairs was reported, which represents more than twice the average annual breeding population size seen during the mid-1990s (California EPA 2004).

The California least tern was first documented nesting on-base in 1969 and has been documented on-base continuously since then to the present. Typically, terns arrive in mid- April and depart by September (MCB Camp Pendleton 2007b). This small migratory tern nests colonially on undisturbed, sparsely vegetated and flat areas with loose, sandy, or saltpan substrate. On MCB Camp Pendleton, California least tern nesting sites are located on the beaches at the mouths of the Santa Margarita River (Blue Beach), North Beach, French, and Aliso Creeks (White Beach). Nesting also occurs on the salt flats of the Santa Margarita Estuary. In 2002 the California least tern population totaled 584 pairs on MCB Camp Pendleton (Foster 2008). More recent surveys in 2004 and 2005 identified the number of nesting pairs at MCB Camp Pendleton as 1,355 and 1,348 respectively. With the exception of a couple of years, the number of nesting attempts at MCB Camp Pendleton sites increased dramatically between 1995 and 2005, from 420 to 1,663 attempts (Foster 2008). The base's management efforts since 1988 have coincided with an increase in the nesting populations on-base and the nesting colony at MCB Camp Pendleton continues to be the largest in the state. In the vicinity of the project areas, LZ 21 is the only landing site in the vicinity of a California Least Tern nesting colony (Figure 6.1.14-6).

WESTERN SNOWY PLOVER

The western snowy plover (*Charadrius alexandrinus nivosus*) was listed by the USFWS as threatened on 5 March 1993 (USFWS 1993c). Critical habitat for the western snowy plover was published on 7 December 1999 (USFWS 1999b), and no critical habitat was designated within the base boundary. On 17 December 2004, (USFWS 2004b) the USFWS published a proposal to designate critical habitat for the Pacific coast distinct population segment of the western snowy plover, pursuant to a court order issued in July 2003. The court order partially vacated critical habitat established for the Pacific coast population of the western snowy plover and remanded the previous designation of critical habitat for preparation of a new analysis of the economic impacts (Coos County Board of County Commissioners et al. v. Department of the Interior et al.). On 29 September 2005, the USFWS published a final rule designating critical habitat for the Pacific coast population of the western snowy plover (USFWS 2005e). Additionally, the snowy plover is protected by the MBTA. On 20 February 2004, the USFWS

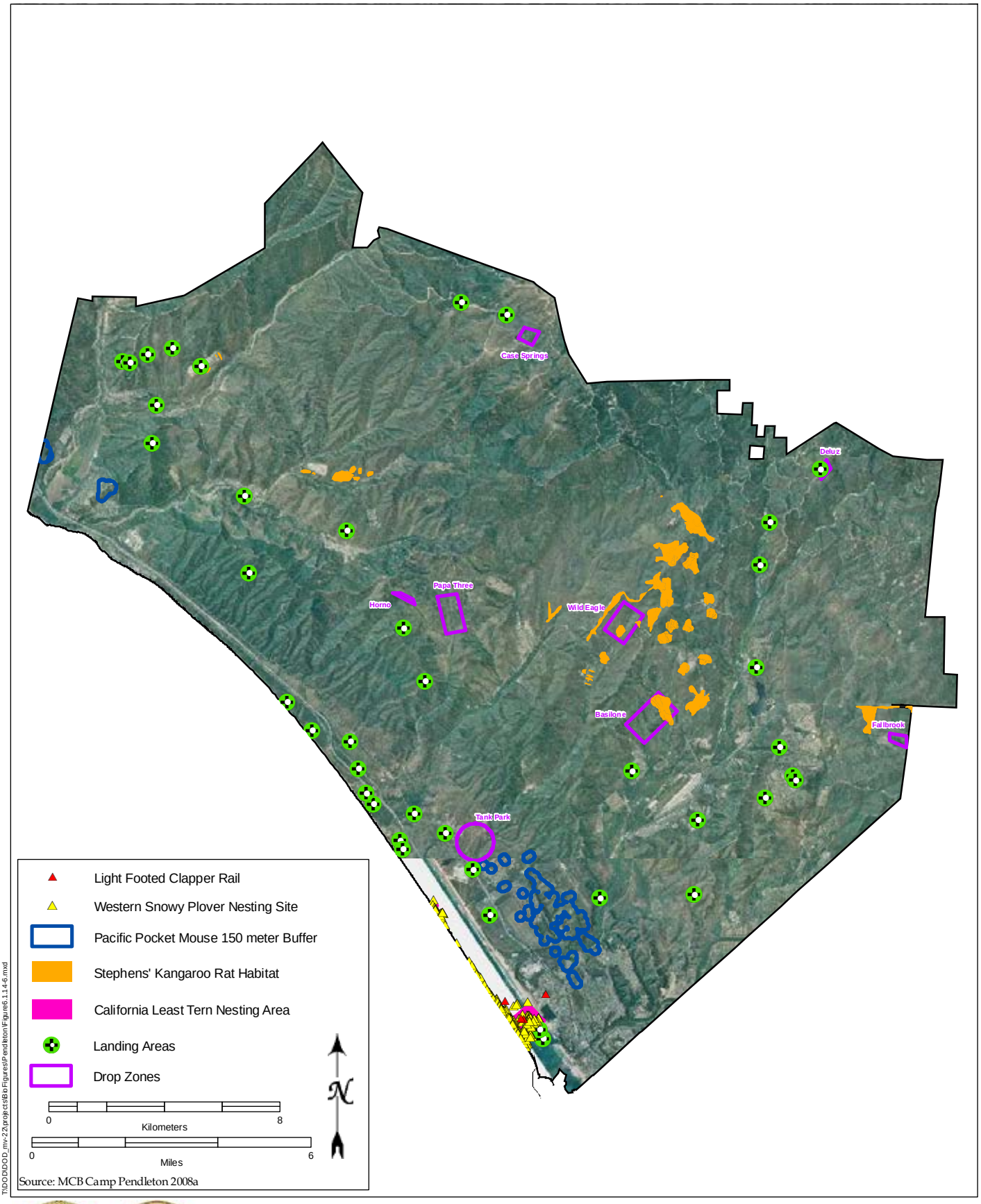
announced a 90-day finding on a petition to remove the Pacific coast population of the western snowy plover from the Federal List of Threatened and Endangered Wildlife and Plants (USFWS 2004c). The USFWS found that the petition presents substantial information that delisting the Pacific coast population of the western snowy plover may be warranted, and initiated a status review.

On 21 April 2006, the USFWS announced a 12-month finding on the petition to remove the Pacific coast population of the western snowy plover from the Federal List of Threatened and Endangered Wildlife pursuant to the ESA of 1973, as amended. After reviewing the best scientific and commercial information, the USFWS found that the petitioned action is *not* warranted (USFWS 2006b). Thus, the western snowy plover continues to qualify as a threatened species under the ESA. The only critical habitat for snowy plover on MCB Camp Pendleton is a small block of habitat on the State Park lease at the north end of the base. All other critical habitat has been excluded from MCB Camp Pendleton per Section 4(a)(3)(B)(i) of the ESA.

The western snowy plover is a small shorebird (length six inches), pale in color, with a thin dark bill, dark or grayish legs, partial breast band and a dark ear patch. Females and juveniles may be confused with piping plover but have a much thinner bill and darker legs. They forage above the mean high-water line of coastal beaches, gathering invertebrates from sand surface, kelp, marine-mammal carcasses, or low foredune vegetation. Typical breeding season occurs from 1 March through 15 September. Factors contributing to the decline of the western snowy plover are attributed to predation, loss of habitat and human disturbance (MCB Camp Pendleton 2007a).

The western snowy plover breeds on the Pacific coast from southern Washington to southern Baja California, Mexico, and in interior areas of Oregon, California, Nevada, Utah, New Mexico, Colorado, Kansas, Oklahoma, and north-central Texas, as well as coastal areas of Texas and possibly northeastern Mexico. The Pacific coast population of the western snowy plover is genetically isolated from western snowy plovers breeding in the interior (USFWS 1993c). The Pacific coast population of the western snowy plover is defined as those individuals that nest adjacent to or near tidal waters and includes all nesting colonies on the mainland coast, peninsulas,offshore islands, adjacent bays, and estuaries (USFWS 1993c). The coastal population of the western snowy plover consists of both resident and migratory birds; some birds winter in the same areas used for breeding (USFWS 1993c). Migratory individuals of the coastal western snowy plover travel either north or south within their coastal range. Typical breeding season occurs between 1 March and 15 September. Two main breeding sites exist for the western snowy plover in San Diego County, including MCB Camp Pendleton and the Silver Strand. Other breeding sites include Batiquitos Lagoon, San Elijo Lagoon, Mariner's Point (Mission Bay), Sweetwater River Estuary, Chula Vista Wildlife Reserve, and the Tijuana River mouth (Unitt 2004). Within San Diego County, 72 to 87 percent of snowy plover nests were located on federal properties from 1994 to 1997; the majorities were located on military bases. Nesting sites on MCB Camp Pendleton include Aliso Beach (White), Cocklebur Beach, North Beach (North), North Beach (South), and South Beach (MCB Camp Pendleton 2007a). A recently completed report of the 2005 nesting season identified 169 snowy plover nests containing 473 eggs (Foster 2007).

In the vicinity of the project areas, LZ 21 is the only landing site that is in the vicinity of a known nesting colony for western snowy plover (Figure 6.1.14-6).



Known Occurrences for California Least Tern, Western Snowy Plover, Light-footed Clapper Rail, Stephen's Kangaroo Rat and Pacific Pocket Mouse on MCB Camp Pendleton

FIGURE

6.1.14-6

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LIGHT-FOOTED CLAPPER RAIL

The light-footed clapper rail (*Rallus longirostris levipes*) was federally listed as an endangered species by the USFWS on 13 October 1970 (USFWS 1970b). No critical habitat has been designated for this species; however, a recovery plan is available (USFWS 1985b).

The light-footed clapper rail is a bird with a deep cinnamon breast and darker flanks and back. It has long legs and bill, a short, upturned tail, and barred flanks. It is a resident of salt marshes in coastal wetlands. It is a non-migratory species, and the site tenacity of adults is high (Unitt 2004).

The breeding season of the light-footed clapper rail extends from 1 March through 15 September. The decline of the light-footed clapper rail is attributed to loss of habitat in coastal marshes and estuaries, human disturbance and predation.

The light-footed clapper rail inhabits salt marshes along the coast between Santa Barbara, California, and the San Quintin Bay, Baja California Sur, Mexico. In California, Newport Bay in Orange County supports the largest numbers of light-footed clapper rails, about 47 percent of the state breeding population in 2002 (MCB Camp Pendleton 2007a). In San Diego County, the light-footed clapper rail numbers only about 100 pairs and the sites where Zembal has found the light-footed clapper rail, from north to south, are as follows: Cocklebur Canyon mouth, Santa Margarita River estuary, San Luis Rey River mouth, Guajome, Buena Vista Lagoon, Agua Hedionda Lagoon, Batiquitos Lagoon, San Elijo Lagoon, San Dieguito River estuary, Los Peñasquitos Lagoon, Kendall- Frost Marsh (Mission Bay), San Diego River flood-control channel, Famosa Slough, Paradise Creek marsh, Sweetwater River estuary (including E and F Street marshes), J Street marsh, Otay River mouth, South Bay Marine Biology Study Area, Tijuana River estuary and the Dairy Mart ponds (Unitt 2004). On MCB Camp Pendleton, light-footed clapper rails have been historically detected in the Santa Margarita River mouth (1982-1988), Cocklebur Canyon mouth (1982), and Las Flores Marsh (1983) (Zembal et al. 1984); however, total sightings on-base were never greater than three pairs for a single survey season from 1982 to 1988. More recently, four marshes/estuaries were surveyed on-base: San Mateo Creek mouth, Las Flores Marsh, Cocklebur Canyon mouth and the Santa Margarita Lagoon based on the availability of potentially suitable habitat. From 2002-2006, one to two pairs were observed in the Santa Margarita Lagoon and, in 2008, one pair was observed just south of the Santa Margarita River mouth (MCB Camp Pendleton 2007a; Kershner, personal communication 2008).

In the vicinity of the project areas, the estuary near LZ-21 provides habitat for the light-footed clapper rail (Figure 6.1.14-6).

STEPHENS' KANGAROO RAT

The USFWS designated the Stephens' kangaroo rat (*Dipodomys stephensi*) as endangered on 30 September 1988 (USFWS 1988). Critical habitat has not been designated for this species, nor has a final recovery plan been approved. A draft recovery plan is, however, available (USFWS 1997c).

The Stephens' kangaroo rat *(Dipodomys stephensi)* is a small burrowing nocturnal rodent and like other kangaroo rats, it has a large head, external fur-lined cheek pouches used for transporting seeds to safe caches, elongated rear legs used for jumping, and relatively small front legs. The front feet are frequently used to hold seeds that the animal eats. The average adult Stephens' kangaroo rat is 11 to 12 inches in length including the tail and weighs 2.3 ounces. Like all kangaroo rats, this

species is nocturnal, spending the day in underground burrows and foraging on the surface at night. The breeding season of the Stephens' kangaroo rat extends from 1 March through 30 September. Threats to the Stephens' kangaroo rat are attributed to agricultural and urban development that reduce and fragment available habitat (MCB Camp Pendleton 2007a).

The Stephens' kangaroo rat has a regional distribution extending along the San Jacinto Valley of San Diego, Riverside, and San Bernardino counties. Numerous small, fragmented populations scattered across a range of approximately 1,100 square miles characterize this distribution. The Stephens' kangaroo rat requires sparse coastal sage scrub and grassland. Moderate human disturbances (e.g., certain grazing regimes, brush removal, mowing, and fires) can benefit Stephens' kangaroo rat habitat by maintaining sparse shrub growth. The Stephens' kangaroo rat is frequently found in close association with dirt roads, previously and currently disturbed areas, and/or other sites with a high percentage of bare ground (USFWS 1997c). The Stephens' kangaroo rat has been recorded in northwestern San Diego County. A previously unknown population of the kangaroo rat was discovered in the Ramona Valley, San Diego County in October 1997. The Stephens' kangaroo rat occurs on-base in the following areas: Juliett, Kilo One, Kilo Two, Range 407-1, Range 407-2, Range 408-1, and Range 409-1. Habitat for this species is found near the HOLF (west and south of runway), DZ Wild Eagle (within 100 meters west and north of boundary, and also in a small portion of the eastern boundary) and DZ Basilone (Figure 6.1.14-6). Stephens' kangaroo rat was historically found near the HOLF, although latest trapping efforts did not detect any (Evans, personal communication 2008).

PACIFIC POCKET MOUSE

The USFWS emergency listed the Pacific pocket mouse (*Perognathus longimembris pacificus*) as endangered on 3 February 1994 (USFWS 1994f) and published the final listing on 29 September 1994 (USFWS 1994f).

The Pacific pocket mouse is a small (4.4 to 5.4 inches total length), pink-buff pocket mouse. The pouches are external to its body. The tail is bicolored. Pocket mice tend to be found on soils of fine, alluvial sands near the ocean. The breeding season of the Pacific pocket mouse extends from 1 April to 31 August. Loss of habitat from urban development, fire, and predation from domesticated cats are the primary threats to the Pacific pocket mouse (MCB Camp Pendleton 2007a).

Historically, Pacific pocket mouse occurred within about 3 km of the coast of southern California, from Marina Del Rey and El Segundo in Los Angeles County south to the vicinity of the Mexican border in San Diego County. Within its range, the Pacific pocket mouse has a much-localized distribution on suitable habitat. Currently, it is only known at a single location at Dana Point, California and at three general locations on MCB Camp Pendleton in the following areas: the Oscar One and Edson Range training areas, east of the San Onofre housing area (San Mateo South), and in the northwest corner of the base between the base boundary with San Clemente and Cristianitos Road (San Mateo North) (MCB Camp Pendleton 2007a).

In the vicinity of the project areas, the Pacific pocket mouse is known to occur within the southeast edge of the DZ Tank Park site, and it is found near CAL Site 1 (500 meters west and southwest) and PAD 2 (northwest) (Figure 6.1.14-6).

OTHER SENSITIVE SPECIES

Several sensitive but not federal or state listed species are also known to occur on MCB Camp Pendleton. These species are expected to occur predominantly within the native habitats such as native grassland, coastal scrub, and riparian corridors, and individuals of these species may be present in or adjacent to the proposed project areas. Species including Brand's phacelia (*Phacelia stellaris*) and Pendleton button-celery (*Eryingium pendletonense*, both California Native Plant Society [CNPS] List 1B species), and the Coastal cactus wren (*Campylorhynchus brunnecapillus*) are non-listed species that have been specifically mapped and/or identified in MCB Camp Pendleton management plans. Populations of Brand's phacelia that were found on the base in 1993 are considered important due to the overall limited distribution of this species (MCB Camp Pendleton 2007a). Brand's phacelia occurs in coastal dunes habitats, which would not be affected by the proposed training operations. Pendleton button-celery occurs only on MCB Camp Pendleton in vernal pools north of the Santa Margarita River. There are currently 818 known populations of this species on the installation and may be present in the vicinity of proposed project components. The coastal cactus wren is a California Species of Concern that occurs in coastal scrub habitat, similar to the California gnatcatcher, except it breeds almost exclusively on *Opuntia* species of cacti. The coastal population of this species (*C. b. sandiegensis*) is considered unique and was proposed for Federal listing in 1990, although it was determined not to meet the definition of a distinct species under the ESA. The Coastal cactus wren has been reported to occur on CAL Site 16 and LZ 27 and near LZs 1, 11, 16, 17, and 63. Golden eagles, a California Species of Concern and Fully Protected Species, are also considered permanent residents with three known nesting pairs occurring on the base (Kershner, personal communication 2008).

Sensitive Habitats

WETLANDS AND OTHER CLEAN WATER ACT REGULATED WATERS

Under the Federal Water Pollution Control Act and subsequent amendments, collectively known as the Clean Water Act (33 USC § 1251 et seq.), wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Executive Order 11990, dated 24 May 1977 and amended by Executive Order 12608 on 9 September 1987, requires federal agencies to minimize the destruction, loss, or degradation of wetlands and to enhance their natural and beneficial values.

Formal project-specific wetland delineations were not completed and not needed specifically for the project areas as there would be no construction or fill of wetlands associated with this activity. However, jurisdictional wetlands and other Clean Water Act regulated waters are present within some of the landing areas and include areas of permanently or seasonally ponded water (such as artificial lakes, vernal pools and isolated ephemeral wetlands), permanent or seasonally flowing streams and drainages, and wetlands associated with streams or drainages.

CRITICAL HABITAT

No proposed or designated critical habitat currently occurs on MCB Camp Pendleton, with the exception of about 40 acres of beach near the mouth of San Mateo Creek. Although important habitat and known populations of several listed species occur on the base, negotiations with the

USFWS through other regulatory processes have resulted in species management on the base without USFWS critical habitat designation. Critical habitat designation can be exempted for military installations where the USFWS determines that the approved INRMP for the installation provides a benefit to the species the species at issue. The 2007 MCB Camp Pendleton INRMP has achieved concurrence from the USFWS, thus the installation is not subject to such designation within its boundaries (MCB Camp Pendleton 2007a, Appendix A).

Established Plans, Measures, and Procedures Applicable to All Training on MCB Camp Pendleton

Because incorporation of the MV-22 into the training environment at MCB Camp Pendleton would occur at previously designated, currently used LZs, CAL sites, and DZs, many general procedures to minimize impacts to biological resources from aircraft operations on MCB Camp Pendleton are already in place and would continue to be implemented as part of the proposed MV-22 training operations. These procedures are derived from existing plans, programs, regulations, and previous consultations between the USMC and USFWS. MCB Camp Pendleton Range and Training Regulations (Base Order P3500.1N) (MCB Camp Pendleton 2008b) would apply to MV-22 operations on MCB Camp Pendleton. The most important measures designed specifically to avoid and minimize impacts to threatened and endangered species are contained in Chapter 2, *Environmental Procedures,* and in Chapter 4, Section 4003.2 (regarding over flight restrictions of endangered species nesting areas).

Avoidance and minimization of impacts are accomplished via the programmatic instructions identified in the USFWS Riparian and Estuarine/Beach BO (Riparian BO, 1-6-95-F-02, dated 30 October 1995), for all training in applicable habitats (i.e., riparian, beach, and estuarine habitats) on MCB Camp Pendleton, such as restricting activities from occurring near breeding areas during species' breeding seasons. These general procedures are made site-specific through the base Environmental Operations Map, where measures such as setbacks and seasonal closures are annotated at specific sites (e.g., LZs), where applicable. In addition to programmatic instructions, physical measures may be enacted to protect sensitive resources, including posting the site.

The site-specific application of these procedures is determined by MCB Camp Pendleton GIS mapping of environmental resources, as shown on the MCB Camp Pendleton's Environmental Operations Map (updated on a semi-annual basis, normally in March and September). As part of the existing Range and Training Regulations (Base Order 3500.1N), "…all users of ranges and training areas are responsible for knowing and adhering to applicable environmental laws and regulations, including, but not limited to, the current Fire Danger Rating and restrictions associated with the environmentally sensitive areas identified on both the Camp Pendleton Military Installation Map and the most current MCB Environmental Operations Map" (MCB Camp Pendleton 2008b). The Environmental Operations Map is referenced during planning for training activities to identify sensitive resources in the field and to ensure that activities are limited to within established boundaries. The MCB Camp Pendleton GIS is continually updated with the acquisition of new data on threatened and endangered species and their habitats.

The MCB Camp Pendleton INRMP (MCB Camp Pendleton 2007a) describes ongoing natural resource management programs as well as long-term goals, objectives, and planned actions. The INRMP notes that the potential impacts of ongoing military training support activities on listed species habitat are infrequent, limited and temporary in nature.

Additionally, MCB Camp Pendleton has developed and implemented habitat-based management and conservation plans for the primary ecosystem types described above including:

- Estuarine/Beach Ecosystem Conservation Plan (MCB Camp Pendleton 2007a, Appendix B)
- Riparian Ecosystem Management Plan (MCB Camp Pendleton 2007a, Appendix C).

The Ecosystem Conservation Plans were developed to promote the conservation of native species and habitats, ensure the sustainability and biological diversity of terrestrial and aquatic ecosystems, and facilitate maximum support of the base's military training mission and infrastructure, while simultaneously ensuring compliance with applicable laws and regulations (MCB Camp Pendleton, 2007a).

The USFWS Riparian and Estuarine/Beach BO (Riparian BO, 1-6-95-F-02) was incorporated into the INRMP, and the consultation for activities in upland areas (Uplands Consultation) is in process and will be incorporated into the INRMP once the consultation is finalized (Letter from USFWS, Appendix A, MCB Camp Pendleton 2007a; sections from the USFWS Riparian BO [1-6-95-F-02], including reasonable and prudent measures and terms and conditions, included in Appendix L, MCB Camp Pendleton 2007a).

The programmatic instructions and pre-established mitigation included in each ecosystem conservation plan encourage avoidance and minimization of impacts to the maximum extent feasible. In addition, each Ecosystem Conservation Plan identifies a Consultation Class System, which is a programmatic approach for directing future consultations on permanent project impacts. Annual reports of activities that affect federally listed threatened or endangered species are sent to the USFWS and the consultation process is triggered if activities exceed a pre-determined impact threshold (defined in the Ecosystem Management Plans) (MCB Camp Pendleton 2007a).

The management of federally listed threatened and endangered species through these plans also allows for the protection of other non-listed species and environments as part of the habitat-based approach. Included in the above-mentioned management plans are USFWS' Terms and Conditions and Reasonable and Prudent Measures resulting from the Section 7 Programmatic Consultation on MCB Camp Pendleton activities affecting the managed environments that support threatened and endangered species. The avoidance, minimization, and compensation measures that are contained in the programmatic instructions of the conservation plans are implemented on an ongoing basis, along with the USFWS's Terms and Conditions and Reasonable and Prudent Measures, and provide guidance on how to avoid and minimize the impacts of training activities.

All project components, as well as all activities that occur on MCB Camp Pendleton, would be conducted in compliance with the MBTA and Executive Order 13186. The MBTA affirms and implements the U.S. commitment to international conventions for the protection of shared migratory bird resources, and prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. Executive Order 13186 directs Federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. On 2 December 2003, the President signed the 2003 National Defense Authorization Act. The Act provides that the Secretary of the Interior shall exercise his/her authority under the MBTA to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during military readiness activities authorized by the Secretary

of Defense. Congress defined military readiness activities as all training and operations of the Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Congress further provided that military readiness activities do not include: (A) the routine operation of installation operating support functions, such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, morale, welfare, and recreation activities, shops, and mess halls; (B) the operation of industrial activities; or (C) the construction or demolition of facilities used for a purpose described in (A) or (B).

On 31 July 2006, the DoD and the USFWS entered into a MOU to Promote the Conservation of Migratory Birds, in accordance with Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds." MCB Camp Pendleton developed an INRMP (2007) to identify and provide management tools for native and protected species and habitats on the installation, including those species projected under the MBTA. Only the training component of the proposed action is a "Military Readiness" activity and therefore incidental take is authorized unless the action jeopardizes bird populations; however, as part of the MOU between USFWS and DoD, all Military Readiness activities shall include conservation measures as part of the NEPA process to minimize and avoid impacts on species protected under the MBTA. These measures are identified at the end of this section and include the avoidance, restoration, and/or enhancement of all sensitive native plant communities that could be affected by proposed projects, seasonal avoidance of nesting birds, avoidance of riparian and wetland habitats, and fuel and fire management.

In addition to these existing practices and procedures, the MV-22 is operated in accordance with the NATOPS training manual. The manual identifies measures and limitations on how the aircraft is flown.

Environmental Consequences

The training component of the proposed action includes the incorporation of the MV-22 into the existing West Coast-based training environment as a replacement for the 1960's era CH-46E medium lift helicopter. The MV-22 would conduct training, readiness, and special exercise operations within Special Use Airspace and on landing areas and other range facilities historically used by the aircraft to be replaced. These sites, listed in Table 6.1.14-1, include both developed and undeveloped landing sites and other range facility locations. Table 6.1.14-3 presents the existing and proposed operational frequency at the different landing and training areas. A detailed presentation of operational frequency is also presented in section 6.1.2, Airspace.

A biological resource impact assessment was conducted for the proposed action and evaluated several factors including magnitude of impact, permanence of impact (permanent loss versus temporary short term/temporary long term), sensitivity of the resource, legal protection of the resource, and existing management of the species, habitat, or community on MCB Camp Pendleton. This assessment is based on a review of all existing data for MCB Camp Pendleton that are included in the installation-wide GIS in rare plant mapping, threatened and endangered species mapping and habitat, as well as recent threatened and endangered species monitoring reports, existing BOs, and other guiding documents that are applicable to all training on-base. No project-specific biological resource surveys were conducted as part of the project.

Table 6.1.14-3. Proposed Change in Annual Operations Resulting from Introduction of the MV-22 to the West Coast[1,2,3]

Landing Area	Addition of MV-22 Operations	Reduction of CH-46 Operations	Change in Operation over Existing Conditions
CAL Sites	165	-1,431	-1,266
Special Sites	11,332	-4,109	7,223
Landing Zones	84	-1,806	-1,722
STOLs	42	-900	-858
Drop Zones	40	-2,025	-1,985

Notes:
1. Change in operations would occur on a squadron by squadron basis beginning in 2010 and ending in 2020.
2. Annual operations at MCB Camp Pendleton are independent of where the aircraft are based on the West Coast and would be a result of the proposed action independent of alternative chosen.
3. Primary change in specific training site use results from differences in training requirements by MV-22 pilots.

Because of the proposed use of existing landing areas and other range facilities (no construction or modifications are proposed), the potential for direct impacts to sensitive biological resources would be related to the change in aircraft (replacement of the CH-46 with the MV-22) and change in frequency of operations at different locations rather than any change in ground-based training operations. For example, impacts evaluated include localized surface disturbance and erosion associated with downdraft from vertical take-offs and landings, visual and noise impacts from aircraft operations, and the potential ignition of vegetation.

Training Range Impacts

VEGETATION

No construction is proposed at any of the LZs/DZs/CAL sites as part of the proposed action at MCB Camp Pendleton; therefore, there would be no direct removal of vegetation at any of the proposed project areas. Incorporation of the MV-22 into the existing training environment at MCB Camp Pendleton would result in the temporary disturbance of loose surface debris and soil caused by downdraft and outwash from moving rotors (collectively known as rotorwash) in the vicinity of take-offs, landings, and near-surface hovering, potentially resulting in an indirect impact to vegetation and soils. Downdraft and outwash forces are relative to the engine power settings and the aircraft's proximity to the ground. Downdraft (and outwash) from the MV-22 would be greater than from the CH-53E (DoN 1998) and CH-46 (Bell Boeing 2008; see Appendix G) at a given height above the ground. Outwash from the MV-22 would reach 50 knots at a distance of 150 feet from the aircraft when hovering at 20 feet above ground level, which is three to four times greater than that associated with the CH-46 (Bell Boeing 2008), the aircraft it is replacing. By comparison, the outwash velocities associated with the CH-53 would be somewhat greater than those of the CH-46, but less than those of the MV-22. Training with the CH-53 would not change as a result of the proposed action. The outwash velocities would rapidly diminish very near the ground surface. As a result, downdraft and outwash from the aircraft during landing, take-offs, and hovering immediately above the ground would temporarily affect vegetation and wildlife habitat in the immediate vicinity of the hovering aircraft.

All existing LZs/DZs/CAL sites proposed for use by the MV-22 consist of native or non-native grassland, disturbed areas, or paved areas in the immediate landing area, surrounded by native habitats or other land uses. Any impact associated with landing would be localized to the open areas, and any woody vegetation and trees would be avoided during landing (to protect the aircraft as well as avoid environmental damage). The training activities would be limited to areas of herbaceous vegetation (e.g., grasses and forbs) which are quick to recover. The training activity would not likely result in uprooting of plants or permanently affect the distribution of plant communities or associated habitats (except in the case of a fire, which is described below). Additionally, the LZs/DZs/CAL sites and other range facilities are already in use and routinely exposed to present-day training activities involving helicopters. Further, replacement of the CH-46E and incorporation of the MV-22 into the training schedule would represent a substantial decrease in the overall number of training activities at undeveloped LZs/DZs/CAL sites, as shown in Table 6.1.14-3 and described below (see also section 6.1.2, Airspace). Ground training associated with the MV-22 would not change from current activities, and methods for avoidance and minimization of impacts to native vegetation resources are addressed in the existing programmatic instructions and Habitat Conservation Plans.

Operation of the MV-22, itself, has not been identified as a cause of frequent fires. A recent DoN review (DoN 2008c) concluded that under normal operations with engine exhaust deflectors operating, the exhaust of the MV-22 should not heat the ground to a temperature high enough to support combustion of plant based materials such as dry grasses. The aircraft operates with the exhaust deflectors on at all times when on the ground. The exhaust deflectors activate as soon as there is weight on the main landing gear wheels. The pilot is not allowed to land in an unprepared LZ if the deflectors are inoperative.

Although available data indicate the unlikelihood of ignition of fires from engine exhaust gases and radiative heating, surface temperatures could be high enough to dehydrate and damage growing vegetation. Any effect would be localized underneath the engine nacelles. Based on the insulating properties of soil, temperatures would be expected to diminish rapidly with depth and very small changes in temperature would be expected at the depth where most roots and underground structures such as bulbs or corms would be located.

According to the DoN review, there has been only one documented fire after 44,000 V-22 flight hours and operations encompassing numerous unprepared LZs, including sites in Alabama, Arizona, California, Florida, Maryland, Nevada, New Mexico, North Carolina, and Virginia. The single fire was caused by a failure of the exhaust deflectors on one engine to operate properly. The deflectors normally divert exhaust gases outward, away from the aircraft and from the ground. Studies of exhaust temperatures with and without deployment of the exhaust deflectors indicate that ground surface temperatures would not reach temperatures required to ignite a variety of natural fuels, including grasses. However, due to the lack of extensive experience with the MV-22 under extreme fire conditions, there is some uncertainty as to the risk of fire associated with MV-22 operations at MCB Camp Pendleton.

At MCB Camp Pendleton, all types of training activities have the potential to start fires due to existing vegetation that is adapted to summer-dry semi arid conditions. Fire potential would be highest in undeveloped areas with an abundance of natural fine fuels (e.g., dry grasses or finely branched shrubs that extend above the ground surface), dry soil, and low fuel moisture content, which may occur frequently during the late summer and fall at MCB Camp Pendleton.

Fire ignitions are most frequent under conditions of low fuel moisture, low relative humidity, high ambient temperatures, and are especially prevalent under Santa Ana conditions, during which dry air masses move from the interior to the coast, typically accompanied by high winds and hot temperatures. If ignition sources are present, the resulting fires are likely to spread rapidly and be difficult to control under Santa Ana conditions, which are most prevalent during the late summer, fall, and early winter months.

Fires associated with training (ordnance use, flares) on MCB Camp Pendleton occur frequently. The use of pyrotechnics and live-fire ammunition during training creates an additional risk of fire occurrence on MCB Camp Pendleton relative to other wildland areas of southern California (MCB Camp Pendleton 2007a). In 2007, there were 57 wildfires on-base, with the majority from military training. The biggest wildfire of 2007 burned 21,000 acres of mostly coastal sage scrub. As a result, a Fire Danger Rating is published each day to assess the risk of wildfires and identifies geographic areas and training activities that are at most risk to start wildfires. Range Control then uses this information to manage day-to-day training operations to reduce the risk of igniting wildfires. For example, Range Control may advise MV-22 operators to touch down only in fuel free zones during Fire Danger Rating 81-100 (Extreme).

Because fires are a common and inevitable result of training on-base, fires and the associated potential loss of natural resources are managed through several plans and orders including Base Order P11320.13D (Fire Protection Regulations and Instructions, MCB Camp Pendleton 2007b), Wildland Fire Management Plan Update (MCB Camp Pendleton 2007b), and MCB Camp Pendleton Range and Training Regulations noted above. Specific pre-suppression activities to manage fires include implementation of the Fire Danger Rating system, maintenance of fuel/firebreaks and access roads, and application of controlled burning. The Fire Danger Rating system is managed by the fire department on-base and includes restrictions on all training activities that have the potential to ignite fires with progressively increasing restrictions at the higher hazard levels such as Orange and Red (high and very high hazard).

WETLANDS AND RIPARIAN AREAS

No project-specific wetland, riparian, or vernal pool mapping was completed for the proposed action; however, no construction, improvements, or other modifications to existing landing areas and other range facilities is proposed. Vernal pools are discussed in detail associated with federally listed vernal pool species below. Introduction of the MV-22 as a replacement for the retiring CH-46 could result in disturbance to wetlands and riparian areas if aircraft landed or dropping personnel or equipment directly into wetlands or riparian areas, which is currently not permitted under existing Range and Training Regulations. Direct impacts to these resources may also occur if downdraft where the aircraft would hover and land results in damage to wetland or riparian vegetation, displaces surface waters (especially in shallow pools) or impacts surface water quality. As noted above under the Vegetation section, rotorwash forces associated with the MV-22 would be greater than the CH-46 and CH-53, which would expand the footprint of the area potentially affected by downdraft and outwash.

However, use of the MV-22, in itself, is not expected to increase the frequency or likelihood of impacts to wetlands or riparian areas or associated habitat because ground training associated with the MV-22 would not change from its current types of activities, and methods for avoidance. Minimization of impacts to wetlands and riparian areas are addressed in the existing Range and

Training Regulations, Riparian BO (Riparian BI, 1-6-95-F-02), and Habitat Conservation Plans. Existing restrictions include airspace restrictions above and laterally (300 feet [approximately 90 meters] above ground level and 980 feet [300 meters] laterally) from endangered species nesting habitat, riparian areas, estuaries and lagoons, and river mouths. Additionally, noise levels are comparable to the CH-46 and the frequency of training would be reduced as part of the proposed action. The Riparian BO is expected to be sufficient to cover training activities associated with the proposed action within riparian and wetland habitats and changes in impacts resulting from the proposed action within riparian and wetland habitats would be offset by conservation measures included in the Riparian BO.

Specific existing programmatic instructions for training in the vicinity of riparian habitat and wetlands, which would continue to be applied by MV-22 training, include:

- "No overflight" areas have been established throughout MCB Camp Pendleton. During the period from 1 March through 15 September, certain airspace within R-2503A is off-limits to all aircraft to protect the nesting and feeding habitat of endangered bird species (Least Tern/Snowy Plover Nesting Areas). This off-limits airspace has been identified as surface to 300 feet (approximately 90 meters) above ground level and 980 feet (300 meters) laterally from endangered species nesting habitats, riparian areas, estuaries and lagoons, and river mouths (Base Order 3500.1N, Range and Training Regulations and programmatic instructions, Chapter 4, Paragraph 4003; MCB Camp Pendleton 2008b).
- To "comply with federal, state, and local laws for the protection of the environment, special care must be taken when conducting training in sensitive environmental areas. When planning training events, refer to…the most current MCB Environmental Operations Map to determine locations of sensitive areas, and use the guidance found in [Range and Training Regulations Chapter 4] to determine applicable restrictions in those areas."
- Vehicle and foot traffic in vicinity of wetlands is authorized year round, and shall remain on existing roads, trails and creek crossings. Off-road vehicular or foot traffic, excavation, and/or fill occurring in wetlands, must be reviewed by the Assistant Chief of Staff, Environmental Security, and receive appropriate permits prior to conducting the work (MCB Camp Pendleton 2008b, Section 2007.4).
- Foot traffic in the vicinity of vernal pools is authorized year round; digging is prohibited in vernal pools. Vehicle/equipment operations near known vernal pool areas should be kept on existing roads, year round (especially in the winter) and bivouac/command post/field support activities should be kept to at least 50 meters from identified vernal pools (MCB Camp Pendleton 2008b, Section 2007.5).
- Vehicles must stay on existing roads and trails and foot traffic is prohibited in the vicinity of coastal lagoons from 1 March to 15 September. Foot traffic is prohibited all year in the Santa Margarita River Estuary and mouth of Cocklebur Canyon (MCB Camp Pendleton 2008b, Section 2007.6).

Additional programmatic instructions apply to riparian areas and wetlands (including vernal pools, estuaries and lagoons) that support sensitive plant or animal species (discussed under *Sensitive Species* below). With existing protection measures already in place, impacts associated with MV-22 training operations on riparian and wetland resources and associated wildlife habitats are expected to be less than significant.

WILDLIFE

The use of any rotary wing aircraft within undeveloped areas has the potential to add noise to the natural environment and cause a response by wildlife, potentially inducing a startle response; possible injury from trampling or uncontrolled running or flight; increase expenditure of energy during critical periods; decrease the amount of time spent on life functions such as seeking food or mates; temporarily mask auditory signals from other animals; and/or otherwise reduce the protection and stability of young. The type of noise that can stimulate the startle reflex is highly variable among animal species (Manci et al. 1988). In general, studies have indicated that close, loud, and sudden noises that are combined with a visual stimulus produce the most intense reactions. Rotary wing aircraft such as helicopters are believed to generally induce the startle effect more frequently than fixed wing aircraft (Gladwin et al. 1988).

Although there are no specific studies evaluating the impacts of MV-22 operations on wildlife species, this aircraft can be presumed to have impacts somewhat similar to those of a helicopter, such as the CH-46E, with exceptions as described in this section. For example, the MV-22 would appear more like a fixed wing aircraft with onset of sound from an MV-22 building up relatively gradually and the rotating blades forming a blur rather than being seen as rotating parts, reducing the potential for a startle effect. The MV-22 sounds more like a conventional turboprop aircraft, such as a short-hop commuter airliner or a C-130 cargo plane, than a helicopter in that it makes a steady buzzing tone and lacks the low pitched percussive ("wop-wop-wop") sound associated with many helicopters.

Compared to the CH-46E, which it would replace, noise modeling conducted for this EIS shows that in cruising flight sound exposure levels (SEL) in dBA from MV-22 would be consistently lower than those from CH-46E at altitudes between 250 feet and 5,000 feet above ground level (Table 6.1.14-4). The same is true of maximum sound levels (Lmax) in dBA (Table 6.1.14-4). SEL represents the total acoustic energy during an event (such as an overflight) typically measured over a duration of one second. Lmax is the maximum sound level measured over a fraction of a second during a single noise event that changes over time. During arrivals, SEL from MV-22 would be slightly lower than those from CH-46E; however, the Lmax would be somewhat greater for MV-22 (Table 6.1.14-4).

Table 6.1.14-4. Comparisons of Modeled CH-46E and MV-22 Sound Levels (SEL and Lmax) During Cruising at Different Altitudes Above Ground Level and During Arrival

Altitude (feet, above ground level)	Sound Exposure Level (SEL) (dBA)		Lmax (dBA)	
	CH-46E	MV-22	CH-46E	MV-22
Cruise[1]				
250	101	93	97	88
500	96	92	90	88
1,000	94	88	86	81
1,500	92	86	82	78
2,000	89	84	78	74
2,500	88	82	76	72
3,000	87	81	74	70
3,500	86	80	73	68
4,000	85	79	72	67
4,500	85	78	72	66
5,000	84	77	69	64
ARRIVAL (AT OR NEAR TOUCHDOWN)[2]				
N/A	95	94	79	83

Notes:
1. Estimates CH-46E cruising speed of 110 knots and MV-22 cruising speed of 220 knots.
2. Measured at a distance of 500 feet abeam of the aircraft, on the left side.

Source: Data from Rotorcraft Noise Model (Wyle 2008).

Effects related to downdraft/outwash and effects related to noise would diminish with distance from the aircraft. Wind velocities associated with MV-22 rotor wash would diminish substantially beyond 100 feet from the aircraft. Elevated noise levels, however, would be experienced at distances of 500 feet or more from the aircraft. Exposure to elevated noise levels would generally be localized around the actual landings, take-offs, and low-level hovering at LZs and other landing areas, diminishing with distance from the aircraft. As with the CH-46E, which it replaces, noise levels would be elevated above background at distances greater than 500 feet from the aircraft. However, no behavioral effects, such as startle response, would be expected at these distances.

The MV-22 would be incorporated into existing training scenarios at MCB Camp Pendleton, which means that the aircraft has the potential to be flying at any time of day or night. Activities during daylight would be expected to temporarily disturb wildlife in the immediate vicinity and could cause migrating or wintering waterfowl to flush or swim away from the immediate vicinity of the activity. Perched raptors would be expected to fly to another perch if closely approached by the aircraft. Activities taking place at night could cause similar responses by these species but would generally require a closer approach to elicit a response at nighttime compared to daytime. Hovering flight by MV-22s would increase the magnitude and duration of the noise exposure and would be more likely to cause a response by species such as waterfowl or raptors that may be in the area. If there were a response to the training activity, the most likely response would be movement of birds to another area during the activity, which would not be expected to result in an adverse effect.

Additionally, incorporation of the MV-22 in place of retiring rotary wing aircraft would result in a decrease in the frequency of aircraft training at MCB Camp Pendleton at LZs/DZs/CAL sites and subsequently reduce the frequency of noise-producing activities in the vicinity of wildlife habitat as well as a decrease in the overall noise environment. Because of different operational training requirements for the MV-22, the total number of annual operations at LZs/DZs/CAL sites would be reduced by 4,983 operations per year (MV-22 would conduct an estimated 291 operations annually versus 5,274 operations which would cease to occur at the same locations with retirement of the CH-46; see Table 6.1.14-3). Operations would substantially increase at some locations, including the HOLF and other developed sites.

Overall, only existing range facilities would be used, and these would be used in the same or similar fashion by MV-22 training as they are used by other rotary wing and fixed wing aircraft. No construction or site development would be necessary to accommodate training by the MV-22. As a result, the response of wildlife to project activities would be within the range of responses to a wide variety of human and non-human stimuli. With incorporation of existing Range and Training Regulations and other managing documents that govern all training on MCB Camp Pendleton, impacts resulting from this alternative on common and non-listed sensitive wildlife populations would not be significant.

MCB Camp Pendleton will, through the INRMP and the NEPA review processes, continue to identify measures to monitor, minimize and mitigate, to the extent practicable, adverse impacts to migratory birds that may be attributable to military readiness activities. As part of MCB Camp Pendleton's compliance and stewardship efforts in support of the MBTA, the base participates in the DoD Partners in Flight including Monitoring Avian Productivity and Survivorship (MAPS Stations) to help contribute to local and regional population and distribution trends. Breeding bird

surveys are conducted on-base as part of the USFWS and USGS Bird Breeding program and the base also supports the annual Christmas bird count (MCB Camp Pendleton 2007a). Potential loss of migratory birds associated with the MV-22 training at MCB Camp Pendleton is expected to be low and infrequent and would not result in a significant impact to migratory bird populations and, therefore, the proposed action is in compliance with the MBTA.

ENDANGERED, THREATENED, AND SENSITIVE PLANT SPECIES

Thread-leaved brodiaea, a federally and state listed plant species, is reported from near CAL Site 13 and in the northeast corner of DZ Wild Eagle. In addition, there is potential for other listed plant species to occur within or adjacent to the project areas that have not been recently surveyed, such as spreading navarretia which occur in vernal pools, although none have been reported from vernal pools in the vicinity of proposed project areas). San Diego button-celery is only known from south of the Santa Margarita River and is not likely affected by any project activity. Several sensitive but non-listed plant species are also known to occur on MCB Camp Pendleton (Appendix J of the INRMP). These species are expected to occur predominantly within the native habitats such as native grassland, wetlands and vernal pools, coastal scrub, and riparian areas. Individuals or populations of these species may be present in or adjacent to the proposed project areas. The most vulnerable species are those that occur in open grassland habitat, which includes the thread-leaved brodiaea, as training operations would avoid dense woody vegetation such as coastal scrub or trees, and programmatic instructions to avoid impacts to wetlands, including vernal pools, and riparian areas are already in place.

As a result, incorporation of the MV-22 into existing training operations is not expected to result in the direct removal of vegetation; therefore, the potential for removal of individuals of a sensitive plant species from such an event is low. Nonetheless, aircraft landing or hovering close to the ground or heavy foot traffic has the potential to crush or otherwise damage individuals of sensitive plant species. Impacts from wind or soil erosion and fire or fire suppression could result in loss or damage to individuals of a sensitive plant species.

In addition, although the loss of a few individuals is possible, the number of annual operations associated with introduction of the MV-22 and retirement of the CH-46 would represent a decrease of 4,983 annual operations at LZs/DZs/CAL sites. At the completion of the transition period, total MV-22 operations would be 291 per year, and at no point during the transition would the annual operations be greater than existing conditions. Therefore, based on the limited use of the identified sites and continued implementation of existing avoidance measures, replacement of the CH-46 with the MV-22 and associated continuing training activities are not expected to have a measurable effect on the populations of any listed plant species.

As noted above under the vegetation discussion, there is uncertainty as to the risk of fire associated with MV-22 operations at MCB Camp Pendleton. However, it is expected that the number of additional fire events would be low to very low, given the available information and the proposed infrequency of MV-22 operations at undeveloped sites (DoN 2008c). Listed plant species include two vernal pool dependent species, San Diego button-celery and spreading navarretia. The navarretia is an annual, existing as dormant seed during much of the year. San Diego button-celery resprouts from dormant perennial roots when soil moisture is adequate. Vernal pools are not known to be fire adapted ecosystems, however they are unlikely to burn except during the dry season when the plants are dormant. After a fire, they would be expected to germinate or resprout when seasonal soil

moisture conditions become appropriate. The third listed species, thread-leaved brodiaea, is also unlikely to be adversely affected because of their habitat and seasonal dormancy as an underground bulblike structure capable of resprouting after fire. All of these species exist in habitats exposed to periodic wildfires under natural conditions and have adaptations, described above, enabling individuals to escape injury from fire and to decolonize affected habitats as they recover from fire. Post-fire habitat recovery in grassland (thread-leaved brodiaea) and vernal pool habitats may occur to a substantial extent within the next growing season after the fire. Habitats dominated by woody species, such as coastal sage scrub or riparian, take longer to recover, although considerable recovery can occur within two to three years post-fire.

It is unlikely that *Brodiaea filifolia* corms would be injured by MV-22 aircraft on the ground whose engines are running. Although surface soil temperatures can reach 422 ˚F (216 ˚C) under the MV-22 nacelles and aircraft could remain on the ground for as long as 20 minutes, *Brodiaea* corms are normally buried approximatly 6 inches (15 cm) or more below the soil surface. Soil transfers heat very poorly, with heat transfer depending not only on the surface temperature and duration of exposure but also on the soil water content, soil texture, and soil pore distribution (Shugihara et al. 2006). Heat transfer through dry soils is very poor and temperatures rapidly decrease with small increments of depth. For example, a grass fire with surface soil temperatures of 482 ˚F (250 ˚C) generated temperatures of less than 212 ˚F (100 ˚C) at a depth of only 0.5 inches (1.3 cm) (Wells et al. 1979). At a depth of only 2 inches (5 cm) there is very little increase in soil temperature even after exposures to surface temperatures ranging from about 572 ˚F (300˚C) to over 1,112 ˚F (600˚C) on the order of 20 minutes or more (Shugihara et al. 2006, Figure 5.2). Since *Brodiaea* corms would be buried at about 3 times that depth it is doubtful that injurious or lethal increases in temperature would be experienced by the corms.

Based on the insulating properties of soil, temperatures would be expected to diminish rapidly with depth and very small changes in temperature would be expected at the depth that *Brodiaea* corms would be buried. Similarly, transfer of heat laterally from the point of heating would be very slow. Any effect from the exhaust gases would therefore be localized underneath the engine nacelles.

Most existing programmatic instructions and Range and Training Regulations focus on ground training because ground training represents the highest potential for impact to biological resources. Specific existing programmatic instructions for rare plant species include: 1) foot traffic is authorized, year round; however, digging, including construction of fighting positions, shall be avoided at locations of rare plants; 2) vehicle/equipment operations near known rare plant habitat should be kept on existing roads, year round; 3) bivouac/command and post/field support activities (e.g., showers, messing, fueling, water purification, etc.) should be set back at least 50 meters from identified rare plant sites; and 4) no cutting or trimming of rare plants is allowed without consultation with the Assistant Chief of Staff, Environmental Security (MCB Camp Pendleton 2008b, Section 2007.10).

Base management of federally listed plant species, including thread-leaved brodiaea, San Diego button-celery, and spreading navarretia, includes avoidance and minimization of temporary impacts. Section 7 Consultation for training impacts on federally listed upland species resulting from the proposed action is also in process. The thread-leaved brodiaea appears to be compatible with training activities in that the species has persisted in a wide variety of locations base-wide, including areas currently used for training activities. Individual plants have a limited seasonal presence above ground and an underground corm from which it can vegetative reproduce should the above ground

structures be damaged. In addition, thread-leaved brodiaea appears to benefit from at least a moderately frequent exposure to fire. San Diego button-celery and spreading navarretia occur in vernal pools and other intermittent ephemeral wetlands and programmatic instructions to protect wetland resources would also protect these species. In addition, to address potential impacts of military activities, including training, on listed upland species (including vernal pools species), MCB Camp Pendleton submitted a programmatic Biological Assessment to the USFWS in March 2000. The base and the USFWS remain in formal consultation. While in consultation, the base is implementing the actions identified in the proposed management plan. When potential impacts cannot be avoided, MCB Camp Pendleton will continue to initiate consultations with the USFWS on a project-by-project basis until the programmatic Uplands BO is finalized (MCB Camp Pendleton 2007a). Monitoring programs implemented at MCB Camp Pendleton (described in the INRMP) will be used to determine species populations/locations, habitat levels, and ecosystem/habitat trends. Negative trends precipitate discussions with the USFWS to try to determine the cause and if management activities on MCB Camp Pendleton would have any effect on the trends (MCB Camp Pendleton 2007a).

Measures are already in place for protection and management of rare plant species, and the project areas proposed for use by MV-22 training are already in use for similar training with existing rotary wing aircraft. Although damage to individuals is possible, training activities are not expected to have a measurable effect on the populations of a rare plant species. Therefore, impacts are not expected to be significant.

ENDANGERED, THREATENED, AND SENSITIVE WILDLIFE SPECIES

Several wildlife species federally listed as threatened or endangered are known to occur on MCB Camp Pendleton, and there are reported occurrences of sensitive wildlife species or their habitat within or in the vicinity of the proposed project areas (Table 6.1.4-2). Numerous sensitive but non-listed species (those species not state or federally listed as threatened or endangered but formally recognized as becoming increasingly rare) are also known to occur on MCB Camp Pendleton. These species are expected to occur predominantly within the native habitats such as coastal scrub and riparian areas. Individuals of these species would be expected to be present in the vicinity of the proposed project areas, especially those that are remote and less frequently used for training operations. In addition, it is likely that bird species would be intermittently flying over the project areas and occasionally perching or nesting in tall trees, posts or power lines that are present in the vicinity.

Upland Species. In general, the primary direct impacts of aviation activity on endangered, threatened, and sensitive species include noise and aircraft rotorwash (winds generated during low level hovering). As described above (see Table 6.1.14-4 and associated discussion), noise associated with MV-22 overflight would be less than from CH-46E when cruising at equivalent altitudes and during arrivals, except that the maximum noise level (Lmax) would be slightly greater for the MV-22 during arrivals. Noise and downdraft effects decrease with distance and would be of concern only when the aircraft is close to occupied habitat, such as during take-off and landing, or low-level hovering. Bird species (including nesting birds), such as California gnatcatcher, located adjacent to project sites, would be most vulnerable as they may exhibit a flushing response to the noise and downdraft of aircraft. Similar to common wildlife, the most likely response by an endangered, threatened, or sensitive bird species to the training activity would be temporary avoidance of the area during the activity. The potential for take in the form of killing or harassing an individual or nests is very low because the MV-22 would not land directly within occupied habitat (to protect resources and

reduce damage to the aircraft). With respect to noise harassment, incorporation of the MV-22 in place of retiring rotary wing aircraft would result in an incremental decrease in the frequency of aircraft training at undeveloped sites in the vicinity of native wildlife habitat and subsequently reduce the frequency of noise-producing activities as described above under wildlife. Additionally, the MV-22 is quieter than the retiring CH-46 in most scenarios. Populations of listed species on-base have been exposed to rotary wing aircraft used in training similar to that proposed for the MV-22 for several decades; therefore, introduction of the MV-22 training would represent a minimal departure from existing conditions. The MV-22 would follow established local approach and departure patterns and train in a similar fashion to that of the CH-46E, which it would replace.

Ground training associated with the MV-22 would not change from its current activities, and methods for avoidance and minimization of impacts are addressed in the existing Range and Training Regulations programmatic instructions and Habitat Conservation Plans. Impacts to wildlife species from fire would be associated with the potential temporary (post-fire conditions until vegetation re-grows) and permanent (type conversion) loss of habitat. As noted under the vegetation discussion, although there is uncertainty as to the risk of fire associated with MV-22 operations at MCB Camp Pendleton, it is expected that the number of additional fire events would be low to very low, given the available information (DoN 2008c). It is therefore expected that the contribution of MV-22 to the overall frequency and distribution of fires on MCB Camp Pendleton would not be substantial and may not result in a measurable change.

In the event of a fire related to MV-22 operations, biological impacts would depend on the location, extent, and season of the fire and related suppression activities. Some habitats on MCB Camp Pendleton have adaptations enabling rapid recovery from wildland fire; however, frequent fire events in scrub habitats can result in habitat type conversion as well as further exacerbate fire potential in future years. Fire impacts on listed vertebrate and invertebrate species would also depend on the location, size, intensity, and seasonal timing of the fire, but could result in injury to or loss of individuals or damage to their habitat. In upland habitats, loss or injury to individuals is possible for species such as Stephens' kangaroo rat, Pacific pocket mouse, California gnatcatcher, and arroyo toad and each species has the potential to experience temporary habitat damage. Vernal pool habitats of listed fairy shrimp species are unlikely to be affected by fire except possibly during the dry season, when the fairy shrimp exist as dormant cysts in the soil. Sparse fuels in dry vernal pools are unlikely to support a hot fire and the soil would provide some protection to the dormant cysts, nevertheless some individuals could be damaged or killed by fire. Although some injury or mortality to species is possible, all of these species exist in habitats exposed to periodic wildfires under natural conditions and have various adaptations enabling individuals to escape injury from fire and to recolonize affected habitats as they recover from fire. Post-fire habitat recovery in grassland and vernal pool habitats may occur to a substantial extent within the next growing season after the fire.

Habitats dominated by woody species, such as coastal sage scrub or riparian take longer to recover, although considerable recovery can occur within two to three years post-fire. For California gnatcatcher, older coastal sage scrub vegetation is preferred and the species is most abundant in habitats that have not burned in ten years or more. Therefore, measures that minimize the potential for increased fire frequency and extent from MV-22 training are important, and are described at the end of this chapter.

Although under certain circumstances a wildfire can have a substantial adverse effect on local population of listed species as a result of habitat loss, in the more likely event, a fire would have no adverse impacts on listed species or sensitive habitats. Because of the low likelihood of fire related to MV-22, the frequency and extent of existing fires on MCB Camp Pendleton, implementation of a Fire Management Plan on MCB Camp Pendleton, protective measures for listed species and sensitive habitats as identified in the Riparian BO (1-6-95-F-02) and Range and Training Regulations, and adaptations of habitats and species to periodic fires, the potential for increased wildfire associated with MV-22 training is expected to have a less than significant impact on biological resources. Nonetheless, mitigation measures are proposed to further reduce the likelihood and significance of impacts resulting from training-related fires.

No programmatic instructions are provided in existing BOs at MCB Camp Pendleton for the protection of sensitive upland species. However, the following measures are implemented within MCB Camp Pendleton in upland areas and if implemented for the proposed action would minimize impacts to these sensitive upland species, including California gnatcatcher, Stephens' kangaroo rat, and Pacific pocket mouse: California gnatcatcher: 1) during the gnatcatchers' breeding season (1 February-15 August), extreme caution beyond that required by the Fire Danger Rating system is necessary when using pyrotechnics and conducting other activities likely to cause a fire; 2) foot traffic between 1 February and 15 August shall be kept to existing roads, trails and established training facilities to the maximum extent practical; foot traffic may be authorized between 16 August and 31 January, however, care must be taken to avoid crushing vegetation; 3) vehicles may leave existing roads between 1 August and 31 January provided brush vegetation is not removed or crushed; and 4) bivouac/command post/field support activities shall be kept at least 50 meters from gnatcatcher habitat areas year-round (MCB Camp Pendleton 2008b, Section 2007.9.e). Stephens' kangaroo rat and Pacific pocket mouse: 1) foot traffic is authorized year round; however, digging, including construction of fighting positions, shall be avoided; 2) vehicle/equipment operations near known habitat should be kept on existing roads, year round (contact the Assistant Chief of Staff, Environmental Security prior to conducting activities involving soil excavation, filling, or grading); and 3) bivouac/command and post/field support activities (e.g., showers, messing, fueling, water purification, etc.) shall be kept at least 50 meters from the Stephens' kangaroo rat habitat areas, year round (MCB Camp Pendleton 2008b, Section 2007.9.f and g).

Riparian Species. The primary direct impacts of aviation activity on endangered, threatened, and sensitive riparian species would be comparable to upland species and include noise and aircraft downdraft (blasts of air). Similarly, direct impacts would be the greatest when the aircraft is within close proximity to occupied riparian habitats, such as during take-offs and landings and hovering. The most likely response by an endangered, threatened, or sensitive bird species to the training activity would be avoidance of the area during the activity. However, the potential for take in the form of killing or harassing an individual is very low because the MV-22 would not land directly within occupied habitat (to protect resources and reduce damage to the aircraft). All current training restrictions associated with the Riparian BO and all other guiding documents would continue to be followed as part of the training environment in applicable habitats, including restrictions on low-level flying over occupied habitats. With respect to noise exposure, incorporation of the MV-22 in place of retiring rotary wing aircraft would result in an incremental decrease in the frequency of aircraft training at most sites at MCB Camp Pendleton (Table 6.1.14-3). This would reduce the frequency of noise-producing activities, and the response by populations of listed riparian species on-base would be expected to be comparable to current aviation activity associated with the CH-46.

As noted above, although there is uncertainty as to the risk of fire associated with MV-22 operations at MCB Camp Pendleton, it is expected that the number of additional fire events would be low to very low, given the available information and the proposed infrequency of MV-22 operations (DoN 2008c). In the event of a fire related to MV-22 operations, biological impacts would depend on the location, extent, and season of the fire and related suppression activities. Riparian corridors would take longer to recover from fire than grasslands or some other habitat types and riparian species such as arroyo toad, southwestern willow flycatcher, and least Bell's vireo have the potential to experience temporary habitat damage. Nonetheless, all of these species exist in habitats exposed to periodic wildfires under natural conditions and have various adaptations enabling individuals to escape injury from fire and to recolonize affected habitats as they recover from fire. Habitats dominated by riparian species take longer to recover, although considerable recovery can occur within two to three years post-fire.

Most existing programmatic instructions and Range and Training Regulations focus on ground training because ground training represents the highest potential for impacts to biological resources. In addition, to protect endangered species nesting areas, during the period from 15 March through 15 September, aircraft are instructed to not fly below 300 feet over riverbeds and streams, other than established landing sites and TERF routes (MCB Camp Pendleton 2008b, Section 4003.2).

Ground training associated with the MV-22 would not change from current activities associated with the CH-46E, and methods for avoidance and minimization of impacts to riparian species are addressed in the existing programmatic instructions and Habitat Conservation Plans. These instructions and plans, specifically including conservation measures in the Riparian BO, are expected to be sufficient to cover potential impacts to listed riparian wildlife species resulting from the proposed action and conservation measures included in these agreements would likely be sufficient to avoid or minimize potential impacts to sensitive species in applicable habitats. Programmatic instructions provided for the protection of sensitive riparian species, including southwestern willow flycatcher, least Bell's vireo, and arroyo toad, include the following: 1) use extreme caution beyond that required by the Fire Danger Rating when using pyrotechnics; and when conducting other activities likely to cause a fire; 2) foot traffic is authorized year round on existing roads, trails, and creek crossings; 3) vehicles operating in the vicinity of creeks, rivers or drainages shall use existing roads, trails, and established creek/river crossings; vehicle traffic on roads in arroyo toad habitat between 15 March and 31 August shall be minimized to the maximum extent practical; 4) consult with the Assistant Chief of Staff, Environmental Security prior to bivouacking, cutting/removing vegetation, trenching, grading, filling, or conducting engineering operations in or adjacent to creek/river bottom areas; and 5) dust produced in or adjacent to creeks and rivers shall be minimized to the maximum extent practical (MCB Camp Pendleton 2008b, Section 2007.9.d).

Estuarine and Beach Species. Five areas (LZ 21, LZ Red Beach, VTOL 1, CAL Site 21, and LHD pad) proposed for use by the MV-22 occur in the vicinity of estuarine and beach habitat known to support nesting colonies of western snowy plover, California least tern and/or habitat for light-footed clapper rail. MV-22 operations in support of amphibious landing exercises could potentially impact western snowy plover in the general vicinity of Red Beach and other areas to the south. However, ground training associated with the MV-22 would not change from current activities associated with the CH-46E, and methods for avoidance and minimization of impacts to estuarine and beach species are addressed in the existing programmatic instructions and Habitat

Conservation Plans. These instructions and plans, specifically the Riparian BO, which encompasses estuarine and beach species, are expected to be sufficient to cover potential impacts to listed wildlife species associated with estuarine and beach habitats resulting from the proposed action and conservation measures included in these agreements would likely be sufficient to cover potential impacts. Programmatic instructions provided for the protection of these species include the following: 1) obtain authorization from the Assistant Chief of Staff, Environmental Security before entering any lagoon or estuary, marsh, mud/salt flat, or posted nesting area; 2) bivouacking and digging of fighting positions are prohibited in the vicinity of the Estuarine/Beach Endangered Species Management Zones during the period of 1 March to 15 September; 3) between 1 March and 15 September, all activities involving smoke, pyrotechnics, loud noises, blowing sand, and large groupings of personnel (14 or more) shall remain at least 300 meters away from fenced or posted nesting areas and all other activities shall be kept at least five meters from these areas; 4) foot traffic involving less than 14 personnel shall be kept as far away as possible, and approach shall be no closer than five meters to posted nesting areas between 1 March and 15 September; and 5) vehicle and equipment operations in the management zones shall be kept to a minimum between 1 March and 15 September (MCB Camp Pendleton 2008b, Section 2007.8). In addition, during the period from 1 March through 15 September, certain airspace is off-limits (off-limits airspace is identified as surface to 300 feet above ground level and 300 meters laterally) to all aircraft to protect the nesting and feeding habitat of the Least tern and California snowy plover (MCB Camp Pendleton 2008b, Section 4003.2). This includes the Santa Margarita River estuary and beach near LZ 21.

Vernal Pool Species. The two federally listed vernal pool plant species are not known from any LZ/DZ/CAL site proposed for use by the MV-22. With respect to the proposed action, Riverside fairy shrimp and San Diego fairy shrimp are known predominately from DZ Tank Park and CAL site 23, and near CAL site 13. Management for San Diego fairy shrimp and Riverside fairy shrimp on MCB Camp Pendleton is primarily through the management and control of human activities that may create impacts to occupied pools and related natural processes. Ground training associated with the MV-22 would not change from current activities associated with the CH-46E (except for a substantial reduction in the number of operations associated with the MV-22), and methods for avoidance and minimization of impacts to native vegetation resources are addressed in the existing programmatic instructions and Habitat Conservation Plans. With respect to air operations, rotorwash forces are greater for the MV-22 than for the CH-46 or CH-53, therefore, the area of disturbance would be larger. However, the number of operations at DZ Tank Park associated with introduction of the MV-22 and retirement of the CH-46 would be reduced from 133 operations per year (CH-46) to four annual operations (MV-22), which would reduce the frequency and potential for impacts from rotorwash. Additionally, impacts are avoided and minimized through the use of programmatic instructions (discussed under riparian and wetlands) which limit training and other activities, including use of the MV-22, in and near pools occupied by listed vernal pool species such as Riverside and San Diego fairy shrimp. Location of occupied pools are updated and published semiannually in the base's Environmental Operations Map Book that is provided for all users of the base. Additional management for the federally listed fairy shrimp species may be implemented on the base depending on the results of the Uplands Biological Assessment and subsequent Section 7 Consultation (Biological Assessment completed and submitted to the USFWS in 2000).

Protection and management of vernal pools would also protect non-listed sensitive plant species, such as the Pendleton button-celery (a CNPS List 1B species). However, due the widespread distribution in vernal pools on-base (it occurs in 818 locations), the potential for increase in grass

fires caused by the MV-22 may impact this species. If grass fires result in a loss of a substantial portion of the species locations, it could represent a decline in the population that would result in a significant impact to the species. The potential for the MV22 to cause wildfires, including fires in grassland, is discussed below.

Determination of Training-Related Impacts to Sensitive Wildlife Species. Although incidental mortality to a listed or non-listed sensitive wildlife species may occur during training operations, the potential for such an event is very low. Sensitive resources are well understood on MCB Camp Pendleton and existing Range and Training Regulations and programmatic instructions are in place to avoid and minimize impacts to these resources. For non-listed sensitive wildlife species, the loss of one or a few individuals is not likely to cause a decline in the population unless it occurs frequently. For listed endangered or threatened wildlife species, the potential for take in the form of injury to or harassment of an individual is low due to the low number of CAL sites, LZs and DZs in occupied sensitive species habitat, the low number of operations in undeveloped areas as part of the proposed action, and management approaches and programmatic instructions designed to protect and avoid impact to listed wildlife species are already being implemented on the base. Populations of listed species on-base have been exposed to rotary wing aircraft used in training similar to that proposed for the MV-22 for several decades; therefore, introduction of the MV-22 and retirement of the CH-46would represent a minimal departure from existing conditions. The MV-22 would follow established local approach and departure patterns and the total number of air operations at undeveloped sites would be substantially reduced compared with existing operations. Therefore potential impacts on federally listed, state listed, and other sensitive wildlife species are expected to be less than significant. Nonetheless, mitigation measures are proposed to further reduce the likelihood and significance of impacts resulting from training-related fires.

SENSITIVE HABITATS

Although jurisdictional wetlands and other Clean Water Act regulated waters are present within the proposed project areas, there is no construction associated with the training operations and no wetlands or other Clean Water Act regulated waters would be directly impacted by this alternative. Programmatic instructions provided when operating within the vicinity of riparian habitats and vernal pools (discussed under riparian and wetlands) would also protect jurisdictional wetlands and other Clean Water Act regulated waters from indirect impacts associated with training operations. USFWS designated Critical Habitat is not present in project area. Therefore, no impacts to sensitive habitats would occur from implementation of the proposed training impacts at MCB Camp Pendleton.

Avoidance, Minimization, and Mitigation Measures

All applicable existing regulations and policies pertaining to protection of natural resources during training with helicopters (discussed in detail under the *Established Plans, Measures, and Procedures Applicable to All Training on MCB Camp Pendleton*) will remain in effect with introduction of the MV-22 training on MCB Camp Pendleton. These include Range and Training Regulations, restrictions identified in the Environmental Operations Map, and requirements of applicable BOs.

Existing management approaches and programmatic instructions designed to avoid or reduce impacts to biological resources from ground-based training operations already in use on the base are adequate and no additional avoidance and minimization, or mitigation measures are proposed

or needed specifically to address introduction of the MV-22 and retirement of the CH-46. However, because this aircraft is new to West Coast habitats and environmental conditions and there is limited experience with training using the MV-22 in fire-prone environments similar to MCB Camp Pendleton, only limited data exist regarding the potential for wildland fire as a result of operating the MV-22. As a result of the need for more data regarding this aircraft's potential fire-related impacts on the environment, the concentration of sensitive species and habitats on the installation, and the degree of adverse impact that could result from wildland fires (depending on their location and timing), the following avoidance and minimization, and mitigation measures are proposed to further reduce the likelihood and significance of impacts resulting from training-related fires. The measures identified in this section were developed as part of an adaptive management approach to operating and training with this aircraft on MCB Camp Pendleton. This approach provides reasonable initial limitations on MV-22-based training while allowing a process to review and modify restrictions on the training environment based on new information as it becomes available. These impact avoidance and mitigation measures are in line with the USMC policy for Defense Support of Civil Authorities (DSCA), National Incident Management System, and Execution Order for Wildland Fire Fighting Operations. As a result of successful implementation of these measures, no significant impacts would occur.

Avoidance and Minimization Measures

- **Exhaust Deflectors.** Exhaust deflectors on the MV-22 aircraft will be deployed while on the ground with engines running at undeveloped and vegetated sites.
- **Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance.** Operators will minimize the time on the ground with engines running on unprepared sites and follow all recommendations in the NATOPS manual. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios. For training within DZs, operators will touch down only on improved or disturbed, unvegetated surfaces where the potential for fire is lowest and landings have been approved, such as paved LZs, fire breaks, and/or training roads. Specific text regarding restrictions on landing sites within DZs will be incorporated into the Wing SOPs.
- **Restrict Training During Extreme Fire Hazard Days.** Due to the lack of MCB Camp Pendleton-specific data regarding MV-22 operations in seasonally dry vegetation, training at unimproved, vegetated sites on MCB Camp Pendleton will initially be subject to restrictions associated with implementation of the FDR system (Table 6.1.14-1). Specifically, training and use of the MV-22 at undeveloped, vegetated landing sites will not occur under a Red (extreme hazard) Fire Danger Rating, and training at undeveloped, vegetated sites will be avoided to the maximum extent feasible under Orange (high) Fire Danger Rating days. This precautionary measure will be in effect until more experience has been gained with MV-22 training at MCB Camp Pendleton. Following a fire event review associated with the initial deployment period of MV-22s (see following measure), this measure may be modified in coordination with MCB Camp Pendleton Assistant Chief of Staff, Environmental Security staff and the MCB Camp Pendleton Fire Department.
- **Range and Training Regulations and Wing SOPs Update and Reporting.** The MCB Camp Pendleton Range and Training Regulations and Wing SOPs will be reviewed and updated by the operations entity (3D MAW), as necessary, to reflect the potential for accidental wildland fire associated with introduction of the MV-22 to the training environment. Specifically, the updates will reference the previous measures including the requirement to

limit time on ground, restrict landings in DZs to previously disturbed unvegetated areas, fire events that occur as a result of the MV-22, and adherence to the Fire Danger Rating system for MV-22 training. This review will make use of the latest information on the potential for fire associated with MV-22 operations (i.e., review of environmental conditions and other factors associated with the fire events) in arid conditions such as exist on MCB Camp Pendleton. The update process will include a review of the existing fire potential at unimproved landing sites (CAL sites, LZs, and DZs where the MV-22 may touchdown) and protection of sensitive resources, and will include formal review and comment by MCB Camp Pendleton Assistant Chief of Staff, Environmental Security and the MCB Camp Pendleton Fire Department. MCB Camp Pendleton Environmental Security will be responsible for ensuring that SOPs reflect restrictions and measures identified as a result of consultation with USFWS. Updates to the Range and Training Regulations and Wing SOPs will be published prior to January 2010.

- **Fire Incident Reporting, Review and Adaptive Training Management.** As part of an MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast operations. The reporting will include an assessment of the conditions under which the fire started such as relative humidity, fuel moistures, ambient temperature, and vegetation type, as well as a description of the project area and other factors which may further the understanding of fire potential. The USMC will distribute the memorandum to the MCB Camp Pendleton Fire Department and Assistant Chief of Staff, Environmental Security for formal review and comment. The memorandum would be used as part of an adaptive fire management strategy, which allows for the periodic review and modification of fire management measures in place, including but not limited to training restrictions. Additionally, future revisions to the INRMP (next update proposed for 2013) will evaluate the best available data on fires associated with the MV-22, and incorporate appropriate guidelines and updates to the existing fire management program.

- **Riparian Corridor and Woody Native Plant Buffers.** To reduce the potential for training related fires in sensitive habitats and breeding periods, operators will avoid training involving takeoffs, landings, and low-level hovering adjacent to riparian corridors, sage scrub communities, and vernal pools to the maximum extent feasible at all times, but specifically between 15 March (15 February for sage scrub communities) and 31 August. This applies to low-level overflights (<500 feet above ground level), hovering, and take-offs and landings. All MV-22 training activities will comply with terms and conditions of the existing Riparian BO (Riparian BO, 1-6-95-F-02), which applies to all training on MCB Camp Pendleton in proximity to riparian, beach, and estuarine areas. Additionally, troops will be deployed away from riparian corridors, vernal pools, and other sensitive habitats and follow all restrictions identified on the Environmental Operations Map and as part of existing Range and Training Regulations. Finally, following deployment of troops in DZs, operators will touch down only at locations greater than 656 feet (200 meters) from riparian corridors and sage scrub communities to minimize fire potential and noise producing activities within sensitive habitats. Additionally, in known vernal pool areas, equipment, and vehicles, including aircraft, must be kept on existing roads and should not touchdown in occupied vernal pools.

Mitigation Measures

If a fire incident reporting, review, and adaptive training management (described above) determines that the MV-22 is likely to start fires and post-fire habitat management is appropriate (impacts cannot be avoided), the following mitigation measure would apply.

- **Restoration of Areas Affected by MV-22 Training-related Fire if Applicable.** Because fires occur frequently on MCB Camp Pendleton, existing programs are in place to map and document fire events. However, because the MV-22 has had limited training use on MCB Camp Pendleton, additional habitat monitoring and restoration may be appropriate as part of an adaptive management approach in the unlikely event that training with this aircraft increases the potential for fires to occur on MCB Camp Pendleton. The USMC will identify and develop a restoration program process to be implemented if initial introduction of the MV-22 to MCB Camp Pendleton results in substantial additional fire events. The determination of whether or not additional monitoring or a restoration program is appropriate will be determined as a coordinated effort between the operational entity and MCB Camp Pendleton Environmental Security. MCB Camp Pendleton Environmental Security will also bear responsibility for development of the habitat monitoring/restoration program if appropriate. If a fire is started by use of the MV-22, the level of impact would depend on the extent and frequency of events as well as the community and habitat types affected, and as a result, a plant community-specific restoration approach is appropriate. The program will be included as part of the Section 7 consultation with USFWS and be based on the frequency and extent of fires resulting from MV-22 training. The program will identify a listed species impact trigger such as minimum fire size and frequency that would trigger restoration, by habitat type and sensitivity of resource, and include specific restoration requirements such as thresholds for passive restoration and habitat recovery monitoring, active restoration, invasive weed management, erosion control, habitat enhancement, and wildlife monitoring and reporting requirements. The specific program components will be included in the BO.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Due to lack of changes to existing conditions, no impacts on biological resources would occur.

6.1.15 Cultural Resources

Cultural resources are historic and traditional cultural properties that reflect our heritage and are considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Federal regulations define historic properties to include prehistoric and historic sites, buildings, structures, districts, or objects in or eligible for inclusion on the National Register, as well as artifacts, records, and remains related to such properties (NHPA, as amended [16 USC 470 et seq.]). Additionally, cultural resources are protected under ARPA (16 USC 470aa-470mm; Public Law 96-95 and amendments), NAGPRA (Public Law 101-601; 25 USC 3001-3013), and the American Indian Religious Freedom Act (Public Law 95-341; 42 USC 1996 and 1996a). Compliance with Section 106 of the NHPA, which directs federal agencies to take into account the effect of a federal undertaking on a historic property, is outlined in the Advisory Council on Historic Preservation's regulations, "Protection of Historic Properties" (36 CFR Part 800). The NHPA and associated Section 106 compliance also includes guidance for Native American

consultation regarding cultural significance of potential religious and sacred artifacts (16 USC 470a [a][6][A] and [B]).

Cultural resources located within the jurisdiction of MCB Camp Pendleton are managed in accordance with the laws, regulations and guidance summarized above as well as DoD Instruction 4715.16 (Cultural Resources Management) and MCO P5090.2A, Change 2 (Environmental Compliance and Protection Manual). As described below, all recorded cultural resources on MCB Camp Pendleton are protected by Base Order P3500.1N, Range and Training Regulations (MCB Camp Pendleton 2008b).

Affected Environment

Cultural Setting

The basic cultural setting described in section 4.15 (MCAS Camp Pendleton Cultural Resources) also applies to MCB Camp Pendleton.

Definition of the Area of Potential Effects

The APE for MCB Camp Pendleton consists of areas of potential ground disturbance from hovering and landing of aircraft. This may occur at established LZs, DZs, CAL sites, or landing pads proposed for use by the MV-22, as shown on Figure 6.1.2-1 and Table 6.1.15-1. Most of these, with the exception of the HOLF, which was built in 2000, are existing landing areas that have been used by other rotary wing aircraft for more than 30 years. No construction activities or other site modifications are associated with proposed operations at these landing areas. To account for MV-22 rotorwash during hovering and landing/take-offs, the APE includes a 350-foot buffer area around all proposed landing areas.

For Native American resources, the APE is the same as described above (i.e., areas of potential ground disturbance from aircraft rotorwash), but also includes traditional cultural resources within the viewshed of MV-22 operations.

There are no historic buildings or structures within the MCB Camp Pendleton APE; therefore, architectural resources at MCB Camp Pendleton are not discussed further.

Known and Predicted Resources

MCB Camp Pendleton has an active archaeological research program, which has recorded over 500 archaeological sites representing more than 8,000 years of human occupation. A review of records held by MCB Camp Pendleton was conducted to determine previous survey coverage of the APE and identify all recorded resources within the APE (see MCIWEST 2009 for full details of cultural resources review). The following provides a summary of those findings.

Archaeological Survey Coverage. Table 6.1.15-1 provides a list of landing areas proposed for use by the MV-22. Previous surveys within the MCB Camp Pendleton APE have been a combination of those conducted for specific construction projects as well as those for general archaeological inventories of the various training areas. Post-fire surveys were also conducted because the burned areas provided good ground surface visibility in areas that otherwise lacked visibility due to

vegetation. Overall, the APE for 35 of the 47 proposed landing areas have been completely surveyed. The survey coverage for the other proposed landing areas range from 70 to 98 percent.

Table 6.1.15-1. List of Landing Areas and DZs at MCB Camp Pendleton Proposed for Use by the MV-22 and Associated Cultural Resources

Landing Area APE	APE Area (acres)	% Surveyed for Cultural Resources	Recorded Cultural Resources*
CAL Site 1	9	100 (?)	None (Previous survey unconfirmed)
CAL Site 2	9	100	None
CAL Site 3	9	95	CA-SDI-9825; unrecorded resources may be present in unsurveyed areas
CAL Site 4	9	95	Unrecorded resources may be present in unsurveyed areas
CAL Site 5	9	100	CA-SDI-14253
CAL Site 9	9	100	CA-SDI-5137
CAL Site 10	9	100	None
CAL Site 13	9	100	None
CAL Site 14	9	100	None
CAL Site 15	9	100	None
CAL Site 16	9	100	None
CAL Site 17	9	100	None
CAL Site 18	9	100	None
CAL Site 19	9	100	None
CAL Site 20	9	100	None
CAL Site 21	9	100	None
CAL Site 22	9	100	None
CAL Site 23	9	100	CA-SDI-14493
HLZ	9	100	None
HOLF	9	100	None
LHD PAD	9	100	None
LZ 1	9	100	None
LZ 11	9	100	None
LZ 12	9	100	None
LZ 16	9	100	CA-SDI-14143
LZ 21	9	100	CA-SDI-13940
LZ 22	9	100	None
LZ 27	9	70	Unrecorded resources may be present in unsurveyed areas
LZ 31	9	70	Unrecorded resources may be present in unsurveyed areas
LZ 33	9	90	Unrecorded resources may be present in unsurveyed areas
LZ 41	9	100	None
LZ 52	9	80	Unrecorded resources may be present in unsurveyed areas
LZ 53	9	100	None
LZ 62	9	20	CA-SDI-9575A/B; unrecorded resources may be present in unsurveyed areas
LZ Red Beach	9	100	CA-SDI-10723

Table 6.1.15-1. List of Landing Areas and DZs at MCB Camp Pendleton Proposed for Use by the MV-22 and Associated Cultural Resources

Landing Area APE	APE Area (acres)	% Surveyed for Cultural Resources	Recorded Cultural Resources*
LZ VIEWPOINT	9	100	None
PAD 1 (VTOL 1)	9	100	None
PAD 2 (VTOL 2)	9	98	Unrecorded resources may be present in unsurveyed areas
STOL 101	9	100	CA-SDI-14508, CA-SDI-14509
DZ Basilone	504	100	CA-SDI-10690, CA-SDI-14702, CA-SDI-14710, CA-SDI-14711
DZ Case Springs	127	95	CA-SDI-14620; unrecorded resources may be present in unsurveyed areas
DZ Deluz	91	100	CA-SDI-14253, CA-SDI-14254, CA-SDI-14724
DZ Fallbrook	109	100	None
DZ Horno	77	95	Unrecorded resources may be present in unsurveyed areas
DZ Papa 3	331	95	CA-SDI-10004, CA-SDI-10008/10708, CA-SDI-15108; ; unrecorded resources may be present in unsurveyed areas
DZ Tank Park	433	100	CA-SDI-4540, CA-SDI-14343, CA-SDI-14344, CA-SDI-14494, CA-SDI-14495, CA-SDI-14496, CA-SDI-14497, CA-SDI-14940, CA-SDI-14941
DZ Wild Eagle	352	100	CA-SDI-14659 CA-SDI-14660

Notes:
*This list includes all recorded archaeological sites, including those that may be ineligible for listing on the National Register and those that have not been evaluated for listing.
*For those areas with less than 100% survey, unrecorded cultural resources may be present.
Source: MCIWEST 2009.

Archaeological Resources. Thirty-one prehistoric archaeological sites are recorded within the MCB Camp Pendleton APE (Table 6.1.15-2). The recorded sites include lithic scatters, milling sites, shell middens and scatters, a camp site, and a quarry site. Four sites have been recommended as eligible for listing on the National Register and nine as ineligible for listing based on testing evaluations (pending SHPO agreement on these recommendations). The other 18 sites have not been evaluated. There is also the possibility of unrecorded archaeological sites within unsurveyed portions of the MCB Camp Pendleton APE.

Native American Consultation. MCIWEST initiated consultation in November and December 2008 with non-federally recognized Indian tribes subject to 36 CFR 800.3(f) (consulting parties) and federally recognized Indian tribes affiliated with lands currently under Marine Corps jurisdiction and involved in this proposed action. MCB Camp Pendleton has on-going consultations with Native American tribes and maintains consulting relationships with the following list of tribal Nations: Juaneño Band of Mission Indians, La Jolla Band of Mission Indians, Pala Band of Mission Indians, Pauma Band of Mission Indians, Pechanga Band of Mission Indians, Rincon Band of Luiseño Indians, San Luis Rey Band of Mission Indians, and Soboba Band of Mission Indians.

Table 6.1.15-2. Recorded Cultural Resources within the MCB Camp Pendleton APE

Site Designation	Eligibility Status	Site Dimension	Report Citation	Site Description
CA-SDI-4540	CI	1000m2	Reddy 1999b	Milling with lithic scatter and midden
CA-SDI-5137	CI	125 x 75m	Reddy et al. 1997	Midden w/surface scatter
CA-SDI-9575A/B	NEV	200m x unknown	Ezel and Theskin 1987	Small artifact scatter
CA-SDI-9825	NEV	10 x 25m	Reddy 1999a	Sparse artifact scatter
CA-SDI-10004	CI	53 x 32m	Reddy et al. 1997	Lithic scatter
CA-SDI-10008/10708	CE	1300 x 500m	Byrd & Andrews 2005	Piedras Lumbras Chert Quarry
CA-SDI-10690	NEV	-	Reddy et al. 1998	Sparse lithic and ground stone scatter
CA-SDI-10723	CE	200 x 190m	Hale & Becker 2006	Shell midden
CA-SDI-13940	CI	320 x 150m	Collett & Bull 2005	Shell scatter
CA-SDI-14143	NEV	30 x 30m	Cheever & Collette 2002	Shell scatter
CA-SDI-14253	NEV	40 x 30m	Cooley 1998	Sparse lithic scatter
CA-SDI-14254	NEV	100 x 40m	Cooley 1998	Sparse lithic scatter
CA-SDI-14343	NEV	75 x 45m	Cooley 1998	Shell and sparse lithic scatter
CA-SDI-14344	NEV	200 x 100m	Cooley 1998	Artifact surface scatter
CA-SDI-14493	NEV	30 x 30m	Reddy et al. 1998	Shell scatter
CA-SDI-14494	CI	1640m^2	Reddy 1999b	Lithic/Pottery artifact and shell scatter
CA-SDI-14495	CI	1620m^2	Reddy 1999b	Lithic/Pottery artifact and shell scatter
CA-SDI-14496	CI	14840m^2	Reddy 1999b	Sparse lithic scatter with shell scatter
CA-SDI-14497	CE	1100m^2	Reddy 1999b	Intensive shell processing site
CA-SDI-14508	CI	-	Reddy 1999b	Shell scatter
CA-SDI-14509	NEV	60 x 120m	Reddy et al. 1998	Shell scatter
CA-SDI-14620	NEV	25 x 25m	Doolittle et al. 2002	Small lithic scatter
CA-SDI-14659	CI	100 x 65m	Hale & Becker 2006	Diffuse lithic scatter
CA-SDI-14660	NEV	80 x 10m	Reddy et al. 1998	Sparse lithic scatter
CA-SDI-14702	NEV	110 x 20m	Reddy et al. 1998	Lithic scatter
CA-SDI-14710	NEV	240 x 42m	Reddy et al. 1998	Sparse lithic scatter
CA-SDI-14711	NEV	25 x 105m	Reddy et al 1998	Sparse lithic and groundstone scatter
CA-SDI-14724	NEV	460 x 185m	Cooley 1998	Campsite/lithic scatter/milling
CA-SDI-14940	NEV	75 x 40m	Reddy 1999a	Artifact scatter
CA-SDI-14941	NEV	30 x 25m	Reddy 1999a	Shell scatter with artifact
CA-SDI-15108	CE	300 x 150m	Becker and Andrews 2006	Midden with lithic and milling

Notes:
National Register Status: NEV = not evaluated for National Register eligibility; DI = determined ineligible for inclusion on the National Register with SHPO agreement; CI = considered ineligible for inclusion on the National Register (pending SHPO agreement); CE = considered eligible for inclusion on the National Register (pending SHPO agreement); DE = determined eligible for inclusion on the National Register with SHPO agreement.
Source: MCIWEST 2009.

MCIWEST is in the process of consulting with these tribal Nations regarding any concerns with the proposed action (see Appendix H). Tribal Nations identified above received a consultation letter by early December 2008. Tribal representatives were contacted by phone and email, and also invited to attend a meeting (briefing) at MCAS Camp Pendleton and MCB Camp Pendleton to discuss the proposed action. During the meeting, representatives were encouraged to provide comments or identify their respective concerns. The following tribal Nations were represented at the meetings: Juaneño Band of Mission Indians, Pala Band of Mission Indians, Pauma Band of Mission Indians, Pechanga Band of Mission Indians, and Rincon Band of Luiseño Indians. No comments were provided by representatives from these Nations, as none had specific concerns following the briefing.

During past consultations, examples of traditional cultural resources that have been identified at MCB Camp Pendleton include various ethnohistoric village sites. However, with the exception of *Topamai* at MCAS Camp Pendleton, none of these are located in the APE.

Existing Plans and Policies for Range Use

Recorded cultural resources on MCB Camp Pendleton are protected by Base Order P3500.1N, Range and Training Regulations (MCB Camp Pendleton 2008b). The Range and Training Regulations identify general environmental protection measures for all training activities as well as measures specific to archaeological resources. For example, existing operational measures designed to protect cultural resources include but are not limited to the following:

- Removal or intentional destruction of archaeological materials or artifacts, or the disturbance of any archaeological site is prohibited on all ranges and training areas aboard MCB Camp Pendleton.
- Contact Assistant Chief of Staff, Environmental Security prior to conducting activities involving mechanical soil excavation, filling, or grading in the vicinity of known archaeological sites.
- Approval must be obtained from the Assistant Chief of Staff, Environmental Security prior to any activity that may adversely impact archaeological sites.
- Digging, including construction of fighting positions, is prohibited at known archaeological sites. Foot traffic is authorized year round.
- Vehicle/equipment operations are to be kept on existing roads through known archaeological sites year round.

Applicable existing regulations and policies pertaining to protection of cultural resources, including the Range and Training Regulations, would remain in effect with introduction of the MV-22 training on MCB Camp Pendleton

Environmental Consequences

Training Range Impacts

MV-22 training operations that could cause ground disturbance would occur at previously established landing areas at MCB Camp Pendleton. Although no new construction or improvements are proposed, ground disturbance from hovering and landing of aircraft could occur at these locations due to dust and debris being scattered and/or becoming airborne from aircraft rotorwash. Downdraft (and outwash) forces, collectively known as rotorwash, are relative to the engine power settings and the aircraft's proximity to the ground. Rotorwash from the MV-22 would be greater than from the CH-53E (DoN 1998) and CH-46 (see Appendix G). Rotorwash from the MV-22 would reach 50 knots at a distance of 150 feet from the aircraft when hovering at 20 feet above ground level, which is three to four times greater than that associated with the CH-46 (see Appendix G). As a result, rotorwash from an MV-22 aircraft during landing, take-offs, and hovering immediately above the ground may disturb artifacts lying on the surface in the immediate vicinity of the hovering aircraft, although the extent of this disturbance would depend on local soil characteristics, presence of vegetation, and size/weight of artifacts.

Lack of Archaeological Survey Coverage. Unrecorded archaeological sites may occur within unsurveyed portions of the APE for CAL Site 1, CAL Site 3, CAL Site 4, LZ 27, LZ 31, LZ 33, LZ 52, LZ 62, VTOL 2, DZ Papa 3, DZ Case Springs, and DZ Horno. Operations within areas lacking adequate survey coverage could impact unrecorded archaeological resources that may or may not qualify as a historic property. This would be a significant impact under the NEPA. Regarding the three DZs, these are large training areas used for parachute drops or "fast rope" (rappelling down ropes from the aircraft) maneuvers; however, MV-22 operators may land in a DZ after deployment of troops. There are no designated landing areas within exising DZs. Since the DZs are large training areas, MV-22 operators, in concert with installation Environmental staff (archaeologists), Range Operations and Range Control staff, as well as the MCIWEST G-3 (Operations), will select landing sites that would avoid areas that lack archaeological survey coverage (see avoidance measures below).

Recorded Archaeological Resources. As described above, 31 archaeological sites are located in the APE. Four sites have been recommended as eligible for listing on the National Register (CA-SDI-10008/10708, -10723, -14497, and -15108) (pending SHPO agreement), and another 18 sites have not been evaluated.

Any disturbance from MV-22 operations on a site that is eligible for listing on the National Register would result in an adverse impact on a historic property. This would be a significant impact under the NEPA.

Nine sites have been recommended as ineligible for listing on the National Register (CA-SDI-4540, -5137, -10004, -13940, -14494, -14495, -14496, -14508, and -14659). Pending SHPO agreement on these determinations, no further action is warranted regarding these sites.

Within DZ areas with recorded archaeological sites, MV-22 operators, in concert with installation Environmental staff (archaeologists), Range Operations and Range Control staff, as well as the MCIWEST G-3 (Operations), will select landing sites that would avoid impact to archaeological sites eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community (see avoidance measures below). Similar avoidance protocols are not possible for MV-22 operations within the CAL sites, LZs, and other designated landing sites because landing sites within these areas cannot be moved (e.g., they have been selected for specific topographic or other physical conditions and/or they are paved or otherwise prepared sites).

Traditional Cultural Resources. No traditional cultural resources have been identified within the MCB Camp Pendleton APE. However, consultations with tribal Nations are on-going. MCIWEST is enterring into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST would follow the procedures outlined in the Programmatic Agreement with the California SHPO. Additionally, the measures described below take into account impacts on archaeological sites that may or may not be considered a traditional cultural resource.

AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

All applicable existing regulations and policies pertaining to protection of cultural resources during training with helicopters, including the Range and Training Regulations discussed above, would remain in effect with introduction of the MV-22 training on MCB Camp Pendleton.

As noted above, MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. Consistent with this agreement, the following measures would avoid or minimze impacts on archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community:

- Prior to commencement of operations within the DZ Papa 3, DZ Case Springs, and DZ Horno, the areas of the APE lacking adequate survey will be shown as restricted areas on the MCB Camp Pendleton Environmental Operations Map, as well as MV-22 operators flight maps. Landing and hovering operations will be prohibited at these locations. Specific landing sites within the DZs will be selected by MV-22 operators, in concert with installation Environmental staff (archaeologists), Range Operations and Range Control staff, as well as the MCIWEST G-3 (Operations), to ensure that pre-approved landing sites and associated rotorwash only occur in areas previously surveyed for archaeological resources.
- If for some reason the above avoidance measure is not possible for some areas, archaeological survey will be conducted prior to MV-22 operations for areas lacking adequate survey coverage. If an archaeological site is identified based on these subsequent survey efforts, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
- Prior to MV-22 operations, the areas lacking adequate survey within the APE for CAL Site 1, CAL Site 3, CAL Site 4, LZ 27, LZ 31, LZ 33, LZ 52, LZ 62, and VTOL 2 will be surveyed for archaeological resources. If an archaeological site is identified based on these subsequent survey efforts, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
- Prior to commencement of operations within the DZs, the location of three eligible sites (CA-SDI-10008/10708, -14497, -15108) and 12 non-evaluated sites (CA-SDI-10690, -14254, -14343, -14344, -14620, -14660, -14702, -14710, -14711, -14724, -14940, -14941) and appropirate buffer will be added to the MCB Camp Pendleton Environmental Operations Map, as well as MV-22 operators flight maps. Landing and hovering operations will be prohibited at these locations. Specific landing sites within the DZs will be selected by MV-22 operators, in concert with installation Environmental staff (archaeologists), Range Operations and Range Control staff, as well as the MCIWEST G-3 (Operations), to ensure that all archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community are avoided. With this operational protocol, impacts to the fifteen sites would be avoided.
- If for some reason the above avoidance measure is not possible for some sites, archaeological testing will be conducted for any non-evaluated sites prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If an archaeological site is recommended as eligible for listing on the National Register

based on site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.

- Prior to MV-22 operations, archaeological testing will be conducted to evaluate if the following sites are eligible or ineligible for listing on the National Register: CA-SDI-9575, -9825, -14143, -14253, -14493, and -14509. These six non-evaluated sites cannot be avoided because they are located within the APE of a CAL site, LZ, or other designated landing site that cannot be moved. If an archaeological site is recommended as eligible for listing on the National Register based on subsequent site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
- Prior to MV-22 operations at LZ Red Beach, the nearby archaeological site (CA-SDI-10723) will be capped to ensure that surface artifacts are not disturbed from MV-22 rotorwash. Site capping involves judiciously covering the archaeological site with geotextile and fill. Prior to capping, the current condition of the site will be recorded, including surface artifact distributions. A record will also be made of the capping process and end result (e.g., thickness and nature of materials used to cap the site, surface topography). To ensure that site capping is effective and that subsequent soil erosion or other soil disturbances are not affecting the site's integrity, the USMC will conduct periodic site visitations to record any changes to the archaeological site (e.g., exposure of the geotextile cover due to soil erosion). If the site visitations reveal any substantial site degradation, further consultation with the California SHPO will be necessary.

Implementation of these measures would reduce impacts to archaeological resources to less than significant

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Existing conditions would remain unchanged, there would be no effect on a historic property, and no impacts would occur under the NEPA.

6.1.16 Safety and Environmental Health

Affected Environment

Range operations at MCB Camp Pendleton are governed by Base Order P3500.1M (MCB Camp Pendleton 2008b) as well as other operations specific DoD Directives and Base Orders. These documents establish procedures and requirements to assure safe operation of the MCB Camp Pendleton ranges. Two health and safety issues related to aircraft range operations include Explosive Safety and Wildfire Management. See section 6.3.16 for information regarding MV-22 aircraft mishaps.

Explosive Safety

Ordnance expenditure during training is limited to ranges within restricted areas. When air-to-ground weapons are used, a safety arc is established around the ground target. Specific weapon safety footprints must be assessed against each intended target to ensure that these weapons can be safely employed. These assessments have been accomplished by MCB Camp Pendleton staff and

allowable ordnance delivery profiles have been documented in Base Order P3500.1M (MCB Camp Pendleton 2008b).

Wildfire Management

Because fires are a common and inevitable result of training on-base, fires and the associated potential loss of natural resources are managed through several plans and orders. Base Order P11320.13D (Fire Protection Regulations and Instructions, MCB Camp Pendleton 2007b) was implemented in 1992 to address fire management issues, and a Fire Management Plan was developed jointly with the USFWS (entitled Wildland Fire Management Plan Update, MCB Camp Pendleton 2007b). The Fire Management Plan is based on the development, implementation, and oversight of a proactive strategy focused on valuation and prioritization of base resources. Specific pre-suppression activities to manage fires include implementation of the Fire Danger Rating System, maintenance of fuel/firebreaks and access roads, and application of controlled burning.

The Fire Danger Rating System is managed by the fire department on-base and includes restrictions on all training activities that have the potential to ignite fires (Table 6.1.16-1). These Fire Danger Ratings are applicable to all organizations and individuals at MCB Camp Pendleton, whether in a training or off-duty status, and while using ranges, training areas, or impact areas.

Table 6.1.16-1. Fire Danger Ratings

Fire Danger Rating (Hazard)	Caution To Be Exercised	Necessary Precautions
0 - 30 (LOW)	Use normal caution.	Any type of ammunition may be used with care. Smoking is permitted. This is the highest allowable Fire Danger Rating for Live Fire and Maneuver training without a waiver.
31 - 40 (MODERATE)	Use normal caution. Fires will start easily.	Any type of ammunition may be used with care. Smoking is permitted.
41 - 60 (HIGH)	Use extra caution. Fires will start very easily.	The beginning of the high danger period. Any type of ammunition may be used, with care, on ranges and within impact areas. Recommend the use of pyrotechnics, demolitions, and heat or flame-producing devices within training areas be limited as much as possible to cleared areas or areas previously burned for that purpose. Smoking is permitted only in cleared areas or firebreaks.
61 - 80 (VERY HIGH)	Use extreme caution. Fires are very hard to control.	Firing will be permitted at all times on all ranges unless restricted by Range Control. Minimal use of pyrotechnics, demolition, and heat or flame-producing devices (including blanks and smoke grenades) is allowed within training areas; however, use is restricted to cleared or previously burned areas only. Smoking will be permitted only in cleared areas or on firebreaks.
81 & Higher (EXTREME)	Flash condition. This is the highest class of fire danger. Fires started are practically impossible to extinguish and usually continue until danger rating conditions improve or burn themselves out. The utmost caution with fire-producing agents and devices must be exercised at all times.	The firing of high explosives, pyrotechnics, incendiaries, or other ammunition likely to cause fires is prohibited unless specifically authorized by Range Control. The use of any type of training/live ordnance (to include blanks), heat or flame-producing devices (heaters, welders, stoves, or open fires) in training areas is strictly prohibited unless authorized by Range Control. No off-road activities by vehicles are permitted without authorization from Range Control. Firing units will exercise maximum attention to the observation of range fans and other precautions to prevent fires from starting. Smoking shall not be permitted under any circumstances.
Source: MCB Camp Pendleton 2003a		

In the event of a wildland fire on any range, impact, or training area, the Range Safety Officers are required to immediately notify Range Control by the most expeditious means possible noting the exact location and extent of the fire. Range Control will then instruct the Range Safety Officers as to what action to take prior to the arrival of the Fire Department. The Range Control Officer then monitors all range and training area fires as they occur, and assists the Base Fire Chief to safeguard property and personnel.

Environmental Consequences

Training Range Impacts

EXPLOSIVE SAFETY

Ordnance expenditure only would occur when the MV-22 aircrews train with its one machine gun at existing ranges and targets specifically designed for air-to-ground gunnery. These ranges and targets have standard procedures in place to ensure safety of personnel on the ground during range exercises and during ordnance clean-up and clearance activities. Because the MV-22 would be adding only a small munitions use on the range and this would be restricted to existing targets, this activity would not result in any greater safety risk. Therefore, no significant impact related to ordnance expenditure would occur.

WILDFIRE MANAGEMENT

All MV-22 training operations at MCB Camp Pendleton would be conducted in accordance with MCB Camp Pendleton Range Operational Instructions and other required safety procedures, including all applicable fire danger precautions. Air-to-ground machine gun training has the potential to increase the frequency of fires in target areas. However, munitions expenditure related to MV-22 operations is fairly minor compared to existing ordnance training at these established targets. Following existing range regulations and applying all fire danger precautions would reduce the potential for fire outbreaks during munitions practice.

As described in section 6.1.14 (Biological Resources), operation of the MV-22 aircraft has not been identified as a common cause for fires. The current configuration includes a heat exhaust shield and modified lighting covers to further reduce the potential. However, introduction of the MV-22 to MCB Camp Pendleton would represent a new type of training with respect to fires. Implementation of the biological resources mitigation measure (see section 6.1.14) would reduce the potential for fire outbreaks caused by the MV-22. With implementation of the measures listed in section 6.1.14, no significant impact related to wildfire management would occur.

MITIGATION MEASURES

Because there would be no significant impact on safety and environmental health, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and no impacts on safety and environmental health would occur.

6.1.17 Environmental Justice

Affected Environment

The Environmental Justice affected environment related to operations at MCB Camp Pendleton is the same as that described in section 4.17 for MCAS Camp Pendleton.

Environmental Consequences

Training Range Impacts

Operations under the proposed action would involve a small increase in the number of aircraft operations annually at MCB Camp Pendleton, while established airspace training footprints would remain unchanged. Environmental justice concerns related to aircraft operations typically include air quality, noise, and safety. Specific issues of concern involve aircraft emissions, aircraft noise, and safety concerns related to flight mishaps and explosives handling. The analyses conducted for these resources areas indicate that no significant environmental or human health impacts are anticipated under the proposed action. Consequently, no disproportionate or adverse impacts related to environmental justice are anticipated, nor would there be any special health or safety risks to children.

MITIGATION MEASURES

Because there would be no disproportionate or adverse impacts anticipated related to environmental justice, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no personnel changes, new construction, demolition, or training activities. Therefore, existing conditions would remain unchanged, and no impacts to environmental justice would occur.

6.2 BOB STUMP TRAINING RANGE COMPLEX

6.2.1 Introduction

The Bob Stump Training Range Complex is composed of airspace and land located in southwestern Arizona and southeastern California. The Bob Stump Training Range Complex includes the Chocolate Mountain Range (R-2507), with about 5,000 square miles of airspace designated for military use in California, and BMGR-West (R-2301W), with approximately 5,000 square miles of airspace designated for military use in Arizona (USMC 1997a) (see Figure 1.1-1). The Chocolate Mountain Range and BMGR-West have more than 1,900 square miles of lands that have been used as aerial gunnery and bombing training areas since they were established during the World War II period. Examples of some of the existing facilities used for training include an auxiliary airfield complex, realistic targets for air-to-ground attack, air-to-air firing ranges, and electronic warfare training ranges. Collectively, this complex is the largest tactical aviation training range utilized by the USMC.

The Bob Stump Training Range Complex also includes R-2510 and R-2512, located near NAF El Centro. The R-2510 restricted airspace covers 154,474 acres, and the R-2512 restricted airspace

covers 63,357 acres in California (see Figure 1.1-1). Typical training operations include aircraft familiarization, air-to-air refueling, tactical air control, bombing, rocket/small arms firing, air combat maneuvering, air intercept, and survey flights. Additional information regarding existing and proposed training operations at the Bob Stump Training Range Complex is discussed in section 6.2.2 (Airfields and Airspace).

Other training areas, like the Yuma Proving Ground, would not be used for MV-22 operations and are not discussed further.

6.2.2 Airfields and Airspace

The airspace associated with the Bob Stump Training Range Complex allows military flight operations to occur without exposing civil aviation users, military aircrews and the general public to hazards associated with military training and operations. This section describes the existing operations at the Bob Stump Training Range Complex and evaluates changes that would occur with the introduction of the MV-22.

Affected Environment

Barry M. Goldwater Range (West)

The primary mission of the BMGR-West is military aircrew training. The range is a trapezoidal-shaped area in Yuma County in the southwestern corner of the State of Arizona (Figure 6.2.2-1) (DoN 2001). The Special Use Airspace consists of R-2301W, which extends from the ground surface and 80,000 feet MSL. Aviation training facilities include an outlying auxiliary airfield (AUX-2), two bull's eye type bombing targets (Yodaville and Cactus West), and a Tactical Aircrew Combat Training System (TACTS).

AUX-2 is a small airfield from the World War II training era that has been redeveloped to support AV-8B and C-130 training activities. It has one runway[1] as well as an aluminum (AM-2) matting LHD deck with in-deck lighting for FCLP training, a shipboard optical landing system and a Landing Ship Officer cab (Kruse, personal communication 2008). The Yodaville and Cactus West target complexes provide a variety of scored air-to-ground targets for bombing, rocketry, and strafing. The TACTS range area, which is about 674 square miles in size, can track and record aircraft operations and simulate air defense threats, such as surface-to-air missiles. Additionally, the range has 39 undeveloped Ground Support Areas (GSA), a developed training site (Cannon Air Defense Complex), a rifle range, a pistol range, a parachute cargo DZ, an Explosive Ordnance Disposal operating area, and a live ordnance jettison area (Department of Air Force and Navy 2007).

Course modules conducted within R-2310W include tactics; confined area landings; combined arms exercises; formations (day and night); terrain following exercises; and training in urban warfare environments. Rotary wing aircraft can use this area for familiarization profiles (day and night); formations (day and night); Nuclear, Biological and Chemical equipment training (day and night); tactics; confined area landings; combined arms exercises; night vision goggle training; and terrain following exercises. A breakdown of existing rotary wing and fixed wing operations at the BMGR-West is shown in Table 6.2.2-1.

[1] The runway has an aggregate base course surface with an SS-1H emulsion surface treatment.

MCAS Yuma is the using agency for R-2301W (MCAS Yuma 2000). The U.S. Air Force (56th Fighter Wing, Luke AFB, Arizona) is the using agency for R-2310E.

Table 6.2.2-1. Existing Annual Aircraft Operations at Barry M. Goldwater Range (West)

Aircraft Type	Yodaville (Bombing)	Cactus West (Bombing)	Low Altitude Training	Air-to-Air & Air-to-Ground	Aerial Combat Maneuvers	Confined Area Landing and Tactics[1]	Free Play	WTI	AUX-2	Total
ROTARY WING										
AH-1	-	-	-	310	-	-	-	3,049	-	3,359
CH-46	-	-	-	258	167	-	-	4,882	572	5,879
CH-53	-	-	-	98	-	-	74	3,097	-	3,269
UH-1	-	-	-	222	-	-	-	1,631	-	1,853
FIXED WING										
AV-8B	273	528	33	480	1,053	-	264	3,198	49,632	55,461
F/A-18C/D	-	-	-	-	-	584	-	2,554	-	3,138
F/A-18E/F	1,833	-	48	-	6,585	1,168	-	2,554	-	12,188
F-16	-	405	-	-	2,025	669	-	207	-	3,306
F-5	-	-	-	50	5,913	1,326	1,204	23	-	8,516
C-130	-	-	-	-	-	-	-	-	1,076	1,076
Total	**2,106**	**933**	**81**	**1,418**	**15,743**	**3,747**	**1,542**	**21,195**	**51,280**	**98,045**

Notes:
1. Includes Tactics (Low).
WTI = Weapons Tactics Instructor Course
See Appendix C for details.

Chocolate Mountain Range

The primary mission of the Chocolate Mountain Range is military aircrew training in the delivery of air-to-ground ordnance (USMC 1997a). The range is located east of the Salton Sea, California (Figure 6.2.2-2). The associated Special Use Airspace consists of R-2507N and R-2507S, which extends from the ground surface to 40,000 feet MSL.

The Chocolate Mountain Range is primarily used for air-to-air and air-to-ground ordnance, including rockeye and live cluster bombs. The range consists of five close air support target complexes (Dead Man, Punch Bowl, Iris Wash, Blue Mountain, Mount Barrow), search and attack target locations with more than 200 individual targets, and four simulated airfields (DoN 2001). There is a wide selection of realistic target complexes and individual sites that simulate enemy airfields, vehicle depots, truck convoys, troop and armor positions, power stations, and command and communications sites (USMC 1997a). The range also contains areas for ground support training that are used by USMC ground units to perform air defense, air control communications, Forward Arming and Refueling Points, and other aviation related functions (USMC 1997a, 2005b). Rotary wing aircraft can use this area for familiarization profiles (day and night); formations (day and night); Nuclear, Biological and Chemical equipment training (day and night); tactics; confined area landings; combined arms exercises; night vision goggle training; and terrain following exercises. A breakdown of existing rotary wing and fixed wing operations at the Chocolate Mountain Range is shown in Table 6.2.2-2.

MCAS Yuma is the using agency for R-2507 (MCAS Yuma 2000). R-2510 and R-2512

The primary objective of operations within R-2510 and R-2512 is military aircrew training. These restricted areas are located near NAF El Centro, near the Chocolate Mountain Range (see Figure 6.2.2-2). The Special Use Airspace associated with R-2510 extends from the ground surface to 40,000 feet MSL (with weekday limitations of 15,000 feet MSL), while R-2512 extends from the ground surface to 23,000 feet MSL (USMC 1997a; FAA JO 7400.8P).

Table 6.2.2-2. Existing Annual Aircraft Operations at Chocolate Mountain Range

Aircraft Type	Close Air Support	Air-to-Air	Aerial Combat Maneuvers	Area Reconnaissance	LAT/Air Interdiction	R-2507N	R-2507S	Other Route-Type Operations	Total
ROTARY WING									
CH-46	282	13	-	-	-	57	510	-	862
CH-53	136	9	-	-	-	27	247	-	419
AH-1	149	15	-	-	-	98	196	-	458
UH-1	68	9	-	-	-	49	94	-	220
FIXED WING									
AV-8B	1,314	-	-	1,725	246	-	-	984	4,269
F/A-18	2,021	-	-	2,644	378	-	-	1,518	6,561
EA-6B	-	-	-	51	-	-	-	-	51
F-5E	96	9	21	100	17	-	-	72	315
T-45	-	-	-	237	-	-	-	-	237
C-130	11	-	-	12	1	-	-	6	30
Total	**4,077**	**55**	**21**	**4,769**	**642**	**231**	**1,047**	**2,580**	**13,422**

Notes:
Includes route-type operations and area-type operations.
LAT = Low Altitude Training
Operations numbers based on estimates developed for the noise modeling (see section 6.2.8, Noise).
See Appendix C for details.

R-2510 contains two targets (Shade Tree and Loom Lobby) and a parachute DZ. Shade Tree target is composed of four individual targets, including a main inert bomb target, a strafing target, a Mobile Land Target, and a bomb dummy unit target (USMC 2001b). This area is used for inert ordnance in high, intermediate, and low altitude bombing and rocket-firing exercises; the main inert bomb target is also equipped with a Weapon Impact Scoring System used for scoring and evaluating pilot performance. Loom Lobby has a 40-foot diameter bull's-eye target as well as a remote-controlled target for special weapons and inert ordnance. In addition, R-2510 has two parachute DZs (Camelot and Bull-head), which can accommodate both personnel ("jumpers") and cargo drops.

R-2512 consists of two multiple-purpose ground targets (Kitty Baggage and Inky Barley) used in conventional dive bombing, high-altitude dive bombing, glide bombing, and firing air-ground rockets (USMC 2001b). No electronic scoring is available on this range.

Typical training operations at the target areas within R-2510 and R-2512 include aircraft familiarization, air-to-air refueling, tactical air control, bombing, rocket/small arms firing, air combat maneuvering, air intercept, survey flights, parachute drops, tactics, search and rescue flights, and air defense exercises (USMC 2001b). A breakdown of existing rotary wing and fixed wing operations at R-2510 and R-2512 is shown in Table 6.2.2-3.

The Fleet Area Control and Surveillance Facility (FACSFAC), San Diego is the using agency for R-2510A, R-2510B, and R-2512, and MCAS Yuma is the using agency for all adjacent MOAs (MCAS Yuma 2000).

Table 6.2.2-3. Existing Annual Aircraft Operations at R-2510, R-2512, and Kane MOAs

Aircraft Type	Target Loom Lobby (R-2510)	Target Shade Tree (R-2510)	Target Inkey Barley (R-2512)	Target Kitty Baggage (R-2512)	R-2510	R-2512	Kane MOAs	Total
ROTARY WING								
CH-46E	-	-	37	30	11	-	-	78
CH-53E	-	-	-	-	10	-	-	10
OH-58D	1,065	1,160	-	-	68	-	-	2,293
UH-1N	58	-	91	96	73	-	-	318
UH-60A	-	110	-	-	48	-	-	158
FIXED WING								
AV-8B	511	628	92	92	130	80	-	1,533
C-130	-	-	-	-	20		-	20
F-18	6,420	8,266	612	598	1,711	86	8,398	2,6091
F-5E	-	-	-	-	-	13	-	13
A-6A	-	-	-	-	-	27	-	27
T-2C	-	-	-	-	-	8	-	8
T-34	-	146	-	-	656	8	-	810
T-45	3,532	5,942	807	803	117	8	-	11,209
Total	**11,586**	**16,252**	**1,639**	**1,619**	**2,844**	**230**	**8,398**	**42,568**

Notes:
Include route-type operations and area-type operations.
Operations numbers based on estimates developed for the noise modeling (see section 6.2.8, Noise).
Kane MOAs include Kane East, Kane South, and Kane West.
See Appendix C for details.

Environmental Consequences

Training Range Impacts

BARRY M. GOLDWATER RANGE (WEST)

Although the MV-22 aircraft mechanically operates and flies differently than the retiring CH-46 (e.g., has rotating nacelles, commonly flies as a fixed wing aircraft, and typically flies higher and faster than the CH-46), the MV-22 would operate in a training environment similar to that of other existing aircraft within the BMGR-West.. Established airspace training footprints would not be expanded or modified with implementation of the action alternatives. The introduction of up to ten squadrons of the MV-22 to the training environment would result in an increase of an estimated 12,063 operations per year due to the associated increase in MV-22 training operations (Table 6.2.2-4) or a 12 percent increase in overall operations at BMGR-West compared to existing conditions. This increase is primarily due to the estimated increase of about 8,000 annual operations at AUX-2 to conduct MV-22 FCLP operations. This increase is also due to the fact that the MV-22 can fly farther than the CH-46 and can reach destinations like the BMGR-West easier than the CH-46. This will allow the MV-22 squadrons to take advantage of a wider selection of training ranges. As a result, some of the operations that previously occurred at training ranges like MCB Camp Pendleton would now occur at the BMGR-West. Another reason for the difference between the

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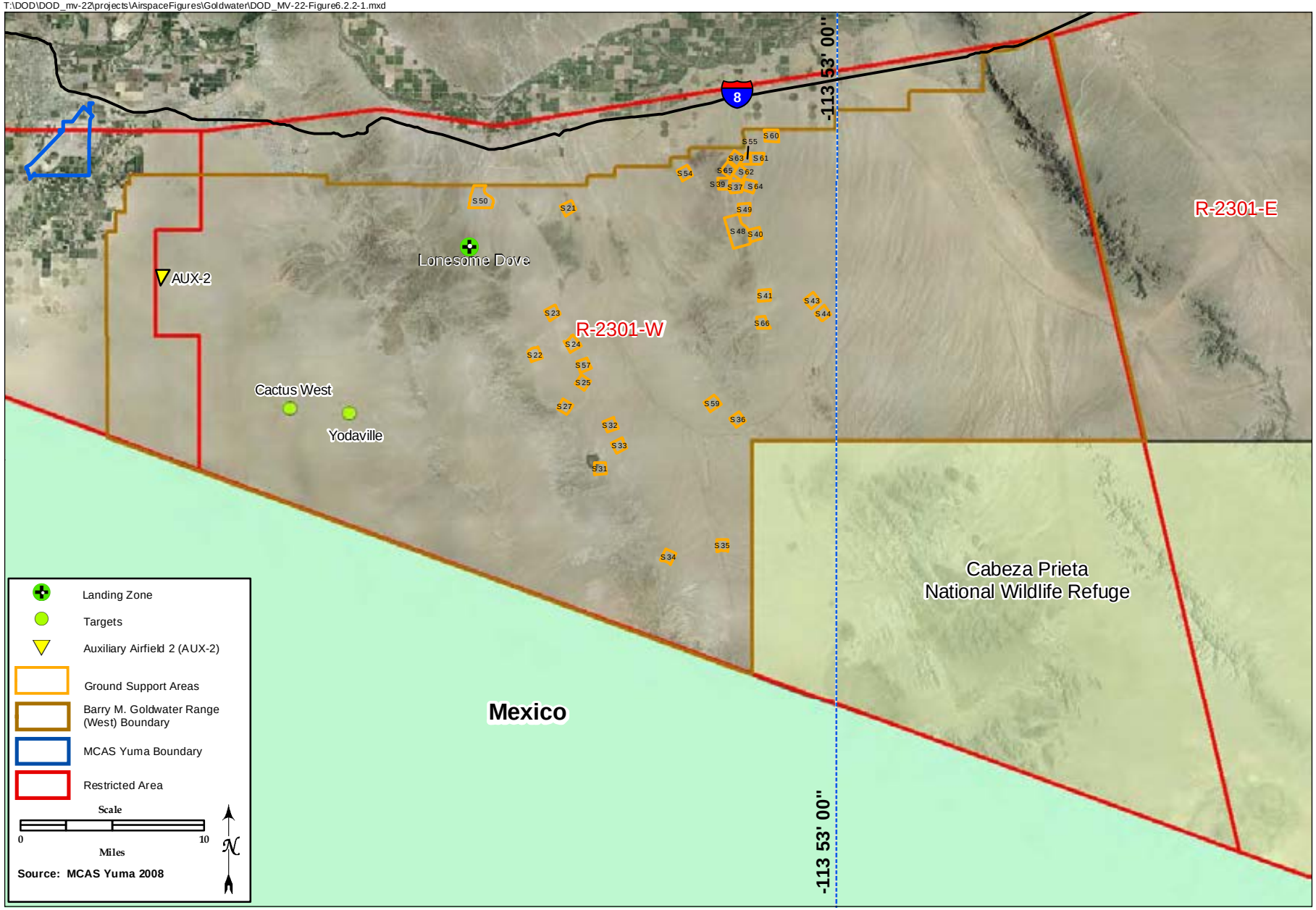

Barry M. Goldwater Range (West) Special Use Airspace and Range Facilities

FIGURE

6.2.2-1

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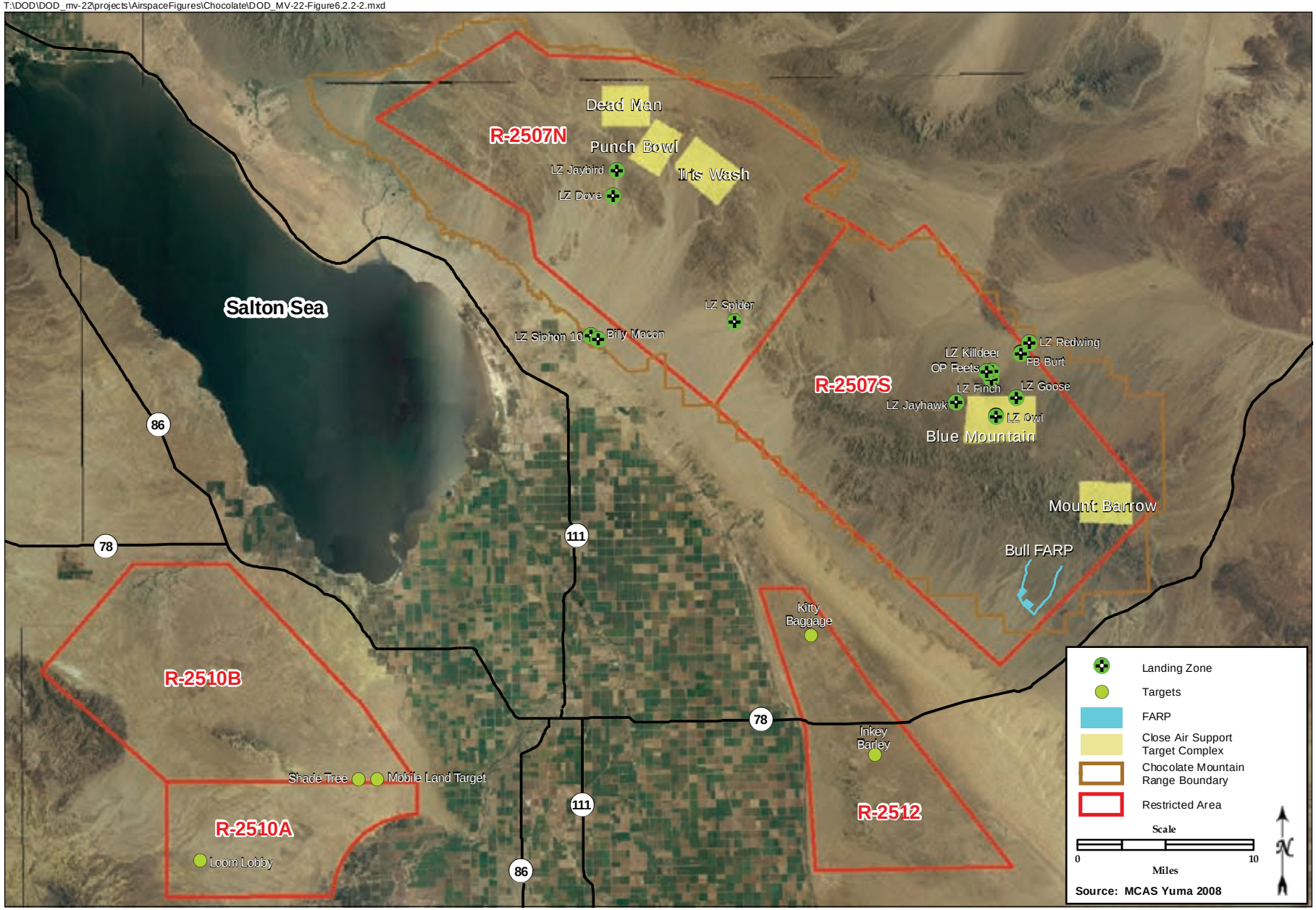

Chocolate Mountain Aerial Bombing and Gunnery Range, R-2510 and R-2512

FIGURE

6.2.2-2

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current CH-46 training operations and those proposed for the MV-22 is due to the fact that some MV-22 operational components would entail flying in a fixed wing mode, which is something the CH-46 cannot do. Therefore, training scenarios sometimes differ from previous CH-46 training operations.

Airspace training operations would be consistent with existing airspace operations, because the MV-22 would operate at only existing range facilities used by other rotary wing and fixed wing aircraft. For example, MV-22 landing operations only would occur at designated GSAs and the Lonesome Dove LZ shown on Figure 6.2.2-1, except under emergency conditions. Flight operations involving the MV-22 aircraft would follow the same procedures as those involving other aircraft currently utilizing the training ranges and airspace. However, this increase in training tempo would likely require more coordination between airspace managers and users to meet the varying needs for testing and training. Priorities in scheduling for specific uses at specific times of the year would be an important determinant in how to allocate limited airspace resources safely. With increased coordination between airspace managers and users, no significant impact would occur (see section 6.2.16 [Safety and Environmental Health] for information regarding aircraft mishap response and other safety issues).

Table 6.2.2-4. Proposed Change in Annual Range Operations at Barry M. Goldwater Range (West)

Operation Area	Addition of MV-22 Operations	Reduction of CH-46 Operations	Change in Operation over Existing Conditions
Yodaville (Bombing)	-	-	-
Cactus West (Bombing)	-	-	-
Low Altitude Training	-	-	-
Air-to-Air & Air-to-Ground	3,611	-258	+3,353
Aerial Combat Maneuvers	50	-167	-117
Confined Area Landing and Tactics	5,664	-	+5,664
Free Play	-	-	-
WTI	96	-4,882	-4,786
AUX 2*	8,521	-572	+7,949
Total	**17,942**	**-5,879**	**+12,063**

Notes:
* Based on noise analysis for the 8-Squadron Alternative, which is the maximum proposed operations at AUX-2 by the MV-22 (see section 5.8, MCAS Yuma Noise).
WTI = Weapons Tactics Instruction Course
See Appendix C for details.

CHOCOLATE MOUNTAIN RANGE

Although the MV-22 mechanically operates and flies differently than the retiring CH-46, the MV-22 would operate in a training environment similar to that of other existing aircraft within the Chocolate Mountain Range. Established airspace training footprints would not be expanded or modified with implementation of the action alternatives. The introduction of up to ten squadrons of the MV-22 to the training environment would result in an increase of an estimated 4,249 operations per year due to the associated increase in MV-22 training operations (Table 6.2.2-5) or a 32 percent increase in overall operations compared to existing conditions at the Chocolate Mountain Range. This increase is also due to the fact that the MV-22 can fly farther than the CH-46 and can reach destinations like the

Chocolate Mountain Range easier than the CH-46. This will allow the MV-22 squadrons to take advantage of a wider selection of training ranges. As a result, some of the operations that previously occurred at training ranges like MCB Camp Pendleton would now occur at the Chocolate Mountain Range. Another reason for the difference between the current CH-46 training operations and those proposed for the MV-22 is due to the fact that some MV-22 operational components would entail flying in a fixed wing mode, which is something the CH-46 cannot do. Therefore, training scenarios sometimes differ from previous CH-46 training operations.

Table 6.2.2-5. Proposed Change in Annual Range Operations at the Chocolate Mountain Range

Operation Area	Addition of MV-22 Operations	Reduction of CH-46 Operations	Change in Operation over Existing Conditions
R-2507N	-	-57	-57
R-2507S	1,131	-510	+621
Other Route-Type Operations	-	-	-
Close Air Support	-	-282	-282
Air-to-Air	-	-13	-13
Air-to-Ground	3,702	-	+3,702
Confined Area Landing	278	-	+278
Aerial Combat Maneuvers	-	-	-
Area Reconnaissance	-	-	-
LAT/Air Interdiction	-	-	-
Total	**5,111**	**-862**	**+4,249**

Notes:
LAT = Low Altitude Training
See Appendix C for details.

Airspace training operations would be consistent with existing airspace operations, because the MV-22 would operate at only existing range facilities used by other rotary wing and fixed wing aircraft. For example, MV-22 landing operations only would occur at the existing LZs shown on Figure 6.2.2-2, except under emergency conditions. Flight operations involving the MV-22 aircraft would follow the same procedures as those involving other aircraft currently utilizing the training ranges and airspace. However, this increase in training tempo would likely require more coordination between airspace managers and users to meet the varying needs for testing and training. Priorities in scheduling for specific uses at specific times of the year would be an important determinant in how to allocate limited airspace resources safely. With increased coordination between airspace managers and users, no significant impact would occur (see section 6.2.16 [Safety and Environmental Health] for information regarding aircraft mishap response and other safety issues).

R-2510 AND R-2512

As noted above, although the MV-22 mechanically operates and flies differently than the retiring CH-46, the MV-22 would conduct similar operations currently conducted by other aircraft within R-2510 and R-2512. Established airspace training footprints would not be expanded or modified with implementation of the action alternatives, and no MV-22 landing operations would occur at either range, except under emergency conditions. The introduction of up to ten squadrons of the MV-22 to the training environment would result in a small increase of an estimated 70 operations per year due to the associated increase in MV-22 training operations (Table 6.2.2-6) or less than one percent increase in overall operations compared to existing conditions. This small increase is reflective of the fact that the MV-22 can fly farther than the CH-46 and can reach destinations like R-2510 easier than the CH-46.

Table 6.2.2-6. Proposed Change in Annual Range Operations at R-2510, R-2512, and Kane MOAs

Operation Area	Addition of MV-22 Operations	Reduction of CH-46 Operations	Change in Operation over Existing Conditions
Target Loom Lobby (R-2510)	148	-	+148
Target Shade Tree (R-2510)	-	-	-
Target Inkey Barley (R-2512)	-	-37	-37
Target Kitty Baggage (R-2512)	-	-30	-30
R-2510	-	-11	-11
R-2512	-	-	-
Kane MOAs	-	-	-
Total	**148**	**-78**	**+70**

Notes:
Kane MOAs include Kane East, Kane South, and Kane West.
See Appendix C for details.

Airspace training operations would be consistent with existing airspace operations, because the MV-22 would operate at only existing range facilities used by other rotary wing and fixed wing aircraft. Therefore, airspace management would not change as a result of the new aircraft (see section 6.2.16 [Safety and Environmental Health] for information regarding aircraft mishap response and other safety issues). No significant impact would occur.

MITIGATION MEASURES

Because there would be no significant impact on range operations, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities, and Bob Stump Training Range Complex operations would continue at the current level. Therefore, no impact would occur.

6.2.3 Land Use

Affected Environment

Existing airspace training operations within the Bob Stump Training Range Complex comply with established range management and safety plans (e.g., MCAS Yuma 2000), the base master plan (DoN 2001), AICUZ/RCUZ guidelines, and the BMGR INRMP (Department of Air Force and Navy 2007).

Environmental Consequences

Training Range Impacts

Established airspace training footprints would not be expanded with implementation of the action alternatives. Airspace training operations would be consistent with existing airspace operations and would comply with the established range and land use management plans mentioned above. Furthermore, safety guidelines, and existing range management and land use plans would be updated to address MV-22 operations. The proposed change in aircraft operations within the Bob Stump Training Range Complex due to the presence of the MV-22 may result in a small increase in

noise levels from existing conditions, but this increase would occur either within military lands or over vacant land immediately adjacent to an established range. The small increase in noise would be minimal and would be consistent with land use compatibility guidelines. Therefore, no significant impacts to land use would occur as a result of proposed airspace operations.

MITIGATION MEASURES

Airspace operations at the Bob Stump Training Range Complex would not result in significant impacts to land use; therefore, no mitigation measures would be required.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and no impacts to land use would occur.

6.2.4 Socioeconomics

The proposed training operations at the Bob Stump Training Range Complex do not include any change in personnel at the associated ranges, and there would be no new construction or improvements at the any range facility. Therefore, the proposed action would have no socioeconomic impact on the local communities, and no socioeconomic impacts would occur.

6.2.5 Community Facilities and Services

The proposed training operations at the Bob Stump Training Range Complex do not include new construction or improvements at any range facility. Therefore, existing conditions would remain unchanged, and no impacts to community facility and services would occur. Additional information regarding aircraft mishaps and general fire issues can be found in section 6.2.16 (Safety and Environmental Health).

6.2.6 Ground Traffic and Transportation

The proposed training operations at the Bob Stump Training Range Complex do not include any ground transportation support. Additionally, no new construction or improvements are proposed at any range facility. Therefore, the proposed action would have no impact on the traveled roadway system, and no impacts to ground transportation would occur.

6.2.7 Air Quality

Affected Environment

In regard to the proposed MV-22 training and operational areas of the Bob Stump Training Range Complex within California, section 4.7 (MCAS Camp Pendleton Air Quality) provides background information regarding NAAQS and the CAAQS (see Tables 4.7-1). In California, the California ARB delegated authority for enforcing both the federal and state air pollution standards to regional air agencies.

The description of the air quality affected environment within the Arizona-portion of the proposed MV-22 training and operational areas of the Bob Stump Training Range Complex is similar to the

information provided in section 5.7 (MCAS Yuma Air Quality). However, due to their more rural nature, ambient pollutant levels in these areas would be lower compared to the MCAS Yuma site. In Arizona, the ADEQ has adopted the NAAQS to regulate sources of air pollution and is the responsible agency for enforcing these standards.

The Bob Stump Training Range Complex includes BMGR-West (R-2301W), the Chocolate Mountain Range (R-2507), and R-2510 and R-2512 near NAF El Centro. The following describes the air quality attainment status for each air space:

R-2301W. The range attains all NAAQS, except the northwest corner (about four percent of R-2301W) occurs within the Yuma PM_{10} moderate nonattainment area. The conformity *de minimis* threshold for this nonattainment area is 100 tons per year of PM_{10}.

Air monitoring data show that O_3 levels in the Yuma metropolitan area approach the national eight-hour O_3 standard (0.075 ppm) (ADEQ 2008b). However, the western border of R-2301W is several miles east of the City of Yuma and location of the monitoring station that recorded the associated elevated O_3 levels.

R-2507. The range occurs within the Salton Sea Air Basin (SSAB), which includes all of Imperial County and the southwest third of Riverside County. In regard to the O_3 national standard, the Imperial and Riverside County portions of the SSAB are marginal and severe-15 nonattainment areas, respectively (USEPA 2008a). The conformity *de minimis* thresholds for these areas are 100 tons per year of VOC and NO_x and 25 tons per year of VOC and NO_x, respectively. In regard to the PM_{10} national standard, the western two-thirds of Imperial County and all of the Riverside County portions of the SSAB are a serious nonattainment area. The conformity *de minimis* threshold for this area is 70 tons per year of PM_{10}. The SSAB attains all other NAAQS. In regard to the CAAQS, the SSAB is a nonattainment area for O_3 and PM_{10} and attains all other CAAQS.

R-2510 and R-2512. In regard to the NAAQS, both ranges occur within the Imperial County portion of the SSAB that is a marginal O_3 nonattainment area and a serious PM_{10} nonattainment area. The conformity *de minimis* thresholds for this area are 100 tons per year of VOC and NO_x and 70 tons per year of PM_{10}. The range areas attain all other NAAQS. In regard to the CAAQS, the SSAB is a nonattainment area for O_3 and PM_{10} and attains all other CAAQS.

Environmental Consequences

Training Range Impacts

Air quality impacts were reviewed for significance in light of federal, state, and local air pollution standards and regulations. For the purposes of the present analysis, if project emissions were projected to exceed a threshold requiring a conformity determination further analysis was conducted to determine whether impacts were significant. In such cases, if emissions conform to the approved SIP, then impacts would be less than significant. In the case of criteria pollutants for which the relevant air basin is in attainment of the NAAQS, the analysis determined whether the magnitude and location of project emissions reasonably would be expected to cause a significant adverse impact to air quality.

Air quality impacts associated with the proposed training operations were determined by estimating the net change in emissions that would occur within each affected air space of the Bob

Stump Training Range Complex due to the replacement of current CH-46 training operations with future MV-22 training operations. The analysis evaluated existing and proposed aircraft training operations that occurred below 3,000 feet (914 meters) above ground level.

Operational data used to calculate current CH-46 and future MV-22 emissions were obtained from the USMC (USMC 2007, Wyle 1999). Factors used to calculate aircraft combustive emissions were obtained from the DoN (AESO 2001a, 2001b, 2001c, and 2001d). Details of emission source data and calculations used to estimate aircraft training emissions are included in Appendix B of this EIS.

Table 6.2.7-1 presents a summary of the resulting annual operational emissions that would occur from the proposed MV-22 training operations within the Bob Stump Training Range Complex. These data show that annual emissions in 2017 would not trigger the requirements for a conformity determination. In the case of criteria pollutants for which the relevant air basin is in attainment of a NAAQS, the emissions, with one possible exception, either decline or increase by very small amounts. Impacts from these emissions would not be significant.

Table 6.2.7-1. Annual Emissions Due to MV-22 Training Operations within the Bob Stump Training Range Complex

Range Location/Aircraft Type	Air Pollutant Emissions (tons) (1)(2)					
	VOC	CO	NOx	SOx	PM10	PM2.5
R-2301W						
MV-22 Operations (3)	0.22	11.56	288.25	8.22	32.35	32.35
CH-46 Operations	-4.59	-26.41	-5.28	-0.54	-2.39	-2.39
Net Change from Existing Conditions	**-4.36**	**-14.86**	**282.97**	**7.68**	**29.97**	**29.97**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**100**	**NA**
R-2507						
MV-22 Operations	0.08	3.89	107.07	3.02	11.92	11.92
CH-46 Operations	-1.26	-7.24	-1.45	-0.15	-0.66	-0.66
Net Change from Existing Conditions	**-1.18**	**-3.35**	**105.63**	**2.87**	**11.26**	**11.26**
Net Change within Imperial County	**-0.94**	**-2.68**	**84.50**	**2.30**	**9.01**	**9.01**
Conformity *De Minimis* Level	**100**	**100**	**NA**	**NA**	**70**	**NA**
Net Change within Riverside County	**-0.24**	**-0.67**	**21.13**	**0.57**	**2.25**	**2.25**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**70**	**NA**
R-2510 and R-2512						
MV-22 Operations	0.00	0.15	3.99	0.11	0.45	0.45
CH-46 Operations	-0.02	-0.10	-0.02	-0.00	-0.01	-0.01
Net Change from Existing Conditions	**-0.02**	**0.05**	**3.96**	**0.11**	**0.44**	**0.44**
Conformity *De Minimis* Level	**100**	**100**	**NA**	**NA**	**70**	**NA**

Notes:
1 Year 2017 emissions.
2 – indicates reduction in pollutant.
3 Maximum proposed operations due to 8 MV-22 squadrons at MCAS Yuma.

Proposed NO_x emissions within R-2301W would increase by a maximum of 283.0 tons per year. These emissions were compared to the most recent Yuma County emissions inventory (year 2002) to determine the relative magnitude of proposed emissions, and therefore, their potential to combine with baseline emissions and contribute to an exceedance of the eight-hour national standard for O_3. In 2002, NO_x emissions generated within Yuma County amounted to 9,540 tons (USEPA 2008a). Review of Table 6.2.7-1 shows that the proposed MV-22 training operations within R-2301W would generate 283.0 tons per year of NO_x emissions within Yuma County. These emissions would amount to 3.0 percent of the annual NO_x emissions generated within Yuma County in 2002. While these emissions represent a relatively small increase in total NO_x emissions within Yuma County, a definitive determination regarding the significance of their impact to ambient O_3 levels would require an intensive computerized photochemical modeling analysis,

which is beyond the scope of this EIS. Proposed MV-22 training operations would occur across approximately 5,000 square miles of R-2301W air space. Emissions from these operations, therefore, would not be localized in any particular area where they might combine with ambient O_3 levels to cause an exceedance of the 8-hour standard for O_3. Moreover, the Yuma metropolitan area, which experiences the highest O_3 levels in the project region, is located several miles from the nearest boarder of the R-2301 air space. Therefore, air quality impacts from the proposed action are expected to be less than significant in the Bob Stump Training Range Complex.

The project conformity applicability analyses for the MV-22 proposed action are summarized in section 7.3.6 and are presented in complete form in Appendix B of this EIS.

MITIGATION MEASURES

Since the proposed MV-22 training operations would produce less than significant air quality impacts, no mitigation measures are required.

No Action Alternative

Under the No Action Alternative, aircraft training operations within the Bob Stump Training Range Complex would continue at current levels. Therefore, the No Action Alternative would not produce any new air quality impacts compared to existing conditions.

6.2.8 Noise

This section analyzes noise impacts related to training operations at the Bob Stump Training Range (BMGR-West, Chocolate Mountain Range, R-2510 and R-2512). These are discussed separately below. Additional background information regarding noise metrics and noise modeling can be found in section 6.1.8 (MCB Camp Pendleton Noise) and Appendix C.

Barry M. Goldwater Range (West)

Affected Environment

The airspace associated with BMGR-West is R-2301W. The existing aircraft noise environment at BMGR-West is initially based on a 2005 aircraft noise study (WR 05-16; Wyle 2006a). The study is based on military aircraft operations within the range during CY 2003. This resulting data serves as the baseline condition for the range for this EIS.

The modeling was summarized into two groups: route-type operations and area-type operations. The following factors were considered in the analysis of noise levels from existing operations at the range: flight operations, flight areas and/or tracks, flight profiles and climatological data. These factors are described in detail in Appendix C. Modeled flight operations are summarized below.

FLIGHT OPERATIONS

The baseline condition for BMGR-West modeled approximately 24,300 route-type operations annually as shown in Table 6.2.8-1. Route modeling consisted of the following:

- Routes serving fixed wing bombing activities to targets at Cactus West and Yodaville;

- WTI routes across R-2301W and R-2301E and through the Cabeza Prieta National Wildlife Refuge and
- A Low Altitude Training (LAT) route for fixed wing aircraft.

The WTI route exercises occur exclusively during the spring and fall seasons. The WTI route operations were modeled as busiest month sorties. Table 6.2.8-1 reflects the annual equivalent number of WTI operations, which is the busiest month sorties multiplied by twelve months per year.

Table 6.2.8-1. Existing Annual Route-Type Operations for Barry M. Goldwater Range (West)

Aircraft Type	Period	Yodaville (Bombing)	Cactus West (Bombing)	Low Altitude Training (LAT)	WTI (1)	Total
AV-8B		273	528	33	**3,198**	**4,032**
F/A-18C/D		-	-	-	**2,554**	**2,554**
F/A-18E/F		1,833	-	48	**2,554**	**4,435**
F-16		-	405	-	**207**	**612**
F-5		-	-	-	**23**	**23**
CH-53		-	-	-	**3,097**	**3,097**
CH-46		-	-	-	**4,882**	**4,882**
AH-1		-	-	-	**3,049**	**3,049**
UH-1		-	-	-	**1,631**	**1,631**
MV-22		-	-	-	**-**	**-**
Total	**Day**	**2,104**	**931**	**81**	**20,136**	**23,252**
	Night	**2**	**2**	**-**	**1,059**	**1,063**
	Total	**2,106**	**933**	**81**	**21,195**	**24,315**

Notes:
1 WTI routes extend into R-2301E; sorties shown are annual equivalent ops.
Day = 0700-2159, Night = 2200-0659
WTI = Weapons Tactics Instructor Course
See Appendix C for details.

The baseline condition for BMGR-West also modeled approximately 22,500 area-type operations annually as shown in Table 6.2.8-2. Areas modeled within the range support the following missions:

- Air-to-Air operations in five different working areas, which included three areas for Tactics Low operations;
- Air-to-Ground operations in nine working areas, which included two areas for Tactics High and two areas for Tactics Low;
- Air Combat Maneuvers in four working areas; and
- Free Play in two working areas.

F/A-18E/F Hornet and F-5 Tiger each make up about one-third of the total area operations. The route operations consist of about 50 percent fixed wing aircraft and approximately 29 percent of route operations are due to F/A-18E/F Hornets. Of all aircraft operations modeled at BMGR-West, approximately 87 percent occur during DNL daytime and 13 percent during DNL nighttime.

NOISE EXPOSURE

Using the data described in the preceding section and in Appendix C, the MR_NMAP computer model was used to calculate and plot the L_{dnmr} contours for average daily aircraft operations during the busiest month. Figure 6.2.8-1 shows the 65 to 85 dB L_{dnmr} contours, in 5 dB increments, for the existing condition. The 65 dB L_{dnmr} contour on the east side of the R-2301W is due to the bombing activity. The 65 dB L_{dnmr} contour in the middle of R-2301W is due to a combination of LAT, Air-to-

Ground and Air Combat Maneuver activity. The two fixed wing WTI routes cause noise exposure less than 70 dB L_{dnmr}. The primary noise driver along the WTI routes are the Hornets. The baseline condition does not cause exposure greater than or equal to 70 dB L_{dnmr}. The overall noise exposure is dominated by the Hornet route and area activity.

Table 6.2.8-2. Existing Annual Area-Type Operations for Barry M. Goldwater Range (West)

Aircraft Type	Period	Air-to-Air & Air-to-Ground	Aerial Combat Maneuvers	Confined Area Landing and Tactics	Tactics Low	Free Play	Total
AV-8B		480	1,053	-	-	264	1,797
F/A-18C/D		-	-	-	584	-	584
F/A-18E/F		-	6,585	-	1,168	-	7,753
F-16		-	2,025	-	669	-	2,694
F-5		50	5,913	-	1,326	1,204	8,493
AH-1		310	-	-	-	-	310
CH-46		258	167	-	-	-	425
H-53		98	-	-	-	74	172
UH-1		222	-	-	-	-	222
Total	**Day**	1,406	15,585	-	3,711	1,526	22,228
	Night	12	158	-	36	16	222
	Total	**1,418**	**15,743**	**-**	**3,747**	**1,542**	**22,450**

Notes:
Day = 0700-2159, Night = 2200-0659
Includes sorties for special exercises.
See Appendix C for details.

As the 65 dB L_{dnmr} contour does not extend beyond the boundary of BMGR, no off-range people or housing units are exposed. Therefore, no indoor speech interference and sleep disturbance analysis was conducted.

Environmental Consequences

General modeling parameters for MV-22 aircraft at BMGR-West included detailed flight operations by mission, DNL period, general airspace utilization, and flight profiles derived from data provided by the USMC (USMC 2008a; USMC 2008b; Weir 2008c).

PROPOSED TRAINING IMPACTS

MV-22 would operate at BMGR-West regardless of basing alternative. For the purposes of the EIS, the maximum tempo of proposed MV-22 activity for any of the basing alternatives was analyzed. It is estimated that one squadron would be deployed at all times. Therefore the noise modeling estimates flight activity from nine squadrons of MV-22 aircraft and the removal of CH-46E aircraft activity at the range. The nine squadrons of MV-22 aircraft would consist of seven active duty squadrons and two reserve squadrons.

Table 6.2.8-3 shows the numbers of proposed annual MV-22 flight operations for area-type operations. In addition to training and readiness operations, the MV-22 squadrons would participate in WTI classes and other special exercisesconducted during different parts of each year. Proposed MV-22 area-type activity is estimated at approximately 9,300 annually, with 93 percent during the DNL day period and seven percent during the DNL nighttime period. MV-22 operations would account for 30 percent of the approximate 31,000 total proposed modeled annual area-type operations for the range.

Table 6.2.8-3. Proposed Annual MV-22 Area-Type Operations at the Barry M. Goldwater Range (West)

Mission	Day	Night	Total
Air-to-Air & Air-to-Ground	3,476	135	3,611
Aerial Combat Maneuvers	50	-	50
Confined Area Landing and Tactics	4,235	498	4,733
Tactics Low	931	-	931
Free Play	-	-	-
Total	**8,692**	**633**	**9,325**

Notes:
Day = 0700-2159, Night = 2200-0659
Includes sorties for special exercises.
Does not include operations at AUX-2.
See Appendix C for details.

As listed in Table 6.2.8-2, approximately 425 modeled area-type operations by CH-46E aircraft would be removed from the range. The operations for all other modeled aircraft types would remain unchanged relative to the Baseline/No Action scenario.

Table 6.2.8-4 shows the numbers of proposed annual MV-22 flight operations for the WTI routes. Operations from baseline activity would remain the same except CH-46 flights would be deleted. Proposed MV-22 route-type activity is estimated at approximately 96 annually, with 95 percent during the DNL day period and five percent during the DNL nighttime period. MV-22 operations would account for less than one percent of the approximate 19,500 total proposed modeled annual route-type operations.

Table 6.2.8-4. Proposed Annual MV-22 Route-Type Operations for Barry M. Goldwater Range (West)

Mission	Day	Night	Total
Yodaville (Bombing)	-	-	-
Cactus West (Bombing)	-	-	-
Low Altitude Training (LAT)	-	-	-
Weapons Tactics Instruction (WTI)	91	5	96
Total	**91**	**5**	**96**

Notes:
WTI routes extend into R-2301E; sorties shown and modeled for busiest month.
Day = 0700-2159, Night = 2200-0659
See Appendix C for details.

Using the data in Appendix C, the MR_NMAP computer model was used to calculate and plot the L_{dnmr} contours for average daily aircraft operations during the busiest month. Figure 6.2.8-2 shows the 65 to 85 dB L_{dnmr} contours, in 5 dB increments for the proposed training operations. As under existing conditions, the overall noise exposure would be dominated by the Hornet route and area activity. The 65 dB L_{dnmr} contour on the east side of the R-2301W would be due to the bombing activity. The 65 dB L_{dnmr} contour in the middle of R-2301W would be due to a combination of LAT, Air-to-Ground, and Air Combat Maneuver activity. The modeling of the proposed condition demonstrates level increases at five additional small LZ areas. The relatively small areas, identified as GSAs, would experience L_{dnmr} up to 75 dB. Significant noise exposure for four of the five GSA modeled areas would be within the boundaries of R-2301W. The S-50 GSA would cause 65 dB L_{dnmr} exposure to extend slightly beyond the northern boundary.

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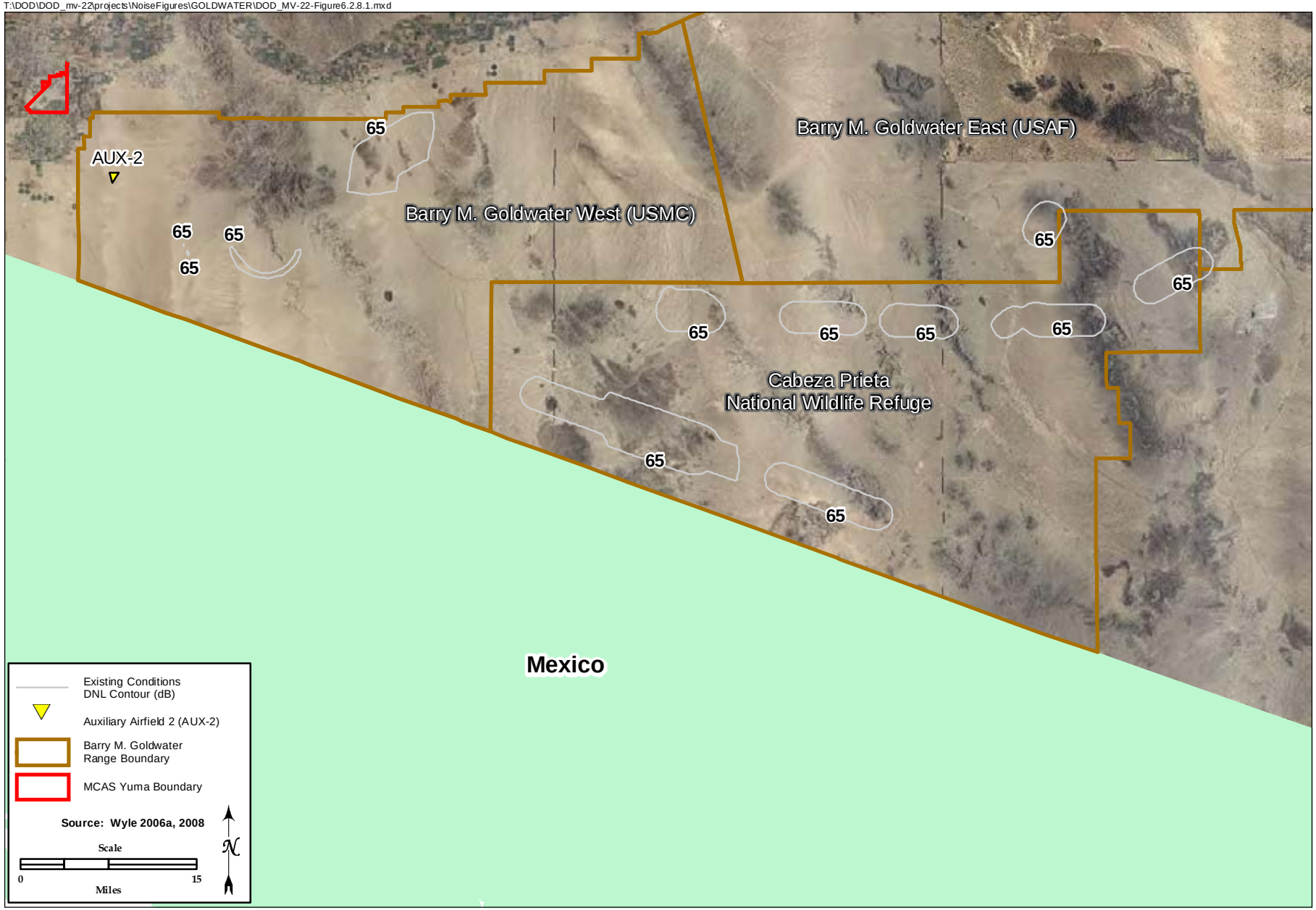

Aircraft Noise Contours from Airspace Operations at Barry M. Goldwater Range (West) for Existing Conditions

FIGURE

6.2.8-1

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In general, with the exception of the previously mentioned exposures at the five GSA modeled areas, the removal of the CH-46E operations and addition of the MV-22 operations would not cause any noticeable change in the L_{dnmr} contours. The 65 dB L_{dnmr} contour extends slightly beyond thenorthern boundary of BMGR-West, but no off-range people or housing units would be exposed, and a significant noise impact is not anticipated.

Mitigation Measures

Because there would be no significant impacts, no mitigation measures would be required.

NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, the noise exposure for the No Action Alternative would be identical to the noise exposure for the baseline condition, and no noise impact would occur.

Chocolate Mountain Range

Affected Environment

The airspace associated with the Chocolate Mountain Range is R-2507. The existing aircraft noise environment at the Chocolate Mountain Range is initially based on a 2004 aircraft noise study (WR 05-04; Wyle 2007c). The study is based on military aircraft operations within R-2507 during FY 2004. Minor changes were made to the existing condition modeling from WR 05-04 to correct for rounding errors and to maintain consistency with the report. This resulting data serves as the baseline conditions for the Chocolate Mountain Range for this EIS.

The modeling was summarized into two groups: route-type operations and area-type operations. The following factors were considered in the analysis of noise levels from existing operations at the range: flight operations, flight areas and/or tracks, flight profile, and climatological data. These factors are described in detail in Appendix C. Modeled flight operations are summarized below.

FLIGHT OPERATIONS

The baseline condition for the Chocolate Mountain Range modeled 3,900 route-type operations annually as shown in Table 6.2.8-5. Route modeling consisted of the following:

- Routes within the Chocolate Mountain Range serving rotary wing close air support missions to five working areas; and
- Routes within the Chocolate Mountain Range serving fixed wing close air support with forward air controller and artillery missions on seven separate routes.

The baseline condition for the Chocolate Mountain Range also modeled approximately 9,600 area-type operations annually as shown in Table 6.2.8-6. Ingress/egress routes to and from R-2507 outside of the range boundary were not modeled. Areas modeled within R-2507 support the following missions:

- Rotary wing close air support in five working areas;
- Air-to-Air (Helicopter and F-5E sorties) in three working areas;
- Air Combat Maneuvers in three working areas;

- Area Reconnaissance in one working area;
- Fixed wing close air support with forward air controller and artillery in seven working areas; and LAT and Air Interdiction in one working area.

Table 6.2.8-5. Existing Annual Route-Type Operations for the Chocolate Mountain Range

Aircraft Type	Period	R-2507N	R-2507S	High Altitude Close Air Support	Total
AV-8B		-	-	984	984
B-1B		-	-	-	-
EA-6B		-	-	-	-
F/A-18C/D		-	-	1,518	1,518
F-5E		-	-	72	72
T-45		-	-	-	-
C-130H		-	-	6	6
AH-1		98	196	-	294
CH-46		57	510	-	567
CH-53		27	247	-	274
UH-1		49	94	-	143
Total	**day**	179	811	1,992	2,982
	evening	41	184	456	681
	night	11	52	132	195
	total	**231**	**1,047**	**2,580**	**3,858**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
Includes sorties for special exercises.
See Appendix C for details.

F/A-18C/D Hornet and AV-8B Harrier aircraft contribute most of the area and route operations. The aircraft area operations are associated with many sub areas throughout R-2507N and R-2507S. Route operations serve the modeled sub areas. Of all aircraft operations modeled at the Chocolate Mountain Range, approximately 18 percent occur during CNEL evening and five percent during CNEL nighttime.

There are no typical profiles as each aircraft type is modeled at different speeds and altitudes for different operation types. Fixed wing aircraft modeled speeds vary from 220 to 500 knots and altitudes from 200 feet to 16,000 feet above ground level. Typical rotary wing aircraft were modeled between 80 and 120 knots and between 0 and 500 feet above ground level.

Consistent with WR 05-04 (Wyle 2007c), it was estimated that the busiest month was equivalent to the annual average month and modeled aircraft fly R-2507 daily during the busiest month of activity. Thirty days per busy month was input to the noise model.

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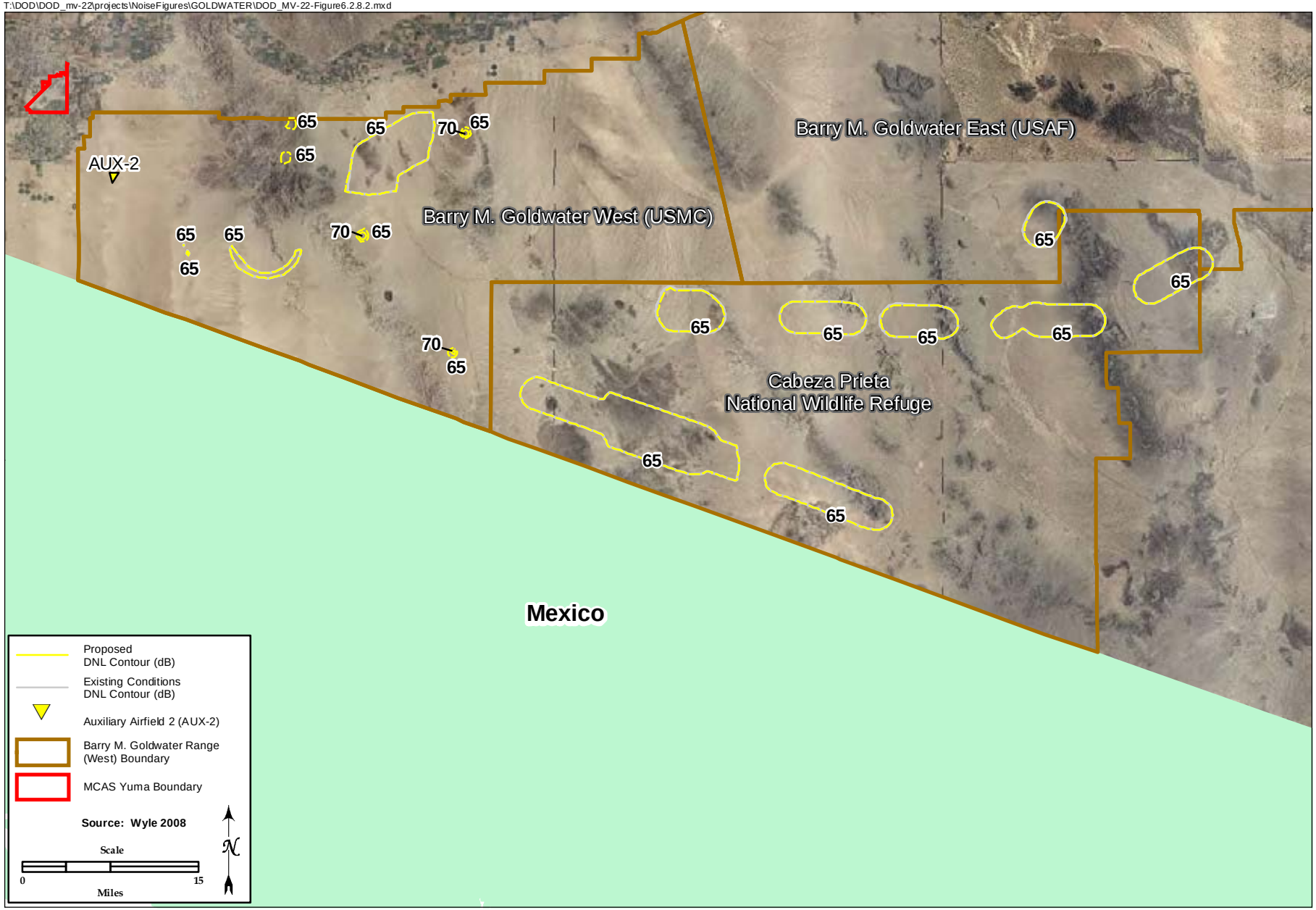

Aircraft Noise Contours from Airspace Operations at Barry M. Goldwater Range (West) for Proposed Training Operations

FIGURE

6.2.8-2

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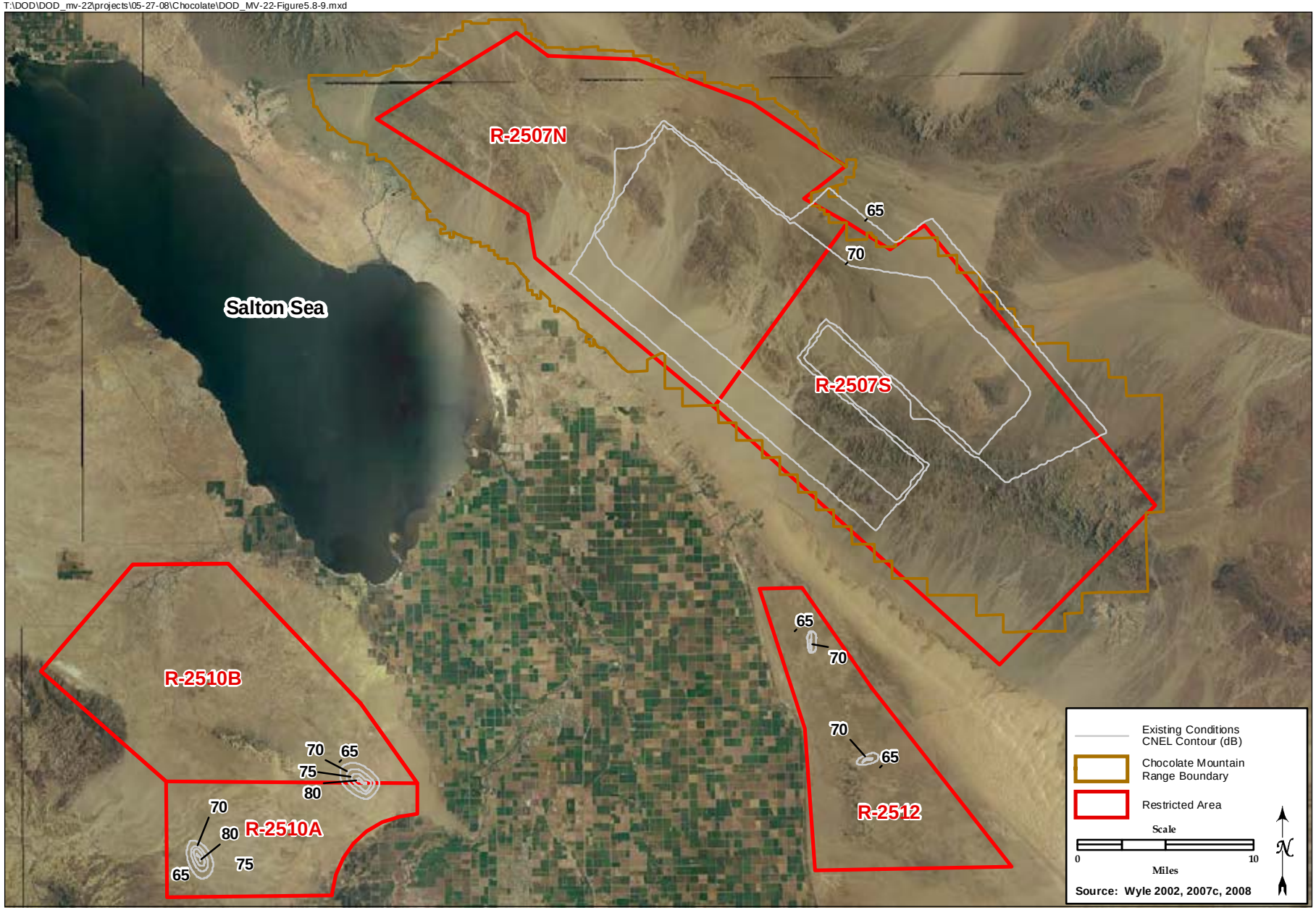

Aircraft Noise Contours from Airspace Operations at Chocolate Mountain Aerial Bombing and Gunnery Range, R-2510, and R-2512 for Existing Conditions

FIGURE

6.2.8-3

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Table 6.2.8-6. Existing Annual Area-Type Operations for the Chocolate Mountain Range

Aircraft Type	Period	Rotary Wing Close Air Support	Fixed Wing Close Air Support	Air-to-Air	Air-to-Ground	Confined Area Landing	Tactics	Aerial Combat Maneuvers	Area Reconnaissance	LAT & Air Interdiction	Total
AV-8B		-	1,314	-	-	-	-	-	1,725	246	3,285
EA-6B		-	-	-	-	-	-	-	51	-	51
F/A-18C/D		-	2,021	-	-	-	-	-	2,644	378	5,043
F-5E		-	96	9	-	-	-	21	100	17	243
T-45		-	-	-	-	-	-	-	237	-	237
C-130H		-	11	-	-	-	-	-	12	1	24
AH-1		149	-	15	-	-	-	-	-	-	164
CH-46		282	-	13	-	-	-	-	-	-	295
H-53		136	-	9	-	-	-	-	-	-	145
UH-1		68	-	9	-	-	-	-	-	-	77
Total	**Day**	495	2,656	45	-	-	-	18	3,685	496	7,395
	Evening	110	608	10	-	-	-	3	845	114	1,690
	Night	30	178	-	-	-	-	-	239	32	479
	Total	**635**	**3,442**	**55**	**-**	**-**	**-**	**21**	**4,769**	**642**	**9,564**

Notes:
Day = 0700-1859, Eve = 1900-2159, Night = 2200-0659
Includes sorties for special exercises.
See Appendix C for details.

NOISE EXPOSURE

Using the data described in the preceding section and in Appendix C, the MR_NMAP computer model was used to calculate and plot the CNELmr contours for average daily aircraft operations during the busiest month. Figure 6.2.8-3 shows the 65 to 85 dB CNELmr contours, in 5 dB increments, for the existing condition. The overall noise exposure is dominated by a combination of Hornet and Harrier Area Reconnaissance, LAT and Air Interdiction activity.

Although the 65 dB CNELmr contour extends beyond the eastern boundary of R-2507 (due to fixed wing LAT/Air Interdiction missions), no off-range people or housing units are exposed. Therefore, no indoor speech interference and sleep disturbance analysis was conducted.

Environmental Consequences

Regarding general modeling parameters involving the MV-22 aircraft at the Chocolate Mountain Range, detailed flight operations by mission, CNEL period, general airspace utilization and flight profiles were derived from data provided by the USMC (USMC 2008a; USMC 2008b; Weir 2008c).

PROPOSED TRAINING IMPACTS

MV-22 would operate at the Chocolate Mountain Range regardless of basing alternative. For the purposes of the EIS, the maximum tempo of proposed MV-22 activity for any of the basing alternatives was analyzed. It is estimated that one squadron would be deployed from its base at all times. Therefore the noise modeling estimates flight activity from nine squadrons of MV-22 aircraft and the removal of CH-46E aircraft activity at the range. The nine squadrons of MV-22 aircraft would consist of seven active duty squadrons and two reserve squadrons.

Table 6.2.8-7 shows the numbers of proposed annual flight operations for route- and area-type operations, respectively. In addition to training and readiness operations, the MV-22 squadrons would participate in WTI classes and other special exercisesconducted during different parts of each year. Proposed MV-22 route-type operations would total approximately 1,131 annually, with 33 percent during the CNEL evening period and eight percent during the CNEL nighttime period. Proposed MV-22 area-type operations would total approximately 4,000 annually, with nearly the same CNEL temporal percentages.

Table 6.2.8-7. Proposed Annual MV-22 Operations at the Chocolate Mountain Range

Airspace / Mission	Day	Evening	Night	Total
ROUTE-TYPE OPERATIONS				
R-2507N	0	0	0	0
R-2507S	664	375	92	1,131
High Altitude Close Air Support	-	-	-	-
Subtotal	664	375	92	1,131
AREA-TYPE OPERATIONS				
Close Air Support	-	-	-	-
Air-to-Air	-	-	-	-
Air-to-Ground	2,208	1,206	288	3,702
Confined Area Landing	150	117	11	278
Tactics	-	-	-	-
Air Combat Maneuvers	-	-	-	-
Area Reconnaissance	-	-	-	-
LAT/Air Interdiction	-	-	-	-
Subtotal	2,358	1,323	299	3,980
Total	**3,022**	**1,698**	**391**	**5,111**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
Confined Area Landing operations consist entirely of special exercises. See Appendix C for details.

Per USMC guidance, the MV-22 was modeled at an average speed of 110 knots and an altitude range up to 500 feet above ground level for Air-to-Ground and Confined Area Landing type sorties. The MV-22 was also modeled at average speeds from 85 up to 220 knots and altitudes up to 2,000 feet above ground level for Air-to-Ground and Confined Area Landing type sorties as well as transition type operations within the Chocolate Mountain Range (USMC 2008b).

Consistent with the baseline condition, it was estimated that the busiest month was equivalent to the annual average month and proposed MV-22 aircraft would fly the modeled airspaces daily during the busiest month. Thirty days per busy month was input to the noise model.

As listed in Tables 6.2.8-5 and 6.2.8-6, approximately 600 modeled flight operations by CH-46E aircraft would be removed. The operations for all other modeled aircraft types would remain unchanged relative to the Baseline/No Action scenario.

Using the data discussed above and in Appendix C, the MR_NMAP computer model was used to calculate and plot the CNELmr contours for average daily aircraft operations during the busiest month. Figure 6.2.8-4 shows the 65 to 85 dB CNELmr contours, in 5 dB increments for the proposed training operations. The overall noise exposure would be dominated by a combination of Hornet and Harrier Area Reconnaissance, LAT and Air Interdiction activity. Relative to the baseline condition, the removal of the CH-46E operations and addition of the MV-22 operations would only cause an increase in area of 60 to 70 dB CNELmr. The largest increase would occur at the Bull LZ area in the southeastern section of R-2507S within the boundary of the Chocolate Mountain Range. The Bull LZ modeled area is the combination of Bull Skid FARP and Bull Assault FARP LZs and has noise exposure less than 60 dB CNELmr for the baseline condition which would increase to nearly 70 dB. The 60 dB contour would increase in the area south of R-2507N as a result of MV-22 flight operations to LZ Siphon and LZ Billy Macon. In the baseline condition, this area has noise exposure below 60 dB; this would increase to 62 dB for the proposed condition. However, modeled operations at Siphon/Billy Macon would not cause off–range exposure of 65 dB CNELmr or greater.

Although the 65 dB CNELmr contour would extend beyond the eastern boundary of R-2507 for both baseline and proposed conditions (due to fixed wing LAT/Air Interdiction missions), no off-range people or housing units would be exposed and a significant noise impact is not anticipated.

MITIGATION MEASURES

Because there would be no significant impacts, no mitigation measures would be required.

NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, the noise exposure for the No Action Alternative would be identical to the noise exposure for the baseline condition, and no noise impact would occur.

R-2510 and R-2512

Affected Environment

The existing aircraft noise environment for R-2510 and R-2512 is initially based on a 2002 aircraft noise study, referred to herein as WR 02-07 (Wyle 2002). Minor changes were made to the existing

condition modeling of WR 02-07 to ensure better consistency between the computer modeling and the report. In general, minor changes were due to rounding or data entry errors for helicopters at several of the modeled airspaces. In addition, all operations by F-14 and S-3 aircraft were removed to reflect their current flight inactivity. The resultant data serves as the baseline for this EIS.

The modeling was categorized into two groups: route-type operations and area-type operations. The following factors were considered in the analysis of noise levels from existing operations within these restricted airspaces: flight operations, flight areas and/or tracks, flight profiles and climatological data. These factors are described in detail in Appendix C. Modeled flight operations are summarized below.

FLIGHT OPERATIONS

The baseline condition for R-2510 and R-2512 modeled approximately 31,000 route-type operations annually, shown in Table 6.2.8-8. Route modeling consists of the following:

- Bombing tracks for inert bombing and strafing practice at the Shade Tree and Loom Lobby targets in R-2510, and
- Bombing tracks for conventional bombing, rocket, and strafing practice at the Inkey Barley and Kitty Baggage targets in R-2512.

Table 6.2.8-8. Existing Annual Route-Type Operations for the R-2510 and R-2512

Aircraft Type	Period	R-2510 Target Loom Lobby	R-2510 Target Shade Tree	R-2512 Target Inkey Barley	R-2512 Target Kitty Baggage	Total
AV-8B		511	628	92	92	1,323
F/A-18C/D		6,420	8,266	612	598	15,896
T-34		-	146	-	-	146
T-45		3,532	5,942	807	803	11,084
OH-58D		1,065	1,160	-	-	2,225
CH-46		-	-	37	30	67
UH-1N		58	-	91	96	245
UH-60A		-	110	-	-	110
Total	**Day**	8,762	12,302	1,239	1,222	23,525
	Evening	2,029	2,840	287	286	5,442
	Night	795	1,110	113	111	2,129
	Total	**11,586**	**16, 252**	**1,639**	**1,619**	**31,096**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
See Appendix C for details.

The baseline condition for R-2510 and R-2512 also modeled approximately 11,500 area-type operations annually as shown in Table 6.2.8-9. Modeled areas consist of the following:

- Kane MOAs (Kane East MOA, Kane South MOA, Kane West MOA),
- Restricted Area R-2510, and
- Restricted Area R-2512, inside Kane West MOA.

The majority of the area-type operations are by fixed wing aircraft (F/A-18 Hornets, AV-8B Prowlers, T-34 Mentors) in the Kane MOAs. Most of the route-type operations are by fixed wing aircraft (F/A-18 Hornets, T-45 Goshawks) on the Shade Tree and Loom Lobby bombing tracks.

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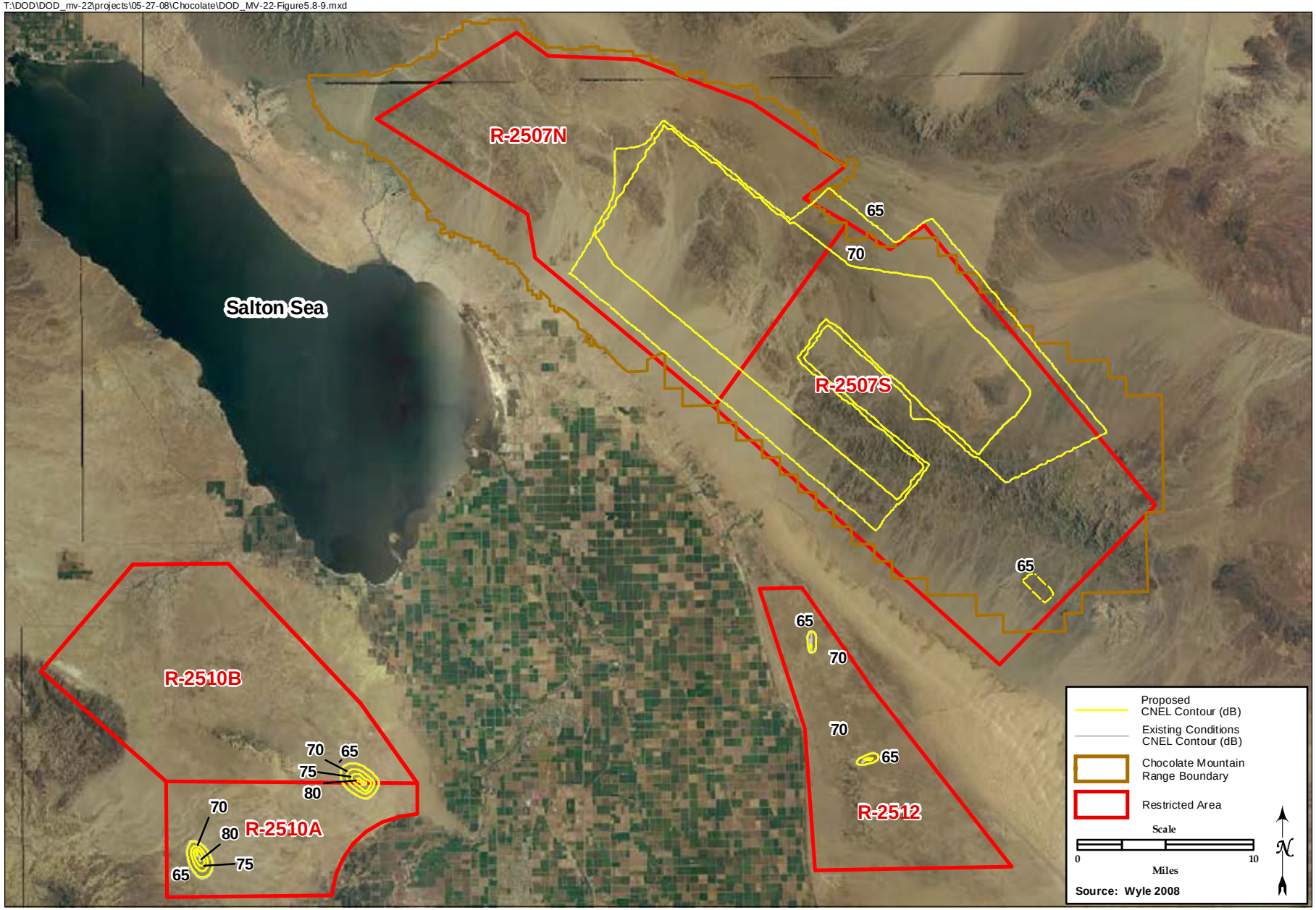

Aircraft Noise Contours from Airspace Operations at Chocolate Mountain Aerial Bombing and Gunnery Range, R-2510, and R-2512 for Proposed Training Operations

FIGURE

6.2.8-4

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Of the total modeled area- and route-type operations, CNEL evening and nighttime flight operations account for 17 percent and 7 percent, respectively.

Typical route- and area-type CH-46 flight profile altitudes both ranged from 50 to 500 feet above ground level, with an average speed of 150 knots. The area-type sorties had an average duration of 45 minutes.

Table 6.2.8-9. Existing Annual Area-Type Operations for the R-2510, R-2512, and Kane MOAs

Aircraft Type	Period	R-2510	R-2512	Kane East MOA	Kane South MOA	Kane West MOA	Total
AV-8B		130	80	-	-	-	210
EA-6B		-	27	-	-	-	27
F/A-18C/D		1,711	86	3,443	504	4,451	10,195
F-5E		-	13	-	-	-	13
T-2C		-	8	-	-	-	8
T-34		656	8	-	-	-	664
T-45		117	8	-	-	-	125
C-130H, N, P		20	-	-	-	-	20
CH-46E		11	-	-	-	-	11
CH-53E		10	-	-	-	-	10
OH-58D		68	-	-	-	-	68
UH-1N		73	-	-	-	-	73
UH-60A		48	-	-	-	-	48
Total	**Day**	2,146	172	2,617	383	3,382	8,700
	Evening	502	40	585	86	757	1,970
	Night	196	18	241	35	312	820
	Total	**2,844**	**230**	**3,443**	**504**	**4,451**	**11,472**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
See Appendix C for details.

CNELmr is a daily metric based on operations flown in a busy month, so daily operations are calculated by dividing the number of annual operations by 12, then by the number of flying days per busy month. Area-type and route-type operations were modeled with 30 flying days per busy month.

NOISE EXPOSURE

Using the data described above and in Appendix C, the MR_NMAP computer model was used to calculate and plot the CNELmr contours for annual average daily operations during the busiest. Figure 6.2.8-3 shows the 65 to 85 dB CNELmr contours, in 5 dB increments, for the existing condition. For R-2510, there is exposure at or above 65 dB near the Shade Tree and Loom Lobby targets. For R-2512, there is exposure at or above 65 dB near the Inkey Barley and Kitty Baggage targets. No off-range people or housing units are exposed. Therefore, no indoor speech interference and sleep disturbance analysis was conducted.

There is no exposure over 65 dB in the rest of the Kane MOAs, so this is not shown on the figure.

Environmental Consequences

Prior to discussing the potential impacts, the following information provides general modeling parameters involving the MV-22 aircraft within these restricted areas.

- Detailed flight operations by type of operation, CNEL period, general airspace utilization and flight profiles were derived from data provided by the USMC (USMC 2008a; USMC 2008b; Weir 2008c).
- Due to the no off-range anticipated impacts, no representative noise-sensitive receptors were identified or analyzed.
- Deleted all F-14 and S-3 operations from MRNMAP and Noisemap files for existing and proposed cases to reflect flight inactivity.

PROPOSED TRAINING IMPACTS

MV-22 would operate at R-2510 regardless of basing alternative (no MV-22 operations are proposed at R-2512). For the purposes of the EIS, the maximum tempo of proposed MV-22 activity for any of the basing alternatives was analyzed. It is estimated that one squadron would be deployed from its base at all times. Therefore the noise modeling estimates flight activity from nine squadrons of MV-22 aircraft and the removal of CH-46E aircraft activity at the range. The nine squadrons of MV-22 aircraft would consist of seven active duty squadrons and two reserve squadrons.

Table 6.2.8-10 shows the numbers of proposed annual MV-22 flight operations for area-type operations; there are no proposed MV-22 route-type operations. Proposed MV-22 area-type operations would total approximately 150 annually, with 30 percent during the CNEL evening period and none during the CNEL nighttime period. These area-type operations would be Air-to-Ground sorties to the Loom Lobby practice target in R-2510. As listed in Tables 6.2.8-8 and 6.2.8-9, approximately 80 modeled flight operations by CH-46E aircraft would be removed, including those at R-2512. The modeled flight operations for all other modeled aircraft types (e.g., the F/A-18, UH-1N and CH-53E aircraft) would remain unchanged relative to the Baseline/No Action scenario.

Table 6.2.8-10. Proposed Annual MV-22 Area-Type Operations at the R-2510, R-2512, and Kane MOAs

Airspace	Day	Evening	Night	Total
R-2510 Shade Tree	-	-	-	-
R-2510 Loom Lobby	104	44	-	148
R-2512	-	-	-	-
Kane East MOA	-	-	-	-
Kane South MOA	-	-	-	-
Kane West MOA	-	-	-	-
Total	**104**	**44**	**-**	**148**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
See Appendix C for details.

Using the data described above and in Appendix C, the MR_NMAP computer model was used to calculate and plot the CNELmr contours for annual average daily aircraft operations during the busiest month. Figure 6.2.8-4 shows the 65 to 85 dB CNELmr contours, in 5 dB increments, for the proposed training operations. The removal of the DoN/USMC CH-46E operations and addition of the MV-22 operations would cause no noticeable change in noise exposure relative to the baseline condition, and the CNELmr contours would be wholly contained within the target boundaries. Therefore, there would be no off-range people or housing units within the CNELmr contours and no noise impact.

Mitigation Measures

Because there would be no significant impacts, no mitigation measures would be required.

NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, the noise exposure for the No Action Alternative would be identical to the noise exposure for the baseline condition, and no noise impact would occur.

6.2.9 Infrastructure and Utilities

The proposed training operations at the Bob Stump Training Range Complex would not include new construction or improvements at any range facility. Therefore, existing conditions would remain unchanged, and no impacts to infrastructure and utilities would occur.

6.2.10 Aesthetics and Visual Resources

The proposed training operations at the Bob Stump Training Range Complex would not include new construction or improvements at any range facility. The only new visual component would be the MV-22 aircraft, itself, within an established military training environment. The MV-22 would utilize the same flight paths and range facilities as existing aircraft. Except during take-offs and landings, the MV-22 would fly more often in fixed wing mode, which is higher and faster than typical rotary wing aircraft. This would lessen any perceived visual impact from the MV-22. Although downwash from MV-22 landings and hovering may cause dust plumes, such occurrences are consistent with existing military training. Therefore, existing conditions would remain relatively unchanged, and no impacts to aesthetics and visual resources would occur.

6.2.11 Hazardous Material Management

The proposed training operations at the Bob Stump Training Range Complex would not include new construction or improvements at any range facility. The MV-22 would be incorporated into existing training scenarios aboard the range complex. Only existing range facilities at the Bob Stump Training Range Complex would be used by the MV-22, and these would be used in the same or similar fashion to current training by rotary wing and fixed wing aircraft. Aircraft fueling at the Bob Stump Training Range Complex would be completed in established forward area refueling points, which are equipped with appropriate spill prevention and spill control features. Therefore, operational impacts would not occur with respect to hazardous materials in association with airspace operations.

6.2.12 Topography, Geology, and Soils

Affected Environment

The Bob Stump Training Range Complex is located within the Basin and Range Physiographic Province of southeastern California and southwestern Arizona, which is characterized by broad alluvial valleys separated by steep, discontinuous, northwest to southeast trending mountain ranges. The range complex is characterized by a broad range of soil types, geological processes, and landforms. The mountain ranges are formed of all three primary rock types, including

sedimentary, volcanic, and metamorphic. The intervening valleys are deep bedrock basins filled with silt, clay, sand, and gravel deposits, which can be more than 10,000 feet deep. Along most of the mountain bases, sloping masses of alluvial fill material, known as bajadas or alluvial fans, extend outward like fans to taper more gradually than the adjacent bedrock mountains, into the generally flat valley floors.

Extensive sheet-like lava flows occur in some parts of the range complex. These flows form irregular plains with rough basalt surfaces. In addition, some of the largest sand dune systems in North America are found in this range complex.

The Bob Stump Training Range Complex is characterized by limited soil development, indicative of unstable alluvial and flood plain surfaces that are subject to periodic flooding, sedimentation, and dynamic alteration. Soil types are highly variable in grain-size and texture, due to large area and variable terrain. Desert pavement is locally present, consisting of a thin, sheet-like concentration of wind-polished, closely packed pebbles, mantling a desert surface where wind action and sheetwash have removed all smaller particles.

Environmental Consequences

Training Range Impacts

Introduction of up to ten squadrons of the MV-22 to the training environment within the Bob Stump Training Range Complex could cause minor erosion associated with downdraft from vertical take-offs and landings, as well as use of the MV-22 machine gun at approved locations. Impacts would occur in localized areas of disturbance from hovering and landing of aircraft, resulting in dust and debris being scattered and/or becoming airborne. Similarly, machine gun fire could result in localized vegetation removal and soil disturbance. No new construction or improvements at any range facility are proposed. The MV-22 would be incorporated into existing training scenarios within the Bob Stump Training Range Complex. Only existing range facilities within Special Use Airspace/military restricted areas would be used by the MV-22, and these would be used in the same or similar fashion to current rotary wing training.

Many general procedures to minimize impacts to geological resources on the Bob Stump Training Range Complex are already in place and would continue to be implemented as part of any training scenario. These procedures are derived from existing plans, programs, regulations, and are associated with various agency consultations. Soil erosion is further minimized through the implementation of terms and conditions of applicable BOs, as well as by implementation of soil erosion measures, such as the Management Resource Prescriptions outlined in the BMGR INRMP (Department of the Air Force and Navy 2007). Because of the localized nature of the impact and the ongoing management and minimization of training impacts on geological resources, no significant impact would occur.

MITIGATION MEASURES

Because there would be no significant impact on geological resources, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Due to lack of changes to existing conditions, no geological impacts would occur.

6.2.13 Water Resources

Affected Environment

The presence of water on the Bob Stump Training Range Complex is very limited. Surface runoff is generally characterized by ephemeral stream flow in otherwise dry stream beds, which occurs only in immediate response to sizeable rainfall events. Surface water drainage is generally outward from the mountain ranges and, for most of the area, ultimately toward the Colorado River, located along the California/Arizona border. However, some drainages are closed, in that these drainages empty into playas, or usually dry lake beds, which hold water temporarily after substantial rains. Some storms cause flash flooding in the smaller mountain drainages and short-term flooding in the larger valley washes and floodplains. Natural flooding events are highly variable in frequency and intensity.

Environmental Consequences

Training Range Impacts

Introduction of up to ten squadrons of the MV-22 to the training environment within the Bob Stump Training Range Complex could cause minor erosion associated with downdraft from vertical take-offs and landings, as well as use of the MV-22 machine gun at approved locations. Impacts would occur in localized areas of disturbance from hovering and landing of aircraft, resulting in dust and debris being scattered and/or becoming airborne. Similarly, machine gun fire could result in localized vegetation removal and soil disturbance. Such localized erosion could be exacerbated by high-intensity rainfall.

Many general procedures to minimize erosion-related water quality impacts on the Bob Stump Training Range Complex are already in place and would continue to be implemented as part of any training scenario. These procedures are derived from existing plans, programs, regulations, and are associated with various agency consultations. Soil erosion is further minimized through the implementation of terms and conditions of applicable BOs, as well as by implementation of soil erosion measures, such as the Management Resource Prescriptions outlined in the BMGR INRMP (Department of the Air Force and Navy 2007). Because of the localized nature of the impact and the ongoing management and minimization of training impacts on water resources, no significant impact would occur.

MITIGATION MEASURES

Because there would be no significant impact on water resources, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Due to lack of changes to existing conditions, no water resources impacts would occur.

6.2.14 Biological Resources

This section describes biological resources which may directly or indirectly be affected by the proposed Bob Stump Training Range Complex training component. Biological resources represent the components of larger ecological communities and include all native and introduced plant and animal species and the habitats, including wetlands, within which they occur. The definition of specific resources and their distribution in the vicinity of the project area are discussed below under the *Affected Environment* section. Incorporation of the MV-22 into the training environment at the Bob Stump Training Range Complex is a result of the proposed action and would occur independent of which basing alternative is carried forward. Natural resources associated with the Bob Stump Training Range Complex are managed through several programs including INRMPs and resource-specific management plans (Department of Air Force and Navy 2007).

The MV-22 aircraft would operate within Special Use Airspace and training areas associated with the Bob Stump Training Range Complex, which includes the Chocolate Mountain Range, and two Restricted Areas (R-2510 and R-2512) in California as well as the BMGR-West in southwestern Arizona.

Key sources of baseline information for this section include the INRMP for the BMGR (Department of Air Force and Navy 2007), and EISs prepared for the Yuma Training Range Complex (USMC 1997a; USMC 2001b), and EAs prepared for the Chocolate Mountain Range (NSW Center 2008; NSW Group ONE 2007).

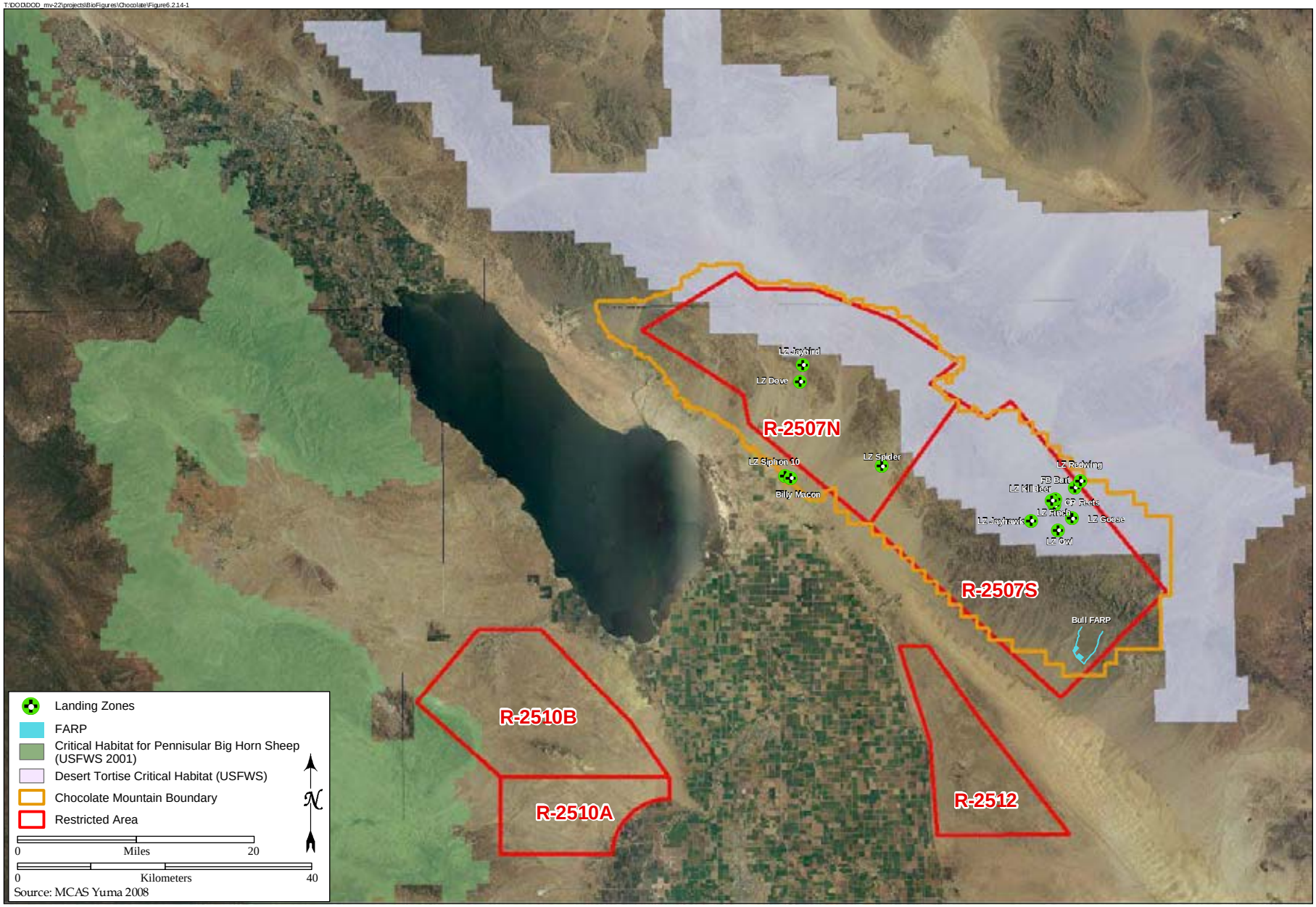
Affected Environment

Affected Ecosystems

For the purposes of this analysis, the affected environment includes the Bob Stump Training Range Complex, which encompasses parts of southern California and southwestern Arizona including the Chocolate Mountain Range, BMGR-West, R-2510 and R-2512, and airspace above Cabeza Prieta National Wildlife Refuge. These areas are part of the Lower Colorado Valley subdivision of the Sonoran Desert (Shreve and Wiggins 1964), a very large area with a variety of vegetation types and wildlife species. Annual precipitation is very low and is bimodal, with some falling during the winter associated with frontal systems from the Pacific and some during the summer (mainly July-September) associated with subtropical monsoons or tropical storms.

Incorporation of the MV-22 into the existing training environment would be limited to overflights as well as aircraft landings at specific LZs and GSAs. Tables 6.2.14-1 and 6.2.14-2 present a list of range facilities that would be used as landing areas by the MV-22 and describes the vegetation and wildlife habitat within and adjacent to each of these sites. The locations of these LZs and GSAs are shown in Figures 6.2.14-1 and 6.2.14-2, respectively. There would be no take-offs, landings, low-level hovering or offloading of personnel or equipment at R-2510 or R-2512.

T:\DOD\DOD_mv-22\projects\BioFigures\Chocolate\Figure6.2.14-1



Location of Desert Tortise Critical Habitat, Peninsular Bighorn Sheep Critical Habitat, Landing Zones, and the Boundaries of CMAGR, R-2510, and R-2512

FIGURE

6.2.14-1

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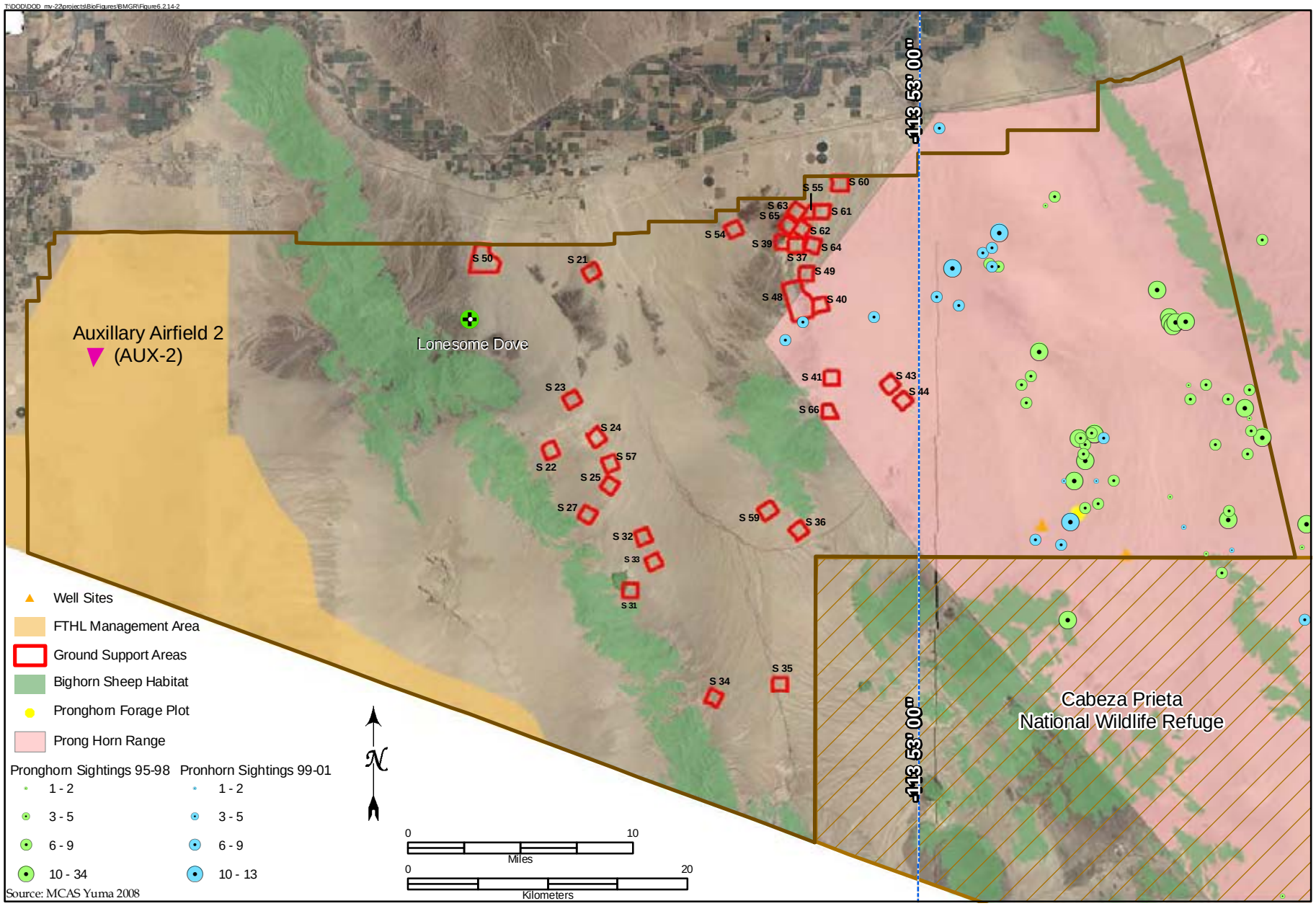

Location of Sonoran Pronghorn Distribution and Recent Observations, the Flat-tailed Horned Lizard Yuma Desert Management Area, Ground Support Areas Proposed for Use by MV-22, and the Boundaries of BMGR West and the Cabeza Prieta National Wildlife Refuge

FIGURE

6.2.14-2

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Table 6.2.14-1. Vegetation and Desert Tortoise Critical Habitat at LZs on the Chocolate Mountain Range

Range Facility	Area (acres) [1]	Vegetation/Comments[2]	Critical Habitat[3]
LZ Killdeer	N/A	Desert Dry Wash Woodland – Palo Verde	Yes
LZ Redwing	N/A	Desert Dry Wash Woodland – Palo Verde; dirt roads.	Yes
FB Burt	N/A	Desert Dry Wash Woodland – Palo Verde; dirt roads	Yes
LZ Goose	N/A	Desert Dry Wash Woodland – Palo Verde	Yes
LZ Owl	N/A	Desert Dry Wash Woodland – Palo Verde; dirt road and berm	Yes
LZ Jayhawk	N/A	Sonoran Desert Mixed Scrub – Jumping cholla (80%); Desert Dry Wash Woodland – Palo Verde (20%)	Yes
OP Feets	N/A	Desert Dry Wash Woodland – Palo Verde. Steep terrain with minimal vegetation	Yes
BullFARP	N/A	Desert Dry Wash Woodland – Desert Ironwood along washes; extensive desert pavement between washes; dirt road and extensive surface disturbance.	No
LZ Spider	N/A	Sonoran Creosote Bush Scrub with dry washes	No
Billy Macon	N/A	Developed site with Helipad Nearby habitats classified as Desert Dry Wash Woodland – Catclaw (70%) and Sonoran Creosote Bush Scrub (30%)	No
LZ Siphon 10	N/A	Cleared site near Coachella Canal Desert Dry Wash Woodland - Catclaw	No
LZ Dove	N/A	Sonoran Creosote Bush Scrub (60%) Desert Dry Wash Woodland-Catclaw (40%); dirt road nearby	No
LZ Jaybird	N/A	Desert Dry Wash Woodland – Catclaw (80%) Sonoran Creosote Bush Scrub (20%)	No
LZ Finch	N/A	Sonoran Creosote Bush Scrub; large wash nearby.	No

Notes:

1. N/A – Area of LZs not given; vegetation category on types intercepted by a 100-meter radius circle from the point location provided. Proportions are approximate.
2. Vegetation coverage is based on California Gap Analysis data coverage prepared by University of California, Santa Barbara (Davis et al., 1998) from various sources. The coverage applies to the entire region and may not be reflective of current conditions on the LZs. The minimum mapping unit of this broad-scale coverage does not provide site-specific detail and does not account for specific features such as cleared areas, roads, etc. For the LZs in particular the vegetation information is more reflective of the surrounding area than of the specific site, which might lack vegetation. Additionally in many categories, especially subcategories of Desert Dry Wash Woodland, the classification results from the presence of one or more vegetated dry washes crossing a landscape that may be nearly vegetation-free between the washes. Comments on roads, surface disturbance, etc. are based on examination of aerial imagery.
3. Critical Habitat = Designated critical habitat for Desert Tortoise, which occupies the northern portion of the Chocolate Mountain Range.

Source: GIS data for LZs provided by MCAS Yuma.

Table 6.2.14-2. Vegetation in the Ground Support Areas in Barry M. Goldwater Range (West)

Landing Area	Area (acres) [1]	Vegetation[2]
GROUND SUPPORT AREAS[3]		
21	264	Creosote bush-bursage; Dry wash, Bedrock Outcrop; dirt track and disturbed area
22	255.9	Creosote bush-bursage; surface disturbance, dirt roads
23	258.8	Creosote bush-bursage; dirt road
24	279.3	Creosote bush-bursage; dirt road; extensive surface disturbance
25	244.3	Creosote bush-bursage; dirt road
27	255.5	Creosote bush-bursage; Bedrock Outcrop; dirt road
31	244.4	Creosote bush-bursage (60%); Paloverde-mixed cacti (40%) ; Bedrock Outcrop; dirt road
32	245.9	Creosote bush-bursage; dirt road
33	250.9	Creosote bush-bursage; dirt road
34	247.2	Creosote bush-bursage; dirt road
35	239.2	Creosote bush-bursage; dry wash; dirt road
36	252.3	Creosote bush-bursage (60%) Paloverde-mixed cacti (40%); dirt road
37	275.6	Creosote bush-bursage; dirt road
39	240.8	Creosote bush-bursage; extensive Bedrock Outcrop; dirt roads
40	246.2	Creosote bush-bursage; dirt road
41	248.6	Creosote bush-bursage; many small braided washes; dirt road
43	264	Creosote bush-bursage; dirt road
44	249.7	Creosote bush-bursage; dirt road
48	1,042.9	Creosote bush-bursage (90%); Paloverde – mixed cacti (10%); Bedrock Outcrop; dirt roads
49	243.7	Creosote bush-bursage; dirt road
50	771.9	Creosote bush-bursage; dirt road
54	262.4	Creosote bush-bursage; one large wash, dirt road
55	171.6	Creosote bush-bursage; dirt road
57	245.1	Creosote bush-bursage; dirt road
59	286.9	Creosote bush-bursage (90%); Paloverde-mixed cacti (10%); Some surface disturbance; dirt road
60	300.7	Creosote bush-bursage; dirt roads
61	256.7	Creosote bush-bursage; dirt track
62	244.6	Creosote bush-bursage; dirt road
63	252.1	Creosote bush-bursage; dirt road
64	250.7	Creosote bush-bursage; dirt road
65	246.7	Creosote bush-bursage; Bedrock Outcrop; dirt road
66	223.2	Creosote bush-bursage (90%); Paloverde-mixed cacti (10%); dirt road
LANDING ZONE		
Lonesome Dove	18.0	Creosote bush-bursage with extensive desert pavement.

Source: GIS data for GSA sites provided by MCAS Yuma.

Notes:

1. Vegetation coverage is based on the Arizona Gap Analysis Project data developed in 2001 for the entire state (Halvorson *et al.*, 2001) and may not be reflective of current conditions on the GSAs. The minimum mapping unit of this broad-scale coverage (1:100,000) and generalized nature of the vegetation classification does not provide site-specific detail and does not account for specific features such as isolated buildings, cleared areas, roads, etc. Comments on roads, bedrock outcrops, washes, surface disturbance, etc. are based on examination of aerial imagery. Dry washes with Paloverde-mixed cacti may cross areas mapped as creosote bush-bursage and areas of Creosote bush bursage very likely to occur between washes where the vegetation is mapped as Paloverde-mixed cacti due to the prevailing vegetation pattern.
2. Proportions of vegetation cover within a GSA are approximated based on mapped boundaries.
3. All of the GSAs identified for use in this project are existing sites and lie to the west of 113 53′ 00″, the approximate westward extent of the current range of the endangered Sonoran pronghorn. None of the GSAs are located with the Yuma Desert flat-tailed horned lizard Management Area, except for the existing Aux-2 Runway.

Additionally, a discussion of all major vegetation communities on the Bob Stump Training Range Complex is included to provide context and due consideration. Federally listed threatened or endangered species that have the potential to occur within or adjacent to range facilities that would be used by the MV-22 are discussed in the *Endangered, Threatened, and Sensitive Species* section following the habitat descriptions. No project-specific biological resource surveys were completed for the proposed action.

Vegetation Communities and Wildlife Habitats

Vegetation within the Bob Stump Training Range Complex is typically very sparse, consisting of small-leaved and sometimes thorny shrubs and succulents that are widely spaced, leaving bare ground between plants. Bare areas remain open except after rainy periods when they are occupied by annual grasses and forbs. Creosote bush (*Larrea tridentata*) provides sparse cover over extensive areas on level ground in the Sonoran Desert, accompanied over large areas by white bursage (*Ambrosia dumosa*), a low shrub. Mesquite (*Prosopis* spp.), smoke tree (*Dalea spinosa*), blue paloverde (*Cercidium floridum*), ironwood (*Olneya tesota*) and other larger plants are present along washes and intermittent streams. This more diverse and structurally complex vegetation is referred to as desert dry wash woodland in Table 6.14.2-1. On gently sloping areas at the base of mountains known as bajadas (coalesced alluvial fans), foothill paloverde (*Cercidium microphyllum;* Arizona only), ironwood, ocotillo (*Fouquieria splendens*), saguaro cactus (*Cereus giganteus;* Arizona only), other large shrubs and cacti, and brittlebush are common. In Arizona, this vegetation type is known as Arizona upland desert and is referenced as Paloverde-mixed cacti in Table 6.14.2-2. In some bajada areas there are dense stands of cacti known as teddy bear (jumping) cholla (*Opuntia bigelovii*) that may be several acres in extent. Creosote bush is found in all these habitats.

At the Chocolate Mountain Range, the Chocolate Mountains form the backbone of the training range; this is a rugged northwest-southeast trending range with a summit approaching 2,000 feet (610 meters) and a high point nearly 2,500 feet (762 meters) in elevation. Bajadas (coalesced alluvial fans) and the channels formed by intermittent and ephemeral drainages lead from the Chocolate Mountains to the northeast and southwest. The alluvial fans are characterized by very low vegetative cover of creosote bush with extensive areas of desert pavement crossed by more or less parallel channels of dry washes of ephemeral streams draining from the mountains. The channels of the intermittent streams are bordered by a mix of larger shrubs, cacti, and small trees, described above, which form key habitat for wildlife.

At BMGR-West, the broad, flat intermountain valleys of the range are dominated by creosote bush and creosote bush-bursage associations, which often grow in stands that cover many thousands of acres. These plant communities cover about three-fourths of the non-mountainous terrain of the BMGR.

Washes are lined by xeroriparian vegetative communities consisting of taller trees and shrubs including blue palo verde, ironwood, and smoke tree. The linear stands of xeroriparian vegetation along washes are relatively dense, structurally diverse, and rich in species diversity; these stands are in sharp contrast to the broadly distributed stands of creosote bush that dominate on valley floors where vegetation is relatively sparse and homogeneous in species and structure. Xeroriparian communities are present principally because of the subsurface water that accumulates in the plant root zones as a result of stormwater surface runoff from summer monsoon and winter rains. Similar communities on Chocolate Mountain Range are referenced as Desert Dry Wash

Woodland (above). Xeroriparian vegetation provides vital habitat for many species of wildlife (Department of the Air Force and Navy 2007).

In upland areas, where bedrock outcrops form foothills or low mountain slopes, paloverde, ocotillo, saguaro, and a wide variety of other cacti and shrubs are the dominant plant life. In BMGR-West, vegetation on these outcrops is quite sparse due to the low average annual precipitation and rapid runoff compared to the ranges farther to the east, which are higher in elevation and receive more precipitation.

Very little specific information on the vegetation at R-2510 and R-2512 is available (NAF El Centro 2001). Both restricted areas are within the Lower Colorado River subdivision of the Sonoran Desert (as are the Chocolate Mountain Range and BMGR-West) and are very low in elevation (near sea level). The eastern portions of R-2510 and western most part of R-2512 were formerly under water as evidenced by beach lines. The prevailing vegetation is likely to be sparse creosote bush scrub, with small dry washes lined with larger shrubs and small trees (such as catclaw, blue paloverde, desert ironwood) draining from the high points (e.g., Superstition Mountain) or from offsite.

Wildlife

Due to the sparse vegetation and absence of water over large areas, there are very few large ungulates in the desert. However, desert mule deer (*Odocoileus hemionus crooki*), desert bighorn (*Ovis canadensis nelsoni*), javelina (*Peccary angulatus;* collared peccary), and Sonoran pronghorn (*Antilocapra americana sonoriensis*) are present in portions of the Bob Stump Training Range Complex. Desert bighorn is known from the low desert ranges in both the Chocolate Mountain Range and BMGR-West. An occupied portion of the desert bighorn sheep Wildlife Habitat Management Area occurs throughout the mountainous areas of the Chocolate Mountain Range. The desert bighorn in the Chocolate Mountain Range and in BMGR-West are not part of the Peninsular Bighorn Distinct Population Segment, which is found in the Peninsular Ranges west of the Salton Sea and whose range overlaps the western portion of R-2510. Sonoran pronghorn, a federally listed endangered species discussed below, occurs in BMGR-West, especially in the eastern portions where suitable habitat exists. Desert mule deer are associated with thick vegetation in the larger drainages. Collared peccary (javelina) are found in the BMGR-West generally on the upper bajadas near the bases of the low mountain ranges where there is arborescent vegetation and a variety of cacti which are a staple of their diet. Mammalian predators are also uncommon and include the badger (*Taxidea taxus*), desert kit fox (*Vulpes macrotis arsipus)* and coyote (*Canis latrans*), which generally hunt at night when their main prey species are active and conditions are more moderate, reducing water loss. Small nocturnal mammals include kangaroo rats and pocket mice. Jackrabbits and cottontails are also active mainly at night. Common reptiles include several species of lizards (mostly diurnal) and snakes (mostly active at night).

Endangered, Threatened, and Sensitive Species

For the purposes of this analysis, only federally listed or proposed wildlife species are considered. Other sensitive species, including sensitive plant species, are not included due to light footprint of training activities, their focus on established operational areas with a history of use by helicopters and ground forces, and the large area within which the impacts could occur (over 10,000 square miles. Sensitive habitats include the formally designated critical habitats of federally listed

endangered species; other habitats that support endangered and other sensitive species and are therefore important to the conservation of these species; and wetlands and other waters regulated under Sections 401 and 404 of the Clean Water Act. Because the proposed action does not include construction or development of new facilities within the Bob Stump Training Range Complex, specific impacts on wetlands are not considered within the context of the Clean Water Act and associated regulations.

The regulatory status and occurrence of species listed, proposed, or designated candidates for federal protection as threatened or endangered within the Bob Stump Training Range Complex are summarized in Table 6.2.14-3.

Table 6.2.14-3. Federally Listed and Proposed Endangered or Threatened Species Known or Likely to Occur within the Bob Stump Training Range Complex

Scientific Name **Common Name**	**Regulatory Status (Federal/State)**	**Habitat Association**	**Occurrence in the Study Area**
Phrynosoma mcallii Flat-tailed Horned Lizard	FPT/WSC	Open country, especially sandy areas, washes, floodplains, and windblown deposits below 6,000 feet.	Designated Management Areas for the species are present in BMGR-West, R-2510 and R 2512 (Yuma Desert, West Mesa, and East Mesa Management Areas, respectively). Possible occurrence in the western portion of the Chocolate Mountain Range but not documented there and is unlikely to occur there (NSW Center 2008).
*Gopherus agassizi*i desert tortoise	FT/SE	Found in the valleys, on bajadas, desert pavements, and rocky slopes, and in the broad, well-developed washes with vegetation characterized by relatively species-rich succulent scrub.	Designated critical habitat is present on the Chocolate Mountain Range, where the species is relatively abundant and widespread. Absent from R-2510 and R-2512. Unlisted population present on BMGR-West.
Empidonax traillii extimus Southwestern willow flycatcher	FE/SE (nesting)	Breeds in dense riparian vegetation along rivers, streams, or other wetlands.	Non-resident and possible transient during migration in washes on the Chocolate Mountain Range, no suitable breeding habitat present within the Bob Stump Training Range Complex.
Leptonycteris curasoae yerbabuenae Lesser long-nosed bat	FE/-	This species roosts and nests in caves and mines and forages on flowers of columnar cacti and certain agaves in desert scrub habitats.	The lesser long-nosed bat is a summer resident in BMGR-East and is known to have a maternity colony in the Growler Mountains. Not known from BMGR-West but may possibly forage there.

Notes:

Federal ESA
- FE Federally Listed as Endangered
- FT Federally Listed as Threatened
- FSC Federal Special Concern Species
- FPT Formerly Proposed for Federal Listing as Threatened. Proposed listing withdrawn; Protected by a Rangewide Management Plan.
- SE California State Listed as Endangered
- \- No listing

Arizona Game and Fish Department
- WSC Wildlife of Special Concern
- \- No listing

Table 6.2.14-3. Federally Listed and Proposed Endangered or Threatened Species Known or Likely to Occur within the Bob Stump Training Range Complex

Scientific Name Common Name	Regulatory Status (Federal/State)	Habitat Association	Occurrence in the Study Area
Antilocapra americana sonoriensis Sonoran pronghorn	FE/-	Prefers open, flat valleys.	Present on the eastern portion of BMGR-West (especially the Mohawk Valley) and adjacent the Cabeza Prieta National Wildlife Refuge.
Ovis canadensis nelsoni DPS Peninsular bighorn sheep	FE/SE	Mountains, canyons, and upper alluvial fans on east facing slopes of the Peninsular Ranges, extending southward into Baja California, Mexico.	Designated critical habitat (USFWS 2001) includes 7,000 acres of in the northwestern corner of R-2510, including the Fish Creek Mountains and Carrizo Wash. Most of the extensive critical habitat extends westward and northward from R-2510. A proposed revision to the critical habitat has been published (USFWS 2008c). Peninsular bighorn has not been documented from lands underlying R-2510 (NAF El Centro 2001).

Notes:

Federal ESA
- FE Federally Listed as Endangered
- FT Federally Listed as Threatened
- FSC Federal Special Concern Species
- FPT Formerly Proposed for Federal Listing as Threatened. Proposed listing withdrawn; Protected by a Rangewide Management Plan.
- SE California State Listed as Endangered
- \- No listing

Arizona Game and Fish Department
- WSC Wildlife of Special Concern
- \- No listing

CHOCOLATE MOUNTAIN RANGE

One federally listed endangered species (Southwestern willow flycatcher) may be present as a transient and one federally listed threatened species (desert tortoise) is a resident on the Chocolate Mountain Range. The flat-tailed horned lizard, a species previously proposed for federal listing as threatened and currently subject to an interagency management agreement, may extend onto the Chocolate Mountain Range from the south but has not been documented there. There are no federally listed endangered or threatened plant species known from the Chocolate Mountain Range. Federally designated critical habitat for the desert tortoise is present in the northern portion of the Chocolate Mountain Range.

Provided below are summaries of the natural history and distribution of the federally listed species occurring or potentially occurring at the Chocolate Mountain Range. Each summary concludes with a discussion of the potential occurrence within the project area. Regulatory status of the species is summarized above in Table 6.2.14-3.

Southwestern willow flycatcher. The southwestern willow flycatcher (*Empidonax traillii extimus*), federally listed as endangered, is unlikely to be present at the Chocolate Mountain Range, except as a rare transient, due to the lack of riparian habitat. Information on its natural history is provided above under MCB Camp Pendleton (section 6.1.14).

Desert tortoise. The desert tortoise (*Gopherus agassizi*i) is known to occur throughout the Chocolate Mountain Range. The Mojave population of the desert tortoise is federally listed as a threatened

species (55 FR 12178; 2 April 1990). The Mojave population includes all desert tortoises occurring north and west of the Colorado River and, therefore, includes the tortoises within the Chocolate Mountain Range as well as the tortoises within MCAGCC (discussed in a subsequent section). Critical Habitat designation for the Mojave Desert population of the Desert Tortoise was published in 1994 (59 FR 5820). The designated critical habitat includes the northern portion of the Chocolate Mountain Range. The portion of the Chocolate Mountain Range within USFWS-designated critical habitat is also within the Bureau of Land Management Chuckwalla Desert Wildlife Management Area (DWMA), the boundaries of which coincide and encompass approximately 1,275 square miles. The tortoises within the Chocolate Mountain Range are considered part of the Colorado Desert Recovery Unit in the USFWS *Draft Revised Recovery Plan* (USFWS 2008b).

Desert tortoises in the Colorado Desert Recovery Unit are found in the valleys, on bajadas, desert pavements, and rocky slopes, and in the broad, well-developed washes. Vegetation is characterized by relatively species-rich succulent scrub, creosote bush scrub, and blue paloverde, ironwood, and smoke tree communities. The tortoises feed on both summer and winter annuals, because this region receives about one-third of its annual rainfall in summer and supports two distinct annual floras on which they can feed (USFWS 2008b). They require friable soil for burrow and nest construction. The soil must be a fine gravelly and/or sandy loam, with some clay for burrow stability. They dig burrows for winter dormancy and shallow or long, deep holes for summer use. Burrows are dug in the open or under shrubs and rocks. They can also be found in the banks of gullies and washes. Burrows may be more than nine feet long. Desert tortoises remain in burrows during the hottest parts of summer to conserve water and during most of the period between November and March (i.e., winter dormancy). From March to October, desert tortoises emerge to forage in the morning and late afternoon, with most activity occurring in March and April (USGS 2004). In addition to burrows, desert tortoises sometimes rely on shrubs for cover during the day.

Desert tortoises derive much of their water from the vegetation they eat and can go for extended periods without drinking. Desert tortoises may live for more than 50 years and reach reproductive maturity when they are 14 to 20 years of age. They have a low reproductive potential, laying between 3 to 14 eggs per clutch, with the mortality rate of juveniles approaching 99 percent. Juveniles are particularly vulnerable to predation due to their soft shells and slow growth rate.

As described in NSW Center (2008), Berry et al. surveyed all but the northern quarter of the Chocolate Mountain Range for presence and population characteristics of the desert tortoise in 1983. The results of the survey showed very low density populations of desert tortoise (0 to 25 tortoises per square mile) in the western half of the range, with large patches of low- to moderate-density populations ranging from 25 to 50 tortoises per square mile and 50 to 100 tortoises per square mile, respectively, and a small area with a high-density desert tortoise population (100 to 250 tortoises per square mile) in the central eastern portion of the range. Surveys in the late 1980s and early 1990s concur with these results, including the finding of two pockets of high-density desert tortoise population (100 to 200 tortoises per square mile) in the central eastern and northeastern portions of the range (NSW Center 2008).

Declines in estimated desert tortoise numbers have been noted on two of the Bureau of Land Management's permanent trend study plots located in the Chocolate Mountain Range region, including the Chuckwalla Valley plot, located approximately ten miles north of the range, and the Chuckwalla Bench plot, located on the northern boundary of the range. Estimated densities in the Chuckwalla Valley plot declined from 163 tortoises per square mile in 1980 to 73 tortoises per square mile in 1992. Estimated densities within the Chuckwalla Bench plot declined from 578

tortoises per square mile in 1979 and 1982 to 160 tortoises per square mile in 1990 (NSW Center 2008). Based on the high number of carcasses found during surveys in 1992, 1993, and 1998 (NSW Center 2008), declines have continued to occur within the Chuckwalla Bench plot.

Flat-Tailed Horned Lizard. The flat-tailed horned lizard (*Phrynosoma mcallii*) is restricted to sandy soils in the lower Colorado River subdivision of the Sonoran Desert. It is present between the Salton Sea and the western boundary of the Chocolate Mountain Range, near the Salt Creek drainage, but probably does not extend onto the Chocolate Mountain Range. Formerly proposed for federal listing as threatened, the flat-tailed horned lizard is protected through an Interagency Conservation Agreement (1997) and subsequent Rangewide Management Strategy. State and federal agencies that own or manage land or natural resources within the range of the flat-tailed horned lizard are participating agencies in the Conservation Agreement and the Rangewide Management Strategy. MCAS Yuma, NAF El Centro, and NAVFAC Southwest are participants (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). Five Management Areas have been designated, four in California and one in Arizona. Of these, the West Mesa Management Area overlaps R-2510, the East Mesa Management Area overlaps the southern half of R-2512, and the Yuma Desert Management Area lies to the south and east of MCAS Yuma and extends into BMGR-West but does not extend as far east as the western Cabeza Prieta National Wildlife Refuge boundary as discussed below.

BARRY M. GOLDWATER RANGE (WEST)

Two federally listed endangered species (Lesser long-nosed bat and Sonoran pronghorn) and one previously proposed for federal listing as threatened and currently subject to an interagency management agreement (flat-tailed horned lizard) are known from BMGR-West and adjacent portions of Cabeza Prieta National Wildlife Refuge. One formerly federally listed endangered species that is currently under status review for relisting as endangered or threatened (cactus ferruginous pygmy-owl) is known from areas to the east of BMGR-West but is not known from the range itself (it won't be discussed further). There are no federally listed endangered or threatened plant species known from BMGR-West.

Provided below are summaries of the natural history and distribution of the three federally listed species occurring or potentially occurring at the BMGR-West and adjacent portions of Cabeza Prieta National Wildlife Refuge. Each summary concludes with a discussion of the potential occurrence within the project area.

Lesser long-nosed bat. The Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) is a summer resident in southern Arizona, roosting and nesting in caves and mines and foraging in desert scrub habitats. These bats feed on nectar and pollen of desert plants including columnar cacti such as saguaro and organ pipe cacti and agaves with spreading (paniculate) inflorescences. A migratory species, they enter Arizona in early April and depart by early October. They roost in mine tunnels and natural caves. When they arrive in Arizona the females are pregnant and congregate in maternity colonies while males occupy separate roosts. The lesser long-nosed bat is known to have colonies in the eastern portion of Cabeza Prieta National Wildlife Refuge and in Organ Pipe Cactus National Monument and foraging may extend into BMGR-East. It has not been documented in BMGR-West (Department of the Air Force and Navy 2007), where the density of vegetation and abundance of food plants such as organpipe and saguaro cacti is considerably lower than it is farther east outside the project area.

Sonoran pronghorn. The Sonoran pronghorn (*Antilocapra americana sonoriensis*) is an endangered subspecies of the American pronghorn. The following species account is drawn with minor modifications from the BMGR INRMP (Department of the Air Force and Navy 2007). In the later 1800s, the Sonoran pronghorn was found over much of southwestern Arizona, northwestern Mexico, and southeastern California. By the inception of the BMGR in 1941, the numbers and distribution of this species had been greatly reduced. This population decline resulted from a combination of factions that include habitat loss; habitat fragmentation from the development of roads, railroads, and canals; hunting (prior to the 1920s); and competition from livestock grazing.

The current distribution of the Sonoran pronghorn is limited to three geographically isolated populations—one in the U.S. and two in Mexico. The U.S. population is limited primarily to the central BMGR, Cabeza Prieta National Wildlife Refuge, and Organ Pipe Cactus NM west of State Route 85. This animal is also periodically found within two parcels of land managed by the Bureau of Land Management. One of these Bureau of Land Management parcels is in the vicinity of Ajo and the second is between the BMGR and Interstate-8 and between Dateland and Sentinel. The BMGR accounts for about 40 percent of the Sonoran pronghorn's range in the U.S. The two Mexican populations are located south of the Cabeza Prieta National Wildlife Refuge and Organ Pipe Cactus NM and are geographically isolated from each other into eastern and western groups by Mexico Highway 8. The U.S. and Mexican populations are isolated from each other by Mexico Highway 2. Recovery of the U.S. Sonoran pronghorn population is regarded by the INRMP (Department of the Air Force and Navy 2007) as one of the most pressing current resource management challenges within the BMGR, Cabeza Prieta National Wildlife Refuge, and Organ Pipe Cactus National Monument.

Estimates of the Sonoran pronghorn population in Arizona were made several times starting in 1925. The various estimates made through 1991 are not directly comparable because of the variety of methods used and geographical areas studied, but each estimate indicates that relatively low numbers of pronghorn (approximately 50 to 150 animals) were present in southwestern Arizona within an increasingly small area of distribution. The Arizona Game and Fish Department initiated regular biennial aerial surveys of the Sonoran pronghorn population in 1992 using standardized techniques. Based on these surveys, the population low was estimated at 21 to 33 animals in the U.S. population in 2002 and the population peak was estimated at 282 animals in 1994. More recent surveys indicate that there has been some recovery in the population numbers since 2002 with estimates of 58 and 68 pronghorn in 2004 and 2006, respectively.

Considerable management and research attention has been focused on the Sonoran pronghorn since the early 1990s. The information from monitoring and research programs have resulted in findings about the Sonoran pronghorn's daily and seasonal movements, birth and mortality rates, habitat preferences and surface water requirements, susceptibility to predation, age-class distribution, and tolerance of aircraft overflight noise and ground-based human activities. This recent body of work has also provided important understandings about the vulnerability of the Sonoran pronghorn to drought and the critical implications that highways, railroads, irrigation canals, and other developed land uses—which have curtailed this animal's movements, fragmented and destroyed its habitat, and subdivided its population—hold for its continued survival.

Virtually the entire distribution of Sonoran pronghorn in the U.S. is within four contiguous areas of federally administered land: BMGR (East and West), the Cabeza Prieta National Wildlife Refuge, and Organ Pipe Cactus National Monument. The Sonoran pronghorn's distribution extends into

the eastern third of BMGR-West. Its distribution to the west is apparently limited by unsatisfactory habitat conditions (Department of the Air Force and Navy 2007), possibly related to increasingly sparse vegetation related to decreased precipitation and elevation moving westward. The western limit of Sonoran pronghorn is given as the Copper and Cabeza (Prieta) Mountains on BMGR-West and Cabeza Prieta National Wildlife Refuge, respectively. A north-south line at 113 53′ 00″ West longitude has been identified by USFWS (2003a) as the western extent of the current range of the pronghorn.

Flat tailed horned lizard. The status of the flat-tailed horned lizard is discussed above under the Chocolate Mountain Range. The Yuma Desert management area for flat-tailed horned lizard lies to the south and east of MCAS Yuma and extends into the western portion of BMGR-West. The management area does not extend eastward into Cabeza Prieta National Wildlife Refuge.

R-2510 AND R-2512

Lands overlain by these restricted airspace units lie on either side of the extensive area of irrigated cropland in the Imperial Valley. Provided below are summaries of the natural history and distribution of the three federally sensitive species occurring or potentially occurring at R-2510 and R-2512. Each summary concludes with a discussion of the potential occurrence within the project area.

Peninsular bighorn sheep. The Endangered Peninsular Ranges bighorn sheep is listed as a distinct population segment (DPS) of the desert bighorn sheep *(Ovis canadensis nelsoni*). According to USFWS (2000c), the Peninsular bighorn sheep is restricted to the east facing, lower elevation slopes (typically below 4,600 feet [1,400 meters]) of the Peninsular Ranges along the northwestern edge of the Sonoran Desert. Bighorn sheep are wide-ranging animals that require a variety of habitat characteristics related to topography, visibility, water availability, and forage quality and quantity. Steep topography is required for lambing and rearing habitat and for escaping from predators. Open terrain with good visibility is critical because bighorn primarily rely on their sense of sight to detect predators. In their hot, arid habitat, water availability in some form is critical, especially during the summer. A wide range of forage resources and vegetation associations is needed to meet annual and drought related variations in forage quality and availability. Limiting factors apparently vary with each ewe group and are not well understood in all cases. The range of factors appear to include predation, urban related sources of mortality, low rates of lamb recruitment, disease, habitat loss, and human related disturbance (USFWS 2000b).

Designated critical habitat for this endangered species (USFWS 2001) includes over 7,000 acres in the western portions of R-2510 and includes Carrizo Wash and the Fish Creek Mountains. The majority of the extensive critical habitat lies in the Peninsular Ranges to the west and the north of R-2510. However, the species has not been documented on lands under R-2510 (NAF El Centro 2001), which are lower in elevation, have sparser vegetation, and lack steep escape cover compared to habitats generally occupied by the species. A revision to this critical habitat has been proposed by USFWS (2008c).

Desert bighorn sheep occurring in the Chocolate Mountains Range and in BMGR-West are not part of the listed DPS. These populations are managed by California Department of Fish and Game and Arizona Game and Fish Department, respectively.

Desert tortoise. The status of the desert tortoise is discussed above under the Chocolate Mountain Range. Desert tortoise does not occur west of the Salton Sea and is therefore absent from R-2510. The western limit of tortoise distribution lies near the southwestern boundary of the Chocolate Mountain Range, east of the Salton Sea. From there the western limit extends to the southeast and passes to the east of the Algodones Dunes. The desert tortoise has not been documented and is presumed absent from R-2512, which is lower in elevation and separated from the known western distributional limit of the species by the Algodones Dunes which probably act as a barrier to the species.

Flat tailed horned lizard. The status of the flat-tailed horned lizard is discussed above under the Chocolate Mountain Range. R-2510 and R-2512 overlie the West Mesa and East Mesa management areas for the flat-tailed horned lizard, respectively. Remnant dunes are present and may support plant and wildlife species of limited distribution (NAF El Centro 2001), however no federally listed plant or wildlife species are documented from either restricted area (NAF El Centro 2001).

Sensitive Habitats

WETLANDS AND OTHER CLEAN WATER ACT REGULATED WATERS

There are no wetlands present where landings, take-offs, or low-level hovering would occur, including the LZs and GSAs in the Chocolate Mountain Range or BMGR-West. Neither R-2510 nor R-2512 support wetlands. Intermittent streams supporting desert riparian communities (e.g., Paloverde-cacti) are important to wildlife and have been considered as Clean Water Act regulated waters in the context of projects where excavation or filling are involved, although their jurisdictional status has not been reviewed in the light of recent court decisions.

CRITICAL HABITAT

Critical habitat for the desert tortoise is present in a considerable portion of the Chocolate Mountain Range. Designated critical habitat for the Peninsular bighorn sheep is present to the west of R-2510 and encompasses over 7,000 acres under the western portion of the restricted area.

Established Plans, Measures, and Procedures Applicable to All Training at Bob Stump Training Range Complex

All project components, as well as all training within the Bob Stump Training Range Complex, would be conducted in compliance with the MBTA and Executive Order 13186. The MBTA affirms and implements the United States' commitment to international conventions for the protection of shared migratory bird resources, and prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. Executive Order 13186 directs Federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. On December 2, 2003, the President signed the 2003 National Defense Authorization Act. The Act provides that the Secretary of the Interior shall exercise his/her authority under the MBTA to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during military readiness activities authorized by the Secretary of Defense. Congress defined military readiness activities as all training and operations of the Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Congress further provided that military readiness activities do not include: (A) the routine

operation of installation operating support functions, such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, morale, welfare, and recreation activities, shops, and mess halls; (B) the operation of industrial activities; or (C) the construction or demolition of facilities used for a purpose described in (A) or (B).

On July 31, 2006, the DoD and the USFWS entered into an Memorandum of Understanding (MOU) to Promote the Conservation of Migratory Birds, in accordance with Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds." Only the training component of the proposed action is a "Military Readiness" activity and therefore incidental take is authorized unless the action jeopardizes bird populations; however, as part of the MOU between USFWS and DoD, all Military Readiness activities shall include conservation measures as part of the NEPA process to minimize and avoid impacts on species protected under the MBTA. These measures are identified at the end of this section and include the avoidance, restoration, and/or enhancement of all sensitive native plant communities that could be affected by proposed projects, seasonal avoidance of nesting birds, avoidance of riparian and wetland habitats, and fuel and fire management. Range Managers at MCAS Yuma address bird conservation through close internal coordination of routine and emergency maintenance, training, and other activities to avoid, minimize, or when possible postpone actions that could impact migratory birds.

Additionally, incorporation of the MV-22 into the existing training environment would be subject to all conservation measures (identified below) pertaining to overflight and helicopter usage from BOs applicable to desert tortoise on the Chocolate Mountain Range, to Sonoran Pronghorn on BMGR-West, to flat-tailed horned lizard on R-2510, R-2512, and BMGR-West. Adherence to these measures is considered part of the proposed action.

In addition, low-level overflights of the western portion of R-2510 and adjacent areas of proposed critical habitat for Peninsular bighorn sheep will be conducted in a manner developed by the USMC in consultation with USFWS.

CHOCOLATE MOUNTAIN RANGE

Section 7 consultation regarding existing and proposed military use activities at the Chocolate Mountain Range at the request of MCAS Yuma on 5 July 1995, resulted in the issuing of a BO from the USFWS on 17 August 1995. It was the opinion of the USFWS that existing and proposed military activities occurring at the Chocolate Mountain Range were not likely to jeopardize the continued existence of the desert tortoise or likely to result in significant destruction or adverse modification of critical habitat for the desert tortoise. Recommendations set forth in the BO to avoid or minimize potential impacts on the desert tortoise and desert tortoise critical habitat and applicable to MV-22 training are as follows (NSW Group ONE 2007):

- All ground users of the Chocolate Mountain Range are required to participate in a tortoise education program, including a video. The program covers the following topics: occurrence of desert tortoises, sensitivity of the species to human activities, legal protection for desert tortoises, penalties for violations of federal laws, general tortoise activity patterns, reporting requirements, measures to protect tortoises, and personal measures that users can take to promote the conservation of desert tortoises.

- All Range users are informed of their responsibility to report any form of take to the tortoise management representative.
- All personnel operating vehicles within tortoise habitat on the Range are required to inspect underneath their parked vehicle prior to moving it. If a desert tortoise is found beneath a vehicle, the tortoise management representative, or qualified appointee(s), is contacted to remove the animal from harm's way.
- No pets are permitted at any time within desert tortoise habitat. Military working dogs are permitted, under the control of their handler.
- All ground personnel that enter the Range are required to remove all food stuffs, trash, or other waste that may attract predators. Trash receptacles used for extended stays are equipped with latching/locking lids.
- Surveys are conducted of existing military activity sites using USFWS-recommended methods by qualified desert tortoise biologists to the extent funds are made available. The objective is to walk 200 miles of transect per year until all activity sites have been surveyed. Each activity site requires only one survey. Surveys are conducted during regularly scheduled Range closures in the spring. The survey results, along with data on take at activity sites, serves as the basis for identifying which, if any activity sites should be relocated. All data are entered in the MCAS Yuma GIS database. Any changes in survey methodology are reported to the USFWS in an annual monitoring report.
- The boundaries of all target sites, existing and proposed, are determined in the field, mapped, and flagged. All new target constructions are placed within the boundaries of the designated target site. An on-site tortoise monitor is present during target placement.
- A Desert Tortoise Management Plan is used, in part, to identify ways to minimize impacts on tortoises from ongoing activities. This includes the relocation of some activities to areas of lower tortoise densities, based on the results of ongoing surveys.
- The tortoise management representative, or appointee(s), survey all ground support areas for dead or injured tortoises after the completion of each ground operation.
- The USFWS is notified by the tortoise management representative within three working days of the discovery of any tortoise death or injury caused by military activity. Notification includes the date, time, circumstances, and location of any injury or death. Dead animals are left *in situ*. Injured animals are taken to a USFWS-approved veterinarian.
- An annual monitoring report is prepared and delivered to the USFWS on or before January 15 of each year. The report briefly outlines the effectiveness of the desert tortoise mitigation measures and summarizes the mortality or injury to desert tortoises. To enhance desert tortoise protection, the report makes recommendations for modifying or refining existing measures.
- Surveys are conducted to further refine tortoise density estimates within critical habitat on the Range and to monitor and determine population trends using the most current methods accepted by the USFWS, Bureau of Land Management, and National Biological Survey. The primary objective of surveys is to evaluate the effectiveness of management prescriptions set forth in the Desert Tortoise Management Plan. Surveys are conducted each year, and all survey data are entered into the MCAS Yuma GIS desert tortoise database.

BARRY M. GOLDWATER RANGE (WEST)

USFWS required the following reasonable and prudent measure in its 2003 BO concerning helicopter use in training activities on BMGR:

- MCAS Yuma shall monitor levels of low-level (<1,000 feet above ground level) helicopter flight use in southeastern BMGR-West and on the transit route through the southern end of the Mohawk Mountains from 15 April to 15 September of each year and report to USFWS the results of that monitoring in the 1 March annual report [see Conservation Measure #15 and the pronghorn Conservation Recommendation #6 in USFWS (2003a)]. This measure was required by USFWS (2003a) and was designed to minimize the impact of incidental take that might otherwise result from the action, which involved training with helicopters on BMGR-West.

MCAS Yuma additionally proposed conservation measures that significantly reduce the effects of the proposed action on the Sonoran pronghorn by:

- reducing the likelihood of encounters between people and pronghorn during the crucial period for fawn growth and survival (15 March - 15 July);
- limiting most low-level aircraft use to specific corridors designed to avoid areas of concentrated pronghorn use and fawning areas;
- contributing to recovery actions, including important emergency actions such as forage enhancement that are designed to buffer the effects of drought and human disturbance on the U.S. sub-population;
- strictly controlling use and cleanup of hazardous materials, and studying the effects of chaff and recommending measures to reduce effects of chaff on pronghorn,
- implementing a military user-education program that includes information about regulations and protection for listed species; and implementing other measures described under "Conservation Measures" in USFWS (2003a) that minimize the effects of the proposed action, including the following:
    - The USMC will continue to restrict low-level overflights conducted during WTI courses and other specified exercises to existing designated corridors consistent with the conservation measures and terms and conditions of the 16 November 2001 opinion and will work with the USFWS and Arizona Game and Fish Department to realign or otherwise revise these corridors if needed in the future to reflect changing mission requirements or updated information on the Sonoran pronghorn. The low-level flight corridors for fixed wing aircraft and helicopter overflights of the Cabeza Prieta National Wildlife Refuge were first established in 1988, in accordance with agreements reached through informal consultations with the USFWS, to avoid or minimize potential effects to Sonoran pronghorn from flight training activities. The helicopter flight corridors were consolidated and realigned in 1997 and again in 2001, through formal consultations with the USFWS, to reflect updated information on Sonoran pronghorn distribution within its current range. Also as a result of the 2001 consultation, the USMC began restricting low-level helicopter overflights of Sonoran pronghorn habitat, excluding flights conducted during WTI courses, within BMGR-West and BMGR-East to designated corridors designed to avoid or minimize potential effects to this species.

- The USMC will continue to require that training and support activities avoid areas with highly erodible soils to the extent practicable in accordance with the requirements of military training and support missions. If areas with highly erodible soils cannot be avoided, training and support activities will be limited to the minimum area needed and confined to established roadways when feasible. These measures will continue to avoid or minimize potential effects to historical and current Sonoran pronghorn habitat.
- The USMC will manage closed USMC GSAs in current Sonoran pronghorn habitat to promote revegetation by native plant communities.
- In accordance with the November 2001 opinion, the USMC will continue to support closure of the Mohawk Valley area of BMGR-West to public use from 15 March to 15 July of each year to reduce the potential for human disturbance of Sonoran pronghorn during the period that is critical to early fawn survival.
- The USMC will continue to restrict low-level overflights (i.e., flights below 1,500 feet above ground level) of the Cabeza Prieta National Wildlife Refuge to those conducted during WTI courses within existing designated corridors.

Environmental Consequences

This section addresses the consequences of training using MV-22 in the Bob Stump Training Range Complex (Chocolate Mountain Range, BMGR-West, R-2510 and R-2512), including overflights over the adjacent Cabeza Prieta National Wildlife Refuge. Although the airspace that would be used by MV-22 aircraft is already established and has been in use by aircraft from MCAS Yuma and elsewhere, there would be changes in the number of operations and the type of aircraft used. Introduction of up to ten squadrons of the MV-22 to the training environment within the Bob Stump Training Range Complex would replace the training requirements of nine squadrons of CH-46 and CH-53 aircraft.

The training component of the proposed action includes the incorporation of the MV-22 into the existing West Coast-based training environment. The MV-22 would conduct training, readiness, and special exercise operations within Special Use Airspace and on training areas historically used by the aircraft to be replaced. The training areas to be used by MV-22 for all take-offs, landings, offloading of personnel and equipment, and low-level hovering within the Bob Stump Training Range Complex are all established and have a history of use by helicopters as well as a variety of ground units. The specific training sites include 15 LZs at the Chocolate Mountain Range and 32 GSAs and one LZ at BMGR-West. The locations of these LZs and GSAs are shown in Figures 6.2.14-1 and 6.2.14-2, respectively. Characteristics of these LZs and GSAs are summarized above in Tables 6.2.14-1 and 6.2.14-2, respectively. There would be no take-offs, landings, low-level hovering or offloading of personnel or equipment at R-2510 or R-2512.

In addition, air-to-ground firing from the aircraft's machine gun may be conducted at existing, long-established bombing and gunnery target ranges including Iris Wash, Blue Mountain, and Mount Barrow on the Chocolate Mountain Range and targets at Yodaville and vicinity on BMGR-West. Operations would be conducted from MCAS Yuma or any other USMC facility supporting the MV-22.

Take-offs, Landings, Off-loading Personnel and Equipment, and Low-level hovering. These activities would take place at specific established sites in the different ranges as described below:

- **Chocolate Mountain Range**. The range would experience 5,111 MV-22 operations per year (see Table 6.2.2-5). Fifteen previously established LZs would be used for MV-22 training at the Chocolate Mountain Range for take-offs, landings, and low-level hovering. MV-22s would hover or land in these designated LZs in the complex, in combination with other ongoing tactical ground mobility training. No concrete pads or other permanent structures would be constructed for MV-22 training (NSW Center 2008).

- **Barry M. Goldwater Range (West).** The range would experience 17,942 MV-22 operations per year including operations at the AUX-2 in the western portion of BMGR-West (Table 6.2.2-4). AUX-2 is a small, outlying airfield remaining from the World War II training era. It would receive nearly half of the MV-22 operations. This field has been redeveloped to support training activities with aircraft that simulate operations out of a forward primitive airfield. All other take-offs and landings at BMGR-West would be at established GSAs and LZ Lonesome Dove, which are locations where ground units with missions such as air defense, radar surveillance, control of aircraft, and arming and refueling of helicopters can deploy to train as well as support aviation training. Additionally, GSAs are used interchangeably for a variety of uses such as base camps, as FARPs, and as sites for mobile radar, communications, and anti-aircraft missiles. All of these GSAs are located adjacent to established roads to allow for vehicle access (USMC 1997a). Drops would occur at the designated DZ near AUX-2.

- The principal existing impacts to the GSAs are from use by heavy vehicles (2.5- to 15-ton trucks, many with dual tires and all axle drive trains) and foot traffic from tens to hundreds of troops. In some locations, years of repeated use has caused considerable ground disturbance and has led to the creation of so called "moondust" from pulverized soils (USMC 1997a). Portions of LZ Lonesome Dove shows ground disturbance for previous helicopter landings.

- The GSAs vary in size, but most range from 200 to 300 acres in area. Collectively, the 41 GSAs on BMGR comprise about 19.6 square miles (USMC 1997a). Thirty two of these GSAs are proposed for use with the MV-22. GSAs east of the 113 degree, 53 minute line of longitude are not proposed for use by the MV-22, thereby avoiding areas used by the endangered Sonoran pronghorn.

- **R-2510**. One hundred forty-eight operations per year are proposed for R-2510. There would be no take-offs, landings, or low-level hovering within R-2510 or R-2512.

Introduction of up to ten squadrons of the MV-22 to the training environment at the Bob Stump Training Range Complex could cause impacts to biological resources due to downdraft (dust and soil erosion) or possible ignition of vegetation that may be associated with vertical take-offs, landings, and low-level hovering; potential bird-aircraft strikes; and potential disturbance to wildlife from noise and visual effects associated with low-level aircraft overflight. The cessation of the CH-46E operations and addition of the MV-22 operations would cause a net increase in operational use of the proposed landing sites relative to the baseline (see section 6.2.2, *Airspace*); however, activities of personnel exiting and entering the aircraft and the effects of aerial drops of cargo would be the same as those involved in current training with CH-46E or CH-53E helicopters.

VEGETATION AND WILDLIFE HABITAT

No new construction or infrastructure improvements are proposed as part of training in the Bob Stump Training Range Complex; therefore, there would be no direct loss of vegetation or wildlife habitat.

Incorporation of the MV-22 into the existing training environment may result in temporary disturbance of loose surface debris and soil caused by downdraft and outwash from the moving rotors (collectively known as rotorwash) in the vicinity of take-offs, landing and near-surface hovering, potentially resulting in an impact to vegetation and soils. Downdraft and outwash forces are relative to the engine power settings and the aircraft's proximity to the ground. Downdraft from the MV-22 would be greater than from the CH-53E (DoN 1998) and CH-46 (see Appendix G) at a given height above ground. Outwash from the MV-22 would reach 50 knots at a distance of 150 feet from the aircraft when hovering at 20 feet above ground level, which is three to four times greater than that associated with the CH-46 (Bell Boeing 2008). The outwash velocities would rapidly diminish very near the ground surface. As a result, downdraft and outwash from the aircraft during landing, take-offs, and hovering immediately above the ground would mobilize soils and temporarily affect vegetation and wildlife habitat in the immediate vicinity of the hovering aircraft.

Many training sites where landings, take-offs, and low-level hovering would occur are already disturbed by a history of use for ground combat training and rotary wing training, limiting their value to vegetation and wildlife. At LZ Lonesome Dove, which is located on an older geologic surface, landing sites frequently used in the past now have a silt surface as a result of the activity. At the GSAs, localized effects of landings on the soil may be obscured by blowing dust and sand associated with naturally-occurring high wind periods that may occur several times a year. As a result, impacts associated with hovering and landing of the MV-22 would be limited to areas that are routinely affected by training and have limited vegetation, and would be minor and localized. Therefore, impacts on vegetation and wildlife habitats resulting associated with take-off, landing and low-level hovering would be less than significant.

Operation of the MV-22, itself, has not been identified as a cause of frequent fires. According to a recent DoN review (DoN 2008c), there has been only one documented fire after 44,000 V-22 flight hours and operations encompassing numerous unprepared LZs at bases and ranges, including sites in Alabama, Arizona, California, Florida, Maryland, Nevada, New Mexico, North Carolina, and Virginia. The single documented fire was caused by an engine whose exhaust deflectors were inoperative. The deflectors normally divert exhaust gases outward, away from the aircraft and the ground. In the MV-22's current configuration, the exhaust deflector system is activated at low power settings and with weight on the wheels. Studies of exhaust temperatures with and without deployment of the exhaust deflectors indicate that ground surface temperatures would not reach temperatures required to ignite a variety of natural fuels, including grasses. The DoN review (DoN 2008c) concluded that, under normal operations with engine exhaust deflectors operating, the exhaust of the V-22 should not heat ground to a temperature high enough to support combustion of plant based materials such as dry grasses. The aircraft operates with the exhaust deflectors on at all times when on the ground. The exhaust deflectors activate as soon as there is weight on the main landing gear wheels. The pilot is not allowed to land in an unprepared LZ if the deflectors are inoperative. The current configuration includes a heat exhaust shield and modified lighting covers to prevent fires from starting during touch downs

(personal communication, Aitchison 2008). Although available data indicate the unlikelihood of ignition of fires from engine exhaust gases and radiative heating, surface temperatures could be high enough to dehydrate and damage growing vegetation. Any effect would be localized underneath the engine nacelles. Based on the insulating properties of soil, temperatures would be expected to diminish rapidly with depth and very small changes in temperature would be expected at the depth where most roots and underground structures such as bulbs or corms would be located.

Nonetheless, all training activities have the potential to start fires. Fire potential would be highest in undeveloped areas with an abundance of natural fine fuels, such as dry grasses or finely branched shrubs that extend above the ground surface. Under natural conditions, the prevalent creosote bush scrub vegetation at the Bob Stump Training Range Complex is too sparse to carry fire. However, the recent spread of introduced invasive species including Sahara mustard (*Brassica tournefortii*) and non-native grasses such as red brome (*Bromus madritensis* var. *rubens*) and Mediterranean grass, also known as schismus or split grass (*Schismus* spp.) through Mojave and Sonoran Desert habitats in eastern California and southern Arizona may result in sufficiently dense vegetation after high rainfall years to carry a fire, which could have long-term adverse effects on the desert ecosystem and biodiversity. This is because the desert ecosystem is believed to have evolved in the absence of significant wildfires and some species, including creosote bush, appear to lack adaptations that facilitate rapid recovery from fire. Known from only a few locations in 1987, Sahara mustard is now perhaps the most common roadside annual in southern Arizona. The USMC and U.S. Air Force have identified Sahara mustard and Arabian schismus (*Schismus arabicus*) as the most prevalent invasive species of concern within the BMGR (Departments of the Air Force and Navy 2007).

Although introduction of the MV-22 to the Bob Stump Training Range Complex has some potential to start fires, the likelihood appears to be very low, given the available information reviewed above, including the infrequency of years during which precipitation is high enough to result in sufficient cover of invasive species to carry fire. Because of the low likelihood of fire related to MV-22, the potential for increased wildfire associated with MV-22 training is expected to have a less than significant impact on biological resources. However, because there is some uncertainty associated with this conclusion due to the relative lack of training history with MV-22 in arid environments and given the severity and long-term adverse effects of wildfire in desert scrub communities, mitigation measures are proposed to further reduce the likelihood and significance of impacts resulting from training-related fires.

WILDLIFE

The use of any rotary wing aircraft within undeveloped areas has the potential to add noise to the natural environment and cause a response by wildlife, potentially inducing a startle response; possible injury due to trampling or uncontrolled running or flight; increased expenditure of energy during critical periods; decrease the amount of time spent on life functions such as seeking food or mates; temporarily mask auditory signals from other animals; and/or otherwise reduce the protection and stability of young. The type of noise that can stimulate the startle reflex is highly variable among animal species (Manci et al. 1988). In general, studies have indicated that close, loud, and sudden noises that are combined with a visual stimulus produce the most intense reactions. Rotary wing aircraft such as helicopters are believed to induce the startle effect more frequently than fixed wing aircraft (Gladwin et al. 1988). In this context, the MV-22 would appear

more like a fixed wing aircraft with onset of sound from an MV-22 building up relatively gradually and the rotating blades forming a blur rather than being seen as rotating parts, reducing the potential for a startle effect. Although little is known about the effects of MV-22 operations on wildlife species, this aircraft can be presumed to have effects somewhat similar to those of a helicopter, such as the CH-46E, with exceptions as described in this section.

The MV-22 sounds more like a conventional turboprop aircraft, such as a short-hop commuter airliner or a C-130 cargo plane, than a helicopter in that it makes a steady buzzing tone and lacks the low pitched percussive ("wop-wop-wop") sound associated with many helicopters. Compared to the CH-46E, which it would replace, noise modeling conducted for this EIS shows that in cruising flight sound exposure levels (SEL) in dBA from MV-22 would be consistently lower than those from CH-46E at altitudes between 250 feet and 5,000 feet above ground level (Table 6.2.14-4). The same is true of maximum sound levels (Lmax) in A-weighted decibels (dBA) (Table 6.2.14-4). SEL represents the total acoustic energy during an event (such as an overflight) typically measured over a duration of one second. Lmax is the maximum sound level measured over a fraction of a second during a single noise event that changes over time. During arrivals, SEL from MV-22 would be slightly lower than those from CH-46E, however the Lmax would be somewhat greater for MV-22 (Table 6.2.14-4).

6.2.14-4. Comparisons of Modeled CH-46E and MV-22 sound levels (SEL and Lmax) during cruising at different altitudes above ground level and during arrival

Altitude (feet, AGL)	SEL (dBA)		Lmax (dBA)	
	CH-46E	MV-22	CH-46E	MV-22
CRUISE[1]				
250	101	93	97	88
500	96	92	90	88
1000	94	88	86	81
1500	92	86	82	78
2000	89	84	78	74
2500	88	82	76	72
3000	87	81	74	70
3500	86	80	73	68
4000	85	79	72	67
4500	85	78	72	66
5000	84	77	69	64
ARRIVAL (AT OR NEAR TOUCHDOWN)[2]				
N/A	95	94	79	83

Notes:
1. Estimates CH-46E cruising speed of 110 knots (kts) and MV-22 cruising speed of 220 kts.
2. Measured at a distance of 500 feet abeam of the aircraft, on the left side.
ABL = above ground level
Source: Data from Rotorcraft Noise Model (Wyle Laboratories, November 2008).

The MV-22 would be incorporated into existing training scenarios at the Bob Stump Training Range Complex, which means that the aircraft has the potential to be flying at any time of day or night. The number of operations would change considerably with introduction of the MV-22. As shown in Table 6.2.2-4 in section 6.2.2 (*Airspace*), there would be a substantial increase in rotary wing operations at the existing AUX 2 airfield, confined area landing and tactics (at existing GSAs described above), and air to air and air-to-ground training. Activities during daylight would be expected to temporarily disturb wildlife in the immediate vicinity and could cause some individuals to move away from the immediate vicinity of the activity. Perched raptors would be expected to fly to another perch if closely approached by the aircraft. Activities taking place at

night could cause similar responses by bird species but would generally require a closer approach to elicit a response at nighttime compared to daytime. Hovering flight by MV-22s would increase the magnitude and duration of the noise exposure and would be more likely to cause a response by species that may be in the area. If there were a response to the training activity, the most likely response would be movement to another area during the activity, which would not be expected to result in an adverse effect.

Desert mule deer, desert bighorn sheep, and Sonoran pronghorn exist in the training areas and could be affected by overflight. Desert bighorn live in the mountain ranges within the Chocolate Mountain Range and BMGR, desert mule deer are mostly associated with dense vegetation along major washes at Chocolate Mountain Range, and endangered Sonoran pronghorn (discussed below under endangered and threatened species) are present in BMGR and within the adjacent Cabeza Prieta National Wildlife Refuge, with most sightings east of the GSAs that would be used for MV-22 training.

Wild ungulates appear to vary in sensitivity to aircraft noise. Responses reported in the literature varied from no observable effect, to a minor behavioral effect (e.g., alert response) followed by habituation, to panic reactions followed by stampeding (Manci et al. 1988, Weisenberger et al. 1996). Aircraft noise has the potential to be most detrimental during periods of stress, including gestation and calving (DeForge 1981). Varying responses to various types of aircraft overflight by desert mule deer, mountain sheep, and Sonoran pronghorn have been studied by Krausman *et al*. (1986), Krausman *et al*. (1998), and Krausman *et al*. (2001), respectively.

Although some reaction (such as alert posture or briefly taking flight or running) to low level overflights is likely, overflights directly over sensitive ungulates would be relatively infrequent due to the low numbers and very sparse distribution of individuals and the large size of the training areas. Additionally, there would likely be habituation to the overflight stimulus given the regularity of training in the area, the gradual increase in sound levels as the aircraft approached, and the lack of perceptible harm from the overflight. For these reasons, the training activity would not be expected to have an observable adverse effect on any species at the population level.

Moreover, because the flight path of training aircraft could fall anywhere within the Bob Stump Training Range Complex (above the minimum overflight altitude of 1,000 feet), which covers over 10,000 square miles (25,900 square km), the frequency of overflights in any one area would be sufficiently low that even a strong response (e.g., flushing, or running) would happen so infrequently that it would not be expected to adversely affect an animal's well-being. For these reasons, the training activity would not be expected to have an observable adverse effect on any species at the population level. Therefore, impact from noise would be less than significant.

ENDANGERED, THREATENED, AND SENSITIVE SPECIES

This section addresses effects on federally listed or proposed endangered or threatened wildlife species. No federally listed or proposed plant species are known to occur in any of the training areas. There would be no construction in the training areas and all areas that would be used for landings, take-offs, low-level hovering, or off-loading personnel or equipment are previously established LZs (Chocolate Mountain Range) or GSAs/LZ Lonesome Dove (BMGR-West) that are used for a variety of ground-based and aerial training. Because the MV-22 would be used in a similar fashion to the helicopters it is replacing (CH-46E) with regard to the transport, off-loading,

and on-loading of personnel and equipment, effects related to the activities of personnel and the offloading of equipment would be the same as currently exist. This analysis therefore focuses on landings, take-offs, and low-level hovering of the MV-22, which has somewhat different flight and noise characteristics than the CH-46 E.

Desert tortoise. The Mojave population of desert tortoise, which is federally listed as Threatened, occurs on the Chocolate Mountain Range, where it is widespread. Designated critical habitat for the tortoise is present in the northern and eastern portion of the Chocolate Mountain Range (Figure 6.2.14-1). The fifteen LZs that would be used by the MV-22 during training in the range are established and currently used by helicopters as well as ground-based units during training. Seven of the 15 LZs are located within designated Critical Habitat. Characteristics of these LZs are given in Table 6.2.14-1.

Desert tortoises on the surface could be affected directly by landing MV-22s or by personnel or equipment offloaded from the aircraft. Desert tortoises are above ground and active during a very limited time of year, generally during spring. Desert tortoises are typically underground during the hottest parts of summer to conserve water, and they brumate (hibernation-like state that cold blooded animals utilize during very cold weather) underground during most of the period between November and March. From March to October, desert tortoises emerge to forage in the morning and late afternoon, with most activity occurring in March and April (USGS 2004). Because of the limited period of activity above ground, operations during evening and nighttime hours and during the winter months would not affect desert tortoises. Less than 40 percent of MV-22 operations at the Chocolate Mountain Range would happen during the daytime (see section 6.2.8, *Noise*). Even during the period of greatest tortoise activity, MV-22 training operations have a very low probability of affecting tortoises given the sparse distribution of individual tortoises, the existing uses and level of disturbance of the LZs and the small "footprint" of an MV-22 training operation.

Individual tortoises in the vicinity of a landing or hovering MV-22 may assume a protective posture by temporarily withdrawing their head and limbs into their shell and remaining still, much as they do when a human or predator approaches. This posture provides protection from physical injury, and minimizes exposure to blowing dust and high frequency sound. Water balance and energy balance would be unaffected. The tortoise would resume normal activities following departure of the aircraft and personnel from the immediate area of the tortoise.

Noise associated with the training activities, specifically from the maneuvering of the MV-22, would cause little change in the peak sound levels related to rotary wing aircraft at the LZs compared to the existing situation although the overall operational tempo would increase. Other sources of noise would remain the same or very similar to that from existing training with CH-46E and CH-53E helicopters as well as low-level military aircraft operations, weapons firing, and explosives detonating during normal range operations. These noise levels are louder than the noise levels that would be generated by MV-22.

The USMC previously completed a 1997 EIS for the Yuma Training Range Complex (USMC 1997) to address the potential effects of management, operation, and development of the Yuma training Range Complex, which included training activities and other military use activities within the Chocolate Mountain Range. In the noise study for the Yuma Training Range Complex EIS, the USMC determined that Naval Special Warfare Center (NSWC) training activities at that time were

an insignificant contribution to the existing noise environment compared to air-to-ground ordnance firings, and that NSWC's training activities could be disregarded in the noise assessment of existing conditions (USMC 1997a).

A Biological Assessment for the proposed action has been prepared and submitted to the USFWS in support of the consultation process to comply with Section 7 of the ESA. An assessment of the impacts from the proposed action on all federally listed species potentially occurring within the project area, including the Mojave population of the desert tortoise, will be included. The USMC previously completed a 1997 EIS for the Yuma Training Range Complex (USMC 1997a) to address the potential effects of management, operation, and development of the Yuma Training Range Complex, which included training activities and other military use activities within the Chocolate Mountain Range. Consistent with Section 7 of the ESA, the USMC prepared a Biological Assessment and consulted with the USFWS about the effects of military use activities within the Chocolate Mountain Range on the desert tortoise. The USFWS issued a BO in 1996 (1-6-95-F-40) that existing and proposed activities were "not likely to jeopardize the continued existence of the desert tortoise….[nor were these activities] likely to result in the significant destruction or adverse modification of critical habitat for the desert tortoise (NSW Center 2008)."

Sonoran Pronghorn. Training operations at BMGR-West and overflights over the adjacent Cabeza Prieta National Wildlife Refuge would affect only a very small proportion of suitable pronghorn habitat within the current range of the U.S. sub-population of Sonoran pronghorn. All GSAs to be used for MV-22 training and LZ Lonesome Dove lie to the west of the current westerly limit of the species' range (113 53' West longitude) as indicated by USFWS (2003a). Existing use of BMGR by helicopters occurs principally in January, February, March, September, and October, and is primarily associated with WTI courses (USFWS 2003a). The same seasonal, altitudinal, and locational limitations in place for CH-46 helicopters would be in place for MV-22 training. Additionally, the MV-22 training would be consistent with existing BO requirements, including terms and conditions of the 16 November 2001 BO for BMGR-West (USFWS 2001) and the subsequent 2003 BO (USFWS 2003a). Replacement of the CH-46E with the MV-22 would result in a reduction of WTI operations from nearly 5,000 annually to less than 100 (Table 6.2.2-4).

The 16 November 2001 BO required that from 15 March to 15 July of each year all helicopters using R-2301W (the restricted airspace overlying BMGR-West), except those participating in the WTI course, will remain west of 113 degrees, 53 minutes (roughly the western extent of the current range of the pronghorn), on two designated transit routes, or above 1,000 feet above ground level. Although the 2001 BO did not constrain flights across the Mohawk Valley to the transit corridors at times other than 15 March to 30April, in practice all such flights are conducted in the two corridors or at altitudes above 1,000 feet above ground level. The Mohawk Valley is located in the eastern end of BMGR-West and is seasonally important to pronghorn (USFWS 2003a). Transit routes over the area were developed in coordination with USFWS to minimize effects to pronghorn while still providing for military training (USFWS 2003a). The seasonal, elevational, and locational restrictions on flights over the occupied pronghorn habitat, coupled with replacing existing helicopter activity with MV-22 activity, are expected to reduce adverse affects on pronghorn. In addition, a Biological Assessment for the proposed action has been prepared and submitted to the USFWS in support of the consultation process to comply with Section 7 of the ESA. An assessment of the impacts from the proposed action on all federally listed species potentially occurring within the project area, including the Sonoran pronghorn, will be included.

Specific studies of wildlife response to MV-22 overflight are not available. There is some available literature evaluating the response of pronghorn and other ungulates to overflight by helicopters and fixed wing aircraft. Helicopters are expected to elicit greater response from pronghorn than fixed wing aircraft. It is estimated that in low-level flight an MV-22 would elicit less of a response than a helicopter because of its faster approach, different sound characteristics, and lower sound levels at a given altitude (Table 6.2.14-4). However during landing, take-offs, and low-level hovering, their maximum sound levels (Table 6.2.14-4) and downdraft characteristics are expected to be greater than the helicopters they would be replacing.

Although no studies have specifically examined the effects of MV-22 overflights on Sonoran pronghorn, based on work with other ungulates including American pronghorn (*Antilocapra americana*), Sonoran pronghorn would be expected to move greater distances and respond for a longer period of time to helicopters than to fixed wing aircraft (Workman et al. 1992, Weisenberger et al. 1996, Luz and Smith 1976). Studies by Workman et al. (1992) and Bayless et al. (2004) on pronghorn response to overflight by jet aircraft and helicopters have suggested rapid habituation to overflight after initial responses which include running for short distances. In the Bayless et al. (2004) study, which included daytime and nighttime exposures to nearby helicopter activity, movements in response to overflight during nighttime hours were less than movements during daylight. About 40 percent of the proposed MV-22 operations on BMGR-West would occur at night.

Because all landings, take-offs, and low-level hovering would take place in established GSAs and LZs outside the present day western limit of pronghorn distribution, the likelihood of pronghorn being adversely affected by these activities would be so low as to be discountable.

Helicopter flights at 50 to 1,500 feet above ground level occur over pronghorn habitat in the Mohawk Valley and in corridors through the Cabeza Prieta National Wildlife Refuge. Responses may include running from aircraft, which may be energetically stressful and cause a variety of adverse physiological effects that are likely exacerbated during times of drought, or critical periods for fawns. Established helicopter flight routes for WTI across the Cabeza Prieta National Wildlife Refuge largely avoid areas of pronghorn concentrations and important fawning areas, thereby reducing likelihood that pronghorn will be significantly affected by these flights. Moreover, no take-offs, landings, or low-level hovering would occur in occupied pronghorn habitat (i.e., east of longitude 113 53′—see Figure 6.2.14-2).

Low-level helicopter flights with the greatest potential for adverse interactions with the pronghorn would be limited primarily to four designated flight corridors, and would occur primarily during the spring and fall WTI courses. The number of operations associated with the WTI courses would be reduced from nearly 5,000 annually to less than 100 annually with the replacement of CH-46E with the MV-22. Low-level helicopter flights along the corridors follow straight-line paths and do not involve hovering flight. Moreover, these corridors have been aligned to minimize the potential effects on pronghorn. Two of the corridors are located over the Cabeza Prieta National Wildlife Refuge and two over the current habitat of the Sonoran pronghorn within the Mohawk Valley of BMGR-West.

Although low-level helicopter flights would occur in the latter half of March and sometimes the first week of April, during the remainder of the crucial period for fawn growth and survival, from March 15 to July 15, no low-level helicopter flights would occur, except along designated transit routes. During this crucial time, non-WTI helicopter flights must remain west of east of 113° 53' west longitude, or on designated transit routes, or above 1,000 above ground level.

Flat-tailed Horned Lizard. The West Mesa and East Mesa flat-tailed horned lizard management areas underlie R-2510, R-2512, respectively, and the Yuma Desert flat-tailed horned lizard management area extends into the western portion of BMGR-West. Flat-tailed horned lizard is not known from the Chocolate Mountain Range.

At R-2510 and R-2512, MV-22 training would be limited to aerial overflight and maneuvering and there would be no landings, take-offs, or low-level hovering. This activity, which would replace similar activity by CH-46E and CH-53E helicopters, would create temporary changes in the sound environment but would not be expected to adversely affect flat-tailed horned lizard or its habitat in these management areas.

At BMGR-West, the AUX-2 runway (Figure 6.2.14-2) is the only site within the flat-tailed horned lizard management area that would be used for take-offs, landings, or low-level hovering by MV-22. It is a long established facility with a paved runway used by many types of aircraft, and it is served by a paved road. Use of this facility would not affect flat-tailed horned lizard or its habitat. Overflight of the flat-tailed horned lizard management area by MV-22s would not adversely affect flat-tailed horned lizard or its habitat in the management area.

Peninsular bighorn sheep. No landing, take-offs, or low-level hovering would be conducted at R-2510, which overlies a corner of Peninsular bighorn sheep critical habitat. Flights over that habitat can be lower than 500 feet (152 meters) above ground level. However, Peninsular bighorn sheep have not been recorded from this restricted area (NAF El Centro 2001) and no physical modification the habitat would occur as part of the proposed action. A Biological Assessment for the proposed action has been prepared and submitted to the USFWS in support of the consultation process to comply with Section 7 of the ESA. An assessment of the impacts from the proposed action on all federally listed species potentially occurring within the project area, including the Peninsular bighorn sheep, will be included.

Avoidance and Minimization Measures

The following measures are proposed to further reduce the level of significance of impacts resulting from training-related fires. As a result of successful implementation of these measures, residual impacts would be less than significant.

- **Exhaust Deflectors.** Exhaust Deflectors on the MV-22 aircraft will be deployed during landings and take-offs and while on the ground with engines running at undeveloped sites.
- **Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance.** Operators will minimize the time on ground with engines running on unprepared sites and follow all recommendations in the NATOPS manual. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios. Following deployment of troops, operators will touch down only on improved or barren surfaces where the potential for fire is lowest, such as previously disturbed areas. Finally, operators will avoid landing in vegetation greater than 12 inches in height to further reduce the potential for fire.
- **Fire Incident Reporting, Review and Adaptive Training Management.** As part of an MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast

operations. The reporting will include an assessment of the conditions under which the fire started such as relative humidity, fuel moistures, ambient temperature, and vegetation type, as well as a description of the project area and other factors which may further the understanding of fire potential. The USMC will distribute the memorandum to the MCAS Yuma Fire Department and Natural Resources staff to be used as part of an adaptive fire management strategy. Additionally, future revisions to the INRMP (next update proposed for 2012) will evaluate the best available data on fires associated with the MV-22, and how the fire environment affects sensitive species, such as the desert tortoise, and incorporate appropriate guidelines and updates to the existing fire management program. As part of the adaptive management approach, and based on information from the initial deployment of the aircraft, MCAS Yuma natural resources staff would monitor landing sites for high weed invasion rates and other disturbances and may proposed landing site management if appropriate and consider modifications to operational protocols as necessary to avoid significant impacts. This process will include coordination by MCAS Yuma environmental management with the USFWS and the MCAS Yuma Fire Department. Specific components of the update would include a defined procedure for monitoring of fuel loads, particularly fine grasses and Sahara mustard, which vary from year to year, timely updating of this information into a Fire Danger Rating System, and adjustment of training activities to minimize the potential for fire during conditions of high fuel loads and fire danger (which would be expected only in years having exceptional growth of annual vegetation). Appropriate recommendations may be made to modify the timing or procedures associated with training during years in which there is a high standing crop of dried fuels. Initial development of monitoring and Fire Danger Rating System updating procedures and initial coordination will occur prior to the introduction of the MV-22 to the Bob Stump Training Range Complex training environment.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Due to lack of changes to existing conditions, no impacts on biological resources would occur.

6.2.15 Cultural Resources

Cultural resources are historic and traditional cultural properties that reflect our heritage and are considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Federal regulations define historic properties to include prehistoric and historic sites, buildings, structures, districts, or objects in or eligible for inclusion on the National Register, as well as artifacts, records, and remains related to such properties (NHPA, as amended [16 USC 470 et seq.]). Additionally, cultural resources are protected under ARPA (16 USC 470aa-470mm; Public Law 96-95 and amendments), NAGPRA (Public Law 101-601; 25 USC 3001-3013), and the American Indian Religious Freedom Act (Public Law 95-341; 42 USC 1996 and 1996a). Compliance with Section 106 of the NHPA, which directs federal agencies to take into account the effect of a federal undertaking on a historic property, is outlined in the Advisory Council on Historic Preservation's regulations, "Protection of Historic Properties" (36 CFR Part 800). The NHPA and associated Section 106 compliance also includes guidance for Native American consultation regarding cultural significance of potential religious and sacred artifacts (16 USC 470a [a][6][A] and [B]).

Cultural resources located within the jurisdiction of the Bob Stump Training Range Complex are managed in accordance with the laws, regulations and guidance summarized above as well as DoD Instruction 4715.16 (Cultural Resources Management) and MCO P5090.2A, Change 2 (Environmental Compliance and Protection Manual).

Affected Environment

The Bob Stump Training Range Complex includes the BMGR-West located in southwestern Arizona as well as the Chocolate Mountain Range, R-2510, and R-2512 located in southern California. The following information is centered on the BMGR-West and the Chocolate Mountain Range because proposed MV-22 landing areas would only occur at these locations.

Cultural Setting

The basic prehistoric cultural setting described in section 5.15 (MCAS Yuma Cultural Resources) also applies to Bob Stump Training Range Complex. Ethnographically, the BMGR in southwestern Arizona was occupied by several groups during the historic period including the Pima speakers in the eastern half of the region and the Hokan and Shoshonean speakers in the western half (USMC 2001b). The region now occupied by the Chocolate Mountain Range in southern California was used as a route between the Colorado River Basin and Lake Cahuilla by populations in the region including the Chemehuevi from the eastern portion of the Mojave Desert; Serrano from areas to the north; Cahuilla from the Chocolate Mountain area; and Desert Kumeyaay from areas south of Chocolate Mountain (USMC 2001b).

First contact between Europeans and the Pima, Hokan, and Shoshone occurred in the sixteenth century when Spanish explorers were in southwestern Arizona (USMC 2001b). El Camino del Diablo, a travel route, was established in the mid-sixteenth century. The Spanish explorers were followed by Spanish missionaries in the late sixteenth century. The earliest American settlement in the region near the BMGR began in 1850 with the California gold rush and was related primarily to mining and ranching activities (Department of the Air Force and Navy 2007). Other historic occupation in the area included transportation, communication activities, and military expeditions and explorations during the nineteenth century, and water projects and large scale farming along the Gila and Colorado rivers after the turn of the century (Department of the Air Force and Navy 2007).

Near the Chocolate Mountains, Europeans used the area primarily for travel along trails and temporary campsites. Other than established trails, the area was left untouched for two hundred years. Mining activity during the late 1800s led to the development of railroad towns in the area. However, water resources to support settlements were limited and led to the development of a canal to channel water between the Colorado River and the Imperial Valley (USMC 2001b).

Military use of southwestern Arizona assumed its current aspect during the World War II era when large areas were withdrawn for training purposes. Facilities at the BMGR including auxiliary airfields, targets, buildings, test facilities, and expended ordnance can be traced to the Korean, Vietnam, and Cold war eras (Department of the Air Force and Navy 2007). Military use of the California desert also assumed its current aspect during World War II with the development of Camp Dunlap Aerial Gunnery Range and the Desert Training Center (USMC 2001b).

Definition of the Area of Potential Effects

The APE for the Bob Stump Training Range Complex consists of areas of potential ground disturbance from hovering and landing of aircraft. For BMGR-West, hovering and landing activities analyzed for this EIS are restricted to the established GSAs and LZs shown on Figure 6.2.2-1. These are existing training areas, many of which have been used by other rotary wing aircraft for more than 30 years. For the Chocolate Mountain Range, analyzed LZs and training areas (i.e., Bull Forward Arming and Refueling Points [FARP]) are shown on Figure 6.2.2-3. Although these LZs have not been formally captured on Range and Training maps over the years, they have been used historically by operators since the 1960s. No construction or other site modifications are associated with proposed operations. To account for MV-22 rotorwash during landing, the APE includes a 350-foot buffer area around all proposed landing areas.

MV-22 aircraft would also operate at AUX-2, a small Expeditionary Airfield from the World War II training era that has been redeveloped and upgraded over the years to support AV-8B and C-130 training activities. AUX-2 is located within BMGR-West. The airfield is a recorded historic resource (AZ X:06:072) that was recommended not eligible for listing on the National Register. However, the USMC has not consulted with Arizona SHPO for their agreement. The proposed action would result in an increase in annual flight operations at AUX-2. However, no modifications or other ground disturbing activities would occur at AUX-2 as a result of the proposed action. Thus, no potential impacts are anticipated and AUX-2 is not discussed further in this analysis.

For Native American resources, the APE is the same as described above (i.e., areas of potential ground disturbance from aircraft rotorwash), but also includes traditional cultural resources within the viewshed of MV-22 operations.

MV-22 operations at the Bob Stump Training Range Complex would not result in modifications to existing buildings or structures or change any viewsheds of existing buildings or structures. Therefore, architectural resources at Bob Stump Training Range Complex are not discussed further.

Known and Predicted Resources

BARRY M. GOLDWATER RANGE (WEST)

A review of records held by MCAS Yuma was conducted to determine previous survey coverage of the APE and identify all recorded resources within the BMGR-West APE (see MCIWEST 2009 for full details of cultural resources review). The following provides a summary of those findings.

Archaeological Survey Coverage. As shown on Table 6.2.15-1, only the GSA 24 APE, the GSA 57 APE, and the LZ Lonesome Dove APE have complete survey coverage. The survey coverage for the other GSAs ranges from zero to 95 percent. Surveys have been conducted in conjunction with construction projects (e.g., power lines, target complex), training exercises (e.g., Weapons Tactics Instructor [WTI] course), and the establishment of training areas. One twenty-acre survey (SAIC 2009) was conducted specifically for the MV-22 proposed action for the LZ Lonesome Dove APE.

Archaeological Resources. A summary of the 23 recorded archaeological sites located in the BMGR-West APE is provided in Table 6.2.15-2. Sixteen are prehistoric sites (e.g., camp sites, artifact scatters, pit features, cleared circles, lithic scatters, rock shelters, cairns, trails), four are historic sites (e.g.,

homestead sites, historic trash deposit), one has both prehistoric and historic components, and two recorded resources have no information available (AZ Y:5:52, AZ-050-2587). AZ Y:5:52 has no site record, and it could not be tied to any survey report; nothing is known about this resource. AZ-050-2587 may be associated with the Fortuna Mine or with Dripping Springs cairns; however, there is no site record, and it could not be tied to any survey report. It is possible that the latter two resources were, at some point, determined not to meet the qualification of an archaeological site.

Table 6.2.15-1. List of Landing Areas at the Barry M. Goldwater Range (West) Proposed for Use by the MV-22 and Associated Cultural Resources

Landing Area APE	APE Area (acres)	% Surveyed for Cultural Resources	Recorded Cultural Resources*
GROUND SUPPORT AREAS			
21	382	5	No resources recorded in surveyed areas.
22	370	70	AZ X:12:3
23	376	1	No resources recorded in surveyed areas.
24	405	100	None
25	358	40	No resources recorded in surveyed areas.
27	370	0	Unknown (no previous surveys).
31	358	90	AZ X:12:8; AZ X:12:9
32	361	5	No resources recorded in surveyed areas.
33	366	10	No resources recorded in surveyed areas.
34	365	50	AZ X:12:5; AZ X:12:78
35	355	80	AZ Y:9:2
36	369	0	Unknown (no previous surveys).
37	394	5	No resources recorded in surveyed areas.
39	355	80	AZ Y:5:5; AZ Y:5:27; AZ Y:5:52; AZ-050-2587
40	364	50	No resources recorded in surveyed areas.
41	363	40	AZ Y:5:35
43	381	20	No resources recorded in surveyed areas.
44	364	20	No resources recorded in surveyed areas.
48	1,277	95	AZ Y:5:14; AZ Y5:15; AZ Y:5:16; AZ Y5:17; AZ Y5:18
49	357	10	No resources recorded in surveyed areas.
50	978	55	AZ X:8:15, AZ X:8:17, AZ X:8:18
54	380	90	No resources recorded in surveyed areas.
55	275	5	No resources recorded in surveyed areas.
57	359	100	None
59	409	5	No resources recorded in surveyed areas.
60	430	50	AZ Y:5:6, AZ Y:5:7
61	374	5	No resources recorded in surveyed areas.
62	358	10	No resources recorded in surveyed areas.
63	368	20	No resources recorded in surveyed areas.
64	365	1	No resources recorded in surveyed areas.
65	363	50	AZ Y:5:8; AZ-050-2587
66	335	10	No resources recorded in surveyed areas.
LANDING ZONES			
LZ Lonesome Dove	9	100	AZ X:81:151

Notes:
*This list includes all recorded archaeological sites, including those that may be ineligible for listing on the National Register and those that have not been evaluated for listing.
*For those areas with less than 100% survey, additional unrecorded cultural resources may be present.
Source: MCIWEST 2009.

Four sites have been recommended as eligible for listing on the National Register and nine as ineligible for listing based on survey and/or testing evaluations (pending SHPO agreement). Six sites were recommended ineligible for listing on the National Register, and the Arizona SHPO agreed with these determinations. The other four sites have not been formally evaluated. There

also is the possibility of unrecorded archaeological sites within unsurveyed portions of the BMGR-West APE that may or may not qualify as a historic property.

Table 6.2.15-2. Recorded Cultural Resources within the BMGR-West APE

Site Designation	Eligibility Status	Site Dimension	Report Citation	Site Description
AZ X:12:3	CI	-	Bruder et al. 1996	Short-term campsite
AZ X:12:5	DI	1000 x 600m	Bruder et al. 1988	Camp site (Sparse Site)
AZ X:12:8	NEV	10m²	Bruder et al. 1996	Artifact scatter
AZ X:12:9	NEV	1 x 3m	Altschul and MCB Camp Pendleton 2007b	Talus pit feature; possible hunting blind
AZ X:12:78	CE	140 x 120m	Hartmann and Thurtle 2000	Artifact scatter
AZ X:8:15	DI	45 x 70m	Bruder et al. 1988	1920-30's Homestead Site (Spitler Site)
AZ X:8:17	DI	14 x 12feet	Bruder et al. 1988	Homestead site (Small House Site)
AZ X:8:18	DI	15 x 170m	Bruder et al. 1988	Sleeping circle cluster (Circle Site)
AZ X:81:151	CI	1.3 x 2.4m	SAIC 2009	Lithic chipping station
AZ Y:5:5	CI	350 x 750m	Bruder et al. 1996	Temporary camp (Baker Peaks TACTS Site)
AZ Y:5:6	DI	40 x 50m	Bruder et al. 1988	Historic homestead (1920's/1930's) (Tent Camp Site)
AZ Y:5:7	DI	80 x 75m	Bruder et al. 1988	Historic trash deposit 1930's (Drone Site)
AZ Y:5:8	CI	50 x 120m	Bruder et al. 1996	Rock shelter (Three cent site)
AZ Y:5:14	CI	56 x 17m	Bruder et al. 1996	Artifact scatter (SR-8; Bullwinkle)
AZ Y5:15	CE	75 x 300m	Bruder et al. 1996	Temporary Camp (SR-12; Countermoon)
AZ Y5:16	CI	1 x 1m	Bruder et al. 1996	Cairn (SR-13)
AZ Y5:17	CI	60 x 260m	Bruder et al. 1996	Cleared Areas (SR-14; Carouselambra)
AZ Y5:18	CI	5 x 20m	Bruder et al. 1996	Cleared area (SR-15; Underdog)
AZ Y:5:27	CI	12 x 75m	York et al. 1997	Trail and lithic scatter
AZ Y:5:35	CE	78 x 20m	Apple 1996	Lithic reduction station (Three Saguaro Site)
AZ Y:5:52	-	-	No survey report or site record available	-
AZ Y:9:2	CE	1320 x 2340m	Bruder et al. 1996	Prehistoric and historic artifact scatter (Coyote Water)
AZ-050-2587	NEV	-	No survey report or site record available	Fortuna Mine? Dripping Springs Cairns?

Notes:
National Register Status: NEV = not evaluated for National Register eligibility; DI = determined ineligible for inclusion on the National Register with SHPO agreement; CI = considered ineligible for inclusion on the National Register (pending SHPO agreement); CE = considered eligible for inclusion on the National Register (pending SHPO agreement); DE = determined eligible for inclusion on the National Register with SHPO agreement.
Source: MCIWEST 2009.

CHOCOLATE MOUNTAIN RANGE

A review of records held by MCAS Yuma was conducted to determine previous survey coverage of the APE and identify all recorded resources within the Chocolate Mountain Range APE (see MCIWEST 2009 for full details of cultural resources review). The following provides a summary of those findings.

Archaeological Survey Coverage. Previous surveys in the Chocolate Mountain Range APE have focused on the target areas, the Bull FARP, and associated roads. As shown on Table 6.2.15-3, the

APE for all of the proposed landing areas lack 100 percent survey coverage. The Bull FARP, itself, has 100 percent coverage, but not the buffer zone around it. The LZ Owl APE has over 90 percent survey coverage; the unsurveyed portion falls within Target 14S, an area that has been previously disturbed from ordnance use. Therefore, this area is considered to have a low probability for the presence of a National Register-eligible archaeological site. The LZ Spider APE has over 99 percent survey coverage. There are no recorded archaeological sites within the surveyed portion of the LZ Spider APE or the nearby areas; therefore, this small, unsurveyed area along the border of the APE is considered to have a low probability for the presence of a National Register-eligible archaeological site. The APE for the remaining LZs have 0 to 60 percent survey coverage.

Table 6.2.15-3. List of Landing Areas at the Chocolate Mountain Range Proposed for Use by the MV-22 and Associated Cultural Resources

Landing Area APE	APE Area (acres)	% Surveyed for Cultural Resources	Recorded Cultural Resources*
LZ Killdeer	9	60	No resources recorded in surveyed areas.
LZ Redwing	9	0	Unknown (no previous surveys).
LZ FB Burt	9	15	CA-IMP-8343H (Pegleg Road)
LZ Goose	9	0	Unknown (no previous surveys).
LZ Owl	9	90	No resources recorded in surveyed areas.
LZ Jayhawk	9	1	No resources recorded in surveyed areas.
LZ OP Feets	9	0	Unknown (no previous surveys).
LZ Spider	9	99	No resources recorded in surveyed areas.
LZ Billy Macon	9	0	Unknown (no previous surveys).
LZ Siphon 10	9	15	No resources recorded in surveyed areas.
LZ Dove	9	0	Unknown (no previous surveys).
LZ Jaybird	9	0	Unknown (no previous surveys).
LZ Finch	9	0	Unknown (no previous surveys).
Bull FARP	1,399	100% of FARP; 5% of buffer	CA-IMP-1864; CA-IMP-8254; CA-IMP-8255; CA-IMP-8256; CA-IMP-8258; CA-IMP-8259; CA-IMP-8260; CA-IMP-8261; CA-IMP-8262; CA-IMP-8263; CA-IMP-8264; CA-IMP-8265; CA-IMP-8266; CA-IMP-8267; CA-IMP-8268; CA-IMP-8269; CA-IMP-8270; CA-IMP-8271; CA-IMP-8272; FARP 4; FARP 11; FARP 13; FARP 14; FARP 26; FARP 27

Notes:
*This list includes all recorded archaeological sites, including those that may be ineligible for listing on the National Register and those that have not been evaluated for listing.
*For those areas with less than 100% survey, additional unrecorded cultural resources may be present.
Source: MCIWEST 2009.

Archaeological Resources. A summary of the 26 recorded archaeological sites located in the Chocolate Mountain Range APE is provided in Table 6.2.15-4. Twenty-four are prehistoric sites (e.g., chipping stations, rock rings, cleared circles, and lithic scatters), and two are historic sites (e.g., historic trails and roads). Three sites have been recommended as eligible for listing on the National Register and 22 as ineligible for listing based on testing evaluations (pending SHPO agreement). One site, the Pegleg Road, has not been formally evaluated.

Twenty-five archaeological sites are located within the Bull FARP APE, and one site is located in the LZ FB Burt APE. There also is the possibility of unrecorded archaeological sites within

unsurveyed portions of the Chocolate Mountain Range APE that may or may not qualify as a historic property.

Table 6.2.15-4. Recorded Cultural Resources Within Chocolate Mountain Range APE

Site Designation	Eligibility Status	Site Dimension	Report Citation	Site Description
CA-IMP-1864	CE	10 x 9m	Apple and Deis 2002	Cleared circles
CA-IMP-8254	CI	52 x 26m	Apple and Deis 2002	Lithic scatter
CA-IMP-8255	CI	68 x 12m	Apple and Deis 2002	Lithic scatter
CA-IMP-8256	CI	78 x 0.35m	Apple and Deis 2002	Trail segment
CA-IMP-8258	CI	28 x 12m	Apple and Deis 2002	Chipping stations
CA-IMP-8259	CI	3.4 x 3.1m	Apple and Deis 2002	Chipping station
CA-IMP-8260	CI	3.3 x 2.1m	Apple and Deis 2002	Chipping station
CA-IMP-8261	CI	30 x 15m	Apple and Deis 2002	Lithic scatter
CA-IMP-8262	CI	15 x 8.5m	Apple and Deis 2002	Chipping station
CA-IMP-8263	CI	0.92 x 0.75m	Apple and Deis 2002	Chipping station
CA-IMP-8264	CI	9.6 x 5m	Apple and Deis 2002	Chipping station
CA-IMP-8265	CI	3 x 2.5m	Apple and Deis 2002	Chipping station
CA-IMP-8266	CI	6 x 2 m	Apple and Deis 2002	Chipping station
CA-IMP-8267	CI	21 x 5 m	Apple and Deis 2002	Lithic scatter
CA-IMP-8268	CI	7.5 x 6m	Apple and Deis 2002	Chipping station
CA-IMP-8269	CI	5.1 x 2.6m	Apple and Deis 2002	Chipping station
CA-IMP-8270	CI	2.6 x 1.9m	Apple and Deis 2002	Chipping station
CA-IMP-8271	CI	0.2 x 0.1m	Apple and Deis 2002	Chipping station
CA-IMP-8272	CI	12.5 x 9m	Apple and Deis 2002	Chipping station
CA-IMP-8343H	NEV	22 mile road	Apple et al. 2006	1940's travel route to Pegleg Mine/Well Complex
FARP 4	CE	29 x 6m	Apple and Deis 2002	Rock ring, chipping station
FARP 11	CI	3.8 x 0.5m	Apple and Deis 2002	Chipping station
FARP 13	CI	3 x 1m	Apple and Deis 2002	Chipping station
FARP 14	CE	13 x 9m	Apple and Deis 2002	Cleared circles, lithic scatter
FARP 26	CI	6 x 2.5m	Apple and Deis 2002	Chipping station
FARP 27	CI	3 x 1m	Apple and Deis 2002	Chipping station

Notes:
National Register Status: NEV = not evaluated for National Register eligibility; DI = determined ineligible for inclusion on the National Register with SHPO agreement; CI = considered ineligible for inclusion on the National Register (pending SHPO agreement); CE = considered eligible for inclusion on the National Register (pending SHPO agreement); DE = determined eligible for inclusion on the National Register with SHPO agreement.
Source: MCIWEST 2009.

NATIVE AMERICAN CONSULTATION

MCIWEST initiated consultation in November and December 2008 with non-federally recognized Indian tribes subject to 36 CFR 800.3(f) (consulting parties) and federally recognized Indian tribes affiliated with lands currently under Marine Corps jurisdiction and involved in this proposed action. MCAS Yuma maintains consulting relationships with the following list of tribal Nations regarding the Bob Stump Training Range Complex: Ak-Chin Indian Community, Cocopah Indian Tribe, Colorado River Reservation, Fort McDowell Yavapai Nation, Fort Yuma Indian Reservation - Quechan Tribe, Gila River Pima-Maricopa Indian Community, Salt River Pima-Maricopa Indian Community, Tohono O'odham Nation, Agua Caliente Band of Cahuilla Indians, Augustine Band of Cahuilla Mission Indians, Cabazon Band of Mission Indians, Cahuilla Band of Mission Indians, Chemehuevi Indian Tribe, Kumeyaay Cultural Historic Committee, Ewiiaapaayp Tribal Office, Fort Mohave Indian Tribe, Inaja-Cosmit Band of Mission Indians, Jamul Indian Village – A Kumeyaay Nation, Kwaaymii Laguna Band of Mission Indians, La Posta Band of Mission Indians, Los Coyotes Band of Cahuilla and Cupeño Indians, Manzanita Band of Mission Indians, Mesa Grande Band of Mission Indians, Morongo Band of Mission Indians, Ramona Band of Cahuilla Mission

Indians, Santa Ysabel Band of Diegueño Indians, San Manuel Band of Mission Indians, Santa Rosa Band of Cahuilla Mission Indians, San Pasqual Band of Mission Indians, and Torres-Martinez Desert Cahuilla Indians.

MCIWEST is in the process of consulting with these tribal Nations regarding concerns with the proposed action (see Appendix H). The tribal Nations identified above received a consultation letter by early December 2008. Many tribal representatives were contacted by phone and email, and some attended a project meeting(s) at MCAGCC in January 2009. Few specific comments have been provided by the representatives from these Nations.

Existing Plans and Policies for Range Use

With regard to range activities, the MCAS Yuma Range Safety Officer briefs all unit commanders about cultural and natural resources prior to any field deployment (USMC 1997a). The purpose is to avoid impacts on cultural resources through the development of strict procedures to ensure that range activities are confined to specific areas (USMC 1997a). All applicable existing regulations and policies pertaining to protection of cultural resources will remain in effect with introduction of the MV-22 training on the Bob Stump Training Range Complex.

Environmental Consequences

Training Range Impacts

MV-22 training operations that could cause ground disturbance would occur at previously established landing areas at the Bob Stump Training Range Complex. Although no new construction or improvements are proposed, ground disturbance from hovering and landing of aircraft could occur at these locations due to dust and debris being scattered and/or becoming airborne from aircraft rotorwash. Downdraft (and outwash) forces, collectively known as rotorwash, are relative to the engine power settings and the aircraft's proximity to the ground, and rotorwash from the MV-22 would be greater than from the CH-53E (DoN 1998) and CH-46 (see Appendix G). Rotorwash from the MV-22 would reach 50 knots[2] at a distance of 150 feet from the aircraft when hovering at 20 feet above ground level, which is three to four times greater than that associated with the CH-46 (see Appendix G). As a result, rotorwash from an MV-22 aircraft during landing, take-offs, and hovering immediately above the ground may disturb artifacts lying on the surface in the immediate vicinity of the hovering aircraft, although the extent of this disturbance would depend on local soil characteristics, presence of vegetation, and size/weight of artifacts. The following provides more detailed impact analysis for BMGR-West and the Chocolate Mountain Range.

BARRY M. GOLDWATER RANGE (WEST)

Lack of Archaeological Survey Coverage. As described above, the APE for most GSAs lack complete survey coverage. There are currently no designated landing sites within the GSAs, which range from 172 to over 1,000 acres in size. Since the GSAs are large training areas, MV-22 operators, working in concert with the installation environmental staff (archaeologist), range operations and range control/management staff, as well as the MCIWEST G-3 (operations), will select landing sites to avoid areas that lack archaeological survey coverage (see measure below). A designated landing

[2] Knots are miles (nautical) per hour.

site would need at least a nine-acre archaeological survey block to accommodate one landing area and associated rotorwash buffer (similar to the size of the APE for LZ Lonesome Dove). Most GSAs have sufficient coverage to accommodate at least one nine-acre landing site. However, the following GSAs, which only have between 0 to 10 percent survey coverage, lack adequate coverage for even one landing site: GSA 21, 23, 27, 32, 36, 37, 49, 55, 59, 61, 64, and 66. Operations within areas without adequate survey coverage may impact unrecorded archaeological resources that may or may not qualify as a historic property. This would be a significant impact under the NEPA.

Recorded Archaeological Resources. As described above, 23 archaeological sites are located in the APE. Four sites have been recommended as eligible for listing on the National Register (AZ X:12:78, AZ Y:5:15, AZ Y:5:35, AZ Y:9:2) (pending SHPO agreement), and another four have not been evaluated (AZ X:12:8, AZ X:12:9, AZ Y:5:52, AZ-050-2587). Any disturbance from MV-22 operations on a site that is eligible for listing on the National Register would result in an adverse impact on a historic property. This would be a significant impact under the NEPA.

Six sites have been determined ineligible for listing on the National Register with Arizona SHPO agreement (AZ X:12:5, AZ X:8:15, AZ X:8:17, AZ X:8:18, AZ Y:5:6, AZ Y:5:7), and nine sites have been recommended as ineligible for listing on the National Register (AZ X:12:3, AZ X:81:151, AZ Y:5:5, AZ Y:5:8, AZ Y:5:14, AZ Y:5:16, AZ Y:5:17, AZ Y:5:18, AZ Y:5:27). Pending SHPO agreement on these determinations, there would be no effect on a historic property, and no impacts would occur under the NEPA.

Traditional Cultural Resources. There are no identified traditional cultural resources within the BMGR-West APE. However, consultations with tribal Nations are on-going. MCIWEST is entering into a Programmatic Agreement with the Arizona SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement. Additionally, the measures described below take into account impacts on archaeological sites that may or may not be considered a traditional cultural resource.

CHOCOLATE MOUNTAIN RANGE

Lack of Archaeological Survey Coverage. Although the APE for LZ Owl and LZ Spider have not been completely surveyed, the unsurveyed areas are considered to have a low probability for the presence of a National Register-eligible archaeological site, as described above. Therefore, no additional survey is proposed for these two LZs. The APE for the Bull FARP also lacks complete survey coverage. There are currently no designated landing sites within the Bull FARP, which is over 750 acres in size. MV-22 operators, working in concert with the installation environmental staff (archaeologist), range operations and range control/management staff, as well as the MCIWEST G-3 (operations), will select landing sites to avoid impacting the unsurveyed rotorwash buffer surrounding the Bull FARP (see measure below). Finally, there is the possibility of unrecorded archaeological sites within unsurveyed portions of the APE for the remaining LZs. Operations within areas without adequate survey coverage may impact unrecorded archaeological resources that may or may not qualify as a historic property. This would be a significant impact under the NEPA.

Recorded Archaeological Resources. As described above, 26 archaeological sites are located in the Chocolate Mountain Range APE. Three sites have been recommended as eligible for listing on the National Register (FARP 4, FARP 24, CA-IMP-1864) (pending SHPO agreement), and one has not been evaluated (CA-IMP-8343H). Any disturbance from MV-22 operations on a site that is eligible for listing on the National Register would result in an adverse impact on a historic property. This would be a significant impact under the NEPA.

Twenty-two sites have been recommended as ineligible for listing on the National Register (see Table 6.2.15-4 for listing). Pending SHPO agreement on these determinations, there would be no effect on a historic property, and no impacts would occur under the NEPA.

Traditional Cultural Resources. There are no identified traditional cultural resources within the Chocolate Mountain Range APE. However, consultations with tribal Nations are on-going. MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement. Additionally, the measures described below take into account impacts on archaeological sites that may or may not be considered a traditional cultural resource.

AVOIDANCE AND MINIMIZATION MEASURES

Barry M. Goldwater Range (West). As noted above, MCIWEST is entering into a Programmatic Agreement with the Arizona SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. Consistent with this agreement, the following measures would avoid or minimze impacts on archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community and would reduce impacts to less than significant:

- Prior to commencement of operations within the BMGR-West, specific landing sites within the GSAs will be pre-approved by the MCAS Yuma Range Management Officer, working in concert with installation environmental (archaeologist) and range operations staff, as well as the MCIWEST G-3 (operations), to ensure that pre-approved landing sites and associated rotorwash buffer only occur in areas previously surveyed for archaeological resources. Additionally, these landing areas will be selected to avoid all archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community. With this operational protocol, four eligible sites (AZ X:12:78, AZ Y:5:15, AZ Y:5:35, AZ Y:9:2) and four non-evaluated sites (AZ X:12:8, AZ X:12:9, AZ Y:5:52, AZ-050-2587) would be avoided.
- If for some reason the above avoidance measure is not possible for some areas, archaeological survey will be conducted prior to MV-22 operations for areas lacking adequate survey coverage. Similarly, archaeological testing will be conducted for any non-evaluated sites that cannot be avoided prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If an archaeological site is identified based on subsequent survey efforts and/or if an archaeological site is recommended as eligible for listing on the National Register based on site testing,

MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.

- Prior to MV-22 operations within GSAs 21, 23, 27, 32, 36, 37, 49, 55, 59, 61, 64, and 66, surveys will be conducted to accommodate selected landing sites and associated rotorwash buffers. If an archaeological site is identified based on these subsequent survey efforts, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.

Chocolate Mountain Range. As noted above, MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. Consistent with this agreement, the following measures would avoid or minimze impacts on archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community, and impacts would be reduced to less than significant:

- Prior to commencement of operations within the Bull FARP, specific landing sites will be pre-selected and approved by the MCAS Yuma Range Management Officer, working in concert with installation environmental (archaeologist) and range operations staff, as well as the MCIWEST G-3 (operations), to ensure that the approved landing sites and associated rotorwash buffer only occur in areas previously surveyed for archaeological resources. Additionally, these landing areas will be selected to avoid all archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community. With implementation of this operational protocol, three eligible sites (FARP 4, FARP 24, CA-IMP-1864) would be avoided.
- If for some reason the above avoidance measure is not possible for some areas, archaeological survey will be conducted prior to MV-22 operations for areas lacking adequate survey coverage. Similarly, archaeological testing will be conducted for any non-evaluated sites that cannot be avoided prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If an archaeological site is identified based on subsequent survey efforts and/or if an archaeological site is recommended as eligible for listing on the National Register based on site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
- Prior to MV-22 operations within LZ Killdeer, LZ Redwing, FB Burt, LZ Goose, LZ Jayhawk, OP Feets, Billy Macon, LZ Siphon 10, LZ Dove, LZ Jaybird, and LZ Finch, either the landing sites will be moved to ensure the entire APE is within a previously surveyed area or surveys will be conducted to provide adequate survey coverage for the APE. If an archaeological site is identified based on subsequent survey, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
- For one non-evaluated site within the APE for LZ FB Burt (CA-SDI-8343H [Pegleg Road]), either the landing site will be moved to ensure avoidance of impact on Pegleg Road or testing will be conducted prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If the archaeological site is recommended as eligible for listing on the National Register based on subsequent site testing, MCIWEST will

follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Existing conditions would remain unchanged, there would be no effect on a historic property, and no impacts would occur under the NEPA.

6.2.16 Safety and Environmental Health

Affected Environment

Range operations at Bob Stump Training Range Complex are governed by MCAS Yuma Base Order 3710.6H (MCAS Yuma 2000), the Bob Stump Training Range Complex Range Complex Management Plan (BSTRC RCMP), as well as other operations specific DoD Directives and Base Orders. These documents establish procedures and requirements to assure safe operation of the BMGR-West, the Chocolate Mountain Range, and the use of R-2510 and R-2512. Two health and safety issues related to aircraft range operations include Explosive Safety and Wildfire Management. See section 6.3.16 for information regarding MV-22 aircraft mishaps.

Explosive Safety

The Bob Stump Training Range Complex was developed to safely accommodate aviation ordnance use (USMC 1997a). Ordnance expenditure during training is limited to within restricted airspace on authorized target ranges. Additionally, target ranges are located only on range lands that are clearly posted as closed to the public. Range operations require that the surface area encompassing the weapon safety footprints be protected by purchase, lease, or other restriction to ensure the safety of personnel, structures, and the public from expended rockets, missiles, or target debris and hazardous operations.

Range managers are required to assess risks associated with weapons employment and establish mission parameters that minimize potential safety hazards. Specific weapon safety footprints must be assessed against each intended target to ensure that they can be safely employed. Range Management Plans for the training ranges used by aircraft assign responsibilities and provides direction regarding range scheduling, maintenance, explosive ordnance disposal, and range decontamination and debris disposal at those ranges.

Wildfire Management

The risk of fire at the Bob Stump Training Range Complex is considered very slight due to the low flammability of most common plant species and sparseness of vegetation (see section 6.2.14, *Biological Resources*). Under natural conditions, the prevalent creosote bush scrub vegetation at the Bob Stump Training Range Complex is too sparse to carry fire. However, the recent spread of introduced invasive species may result in sufficiently dense vegetation after high rainfall years to carry a fire. According to the BMGR INRMP, a range-wide fire management plan will be prepared to establish fire prevention and suppression protocols to minimize threats to human life, property, and natural and cultural resources (Department of Air Force and Navy 2007).

Environmental Consequences

Training Range Impacts

EXPLOSIVE SAFETY

Ordnance expenditure only would occur when the MV-22 aircrews train with its one machine gun at existing ranges and targets specifically designed for air-to-ground gunnery. These include applicable targets within R-2507N, R-2507S, and R-2301W. These ranges and targets have standard procedures in place to ensure safety of personnel on the ground during range exercises and during ordnance clean-up and clearance activities. Because the MV-22 would be adding only a small munitions use on the range and this would be restricted to existing targets, this activity would not result in any greater safety risk. Therefore, no significant impact related to ordnance expenditure would occur.

WILDFIRE MANAGEMENT

All MV-22 training operations at Bob Stump Training Range Complex would be conducted in accordance with required safety procedures. Air-to-ground machine gun training has the potential to increase the frequency of fires in target areas. However, munitions expenditure related to MV-22 operations is fairly minor compared to existing ordnance training at these established targets. Following existing range regulations and applying all fire danger precautions would reduce the potential for fire outbreaks during munitions practice.

As described in section 6.2.14 (Biological Resources), operation of the MV-22 aircraft has not been identified as a common cause for fires. The current configuration includes a heat exhaust shield and modified lighting covers to further reduce the potential. Additionally, the likelihood for a fire appears to be very low at the Bob Stump Training Range Complex, because of the infrequency of years during which precipitation is high enough to result in sufficient cover of invasive species to carry fire. With implementation of the mitigation measures described in section 6.2.14, no significant impact related to wildfire management would occur.

MITIGATION MEASURES

Because there would be no significant impact on safety and environmental health, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and no impacts on safety and environmental health would occur.

6.2.17 Environmental Justice

Affected Environment

The Special Use Airspace associated with the Bob Stump Training Range Complex includes the Chocolate Mountain Range in Riverside and Imperial counties, California; R-2510 and R-2512 in

Imperial County, California; and BMGR-West (R-2301W) in Yuma County, Arizona. The Chocolate Mountain Range and BMGR-West have more than 1,900 square miles of lands that have been used as aerial gunnery and bombing training areas since they were established during the World War II period. Examples of some of the existing facilities used for training include an auxiliary airfield complex, realistic targets for air-to-ground attack, air-to-air firing ranges, and electronic warfare training ranges. Based on the designation and management of these areas as military training ranges, residential land uses and populations are prohibited. As a result, minority and low-income populations are not present within these areas.

Environmental Consequences

Training Range Impacts

Environmental justice concerns related to aircraft operations typically include air quality, noise, and safety. Specific issues of concern involve aircraft emissions, aircraft noise, and safety concerns related to flight mishaps and explosives handling. The analyses conducted for these resources areas indicate that no significant environmental or human health impacts are anticipated. Therefore, proposed training operations are not expected to create significant adverse environmental or health effects to the human population. Furthermore, there are no minority or low-income populations, or youth populations, present within the potentially affected areas. Consequently, no disproportionate or adverse impacts related to environmental justice are anticipated, nor would there be any special health or safety risks to children.

MITIGATION MEASURES

Because there would be no disproportionate or adverse impacts anticipated related to environmental justice, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, aircraft training operations within the Bob Stump Training Range Complex would continue at current levels. Therefore, existing conditions would remain unchanged, and no impacts to environmental justice would occur.

6.3 MCAGCC

6.3.1 INTRODUCTION

MCAGCC (see Figure 1.1-1), which covers 935 square miles, is the largest USMC training facility. The combat center is composed of 23 range training areas that contain a number of fixed ranges and targets. The associated Special Use Airspace includes restricted airspace (R-2501), which overlies most of the range training areas. There is also an Expeditionary Airfield (EAF) that supports both fixed wing and rotary wing aircraft. While all aircraft that train at MCAGCC are home-based elsewhere, aircraft use the restricted and military operating airspace for three types of general training: Aircraft Air-to-Ground Operations, Aircraft Gunnery/Strafing Operations, and Aerial Supply and Support. Additionally, the combat center provides training to one third of the Fleet Marine Force and USMC Reserves through a series of live-fire maneuvers that involve various combinations of infantry troops, artillery and armored battalions, fixed wing aircraft, and attack helicopters. Artillery use and delivery of Air-to-Ground ordnance and the use of aircraft for troop

transport are an integral part of training at MCAGCC. Additional information regarding existing and proposed training operations at MCAGCC is discussed in section 6.3.2 (Airfields and Airspace).

6.3.2 Airfields and Airspace

This section provides an analysis of airfield use and range use at MCAGCC.

Affected Environment

MCAGCC is located in San Bernardino County, approximately four miles north of the City of Twentynine Palms. The primary mission is to develop, conduct, and evaluate the USMC Combined Arms Training Program (USMC 2003a). The combat center is composed of 23 range training areas that contain a number of fixed ranges and targets (Figures 6.3.2-1 and 6.3.2-2) that support a broad range of realistic training scenarios. The combat center also has an Expeditionary Airfield (EAF) to support flight activities. Training at MCAGCC includes operations in combined arms tactics, close air support, and air strike operations. Additional training in the use of Unmanned Aerial systems occurs in the restricted airspace.

Expeditionary Airfield

The EAF, also known as the Strategic Expeditionary Landing Field, is located in the West and Sand Hill range training areas about six miles northwest of Mainside. The runway, composed of an aluminum-matting surface, is 8,000 feet long and 150 feet wide, and is capable of supporting all aircraft in the U.S. military inventory. The prevailing winds in the area make Runway 28 the primary runway. Runway 28 is utilized 75 percent of the time, and Runway 10 is utilized 25 percent of the time during all types of operations. The EAF does not feature an Instrument Landing System and precision approaches are not conducted. The sole navigational aid is the Coyote Tactical Air Navigation (TACAN) beacon, located directly adjacent to the center of the runway.

The EAF has a Class D surface area defined as that airspace extending from the surface up to and including 4,600 feet MSL within a 4.3 nm radius[3]. The Class D surface area is under control of the EAF tower whenever the EAF is operational. Coordination between the EAF tower and Range Control is necessary to avoid conflicts between airfield and range operations. In order to improve flight safety, pilots are advised to avoid over flight of the range training areas within five miles of the EAF.

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[3] The Class D surface area also includes the airspace extending upward from the surface within 1.8 miles of each side of the Twentynine Palms VHF Omni directional Range/Tactical Air Navigation (VORTAN) 298 degree radial extending from the 4.3 mile radius to 13.9 miles west of the VORTAN.

[4] The Class D surface area also includes the airspace extending upward from the surface within 1.8 miles of each side of the Twentynine Palms VHF Omni directional Range/Tactical Air Navigation (VORTAN) 298 degree radial extending from the 4.3 mile radius to 13.9 miles west of the VORTAN.

Operations at the EAF are conducted per 3D MAW Order 3700.1 and are the responsibility of Marine Wing Support Squadron 374 (MWSS-374). A Letter of Agreement has been established between the Commanding General, Marine Air Ground Task Force Training Command (MAGTFTC), and the Commanding General 3D MAW, to promote safety of flight and to define the coordination required to control live-fire of weapons and other projectile hazards to aircraft flights arriving and departing the EAF.

Annual aircraft operations at the airfield are conducted by a variety of fixed wing and rotary wing aircraft, and currently average around 2,700 operations per year. This level is much lower than previous years due to changes in training requirements (Bussard, personal communication 2008). For example, a recent noise study estimated that over 14,000 annual operations were conducted at the airfield (Wyle 2003b).

Fixed wing aircraft account for about 20 percent of the total aircraft operations at the airfield, and rotary wing aircraft account for about 80 percent of the operations. Besides departures and arrivals from the airfield, pilots also perform Touch-and-Go patterns to ensure proficiency in these areas. A breakdown of current airfield operations is shown in Table 6.3.2-1.

Table 6.3.2-1. Existing Annual Aircraft Flight Operations at the EAF

Aircraft Type	Departure	Arrival	TGO	Total
FIXED WING				
F-18A/C	7	6	3	16
F-18E/F	7	6	3	16
AV-8B	16	16	3	35
UC-35	22	21	-	43
C-20	22	21	-	43
C-17	6	6	-	12
C-12	171	170	-	341
E-2/C-2	1	1	8	10
C-130	3	3	4	10
ROTARY WING				
CH-53E	206	206	20	432
CH-46E	319	327	13	659
AH-1	176	176	40	392
UH-1	176	176	40	392
Search and Air Rescue (SAR)	131	131	-	262
H-60	22	22	-	44
Total	**1,285**	**1,288**	**134**	**2,707**

Notes:
TGO = Touch-and-Go.
Arrivals do not equal departures due to mission schedules.
TGO are counted as 2 operations.
See Appendix C for details.

The approach and departure routes which aircraft fly vary with aircraft speed, air density, timing of pilot activity, number of aircraft in the pattern, etc. There are several commonly used fixed wing aircraft flight tracks at the EAF. Helicopters also fly the fixed wing aircraft patterns. As noted above, pilots are advised to avoid over flight of the range training areas within five miles of the EAF. Therefore, aircraft generally use three standard flight patterns known as the straight-in approach, overhead penetration, and FCLP pattern.

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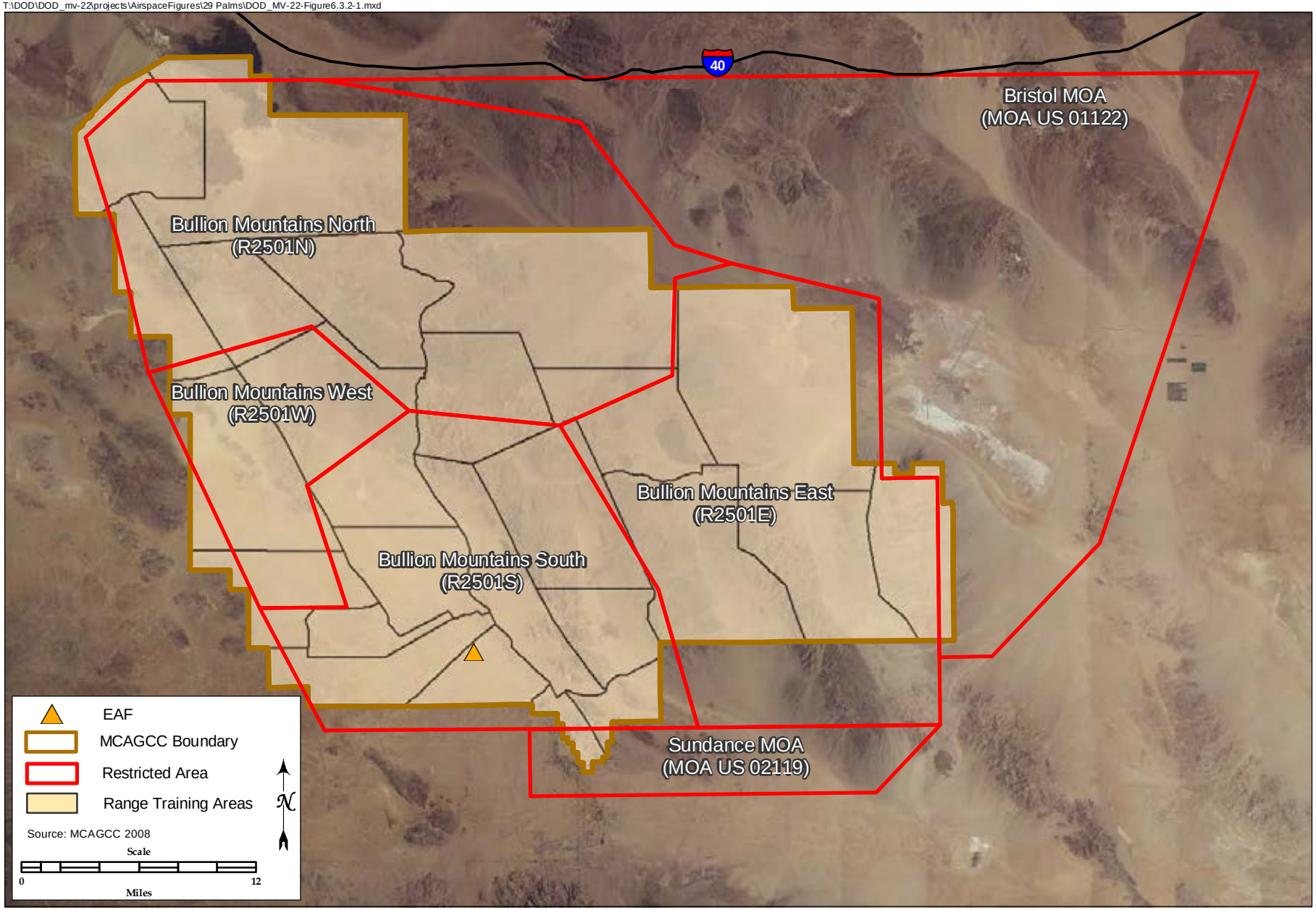

MCAGCC Special Use Airspace

FIGURE

6.3.2-1

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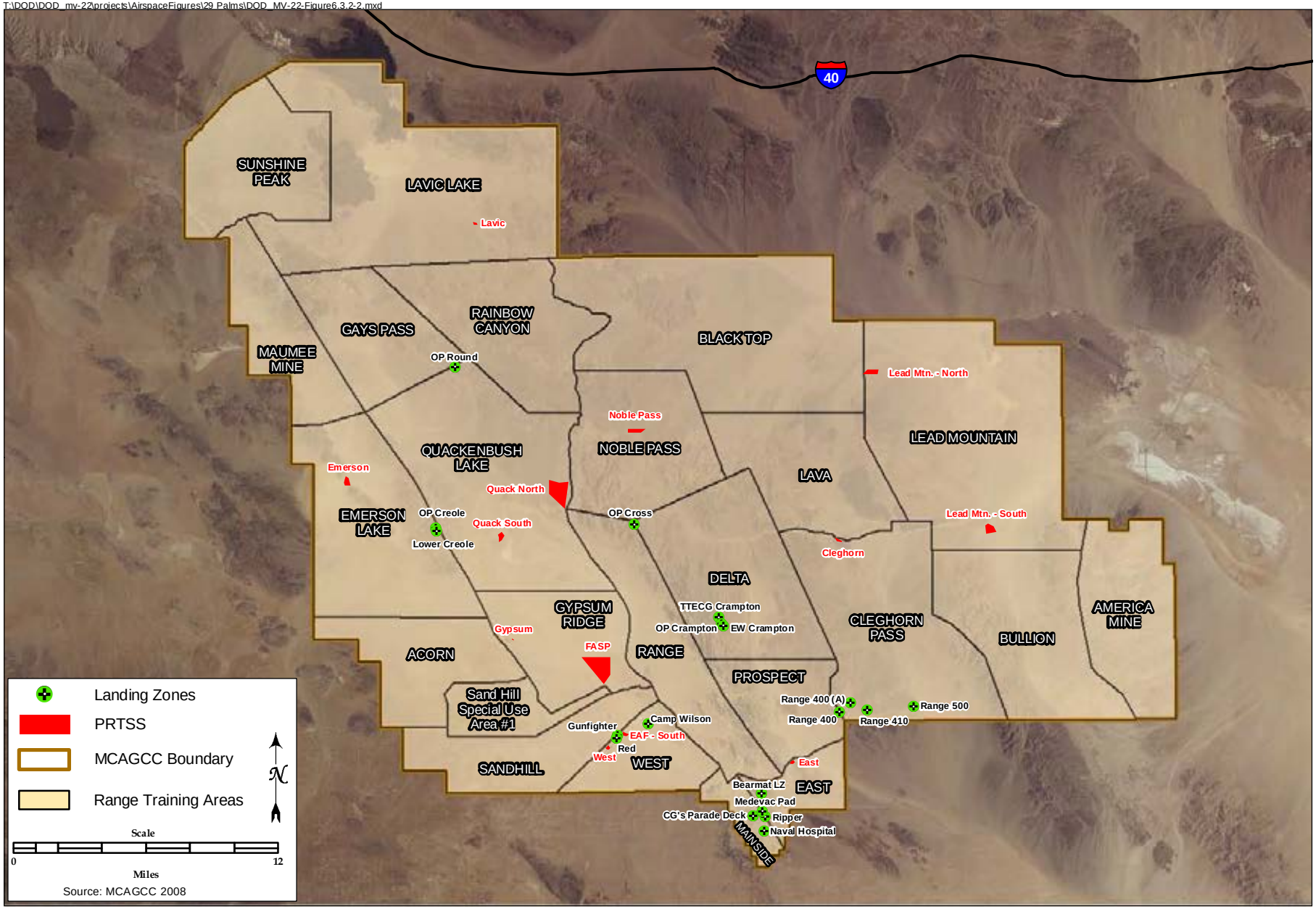

MCAGCC Landing Zones and PRTSS

FIGURE

6.3.2-2

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Normal EAF operations hours are between 0800 and 1630, although the airfield may operate 24 hours per day when needed.

Description of Special Use Airspace and Range Facilities

The MCAGCC airspace consists of one restricted area (R-2501) and two MOAs (Bristol MOA/ATCAA, Sundance MOA). The restricted area is used to segregate activities, which would be hazardous to nonparticipating aircraft. The MOAs are used for Air-to-Air training maneuvers such as combat maneuvering, all weather flight training, tactical exercises, special operations at high speed, and holding areas. Only non-hazardous activities may be conducted within a MOA, therefore, no ordnance delivery is allowed. The combat center also has designated training routes, LZs, and DZs, which are described below.

FAA Los Angeles Air Route Traffic Control Center ("LA Center") is the Controlling Agency for MCAGCC Special Use Airspace. MCAGCC Range Control has been designated as the Scheduling/Using Agency for the airspace. The combat center maintains sole approval and scheduling authority for all users and activities, including ground and aviation operations taking place within this airspace. As noted above, MWSS-374 is the scheduling authority for the Class D Airspace at the EAF.

RESTRICTED AREA (R-2501)

R-2501 (Figure 6.3.2-1) encompasses 814 square nm from the ground surface to unlimited altitude, and is broken into four sub-areas (R-2501N, R-2501S, R-2501E, R-2501W). The restricted airspace supports air-to-ground, ground-to-ground, and ground-to-air training events.

R-2501N overlies Gays Pass, Maumee Mine, Sunshine Peak, Lavic Lake, Rainbow Canyon, Blacktop and portions of the Noble Pass range training areas (Figure 6.3.2-2). R-2501S overlies the Delta, Prospect, East, West, Sand Hill, Gypsum Ridge and portions of the Noble Pass, Quackenbush, Emerson Lake, Acorn and Cleghorn Pass range training areas. It also overlies the main base (Mainside). Some of these training areas are considered "no impact" areas or are areas that conduct live fire training. Therefore, overflights over some portions of R-2501S are restricted from surface to 3,000 feet above ground level during daylight hours. R-2501E overlies the American Mine, Cleghorn Pass, Bullion, Lead Mountain, Lava, and a small portion of the Delta range training areas. R-2501W overlies the Acorn, Quackenbush, and Emerson Lake range training areas.

Operations within the restricted area can be divided into three general categories: Aircraft Air-to-Ground Operations (including rocket fire), Aircraft Gunnery/Strafing Operations, and Aerial Supply and Support. The major contributor in terms of operations is the F/A-18C/D aircraft, which totaled about 19 percent of all operations within R-2501. Rotary wing aircraft (AH-1, UH-1, CH-53, CH- 46) accounted for 54 percent of total operations. Table 6.3.2-2 provides a breakdown of existing rotary wing and fixed wing operations at MCAGCC (not including operations at the EAF, which is shown in Table 6.3.2-1).

Table 6.3.2-2. Existing Annual Aircraft Operations at MCAGCC

Aircraft Type	R-2501N	R-2501S	R-2501E	R-2501W	Sundance MOA	Bristol MOA	Route Operations	Camp Wilson LZ	Sandhill DZ	Total
FIXED WING										
F/A-18C/D	1,093	1,394	1,079	1,033	102	237	200	-	-	5,138
F-5E	36	44	35	33	3	7	-	-	-	158
KC-130	358	456	352	339	34	80	816	-	-	2,435
AV-8B	895	1,140	883	848	83	194	176	-	-	4,219
UAV	286	366	282	270	27	63	-	-	220	1,514
ROTARY WING										
AH-1	1,144	1,463	1,132	1,083	108	251	-	-	-	5,181
UH-1	359	458	354	339	34	79	-	-	-	1,623
CH-53E	555	707	547	525	52	121	-	17	20	2,544
CH-46E	1,075	1,372	1,060	1,015	101	235	-	26	20	4,904
Total	**5,801**	**7,400**	**5,724**	**5,485**	**544**	**1,267**	**1,192**	**43**	**260**	**27,716**

Notes:
Does not include operations at the EAF (see Table 6.3.2-1).
UAV = unmanned aerial vehicle; LZ = Landing Zone; DZ = Drop Zone.
See Appendix C for details.

MILITARY OPERATING AREAS

The Bristol MOA abuts the eastern boundary of R-2501 from 5,000 feet MSL to 22,000 feet MSL (Figure 6.3.2-1). The Sundance MOA abuts a portion of the southern boundary of R-2501 from 500 feet above ground level to 10,000 feet MSL. Operations within Sundance MOA are always in conjunction with R-2501 use, and is designed to handle the problem of aircraft overflow from R-2501 while supporting major exercises using targets in the southern portion of the Delta range training area.

The major fixed wing contributors in terms of total operations within the MOAs are the F/A-18C/D (19 percent) and the AV-8B (15 percent). Rotary wing aircraft (AH- 1, UH-1, CH-53, CH-46) account for 54 percent of the total sorties for the MOAs. Table 6.3.2-2 provides a breakdown of existing rotary wing and fixed wing operations at the MOAs.

OTHER RANGE FACILITIES

Seven TERF routes are located within the airspace, and all are designated for helicopters at low altitudes (Sand, Yellow, Amber, Blue, Orange, Green, and Red).

There are nineteen LZs located throughout the combat center (see Figure 6.3.2-2), and helicopters are currently authorized to land in training areas, as required, to support tactical operations and exercises subject to certain restrictions. For example, there are four LZs within the Mainside, which are mainly used for transporting VIPs or for medical emergencies. There are also two LZs located off the southern end of the EAF (Red and Gunfighter), which are used for personnel and equipment pick-up and drop-off. Additionally, Camp Wilson has a helipad located approximately one mile north of the southern end of the EAF runway; normal operations consist of personnel and equipment pick-up and drop-off. Additionally, Auxiliary Landing Field (ALF) Sand Hill is an unimproved dirt airfield located approximately 2.5 miles southwest of the EAF. The ALF can support rotary wing and C-130 aircraft, with the latter being the primary user.

There are thirteen Pre-Designated Range Training Support Sites (PRTSS) at MCAGCC (MCAGCC 2007c) (see Figure 6.3.2-2). PRTSS are permanent combat support sites ranging in size from 3 to 595 acres. They are intended to be multiple-use areas that direct military units to concentrate ground-disturbing activities to the same area as a means to reduce the environmental burden on training units, ensure environmental compliance, and extend the use training lands (MCAGCC 2007c). Authorized uses include bivouacking, berm construction, trenching, Forward Ammunition Resupply Point (FARP), forward Logistics Base (FLB), field mess, and field showers.

There are three designated parachute DZs authorized for unit parachute drops, including Giant Rock, Sand Hill, and Joshua. Parachute drops in other range training areas are authorized with prior coordination with the Range Control Officer.

COMMERCIAL AIR ROUTES

In addition to military uses, there are civilian airports and commercial jet routes located within and in the vicinity of the R-2501 airspace. Commercial and general aviation aircraft operate under VFR conditions in the MOAs, but remain clear of R-2501. Other air carriers and civilian aircraft flying under IFR conditions normally operate on structured routes on all sides of the R-2501 Complex (V514-538 to the east, V264 to the south, V386 to the west, V21-283 to the northwest and V12-442 to the north). This includes the main east-west high altitude routes entering the Los Angeles basin. Real time coordination of the various airspace users allows daily use of the airspace without impacting the combat center's mission requirements.

There is one commercial air route that bisects the MCAGCC Training Range (J-128) with a floor of 18,000 feet (5,486 meters). Commercial operations generally occur above 28,000 feet (8,534 meters), and military operations occur below 26,000 feet (7,925 meters); thus, a 2,000-foot (610-meter) buffer exists between the military and commercial users. Commercial users may fly lower than 28,000 upon approval by air traffic control.

Environmental Consequences

Training Range Impacts

MV-22 operations within the MCAGCC airspace and range training areas would be similar to current operations. MV-22 aircraft participating in training operations would employ tactics using existing facilities, such as the EAF, PRTSSs, LZs, and DZs depending on the training scenario, location of ground forces, and other operations and features on the range. Landing operations would be restricted to the EAF, PRTSSs, and LZs. As with ground operations, each aircraft commander is ultimately responsible for the safe operation of his aircraft to assure there is no danger to the ground forces that they may be supporting.

MV-22 operations at the EAF, combined with a reduction in CH-46 operations, would result in an estimated increase of 2,293 airfield operations per year at the EAF (Table 6.3.2-3) or an 85 percent increase in operations compared to current conditions (currently average approximately 2,700 operations per year). However, the current number of annual operations is much lower than previous years due to current squadron deployments (Bussard, personal communication 2008). A recent noise study estimated that over 14,000 annual operations per year were conducted at the airfield, which suggests that the proposed increase falls within recent levels of airfield use (Wyle 2003b). Even with the introduction of more aircraft and a corresponding increase in operation

levels over current levels, the MV-22 would operate in an airfield environment similar to the current operational environment. For example, the MV-22 would follow established local approach and departure patterns. No new flight tracks would be established. Therefore, the EAF airspace management and aircraft ground safety conditions would not change as a result of the new aircraft.

Table 6.3.2-3. Proposed Change in Annual EAF Flight Operations at MCAGCC

Operation Type	Addition of MV-22 Operations	Reduction of CH-46 Operation	Change in Operation over Existing Conditions
Departure	974	-319	+834
Arrival	974	-327	+826
Touch-and-Go	624	-13	+633
Total	**2,952**	**-659**	**+2,293**

Notes:
See Appendix C for details.

MV-22 airspace operations at MCAGCC, combined with a reduction in CH-46 operations, would result in an overall decrease in 3,982 flight operations per year (Table 6.3.2-4) or a 14 percent decrease compared to current conditions. Airspace training operations would be consistent with existing airspace operations, because the MV-22 would operate at only existing range facilities used by other rotary wing and fixed wing aircraft. For example, MV-22 landing operations within the range areas only would occur at the existing PRTSS and LZs (see Figure 6.3.2-2), except under emergency conditions. Therefore, MCAGCC airspace management would not change as a result of the new aircraft (see section 6.3.16 [Safety and Environmental Health] for information regarding aircraft mishap response and other safety issues). No significant impact would occur.

Table 6.3.2-4. Proposed Change in Annual Airspace Operations at MCAGCC

Airspace or Range Facility	Addition of MV-22 Operations	Reduction of CH-46 Operation	Change in Operation over Existing Conditions
R-2501N	76	-1,075	-999
R-2501S	20	-1,372	-1,352
R-2501E	195	-1,060	-865
R-2501W	8	-1,015	-1,007
Sundance MOA	-	-101	-101
Bristol MOA	-	-235	-235
Route Operations	457	-	+457
Camp Wilson LZ	-	-26	-26
Sandhill DZ	166	-20	+146
Total	**922**	**-4,904**	**-3,982**

Notes:
Does not include operations at the EAF (see Table 6.3.2-3).
See Appendix C for details.

MITIGATION MEASURES

Because there would be no significant impact on airfield or range operations, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities, and MCAGCC operations would continue at the current level. Therefore, no impact would occur.

6.3.3 Land Use

Affected Environment

Regional and Local Land Use

MCAGCC (Figure 6.3.3-1), the largest USMC training facility, encompasses approximately 935 square miles (2,422 ha). MCAGCC is located in San Bernardino County, approximately 150 miles east of the City of Los Angeles, 40 miles northeast of the City of Palm Springs, and four miles north of the City of Twentynine Palms (USMC 2003a). The combat center is bounded by Interstate-40 to the north and Highway 62 to the south. The combat center is mainly surrounded by open space and low-density residential development with virtually no industrial land uses in the adjacent communities.

The majority of the surrounding land use is administered by the Bureau of Land Management, including the Ord-Rodman Critical Habitat Area on the northwest border, Johnson Valley Off-Highway Vehicle Area on the western border, Cleghorn Lakes Wilderness Area on the southeastern border, and open land along the eastern, northern, and southern borders (Figure 6.3.3-1). To protect important wildlife habitats, these lands are managed to control access and use, although some areas are designated for specialized uses such as grazing and off-road vehicle recreation (MCAGCC 2007a). The predominant land uses north of Highway 62 and south of MCAGCC are rural living and Bureau of Land Management lands. Rural living land use areas are characterized by partial public services and limited public improvements and are intended to prevent high demand for public services (USMC 2003b). This area is characterized by scattered low-density residential development with the majority of the area consisting of a minimum parcel size of 2.5 or 5 acres per dwelling unit (USMC 2003b). Additional land uses in the immediate vicinity include mining, as well as small areas of commercial, recreation, public facilities, and agriculture (USMC 2003a).

MCAGCC is divided into 22 training areas plus the main base (Mainside) (see Figure 6.3.2-2). Mainside includes a number of different land uses including operations and training, maintenance and production, supply and storage, administration, housing and community support, and utilities while the training range is primarily designated for operations and training (USMC 2003a). Most of the land in the training range is undeveloped with existing facilities consisting of the Exercise Support Base (refered to as Camp Wilson) and the EAF. The proposed action falls within the training range and thus affects primarily operations and training land uses.

The 8,000-foot long EAF is located northwest of Mainside and straddles the Sandhill and West range training areas. It consists of a runway, taxiways, aircraft parking areas, aircraft control tower, navigational aids, and aircraft refueling system. Camp Wilson is located northeast of the EAF and lies within the Sandhill and West range training areas. Camp Wilson functions as support for deployed units during training operations and is composed primarily of tents under camouflage netting as well as a fire station, field kitchen, exchange, all ranks club, shower facilities, A-frame billeting structures, laundry, chapel, maintenance, and administration facilities. Other range facilities are described in section 6.3.2 (Airfields and Airspace).

Land Use and the Noise Environment

Land use activities most sensitive to noise typically include residential and commercial areas, public services, and areas associated with cultural and recreational uses. The MCAGCC AICUZ (MCAGCC 2003a) and RCUZ (MCAGCC 2003b) programs are intended to achieve compatibility between land uses on the installation and in surrounding communities. In particular, these programs seek to reasonably reduce impacts to surrounding communities from noise generated at the EAF and other range areas. Noise measurements related to aircraft operations to define the area of noise impact are expressed in terms of a CNEL. The CNEL represents the average annual day community noise exposure from aircraft operations during a 24-hour period over a year. The DoD has established noise compatibility criteria for various land uses. According to these criteria, sound levels up to 65 dB CNEL are compatible with land uses such as residences, transient lodging, and medical facilities (USMC 2003a). Both existing noise contours and those associated with the proposed action are presented in section 6.3.8 (Noise), along with a discussion of any affect on nearby housing and population.

Environmental Consequences

Training Range Impacts

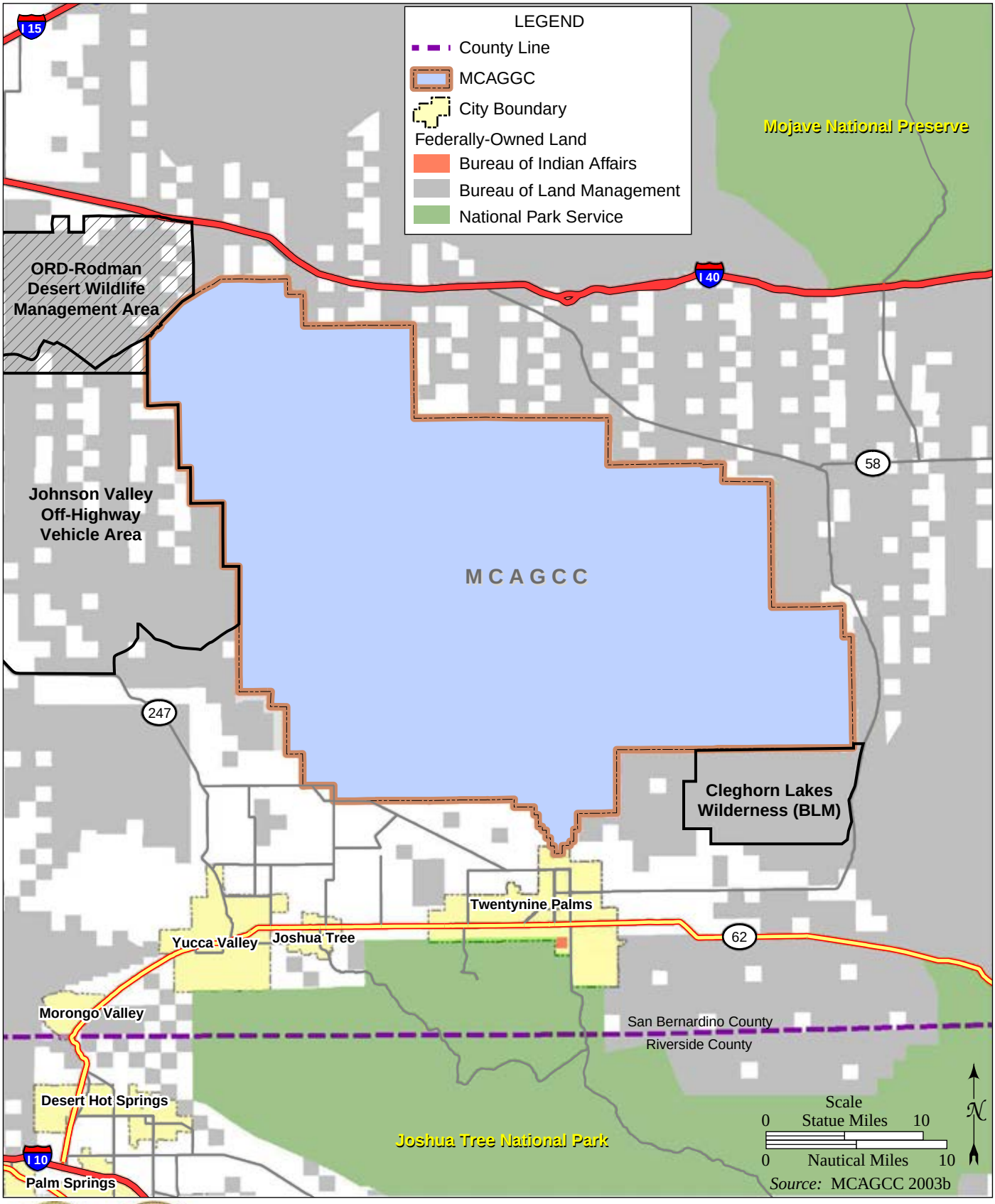
MV-22 training operations at MCAGCC would entail take-off and landings at the EAF and training operations within existing airspace and at existing range facilities used by other rotary wing and fixed wing aircraft. Airspace training operations would be consistent with existing airspace operations and would comply with the established range and land use management plans. Furthermore, safety guidelines and existing range management and land use plans would be updated to address MV-22 operations (see section 6.3.16, Safety and Environmental Health). Operations associated with the MV-22 would comply with the combat center's AICUZ and RCUZ compatible land use guidelines. Noise associated with proposed training activities would not increase noise levels for non-military land uses, as described in section 6.3.8 (Noise). In addition, noise levels would continue to be monitored according to the RCUZ study (MCAGCC 2003b). Overall, the proposed training operations would not introduce a new land use to the area, and would be consistent with existing land uses on MCAGCC and within the surrounding area. Therefore, implementation of the proposed training operations would not result in significant impacts to land use.

MITIGATION MEASURES

Airspace operations at MCAGCC would not result in significant impacts to land use; therefore, no mitigation measures would be required.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and no impacts to land use would occur.



Regional Location of MCAGCC

FIGURE

6.3.3-1

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6.3.4 Socioeconomics

The proposed training operations within MCAGCC do not include any change in personnel, and there would be no new construction or improvements at any range facilities or airfield. Therefore, the proposed action associated with MCAGCC would have no socioeconomic impact on the local communities, and no socioeconomic impacts would occur.

6.3.5 Community Facilities and Services

The proposed training operations at MCAGCC do not include any change in personnel at MCAGCC, and there would be no new construction or improvements at the established airfield, LZs, PRTSSs, and other range facilities. Therefore, existing conditions would remain unchanged, and no impacts to community facility and services would occur. Additional information regarding aircraft mishaps and general fire issues can be found in section 6.3.16 (Safety and Environmental Health).

6.3.6 Ground Traffic and Transportation

The proposed training operations at MCAGCC do not include any ground transportation support. Additionally, no new construction or improvements are proposed at the established airfield LZs, PRTSSs, and other range facilities. Therefore, the proposed action would have no impact on the traveled roadway system, and no impacts to ground transportation would occur.

6.3.7 Air Quality

Affected Environment

Section 4.7 (MCAS Camp Pendleton Air Quality) provides background information regarding NAAQS and the CAAQS (see Tables 4.7-1).

Region of Influence

The general project region for the proposed action includes MCAGCC training areas and aircraft flight routes between these locations. All of these locations lie within the Mojave Desert Air Basin (MDAB), which includes the eastern portions of Kern, San Bernardino, Riverside, and Los Angeles Counties.

Existing Air Quality

In regard to the NAAQS, the USEPA designates all areas of the U.S. in terms of having air quality better (attainment) or worse than (nonattainment) the NAAQS. An area generally is in nonattainment for a pollutant if its NAAQS has been exceeded more than once per year. Former nonattainment areas that have attained the NAAQS are designated as maintenance areas. Presently, the MCAGCC project region attains all NAAQS except the O_3 and PM_{10} standards. The portions of the MDAB that encompass the MCAGCC project region are severe-17 O_3 and moderate PM_{10} nonattainment areas (USEPA 2008a).

The ARB also designates areas of the state that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded more than once in 3 years. Presently, MCAGCC is in attainment of the CAAQS for all air pollutants except O_3, PM_{10}, and $PM_{2.5}$.

Ozone concentrations are the highest during the warmer months of the year and coincide with the period of maximum insolation. Maximum O_3 concentrations tend to be homogeneously spread throughout a region, since it often takes several hours to convert precursor emissions to O_3 in the atmosphere. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime/early morning surface-based temperature inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

MCAGCC Existing CH-46E Emissions

Table 6.3.7-1 presents an estimation of annual operational emissions associated with current CH-46E aircraft operations at MCAGCC. These data represent emissions that the proposed action would replace at MCAGCC. Emissions presented for CH-46 aircraft occurred from operations below 3,000 feet (914 meters) above ground level in proximity to MCAGCC and include departure, arrival, and Touch-and-Go activities.

Table 6.3.7-1. Annual Emissions from Current CH-46E EAF and Airspace Operations at MCAGCC

Activity/Aircraft	Air Pollutant Emissions (Tons/Year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
EAF/CH-46E	1.26	3.96	0.20	0.03	0.25	0.25
Airspaces/CH-46E	2.38	13.36	2.71	0.28	1.25	1.25
Total Existing Emissions	**3.64**	**17.32**	**2.91**	**0.31**	**1.50**	**1.50**
Source: Wyle 2008.						

Regional Climate

The climate of the MCAGCC project region is classified as arid continental, characterized by hot summers, mild winters, low humidity, and large diurnal variations in temperature. This arid condition produces low soil moisture and a high potential for fugitive dust emissions (PM_{10}), which is one of the main air pollution problems in the region. Data collected at the town of Twentynine Palms are used to describe the climatic conditions of the project region (Western Region Climate Center 2007).

PRECIPITATION

The project region is within the Mojave Desert, which is one of the driest regions in the U.S. This condition occurs because (1) the region is at the southern extent of the track of wintertime North Pacific storms, (2) the rain shadow effects of the Coast Ranges block the flow of moisture into the region from the Pacific Ocean, and (3) the region is at the western fringe of the summertime monsoon regime, whose moisture sources originate from the Gulf of Mexico and Gulf of California. The annual average precipitation at Twentynine Palms is about 4 inches (10 cm). Monsoon rains, which generally occur between the months of July through September, produce about 43 percent of the annual rainfall at Twentynine Palms.

TEMPERATURE

The average high and low temperatures at Twentynine Palms during the summer months range from about 105 to 64 °F. The average high and low temperatures during the winter months range from 74 to 35 °F. The low humidity in the region is responsible for the large diurnal variations in temperature.

PREVAILING WINDS

Concurrent with the presence of the Eastern Pacific high west of California, a thermal low pressure system persists in the interior desert region due to intense solar heating. The resulting pressure gradient between these two systems produces a west to northwest air flow across the Twentynine Palms region for most of the year. Average daily wind speeds range from a low of about 6 knots in the fall to 8 knots in the spring and summer.

Applicable Regulations and Standards

The Federal Clean Air Act of 1970 and its subsequent amendments (the CAA) establish air quality regulations and the NAAQS and delegate the enforcement of these standards to the states. In California, the ARB is responsible for enforcing air pollution regulations. The CAA establishes air quality planning processes and requires areas in nonattainment of a NAAQS to develop a SIP that details how the state will attain the standard within mandated time frames. The requirements and compliance dates for attainment are based on the severity of the nonattainment classification of the area. The following summarizes the air quality rules and regulations that apply to the project actions.

FEDERAL REGULATIONS

Section 176(c) of the CAA, as articulated in the USEPA General Conformity Rule, states that a federal agency cannot issue a permit for or support an activity unless the agency determines that it will conform to the most recent USEPA-approved SIP. This means that projects using federal funds or requiring federal approval must not (1) cause or contribute to any new violation of a NAAQS, (2) increase the frequency or severity of any existing violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. Mojave Desert Air Quality Management District (MDAQMD) Rule 2202 implements the USEPA's General Conformity Rule. Within the MDAB project region, if net annual emissions of remain below 25 tons of VOCs and NO_x and 100 tons of PM_{10}, a CAA conformity determination is not required. If emissions of one or more of these compounds exceed a *de minimis* threshold, the DoN must demonstrate conformity under one of the methods prescribed by MDAQMD Rule 2202. The project conformity applicability analysis for the MV-22 proposed action within the MDAB is summarized in section 7.3.2 and is presented in complete form in Appendix B of this EIS.

LOCAL REGULATIONS

The MDAQMD is responsible for regulating stationary sources of air emissions within the MDAB. The MDAQMD has developed air quality plans designed to reduce emissions to a level that will bring the MDAB into attainment of the ambient air quality standards (MDAQMD 2008). Control measures for stationary sources proposed in the air quality plans and adopted by the MDAQMD are incorporated into the Rules and Regulations of the MDAQMD (MDAQMD 2008).

Environmental Consequences

Training Range Impacts

Air quality impacts were reviewed for significance in light of federal, state, and local air pollution standards and regulations. For the purposes of the present analysis, if project emissions were projected to exceed a threshold requiring a conformity determination further analysis was

conducted to determine whether impacts were significant. In such cases, if emissions conform to the approved SIP, then impacts would be less than significant. In the case of criteria pollutants for which the relevant air basin is in attainment of the NAAQS, the analysis determined whether the magnitude and location of project emissions reasonably would be expected to cause a significant adverse impact to air quality.

Air quality impacts associated with the proposed training operations were determined by comparing the net change in emissions between current CH-46 operations and proposed MV-22 operations within the MCAGCC existing airfields, airspaces, and range facilities. Existing and proposed sources affected by the replacement action would include departure, arrival, and Touch-and-Go testing activities of the CH-46 and MV-22 aircraft. Operational data used to calculate proposed MV-22 emissions were obtained from the USMC (USMC 2007, Wyle 2008). Factors used to calculate aircraft combustive emissions were obtained from the DoN (AESO 2001a, 2001b, 2001c, and 2001d).

Table 6.3.7-2 presents an estimation of the annual operational emissions associated with the proposed action at MCAGCC in year 2017. These data show that replacement of the current CH-46 operations at MCAGCC with the proposed MV-22 training operations would reduce annual emissions of VOC and would increase NO_x and PM_{10} emissions by less than the conformity *de minimis* threshold of 25 and 100 tons per year, respectively. The MCAGCC project region is in attainment for CO, SO_2, and $PM_{2.5}$ and proposed operational emissions of these criteria pollutants are only a small fraction of their conformity *de minimis* levels in a nonattainment area (100 tons per year). Therefore, training operations at MCAGCC would not produce significant adverse impacts to air quality, and impacts for some pollutants would be beneficial.

Table 6.3.7-2. Annual Emissions from the MV-22 Training Operations at MCAGCC EAF and Airspace

Activity/Aircraft	Air Pollutant Emissions (Tons/Year) (1) (2)					
	VOC	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
EAF/CH-46E	-1.26	-3.96	-0.20	-0.03	-0.25	-0.25
Airspaces/CH-46E	-2.38	-13.36	-2.71	-0.28	-1.25	-1.25
EAF/MV-22	0.05	3.41	7.96	0.39	1.35	1.33
Airspaces/MV-22	0.00	0.12	3.25	0.09	0.36	0.36
Total	**-3.59**	**-13.80**	**8.30**	**0.18**	**0.20**	**0.20**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**100**	**NA**

Notes:
1 Year 2017 emissions.
2 – indicates reduction in pollutant.

Proposed training operations would emit TACs that could potentially impact public health. TACs generally are subsets of VOC and PM_{10} emissions. The data in Table 6.3.7-2 show that the proposed training operations would reduce combined VOC and PM_{10} emissions by 3.4 tons compared to current CH-46 operations. Additionally, the main sources of proposed TACs are mostly mobile and intermittent in nature and, therefore, they would produce minimal impacts of TACs in a localized area. As a result, proposed training operations would produce less than significant impacts to public health.

The project conformity applicability analysis for the MV-22 proposed action within the MDAB is summarized in section 7.3.6 and is presented in complete form in Appendix B of this EIS.

MITIGATION MEASURES

Since the proposed training operations would produce less than significant air quality impacts, no mitigation measures are required.

No Action Alternative

Under the No Action Alternative, MCAGCC aircraft training operations would continue at current levels. Therefore, the No Action Alternative would not produce any new air quality impacts compared to existing conditions.

6.3.8 Noise

This section analyzes noise impacts related to training operations at the MCAGCC EAF and the range complex. These are discussed separately below. Additional background information regarding noise metrics and noise modeling can be found in section 6.1.8 (MCB Camp Pendleton Noise) and Appendix C.

MCAGCC Expeditionary Airfield

Affected Environment

Aircraft using the MCAGCC range complex would also be operating out of the EAF. Although the EAF at MCAGCC is not a basing alternative for this EIS, airfield operations were modeled in a similar manner as the airfields for the basing alternatives. The existing aircraft noise environment at the EAF is initially based on a 2003 aircraft noise study referred to herein as WR 02-13 (Wyle 2003a). The analysis was updated based on additional data provided by MCAGCC (Bussard, personal communication 2008). The resulting condition serves as the baseline for the EAF for this EIS.

The following factors were considered in the analysis of noise levels from existing aircraft operations at the air station: flight operations, runway utilization, flight tracks, flight track utilization, flight profiles, climatological data, pre-flight run-ups, maintenance run-up operations, and low work operations. These factors are described in detail in Appendix C. Modeled flight operations are summarized below.

Due to the remote location of the EAF within MCAGCC, no noise-sensitive receptors outside of the military boundaries were identified. Therefore, no indoor speech interference and sleep disturbance analysis was conducted.

FLIGHT OPERATIONS

The baseline condition for the EAF considered approximately 3,000 flight operations annually, as shown in Table 6.3.8-1. Approximately 2,000 annual flight operations were modeled for the affected environment as shown in the table. Nearly one quarter of the modeled flight operations are by CH-46E Sea Knight (twin engine, twin rotor helicopter). The CH-53E Super Stallion (three-engine, single rotor heavy lift helicopter) accounts for 16 percent of the total modeled flight operations. The AH-1W Super Cobra and UH-1W Huey each account for 13 percent of the total modeled flight operations. Of the total modeled flight operations, CNEL evening and nighttime flight operations account for 50 percent and one percent, respectively.

Table 6.3.8-1. Annual Aircraft Flight Operations for Existing Conditions for the Expeditionary Airfield at MCAGCC

Aircraft Type	Departure	Arrival (non break)	Arrival (overhead break)	TGO	Camp Wilson	Drop Zone Sandhill	Total
ROTARY WING							
CH-46	319	327	-	13	26	20	705
CH-53	206	206	-	20	17	20	469
AH-1	176	176	-	40	-	-	392
UH-1	176	176	-	40	-	-	392
SAR (helicopter)	131	131	-	-	-	-	262
H-60	22	22	-	-	-	-	44
FIXED WING							
F/A-18A/C	7	-	6	3	-	-	16
F/A-18E/F	7	-	6	3	-	-	16
AV-8B	16	2	14	3	-	-	35
UC-35(3)	22	21	-	-	-	-	43
C-20	22	21	-	-	-	-	43
C-17	6	6	-	-	-	-	12
C-12	171	170	-	-	-	-	341
UAV	-	-	-	-	-	220	220
E-2/C-2	1	1	-	8	-	-	10
C-130	3	3	-	4	-	-	10
Total Operations	**1,285**	**1,262**	**26**	**134**	**43**	**260**	**3,010**
Total Modeled Operations	**957**	**935**	**26**	**122**	**43**	**40**	**2,123**

Notes:
TGO = Touch-and-Go
Arrivals do not equal departures due to mission schedules.
Touch-and-Go and operations at Camp Wilson and Drop Zone Sandhill are counted as two operations each.
To be consistent with previous modeling, SAR, H-60, C-12, UAV, E-2/C-2 and C-130 aircraft were not modeled as their operations would have negligible impact on the noise contours.
See Appendix C for details.

All rotary wing flight operations were modeled to depart/arrive on Runway 10/28, the Camp Wilson helicopter landing area, or the Sandhill DZ. Runway utilization is nearly identical to WR 02-13 (Wyle 2003a) with updates provided by MCAGCC. The flight operations listed in Table 6.3.8-1 were applied to the flight tracks from WR 02-13 with identical utilization to WR 02-13. No new flight tracks were added. CH-46E and CH-53E aircraft and their modeled flight profiles were converted from being modeled with NOISEMAP to being modeled with RNM. The NOISEMAP-modeled altitudes and speeds were maintained, and roll angles were implemented where practicable. Roll angles were based on roll angles modeled at MCAS Miramar (see section 3.8). The aircraft noise sources and flight profiles were converted to RNM to be more consistent with the MCAS Miramar modeling and to take advantage of more accurate modeling technology not available for WR 02-13.

Because maintenance run-ups are not typically conducted at the EAF, maintenance run-up operations were not modeled.

NOISE EXPOSURE

Using the data described above and in Appendix C, the NOISEMAP and RNM computer models were used to calculate and plot the CNEL contours for annual average daily aircraft operations. Although the previous noise study modeled average busy-day operations, annual average daily operations were modeled for this EIS for consistency with other airfield noise analyses contained herein.

Figure 6.3.8-1 shows the 60 to 85 dB CNEL contours, in 5 dB increments, for the existing condition. The contours primarily follow the path of departures and arrivals on Runway 10L/28R The northwest lobe of the 60 dB contour extends approximately 0.9 nm past the arrival end of Runway 10, and the southeast lobe extends approximately 1.1 nm past the arrival end of Runway 28. The main body of the 60 dB contour is 0.5 to 0.75 nm wide, and the lobes at the runway ends are up to 0.25 nm wide. The contours do not extend beyond the boundary of MCAGCC.

Because the CNEL contours are wholly contained within the MCAGCC boundary, there are no off-base people or housing units within the CNEL contours.

Environmental Consequences

Prior to discussing the potential impacts due to each alternative, the following information provides modeling parameters common to all alternatives involving the MV-22 aircraft at MCAGCC.

- Detailed flight operations by type of operation, CNEL period and general airfield routing were derived from data provided by the USMC (NAVFAC 2007), and is based on best estimates by MV-22 operators for this new aircraft.
- Touch-and-Go operations are the only closed patterns modeled at the airfield. No FCLP or Ground-Controlled Approach Box flight operations would be conducted at the EAF.
- It was estimated that the runway and flight track utilization percentages from WR 02-13 (Wyle 2003a) would be applicable to the MV-22. MV-22 aircraft would use runways, pads and tracks historically modeled for fixed and rotary wing aircraft at the airfield. The MV-22 flight tracks were modeled to/from Runway 10/28, the Camp Wilson helicopter landing area, and the Sandhill DZ. Further detail regarding runway/pad and flight track utilization percentages is contained in Appendix C.
- MV-22 flight profiles for each modeled track were created based on the flight profiles modeled for MCAS Miramar. The proposed Miramar MV-22 flight profiles are described in section 3.8. Appendix C contains maps of representative modeled flight profiles for each type of flight operation.
- MCAGCC is not a basing alternative, and maintenance activity on MV-22 engines would generally occur off-site at the engine manufacturer (Moye and Aitchison 2007). No maintenance run-up operations were modeled at this airfield.
- Due to the number of operations and the EAF's location within MCAGCC, no off-base impacts were anticipated. Thus, no representative noise-sensitive receptors were identified.

PROPOSED TRAINING IMPACTS

The maximum tempo of activity was analyzed for the purposes of the EIS. It is estimated that one squadron would be deployed from its base at all times. Therefore the noise modeling estimates flight activity from nine squadrons of MV-22 aircraft and the removal of CH-46E aircraft activity at MCAGCC. The nine squadrons of MV-22 aircraft would consist of seven active duty squadrons and two reserve squadrons. However, none of the squadrons would be based at MCAGCC.

Table 6.3.8-2 shows the numbers of proposed annual MV-22 flight operations at the EAF. Proposed MV-22 flight operations would total approximately 3,100 annually, with 34 percent during the CNEL evening period and nine percent during the CNEL nighttime period. Approximately 74 percent of the MV-22 flight operations at the EAF would consist of departures and arrivals to/from other places, approximately 21 percent would consist of closed-pattern operations in the vicinity of the EAF, and the remaining five percent would consist of interfacility traffic between the EAF and Sandhill DZ.

Table 6.3.8-2. Proposed Annual MV-22 Flight Operations for the Expeditionary Airfield at MCAGCC

Operation Type	Day	Evening	Night	Total
Departure	657	395	101	1,153
Arrival (no break)	125	75	19	219
Arrival (overhead break)	532	320	82	934
Touch-and-Go	368	222	56	646
Camp Wilson	-	-	-	-
Drop Zone Sandhill	90	58	18	166
Total	**1,772**	**1,070**	**276**	**3,118**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
Touch-and-Go and operations at Camp Wilson and Drop Zone Sandhill are counted as two operations each.
See Appendix C for details.

As listed in Table 6.3.8-1, approximately 700 modeled flight operations by CH-46E aircraft would be removed from the airfield. The flight operations for all other modeled aircraft types (e.g., F/A-18, AV-8B and various helicopter aircraft) would remain unchanged relative to the Baseline/No Action scenario.

Using the data described above and in Appendix C, the NOISEMAP and RNM computer models were used to calculate and plot the CNEL contours for annual average daily aircraft operations.

Figure 6.3.8-2 shows the 60 to 85 dB CNEL contours, in 5 dB increments, for the proposed training operations. The contours would be very similar to the baseline contours, but the departure/arrival lobes to the northwest and southeast would extend farther along runway heading. The northwest lobe of the 60 dB contour would extend approximately one nm past the arrival end of Runway 10. The southeast lobe would extend approximately 1.5 nm past the arrival end of Runway 28 and would curve southward, following the final turn of the Touch-and-Go track on Runway 28. The main body of the 60 dB contour would be 0.5 to 0.75 nm wide, and the lobes at the runway ends would be up to 0.3 nm wide. The contours would not extend beyond the boundary of MCAGCC.

Because the CNEL contours would be wholly contained within the MCAGCC boundary, there would be no off-base people or housing units within the CNEL contours and no significant noise impact.

Mitigation Measures

Because there would be no significant impacts, no mitigation measures would be required.

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Aircraft Noise Contours from Operation at the MCAGCC Expeditionary Airfield for Existing Conditions

FIGURE

6.3.8-1

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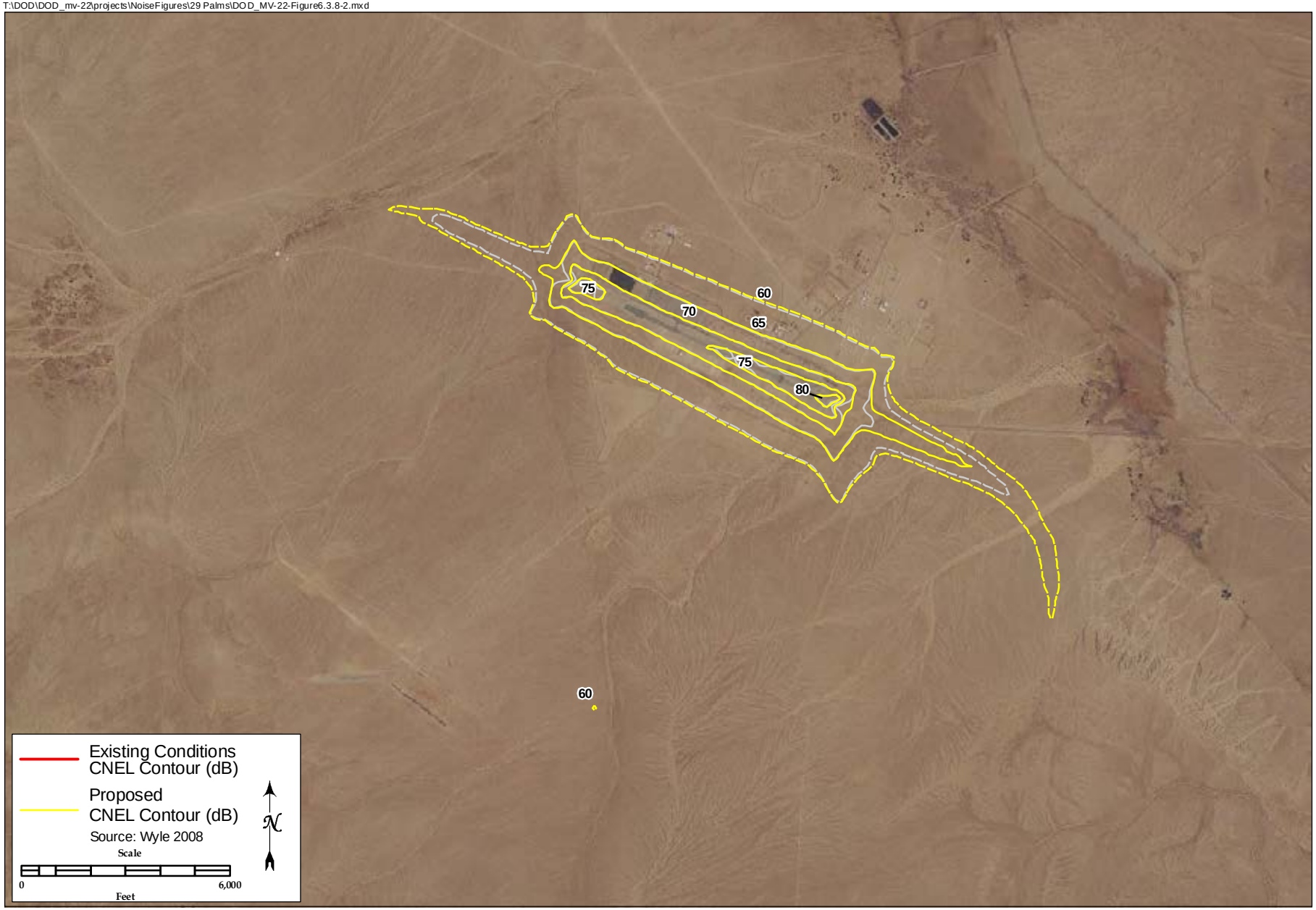

Aircraft Noise Contours from Operation at the MCAGCC Expeditionary Airfield for Proposed Training Operations

FIGURE

6.3.8-2

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NO ACTION ALTERNATIVE

There would be no change in current airfield operations under the No Action Alternative. Therefore, the noise exposure for the No Action Alternative would be identical to the noise exposure for the baseline condition, and no noise impact would occur.

MCAGCC Range Operations

Affected Environment

The existing aircraft noise environment at the MCAGCC range complex is initially based on a 2003 aircraft noise study, referred to herein as WR 03-11 (Wyle 2003b). Minor changes were made to the existing condition modeling of WR 03-11 to ensure better consistency between the computer modeling and the report. In general, minor changes were due to rounding or data entry errors for helicopters at several of the modeled airspaces. The resultant data serves as the baseline for MCAGCC for this EIS.

The modeling was categorized into two groups: route-type operations and area-type operations. The following factors were considered in the analysis of noise levels from existing operations at MCAGCC: flight operations, flight areas and/or tracks, flight profiles and climatological data. These factors are described in detail in Appendix C. Modeled flight operations are summarized below.

FLIGHT OPERATIONS

The baseline condition for MCAGCC modeled approximately 1,200 route-type operations annually, shown in Table 6.3.8-3. Route modeling consists of two aerial refueling tracks in the Bristol MOA, one flown at an altitude of 19,000 feet MSL and the other flown at 22,000 feet MSL.

Table 6.3.8-3. Existing Annual Route-Type Operations for MCAGCC

Aircraft Type*	Period	Bristol MOA Aerial Refueling Track		Total
		19,000 feet	22,000 feet	
F/A-18C/D		100	100	200
F-5E		-	-	-
KC-130		408	408	816
AV-8B		88	88	176
AH-1		-	-	-
UH-1		-	-	-
CH-53E		-	-	-
CH-46E		-	-	-
Total	**Day**	544	544	1,088
	Evening	52	52	104
	Night	-	-	-
	Total	**596**	**596**	**1,192**

Notes:
See Appendix C for details.

The baseline condition for MCAGCC also modeled approximately 26,000 area-type operations annually, shown in Table 6.3.8-4. Modeled areas consist of the following:

- Bristol MOA/ATCAA
- Sundance MOA,
- Restricted Area R-2501 (four components – North, South, East and West).

Table 6.3.8-4. Existing Annual Area-Type Operations for MCAGCC

Aircraft Type	Period	Restricted Area 2501				Military Operating Area		Total
		North	South	East	West	Sundance	Bristol	
F/A-18C/D		1,093	1,394	1,079	1,033	102	237	4,938
F-5E		36	44	35	33	3	7	158
KC-130		358	456	352	339	34	80	1,619
AV-8B		895	1,140	883	848	83	194	4,043
AH-1		1,144	1,463	1,132	1,083	108	251	5,181
UH-1		359	458	354	339	34	79	1,623
CH-53E		555	707	547	525	52	121	2,507
CH-46E		1,075	1,372	1,060	1,015	101	235	4,858
UAV(1)		286	366	282	270	27	63	1,294
Total	**Day**	4,925	6,279	4,862	4,656	461	1,071	22,254
	Evening	697	892	686	660	66	156	3,157
	Night	179	229	176	169	17	40	810
	Total	**5,801**	**7,400**	**5,724**	**5,485**	**544**	**1,267**	**26,221**

Notes:
1. Unmanned Aerial Vehicles (UAV) were not modeled.

See Appendix C for details.

All of the existing route operations are by fixed wing aircraft (KC-130, F/A-18C/D, AV-8B), with the modeled activity evenly split between the 19,000 feet aerial refueling track and the 22,000 feet aerial refueling track. Most of the existing area operations are by helicopters (primarily by AH-1W Super Cobra and CH-46E Sea Knight) and about 30 percent of these operations are to R-2501S. The remaining operations are approximately equally divided to R-2501N, R-2501E, and R-2501W. Of the total modeled area-type and route-type operations, CNEL evening and nighttime flight operations account for 12 percent and three percent, respectively.

Typical area-type CH-46 flight profile altitudes ranged from 0 to 1,000 feet above ground level, with an average speed of 100 knots and average sortie duration of 6 to 18 minutes. Typical route-type CH-46 flight profile altitudes ranged from 0 to 5,000 feet above ground level, with an average speed of 110 knots and average sortie duration of 30 minutes.

CNELmr is a daily metric based on operations flown in a busy month, so daily operations are calculated by dividing the number of annual operations by 12, then by the number of flying days per busy month. Consistent with the previous noise study, area- and route-type operations at MCAGCC were modeled with 30 flying days per busy month.

NOISE EXPOSURE

Using the data described above and in Appendix C, the MR_NMAP computer model was used to calculate CNELmr for annual average daily aircraft operations during the busy-month. Because there is no exposure greater than or equal to 65 dB CNELmr for the baseline scenario, Table 6.3.8-5 shows the maximum uniform distributed sound level for each modeled area (instead of contours). The results of the route modeling are lumped into the area modeling results for the Bristol MOA. The exposure ranges from less than 45 dB CNELmr in Bristol MOA and Sundance MOA to 61 dB CNELmr in R-2501W. Most of the existing noise exposure is due to F/A-18 activity. There are no off-range people or housing units exposed to CNELmr greater than or equal to 65 dB. Therefore, no indoor speech interference and sleep disturbance analysis was conducted.

Table 6.3.8-5. Maximum CNELmr for MCAGCC

Area	Sub-Area	Maximum CNELmr (dB)		
		Baseline	Proposed [3]	Increase Compared to Baseline
Bristol MOA [2]		< 45	< 45	n/a
Sundance MOA		< 45	< 45	n/a
R-2501N	R-2501N	55	55	0
	Lavic Lake[1]	55	65	10
	Noble Pass[1]	55	56	1
R-2501S	R-2501S	53	53	0
	FASP[1]	53	53	0
	Delta[1]	53	54	1
R-2501E	R-2501E	56	56	0
	Lead Mtn North[1]	56	59	3
	Lead Mtn South[1]	56	60	4
R-2501W	R-2501W	61	61	0
	Emerson Lake[1,4]	61	61	0

Notes:
1. CNELmr set same as Primary Area; not modeled individually for Baseline.
2. Includes aerial refueling routes.
3. Includes perimeter route for MV-22 sorties.
4. Includes flight area outside of R-2501.

See Appendix C for details.

Environmental Consequences

Prior to discussing the potential impacts due to the proposed training operations, the following information provides general modeling parameters involving the MV-22 aircraft at MCAGCC.

- The existing (non-MV-22) area-type modeling used the restricted areas R-2501N, R-2501S, R-2501E, and R-2501W areas. The MV-22 operations, however, were modeled with higher fidelity, using the specific landing areas expected to be used for MV-22 training. Specific landing areas include: PRTSS Lavic and PRTSS Noble Pass in R-2501N, PRTSS FASP and Delta[5] in R-2501S, PRTSS Lead Mountain North and South in R-2501E, and PRTSS Emerson in R-2501W (see Figure 6.3.2-2).
- Detailed MV-22 flight operations by type of operation, CNEL period, general airspace utilization and flight profiles were derived from data provided by the USMC (USMC 2008a; USMC 2008b; Weir 2008c). One perimeter route, used to model high light level night vision goggle training, low light level night vision goggle training, and tactical air combat training throughout R-2501 (Weir 2008d).
- For both area-type and route-type sorties, typical MV-22 flight profile altitudes ranged from 0 to 500 feet above ground level, with an average speed of 110 knots and an average sortie duration of 60 minutes.
- No off-range impacts were anticipated, so no representative noise-sensitive receptors were identified or analyzed.

PROPOSED TRAINING IMPACTS

The maximum tempo of activity was analyzed for the purposes of the EIS. It is estimated that one squadron would be deployed from its base at all times. Therefore the noise modeling

[5] Represents TTECG Crampton, OP Crampton, and EW Crampton LZs in the Delta training area.

estimates flight activity from nine squadrons of MV-22 aircraft and the removal of CH-46E aircraft activity at MCAGCC. The nine squadrons of MV-22 aircraft would consist of seven active duty squadrons and two reserve squadrons. However, none of the squadrons would be based at MCAGCC.

Table 6.3.8-6 shows the numbers of proposed annual MV-22 flight operations for route- and area-type operations. Proposed MV-22 route-type operations would total approximately 450 annually, with 39 percent during the CNEL evening period and 13 percent during the CNEL nighttime period. All of the MV-22 route-type operations at MCAGCC would be on the Perimeter track.

Table 6.3.8-6. Proposed Annual MV-22 Operations for MCAGCC

Airspace	Day	Evening	Night	Total
Route-Type Operations				
Perimeter	221	177	59	457
Area-Type Operations				
Lavic Lake	37	21	6	64
Noble Pass	10	2	-	12
Lead Mountain North	50	19	-	69
Lead Mountain South	81	39	6	126
FASP	6	2	-	8
Delta*	10	2	-	12
Emerson Lake	6	2	-	8
Subtotal	200	87	12	299
Total	**421**	**264**	**71**	**756**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
*Represents TTECG Crampton, OP Crampton, and EW Crampton LZs in the Delta training area.
See Appendix C for details.

Proposed MV-22 area-type operations would total approximately 300 annually, with 29 percent during the CNEL evening period and four percent during the CNEL nighttime period. A majority of the modeled area-type operations for the MV-22 would be at the Lavic Lake, Lead Mountain North, and Lead Mountain South landing areas.

As listed in Table 6.3.8-4, approximately 4,900 modeled flight operations by DoN/USMC CH-46E aircraft would be removed from MCAGCC range complex. The modeled flight operations for all other modeled aircraft types (e.g., F/A-18, AV-8B and various helicopter aircraft) would remain unchanged relative to the Baseline/No Action scenario.

CNELmr is a daily metric based on operations flown in a busy month, so daily operations are calculated by dividing the number of annual operations by 12, then by the number of flying days per busy month. Consistent with the previous noise study, area- and route-type operations at MCAGCC were modeled with 30 flying days per busy month.

Using the data described above and in Appendix C, the MR_NMAP computer model was used to calculate CNELmr for annual average daily aircraft operations during the busiest month. Table 6.3.8-5 shows the maximum uniform distributed sound level for each modeled area. The results of the route modeling are lumped into the area modeling results. The exposure in each modeled area ranges from less than 45 dB CNELmr in Bristol MOA, Sundance MOA, and the training ranges to 65 dB CNELmr in the Lavic Lake landing area in R-2501N. Most of the proposed noise exposure would be due to F/A-18 activity except at the Lavic Lake, Lead Mountain North and Lead

Mountain South landing areas where MV-22 operations would dominate. Exposure greater than 65 dB CNELmr is not anticipated.

The largest increase of 10 dB in the CNELmr values relative to the existing condition would occur at the Lavic Lake landing area. This increase, however, would impact only the small landing area and would not extend off-range. Therefore, no significant noise impact is anticipated.

Mitigation Measures

Because there would be no significant impacts, no mitigation measures would be required.

NO ACTION ALTERNATIVE

There would be no change in current airspace operations under the No Action Alternative. Therefore, the noise exposure for the No Action Alternative would be identical to the noise exposure for the baseline condition, and no noise impact would occur.

6.3.9 Infrastructure and Utilities

The proposed training operations at MCAGCC would not include new construction or improvements at the established airfield, LZs, PRTSSs, and other range facilities. Operational changes would include take-off and landings at the airfield and air operations within the range. However, these operational activities are not expected to place a demand for infrastructure and utilities. Therefore, existing conditions would remain unchanged, and no impacts to infrastructure and utilities would occur.

6.3.10 Aesthetics and Visual Resources

The proposed training operations at MCAGCC would not include new construction or improvements at the established airfield, LZs, PRTSSs, and other range facilities. The only new visual component would be the MV-22 aircraft, itself, within an established military training environment. The MV-22 would utilize the same flight paths and range facilities as existing aircraft. Except during take-offs and landings, the MV-22 would fly more often in fixed wing mode, which is higher and faster than typical rotary wing aircraft. This would lessen any perceived visual impact from the MV-22. Although downwash from MV-22 landings and hovering may cause dust plumes, such occurrences are consistent with existing military training. Therefore, existing conditions would remain relatively unchanged, and no impacts to aesthetics and visual resources would occur.

6.3.11 Hazardous Material Management

Hazardous materials are chemical substances that pose a substantial hazard to human health or the environment. Hazardous materials include hazardous substances, extremely hazardous substances, hazardous chemicals, and toxic chemicals. In general, these materials pose hazards because of their quantity, concentration, physical, chemical, or infectious characteristics. A hazardous waste may be a solid, liquid, semi-solid, or contained gaseous material that alone or in combination may: 1) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or 2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

This section describes hazardous materials/waste management associated with airfield operations and operations at the training range complex at MCAGCC.

Affected Environment

Activities at MCAGCC require the use and storage of a variety of hazardous materials and wastes, including flammable and combustible liquids, acids, corrosives, caustics, compressed gases, solvents, paints, paint thinners, and various other petroleum oils and lubricants.

The Pollution Prevention Branch at MCAGCC has the responsibility of the day-to-day compliance of all environmentally-related type facilities and operations, prevention and reduction of pollutants from entering the environment, and the identification, response, clean-up, and restoration of any past or current hazardous releases to the environment in accordance with applicable laws and regulations (MCAGCC 2007a).

The Compliance Support, Hazardous Materials, and Pollution Prevention branches work together very closely in joint efforts to inspect for compliance, prevent, respond to and clean-up spills of hazardous materials. All units and military personnel attend a briefing when they arrive at MCAGCC. All personnel are informed about laws, policies and procedures they must follow to reduce and respond to hazardous material (HAZMAT) spills. The Natural Resources and Environmental Affairs (NREA) Division meets directly with military personnel who specifically focus on HAZMAT, to determine what waste will be generated and approximately how many containment barrels will be needed. MAGTFTC/MCAGCC averages about 35 spills a year; however, most of these are less than five gallons. Sensitive wildlife areas are shown in Combat Center Order 5090.1c (MCAGCC 2002) and are known by HAZMAT response personnel. These sensitive areas include natural resources that may be impacted by a spill and also designates areas where care must be taken with heavy equipment and other remediation activities (MCAGCC 2007a).

Satellite Accumulation Areas (SAAs) are utilized to facilitate the temporary storage of HAZMAT. There are 45 SAAs at Mainside and seven at Camp Wilson, all of which are serviced every 72 working hours. Lead acid batteries must be turned in directly to the HAZMAT center, and soil contaminated with organic or synthetic petroleum, oils, or lubricants are managed in two ways. The first technique is to completely dig up all contaminated soil and then backfill with clean soil. Excavated, contaminated soil is taken to the on-base bioremediation lot, where it is treated. The alternative method is to remediate in place, which only occurs when the spill site is inaccessible to equipment or when dealing with soil that has an abundance of rocks. In-place remediation incorporates the consideration of installing temporary fences or barriers to keep wildlife out of both spill areas and other known contaminated areas that have not yet been remediated (MCAGCC 2007a).

In 2001, MAGTFTC opened the Range Residue Processing Center (RRPC), a state-of-the-art facility that processes and recycles large amounts of brass, copper, aluminum and other materials collected from the training areas. The facility certifies that all material posing a potential explosive hazard (MPPEH) coming from the range and/or being turned in by the Marines are safe for further processing. The RRPC's staff of qualified personnel having EOD, range operation and maintenance, or ordnance experience is required to visually inspect and/or mechanically process and certify all scrap (MCAGCC 2007a).

No buildings are to be demolished or relocated as part of the proposed action at MCAGCC; therefore, asbestos-containing materials and lead-based paint have not been addressed.

Environmental Consequences

Training Range Impacts

MCAGCC AIRFIELD FACILITY AND AIRFIELD OPERATIONS

Potential impacts to soil, surface water, or groundwater quality through the accidental release of chemicals during MV-22 operations (e.g., refueling at the airfield) would be reduced to below a level of significance by implementation of an NPDES-mandated SWPPP and compliance with federal, state, and local statutes and regulations regarding stormwater retention and treatment; worker safety; and soil and groundwater contamination. Hazardous materials/waste management would be completed in compliance with DERP. As part of DERP, the DoD must satisfy the requirements of CERCLA for former and current hazardous waste sites. In addition, as indicated in section 6.3.13 (Water Resources), the SWPPP includes an SPCC plan, which provides protective and corrective measures for accidental releases of hazardous substances or petroleum products. Therefore, operational impacts would not be significant.

MCAGCC-RELATED AIRSPACE OPERATIONS

No new construction or improvements at any range facility are proposed as part of this alternative. The MV-22 would be incorporated into existing training scenarios associated with the training range complex. Only existing range facilities at MCAGCC would be used by the MV-22, and these would be used in the same or similar fashion to current training by rotary wing and fixed wing aircraft. In addition, aircraft would not be maintained or fueled at any LZ or PRTSS (other than the EAF). Therefore, operational impacts would not occur with respect to hazardous materials in association with airspace operations.

MITIGATION MEASURES

Because there would be no significant hazardous material related impacts, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, MV-22 airspace operations at MCAGCC would not occur, and existing training at MCAGCC would continue as under current conditions. Therefore, no hazardous material related impacts would occur.

6.3.12 Topography, Geology, and Soils

This section describes the general geology, topography, and soils at MCAGCC. The geologic resources of an area consist of soil and bedrock materials. For the purpose of this study, the terms soil and rock refer to unconsolidated and consolidated earth materials, respectively, regardless of depth. No new support facilities would be constructed at MCAGCC; therefore, construction impacts related to changes in topography, seismicity, soil settlement, and erosion would not occur.

Similarly, airfield operations would have no geology and soils related impacts; therefore, the EAF area has not been discussed in this section.

Affected Environment

General Geology and Topography

The MCAGCC training area comprises approximately 935 square miles of the southern Mojave Desert and is characterized by mountainous terrain with steep slopes and deep, dissected alluvial fans. Large valleys are used for combined arms maneuvers with relatively inaccessible mountains and rough terrain (e.g., granitic massifs) separating these maneuver corridors. The climate allows for year round training with more than 325 rain-free days a year (MCAGCC 2007a).

The training range is composed of numerous mountain ranges and valleys running parallel along a northwest/southeast axis. Several volcanic craters are in the general proximity of the training range, including Amboy Crater and Pisgah Crater (just outside of MCAGCC), which are the most dramatic. Sunshine Peak Crater lies within the Sunshine Peak range training area. The highest elevation in the training range is 4,699 feet at OP Round in the Bullion Mountains and the lowest is 604 feet at Dry Lake in the Lead Mountain range training area. A major topographic feature within the training range is Hidalgo Mountain, a region-wide landmark (MCAGCC 2007a).

The training range geological make-up consists of tertiary basement rock with overlying quaternary alluvial deposits. The basement rock is nearly impermeable except where it has been fractured or weathered. Alluvial deposits, varying in age and thickness, lie within valleys between mountain ranges. Alluvial deposits that flank mountain ranges have developed into numerous, gently dipping alluvial fans. Sediment composing alluvial fans is primarily from the weathering and erosion of local mountain ranges. Older deposits, often including subsoil layers cemented with silica and engulfed with calcium carbonate, contain sand, gravel, and tightly cemented clay and silt. Newer deposits consist of layers of alluvium containing primarily sand and gravel (MCAGCC 2007a).

SOILS

Desert soils are extremely vulnerable to disruption, and once disturbed, are easily susceptible to wind and water erosion. These soils are also highly vulnerable to compaction. Soils may be transported away from disturbed areas, leaving them void of vegetation. Soils develop very slowly in the harsh conditions of desert environments and may not be replaced for centuries following disturbance (MCAGCC 2007a).

Hardened soil crust forms on clay or silty desert soils by the biological activity of resident bacteria, algae, and lichens. These cryptogamic crusts stabilize surface integrity and resist wind and water erosion from both water drops and flows. Cryptogamic crust "fixes" atmospheric nitrogen in low quantities, making it available to desert flora. The time required for these soils to develop and their recovery rates are unknown. It has been estimated that it takes a minimum of 50 years for vegetation to recover, 100 years for soil, and over 1,000 years for total recovery. Patches of cryptogamic crust are found on the training range. These may include many different soil associations; however, they are usually characterized by a surface crust of pebbles and rocks, often rendered dark and shiny (MCAGCC 2007a).

The coarsest depositional materials derived from mountainous parent rock are generally found on upper regions of high plains; the finest materials are along valley floors. Soil of upper bajadas (or coalescent alluvial fans along bases of mountain ranges) consists of coarse gravels grading into loamy gravels toward the toe of alluvial fans. Soils of lower bajadas grade from sandy loams to finer loamy materials. Playas located at the bottom of basins accumulate silts and clays and generally develop salt pans (MCAGCC 2007a).

Higher mountains of the training area are excessively drained, very stony or rocky, sandy loams to sands that are derived from nearby parent material. These soils develop on strong slopes to very steep upland slopes with rock outcrops covering much of the ground surface area. Where present, soil depth is seldom more than ten inches (MCAGCC 2007a).

Environmental Consequences

Training Range Impacts

Activities in the airspace that could affect geological resources include minor erosion associated with downdraft from vertical take-offs and landings, as well as use of the MV-22 machine gun at approved locations. Impacts would occur in localized areas of disturbance from hovering and landing of aircraft, resulting in dust and debris being scattered and/or becoming airborne. Similarly, machine gun fire could result in localized vegetation removal and soil disturbance. The MV-22 would be incorporated into existing training scenarios aboard MCAGCC. Only existing range facilities at MCAGCC would be used by the MV-22, and these would be used in the same or similar fashion to current rotary wing and fixed wing aircraft.

Many general procedures to minimize impacts to geological resources on MCAGCC are already in place and would continue to be implemented as part of any training scenario. These procedures are derived from existing plans, programs, regulations, and are associated with various agency consultations. Soil erosion is further minimized through the implementation of terms and conditions of applicable BOs, as well as by implementation of soil erosion measures, such as the Training Disturbance Minimization measures outlined in the MCAGCC INRMP (MCAGCC 2007a). Because of the localized nature of the impact and the ongoing management and minimization of training impacts on geological resources, no significant impact would occur.

MITIGATION MEASURES

Because there would be no significant impact on geological resources, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Due to lack of changes to existing conditions, no geologic impacts would occur.

6.3.13 Water Resources

This section describes the surface hydrology within the MCAGCC airspace training area. Hydrology is the science that deals with global water, its properties, circulation, and distribution, on the surface of the earth and in the atmosphere, from the moment of precipitation until it returns

to the atmosphere through evapotranspiration or is discharged into the ocean. Water quality describes the chemical and physical composition of water as affected by natural conditions (e.g., erosion) and human activities (e.g., hazardous waste spills).

No new support facilities would be constructed at MCAGCC; therefore, construction impacts related to groundwater supply, groundwater quality, and flooding would not occur. Similarly, other than water quality impacts associated with potential hazardous materials spills, airfield operations would have no water resources related impacts. Therefore, the EAF area has not been discussed in this section. See section 6.3.11 (Hazardous Materials Management), for a discussion of water quality impacts associated with potential hazardous materials spills.

Affected Environment

Annual precipitation at MCAGCC averages approximately four inches (10 cm), the majority of which occurs during summer and early fall thunderstorms. During heavy storm events, water carries sand, gravel, cobbles, and even boulder-sized rocks as part of the bedload transport. Deposition of this bedload material across less steep terrain has resulted in the formation of alluvial fans commonly observed in this area (MCAGCC 2007a).

All streams within the MCAGCC training area are intermittent and all naturally occurring, standing water is ephemeral, occurring only during and after heavy rains or thunderstorms. When surface flow due to high intensity rainfall occurs, the water soon percolates into the sandy soil of dry washes and/or collects on playas. Without a drainage outlet, surface water in shallow ephemeral lakes is lost through groundwater percolation or evaporation. Standing water on playas, a result of low infiltration rates in evaporated clay lakebeds, is a short-lived phenomenon, and is dependent of amount of rainfall. Evaporation of playa waters results in precipitation of alkali salts at or near the surface of the playa (MCAGCC 2007a).

MCAGCC has 16 watersheds, ranging in size from 2,819 acres to 52,178 acres. Quackenbush Lake watershed is the only one that lies entirely within the base boundary. Most surface drainage at MCAGCC is internal, flowing inward from all directions into 14 playas, which total approximately 7,674 acres. Two prominent (and the most heavily impacted) playas are Mesquite Lake (located near Mainside) and Deadman Lake (located in Sand Hill, Gypsum Ridge, and West range training areas). Unlike Mesquite Lake, Deadman Lake does not have any appearance of uplifted and tufted soils, suggesting that the water table is near the surface (MCAGCC 2007a).

In addition to playas, other water features within MCAGCC watersheds include dry washes, seeps, springs, and man-made water bodies. There are 289 dry washes, totaling 50,471 acres throughout the training area, but only twelve are considered major washes. The largest dry washes are located in the three largest watersheds (Deadman Lake, Bristol Lake, and Dry Lake). Approximately 25 percent of all dry washes occur in the Bristol Lake watershed. Seeps and springs are a valuable biological resource, particularly when standing or flowing water is available for wildlife. U.S. Geological Survey topography maps indicate the presence of four wells and two springs within the range. Seasonal seeps are located in the Imperial Lode mining area, Lead Mountain area, and several mine shafts located throughout MCAGCC (MCAGCC 2007a).

There are no naturally occurring, permanent ponds or lakes on the training range. Man-made water bodies at MCAGCC include stormwater retention ponds to the northeast of Mesquite Lake, golf

course ponds, and several sewage lagoons located near Deadman and Mesquite lakes, Camp Wilson, and the golf course. None of these waters are regulated under Section 404 of the Clean Water Act. Man-made water bodies are utilized by wildlife, most often migrating birds. In addition, settling basins trap sediment that would otherwise flow into Mesquite Lake (MCAGCC 2007a).

Stormwater runoff during operational phases of the project would be regulated under a NPDES Permit and associated SWPPP, prior to off-base discharge. The NPDES is the national program for issuing, modifying, revoking, etc., permits under Sections 307, 318, 402, and 405 of the Clean Water Act. The NPDES permit is an authorization issued by the USEPA, or an approved state, to discharge under certain specified conditions. The SWPPP is designed to minimize water quality degradation through establishment of project-specific BMPs, implementation of standard erosion control measures, and implementation of a SPCC plan. Currently, MCAGCC maintains an activity-wide (base-wide) SWPPP.

Environmental Consequences

Training Range Impacts

Introduction of up to ten squadrons of the MV-22 to the training environment at MCAGCC could cause minor erosion associated with downdraft from vertical take-offs and landings, as well as use of ammunition from the MV-22 machine gun at approved locations. Impacts would occur in localized areas of disturbance from hovering and landing of aircraft, resulting in dust and debris being scattered and/or becoming airborne. Similarly, indirect fire barrages could result in localized vegetation removal and soil disturbance. Such localized erosion could be exacerbated by high-intensity rainfall.

Many general procedures to minimize erosion related water quality impacts on the MCAGCC training range complex are already in place and would continue to be implemented as part of any training scenario. These procedures are derived from existing plans, programs, regulations, and are associated with various agency consultations. Soil erosion is further minimized through the implementation of terms and conditions of applicable BOs, as well as by implementation of soil erosion measures, such as the Training Disturbance Minimization measures outlined in the MCAGCC INRMP (MCAGCC 2007a). Because of the localized nature of the impact and the ongoing management and minimization of training impacts on water resources, no significant impact would occur.

MITIGATION MEASURES

Because there would be no significant impact on water resources, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Due to lack of changes to existing conditions, no water resources impacts would occur.

6.3.14 Biological Resources

This section describes the biological resources that may directly or indirectly be affected by the proposed MCAGCC training component of the West Coast basing of the MV-22. Biological resources refer to vegetation and wildlife, including endangered, threatened and sensitive species and habitats. Training activities involving landings, take-offs, and unloading of personnel and equipment would occur at established sites including the EAF, thirteen PRTSSs and nineteen established LZs. PRTSSs are permanent combat support sites ranging from 3 to 596 acres (1.2 to 241 ha) established in previously disturbed areas. The LZs are point locations throughout the training range. The MV-22 would use sites that are clear of vegetation or obstacles that would impede take-offs or landings, and onloading or offloading of personnel and cargo. Site-specific information on the PRTSSs and LZs presented below is from GIS data supplied by MCAGCC (MCAGCC 2008). No new support facilities would be constructed at MCAGCC; therefore, no construction impacts related to biological resources would occur. The definition of specific resources and their distribution in the vicinity of the project area are discussed below under the *Affected Environment* section. Incorporation of the MV-22 into the training environment at MCAGCC is part of the proposed action and is independent of which basing alternative is executed.

The biological information presented in this assessment was adapted from the MCAGCC INRMP 2007-2011 (MCAGCC 2007a) to provide specific context for the proposed action alternatives. The vegetation classification in the INRMP is based on a comprehensive inventory of vegetation on MCAGCC prepared by the University of California, Riverside in 1993. More recent inventories incorporated into the 2007 INRMP including a *Rare Plant Survey and Floristic Inventory* conducted by Tierra Data Systems in 1999, a *Preliminary Survey of Nonnative Plant Species* conducted by Anteon in 2001, and an *Invasive Non-Native Plant Survey* conducted by Agri-Chemical and Supply, Inc. in 2005. In addition, an updated survey of sensitive plant species was conducted in May 2005 (MCAGCC 2007a). Sensitive species surveys, such as desert tortoise, invasive species surveys, and general plant community surveys are ongoing with inventories updated periodically. More than 250 vertebrate wildlife species and 1,600 invertebrate species have been documented along with nearly 400 plant species at MCAGCC. An update to the vegetation map and community classification system is scheduled to be completed in 2009, and updated vegetation inventories are scheduled to be completed by 2010 (MCAGCC 2007a).

Affected Environment

Affected Ecosystems

MCAGCC is in the south-central region of the Mojave Desert, where temperature and rainfall patterns approach conditions more typical of the hotter, drier Sonoran Desert. Creosote bush (*Larrea tridentata*) is the dominant plant species along with desert annuals. Plant density and diversity increases in higher elevations and along desert wash systems. The MCAGCC INRMP identifies ten non-urban land cover types. There are variations in the classification, naming, and mapping of vegetation types or plant communities on MCAGCC. The MCAGCC GIS database includes 15 plant communities identified by the University of California, Riverside (1993), with four major vegetation types found on MCAGCC: Mojave creosote bush shrub, desert saltbush scrub, Mojave wash scrub, and blackbrush scrub (Figure 6.3.14-1) (MCAGCC 2007a). Table 6.3.14-1 provides a summary of the different plant communities mapped in Figure 6.3.14-1 and their percent coverage on the installation.

Table 6.3.14-1. Plant Communities and their Coverage on MCAGCC

Plant Community	% Coverage
Blackbrush Scrub	0.7
Catclaw/Desert Willow	1.5
Creosote Bush Clones	<0.05
Creosote Bush Scrub	64.0
Creosote Bush/Galleta Grass	6.0
Disturbed Creosote Bush	10.0
Dune Creosote Bush	3.0
Joshua Tree Woodlands	0.2
Lake Beds	1.5
Mesquite Thicket	<0.05
Mojave Yucca Scrub	0.3
Nevadan Creosote Bush	1.5
Saltbush Scrub	6.0
Sparse Creosote Scrub	4.0
Sweetbush/Cheesebush	2.0
Source: MCAGCC 2007a	

Table 6.3.14-2 identifies the vegetation types present at the PRTSSs and in the vicinity of the LZs based on the 1993 University of California, Riverside classification using GIS data provided by MCAGCC (2008).

MOJAVE CREOSOTE BUSH SCRUB

Mojave creosote bush scrub incorporates several plant communities that are dominated by creosote bush and white bursage (*Ambrosia dumosa*). This is the dominant vegetation type on MCAGCC, occupying nearly 85 percent of the land. This vegetation type occurs on a wide variety of terrain ranging from gently sloping alluvial fans to the steep slopes of mountains and hills (MCAGCC 2007a).

Related vegetation communities include creosote/galleta grass, creosote bush clones, dune creosote bush scrub, sparse creosote bush scrub and Nevadan creosote bush.

DESERT SALTBUSH SCRUB

Desert saltbush scrub is characterized by one or more species of saltbush (*Atriplex* spp.) in combination with other halophytes, often prevalent around margins of dry lakes or other poorly drained soil types (dry lakes are mapped as "lake beds" on Figure 6.3.14-1). Desert saltbush scrub occupies about six percent of the land within the MCAGCC boundary (MCAGCC 2007a).

MOJAVE WASH SCRUB

Mojave wash scrub occurs in ephemeral channels and is influenced by the size of the watershed, slope gradient, parent material, soil texture, and climate. Smoketree (*Psorothamnus spinosus*) occurs at lower elevations in many dry watercourses. Desert willow (*Chilopsis linearis*) occurs in large ephemeral channels where there is a permanent source of underground water. Cat-claw acacia (*Acacia greggii*) may also be present in these communities. Mojave wash scrub occurs on about 1.5 percent of the land within the MCAGCC boundary (MCAGCC 2007a; USMC 2003a). This type includes the catclaw/desert willow and mesquite thicket types on the vegetation map. The cover provided by the

large shrubs and small trees associated with the desert washes is important to wildlife, especially avian species.

Table 6.3.14-2. Vegetation in the Vicinity of PRTSS and LZs on MCAGCC

Range Facility	Area (acres) [1]	Vegetation[2]
PRE-DESIGNATED RANGE TRAINING SUPPORT SITE (PRTSS)		
Cleghorn Pass	19.7	Creosote Bush Scrub
EAF – South	24.5	Creosote Bush Scrub
East	3.5 13.0	Creosote Bush Scrub Disturbed Creosote Bush
Emerson Lake	44.1 11.6	Saltbush Scrub Lake Beds
FASP	577.7 18.1	Creosote Bush Scrub Catclaw/Desert Willow
Gypsum Ridge	2.7	Disturbed Creosote Bush
Lavic Lake	10.2	Disturbed Creosote Bush
Lead Mountain – North	83.9	Creosote Bush Scrub
Lead Mountain – South	92.1 7.1	Creosote Bush Scrub Sweetbush and Cheesebush
Noble Pass	27.2 46.7 5.9	Creosote Bush Scrub Disturbed Creosote Bush Sweetbush and Cheesebush
Quackenbush – North	120.6 349.0	Creosote Bush Scrub Disturbed Creosote Bush
Quackenbush – South	30.8 17.2	Creosote Bush Scrub Lake Beds
West	15.7	Creosote Bush Scrub
LANDING ZONE (LZ)		
TTECG Crampton	N/A[3]	Creosote Bush Scrub
OP Crampton	N/A	Creosote Bush Scrub
EW Crampton	N/A	Creosote Bush Scrub
OP Creole	N/A	Nevadan Creosote Bush
Lower Creole	N/A	Nevadan Creosote Bush
OP Round	N/A	Nevadan Creosote Bush
Camp Wilson	N/A	Creosote Bush Scrub
Range 400	N/A	Creosote Bush Scrub
Range 400 (A)	N/A	Creosote Bush Scrub
Range 410	N/A	Creosote Bush Scrub
OP Cross	N/A	Creosote Bush Scrub
Bearmat LZ	N/A	Creosote Bush Scrub
Range 500	N/A	Disturbed Creosote Bush (cleared area)
Gunfighter	N/A	Creosote Bush Scrub
Red	N/A	Creosote Bush Scrub
CG's Parade Deck	N/A	Developed pad in Built Up Area
Ripper	N/A	Dune Creosote Bush Scrub (80%) Creosote Bush Scrub (20%)
Medevac Pad	N/A	Developed pad in Built Up Area
Naval Hospital	N/A	Developed pad in Built Up Area

Notes:

1. Areas within the PRTSSs are based on GIS analysis of boundaries supplied by MCAGCC in 2008. When noted as "N/A" (Area of LZs not given), vegetation category based on types intercepted by a 50-meter radius from the point location provided using GIS. For LZs having more than one vegetation type within the 50-meter radius circle, the percentages of the circle occupied by the different types were visually estimated.
2. Vegetation coverage is based on 1993 data collected by University of California, Riverside for the entire installation and may not reflect current conditions on the PRTSSs or LZs. The minimum mapping unit of this broad-scale coverage does not provide site-specific detail and does not account for specific features such as isolated buildings, cleared areas and roads. For the LZs in particular, the vegetation information is more reflective of the surrounding area than of the specific site, which might lack vegetation.

Source: GIS data provided by NREA Division, MCAGCC 2008.

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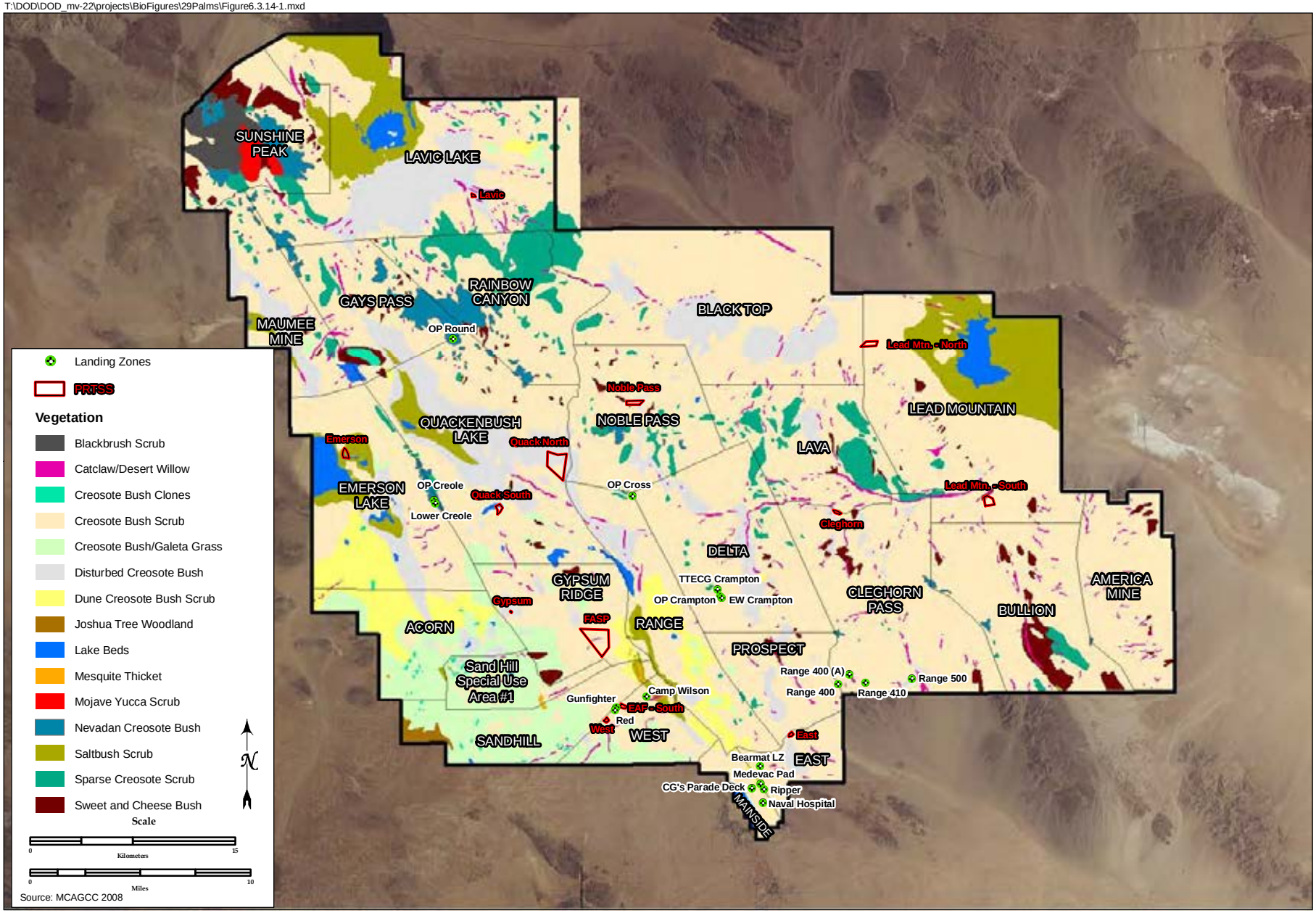

Plant Communities in the Vicinity of MCAGCC Training Areas

FIGURE

6.3.14-1

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BLACKBRUSH SCRUB

Blackbush scrub is dominated by blackbrush (*Coleogyne ramosissima*) accompanied by other species including turpentine broom (*Thamnosma montana*), spiny hopsage (*Grayia spinosa*), winterfat (*Krascheninnikovia lanata*), shadscale (*Atriplex confertifolia*), and Anderson desert thorn or water jacket (*Lycium andersonii*). This vegetation type occupies less than one percent of the land within the MCAGCC boundary and occurs on the flat top of Argos Mountain, near OP Round, and on high alluvial slopes in the Sunshine Peak Training Area (MCAGCC 2007a).

OTHER NATURAL COMMUNITIES

Mojave yucca (*Yucca schidigera*) and Joshua Tree (*Yucca brevifolia*) woodlands are conspicuous in small portions of the installation. These plant communities cover only a small fraction of land within the MCAGCC boundary (MCAGCC 2007a; USMC 2003a), but are important to resident and migratory wildlife species for the cover, food resources, and habitat diversity provided by the dominant plant species. Sweetbush/cheesebush communities are areas dominated by sweetbush or tortoise's delight (*Bebbia juncea*) and cheesebush (*Hymenoclea salsola*), both of which are short-lived shrubs with relatively good colonizing ability, especially in coarse sandy soils.

DISTURBED AND LANDSCAPED AREAS

Some areas of the training ranges have been disturbed intensively by military activities with consequent degradation of vegetation. In addition, natural vegetation has decreased significantly in the Surprise Spring area due to the lowering of the water table via wells that supply the base with potable water (USMC 2003a). The "landscaped" areas of the base are restricted to Mainside. Mainside vegetation consists of a variety of ornamental trees, shrubs, and ground cover, most of which are drought-tolerant plants commonly used in landscaped areas in Mojave Desert communities (USMC 2003a).

INVASIVE NON-NATIVE PLANT SPECIES

Several non-native invasive plant species have populated Mainside and training areas, such as salt cedar (*Tamarix ramossissima*), Mediterranean grass (*Schismus barbatus*), Russian-thistle or tumbleweed (*Salsola tragus*), and Sahara mustard (*Brassica tournefortii*). Salt cedar eradication efforts have largely mitigated that species' presence at MCAGCC; however, the process is ongoing. Non-native invasive grasses are prevalent, and eradication efforts are not practical. There is a possibility of treating the Sahara mustard and Russian-thistle. Mitigation efforts are being studied as part of MCAGCC's Wildland Fire Management Plan. MCAGCC's Master Plan provides a list of native desert plant materials that should be utilized in landscaped areas to promote environmentally and economically beneficial grounds maintenance (USMC 2003a).

Wildlife

The major ecosystems on MCAGCC include the Creosote/Bursage Scrub Series, Riparian, Wet Areas and Aquatic Ecosystems. Approximately 90 percent of MCAGCC is in the Creosote/Bursage Scrub Ecosystem with less than one percent of training land occupied by Yucca Woodlands, Desert Riparian, and Wet Areas/Ponds/Riparian (perennial ecosystems that support the richest wildlife diversity; MCAGCC 2007a). There are approximately 264 species of vertebrate animals that are

permanent or seasonal residents of MCAGCC, including two amphibian, 21 reptile, 24 mammal, and hundreds of bird species. Fourteen bird species are resident, and the remainder are migratory. Of the 256 animal species, thirty-four are considered sensitive species (see *Sensitive Species and Habitats* for a discussion of sensitive wildlife species).

The wildlife species at MCAGCC are typical of Mojave Desert habitats and have adaptations enabling survival under desert conditions. In addition, a wide variety of non desert-adapted species inhabit manmade water areas at Mainside (MCAGCC 2007a).

In desert habitats, seeps, springs and manmade bodies of water provide water and associated vegetation cover and contribute to increased wildlife diversity. Large mammals, such as desert bighorn sheep (*Ovis canadensis nelsonii*), coyote, and bobcat, use these water sources. Bats typically feed over these areas because of increased abundance of their prey. Bird species that migrate in the spring and fall (and are not usually associated with desert environment) forage and rest in these areas, particularly at manmade bodies of water (MCAGCC 2007a). However, there currently are no active perennial springs located at MCAGCC. The lack of perennial water also limits the presence of native fish species. The introduced mosquito fish (*Gambusia affinis*) occurs in some of the manmade treatment ponds; however, no other fish species are known to occur on the installation (MCAGCC 2007a).

At MCAGCC, large animal species are uncommon, widely dispersed and often nocturnal. Smaller mammals and reptiles, adapted to harsh desert conditions, are much more common but are often secretive, nocturnal, or active for only short periods of the year. Birds are among the most conspicuous species, and occur in greatest concentration in the vicinity of washes and springs where more structured and complex vegetative assemblages occur. The open training areas of MCAGCC outside of Mainside, which constitute the majority of the area on MCAGCC provide habitat for desert species and migrants (MCAGCC 2007a).

In November 1992, twenty bighorn sheep (five rams and fifteen ewes) were introduced onto the combat center near the boundary of the Bullion and Cleghorn Pass Training Areas north of Cleghorn Lakes. This is an experimental population. Population counts conducted after introduction indicated that the population had become stable (MCAGCC 2007a).

Threatened, Endangered, and Sensitive Species

Sensitive species include those that are listed, proposed, or candidates for listing as threatened or endangered under the federal ESA, species that have similar status under the California ESA, and other species that are of regional concern due to rarity and potential vulnerability to extinction. Sensitive habitats include habitats that support endangered, threatened or sensitive species and, therefore, are important to the conservation of these species, and wetlands and other waters regulated under Sections 401 and 404 of the Clean Water Act. There is no designated Critical Habitat of federally listed endangered or threatened species on the installation.

No federally or state listed plant species are known to occur on MCAGCC; however, an ongoing study reports eleven sensitive plant taxa known to occur on the installation, including two species on the California Native Plant society's (CNPS) List 1B or 2. White-margin beardtongue (*Penstemon albomarginatus)* is included on CNPS List 1B (plants rare and endangered in California and elsewhere), and crucifixion thorn (*Castela emoryi*) is on CNPS List 2 (plants rare and endangered in

California but more common elsewhere). Species on CNPS Lists 1B and 2 may meet the criteria for federal listing but have not yet been formally listed. The white-margin beardtongue is a perennial herb that occurs on stabilized desert dunes and Mojavean desert scrub with sandy soils. This species is known from only four occurrences on MCAGCC. Crucifixion thorn is a very thorny deciduous shrub that occurs on gravelly soils on playas and Mojavean or Sonoran desert scrub (CNPS 2008). The INRMP (MCAGCC 2007a) identifies an additional fifteen rare plant species with a "moderate-high" potential, based on their distribution and habitat associations, to be present at MCAGCC; much of these habitats are remote and inaccessible due to MCAGCC's mission and terrain. Appendix F includes a list of sensitive plant species known, or having the potential, to occur on the combat center (MCAGCC 2007a).

The desert tortoise (*Gopherus agassizii*), which is state and federally listed as Threatened, is MCAGCC's only resident species protected under the ESA that has been documented within the boundaries of MCAGCC (MCAGCC 2007a). Its occurrence on the installation is described below.

The Golden Eagle (*Aquila chrysaetos*), which is protected under the Federal Bald and Golden Eagle Protection Act, and is a California fully-protected species, has been observed on several different occasions. It is believed that a nesting pair lives in the Delta Training Area. The Bald and Golden Eagle Protection Act provides for the protection of both the Bald Eagle (*Haliaeetus leucocephalus*) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds (MCAGCC 2007a).

The Brown Pelican (*Pelecanus occidentalis*), Snowy Plover (*Charadrius alexandrinus*), Willow Flycatcher (*Empidonax traillii*), and Bell's Vireo (*Vireo bellii*) are nonresident bird species known to migrate through the area. These migratory species have been observed at water sources and landscaped areas (e.g., the golf course) and most likely utilize only these areas during migration. The USFWS has proposed to delist the Brown Pelican from the Federal List of Endangered and Threatened Wildlife (Federal Register 73[34]:9407-9433, February 20, 2008) due to recovery. Only certain subspecies of the Snowy Plover, Willow Flycatcher, and Bell's Vireo are listed under the ESA; other subspecies are non-listed and they are very difficult to distinguish outside of their breeding habitat. Observations at MCAGCC identified these birds only to the species level due to the difficulty of identifying to subspecies (requires take), and the habitat would not support viable resident populations of these species (MCAGCC 2007a).

Provided below is a summary of the natural history and distribution of the only resident federally listed species occurring or potentially occurring in the vicinity of the project area (PRTSS and LZ).

DESERT TORTOISE (*Gopherus agassizii*)

The desert tortoise is listed as threatened by the CDFG and the Mojave Desert population is listed as threatened by the USFWS. The desert tortoise is a herbivorous reptile found throughout much of the Mojave and Sonoran Deserts. Its range roughly approximates the distribution of creosote bush scrub plant community. The desert tortoise spends much of the year underground to avoid extreme temperatures during summer and winter. It constructs and maintains burrows, of which there may be several within an individual's home range. The desert tortoise is active above ground during the spring, summer, and autumn when daytime temperatures are below 90°F (32°C). Most activity occurs during spring and early summer (MCAGCC 2007a).

The USFWS determined that the Mojave Desert tortoise population warranted listing in response to documented population declines over large portions of its range. The decline is thought to be due to a number of causes, including loss of habitat, upper respiratory tract disease, predation by ravens on young tortoises, off-highway vehicle use, livestock grazing, and direct disturbance and collection by humans. The tortoise was emergency-listed by USFWS on 4 August 1989, and the Mojave population was federally listed as Threatened in April 1990 (USFWS 1990).

MCAGCC is within the southern Mojave subdivision of the Western Recovery Unit for the desert tortoise. The combat center has no Critical Habitat. However, it shares a 6.2 mile (10.0 km) boundary with the Ord-Rodman Critical Habitat to the northwest, and the Pinto Mountain critical habitat area is six miles (9.7 km) southeast of the installation. Numerous surveys have been conducted over the years to document the distribution and relative densities of tortoise populations throughout the installation (see Figure 6.3.14-2; MCAGCC 2007a). According to the USFWS (2002a), the results of the numerous surveys conducted at MCAGCC and reported between 1982 and 1999, "indicated that densities of desert tortoises are generally low throughout the Center", with 64.7 percent of the land area supporting the lowest category of tortoise density (up to five individuals per square mile). However, there are several areas where desert tortoise densities are moderate to moderately high (Figure 6.3.14-2). Table 6.3.14-3 provides estimated tortoise densities within 50 meters of the PRTSSs and LZs. Most of the sites fall within the lowest density category (0 to 5 individuals per square mile), with a few sites falling within the 6 to 20 individuals per square mile category.

MCAGCC prepared a Biological Assessment of the effects of training and land use on the desert tortoise. This assessment was used by the USFWS to issue a BO (1-8-99F-41) (USFWS 2002a) that identified the terms and conditions under which the USMC may operate on the combat center while remaining in compliance with the ESA. The BO addresses the military mission, and conservation and protection of the desert tortoise.

An assessment of the effects of military operations on desert tortoise concluded that operations in undisturbed tortoise habitat areas may have the most significant effects on populations through habitat degradation, though not necessarily mortality. Desert tortoises present on-base occur predominantly in creosote bush scrub habitat below approximately 4,300 feet elevation. A "Special Use Area" of approximately 27 square km, which has moderate to high densities of desert tortoises (Figure 6.3.14-2), was established in the Sand Hill Training Area to protect natural resources (Combat Center Order 5090.1C); desert tortoises benefit from this designation. No vehicle training is allowed off-road in this area. MCAGCC's Desert Tortoise Management Plan recommends that consideration be given to expanding protected tortoise habitat in the Sand Hill Area. Desert tortoises have also been found at Mainside, primarily between Mainside and the mountains directly to the east, although infrequently and in low numbers.

Sensitive Habitats

WETLANDS

There are no wetlands in the vicinity of the EAF, PRTSSs and LZs that would be used during MV-22 training.

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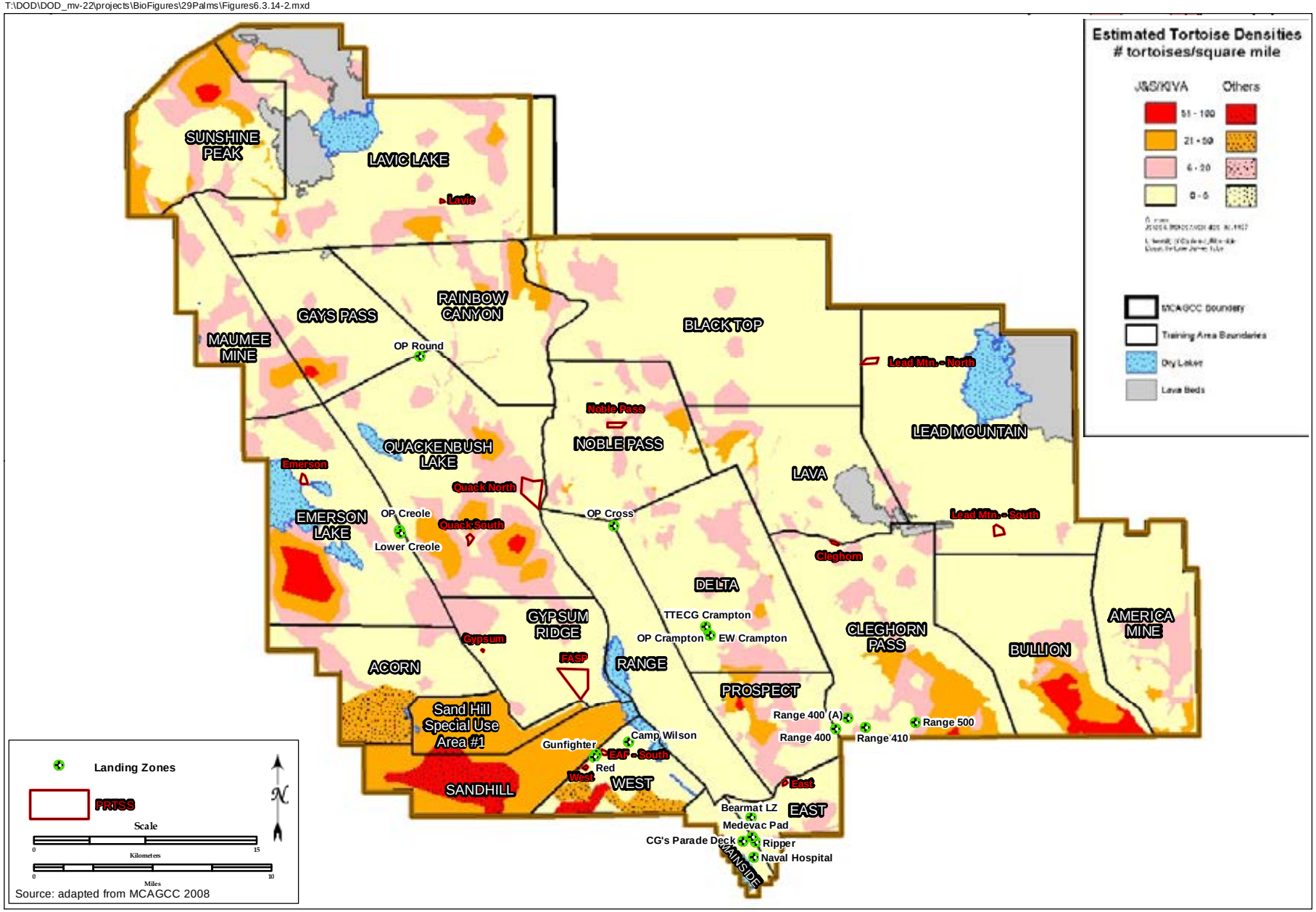

Desert Tortise Density in the Vicinity of MCAGCC Training Areas

FIGURE

6.3.14-2

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Table 6.3.14-3. Estimated Desert Tortoise Densities (individuals per square mile) at MCAGCC PRTSSs and LZs

Range Facility	Area (acres [1])	Tortoise density[2] # per square mile
PRE-DESIGNATED RANGE TRAINING SUPPORT SITE (PRTSS)		
Cleghorn Pass	19.7	0 - 5
EAF – South	24.5	0 - 5
East	16.5	0 - 5 (40%) 6 - 20 (60%)
Emerson Lake	55.7	0 - 5
FASP	595.7	0 - 5
Gypsum Ridge	2.7	0 - 5
Lavic Lake	10.2	0 - 5
Lead Mountain – North	83.9	0 - 5
Lead Mountain – South	99.2	0 - 5
Noble Pass	79.8	0 – 5 (70%) 6 – 20 (30%)
Quackenbush - North	469.6	0 – 5 (60%) 6-20 (40%)
Quackenbush - South	48.0	0 – 5 (75%) 6 – 20 (25%)
West	15.6	0 - 5
LANDING ZONE (LZ)		
TTECG Crampton	N/A	0 - 5
OP Crampton	N/A	0 - 5
EW Crampton	N/A	0 - 5
OP Creole	N/A	0 - 5
Lower Creole	N/A	0 - 5
OP Round	N/A	0 - 5
Camp Wilson	N/A	0 - 5
Range 400	N/A	0 - 5
Range 400 (A)	N/A	6 - 20
Range 410	N/A	0 - 5
OP Cross	N/A	0 - 5
Bearmat LZ	N/A	0 - 5
Range 500	N/A	6 - 20
Gunfighter	N/A	0 - 5
Red	N/A	0 - 5
CG's Parade Deck	N/A	0 - 5
Ripper	N/A	0 - 5
Medevac Pad	N/A	6 - 20
Naval Hospital	N/A	0 - 5

Notes:
1 N/A –LZs are listed as point features. Tortoise density category is based on mapped density classifications falling within a 50 meter radius from the point location provided (LZ) or PRTSS boundaries. Beyond 50 meters may lead to lower or higher tortoise density areas (see Figure 6.3.14-2).
2 Estimated tortoise density is based on survey data and reports prepared during the 1980s and 1990s. Percentage areas shown in parentheses were visually approximated from maps produced in Arc GIS.
Source: GIS data provided by NREA, MCAGCC 2008.

CRITICAL HABITAT

The installation has no formally designated Critical Habitat of federally listed endangered or threatened species. Although important habitat and known populations of desert tortoise occur on the base, negotiations with the USFWS through other regulatory processes have resulted in species management without USFWS critical habitat designation. Critical habitat designation can be exempted for military installations where the USFWS determines that the approved INRMP for the installation provides a benefit to the species at issue. However, the installation shares a 6.2 mile (10.0

km) boundary with the Ord-Rodman Critical Habitat to the northwest, and the Pinto Mountain Critical Habitat is six miles (9.7 km) southeast of the installation.

Established Plans, Measures, and Procedures Applicable to All Training on MCAGCC

All project components, as well as all activities that occur on MCAGCC, would be conducted in compliance with the MBTA and Executive Order 13186. The MBTA affirms and implements the U.S. commitment to international conventions for the protection of shared migratory bird resources, and prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. Executive Order 13186 directs Federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. On 2 December 2003, the President signed the 2003 National Defense Authorization Act. The Act provides that the Secretary of the Interior will exercise his/her authority under the MBTA to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during military readiness activities authorized by the Secretary of Defense. Congress defined military readiness activities as all training and operations of the Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Congress further provided that military readiness activities do not include: (A) the routine operation of installation operating support functions, such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, morale, welfare, and recreation activities, shops, and mess halls; (B) the operation of industrial activities; or (C) the construction or demolition of facilities used for a purpose described in (A) or (B).

On 31 July 2006, the DoD and the USFWS entered into a MOU to Promote the Conservation of Migratory Birds, in accordance with Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds." MCAGCC developed an INRMP (2007) to identify and provide management tools for native and protected species and habitats on the installation, including those species protected under the MBTA. The training component of the proposed action is a "Military Readiness" activity and therefore incidental take is authorized unless the action jeopardizes bird populations; however, as part of the MOU between USFWS and DoD, all Military Readiness activities will include conservation measures as part of the NEPA process to minimize and avoid impacts on species protected under the MBTA. These measures are identified at the end of this section and include the avoidance, restoration, and/or enhancement of all sensitive native plant communities that could be affected by proposed projects, seasonal avoidance of nesting birds, avoidance of riparian and wetland habitats, and fuel and fire management.

In addition to these existing practices and procedures, the MV-22 is operated in accordance with the NATOPS training manual. The manual identifies measures and limitations on how the aircraft is flown.

Environmental Consequences

A biological resource impact assessment was conducted for the proposed action and evaluated several factors including magnitude of impact, permanence of impact (permanent loss versus temporary short term/temporary long term), sensitivity of the resource, legal protection of the resource, and existing management of the species, habitat, or community on MCAGCC. No

project-specific biological resource surveys occurred as part of the project. Because of the use of existing training sites (no construction or modifications are proposed), there is limited potential for direct impacts to sensitive biological resources. As a result, the impact assessment is based on known current and historic records of sensitive resources and habitats on MCAGCC and an assessment of likely impacts unique to the MV-22.

The training component of the proposed action includes the incorporation of the MV-22 into the existing West Coast-based training environment. The MV-22 is the replacement aircraft for the CH-46E medium lift helicopter. The MV-22 would conduct training, readiness, and special exercise operations within Special Use Airspace and on training areas historically used by the aircraft to be replaced. These include the PRTSSs and LZs listed in Table 6.3.14-2. Operations would be conducted from the EAF, which is located in the southwestern portion of the combat center, and serves as a temporary support base for most air units during combined exercises; it is used by fixed wing aircraft and helicopters.

Indirect impacts on plant communities and wildlife habitats would be limited to localized surface disturbance and erosion associated with downdraft from vertical take-offs and landings, visual and noise effects from overflight, and the potential ignition of vegetation. The removal of the CH-46E operations and addition of the MV-22 operations would cause a net decrease in operational use of the proposed landing sites relative to the baseline (see section 6.2.2, *Airspace*). The activities of personnel exiting and entering the aircraft and the effects of aerial drops of cargo would be the same as those involved in current rotary wing training, which could involve a wide variety of ground-based activities, such as patrolling and actions against an objective, identified in the USMC training syllabus.

Introduction of up to ten squadrons of the MV-22 to the training environment at MCAGCC could cause impacts to biological resources due to fire; downdraft (dust and soil erosion) from vertical take-offs, landings, and hovering; bird-aircraft strikes; and disturbance to wildlife from noise and visual effects from aircraft overflight. Introduction of up to ten squadrons of the MV-22 to the training environment within MCAGCC would replace nine squadrons of CH-46E and CH-53 aircraft.

Training Range Impacts

VEGETATION

No new construction or infrastructure improvements are proposed as part of this alternative; therefore, there would be no direct loss of vegetation or wildlife habitat associated with MV-22 training at MCAGCC. Incorporation of the MV-22 into the existing training environment may result in temporary disturbance of loose surface debris and soil caused by downdraft and outwash in the vicinity of take-offs, landing and near-surface hovering, potentially resulting in an impact to vegetation and soils. For a given aircraft, downdraft forces are relative to the engine power settings and the aircraft's proximity to the ground. Downdraft from the MV-22 would be up to 10 percent greater than from the CH-53E (DoN 1998) at a given height above ground. Downdraft from the aircraft during landing, take-offs, and hovering immediately above the ground could temporarily disturb vegetation and wildlife habitat in the immediate vicinity of the aircraft. This potential impact would be very localized and would be unlikely to permanently affect the distribution of plant communities or associated habitats in a magnitude different than existing aircraft. Additionally, most sites are already developed or heavily disturbed and offer low value to

vegetation and wildlife. Moreover, any localized effect on the soil at landing sites may be obscured by blowing dust and sand associated with naturally-occurring high winds (dust storms or sandstorms) that may occur several times a year. Additionally, the training areas that would be used in MV-22 training have a history of similar training activities, and incorporation of the MV-22 would represent a negligible change in the overall training environment at MCAGCC.

As a result, impacts associated with hovering and landing of the MV-22 would be limited to areas that are routinely affected by training and have limited vegetation, and would be minor and very localized. Therefore, impacts on vegetation and wildlife habitats associated with take-off, landing and low-level hovering would be less than significant.

Operation of the MV-22, itself, has not been identified as a cause of frequent fires. According to a recent DoN review (DoN 2008c), there has been only one documented fire after 44,000 V-22 flight hours and operations encompassing numerous unprepared LZs at bases and ranges, including sites in Alabama, Arizona, California, Florida, Maryland, Nevada, New Mexico, North Carolina, and Virginia. The single documented fire was caused by an engine which had inoperative exhaust deflectors. The deflectors normally divert exhaust gases outward, away from the aircraft and the ground. In the MV-22's current configuration, the exhaust deflector system is activated at low power settings and with weight on the wheels. Studies of exhaust temperatures with and without deployment of the exhaust deflectors summarized in DoN (2008c) indicate that ground surface temperatures would not reach temperatures required to ignite a variety of natural fuels, including grasses. The DoN review (DoN 2008c) concluded that, under normal operations with engine exhaust deflectors operating, the exhaust of the V-22 should not heat ground to a temperature high enough to support combustion of plant based materials such as dry grasses. The current configuration includes a heat exhaust shield and modified lighting covers to prevent fires from starting during touch downs (personal communication, Aitchison 2008).

Nonetheless, all training activities have the potential to start fires. Fire potential would be highest in undeveloped areas with an abundance of natural fine fuels, such as dry grasses or finely branched shrubs that extend above the ground surface. Under natural conditions, the prevalent creosote bush scrub vegetation at MCAGCC is too sparse to carry fire. Wide plant spacing and the scarcity of native grasses are natural barriers to the spread of fire (MCAGCC 2007a). However, the recent spread of introduced invasive species including Sahara mustard (*Brassica tournefortii*) and non-native grasses such as red brome (*Bromus madritensis* var. *rubens*) and Mediterranean grass or split grass (*Schismus* spp.) through Mojave Desert habitats, may result in sufficiently dense vegetation after high rainfall years to carry a fire, which could have long-term adverse effects on the Mojave Desert ecosystem and biodiversity (MCAGCC 2007a). This is because the Mojave Desert ecosystem is believed to have evolved in the absence of significant wildfires and some species, including creosote bush, appear to lack adaptations that facilitate rapid recovery from fire.

Although introduction of the MV-22 to MCAGCC has some potential to start fires, the likelihood appears to be very low, given the available information reviewed above. Years during which precipitation is high enough to result in sufficient cover of invasive species to carry fire would be infrequent. MCAGCC has programs for managing invasive species and has developed a Wildland Fire Management Plan in recognition of the new hazard posed by these invasive species and the long-term adverse ecological consequences of fire in the desert scrub vegetation, including exacerbating the potential for subsequent wildland fires. Both the invasive species management efforts and the Wildland Fire Management Plan should help reduce the potential for fire associated with MV-22 training. MCAGCC's Wildland Fire Management Plan was prepared with the PRTSSs

& LZs in mind, and with the training mission in mind. MCAGCC's Office of Natural Resources and Environmental Affairs (NREA) agrees that these sites are approved from the Natural and Cultural Resources perspective. The PRTSSs and LZs would be managed for wildland fires according to the existing plan, which was signed in 2008. Because of the low likelihood of fire related to MV-22, and the plans in place for invasive species and wildland fire management, the potential for increased wildland fire associated with MV-22 training is expected to have a less than significant impact on biological resources. However, because there is some uncertainty associated with this conclusion due to the relative lack of training history with MV-22 in arid environments, and given the severity and long-term adverse effects of fire in desert scrub communities, mitigation measures are proposed at the end of this chapter to further reduce the likelihood and significance of impacts resulting from training-related fires.

WILDLIFE

Most of the vertebrate species found on MCAGCC are resident or migratory birds, with many birds occurring near water at Mainside. The use of any rotary wing aircraft within undeveloped areas has the potential to add noise to the natural environment and cause a response by wildlife, potentially inducing a startle response and possible injury from trampling or uncontrolled running or flight; increased expenditure of energy during critical periods; decreasing the amount of time spent on life functions such as seeking food or mates; temporarily masking auditory signals from other animals; and/or otherwise reducing the protection and stability of young (Manci et al. 1988). The type of noise that can stimulate the startle reflex is variable among animal species (Manci et al. 1988). In general, studies have indicated that close, loud, and sudden noises that are combined with a visual stimulus produce the most intense reactions, with distance from the stimulus being the primary variable (Delaney and Grubb 1997; Manci et. al. 1988). Rotary wing aircraft such as a helicopter generally induce a startle effect more frequently than fixed wing aircraft (Gladwin et al. 1988); however, there are many variables, including the altitude of approach, whether or not the aircraft is visible, and whether or not the aircraft produces a percussive sound typical of helicopters having a single two-bladed main rotor, such as the UH-1 Huey. In this context, the MV-22 would appear more like a fixed wing aircraft with onset of sound from an MV-22 building up relatively gradually and the rotating blades forming a blur rather than being seen as rotating parts, reducing the potential for a startle effect. Although there are no specific studies evaluating the effects of MV-22 operations on wildlife species, this aircraft would perform similar to helicopters, such as the CH-46E, currently operating within the existing MCAGCC training environment, with exceptions as described in this section.

The MV-22 sounds more like a conventional turboprop aircraft, such as a short-hop commuter airliner or a C-130 cargo plane, than a helicopter in that it makes a steady buzzing tone and lacks the low pitched percussive ("wop-wop-wop") sound associated with many helicopters. Compared to the CH-46E, which it would replace, noise modeling conducted for this EIS shows that in cruising flight sound exposure levels (SEL) in dBA from MV-22 would be consistently lower than those from CH-46E at altitudes between 250 feet and 5,000 feet above ground level. The same is true of maximum sound levels (Lmax) in dBA (Table 6.3.14-4). SEL represents the total acoustic energy during an event (such as an overflight) typically measured over a duration of one second. Lmax is the maximum sound level measured over a fraction of a second during a single noise event that changes over time. During arrivals, SEL from MV-22 would be slightly lower than those from CH-46E, however the Lmax would be somewhat greater for MV-22 (Table 6.3.14-4).

Table 6.3.14-4. Comparisons of Modeled CH-46E and MV-22 Sound Levels (SEL and Lmax) During Cruising at Different Altitudes Above Ground Level and During Arrival.

Altitude (feet, AGL)	Sound Exposure Level (SEL) (dBA)		Lmax (dBA)	
	CH-46E	MV-22	CH-46E	MV-22
CRUISE[1]				
250	101	93	97	88
500	96	92	90	88
1000	94	88	86	81
1500	92	86	82	78
2000	89	84	78	74
2500	88	82	76	72
3000	87	81	74	70
3500	86	80	73	68
4000	85	79	72	67
4500	85	78	72	66
5000	84	77	69	64
ARRIVAL (AT OR NEAR TOUCHDOWN)[2]				
N/A	95	94	79	83

Notes:
1. Estimates CH-46E cruising speed of 110 knots (kts) and MV-22 cruising speed of 220 kts.
2. Measured at a distance of 500 feet abeam of the aircraft, on the left side.
AGL = above ground level
Source: Data from Rotorcraft Noise Model Results (Wyle 2008).

The MV-22 would operate in an airfield environment similar to the current operational environment at MCAGCC and would follow established local approach and departure patterns. No sensitive bird species are normally found in the vicinity of the airfield environment and effects of the change from CH-46E to MV-22 on wildlife in the vicinity of the airfield would be less than significant, despite an increase in activity at the EAF (Table 6.3.2-3 in section 6.3.2, *Airspace*). With the change from CH-46E to MV-22, there would be a substantial decrease in overall operation levels within the range training areas (see Table 6.3.2.4, in section 6.3.2, *Airspace*). Because training of the MV-22 would not occur in any new or undisturbed areas of MCAGCC and because the MV-22 would perform similar to helicoptors, such as the CH-46E, currently operating within the existing MCAGCC training environment, wildlife would not be expected to react or modify behavior as a result of the proposed project compared to the existing situation. Effects related to downdraft/outwash and effects related to noise would diminish with distance from the aircraft. Wind velocities associated with MV-22 rotor wash would diminish substantially beyond 100 feet from the aircraft. Elevated noise levels, however, would be experienced at distances of 500 feet or more from the aircraft. Exposure to elevated noise levels would generally be localized around the actual landings, take-offs, and low-level hovering at LZs and PRTSSs, diminishing with distance from the aircraft. However, as with the CH-46E, which it replaces, noise levels would be elevated above background at distances greater than 500 feet from the aircraft. However, no behavioral effects, such as startle response, would be expected at these distances. As a result, impacts on wildlife from noise associated with MV-22 training are expected to be less than significant.

A BASH management plan completed in 2003 determined that MCAGCC and the EAF have a low risk of airstrikes due to the remoteness of the airfield from any major source of water (MCAGCC 2004). Between 1985 and 2002, there were only three reported BASH incidents involving rotary wing aircraft and birds on the installation (MCAGCC 2004). There is an extremely low likelihood of strikes because the MV-22 would be incorporated into existing training scenarios, and there would not be a substantial increase in the potential for bird-aircraft strikes compared with existing conditions. Therefore impacts on wildlife from bird-aircraft strikes would be minimal and less than significant.

ENDANGERED, THREATENED, AND SENSITIVE PLANT SPECIES

Implementation of the proposed action is unlikely to affect sensitive plant species. There are no federally listed plant species known to occur anywhere on the installation. Analysis of existing records for the non-listed sensitive plant species indicates no records of sensitive plant species at the PRTSSs and LZs that would be the focal points of MV-22 activities involving take-off and landing.

ENDANGERED, THREATENED, AND SENSITIVE WILDLIFE SPECIES

Existing range facilities within Special Use Airspace/military restricted areas would be used by the MV-22, and these would be used in the same or similar fashion to current rotary wing training. These areas are routinely affected by ground-based and rotary wing training activities. Incorporation of the MV-22 as replacement for the CH-46E would result in an increase in activity at the EAF, where exposure of desert tortoises to the activities would be very low, but a substantial decrease in use compared to existing activities of the CH-46E elsewhere at MCAGCC, including LZs and PRTSSs, resulting in a substantial decrease in the potential exposure of desert tortoise to MV-22 activities compared to existing CH-46E activities.

The desert tortoise is the only federally-listed resident species on MCAGCC. There is no critical habitat within the installation boundaries. Incorporation of the MV-22 into the existing training environment would result in localized disturbance of surface material and soil at the PRTSSs and LZs, where the aircraft would hover and land, and desert tortoises have the potential to be present at some of these locations (see Figure 6.3.14-2). Most of the PRTSSs and LZs occur in the lowest density category of desert tortoise habitat—up to five individuals per acre (see Table 6.3.14-2). Because of the consolidation of a wide variety of ground disturbing training activities at the PRTSSs and LZs, the effect of introducing MV-22 training would be very low and unlikely to be measurable. The likelihood of a direct effect on an individual tortoise during take-off, landing, or offloading cargo or personnel would be so low as to be discountable. Dust raised by the MV-22 during training could affect desert tortoise, especially individuals with respiratory disease; however, dust raised by MV-22 would be temporary, episodic, and minimal, and comparable to current activities associated with the CH-46E. Moreover, there would be a considerable decrease in annual operations on MCAGCC with the MV-22 compared to use by CH-46E. As shown in Table 6.3.14-4 and discussed above, noise from MV-22 overflights and arrivals (SEL and Lmax) are generally similar to or less than noise from CH-46E which it replaces. It is not expected that noise associated with MV-22 training would adversely affect desert tortoises, which are sensitive to very low frequency noise and vibration, to a level that would approach take.

The proposed action under this alternative does not include any construction component and would not change the current levels of on-ground training activities. As a result, the proposed action would not result in a change in operations rates that would affect undisturbed tortoise habitat or result in increased mortality to desert tortoise. Therefore, impacts to this species from the proposed action would be less than significant.

No adverse effects on Bell's Vireo, Willow Flycatcher, Snowy Plover, or Brown Pelican are expected from training given their non-resident status, their occurrence in built up parts of the base (golf course, landscaped areas, water and sewage treatment ponds) away from areas in which the MV-22 would train, and the similarities of MV-22 training activity to existing training activity.

Avoidance, Minimization, and Mitigation Measures

The following measures are proposed to further reduce the likelihood and significance of impacts resulting from training-related fires. As a result of successful implementation of these measures, residual impacts would not be significant.

- **Exhaust Deflectors.** Exhaust deflectors on the MV-22 aircraft will be deployed during landings and takeoffs and while on the ground with engines running at undeveloped sites where landing is permitted (i.e., PRTSSs and LZs).
- **Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance.** Operators will minimize the time on the ground with engines running on unprepared (=unpaved) PRTSSs and LZs and follow all recommendations in the NATOPS manual. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios.
- **Fire Incident Reporting, Review and Adaptive Management.** As part of an MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast operations. The reporting will include an assessment of the conditions under which the fire started, such as the amount of annual vegetative fuel generally existing at the time. The USMC MV-22 Program Office will distribute the memorandum to the MCAGCC NREA staff and fire department to be used as part of an adaptive, fire management strategy, which allows for the periodic review and modification of fire management measures in place, including but not limited to training restrictions. Additionally, future revisions to the INRMP (next update proposed for 2012) will evaluate the best available data on fires associated with the MV-22, and incorporate appropriate guidelines and updates.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Due to lack of changes to existing conditions, no impacts on biological resources would occur.

6.3.15 Cultural Resources

Cultural resources are historic and traditional cultural properties that reflect our heritage and are considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Federal regulations define historic properties to include prehistoric and historic sites, buildings, structures, districts, or objects in or eligible for inclusion on the National Register, as well as artifacts, records, and remains related to such properties (NHPA, as amended [16 USC 470 et seq.]). Additionally, cultural resources are protected under ARPA (16 USC 470aa-470mm; Public Law 96-95 and amendments), NAGPRA (Public Law 101-601; 25 USC 3001-3013), and the American Indian Religious Freedom Act (Public Law 95-341; 42 USC 1996 and 1996a). Compliance with Section 106 of the NHPA, which directs federal agencies to take into account the effect of a federal undertaking on a historic property, is outlined in the Advisory Council on Historic Preservation's regulations, "Protection of Historic Properties" (36 CFR Part 800). The NHPA and associated Section 106 compliance also includes guidance for Native American consultation regarding cultural significance of potential religious and sacred artifacts (16 USC 470a [a][6][A] and [B]).

Cultural resources located within the jurisdiction of MCAGCC are managed in accordance with the laws, regulations and guidance summarized above as well as DoD Instruction 4715.16 (Cultural Resources Management) and MCO P5090.2A, Change 2 (Environmental Compliance and Protection Manual). In addition, the MCAGCC ICRMP (MCAGCC 2007b), which was prepared in accordance with a Programmatic Agreement with the Advisory Council on Historic Preservation and the California SHPO, provides specific guidance for the installation. As described below, all recorded cultural resources are protected from range activities by Combat Center Order 5090.1C (MCAGCC 2002).

Affected Environment

Cultural Setting

The prehistoric cultural setting for the region is defined by archaeologists through temporal and behavioral schemes. There are three distinct periods associated with the changing environmental conditions of the Holocene and with the end of the Late Pleistocene glaciations: Early Holocene (11,000 - 7,500 B.P.), Middle Holocene (7,500 - 4,000 B.P.), and Late Holocene (4,000 – 100 B.P.). These environmental changes consequently led to adjustments in the behaviors of indigenous groups including mobility, settlement patterns, and the acquisition of emerging resources. The following is a summary of the cultural phases and an overview of the associated cultural setting in the region based on information provided in the MCAGCC ICRMP (MCAGCC 2007b) and other sources.

The earliest prehistoric cultural complex in the region is designated Lake Mojave (11,000 to 7,500 B.P.). Artifacts recovered include large, stemmed projectile points, leaf-shaped bifaces, steep-edged unifacial tools, miscellaneous flake tools, and heavy core-cobble tools. Milling equipment is generally rare in Lake Mojave components (Campbell et al. 1937; Wallace 1962; Warren 1984). The Mojave complex is generally seen as representing small, mobile bands of hunters and gatherers with a hunting economy focused on large game, although some artifact assemblages and associated faunal (animal) remains suggest significant exploitation of small mammals and reptiles (Douglas et al. 1988). Sites are found in a variety of environments, including near inactive and active springs, along lake margins, as well as areas with no apparent connection to water. Several locations at MCAGCC contain archaeological materials from this period (Basgall et al. 2000).

Sites dating to the Middle Holocene (approximately 7,500 to 4,000 B.P.) are associated with an increase in seed collection and supported by a greater frequency of ground stone implements. Additionally, the emergence of Pinto Basin Projectile Points suggests that Pinto populations were full-fledged, generalized foragers (Wallace 1978). It is also likely that Pinto populations shifted toward use of the desert margins and oases (Campbell and Campbell 1935). Several sites associated with the Pinto Period have been discovered at MCAGCC (MCAGCC 2007b; Basgall et al. 2000).

During the Late Holocene (approximately 4,000 to 100 B.P.), populations of larger-sized game (e.g., sheep, deer, antelope) increased due to improving climatic conditions. Game hunting increased in importance and was associated with larger projectile points, including the Elko, Gypsum, and Humboldt series points. Later, smaller points are present, including the Rose Spring series and Desert Side-notched points, and are thought to be associated with the advent of the bow and arrow technology. In addition to hunting, there was also an intensification of plant exploitation, especially mesquite. These patterns of subsistence continued until approximately 700 B.P., at which time a greater reliance on a wide range of plant foods occurred. Sites from this later period also show

influence from the Great Basin and the Southwest, such as the presence of Anasazi ceramics at sites in the northeast Mojave Desert around 1,100 years ago (Rogers 1929). Later, cultural ties appear to shift south with the importation of lower Colorado buff wares to the region through historic times.

At the time of European contact, the Twentynine Palms region was inhabited by various Native American groups. The Serrano, Chemehuevi, and Cahuilla are associated with various Uto-Aztecan speaking groups that occupied the Great Basin and had connections with groups along the lower Colorado River area (Shipley 1978; Bean & Smith 1978). They were hunter-gatherers composed of small, highly mobile groups who followed the seasonal availability of plant and animal resources. The Mojave Tribe also had trails and possibly settlement sites near this region. The Mojave Tribe, a Yuman-speaking group, was primarily located along the Colorado River, but they ranged far and wide and often warred with tribes along the Colorado River and in Arizona (Bean & Smith 1978).

It was not until the late 1700s that Spanish traveled west along the Mojave River and established the "Old Spanish Trial", which was later used by early American settlers, including the Mormon Battalion that trekked from Utah to California in 1847 (USMC 2005a). With the gold rush strikes in California and along the Colorado River in the 1840s and 1850s, the Twentynine Palms region attracted miners, who at one time operated up to 25 mines in and around the military installation (USMC 2005a). After World War I, many veterans with lung damage from gas attacks moved to Twentynine Palms for the dry climate and clean air. However, it was not until World War II and an increase in military presence that there was real settlement growth in the region.

The U.S. Army first used the lands now associated with MCAGCC in 1941 as a glider-training base known as Condor Field (MCAGCC 2007a). In 1944, the DoN took possession of the land and used it as a gunnery and bombing range. At the end of World War II, the property was placed in caretaker status, and was unused for the next seven years. The area was re-activated in 1952 when the USMC needed access to a large unencumbered space to effectively train with new, longer range weapons. In 1953, the name of the installation was changed to Marine Corps Training Center, Twentynine Palms as a result of its new mission. Over the years, the mission of the installation was changed and refined. It was re-designated the Marine Corps Air Ground Combat Center in 1979, and became home of the Marine Air Ground Task Force Training Command in 2000.

Definition of the Area of Potential Effects

The APE for MCAGCC consists of areas of potential ground disturbance from hovering and landing of aircraft. This may occur at the previously established 13 PRTSSs and 19 LZs, as shown on Table 6.3.15-1 and Figure 6.3.2-2. These are existing landing and training areas, and no construction or other site modifications are associated with proposed MV-22 operations at these locations. To account for aircraft rotorwash during hovering and landing/take-offs, the APE includes a 350-foot buffer area around all proposed landing areas.

The MV-22 would also conduct operations at the EAF. The runway, composed of an aluminum-matting surface, is 8,000 feet long and 150 feet wide, and is capable of supporting all aircraft in the U.S. military inventory. There would be an increase in annual flight operations at the EAF under the proposed action, but the airfield would not be modified. Because no modifications or other ground disturbing activities are planned, no potential impacts are anticipated. Therefore, the EAF is not discussed further.

Table 6.3.15-1. List of Landing Areas at MCAGCC Proposed for Use by the MV-22 and Associated Cultural Resources

Landing Area APE	APE Area (acres)	% Surveyed for Cultural Resources	Recorded Cultural Resources*
PRE-DESIGNATED RANGE TRAINING SUPPORT SITE (PRTSS)			
Cleghorn Pass	66	100% PRTSS; 70% buffer	Resources may be present in unsurveyed areas
EAF – South	68	100	None
East	52	100% PRTSS; 25% buffer	Resources may be present in unsurveyed areas
Emerson Lake	117	100% PRTSS; 50% buffer	Resources may be present in unsurveyed areas
FASP	784	100	CA-SBR-8138; CA-SBR-8139; CA-SBR-8140
Gypsum Ridge	23	100	None
Lavic Lake	43	100	None
Lead Mountain – North	167	100	None
Lead Mountain – South	174	100	None
Noble Pass	165	100% PRTSS; 90% buffer	Resources may be present in unsurveyed areas
Quackenbush – North	637	100% PRTSS; 40% buffer	3 newly recorded prehistoric sites
Quackenbush – South	107	100	None
West	51	100	None
LANDING ZONE (LZ)			
Bearmat	9	0	Unknown (no previous surveys)
Camp Wilson	9	100	None
CG's Parade Deck	9	0	Unknown (no previous surveys)
EW Crampton	9	0	Unknown (no previous surveys)
Gunfighter	9	100	None
Lower Creole	9	0	Unknown (no previous surveys)
Medevac Pad	9	100	None
Naval Hospital	9	100	None
OP Crampton	9	0	Unknown (no previous surveys)
OP Creole	9	0	Unknown (no previous surveys)
OP Cross	9	0	Unknown (no previous surveys)
OP Round	9	0	Unknown (no previous surveys)
Range 400	9	100	None
Range 400 (A)	9	100	None
Range 410	9	100	None
Range 500	9	100	None
Red	9	100	None
Ripper	9	0	Unknown (no previous surveys)
TTECG Crampton	9	0	Unknown (no previous surveys)

Notes:
* This list includes all recorded archaeological sites, including those that may be ineligible for listing on the National Register and those that have not been evaluated for listing.
* For those areas with less than 100% survey, unrecorded cultural resources may be present.
Source: MCIWEST 2009.

For Native American resources, the APE is the same as described above (i.e., areas of potential ground disturbance from aircraft rotorwash), as well as traditional cultural resources within the viewshed of MV-22 operations.

MV-22 operations at MCAGCC would not result in modifications to existing buildings or structures or change any viewshed of existing buildings or structures. Therefore, architectural resources at MCAGCC are not discussed further.

Known and Predicted Resources

Systematic cultural resource investigations at MCAGCC began in the 1970s in the course of compliance with the NEPA and requirements of Sections 106 and 110 of the NHPA. The responsibility for this compliance lies with the NREA Division of MAGTFTC at the MCAGCC. A vast amount of cultural resource investigation and management has occurred at the facility under the stewardship of the NREA Divsion. The current bibliography for cultural resources studies at MCAGCC consists of approximately 270 entries, including archaeological surveys and evaluations, ethnographic overviews, treatment plans, and assessments. These efforts have resulted in the identification of more than 1,700 archaeological sites, many of which have been evaluated for listing on the National Register. A review of records held by the NREA Division was conducted to determine previous survey coverage of the APE and identify all recorded resources within the APE. The following provides a summary of those findings.

Archaeological Survey Coverage. Previous survey coverage for the 13 PRTSSs and 19 LZs is summarized in Table 6.3.15-1. Previous surveys in the MCAGCC APE have been a combination of those conducted for specific construction projects as well as those for archaeological inventories of the training areas. A recent survey report (Cottrell et al. 2009) also summarizes previous research for all 13 PRTSSs. Overall, the APE for eight PRTSSs have been completely surveyed. For the other five (Cleghorn Pass, East, Emerson Lake, Noble Pass, and Quackenbush-North), the PRTSS, itself, has been completely surveyed, but the rotorwash buffer around the PRTSS has only been partially surveyed.

The APE for nine of the 19 LZs have been completely surveyed (Camp Wilson, Gunfighter, Range 500, Red, Medevac Pad, Naval Hospital, Range 400, Range 400[A], and Range 410). However, eight of the unsurveyed LZs (Bearmat, EW Crampton, Lower Creole, OP Crampton, OP Creole, OP Cross, OP Round, and TTECG Crampton) are long-standing landing areas located on mountain tops. Due to previous ground disturbance from prior landing operations and the steep terrain, these are considered to have a low probability for the presence of a National Register-eligible archaeological site. Additionally, the APE for the LZ CG's Parade Deck is located entirely within a developed area; although the APE has not been previously surveyed, it is considered to have a low probability for the presence of a National Register-eligible archaeological site due to prior ground disturbance.

Archaeological Resources. A summary of six recorded prehistoric archaeological sites located in the MCAGCC APE is provided in Table 6.3.15-2. Three prehistoric sites recorded in the PRTSS FASP APE consist of two lithic scatters and a possible habitation site. The other three prehistoric sites were only recently recorded in the northern portion of the PRTSS Quackenbush North APE (Cottrell et al. 2009), and additional information is currently unavailable. Of the six prehistoric sites, only one has been previously tested and recommended as eligible for listing on the National Register (pending SHPO agreement). The other five sites have not been formally evaluated. There also is the possibility of unrecorded archaeological sites within unsurveyed portions of the MCAGCC APE that may or may not qualify as a historic property.

Native American Consultation. MCIWEST initiated consultation in November and December 2008 with non-federally recognized Indian tribes subject to 36 CFR 800.3(f) (consulting parties) and federally recognized Indian tribes affiliated with lands currently under Marine Corps jurisdiction and involved in this proposed action. MCAGCC has completed previous consultations with Native

American tribes and maintains consulting relationships with the following list of tribal Nations: Chemehuevi Indian Tribe, Agua Caliente Band of Cahuilla Indians, Colorado River Indian Tribe, Morongo Band of Mission Indians, Twentynine Palms Band of Mission Indians, San Manuel Band of Mission Indians, and Fort Mojave Indian Tribe.

Table 6.3.15-2. Recorded Cultural Resources within the MCAGCC APE

Site Designation	Eligibility Status	Site Dimension	Report Citation	Site Description
CA-SBR-8138	NE	35 x 27m	Cottrell 1995	Lithic Scatter
CA-SBR-8139	CE	150 x 62m	Basgall, Giambastiani, and Bethard 2000	Possible habitatation site
CA-SBR-8140	NE	150 x 62m	Cottrell 1995	Lithic Scatter
TBD	NE	TBD	Cottrell et al. 2009	3 prehistoric sites in PRTSS Quackenbush North

Notes:
National Register Status: NE = not evaluated for National Register eligibility; DI = determined ineligible for inclusion on the National Register with SHPO agreement; CI = considered ineligible for inclusion on the National Register (pending SHPO agreement); CE = considered eligible for inclusion on the National Register (pending SHPO agreement); DE = determined eligible for inclusion on the National Register with SHPO agreement.
Source: MCIWEST 2009.

MCIWEST is in the process of consulting with tribal Nations regarding any concerns with the proposed action (see Appendix H). All tribal Nations identified above received a consultation letter by early December 2008. Many tribal representatives were contacted by phone and email, and some attended a project meeting(s) at MCAGCC in January 2009. Few specific comments have been provided by the representatives from these Nations.

Existing Plans and Policies for Range Use

Cultural resources management is governed by the MCAGCC ICRMP (MCAGCC 2007b), which serves as the NHPA compliance document for the installation. The ICRMP was prepared in accordance with a Programmatic Agreement with the Advisory Council on Historic Preservation, the California SHPO, and coordinated with interested Native American groups (MCAGCC 2007a).

Additionally, all recorded cultural resources are protected from range activities by Combat Center Order 5090.1C (MCAGCC 2002). These range and training regulations identify general environmental protection measures for all training activities as well as measures specific to archaeological resources. For example, existing operational measures designed to protect cultural resources include but are not limited to the following:

- Personnel and units training aboard MCAGCC must receive all briefings required, including a complete environmental briefing by qualified staff.
- There are designated special use areas that are designated as "no impact", where no mechanized maneuver can occur for the purpose of protecting and studying important biological and cultural resources. Collecting artifacts, excavation, or otherwise damaging sites is prohibited. All abandoned mines and prospects are considered historic resources and are off limits to all personnel and equipment.
- If artifacts are discovered during training activities, halt the activity immediately and report the occurrence to the NREA Division.
- Do not deface any petroglyph or pictograph, or pick up or remove any artifacts, to include arrowheads, from where they are found.

- If earth movement of any type is proposed, the NREA Cultural Resources Manager must be contacted to determine whether cultural resources are or could be involved.

All applicable existing regulations and policies pertaining to protection of cultural resources will remain in effect with introduction of the MV-22 training on MCAGCC.

Environmental Consequences

Training Range Impacts

MV-22 training operations that could cause ground disturbance would occur at previously established landing areas at MCAGCC. Although no new construction or improvements are proposed, ground disturbance from hovering and landing of aircraft could occur at these locations due to dust and debris being scattered and/or becoming airborne from aircraft downdraft. Downdraft (and outwash) forces, collectively known as rotorwash, are relative to the engine power settings and the aircraft's proximity to the ground, and rotorwash (and outwash) from the MV-22 would be greater than from the CH-53E (DoN 1998) and CH-46 (see Appendix G). Rotorwash from the MV-22 would reach 50 knots at a distance of 150 feet from the aircraft when hovering at 20 feet above ground level, which is three to four times greater than that associated with the CH-46 (see Appendix G). As a result, rotorwash from an MV-22 aircraft during landing, take-offs, and hovering immediately above the ground may disturb artifacts lying on the surface in the immediate vicinity of the hovering aircraft, although the extent of this disturbance would depend on local soil characteristics, presence of vegetation, and size/weight of artifacts.

Lack of Archaeological Survey Coverage. Regarding the five PRTSSs with lack of complete survey coverage, there is the possibility of unrecorded archaeological sites within unsurveyed portions of the APE that may or may not qualify as a historic property. There are currently no designated landing sites within the PRTSSs, which range from 3 to close to 600 acres in size. MV-22 operators, working in concert with the NREA Division, range operations and range control/management staff, as well as the MCIWEST G-3 (operations), will select landing sites that would avoid impacts to the unsurveyed rotorwash buffer areas surrounding PRTSS Cleghorn Pass, PRTSS East, PRTSS Emerson Lake, PRTSS Noble Pass, and PRTSS Quackenbush-North (see measure below).

Although the APE for Bearmat, EW Crampton, Lower Creole, OP Crampton, OP Creole, OP Cross, OP Round, TTECG Crampton, and CG's Parade Deck have not been completely surveyed, the unsurveyed areas are considered to have a low probability for the presence of a National Register-eligible archaeological site, as described above. Therefore, no additional survey is proposed for these landing areas. There is the possibility of unrecorded archaeological sites within unsurveyed portions of the LZ Ripper APE. Operations within areas without adequate survey coverage within the LZ Ripper APE may impact unrecorded archaeological resources that may or may not qualify as a historic property. This would be a significant impact under the NEPA.

Recorded Archaeological Resources. As described above, six archaeological sites are recorded in the MCAGCC APE. One site has been recommended as eligible for listing on the National Register (CA-SBR-8139) (pending SHPO agreement), and five have not been evaluated. Any disturbance from MV-22 operations on a site that is eligible for listing on the National Register would result in an adverse impact on a historic property. This would be a significant impact under the NEPA.

Traditional Cultural Resources. There are no identified traditional cultural resources within the MCAGCC APE. However, consultations with tribal Nations are on-going. MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement. Additionally, the measures described below take into account impacts on archaeological sites that may or may not be considered a traditional cultural resource.

AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

All applicable existing regulations and policies pertaining to protection of cultural resources during training with helicopters, including Combat Center Order 5090.1C discussed above, will remain in effect with introduction of the MV-22 training on MCAGCC.

As noted above, MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. Consistent with this agreement, the following measures would avoid or minimze impacts on archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community, and impacts would be reduced to less than significant:

- Prior to MV-22 operations within PRTSS Cleghorn Pass, PRTSS East, PRTSS Emerson Lake, PRTSS Noble Pass, PRTSS Quackenbush-North, and PRTSS FASP, specific landing sites will be pre-seleted and approved by the NREA Division, in concert with the Range Operations/Control Office and the MCIWEST G-3 (operations), to ensure 1) that pre-approved landing sites and associated rotorwash buffer only occur in areas previously surveyed for archaeological resources, and 2) that all archaeological sites that are eligible for listing on the National Register and/or are of concern to the Native American community are avoided. With this operation protocol, one eligible site (CA-SBR-8139) and five non-evaluated sites (CA-SBR-8138, CA-SBR-8140, three newly recorded prehistoric sites) would be avoided.

- If for some reason the above avoidance measure is not possible for some areas, archaeological survey will be conducted prior to MV-22 operations for areas lacking adequate survey coverage. Similarly, archaeological testing will be conducted for any non-evaluated sites that cannot be avoided prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If an archaeological site is identified based on subsequent survey efforts and/or if an archaeological site is recommended as eligible for listing on the National Register based on site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.

- Prior to MV-22 operations at LZ Ripper, a survey will be conducted to provide adequate survey coverage for the APE. If an archaeological site is identified based on subsequent survey, MCIWEST will follow the procedures in the Programmatic Agreement regarding post-review discoveries.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Existing conditions would remain unchanged, there would be no effect on a historic property, and no impacts would occur under the NEPA.

6.3.16 Safety and Environmental Health

The USMC practices Operational Risk Management as outlined in OPNAV 3500.39A and MCO 3500.27A. Requirements outlined in these documents provide for a process to maintain readiness in peacetime and achieving success in combat while safeguarding people and resources. The safety and environmental health analysis contained in the following sections addresses issues related to the health and well being of both military personnel and civilians living on or in the vicinity of MCAGCC. Specifically, this section provides information on hazards associated with aircraft mishaps, BASH, APZs, explosives safety, and wildfire management. There is no new construction or improvements proposed; therefore, there would be no impact related to electromagnetic emission hazards so these are not addressed below.

Affected Environment

Aircraft Mishaps

The FAA is responsible for ensuring safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. In order to fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. The primary concern with regard to military training flights is the potential for aircraft mishaps (i.e., crashes) to occur, which could be caused by mid-air collisions with other aircraft or objects, weather difficulties, mechanical failures, pilot error, or bird-aircraft strikes.

Aircraft mishaps are classified as A, B, or C (Table 6.3.16-1). Class A mishaps are the most severe with total property damage of $1 million or more and a fatality and/or permanent total disability. Calculating Class A mishaps can be used for comparing mishap rates for various aircraft types, as shown below.

Table 6.3.16-1. Aircraft Class Mishaps

Mishap Class	Total Property Damage	Fatality/Injury
A	$1,000,000 or more and/or aircraft destroyed	Fatality or permanent total disability
B	$200,000 or more but less than $1,000,000	Permanent partial disability or three or more persons hospitalized as inpatients
C	$20,000 or more but less than $200,000	Nonfatal injury resulting in loss of time from work beyond day/shift when injury occurred

CLASS A MISHAP RATES FOR MV-22

During the development and testing phase, the MV-22 recorded two Class A mishaps. All MV-22's were grounded for 17 months after the second mishap (December 2000). As a result of these incidents, a major re-engineering of the aircraft's electrical and hydraulic systems allowed the aircraft to return to flight in November 2001 (FY 2002). Since that time, additional safety, reliability and maintainability improvements along with additional capabilities have been implemented in the modified MV-22's flown by the Marines and Naval Air Systems Command's test squadron. These aircraft have logged more than 26,000 flight hours combined without a serious mishap and have recently been deployed to Southwest Asia in the first combat theater mission.

In order to present a realistic picture of the actual mishap rate for the MV-22, the number of Class A mishaps during the testing phase of the aircraft (prior to reaching operational status) versus the number of mishaps after reaching operational status is broken out in Table 6.3.16-2. Adjusting the flight hours to account for the periods in which the aircraft was not operational, the accident rate for the MV-22 is 11.43 for 26,245 hours.

Table 6.3.16-2. Class A Flight Mishaps for MV-22

FY	Flight Hours	Mishaps
PRIOR TO REACHING OPERATIONAL STATUS		
1999	416	0
2000	221	1
2001	470	1
2002[1]	Unavailable	0
2003[1]	Unavailable	0
OPERATIONAL STATUS		
2004[2]	2,238	0
2005	5,405	0
2006	6,989	0
2007	9,745	0

Notes:
1. Aircraft Grounded
2. Aircraft Returns to Flight Status

Source: Navy Safety Center 2007

CLASS A MISHAP RATES FOR THE AV-8B, CH-46, AND CH-53

To provide a broader perspective on the potential mishap rate for a new technology like the MV-22, the following discusses mishap rates for the introduction of the AV-8B (Harrier). The AV-8B was introduced in 1984, and provided the USMC with jet powered vertical take-off and landing capability. This new technology is similar to the MV-22 in that it was a new airframe with new vertical take-off capability. With that in mind, it is possible that projected mishap rates for the MV-22 may be similar to the historical rates of the AV-8B. The Class A mishap rates for the AV-8B from fleet inception through 30 September 2007 is provided in Table 6.3.16-3. Data from CY 1979 to FY 1984 relates to the testing and evaluation phase of the AV-8B, while data from FY 1985 to present represents its full introduction to the fleet. Note the highest mishap rate occurred during the testing phase of the aircraft, and that mishap rates during the operational phase of the aircraft fluctuated between 2.80 and 23.00.

Mishap data for the CH-46 and CH-53 are included in Table 6.3.16-3 since they represent the type of aircraft operations and some similar flight profiles expected by the MV-22. One pattern to note in Table 6.3.16-3 is the fluctuation of mishap rates from year to year for all three aircraft types.

Table 6.3.16-3. Historic Class A Flight Mishaps for DoN/USMC

Year	H-46 (all types)			CH-53E			AV-8B		
	Class A Mishaps	Flight Hours	Mishap Rate	Class A Mishaps	Flight Hours	Mishap Rate	Class A Mishaps	Flight Hours	Mishap Rate
FY 64	0	147	0	-	-	-	-	-	-
FY 65	1	9,034	11.07	-	-	-	-	-	-
FY 66	2	33,442	5.98	-	-	-	-	-	-
FY 67	17	75,236	22.60	-	-	-	-	-	-
FY 68	24	92,108	26.06	-	-	-	-	-	-
FY 69	29	161,595	17.95	-	-	-	-	-	-
FY70	21	140,406	14.96	-	-	-	-	-	-
FY 71	9	132,350	6.80	-	-	-	-	-	-
FY 72	9	96,042	9.37	-	-	-	-	-	-
FY 73	6	93,971	6.38	-	-	-	-	-	-
FY 74	6	68,509	8.76	-	-	-	-	-	-
Jul-Dec 74	4	41,170	9.72	-	-	-	-	-	-
CY 75	5	86,428	5.79	0	105	0	-	-	-
CY 76	5	87,319	5.73	0	27	0	-	-	-
CY 77	3	93,500	3.21	0	249	0	-	-	-
CY 78	5	97,307	5.14	1	0	0	-	-	-
CY 79	3	92,390	3.25	0	88	0	1	248	403.23
Jan-Sep 80	4	66,689	6.00	0	0	0	0	93	0
FY 81	8	88,951	8.99	0	160	0	0	70	0
FY 82	5	92,300	5.42	0	4,629	0	0	431	0
FY 83	3	99,406	3.02	0	10,629	0	0	821	0
FY 84	3	106,039	2.83	1	16,259	6.15	0	1,573	0
FY 85	2	106,883	1.87	4	19,152	20.89	1	8,195	12.20
FY 86	7	110,743	6.32	1	22,748	4.40	2	18,467	10.83
FY 87	5	118,331	4.23	1	16,081	6.22	5	22,212	22.51
FY 88	4	112,606	3.55	0	21,075	0	3	37,415	8.02
FY 89	4	112,365	3.56	0	25,431	0	5	43,570	11.48
FY 90	4	98,775	4.05	1	27,385	3.65	11	48,644	22.61
FY 91	3	110,122	2.72	1	30,269	3.30	6	55,590	10.79
FY 92	4	96,834	4.13	1	28,598	3.50	7	56,873	12.31
FY 93	5	106,743	4.68	1	31,903	3.13	4	55,488	7.21
FY 94	2	98,796	2.02	0	33,779	0	5	51,603	9.69
FY 95	1	96,115	1.04	0	34,345	0	5	51,128	9.78
FY 96	5	90,401	5.53	0	24,867	0	6	50,232	11.94
FY 97	3	81,816	3.67	0	26,439	0	4	39,060	10.24
FY 98	1	87,321	1.15	0	30,327	0	4	33,209	12.04
FY 99	1	84,346	1.19	1	29,408	3.40	7	30,441	23.00
FY 00	1	92,849	1.08	0	32,739	0	2	22,088	9.05
FY 01	2	91,708	2.18	0	28,660	0	1	32,372	3.09
FY 02	2	90,287	2.22	1	36,144	2.77	3	43,078	6.96
FY 03	2	79,390	2.52	0	37,340	0	3	47,103	6.37
FY 04	1	57,893	1.73	2	35,010	5.71	2	40,775	4.91
FY 05	1	70,901	1.41	1	34,595	2.89	5	37,969	13.17
FY 06	0	58,763	0	1	33,321	3.00	3	40,467	7.41
FY 07	1	55,038	1.82	1	33,325	3.00	1	35,718	2.80
Total	233	3,963,365	5.87	19	705,087	2.69	96	904,933	10.6

Source: Navy Safety Center 2007

Emergency and Mishap Response at Marine Corps Air Ground Combat Center

MCAGCC maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to major mishaps, whether on- or off-base. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to

prevent loss of life or further property damage. The initial response element usually consists of the Fire Chief, who would normally be the first On-scene Commander, fire-fighting and crash-rescue personnel, medical personnel, security police, and crash-recovery personnel. The second phase is the mishap investigation, which included an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoD 2000).

Bird Aircraft Strike Hazards

Bird-aircraft strikes and the hazards they present form another safety concern for aircraft operations. Over 97 percent of bird-aircraft strikes occur below 3,000 feet (915 meters) above ground level, and approximately 30 percent of bird strikes happen at airfields. Since the introduction of the MV-22 on the East Coast at MCAS New River, there have been six reported bird strikes, with minor damage to the aircraft occurring with two of the strikes.

DoN and USMC commands develop BASH plans to reduce hazardous bird/animal activity relative to airport flight operations. MCAGCC has developed a BASH Plan (MCAGCC 2004), which establishes aggressive procedures designed to minimize the occurrence of bird-aircraft strikes. The intent of the MCAGCC BASH Plan is to reduce BASH issues at the EAF and associated airspace by creating an integrated hazard abatement program through awareness, avoidance, monitoring, and actively controlling bird and animal population movements. The document contains detailed procedures to monitor and react to heightened risk of bird strikes. Some of the procedures outlined in the plan include monitoring the airfield for bird activity, issuing bird hazard warnings, initiating bird avoidance procedures when potentially hazardous bird activities are reported, and submitting BASH reports for all incidents. Special briefings are provided to pilots whenever the potential exists for greater risk of bird-strikes within the airspace.

Accident Potential Zones

APZs are established to delineate recommended surrounding land uses for the protection of people and property on the ground. APZs define the areas in the vicinity of an airfield that would have the highest potential to be affected if an aircraft mishap were to occur. AICUZ guidelines identify three types of APZs for airfields based on aircraft mishap patterns: the Clear Zone, APZ I, and APZ II. The standard Clear Zone is a trapezoidal area that extends 3,000 feet from the end of a runway and has the highest probability of being impacted by a mishap. APZ I, which typically extends 5,000 feet from the end of the Clear Zone, has a lower mishap probability. APZ II, which typically extends 7,000 feet from the end of APZ I, has the lowest mishap probability of the three zones. To minimize the results of a potential accident involving aircraft operating from MCAGCC EAF, APZs have been established for the airfield, as depicted in Figure 6.3.16-1.

Explosives Safety

Siting requirements for explosive materials storage (e.g., munitions) and handling facilities are based on safety and security criteria established by the DoD Explosive Safety Board. ESQD arcs determine the distance between ordnance storage and handling facilities and inhabitable areas. Ammunition and bulk explosives are stored in magazines specifically designed, sited, and designated for this purpose. A magazine's ESQD arc is calculated by the type and amount of ordnance stored in that magazine. ESQD requirements and permissible storage capacities are established by NAVSEASYSCOM and approved by the DoD Explosives Safety Board.

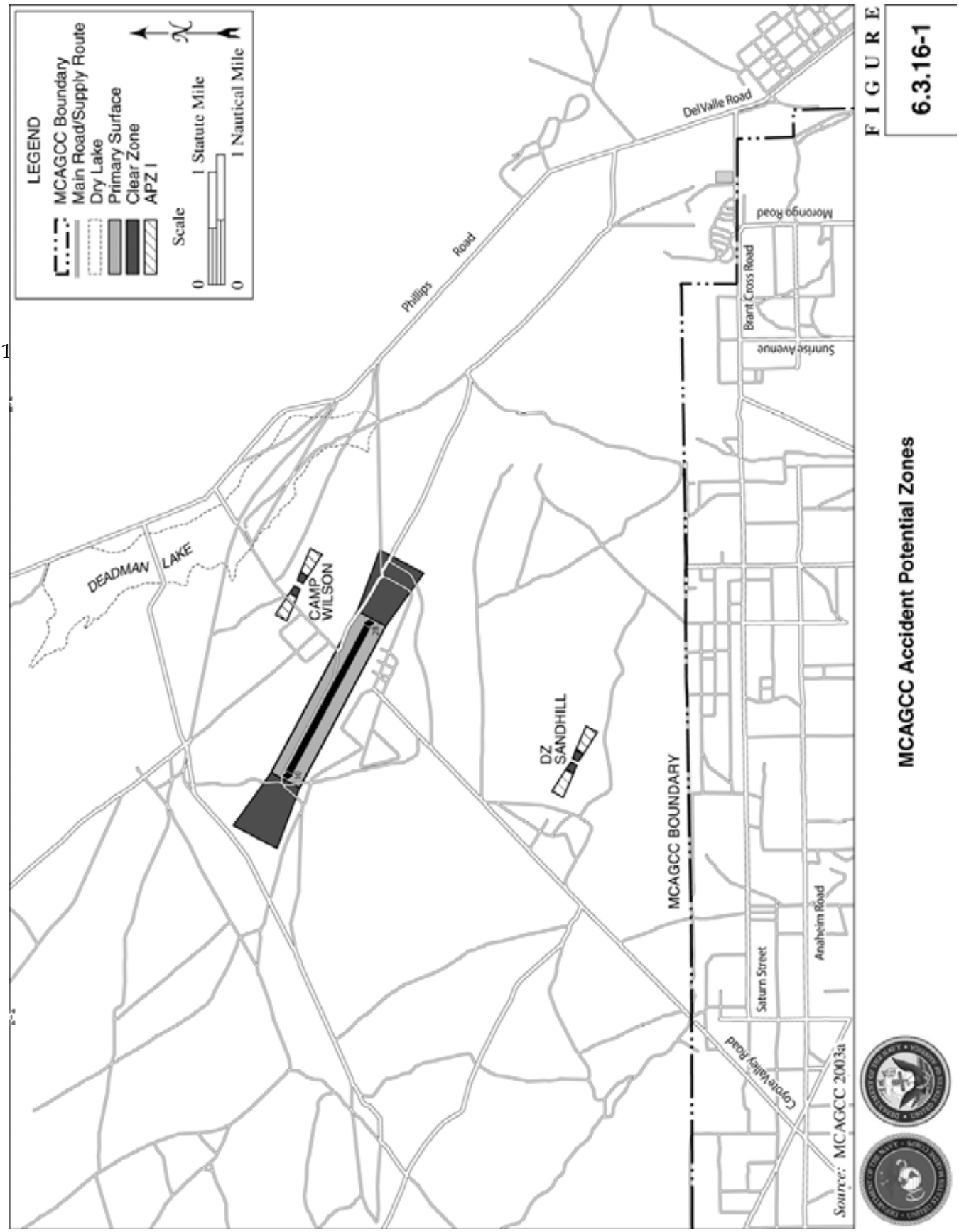

FIGURE 6.3.16-1

MCAGCC Accident Potential Zones

Ordnance expenditure during training is limited to within restricted airspace on authorized target ranges. Additionally, target ranges are located only on range lands that are clearly posted as closed to the public. Range operations require that the surface area encompassing the weapon safety footprints be protected by purchase, lease, or other restriction to ensure the safety of personnel, structures, and the public from expended rockets, missiles, or target debris and hazardous operations.

Range managers are required to assess risks associated with weapons employment and establish mission parameters that minimize potential safety hazards. Specific weapon safety footprints must be assessed against each intended target to ensure that they can be safely employed. Range Management Plans for the training ranges assign responsibilities and provides direction regarding range scheduling, maintenance, explosive ordnance disposal, and range decontamination and debris disposal at those ranges.

Wildfire Management

The risk of fire at the MCAGCC is considered very slight due to the low flammability of most common plant species and sparseness of vegetation (see section 6.3.14, Biological Resources). Under natural conditions, the prevalent creosote bush scrub vegetation is too sparse to carry fire. However, the recent spread of introduced invasive species may result in sufficiently dense vegetation after high rainfall years to carry a fire. MCAGCC recently developed a Wildland Fire Management Plan as an important step in responding to a potentially increasing fire risk to the combat center (MCAGCC 2007a).

Environmental Consequences

Training Range Impacts

AIRCRAFT MISHAPS AND MISHAP RESPONSE

Although the MV-22 is a relatively new type of aircraft, historical trends show that mishaps of all types decrease the longer an aircraft is operational as flight crews and maintenance personnel learn more about the aircraft's capabilities and limitations. Mishap rates generally level out approximately five years after introduction of a new airframe (GAO 2001; Navy Safety Center 2007). Although it is difficult to predict the mishap rate of a new airframe like the MV-22, mishap rates will likely stabilize to levels similar to those shown in Table 6.3.16-3 soon after its introduction on the West Coast. Therefore, as the MV-22 becomes more operationally mature, the aircraft mishap rate is expected to become comparable with a similarly sized helicopter aircraft with a similar mission.

MV-22 aircraft training at MCAGCC would result in an increase in airfield operations compared to current levels, but this increase would be consistent with recent levels of operations at the EAF (see section 6.3.2). Additionally, the MV-22 would operate in an airfield environment similar to the current operational environment. Since the MV-22 is a new airframe and would require response actions specific to the MV-22, the emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the MV-22 and associated equipment. With this update, the MCAGCC safety conditions would be similar to existing conditions. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

Bird Aircraft Strike Hazards

Even with the introduction of a new aircraft, the overall potential for bird-aircraft or wildlife strikes is not anticipated to be significantly greater than recent levels. MV-22 aircrews operating in MCAGCC airspace would be required to follow applicable procedures outlined in the MCAGCC BASH Plan (MCAGCC 2004). MCAGCC has developed aggressive procedures designed to minimize the occurrence of bird/wildlife aircraft strikes, and has documented detailed procedures to monitor and react to heightened risk of bird-strikes (MCAGCC 2004). When risk increases, limits are placed on low altitude flight and some types of training (e.g., multiple approaches, closed pattern work) in the airport environment. Special briefings are provided to pilots whenever the potential exists for greater bird-strike sightings within the airspace. MV-22 pilots would be subject to these procedures. Therefore, no significant impact would occur related to BASH issues.

Accident Potential Zones

Proposed flight activity would be consistent with established APZs. Although the proposed MV-22 operations at the EAF would increase the level of operations over current conditions, it is well within the level of operations at the EAF in recent years (see section 6.3.2). The MV-22 would follow established local approach and departure patterns, and no new flight tracks would be established. Therefore, flight activity and subsequent operations within MCAGCC airspace would not result in any greater safety risk, and no significant impact related to APZs would occur.

Explosives Safety

The only munitions used by the MV-22 would be associated with its one rear ramp mounted machine gun. Ordnance is handled and stored in accordance with USMC explosive safety directives (MCO P8020.10A, 3 April 2002, Marine Corps Ammunition Management and Explosives Safety Policy Manual), and all munitions handling is carried out by trained, qualified personnel. Therefore, munitions handling would not result in any greater safety risk, and no significant impact related to explosives safety would occur.

Ordnance expenditure only would occur when the MV-22 aircrews train with its one machine gun at existing ranges and targets specifically designed for air-to-ground gunnery. These ranges and targets have standard procedures in place to ensure safety of personnel on the ground during range exercises and during ordnance clean-up and clearance activities. Because the MV-22 would be adding only a small munitions use on the range and this would be restricted to existing targets, this activity would not result in any greater safety risk. Therefore, no significant impact related to ordnance expenditure would occur.

Wildfire Management

All MV-22 training operations at MCAGCC would be conducted in accordance with required safety procedures, including all applicable fire danger precautions. Air-to-ground machine gun training has the potential to increase the frequency of fires in target areas. However, munitions expenditure related to MV-22 operations is fairly minor compared to existing ordnance training at these established targets. Following existing range regulations and applying all fire danger precautions would reduce the potential for fire outbreaks during munitions practice.

As described in section 6.3.14 (Biological Resources), operation of the MV-22 aircraft has not been identified as a common cause for fires. The current configuration includes a heat exhaust shield and modified lighting covers to further reduce the potential. Additionally, the likelihood for a fire appears to be very low at the MCAGCC, because of the infrequency of years during which precipitation is high enough to result in sufficient cover of invasive species to carry fire. With implementation of the mitigation measures in section 6.3.14,, no significant impact related to wildfire management would occur.

MITIGATION MEASURES

Because there would be no significant impact on safety and environmental health, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and no impacts on safety and environmental health would occur.

6.3.17 Environmental Justice

In 1994, Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (Environmental Justice)*, was issued to focus the attention of federal agencies on human health and environmental conditions in minority populations and low-income populations. This Executive Order was also established to ensure that, if there were a disproportionately high and adverse human health or environmental effects of federal actions on these populations, those effects would be identified and addressed. The environmental justice analysis addresses the characteristics of race, ethnicity and poverty status for populations residing in areas potentially affected by implementation of the proposed action.

In 1997, Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (*Protection of Children*), was issued to identify and address issues that affect the protection of children. Socioeconomic data specific to the distribution of population by age are presented below.

Affected Environment

For the purpose of this analysis, minority populations, low-income populations, and children are defined as:

Minority Populations. All persons identified by the Census of Population and Housing to be of Hispanic or Latino origin, regardless of race, plus non-Hispanic persons who are Black or African American, American Indian and Alaskan Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other (i.e., non-white) Race or Two or More Races. For purposes of the EIS analysis, the minority population is calculated by subtracting the number of persons who are White but not Hispanic or Latino from the total population.

Low-Income Populations. All persons that fall within the statistical poverty thresholds published by the U. S. Census Bureau in the Current Population Survey are considered to be low-income. For the

purposes of this analysis, low-income populations are defined as persons living below the poverty level ($16,895 for a family of four with two children, adjusted based on household size and number of children), as reported in the 2000 Census. The 2000 Census asked people about their income in the previous calendar year. Therefore, poverty estimates reported in the 2000 Census compare family income in 1999 with the corresponding 1999 poverty thresholds. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as being below the poverty level. The percentage of low-income persons is calculated as the percentage of all persons for whom the Census Bureau determines poverty status, which is generally a slightly lower number than the total population since it excludes institutionalized persons, persons in military group quarters and college dormitories, and unrelated individuals under 15 years old.

Children. All persons identified by the Census of Population and Housing to be under the age of 18 years. For the purposes of this EIS, the number of children is calculated by subtracting the number of persons 18 years and over from the total population.

Environmental Justice

MCAGCC is the USMC largest training facility, and has been identified by the U. S. Census Bureau as a census designated place (CDP). Census data on minority populations, low-income populations and children at the combat center and in the MCAGCC region of influence (including San Bernardino County, the city of Twentynine Palms and the town of Yucca Valley), and in the State of California are shown in Table 6.3.17-1. While San Bernardino County in its entirety has a minority population percentage (56.0 percent) comparable to the State of California (53.3 percent), the minority population percentages for the city of Twentynine Palms (35.3 percent) and town of Yucca Valley (18.0 percent) are substantially lower than the state's minority percentage. MCAGCC has a minority population percentage close to that of its neighboring city (36.9 percent).

Table 6.3.17-1. Environmental Justice Data for the MCAGCC Region of Influence and the State of California (2000)

Geographic Area	Total Population	Minority Population	Percent Minority	Low-Income Population	Percent Low-Income[1]	Children Under Age 18	Percent Children
MCAGCC CDP[2]	8,413	3,101	36.9	363	12.1	1,297	15.4
City of Twentynine Palms	14,764	5,216	35.3	2,440	16.8	4,601	31.2
Town of Yucca Valley	16,865	3036	18.0	3,247	19.5	4,235	25.1
San Bernardino County	1,709,434	957,212	56.0	263,412	15.8	552,047	32.3
State of California	33,871,648	18,054,858	53.3	4,706,130	14.2	9,249,829	27.3

Notes:
1. The percentage of low-income persons is calculated as a percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, persons in military group quarters and college dormitories, and unrelated individuals under 15 years old.
2. CDP (Census Designated Place) is a statistical entity comprising a dense concentration of population that is not within an incorporated place but is locally identified by a name. CDPs are delineated cooperatively with state and local and tribal government officials based on U.S. Census Bureau guidelines.

Source: U.S. Census Bureau 2000

The number of persons living below poverty level in San Bernardino County (15.8 percent) is slightly higher than the state (14.2 percent), whereas the city of Twentynine Palms and the town of Yucca Valley (16.8 percent and 19.5 percent, respectively) are considerably higher than that of the state. The percent of persons living below poverty level on MCAGCC (12.1 percent) is measurably less than the

state. In 2000, children under the age of 18 living in the MCAGCC region of influence comprised approximately 32.3 percent of the total population, compared to 27.3 percent for the state.

Protection of Children

No children would be expected at or in the vicinity of the proposed training areas, which includes the EAF and other range training areas located some distance from the Mainside area of the installation. The Mainside at MCAGCC is the primary developed area on the installation, and contains facilities that support the installation's overall functions as well as community support, family housing, and the Condor Elementary School (USMC 2003a). No facilities frequently used by children, such as childcare centers, are located in the proposed training areas. The places where children would normally be present at MCAGCC are the family housing units, recreation facilities, and school, which are located outside of the MCAGCC flightline boundaries and range training areas.

Environmental Consequences

Environmental justice analysis applies to adverse environmental impacts. Consequently, potential disproportionate impacts to minority or low-income populations are assessed only when adverse environmental consequences to the general human population are anticipated. The same is true for analysis of health and safety risks to children, as the potential for such risks would be driven by adverse environmental impacts.

In order to address the possibility of environmental justice concerns, health and safety factors were analyzed to determine the potential for adverse human health or environmental impacts of the proposed alternatives that could affect the human population. In addition, potential environmental health or safety hazards were examined to assess potential special risks to children. The analyses conducted for Air Quality (section 6.3.7), Noise (section 6.3.8), Hazardous Materials Management (section 6.3.11), and Safety and Environmental Health (section 6.3.16) indicate that less than significant environmental impacts to the human population are anticipated.

Training Range Impacts

Proposed training operations would be similar to that which is presently taking place. MV-22 training operations at MCAGCC would entail take-off and landings at existing airfields and training operations within existing airspace and at existing range facilities. Environmental justice concerns related to aircraft operations may include air quality, noise, and safety. Specific issues of concern involve aircraft emissions, aircraft noise, and safety concerns related to flight mishaps and explosives handling. The analyses conducted for these resource areas indicate that no significant environmental or human health impacts are anticipated. Consequently, no disproportionate or adverse impacts related to environmental justice are anticipated, nor would there be any special health or safety risks to children.

MITIGATION MEASURES

Because there would be no disproportionate or adverse impacts anticipated related to environmental justice, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, operations at MCAGCC would continue at the current level. Therefore, existing conditions would remain unchanged, and no impacts to environmental justice would occur.

6.4 MILITARY TRAINING ROUTES

6.4.1 Introduction

The MV-22 would use seven MTRs located within southern California and western Arizona as part of their training operations. These include IR-216, IR-217, IR-218, VR-1266, VR-1267, VR-1267A, and VR-1268. These MTRs are sufficient to accommodate proposed operations associated with the MV-22 Training and Readiness Manual. Although the MV-22 may fly at a range of altitudes and speeds along these routes, for the purposes of air quality and noise modeling, it was estimated that the MV-22 would fly at 200 knots and at the minimum altitude allowable, which in most cases was between 200 feet (60 meters) and 500 feet (152 meters) above ground level, and that the aircraft would fly in a fixed wing mode. Note that some segments of the MTRs have higher minimum altitudes to protect recreational or biological resources. For example, aircraft must stay over 3,000 feet (915 meters) over the Imperial National Wildlife Refuge when flying VR-1266 and VR-1267. The MV-22 operators would abide by these regulations.

6.4.2 Airfields and Airspace

Affected Environment

MV-22 aircraft based on the West Coast, regardless of basing alternative, would use seven established MTRs located in southern California and Arizona for routine training and other readiness operations (Table 6.4.2-1; Figure 6.4.2-1). MTRs are flight corridors developed and used by the DoD usually to practice high-speed, low-altitude flight, generally below 10,000 feet MSL. Specifically, MTRs are airspace of defined vertical and lateral dimensions established to conduct military flight training that may include airspeeds of 220 knots indicated airspeed (KIAS) for the MV-22. MTRs are developed in accordance with criteria specified in FAA Order 7610.4 (DoD 2003). They are described by a centerline, with defined horizontal limits on either side of the centerline, and vertical limits expressed as minimum and maximum altitudes along the flight track.

Table 6.4.2-1. Description of the Military Training Routes

MTR	Scheduler	Average Floor (feet AGL)	Length (miles)	Width Either Side from Center (nm)	Hours of Operation	Comment
IR-216	MCAS Miramar	200	60	3	Even-numbered days, daylight only	-
IR-217	MCAS Miramar	200	308	5	Continuous	Part of route has a floor of 1,500 feet AGL.
IR-218	MCAS Miramar	500	116	2 to 5	Continuous	Part of route has a floor of 3,500 feet MSL.
VR-1266	MCAS Yuma	200	248	1 to 3	0700-1800 local (daylight hours)	Remain clear of Imperial National Wildlife Refuge below 3,000 feet AGL.
VR-1267	MCAS Yuma	200	164	2 to 4	0700-1800 local	Remain clear of Imperial National Wildlife Refuge below 3,000 feet AGL.
VR-1267A	MCAS Yuma	200	182	2	0700-1800 local	-
VR-1268	MCAS Yuma	200	428	1 to 4	0700-1800 local	-

Notes:
AGL = above ground level; MSL = mean sea level; nm = nautical mile
Source: DoD 2008.

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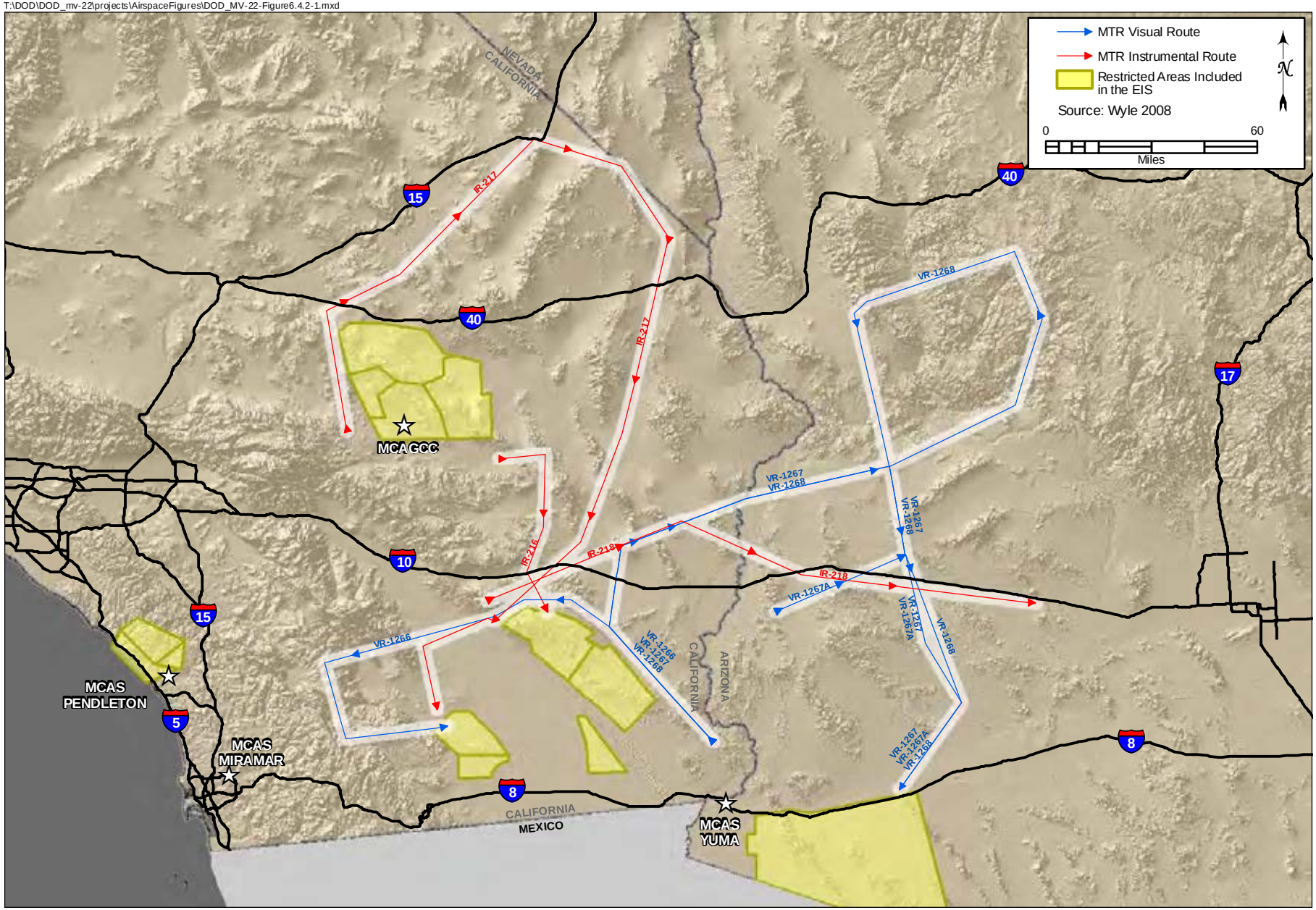

Military Training Routes Proposed for Use by the MV-22

FIGURE

6.4.2-1

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MTRs are identified as Visual Routes (VR) or Instrument Routes (IR). VRs are used by DoD and associated Reserve and Air National Guard units for the purpose of conducting low-altitude navigation and tactical training under VFR below 10,000 feet MSL at airspeeds in excess of 250 knots KIAS. IRs are used by DoD and associated Reserve and Air National Guard units for the purpose of conducting low-altitude navigation and tactical training in both IFR and VFR weather conditions below 10,000 feet MSL at airspeeds that may be in excess of 250 knots KIAS. A breakdown of existing sorties along the seven MTRs is shown in Table 6.4.2-2.

Table 6.4.2-2. Existing Annual MTR Sorties

Aircraft Type	VR-1266	VR-1267	VR-1267A	VR-1268	IR-216	IR-217	IR-218	Total
A-10	6	-	1	3	-	-	-	10
AV-8B	206	127	32	25	8	8	-	406
C-12	1	1	1	1	-	-	-	4
C-17	13	62	36	1	-	-	3	115
C-130	-	-	-	-	2	2	2	6
E-3	1	-	-	-	-	-	-	1
EA-6B	229	220	3	-	95	95	1	643
F-15A	-	-	-	-	1	1	-	2
F-16A	6	15	-	-	-	-	-	21
F-18	220	82	18	13	48	48	21	450
F-5E	1	-	-	-	-	-	-	1
T-1	1	-	-	-	-	-	-	1
T-35	1	-	-	-	-	-	-	1
T-38A	6	-	-	-	-	-	-	6
T-45	140	84	2	1	16	16	-	259
HELOS	-	-	-	-	-	-	1	1
Total	831	591	93	44	170	170	28	1,927

Note:
See Appendix C for details.

Environmental Consequences

Training Range Impacts

The introduction of up to ten squadrons of the MV-22 to the training environment along the MTRs would result in an increase of an estimated 2,085 MTR sorties per year (Table 6.4.2-3), with an increase in sorties per MTR ranging from 18 percent to over 2,700 percent compared to existing conditions. The USMC expects that IR-217 and IR-218 would see the largest increase in sorties from the MV-22 aircraft because these have fewer flying limitations regarding hours of operation. MV-22 sorties would account for approximately 77 percent of the proposed sorties along IR-217 and 97 percent of the proposed sorties along IR-218. Evening and night sortie operations would also increase as a result of proposed action. These training flights are intended to simulate real world conditions, and as such, the flight paths would avoid populated areas to the fullest extent practicable. During the night missions it is not anticipated there would be an impact upon general aviation since most general aviation flights occur during daylight hours. Additionally, the MV-22 aircraft would be operated by a pilot and co-pilot and would fly at speeds that support see-and-avoid procedure, which would minimize risks to general aviation aircraft during both daylight and night operations.

Table 6.4.2-3. Proposed Change in Annual MTR Sorties

MTR	Existing Sorties	Addition of MV-22 Sorties	% Increase in Operations
VR-1266	831	148	18
VR-1267	591	148	25
VR-1267A	93	148	159
VR-1268	44	148	336
IR-216	170	148	87
IR-217	170	564	332
IR-218	28	781	2,789
Total	1,927	2,085	108

Note:
See Appendix C for details.

The increase in MV-22 operations compared to existing CH-46 operations is partly due to the fact that the MV-22 can fly farther than the CH-46 and can reach destinations like the MTRs easier than the CH-46. Another reason for the difference is that some MV-22 operational components would entail flying in a fixed wing mode, which is something the CH-46 cannot do. For example, the MV-22 is expected to fly in a fixed wing mode along the MTRs.

Flight operations involving the MV-22 aircraft would follow the same procedures as those involving other aircraft currently utilizing the MTRs. MV-22 operators would follow all limitations and restrictions, such as those listed in Table 6.4.2-1. Due to the increase in MTR usage from the proposed action, priorities in scheduling for specific uses would be an important determinant in how to allocate limited airspace resources safely. There could be an increase in civil aviation adjustments required when MTR's are used for ingress and egress to training areas supporting large scale exercises; however, this is expected to be minimal due to MTR use in the evening and night when less general aviation activity occurs. Given adequate coordination between regional FAA and military airspace managers, MTR airspace management would not change significantly as a result of the new aircraft. No significant impact would occur.

MITIGATION MEASURES

Because there would be no significant impact on aircraft operations within the MTRs, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities, and MTR operations would continue at the current level. Therefore, no impact would occur.

6.4.3 Land Use

Affected Environment

Land use is defined as developed and undeveloped land occurring at a particular location. Land use categories typically include residential; commercial; manufacturing; transportation, communication, and utilities; recreation; institutional; mining and extraction; and agriculture and forestry. On military installations, land use is often divided into operational and support functions. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect specially designated or environmentally sensitive areas.

Developed and undeveloped land underlying the MTRs in southern California and Arizona cover the full spectrum of land use categories as defined above. The MTRs are currently used for training and readiness operations by various types of aircraft (see section 6.4.2).

Environmental Consequences

Training Range Impacts

Seven MTRs would be utilized by MV-22 aircraft for training and readiness operations, and these MTRs are currently used by other military aircraft. There would be no use of chaff or flares. Additionally, no landing or hovering operations would occur within the MTRs. Although the MV-22 may fly at a range of altitudes and speeds along these routes, for the purposes of noise modeling, it was estimated that the MV-22 would fly at the minimum altitude allowable, which in most cases was between 200 feet (60 meters) and 500 feet (152 meters) above ground level, and that the aircraft would fly in a fixed wing mode. Based on this noise analysis, no appreciable change in noise exposure is expected along the MTRs due to the MV-22 (see section 6.4.8, Noise).

Although the proposed MV-22 operations along the MTRs would result in an 18 to 2,700 percent increase in MTR use compared to existing condition, this still amounts to only a few flights or less per day on average. There would be less than 150 flights per year for five MTRs, and the other two would range from about 500 to 800 flights per year. The same typical spectrum of land uses would continue to experience a relatively consistent amount of military overflights. MV-22 operators also would abide by existing limitations regarding minimum altitude over sensitive areas, like the Imperial National Wildlife Refuge. Furthermore, as discussed in section 2.1.3, typical routes for access to and from the MTRs would occur at over 3,000 feet (914 meters) above ground level, as a result no impacts to land uses below these transit routes would occur.

Agricultural land uses under the MTRs likely includes ranch land. Aircraft overflights can cause a startle reflex on domesticated animals similar to that experienced by wildlife (see section 6.4.14, Biological Resources). Results of the startle reflex are typically minor (e.g., increase in heart rate and nervousness) and do not result in injury. Exceptions may occur when animals are crowded in small enclosures such as corrals or feedlots, where loud, sudden noise may cause a widespread panic reaction (U.S. Air Force 2007). Although some reaction (such as alert posture or briefly taking flight or running) to the low-level overflights is possible, overflights directly over any particular area would be relatively infrequent. There would likely be habituation to the overflight stimulus as the gradual increase in sound levels as the aircraft approached, and the lack of perceptible harm from the overflight. Additionally, the MV-22 would most often be travelling in fixed wing mode further reducing the potential for noise impacts. Furthermore, animals present in the airspace are likely habituated to the sound of aircraft overflight due to existing use of the MTRs. Therefore, no significant impacts to land use would occur.

MITIGATION MEASURES

MTR operations would not result in significant impacts to land use; therefore, no mitigation measures would be required.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities, and MTR operations would continue at the current level. Therefore, existing conditions would remain unchanged, and no impacts to land use would occur.

6.4.4 Socioeconomics

The proposed training operations within the MTRs do not include any change in personnel, and there would be no new construction or improvements at any on- or off-range facilities. Therefore, the proposed action associated with MTR use would have no socioeconomic impact on the local communities, and no socioeconomic impacts would occur.

6.4.5 Community Facilities and Services

Affected Environment

Community facilities and services include medical, security, fire and other emergency support services, education, and recreational services. Of particular importance with respect to military overflights on non-military lands are recreational facilities and parks.

Community facilities and services underlying the MTRs in southern California and Arizona cover the full spectrum of typical categories as defined above. Although numerous recreational facilities and parks currently experience MTR overflight operations, the most notable recreational features currently overflown by aircraft along the MTRs include portions of Anza Borrego Desert State Park, Joshua Tree National Park, the Mojave National Preserve, and the Imperial National Wildlife Refuge.

Environmental Consequences

Training Range Impacts

Seven MTRs would be utilized by MV-22 aircraft for training and readiness operations, and these MTRs are currently used by other military aircraft. There would be no use of chaff or flares, and no landing or hovering operations would occur within the MTRs. Although there would be an increase in the number of overflights above parks and recreational facilities, no appreciable change in noise exposure is expected along the MTRs (see section 6.4.8, Noise). In addition, the MV-22 operators would abide by existing limitations regarding minimum altitude over sensitive areas, like the Imperial National Wildlife Refuge. Therefore, the same typical spectrum of community facilities and services would continue to experience a relatively consistent amount of military overflights, including the notable recreational features listed above, and no significant impacts to community facilities and services would occur.

MITIGATION MEASURES

Proposed MTR operations would not result in significant impacts to community facilities and services; therefore, no mitigation measures would be required.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities, and MTR operations would continue at the current level. Therefore, existing conditions would remain unchanged, and no impacts to community facilities and services would occur.

6.4.6 Ground Traffic and Transportation

The proposed training operations within the MTRs do not include any ground transportation support. Additionally, no new construction or improvements are proposed at on- or off- range facilities. Therefore, the proposed action associated with MTR use would have no impact on the traveled roadway system, and no impacts to ground transportation would occur.

6.4.7 Air Quality

Affected Environment

In regard to the proposed MTR training and operational areas within California, section 4.7 (MCAS Camp Pendleton Air Quality) provides background information regarding NAAQS and the CAAQS (see Tables 4.7-1). In Arizona, the ADEQ has adopted the NAAQS to regulate sources of air pollution and is the responsible agency for enforcing these standards.

Region of Influence

The project region for the proposed training operations includes areas in and adjacent to proposed MTRs within southeastern California and western Arizona. In California, the proposed MTRs would occur within the following air basins:

1. SDAB, which includes San Diego County.
2. MDAB, which includes the eastern portions of Kern, San Bernardino, Riverside, and Los Angeles Counties.
3. SSAB, which includes Imperial County and the western portion of Riverside County.

In Arizona, the proposed MTRs would occur within the Counties of Yuma, La Paz, Mohave, and Yavapai.

The analysis of aircraft emissions within MTRs associated with the proposed training operations estimates that all operations would occur below 3,000 feet (914 meters) above ground level, which is the average depth of the mixing layer where emissions released into this layer could affect ground-level pollutant concentrations. Emissions released above the mixing layer generally would not appreciably affect ground-level air quality.

Existing Air Quality

In regard to the NAAQS, the USEPA designates all areas of the U.S. in terms of having air quality better (attainment) or worse than (nonattainment) the NAAQS. An area generally is in nonattainment for a pollutant if its NAAQS has been exceeded more than once per year. Former nonattainment areas that have attained the NAAQS are designated as maintenance areas. The

following describes the current nonattainment status related to the NAAQS for the portion of each air basin affected by the alternative:

1. The SDAB is a nonattainment area for the O_3 standard.
2. The San Bernardino County portion of the MDAB is a moderate nonattainment area for PM_{10}. The southwest portion of the County is a severe-17 nonattainment area for O_3 and the northeast portion of the County attains the standard.
3. The Riverside County portion of the MDAB attains all NAAQS.
4. The Imperial County portion of the SSAB is a marginal nonattainment area for O_3. The western two-thirds of the County is a serious nonattainment area for PM_{10} and the eastern third of the County attains the standard.
5. The Riverside County portion of the SSAB is a severe-15 nonattainment area for O_3 and PM_{10}.
6. The Arizona air basins attain all NAAQS.

The ARB also designates areas of California that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded more than once in 3 years. Presently, the entire Project region within California does not attain the CAAQS for O_3 or PM_{10}. Additionally, the southwest portion of San Bernardino County (same area as the nonattainment area for the national O_3 standard) does not attain the CAAQS for $PM_{2.5}$.

Ozone concentrations are the highest during the warmer months of the year and coincide with the period of maximum insolation. Maximum O_3 concentrations tend to be homogeneously spread throughout a region, since it often takes several hours to convert precursor emissions to O_3 in the atmosphere. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime/early morning surface-based temperature inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

Regional Climate

Since the MTRs project region occurs primarily within the lower Colorado River and Mojave Desert regions, sections 5.7.1 and 6.3.7 provide adequate descriptions of the climates of these regions. However, the westernmost portion of VR-1266 occurs over the mountainous terrain of San Diego County, which has a cooler and wetter climate compared to the desert regions to the east.

Applicable Regulations and Standards

The Federal Clean Air Act of 1970 and its subsequent amendments (the CAA) establish air quality regulations and the NAAQS and delegate the enforcement of these standards to the states. In California, the ARB is responsible for enforcing air pollution regulations. The CAA establishes air quality planning processes and requires areas in nonattainment of a NAAQS to develop a SIP that details how the state will attain the standard within mandated time frames. The requirements and compliance dates for attainment are based on the severity of the nonattainment classification of the area. The following summarizes the air quality rules and regulations that apply to the project actions.

FEDERAL REGULATIONS

Section 176(c) of the CAA, as articulated in the USEPA General Conformity Rule, states that a federal agency cannot issue a permit for or support an activity unless the agency determines that it will conform to the most recent USEPA-approved SIP. This means that projects using federal funds or requiring federal approval must not (1) cause or contribute to any new violation of a NAAQS, (2) increase the frequency or severity of any existing violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. The regional and state air pollution control agencies within the project regions implement the USEPA's General Conformity Rule. If the proposed annual emissions remain below the following *de minimis* thresholds, a CAA conformity determination is not required:

1. For the SDAB, 100 tons of VOC and NO_x.
2. For the MDAB, (a) 100 tons of PM_{10} within the moderate PM_{10} nonattainment area of San Bernardino County and (b) 25 tons of VOC and NO_x for the severe O_3 nonattainment area in the southwest portion of the County.
3. For the SSAB, (a) 100 tons of VOC and NO_x within the marginal O_3 nonattainment area of Imperial County, (b) 70 tons per year of PM_{10} within the serious PM_{10} nonattainment area of Imperial and Riverside County, and (c) 25 tons per year of VOC and NO_x within the severe O_3 nonattainment area of Riverside County.

If emissions of one or more of these compounds exceed a *de minimis* threshold, the DoN must demonstrate conformity under one of the methods prescribed by the General Conformity Rule. The project conformity analysis for the MV-22 proposed action is summarized in section 7.3.2 and is presented in complete form in Appendix B of this EIS.

Environmental Consequences

Training Range Impacts

Air quality impacts were reviewed for significance in light of federal, state, and local air pollution standards and regulations. For the purposes of the present analysis, if project emissions were projected to exceed a threshold requiring a conformity determination further analysis was conducted to determine whether impacts were significant. In such cases, if emissions conform to the approved SIP, then impacts would be less than significant. In the case of criteria pollutants for which the relevant air basin is in attainment of the NAAQS, the analysis determined whether the magnitude and location of project emissions reasonably would be expected to cause a significant adverse impact to air quality.

Air quality impacts associated with the proposed training operations were determined by comparing the emissions generated by the MV-22s within each air basin to the criteria mentioned above to determine their significance. Proposed MV-22 flights within all MTRs were evaluated as occurring in cruise mode. Operational data used to calculate proposed MV-22 emissions were obtained from the USMC (Wyle 2008). Factors used to calculate combustive emissions for the MV-22 aircraft were obtained from the DoN (AESO 2001a and 2001b).

Table 6.4.7-1 presents an estimation of the annual MV-22 emissions that would occur within each air basin in association with the MTR portion of the proposed training operations. These data show that

proposed MV-22 operations within MTRs would produce annual emissions that would not exceed any conformity *de minimis* threshold, except the NO_x threshold of 25 tons within the MDAB. Given that the MDAB project region does not attain the NAAQS for O_3, this EIS further analyzes whether this increase in NO_x emissions would produce significant impacts to ambient O_3 levels in the MDAB.

Table 6.4.7-1. Annual Emissions from MV-22 Training Operations within MTRs -Year 2017

Air Basin/MTR	Air Pollutant Emissions (tons/year)					
	VOC	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
SAN DIEGO AIR BASIN						
Total MTRs	0.00	0.05	1.24	0.04	0.14	0.14
Conformity *De Minimis* Level	**100**	**100**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN						
Total MTRs	0.00	0.23	6.22	0.18	0.70	0.70
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**70**	**NA**
MDAB						
Total MTRs	0.02	0.93	25.30	0.72	2.84	2.84
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**100**	**NA**
ARIZONA – COMBINED COUNTIES						
Total MTRs	0.01	0.65	17.51	0.50	1.96	1.96
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Within the MDAB, the NO_x emission threshold of 25 tons per year directly applies to the severe O_3 nonattainment portion of the air basin. Within this region, the only MTR proposed for MV-22 operations is about a 100-mile length of IR-217. Proposed MV-22 operations would produce about 5.7 tons per year of NO_x emissions along this route within severe O_3 nonattainment, which is substantially less than the 25 tons per year threshold. Therefore, proposed training operations within this portion of the MDAB would produce less than significant air quality impacts. Due to the extensive area of operation within the remaining portion of the MDAB, proposed MV-22 emissions within MTRs would disperse over a large region and given their intermittent nature (564 annual flights), they would produce minimal ambient impacts at any ground-level location. As a result, proposed training operations within the remaining MTRs of the MDAB and any other affected air basin would produce less than significant air quality impacts.

Proposed training operations would emit TACs that could potentially impact public health. TACs generally are subsets of VOC and PM_{10} emissions. The data in Table 6.4.7-1 show that the proposed training operations would generate a combined total of 5.7 tons of VOC and PM_{10} emissions. Since proposed MV-22 emissions would occur over a large region of operation and would be intermittent in nature, they would produce minimal ambient impacts of TACs at any ground level location. As a result, proposed training operations within MTRs would produce less than significant impacts to public health.

MITIGATION MEASURES

Since the proposed training operations would produce less than significant air quality impacts, no mitigation measures are required.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and the No Action Alternative would not produce any impacts to air quality.

6.4.8 Noise

This section analyzes noise impacts related to training operations along the MTRs. Additional background information regarding noise metrics and noise modeling can be found in section 6.1.8 (MCB Camp Pendleton Noise) and Appendix C.

Affected Environment

For the purposes of this EIS, MTRs are split into two groups: IRs and VRs. As their names imply, instrument navigation is performed on IRs and visual navigation is performed on VRs.

Seven MTRs were examined, including four VRs (VR-1266, VR-1267, VR-1267A, VR-1268) and three IRs (IR-216, IR-217, IR-218). The existing aircraft noise environment associated with the MTRs is primarily based on usage data provided by the USMC (USMC 2008b). Most of these MTRs were previously studied (Wyle 2006a [WR 05-16]; Wyle 2002 [WR 02-07]), but the baseline condition information was updated for this EIS.

The following factors were considered in the analysis of noise levels from existing operations on the MTRs: flight operations, flight tracks, flight profiles and climatological data. These factors are described in detail in Appendix C. Modeled flight operations are summarized below.

Flight Operations

The baseline condition for modeled MTRs consists of between 28 and 831 annual sorties per route as shown in Table 6.4.8-1. The centerlines of these routes are in southeastern California and western Arizona, bounded roughly by Twentynine Palms, California to the north, Julian, California to the west, Yuma, Arizona to the south and Phoenix, Arizona to the east (see Figure 6.4.2-1). Although some of the MTRs traverse parts of Arizona, California's CNELmr metric was conservatively applied to all MTRs in this EIS.

Table 6.4.8-1. Existing Annual MTR Sorties

Aircraft Type	Period	VR-1266	VR-1267	VR-1267A	VR-1268	IR-216	IR-217	IR-218	Total
A-10		6	-	1	3	-	-	-	10
AV-8B		206	127	32	25	8	8	-	406
C-12		1	1	1	1	-	-	-	4
C-17		13	62	36	1	-	-	3	115
C-130H&N&P		-	-	-	-	2	2	2	6
E-3		1	-	-	-	-	-	-	1
EA-6B		229	220	3	-	95	95	1	643
F-15A		-	-	-	-	1	1	-	2
F-16A		6	15	-	-	-	-	-	21
F/A-18		220	82	18	13	48	48	21	450
F-5E		1	-	-	-	-	-	-	1
T-1		1	-	-	-	-	-	-	1
T-35		1	-	-	-	-	-	-	1
T-38A		6	-	-	-	-	-	-	6
T-45		140	84	2	1	16	16	-	259
HELOS		-	-	-	-	-	-	1	1
Total	**Day**	831	591	93	44	170	136	17	1,882
	Evening	-	-	-	-	-	25	10	35
	Night	-	-	-	-	-	9	1	10
	Total	**831**	**591**	**93**	**44**	**170**	**170**	**28**	**1,927**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
See Appendix C for details.

Annual sorties for each MTR by type of aircraft and CNEL time period are shown in Table 6.4.8-1. This information was primarily derived from available MTR scheduling data -- six-year averages corresponding to 2001 through 2003 and 2005 through 2007 for the VRs and two-year averages corresponding to 2006 through 2007 for IR-217 and -218 (Hendricks 2008a; Weir 2008a). As data was not available for IR-216, it was estimated that the aircraft mix and most of overall sorties from IR-217 would apply to IR-216 (Weir 2008b). The only difference was that all sorties on IR-216 were estimated to occur in the daytime due to IR-216's nighttime restriction of operations.

For most of the modeled MTRs, CNEL temporal period distribution was dictated by each route's restrictions. For routes which allowed more than one CNEL time period, the temporal distribution was extracted from the scheduling data (Weir 2008a). All of the modeled VRs and IR-216 only support CNEL daytime operations, and thus there are no CNEL evening or nighttime sorties along these routes. IR-217 and IR-218 support CNEL evening and nighttime operations. On these two IRs, the average evening and nighttime percentages of sorties is 18 percent and five percent, respectively.

Except for VR-1266 and IR-217, it was estimated that all aircraft fly all segments of all modeled MTRs. For the former named routes, segment utilization was obtained from a previous noise study (Wyle 2002) and the USMC (Weir 2008a).

Most of the existing MTR sorties are from EA-6B, F/A-18 and AV-8B jet aircraft. Only one annual helicopter sortie (type not specified) was identified for all modeled MTRs (IR-218). The A-10, C-12, E-3, F-3, T-1 and T-35 aircraft and the one helicopter sortie were not modeled due to their relatively insignificant contribution to the overall noise environment compared to the modeled types or because aircraft types were unknown or because of typographical errors in the source data. All but one percent of the sorties in Table 6.4.8-1 were modeled.

During the busiest month of activity for the modeled routes from the multi-year (scheduling) source data, the number of modeled flying days was between 25 and 27 days for the busiest month for the VRs, 21 days for IR-217 and 9 days for IR-218 (Hendricks 2008a; Hendricks 2008b). It was estimated that the number of the busiest month's flying days for IR-217 would apply to IR-216 (Weir 2008b).

MTR floors and route widths were obtained from DoD flight information publications (DoD 2008). The minimum modeled altitudes ranged from 200 to 500 feet above ground level. Route widths corridors were commonly six nm wide but ranged between one nm to ten nm. Fixed wing aircraft, such as the F/A-18 Hornets, were generally modeled to fly between 400 and 550 knots. Detailed flight profile data is contained in Appendix C.

Noise Exposure

Using the data described above and in Appendix C, the MR_NMAP computer model was used to calculate maximum centerline CNELmr for annual average busy-month aircraft operations. Table 6.4.8-2 shows the noise levels for individual MTR segments. None of the individual segments cause exposure greater than or equal to 65 dB CNELmr. Considering applicable overlaps of coincident segments, the combined exposure is not greater than or equal to 65 dB CNELmr, except at the intersection of IR-217 and IR-218 where the exposure is between 65 and 66 dB CNELmr. There are no civilian people or housing units within the 65 dB CNELmr contour at this location.

Table 6.4.8-2. Maximum Centerline CNELmr for the MTRs

MTR	Segments	CNELmr		
		Existing	Proposed	Increase Compared to Existing Condition
VR-1266	A-E	54	54	0
	E-F	53	53	0
	F-G	53	53	0
	G-H	53	53	0
VR-1267	A-E	56	56	0
	E-F	55	55	0
	F-I	56	56	0
VR-1267A	A-E	<45	<45	n/a
VR-1268	A-E	<45	<45	n/a
	E-F	<45	<45	n/a
	F-N	<45	<45	n/a
IR-216	A-E	62	62	0
IR-217	A-E	62	62	0
	E-F	64	64	0
	F-K	62	62	0
IR-218	A-D	51	51	0
	D-E	46	48	2
	E-F	46	48	2
	F-G	58	58	0
See Appendix C for details.				

Environmental Consequences

Proposed Training Impacts

The MV-22 would operate within seven MTRs regardless of basing alternative selected. The maximum tempo of activity was analyzed for the purposes of the EIS. It is estimated that one squadron would be deployed from its base at all times. Therefore the noise modeling estimates flight activity from nine squadrons of MV-22 aircraft, consisting of seven active duty squadrons and two reserve squadrons.

Table 6.4.8-3 shows the numbers of proposed annual MV-22 flight sorties for the proposed training operations for MTRs as derived from data provided by the USMC (USMC 2008a). It was estimated that all other aircraft sorties and associated estimates regarding flying days, segment utilization, floors and widths from the existing condition would not change.

Table 6.4.8-3. Proposed Annual MV-22 MTR Sorties

MTR	Day	Evening	Night	Total
VR-1266	148	-	-	148
VR-1267	148	-	-	148
VR-1267A	148	-	-	148
VR-1268	148	-	-	148
IR-216	148	-	-	148
IR-217	107	397	60	564
IR-218	148	551	82	781
Total	**995**	**948**	**142**	**2,085**

Notes:
Day = 0700-1859, Evening = 1900-2159, Night = 2200-0659
See Appendix C for details.

Proposed MV-22 MTR missions would include Low Altitude Tactics, High Light Level, and Low Light Level sorties. Of the 2,085 total annual one-way MV-22 sorties, most would be Low Altitude Tactics missions (66 percent), 46 percent of the overall sorties would be during the CNEL evening period and seven percent during the CNEL nighttime period. Although most sorties (48 percent) would be Low Altitude Tactics missions during CNEL daytime, the evening and nighttime counts are due to the requirements of the High Light Level and Low Light Level missions which need to be conducted during darkness. For the MV-22, the minimum modeled altitudes ranged from 200 to 500 feet above ground level with a speed of 220 knots. It was also modeled in fixed wing mode.

Using the data described above and in Appendix C, the MR_NMAP computer model was used to calculate maximum centerline CNELmr for annual average busy-month aircraft operations. Table 6.4.8-2 shows the noise levels for individual MTR segments under these proposed conditions. None of the individual segments would cause exposure greater than or equal to 65 dB CNELmr. Considering applicable overlaps of coincident segments, the combined exposure would not be greater than or equal to 65 dB CNELmr, except at the intersection of IR-217 and IR-218 where the exposure would be between 65 and 66 dB CNELmr. There are no civilian people or housing units within the 65 dB CNELmr contour at this location.

Overall, the addition of the MV-22 operations would cause an insignificant increase in CNELmr for segments of IR-217 and IR-218, relative to the baseline condition. Therefore, no significant noise impact would occur.

MITIGATION MEASURES

Because there would be no significant impacts, no mitigation measures would be required.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and no noise impacts would occur.

6.4.9 Infrastructure and Utilities

There are no infrastructure and utilities associated with the MTRs. The proposed training operations within the MTRs do not include any change in personnel, and there would be no new construction or improvements at any on- or off-range facilities. Therefore, no impacts to infrastructure and utilities would occur.

6.4.10 Aesthetics and Visual Resources

Visual resources are defined as the natural and manufactured features that constitute an area's aesthetic qualities. These features form the overall impression that an observer receives of an area, including its landscape character. Landforms, water surfaces, vegetation, and manufactured features are considered distinctive elements of an area's visual character.

Generally, any activity that has the potential to alter the quality or distinguishable characteristic of the perceived environment may be considered as having an impact on the visual resources of that area. The significance of a change in visual character is influenced by social considerations including public value placed on the resource, public awareness of the area, and general

community concern for visual resources in the area. These social considerations equate to visual sensitivity and are defined as the degree of public interest in a visual resource and concern over potential adverse changes in the quality of that resource.

Of particular importance with respect to military overflights is the consideration of the perceived impacts that those overflights may have on the aesthetic and visual quality of a particular aesthetic feature.

Affected Environment

Aesthetic and visual resources underlying the MTRs in southern California and Arizona cover the full spectrum of typical natural and manufactured features that constitute an area's aesthetic quality. Although numerous aesthetic and visual resources currently experience MTR overflight operations, some of the notable visually distinctive features currently overflown by military aircraft along the MTRs include portions of Anza Borrego Desert State Park, Joshua Tree National Park, the Mojave National Preserve, and the Imperial National Wildlife Refuge.

Environmental Consequences

Training Range Impacts

Seven MTRs would be utilized by MV-22 aircraft for training and readiness operations, and these MTRs are currently used by other military aircraft. There would be no use of chaff or flares, and no landing or hovering operations would occur within the MTRs. Although the MV-22 may fly at a range of altitudes and speeds along these routes, for the purposes of noise modeling, it was estimated that the MV-22 would fly at the minimum altitude allowable, which in most cases was between 200 feet (60 meters) and 500 feet (152 meters) above ground level, and that the aircraft would fly in a fixed wing mode. Although there would be an increase in the number of overflights, no appreciable change in noise exposure is expected along the MTRs (see section 6.4.8, Noise).

Although the proposed MV-22 operations along the MTRs would result in an 18 to 2,700 percent increase in MTR use compared to existing condition, this still amounts to only a few flights or less per day on average. For the five MTRs, there would be less than 150 flights per year, and the other two would range from about 500 to 800 flights per year. In addition, the MV-22 operators would abide by existing limitations regarding minimum altitude over sensitive areas, like the Imperial National Wildlife Refuge. The same typical spectrum of aesthetic and visual resources would continue to experience a relatively consistent amount of military overflights, including the notable visually distinctive features listed above. Therefore, no significant impacts to aesthetics and visual resources would occur.

MITIGATION MEASURES

MTR operations would not result in significant impacts to aesthetics and visual resources; therefore, no mitigation measures would be required.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities, and MTR operations would continue at the current level. Therefore, existing conditions would remain unchanged, and no impacts to aesthetics and visual resources would occur.

6.4.11 Hazardous Material Management

The proposed training operations within the MTRs do not include new construction or improvements at any on- or off-range facilities. Aircraft would not be maintained or fueled along the MTR route. Therefore, operational impacts would not occur with respect to hazardous materials in association with airspace operations.

6.4.12 Topography, Geology, and Soils

The proposed training operations within the MTRs do not include new construction or improvements at any on- or off-range facilities. MTR operations do not include hovering near to the ground or landing along the MTR route and, therefore, would not contribute to soil erosion or other impacts to geological resources. No geologic impacts would occur.

6.4.13 Water Resources

The proposed training operations within the MTRs do not include new construction or improvements at any on- or off-range facilities. MTR operations do not include hovering near to the ground or landing along the MTR route and, therefore, would not contribute to erosion-related water quality impacts. No water resources impacts would occur.

6.4.14 Biological Resources

This section considers terrestrial habitats and species with special protection status residing beneath airspace associated with seven MTRs that would be utilized by the MV-22.

Biological resources presented here include wild species that may occur, either as a resident or transient, within or beneath the airspace associated with MTRs. The definition includes both wildlife and their habitats. However, because ground disturbance including the use of ordnance, touch-downs, or chaff and flare, is not included as part of operations along MTRs, vegetation communities or wetlands and other Clean Water Act regulated waters are not considered as part of this analysis. A description of the ecoregions and general ecology is provided as context for sensitive wildlife species that may occur.

Affected Environment

The seven MTRs are located within southern California and southwestern Arizona (see Figure 6.4.2-1), occupying a portion of the *American Semi-desert and Desert*, *California Coastal Range Open Woodland-Shrub-Conifer Forest-Meadow*, and the C*olorado Plateau Semi-Desert Province*, as defined by Bailey (1995). The American Desert includes the Mojave, Colorado, and Sonoran Deserts and is characterized by extensive plains with isolated low mountains and buttes (Bailey 1995). This ecoregion occupies most of the area beneath the MTR's. Prominent drainage features are lacking in this province but include the Salton Sea and the Colorado River. Vegetation is typical of desert

environments including many species of cacti, creosote bush, brittlebrush, and various species of saltbush (*Atriplex* spp.). Large ungulates are almost absent from the desert; however, desert mule deer (*Odocoileus Hemionus*), peccary (*Peccary angulatus*), and Sonoran pronghorn antelope (*Antilocapra americana sonoriensis*; Federally listed as endangered) are present. Other notable wildlife include the desert kit fox (*Vulpes macrotis macrotis*), desert tortoise (*Gopherus agassizii*), and Gila monster (*Heloderma suspectum)*.

The *California Coastal Range Open Woodland-Shrub-Conifer Forest-Meadow* province occupies the central part of the California Coast Ranges and the mountains of southern California (Bailey 1995). Vegetation communities include chaparral, sclerophyll communities including madrone (*Arbutus menziesii)* and several species of oak (*Quercus* spp.), and sagebrush and grasslands in valleys. These plant communities support habitats for mule deer, mountain lion *(Felis concolor)*, California bobcat *(Felis rufus)*, wrentit *(Chamaea fasciata)*, and several species of sparrows, among others.

Within the project area, the Colorado Plateau Province consists of tablelands with moderate to considerable relief (Bailey 1995). Vegetation is dominated by grasslands with xeric shrub species, sagebrush communities, and several species of cacti (Bailey 1995). Cottonwoods (*Populus* spp.) are common along permanent streams. Common mammals are the mule deer, mountain lion, coyote, and bobcat (Bailey 1995). Pronghorn are regionally important. The most abundant resident birds are the bushtit (*Psaltriparus minimus*), pinyon jay (*Gymnorhinus cyanocephalus*), juniper titmouse (*Baeolophus ridgwayi*), red-tailed hawk (*Buteo jamaicensis*), and golden eagle (*Aquila chrysaetos*). Reptiles include the horned lizard (*Phrynosoma* spp.), collared lizard (*Crotaphytus collaris*), and rattlesnake (*Crotalus* spp.).

Threatened and Endangered Species

The occurrence of listed or designated candidates for federal protection as threatened or endangered species identified for the counties falling under MTRs is summarized in Table 6.4.14-1. Because project activities in the airspace are primarily associated with overflight and have no on-the-ground or in-water activities, habitat disturbance by the project would have no adverse effects on plants. In addition, it is estimated that airborne noise would produce minimal, if any, affects on aquatic species; therefore, federally listed amphibians and fish will not be discussed. A comprehensive table of all species listed or designated as candidates for federal protection as threatened or endangered, including amphibians and fish, and identified for the counties falling under MTRs is included in Appendix F. Note that this list is based on county by county information. If any part of a county lies under an airspace element that would be used by the project, species in the county are included in the table. Only species with a federal status were included in Table 6.4.14-1 and Appendix F. The *Environmental Consequences* section includes discussions for threatened and endangered species and evaluates impacts associated with use of the MTR's.

Table 6.4.14-1. Federally Listed, Proposed, or Designated Candidate Endangered or Threatened Species Identified for Counties under Airspace Identified for Proposed MTRs

Common Name and Scientific Name	County of Occurrence By State[1]		Status (Federal and State)[2]			Proposed MTRs Within Range	General Habitat Associations
	CA	AZ	Fed	CA	AZ		
BIRDS							
American peregrine falcon, *Falco peregrinus anatum*	San Diego	La Paz	DE	E	WSC	IR-218, VR-1266, VR-1267, VR-1267A, VR-1268	Range includes most of California, except in deserts. Nesting and wintering habitats are varied, including wetlands, woodlands, other forested habitats, cities, agricultural areas and coastal habitats.
Bald eagle (wintering pop.), *Haliaeetus leucocephalus*		Mohave, Yavapai, Yuma	T (PDL)	E	WSC	VR-1267A, VR-1268	Wintering habitat includes perches in a variety of species of trees, in close proximity to a food source (fish, waterfowl, seabirds). Communal roosts are often located in close proximity to a rich food source and most often in forests with an old-growth constituent. (USFWS 1986b)
California brown pelican, *Pelecanus occidentalis californicus*	San Diego		E	E		IR-218, VR-1266, VR-1267	A southern California population breeds on islands off the coast of southern California and in Mexico. Between breeding seasons, pelicans gather in communal roosts along the Pacific Coast and at the Salton Sea in Imperial County, California. Major roosts are found on man-made structures (piers, jetties, offshore rocks) and on beaches. (CDFG 2000a)
California least tern, *Sternula antillarum browni*	San Diego		E	E		IR-218, VR-1266, VR-1267	Nests in colonies on bare, gravelly, or sparsely vegetated coastal beaches, coastal wetlands, and riverine sandbars. Nest at sites near sources of water where small fish are abundant.
Coastal California gnatcatcher, *Polioptila californica californica*	Riverside, San Bernardino, San Diego		T	SC		IR-216, IR-217, IR-218, VR-1266, VR-1267, VR-1268	Typically occurs in or near sage scrub habitat. Will also use chaparral, grassland, and riparian habitats where they occur in proximity to sage scrub for dispersal and foraging. Avoid nesting on very steep slopes (greater than 40 percent).
Least Bell's vireo, *Vireo bellii pusillus*	Imperial, Riverside, San Bernardino, San Diego		E	E		IR-216, IR-217, IR-218, VR-1266, VR-1267, VR-1268	Breeds in cottonwood-willow forests, oak woodlands, shrubby thickets, and dry washes with willow thickets at the edges. Large breeding populations in Riverside and San Diego counties.
Light-footed clapper rail, *Rallus longirostris levipes*	San Diego		E	E		IR-218, VR-1266, VR-1267	Inhabits cordgrass-pickleweed salt marsh year-round, feeding primarily on intertidal invertebrates. (CDFG 2000b)
Mexican Spotted Owl, *Strix occidentalis lucida*		Yavapai	T		WSC	VR-1267A, VR-1268	Nest or roost in closed canopy forests or rocky canyons. The majority of nests are found in trees. Favors old growth mixed-conifer forests.
Southwestern willow flycatcher, *Empidonax traillii extimus*	Imperial, Riverside, San Bernardino, San Diego	Mohave, Yavapai, Yuma	E	E	WSC	IR-216, IR-217, IR-218, VR-1266, VR-1267, VR-1267A, VR-1268	Breeds in patchy to dense riparian habitats along streams and other wetlands. (USFWS 2002b)

Table 6.4.14-1. Federally Listed, Proposed, or Designated Candidate Endangered or Threatened Species Identified for Counties under Airspace Identified for Proposed MTRs

Common Name and Scientific Name	County of Occurrence By State[1]		Status (Federal and State)[2]			Proposed MTRs Within Range	General Habitat Associations
	CA	AZ	Fed	CA	AZ		
Western snowy plover, *Charadrius alexandrines nivosus*	Riverside, San Bernardino, San Diego		T	SC		IR-216, IR-217, IR-218, VR-1266, VR-1267, VR-1268	Nest on sand spits, dune-backed beaches, beaches along creeks and river mouths, lagoons, and estuaries along the pacific coast from Baja California to Washington. (USFWS 2007)
BIRDS (CONTINUED)							
Western yellow-billed cuckoo, *Coccyzus americanus occidentalis*	Imperial, Riverside, San Bernardino, San Diego	Mohave, Yavapai, Yuma	C	E	WSC	IR-216, IR-217, IR-218, VR-1266, VR-1267, VR-1267A, VR-1268	Nests in riparian habitats, primarily woodlands with willows and cottonwoods or mesquite thickets.
Yuma clapper rail, *Rallus longirostris yumanensis*	Imperial, Riverside, San Bernardino	Mohave, Yavapai, Yuma	E	T	WSC	IR-216, IR-217, IR-218, VR-1266, VR-1267, VR-1267A, VR-1268	Inhabits dense stands of cattails and bulrushes along the lower Colorado River from California and Arizona south into Mexico year-round. The rail is also found at the Salton Sea in Imperial County, California. (CDFG 2000c)
REPTILES							
Desert Tortoise, *Gopherus agassizii*	Imperial, Riverside, San Bernardino	La Paz, Mohave, Yavapai, Yuma	T	T	WSC	IR-216, IR-217, IR-218, VR-1266, VR-1267, VR-1267A, VR-1268	Inhabits river washes, rocky hillsides, and flat desert having sandy or gravelly soil. Creosote bush, burrobush, saltbush, Joshua tree, Mojave yucca and cacti are often present in the habitat along with other shrubs, grasses, and wildflowers.
MAMMALS							
Bighorn sheep, *Ovis Canadensis*	Riverside, San Bernardino, San Diego		E	T		IR-216, IR-217 IR-218, VR-1266, VR-1267, VR-1268	Inhabit mountainous terrain, alluvial fans and washes, and areas of flat terrain, such as valley floors, which serve as linkages between mountain ranges and allow for access to resources such as food and water.
Hualapai Mexican Vole, *Microtus mexicanus hualpaiensis*		Yavapai	E		WSC	VR-1268	Inhabits burrows in washes with abundant grass or sedge cover and a riparian or ponderosa pine overstory. Active year round. (USFWS 1991)
Lesser Long-nosed Bat, *Leptonycteris curasoae yerbabuenae*		Yuma	E		WSC	VR-1267A, VR-1268	Roosts in caves and mines during the day. Night roosts include caves, mines, rock crevices, trees, shrubs, and occasionally abandoned buildings. (USFWS 1995d)
Sonoran pronghorn, *Antilocapra Americana sonoriensis*		Yuma	E		WSC	VR-1267A, VR-1268	Located in the Sonoran Desert in broad alluvial valleys separated by block-faulted mountains. Ephemeral washes are important during summer for thermal protection. (USFWS 1998e)

Table 6.4.14-1. Federally Listed, Proposed, or Designated Candidate Endangered or Threatened Species Identified for Counties under Airspace Identified for Proposed MTRs

Common Name and Scientific Name	County of Occurrence By State[1]		Status (Federal and State)[2]			Proposed MTRs Within Range	General Habitat Associations
	CA	AZ	Fed	CA	AZ		

Notes:
(1) Counties of occurrence determined through review of county lists provided by CDFG 2008 and Arizona Game and Fish Department, Heritage Data Management System (February 2008)
(2) Status:

Federal Status (determined by USFWS)
E Federally listed as Endangered
T Federally listed as Threatened
C Federally listed as Candidate
DE Federally delisted as Endangered
PDL Proposed for Federally delisted as Threatened (has not yet been proposed for listing)

California State Status (determined by CDFG):
E State listed as Endangered
T State listed as Threatened
CSC State listed as California Species of Special Concern

Arizona State Status (determined by AGFD):
WSC State listed as Wildlife of Special Concern

Environmental Consequences

Proposed Training Impacts

The majority of MTR use by the MV-22 would take place during the daylight hours. MTRs would be scheduled by MCAS Miramar and MCAS Yuma. In general, sortie operations would fly with a floor of 200 to 500 feet above ground level, and increasing to a floor level of 2,000 to 3,500 feet above ground level when flying over sensitive noise receptor areas, including the Imperial National Wildlife Refuge.

This is the minimum floor that would be used, and most flights would be at a greater elevation; nonetheless, this value represents the worst-case scenario for the purposes of this analysis.

Specific issues and concerns identified for biological resources are related to the potential effects of low-altitude overflights in existing airspace. The use of any rotary wing aircraft within undeveloped areas has the potential to add noise to the natural environment and cause a response by wildlife, potentially inducing a startle response injury due to trampling or uncontrolled running or flight; increased expenditure of energy during critical periods; decrease the amount of time spent on life functions such as seeking food or mates; temporarily mask auditory signals from other animals; and/or otherwise reduce the protection and stability of young. For this analysis, published literature was reviewed on the potential impacts of aircraft noise on wildlife and livestock including Manci et. al. (1988), Delaney, Grubb, and Pater (1997), Anderson et. al. (1989), Efroymson et. al. (2000), Gladwin et. al. (1988), and Bayless et. al. (2004). This information is summarized below. For most wild species along the MTRs, no specific studies on their response to aircraft noise are available. A discussion of general patterns of animal response to noise and published studies on effects of aircraft noise on wild and domestic animals is included in this section.

The type of noise that can stimulate the startle reflex is highly variable among animal species (Manci et al. 1988). In general, studies have indicated that close, loud, and sudden noises that are combined with a visual stimulus produce the most intense reactions. Rotary wing aircraft such as helicopters generally induce the startle effect more frequently than fixed wing aircraft (Gladwin et al. 1988; Ward et al. 1999).

Although there are no specific studies evaluating the impacts of MV-22 operations on wildlife species, this aircraft can be presumed to have impacts somewhat similar to those of a helicopter, such as the CH-46E, with exceptions as described in this section. For example, the MV-22 would appear more like a fixed wing aircraft with onset of sound from an MV-22 building up relatively gradually and the rotating blades forming a blur rather than being seen as rotating parts, reducing the potential for a startle effect. The MV-22 sounds more like a conventional turboprop aircraft, such as a short-hop commuter airliner or a C-130 cargo plane, than a helicopter in that it makes a steady buzzing tone and lacks the low pitched percussive ("wop-wop-wop") sound associated with many helicopters.

Compared to the CH-46E, which it would replace, noise modeling conducted for this EIS shows that in cruising flight sound exposure levels (SEL) in dBA from MV-22 would be consistently lower than those from CH-46E at altitudes between 250 feet and 5,000 feet above ground level (Table 6.4.14-2). The same is true of maximum sound levels (Lmax) in dBA (Table 6.1.14-4). SEL represents the total acoustic energy during an event (such as an overflight) typically measured over a duration of one second. Lmax is the maximum sound level measured over a fraction of a second during a single noise event that changes over time. During arrivals, SEL from MV-22 would be slightly lower than those from CH-46E; however, the Lmax would be somewhat greater for MV-22 (Table 6.4.14-2).

Table 6.4.14-2. Comparisons of Modeled CH-46E and MV-22 Sound Levels (SEL and Lmax) During Cruising at Different Altitudes Above Ground Level and During Arrival

Altitude (feet, above ground level)	Sound Exposure Level (SEL) (dBA)		Lmax (dBA)	
	CH-46E	MV-22	CH-46E	MV-22
CRUISE[1]				
250	101	93	97	88
500	96	92	90	88
1,000	94	88	86	81
1,500	92	86	82	78
2,000	89	84	78	74
2,500	88	82	76	72
3,000	87	81	74	70
3,500	86	80	73	68
4,000	85	79	72	67
4,500	85	78	72	66
5,000	84	77	69	64
ARRIVAL (AT OR NEAR TOUCHDOWN)[2]				
N/A	95	94	79	83

Notes:
1. Estimates CH-46E cruising speed of 110 knots and MV-22 cruising speed of 220 knots.
2. Measured at a distance of 500 feet abeam of the aircraft, on the left side.

Source: Data from Rotorcraft Noise Model Results (Wyle 2008).

Wild ungulates appear to vary in sensitivity to aircraft noise. Responses reported in the literature varied from no effect and habituation to panic reactions followed by stampeding (Manci et al. 1988, Weisenberger et al. 1996). For pronghorn, initial responses were an increased heart rate that returned to normal within minutes, running for short distances, and increased alertness. By the third exposure to a sonic boom, the animals' heart rate response had decreased by half and they did not run. Aircraft noise has the potential to be most detrimental during periods of stress, especially winter, gestation, and calving (Stockwell et. al. 1991, DeForge 1981).

Most studies have found few negative effects of aircraft noise on raptors, which generally included short-term to no alterness response. Ellis et al. (1991) examined behavioral and reproductive responses of several raptor species to low-level flights and sonic booms. No incidents of reproductive failure were observed and site reoccupancy rates were high (95 percent) the following year. Several researchers found that ground-based activities, such as operating chainsaws or an intruding human, were more disturbing than aircraft (White and Thurow 1985, Grubb and King 1991, Delaney et al. 1997). Red-tailed hawks (Buteo jamaicensis) and osprey (Pandion haliaetus) appeared to readily habituate to regular aircraft overflights (Andersen et al. 1989, Trimper et al. 1998). Mexican spotted owls did not flush from a nest or perch unless a helicopter was as close as 330 feet (Delaney et al. 1997). Johnson and Reynolds (2002) reported on the response of Mexican spotted owls to low altitude (1,400 feet above ground level) jet overflights of owl territories in narrow canyons in Colorado. Behaviors ranged from no response to sudden turning of the head. These behaviors did not exceed those observed before and after each fly-by. Delaney et al. (1997), who made measurements of Mexican spotted owl behavior in response to helicopters, indicated that their data suggest that diurnal flights would likely have less potential for disrupting critical spotted owl activity than nocturnal flights and indicated that the three hours following sunset and the three hours preceding dawn were most important.

The burrows of some mammals may reduce their exposure to aircraft noise. Francine *et al.* (1995) found that kit foxes (*Vulpes macrotis*) with twisting tunnels leading to deeper burrows experienced less noise than kangaroo rats with shallow burrows. Kit foxes are closely related to swift foxes (*Vulpes velox*), which occur under the airspace. Small mammals exposed to frequent and loud aircraft noise can develop enlarged adrenal glands. Chesser et al. (1975) found that house mice (*Mus musculus*) captured near an airport runway had larger adrenal glands than those captured 2 km from the airport. In the lab, naïve (previously unexposed) mice subjected to simulated aircraft noise also developed larger adrenal glands than a control group. The implications of enlarged adrenals for small mammals with a relatively short life span are undetermined, but may indicate lower body condition, reproductive problems, and shorter life spans.

Although some reaction (such as alert posture or briefly taking flight or running) to the low-level overflights is possible, overflights directly over any particular area would be relatively infrequent due to the area that would be used. There would likely be habituation to the overflight stimulus as the gradual increase in sound levels as the aircraft approached, and the lack of perceptible harm from the overflight. Additionally, the MV-22 would most often be travelling in fixed wing mode further reducing the potential for noise effects. For these reasons, the use of MTRs by the MV-22 would not be expected to have an observable adverse effect on any species at the population level. Furthermore, animals present in the airspace are likely habituated to the sound of aircraft overflight due to existing use of the MTRs. Therefore impact from noise would not be a significant impact.

Threatened and Endangered Species

CALIFORNIA LEAST TERN, WESTERN SNOWY PLOVER, AND LIGHT-FOOTED CLAPPER RAIL

The Western snowy plover and California least tern forage and nest on sandy beaches, dried mudflats, estuaries, and bays along the California coast. The light-footed clapper rail is a resident of coastal wetlands from Carpinteria, California south to northern Baja, California, Mexico (Zembal and Hoffman 2004). Since MTRs do not go west of the Santa Rosa Mountains, there would not be

any adverse effects to the California least tern, western snowy plover, and light-footed clapper rails, given their geographical distributions. Therefore, no significant impacts would occur.

CALIFORNIA BROWN PELICAN

The California brown pelican nests on islands off the coast of southern California and Mexico. During the winter, pelicans gather in communal roosts along the Pacific Coast and at the Salton Sea in Imperial County. Major roosts are found on man-made structures and on beaches (CDFG 2000a). While no specific studies have been performed on the effects of aircraft noise on California brown pelicans, it is estimated that, similar to other species, they would demonstrate a greater sensitivity to rotary wing aircraft than other aircraft. Also, effects from aircraft disturbance on this colonial rooster may be more dramatic due to the crowded nature of the nesting colonies. Aircrafts flying MTRs which cross over the Salton Sea may affect roosting California brown pelicans during the winter. Because these birds are non-breeding in these areas, aircrafts flying MTRs are not likely to adversely affect the species. As a result, impacts would be less than significant.

YUMA CLAPPER RAIL

The Yuma clapper rail is the only clapper rail to breed in freshwater and brackish water marshes in California and Arizona. The Yuma clapper rail's range includes Yuma County, Arizona and the Salton Sea in California. They are also found along several major river drainages in central and southwestern Arizona (Arizona Game and Fish Department 2006). While no specific studies have been performed on the effects of aircraft noise on Yuma clapper rails, it is estimated that Yuma clapper rails behave similarly to other waterfowl and waterbirds to aircraft disturbance. This species would likely demonstrate a greater sensitivity to rotary wing aircraft than other aircraft; the MV-22 would most often be travelling in fixed wing mode along the MTRs. Additionally, travel along any MTR could occur within the range of the total width (generally 3 miles), and as a result the potential for repeated overflights on a consistent basis is very low. Furthermore, animals present in the airspace are likely habituated to the sound of aircraft overflight due to existing use of the MTRs. MTRs crossing over the Salton Sea and marshes in southeastern California and Southwestern Arizona may temporarily and locally affect Yuma clapper rails, but overflights are not likely to result in a decrease of the long-term success of any population. Therefore impact from noise would not be significant, and thus noise associated with the MV-22 use of existing MTR's is likely to affect, but not likely to adversely affect this species.

SOUTHWESTERN WILLOW FLYCATCHER, LEAST BELL'S VIREO, AND YELLOW-BILLED CUCKOO

The southwestern willow flycatcher is a neotropical migrant. It arrives in breeding habitat as early as mid-May and may be present until mid-August. The southwestern willow flycatcher inhabits and breeds in dense riparian vegetation along rivers, streams, or other wetlands. The vegetation can be dominated by dense growths of willows (*Salix* spp.), mulefat (*Baccharis salicifolia*), and other shrubs and trees. Overstory is commonly composed of cottonwood (*Populus* spp.), tamarisk (*Tamarix* sp.), and other large trees. Suitable habitat appears to depend on the presence of dense vegetation, typically throughout all vegetation layers. Generally, southwestern willow flycatcher breeding habitats are close to water or very saturated soil, including large rivers, smaller streams, springs, or marshes.

The least Bell's vireo arrives in southern California from mid-March to early April and leaves for its wintering grounds in southern Baja California in August. Vireos primarily inhabit dense willow-dominated riparian habitats with lush understory vegetation, nesting 3 to 4 feet (1 to 1.2 meters) above the ground in the understory and using taller trees for foraging and singing perches. Least Bell's vireos forage primarily in willows.

Like the least Bell's vireo, the yellow-billed cuckoo arrives in its breeding grounds in southern California and Arizona from mid-March to early April and leaves for its wintering grounds in July. Cuckoos primarily inhabit young riparian habitat, including streamside cottonwood, willow groves, and larger mesquite bisques. Cuckoos prefer rapidly growing stands of trees for nest sites, in close proximity to water (Laymon 1998).

Studies have shown (Larkin n.d.) that non-auditory cues (i.e., visual) appearing prior to loud sounds may permit animals to prepare for loud noises, thus reducing the potential stressful effect of the noise. Such studies have shown that migrating birds show stronger reactions to large blasts resembling thunder than to loud noises. MV-22's flying MTR's are not likely to adversely affect the species. Impacts would be less than significant.

COASTAL CALIFORNIA GNATCATCHER

The coastal California gnatcatcher is a non-migratory bird with a range restricted to California and Baja California, Mexico. This subspecies is found from Ventura County south to San Diego County and east to San Bernardino County. On MCB Camp Pendleton, the coastal California gnatcatcher's distribution is markedly clumped. The gnatcatcher breeds almost exclusively in the coastal sage community, but can also be found in adjacent grassland, chaparral, and riparian habitats. The breeding season of the gnatcatcher extends from late February through July, with peak nesting activities occurring from mid-March through May. This species' nests are composed of grass, bark strips, small leaves, spider webs, and down and are typically built in coastal sagebrush about three feet above the ground. It is estimated that the coastal California gnatcatcher would react similarly to loud noises as migrating birds do. Studies have shown that migrating birds show stronger reactions to large blasts resembling thunder than to loud noises. MV-22's flying MTR's may affect but are not likely to adversely affect the species. Impacts would be less than significant.

BALD EAGLE AND PEREGRINE FALCON

Bald eagles winter at water bodies locally within the project area and peregrine falcons can be found year round in many habitats throughout California, including wetlands, woodlands, cities, agricultural areas, and forested habitats (though they are not found in deserts). In a study comparing on-ground or in-water activities, aircraft showed the lowest level of response by breeding bald eagles in terms of frequency and duration of response. The most common response to aircraft, including jets, light planes, and helicopters, was no response (67 percent), followed by alert response (29 percent), flight (three percent), and temporary departure from area (one percent). Among aircraft, helicopters elicited the highest response frequency and the greatest level of response alert (36 percent); flight (nine percent); departure (two percent). The median duration of response was 1.0 minute (Grubb and King 1991). Wintering bald eagles showed a strong response (taking flight) when approached closely by boats (ranging from a few meters to 100 meters) or low-flying helicopters (mostly UH-1 at 60 to 120 meters above ground level). This study (Stalmaster and Kaiser 1997) did not evaluate response to fixed wing aircraft, which would have been considerably

less than to helicopters, based on observations in many other studies. Occasionally taking flight when closely approached by a helicopter is not expected to adversely affect wintering bald eagles, given the low likelihood of direct overflight, and the potential for acclimation to the overflight of rotary wing and fixed wing aircraft. Based on previous research (Larkin n.d.), Peregrine falcons have tolerated construction activity and successfully reared young under noisy conditions. This species is regularly introduced into urban areas and is thought to tolerate noise. It is estimated that peregrine falcons would behave similarly to bald eagles when disturbed by aircraft. Based on these factors, project related overflights may affect but are not likely to adversely affect wintering bald eagles or peregrine falcons. Impacts would be less than significant.

MEXICAN SPOTTED OWL

Occupied Mexican spotted owl habitat is present under MTRs that would be used by the project. Delaney, Grubb, and Pater (1997) conducted a detailed study on the effects of helicopter noise as well as on the ground disturbances during daylight and nighttime hours. Their findings concurred with other noise disturbance research suggesting that aircraft overflights alone have a negligible effect on raptor reproductive success and young fledged per nest. Adult owls only flushed after their chicks had fledged. This study included very low level overflight (down to 30 meters above ground level). The study found alert responses (head movements) at an average distance of 403 meters. No flushing occurred at a distance of greater than 105 meters and only five percent of spotted owls flushing at distances between 61 and 105 meters. A relatively quick return to pre-disturbance behavior was consistently found. Habituation (progressively less response with repeated exposures to a given type of disturbance) is suggested by the data but sample sizes were not adequate to demonstrate it statistically. Owls were most active during hours of darkness, with the greatest activity during the three hours following sunset and the three hours preceding dawn. The majority of overflights along MTRs would occur during daytime hours, when spotted owls are less active. During the nesting season, the peak period of prey deliveries to the nest was during the three hours preceding dawn. Based on Delaney et al.'s finding of no substantive evidence that helicopter overflights during the nesting season detrimentally affected success or productivity of Mexican spotted owls, it is expected that overflights may affect but are not likely to adversely affect Mexican spotted owls. Impacts would be less than significant.

DESERT TORTOISE

The desert tortoise inhabits creosote, shadscale, and Joshua tree desert scrub in the Mohave and Sonoran deserts (USFWS 2002a). Desert tortoises usually dig their burrows in gravelly flats and sandy soils with some clay. Desert tortoises spend most of the year in burrows, to avoid the extreme conditions of the desert. Desert tortoises are most active while foraging in the spring and early summer. As mentioned previously, the burrows of some mammals may reduce their exposure to aircraft noise. It is estimated that this is the same for desert tortoise burrows. Bowels et al. (1998) found that desert tortoises exhibited the species-typical freezing response to simulated subsonic aircraft noise. After the initial exposure, freezing bouts significantly shortened to an alert response. Based on the infrequency of sorties along MTRs and the direct flight pattern, the effects of project activities would not reach the level at which take occurs; thus, impacts would be less than significant.

HUALAPAI MEXICAN VOLE

The Hualapai Mexican Vole inhabits burrows in washes with abundant grass or sedge cover and a riparian or ponderosa pine overstory and are active year round. As mentioned previously, the burrows of some mammals may reduce their exposure to aircraft noise. While the species is known to occur in habitats under the airspace, it is not expected to have any reaction to project overflights during daytime since it would be underground. Effects of project activities are not likely to affect the species and impacts would be less than significant.

SONORAN PRONGHORN

Sonoran pronghorn inhabit broad alluvial valleys and washes in the Sonoran desert. Pronghorn occur in Sonoran desert scrub vegetation communities, often dominated by Creosote (*Larrea tridentate* and white bursage (*Ambrosia dumosa*) (USFWS 2000). Stem succulents are also an important constituent of the habitat, providing water to pronghorn in hot, dry conditions. Washes and drainages are used by pronghorn as shade and fawning areas in the spring and summer. Large, sandy areas within the habitat provides good foraging vegetation in the spring; though, lack of thermal protection make these habitats undesirable in the summer. As mentioned previously, responses of pronghorn to noise, as reported in the literature, varied from no effect and habituation to panic reactions followed by stampeding (Manci et al. 1988, Weisenberger et al. 1996). Luz and Smith (1976) observed that pronghorn antelope did not run until a helicopter was 150 feet above ground level. The minimum floor level along MTRs would be 200 feet above ground level. Preliminary results by Bayless et al. (2004) have shown flight responses followed by habituation of pronghorn to helicopter overflight when the flight pattern is a racetrack, but a repeated flight response with no habituation to a helicopter hovering in one place at the same distance. MV-22 use along MTRs would follow a linear flight pattern with no hovering. Pronghorn can be active during both daylight and nighttime hours. Greatest movement activity of pronghorn at a northern Arizona study location, however, took place during twilight hours. The majority of MTR use by the MV-22 would take place during the daylight hours. Studies on pronghorn response to overflight by jet aircraft and helicopters have suggested rapid habituation to overflight after initial responses, which include running for short distances (Workman *et al.*1992, Bayless *et al.* 2004). Given the results of these previous studies, it is estimated that MV-22 use along MTRs would results in rapid habituation to overflight. It is expected that that overflights may temporarily affect but not adversely affect Sonoran pronghorn, and as a result, impacts would be less than significant.

BIGHORN SHEEP

The bighorn sheep inhabits a variety of mountainous habitats in southern California, in the Peninsular Ranges along the northwestern edge of the Sonoran Desert (USFWS 2000). Bighorn sheep are typically found below 4,600 feet in elevation on east-facing slopes. Two crucial habitat characteristics are steep topography and open terrain, which both aid in rearing lambs and evading predators. During inclement weather, bighorn sheep may move to sunny, south-facing slopes or take refuge in caves and cliff overhangs. Other non-mountainous habitat, such as alluvial fans and washes and valley floors, are important to bighorn sheep, offering access to resources. It is estimated that bighorn sheep would react similarly to overflight noise as other ungulates, such as the Sonoran pronghorn. Studies on pronghorn response to overflight by jet aircraft and helicopters have suggested rapid habituation to overflight after initial responses, which include running for short distances. As a result, it is expected that overflight noise from use of the MV-22 along MTR's

would likely temporarily affect but not adversely affect Bighorn sheep. Impacts would be less than significant.

MITIGATION MEASURES

Because no significant impacts would occur, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and no impacts on biological resources would occur.

6.4.15 Cultural Resources

The proposed training operations within the MTRs do not include new construction or improvements at any on- or off-range facilities. MTR use would not involve any ground disturbance that may affect archaeological resources nor would there be any impact on historic buildings. MCIWEST is entering into a Programmatic Agreements with the California and Arizona SHPOs, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. MCIWEST is in the process of consulting with tribal Nations regarding any concerns with the proposed action (see Appendix H), such as visual or noise-related impacts on a traditional cultural resource. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreements.

6.4.16 Safety and Environmental Health

The proposed training operations within the MTRs do not include hovering near to the ground or landing along the MTR route, and no chaff, flare, or munitions use is proposed. Therefore, MV-22 flight operations along the MTR would not result in any explosives safety or wildfire management issues. Airspace management and general aviation safety is discussed in section 6.4.2. No other safety or environmental health impacts would occur.

6.4.17 Environmental Justice

In 1994, Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (Environmental Justice)*, was issued to focus the attention of federal agencies on human health and environmental conditions in minority populations and low-income populations. This Executive Order was also established to ensure that, if there were a disproportionately high and adverse human health or environmental effects of federal actions on these populations, those effects would be identified and addressed. In 1997, Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (*Protection of Children*), was issued to identify and address issues that affect the protection of children. This Executive Order was also established to ensure that, if there were human health or environmental effects of federal actions that might pose a particular risk to children, those effects would be identified and addressed.

Affected Environment

MV-22 aircraft based on the West Coast, regardless of basing alternatives, would use established MTRs located in southern California and Arizona for routine training and other readiness operations. These MTRs are currently used by various aircraft for training and readiness operations. Populations inhabiting lands underlying the MTRs in southern California and Arizona represent a broad mix of demographic categories as defined above. The affected environments for the various basing alternatives described in sections 3.17, 4.17, 5.17, and 6.3.17 are representative of the populations associated with the MTRs.

Environmental justice analysis applies to adverse human health or environmental effects. Consequently, potential disproportionate impacts to minority or low-income populations are assessed only when adverse environmental consequences to the general human population are anticipated. The same is true for analysis of health and safety risks to children, as the potential for such risks would be driven by adverse environmental impacts. As no significant environmental impacts to the human population are associated with proposed MTR operations (see below), quantitative assessment of minority, low-income, and youth populations is not required under Executive Order 12898 and Executive Order 13045.

Environmental Consequences

Training Range Impacts

Seven MTRs would be utilized by MV-22 aircraft for training and readiness operations. There would be no use of chaff or flares, and no landing or hovering operations would occur within the MTRs.

Operations under the proposed action are not expected to create significant adverse environmental or health effects to the human population. Environmental justice concerns related to aircraft operations typically include air quality, noise, and safety. Specific issues of concern involve aircraft emissions, aircraft noise, and safety concerns related to flight mishaps and explosives handling. The analyses conducted for Air Quality (section 6.4.7), Noise (section 6.4.8), Hazardous Materials Management (section 6.4.11), and Safety and Environmental Health (section 6.4.16) indicate that less than significant environmental or human health impacts are anticipated under the proposed action. Consequently, no disproportionate or adverse impacts related to environmental justice are anticipated, nor would there be any special health or safety risks to children.

MITIGATION MEASURES

Because there would be no disproportionate or adverse impacts anticipated related to environmental justice, no mitigation measures are proposed.

No Action Alternative

Under the No Action Alternative, there would be no West Coast-based MV-22 training activities. Therefore, existing conditions would remain unchanged, and no environmental justice impacts would occur.

Chapter 7

Summary of Impacts

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7.0 SUMMARY OF IMPACTS

7.1 INTRODUCTION

This EIS addresses the impacts of basing up to ten squadrons of MV-22 on the West Coast. Evaluations were made of the maximum and minimum number of squadron options at each air station (e.g., maximum partial basing of eight squadrons and minimum partial basing of two squadrons). These include the following basing alternatives.

- Full basing (ten squadrons) at MCAS Miramar;
- **Partial basing at MCAS Miramar (eight squadrons) and MCAS Camp Pendleton (two squadrons) (*Preferred Alternative*);**
- Partial basing at MCAS Miramar (eight squadrons) and MCAS Yuma (two squadrons);
- Partial basing at MCAS Miramar (two squadrons) and MCAS Yuma (eight squadrons);
- Partial basing at MCAS Yuma (eight squadrons) and MCAS Camp Pendleton (two squadrons); and
- No Action.

Environmental impacts of the proposed action (construction and operations) were assessed for each air station in Chapters 3.0 (MCAS Miramar), 4.0 (MCAS Camp Pendleton), and 5.0 (MCAS Yuma). Regardless of which basing alternative is ultimately selected, the MV-22 would conduct training and readiness operations and special exercise operations within DoD-controlled airspace and DoN/USMC training ranges located on the West Coast. This includes operations at MCB Camp Pendleton (section 6.1), the Bob Stump Training Range Complex (Chocolate Mountain Range, BMGR-West, R-2510 and R-2512) (section 6.2), MCAGCC (section 6.3), and various MTRs (section 6.4). No new or modified restricted areas, MTRs, OLFs, DZs, or CAL sites are included in this EIS, and no construction or improvements are proposed at any range facility at this time.

This section provides an overview of potential environmental impacts related to each proposed action alternative and the No Action Alternative, including a summary of all significant impacts and proposed measures to avoid, minimize, or mitigate impacts. Each basing alternative also has a discussion of the air quality impacts, including a presentation of the estimated emissions for all project components (construction and operations) within each air basin. Table 7.1-1 also provides an overview comparison of impacts for each resource area by alternative for a quick reference. Please see the following sections for further information.

7.2 FULL BASING ALTERNATIVE AT MCAS MIRAMAR

Full basing of the MV-22 squadrons at MCAS Miramar would require placing 60 aircraft north of the runway and 48 aircraft south of the runway (hangar and apron space planning accounts for the fact at least 12 aircraft are deployed at all times). New support facilities would include one new hangar module, parking apron, four new fuel pits, and one new wash rack north of the runway, as well as two new hangars, aircraft parking apron, taxiways, wash racks, three new fuel pits and associated fuel lines south of the runway (see Figures 2.3-1 and 2.3-2). This alternative would result in an increase of 1,142 military personnel and 72 aircraft at MCAS Miramar and a reduction of 42

Table 7.1-1 Comparison of Environmental Impacts by Basing Alternative

Resource Area	Full Basing Alternative MCAS Miramar (10 squadrons)	Partial Basing at MCAS Miramar (8 squadrons) & MCAS Camp Pendleton (2 squadrons)	Partial Basing at MCAS Miramar (8 squadrons) & MCAS Yuma (2 squadrons)	Partial Basing at MCAS Yuma (8 squadrons) & MCAS Miramar (2 squadrons)	Partial Basing at MCAS Yuma (8 squadrons) & MCAS Camp Pendleton (2 squadrons)	No Action Alternative
Airfield Operations	NS/NI	NS/NI	NS	NS	NS	NI
Land Use	NS	NS	NS	NS	NS	NS/NI
Socioeconomics	NS/NI	NS/NI	S-M (MCAS Yuma)	S-M (MCAS Yuma)	S-M (MCAS Yuma)	NS/NI
Community Facilities and Services	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI	NI
Ground Traffic & Transportation	S-U (MCAS Miramar)	S-U (MCAS Miramar)	S-U (MCAS Miramar & MCAS Yuma)	S-U (MCAS Yuma)	S-U (MCAS Yuma)	NS/NI
Air Quality	NS/BI	NS/BI	NS/BI	NS/BI	NS/BI	NS/NI
Noise	NS	NS	NS	NS	NS	NS/NI
Infrastructure and Utilities	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI
Aesthetics & Visual Resources	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI
Hazardous Materials Management	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI
Topography, Geology, and Soils	NS	NS	NS	NS	NS	NS/NI
Water Resources	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI
Biological Resources	S-U (MCAS Miramar)	S-M (MCAS Miramar & MCAS Camp Pendleton)	S-M (MCAS Miramar)	NS/NI	S-M (MCAS Camp Pendleton)	NS/NI
Cultural Resources	S-M (MCAS Miramar; MCB Camp Pendleton; Bob Stump Training Range Complex; and MCAGCC)	S-M (MCAS Camp Pendleton; MCB Camp Pendleton; Bob Stump Training Range Complex; and MCAGCC)	S-M (MCB Camp Pendleton; Bob Stump Training Range Complex; and MCAGCC)	S-M (MCAS Yuma; MCB Camp Pendleton; Bob Stump Training Range Complex; and MCAGCC)	S-M (MCAS Yuma; MCAS Camp Pendleton; MCB Camp Pendleton; Bob Stump Training Range Complex; and MCAGCC)	NS/NI
Safety & Environmental Health	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI	NS/NI
Environmental Justice	NS	NS	NS	NS	NS	NS/NI

Notes:
Significant/Unmitigable Impacts = S-U; Significant/Mitigable = S-M; No Significant Impacts = NS; Beneficial Impacts = BI; No Impacts = NI

Table 7.2-1. Summary of Environmental Consequences for the Full Basing Alternative at MCAS Miramar

	MCAS Miramar (Ten Squadrons)	MCAS Camp Pendleton (No MV-22 Squadrons*)	MCAS Yuma (No MV-22 Squadron+)	MCB Camp Pendleton	Bob Stump Training Range Complex	MCAGCC	MTR
CHANGE IN CONDITIONS							
Net Change in Aircraft	+72	-42	-	-	-	-	-
Net Change in Military Personnel	+1,142	-674	-	-	-	-	-
Net Change in Annual Operations	+34,421	-17,995	-2,812	+1,895	+16,382	-1,689	+2,085
RESOURCE AREA IMPACT							
Airfields and Airspace	NS	NS	NI	NS	NS	NS	NS
Land Use	NS	NS	NS	NS	NS	NS	NS
Socioeconomics	NS	NS	NS	NI	NI	NI	NI
Community Facilities & Services	NS	NS	NI	NI	NI	NI	NS
Ground Traffic & Transportation	S-U	NS	NS	NI	NI	NI	NI
Air Quality	NS	NS/BI	NS	NS	NS	NS	NS
Noise	NS	NS	NS	NS	NS	NS	NS
Infrastructure & Utilities	NS	NS	NS	NI	NI	NI	NI
Aesthetics & Visual Resources	NS	NI	NS	NI	NI	NI	NS
Hazardous Materials Management	NS	NI	NS	NI	NI	NS	NI
Topography, Geology, & Soils	NS	NI	NS	NS	NS	NS	NI
Water Resources	NS	NI	NS	NS	NS	NS	NI
Biological Resources	S-U	NI	NS	NS	NS	NS	NS
Cultural Resources	S-M	NI	NS	S-M	S-M	S-M	NI
Safety & Environmental Health	NS	NS	NS	NS	NS	NS	NI
Environmental Justice	NS	NS	NS	NS	NS	NS	NS

Notes:
Significant/ Unmitigable Impacts = S-U; Significant/Mitigable = S-M; No Significant Impacts = NS; Beneficial Impacts = BI; No Impacts = NI
* MCAS Camp Pendleton would lose three CH-46 squadrons.
\+ There would be no change in personnel or aircraft at MCAS Yuma; this column is based on the No Action Alternative.

aircraft and 674 military personnel at MCAS Camp Pendleton (no change would occur at MCAS Yuma). Environmental impacts of construction and operations related to this alternative were assessed for all air stations. Environmental impacts were also assessed for proposed training operations at MCB Camp Pendleton, the Bob Stump Training Range Complex, MCAGCC, and various MTRs; these impacts apply to all basing alternatives. An overview of the environmental consequences for full basing at MCAS Miramar is provided in Table 7.2-1.

Implementation of the Full Basing Alternative at MCAS Miramar would result in significant and unmitigable impacts to vernal pools and other biological resources (see discussion in section 3.14). Mitigation measures outlined in section 3.14 include compensatory restoration efforts (i.e., habitat restoration on other areas of MCAS Miramar). Analysis was conducted to determine if these habitat restoration activities would result in an impact to other resource areas (e.g., Land Use, Cultural Resources) in Chapter 3, and results of these analyses are summarized, as appropriate, below.

This alternative would result in significant and unmitigable impacts to biological resources, and ground traffic and transportation. Additionally, significant but mitigable impacts to cultural resources were determined to occur in association with this alternative. These significant impacts are discussed below along with proposed measures to avoid, minimize, or mitigate impacts. Impacts to the balance of the resource areas were either not significant or had no impact and are not discussed further here, with the exception of air quality. As noted above, each basing alternative has a presentation of the estimated emissions for all project components (construction and operations) within each air basin.

7.2.1 Ground Traffic and Transportation

Operations at MCAS Miramar

Significant and unmitigable impacts to ground traffic and transportation were identified in association with the Full Basing Alternative at MCAS Miramar. Operations-related traffic from increased military personnel and civilian employees would add an estimated 2,444 trips onto the existing roadway conditions. The operations-related traffic associated with this alternative would be a significant portion of the total traffic volumes for the segment of Miramar Way between Kearny Villa Road and Interstate-15. These significant traffic impacts cannot be mitigated because the additional traffic volume does not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210), and the DoN has no other legal authority for funding roadway improvements outside the installation. Therefore, implementation of the Full Basing Alternative at MCAS Miramar would result in a significant and unmitigable impact.

7.2.2 Biological Resources

Construction at MCAS Miramar

Significant and unmitigable impacts to biological resources were identified in association with the Full Basing Alternative at MCAS Miramar. Construction activities at MCAS Miramar would result in impacts to vernal pool habitat and the direct loss of San Diego fairy shrimp, San Diego button-celery, and San Diego mesa mint populations (significant and unmitigable impacts). This alternative would

also result in impacts to undisturbed Diegan coastal sage scrub, Clean Water Act regulated waters, chaparral, and the California gnatcatcher population (significant but mitigable impacts).

The following avoidance, minimization, and mitigation measures are proposed for the Full Basing Alternative to reduce construction-related impacts on biological resources. For some resources, successful implementation of these measures would reduce the impact to a less than significant level, including project-related impacts to Diegan coastal sage scrub and temporary impacts to native communities; Clean Water Act regulated waters, indirect impacts on vernal pool habitat and associated sensitive species; migratory birds; and California gnatcatcher. Direct impacts on vernal pools and associated species that are federally listed as threatened or endangered could be reduced through mitigation; however, resulting impacts after mitigation would remain significant under the Full Basing Alternative. Measures for plant communities and common wildlife species, including migratory birds, are discussed together because proposed measures would provide comparable benefits. Similarly, measures for vernal pool species and habitats are grouped together.

Measure 1. Restrict clearing and grubbing of vegetation known to support or have the potential to support migratory birds or other sensitive resources; restrict construction in the vicinity of San Clemente Canyon. Removal of vegetation for the new bridge, new apron areas, parking areas, and fuel pits, will be restricted to outside of the breeding season for most migratory birds (15 February to 31 August) to the extent feasible. In areas, such as in the vicinity of vernal pools, where clearing and grubbing cannot be conducted outside of the breeding season to avoid work in wet pool conditions, biological monitors will conduct nest searches prior to clearing and grubbing and identify nests to be avoided. Implementation of this measure would reduce impacts on breeding behavior.

Measure 2. Monitor biological resources during construction within native habitats and other sensitive environments. A biological resource monitor will be onsite at all times during clearing and grubbing of vegetation. The monitor will identify work areas, monitor work activity, and provide "tailgate" sessions for construction contractors. The monitor will also be responsible for ensuring that all minimization and conservation measures are implemented.

Measure 3. Restoration/enhancement of disturbed areas supporting sensitive plant communities consistent with the MCAS Miramar INRMP (2006). Avoidance and/or on-site mitigation would not be feasible under this alternative. Therefore, consistent with the INRMP, the removal of 43.1 acres (17.9 ha) of Diegan coastal sage scrub (32.9 acres [13.3 ha] permanently lost and 10.2 acres [4.2 ha] assumed lost within buffer) will be compensated for through habitat restoration/creation of a like-kind community either on MCAS Miramar or off-station (Table 3.14-6). Compensation will occur at a ratio of 1:1 for undisturbed sensitive native plant communities and 0.5:1 for disturbed, sensitive, native plant communities (coastal sage scrub). The specific location/locations for restoration will be coordinated and approved by the USMC. This measure will also include the preparation of a habitat restoration plan by the USMC to be completed prior to any project-related construction. The proposed bridge construction will avoid removal of riparian vegetation to the maximum extent feasible. The USMC will compensate any permanent loss of riparian vegetation at 2:1 ratio. Planning and compensation guidance will follow direction outlined in Chapter 6 of the MCAS Miramar INRMP (2006).

Measure 4. Compensate for unavoidable temporary and permanent effects on Clean Water Act regulated waters by implementing restoration/enhancement on MCAS Miramar or off-station preservation. Clean Water Act regulated waters have been mapped associated with San Clemente Canyon in the vicinity of the proposed bridge construction and new fuel pit areas, and apron and infrastructure expansion south of the runway. As part of finalized construction plans, wetlands delineations will be reviewed and plans will be prepared to reduce permanent removal of wetland areas to the maximum extent feasible. Where impacts to Clean Water Act regulated features cannot be avoided, the USMC will compensate for losses at 1:1 or as required by the permitting agency as a condition of the permit, consistent with the MCAS Miramar INRMP. Specific mitigation sites will be coordinated as part of the Clean Water Act permitting process. At a minimum, compensation will occur at areas identified and approved by the regulating agency in a wetland restoration and compensation plan, and specifically address success criteria, monitoring frequency and duration requirements, plant proposed for restoration, and invasive weed control. These requirements would be in addition to any required by the regulating agency as part of the permitting process although compensation for Clean Water Act purposes will not be additive to other proposed compensation.

Measure 5. Implement a water quality management program at construction areas within the watersheds of vernal pools outside the project boundary and in the vicinity of San Clemente Canyon. Before construction, the construction contractor will prepare a water quality management plan, which addresses the type, placement, and monitoring of erosion and water quality control features to be used during and following construction to reduce indirect impacts to biological resources due to construction runoff. Specifically, the plan will include:

- PLACEMENT AND IMPLEMENTATION OF EROSION CONTROL MEASURES. Placement and maintenance of jute netting, geotextiles and other materials will be performed to minimize the effects from stormwater and soil erosion.
- MINIMIZE BLADING AND GRADING OF TEMPORARY CONSTRUCTION WORK AREAS. When feasible, vegetation within the disturbance area will be cut or crushed vegetation at the surface rather than completely remove.
- POST-CONSTRUCTION WATER QUALITY MONITORING AT VERNAL POOL LOCATIONS. The USMC will monitor water quality during and after project construction at vernal pool locations. A monitoring plan will be prepared by a biologist with extensive experience with vernal pools. The plan will include sampling and measurements of dissolved oxygen, turbidity, suspended solids, lead, copper, and zinc. Additionally the plan will include action protocols to be followed if water quality is below pre-construction standards. If water quality standards are met, monitoring will cease after two years post construction.
- RESTRICT CONSTRUCTION IN WATERSHED OF VERNAL POOL TO OUTSIDE OF THE WET SEASON. Consistent with the INRMP, any construction that could affect habitat for sensitive species associated with true vernal pools and seasonally ponded features and watersheds will occur outside of the rainy season (1 November to 1 June) and in dry conditions only. Following the initial clearing of features, ongoing construction activities can occur into the wet season with implementation of erosion control BMPs.

Measure 6. Compensate for unavoidable permanent effects on vernal pool basins (occupied and unoccupied by listed species) by implementing restoration/enhancement on MCAS

Miramar or off-station preservation. Consistent with the INRMP, the USMC will compensate for losses of occupied true vernal pool basins at a ratio of 3:1. Unoccupied vernal pools will be compensated for at a 1:1 ratio, and occupied seasonally ponded features (road ruts, ditches, and puddles) will be compensated for at 1.5:1. Tables 3.14-5 and 3.14-6 provide a breakdown of occupied and unoccupied features. For use in compensating restoration sites, surface soil from basins supporting endangered species will be salvaged during the "dry season" prior to the start of construction.

As part of this measure, a restoration/enhancement plan will be prepared for USFWS concurrence. The USMC has identified potential restoration areas for vernal pools, including areas in the vicinity of the proposed action, based on pool re-establishment surveys (south of Harris Plant Road, Johnson Road, west of Interstate-15) completed during the 2004-2005 rainfall season (Figure 3.14-6). Based on the alternative selected, the plan will include restoration/enhancement locations, restoration/enhancement components, monitoring requirements and time periods, success criteria, and follow-on measures as appropriate. Any additional requirements that result from Section 7 ESA consultation with the USFWS will be implemented as well.

Measure 7. Restoration/enhancement of areas temporarily disturbed by project-related construction activities to reduce indirect impacts to biological resources. For the purposes of the impact analysis, all potential effects within a 50 foot (15 meter) buffer around proposed new facilities are conservatively considered permanent; however, no new construction is proposed within the buffer. While this buffer zone is not proposed to have new facilities constructed on it, it will be recontoured to prevent water ponding and subsequent establishment of vernal pool habitat**.** The USMC will avoid and minimize temporary impacts to areas adjacent to project-related construction activities (but outside of the 50-foot buffer zone). Specifically, the USMC will take action to minimize the area of impact, soil loss, and sediment laden stormwater runoff, and implement passive restoration of temporary disturbance areas including recontouring and reseeding with native herbaceous species that will withstand frequent disturbance, as identified in the MCAS Miramar INRMP (MCAS Miramar 2006).

Habitat Restoration at MCAS Miramar

As a result of implementation of compensation measures as identified in the MCAS Miramar INRMP, existing degraded areas that are not specifically associated with this alternative under the proposed action might be included as part of a vernal pools or jurisdictional features restoration program. As noted under **Measure 6**, USMC has identified potential restoration areas for vernal pools, including areas in the vicinity of the proposed action, based on pool re-establishment surveys (Figure 3.14-6; south of Harris Plant Road, Johnson Road, west of Interstate-15). Under the Full Basing Alternative, all areas identified as potential vernal pool restoration areas would likely be required to satisfy compensation requirements. Only a very small area of identified restoration site options would be required for the Maximum Partial Basing Alternative, and no restoration would be required under the Minimum Partial Basing Alternative. Impacts resulting from restoration of these areas would represent a beneficial impact on biological resources (converting degraded non-native plant communities and habitat to restored native habitats).

Proposed Training Operations

No significant impacts to biological resources would occur from proposed training operations at MCB Camp Pendleton, Bob Stump Training Range Complex, or MCAGCC. However, the use of range facilities would represent a new type of training with respect to fires, which could impact biological resources. Operation of the MV-22, itself, has not been identified as a cause of frequent fires. Nonetheless, all training activities have the potential to start fires. At MCB Camp Pendleton, all types of training activities have the potential to start fires due to existing vegetation that is adapted to summer-dry semi arid conditions. Fire potential would be highest in undeveloped areas with an abundance of natural fine fuels (e.g., dry grasses or finely branched shrubs that extend above the ground surface), dry soil, and low fuel moisture content, which may occur frequently during the late summer and fall at MCB Camp Pendleton. Fire is of less concern at the Bob Stump Training Range Complex and MCAGCC because, under natural conditions, the prevalent creosote bush scrub vegetation is too sparse to carry fire. However, the recent spread of introduced invasive species may result in sufficiently dense vegetation after high rainfall years to carry a fire. Because of the low likelihood of fire related to MV-22, the potential for increased wildland fire associated with MV-22 training is expected to have a less than significant impact on biological resources. However, the measures listed in Table 7.2-2 are proposed to further reduce the likelihood and significance of impacts resulting from training-related fires.

Table 7.2-2. Biological Resources Measures for the Proposed Training Operations

MCB Camp Pendleton
Exhaust Deflectors. Exhaust deflectors on the MV-22 aircraft will be deployed while on the ground with engines running at undeveloped and vegetated sites.
Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance. Operators will minimize the time on the ground with engines running on unprepared sites and follow all recommendations in the NATOPS manual. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios. For training within DZs, operators will touch down only on improved or disturbed, unvegetated surfaces where the potential for fire is lowest and landings have been approved, such as paved LZs, fire breaks, and/or training roads. Specific text regarding restrictions on landing sites within DZs will be incorporated into the Wing SOPs.
Restrict Training During Extreme Fire Hazard Days. Due to the lack of MCB Camp Pendleton-specific data regarding MV-22 operations in seasonally dry vegetation, training at unimproved, vegetated sites on MCB Camp Pendleton will initially be subject to restrictions associated with implementation of the FDR system. Specifically, training and use of the MV-22 at undeveloped, vegetated landing sites will not occur under a Red (extreme hazard) Fire Danger Rating, and training at undeveloped, vegetated sites will be avoided to the maximum extent feasible under Orange (high) Fire Danger Rating days. This precautionary measure will be in effect until more experience has been gained with MV-22 training at MCB Camp Pendleton. Following a fire event review associated with the initial deployment period of MV-22s (see following measure), this measure may be modified in coordination with MCB Camp Pendleton Assistant Chief of Staff, Environmental Security staff and the MCB Camp Pendleton Fire Department.
Range and Training Regulations and Wing SOPs Update and Reporting. The MCB Camp Pendleton Range and Training Regulations and Wing SOPs will be reviewed and updated by the operations entity (3D MAW), as necessary, to reflect the potential for accidental wildland fire associated with introduction of the MV-22 to the training environment. Specifically, the updates will reference the previous measures including the requirement to limit time on ground, restrict landings in DZs to previously disturbed unvegetated areas, fire events that occur as a result of the MV-22, and, adherence to the Fire Danger Rating system for MV-22 training. This review will make use of the latest information on the potential for fire associated with MV-22 operations (i.e., review of environmental conditions and other factors associated with the fire events) in arid conditions such as exist on MCB Camp Pendleton. The update process will include a review of the existing fire potential at unimproved landing sites (CAL sites, LZs, and DZs where the MV-22 may touchdown) and protection of sensitive resources, and will include formal review and comment by MCB Camp Pendleton Assistant Chief of Staff, Environmental Security and the MCB Camp Pendleton Fire Department. MCB Camp Pendleton Environmental Security will be responsible for ensuring that

Table 7.2-2. Biological Resources Measures for the Proposed Training Operations

SOPs reflect restrictions and measures identified as a result of consultation with FWS. Updates to the Range and Training Regulations and Wing SOPs will be published prior to January 2010.
Fire Incident Reporting, Review and Adaptive Training Management. As part of an MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast operations. The reporting will include an assessment of the conditions under which the fire started such as relative humidity, fuel moistures, ambient temperature, and vegetation type, as well as a description of the project area and other factors which may further the understanding of fire potential. The USMC will distribute the memorandum to the MCB Camp Pendleton Fire Department and Assistant Chief of Staff, Environmental Security for formal review and comment. This memorandum would be used as part of an adaptive fire management strategy, which allows for the periodic review and modification of fire management measures in place, including but not limited to training restrictions. Additionally, future revisions to the INRMP (next update proposed for 2013) will evaluate the best available data on fires associated with the MV-22, and incorporate appropriate guidelines and updates to the existing fire management program.
Riparian Corridor and Woody Native Plant Buffers. To reduce the potential for training related fires in sensitive habitats and breeding periods, operators will avoid training involving takeoffs, landings, and low-level hovering adjacent to riparian corridors, sage scrub communities, and vernal pools to the maximum extent feasible at all times, but specifically between 15 March (15 February for sage scrub communities) and 31 August. This applies to low-level overflights (<500 feet above ground level), hovering, and take-offs and landings. All MV-22 training activities will comply with terms and conditions of the existing Riparian BO (Riparian BO, 1-6-95-F-02), which applies to all training on MCB Camp Pendleton in proximity to riparian, beach, and estuarine areas. Additionally, troops will be deployed away from riparian corridors, vernal pools, and other sensitive habitats and follow all restrictions identified on the Environmental Operations Map and as part of existing Range and Training Regulations. Finally, following deployment of troops in DZs, operators will touch down only at locations greater than 656 feet (200 meters) from riparian corridors and sage scrub communities to minimize fire potential and noise producing activities within sensitive habitats. Additionally, in known vernal pool areas, equipment, and vehicles, including aircraft, must be kept on existing roads and should not touchdown in occupied vernal pools.
Restoration of Areas Affected by MV-22 Training-related Fire if Applicable. Because fires occur frequently on MCB Camp Pendleton, existing programs are in place to map and document fire events. However, because the MV-22 has had limited training use on MCB Camp Pendleton, additional habitat monitoring and restoration may be appropriate as part of an adaptive management approach in the unlikely event that training with this aircraft increases the potential for fires to occur on MCB Camp Pendleton. The USMC will identify and develop a restoration program process to be implemented if initial introduction of the MV-22 to MCB Camp Pendleton results in substantial additional fire events. The determination of whether or not additional monitoring or a restoration program is appropriate will be determined as a coordinated effort between the operational entity and MCB Camp Pendleton Environmental Security. MCB Camp Pendleton Environmental Security will also bear responsibility for development of the habitat monitoring/restoration program if appropriate. If a fire is started by use of the MV-22, the level of impact would depend on the extent and frequency of events as well as the community and habitat types affected, and as a result, a plant community-specific restoration approach is appropriate. The program will be included as part of the Section 7 consultation with USFWS and be based on the frequency and extent of fires resulting from MV-22 training. The program will identify a listed species impact trigger such as minimum fire size and frequency that would trigger restoration, by habitat type and sensitivity of resource, and include specific restoration requirements such as thresholds for passive restoration and habitat recovery monitoring, active restoration, invasive weed management, erosion control, habitat enhancement, and wildlife monitoring and reporting requirements. The specific program components will be included in the BO.
Bob Stump Training Range Complex
Exhaust Deflectors. Exhaust Deflectors on the MV-22 aircraft will be deployed during landings and take-offs and while on the ground with engines running at undeveloped sites.

Table 7.2-2. Biological Resources Measures for the Proposed Training Operations

Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance. Operators will minimize the time on ground with engines running on unprepared sites and follow all recommendations in the NATOPS manual. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios. Following deployment of troops, operators will touch down only on improved or barren surfaces where the potential for fire is lowest, such as previously disturbed areas. Finally, operators will avoid landing in vegetation greater than 12 inches in height to further reduce the potential for fire.
Fire Incident Reporting, Review and Adaptive Training Management. As part of an MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast operations. The reporting will include an assessment of the conditions under which the fire started such as relative humidity, fuel moistures, ambient temperature, and vegetation type, as well as a description of the project area and other factors which may further the understanding of fire potential. The USMC will distribute the memorandum to the MCAS Yuma Fire Department and Natural Resources staff to be used as part of an adaptive fire management strategy. Additionally, future revisions to the INRMP (next update proposed for 2012) will evaluate the best available data on fires associated with the MV-22, and how the fire environment affects sensitive species, such as the desert tortoise, and incorporate appropriate guidelines and updates to the existing fire management program. As part of the adaptive management approach, and based on information from the initial deployment of the aircraft, MCAS Yuma natural resources staff would monitor landing sites for high weed invasion rates and other disturbances and may proposed landing site management if appropriate and consider modifications to operational protocols as necessary to avoid significant impacts. This process will include coordination by MCAS Yuma environmental management with the USFWS and the MCAS Yuma Fire Department. Specific components of the update would include a defined procedure for monitoring of fuel loads, particularly fine grasses and Sahara mustard, which vary from year to year, timely updating of this information into a Fire Danger Rating System, and adjustment of training activities to minimize the potential for fire during conditions of high fuel loads and fire danger (which would be expected only in years having exceptional growth of annual vegetation). Appropriate recommendations may be made to modify the timing or procedures associated with training during years in which there is a high standing crop of dried fuels. Initial development of monitoring and Fire Danger Rating System updating procedures and initial coordination will occur prior to the introduction of the MV-22 to the Bob Stump Training Range Complex training environment.
MCAGCC
Exhaust Deflectors. Exhaust deflectors on the MV-22 aircraft will be deployed during landings and take-offs and while on the ground with engines running at undeveloped sites where landing is permitted (i.e., PRTSSs and LZs).
Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance. Operators will minimize the time on the ground with engines running on unprepared (=unpaved) PRTSSs and LZs and follow all recommendations in the NATOPS manual. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios.
Fire Incident Reporting, Review and Adaptive Management. As part of an MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast operations. The reporting will include an assessment of the conditions under which the fire started, such as the amount of annual vegetative fuel generally existing at the time. The USMC MV-22 Program Office will distribute the memorandum to the MCAGCC NREA staff and fire department to be used as part of an adaptive, fire management strategy, which allows for the periodic review and modification of fire management measures in place, including but not limited to training restrictions. Additionally, future revisions to the INRMP (next update proposed for 2012) will evaluate the best available data on fires associated with the MV-22, and incorporate appropriate guidelines and updates.

7.2.3 Cultural Resources

Construction and Habitat Restoration at MCAS Miramar

Ground disturbance from construction would have no impact on recorded historic properties. However, implementation of the Full Basing Alternative at MCAS Miramar would require a

number of mitigation measures for habitat restoration. Eight archaeological sites are recorded within the APE for the proposed habitat restoration areas. Four sites have been determined ineligible of listing on the National Register, and four sites are pending SHPO agreement on their ineligibility. One site (KM-7), however, has not been tested for eligibility on the National Register. Even though it is likely ineligible, KM-7 requires formal testing to determine whether or not it is considered a historic property. Any disturbance from habitat restoration on a site that is eligible for listing on the National Register would result in an adverse impact on a historic property. This would be a significant impact under the NEPA.

There are no identified traditional cultural resources within the MCAS Miramar APE. However, consultations with tribal Nations are on-going. MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement. Additionally, the measures described below take into account impacts on archaeological sites that may or may not be considered a traditional cultural resource.

With the following measures, archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community would be avoided or impacts minimized, and impacts would be reduced to less than significant:

- Habitat restoration efforts will be designed to avoid all impact on newly recorded archaeological site, KM-7. The site will be fenced during active restoration efforts to ensure avoidance of all ground disturbance.
- Preconstruction meetings will be conducted in order to inform construction personnel about common types of artifacts that may be uncovered during construction, the importance of cultural resources to archaeologists and Native Americans, and the reporting requirements and responsibilities of construction personnel.

Proposed Training Operations

MV-22 training operations that could cause ground disturbance would occur at previously established landing areas. Although no new construction or improvements are proposed, ground disturbance from hovering and landing of aircraft could occur at these locations due to dust and debris being scattered and/or becoming airborne from aircraft rotorwash. Rotorwash from an MV-22 aircraft during landing, take-offs, and hovering immediately above the ground may disturb artifacts lying on the surface in the immediate vicinity of the hovering aircraft, although the extent of this disturbance would depend on local soil characteristics, presence of vegetation, and size/weight of artifacts.

MCB Camp Pendleton

There is the possibility of unrecorded archaeological sites within unsurveyed portions of the MCB Camp Pendleton APE. Operations within areas without adequate survey coverage may impact unrecorded archaeological resources that may or may not qualify as a historic property. This would be a significant impact under the NEPA.

Thirty-one archaeological sites are located in the APE at MCB Camp Pendleton, of which four sites have been recommended as eligible for listing on the National Register (CA-SDI-10008/10708, -10723, -14497, and -15108) (pending SHPO agreement), and another 18 sites have not been evaluated. Nine sites have been recommended as ineligible for listing on the National Register (CA-SDI-4540, -5137, -10004, -13940, -14494, -14495, -14496, -14508, and -14659) (pending SHPO agreement). Any disturbance from MV-22 operations on a site that is eligible for listing on the National Register would result in an adverse impact on a historic property. This would be a significant impact under the NEPA.

No traditional cultural resources have been identified within the MCB Camp Pendleton APE. However, consultations with tribal Nations are on-going.

MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST would follow the procedures outlined in the Programmatic Agreement with the California SHPO. Additionally, the measures listed in Table 7.2-3 would avoid or minimize impacts on archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community. Implementation of these measures would reduce impacts on archaeological resources to less than significant.

Bob Stump Training Range Complex

BARRY M. GOLDWATER RANGE (WEST)

There is the possibility of unrecorded archaeological sites within unsurveyed portions of the BMGR-West APE. Operations within areas without adequate survey coverage may impact unrecorded archaeological resources that may or may not qualify as a historic property. This would be a significant impact under the NEPA.

Twenty-three archaeological sites are located in the BMGR-West APE, of which four sites have been recommended as eligible for listing on the National Register (AZ X:12:78, AZ Y:5:15, AZ Y:5:35, AZ Y:9:2) (pending SHPO agreement), and another four have not been evaluated (AZ X:12:8, AZ X:12:9, AZ Y:5:52, AZ-050-2587). Six sites have been determined ineligible for listing on the National Register with Arizona SHPO agreement (AZ X:12:5, AZ X:8:15, AZ X:8:17, AZ X:8:18, AZ Y:5:6, AZ Y:5:7), and nine sites have been recommended as ineligible for listing on the National Register (AZ X:12:3, AZ X:81:151, AZ Y:5:5, AZ Y:5:8, AZ Y:5:14, AZ Y:5:16, AZ Y:5:17, AZ Y:5:18, AZ Y:5:27) (pending SHPO agreement). Any disturbance from MV-22 operations on a site that is eligible for listing on the National Register would result in an adverse impact on a historic property. This would be a significant impact under the NEPA.

There are no identified traditional cultural resources within the BMGR-West APE. However, consultations with tribal Nations are on-going.

MCIWEST is entering into a Programmatic Agreement with the Arizona SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed. If a traditional cultural resource is identified based on continuing dialogue with

identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement. Additionally, the measures listed in Table 7.2-3 would avoid or minimize impacts on archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community. Implementation of these measures would reduce impacts on archaeological resources to less than significant.

CHOCOLATE MOUNTAIN RANGE

There is the possibility of unrecorded archaeological sites within unsurveyed portions of the Chocolate Mountain Range APE. Operations within areas without adequate survey coverage may impact unrecorded archaeological resources that may or may not qualify as a historic property. This would be a significant impact under the NEPA.

Twenty-six archaeological sites are located in the Chocolate Mountain Range APE, of which 3 sites have been recommended as eligible for listing on the National Register (FARP 4, FARP 24, CA-IMP-1864) (pending SHPO agreement), and one has not been evaluated (CA-IMP-8343H). The other 22 sites have been recommended as ineligible for listing on the National Register (pending SHPO agreement). Any disturbance from MV-22 operations on a site that is eligible for listing on the National Register would result in an adverse impact on a historic property. This would be a significant impact under the NEPA.

There are no identified traditional cultural resources within the Chocolate Mountain Range APE. However, consultations with tribal Nations are on-going.

MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement. Additionally, the measures listed in Table 7.2-3 would avoid or minimize impacts on archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community. Implementation of these measures would reduce impacts on archaeological resources to less than significant.

MCAGCC

There is the possibility of unrecorded archaeological sites within unsurveyed portions of the MCAGCC APE. Operations within areas without adequate survey coverage may impact unrecorded archaeological resources that may or may not qualify as a historic property. This would be a significant impact under the NEPA.

Six archaeological sites are recorded in the MCAGCC APE, of which one site has been recommended as eligible for listing on the National Register (CA-IMP-8139) (pending SHPO agreement), and five have not been evaluated. Any disturbance from MV-22 operations on a site that is eligible for listing on the National Register would result in an adverse impact on a historic property. This would be a significant impact under the NEPA.

There are no identified traditional cultural resources within the MCAGCC APE. However, consultations with tribal Nations are on-going.

MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement. Additionally, the measures listed in Table 7.2-3 would avoid or minimize impacts on archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community. Implementation of these measures would reduce impacts on archaeological resources to less than significant.

Table 7.2-3. Cultural Resources Measures for the Proposed Training Operations

MCB Camp Pendleton
Prior to commencement of operations within the DZ Papa 3, DZ Case Springs, and DZ Horno, the areas of the APE lacking adequate survey will be shown as restricted areas on the MCB Camp Pendleton Environmental Operations Map, as well as MV-22 operators flight maps. Landing and hovering operations will be prohibited at these locations. Specific landing sites within the DZs will be selected by MV-22 operators, in concert with installation Environmental staff (archaeologists), Range Operations and Range Control staff, as well as the MCIWEST G-3 (Operations), to ensure that pre-approved landing sites and associated rotorwash only occur in areas previously surveyed for archaeological resources.
If for some reason the above avoidance measure is not possible for some areas, archaeological survey will be conducted prior to MV-22 operations for areas lacking adequate survey coverage. If an archaeological site is identified based on these subsequent survey efforts, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
Prior to MV-22 operations, the areas lacking adequate survey within the APE for CAL Site 1, CAL Site 3, CAL Site 4, LZ 27, LZ 31, LZ 33, LZ 52, LZ 62, and VTOL 2 will be surveyed for archaeological resources. If an archaeological site is identified based on these subsequent survey efforts, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
Prior to commencement of operations within the DZs, the location of three eligible sites (CA-SDI-10008/10708, -14497, -15108) and 12 non-evaluated sites (CA-SDI-10690, -14254, -14343, -14344, -14620, -14660, -14702, -14710, -14711, -14724, -14940, -14941) and appropriate buffer will be added to the MCB Camp Pendleton Environmental Operations Map, as well as MV-22 operators flight maps. Landing and hovering operations will be prohibited at these locations. Specific landing sites within the DZs will be selected by MV-22 operators, in concert with installation Environmental staff (archaeologists), Range Operations and Range Control staff, as well as the MCIWEST G-3 (Operations), to ensure that all archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community are avoided. With this operational protocol, impacts to the fifteen sites would be avoided.
If for some reason the above avoidance measure is not possible for some sites, archaeological testing will be conducted for any non-evaluated sites prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If an archaeological site is recommended as eligible for listing on the National Register based on site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
Prior to MV-22 operations, archaeological testing will be conducted to evaluate if the following sites are eligible or ineligible for listing on the National Register: CA-SDI-9575, -9825, -14143, -14253, -14493, and -14509. These six non-evaluated sites cannot be avoided because they are located within the APE of a CAL site, LZ, or other designated landing site that cannot be moved. If an archaeological site is recommended as eligible for listing on the National Register based on subsequent site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.

Table 7.2-3. Cultural Resources Measures for the Proposed Training Operations

Prior to MV-22 operations at LZ Red Beach, the nearby archaeological site (CA-SDI-10723) will be capped to ensure that surface artifacts are not disturbed from MV-22 rotorwash. Site capping involves judiciously covering the archaeological site with geotextile and fill. Prior to capping, the current condition of the site will be recorded, including surface artifact distributions. A record will also be made of the capping process and end result (e.g., thickness and nature of materials used to cap the site, surface topography). To ensure that site capping is effective and that subsequent soil erosion or other soil disturbances are not affecting the site's integrity, the USMC will conduct periodic site visitations to record any changes to the archaeological site (e.g., exposure of the geotextile cover due to soil erosion). If the site visitations reveal any substantial site degradation, further consultation with the California SHPO will be necessary.
Bob Stump Training Range Complex-Barry M. Goldwater Range (West)
Prior to commencement of operations within the BMGR-West, specific landing sites within the GSAs will be pre-approved by the MCAS Yuma Range Management Officer, working in concert with installation environmental (archaeologist) and range operations staff, as well as the MCIWEST G-3 (operations), to ensure that pre-approved landing sites and associated rotorwash buffer only occur in areas previously surveyed for archaeological resources. Additionally, these landing areas will be selected to avoid all archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community. With this operational protocol, four eligible sites (AZ X:12:78, AZ Y:5:15, AZ Y:5:35, AZ Y:9:2) and four non-evaluated sites (AZ X:12:8, AZ X:12:9, AZ Y:5:52, AZ-050-2587) would be avoided.
If for some reason the above avoidance measure is not possible for some areas, archaeological survey will be conducted prior to MV-22 operations for areas lacking adequate survey coverage. Similarly, archaeological testing will be conducted for any non-evaluated sites that cannot be avoided prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If an archaeological site is identified based on subsequent survey efforts and/or if an archaeological site is recommended as eligible for listing on the National Register based on site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
Prior to MV-22 operations within GSAs 21, 23, 27, 32, 36, 37, 49, 55, 59, 61, 64, and 66, surveys will be conducted to accommodate selected landing sites and associated rotorwash buffers. If an archaeological site is identified based on these subsequent survey efforts, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
Bob Stump Training Range Complex-Chocolate Mountain Range
Prior to commencement of operations within the Bull FARP, specific landing sites will be pre-selected and approved by the MCAS Yuma Range Management Officer, working in concert with installation environmental (archaeologist) and range operations staff, as well as the MCIWEST G-3 (operations), to ensure that the approved landing sites and associated rotorwash buffer only occur in areas previously surveyed for archaeological resources. Additionally, these landing areas will be selected to avoid all archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community. With implementation of this operational protocol, three eligible sites (FARP 4, FARP 24, CA-IMP-1864) would be avoided.
If for some reason the above avoidance measure is not possible for some areas, archaeological survey will be conducted prior to MV-22 operations for areas lacking adequate survey coverage. Similarly, archaeological testing will be conducted for any non-evaluated sites that cannot be avoided prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If an archaeological site is identified based on subsequent survey efforts and/or if an archaeological site is recommended as eligible for listing on the National Register based on site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries

Table 7.2-3. Cultural Resources Measures for the Proposed Training Operations

Prior to MV-22 operations within LZ Killdeer, LZ Redwing, FB Burt, LZ Goose, LZ Jayhawk, OP Feets, Billy Macon, LZ Siphon 10, LZ Dove, LZ Jaybird, and LZ Finch, either the landing sites will be moved to ensure the entire APE is within a previously surveyed area or surveys will be conducted to provide adequate survey coverage for the APE. If an archaeological site is identified based on subsequent survey, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries
For one non-evaluated site within the APE for LZ FB Burt (CA-SDI-8343H [Pegleg Road]), either the landing site will be moved to ensure avoidance of impact on Pegleg Road or testing will be conducted prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If the archaeological site is recommended as eligible for listing on the National Register based on subsequent site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
MCAGCC
Prior to MV-22 operations within PRTSS Cleghorn Pass, PRTSS East, PRTSS Emerson Lake, PRTSS Noble Pass, PRTSS Quackenbush-North, and PRTSS FASP, specific landing sites will be pre-selected and approved by the NREA Division, in concert with the Range Operations/Control Office and the MCIWEST G-3 (operations), to ensure 1) that pre-approved landing sites and associated rotorwash buffer only occur in areas previously surveyed for archaeological resources, and 2) that all archaeological sites that are eligible for listing on the National Register and/or are of concern to the Native American community are avoided. With this operation protocol, one eligible site (CA-SBR-8139) and five non-evaluated sites (CA-SBR-8138, CA-SBR-8140, three newly recorded prehistoric sites) would be avoided.
If for some reason the above avoidance measure is not possible for some areas, archaeological survey will be conducted prior to MV-22 operations for areas lacking adequate survey coverage. Similarly, archaeological testing will be conducted for any non-evaluated sites that cannot be avoided prior to MV-22 operations to evaluate if the site is eligible or ineligible for listing on the National Register. If an archaeological site is identified based on subsequent survey efforts and/or if an archaeological site is recommended as eligible for listing on the National Register based on site testing, MCIWEST will follow the procedures outlined in the Programmatic Agreement regarding post-review discoveries.
Prior to MV-22 operations at LZ Ripper, a survey will be conducted to provide adequate survey coverage for the APE. If an archaeological site is identified based on subsequent survey, MCIWEST will follow the procedures in the Programmatic Agreement regarding post-review discoveries.

7.2.4 Air Quality

Air quality impacts associated with the Full Basing Alternative at MCAS Miramar were determined by estimating the net change in emissions that would occur within each affected air basin due to the replacement of current CH-46 operations with future MV-22 operations. These emissions were compared to the criteria applicable to each air basin, as identified in sections 3.7.1, 6.2.7, and 6.3.7 of this EIS, to determine their significance.

Construction at MCAS Miramar

Construction of the Full Basing Alternative at MCAS Miramar would produce emissions that would remain below all conformity *de minimis* thresholds (see Table 3.7-3). Construction of this alternative would produce less than significant air quality impacts. However, to minimize fugitive dust and equipment combustive emissions during proposed construction activities, the project construction contractor shall implement a Construction Emissions Mitigation Plan, as described in section 3.7.

Operations

Table 7.2-4 presents an estimation of the annual operational emissions that the Full Basing Alternative would generate within each air basin. These data show that emissions of VOC, CO, SO_x, PM_{10}, and $PM_{2.5}$ would either decline or would increase by only a nominal amount within any air basin. Additionally, the proposed increases in NO_x emissions would not exceed the applicable NO_x conformity *de minimis* thresholds within the Salton Sea and Mojave Desert Air Basins O_3 nonattainment areas. Therefore, these net changes in emissions would produce insignificant impacts to air quality.

Table 7.2-4. Annual Emissions from the Full Basing Alternative at MCAS Miramar by Air Basin

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)					
	VOC	CO	NOx	SOx	PM10	PM2.5
SAN DIEGO AIR BASIN						
Existing Facility Emissions						
MCAS Miramar	-62.20	-318.33	-44.50	-3.21	-36.08	**-32.04**
MCAS Camp Pendleton	-58.70	-287.90	-41.90	-3.18	-32.94	-30.49
MCB Camp Pendleton Ranges	-7.67	-41.49	-8.38	-0.85	-3.81	-3.81
Total Existing Emissions	**-128.57**	**-647.72**	**-94.78**	**-7.24**	**-72.82**	**-66.34**
Proposed Facility Emissions						
MCAS Miramar	34.85	332.61	205.51	8.99	50.46	42.77
MCAS Camp Pendleton	-	-	-	-	-	-
MCB Camp Pendleton Ranges	0.08	3.70	101.59	2.87	11.32	11.32
MTRs	0.00	0.05	1.24	0.04	0.14	0.14
Total Proposed Emissions	**34.93**	**336.36**	**308.34**	**11.90**	**61.92**	**54.23**
Total Net Change – SDAB	**-93.64**	**-311.37**	**213.57**	**4.66**	**-10.90**	**-12.11**
Conformity *De Minimis* Level	**100**	**100**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – MARGINAL O3 NONATTAINMENT AREA						
Existing Facility Emissions						
Chocolate Mountain Range	-1.01	-5.79	-1.16	-0.12	-0.52	-0.52
R-2510/2512	-0.02	-0.10	-0.02	-0.00	-0.01	-0.01
Total Existing Emissions	**-1.03**	**-5.90**	**-1.18**	**-0.12**	**-0.53**	**-0.53**
Proposed Facility Emissions						
Chocolate Mountain Range	0.07	3.11	85.66	2.42	9.53	9.53
R-2510/2512	0.00	0.15	3.99	0.11	0.45	0.45
MTRs	0.00	0.09	2.44	0.07	0.27	0.27
Total Proposed Emissions	**0.07**	**3.35**	**92.08**	**2.60**	**10.25**	**10.25**
Total Net Change	**-0.96**	**-2.55**	**90.90**	**2.48**	**9.72**	**9.72**
Conformity *De Minimis* Level	**100**	**NA**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – SEVERE O3 NONATTAINMENT AREA						
Existing Facility Emissions						
Chocolate Mountain Range	-0.25	-1.45	-0.29	-0.03	-0.13	-0.13
Total Existing Emissions	**-0.25**	**-1.45**	**-0.29**	**-0.03**	**-0.13**	**-0.13**
Proposed Facility Emissions						
Chocolate Mountain Range	0.02	0.78	21.41	0.60	2.38	**2.38**
MTRs	0.00	0.14	3.78	0.11	0.42	**0.42**
Total Proposed Emissions	**0.02**	**0.92**	**25.20**	**0.71**	**2.81**	**2.81**
Total Net Change	**-0.23**	**-0.53**	**24.91**	**0.68**	**2.68**	**2.68**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**70**	**NA**
MOJAVE DESERT AIR BASIN						
Existing Facility Emissions						
MCAGCC EAF	-1.26	-3.96	-0.20	-0.03	-0.25	-0.25
MCAGCC Air Spaces	-2.38	-13.36	-2.71	-0.28	-1.25	-1.25

Table 7.2-4. Annual Emissions from the Full Basing Alternative at MCAS Miramar by Air Basin

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Total Existing Emissions	**-3.64**	**-17.33**	**-2.90**	**-0.30**	**-1.51**	**-1.51**
Proposed Facility Emissions						
MCAGCC EAF	0.05	3.41	7.96	0.39	1.35	1.35
MCAGCC Air Spaces	0.00	0.12	3.25	0.09	0.36	0.36
MTRs	0.02	0.93	25.30	0.72	2.84	2.84
Total Proposed Emissions	**0.07**	**4.46**	**36.51**	**1.20**	**4.55**	**4.55**
Total Net Change - MDAB	**-3.57**	**-12.86**	**33.60**	**0.90**	**3.04**	**3.04**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**100**	**NA**
MOJAVE DESERT AIR BASIN – SEVERE O3 NONATTAINMENT AREA						
Existing Facility Emissions						
MCAGCC EAF	-1.26	-3.96	-0.20	-0.03	-0.25	-0.25
MCAGCC Air Spaces	-2.38	-13.36	-2.71	-0.28	-1.25	-1.25
Total Existing Emissions	**-3.64**	**-17.33**	**-2.90**	**-0.30**	**-1.51**	**-1.51**
Proposed Facility Emissions						
MCAGCC EAF	0.05	3.41	7.96	0.39	1.35	1.35
MCAGCC Air Spaces	0.00	0.12	3.25	0.09	0.36	0.36
MTRs	0.00	0.21	5.74	0.16	0.64	0.64
Total Proposed Emissions	**0.06**	**3.74**	**16.95**	**0.64**	**2.35**	**2.35**
Total Net Change	**-3.58**	**-13.59**	**14.05**	**0.34**	**0.85**	**0.84**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**NA**	**NA**
ARIZONA – COMBINED COUNTIES						
Existing Facility Emissions						
MCAS Yuma	-4.76	-14.96	-0.75	-0.10	-0.95	-0.95
BMGR	-4.59	-26.41	-5.28	-0.54	-2.39	-2.39
Total Existing Emissions	**-9.35**	**-41.37**	**-6.03**	**-0.63**	**-3.34**	**-3.34**
Proposed Facility Emissions						
BMGR	0.21	10.17	278.59	7.87	31.07	31.07
MTRs	0.01	0.65	17.51	0.50	1.96	1.96
Total Proposed Emissions	**0.22**	**10.81**	**296.10**	**8.37**	**33.03**	**33.03**
Total Net Change - Arizona	**-9.13**	**-30.56**	**290.07**	**7.73**	**29.69**	**29.69**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Notes:
1 Year 2017 emissions.
2 – indicates a reduction in pollutant emissions.

Operational emissions of NO_x generated by the Full Basing Alternative within the SDAB would exceed the NO_x conformity *de minimis* level of 100 tons per year. These emissions, however, would conform to the most recent federally-approved O_3 SIP for the SDAB (*1-Hour Ozone Maintenance Plan*), which incorporates a NO_x emissions growth budget for military programs. The 213.6 tons per year net increase of NO_x emissions is well within the available SDAB military growth budget. The Full Basing Alternative, therefore, would conform to the SIP and would not cause significant impacts to air quality in the SDAB.

The Arizona region affected by the Full Basing Alternative attains the NAAQS for NO_2 and O_3. However, O_3 levels in the Yuma metropolitan area approach the national eight-hour O_3 standard (0.075 ppm). Therefore, substantial increases in future O_3 precursor emissions (such as NO_x) in proximity to Yuma have the potential to contribute to an exceedance of the O_3 standard. To determine the relative magnitude of proposed emissions and therefore their potential to combine with baseline emissions and contribute to an exceedance of the O_3 standard, NO_x emissions estimated for the operation of Full Basing Alternative within the Arizona project region were compared to the most recent (2002) Yuma County baseline NO_x emissions. The Yuma County baseline emissions are

chosen for analysis, as the overwhelming majority of emissions from the alternative would occur within the R-2301W airspace, which lies within Yuma County.

In 2002, NO_x emissions generated within Yuma County amounted to 9,540 tons. Review of Table 7.2-2 shows that operation of the Full Basing Alternative within Arizona would increase NO_x emissions by 290.1 tons per year in 2017. These emissions would amount to about 3.0 percent of the annual NO_x emissions generated within Yuma County. While these emissions represent a relatively small increase in total NO_x emissions within Yuma County, a definitive determination regarding the significance of their impact to ambient O_3 levels would require an intensive computerized photochemical modeling analysis, which is beyond the scope of this EIS. Proposed MV-22 training operations would occur (1) across approximately 5,000 square miles of R-2301W air space and (2) MTRs with a combined length of about 630 miles. Emissions from these operations, therefore, would not be localized in any particular area where they might combine with ambient O_3 levels to cause an exceedance of the 8-hour standard for O_3. Moreover, the Yuma metropolitan area, which experiences the highest O_3 levels in the project region, is located several miles from the nearest boarder of R-2301W air space. Therefore, air quality impacts from the proposed operation of the Full Basing Alternative within Arizona are expected to be less than significant.

7.3 MCAS MIRAMAR 8-SQUADRON / MCAS CAMP PENDLETON 2-SQUADRON ALTERNATIVE (PREFERRED ALTERNATIVE)

Partial basing of eight MV-22 squadrons at MCAS Miramar and two squadrons at MCAS Camp Pendleton would lead to an increase of 48 aircraft and 746 military personnel at MCAS Miramar and a reduction of 18 aircraft and 257 military personnel at MCAS Camp Pendleton (no change would occur at MCAS Yuma). New support facilities at MCAS Miramar would include three new hangar modules, parking apron, four new fuel pits, and five new wash racks (see Figure 2.3-3). New support facilities at MCAS Camp Pendleton would include a new hangar module, modifications to an existing hangar, new wash rack, and new parking apron (see Figure 2.3-5). Environmental impacts of construction and operations related to this alternative were assessed for all air stations. Environmental impacts were also assessed for proposed training operations at MCB Camp Pendleton, the Bob Stump Training Range Complex, MCAGCC, and various MTRs; these impacts apply to all basing alternatives. An overview of the environmental consequences is provided in Table 7.3-1.

Implementation of the 8-Squadron Alternative at MCAS Miramar would result in significant but mitigable impacts to vernal pools and other biological resources (see discussion in section 3.14). Mitigation measures outlined in section 3.14 include compensatory restoration efforts (i.e., habitat restoration on other areas of MCAS Miramar). Analysis was conducted to determine if these habitat restoration activities would result in an impact to other resource areas (e.g., Land Use, Cultural Resources) in Chapter 3, and results of these analyses are summarized, as appropriate, below.

This alternative would result in significant and unmitigable impacts to ground traffic and transportation. Additionally, significant but mitigable impacts to biological resources and cultural resources would occur in association with this alternative. These significant impacts are discussed below along with proposed measures to avoid, minimize, or mitigate impacts. Impacts to the balance of the resource areas were either not significant or had no impact and are not discussed further here, with the exception of air quality. As noted above, each basing alternative has a presentation of the estimated emissions for all project components (construction and operations) within each air basin.

Table 7.3-1. Summary of Environmental Consequences for MCAS Miramar 8-Squadron / MCAS Camp Pendleton 2-Squadron Alternative (Preferred Alternative)

	MCAS Miramar (Eight Squadrons)	MCAS Camp Pendleton (Two Squadrons)	MCAS Yuma (No MV-22 Squadrons*)	MCB Camp Pendleton	Bob Stump Training Range Complex	MCAGCC	MTR
CHANGE IN CONDITIONS							
Net Change in Aircraft	+48	-18	-	-	-	-	-
Net Change in Military Personnel	+746	-257	-	-	-	-	-
Net Change in Annual Operations	+22,246	-5,898	-2,812	+1,895	+16,382	-1,689	+2,085
RESOURCE AREA IMPACT							
Airfields and Airspace	NS	NS	NI	NS	NS	NS	NS
Land Use	NS	NS	NS	NS	NS	NS	NS
Socioeconomics	NS	NS	NS	NI	NI	NI	NI
Community Facilities & Services	NS	NS	NI	NI	NI	NI	NS
Ground Traffic & Transportation	S-U	NS	NS	NI	NI	NI	NI
Air Quality	NS	NS/BI	NS	NS	NS	NS	NS
Noise	NS	NS	NS	NS	NS	NS	NS
Infrastructure & Utilities	NS	NS	NS	NI	NI	NI	NI
Aesthetics & Visual Resources	NS	NS	NS	NI	NI	NI	NS
Hazardous Materials Management	NS	NS	NS	NI	NI	NS	NI
Topography, Geology, & Soils	NS	NS	NS	NS	NS	NS	NI
Water Resources	NS	NS	NS	NS	NS	NS	NI
Biological Resources	S-M	S-M	NS	NS	NS	NS	NS
Cultural Resources	NS	S-M	NS	S-M	S-M	S-M	NI
Safety & Environmental Health	NS	NS	NS	NS	NS	NS	NI
Environmental Justice	NS	NS	NS	NS	NS	NS	NS

Notes:
Significant/Unmitigable Impacts = S-U; Significant/Mitigable = S-M; No Significant Impacts = NS; Beneficial Impacts = BI; No Impacts = NI
* There would be no change in personnel or aircraft at MCAS Yuma; this column is based on the No Action Alternative.

7.3.1 Ground Traffic and Transportation

Operations at MCAS Miramar

Significant and unmitigable impacts to ground traffic and transportation were identified in association with the 8-Squadron Alternative at MCAS Miramar. Operations-related traffic from increased military personnel and civilian employees would add an estimated 1,596 trips onto the existing roadway conditions. The operations-related traffic associated with this alternative would be a significant portion of the total traffic volumes for the segment of Miramar Way between Kearny Villa Road and Interstate-15. These significant traffic impacts cannot be mitigated because the additional traffic volume does not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210), and the DoN has no other legal authority for funding roadway improvements outside the installation. Therefore, implementation of this alternative at MCAS Miramar would result in a significant unmitigable impact.

7.3.2 Biological Resources

Construction at MCAS Miramar

Construction activities at MCAS Miramar would result in the permanent loss of 4.3 acres (1.8 ha) of mostly disturbed Diegan coastal sage scrub. Due to the sensitivity of this community, impacts on Diegan coastal sage would be significant. However, this impact would be reduced to a less than significant level through implementation of **Measures 2, 3,** and **7** summarized in section 7.2.

Additionally, approximately 0.98 acres (42,689 square feet) of jurisdictional wetland and vernal pool features, and approximately 0.11 acre (4,792 square feet) of non-wetland Clean Water Act regulated waters (stream channel) would be impacted by project components. Removal or degradation reduces the functions and values of these regulated features and removes or reduces the suitable habitat available. Because there would be a direct loss of jurisdictional features as well as likely indirect impacts from sedimentation and degradation of water quality, impacts to Clean Water Act regulated waters would be significant. However, successful implementation of the avoidance, minimization, and compensation measures would reduce effects from the Maximum Partial Basing Alternative on Clean Water Act regulated waters to a less than significant impact (**Measures 2, 3, 4, and 5**).

Finally, direct impacts to vernal pools from siting the fuel pits under this alternative include permanent loss of vernal pool features, including the removal of vernal pool soils, plant communities, and associated wildlife habitats. Under this alternative, approximately 0.04 acre (0.02 ha) of vernal pool resources would be removed as part of construction of the fuel pits area. Of this, 0.006 acre (272 square feet) support at least one species federally listed as threatened or endangered and 0.029 acre (1,265 square feet) do not. Approximately 0.094 acre (<0.038 hectare) of seasonally ponded habitat (non-vernal pools) that support fairy shrimp would also be impacted. Indirect effects on adjacent pools that are not directly subject to removal would include degradation of water quality by construction runoff or change in local runoff regime. Although this area represents only a fraction of unoccupied vernal pool habitat on MCAS Miramar, because of the unique habitat that vernal pools provide to native plant and wildlife species, impacts on vernal pools would be

significant. **Measures 2, 5, 6**, and **7,** as outlined in section 7.2, would reduce the impact on unoccupied vernal pool basins and watersheds to less than significant.

Habitat Restoration at MCAS Miramar

As a result of implementation of compensation measures as identified in the MCAS Miramar INRMP, existing degraded areas that are not specifically associated with this alternative under the proposed action might be included as part of a vernal pools or jurisdictional features restoration program. As noted under **Measure 6** (see section 7.2), USMC has identified potential restoration areas for vernal pools, including areas in the vicinity of the proposed action, based on pool re-establishment surveys. Only a very small area of identified restoration site options would be required for the Maximum Partial Basing Alternative. Impacts resulting from restoration of these areas would represent a beneficial impact on biological resources (converting degraded non-native plant communities and habitat to restored native habitats).

Construction at MCAS Camp Pendleton

Construction activities associated with the basing of two MV-22 squadrons at MCAS Camp Pendleton could directly affect federally endangered arroyo toads located within the project area. Although no suitable habitat occurs within the MCAS Camp Pendleton construction area, arroyo toads may inadvertently attempt to pass through the area. Due to the federal protection afforded to the arroyo toad, direct impacts to this species are considered significant. The following measure is proposed for MCAS Camp Pendleton to reduce construction-related impacts to the arroyo toad to below a level of significance.

- **Restrict arroyo toad access to construction areas.** Although no suitable habitat occurs within the MCAS Camp Pendleton construction area, arroyo toads may inadvertently attempt to pass through the area. If construction is to occur when toads are still expected to be active, toad-proof silt fencing will be installed surrounding construction areas two weeks prior to construction, and monitored by a qualified toad biologist. For this assessment, MCAS Camp Pendleton Environmental will conduct an assessment survey prior to any construction activities. The survey will check for the presence or absence of toads and evaluate the likelihood of this species to occur. If necessary, the qualified biologist will complete two arroyo toad surveys within the fence boundary prior to construction. This qualified biologist will inspect sites before daylight of each construction day and remove any toads. The qualified biologist will also inspect fencing on a daily basis and make repairs or direct others to make repairs as needed to maintain the integrity of the fencing. The USFWS will approve in writing those monitors who will be permitted to handle the toads (USFWS 2005a). MCAS Camp Pendleton Environmental will be consulted immediately if arroyo toads are found within the project area.

Proposed Training Operations

No significant impacts to biological resources would occur from proposed training operations at MCB Camp Pendleton, Bob Stump Training Range Complex, or MCAGCC. However, the use of range facilities would represent a new type of training with respect to fires, which could impact biological resources, as described in section 7.2. The measures listed in Table 7.2-2 are proposed to further reduce the likelihood and significance of impacts resulting from training-related fires.

7.3.3 Cultural Resources

Construction at MCAS Camp Pendleton

Construction activities associated with this alternative fall within recorded site boundaries of CA-SDI-10156/CA-SDI-12599/H (*Topamai)*, and are located approximately 200 feet from a recorded locus of dense archaeological material. This site is eligible for listing on the National Register and is highly sensitive to local Native Americans. Previous excavations within or immediately adjacent to the APE have been negative, which suggest that the likelihood of encountering intact cultural deposits within the APE is low, but this possibility cannot be dismissed completely. Besides *Topamai*, there are no other identified traditional cultural resources at MCAS Camp Pendleton. However, consultations with tribal Nations are on-going.

MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement.

Consistent with the Programmatic Agreement, the following measures would avoid or minimize impacts on archaeological sites that are eligible for listing on the National Register and/or sites that are of concern to the Native American community, and impacts would be reduced to less than significant:

- All ground disturbing activities that extend beneath 18 inches of undisturbed ground in the immediate vicinity of CA-SDI-10156/12599/H will be monitored by a qualified archaeologist and Native American observer.
- Preconstruction meetings will be conducted in order to inform construction personnel about common types of artifacts that may be uncovered during construction, the importance of cultural resources to archaeologists and Native Americans, and the reporting requirements of responsibilities of construction personnel.
- In the event that unexpected cultural remains are discovered, the MCAS Camp Pendleton environmental office will be notified of the discovery and construction activities will be temporarily halted until the significance of the discovery is determined. If the cultural remains are determined to be significant (i.e., eligible for listing on the National Register), then MCAS Camp Pendleton will follow the standard operating procedures outlined in the ICRMP, Programmatic Agreement with the California SHPO, and other applicable guidance documents.

Proposed Training Operations

MV-22 training operations that could cause ground disturbance would occur at previously established landing areas. Rotorwash from an MV-22 aircraft during landing, take-offs, and hovering immediately above the ground may disturb artifacts lying on the surface in the immediate vicinity of the hovering aircraft, although the extent of this disturbance would depend on local soil characteristics, presence of vegetation, and size/weight of artifacts. As described in section 7.2, with implementation of the measures listed in Table 7.2-3, the impacts on cultural resources at MCB

Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC would be reduced to less than significant.

7.3.4 Air Quality

Air quality impacts associated with the MCAS Miramar 8-Squadron / MCAS Camp Pendleton 2-Squadron Alternative (Preferred Alternative) were determined by estimating the net change in emissions that would occur within each affected air basin due to the replacement of current CH-46 operations with future MV-22 operations. These emissions were compared to the criteria applicable to each air basin, as identified in sections 3.7.1, 6.2.7, and 6.3.7 of this EIS, to determine their significance.

Construction at MCAS Miramar and MCAS Camp Pendleton

Construction of the Preferred Alternative would produce emissions that would remain below all conformity *de minimis* thresholds (see Tables 3.7-5 and 4.7-3). Construction of the alternative would produce less than significant air quality impacts. However, to minimize fugitive dust and equipment combustive emissions during proposed construction activities, the project construction contractor shall implement a Construction Emissions Mitigation Plan, as described in sections 3.7 and 4.7.

Operations

Table 7.3-2 presents an estimation of the annual operational emissions that the Preferred Alternative would generate within each air basin. These data show that emissions of VOC, CO, SO_x, PM_{10}, and $PM_{2.5}$ would either decline or would increase by only a nominal amount within any air basin. Additionally, the proposed increases in NO_x emissions would not exceed the applicable NO_x conformity *de minimis* thresholds within the Salton Sea and Mojave Desert Air Basins O_3 nonattainment areas. Therefore, these net changes in emissions would produce insignificant impacts to air quality.

Table 7.3-2. Annual Emissions from the MCAS Miramar 8-Squadron / MCAS Camp Pendleton 2-Squadron Alternative (Preferred Alternative) by Air Basin

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)					
	VOC	CO	NOx	SOx	PM10	PM2.5
SAN DIEGO AIR BASIN						
Existing Facility Emissions						
MCAS Miramar	-62.20	-318.33	-44.50	-3.21	-36.08	**-32.04**
MCAS Camp Pendleton	-58.70	-287.90	-41.90	-3.18	-32.94	-30.49
MCB Camp Pendleton Ranges	-7.67	-41.49	-8.38	-0.85	-3.81	-3.81
Total Existing Emissions	**-128.57**	**-647.72**	**-94.78**	**-7.24**	**-72.82**	**-66.34**
Proposed Facility Emissions						
MCAS Miramar	28.70	273.91	169.24	7.40	41.55	35.34
MCAS Camp Pendleton	10.38	93.47	46.00	1.91	11.17	9.26
MCB Camp Pendleton Ranges	0.08	3.70	101.59	2.87	11.32	11.32
MTRs	0.00	0.05	1.24	0.04	0.14	0.14
Total Proposed Emissions	**39.16**	**371.13**	**318.07**	**12.22**	**64.18**	**56.06**
Total Net Change – SDAB	**-89.40**	**-276.59**	**223.30**	**4.98**	**-8.64**	**-10.28**
Conformity *De Minimis* Level	**100**	**100**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – MARGINAL O3 NONATTAINMENT AREA						
Total Net Change – SSAB	**-0.96**	**-2.55**	**90.90**	**2.48**	**9.72**	**9.72**
Conformity *De Minimis* Level	**100**	**NA**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – SEVERE O3 NONATTAINMENT AREA						
Total Net Change – SSAB	**-0.23**	**-0.53**	**24.91**	**0.68**	**2.68**	**2.68**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**70**	**NA**

Table 7.3-2. Annual Emissions from the MCAS Miramar 8-Squadron / MCAS Camp Pendleton 2-Squadron Alternative (Preferred Alternative) by Air Basin

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)					
	VOC	CO	NOx	SOx	PM10	PM2.5
SAN DIEGO AIR BASIN						
MOJAVE DESERT AIR BASIN						
Total Net Change – MDAB	**-3.57**	**-12.86**	**33.60**	**0.90**	**3.04**	**3.04**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**100**	**NA**
MOJAVE DESERT AIR BASIN – SEVERE O3 NONATTAINMENT AREA						
Total Net Change	**-3.58**	**-13.59**	**14.05**	**0.34**	**0.85**	**0.84**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**NA**	**NA**
ARIZONA – COMBINED COUNTIES						
Total Net Change - Arizona	**-9.13**	**-30.56**	**290.07**	**7.73**	**29.69**	**29.69**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Notes:
1 Year 2017 emissions.
2 – indicates a reduction in pollutant emissions.

Operation of the Preferred Alternative would produce the same to slightly higher amounts of emissions within the Arizona and SDAB project regions, respectively, compared to the Full Basing Alternative. The impacts described in section 7.2.5 for the Full Basing Alternative also would apply to the Preferred Alternative and, therefore, operation of the Preferred Alternative would produce less than significant impacts to ambient O_3 levels and air quality within the SDAB and Arizona project regions.

Conformity Analysis

Table 7.3-3 presents an estimation of the annual conformity-related emissions that the Preferred Alternative would generate within each NAAQS nonattainment and maintenance area. These data show that the Preferred Alternative would produce annual emissions that would exceed the NO_x conformity threshold within the SDAB basic O_3 nonattainment area. However, as stated in section 3.7.2 and 7.3.6 of this EIS, implementation of the Preferred Alternative would conform to the SDAB SIP. Emissions from the alternative would not exceed any other conformity threshold in any other project region. The conformity determination and applicability analyses for the proposed action are presented in Appendices B.2 and B.3, respectively, of this EIS.

Table 7.3-3. Conformity-Related Emissions from the MCAS Miramar 8-Squadron/MCAS Camp Pendleton 2-Squadron Alternative (Preferred Alternative) by Nonattainment Area

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)			
	VOC	CO	NOx	PM10
SAN DIEGO AIR BASIN				
Construction				
MCAS Miramar - 2010	**1.71**	**6.91**	**13.02**	NA
MCAS Camp Pendleton - 2010	0.54	1.75	2.67	NA
Maximum Annual Emissions – 2010	**2.25**	**8.66**	**15.69**	**NA**
Existing Facility Emissions				
MCAS Miramar	-62.20	-318.33	-44.50	NA
MCAS Camp Pendleton	-58.70	-287.90	-41.90	NA
MCB Camp Pendleton Ranges	-7.67	-41.49	-8.38	NA
Total Existing Emissions	**-128.57**	**-647.72**	**-94.78**	**NA**
Proposed Facility Emissions				
MCAS Miramar	28.70	273.91	169.24	NA
MCAS Camp Pendleton	10.38	93.47	46.00	NA
MCB Camp Pendleton Ranges	0.08	3.70	101.59	NA
MTRs	0.00	0.05	1.24	NA
Total Proposed Emissions – 2017	**39.16**	**371.13**	**318.07**	**NA**
Total Net Change - SDAB	**-89.40**	**-276.59**	**223.30**	**NA**
SDAB Conformity Thresholds	**100**	**100**	**100**	**NA**

Table 7.3-3. Conformity-Related Emissions from the MCAS Miramar 8-Squadron/MCAS Camp Pendleton 2-Squadron Alternative (Preferred Alternative) by Nonattainment Area

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)			
	VOC	CO	NOx	PM10
SALTON SEA AIR BASIN – MARGINAL O3 NONATTAINMENT AREA				
Existing Facility Emissions				
Chocolate Mountain Range	-1.01	NA	-1.16	NA
R-2510/2512	-0.02	NA	-0.02	NA
Total Existing Emissions	**-1.03**	NA	**-1.18**	NA
Proposed Facility Emissions				
Chocolate Mountain Range	0.07	NA	85.66	NA
R-2510/2512	0.00	NA	3.99	NA
MTRs	0.00	NA	2.44	NA
Total Proposed Emissions	**0.07**	NA	**92.08**	NA
Total Net Change - SSAB	**-0.96**	NA	**90.90**	NA
SSAB Conformity Thresholds	**100**	**NA**	**100**	**NA**
SALTON SEA AIR BASIN – SEVERE O3 NONATTAINMENT AREA				
Existing Facility Emissions				
Chocolate Mountain Range	-0.25	NA	-0.29	NA
Total Existing Emissions	**-0.25**	NA	**-0.29**	NA
Proposed Facility Emissions				
Chocolate Mountain Range	0.02	NA	21.41	NA
SALTON SEA AIR BASIN – SEVERE O3 NONATTAINMENT AREA (CONTINUED)				
MTRs	0.00	NA	3.78	NA
Total Proposed Emissions	**0.02**	NA	**25.20**	NA
Total Net Change - SSAB	**-0.23**	NA	**24.91**	NA
SSAB Conformity Thresholds	**25**	**NA**	**25**	**NA**
SALTON SEA AIR BASIN – SERIOUS PM10 NONATTAINMENT AREA				
Existing Facility Emissions				
Chocolate Mountain Range	NA	NA	NA	-0.66
R-2510/2512 Existing	NA	NA	NA	-0.01
Total Existing Emissions	NA	NA	NA	**-0.66**
Proposed Facility Emissions				
Chocolate Mountain Range	NA	NA	NA	11.92
R-2510/2512 Proposed	NA	NA	NA	0.45
MTRs	NA	NA	NA	0.57
Total Proposed Emissions	NA	NA	NA	**12.94**
Total Net Change - SSAB	NA	NA	NA	**12.27**
SSAB Conformity Thresholds	**NA**	**NA**	**NA**	**70**
MOJAVE DESERT AIR BASIN – SEVERE O3 NONATTAINMENT AREA				
Existing Facility Emissions				
MCAGCC EAF	-1.26	NA	-0.20	NA
MCAGCC Air Space	-2.38	NA	-2.71	NA
Total Existing Emissions	**-3.64**	NA	**-2.90**	NA
Proposed Facility Emissions				
MCAGCC EAF	0.05	NA	7.96	NA
MCAGCC Air Space	0.00	NA	3.25	NA
MTRs	0.00	NA	5.74	NA
Total Proposed Emissions	**0.06**	NA	**16.95**	NA
Total Net Change - MDAB	**-3.58**	NA	**14.05**	NA
MDAB Conformity Thresholds	**25**	**NA**	**25**	**NA**
MOJAVE DESERT AIR BASIN – MODERATE PM10 NONATTAINMENT AREA				
Existing Facility Emissions				
MCAGCC EAF	NA	NA	NA	-0.25
MCAGCC Air Space	NA	NA	NA	-1.25
Total Existing Emissions	NA	NA	NA	**-1.51**
Proposed Facility Emissions				

Table 7.3-3. Conformity-Related Emissions from the MCAS Miramar 8-Squadron/MCAS Camp Pendleton 2-Squadron Alternative (Preferred Alternative) by Nonattainment Area

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)			
	VOC	CO	NOx	PM10
MCAGCC EAF	NA	NA	NA	1.35
MCAGCC Air Space	NA	NA	NA	0.36
MOJAVE DESERT AIR BASIN – MODERATE PM10 NONATTAINMENT AREA (CONT.)				
MTRs	NA	NA	NA	1.49
Total Proposed Emissions	NA	NA	NA	**3.20**
Total Net Change - MDAB	NA	NA	NA	**1.69**
MDAB Conformity Thresholds	**NA**	**NA**	**NA**	**100**
YUMA MODERATE PM10 NONATTAINMENT AREA				
Existing Facility Emissions				
MCAS Yuma	NA	NA	NA	-0.95
BMGR	NA	NA	NA	-0.24
Total Existing Emissions	NA	NA	NA	**-1.19**
Proposed Facility Emissions				
BMGR	NA	NA	NA	3.11
Total Proposed Emissions	NA	NA	NA	**3.11**
Total Net Change – Yuma Area	NA	NA	NA	**1.92**
Yuma Area Conformity Thresholds	**NA**	**NA**	**NA**	**100**

Notes:
1 Year 2017 emissions.
2 " indicates a reduction in pollutant emissions.

7.4 MCAS MIRAMAR 8-SQUADRON/MCAS YUMA 2-SQUADRON ALTERNATIVE

Partial basing of eight MV-22 squadrons at MCAS Miramar and two squadrons at MCAS Yuma would lead to an increase of 48 aircraft and 746 military personnel at MCAS Miramar; an increase of 24 aircraft and 712 military personnel at MCAS Yuma; and a reduction of 42 aircraft and 674 military personnel at MCAS Camp Pendleton. New support facilities at MCAS Miramar would include three new hangar modules, parking apron, four new fuel pits, and five new wash racks (see Figure 2.3-3). New support facilities at MCAS Yuma would include two new hangars, new apron space a new rinse facility and wash racks and other support facilities (see Figure 2.3-7). Environmental impacts of construction and operations related to this alternative were assessed for all air stations. Environmental impacts were also assessed for proposed training operations at MCB Camp Pendleton, the Bob Stump Training Range Complex, MCAGCC, and various MTRs; these impacts apply to all basing alternatives. An overview of the environmental consequences is provided in Table 7.4-1.

This alternative would result in significant and unmitigable impacts to ground traffic and transportation. Additionally, significant but mitigable impacts to socioeconomics, biological resources, and cultural resources would occur in association with this alternative. These significant impacts are discussed below along with proposed measures to avoid, minimize, or mitigate impacts. Impacts to the balance of the resource areas were either not significant or had no impact and are not discussed further here, with the exception of air quality. As noted above, each basing alternative has a presentation of the estimated emissions for all project components (construction and operations) within each air basin.

Table 7.4-1. Summary of Environmental Consequences for MCAS Miramar 8-Squadron / MCAS Yuma 2-Squadron Alternative

	MCAS Miramar (Eight Squadrons)	MCAS Yuma (Two Squadrons)	MCAS Camp Pendleton (No MV-22 Squadrons*)	MCB Camp Pendleton	Bob Stump Training Range Complex	MCAGCC	MTR
CHANGE IN CONDITIONS							
Net Change in Aircraft	+48	+24	-42	-	-	-	-
Net Change in Military Personnel	+746	+712	-674	-	-	-	-
Net Change in Annual Operations	+22,246	+6,320	-17,995	+1,895	+16,382	-1,689	+2,085
RESOURCE AREA IMPACT							
Airfields and Airspace	NS	NS	NS	NS	NS	NS	NS
Land Use	NS	NS	NS	NS	NS	NS	NS
Socioeconomics	NS	S-M	NS	NI	NI	NI	NI
Community Facilities & Services	NS	NS	NS	NI	NI	NI	NS
Ground Traffic & Transportation	S-U	S-U	NS	NI	NI	NI	NI
Air Quality	NS	NS/BI	NS/BI	NS	NS	NS	NS
Noise	NS	NS	NS	NS	NS	NS	NS
Infrastructure & Utilities	NS	NS	NS	NI	NI	NI	NI
Aesthetics & Visual Resources	NS	NS	NI	NI	NI	NI	NS
Hazardous Materials Management	NS	NS	NI	NI	NI	NS	NI
Topography, Geology, & Soils	NS	NS	NI	NS	NS	NS	NI
Water Resources	NS	NS	NI	NS	NS	NS	NI
Biological Resources	S-M	NS	NI	NS	NS	NS	NS
Cultural Resources	NS	NS	NI	S-M	S-M	S-M	NI
Safety & Environmental Health	NS	NS	NS	NS	NS	NS	NI
Environmental Justice	NS	NS	NS	NS	NS	NS	NS

Notes:
Significant/Unmitigable Impacts = S-U; Significant/Mitigable = S-M; No Significant Impacts = NS; Beneficial Impacts = BI; No Impacts = NI
* MCAS Camp Pendleton would lose three CH-46 squadrons.

7.4.1 Ground Traffic and Transportation

Operations at MCAS Miramar

Significant and unmitigable impacts to ground traffic and transportation were identified in association with the 8-Squadron Alternative at MCAS Miramar. Operations-related traffic from increased military personnel and civilian employees would add an estimated 1,596 trips onto the existing roadway conditions. The operations-related traffic associated with this alternative would be a significant portion of the total traffic volumes for the segment of Miramar Way between Kearny Villa Road and Interstate-15. These significant traffic impacts cannot be mitigated because the additional traffic volume does not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210), and the DoN has no other legal authority for funding roadway improvements outside the installation. Therefore, implementation of this alternative at MCAS Miramar would result in a significant unmitigable impact.

Operations at MCAS Yuma

Significant and unmitigable impacts to ground traffic and transportation were identified in association with the 2-Squadron Alternative at MCAS Yuma. Operations-related traffic from increased military personnel and civilian employees would add an estimated 1,524 trips onto the existing roadway conditions. The operations-related traffic associated with this alternative would be a significant portion of the total traffic volumes for the segment of Avenue 3E between Interstate-8 and Business 8. These significant traffic impacts cannot be mitigated because the additional traffic volume does not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210), and the DoN has no other legal authority for funding roadway improvements outside the installation. Therefore, implementation of this alternative at MCAS Yuma would result in a significant unmitigable impact.

7.4.2 Socioeconomics

Construction and Operations at MCAS Yuma

Potentially significant socioeconomic impacts are anticipated related to both the construction and operations phases. Insufficient industry resources may be available within the region to accommodate the entire labor demand generated by the proposed construction projects. Military construction projects at MCAS Yuma, however, often are awarded to general/prime contractors from urban centers in neighboring counties. While some local subcontractors are utilized, many firms provide skilled laborers and equipment from outside the region. With regard to operations, the anticipated influx of military personnel and their families may exceed existing station housing capacity. Advance planning and coordination with station planners and community leaders in the Yuma area could mitigate potential negative effects associated with these transition impacts.

7.4.3 Biological Resources

Construction at MCAS Miramar

Construction activities at MCAS Miramar would result in the permanent loss of 5.2 acres (1.7 ha) of mostly disturbed Diegan coastal sage scrub. Due to the sensitivity of this community, impacts on

Diegan coastal sage would be significant. However, this impact would be reduced to a less than significant level through implementation of **Measures 2, 3,** and **7** summarized in section 7.2.

Additionally, approximately 0.98 acres (42,689 square feet) of jurisdictional wetland and vernal pool features, and approximately 0.11 acre (4,792 square feet) of non-wetland Clean Water Act regulated waters (stream channel) would be impacted by project components. Removal or degradation reduces the functions and values of these regulated features and removes or reduces the suitable habitat available. Because there would be a direct loss of jurisdictional features as well as likely indirect impacts from sedimentation and degradation of water quality, impacts to Clean Water Act regulated waters would be significant. However, successful implementation of the avoidance, minimization, and compensation measures would reduce effects from the Maximum Partial Basing Alternative on Clean Water Act regulated waters to a less than significant impact (**Measures 2, 3, 4, 5**).

Finally, direct impacts to vernal pools from siting the fuel pits under this alternative include permanent loss of vernal pool features, including the removal of vernal pool soils, plant communities, and associated wildlife habitats. Under this alternative, approximately 0.04 acre (0.02 ha) of vernal pool resources would be removed as part of construction of the fuel pits area. Of this, 0.006 acre (272 square feet) support at least one species federally listed as threatened or endangered and 0.029 acre (1,265 square feet) do not. Approximately 0.094 acre (<0.038 hectare) of seasonally ponded habitat (non-vernal pools) that support fairy shrimp would also be impacted. Indirect effects on adjacent pools that are not directly subject to removal would include degradation of water quality by construction runoff or change in local runoff regime. Although this area represents only a fraction of unoccupied vernal pool habitat on MCAS Miramar, because of the unique habitat that vernal pools provide to native plant and wildlife species, impacts on vernal pools would be significant. **Measures 2, 5, 6**, and **7,** as outlined in section 7.2, would reduce the impact on unoccupied vernal pool basins and watersheds to less than significant.

Habitat Restoration at MCAS Miramar

As a result of implementation of compensation measures as identified in the MCAS Miramar INRMP, existing degraded areas that are not specifically associated with this alternative under the proposed action might be included as part of a vernal pools or jurisdictional features restoration program. As noted under **Measure 6** (see section 7.2), USMC has identified potential restoration areas for vernal pools, including areas in the vicinity of the proposed action, based on pool re-establishment surveys. Only a very small area of identified restoration site options would be required for the Maximum Partial Basing Alternative. Impacts resulting from restoration of these areas would represent a beneficial impact on biological resources (converting degraded non-native plant communities and habitat to restored native habitats).

Proposed Training Operations

No significant impacts to biological resources would occur from proposed training operations at MCB Camp Pendleton, Bob Stump Training Range Complex, or MCAGCC. However, the use of range facilities would represent a new type of training with respect to fires, which could impact biological resources, as described in section 7.2. The measures listed in Table 7.2-2 are proposed to further reduce the likelihood and significance of impacts resulting from training-related fires.

7.4.4 Cultural Resources

Proposed Training Operations

MV-22 training operations that could cause ground disturbance would occur at previously established landing areas. Rotorwash from an MV-22 aircraft during landing, take-offs, and hovering immediately above the ground may disturb artifacts lying on the surface in the immediate vicinity of the hovering aircraft, although the extent of this disturbance would depend on local soil characteristics, presence of vegetation, and size/weight of artifacts. As described in section 7.2, with implementation of the measures listed in Table 7.2-3, the impacts on cultural resources at MCB Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC would be reduced to less than significant.

7.4.5 Air Quality

Air quality impacts associated with the MCAS Miramar 8-Squadron/MCAS Yuma 2-Squadron Alternative were determined by estimating the net change in emissions that would occur within each affected air basin due to the replacement of current CH-46 operations with future MV-22 operations. These emissions were compared to the criteria applicable to each air basin, as identified in sections 3.7.1, 6.2.7, and 6.3.7 of this EIS, to determine their significance.

Construction at MCAS Miramar and MCAS Yuma

Construction of the MCAS Miramar 8-Squadron/MCAS Yuma 2-Squadron Alternative would produce emissions that would remain below all conformity *de minimis* thresholds (see Tables 3.7-5 and 5.7-5). Therefore, construction of the alternative would produce less than significant air quality impacts. However, to minimize fugitive dust and equipment combustive emissions during proposed construction activities, the project construction contractor shall implement a Construction Emissions Mitigation Plan, as described in sections 3.7 and 5.7.

Operations

Table 7.4-2 presents an estimation of the annual operational emissions that the MCAS Miramar 8-Squadron/MCAS Yuma 2-Squadron Alternative would generate within each air basin. These data show that emissions of VOC, CO, SO_x, PM_{10}, and $PM_{2.5}$ would either decline or would increase by only a nominal amount within any air basin. Additionally, the proposed increases in NO_x emissions would not exceed the applicable NO_x conformity *de minimis* thresholds within the Salton Sea and Mojave Desert Air Basins O_3 nonattainment areas. Therefore, these net changes in emissions would produce insignificant impacts to air quality. The alternative would produce the same level of emissions as the Preferred Alternative within the SDAB, SSAB, and MDAB project regions. The alternative would produce greater emissions within the Arizona project region compared to the Preferred Alternative, due to the basing of two MV-22 squadrons at MCAS Yuma.

Operation of the MCAS Miramar 8-Squadron/MCAS Yuma 2-Squadron Alternative would produce slightly lower emissions within the SDAB compared to the Full Basing Alternative. Therefore, the impacts described in section 7.2.5 for the Full Basing Alternative also would conservatively apply to this Alternative. As a result, the MCAS Miramar 8-Squadron/MCAS Yuma 2-Squadron Alternative would produce less than significant impacts to ambient O_3 levels and air quality within the SDAB.

Using the analysis technique described in section 7.2.5, NO_x emissions that would occur from the MCAS Miramar 8-Squadron/MCAS Yuma 2-Squadron Alternative within Arizona were compared to the 2002 Yuma County NO_x emissions inventory to determine the relative magnitude of proposed emissions, and therefore their potential to combine with baseline emissions and contribute to an exceedance of an ambient air quality standard. Review of Table 7.4-2 shows that operation of the Alternative within Arizona would increase NO_x emissions by 327 tons per year in 2017. These emissions would amount to about 3.5 percent of the annual NO_x emissions generated within Yuma County. While these emissions represent a relatively small increase in total NO_x emissions within Yuma County, a definitive determination regarding the significance of their impact to ambient O_3 levels would require an intensive computerized photochemical modeling analysis, which is beyond the scope of this EIS. Air emissions from the operation of the MCAS Miramar 8-Squadron/MCAS Yuma 2-Squadron Alternative would occur within (1) MCAS Yuma, (2) across approximately 5,000 square miles of R-2301W air space, and (3) MTRs with a combined length of about 630 miles. Proposed NO_x emissions also would occur from aircraft that operate on the ground and to an atmospheric depth of 3,000 feet above ground level. These factors would substantially dilute the impact of proposed NO_x emissions within a localized area where they might combine with ambient O_3 levels to cause an exceedance of the 8-hour standard for O_3. Additionally, the Yuma metropolitan area, which experiences the highest O_3 levels in the project region, is located several miles from the nearest boarder of R-2301W air space or proposed MTR. Therefore, air quality impacts from the proposed operation of the MCAS Miramar 8-Squadron/MCAS Yuma 2-Squadron Alternative in Arizona would produce less than significant impacts to air quality.

Table 7.4-2. Annual Emissions from the MCAS Miramar 8-Squadron / MCAS Yuma 2-Squadron Alternative by Air Basin

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)					
	VOC	CO	NOx	SOx	PM10	PM2.5
SAN DIEGO AIR BASIN						
Existing Facility Emissions						
MCAS Miramar	-62.20	-318.33	-44.50	-3.21	-36.08	**-32.04**
MCAS Camp Pendleton	-58.70	-287.90	-41.90	-3.18	-32.94	-30.49
MCB Camp Pendleton Ranges	-7.67	-41.49	-8.38	-0.85	-3.81	-3.81
Total Existing Emissions	**-128.57**	**-647.72**	**-94.78**	**-7.24**	**-72.82**	**-66.34**
Proposed Facility Emissions						
MCAS Miramar	28.70	273.91	169.24	7.40	41.55	35.34
MCAS Camp Pendleton	---	---	---	---	---	---
MCB Pendleton Ranges	0.08	3.70	101.59	2.87	11.32	11.32
MTRs	0.00	0.05	1.24	0.04	0.14	0.14
Total Proposed Emissions	**28.46**	**273.60**	**271.99**	**10.32**	**53.23**	**46.80**
Total Net Change – SDAB	**-100.11**	**-374.12**	**177.21**	**3.08**	**-19.60**	**-19.54**
Conformity *De Minimis* Level	**100**	**100**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – MARGINAL O3 NONATTAINMENT AREA						
Total Net Change – SSAB	**-0.96**	**-2.55**	**90.90**	**2.48**	**9.72**	**9.72**
Conformity *De Minimis* Level	**100**	**NA**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – SEVERE **O3 NONATTAINMENT AREA**						
Total Net Change – SSAB	**-0.23**	**-0.53**	**24.91**	**0.68**	**2.68**	**2.68**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**70**	**NA**
MOJAVE DESERT AIR BASIN						
Total Net Change – MDAB	**-3.57**	**-12.86**	**33.60**	**0.90**	**3.04**	**3.04**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**100**	**NA**
MOJAVE DESERT AIR BASIN – SEVERE **O3 NONATTAINMENT AREA**						
Total Net Change	**-3.58**	**-13.59**	**14.05**	**0.34**	**0.85**	**0.84**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**NA**	**NA**

Table 7.4-2. Annual Emissions from the MCAS Miramar 8-Squadron / MCAS Yuma 2-Squadron Alternative by Air Basin

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)					
	VOC	CO	NOx	SOx	PM10	PM2.5
ARIZONA – COMBINED COUNTIES						
Existing Facility Emissions						
MCAS Yuma and BMGR	**-9.35**	**-41.37**	**-6.03**	**-0.63**	**-3.34**	**-3.34**
Proposed Facility Emissions						
MCAS Yuma	8.40	69.64	35.37	1.48	5.65	5.46
BMGR	0.21	10.44	280.15	7.93	31.28	31.28
MTRs	0.01	0.65	17.51	0.50	1.96	1.96
Total Proposed Emissions	**8.63**	**80.73**	**333.02**	**9.90**	**38.90**	**38.70**
Total Net Change - Arizona	**-0.72**	**39.36**	**326.99**	**9.27**	**35.56**	**35.37**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Notes:
1 Year 2017 emissions.
2 – indicates a reduction in pollutant emissions.

7.5 MCAS YUMA 8-SQUADRON / MCAS MIRAMAR 2-SQUADRON ALTERNATIVE

Partial basing of eight MV-22 squadrons at MCAS Yuma and two squadrons at MCAS Miramar would lead to an increase of 96 aircraft and 2,015 military personnel at MCAS Yuma; a decrease of 24 aircraft and 557 military personnel at MCAS Miramar; and a reduction of 42 aircraft and 674 military personnel at MCAS Camp Pendleton. New support facilities at MCAS Yuma would include seven new hangar modules, a new taxiway, parking apron, wash racks, a rinse facility, and other support facilities (e.g., headquarters, warehouse, van pads) (see Figure 2.3-6). No construction would occur at MCAS Miramar. Environmental impacts of construction and operations related to this alternative were assessed for all air stations. Environmental impacts were also assessed for proposed training operations at MCB Camp Pendleton, the Bob Stump Training Range Complex, MCAGCC, and various MTRs; these impacts apply to all basing alternatives. An overview of the environmental consequences is provided in Table 7.5-1.

This alternative would result in significant and unmitigable impacts to ground traffic and transportation. Additionally, significant but mitigable impacts to socioeconomics and cultural resources would occur in association with this alternative. These significant impacts are discussed below along with proposed measures to avoid, minimize, or mitigate impacts. Impacts to the balance of the resource areas were either not significant or had no impact and are not discussed further here, with the exception of air quality. As noted above, each basing alternative has a presentation of the estimated emissions for all project components (construction and operations) within each air basin.

7.5.1 Ground Traffic and Transportation

Construction at MCAS Yuma

Significant and unmitigable impacts to ground traffic and transportation were identified in association with the 8-Squadron Alternative at MCAS Yuma. Construction-related traffic would add an estimated 5,165 truck trips onto the existing roadway conditions. The construction-related traffic associated with this alternative would be a significant portion of the total traffic volumes for the segment of Avenue 3E between Interstate- 8 and Business 8. These significant traffic impacts

cannot be mitigated because the additional traffic volume does not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210), and the DoN has no other legal authority for funding roadway improvements outside the installation. Therefore, implementation of this alternative at MCAS Yuma would result in a significant unmitigable impact.

Operations at MCAS Yuma

Significant and unmitigable impacts to ground traffic and transportation were identified in association with the 8-Squadron Alternative at MCAS Yuma. Operations-related traffic from increased military personnel and civilian employees would add an estimated 4,312 trips onto the existing roadway conditions. The operations-related traffic associated with this alternative would be a significant portion of the total traffic volumes for the segment of Avenue 3E between Interstate-8 and Business 8. These significant traffic impacts cannot be mitigated because the additional traffic volume does not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210), and the DoN has no other legal authority for funding roadway improvements outside the installation. Therefore, implementation of this alternative at MCAS Yuma would result in a significant unmitigable impact.

7.5.2 Socioeconomics

Construction and Operations at MCAS Yuma

Potentially significant socioeconomic impacts are anticipated related to both the construction and operations phases. Insufficient industry resources may be available within the region to accommodate the entire labor demand generated by the proposed construction projects. Military construction projects at MCAS Yuma, however, often are awarded to general/prime contractors from urban centers in neighboring counties. While some local subcontractors are utilized, many firms provide skilled laborers and equipment from outside the region. With regard to operations, the anticipated influx of military personnel and their families may exceed existing station housing capacity. Advance planning and coordination with station planners and community leaders in the Yuma area could mitigate potential negative effects associated with these transition impacts.

7.5.3 Cultural Resources

Construction at MCAS Yuma

The Yuma Army Explosives Magazine, a historic structure recommended as eligible for listing on the National Register, is located within a few feet of proposed apron expansion and a new hangar on the south side of the APE. Proposed construction would adversely affect the integrity of this historic structure. If SHPO agrees on the eligibility of this structure, disturbance to the structure would result in an adverse impact on a historic property. This would be a significant impact under the NEPA. With the following measure, impacts on historic structures that are eligible for listing on the National Register would be avoided or minimized, and impacts would be reduced to less than significant:

- In coordination with an architectural historian, site layouts for the Maximum Partial Basing Alternative shall be redesigned to avoid all impact on the Yuma Army Explosives Magazine. Final site layouts shall be approved by the Cultural Resources Manager of the MCAS Yuma Range Management Department.

Table 7.5-1. Summary of Environmental Consequences for MCAS Yuma 8-Squadron / MCAS Miramar 2-Squadron Alternative

	MCAS Yuma (Eight Squadrons)	MCAS Miramar (Two Squadrons)	MCAS Camp Pendleton (No MV-22 Squadrons*)	MCB Camp Pendleton	Bob Stump Training Range Complex	MCAGCC	MTR
CHANGE IN CONDITIONS							
Net Change in Aircraft	+96	-24	-42	-	-	-	-
Net Change in Military Personnel	+2,015	-557	-674	-	-	-	-
Net Change in Annual Operations	+39,799	-8,910	-17,995	+1,895	+16,382	-1,689	+2,085
RESOURCE AREA IMPACT							
Airfields and Airspace	NS	NS	NS	NS	NS	NS	NS
Land Use	NS	NS	NS	NS	NS	NS	NS
Socioeconomics	S-M	NS	NS	NI	NI	NI	NI
Community Facilities & Services	NS	NS	NS	NI	NI	NI	NS
Ground Traffic & Transportation	S-U	NS	NS	NI	NI	NI	NI
Air Quality	NS	NS/BI	NS/BI	NS	NS	NS	NS
Noise	NS	NS	NS	NS	NS	NS	NS
Infrastructure & Utilities	NS	NS	NS	NI	NI	NI	NI
Aesthetics & Visual Resources	NS	NI	NI	NI	NI	NI	NS
Hazardous Materials Management	NS	NS	NI	NI	NI	NS	NI
Topography, Geology, & Soils	NS	NS	NI	NS	NS	NS	NI
Water Resources	NS	NS	NI	NS	NS	NS	NI
Biological Resources	NS	NS	NI	NS	NS	NS	NS
Cultural Resources	S-M	NI	NI	S-M	S-M	S-M	NI
Safety & Environmental Health	NS	NS	NS	NS	NS	NS	NI
Environmental Justice	NS	NS	NS	NS	NS	NS	NS

Notes:
Significant/Unmitigable Impacts = S-U; Significant/Mitigable = S-M; No Significant Impacts = NS; Beneficial Impacts = BI; No Impacts = NI
*MCAS Camp Pendleton would lose three CH-46 squadrons.

There are no identified traditional cultural resources within the MCAS Yuma APE. However, consultations with tribal Nations are on-going. MCIWEST is entering into a Programmatic Agreement with the Arizona SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement.

Proposed Training Operations

MV-22 training operations that could cause ground disturbance would occur at previously established landing areas. Rotorwash from an MV-22 aircraft during landing, take-offs, and hovering immediately above the ground may disturb artifacts lying on the surface in the immediate vicinity of the hovering aircraft, although the extent of this disturbance would depend on local soil characteristics, presence of vegetation, and size/weight of artifacts. As described in section 7.2, with implementation of the measures listed in Table 7.2-3, the impacts on cultural resources at MCB Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC would be reduced to less than significant.

7.5.4 Air Quality

Air quality impacts associated with the MCAS Yuma 8-Squadron/MCAS Miramar 2-Squadron Alternative were determined by estimating the net change in emissions that would occur within each affected air basin due to the replacement of current CH-46 operations with future MV-22 operations. These emissions were compared to the criteria applicable to each air basin, as indentified in sections 3.7.1, 6.2.7, and 6.3.7 of this EIS, to determine their significance.

Construction at MCAS Yuma

Construction of the MCAS Yuma 8-Squadron/MCAS Miramar 2-Squadron Alternative would produce emissions that would remain below all conformity *de minimis* thresholds (see Tables 3.7-7 and 5.7-3). Therefore, construction of the alternative would produce less than significant air quality impacts. However, to minimize fugitive dust and equipment combustive emissions during proposed construction activities, the project construction contractor shall implement a Construction Emissions Mitigation Plan, as described in section 5.7.

Operations

Table 7.5-2 presents an estimation of the annual operational emissions that the MCAS Yuma 8-Squadron/MCAS Miramar 2-Squadron Alternative would generate within each air basin. Regarding project regions other than Arizona, these data show that emissions of VOC, CO, SO_x, PM_{10}, and $PM_{2.5}$ would either decline or would increase by only a nominal amount within any air basin. Additionally, the proposed increases in NO_x emissions would not exceed the applicable NO_x conformity *de minimis* threshold within any O_3 nonattainment area. Therefore, these net changes in emissions would produce insignificant impacts to air quality. Regarding the Arizona project region, the data in Table 7.5-2 show that project emissions of VOC, SO_x, PM_{10}, and $PM_{2.5}$ would be well below the conformity *de minimis* levels for a nonattainment area (100 tons per year). Impacts associated with these emissions would not be significant. The alternative would produce the same level of emissions as the Preferred Alternative within the SSAB and MDAB project regions. The alternative would produce greater/lower emissions within the Arizona/SDAB project regions compared to the Preferred Alternative, due to the basing of eight MV-22 squadrons at MCAS Yuma.

Using the analysis technique described in section 5.7.2, CO and NOx emissions that would occur from the operation of the MCAS Yuma 8-Squadron/MCAS Miramar 2-Squadron Alternative within Arizona were compared to the 2002 Yuma County emissions inventory to determine the relative magnitude of proposed emissions and therefore their potential to combine with baseline emissions and contribute to an exceedance of an ambient air quality standard. In 2002, Yuma County produced 40,420 tons of CO. Review of Table 7.5-2 shows that operation of the Alternative within Arizona would increase CO emissions by 239 tons per year in 2017. These emissions would amount to 0.6 percent of the annual CO emissions for Yuma County. Given that the County attains the CO NAAQS by wide margins, these emission increases would not contribute to an exceedance of an ambient air quality standard and they would produce less than significant air quality impacts.

Table 7.5-2. Annual Emissions from the MCAS Yuma 8-Squadron/MCAS Miramar 2-Squadron Alternative by Air Basin

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)					
	VOC	CO	NOx	SOx	PM10	PM2.5
SAN DIEGO AIR BASIN						
Existing Facility Emissions						
MCAS Miramar	-62.20	-318.33	-44.50	-3.21	-36.08	**-32.04**
MCAS Camp Pendleton	-58.70	-287.90	-41.90	-3.18	-32.94	-30.49
MCB Camp Pendleton Ranges	-7.67	-41.49	-8.38	-0.85	-3.81	-3.81
Total Existing Emissions	**-128.57**	**-647.72**	**-94.78**	**-7.24**	**-72.82**	**-66.34**
Proposed Facility Emissions						
MCAS Miramar	8.21	70.20	39.83	1.70	11.47	**9.20**
MCAS Camp Pendleton	-	-	-	-	-	-
MCB Camp Pendleton Ranges	0.08	3.70	101.59	2.87	11.32	11.32
MTRs	0.00	0.05	1.24	0.04	0.14	0.14
Total Proposed Emissions	**8.28**	**73.95**	**142.67**	**4.60**	**22.93**	**20.66**
Total Net Change - SDAB	**-120.28**	**-573.77**	**47.89**	**-2.64**	**-49.90**	**-45.68**
Conformity *De Minimis* Level	**100**	**100**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – MARGINAL O3 NONATTAINMENT AREA						
Total Net Change	**-0.96**	**-2.55**	**90.90**	**2.48**	**9.72**	**9.72**
Conformity *De Minimis* Level	**100**	**NA**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – SEVERE O3 NONATTAINMENT AREA						
Total Net Change	**-0.23**	**-0.53**	**24.91**	**0.68**	**2.68**	**2.68**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**70**	**NA**
MOJAVE DESERT AIR BASIN						
Total Net Change - MDAB	**-3.57**	**-12.86**	**33.60**	**0.90**	**3.04**	**3.04**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**100**	**NA**
MOJAVE DESERT AIR BASIN – SEVERE O3 NONATTAINMENT AREA						
Total Net Change	**-3.58**	**-13.59**	**14.05**	**0.34**	**0.85**	**0.84**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**NA**	**NA**
ARIZONA – COMBINED COUNTIES						
Existing Facility Emissions						
MCAS Yuma and BMGR	**-9.35**	**-41.37**	**-6.03**	**-0.63**	**-3.34**	**-3.30**
Proposed Facility Emissions						
MCAS Yuma	28.94	268.27	156.43	6.77	25.29	**24.73**
BMGR	0.22	11.56	288.25	8.22	32.35	32.35
MTRs	0.01	0.65	17.51	0.50	1.96	1.96
Total Proposed Emissions - Arizona	**29.18**	**280.47**	**462.19**	**15.49**	**59.61**	**59.05**
Net Change in Emissions - Arizona	**19.83**	**239.10**	**456.16**	**14.85**	**56.28**	**55.71**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Notes:
1 Year 2017 emissions.
2 – indicates a reduction in pollutant emissions.

Review of Table 7.5-2 shows that operation of the MCAS Yuma 8-Squadron/MCAS Miramar 2-Squadron Alternative within Arizona would increase NOx emissions by 456 tons per year in 2017.

These emissions would amount to about 4.8 percent of the annual NO_x emissions generated within Yuma County in 2002. While these emissions represent a relatively small increase in total NO_x emissions within Yuma County, a definitive determination regarding the significance of their impact to ambient O_3 levels would require an intensive computerized photochemical modeling analysis, which is beyond the scope of this EIS. Air emissions from the operation of the alternative would occur within (1) MCAS Yuma, (2) across approximately 5,000 square miles of R-2301W air space, and (3) MTRs with a combined length of about 630 miles. Proposed NO_x emissions also would occur from aircraft that operate on the ground and to an atmospheric depth of 3,000 feet above ground level. These factors would substantially dilute the impact of proposed NO_x emissions within a localized area where they might combine with ambient O_3 levels to cause an exceedance of the 8-hour standard for O_3. Additionally, the Yuma metropolitan area, which experiences the highest O_3 levels in the project region, is located several miles from the nearest boarder of R-2301W air space or proposed MTR. Therefore, air quality impacts from the proposed operation of the MCAS Yuma 8-Squadron/MCAS Miramar 2-Squadron Alternative in Arizona would produce less than significant impacts to air quality.

7.6 MCAS YUMA 8-SQUADRON/MCAS CAMP PENDLETON 2-SQUADRON ALTERNATIVE

Partial basing of eight MV-22 squadrons at MCAS Yuma and two squadrons at MCAS Camp Pendleton would lead to an increase of 96 aircraft and 2,015 military personnel at MCAS Yuma; a decrease of 18 aircraft and 257 military personnel at MCAS Camp Pendleton; and a reduction of 48 aircraft and 974 military personnel at MCAS Miramar. New support facilities at MCAS Yuma would include seven new hangar modules, a new taxiway, parking apron, wash racks, a rinse facility, and other support facilities (e.g., headquarters, warehouse, van pads) (see Figure 2.3-6). New support facilities at MCAS Camp Pendleton would include a new hangar module, modifications to an existing hangar, new wash rack, and new parking apron (see Figure 2.3-5). Environmental impacts of construction and operations related to this alternative were assessed for all air stations. Environmental impacts were also assessed for proposed training operations at MCB Camp Pendleton, the Bob Stump Training Range Complex, MCAGCC, and various MTRs; these impacts apply to all basing alternatives. An overview of the environmental consequences is provided in Table 7.6-1.

This alternative would result in significant and unmitigable impacts to ground traffic and transportation. Additionally, significant but mitigable impacts to socioeconomics, biological resources, and cultural resources would occur in association with this alternative. These significant impacts are discussed below along with proposed measures to avoid, minimize, or mitigate impacts. Impacts to the balance of the resource areas were either not significant or had no impact and are not discussed further here, with the exception of air quality. As noted above, each basing alternative has a presentation of the estimated emissions for all project components (construction and operations) within each air basin.

Table 7.6-1. Summary of Environmental Consequences for MCAS Yuma 8-Squadron / MCAS Camp Pendleton 2-Squadron Alternative

	MCAS Yuma (Eight Squadrons)	MCAS Camp Pendleton (Two Squadrons)	MCAS Miramar (No MV-22 Squadrons*)	MCB Camp Pendleton	Bob Stump Training Range Complex	MCAGCC	MTR
CHANGE IN CONDITIONS							
Net Change in Aircraft	+96	-18	-48	-	-	-	-
Net Change in Military Personnel	+2,015	-257	-974	-	-	-	-
Net Change in Annual Operations	+39,799	-5,898	-17,322	+1,895	+16,382	-1,689	+2,085
RESOURCE AREA IMPACT							
Airfields and Airspace	NS	NS	NS	NS	NS	NS	NS
Land Use	NS	NS	NS	NS	NS	NS	NS
Socioeconomics	S-M	NS	NS	NI	NI	NI	NI
Community Facilities & Services	NS	NS	NS	NI	NI	NI	NS
Ground Traffic & Transportation	S-U	NS	NS	NI	NI	NI	NI
Air Quality	NS	NS/BI	NS/BI	NS	NS	NS	NS
Noise	NS	NS	NS	NS	NS	NS	NS
Infrastructure & Utilities	NS	NS	NS	NI	NI	NI	NI
Aesthetics & Visual Resources	NS	NS	NI	NI	NI	NI	NS
Hazardous Materials Management	NS	NS	NI	NI	NI	NS	NI
Topography, Geology, & Soils	NS	NS	NI	NS	NS	NS	NI
Water Resources	NS	NS	NI	NS	NS	NS	NI
Biological Resources	NS	S-M	NS	NS	NS	NS	NS
Cultural Resources	S-M	S-M	NI	S-M	S-M	S-M	NI
Safety & Environmental Health	NS	NS	NS	NS	NS	NS	NI
Environmental Justice	NS	NS	NS	NS	NS	NS	NS

Notes:
Significant/Unmitigable Impacts = S-U; Significant/Mitigable = S-M; No Significant Impacts = NS; Beneficial Impacts = BI; No Impacts = NI
* MCAS Miramar would lose four CH-46 squadrons.

7.6.1 Ground Traffic and Transportation

Construction at MCAS Yuma

Significant and unmitigable impacts to ground traffic and transportation were identified in association with the 8-Squadron Alternative at MCAS Yuma. Construction-related traffic would add an estimated 5,165 truck trips onto the existing roadway conditions. The construction-related traffic associated with this alternative would be a significant portion of the total traffic volumes for the segment of Avenue 3E between Interstate-8 and Business 8. These significant traffic impacts cannot be mitigated because the additional traffic volume does not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210), and the DoN has no other legal authority for funding roadway improvements outside the installation. Therefore, implementation of this alternative at MCAS Yuma would result in a significant unmitigable impact.

Operations at MCAS Yuma

Significant and unmitigable impacts to ground traffic and transportation were identified in association with the 8-Squadron Alternative at MCAS Yuma. Operations-related traffic from increased military personnel and civilian employees would add an estimated 4,312 trips onto the existing roadway conditions. The operations-related traffic associated with this alternative would be a significant portion of the total traffic volumes for the segment of Avenue 3E between Interstate-8 and Business 8. These significant traffic impacts cannot be mitigated because the additional traffic volume does not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210), and the DoN has no other legal authority for funding roadway improvements outside the installation. Therefore, implementation of this alternative at MCAS Yuma would result in a significant unmitigable impact.

7.6.2 Socioeconomics

Construction and Operations at MCAS Yuma

Potentially significant socioeconomic impacts are anticipated related to both the construction and operations phases. Insufficient industry resources may be available within the region to accommodate the entire labor demand generated by the proposed construction projects. Military construction projects at MCAS Yuma, however, often are awarded to general/prime contractors from urban centers in neighboring counties. While some local subcontractors are utilized, many firms provide skilled laborers and equipment from outside the region. With regard to operations, the anticipated influx of military personnel and their families may exceed existing station housing capacity. Advance planning and coordination with station planners and community leaders in the Yuma area could mitigate potential negative effects associated with these transition impacts.

7.6.3 Biological Resources

Construction at MCAS Camp Pendleton

Construction activities associated with the basing of two MV-22 squadrons at MCAS Camp Pendleton could directly affect federally endangered arroyo toads located within the project area. Although no suitable habitat occurs within the MCAS Camp Pendleton construction area, arroyo

toads may inadvertently attempt to pass through the area. Due to the federal protection afforded to the arroyo toad, direct impacts to this species are considered significant. The following measure is proposed for MCAS Camp Pendleton to reduce construction-related impacts to the arroyo toad to below a level of significance.

- **Restrict arroyo toad access to construction areas.** Although no suitable habitat occurs within the MCAS Camp Pendleton construction area, arroyo toads may inadvertently attempt to pass through the area. If construction is to occur when toads are still expected to be active, toad-proof silt fencing will be installed surrounding construction areas two weeks prior to construction, and monitored by a qualified toad biologist. For this assessment, MCAS Camp Pendleton Environmental will conduct an assessment survey prior to any construction activities. The survey will check for the presence or absence of toads and evaluate the likelihood of this species to occur. If necessary, the qualified biologist will complete two arroyo toad surveys within the fence boundary prior to construction. This qualified biologist will inspect sites before daylight of each construction day and remove any toads. The qualified biologist will also inspect fencing on a daily basis and make repairs or direct others to make repairs as needed to maintain the integrity of the fencing. The USFWS will approve in writing those monitors who will be permitted to handle the toads (USFWS 2005a). MCAS Camp Pendleton Environmental will be consulted immediately if arroyo toads are found within the project area.

Proposed Training Operations

No significant impacts to biological resources would occur from proposed training operations at MCB Camp Pendleton, Bob Stump Training Range Complex, or MCAGCC. However, the use of range facilities would represent a new type of training with respect to fires, which could impact biological resources, as described in section 7.2. The measures listed in Table 7.2-2 are proposed to further reduce the likelihood and significance of impacts resulting from training-related fires.

7.6.4 Cultural Resources

Construction at MCAS Yuma

The Yuma Army Explosives Magazine, a historic structure recommended as eligible for listing on the National Register, is located within a few feet of proposed apron expansion and a new hangar on the south side of the APE. Proposed construction would adversely affect the integrity of this historic structure. If SHPO agrees on the eligibility of this structure, disturbance to the structure would result in an adverse impact on a historic property. This would be a significant impact under the NEPA. With the following measure, impacts on historic structures that are eligible for listing on the National Register would be avoided or minimized, and impacts would be reduced to less than significant:

- In coordination with an architectural historian, site layouts for the Maximum Partial Basing Alternative shall be redesigned to avoid all impact on the Yuma Army Explosives Magazine. Final site layouts shall be approved by the Cultural Resources Manager of the MCAS Yuma Range Management Department.

There are no identified traditional cultural resources within the MCAS Yuma APE. However, consultations with tribal Nations are on-going. MCIWEST is entering into a Programmatic

Agreement with the Arizona SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement.

Construction at MCAS Camp Pendleton

Construction activities associated with this alternative fall within recorded site boundaries of CA-SDI-10156/CA-SDI-12599/H (*Topamai)*, and are located approximately 200 feet from a recorded locus of dense archaeological material. This site is eligible for listing on the National Register and is highly sensitive to local Native Americans. Previous excavations within or immediately adjacent to the APE have been negative, which suggest that the likelihood of encountering intact cultural deposits within the APE is low, but this possibility cannot be dismissed completely. Besides *Topamai*, there are no other identified traditional cultural resources at MCAS Camp Pendleton. However, consultations with tribal Nations are on-going.

MCIWEST is entering into a Programmatic Agreement with the California SHPO, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed. If a traditional cultural resource is identified based on continuing dialogue with identified tribal Nations, MCIWEST will follow the procedures outlined in the Programmatic Agreement.

Consistent with the Programmatic Agreement, the following measures would avoid or minimize impacts on archaeological sites that are eligible for listing on the National Register and/or sites that are of concern to the Native American community, and impacts would be reduced to less than significant:

- All ground disturbing activities that extend beneath 18 inches of undisturbed ground in the immediate vicinity of CA-SDI-10156/12599/H will be monitored by a qualified archaeologist and Native American observer.
- Preconstruction meetings will be conducted in order to inform construction personnel about common types of artifacts that may be uncovered during construction, the importance of cultural resources to archaeologists and Native Americans, and the reporting requirements of responsibilities of construction personnel.
- In the event that unexpected cultural remains are discovered, the MCAS Camp Pendleton environmental office will be notified of the discovery and construction activities will be temporarily halted until the significance of the discovery is determined. If the cultural remains are determined to be significant (i.e., eligible for listing on the National Register), then MCAS Camp Pendleton will follow the standard operating procedures outlined in the ICRMP, Programmatic Agreement with the California SHPO, and other applicable guidance documents.

Proposed Training Operations

MV-22 training operations that could cause ground disturbance would occur at previously established landing areas. Rotorwash from an MV-22 aircraft during landing, take-offs, and hovering immediately above the ground may disturb artifacts lying on the surface in the immediate vicinity of the hovering aircraft, although the extent of this disturbance would depend on local soil

characteristics, presence of vegetation, and size/weight of artifacts. As described in section 7.2, with implementation of the measures listed in Table 7.2-3, the impacts on cultural resources at MCB Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC would be reduced to less than significant.

7.6.5 Air Quality

Air quality impacts associated with the MCAS Yuma 8-Squadron/MCAS Camp Pendleton 2-Squadron Alternative were determined by estimating the net change in emissions that would occur within each affected air basin due to the replacement of current CH-46 operations with future MV-22 operations. These emissions were compared to the criteria applicable to each air basin, as indentified in sections 3.7.1, 6.2.7, and 6.3.7 of this EIS, to determine their significance

Construction at MCAS Yuma and MCAS Camp Pendleton

Construction of the MCAS Yuma 8-Squadron/MCAS Camp Pendleton 2-Squadron Alternative would produce emissions that would remain below all conformity *de minimis* thresholds (see Tables 4.7-3 and 5.7-3). Therefore, construction of the alternative would produce less than significant air quality impacts. However, to minimize fugitive dust and equipment combustive emissions during proposed construction activities, the project construction contractor shall implement a Construction Emissions Mitigation Plan, as described in sections 4.7 and 5.7.

Operations

Table 7.6-2 presents an estimation of the annual operational emissions that the MCAS Yuma 8-Squadron/MCAS Camp Pendleton 2-Squadron Alternative would generate within each air basin. Regarding project regions other than Arizona, these data show that emissions of VOC, CO, SO_x, PM_{10}, and $PM_{2.5}$ would either decline or would increase by only a nominal amount within any air basin. Additionally, the proposed increases in NO_x emissions would not exceed the applicable NO_x conformity *de minimis* threshold within any O_3 nonattainment area. Therefore, these net changes in emissions would produce insignificant impacts to air quality. Regarding the Arizona project region, the data in Table 7.5-2 show that project emissions of VOC, SO_x, PM_{10}, and $PM_{2.5}$ would be well below the conformity *de minimis* levels for a nonattainment area (100 tons per year). Impacts associated with these emissions would not be significant. The Alternative would produce the same level of emissions as the Preferred Alternative within the SSAB and MDAB project regions. The alternative would produce the same amount of emissions within the Arizona project region compared to the MCAS Yuma 8-Squadron/MCAS Miramar 2-Squadron Alternative.

Operation of the MCAS Yuma 8-Squadron/MCAS Camp Pendleton 2-Squadron Alternative would produce the same impacts within the Arizona project region as those described for the MCAS Yuma 8-Squadron/MCAS Miramar 2-Squadron Alternative in section 7.5.5. Therefore, the MCAS Yuma 8-Squadron/MCAS Camp Pendleton 2-Squadron Alternative would produce less than significant air quality impacts within the Arizona project region.

Table 7.6-2. Annual Emissions from the MCAS Yuma 8-Squadron/MCAS Camp Pendleton 2-Squadron Alternative by Air Basin

Air Basin/Facility	Air Pollutant Emissions (tons/year) (1)(2)					
	VOC	CO	NOx	SOx	PM10	PM2.5
SAN DIEGO AIR BASIN						
Existing Facility Emissions						
MCAS Miramar	-62.20	-318.33	-44.50	-3.21	-36.08	**-32.04**
MCAS Camp Pendleton	-58.70	-287.90	-41.90	-3.18	-32.94	-30.49
MCB Camp Pendleton Ranges	-7.67	-41.49	-8.38	-0.85	-3.81	-3.81
Total Existing Emissions	**-128.57**	**-647.72**	**-94.78**	**-7.24**	**-72.82**	**-66.34**
Proposed Facility Emissions						
MCAS Miramar	-	-	-	-	-	-
MCAS Camp Pendleton	10.38	93.47	46.00	1.91	11.17	9.26
MCB Camp Pendleton Ranges	0.08	3.70	101.59	2.87	11.32	11.32
MTRs	0.00	0.05	1.24	0.04	0.14	0.14
Total Proposed Emissions	**10.46**	**97.21**	**148.83**	**4.81**	**22.63**	**20.72**
Total Net Change – SDAB	**-118.11**	**-550.51**	**54.06**	**-2.43**	**-50.20**	**-45.62**
Conformity *De Minimis* Level	**100**	**100**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – MARGINAL O3 NONATTAINMENT AREA						
Total Net Change	**-0.96**	**-2.55**	**90.90**	**2.48**	**9.72**	**9.72**
Conformity *De Minimis* Level	**100**	**NA**	**100**	**NA**	**NA**	**NA**
SALTON SEA AIR BASIN – SEVERE O3 NONATTAINMENT AREA						
Total Net Change	**-0.23**	**-0.53**	**24.91**	**0.68**	**2.68**	**2.68**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**70**	**NA**
MOJAVE DESERT AIR BASIN						
Total Net Change - MDAB	**-3.57**	**-12.86**	**33.60**	**0.90**	**3.04**	**3.04**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**100**	**NA**
MOJAVE DESERT AIR BASIN – SEVERE O3 NONATTAINMENT AREA						
Total Net Change	**-3.58**	**-13.59**	**14.05**	**0.34**	**0.85**	**0.84**
Conformity *De Minimis* Level	**25**	**NA**	**25**	**NA**	**NA**	**NA**
ARIZONA – COMBINED COUNTIES						
Existing Facility Emissions						
MCAS Yuma and BMGR	**-9.35**	**-41.37**	**-6.03**	**-0.63**	**-3.34**	**-3.34**
Proposed Facility Emissions						
MCAS Yuma	28.94	268.27	156.43	6.77	25.29	**24.73**
BMGR	0.22	11.56	288.25	8.22	32.35	32.35
MTRs	0.01	0.65	17.51	0.50	1.96	1.96
Total Proposed Emissions - Arizona	**29.18**	**280.47**	**462.19**	**15.49**	**59.61**	**59.05**
Net Change in Emissions - Arizona	**19.83**	**239.10**	**456.16**	**14.85**	**56.28**	**55.71**
Conformity *De Minimis* Level	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Notes:
1 Year 2017 emissions.
2 – indicates a reduction in pollutant emissions.

7.7 NO ACTION ALTERNATIVE

Under the No Action Alternative, no aircraft would be replaced, aircraft operations would continue at the current level, and no construction/demolition or personnel changes related to basing the MV-22 aircraft on the West Coast would occur. Some MV-22 training by East Coast squadrons currently occurs on the West Coast, and would continue to occur under the No Action Alternative.

It is possible that future construction efforts may be needed (e.g., wash racks at MCAS Yuma) related to this training activity under the No Action Alternative. Future construction efforts would likely focus on MCAS Yuma because this air station supports special exercises like WTI training activities, which currently includes participation by East Coast MV-22 squadrons.

The No Action Alternative would have no significant impact on existing environmental resources at MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, MCB Camp Pendleton, the Bob Stump Training Range Complex, MCAGCC, or the MTRs.

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Chapter 8

Cumulative Impacts

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8.0 CUMULATIVE IMPACTS

8.1 INTRODUCTION

CEQ regulations implementing the NEPA require that the cumulative impacts of a proposed action be assessed (40 CFR Parts 1500-1508). A cumulative impact is defined as the following:

> *"…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR § 1508.7)*

CEQ's guidance for considering cumulative effects states that the NEPA documents "should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant" (CEQ 1999). The first step in assessing cumulative effects, therefore, involves identifying and defining the scope of other actions and their interrelationship with the proposed action or alternatives. The scope must consider other projects that coincide with the location and timetable of the proposed action and other actions. Section 8.2 identifies relevant past, present and reasonably foreseeable future actions, including both military actions in the region as well as other federal and non-federal actions. Projects were selected because they are either similar to the proposed action, large enough to have far reaching effects, or in proximity to the proposed action.

Section 8.3 provides an analysis of how the impacts of the identified actions might be affected by those resulting from the proposed action for each of the environmental resources discussed in this EIS.

8.2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE PROJECTS CONSIDERED IN THE CUMULATIVE ANALYSIS

This section describes past, present, and reasonably foreseeable future actions in either the project area or the greater regional influence area. These are organized by military actions (section 8.2.1), other federal actions (section 8.2.2), and non-federal actions (section 8.2.3).

8.2.1 Military Actions

The USMC expects to continue updating the MV-22 Training and Readiness Manual and training plans to reflect lessons learned from training evolutions and deployment experience. Due to the evolving nature of these MV-22 training requirements, additional training areas and air space, on or off DoD-owned lands, likely will emerge as necessary or useful for applying the aircraft's capabilities to ever-changing missions. Suitable training areas may be identified on lands managed by other federal agencies such as the Bureau of Land Management and U.S. Forest Service. The types of training and readiness operations may include low altitude tactical navigation, detection avoidance, low-level instrumental meteorological navigation, water operations, terrain-following exercises, night vision goggle training, and gunnery and combined arms exercises. The environmental impacts associated with new training requirements will be evaluated under the

NEPA, and will include consultations pursuant to the ESA and/or NHPA where applicable. Toward that end, the DoN is seeking programmatic agreements with SHPOs to set forth procedures for evaluating future proposed landing zones.

MCAS Miramar Military Actions

Projects located on MCAS Miramar that could interact directly or indirectly with the proposed action consist of facility, infrastructure, and community service improvements to support station operations and personnel. These include the following, with an estimated date of completion provided in parentheses, when available:

- **Basing of the F-35B Joint Strike Fighter** - The F-35B Lightning II (aka Joint Strike Fighter) is a new stealth, supersonic, multi-role fighter optimized for the air-to-ground role. The distinguishing feature of the USMC version of the F-35B is its short take-off/vertical landing capability (STOVL). This project involves the introduction of the F-35B to the West Coast to replace the F/A-18A/C/D Hornet in the 3D and 4th MAW, which the USMC plans to remove from service. Up to ten active duty squadrons of the F-35B as well as one reserve squadron and one Operational Test and Evaluation squadron could be based at two locations on the West Coast, one of which could be MCAS Miramar. Basing the F-35B at MCAS Miramar would likely require construction components for expanded apron space and hangar upgrades, similar to the proposed action. An EIS is currently under preparation for this action. (2012)

- **Grow the Force Initiative** - This project involves increasing the USMC's end strength nationwide from approximately 180,000 to 202,000 Marines by 2011. To support the Grow the Force Initiative, the DoN has proposed to increase the number of Marines stationed at MCAS Miramar by approximately 700 personnel. To support this increase, both temporary and permanent facilities are proposed for construction. Temporary facilities (modular buildings with temporary utility hook-ups) are proposed for either East Miramar or the main station. Five military construction (MILCON) projects are proposed for permanent facilities, including new training facilities, equipment facilities and new bachelor enlisted quarters (BEQs). An EA is currently being prepared for this action. (2011)

- **Military Family Housing –** An EIS was completed in 2004 for the construction of 1,400 units of military family housing in East Miramar to provide suitable and affordable housing for enlisted personnel and their families assigned to installations in the San Diego region. A Supplemental EA was prepared to analyze impacts of due to revisions to the project description and boundaries of the Preferred Alternative previously analyzed in the 2004 EIS. A FONSI was signed in December 2008. (2009)

- **Wildland Fire Management Plan –** This is a proposed comprehensive vegetation and fire management program that includes fire prevention and suppression measures to prevent and/or control the frequency, size, distribution, and intensity of wildfires. The MCAS Miramar Fire Department has the responsibility of fire prevention and fire suppression at MCAS Miramar. The proposed measures are intended to protect high value areas on (e.g., military assets and sensitive natural and cultural resources) and off MCAS Miramar (e.g., residential and commercial areas that border MCAS Miramar). The actions would include fuel management via mechanical, prescribed fire, or chemical methods to reduce the risk of

wildfire. Other measures could include surveying and documentation of fuel load conditions throughout MCAS Miramar, and the construction of new fuelbreaks. (2011)

- **Replacement of Jet Fuel Underground Storage Tanks and Distribution System (P-125) –** This is a replacement of seven existing jet fuel (JP-5) underground storage tanks with three above-ground tanks and modification of associated distribution lines. This action will provide greater storage capacity and modify the distribution pipeline system so it does not traverse Rose Canyon. The new distribution system would be equipped with a centralized leak detection device. (2009)

- **Veterans Administration Cemetery –** This entails construction and operation of the Fort Rosecrans National Cemetery Annex in the northwest corner of MCAS Miramar. An EIS was prepared for this action on 30 July 2007.

- **Joint Regional Confinement Facility Southwest –** The proposed action would consolidate the Naval Consolidated Brig Miramar and three other U.S. Air Force and USMC correctional facilities into one joint facility at MCAS Miramar. The existing correctional facility has a capacity for 400 inmates; this facility would be expanded to house up to 600 inmates.

- **U.S. Army Reserve Center –** This includes construction and operation of a U.S. Army Reserve Center on MCAS Miramar. The parcel is located approximately one-third mile south of Pomerado Road and one-quarter mile east of Interstate-15, adjacent to the existing Naval and Marine Corps Reserve Center. A Draft EA was prepared in April 2008 and is currently under review.

MCAS Camp Pendleton Actions

Projects located on MCAS Camp Pendleton that could interact directly or indirectly with the proposed action consist of facility and infrastructure improvements along the flightline to support station operations. These include the following, with an estimated date of completion provided in parentheses, when available:

- **Taxiway Improvements (P-036) –** This includes construction of a reinforced concrete taxiway (28,654 square feet) with asphalt shoulders (19,095 square feet) to provide egress from the runway and the hot refueling area. (2008)

- **Hangar Additions to 2386, 2396, and 2397 (P-070) –** This entails construction of second-story squadron administrative space to hangars 2386 (3,123 square feet), 2396 (3,315 square feet), and 2397 (2,227 square feet) on top of existing first floor additions. (2009)

- **MALS Depot Level Maintenance for the H-1 (P-099) and MALS Complex Expansion (P-012) –** This project includes construction of a multi-story reinforced building to provide a high bay maintenance hangar (34,875 square feet) in the MALS complex for Naval Aviation Depot level maintenance for all West Coast USMC and Navy H-1 aircraft. It also includes construction of support facilities totaling an additional 35,210 square feet. (2009-2010)

- **Security Stand-off Structure (P-088) –** This project is the construction of a multi-story concrete parking structure (125,389 square feet) on a pile foundation. (2011)

- **Combat Aircraft Loading Apron/De-arming/Ordnance Improvements (P-086) –** This entails expansion of the existing CALA loading area by 2,691 square feet. (2010)

- **Tactical Van Pad Expansion (P-078, P-079) –** This would expand the concrete van pads with utility connections, relocate and expand a utility building, construct a storage shed and guard house, and provide chain link fencing and area lighting. The estimated expansion area equals 100,836 square feet. (2008)

MCAS Yuma Actions

Projects located on MCAS Yuma that could interact directly or indirectly with the proposed action consist of military construction projects to support station operations such as fueling facilities, aircraft hangars, instructional and training facilities. These include the following, with an estimated date of completion provided in parentheses, when available:

- **Basing of the Joint Strike Fighter -** As described above for MCAS Miramar, this project involves the introduction of the Joint Strike Fighter (F-35B) to the West Coast to replace the F/A-18 Hornet and the AV-8 Harrier, which the USMC plans to remove from service. Up to five additional squadrons of the F-35B could potentially be based at MCAS Yuma with up to 250 personnel associated with each squadron; this would replace the four squadrons of AV-8 that are currently based at MCAS Yuma. Basing the F-35B at MCAS Yuma would likely require construction components for expanded apron space and hangar upgrades, similar to the proposed action. Anticipated arrival of the F-35B to the West Coast is 2012, and an EIS is currently under preparation for this action. (2012)

- **Grow the Force Initiative (P-552)** - As described above for MCAS Miramar, this project involves increasing the USMC's end strength nationwide from approximately 180,000 to 202,000 Marines by 2011. To support this initiative, the DoN has proposed to increase the number of Marines stationed at MCAS Yuma by approximately 90 to 110 personnel as well as construct a 12,927 square foot facility. An EA is currently being prepared for this action. (2011)

- **Aircraft Maintenance Hangar (P-447) –** This project involves construction of a 38,858 square-foot Type I aircraft maintenance hangar with 132,773 square feet of paved taxiway and 102,472 square feet of paved aircraft parking apron. (2010)

- **Aircraft Maintenance Hangar (P-460) –** This project involves construction of a 50,676 square-foot Type I aircraft maintenance hangar with 160,630 square feet of paved taxiway and 104,550 square feet of paved aircraft parking apron. (2011)

- **New MAWTS-1 Applied Instruction Facility (P-495) –** This project includes construction of a new 47,792-square-foot instructional facility and headquarters for aerial weapons training and related functions. The facility would support the mission of Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) and would include auditoriums,

classrooms, administrative offices and various laboratories, learning resource and research centers, ready rooms, and other related buildings and structures. (2008)

- **New Fixed Wing Fueling Apron (P-520) –** This project entailed the construction of a new fixed wing aircraft refueling apron and all associated utilities. The apron measures 432,924 square feet in size and provides the opportunity to rapidly refuel ("hot pit") four fixed wing aircraft simultaneously. (Completed)

- **New Rotary Wing Refueling Facility (P-521, P-523P)** - This new facility provides the opportunity to rapidly refuel ("hot pit") two light attack helicopters simultaneously. The project entailed construction of a new rotary wing aircraft refueling apron and all associated utilities. The apron measures 164,150 square feet in size. A new rotary wing hot pit refueling facility was also constructed that includes two 210,000 gallon above ground jet engine fuel storage tanks, day tanks for fuel storage and dispensing, fuel pumps and fuel piping system, filtration system, and aircraft direct fueling stations. The project also included construction of a concrete masonry hot pit refueling operations office and necessary utilities. (Completed)

- **Fixed Wing Fueling Facilities (P-522) –** This project entailed construction of a new fixed wing hot pit refueling facility that ties into the two 210,000 gallon above ground jet engine fuel storage tanks, day tanks for fuel storage and dispensing, fuel pumps and fuel piping system, filtration system, and aircraft direct fueling stations developed under project P-521 above. (Completed)

- **New Water Survival Training Facility (P-527) –** This would construct a new indoor Combat Training Pool and a single-story concrete masonry training support facility that would include a classroom, administrative offices, storage rooms, a shop, and associated utilities and parking. The new facility would measure approximately 17,933 square feet. An existing pool and bathhouse would be demolished. (2012)

- **Military Construction Project P-532V –** This project would construct a 2,000 square feet aircraft maintenance support shop to provide intermediate and depot level maintenance under the Integrated Maintenance Program by NAVAIR. (2008)

- **Helicopter Parking Apron** - This project is in the early stages of consideration and would include construction of a dedicated helicopter parking apron approximately 52,000 square feet in size and located north of the north ramp, east of the rotary wing refueling apron. (2010)

MCB Camp Pendleton Military Actions

Projects located on MCB Camp Pendleton that could interact directly or indirectly with the proposed action consist of military construction projects to support base operations, such as infrastructure and facility improvements including roadway improvements and housing improvements. These include the following, with an estimated date of completion provided in parentheses, when available:

- **Grow the Force Initiative** - As described above for MCAS Miramar, the DoN has proposed to increase the number of Marines stationed at MCB Camp Pendleton as part of this nationwide

initiative. To support this increase in Marines, both temporary and permanent facilities and infrastructure are proposed for construction at MCB Camp Pendleton. Approximately 60 construction projects are proposed to support this need. Construction of temporary facilities is expected as early as FY 2008, while the permanent facilities are scheduled for FY 2010, FY 2011, and FY 2012. An EA/FONSI has been completed for the temporary facilities. A programmatic EA is being prepared for the permanent facilities. (2008 – 2012)

- **Public-Private Venture (PPV) Projects** - The military housing at Del Mar and Wire Mountain would be repaired and upgraded through a PPV project. The Del Mar PPV involves routine repair and maintenance of existing facilities and construction of new facilities consistent with current land use and compliant with existing regulatory requirements and constraints. No expansion of the housing area would occur. A CATEX was signed on 23 September 2003. The Wire Mountain PPV involves the demolition of all the existing housing units and construction of new units, all built within the existing development footprint. The action has been completed for half of the project and the remaining half is currently underway. The Wire Mountain PPV action was analyzed in an EA finalized in November 2002 and a FONSI signed on 4 December 2002. Four additional sites were proposed to support PPV Phase IV including the San Onofre Mobile Home Park, (344 units); Stuart Mesa (up to 588 units); the Rodeo Grounds (up to 550 units); and South Mesa (up to 134 units). The EA was finalized and a FONSI was signed on 25 August 2006. The action has been completed for a portion of the project and the remaining is currently underway. PPV Phase V is in the design phase and construction is anticipated to be completed by 2010. (2008 – 2010)

- **San Jacinto Street Extension and Temporary Lodging Facility** – This action includes extending San Jacinto Street to an intersection with Vandegrift Boulevard at Pacific Plaza. This road extension would increase the level of service for vehicles traveling from Wire Mountain Housing Complex to Pacific Plaza and other base destinations to the east of the shopping complex. Additionally, the extension would provide enhanced and safer pedestrian routes to and from the shopping area for residents of the Wire Mountain Housing Complex and patrons of related community services in the housing area. An EA/FONSI has been completed for these two projects. The road extension is on hold due to lack of funding.

- **Basewide Utility and Infrastructure Improvements** – This project would provide new or upgraded, reliable, and compliant utility systems to support Military Training and Operations and delivery of life support and quality of life services. It includes eight MILCON construction projects to upgrade basewide utilities including potable water, wastewater, electrical, and communication. The NOI was published in the Federal Register on 10 November 2008 and a Draft EIS is currently being prepared. (2010)

MCAGCC Military Actions

Projects located on MCAGCC that could interact directly or indirectly with the proposed action consist of upgrades to station and range facilities. These include the following, with an estimated date of completion provided in parentheses, when available:

- **Proposed Acquisition of Lands and Establishment of Airspace Contiguous to MCAGCC** - The proposed action is to request the withdrawal of federal public lands, acquire state and privately owned lands, and to seek the establishment of Special Use Airspace with the

effect of expanding the MCAGCC. This action is needed to support Marine Corps Marine Expeditionary Brigade (MEB) sustained, combined arms, live-fire and maneuver training requirements. An EIS is currently being prepared for this action.

- **Grow the Force Initiative** - As described above for MCAS Miramar, an EA was prepared to analyze the potential impacts associated with an increase of up to 2,100 Marines at MCAGCC over the course of four years beginning in FY 2008 as part of the Grow the Force initiative. The proposed action includes the temporary placement of new portable facilities at MCAGCC, the construction of associated site improvements and infrastructure to support these facilities, and the repair/upgrade of existing facilities. Additionally, a second EA is currently being prepared to address construction of permanent facilities. (2008 – 2011)

- **Public-Private Venture (PPV) Projects** - An EA is currently being prepared for PPV military family housing at MCAGCC.

- **Range 500 Upgrades**. An EA was prepared to analyze the potential impacts associated with proposed Range 500 upgrades at MCAGCC. These upgrades include construction and installation of infrastructure upgrades (trails, targets, and facilities), as well as associated increases in operational tempo facilitated by these ranges. Upon full implementation, operational tempo would be approximately 15 percent greater than current conditions.

- **MAGTFTC Combined Arms Military Operations in Urban Terrain Facility** - An EA was prepared to analyze the potential impacts associated with development of a Combined Arms Military Operation in Urban Terrain (MOUT) training facility at the MCAGCC. The Combined Arms MOUT would be implemented in five phases at three candidate Training Area locations: Quackenbush, Lead Mountain, and Black Top.

- **Mainside Area Projects** - A variety of housing projects (e.g., Military Family Housing) and support facilities (e.g., Total Force Integration Facility) have been completed for the Mainside Area of MCAGCC. Fifteen projects would total approximately 735,000 square feet. (2005-2009)

Other Applicable Military Actions

- **On-Going Training at the NSW Desert Warfare Training Facility (Chocolate Mountain Range)** – An EA was prepared to analyze the potential impacts associated with continuing existing land warfare training at the Naval Special Warfare (NSW) Desert Warfare Training Facility and upgrading and enhancing the capacity and capabilities of the infrastructure and battlespace for training to provide diversity and flexibility for land warfare training. (2008-2011)

- **Establishment of an Advanced Tactical Training Battlespace (Chocolate Mountain Range)** – An EA is being prepared to analyze the potential impacts of establishing a range area (battle space) for conducting advanced land warfare tactical training and maneuvering operations to provide NSW personnel (and other special forces) with a realistic desert battlespace for ground and mounted units. The proposed action would meet the mission needs of NSWG-1 to train and deploy NSW forces worldwide at an optimum state of readiness, discipline, and morale in accordance with contingency and wartime requirements.

- **Navy Pacific Fleet Training on the El Centro Ranges (R-2510/R-2512)** – An EA is being prepared to analyze the potential impacts associated with current and anticipated future DoN and USMC training, and enhancements of the range capabilities needed to support training on the El Centro Ranges. The project area includes the El Centro Ranges, which is a component of the Bob Stump Training Range Complex, and adjacent lands in Imperial Valley, California.

- **Beddown of Apache Helicopters at the Western Army National Guard Aviation Training Station -** The U.S. Army prepared an EA for the Beddown of the Apache helicopter at the Western Army National Guard Aviation Training Site in Marana, Arizona, and issued a FONSI in April 1997. It is expected that up to 50 Apache helicopters will be added. Although the exact start date is unknown, it is expected that the additions will not begin until at least 2008. (tentative 2009)

- **Range Enhancements at the Barry M. Goldwater Range (Luke Air Force Base) –** An EIS is being prepared to analyze the potential impacts associated with anticipated future U.S. Air Force upgrades to BMGR-East, including modifying the MOU among the Department of Interior and the Secretaries of the Navy and Air Force to change the floor for routine flight training operations over portions of the Cabeza Prieta National Wildlife Refuge from 1,500 feet to 500 feet above ground level to support realistic low level approaches to targets.

8.2.2 Other Federal Actions

Other past, current, and future federal actions in the area could also contribute to cumulative effects of the proposed action or alternatives. Federal agencies with proposed actions within the region of influence include the U.S. Bureau of Land Management, USFWS, U.S. Border Patrol, FAA, and U.S. Bureau of Reclamation.

- **Bureau of Land Management Livestock Grazing Allotments** – Five Bureau of Land Management grazing allotments are within the vicinity of the BMGR and the active distributions of the Sonoran pronghorn, lesser long-nosed bat, and cactus ferruginous pygmy-owl. The five allotments include Cameron, Childs, Coyote Flat, Sentinel, and Why allotments.

- **Cabeza Prieta National Wildlife Refuge/Draft Comprehensive Conservation Plan** – An EIS was prepared by the USFWS to establish the wilderness management framework that addresses a variety of issues facing the USFWS including military activities on and overlying the refuge as well as the Sonoran pronghorn.

- **U.S. Border Patrol Activities and Undocumented Alien Traffic –** The U.S. Border Patrol is currently preparing an EIS to identify the environmental effects of its daily operations and to propose infrastructure construction projects within the Tucson and Yuma sectors. Infrastructure construction projects consist of fences, bridges, and lighting. The proposed action is to expand operations/activities and complete all proposed infrastructure construction projects. An alternative action is to expand the use of technology-based operations and infrastructure such as lighting, skywatch towers, and sensors over traditional operations.

- **Improvements at Childs Mountain (Air Route Surveillance Radar [ARSR] Facility and Watchable Wildlife Overlook) –** Installation of the ARSR was needed as part of a FAA national program to modernize joint use en-route radar systems along the perimeter of the continental U.S. Action included repaving the existing roadway extending from the Cabeza Prieta National Wildlife Refuge boundary to the mountain summit. An EA was prepared and a FONSI was signed in February 1998. Cooperating agencies for the EA included USFWS, U.S. Air Force, U.S. Customs Service, and U.S. Border Patrol. These actions were implemented in concert with habitat and wildlife mitigation measures identified in the NEPA process including the removal of aboveground power lines from the refuge boundary to the summit, wildlife-friendly reorientation of physical barriers, and development of an interpretive overlook and watchable wildlife area.

- **San Louis Port of Entry –** On 26 June 2000, the U.S. House of Representatives passed a bill to authorize the Secretary of Interior, acting through the U.S. Bureau of Reclamation, to convey property to the Greater Yuma Port Authority for use as an international port-of-entry. The San Louis commercial port-of-entry would be relocated to approximately four miles east of its present location. An EA was prepared for the project and a FONSI was issued on 31 July 2000.

8.2.3 Non-Federal Actions

Non-federal actions include State of California and Arizona, county, and private projects. General ongoing state activities include residential development, office and commercial development, travel and recreation industries (hotels, spa, golf courses), landfill expansion, road and utility improvements, open space/park developments, concrete manufacturing plant and other light industrial projects, and mixed-use development projects. Appendix E provides additional details about non-federal projects located near the proposed action.

8.3 ANALYSIS OF CUMULATIVE IMPACTS BY ENVIRONMENTAL RESOURCE AREA

The following analysis examines the impact on the environment that results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. For this analysis, the potential for an overlap of adverse impacts with respect to project schedules and/or regions of influence was assessed. Transition from the helicopters to the MV-22 is scheduled to occur between FY 2010 and FY 2020. Construction activities are anticipated to occur between FY 2010 and FY 2014. MV-22 training exercises and operations would begin with the arrival of the first MV-22 aircraft in FY 2010.

8.3.1 Airfields and Airspace

The geographic scope of this cumulative analysis includes airfields and associated airspace at MCAS Miramar, MCAS Yuma, MCAS Camp Pendleton, MCB Camp Pendleton, Bob Stump Training Range Complex, MCAGCC, and the seven MTRs discussed in Chapter 6. Projects within this region could impact airfields and airspace if they result in a significant change in the operational environment, such as an increase in tempo of aircraft operations or an increase in an airspace training footprint.

The MV-22 squadrons would conduct operations similar to those currently conducted by the CH-46E and other rotary wing and fixed wing aircraft within the existing airspace, ranges, and MTRs noted above. Established airspace training footprints would not be expanded or modified with implementation of the action alternatives. The introduction of up to ten squadrons of the MV-22 to the training environment would result in an increase in operations in most locations currently used by the CH-46E. However, airspace training operations would be consistent with existing airspace operations because the MV-22 would operate at only existing range facilities, restricted airspace, and along established MTRs. Thus, the proposed action would not result in significant airspace impacts at MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, or the training ranges and MTRs.

The following cumulative actions identified in section 8.2 may affect airfields, airspace, or associated range management: Grow the Force Initiative; Basing of the Joint Strike Fighter; Range 500 Upgrades at MCAGCC; MCAGCC Land Acquisition; Navy Pacific Fleet Training on the El Centro Ranges; and the Beddown of Apache Helicopters at the Western National Guard Aviation Training Station in Marana, Arizona.

In regional airspace, the primary cumulative effects would occur over the military ranges, where the airspace is used by a variety of other users. In the future, the level of use of restricted airspace is likely to increase due to an overall increase in training tempo, the introduction of the Joint Strike Fighter, the Grow the Force initiative, and other programs. This increase in operational tempo would require more coordination between airspace managers and users to meet the varying needs for military training. Priorities in scheduling for specific uses would be an important determinant in how to allocate limited airspace resources safely. There could be an increase in civil aviation adjustments required when military controlled airspace is activated in addition to other temporary or MOA/ATCAA airspace that is used for other activities (such as large exercises) and regional training units. The MCAGCC Land Acquisition may alleviate some of this airspace congestion because the proposed acquisition of training land also includes expansion of associated Special Use Airspace.

The cumulative impacts identified for airfields or airspace from the proposed action, in conjunction with other projects on and in the vicinity of installations associated with the proposed action, would not be cumulatively significant, but will likely require more coordination between regional FAA and military airspace managers. Application of established airspace management procedures, as promulgated in FAA and DoD regulations, ensures that training flight operations are conducted safely and with maximum efficiency. By following these established procedures, the likelihood of airspace conflicts are reduced.

8.3.2 Land Use

The geographic scope of the land use cumulative analysis includes MCAS Miramar, MCAS Yuma, MCAS Camp Pendleton, MCB Camp Pendleton, Bob Stump Training Range Complex, MCAGCC, as well as adjacent areas/communities to these installations. Cumulative impacts are assessed in terms of their compatibility with existing land uses. Projects within this region that are not compatible with existing installation master plans, airfield safety guidelines, or other planning documents would impact land use.

The proposed action would not result in significant land use impacts at MCAS Camp Pendleton, MCAS Yuma, MCAS Miramar, or associated training ranges and MTRs with the continued

implementation of established land use management and safety plans. The Master Plan or other installation planning documents for each installation and/or range would be updated to include MV-22-related facilities and areas to be used for training. Existing land use designations would not change as a result of the proposed action, and the existing land uses within the project area would essentially continue to be used for the same purposes. There would be no safety or significant land use impacts to surrounding communities since the APZs and clear zones would be contained within each installation. Therefore, the proposed action would not result in significant impacts to land use. Moreover, the cumulative projects located on and in the vicinity of MCAS Camp Pendleton, MCAS Yuma, and associated training ranges and MTRs would be required to comply with existing land use management and safety plans, as described for the proposed action. Therefore, the proposed action, in conjunction with other projects on and in the vicinity of MCAS Camp Pendleton, MCAS Yuma, and associated training ranges would not result in significant cumulative impacts to land use.

The Marine Corps is studying basing for the F-35B Joint Strike Fighter, including alternatives that would base the aircraft at MCAS Miramar. Like the F/A-18 it would replace, noise from F-35B operations would be expected to be the dominant aircraft noise category at MCAS Miramar. As such, noise and land use impacts from MV-22 would not be cumulatively significant with those from F-35B operations.

8.3.3 Socioeconomics

The geographic scope of the socioeconomic cumulative analysis includes communities adjacent to MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma. Impacts are based on changes or relocation of personnel and/or construction spending in support of improvements at the military installations. Because the proposed training operations within MCB Camp Pendleton, Bob Stump Training Range Complex, MCAGCC, and along the MTRs do not include any change in personnel or no new construction/improvements, the proposed action would have no socioeconomic effect on local communities in these areas and, therefore, the proposed action, in conjunction with other projects on and in the vicinity of these training ranges, would not result in cumulative impacts.

Construction

The proposed action would involve construction activities scheduled to occur between FY 2010 and FY 2014 at MCAS Miramar, MCAS Camp Pendleton, and/or MCAS Yuma. During the construction phase of the project, the effects on local and regional socioeconomics would not be significant at MCAS Miramar and MCAS Camp Pendleton. During peak construction periods, labor and supply demand would be met by regional industries and contractors. Although other construction projects are expected to occur within the San Diego region during the same time frame (see section 8.2), the size and capacity of the metropolitan area's construction industry accommodates regular fluctuations in labor and demand. Because of the transitory nature of construction projects, it is the anticipation of future projects that maintains certain stability in the construction industry. Therefore, when the construction-related impacts from the proposed action are combined with other construction projects on and in the vicinity of MCAS Miramar and MCAS Camp Pendleton, no significant cumulative socioeconomic effects are anticipated.

The proposed action would result in significant but mitigable impacts at MCAS Yuma under the Maximum and Minimum Partial Basing Alternatives. Insufficient industry resources may be available within the region to accommodate the entire labor demand generated by the proposed action in conjunction with other proposed construction projects during the construction years of FY 2010 to FY 2014 (including Basing of the Joint Strike Fighter, Grow the Force Initiative, Aircraft Maintenance Hangars P-447 and P-460, and the Helicopter Parking Apron project). Military construction projects at MCAS Yuma, however, often are awarded to general/prime contractors from urban centers in neighboring counties. While some local subcontractors are utilized, many firms provide skilled laborers and equipment from outside the region. Depending on the availability of appropriate labor from outside the region, construction impacts under the Maximum or Minimum Partial Basing Alternatives at MCAS Yuma, when combined with potential socioeconomic effects of other projects on and in the vicinity of MCAS Yuma, would potentially result in significant cumulative effects with regard to construction labor.

Mitigation measures under the Maximum or Minimum Partial Basing Alternatives at MCAS Yuma would be implemented to reduce significant cumulative socioeconomic impacts from construction to a less than significant level. Advance planning and coordination with station planners and community leaders in the Yuma area could mitigate potential negative effects associated with the projected impacts. No additional mitigation measures would be required.

Operations

The proposed action would involve a net change in the number of military and civilian personnel at MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma. Although expected personnel changes and resulting effects on local and regional socioeconomics would not be significant at MCAS Miramar and MCAS Camp Pendleton, the proposed action would result in significant but mitigable impacts at MCAS Yuma under the Maximum and Minimum Partial Basing Alternatives. For example, a change in station population of the magnitude anticipated at MCAS Yuma could be consequential to housing without sufficient advance planning and preparation.

Basing of the Joint Strike Fighter would result in additional personnel at MCAS Miramar and MCAS Yuma beyond those anticipated under the proposed action. The Grow the Force Initiative, a nationwide USMC recruiting effort, would generate increases in personnel at all stations. For stations within the San Diego region, changes in personnel are a common occurrence and are not likely to be noticeable within the region. With an additional 1,400 units of military housing planned at MCAS Miramar and the various phases of the PPV housing project at MCB Camp Pendleton, housing effects related to the incoming personnel and their families are not expected to be consequential. Therefore, when the impacts from the proposed action are combined with other projects on and in the vicinity of MCAS Miramar and MCAS Camp Pendleton, no significant cumulative socioeconomic effects would be anticipated. At MCAS Yuma, however, the cumulative effect of additional personnel increases beyond those anticipated under the proposed action in conjunction with other projects on and in the vicinity of MCAS Yuma, would result in additional demand on station housing capacity. As such, the proposed action's contribution to cumulative socioeconomic impacts, in conjunction with other projects on and in the vicinity, could be significant under the Maximum and Minimum Partial Basing Alternatives at MCAS Yuma.

Mitigation measures under the Maximum and Minimum Partial Basing Alternatives at MCAS Yuma would be implemented to reduce significant socioeconomic impacts from construction and operation to a less than significant level. This includes advance planning and coordination with station planners and community leaders in the Yuma area. No additional mitigation measures would be required.

8.3.4 Community Facilities and Services

The geographic scope of the cumulative analysis for community facilities and services includes community facilities within the vicinity of MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma. Impacts are based on changes or relocation of personnel and/or construction activities in support of improvements at the military installations. Because the proposed training operations within MCB Camp Pendleton, Bob Stump Training Range Complex, MCAGCC, and along the MTRs do not include any change in personnel or no new construction/ improvements, the proposed action would have no impact on community facilities and services in these areas and, therefore, the proposed action, in conjunction with other projects on and in the vicinity of these training ranges, would not result in cumulative impacts.

Existing community facilities and services (health services, security services, fire protection, education, and park and recreation services) at MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma are adequate and would accommodate the proposed increase in personnel. Additionally, these services would not be disrupted by proposed construction activities. Therefore, the proposed action would not result in significant impacts to community facilities and services.

Other projects that may increase the number of personnel at the installations beyond those anticipated under the proposed action, such as the introduction of the Joint Strike Fighter and the Grow the Force initiative, may result in an even greater demand on existing community facilities and services. However, considering the number of community facilities and services (including school districts) in the study areas, planned infrastructure and site improvements, and given sufficient advance planning and preparation to accommodate the influx of personnel, no significant impacts would result from implementation of the cumulative projects located on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma. Furthermore, there are several planned projects within the study areas that are intended to improve the existing community facilities and services, such as construction of military family housing, infrastructure and site improvements, and construction of administrative and operational facilities. Implementation of these types of projects would accommodate and further minimize impacts resulting from increased personnel at the installations. Therefore, the proposed action, in conjunction with other projects on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma, would not result in significant cumulative impacts to community facilities and services.

8.3.5 Ground Traffic and Transportation

The region of influence considered in this analysis includes roadway systems on or within the vicinity of MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma. Projects that increase total traffic volumes on existing roadways could result in cumulative impacts to ground traffic and transportation.

The proposed action would involve a net change in the number of military and civilian personnel currently using the local and regional circulation system at MCAS Miramar, MCAS Camp Pendleton, and/or MCAS Yuma. The proposed training operations at MCB Camp Pendleton, Bob Stump Training Range Complex, and MCAGCC would have no effect on the traveled roadway system and, therefore, are not included in this cumulative analysis. A quantitative cumulative traffic and transportation analysis was conducted for MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma, as detailed in Appendix D. When the impacts from the proposed action are combined with estimated traffic volumes for 2010 and 2020 (SANDAG 2010; SANDAG 2020; and YMPO 2006-2029), this could result in a cumulatively significant traffic impact at MCAS Miramar and MCAS Yuma (SANDAG 2006; YMPO 2009).

Table 8.3-1 provides an overview of the regional or installation-specific traffic segments that could contribute a significant portion of the total cumulative traffic volumes from either construction or operations of the proposed action. Construction-related activities could result in cumulatively significant impacts at one segment as a result of the Full Basing Alternative at MCAS Miramar and one segment as a result of the Maximum Partial Basing Alternative at MCAS Yuma. At MCAS Miramar, operational activities, in conjunction with estimated traffic volumes for 2010 and 2020, could result in cumulatively significant impacts to six segments under the Full Basing Alternative and three segments under the Maximum Partial Basing Alternative. At MCAS Yuma, operational activities, in conjunction with estimated traffic volumes, could result in cumulatively significant impacts to three segments under both the Maximum and Minimum Partial basing alternatives. Cumulatively significant construction-related traffic impacts could be mitigated to less than significant by conducting construction activities during off peak hours. Cumulatively significant operations-related traffic impacts cannot be mitigated because the additional traffic volume does not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210), and the DoN has no other legal authority for funding roadway improvements outside the installation.

Other projects that may increase the number of personnel at the installations beyond those anticipated under the proposed action, such as the introduction of the Joint Strike Fighter and the Grow the Force initiative, may result in an even greater demand on the existing road system, especially in the vicinity of MCAS Miramar and MCAS Yuma. These projects could exacerbate the significant operations-related cumulative impacts to traffic identified above. As for MCAS Miramar, the Military Housing Project identified significant impacts to two intersections also impacted by the proposed action: Kearny Villa Road southbound/Miramar Way and Interstate-15 southbound ramps/Miramar Way. However, the PPV entity associated with the MCAS Miramar Military Housing Project will provide a fair-share contribution for the construction of a traffic signal at the intersection of Interstate-15 southbound ramps/Miramar Way and at the Kearny Villa Road southbound ramps/Miramar Way intersection. Implementation of these mitigation measures by the PPV entity may lessen significant cumulative traffic impacts of the proposed action at these intersections.

Table 8.3-1. Significant Portion of the Total Cumulative Traffic Volumes for the Proposed Basing Alternatives

Basing Alternative	Segments with Potentially Significant Cumulative Affects	
	Construction	**Operation**
MCAS MIRAMAR		
Full Basing	Miramar Wy. between Kearny Villa Rd. and Interstate-15 southbound ramp.	• Three segments of Interstate-15 between Mira Mesa Blvd. and south of Miramar Wy.; • Miramar Rd. between Clayton Drive and Kearny Villa Dr.; • Miramar Rd. between Kearny Mesa Rd. and Interstate-15 southbound ramp; and • Miramar Wy between Kearny Villa Rd. and Interstate-15 southbound ramp.
Maximum Partial Basing	No significant cumulative impacts.	• Interstate-15 south of Miramar Wy.; • Miramar Rd. between Kearny Mesa Rd. and Interstate-15 southbound ramps; and • Miramar Wy. between Kearny Villa Rd. and Interstate-15 southbound ramps.
Minimum Partial Basing	No significant cumulative impacts.	No significant cumulative impacts.
Non-MCAS Miramar Basing Alternatives	No significant cumulative impacts.	No significant cumulative impacts.
MCAS CAMP PENDLETON		
Partial Basing	No significant cumulative impacts.	No significant cumulative impacts.
Non-MCAS Camp Pendleton Basing Alternatives	No significant cumulative impacts.	No significant cumulative impacts.
MCAS YUMA		
Maximum Partial Basing	Avenue 3E south of Palo Verde.	• Avenue 3E south of Palo Verde; • Avenue 3E between Business 8 and 40th St.; and • Avenue 3E between 40th St. and Co 14th St..
Minimum Partial Basing	Avenue 3E south of Palo Verde.	• Avenue 3E south of Palo Verde; • Avenue 3E between Business 8 and 40th St.; and • Avenue 3E between 40th St. and Co 14th St.
Non-MCAS Yuma Basing Alternatives	No significant cumulative impacts.	No significant cumulative impacts.

8.3.6 Air Quality

Criteria Pollutants

The region of influence considered in this air quality cumulative analysis includes areas in and adjacent to proposed air stations, training areas, and MTRs within Southern California and Western Arizona. This region of influence includes all or portions of the following air basins:

1. SDAB, which includes San Diego County;
2. MDAB, which includes the eastern portions of Kern, San Bernardino, Riverside, and Los Angeles Counties;
3. SSAB, which includes Imperial County and the western portion of Riverside County; and
4. In Arizona, the Counties of Yuma, La Paz, Mohave, and Yavapai.

The following future actions identified in section 8.2 would contribute to project cumulative air quality impacts through an increase in aircraft operations: Grow the Force Initiative; Basing of the Joint Strike Fighter; Range 500 Upgrades at MCAGCC; MCAGCC Land Acquisition; Navy Pacific Fleet Training on the El Centro Ranges; and the Beddown of Apache Helicopters at the Western National Guard Aviation Training Station in Marana, Arizona. Additionally, construction projects listed in section 8.2 would produce a nominal amount of emissions from construction equipment.

Cumulative impacts resulting from the proposed action, in conjunction with impacts from other projects discussed herein, would potentially occur during construction and operational activities within MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma and associated training range project regions. Proposed construction activities at MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma would produce emissions that would remain below applicable conformity emission significance thresholds. Any concurrent emissions-generating action that occurs in the vicinity of proposed construction activities would potentially contribute to the ambient impacts of these emissions. Since proposed construction would produce a nominal amount of emissions, the combination of proposed construction and future project air quality impacts would not contribute to an exceedance of an ambient air quality standard. As a result, proposed construction activities would produce less than significant cumulative air quality impacts. Implementation of recommended fugitive dust control measures would ensure that air emissions from proposed construction activities would produce less than significant cumulative impacts.

Proposed operational activities would generate emissions that would exceed the annual conformity *de minimis* threshold for NO_x within the SDAB project region. The current SDAB SIP (*1-Hour Ozone Maintenance Plan*) includes a NO_x emissions budget for military programs that would grow by 4,161 tons per year between 2005 and 2014, including over 3,285 tons per year for MCAS Miramar and MCP Camp Pendleton. The maximum net change in annual VOC/NO_x emissions for any proposed action alternative within the SDAB is -90/+223 tons in year 2017 (see Table 7.3-2). These emissions would fit within the military programs emissions budget allowed in the SDAB SIP (see the project conformity determination in Appendix B.2 of this EIS). As a result, operational emissions from the proposed actions would conform to the SDAB SIP and would produce less than significant cumulative contributions to O_3 levels within the SDAB.

Proposed operational activities would not contribute to an exceedance of an ambient air quality standard for CO, NO_2, or O_3 within the Arizona project region (see section 7.3.6). As a result, operational emissions from the proposed actions would produce less than significant cumulative contributions to air quality within the Arizona project region. Project operations would produce less than significant cumulative contributions to all other pollutant levels within all other project regions.

Greenhouse Gases

The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, an appreciable impact on global climate change would only occur when proposed GHG emissions combine with GHG emissions from other man-made activities on a global scale.

Currently, there are no formally adopted or published NEPA thresholds of significance for GHG emissions. Formulating such thresholds is problematic, as it is difficult to determine what level of proposed emissions would substantially contribute to global climate change. Therefore, in the absence of an adopted or science-based NEPA significance threshold for GHGs, this EIS compares GHG emissions that would occur from the Preferred Alternative to the U.S. GHG baseline inventory of 2006 to determine the relative increase in proposed GHG emissions.

Table 8.3-2 summarizes the annual GHG emissions associated with implementation of the Preferred Alternative in 2017. Appendix B.1 presents estimates of GHG emissions generated by each proposed alternative. These data show that the ratio of annual CO_{2e} emissions estimated for the Preferred Alternative to CO_{2e} emissions generated from all sources in the U.S. in 2006 is approximately 0.14/7,054 million metric tons (USEPA 2008b). Therefore, CO_{2e} emissions associated with the Preferred Alternative would amount to approximately 0.002 percent of the total CO_{2e} emissions generated by the U.S. Under any of the alternatives, cumulative impacts to global climate change would not be significant.

Table 8.3-2. Annual GHG Emissions - MV-22 Preferred Alternative

Scenario/Activity	Metric Tons per Year[1]			
	CO_2	CH_4	N_2O	CO_2e
CH-46 Existing Operations	61,795	4.77	0.36	62,010
MV-22 Proposed Operations	201,895	24.21	1.70	203,356
Net Change - MV-22 Proposed Operations	140,101	19.44	1.34	141,346
U.S. 2006 Baseline Emissions (10^6 metric tons) [2]	-	-	-	7,054.2
Proposed Emissions as a % of U.S. Emissions	-	-	-	0.002

Notes:
1 $CO_2e = (CO_2 * 1) + (CH_4 * 21) + (N_2O * 296)$.
2 (USEPA 2008b).

Although the proposed action would not cause significant cumulative impacts associated with global climate change, this important topic warrants discussion of USMC and DoN leadership in broad-based programs to reduce energy consumption and shift to renewable and alternative fuels, thereby reducing emissions of carbon dioxide and other green house gases.

The Commandant of the Marine Corps' *Facilities Energy and Water Management Program Campaign Plan* (2009) declares that energy conservation is "an issue of combat readiness." The Commandant issues his Commanders Intent to implement measures to conserve energy, supporting "our Nation's pledge to reduce green house gas emissions and dependence on foreign oil." The campaign plan

identifies long-term goals to reduce energy intensity and increase the percentage of renewable electrical energy consumed. He mandates that all "acquisitions of relevant products will meet ENERGY STAR and Federal Energy Management Program (FEMP) requirements." He directs "an integrated approach to optimize energy performance to meet Federal building performance requirements and achieve a Leadership in Energy & Environmental Design (LEED) rating of silver for new construction and major renovation projects."

The Commandant requires his Base Commanders to "evaluate the effectiveness of incorporating emerging technologies" including integrated photovoltaics, cool roofs, daylighting, ground source heat pumps, heat recovery ventilation, high efficiency chillers, occupancy sensors, premium efficiency motors, radiant heating, solar water heating, and variable air volume (VAV) systems. "The Marine Corps is committed to taking a leadership position in on-site renewable power development with the assistance of private sector financing and development expertise."

Marine Corps installation commanders are to "use energy management and control systems (EMCS) to monitor building conditions, perform diagnostics, and optimize system performance." Geospatial Information System capabilities will be applied to management of metered data for energy consumption. Personnel awareness programs will emphasize conservation.

This Marine Corps Campaign Plan reflects more than just good intentions. MCAS Miramar is actively pursuing a power purchase agreement to procure approximately 3 megawatts (MW) of electricity generated from captured methane at the Miramar Landfill, and also is pursuing an Energy Savings Performance Contract under the Department of Energy's FEMP. MCAS Miramar won a Presidential Award for Leadership in Federal Energy Management recognizing its reduction of energy intensity to 49 million British Thermal Units (MBTU) per thousand square feet, placing it in the top percentile of all DoN installations. MCAS Miramar achieved this through energy awareness, retrofitting lighting and Heating, Ventilation, & Air Conditioning (HVAC), consolidating chiller and thermal energy storage systems, installing HVAC occupancy sensors, and boiler upgrades. The most recent ribbon-cutting for the combined Golf Course Pro Shop, Clubhouse, Restaurant, and Staff Noncommissioned Officer Club marked the grand opening of the first "LEED Silver Certified" building in the USMC. The base recently broke ground on construction of a new Youth Activities Center designed to the same standards. MCAS Miramar will far surpass its energy reduction goal under Executive Order 13423 by 2015.

MCAGCC reduced energy intensity (energy usage per square foot) by 2.07 percent in one year during 2007, through a $5 million investment in energy improvements, including conversion from evaporative coolers to chilled water systems with EMCS, re-commissioning 15 inoperable solar water heating systems, installing lighting and photocell controls. MCB Camp Pendleton won a Department of Energy award for solar thermal photovoltaic projects at two year-round training pools, converted from natural gas.

These examples illustrate the leadership role that the USMC and DoN play in achieving energy reductions that will contribute to the national effort to mitigate global climate change. As the Commandant of the Marine Corps has said, "As Marines, we take pride in providing the best value to the Nation. This extends to energy conservation aboard our facilities."

8.3.7 Noise

The geographic scope of the noise cumulative analysis includes MCAS Miramar, MCAS Yuma, MCAS Camp Pendleton, MCB Camp Pendleton, Bob Stump Training Range Complex, MCAGCC, as well as adjacent areas/communities to these installations. The proposed action would not result in significant noise-related impacts for any of the above-named facilities under any alternative.

Numerous other projects located on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and associated training ranges could contribute to the noise environment during construction and operation activities. Of the numerous projects listed in section 8.2, the potentially significant noise-related projects are the (West Coast) Basing of the Joint Strike Fighter, MCAGCC Land Acquisition, and the Grow the Force Initiative.

The Grow the Force Initiative, in conjunction with the proposed action, is not anticipated to cause significant cumulative noise impacts because it would be required to incorporate similar types of plans, policies, and procedures into project design, and comply with similar regulations, as described above for the proposed action.

The MCAGCC Land Acquisition would likely increase noise levels due to increased training activity but is also anticipated to disperse the activity (and therefore the noise) over larger areas. Due to the lack of significant impact to MCAGCC by the MV-22 under the proposed action, the proposed action's contribution to cumulative noise impacts at MCAGCC would not be significant.

The USMC is proposing an EIS to study the impacts of basing the F-35B Joint Strike Fighter on the West Coast beginning in 2012 as a replacement for the F/A-18 and AV-8B. Introduction of the F-35B Joint Strike Fighter is anticipated to add to the proposed noise environment in the vicinity of MCAS Miramar and/or MCAS Yuma, but not that of MCAS or MCB Camp Pendleton or the associated training ranges. The EIS will address noise studies and predict noise impacts from a range of alternative basing scenarios. Early studies indicate the F-35B aircraft generates more noise than the F/A-18 C/D Hornets and the AV-8B Harriers.

Because of the lack of proximity of MCAS Camp Pendleton to noise-sensitive receptors, it is not anticipated the Joint Strike Fighter project, if considering training at MCAS or MCB Camp Pendleton, would cause significant cumulative noise impacts. The associated training ranges would be unlikely to have a significant cumulative noise impact due to the dispersion of flight operations throughout the training areas.

If the noise studies from the F-35B West Coast Basing EIS predict additional noise beyond existing baselines, F-35B and MV-22 noise could have a cumulative impact. However, it is anticipated that the F-35B, like the F/A-18 and AV-8 jets it would replace, would be the dominant source for defining noise impacts at any installation where collocated with MV-22 or rotary wing aircraft, and thus MV-22 cumulative noise impacts would not be significant.

8.3.8 Infrastructure and Utilities

The geographic scope of the cumulative analysis for infrastructure and utilities includes MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma. Projects that contribute to an overall increase in demand for water supply, wastewater treatment and disposal, electrical and natural gas supply facilities, solid waste management facilities, and storm drainage facilities, could result in a

cumulative impact to infrastructure and utilities. Because the proposed training operations within MCB Camp Pendleton, Bob Stump Training Range Complex, MCAGCC, and along the MTRs do not include any change in personnel or no new construction/ improvements, the proposed action would have no impact on infrastructure and utilities in these areas and, therefore, the proposed action, in conjunction with other projects on and in the vicinity of these training ranges, would not result in cumulative impacts.

Existing infrastructure and utilities at MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma are adequate and would accommodate the proposed increase in personnel. Proposed facility construction would continue to comply with existing solid waste and stormwater management plans and incorporate standard utility requirements. Other projects that may increase the number of personnel at the installations beyond those anticipated under the proposed action, such as the introduction of the Joint Strike Fighter and the Grow the Force initiative, may result in an even greater demand on existing infrastructure and utilities. However, considering implementation of the planned infrastructure and site improvement projects, and given sufficient advance planning and preparation to accommodate the influx of personnel, no significant impacts would result from implementation of the cumulative projects located on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma. Moreover, these cumulative projects would be required to comply with existing management plans and utility requirements. Therefore, the proposed action, in conjunction with other projects on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma would not result in significant cumulative impacts to infrastructure and utilities.

8.3.9 Hazardous Materials Management

The cumulative geographic scope is the same as the airfields associated with the proposed action (MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and MCAGCC), because the effects of hazardous material-related impacts are site-specific, in that they relate primarily to potential exposure of hazardous materials/waste to on-site personnel during demolition and construction, or to on-site personnel following construction (e.g., aircraft refueling).

Numerous other projects located on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and MCAGCC would result in similar potential hazardous materials impacts during construction and operation. ACMs and lead-based paint may be present in structures proposed to be demolished and relocated; grading and construction may encounter contaminated soil in the vicinity of current or former IRP sites; and surface or groundwater quality could be adversely affected through the accidental release of chemicals during aircraft and vehicle operations (e.g., maintenance and refueling).

The proposed action would not result in significant hazardous material-related impacts at MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, or MCAGCC, with the continued implementation of established plans, policies, and procedures. Surveys would be conducted for both ACMs and lead-based paint, and these materials would be characterized, managed, transported, and disposed according to applicable state and federal requirements for protecting human health and safety and the environment. Compliance with all applicable federal, state, and local regulations would reduce the potential for significant adverse impacts from contaminants, if encountered, such that significant impacts would not occur. In addition, potential impacts to surface or groundwater quality through the accidental release of chemicals during MV-22 operations would be addressed by implementation of an NPDES-mandated SWPPP and compliance with federal, state, and local

statutes and regulations regarding stormwater retention/treatment and soil and groundwater contamination, such that significant impacts would not occur. Therefore, construction and operational impacts would not be significant.

Similarly, each of the related cumulative projects discussed in section 8.2 would be required to incorporate similar types of plans, policies, and procedures into project design, and comply with similar regulations, as described above for the proposed action. Therefore, the individual cumulative projects in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and MCGACC would not result in significant impacts. As such, the proposed action, in conjunction with other projects on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and MCAGCC, would not result in significant cumulative impacts related to hazardous materials.

8.3.10 Aesthetics and Visual Resources

The geographic scope for cumulative impacts with respect to aesthetics and visual resources is MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and areas in the vicinity of the MTRs discussed in Chapter 6. Generally, projects that have the potential to alter the quality or distinguishable characteristic of the perceived environment may be considered as having an impact on the visual resources of that area. The significance of a change in visual character is influenced by social considerations including public value placed on the resource, public awareness of the area, and general community concern for visual resources in the area.

Because the proposed training operations within MCB Camp Pendleton, Bob Stump Training Range Complex, and MCAGCC do not include new construction/ improvements and the only new visual component would be the MV-22 aircraft, itself, within an established military training environment, the proposed action, in conjunction with other projects on and in the vicinity of these training ranges, would not result in cumulative impacts.

The proposed action would not result in the obstruction or degradation of scenic viewsheds at MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, or along the MTRs. Proposed construction would be visually consistent with existing structures and would adhere to the applicable Base Exterior Architecture Plan. In addition, the visual environment of MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma is already characteristic of a military airfield, and local visual sensitivity is low. Therefore, no significant impacts to aesthetics and visual resources would occur. Moreover, the cumulative projects located on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma, as discussed in section 8.2.1, would be required to comply with the applicable Base Exterior Architecture Plan and would not affect the overall visual environment. Therefore, the proposed action, in conjunction with other projects in and near the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and MTRs would not result in significant cumulative impacts to aesthetics and visual resources.

8.3.11 Topography, Geology, and Soils

The geographic scope for cumulative impacts varies for geological resources, depending on the geologic issue. The geographic scope with respect to seismicity is an approximate 30-mile radius circle from the areas associated with the proposed action, as an earthquake could cause substantial damage or injury throughout these areas. Seismic impacts could occur during construction and/or operations. With respect to other geotechnical aspects of the proposed action, such as

subsidence/settlement, expansive soils, and unstable soil conditions, the cumulative geographic scope is the same as the airfields and training ranges associated with the proposed action, because the effects of such soils hazards are site-specific, in that they relate primarily to potential damage to structures and associated injury to on-site personnel during construction and subsequent operations. With respect to soil erosion, the cumulative geographic scope is the encompassing watershed of each proposed action site, as these areas represent receiving waters for the cumulative projects. Erosional impacts would primarily occur as a result of grading and construction; however, in the absence of adequate vegetation cover and/or proper drainage, erosion could also occur during operations (e.g., aircraft landings).

Numerous other construction projects identified in section 8.2 that are located on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and associated training ranges would result in similar potential geologic/seismic impacts during construction and operation. Existing and proposed structures are/would potentially be subject to seismically induced ground failure, expansive soils, slope failure, differential settlement, subsidence, and other unstable soil conditions. Additionally, examples of projects that may lead to erosional impacts from military training activities include Basing of the Joint Strike Fighter; Grow the Force Initiative, and the MCAGCC Land Acquisition.

The proposed action would not result in significant topographic, geologic, seismic, or soil-related impacts at MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, or associated training ranges with the continued implementation of established plans, policies, and procedures. Changes to the existing topography and erosion would be minimal during construction due to the relatively flat topography at each of the air stations. Based on compliance with geotechnical recommendations and implementation of BMPs, including incorporation of standard erosion control measures, significant erosional impacts associated with project construction or operations would not occur. In addition, proposed structures and infrastructure subject to expansive soils would be designed and constructed in accordance with a site-specific geotechnical investigation and would comply with the Uniform Building Code and the most stringent criteria identified in the latest design specifications of the Structural Engineering Association of California.

None of the facilities are underlain by any active or potentially active faults. However, active faults located within 60 miles (96 km) of these facilities could result in strong seismically induced ground motion and associated ground shaking, and, therefore, proposed construction and operations could increase exposure of people and property to seismic hazards from a major or great earthquake. Proposed structures and infrastructure would be designed and constructed in accordance with a site-specific geotechnical investigation and would comply with the seismic design criteria identified in the Uniform Building Code, the NAVFAC P-355 Seismic Design Manual, and the most stringent criteria identified in the latest design specifications of the Structural Engineering Association of California and the Yuma Arizona Structural Code. As a result, significant impacts associated with seismically induced ground motion and ground shaking would not occur.

Similarly, each of the related cumulative projects would be required to implement BMPs; comply with recommendations of site-specific geotechnical investigations; and comply with the seismic design criteria identified in the California Building Standards Code, the Uniform Building Code, the NAVFAC P-355 Seismic Design Manual, as well as the most stringent criteria identified in the latest design specifications of the Structural Engineering Association of California and the Yuma Arizona Structural Code. Therefore, the proposed action, in conjunction with other projects on and in the

vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and associated training ranges, would not result in significant cumulative impacts related to topography, geology, seismicity, and soils.

8.3.12 Water Resources

With respect to hydrology and water quality, the cumulative geographic scope is the encompassing watershed of each proposed action site, as these areas represent receiving waters for the cumulative projects. Surface water quality of drainages and creeks in proximity to the cumulative projects could potentially be impacted by fuel spills and surface water run-off associated with construction- and operation-related activities. Numerous other construction projects identified in section 8.2 that are located on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and associated training ranges would result in similar potential water quality impacts during construction and operation.

Implementation of the proposed action would not result in significant impacts to hydrology and water quality at MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and associated training ranges. Potential surface water quality impacts of nearby drainages and creeks, as a result of fuel spills and surface water run-off associated with construction- and operation-related activities, would not be significant with implementation of BMPs, including incorporation of a SPCC plan. Impacts due to flooding would not occur at any of the facilities. In addition, construction and operation activities would likely have minimal impact on water supply.

Each of the related cumulative projects would similarly be required to implement BMPs, including incorporation of a SPCC plan, into project design, construction, and operations. With respect to water supply and flooding, each project would be evaluated on a case-by-case basis by the local water purveyor and/or flood control agency to determine the adequacy of water supply and flooding potential, respectively. Therefore, the proposed action, in conjunction with other projects on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, and associated training ranges, would not result in significant cumulative impacts related to hydrology and water quality.

8.3.13 Biological Resources

For the purposes of biological resources, the geographic scope for the assessment of cumulative impacts varies and is based on the presence of suitable habitat and known occurrences of a specific resource. Projects with direct and indirect impacts on biological resources include those that would result in the direct loss of native plant communities, loss of individuals, permanent loss of sensitive plant populations, noise production, and permanent lighting. For native plant communities, fragmentation, destruction, and direct permanent loss of contiguous native areas could be significant.

With respect to construction, the proposed action would not result in significant unmitigable impacts to terrestrial biological resources at MCAS Camp Pendleton and MCAS Yuma, and no construction would occur at the training ranges. On MCAS Camp Pendleton, potential construction-related impacts range from temporary noise exposure, to the permanent loss of a small area of non-native plant communities (4.4 acres [1.8 ha]), mowed field, associated with the construction of new facilities. Nonetheless, construction associated with the proposed action combined with other development projects at MCAS Camp Pendleton, such as the Taxiway

Improvements Project, Hangar Additions, and other expansion projects would cumulatively result in the build-out of undeveloped areas. However, the proposed action would result in only a small loss of non-native vegetation that does not support federally listed or otherwise sensitive species and provides only marginal habitat to more common wildlife. Other development projects on MCAS Camp Pendleton would similarly result in the loss of generally non-native communities with limited functions and values for native wildlife populations. As a result, the proposed action, combined with other past and planned activities, would not result in cumulatively significant impacts on MCAS Camp Pendleton.

Similarly, construction at MCAS Yuma would require the removal of vegetation; however, nearly all of the area is highly disturbed or previously developed and supports virtually no native vegetation. The ecological value of this habitat is low and is further reduced by persistent disturbance as a result of air station activities. Other past and planned construction projects, including basing of the Joint Strike Fighter, the multiple hangar modification projects, and other projects associated with the Grow the Force Initiative, would similarly result in the limited loss of generally non-native or otherwise low-value habitat for wildlife populations because most of the MCAS Yuma installation is developed or disturbed and, therefore, only a limited potential for permanent impacts exists. As a result, the proposed action, combined with other past and planned activities, would not result in cumulatively significant impacts on MCAS Yuma.

The proposed action would not result in significant unmitigable impacts to terrestrial biological resources under the Maximum and Minimum Partial Basing Alternatives at MCAS Miramar. Under the Maximum Partial Basing Alternative, a small area of occupied vernal pool and seasonally ponded (non-vernal pools) fairy shrimp habitat (0.006 acre [272 square feet] and 0.094 acre[4,101 square feet], respectively) would be removed and be compensated for following guidelines set forth in the MCAS Miramar INRMP. Vernal pools not occupied by federally listed species would also be affected by project activities. In support of Section 7 Consultation, a Biological Assessment has been prepared and incorporates previously established guidelines and compensation ratios from the INRMP. All past and planned actions on MCAS Miramar, including the basing of the MV-22, are directed to avoid and minimize direct losses and indirect impacts on sensitive habitats, and compensate for any impacts through the MCAS Miramar INRMP, with a no net-loss goal of wetland and vernal pool habitats. All future projects at MCAS Miramar, such as basing of the Joint Strike Fighter, housing development projects, other projects associated with the Grow the Force Initiative, and several other planned hangar and air station improvement projects, would be subject to mitigation measures and compensation guidance outlined in the MCAS Miramar INRMP, including standard construction BMPs, resource-specific seasonal restrictions, stormwater and erosion management, and restoration/compensation ratios for all native habitats present on the installation. For example, the Veterans Administration Cemetery project, the Military Family Housing project, and the Joint Regional Confinement Facility currently have plans for on- or off-site restoration projects. Additionally, impacts on Waters of the U.S. or species federally listed as threatened or endangered from this project or others would be subject to Sections 401 and 404 of the Clean Water Act and Section 7 of the ESA consultation respectively, and as a result, would be subject to compensation, restoration or other measures that would reduce the level and extent of impact. Therefore, the proposed action, in conjunction with other projects on and in the vicinity of MCAS Miramar, would not result in significant cumulative impacts under these alternatives related to biological resources.

Under the Full Basing Alternative at MCAS Miramar, the proposed action would result in significant unmitigable impacts to terrestrial biological resources. For regionally sensitive plant communities,

such as Diegan coastal sage scrub, impacts under this alternative would be compensated for (both disturbed and undisturbed phases) following compensation ratios defined in the MCAS Miramar INRMP. A small amount of jurisdictional features subject to regulation under the Clean Water Act (0.139 acres [6,839 square feet] of jurisdictional wetlands and jurisdictional vernal pools) would also be lost and compensated for. Additionally, occupied and unoccupied non-jurisdictional vernal pool habitat would also be lost and compensated for following MCAS Miramar-prescribed compensation ratios (see Tables 3.14-5 and 3.14-6 for a complete breakdown of impacts and compensation values) to mitigate for the loss of habitat and federally listed vernal pool species such as San Diego fairy shrimp, San Diego button celery, and San Diego mesa mint. However, although measures and guidance are in place for all current and future projects, including this alternative under the proposed action, the magnitude of loss of regionally sensitive habitats and the potential loss of federally listed species including San Diego fairy shrimp would be significant. Because of the amount of loss, and the limited onsite potential for restoration or compensation programs relative to the size of the impact, impacts would be significant and unmitigable. Therefore, the proposed action's contribution to cumulative impacts on biological resources would be significant under the Full Basing Alternative at MCAS Miramar. Similarly, mitigation measures identified in section 3.14 (MCAS Miramar Biological Resources) would reduce the level of cumulative impact from the Full Basing Alternative; however, due to the amount of loss, and the limited onsite potential for restoration or compensation programs relative to the size of the impact, cumulative impacts would also be significant and unmitigable.

The training component associated with the West Coast basing of the MV-22 would not result in any new construction or modification to existing structures at the training ranges, and operations and training would be conducted on existing facilities where impacts would generally be limited to localized ground disturbance and erosion, limited fire potential, and training and aircraft noise. As a result, direct loss of habitat for federally listed or otherwise sensitive species such as the desert tortoise is not likely to occur. Mapped sensitive resources would be avoided following existing range and training regulations and other plans and procedures that apply to all training. As a result, the proposed action is not likely to cumulatively add to the loss of rare or sensitive plant communities or habitats resulting from training. Although the aircraft operations would change compared to existing conditions, the ground training would remain similar to ongoing activities, and would not result in significant impacts to plant communities and wildlife. Because the MV-22 would replace existing helicopter squadrons, the overall training use of military aircraft on these ranges would not substantially deviate as a result of the proposed action. Nonetheless, most past and planned projects at MCAGCC, MCB Camp Pendleton, and Bob Stump Training Range Complex have construction components which would result in the direct loss of habitat. However, the proposed action would not cumulatively add to the direct loss of native habitats associated with these training ranges because no construction or site improvements are proposed at these locations.

Similar to the proposed action, basing and training of the Joint Strike Fighter could result in noise related impacts within established training ranges also impacted by the MV-22. California gnatcatchers, as well as several riparian bird species, would be subject to noise associated with ongoing training. The number of operations associated with the replacement MV-22, particularly on MCB Camp Pendleton, would substantially decrease within many areas where wildlife would be most susceptible to noise impacts including CAL sites and LZs. For most types of operations, the MV-22 is less noisy and would result in a decrease in potential noise related impacts on wildlife. Training activities would continue to be conducted in compliance with established range and training regulations, environmental operations maps, fire management plans, USFWS Biological Opinions, and other required permits. In addition, any project proposed on MCB Camp

Pendleton and/or Bob Stump Training Range Complex affecting threatened or endangered species will include consultation with the USFWS in compliance with Section 7 of the ESA, addressing direct, indirect, and cumulative impacts as part of the NEPA and formal consultation process. Therefore, the training component of the proposed action, in conjunction with other projects in the vicinity MCB Camp Pendleton, MCAGCC, and Bob Stump Training Range Complex, would not result in significant cumulative impacts to biological resources.

8.3.14 Cultural Resources

The geographic region of analysis for cumulative impacts on cultural resources consists of areas on or in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, MCB Camp Pendleton, Bob Stump Training Range Complex, and MCAGCC. Projects that include ground disturbance from construction activities or aircraft operations (e.g., downwash at landing areas) as well as demolition/modifications of buildings could impact prehistoric archaeological resources, historic archaeological resources, or historic structures or districts.

No impacts on recorded cultural resources would occur from proposed construction activities at MCAS Miramar or MCAS Yuma with the proposed avoidance measures. Proposed construction at MCAS Camp Pendleton under the Partial Basing Alternative has a low probability of encountering intact cultural deposits, and measures are provided to minimize impacts in case this occurs. Additionally, training operations at MCB Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC have the potential of impacting archaeological sites during landing operations. However, measures have been designed to minimize and avoid impacts to archaeological sites that are eligible for listing on the National Register, sites that require further evaluation, and/or sites that are of concern to the Native American community. MCIWEST also is entering into a Programmatic Agreements with the California and Arizona SHPOs, the Advisory Council of Historic Preservation, and other consulting parties to resolve adverse effects from the proposed action.

Numerous proposed military construction projects with associated ground disturbance and/or demolition/modifications of buildings are listed in section 8.2 that have the potential to impact cultural resources. Additionally, examples of projects that may cause ground disturbance from military training activities include Basing of the Joint Strike Fighter, Grow the Force Initiative, and the MCAGCC Land Acquisition; these projects also have the potential to impact cultural resources. Federal projects with potential for significant impacts on cultural resources would undergo Section 106 review under the NHPA and any potentially significant impacts would be mitigated, usually through avoidance when possible. However, archaeological sites are a limited resource and, therefore, any impact on an archaeological site that is eligible or potentially eligible for listing on the National Register and/or is of concern to the Native American community may contribute to a cumulative impact.

By implementing the proposed measures described in this EIS, the proposed action would minimize impacts on archaeological sites that are eligible or potentially eligible for listing on the National Register and/or are of concern to the Native American community. Therefore, the proposed action's contribution to potentially cumulative impacts on cultural resources would not be significant. No additional mitigation measures would be required.

8.3.15 Safety and Environmental Health

The geographic scope of this cumulative analysis includes airfields and associated airspace at MCAS Miramar, MCAS Yuma, MCAS Camp Pendleton, MCB Camp Pendleton, Bob Stump Training Range Complex, and MCAGCC. Projects that affect airfield operations could impact hazards associated with aircraft mishaps, APZs, and other safety issues. Projects that result in a significant change in range operations, such as an increase in tempo of aircraft operations or an increase in an airspace training footprint, could impact explosives safety or wildfire management issues.

The proposed action would not result in significant impacts to environmental health and safety of public or military personnel. Flight operations involving the MV-22 aircraft would follow the same procedures as those involving other aircraft currently utilizing the training ranges and airspace. In regional airspace, the primary cumulative effects would occur over the military ranges, where the airspace is used by a variety of other users. In the future, the level of use of restricted airspace is likely to increase due to an overall increase in training tempo, potentially associated with the introduction of the Joint Strike Fighter, the Grow the Force Initiative, and other programs, which would require more coordination between airspace managers and users to meet the varying needs for military training. Priorities in scheduling for specific uses would be an important determinant in how to allocate limited airspace resources safely. There could be an increase in civil aviation adjustments required when military controlled airspace is activated in addition to other temporary or MOA/ATCAA airspace that is used for other activities (such as large exercises) and regional training units. None of the cumulative impacts identified for airspace, ranges, or safety would be significant, but will likely require more coordination between regional FAA and military airspace managers. The MCAGCC Land Acquisition may alleviate some of this airspace congestion because the proposed acquisition of training land also includes expansion of associated Special Use Airspace.

Regarding wildfire management, fires are a common and inevitable result of training on many bases. Although the MV-22 aircraft has not been identified as a common cause for fire, introduction of the MV-22 to a training range would represent a new type of training with respect to fires. Implementation of the biological resources avoidance, minimization, and mitigation measures in Chapter 6 would reduce the potential for fire outbreaks caused by the MV-22. In the future, there may be an overall increase in training tempo, potentially associated with the Grow the Force Initiative and other programs, and this increased level of operations may increase the frequency of fires on a training range. Fire management plans, range regulations, and associated fire avoidance/prevention measures for the training ranges (MCB Camp Pendleton, Bob Stump Training Range Complex, MCAGCC) would need to stay current with any increase in operations level and/or change in the training environment.

Other airfield safety issues, such as BASH plans or APZs may need to be updated due to potential increases in flight operations from the various proposed military initiatives described in section 8.2. Similarly, range regulations and other plans for the training ranges (MCB Camp Pendleton, Bob Stump Training Range Complex, MCAGCC) would need to stay current with any additions of new aircraft and/or munitions use into the training environment. Assuming these updates are made, the proposed action, in conjunction with other projects on and in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma and associated training ranges and airspace, would not result in significant cumulative environmental health and safety impacts.

8.3.16 Environmental Justice

No disproportionate or adverse impacts related to environmental justice are anticipated, nor would there be any special health or safety risks to children associated with the proposed action. As such, the proposed action would not result in significant cumulative impacts. Additionally, no cumulative consequences are expected to have any disproportionate adverse impacts separately or cumulatively on minority or low-income populations in the vicinity of MCAS Miramar, MCAS Camp Pendleton, MCAS Yuma, MCB Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC. The incremental affects of the proposed action, in combination with potential impacts associated with the reasonably foreseeable future actions on and in the vicinity of the proposed installations, would also not be expected to have any cumulative health or safety risks to children.

Chapter 9

Other NEPA Considerations

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9.0 OTHER NEPA CONSIDERATIONS

9.1 POSSIBLE CONFLICTS BETWEEN THE PROPOSED ACTION AND THE OBJECTIVES OF LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AREA CONCERNED

The proposed action has been assessed to determine its consistency and compliance with applicable environmental regulations and other plans, policies, and controls. This analysis indicates that the proposed action would not conflict with the objectives of applicable federal regulations. A summary of applicable environmental regulations and regulatory compliance for the preferred alternative is provided in Table 9-1.

9.2 SIGNIFICANT UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

An EIS must describe any unavoidable adverse environmental effects for which either no mitigation or only partial mitigation is feasible. The impact analysis presented in Chapter 3 through Chapter 6 of this EIS demonstrate that the proposed action would have significant and unavoidable impacts related to land use (due to land use incompatibility issues related to noise from flight operations at MCAS Miramar under the Full and Maximum Basing Alternatives), ground traffic and transportation (due to additional trips to existing roadways from operations at MCAS Miramar under the Full and Maximum Partial Basing Alternatives and at MCAS Yuma under the Maximum Partial and Minimum Partial Basing Alternatives), and biological resources (due to construction-related impacts on vernal pools and associated species, San Diego mesa mint, San Diego button-celery, and San Diego fairy shrimp, and loss of Diegan coastal sage scrub and south coast live oak riparian forest at MCAS Miramar under the Full Basing Alternative). A summary of these unavoidable impacts is provided in Chapter 7.0.

9.3 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This section evaluates the short-term benefits of the proposed project alternatives compared to the long-term productivity derived from not pursuing the proposed alternatives.

A short-term use of the environment is generally defined as a direct consequence of a project in its immediate vicinity. Short-term effects could include localized disruptions and higher noise levels in some areas. The proposed action and alternatives would result in both short- and long-term impacts.

The proposed action largely involves improvements to existing military lands and some changes in airspace use. Basing of the MV-22 on the West Coast would result in short-term uses of the environment due to the extent of construction activities on MCAC Miramar, MCAS Pendleton, and/or MCAS Yuma, depending on the basing alternative selected. Project-related construction activities would temporarily increase air pollution emissions and noise in the immediate vicinity of the project areas(s). Depending on their location, humans and animals cumulatively experience somewhat increased levels of noise due to airfield operations and other nearby military activities. Construction-related noise effects would be short term and would not be expected to result in permanent damage or long-term changes in wildlife productivity or habitat use. However, under

the Full Basing Alternative at MCAS Miramar, construction would have a significant and long-term impact on vernal pools and other sensitive habitats.

Established airspace training footprints would not be expanded with implementation of the action alternatives. Airspace training operations would be consistent with existing airspace operations and would comply with the established range and land use management plans. There would be an increased noise exposure greater than 65 db CNEL to neighboring land uses at MCAS Miramar under the Full Basing and Maximum Partial Basing alternatives, which would be inconsistent with land use compatibility guidelines for the installation. However, with proper mitigation, changes in the aircraft mix using the existing airspace would not be projected to affect the long-term productive use of natural resources.

Implementation of the Full and Maximum Partial Basing Alternatives at MCAS Miramar will require a number of mitigation measures to compensate for lost biological resources. Compensatory restoration of vernal pool habitat and other biological resources could result in the conversion of land elsewhere on the station from degraded habitat to high quality habitat. Creation of high quality habitat supporting threatened and endangered species in these areas would restrict future development and use of those areas, but it would enhance local habitat.

9.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Primary irreversible effects result from permanent use of a nonrenewable resource (e.g., minerals or energy). Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the proposed action (e.g., disturbance of a cultural site) or consumption of renewable resources that are not permanently lost (e.g., old growth forests). Secondary impacts could result from environmental accidents, such as fires. Natural resources include minerals, energy, land, water, forestry, and biota. Non renewable resources are those resources that cannot be replenished by natural means, including oil, natural gas, and iron ore. Renewable natural resources are those resources that can be replenished by natural means, including water, lumber, and soil.

The proposed action and alternatives would involve irretrievable commitments of two types of resources, depending on basing alternative selected: (1) general industrial resources including capital, labor, fuels, and construction materials; and (2) project-specific resources such as vernal pool, Diegan coastal sage scrub, and other sensitive habitat, and land uses at the project site(s). With proper mitigation, no irreversible or irretrievable effects are expected for cultural resources or other natural resources, including land and water.

The industrial resources necessary to implement improvements to existing military lands would not be retrievable if the proposed action were constructed. Additionally, development of new airfield components under the Full Basing Alternative at MCAS Miramar would cause significant unmitigable impacts to vernal pool and associated sensitive species and Diegan coastal sage scrub. Military training necessarily involves consumption of nonrenewable resources, such as jet fuel for the aircraft.

Table 9-1. Summary of Compliance of Preferred Alternative with Applicable Federal Regulations

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
The National Environmental Policy Act (NEPA) (PL 91-190, 42 USC 4341 et seq. as amended), 1969 Department of the Navy Procedures for Implementing NEPA (OPNAVINST 5090.1B 2003) USMC Environmental Compliance and Protection Manual (Marine Corps Order P5090.2A, change 2)	DoN/USMC	This EIS has been prepared in accordance with the Council on Environmental Quality (CEQ) Regulations implementing NEPA and DoN/USMC NEPA procedures. The preparation of this EIS and the provision for public review are being conducted in compliance with NEPA.
Executive Order 12372 (Intergovernmental Review of Federal Programs) 47 FR 30959 (1982)	DoN/USMC	The DoN/USMC are in the process of consulting with and solicited comments from state and local officials whose jurisdictions will be affected by the federal action, consistent with this directive.
Master Plan: MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma	DoN/USMC	The proposed action will be consistent with the goals of master plans for MCAS Miramar, MCAS Camp Pendleton, and MCAS Yuma.
Clean Water Act, 33 USC. §§ 1251 to 1387 (1986 & Supp. 1997). Safe Drinking Water Act (SDWA) of 1974, 42 USC §§ 300f to 300j-26 (1991 & Supp. 1997).	USEPA/USACE RWQCB (under federally-authorized program) California Department of Health Services DoN/USMC	Surface water quality of nearby drainages could potentially be impacted by fuel spills and surface water run-off associated with construction-related activities. Stormwater runoff during construction and operational phases of the project will be regulated under a NPDES Permit and associated SWPPP, prior to off-base discharge. Currently, each station maintains an activity-wide (station-wide) SWPPP. New facilities construction will require a separate SWPPP for construction activities. This plan will override existing SWPPPs. Following construction, BMPs will be applied to new operational activities. Introduction of up to ten squadrons of the MV-22 to the training environment within the Bob Stump Training Range Complex, MCB Camp Pendleton, or MCAGCC could cause minor erosion associated with downdraft from vertical take-offs and landings, as well as use of munitions. Impacts will occur in localized areas of disturbance from hovering and landing of aircraft, resulting in dust and debris being scattered and/or becoming airborne. Such localized rotor-derived erosion could be exacerbated by high-intensity rainfall. Many general procedures to minimize erosion related water quality impacts are already in place and will continue to be implemented as part of any training scenario. These procedures are derived from existing plans, programs, regulations, and are associated with various agency consultations. Soil erosion is further minimized through the implementation of terms and conditions of applicable Biological Opinions (BOs), as well as by implementation of soil erosion measures.
Oil Pollution Act of 1990 (OPA 90), 33 USC §§ 2701 to 2761 (West Supp. 1997).	DoN/USMC	Handling of hazardous material will be performed in accordance with federal regulations. Operation of the proposed action will be covered under the existing SWPPP and associated SPCC plan for each base. The SWPP and SPCC plan provides protective and corrective measures for accidental releases of hazardous substances or petroleum products.

Table 9-1. Summary of Compliance of Preferred Alternative with Applicable Federal Regulations (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Clean Air Act (CAA), 42 USC §§ 7401 to 7671q (West 1995 & Supp. 1997).	SDCAPCD DoN/USMC	The CAA, with its subsequent amendments of 1977, 1990, and 1993, establishes the NAAQS and the planning process for NAAQS nonattainment areas and the return to attainment. The Act allows individual states to adopt pollutant standards that are equal to or more stringent than the NAAQS. The air quality analysis in the EIS concludes that proposed emissions (1) will not contribute to exceeding an ambient air quality standard, and (2) will comply with all applicable regional air agency rules and regulations.
Federal General Conformity Rule, Clean Air Act § 176(c), 42 USC § 7506(c) (West 1995 & Supp. 1997) and its implementing regulations in 40 CFR Part 93 (1997)	DoN/USMC	The CAA requires federal actions to conform to the goals of the applicable SIP. Section 176(c) of the Act outlines the procedures to make a conformity determination for federal actions. Results of the project conformity applicability analyses showed that the proposed action within the SDAB portion of the project region requires a conformity determination. The DoN concludes that the project will conform with the most recent federally-approved SIP for the SDAB. The DoN also concludes that the project would conform to the SIPs for the remainder of the project region within the States of California (that pertain to the Salton Sea and Mojave Desert Air Basins) and Arizona.
Endangered Species Act of 1973, 16 USC §§ 1531 to 1534 (West 1985 & Supp. 1997).	USFWS DoN/USMC	The proposed action may adversely affect threatened or endangered species at MCAS Miramar and may affect but is not likely to adversely affect species at MCAS Yuma, MCAS Camp Pendleton, MCB Camp Pendleton, Bob Stump Training Range Complex and MCAGCC. The DoN is consulting with the USFWS regarding this action.
Executive Order 11990 (Protection of Wetlands) 42 FR 26961 (1977).	USACE DoN/USMC	The project may directly impact wetlands at MCAS Miramar. Additional project activities may occur in the vicinity of wetlands at MCB Camp Pendleton. Any impacts to wetland resources from the proposed action will be determined in coordination with the U.S. Army Corps of Engineers and permitted accordingly. Additionally, loss of any wetlands at MCAS Miramar will be compensated for in consultation with the U.S. Army Corps of Engineers and Environmental Division at MCAS Miramar.
Fish and Wildlife Coordination Act, 16 USC §§ 661 to 668ee (West 1985 & Supp. 1997).	USFWS DoN/USMC	Project scoping activities included coordination with the USFWS. Project activities at MCAS Miramar have the potential to result in the direct loss of San Diego fairy shrimp and their habitat. The Full Basing Alternative at MCAS Miramar will result in the loss of fairy shrimp habitat that will result in significant impacts to the species. Additionally, this same alternative will also result in the substantive loss of native plant communities. Project activities at MCAS Camp Pendleton, MCB Camp Pendleton, MCAS Yuma, and MCAGCC will not result in a substantial decrease in existing wildlife habitat because the proposed action is the replacement of current aircraft with the MV-22. Because training will continue in a similar fashion and in the same areas that it currently occurs, this will not significantly affect fish and wildlife species. The DoN is consulting with the USFWS regarding this action.

Table 9-1. Summary of Compliance of Preferred Alternative with Applicable Federal Regulations (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Conservation Programs on Government Lands (Sikes Act) §§ 670a to 670o (West 1985 & Supp. 1997).	DoN/USMC	The DoN currently complies with and implements the Sikes Act through its cooperative programs with state, federal, and local resource agencies to manage natural resources, including sensitive botanical and fish and wildlife resources. The DoN will continue to comply with this program under the proposed action.
Fish and Wildlife Conservation Act of 1980 (Nongame Act), 16 USC §§ 2901 to 2911 (West 1985 & Supp. 1997).	USFWS DoN/USMC	The proposed action will not interfere with lands identified by the USFWS to foster the conservation of migratory nongame birds.
National Historic Preservation Act (NHPA), 16 USC §§ 470 to 470x-6 (West 1985 & Supp. 1997).	Advisory Council on Historic Preservation, State Historic Preservation Office (SHPO) DoN/USMC	Proposed construction at MCAS Camp Pendleton under the Partial Basing Alternative has a low probability of encountering intact cultural deposits, and measures are provided to minimize impacts in case this occurs. Additionally, training operations at MCB Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC have the potential of impacting archaeological sites during landing operations. However, mitigation measures have been designed to minimize and avoid impacts. The USMC uses environmental planning, project design and redesign to avoid or minimize impacts. When avoidance is not feasible eligible resources receive appropriate treatment. For archaeological sites considered important for their potential to provide information this usually involves data recovery and/or construction monitoring. The USMC will comply with section 106 of the NHPA by conducting consultation with SHPO, as described in 36 CRF Part 800.2(4) and 800.9 regarding effects to historic properties and mitigation plans as appropriate.
Archaeological Resources Protection Act (ARPA) of 1979, 16 USC §§ 470aa to 470mm (West 1985 & Supp. 1997). Archaeological Resources Protection Act (ARPA) of 1979, Final Uniform Regulations, 32 CFR Part 229 (1997).	Advisory Council on Historic Preservation, State Historic Preservation Office (SHPO) DoN/USMC	The DoN/USMC uses environmental planning, project design and redesign to avoid or minimize impacts. When avoidance is not feasible eligible resources receive appropriate treatment. For archaeological sites considered important for their potential to provide information this usually involves data recovery and/or construction monitoring. ARPA permits generally are not required for actions initiated by the USMC on land over which the USMC has jurisdiction, although the work must be carried out in such a way that it will meet the requirements of an ARPA permit. In addition, if a situation arises that requires an ARPA permit, the DoN/USMC will ensure that the permittees meet all ARPA requirements.
Native American Graves Protection and Repatriation Act (NAGPRA), 25 USC §§ 3001 to 3013 (West Supp. 1997).	DoN/USMC	No objects to which NAGPRA are known or have been located within the APEs. If human remains, associated grave goods, or other pertinent resources are uncovered during construction, all NAGPRA guidelines and regulations will be followed. This may include coordination with federally-recognized tribes and the Native American Heritage Commission.

Table 9-1. Summary of Compliance of Preferred Alternative with Applicable Federal Regulations (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Pollution Prevention Act of 1990, 42 USC §§ 13101-13109.	DoN/USMC	The Pollution Prevention Act states that it is the policy of the U.S. that "pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner." The DoN/USMC currently implements procedures to comply with this Act and will continue to do as part of the proposed action.
Executive Order 13123 (Greening the Government through Efficient Energy Management) 64 FR 30851 (1999)	DoN/USMC	This order directs the federal government to significantly improve its energy management in order to save federal dollars and to significantly reduce emissions that contribute to air pollution and global climate change. The order sets specific goals. Each agency shall, through life cycle cost-effective energy measures, reduce energy consumption per gross square foot of its facilities by 35 percent by 2010 relative to 1985. The requirements of this order are contained in all contractual documents for the design, construction, and operation of proposed facilities. Supersedes Executive Order 12902 (Energy Efficiency and Water Conservation at Federal Facilities) 59 FR 11463 (1994).
Executive Order 13148 (Greening the Government through Leadership in Environmental Management) 65 FR 24595 (2000)	DoN/USMC	This order directs federal agencies to ensure, whenever feasible, that pollution is prevented or reduced at the source; that pollution that cannot be prevented is recycled in an environmentally safe manner; that pollution that cannot be prevented or recycled will be treated in an environmentally safe manner; and that disposal or other releases to the environment are employed as a last resort. The requirements of this order are contained in all contractual documents for the design, construction, and operation of proposed facilities. Supersedes Executive Order 12856 (Federal Compliance With Right-to-Know Laws and Pollution Prevention Requirements) 58 FR 41981 (1993).
Executive Order 12088 (Federal Compliance with Pollution Control Standards) 43 FR 47707 (1978).	DoN/USMC	The DoN/USMC has consulted with state and local agencies concerning the best techniques and methods available for the prevention, control, and abatement of environmental pollution. The DoN/USMC will also comply with applicable pollution control standards concerning air pollution, water pollution, hazardous materials, and hazardous substances.
Executive Order 12898 (Environmental Justice) 59 FR 7629 (1994).	DoN/USMC	The potential for impacts associated with this project to result in environmental justice issues were evaluated in this EIS consistent with this order and determined to be not significant.
Executive Order 13045 (Environmental Justice for Children, Protection from Environmental Health Risks and Safety Risks) 62 FR 19883 (1997).	DoN/USMC	The potential for impacts associated with this project to result in risks to children were evaluated in this EIS consistent with this order and determined to be not significant.

Table 9-1. Summary of Compliance of Preferred Alternative with Applicable Federal Regulations (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Resource Conservation and Recovery Act (RCRA) of 1976, 42 USC §§ 6901 to 6992k (West 1995 & Supp. 1997).	USEPA and DTSC DoN/USMC	Hazardous materials are not know to occur at the propose project sites. However, visual and physical screening throughout the project will ensure the continued accuracy of this waste determination. Remedial actions of contaminates encountered will be conducted prior to or in conjunction with construction activities. Remedial actions and excavations will be conducted in compliance with federal and state regulations pertaining to soil and groundwater contamination. Hazardous materials will be used during MV-22 operations. Any hazardous materials determined to be hazardous waste will be disposed in accordance with hazardous waste laws and regulations.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 USC §§ 9601 to 9675 (West 1995 & Supp. 1997).	DoN/USMC	This act applies to identification, investigation, and remediation of hazardous substance release sites. It would only be pertinent to this project in conjunction with the exercise of DoN's authority under DERP as discussed below. Hazardous materials are not know to occur at the propose project sites. However, visual and physical screening throughout the project will ensure the continued accuracy of this waste determination. Remedial actions of contaminates encountered will be conducted prior to or in conjunction with construction activities. Remedial actions and excavations will be conducted in compliance with federal and state regulations pertaining to soil and groundwater contamination.
Defense Environmental Restoration Program (DERP), 10 USC §§ 2701 to 2708 (West Supp. 1997).	DoN/USMC	IRP sites in the vicinity of the project area have been closed with respect to regulatory compliance (i.e., no further action is required) and will be completed concurrent with or prior to construction of proposed project facilities. If any IRP sites were identified during construction or operation of the proposed action, they will be managed under the DoN's Installation Restoration (IR) Program. The IR Program provides for compliance with the procedural and substantive requirements of the CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), including compliance with applicable or relevant and appropriate state law.
Department of Navy Occupational Safety and Health (NAVOSH) Program Instructions (OPNAVINST) 3120.32C, 5100.19c, 5100.25A & Appendix A7-C.	DoN/USMC	Operation of the proposed action involving hazardous materials will be accomplished by specially trained personnel using the appropriate personal protective equipment, in accordance with the applicable occupational safety and health requirements.
Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, 42 USC §§ 11001 to 11050 (West 1995 & Supp. 1997).	DoN/USMC	The DoN/USMC will inform Local Emergency Planning Committees (LEPCs) of the proposed action as required to assist them in developing plans to prepare for and respond to chemical emergencies.
Uniform Fire Code (International Fire Code Institute 1997)	DoN/USMC	The DoN/USMC will require construction contractors to conform to Uniform Fire Code guidelines for appropriate construction materials to reduce fire hazards.

Table 9-1. Summary of Compliance of Preferred Alternative with Applicable Federal Regulations (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Military Munitions Rule (MMR) 62 FR 6621, February 12, 1997	DoN/USMC	Ammunition products produced or owned by the DoD are regulated under the Military Munitions Rule (MMR) (62 FR 6621, February 12, 1997). Munitions are defined under 40 CFR 260.10 and the definition includes items such as explosive rounds and small arms rounds. A military munition is classified as hazardous waste if it is either a listed waste or exhibits a hazardous characteristic. Hazardous waste classification analysis of military munitions must also consider other hazardous waste characteristics such as toxicity and ignitability. Grading and construction in association with the proposed action at MCAS Miramar may encounter munitions-contaminated soil in the vicinity of MR Site 13. However, a Site Inspection will be conducted in accordance with 40 CFR 300, prior to excavations; if necessary, remediation will be conducted in accordance with CERCLA and in coordination with the California RWQCB, the Remedial Project Manager at NAVFAC and IRP Manager; and excavations at MR Site 13 will be conducted in accordance with RCRA (42 USC 6901).
Toxic Substances Control Act (TSCA), 15 USC s/s 2601 et seq. (1976).	USEPA DoN/USMC	TSCA authorizes the USEPA to regulate the manufacture, importation, processing, distribution, use, and/or disposal of any chemical that presents an unreasonable risk of injury to human health or the environment. TSCA also includes a provision [Section 6(e)] requiring USEPA to take specific measures to control the risks from polychlorinated biphenyls (PCBs), which are not considered to be hazardous wastes under TSCA. Any asbestos, lead-containing coatings, PCBs, or other materials regulated under TSCA found in existing structures to be demolished as part of the proposed action, will be removed and disposed of by the contractor in accordance with all applicable federal, state, and local regulations. Airfield operations that require handling and disposal of regulated materials also will be performed in accordance with TSCA.
Noise Control Act of 1972 and Quiet Communities Act of 1978, 42 USC §§ 4901 to 4918 (West 1995 & Supp. 1997).	DoN/USMC	This EIS provides due consideration to noise impacts, consistent with this act.

Chapter 10

List of Preparers

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10.0 LIST OF PREPARERS

10.1 SAIC PREPARERS

Name	Title	Education & Years of Experience	Project Participation
Project Management			
Karen Foster	NEPA Project Manager/Cultural Resources Manager	Ph.D., Anthropology (20 years)	Project Manager, Cultural Resources, QA
Robert Van Tassel	Program Manager	M.A., Economics (34 years)	Program Management, QA
Technical Team			
Chris Crabtree	Senior Air Quality Meteorologist	B.A., Environmental Studies (20 years)	Air Quality
Catrina Gomez	Environmental Planner	MESM, Environmental Science & Management (8 years)	QA
Adam Hasen	Senior Program Manager	M.S., Chemical Engineering MBA, Management (25 years)	Air Quality
Irene Johnson	Economist	M.A., Economics (17 years)	Socioeconomics, Environmental Justice
Tamara Klug	Biologist	B.A., Ecology and Evolution (15 years)	Biology
Tom Mulroy	Principal Scientist	Ph.D., Ecology and Evolutionary Biology (over 30 years)	Biology
Trevor Pattison	Staff Scientist	B.S., Geological Sciences-Earth Systems (8 years)	Biology
Brad Rock	Senior Analyst	B.A., Biology (33 years)	Safety and Environmental Health, Airfields/Airspace
Perry Russell	Senior Geologist	M.S., Geological Sciences (20 years)	Geology, Hazards & Hazardous Materials, Water Resources
Lisbeth Springer	Senior Planner; Socioeconomic	Master of City & Regional Planning; AICP (25 years)	Socioeconomics
Production Team			
Catherine FitzGerald	Graphic Artist	A.A. Fine Arts (29 years)	Graphic Design
Ellyn Lloyd	Production Assistant	B.A. Advertising (1 year)	Word Processing
Greg Wadsworth	Production Manager	B.A. Music Composition (5 years)	Publications
GIS Team			
Chris Woods	GIS Programmer	B.A. Geography (11 years)	GIS

10.2 SUBCONTRACTOR FIRMS

Name	Title	Education & Years of Experience	Project Participation
Darnell & Associates			
Jessica Bavos	Transportation Planner	M.S., Business Technology B.S., Facilities Planning and Management (7 years)	Traffic
Vicky Haskel	Principal Transportation Engineer	M.S., Civil Engineering/ Transportation Engineering B.S., Civil Engineering (9 years)	Traffic
The Environmental Company (TEC)			
Doug Billings	NEPA Project Manager	BS., Geology & Geography (25 years)	Project Manager, QA
Christine Davis	Environmental Planner	M.S., Environmental Management (9 years)	Land Use; Community Services; Infrastructure & Utilities
Wyle Laboratories Inc.			
Joe Czech	Principal Engineer	B.S., Aerospace Engineering (20 year)	Noise
Patrick Kester	Engineer	B.S., Mechanical Engineering (2 years)	Noise
Rachel Romond	Senior Engineer	M.S., Acoustics (4 years)	Noise
Matt Zirbes	Engineer	B.A., Acoustics (6 years)	Noise

Chapter 11

Acronyms

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11.0 ACRONYMS

AAF	Army Air Field
ACM	asbestos-containing material
ADEQ	Arizona Department of Environmental Quality
ADES	Arizona Department of Economic Security
ADT	average daily traffic
ADWR	Arizona Department of Water Resources
AESO	Aircraft Environmental Support Office
AFB	Air Force Base
AGFD	Arizona Game and Fish Department
AICUZ	Air Installations Compatible Use Zones
ALF	Auxiliary Landing Field
ALM	A-weighted Maximum Noise Level
APE	area of potential effects
APZ	accident potential zone
ARB	Air Resource Board
ARPA	Archaeological Resource Protection Act
ARSR	Air Route Surveillance Radar
ARTCC	Air Route Traffic Control Center
AST	aboveground storage tanks
ATCAA	Air Traffic Control Assigned Airspace
AUL	Authorized Use List
AZPDES	Arizona Pollution Discharge Elimination System
BAASH	Bird Animal Air Strike Hazard
BASH	Bird Air Strike Hazard

BEA	Bureau of Economic Analysis
BEQ	Bachelor Enlisted Quarters
BLS	Bureau of Labor Statistics
BMGR	Barry M. Goldwater Range
BMP	Best Management Practices
BO	Biological Opinion
B.P.	Before Present
BRAC	base realignment and closure
CAAQS	California Ambient Air Quality Standards
CAL	Confined Area Landing
CALA	Combat Aircraft Loading Area
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDP	census designated place
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
cm	centimeter
CNATT	Center for Naval Aviation and Technical Training
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent

CY	calendar year
dB	decibel
dBA	decibel on an "A-weighted" scale
dBC	decibel on a "C-weighted" scale
DERP	Defense Environmental Restoration Program
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DOF	Department of Finance
DoN	Department of the Navy
DPM	diesel particulate matter
DWMA	Desert Wildlife Management Area
DZ	Drop Zone
EA	Environmental Assessment
EAF	Expeditionary Airfield
EDD	Employment Development Department
EIS	Environmental Impact Statement
EMCS	energy management and control systems
EOD	Explosive Ordnance Disposal
ESA	Endangered Species Act
ESB	Exercise Support Base
ESQD	Explosive Safety Quantity Distance
FAA	Federal Aviation Administration
FARP	Forward Arming and Refueling Points
FCLP	Field Carrier Landing Practice
FEMA	Federal Emergency Management Agency

FEMP	Federal Energy Management Program
FOB	Forward Operating Base
FPO	Federal Preservation Officer
FY	fiscal year
g	acceleration due to gravity
G/TSE	ground/tactical support equipment
GCA	ground-controlled approach
GCE	Ground Combat Element
GHG	greenhouse gases
GIS	geographic information system
GMT	Greenwich Mean Time
GOV	government-owned vehicle
GSA	Ground Support Area
GWP	global warming potential
ha	hectares
HARP	Historic and Archaeological Resources Protection Plan
HASP	Health and Safety Plan
HAZMAT	Hazardous Material
HIP	Helicopter Initial Point
HLZ	Heavy Lift Zone
HMLA	light attack helicopter
HOLF	Helicopter Outlying Landing Field
HVAC	Heating, Ventilation, & Air Conditioning
HWAA	Hazardous Waste Accumulation Areas
Hz	hertz

I MEF	I Marine Expeditionary Force
IAS	Initial Assessment Study
ICRMP	Integrated Cultural Resources Management Plan
IFR	Instrument Flight Rules
INRMP	Integrated Natural Resource Management Plan
IR	Instrument Route
IRP	Installation Restoration Program
kg/cm^2	kilogram per square centimeter
KIAS	knots indicated airspeed
km	kilometer
kts	knots
kv	kilovolt
LAT	Low Altitude Training
LATT	Low Altitude Tactics Training
LEED	Leadership in Energy & Environmental Design
LHA	Landing Helicopter Assault
LHD	Landing Helicopter Dock
LNG	liquefied natural gas
LOS	level of service
LZ	Landing Zone
MA	Management Area
MAG	Marine Aircraft Group
MAGTFTC	Marine Air Ground Task Force Training Command
MAL	Mountainous Area Landing
MALS	Marine Aviation Logistics Squadron

MAW	Marine Aircraft Wing
MAWTS-1	Marine Aviation Weapons and Tactics Squadron-1
MBTA	Migratory Bird Treaty Act
MBTU	million British Thermal Units
MCAGCC	Marine Corps Air Ground Combat Center
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCI WEST	Marine Corps Installations West
MCO	Marine Corps Order
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MEB	Marine Expeditionary Brigade
MEF	Marine Expeditionary Force
MEU	Marine Expeditionary Unit
mg/L	milligram per liter
MHPA	Multiple Habitat Planning Areas
MILCON	Military Construction
MOA	Military Operations Area
MOU	Memorandum of Understanding
MOUT	Military Operation in Urban Terrain
mph	miles per hour
MPPEH	material posing a potential explosive hazard
MR	Military Munitions Response
MSCP	Multiple Species Conservation Program
MSL	mean sea level

MST	Mountain Standard Time
MTR	Military Training Route
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAF	Naval Air Facility
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	Naval Air Station
NATOPS	Naval Air Training and Operating Procedures Standardization
NAVFAC	Naval Facilities Engineering Command
NAVSEASYSCOM	Naval Sea Systems Command
NAWS	Naval Air Weapons Station
NCCP	National Community Conservation Planning
NCP	National Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
nm	nautical mile
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOLF	Naval Outlying Landing Field
NPDES	National Pollutant Discharge Elimination System

NPPA	Native Plant Protection Act
NREA	Natural Resources and Environmental Affairs
NSW	Naval Special Warfare
NSWC	Naval Special Warfare Center
O_3	ozone
OLF	Outlying Landing Field
OPNAVINST	Chief of Naval Operations Instruction
PAH	polychlorinated aromatic hydrocarbons
PCB	polychlorinated biphenyl
PCE	passenger car equivalent
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
PMO	Provost Marshall's Office
POL	petroleum, oil, and lubricants
POV	personal-owned vehicle
ppm	parts per million
PPV	Public-Private Venture
PRG	Preliminary Remediation Goals
psi	pounds per square inch
PST	Pacific Standard Time
PWC	Public Works Center
R-	Restricted Area
RACM	regulated asbestos-containing material
RCRA	Resource Conservation and Recovery Act
RCUZ	Range Compatibility Use Zone

RNM	Rotocraft Noise Model
ROD	Record of Decision
RRPC	Range Residue Processing Center
RTD&E	Research, Testing, Development, and Evaluation
RWQCB	Regional Water Quality Control Board
SAA	Satellite Accumulation Areas
SANDAG	San Diego Association of Governments
SCE	Southern California Edison
SCIC	South Coastal Information Center
SDAB	San Diego Air Basin
SDCAPCD	San Diego County Air Pollution Control District
SDCWA	San Diego County Water Authority
SDG&E	San Diego Gas and Electric
SEL	Sound Exposure Level
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SONGS	San Onofre Nuclear Generating Station
SPCC	Spill Prevention, Control, and Countermeasure
SR	State Route
SSAB	Salton Sea Air Basin
STOL	short take-off and landing
STOVL	short take-off/vertical landing
SWPPP	Stormwater Pollution Prevention Plan
TAC	toxic air pollutants

TACAN	Coyote Tactical Air Navigation
TACTS	Tactical Aircrew Combat Training System
TALA	Temporary Alternative Landing Area
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
TERF	Terrain-following Route
TPH	total petroleum hydrocarbons
TPO	Tribal Preservation Officer
UFC	Unified Facilities Criteria
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
UST	underground storage tank
V/C	Volume/Capacity
V/STOL	Vertical/Short Take Off and Landing
VAV	variable air volume
VFR	Visual Flight Rules
VIP	very important persons
VOC	volatile organic compounds
VR	Visual Routes
WTI	Weapons Tactics Instructor

WURMP	Watershed Urban Runoff Management Plan
YMPO	Yuma Metropolitan Planning Organization
$\mu g/m^3$	micrograms per cubic meter
3D MAW	Third Marine Aircraft Wing
4th MAW	Fourth Marine Aircraft Wing

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Chapter 12

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APPENDIX A

Public Outreach

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APPENDIX A-1

Public Comments and Responses

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

April 15, 2009

Naval Facilities
Engineering Command Southwest,
Attn: Adrianne Saboya, JSF West EIS Project Manager
1220 Pacific Highway,
San Diego, California 92132-5190

Subject: Draft Environmental Impact Statement (Draft EIS) for the West Coast Basing of the MV-22 Tilt Rotor Aircraft (CEQ # 20090045)

Dear Ms. Saboya:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft EIS for the proposed basing of the MV-22 Osprey tilt-rotor aircraft in the Western United States pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. Our comments were also prepared under the authority of, and in accordance with, the provisions of the Federal Guidelines (Guidelines) promulgated at 40 CFR 230 under Section 404(b)(1) of the Clean Water Act (CWA). **A-1**

We have rated the Draft EIS as Environmental Concerns - Insufficient Information (EC-2) due to concerns regarding air quality and noise impacts. A Summary of EPA Rating Definitions is enclosed. Through the enclosed detailed comments, EPA recommends additional measures to reduce impacts. **A-2**

EPA appreciates the opportunity to review this Draft EIS. When the Final EIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact me at (415) 972-3521, or contact Connell Dunning, the lead reviewer for this project, at 415-947-4161 or dunning.connell@epa.gov. **A-3**

Sincerely,

Kathleen M. Goforth, Manager
Environmental Review Office

Enclosure: Summary of EPA Rating Definitions
EPA's Detailed Comments

Printed on Recycled Paper

Air Quality Impacts

A-4 Emissions Budget Documentation

The Draft EIS provides a detailed discussion of ambient air conditions (baseline/existing conditions), National Ambient Air Quality Standards (NAAQS), criteria pollutant nonattainment areas, and potential air quality impacts of the project (including cumulative and indirect impacts) for each alternative. The document states that because all anticipated emissions in nonattainment areas fit within the emissions budget allowed for military operations in the San Diego Air Basin, there will be no significant impacts to air quality for the preferred alternative basing location at Marine Corps Air Station (MCAS) Miramar and MCAS Pendleton. Although there is a reference to a letter from San Diego Air Pollution Control District indicating that the project emissions fit within the military budget, the letter is not included in the Draft EIS nor is it included in the references listed in Appendix B.

Recommendation:

Include the letter from the San Diego Air Pollution Control District cited in Appendix B (B.2-12) and confirm in the Final EIS that emissions fit within the military budget as stated.

A-5 Mitigation Measures

The Draft EIS states that because the proposed project emissions fit within the military programs emissions budget allowed in the San Diego Air Basin, no mitigation measures are warranted to reduce air quality impacts due to operational activities. We note that the activities associated with the proposed action will result in emissions of $PM_{2.5}$ (fine particulate matter) and diesel exhaust, as well as emissions that would exceed the annual NOx emission significance threshold within the San Diego Air Basin. EPA recommends that the Navy commit to additional measures to reduce air quality impacts, even if the proposal will not result in exceedances of the military emissions budget. We note that Council on Environmental Quality NEPA 40 Most Asked Questions (#19a) states the following:

> *The mitigation measures discussed in an EIS must cover the range of impacts of the proposal. The measures must include such things as design alternatives that would decrease pollution emissions, construction impacts, esthetic intrusion, as well as relocation assistance, possible land use controls that could be enacted, and other possible efforts. Mitigation measures must be considered even for impacts that by themselves would not be considered "significant." Once the proposal itself is considered as a whole to have significant effects, all of its specific effects on the environment (whether or not "significant") must be considered, and mitigation measures must be developed where it is feasible to do so. Sections 1502.14(f), 1502.16(h), 1508.14.*

Recommendations:

In light of the serious health impacts associated with $PM_{2.5}$ and diesel exhaust exposure, we recommend that the best available control measures for these pollutants be implemented at all times and that a Construction Emissions Mitigation Plan is incorporated into the Draft EIS. We recommend that all requirements under San Diego Air Pollution Control District Guidelines and the following additional measures be incorporated into a Construction Emissions Mitigation Plan, where feasible and appropriate, in order to reduce impacts associated with fugitive dust and emissions of $PM_{2.5}$, diesel exhaust, and mobile source air toxics from construction and operations associated with this project. A-5

Fugitive Dust Source Controls:

- Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Mobile and Stationary Source Controls:

- Minimize use, trips, and unnecessary idling of heavy equipment.
- Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications. The California Air Resources Board has a number of mobile source anti-idling requirements which could be employed. See their website at: http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm
- Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations.
- If practicable, lease new, clean equipment meeting the most stringent of applicable Federal or State Standards. In general, commit to the best available emissions control technology. Tier 4 engines will be available in the 2009-model year and should be used for project construction equipment to the maximum extent feasible. Lacking availability of non-road construction equipment that meets Tier 4 engine standards, the Navy should commit to using the best available emissions control technologies on all equipment.
- Utilize EPA-registered particulate traps and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site.

A-5 *Administrative controls:*

- Specify the means by which impacts to sensitive receptors, such as children, elderly, infirm, and others identified in the Final EIS, will be minimized. For example, locate construction equipment and staging zones away from sensitive receptors and fresh air intakes to buildings and air conditioners.
- Identify where implementation of mitigation measures is rejected based on economic infeasibility.
- Prepare an inventory of all equipment prior to construction and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking. (Suitability of control devices is based on: whether there is reduced normal availability of the construction equipment due to increased downtime and/or power output, whether there may be significant damage caused to the construction equipment engine, or whether there may be a significant risk to nearby workers or the public.) Meet EPA diesel fuel requirements for off-road and on-highway, and, where appropriate, use alternative fuels such as natural gas and electric.

A-6 Greenhouse Gases

The Draft EIS identifies general measures that the Navy is taking to reduce greenhouse gas (GHG) emissions and includes a quantification of annual greenhouse gas emissions on page 8-17. However, the document does not identify any specific measures associated with the proposed project to reduce greenhouse gas emissions.

Recommendations:

EPA recommends that the Final EIS identify specific mitigation measures that would 1) protect the Project from the effects of climate change, 2) reduce the Project's adverse air quality effects, and/or 3) promote pollution prevention or environmental stewardship. Any design and operation measures that can be identified as reducing GHG emissions should be identified in the Final EIS with an estimate of the GHG emissions reductions that would result if measures were ultimately implemented. Because the preferred alternative includes operations and construction at MCAS Miramar and MCAS Pendleton, any specific mitigation measures to reduce GHG emissions are important to note in relation to California's Global Warming Solutions Act of 2006.

A-7 **Land Use and Noise Impacts**

The Draft EIS states that unmitigated impacts to land use surrounding MCAS Miramar will result due to increased noise affecting residential, commercial, and recreational complexes (page 8-11) and that the population within the 65 dB CNEL contour would increase. The Draft EIS does not state why these impacts cannot be mitigated and does not identify mitigation measures that were considered and determined to not be feasible. EPA encourages the Navy to incorporate additional mitigation measures to reduce noise impacts to the surrounding communities if feasible, such as reduced operations during the evening period and commitments for additional soundproofing for affected receptors. EPA also encourages the Navy to consider

the benefits of collaboration in addressing noise impacts to the community. The Council on Environmental Quality, by releasing new guidance on Collaboration in NEPA[1], has communicated the need for Federal agencies to better engage interested parties in collaborative environmental analysis and federal decision-making. We understand national security issues would limit some opportunities to collaborate, but we anticipate that some opportunities with other interested parties may exist, such as in developing a suite of mitigation measures to offset significant impacts and/or in joint fact-finding (an inclusive and deliberative process to foster mutual learning and resolve disputes over scientific and technical issues). A-7

Recommendation:

EPA encourages the Navy to identify any additional mitigation measures available to mitigate increased noise impacts from the proposed basing at MCAS Miramar. We recommend collaboration with interested outside parties where possible, especially in the development of mitigation to offset significant impacts and in joint fact-finding to resolve disputes over scientific and technical issues.

[1] Available: http://www.nepa.gov/ntf/Collaboration_in_NEPA_Oct_2007.pdf

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Response to Comments

Response to Comment A-1. Thank you for your review of the Draft EIS.

Response to Comment A-2. Please see responses to A-4 through A-7 below.

Response to Comment A-3. A copy of the Final EIS will be submitted to the EPA at the address requested.

Response to Comment A-4. Because the Conformity Determination is routed for review concurrent with the EIS, and because San Diego Air Pollution Control District (SDAPCD) Rule 1551.855 does not specify that the APCD will provide a concurring letter, the reference to SDAPCD approval is deleted from the Final EIS. The administrative record will include any documentation received from SDAPCD, the California Air Resource Board, and the U.S. Environmental Protection Agency regarding their respective reviews of the conformity determination.

Response to Comment A-5. The Final EIS has adopted your recommendations to reduce emissions of fugitive dust and diesel particulates from proposed construction activities. Final EIS sections 3.7.2, 4.7.2, and 5.7.2 propose an air quality mitigation measure (construction mitigation plan), which identifies several measures to reduce these emissions from fugitive dust and mobile and stationary sources, including those requested in your comment, where feasible.

Response to Comment A-6. The cumulative impact section of the Final EIS (Chapter 8) has been supplemented with a discussion of United States Marine Corps and Department of the Navy programs for reducing energy usage and greenhouse gas emissions.

Response to Comment A-7. Further review of land uses under the increased area within the 65 dB CNEL contour for MCAS Miramar Full Basing and Maximum Partial Basing alternatives has identified that only a very small area of pre-existing residential development is impacted. Noise impacts are not significant because the increase in noise is less than a decibel. Land use impacts are not significant because the area is already built-out and is pre-existing use. As such, impacts are not significant and mitigation is not required. The Final EIS has been revised accordingly.

Public and agency input on the proposed action has been solicited through the NEPA public review process. The Department of the Navy is not aware of disputes over scientific or technical issues, but would consider collaboration where appropriate.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
1111 Jackson Street, Suite 520
Oakland, California 94607

IN REPLY REFER TO:
ER# 09/209

E-filed

6 April 2009

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

Subject: Review of the Draft Environmental Impact Statement (DEIS) for the West Coast Basing of MV-22, CA and AZ

Dear Project Manager:

The Department of the Interior has received and reviewed the subject document and has no comments to offer. **B-1**

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC

Response to Comments

1 **Response to Comment B-1**. Thank you for your review of the Draft EIS.

Arizona Department of Transportation
Intermodal Transportation Division
206 South Seventeenth Avenue Phoenix, Arizona 85007-3213

Janice K. Brewer
Governor

John S. Halikowski
Director

Floyd Roehrich Jr.
State Engineer

April 1, 2009

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, California 92132-5190

Re: Comments on Draft Environmental Impact Statement – MV-22 Basing Alternatives

Dear Sir/Madam:

Thank you for the opportunity to comment on the draft environmental impact statement (EIS) addressing the potential basing options for the MV-22. We support the effort of the Department of Navy to provide a strong defense for the country and the added economic benefits of military personnel and base operations within the state of Arizona. Because the Arizona Department of Transportation is responsible for maintaining a safe, reliable, and efficient highway network within the state, we wish to detail a couple of comments below on the draft EIS. C-1

Section 5.6.1, Page 5-20, Line 16

The correct term is "ordnance" when referring to military munitions. The spelling of this term as "ordinance" as done in the text refers a rule or regulation which is not in context with what is meant in the document. This misspelling may also apply to the document as a whole and should be checked throughout the document. C-2

Table 5.6-2, Page 5-22

The document does not identify how the Department of Navy defines the term "significant." What triggers the finding of a "significant" effect on traffic as shown in the last column of Table 5.6-2 in the view of the Department of Navy? The Arizona Department of Transportation (ADOT) defines "significant" as a change in Level of Service (LOS). We assesses the effect of development on the state's highway network according to our policy on traffic impact analysis (for a copy of the policy, see ADOT's web page http://www.azdot.gov/Highways/Traffic/standards/PGP/TM240.pdf. C-3

The draft EIS identified projected changes in the level of service for the traveling public along various routes, but it did not identify any potential effects on the operation of intersections along the traffic routes. The projected increase in traffic volumes with an expansion of the base will increase northbound travel north on Avenue 3 E and turning movements to the east or to the west as vehicles enter the state's C-4

C-4 highway system on Business 8 (32nd Street). The projected increase in traffic volume will significantly increase the number of vehicles making turns and we expect the turn lanes will need lengthening. In addition, changes in the signal timing will also likely be needed. State law requires developers to mitigate significant effects under Section 28-7045 of the Arizona Revised Statutes and Rule 17-3-506 of the Arizona Administrative Code.

C-5 All of the changes needed to Avenue 3E in order to accommodate increased traffic volumes may not physically fall within ADOT's right-of-way. We request, however, the Department of Navy to work with ADOT and the city of Yuma to implement the roadway improvements needed to accommodate the increased commuting traffic associated with the basing of MV-22 aircraft in Yuma.

C-6 Thank you, again, for the opportunity to comment of the Department of Navy's assessment of basing alternatives. If you have any questions on these comments, please call either the district's development engineer, Bruce A. Fenske, P.E., at (928) 317-2138 or me at (928) 317-2100.

Sincerely,

Paul V. Patane, P. E.
District Engineer

cc: P. Brooberg - City of Yuma

Response to Comments

Response to Comment C-1. Thank you for your review of the Draft EIS. Please see responses to C-4 through C-6 below.

Response to Comment C-2. A global search of the Draft EIS was made for the term "ordinance", which was then corrected to "ordnance", when appropriate.

Response to Comment C-3. Project impacts are considered "significant", as defined in Tables 5.6-2 through 5.6-5 in section 5.6 of the Final EIS, with regard to the traffic analysis impacts if the project traffic, itself, is a considerable portion of the total traffic volumes for a roadway segment. ADOT and City of Yuma criteria were also used as reference points, as applicable.

Response to Comment C-4. Significant traffic impacts resulting from the proposed action cannot be mitigated because the traffic impacts do not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210, Army Regulation 55-80), and the Department of Navy has no other legal authority for funding roadway improvements outside the installation. As such and as discussed in the Draft EIS, impacts of the Maximum Partial Basing Alternative and the Minimum Partial Basing Alternative at MCAS Yuma are considered significant and unmitigable.

Response to Comment C-5. Please see response to comment C-4.

Response to Comment C-6. Thank you for your comments.

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV
REGION IV, 9140 E. 28TH ST., YUMA, AZ 85365

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LARRY D. VOYLES
DEPUTY DIRECTORS
GARY R. HOVATTER
ROBERT D. BROSCHEID

March 31, 2009

D. C. Weir
c/o Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

Re: Draft EIS for the West Coast Basing of the MV-22 Aircraft

Dear Mr. Weir:

Arizona Game and Fish Department (Department) personnel have reviewed the Draft Environmental Impact Statement (DEIS) for the West Coast Basing of the MV-22 Aircraft (Project) dated February 2009, and attended a public meeting on March 26. Given the project description and our understanding of planned activities, we are providing the following comments for your consideration. D-1

Department personnel accessed the Heritage Data Management System and provided a list of special status species that have been identified within 3 miles of the Project area: D-2

SPECIES NAME	COMMON NAME	USESA	USFS	BLM	STATE
Uma rufopunctata	Yuman Desert Fringe-toed Lizard	SC	S		WSC
Phrynosoma mcallii	Flat-tailed Horned Lizard	SC			WSC
Triteleiopsis palmeri	Blue Sand Lily			S	SR
Helianthus niveus ssp. tephrodes	Dune Sunflower	SC			
Phrynosoma mcallii	Flat-tailed Horned Lizard	SC			WSC
Athene cunicularia hypugaea	Western Burrowing Owl	SC		S	

The Department recommends that surveys be conducted for burrowing owls and active burrows prior to ground disturbing activities and that any ground disturbing activities take place between approximately August and January, outside of the burrowing owl nesting season. Any burrows that are found to be active during the project construction need to be excluded or relocated. D-3

According to the *Flat-tailed Horned Lizard Rangewide Management Strategy 2003 Revision*, mitigation and compensation are not required by the Marine Corps Air Station (MCAS) Yuma because they are a signatory to the management strategy and because the project impacts to flat-tailed horned lizard habitat in and around the MCAS Yuma are localized and outside of the Yuma Desert Management Area. D-4

AN EQUAL OPPORTUNITY REASONABLE ACCOMMODATIONS AGENCY

D-5 Thank you for the opportunity to review and comment on this DEIS. If you have any questions about this letter, please contact me at (928) 341-4068.

Sincerely,

Troy G. Smith
Habitat Program Manager
Region IV, Yuma

TGS:tgs

cc: Pat Barber, Regional Supervisor, Region IV
Laura Canaca, Supervisor, Project Evaluation Program

AGFD # M09-03195053

Response to Comments

Response to Comment D-1. Thank you for your review of the Draft EIS. Please see responses to D-2 through D-4 below.

Response to Comment D-2. Data provided in this comment was incorporated into the Final EIS under *Endangered, Threatened, and Sensitive Species* in section 5.14.1, and subsequent text was revised accordingly.

Response to Comment D-3. The following text was added to the Final EIS under *Endangered, Threatened, and Sensitive Species* in section 5.14.1. "The AGFD (2009) recommends that surveys be conducted for burrowing owls and active burrows prior to ground disturbing activities, and they further recommend that any ground disturbing activities take place between approximately August and January, outside the burrowing owl nesting season. Any burrows found to be active during the project construction would need to be excluded or relocated (AGFD 2009)."

Response to Comment D-4. The following text was added to the Final EIS under *Endangered, Threatened, and Sensitive Species* in section 5.14.1: "Because MCAS Yuma is a signatory to the management strategy and because project impacts in around MCAS Yuma are localized and outside of the identified Management Areas, mitigation or compensation are not required (AGFD 2009)."

Response to Comment D-5. Thank you for your comments.

Janice K. Brewer
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Patrick J. Cunningham
Acting Director

March 30, 2009

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

SUBMITTED VIA E-MAIL: comments@marinescience.saic.com

Re: Draft EIS for the West Coast Basing of the MV-22 Aircraft

The Arizona Department of Environmental Quality Water Quality Division (ADEQ WQD) appreciates the opportunity to comment on the Draft Environmental Impact Study (EIS) for the proposed basing of the MV-22 Osprey tilt-rotor aircraft in the Western United States. The WQD is responsible for ensuring the delivery of safe drinking water to customers of regulated public water systems under the Safe Drinking Water Act, permits for proposed discharges to surface waters of the United States under the federal Clean Water Act (CWA), permits under the State aquifer protection program, and water quality certifications of certain federal licenses and permits. With the information provided, the WQD would like to make you aware of some water quality issues that may need to be considered for the EIS. Our comments are limited to the basing alternatives of partial basing at MCAS Yuma. **E-1**

(1) Drinking Water: If the current water system requires modifications or additions, such as a storage tank, part of Arizona's Safe Drinking Water Rules require design approval. The WQD in Phoenix is responsible for design review of federal facilities. Projects with a cost of less than $12,500 are exempt from the WQD's review and authorization, although the WQD must issue an exemption letter. Information on the WQD's review of modifications or additions to water systems is available on ADEQ's website at: http://www.azdeq.gov/environ/water/engineering/dwd.html. If you have questions, please contact Janak Desai, manager, technical engineering review unit at 602.771.4671 or at JD1@azdeq.gov. **E-2**

(2) Aquifer Protection Permit (APP): Facilities such as a wash rack and rinse facility require an APP, specifically the General Permit for Vehicle and Equipment Washes. The applicant must file a Notice of Intent to Discharge, along with a narrative description and design of the disposal facility. Information on the APP General Permits and associated forms is available on ADEQ's website at: http://www.azdeq.gov/environ/water/permits/app.html#permits. If you have questions, please contact Carrolette Winstead in our APP and Drywell Unit at (602) 771-4616 or by e-mail at cw6@azdeq.gov. **E-3**

E-4 *(3) Delegation:* As of December 5, 2002, Arizona has authorization from the U.S. Environmental Protection Agency (EPA) to operate the National Pollutant Discharge Elimination System (NPDES) Permit Program (Section 402 of the CWA) on the state level. The NPDES program, and the surface water permits issued, are referred to as the Arizona Pollutant Discharge Elimination System (AZPDES) Permit Program. The program includes individual permits as well as general permits for construction, demininus discharges, and municipal (MS4) and industrial stormwater (Multi-Sector General Permit) discharges.

E-5 *(4) Stormwater:* Stormwater discharges associated with construction activities (clearing, grading, or excavating) which disturb one acre or more must obtain a general permit for coverage of stormwater discharges under the AZPDES Construction General Permit. Permit coverage also is required for construction activities that will disturb less than one acre of land but the project is part of a larger common plan of development or sale and the entire project will ultimately disturb one or more acres. Under the AZPDES Permit Program, the WQD issued a new Construction General Permit (AZG2008-001) on February 28, 2008.

As part of permit coverage, a Stormwater Pollution Prevention Plan (SWPPP) must be prepared, and implemented during the course of construction. The SWPPP must comply with ADEQ's Construction General Permit's SWPPP requirements, and must identify such elements as the project scope, anticipated acreage of land disturbance, and the best management practices that would be implemented to reduce soil erosion and contain or minimize the pollutants that might be released to waters of the U.S. In addition to preparing the SWPPP, the project proponent must file for permit coverage. The Construction General Permit, SWPPP checklist, and associated forms are available on ADEQ's website at: http://www.azdeq.gov/environ/water/permits/stormwater.html#const. If you have questions, please contact Chris Henninger in our Stormwater and General Permits Unit at (602) 771-4508 or by e-mail at cph@azdeq.gov.

E-6 *(5) Multi-Sector General Permit (MSGP):* The AZPDES Multi-Sector General Permit (MSGP) is a separate stormwater permit that is required from certain specified industrial sites. Operators of these industrial sites must develop and implement a SWPPP, which includes best management practices that would be implemented to reduce soil erosion and contain or minimize the pollutants that might be released to waters of the U.S. MSGP coverage is required for airports as a Sector S industry. MCAS Yuma filed for MSGP coverage with ADEQ on April 7, 2003.

ADEQ is in the process of developing a new Arizona-specific MSGP, which will be based in part on the U.S. Environmental Protection Agency's new MSGP 2008, issued on September 29, 2008. ADEQ is required to conduct a 30 day public comment period, followed by a formal written response from ADEQ, before issuance. Public participation process for the new MSGP will begin this spring, with a new MSGP expected to be issued in early summer 2009.

Facilities in Arizona with coverage under the previous MSGP 2000 before it expired on October 30, 2005 continue to be granted an administrative continuance. The administrative continuance remains in effect until ADEQ issues a new permit. Those facilities already covered under MSGP 2000 must continue to implement their SWPPP and comply with the requirements in the MSGP 2000.

All facilities in Arizona (excluding Indian Country lands) will be required to reapply for permit coverage when ADEQ issues a new MSGP. Please watch the ADEQ web page for any announcements. Only MSGP 2000 permittees of record will be directly notified when the new permit becomes effective. Information on the MSGP can be found at: http://www.azdeq.gov/environ/water/permits/msgp.html. For questions on MSGP coverage for this project, please contact Dennis Turner at 602-771-4501 or by e-mail at dt1@azdeq.gov. E-6

(6) Impaired Waters: Under Section 303(d) of the federal CWA, the Colorado River is identified as an "impaired" water with respect to the surface water quality standards for dissolved oxygen and selenium. See Arizona's 2006/2008 303(d) Impaired Waters list (awaiting EPA final approval). The Colorado River's listing as an impaired water may impact surface water quality permits, such as the AZPDES permits. For information relating to impaired waters, please contact Anel Avila at 602-771- 4647 or by e-mail at aa1@azdeq.gov. The 2006/2008 303(d) Impaired Waters list is available at ADEQ's website: http://www.azdeq.gov/environ/water/assessment/assess.html. E-7

We appreciate the opportunity to review and provide comments. If you need further information, please contact Wendy LeStarge of my staff at 602.771.4836 or via e-mail at wl1@azdeq.gov, or myself at 602.771.4416 or via e-mail at lc1@azdeq.gov. E-8

Sincerely,

Linda Taunt, Deputy Director
Water Quality Division

Response to Comments

Response to Comment E-1. Thank you for your review of the Draft EIS. Please see responses to E-2 through E-7, below.

Response to Comment E-2. The Water Supply subsection of section 5.13.2 of the Final EIS has been edited to indicate that water supply improvements would be completed in accordance with Arizona Department of Environmental Quality approval.

Response to Comment E-3. The Water Quality subsection of section 5.13.2 of the Final EIS has been edited to indicate that the wash racks would be constructed in accordance with a General Permit for Vehicle and Equipment Washes, which is part of an Aquifer Protection Permit.

Response to Comment E-4. The Water Quality subsection of section 5.13.2 of the Final EIS has been edited to indicate that stormwater runoff would be regulated under Arizona Pollution Discharge Elimination System (AZPDES) Construction General Permit AZG2008-001, and associated site-specific Stormwater Pollution Prevention Plan (SWPPP).

Response to Comment E-5. The Water Quality subsection of section 5.13.2 of the Final EIS has been edited to indicate that stormwater runoff would be regulated under AZPDES Construction General Permit AZG2008-001, and associated site-specific SWPPP.

Response to Comment E-6. The Water Quality subsection of section 5.13.2 of the Final EIS has been edited to indicate that stormwater runoff would be regulated under AZPDES Multi-Sector General Permit (MSGP).

Response to Comment E-7. The Surface Water subsection of section 5.13.1 of the Final EIS has been edited to indicate that the Colorado River is an impaired water body, with respect to surface water quality standards.

Response to Comment E-8. Thank you for your comments.

SAN DIEGO COUNTY
REGIONAL AIRPORT AUTHORITY

P.O. BOX 82776 SAN DIEGO, CA 92138-2776
619.400.2400 WWW.SAN.ORG

March 12, 2009

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

Dear MV-22 Homebasing EIR Project Manager:

This letter is written in response to the West Coast Basing of the MV-22 Environmental Impact Statement (EIS). The San Diego County Regional Airport Authority ("Airport Authority") serves as the Airport Land Use Commission ("ALUC") for military and civilian airports within the county of San Diego (Cal.Pub.Util.Code §21670.3). The ALUC is required to prepare and adopt an Airport Land Use Compatibility Plan ("ALUCP") for Marine Air Corps Station Miramar ("Miramar") and Camp Pendleton ("Pendleton") that are consistent with the adopted AICUZ documents for each facility. The ALUC adopted the ALUCPs for Pendleton in June 2008 and Miramar in October 2008. F-1

The EIS indicates that the preferred alternative involves basing squadrons at both Miramar and Pendleton. While it appears that the preferred alternative would not have any impact on the noise contours for Pendleton since that facility's contours are located on base property, the EIS indicates that the changes to Miramar's noise contours are "...statistically insignificant for land use planning purposes." (EIS, page 3-51, lines 18 and 19). Should changes made to the operations at these air stations impact the noise contours in the Air Installations Compatible Use Zone ("AICUZ"), it is important that the ALUC be notified of these modifications so compatibility policies can be reviewed in context to the adopted ALUCPs. F-2

Additionally, the ALUC would appreciate notification if new AICUZ studies or amendments to the existing AICUZ are anticipated for these facilities to ensure that the SDCRAA is fulfilling its mandate of promoting airport land use compatibility. F-3

SAN DIEGO
INTERNATIONAL
AIRPORT

F-4 Thank you for your consideration. Should you have any questions, please call me at 619-400-2464.

Sincerely,

Sandi Sawa
Manager, Airport Planning
San Diego County Regional Airport Authority

cc: Amy Gonzalez, SDCRAA – General Counsel
C. Laura Thornton, MCAS Miramar
Larry Rannals, MCAS Camp Pendleton

Response to Comments

Response to Comment F-1. Thank you for your review of the Draft EIS.

Response to Comment F-2. Page 3-51, lines 18-19 of the Draft EIS discuss changes in the Community Noise Equivalent Level (CNEL) contours between the published Air Installation Compatible Use Zone (AICUZ) Study for MCAS Miramar and the baseline condition. The Preferred Alternative would not cause a significant noise impact due to aircraft operations at MCAS Miramar as stated on page 3-65, lines 4-5 of the Draft EIS. Although no new AICUZ studies are proposed at this time, the U.S. Marine Corps will continue to notify the Airport Land Use Commission (ALUC) of major changes in its CNEL contours or the need for changes in the AICUZ.

Response to Comment F-3. The U.S. Marine Corps will continue to notify the Airport Land Use Commission (ALUC) of new AICUZ studies or amendments.

Response to Comment F-4. Thank you for your comments.

THE CITY OF SAN DIEGO

April 3, 2009

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager,
1220 Pacific Highway, San Diego CA 92132-5190

Subject: **City of San Diego Comments on the Draft EIS for the West Coast Basing of the MV-22 Aircraft**

The City of San Diego ("City") has received and reviewed the Draft Environmental Impact Statement ("DEIS") for the West Coast Basing of the MV-22 Aircraft and appreciates this opportunity to provide comments. In response to the DEIS, the City as identified potential environmental issues that may have a significant environmental impact. G-1

Staff from the Development Services Department ("DSD") and Metropolitan Wastewater Department ("MWWD") have reviewed the DEIR and have the following comments regarding the content of the DEIR. Additionally, LDR-Transportation has provided comments in the form of a City Memo which is attached to this document.

Metropolitan Wastewater Department, Development Section: Mehdi Rastakhiz (619) 533-5155

1. There has been an ongoing problem associated with the sewer flow within the MCAS Miramar site. The sewer system within the site has surcharged during the rainy season in the past. It appears that this overflow might be due to infiltration or airplane wash/storm drain cross-connection. The City recently upsized a number of miles of the Miramar Trunk Sewer, which is downstream from the MCAS Miramar in order to accommodate the facility. This replacement has not resolved the surcharge problem near the upstream connection to the MCAS Miramar site. Any significant additional flow to the 15-inch main at the MCAS Miramar site can potentially cause a spill from the sewer system into the adjoining downstream canyon. G-2

2. The report shall address existing on-site utilities and how they will impact City facilities as a result of the increase in staffing and construction of aircraft facilities and how the marine corps will bring the total peak flow down so that G-3

G-3 it does not exceed the 2007 agreement for 1.6 MGD. A sewer study must be submitted for staff review to ensure that the existing and/or proposed facilities can service the needs of the project. Due to magnitude of the recent discharge rate of 4.0 MGD and potential health impacts this may create, we request a schedule for needed improvements.

City Planning & Community Investment, Community Planning Division: Tait Galloway (619) 533-4550

G-4 1. Please address the amount of MV-22 flight operations that would use any of the following established rotary wing arrival and departure routes for each alternative: Fairway Corridor, the Beach Route, the Interstate-15 Corridor, and the Yuma Corridor.

G-5 2. Please address the amount of MV-22 flight operations that would use the Seawolf Corridor and Julian Corridor established for fixed wing arrival and departure routes for each alternative.

G-6 3. Please provide maps showing the MCAS Miramar AICUZ Study CNEL contours and the proposed CNEL contours for each alternative with the City of San Diego's adopted community plan and/or general plan land use.

Please contact the appropriate above-named individual(s) if you have any questions on the submitted comments. The City respectfully requests that you please address the above comments in the EIR.

Sincerely,

Allison Sherwood
Senior Planner
Development Services Department

cc:

Tait Galloway, Senior Planner, City Planning & Community Investment
Mehdi Rastakhiz, Associate Civil Engineer, Metro Wastewater
Marc Cass, Associate Planner, Development Services

Response to Comments

Response to Comment G-1. Thank you for your review of the Draft EIS. Please see responses to G-2 through G-6 below.

Response to Comment G-2. MCAS Miramar and Naval Facilities Engineering Command (NAVFAC), Utilities Code 600 is fully aware of the inflow and infiltration (I&I) of storm water to the sewer system. For several years MCAS Miramar and NAVFAC Utilities have been coordinating with the City of San Diego Metropolitan Wastewater Department (MWWD). MCAS Miramar has responded to the same issue stated in the 3 March 2009 letter from the City of San Diego Metropolitan Wastewater Department (MWWD). On 25 March 2009, MCAS Miramar and NAVFAC Utilities had a status report meeting with the City of San Diego MWWD. In the meeting, details were discussed of the progress and efforts that have been made in identifying and eliminating sources of I&I on MCAS Miramar. A copy of the I&I report and recommendations was forwarded to MWWD staff. All eight of the MCAS Miramar aircraft wash racks have a rainwater diversion system and have been acceptably inspected annually by MWWD staff as a condition of MCAS Miramar's Industrial User Discharge Permit issued by City of San Diego MWWD.

Response to Comment G-3. MCAS Miramar currently has the sewer capacity to accommodate the proposed action without significant impacts. Sewer flow spikes attributable to inflow and infiltration (I&I) during heavy rain events are unrelated to the proposed action or the system's ability to accommodate the proposed action. MCAS Miramar has been actively engaged in efforts to identify and repair the source of I&I, and has coordinated these efforts closely with the City. Miramar will continue these efforts (see response to comment G-2).

The commenter's reference to a 2007 agreement is erroneous. The 1.6 MGD peak flow rate is established in a 1956 contract. The Department of the Navy and the City MWWD met on 13 May 2009 to initiate the process of reassessing the December 1956 contract and identify the appropriate updated limit through engineering sewer modeling of current and future growth to redefine the maximum peak flow. As a customer of the City of San Diego MWWD services, MCAS Miramar supports the City of San Diego's Metropolitan Wastewater Department.

Response to Comment G-4. This information can be found on pages C-3 through C-5 of Appendix C of the Final EIS. Annual MV-22 flight operations for the four rotary-wing corridors would range from 32 to 2,030 depending on the selected alternative.

Response to Comment G-5. Note that the fixed-wing Julian and Seawolf corridors are for departures only. This information can be found on pages C-3 through C-5 of Appendix C of the Final EIS. Annual MV-22 departures for the two fixed wing corridors would range from 597 to 15,382 depending on the selected alternative.

Response to Comment G-6. Based on land use GIS data subsequently provided by the City, the MCAS Miramar noise contour figures (Figures 3.8-1 through 3.8-5) have been updated in the Final EIS.

CITY OF SAN DIEGO
MEMORANDUM

DATE: March 27, 2009

TO: Marc Cass, Environmental Analysis Section

FROM: Labib Qasem, Transportation Development Section

SUBJECT: West Coast Basing of the MV-22 Public Draft Environmental Impact Statement

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We have reviewed the Draft Environmental Impact Statement (DEIS) dated February 2009 and offer the following general comments: **H-1**

1. Please provide the City of San Diego of the traffic study including its appendices for our review and comment. **H-2**

2. Although we understand that this document was prepared to meet NEPA requirements, because the facility is located adjacent to the City of San Diego, we request that the transportation analysis be conducted to meet City of San Diego environmental standards. Therefore, the DEIS should include the following: **H-3**

- Intersection analysis of any intersection where the project adds 50 or more peak-hour directional project trips.
- Interchange intersection and ramp meter analysis where the project adds 20 or more peak-hour directional project trips.
- Provide Congestion Management Program (CMP) analysis.
- Near Term analysis (i.e. existing plus cumulative projects) to determine direct project impacts.
- Horizon Year (2030) analysis to determine cumulative project impacts.

3. Project access points, including Mitscher Way/Miramar Road, should be evaluated. **H-4**

4. The traffic study should be signed and stamped by California Registered Traffic Engineer to declare the responsible person in charge. **H-5**

5. The trip rate used of 2 trips/employee is too low, since it is anticipated some employees would make trips to and from the facility during their work shift. **H-6**

H-7 6. In the am peak, southbound traffic from Interstate 15 heading west on Miramar Road is queued up back to the freeway mainline. This DEIS should analyze the increase in trips from the proposed project into this existing queue during both the a.m. and p.m. peak-hour.

H-8 7. Miramar Road east of Eastgate Mall cannot be considered a 6 lane prime arterial, since it does not have a raised center median and has driveways on the north side. Therefore, its LOS E capacity is no greater than 50,000 ADT.

H-9 8. The 2006 SANDAG roadway volumes for the SANDAG counts used in this study are significantly lower than City of San Diego machine counts. City of San Diego machine counts should be used.

H-10 9. Based on our comments above, a comprehensive traffic study should be prepared to evaluate all the proposed project traffic impacts on roadway segments, intersections, freeway interchanges and ramps during the a.m. and p.m. peak hours.

H-11 10. The proposed project direct traffic impacts on City of San Diego roadways and intersections should be fully mitigated by the Department of the Navy. Provide preliminary design and cost estimates for the required traffic mitigations for our review and comment.

H-12 11. Due to the project impacts on the freeway system, please send a copy of this DEIS and its traffic study to Caltrans for their review and comment.

H-13 Should you have any questions or need additional information, please contact me at (619) 446-5358 or Victoria Huffman at (619) 446-5396.

Labib Qasem

Labib Qasem, P.E.
Senior Traffic Engineer

VH

Response to Comments

Response to Comment H-1. Thank you for your review of the Draft EIS. Please see responses to H-2 through H-12 below.

Response to Comment H-2. The detailed traffic analysis was presented in sections 3.6 (MCAS Miramar), 4.6 (MCAS Camp Pendleton), 5.6 (MCAS Yuma), 8.3.5 (Cumulative Traffic Impacts), and Appendix D of Draft EIS; a standalone Traffic Study was not prepared.

Response to Comment H-3. The traffic analysis was prepared in accordance with daily roadway segment traffic impact analysis procedures. Darnell & Associates used the City of San Diego's Roadway Classification, Level of Service and Average Daily Traffic (ADT) table to address the roadway segments summarized in the Draft EIS. The existing off-base daily traffic volumes were taken from the City of San Diego's Traffic Engineering-Machine Count Traffic Volumes-City Streets dated: 1/1/95 to 12/07/04. The existing analysis addresses impacts of the proposed action for daily roadway segments using the City of San Diego's thresholds. As such the Draft EIS provides an appropriate analysis of ground transportation impacts for NEPA purposes.

Intersection Analysis and Interchange Intersection/Ramp Meter Analysis: As described above, the Draft EIS assessed off-station traffic impacts by daily roadway segment analysis. Although an intersection analysis and interchange intersection/ramp meter analysis was not completed, the Draft EIS provides an appropriate analysis for NEPA purposes to determine off-base traffic impacts within the region of influence.

CMP Analysis: The Draft EIS assessed traffic impacts on daily roadway segments. All roadway segments analyzed for the MCAS Miramar basing alternatives cover the CMP requirements because the Full Basing Alternative adds 2,444 daily trips to the roadway network. As such, for NEPA purposes the EIS provides an appropriate analysis to determine off-base traffic impacts within the region of influence.

Near term analysis (existing plus cumulative projects). The SANDAG FY 2020 model forecast was used for the cumulative traffic impact analysis. The data includes all pending developments that are consistent with the adopted County of San Diego General Plan. As such, the Draft EIS provides an appropriate project and cumulative-level analysis of ground transportation impacts for NEPA purposes.

Horizon Year (2030) analysis to determine cumulative project impacts: Horizon Year Baseline Conditions represents the traffic conditions of the street network assumed to be in place under build-out conditions. Transition to the MV-22 is scheduled to occur between fiscal year (FY) 2010 and FY 2020. Traffic conditions in Horizon Year 2020 were analyzed because 2020 is the year of assumed build out of the study area communities (SANDAG). The level of impact was assessed by comparing the future traffic conditions (Year 2020) with the project against future traffic conditions without the project. As such, the Draft EIS provides an appropriate horizon year (2020) analysis of ground transportation impacts to determine cumulative project impacts for NEPA purposes.

Response to Comment H-4. Project access would be provided by either the Main/East Gate (Miramar Way/Kearny Villa Road) or the North Gate (Miramar Road/Mitscher Way). The traffic analysis evaluated impacts of the proposed action to roadway segments in the vicinity of MCAS Miramar gates including: (1) Miramar Road between Camino Ruiz and Clayton Dr., which includes the North Gate access point, and (2) Miramar Way between the Main/East Gate and Kearny Villa Road and Kearny Villa Road to Interstate-15 SB Ramp.

Response to Comment H-5. Chapter 10 of the EIS provides a list of preparers of the document and outlines the individuals, their title, education, years of experience, and role in the preparation of the Draft EIS. As indicated in Chapter 10 of the Draft EIS, Darnell & Associates is the principal transportation engineer responsible for the ground transportation analysis. This information is appropriate for the purposes of NEPA to declare the responsible person in charge of the traffic analysis. Signing and stamping is not required for NEPA purposes.

Response to Comment H-6. The specified 2 trips/employee is an industry standard that is consistently used in the environmental review process by federal agencies. This estimate is consistent with the fact that installations provide various eateries and other services for employees, limiting their need to go off-station.

Response to Comment H-7. The existing analysis addresses impacts of the proposed action for daily roadway segments using the City of San Diego's thresholds. Specifically, the roadway segment for Miramar Road from Kearny Villa Road to Kearny Mesa Road was analyzed for each basing alternative at MCAS Miramar. As such the EIS provides an appropriate analysis of ground transportation impacts for NEPA purposes.

Response to Comment H-8. The text of the Final EIS has been revised accordingly.

Response to Comment H-9. The Final EIS has been updated to include the City of San Diego's 2004 Machine Counts instead of the lower volumes taken from 2006 SANDAG forecast. The updated analysis provided in the Final EIS did not result in changes to the conclusion of the traffic analysis provided in the Draft EIS.

Response to Comment H-10. Please see response to comment H-2.

Response to Comment H-11. Significant traffic impacts within the City of San Diego resulting from the proposed action cannot be mitigated because the traffic impacts do not meet eligibility criteria for the Defense Access Roads Program (23 U.S. Code § 210, Army Regulation 55-80), and the Department of Navy has no other legal authority for funding roadway improvements outside the installation. As such and as discussed in the Draft EIS, impacts of the Full Basing Alternative and the Maximum Partial Basing Alternative at MCAS Miramar are considered significant and unmitigable.

Response to Comment H-12. A letter (dated 13 February 2009) regarding the public availability of the Draft EIS for the West Coast Basing of the MV-22 for public comment along with a CD containing an electronic copy of the document was sent to Mr. Mike Owen of CalTrans District 11.

1 **Response to Comment H-13**. Thank you for your comments.

COUNCILMEMBER SHERRI S. LIGHTNER

FIRST DISTRICT

CITY OF SAN DIEGO

April 3, 2009

Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92132-5190
Attn: MV-22 Homebasing EIS Project Manager

Dear Project Manager:

This letter is to comment on the United States Marine Corps Draft Environmental Impact Statement for the West Coast Basing of the MV-22. Due to the proximity of MCAS Miramar and the communities of San Diego that I represent (University City, La Jolla, Torrey Pines, Torrey Hills, Carmel Valley, Del Mar Mesa, and Rancho Peñasquitos), the Full Basing alternative or the Maximum Partial Basing alternative of the MV-22 will likely have an impact on the quality of life in these neighborhoods. These impacts can be both positive, such as the economic impacts, and negative, such as the noise impacts. I urge those who will make this decision to prioritize the protection of the quality of life and the safety of the surrounding communities. I-1

The major potential negative impacts to the surrounding communities that concern me most relate to noise, ground traffic & transportation, biological resources, air quality, and safety. I-2

Noise: I-3

The EIS finds that that the 65 dB CNEL noise contour would extend further into the surrounding communities under both the Full Basing alternative and to a slightly lesser extent under the Maximum Partial Basing alternative. While there will be no change in the type of land currently affected by the 65 dB CNEL, the expansion of this contour is a major concern. My concern is magnified by the additional, cumulative impacts of both the increase in operational tempo due to the Grow the Force initiative, and the potential basing of the F-35B Joint Strike Fighter (JSF) at MCAS Miramar. While the EIS for the basing of the JSF has not been completed, it is generally understood that the JSF generates more noise than the current F/A-18. With both the MV-22 and the JSF stationed at Miramar, it is likely that noise may negatively impact livability in certain neighborhoods in University City and Carmel Valley. This could affect not only the everyday life that these residents currently enjoy, but also the value of their homes. If you go forward with one of these two alternatives, I urge you to seek new ways of mitigating this noise to the greatest extent possible, including modifying flight paths to minimize the expansion of noise contours. I also urge vigilance on the part of squadron commanders in ensuring that the pilots under their command limit their flight strictly to the established corridors.

202 C STREET - SAN DIEGO, CALIFORNIA 92101
(619) 236-6611 - FAX (619) 236-6996 - EMAIL: SHERRILIGHTNER@SANDIEGO.GOV

I-4 Ground Traffic and Transportation:
The EIS finds that the Full Basing alternative would add an estimated 2,444 trips onto existing roadways, and the Maximum Partial Basing alternative would add an estimated 1,596 trips onto existing roadways. As stated in the EIS, this is a significant portion of total traffic volumes for the segment of Miramar Way between Kearney Villa Road and I-15. These impacts could be exacerbated by the cumulative impacts of several other projects that are ongoing or about to begin at MCAS Miramar: the basing of the JSF and the Grow the Force initiative. While these roads are not in District 1, which I represent, I am concerned because they are routes that my constituents travel on a daily basis. The predicted increase in traffic will affect their daily lives. If you proceed with one of these two alternatives, I urge you to look for alternative transportation methods to mitigate the traffic concerns to the greatest extent possible.

I-5 Biological Resources:
The EIS finds that the Full Basing alternative would result in significant and unavoidable impacts to vernal pool habitat, and direct loss of San Diego fairy shrimp, San Diego button-celery, San Diego mesa mint populations, as well as significant and mitigable impacts to Diegan coastal sage scrub, coast live oak riparian forest, Waters of the U.S., chaparral, and the California gnatcatcher. This option also has direct impacts on species that are federally listed as threatened or endangered that could be reduced through mitigation, but not entirely. I applaud the fact that the preferred alternative, the Maximum Partial Basing alternative, reduces many of these biological impacts--though not entirely. I urge you to look for ways to further reduce these impacts, because even though the impacts may be relatively small, the community is concerned about any impacts to these plants and animals.

I-6 Air Quality:
The EIS finds that both the Full Basing and Maximum Partial Basing alternatives would not significantly impact overall air quality within the San Diego Air Basin. However, this is only because increases in certain types of pollution are balanced by decreases in other types of pollution. I am concerned that both the Full Basing and Maximum Partial Basing alternatives would result in emissions that would exceed NOx significance thresholds in the San Diego Air Basin. I urge you to look for ways to reduce your NOx emissions so that the chosen alternative does not increase the presence of this air pollutant in our communities, and if possible reduces them to assist in meeting the goals of California Assembly Bill 32.

I-7 Saftey:
The EIS finds that the proposed action would not result in significant impacts to environmental health and safety of public or military personnel. However, it finds that in the future, the level of use of restricted airspace is likely to increase due to the basing of the JSF, the Grow the Force initiative, and other actions. The EIS states that this may require more coordination between regional FAA and military airspace managers, and for airfield APZs to be updated. The growth in air traffic above the communities surrounding MCAS Miramar is a major concern. I urge you to adequately prepare for coordination with the FAA, as well as update the APZs as necessary, so that the San Diego communities surrounding MCAS Miramar remain safe.

I would be remiss to only highlight the negative impacts of the Full Basing or Maximum Partial Basing alternatives. According to the EIS, both alternatives are projected to result in positive economic impacts for the surrounding communities. The Full Basing alternative would result in a projected one-time impact (due to construction) of $1 billion in spending, 10,048 annual jobs, and $460 million in personal income. The subsequent annual impact of base operations under this alternative is projected to be 1,659 jobs, $104 million in spending, and $76 million in income. The Maximum Partial Basing alternative would result in a projected one-time impact (due to construction) of over $515 million in spending, 5,055 annual jobs, and over $231 million in personal income. The subsequent annual impact of base operations under this alternative is projected to be 1,083 jobs, $68 million in spending, and nearly $50 million in income. With either alternative, these numbers are significant and will positively affect our local economy. The basing of the MV-22 at MCAS Miramar would be welcome economic stimulus to San Diego's communities. **I-8**

I appreciate your efforts to date to publicize the EIS process and include community input, such as the latest scoping meeting held on March 24, 2009. I request that you continue to include public input and use every available opportunity to publicize the EIS process and the potential change in the type and number of aircraft based at MCAS Miramar. I encourage you to find future opportunities for community involvement and comment above and beyond what is legally required. **I-9**

Finally, I respectfully request that the final decision-making be a transparent process so that all citizens can feel confident that their concerns were taken into consideration and that the Marine Corps is mindful of their quality of life and safety. If I can assist in any way, please contact my office at (619) 236-6611. **I-10**

Sincerely,

Sherri S. Lightner
Councilmember, First District
The City of San Diego

cc: General Michael R. Lehnert
Colonel David C. Myers
C. Laura Thornton

Response to Comments

Response to Comment I-1. Thank you for your review of the Draft EIS. The U.S. Marine Corps understands the concerns of residents, business owners, and visitors of the City of San Diego and is committed to working with their neighbors to ensure that impacts on the quality of life and safety of the surrounding communities are minimized.

Response to Comment I-2. Please see responses to I-2 through H-10 below.

Response to Comment I-3. As shown in Table 3.8-7 of the Draft EIS, the Preferred Alternative's Noise Zone II (65-75 dB CNEL) would increase by 22 acres, 56 people and 23 housing units relative to Baseline/No Action. Housing units and population would not increase in Noise Zone III (75 dB CNEL and greater). Additionally, the Preferred Alternative would not cause an increase in CNEL to an affected population relative to the Baseline/No Action condition of at least 1.5 dB within the alternative's 65 dB CNEL contour. As a comparison, the minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. Therefore, this noise increase is not considered a significant impact.

Page 8-18 of the Draft EIS addresses the potential for cumulative noise impacts due to future actions, such as Grow the Force and F-35B Joint Strike Fighter basing at MCAS Miramar, in conjunction with the proposed basing of the MV-22. Noise modeling is currently being conducted for the F-35B, in conjunction with the development of an EIS for the West Coast Basing of the F-35B. Based on this modeling, the EIS for the West Coast Basing of the F-35B will evaluate potential noise and other impacts from proposed F-35B operations. If impacts are significant, the U.S. Marine Corps will evaluate potential mitigation measures.

As indicated in theMV-22 Basing Draft EIS (page 8-18, lines 23 – 27), if the noise studies from the F-35B West Coast Basing EIS predict additional noise beyond existing baselines, F-35B and MV-22 noise could have a cumulative impact. However, it is anticipated that the F-35B, like the F/A-18 and AV-8 jets it would replace, would be the dominant source for defining noise impacts at any installation when these aircraft are collocated with MV-22 or rotary wing aircraft, and thus MV-22 cumulative noise impacts would not be significant.

The USMC is also committed to ensuring that all proposed MV-22 operations follow established flight corridors.

Response to Comment I-4. Marines, Sailors, and civilian employees assigned to MCAS Miramar are offered and encouraged to take advantage of the U.S. Department of Transportation's Transportation Incentive Program, which provides vouchers toward vanpool and mass transit (Coaster train) expenses. The Department of Navy is open to exploring other ideas that may reduce traffic without adversely impacting military readiness.

Response to Comment I-5. The U.S. Marine Corps is committed to protecting terrestrial and aquatic environments and is an active participant in their protection to minimize the effects of its training

activities. Consistent with NEPA requirements, the Draft EIS incorporates all feasible mitigation measures to address the significant impacts of the proposed action. In addition, the U.S. Marine Corps has prepared a Biological Assessment to support consultation with the U. S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. Proposed measures to avoid, minimize, or compensate for impacts on endangered and threatened species and their habitat will be evaluated and may be augmented or refined through the consultation.

Response to Comment I-6. The increases in nitrogen oxide (NOx) emissions associated with the proposed action have been budgeted into the San Diego Air Pollution Control District's State Implementation Plan (SIP). While the Department of the Navy cannot compromise the combat capability of the MV-22 in order to reduce emissions, the Department implements a range of programs that are designed to reduce energy consumption. Implementation of these measures would reduce future Department of the Navy emissions of both criteria pollutants (such as NOx) and greenhouse gas (GHG) emissions. A discussion of such programs has been added to section 8.3.6.

Response to Comment I-7. We currently do not have sufficient information about the basing of the Joint Strike Fighter (F-35B) to determine whether accident potential zone (APZ) updates would be required. Those studies will be performed under NEPA in the Joint Strike Fighter (F-35B) EIS for that future federal action. The Marine Corps will continue to work closely with the Federal Aviation Administration regarding airspace and air operations matters.

Response to Comment I-8. Thank you for acknowledging the positive economic impacts for surrounded communities related to basing the MV-22 at MCAS Miramar.

Response to Comment I-9. MCAS Miramar has a robust Community Plans and Liaison program, including a Community Leaders Forum that meets periodically to discuss issues of shared importance. The Department of the Navy agrees the continuing dialog such as this is essential to sound community relations.

Response to Comment I-10. After the close of the public comment period for the Draft EIS, the Final EIS was prepared, which included written responses to all comments received during the public comment period (Appendix A of the Final EIS). In some cases, responses to comments resulted in minor changes to the Final EIS to correct or clarify specific text. The Final EIS was released on 16 October 2009 for a 30-day review period, after which the Department of the Navy will issue a Record of Decision (ROD) that will be published in the Federal Register. The ROD will summarize the Assistant Secretary of the Navy's decision, identify the selected course of action, describe the public involvement and agency decision-making processes, and present commitments to specific mitigation measures. The Final EIS and ROD will be available on the MV-22 project website at http://www.mv22eiswest.net.

CITY OF POWAY

MICKEY CAFAGNA, Mayor
DON HIGGINSON, Deputy Mayor
MERRILEE BOYACK, Councilmember
JIM CUNNINGHAM, Councilmember
BETTY REXFORD, Councilmember

April 1, 2009

MV-22 Homebasing EIS Project Manager
NAVFAC SW Central IPT
1220 Pacific Highway
San Diego, CA 92132-5190

Subject: MV-22 West Coast Basing Environmental Impact Statement

Dear EIS Project Manager:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for the West Coast basing of the twin engine tilt-rotor MV-22 Osprey as part of the Third and Fourth Marine Wings in southern California and Arizona. As proposed, the project would introduce up to ten MV-22 squadrons on the West Coast as part of the U.S. Marine Corps process of replacing its aging fleet of medium lift helicopters with more advanced, operationally fit, aircraft. J-1

The EIS analyzed six options:

- Full basing (ten squadrons) at MCAS Miramar
- Partial basing at MCAS Miramar (eight squadrons) and MCB Camp Pendleton (two squadrons) (*Preferred Alternative*)
- Partial basing at MCAS Miramar (eight squadrons) and MCAS Yuma (two squadrons)
- Partial basing at MCAS Miramar (two squadrons) and MCAS Yuma (eight squadrons)
- Partial basing at MCAS Yuma (eight squadrons) and MCB Camp Pendleton (two squadrons)
- No Action

The full and partial basing options will place between eight and ten squadrons (96 to 120 MV-22 aircraft) at MCAS Miramar. As these scenarios have the potential to impose the greatest impacts to the surrounding communities, we offer the following comments that should be addressed in the Final EIS.

- The EIS states that the MV-22 will follow the existing air traffic patterns. It appears that the CH-53 Sea Stallion helicopter and the FA-18 jet fighter will continue to operate from MCAS Miramar. The MV-22, which flies like an airplane, will follow the same traffic patterns as these other aircraft. The EIS should discuss how to resolve, or de-conflict, the airspace as the three aircraft will be flying at different air speeds within the same traffic pattern. Will this potential conflict require the creation of new traffic patterns over residential areas? If so, it should be addressed in the EIS. J-2

- The Department of the Navy is proposing to introduce the new F-35 Joint Strike Fighter to replace the F-18 jets. Many of the new jets are tentatively slated for MCAS Miramar. The EIS should discuss whether the introduction of the F-35 will result in an increase in the total number of daily flight (helicopter/Osprey/jet) operations at MCAS Miramar and potential impacts. J-3

City Hall Located at 13325 Civic Center Drive
Mailing Address: P.O. Box 789, Poway, California 92074-0789 • (858) 668-4400

J-4 ▪ The EIS notes that the full and partial basing alternatives at MCAS Miramar will necessitate substantial new improvements, requiring the construction of new hangers, parking aprons, and underground fuel storage facilities, costing hundreds of millions of dollars to accommodate the MV-22 Osprey. The partial basing alternative improvements will maximize the developed area on the north side of the runways. The full basing alternative will require maximizing development on the north side of the runways and new construction on the south side of the runways. It is anticipated that new improvements will also be required to accommodate the F-35 Joint Strike Fighter. The EIS should discuss how the Department of Defense and MCAS Miramar will coordinate the construction of future (F-35) and near-future (MV-22) field and base improvements that will maximize the use of the existing facilities and land use area, avoid demolition of new improvements, and minimize the cost to taxpayers.

J-5 ▪ With the introduction of the MV-22 to MCAS Miramar, the eight squadron partial basing alternative will generate a minimum 21 percent increase in air operations. Although the EIS states that future increases in the total number of daily operations are less than peak limits previously set at MCAS Miramar, these limits were set 10 to 20 years ago. A significant amount of new development has occurred within the flight patterns since that time, and new residents are not accustom to the proposed increase in the number of flights and corresponding noise. The EIS should analyze and discuss potential impacts on those routes that will experience an increase in air traffic and noise.

J-6 We appreciate the opportunity to provide input on the Draft EIS for the West Coast basing of the MV-22 and look forward to receiving future environmental documentation on this project.

Sincerely,

DEVELOPMENT SERVICES DEPARTMENT

Jim Lyon
Senior Planner

c. Rod Gould, City Manager
Penny Riley, Assistant City Manager
Robert J. Manis, Director of Development Services
Patti Brindle, City Planner

M:\planning\jl\Letters & Memos\MV-22 Osprey DEIR ltr.docx

Response to Comments

Response to Comment J-1. Thank you for your review of the Draft EIS. Please see responses to J-2 through J-5 below.

Response to Comment J-2. No new traffic patterns or flight corridors are planned under the proposed action. When the MV-22 flies in fixed wing mode, it will follow fixed wing flight corridors. When it flies in rotary wing mode, it will follow rotary wing flight corridors.

Air Traffic Control (ATC) is aware of the speed differential between existing aircraft and the MV-22 with regard to departures and arrivals. ATC will sequence aircraft in/out of the air station. Normal airspace de-confliction by Air Traffic Control will resolve the issues of dissimilar aircraft operations within the airspace. In addition, a minimum separation of 500 feet is maintained between aircraft during maneuvers or training operations. This is no different than how air traffic is handled in traffic patterns where slow moving private aircraft and commercial jet liners share air traffic approach and departure routes in the airport environments within the Nation Airspace System. The text of the Final EIS in section 3.2 (MCAS Miramar Airfields and Airspace) has been revised to clarify this process for de-confliction of the MV-22 and other aircraft within the same airspace.

Response to Comment J-3. Consistent with NEPA, the Draft EIS (pages 8-9 through 8-10) address the potential for cumulative airspace impacts due to future actions, such as basing the F-35B Joint Strike Fighter at MCAS Miramar, in conjunction with the proposed basing of the MV-22. At this time, it is not known whether the proposed introduction of the F-35B at MCAS Miramar would result in an increase in the total number of daily flight operations at MCAS Miramar. This type of proposed operations data is currently being compiled in conjunction with the development of an EIS for the West Coast Basing of the F-35B, which will evaluate potential airspace conflicts and other impacts from proposed F-35B operations in addition to MV-22 operations. If impacts are significant, the U.S. Marine Corps will evaluate potential mitigation measures to resolve or de-conflict any airspace issues as part of the NEPA process for that proposed action.

Response to Comment J-4. The Department of Navy is currently preparing an EIS for the West Coast Basing of the F-35B, including the development of potential site layouts for each basing alternative. These site layouts are being developed in coordination with appropriate staff at each air station to ensure that proper consideration and understanding is given to proposed site layouts associated with the west coast basing of the MV-22 so that improvements will maximize the use of existing facilities, and site layouts for either aircraft will not conflict with each other or with other future developments.

Response to Comment J-5. The Draft EIS noise analysis accounted for increases in operations on existing routes into and out of MCAS Miramar compared to existing conditions. Although there is an expected 20 percent increase in annual operations compared to existing conditions under the Preferred Alternative, the noise analysis concluded that the Preferred Alternative's Noise Zone II (65-75 dB CNEL) would increase by 22 acres, 56 people and 23 housing units relative to Baseline/No Action. Housing units and population would not increase in Noise Zone III (75 dB CNEL and greater). This analysis took into consideration current land use development and population census data to determine the noise

and associated land use impact from the proposed increase in operations. As such, the Draft EIS provides a thorough and appropriate analysis of the proposed action's air traffic and noise impacts for NEPA purposes.

Response to Comment J-6. Thank you for your comments.

City of San Clemente
Community Development/Public Works
James S. Holloway, Community Development Director
Phone: (949) 361-6105 Fax: (949) 361-8281

March 30, 2009

Naval Facilities Engineering Command Southwest,
Attn: MV-22 Homebasing EIS Project Manager,
1220 Pacific Highway, San Diego,
California 92132-5190.

Re: Internal Draft Report for City of San Clemente on the West Coast Basing of the MV-22 Public Draft Environmental Impact Statement (February, 2009)

Dear EIS Project Manager,

I. Project Overview

The Department of the Navy released a draft Environmental Impact Statement (EIS) in February of 2009. The Draft EIS assesses the potential impacts of basing 10 squadrons (12 aircraft each) of MV-22 Osprey tilt-rotor (MV-22) aircraft in the Western United States. This is part of a U.S. Marine Corps (USMC)-wide process of replacing its aging fleet of medium lift helicopters with more advanced aircraft. The MV-22s would be used to replace nine squadrons of CH-46E helicopters. The EIS can be broken into three areas: 1) the impacts of basing the squadrons at U.S. Marine Corps Air Station (MCAS) Miramar, MCAS Camp Pendleton, and MCAS Yuma; 2) the associated construction and/or renovation of facilities to accommodate the aircraft; 3) and, the impacts of conducting training and readiness operations. If squadrons are stationed at MCAS Camp Pendleton they will be based at the airfield at the south end of the base. For this reason, **the City of San Clemente is primarily interested in the impacts of the training and readiness, operations as these have the largest impact upon the northern portion of Marine Corps Base (MCB) Camp Pendleton.** K-1

A. History

The Department of the Navy began this process in 2000, when it published a Notice of Intent (NOI) in the Federal Register and held a series of public meetings. A meeting was held in the City of San Clemente on November 7, 2000. The City attended the meeting and provided written comments, which are provided as Attachment A, Holloway Letter. After the public scoping meetings, the MV-22 program was delayed; the aircraft was involved in several crashes which resulted in a number of fatalities. The aircraft was tested, evaluated, changes were made, and the Department of the Navy has determined that the issues which led to the crashes were resolved. There are active squadrons of MV-22s on the East Coast which have been used for combat missions in Iraq. The Department of the Navy held three public meetings on the Draft EIS, in San Diego, California (March 24, 2009), San Clemente, CA (March 25, 2009) and Yuma, AZ (March 26, 2009). Staff members from the City of San Clemente attended the March 25, 2009 public meeting. K-2

K-3 In the response to the NOI, the City of San Clemente had concerns related to MCB Camp Pendleton's asserted freedom to conduct aircraft operations as it sees fit throughout the base, without regard for impacts on neighboring private and non-base public properties. This change in operational character of the base would have a great potential for negative impacts. The November 2, 2000 letter (Attachment A) requests of the EIS included the following:

K-4 Operational Description
Provide the specific description of the on-base flight patterns, off- and on-base approach routes the number of anticipated operations and the anticipated growth of operations over time associated with the MV-22.

K-5 Noise/Vibrations
Provide the actual projected and verifiable noise contours for the MCB Camp Pendleton using state-of-the-art noise analysis modeling and reflecting actual local topography. Further analyze the recent added helicopter activity in the area, related to the Helicopter Outlying Landing Field (HOLF) and Helicopter Landing Zone (HLZ) and other activities and if these will have a cumulative impact on San Clemente. Identify the growth/impact of future training activities for all air operations in the North Base and provide this information in the EIS.

K-6 Air Safety
Provide a map showing the magnitude of the potential risk for aviation accident. The City assumes that such a map would be based on the characteristics of the MV-22's operations (that some operations have a higher potential for aviation accident than others).

K-7 Facilities and Support
There should be an evaluation of the operational characteristics of base operations characteristics of base support facilities such as landing fields, outlying facilities, practice ranges, and maintenance facilities.

K-8 Resource Impacts
There is concern that the recent action at the federal level has provided MCBCP exemptions from the Endangered Species Act and the change in operations will result in degradation of the local physical environment.

K-9 B. **Basing**
The proposed MV-22 squadrons would be co-located at a single installation or would be split between a maximum of two aviation facilities. The EIS identifies four possible basing options with a no action alternative.

The EIS identifies the Preferred Alternative as Partial Basing, with eight squadrons at MCAS Miramar and two at MCAS Camp Pendleton. The split basing option best meets the Department of Navy's preferred alternative because it best meets the criteria for fulfilling Marine Corps missions and minimizes the potential adverse effects on biological resources. The other alternatives include basing eight squadrons at MCAS Miramar and two squadrons at MCAS Yuma, basing eight squadrons at

MCAS Yuma and two Squadrons at MCAS Camp Pendleton. (The maximum number of squadrons proposed for basing at MCAS Camp Pendleton is two.) K-9

Under the no action alternative, operations and missions would continue using the current medium lift helicopters. No aircraft would be replaced, aircraft operations would continue at the current level, and no construction/demolition or personnel changes related to basing the MV-22 aircraft on the West Coast would occur.

C. **Training and Readiness Operations** K-10

Regardless of which basing alternative is selected, the MV-22 would conduct training and readiness operations at MCB Pendleton, the Bob Stump Training Range Complex, Marine Corps Air Ground Combat Center and various military training routes. The proposed MV-22 operations at established airfields include the following actions: departures, arrivals (straight-in/full-stop), overhead beak arrivals, touch-and-go's, field carrier landing practice, ground-controlled approach box, and low work. Approximately 12,100 MV-22 annual operations are expected to occur at the training ranges and military training routes under consideration in this EIS. These would replace the approximately 17,995 annual operations currently being conducted with the CH-46 helicopter.

II. MCB & MCAS Camp Pendleton K-11

MCB Camp Pendleton is one of the Department of Defense's busiest training installations. It has over 125,000 acres of varied terrain and 17 miles of shoreline. MCB Camp Pendleton provides a unique training and readiness operations environment for the 60,000+ military personnel who annually use the base's ranges and facilities to maintain and sharpen their combat skills. The City of San Clemente shares a border with the base, as do the Counties of Orange and San Diego, and the City of Oceanside. There are several aircraft training areas located within five miles of the City of San Clemente's border, these include the Helicopter Outlying Landing Field (HOLF), Helicopter Landing Zone (HLZ) and at least three Confined Area Landing (CAL) sites. These are shown in Attachment B, Figure 6.1.2-1 (MCB Camp Pendleton Special Use Airspace and Range Facilities). MCAS Camp Pendleton, also shown on Figure 6.1.2-1, is located at the southern end of the base.

III. Specific Local Impacts K-12

The City of San Clemente has long enjoyed a strong relationship with MCB Camp Pendleton. Our City is proud of our support for the armed forces and recognizes that the base provides an irreplaceable asset for the defense and support of the United States of America, at home and abroad. We are confident that the Department of Defense, U.S. Navy and all personnel at MCB Camp Pendleton are acting in the best interest of our County.

The City requests that the U.S. Navy take into account and address the specific local impacts, identified below, when preparing the Final EIS. As noted above, the Draft EIS assesses potential environmental impacts of basing the MV-22 Osprey tilt-rotor aircraft in the Western US. Ten squadrons would replace the existing CH-46 helicopter squadrons in phases, from 2010 to 2020. The alternatives discussed in the EIS base the squadrons at MCAS Miramar, MCAS Pendleton and MCAS Yuma. However, there are no alternatives proposed for Training and Readiness Operations, unless the no-action alternative is selected. K-13

K-13 Training and Readiness Operations will have a heavy footprint at MCB Camp Pendleton, specifically at the HLZ and HOLF which are located near the boundaries of City of San Clemente adding approximately 7,358 annual operations to the landing areas near San Clemente's southern border. There are three areas which must be addressed during the preparation of the Final EIS: 1) Potential Noise Impact on the City of San Clemente; 2) Approaches and Operations of the Aircraft; and, 3) Potential Wildfire Risk to the City from the Aircraft.

K-14 A. **Potential Noise Impact of Aircraft**

The methodology used to calculate the impacts of Operations and Training (Chapter 6, Section 6.1) at MCB Camp Pendleton does not accurately reflect the impact on the residents, businesses and visitors to the City of San Clemente. It appears that the methodology used to calculate potential impacts uses 2017 as the "average" year. It then sums the total impacts for all training and operations at the base, resulting in a negligible net impact for each area considered. This is possible because reduced CH-46 activity at the CAL sites, Drop Zones and Landing Areas obscures the large increase in MV-22 operations at the HOLF and HLZ, located 2.7 miles and 1.7 miles from our City's boundaries, respectively.

K-15 The maps on Figure 6.1.2-1, Attachment B (MCB Camp Pendleton Special Use Airspace and Range Facilities), Figure 6.1.8-2, Attachment C (Aircraft Noise Contours from Airspace and HOLF Operations at MCB Camp Pendleton for Proposed Training Operations) and Page C-105 in Appendix C-1 Noise, Attachment D, all appear to have inconsistent landing locations identified. The maps should be updated to ensure that all the landing areas are consistent. The Aircraft Noise Contours model should be checked to ensure all of the proposed landing locations were properly analyzed. The map in the Appendix C-1 Noise, C-105 shows there are Landing Zones that are not identified on Figure 6.1.2-1, and the Aircraft Noise Contours Figure 6.1.8-2 does not show all of the landing locations that are identified on either Figure 6.1.2-1 or Appendix C-1 Noise, C-105.The additional landing areas located adjacent to the City of San Clemente and may create a negative noise impact. The Noise Contours Map on Figure 6.1.8-2 should identify the proposed CNEL Contour (dB) of these landing areas to determine if there is an impact on the City of San Clemente and its residents for any and all proposed flight patterns and landing areas. After the additional landing locations have been analyzed by the noise model, mitigation should be included, if need to address these problems to ensure that these operations do not negatively effect the City of San Clemente.

K-16 Clarification of the training flight paths and whether flights will be conducted over the City of San Clemente should be stated in the EIS and should included additional modeling, if flight paths will be over the City. Specifically this may need to be conducted because of the inconsistency with the three maps stated above (Figure 6.1.2-1, 6.1.8-2 and Appendix C-1 Noise, C-105) in the identification of the landing areas and if these additional landing areas will have an impact on the City of San Clemente and its residents.

B. **Approaches and Operations of the Aircraft**

K-17 The EIS should identify if any flights patterns (day and/or night) will be conducted over the City of San Clemente and what those routes will be. If there are flights that will be conducted over San Clemente then the minimum altitude of the flights and the altitude at which is 65 CNELmr is met by the MV-22 must be identified, this would be the City's preferred altitude for these flights. If there are noise impacts related to flights near or over the City of San Clemente with these evening and night flights then

mitigation should be included to address these impacts to limit the level of noise to which the City will be exposed. K-17

The increased activity at the north end of the base related to the increased use of the HOLF, HLZ and the night flights may cause noise disturbances to the City of San Clemente. It is unclear in the EIS if flights over the City of San Clemente will be conducted. The City has concerns over the noise that will be created by flights over the City and what mitigation will be created to lessen the impacts to the City. The noise modeling should include the approaches to the landing areas. In San Clemente's letter from the City Council to Major General, Edward Hanlon, Jr. regarding the HOLF to the south of San Clemente in 1999 there was concern over the approach up San Mateo Creek to the HOLF. Analysis should be done to ensure that there are limited/no impacts to the City of San Clemente. This concern is raised again when it was stated at the meeting on March 25, 2009 that this would be one of the primary approach paths to the Landing Area. The noise modeling that was provided in the EIS (Figure 6.1.8-2) is only focused on the landing areas and does not analyze the approach paths to these landing sites which are in close proximity to the City of San Clemente. The concern is with the potential of the noise that may echo off of the canyon for the approaches up the San Mateo Creek to the HLZ and the HOLF along with the increase in operations at the HOLF and the HLZ which will create elevated noise levels that will be detrimental to the residents of San Clemente. Further analysis should be conducted in the EIS to ensure that there will be no noise impacts to the City of San Clemente and its residents and the statement on 6-7 of the EIS "..there are no off-range people or housing units exposed to CNELmr greater than or equal to 65dB" is a correct statement. If further analysis shows that there is an impact to the City of San Clemente because of these operations and approach routes then mitigation should be included in the EIR to ensure that the City of San Clemente will not be impacted. K-18

Table 6.1.2-3 shows the increase in annual operations, using the "average year" as a net increase of 283 at the HLZ and 7,118 at the HOLF (provided as Attachment E). The Final EIS should consider each of these sites and/or the north area of the base separately from the reduced impacts elsewhere on the base. K-19

C. **Potential Wildfire Risk to the City from the Aircraft**

The City understands the need to train and operate on base. However, when that training has the potential to threaten the property of our residents, we ask that appropriate and reasonable mitigation measures be designed and implemented to reduce that risk. The tilt-rotor design of the MV-22 results in the jet engines pointing downwards during takeoffs, landing and while running on the ground. These engines produce a large volume of extremely hot exhaust; it is our understanding, based on conversations with experts at the March 25, 2009 public meeting, that the exhaust deflectors vent a large portion of exhaust to the side, at approximately four feet above the ground, which is then dissipated as it mixes with the rotor wash. This action reduces heat applied to any one area, mitigating the potential fire risk. However, these aircraft have not been tested in, nor the combustion potential analyzed for, the extreme weather conditions and easily ignitable ground vegetation found in southwest California. Additionally, any wildfire started on the base during extreme weather events has the potential to travel quickly and leave the boundaries of the base. K-20

We ask that the Final EIS fully consider wildfire risk as a portion of Chapter 6, Impacts of MV-22 Training Operations, and address additional issues related to wildfire.

K-21 The current Section 6.1.16 Safety and Environmental Health, identifies two health and safety issues, Explosive Safety and Wildfire Management. The Wildfire Management portion is not adequate as it only minimally addresses the potential wildfire impact and does not address mitigation measures. It simply refers to the Biological Resources section.

The section should fully consider the potential for, impact of and mitigation of wildfire to areas on the base and surrounding communities. The unique topography and vegetation found on MCB Camp Pendleton make it susceptible to ignition. Although the majority of fires on the base do not threaten the areas outside the boundaries, fires which occur during Santa Ana events can, and do travel rapidly. In 2007 and 2008 alone, multiple fires which began on MCB Camp Pendleton have threatened the communities which surround the base.

Assuming the same precautions described in the Biological Resources section for wildfire are directly brought into the Safety and Environmental Health Section, the Wildfire Management and Biological Resources sections must address additional issues. Clarification of the measures and plans which will be put into place to reduce wildfire risk is required. These measures are summarized in Attachment F, Table 7.2-2.

K-22 First, although the measures described are detailed, they do not provide adequate assurance of mitigation of the wildfire risk. MV-22s will initially follow current guidelines which appear to adequately restrict operations during extreme fire hazard days. However, the measures "will be in effect until more experience has been gained with MV-22 traitting at MCB Camp Pendleton." They will then "be modified in coordination with" various departments. The Range & Training Regulations and Fire Incident Reporting follow the same pattern. The mitigation measures here are policies, procedures and operating protocols. The Draft EIS allows for these measures to be adjusted to be more or less stringent without regard to the actual fire potential of these aircraft.

The City is confident that MCB Camp Pendleton would modify their regulations in the direction of mitigating wildfire risk, if they determine a risk is present. This directional intent should be stated in the Final EIS, rather than assumed. At the very least, the language must be changed to indicate what standards will be adhered to if MV-22s are found to ignite fires at landing sites.

K-23 Second, all of the CAL sites located in close proximity to the City of San Clemente (described in Cultural Resources Table 6.1.15-1), are Grass Areas. Any ignition in these areas during a low-humidity, high-wind weather event could result in a wildfire which would threaten the City of San Clemente's borders within minutes. These areas would be susceptible to potential ignition of the grass landing area due to the large volume of extremely hot exhaust produced by the MV-22. Measures should be identified which state how the grass and other landing areas will be maintained and managed to mitigate the ignition risk of these areas.

K-24 Third, the statement of the use of exhaust deflectors during "landings and take-offs and while on the ground with engines running at undeveloped and vegetated sites" appears to be a lower standard than the condition applied in Section 6.1 pages 6-66 & 6-67, "The aircraft operates with exhaust deflectors on at all -times, except post-maintenance test flights to ensure all equipment is functioning, and such test flights would not occur at any MCB Camp Pendleton landing areas." It is our understanding, based on answers provided at the Public Meeting on March 25, 2009, that the higher standard is used, and that

post-maintenance test flights would only take-off and land on base on the concrete runway of MCAS Camp Pendleton. This higher standard should be reflected in the Final EIS. K-24

IV. Notification

Our final request at this time is that you keep us informed at every significant milepost in the consideration of this aircraft deployment. Correspondence to the City of San Clemente or notices of future action should be directed to the two addressed below: K-25

George Scarborough City Manager City of San Clemente 100 Avenida Presidio San Clemente, CA 92672 Telephone: (949) 361-8322 Facsimile: (949)361-8283 E-mail: ScarboroughG@san-clemente.org	Jim Holloway Community Development Director City of San Clemente 910 Calle Negocio San Clemente, CA 92673 Telephone: (949)361-6106 Facsimile: (949)361-8281 E-mail: HollowayJ@San-Clemente.org

Thank you for the opportunity you have provided us to respond to the Environmental Impact Statement. We look forward to working with you on this matter, which is critically important to the citizens of San Clemente. K-26

Sincerely,

for Jim Holloway

James S. Holloway
Community Development Director

ATTACHMENTS:

A. James Holloway's Comment Letter for NOI to Prepare and EIS for MV-22
B. MCB Camp Pendleton Special Use Airspace and Range Facilities
C. Aircraft Noise Contours from Airspace and HOLF Operations at MCB Camp Pendleton for Proposed Training Operations
D. C-105 in Appendix C-1 Noise
E. Breakdown of Proposed Change in Annual Operations for Each Landing Area at MCB Camp Pendleton
F. Biological Resources Measures for the Proposed Training Operations

CC: Mayor and City Council w/attachment
George Scarborough w/attachment
Larry Rannals w/attachment

City of San Clemente
Community Development/Public Works
James S. Holloway, Community Development Director
Phone: (949) 361-6105 Fax: (949) 361-8281

November 2, 2000

Mr. Doug Gilkey
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, CA 92132-5190

RE: Notice of Intent to Prepare an Environmental Impact Statement
West Coast Introduction of the MV-22 Tilt Rotor Aircraft
(Received by the City of San Clemente October 4, 2000)

Dear Mr. Gilkey:

We have received the referenced National Environmental Protection Act (NEPA) Notice of Intent regarding the introduction of the MV-22 "Osprey" tilt rotor aircraft and its possible deployment at Marine Corps Base Camp Pendleton. This letter will outline the concerns that should be addressed in the Environmental Impact Statement (EIS) and seriously considered as a part of this potential deployment.

We were disappointed to learn by the notice that the San Clemente Public Workshop for this important matter has been scheduled for November 7, 2000, the date of national and local elections. This date conflict will most assuredly lessen turnout by interested individuals, community leaders and both current and future members of San Clemente's City Council. We inquired about a change in the workshop date, but were told that such a change would be impossible.

Background / General Observations

The City of San Clemente understands from the notice that the purpose of this EIS is to determine the suitability of five or more Corps installations to receive the MV-22 aircraft. The purpose of this introduction will be as replacement for a portion of the Corps' existing helicopter fleet, specifically the CH-46 and the CH-53. The notice indicates that the EIS will be used as a tool in the current evaluation of all West Coast bases to develop reasonable siting alternatives.

In the context of this EIS, the City of San Clemente's obvious concerns relate to the placement of the MV-22s at Marine Corps Base Camp Pendleton (MCBCP). In undertaking its mission, MCBCP has asserted its freedom to conduct aircraft operations as it sees fit throughout the base, without regard for impacts on neighboring private and non-base public properties. Therefore, the City views the possible location of the MV-22s at MCBCP as a change in the operational character of the base that will have

great potential for negative impacts. These impacts need empirical analysis within the EIS for the City and its residents to be informed respondents.

Alternatives Analysis

With regard to the alternative considerations the EIS notice purports to address, we have great concern that the decision to locate MV-22s at MCBCP has already been made. Since CH-46 and CH-53 vehicles make up most of the existing fleet currently stationed at MCBCP, it could be reasonably assumed that the Corps already anticipates that the base will be a leading location to receive the MV-22s. Therefore, careful attention will need to be paid to the preparation of an honest and objective analysis of alternatives, as required by NEPA.

Specific Impact Analysis

Clearly, the City of San Clemente will reserve its right to comment on all parts of the EIS when it is issued for public review, and no scoping contained in this letter should be read as a limitation on our possible range of comments at that time. Nevertheless, we would ask that the EIS specifically address those issues which we have raised in our previous correspondence with MCBCP regarding the placement of Helicopter Outlying Landing Fields (HOLFs) [See attached letter]. These issues require that the EIS go beyond merely describing the characteristics of the MV-22 vehicle itself and the deployment of the vehicles among the candidate locations. We would expect the EIS to include:

- Operational Description. We seek specific description of the on-base flight patterns, off- and on-base approach routes, the number of anticipated operations and means of control of those routes and operations. This description should include projections of the growth of operations over time, for a period associated with the projected useful life span of the MV-22 as an air fleet component.

- Noise/Vibration. Using the information contained in the operational description and vehicle characteristics description, we expect to see the actual projected and verifiable noise contours for MCBCP. Since current operations on the base are unconstrained, it will not be sufficient for the EIS to conclude that because of changes in the fleet vehicle composition that noise will be reduced. Rather, contours based on actual current and projected operations, using state-of-the-art noise analysis modeling and reflecting actual local topography, will be required. Further, the recent added helicopter activity in the area, related to HOLF and HLZ and other activities, has had a cumulative impact on our community. Therefore, those emerging operations, plus the baseline impacts which we ask be documented, plus the growth/impact of future training activities for all air operations in the North Base should be evaluated, identified and factored into the EIS for the MV-22. Finally, changes in the projected impact contours over the life of the MV-22 program should be evaluated and compared to same-year projections for occupied lands near the base, to determine future impacts.

- Air Safety. In light of controversial safety issues surrounding the introduction of the MV-22, crash potential and the mapping of accident potential zones associated with the operational description should be included in the EIS. Changes in the projected accident potential zone contours over the life of the MV-22 program should be evaluated and compared to same-year projections for occupied lands to determine future impacts.

- Munitions Safety. We are unaware of the armaments, if any, carried by the MV-22, and how they may differ from existing craft. Air and ground safety impacts associated with the changes in munitions capabilities should be addressed by the EIS.

- Facilities and Support. The assignment or transient accommodation of any MV-22 vehicles at MCBCP will necessitate a disclosure of the location and operational characteristics of base support facilities such as landing fields, outlying facilities, practice ranges, maintenance facilities, etc. These should be disclosed and evaluated. Again, growth in these facilities over the life of the MV-22 program should be discussed.

- Resource Impacts. A recent action at the federal level has provided MCBCP with certain exemptions from the Endangered Species Act. We are concerned that changes in the operations at the base will result in degradation of the local physical environment. We are especially concerned about impacts to habitats and to water quality within the base that might extend into areas within San Clemente or to the coastal shore we share with MCBCP.

Notification

Our final request at this time is that you keep us informed at every significant milepost in the consideration of this vehicle deployment. Correspondence to the City of San Clemente or notices of future action should be directed to the two addresses below:

Mike Parness City Manager City of San Clemente 100 Avenida Presidio San Clemente, CA 92672 Telephone: (949) 361 8322 Facsimile: (949) 361-8283 E-mail: ParnessM@San-Clemente.org	Jim Holloway Community Development Director City of San Clemente 910 Calle Negocio San Clemente, CA 92673 Telephone: (949) 361 6106 Facsimile: (949) 361-8281 E-mail: HollowayJ@San-Clemente.org

Thank you for the opportunity you have provided us to respond to the notice of preparation. We look forward to working with you on this matter, which is critically important to the citizens of San Clemente.

Sincerely,

James S. Holloway
Community Development Director

ATTACHMENT

CC: Mayor and City Council w/attachment
Mike Parness, City Manager w/attachment

CITY OF SAN CLEMENTE

December 15, 1999

Edward Hanlon, Jr.
Major General
U.S. Marine Corps
Commanding General
Marine Corp Base Camp Pendleton
Camp Pendleton, CA 92055-5010

Re: MCB Camp Pendleton Helicopter Outlying Landing Field - Issues Re: Environmental Assessment

Dear General Hanlon:

The City Council of the City of San Clemente wishes, in the spirit of the long and amicable relationship between San Clemente and the Marine Corps, to bring your attention to its deepening concern regarding the implementation of the proposed Helicopter Outlying Landing Field Project ("HOLF"), to be located on a site at Range 313A in the northeast portion of the San Mateo Valley. That concern, some of which has already been expressed to you, now includes the confirmed omission of required technical information from the environmental assessment for the HOLF ("EA"); inconsistency of data still in the EA with data contained in the Marine Corps' recently published "Memorandum of Environmental Considerations" ("Memorandum") which purports to rectify clear errors of analysis in the EA; and the consequent potential for serious environmental impact on the citizens of San Clemente arising out of decisions that may be predicated upon the flawed EA. In the spirit of further cooperation, the Council also offers some solutions to resolve these issues to the benefit of what we believe to be both parties.

First, over the months since the Council discovered the final plans for the HOLF in a newspaper announcement of the EA, it has attempted to work with the Marine Corps to obtain answers to its questions concerning the data contained in the EA, and the conclusions contained in the Finding of No Significant Impact ("FONSI"), signed by you on July 16, 1999. Unfortunately, these efforts have only raised further questions.

For example, at the Council's request, the Marine Corps hosted a public meeting of August 31, 1999. At that meeting, several hundred citizens of San Clemente expressed their own concerns with the potential impacts of the HOLF on their homes. Specifically, their concerns fell into three general categories: (1) that the flight paths for the HOLF set forth in the EA appear to

100 Avenida Presidio San Clemente, California 92672 (714) 361-8200

take a substantial number of the proposed 430 helicopter operations projected for the HOLF directly up the San Mateo Valley, immediately south of San Clemente, a corridor which has apparently not been used in such a high volume previously; (2) that the EA contains no limit on the number of operations for the HOLF (although 430 per day are projected), no limit on those which would use the San Mateo Valley, and no designation of a level at which environmental review would be triggered by an increase or change in such operations; and (3) that the EA contains no mitigation measures, or other assurances, that the helicopters, once operating at the HOLF, would in fact limit their operations to the areas around the HOLF, and not stray the few miles over the valley to San Clemente.

In their response, representatives of the Marine Corps displayed at the meeting new approach and departure corridors, principally from the southeast, and different from those in the EA. In a letter of the next day, September 1, 1999, you confirmed the statements made at the meeting, and provided the revised approach and departure corridors as attachments. Naturally, the Council is somewhat confused as to which set of approach and departure paths will in fact be implemented, as Fig. 4.3-1 of the EA, the basis for the Marine Corps' commitment in the FONSI, provides specific approaches and departures from the northwest, while your letter and representations made at the August 31 meeting assure the Council that approaches and departures will be principally from the south and east.

In an attempt to ameliorate its confusion, the Council requested another meeting between counsel for the Marine Corps and San Clemente, which was held on September 28, 1999. At that meeting, our counsel set forth not only our concerns with the location of proposed approaches and departures, but also our broader concerns with the noise analysis contained in the EA. Specifically, our counsel expressed the concern that the use of the NOISEMAP noise model for the determination of helicopter noise impacts may have understated those impacts, where the U.S. Army's Construction Engineering Research Laboratories has determined that NOISEMAP does not adequately account for the noise resulting from the unconstrained movement of helicopters; that the EA may have understated helicopter operations at the HOLF by as much as 50%, where the EA inconsistently defined a "touch and go" as one operation for purposes of inclusion in the noise model, and as two operations for other purposes; and that the EA does not adequately account for the cumulative impacts of the HOLF project where it fails to analyze the impacts of ongoing operations at the Heavy Lift Zone ("HLZ"), located only a little more than a mile from the border of San Clemente.

In light of the above defects in the technical underpinning of the EA, our counsel took the position that a supplemental EA was appropriate. However, because of our relationship with the Marine Corps, we requested only less formal written assurances that: (1) there would be as little

use as possible of the San Mateo Valley as an approach to the HOLF; (2) helicopter pilots would be instructed to respect the boundaries of San Clemente, and to keep the helicopters as far back in the valley as possible, consistent with the HOLF mission; (3) there would be coordination of the use of the HLZ with that of the HOLF to minimize the cumulative noise impacts; (4) there would be new environmental documentation if the number or type of operations change from those memorialized in the EA; and (5) construction of the HOLF would be delayed pending resolution of these issues.

Also at the meeting of September 28, Marine Corps counsel acknowledged the above problems, and informed us that the Marine Corps was in the process of amending the noise analysis in the EA to correct those errors. We therefore requested, both in person at the meeting, and through formal Freedom of Information Act requests on October 21 and 28, 1999 that the revised noise data be provided to us immediately. However, it was not until almost a month later, and after several additional requests that the data, in a form that could be input into the model, was provided. This council has never received a response to our request for the written assurances set forth above.

In fact, it was not until yet another meeting requested by this Council, held on December 10, 1999, that we discovered that the Marine Corps had, during the same period, without any direct communication with, or comment from, this Council, published, on October 18 and 21, 1999, what it now calls its "Memorandum of Environmental Considerations". This Memorandum purports to contain corrected data and to demonstrate that the HOLF's impacts remain insignificant. Leaving aside the legal viability of the Memorandum as a vehicle for correcting a flawed EA (the Memorandum is not a procedure provided for under the National Environmental Policy Act ("NEPA"), the Council on Environmental Quality ("CEQ") Regulations or in the Navy's own Environmental Regulations implementing NEPA), and leaving aside the needless failure to directly notify the Council or provide requested data before publishing the Memorandum, the Memorandum itself fails to cure the problems which permeate the EA. Remaining matters affecting the integrity of the EA include: (1) the EA's omission to analyze all reasonably foreseeable project impacts, including the use of the hard surface runways at the HOLF for aircraft other than helicopters, such as the V-22 (Osprey); (2) potential for impermissible segmentation of the project arising out of the EA's omission to fully discuss the operational potential of the hard surface runway; as well as (3) the EA's continuing omission to fully analyze the cumulative impacts of past projects, such as the HLZ on the HOLF.

The proper cure for these, as well as the prior designated inadequacies of the EA's technical analysis, is, at a minimum, a supplemental EA with data added and corrected and properly circulated both by publication and direct delivery to those parties requesting to be

notified, allowing adequate opportunity for all interested parties to comment. However, once again in the spirit of its ongoing relationship with the Marine Corps, and because this Council subscribes to the Marine Corps' apparent position that more than the informal written assurances first requested by this Council are necessary to formally correct the pervasive errors in the EA, we propose instead the publication of a second comprehensive Memorandum, incorporating prior amendments to the EA, as well as an analysis of the potential impacts of the full range of aircraft which it is reasonably foreseeable will use the hard surface runway, and of the cumulative impacts of the HLZ. The Memorandum should also incorporate the mitigation measures previously requested including: (1) assurance that the San Mateo Valley will be used as little as possible as an approach to the HOLF; (2) assurance that pilots will be instructed to respect the boundaries of San Clemente, and to keep the helicopters as far back in the valley as possible, consistent with the HOLF mission, through publication of instructions in Course Rules and other relevant documents; (3) assurance that new environmental documentation will be commenced if the number of operations, or types of operations, are changes from those projected in the EA; and (4) assurance that construction on the HOLF will be halted during drafting, publication and comment on the Memorandum.

Please be assured that this Council makes this request with full cognizance of the Marine Corps' need for the expeditious addition of training and operational facilities, especially in light of the recent closure of military bases which might have relieved the pressure on Camp Pendleton. We ask only that the Marine Corps be equally cognizant of this Council's responsibility as a governmental entity to insure the safety of our citizens and integrity of the environment, as well as to maintain the quality of life, which brought our citizens to San Clemente in the first instance.

We are confident that the Marine Corps recognizes both the necessity of fully complying with applicable environmental laws, and the wisdom of maintaining the existing cooperative relationship between the Marine Corps and the City of San Clemente. Given the current status of the HOLF construction, we can no longer engage in dialogue or continue to address this issue in a piecemeal fashion. The Council, therefore, requests your written response to this proposal no later than 5:00 p.m., January 3, 2000.

Thank you in advance for your cooperation in this matter.

Sincerely,

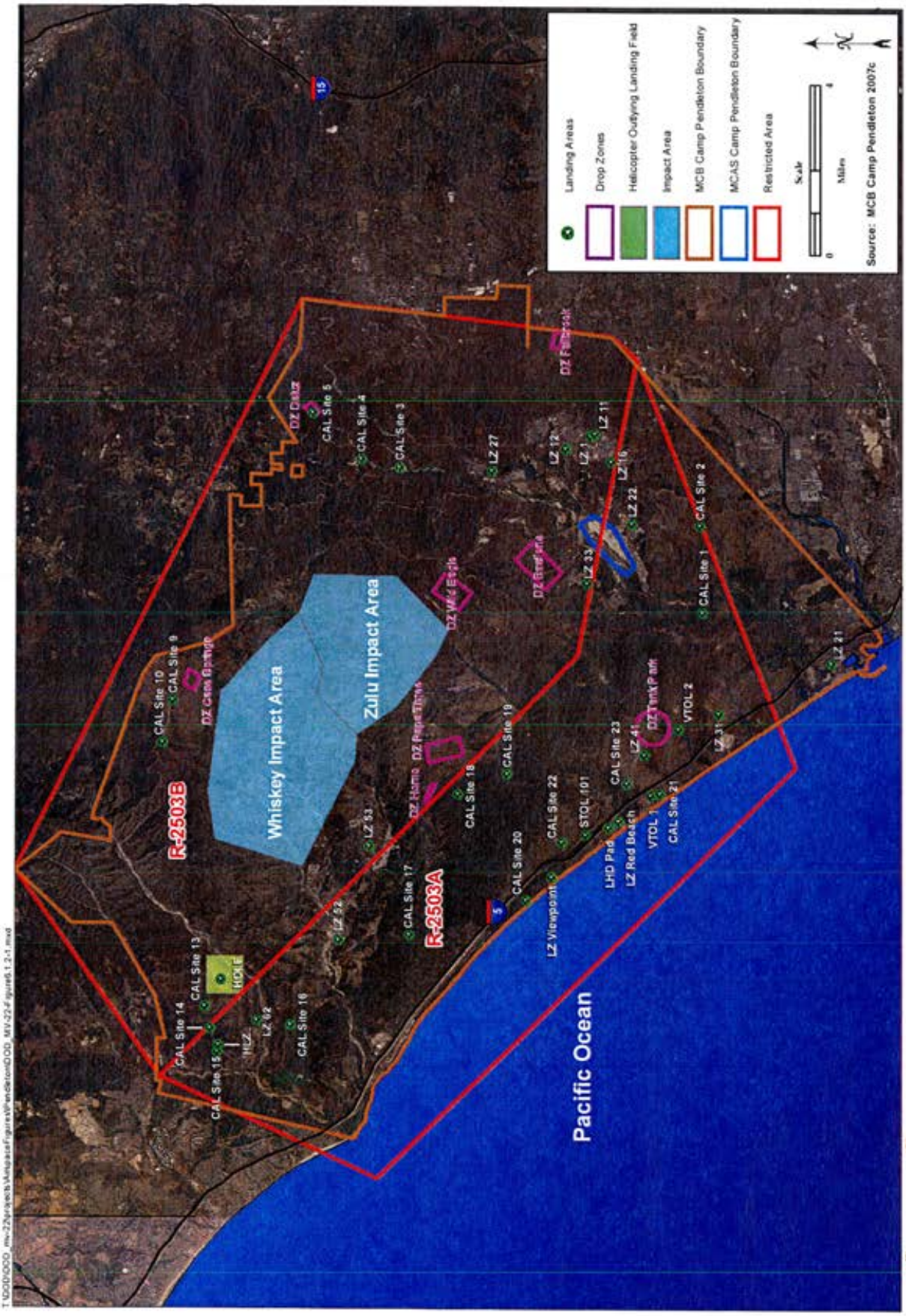
Mayor Susan Ritschel

Mayor Pro Tem Wayne Eggleston

Councilmember Lois Berg

Councilmember Jim Dahl

Councilmember Scott Diehl



FIGURE

6.1.2-1

MCB Camp Pendleton Special Use Airspace and Range Facilities

Aircraft Noise Contours from Airspace and HOLF Operations at MCB Camp Pendleton for Proposed Training Operations

FIGURE 6.1.8-2

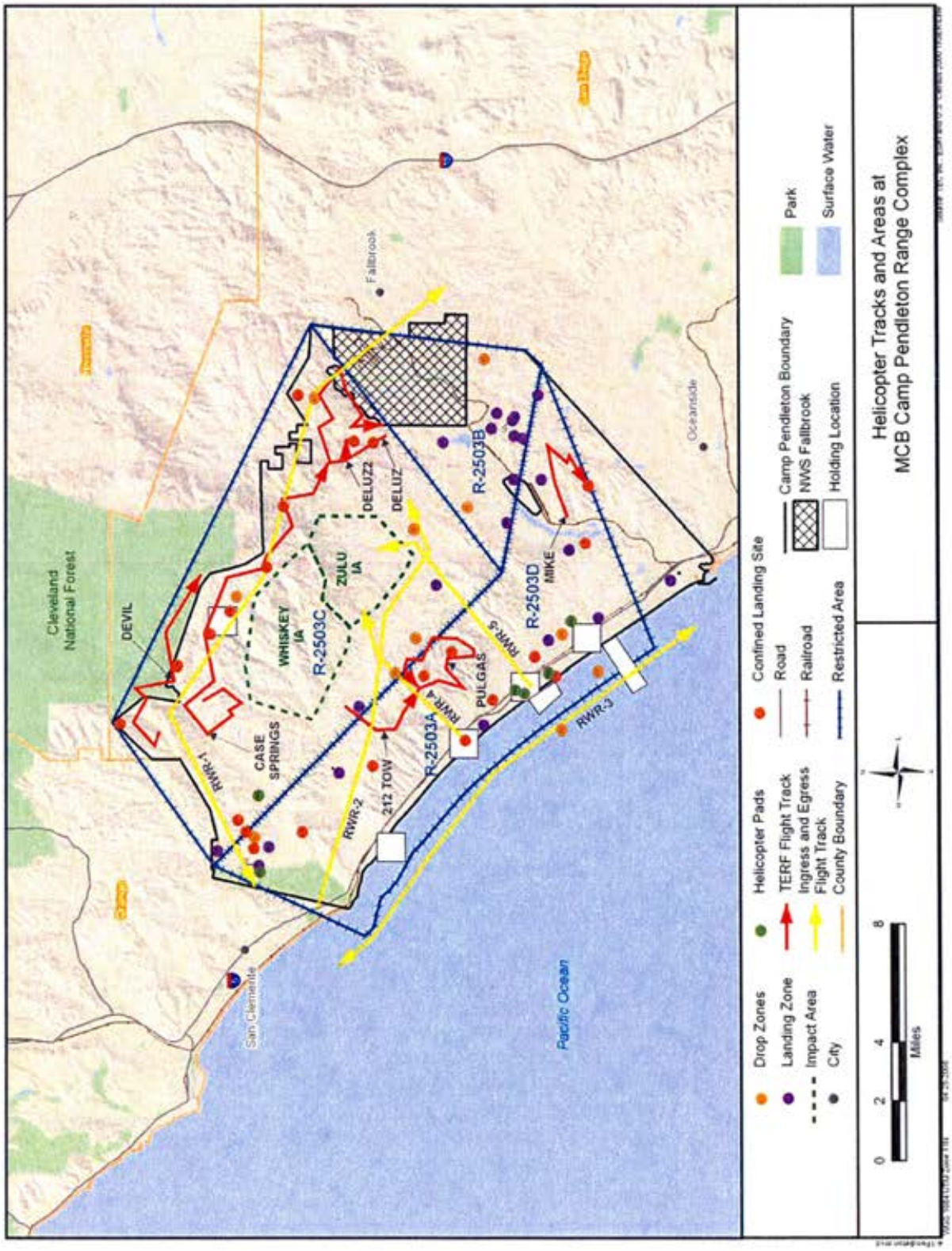

Cleveland National Forest
DEVIL
CASE SPRINGS
WHISKEY IA
R-2503C
ZULU IA
DELUZ2
DELUZ
Fallbrook
R-2503B
R-2503D
MIKE
Oceanside
RWR-1
RWR-2
212 TOW
R-2503A
RWR-4
PULGAS
RWR-5
RWR-3
San Clemente
Pacific Ocean
Drop Zones
Landing Zone
Impact Area
City
Helicopter Pads
TERF Flight Track
Ingress and Egress Flight Track
County Boundary
Confined Landing Site
Road
Railroad
Restricted Area
Camp Pendleton Boundary
NWS Fallbrook
Holding Location
Park
Surface Water
0
2
4
8
Miles
Helicopter Tracks and Areas at
MCB Camp Pendleton Range Complex

Table 6.1.2-3. Breakdown of Proposed Change in Annual Operations for Each Landing Area at MCB Camp Pendleton

Landing Area	Addition of MV-22 Operations	Reduction of CH-46 Operations[1]	Change in Operation over Existing Conditions
CAL Site 1	6	-4	+2
CAL Site 2	5	-10	-5
CAL Site 3	15	-92	-77
CAL Site 4	15	-290	-275
CAL Site 5	6	-106	-100
CAL Site 9	15	-75	-60
CAL Site 10	5	-10	-5
CAL Site 13	5	-7	-2
CAL Site 14	15	-10	+5
CAL Site 15	6	-7	-1
CAL Site 16	6	-11	-5
CAL Site 17	5	-28	-23
CAL Site 18	6	-96	-90
CAL Site 19	6	-80	-74
CAL Site 20	15	-192	-177
CAL Site 21	5	-196	-191
CAL Site 22	15	-192	-177
CAL Site 23	14	-25	-11
HLZ	738	-500	+238
HOLF	9,854	-2,736	+7,118
LHD PAD	740	-873	-133
LZ 1	12	-2	+10
LZ 11	4	-3	+1
LZ 12	4	-10	-6
LZ 16	4	-8	-4
LZ 21	4	-247	-243
LZ 22	4	-9	-5
LZ 27	4	-2	+2
LZ 31	4	-35	-31
LZ 33	4	-18	-14
LZ 41	4	-26	-22
LZ 52	4	-70	-66
LZ 53	11	-470	-459
LZ 62	15	-624	-609
LZ Red Beach	3	-	+3
LZ VIEWPOINT	3	-282	-279
PAD 1 (VTOL 1)	14	-556	-542
PAD 2 (VTOL 2)	14	-113	-99
STOL 101	14	-231	-217
DZ Basilone	4	-31	-27
DZ Case Springs	7	-406	-399
DZ Deluz	4	-492	-488
DZ Fallbrook	7	-15	-8
DZ Horno	6	-24	-18
DZ Papa 3	4	-923	-919
DZ Tank Park	4	-133	-129
DZ Wild Eagle	4	-1	+3

Notes:

CAL = Confined Area Landing; HOLF = Helicopter Outlying Landing Fields; HLZ = Helicopter Landing Zone; LHD = Landing Helicopter Dock; VTOL = Vertical Take-off and Landing; STOL = Short Take-off and Landing; LZ = Landing Zone; DZ = Drop Zone

See Appendix C for details.

Table 7.2-2. Biological Resources Measures for the Proposed Training Operations

MCB Camp Pendleton
Exhaust Deflectors. Exhaust deflectors on the MV-22 aircraft will be deployed during landings and take-offs and while on the ground with engines running at undeveloped and vegetated sites.
Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance. Operators will minimize the time on the ground with engines running on unprepared sites and follow all recommendations in the NATOPS manual, including rotating nacelles when the vehicle is on the ground greater than 10 minutes with engines running. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios. For training within DZs, operators will touch down only on improved or disturbed, unvegetated surfaces where the potential for fire is lowest and landings have been approved, such as paved LZs, fire breaks, and/or training roads. Specific text regarding restrictions on landing sites within DZs will be incorporated into the Wing SOPs.
Restrict Training During Extreme Fire Hazard Days. Due to the lack of MCB Camp Pendleton-specific data regarding MV-22 operations in seasonally dry vegetation, training at unimproved, vegetated sites on MCB Camp Pendleton will initially be subject to restrictions associated with implementation of the FDR system. Specifically, training and use of the MV 22 at undeveloped, vegetated landing sites will not occur under a Red (extreme hazard) Fire Danger Rating, and training at undeveloped, vegetated sites will be avoided to the maximum extent feasible under Orange Fire Danger Rating days. This precautionary measure will be in effect until more experience has been gained with MV-22 training at MCB Camp Pendleton. Following a fire event review associated with the initial deployment period of MV-22s (see following measure), this measure may be modified in coordination with MCB Camp Pendleton Assistant Chief of Staff, Environmental Security staff and the MCB Camp Pendleton Fire Department.
Range and Training Regulations and Wing SOPs Update and Reporting. The MCB Camp Pendleton Range and Training Regulations and Wing SOPs will be reviewed and updated, as necessary, to reflect the potential for accidental wildland fire associated with introduction of the MV-22 to the training environment. Specifically, the updates will reference the previous measures including the requirement to limit time on ground, restrict landings in DZs to previously disturbed unvegetated areas, and, adherence to the Fire Danger Rating system for MV-22 training. This review will make use of the latest information on the potential for fire associated with MV-22 operations in arid conditions such as exist on MCB Camp Pendleton. The update process will include a review of the existing fuel and fire break grid with regard to potential ignition of fire at unimproved landing sites (CAL sites, LZs, and DZs where the MV-22 may touchdown) and protection of sensitive resources, and will include participation by MCB Camp Pendleton Assistant Chief of Staff, Environmental Security and the MCB Camp Pendleton Fire Department. Updates to the Range and Training Regulations and Wing SOPs will be published prior to January 2010.
Fire Incident Reporting, Review and Adaptive Training Management. As part of an MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast operations. The reporting will include an assessment of the conditions under which the fire started such as relative humidity, fuel moistures, ambient temperature, and vegetation type, as well as a description of the project area and other factors which may further the understanding of fire potential. The USMC will distribute the memorandum to the MCB Camp Pendleton Fire Department and Assistant Chief of Staff, Environmental Security to be used as part of an adaptive fire management strategy, which allows for the periodic review and modification of fire management measures in place, including but not limited to training restrictions. Additionally, future revisions to the INRMP (next update proposed for 2013) will evaluate the best available data on fires associated with the MV-22, and incorporate appropriate guidelines and updates to the existing fire management program.

Table 7.2-2. Biological Resources Measures for the Proposed Training Operations (continued)

MCB Camp Pendleton (continued)
Riparian Corridor and Woody Native Plant Buffers. To reduce the potential for training related fires in sensitive habitats and breeding periods, operators will avoid training adjacent to riparian corridors, sage scrub communities, and vernal pools to the maximum extent feasible at all times, but specifically between 15 March and 31 August, including low-level overflights (<500 feet above ground level), hovering, and take-offs and landings. All MV-22 training activities will comply with terms and conditions of the existing Riparian BO, which applies to all training on MCB Camp Pendleton in proximity to riparian areas. Additionally, troops will be deployed away from riparian corridors, vernal pools, and other sensitive habitats and follow all restrictions identified on the Environmental Operations Map and as part of existing Range and Training Regulations. Finally, following deployment of troops in DZs, operators will touch down at locations greater than 200 meters (656 feet) from riparian corridors and sage scrub communities to minimize fire potential and noise producing activities within sensitive habitats.
Restoration of Areas Affected by MV-22 Training-related Fire if Applicable. Because fires occur frequently on MCB Camp Pendleton, existing programs are in place to map and document fire events. However, because the MV-22 has had limited training use on MCB Camp Pendleton, additional habitat monitoring and restoration may be appropriate as part of an adaptive management approach in the unlikely event that the aircraft causes a fire. If a fire is started by use of the MV-22, the level of impact would depend on the extent and frequency of events as well as the community and habitat types affected, and as a result, a plant community-specific restoration approach is appropriate. The USMC will identify and implement a restoration program process to be implemented if initial introduction of the MV-22 to MCB Camp Pendleton results in substantial additional fire events. The program will be included as part of the Section 7 consultation with USFWS and be based on the frequency and extent of fires resulting from MV-22 training. The program will identify a listed species impact trigger such as minimum fire size and frequency that would trigger restoration, by habitat type and sensitivity of resource, and include specific restoration requirements such as thresholds for passive restoration and habitat recovery monitoring, active restoration, invasive weed management, erosion control, habitat enhancement, and wildlife monitoring. The specific program components will be included in the BO.
Bob Stump Training Range Complex
Exhaust Deflectors. Exhaust Deflectors on the MV-22 aircraft will be deployed during landings and take-offs and while on the ground with engines running at undeveloped sites.
Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance. Operators will minimize the time on ground with engines running on unprepared sites. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios. Following deployment of troops, operators will touch down only on improved or barren surfaces where the potential for fire is lowest, such as previously disturbed areas. Finally, operators will avoid landing in vegetation greater than 12 inches in height to further reduce the potential for fire.
Fire Management Plan Update. The MCAS Yuma INRMP and Wildfire Management Plan will be updated, as necessary, to reflect the introduction of the MV-22 to the training environment. The update process will include coordination by MCAS Yuma environmental management with the USFWS and the MCAS Yuma Fire Department. Specific components of the update would include a defined procedure for monitoring of fuel loads, particularly fine grasses and Sahara mustard, which vary from year to year, timely updating of this information into a Fire Danger Rating System, and adjustment of training activities to minimize the potential for fire during conditions of high fuel loads and fire danger (which would be expected only in years having exceptional growth of annual vegetation). Appropriate recommendations may be made to modify the timing or procedures associated with training during years in which there is a high standing crop of dried fuels. Initial development of monitoring and Fire Danger Rating System updating procedures and initial coordination will occur prior to the introduction of the MV-22 to the Bob Stump Training Range Complex training environment. Thereafter monitoring and updating of the Fire Danger Rating System will occur annually with results published sufficiently in advance of fire season to allow effective implementation of mitigation to minimize the fire danger from take-offs and landings. Completion of any required updates/modifications to the Wildland Fire Management Plan would reduce impacts on biological resources to less than significant.

Table 7.2-2. Biological Resources Measures for the Proposed Training Operations (continued)

Bob Stump Training Range Complex (continued)
Fire Incident Reporting, Review and Adaptive Training Management. As part of an MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast operations. The reporting will include an assessment of the conditions under which the fire started such as relative humidity, fuel moistures, ambient temperature, and vegetation type, as well as a description of the project area and other factors which may further the understanding of fire potential. The USMC will distribute the memorandum to the MCAS Yuma Fire Department and Natural Resources staff to be used as part of an adaptive fire management strategy. Additionally, future revisions to the INRMP (next update proposed for 2012) will evaluate the best available data on fires associated with the MV-22, and incorporate appropriate guidelines and updates to the existing fire management program. As part of the adaptive management approach, and based on information from the initial deployment of the aircraft, MCAS Yuma natural resources staff would monitor landing sites for high weed invasion rates and other disturbances and may proposed landing site management if appropriate and consider modifications to operational protocols if necessary to avoid significant impacts. Staff will develop a process to report and communicate with the MV-22 Program Office proposed adaptive management strategies.
MCAGCC
Exhaust Deflectors. Exhaust deflectors on the MV-22 aircraft will be deployed during landings and take-offs and while on the ground with engines running at undeveloped sites where landing is permitted (i.e., PRTSSs and LZs). **Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance.** Operators will minimize the time on the ground with engines running on unprepared (=unpaved) PRTSSs and LZs and follow all recommendations in the NATOPS manual, including rotating nacelles when the vehicle is on the ground greater than ten minutes with engines running. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios.
Fire Incident Reporting, Review and Adaptive Management. As part of an MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast operations. The reporting will include an assessment of the conditions under which the fire started, such as the amount of annual vegetative fuel generally existing at the time. The USMC MV-22 Program Office will distribute the memorandum to the MCAGCC NREA staff and fire department to be used as part of an adaptive, fire management strategy, which allows for the periodic review and modification of fire management measures in place, including but not limited to training restrictions. Additionally, future revisions to the INRMP (next update proposed for 2012) will evaluate the best available data on fires associated with the MV-22, and incorporate appropriate guidelines and updates.

7.2.4 Topography, Geography, and Soils

Construction at MCAS Miramar

MCAS Miramar is not underlain by any active or potentially active faults. However, active faults located within 60 miles (97 km) of MCAS Miramar could result in strong seismically induced ground motion and associated ground shaking, and, therefore, proposed construction and operations could increase exposure of people and property to seismic hazards from a major or great earthquake. With implementation of the following measure, impacts associated with seismically induced ground motion and ground shaking would be reduced to less than significant:

- New facilities will be designed and constructed in accordance with a site-specific geotechnical investigation and will comply with the seismic design criteria identified in the Uniform Building Code, the NAVFAC P-355 Seismic Design Manual, and the most stringent criteria identified in the latest design specifications of the Structural Engineering Association of California.

Response to Comments

Response to Comment K-1. Thank you for your comments. Please see responses to K-2 through K-26 below.

Response to Comment K-2. This is an accurate history of the EIS process to date.

Response to Comment K-3. Please see responses to K-4 through K-8 below.

Response to Comment K-4. Typical airspace routes were depicted in Appendix C of the Draft EIS. Routes to/from/at the Helicopter Outlying Landing Field (HOLF) at MCB Camp Pendleton have been added to Appendix C of the Final EIS (pages C-105 and C-106). Airspace and HOLF operations were tabulated in Appendix C of the Draft EIS (page C-102).

Response to Comment K-5. Potential impacts, including noise, of training activity for the whole of MCB Camp Pendleton, including the HOLF, are provided in section 6.1 of the Draft EIS. Noise contours for airspace and HOLF operations are shown in Figure 6.1.8-1 and 6.1.8-2 for existing and projected activity, respectively. As stated in section 6.1.8, noise from MCB Camp Pendleton airspace operations, including the Helicopter Landing Zone (HLZ), were computed with the Department of Defense (DoD) noise model MOA_Range NOISEMAP. Noise from HOLF activity was computed with the DoD/NASA's Rotorcraft Noise Model (RNM), a state-of-the-art tool for computing noise exposure from helicopter and tilt-rotor operations. The Draft EIS utilized RNM's ability to account for the shielding effect of terrain on sound propagation and the effect of ground impedance (i.e., acoustically "soft" or "hard" ground cover). As shown in the aforementioned figures, noise exposure at 65 dB CNEL or greater would be within the boundary of the MCB Camp Pendleton and would not significantly impact the City of San Clemente.

Page 8-18 of the Draft EIS addresses the potential for cumulative noise impacts due to future actions, such as Grow the Force and F-35B Joint Strike Fighter basing at MCAS Miramar, in conjunction with the proposed basing of the MV-22.

Response to Comment K-6. Accident Potential Zones (APZs) associated with Air Installations Compatible Use Zone (AICUZ) studies related to aircraft operations at MCAS Camp Pendleton are depicted in Figure 4.16-1 of the Draft EIS. As indicated in the Draft EIS (page 4-93), APZs define the areas in the vicinity of an airfield that would have the highest potential to be affected if an aircraft mishap were to occur and are established to delineate recommended surrounding land uses for the protection of people and property on the ground. The proposed action would not affect or create a change to existing APZs.

Presently, there are no existing ingress or egress routes into (or out-of) the MCB Camp Pendleton HOLF or into/out-of any other aviation training areas on the base that require flight operations over the City of San Clemente. As indicated in the Draft EIS (page 4-95 lines 34 through 37), the MV-22 would follow established local approach and departure patterns, and no new flight tracks would be established.

Response to Comment K-7. The analysis of training impacts at MCB Camp Pendleton (Chapter 6.1) took into consideration proposed MV-22 operations at 18 Confined Area Landing sites (CAL sites), 14

Landing Zones (LZs), eight Drop Zones (DZs), the Helicopter Landing Zone (HLZ), the Helicopter Outlying Landing Field (HOLF), the Landing Helicopter Dock (LHD) pad, two Vertical Take-off and Lift (VTOL) pads, and one Short Take-Off and Landing (STOL) site. Maintenance facilities would be located at the air station where the aircraft is based, and were taken into consideration when developing site layouts for each basing alternative.

Response to Comment K-8. The U.S. Marine Corps is committed to protecting biological resources and is an active participant in their protection to minimize the effects of its training activities. In compliance with the Endangered Species Act (ESA), the U.S. Marine Corps has prepared a Biological Assessment for the proposed action and has engaged in consultations with the U.S. Fish and Wildlife Service per Section 7 of the ESA.

Response to Comment K-9. Please note there is also a Full Basing alternative at MCAS Miramar and a split basing alternative with eight squadrons at MCAS Yuma and two squadrons at MCAS Miramar.

Response to Comment K-10. The summary provided is generally accurate; however, the numbers stated for existing CH-46 and proposed MV-22 annual operations are incorrect. As stated in Table 2.1-3 on page 2-10 of the Draft EIS, there are an estimated 46,168 annual MV-22 operations proposed at the training ranges and military training routes, which would replace approximately 27,268 existing CH-46 annual operations in these areas.

Response to Comment K-11. This is an accurate overview of information presented in the Draft EIS.

Response to Comment K-12. The U.S. Marine Corps appreciates the support of the City and is committed to working closely with their neighbors, including the City of San Clemente.

Response to Comment K-13. Please see responses to K-14 through K-24 below.

Response to Comment K-14. Operations at the HOLF were analyzed similarly to airfield operations at MCAS Camp Pendleton – on an annual average daily operations basis for a year that accounts for training from all ten MV-22 squadrons (i.e., maximum amount of proposed MV-22 training). The MCB Camp Pendleton airspace activity was also analyzed on an average daily operations basis. As required under NEPA, the Draft EIS first examined existing operations and compared the noise of each alternative, including the Preferred Alternative, to the existing environment. The alternatives would mean the elimination of CH-46 operations and the introduction of MV-22 operations; thus, it is appropriate that the resultant "net" noise exposure for each alternative is compared to the existing environment. The noise contours shown on Figure 6.1.8-2 reflect this analysis for each modeled location, including the HOLF and HLZ. As such, the Draft EIS provides a thorough and adequate analysis of the proposed action's noise impacts for NEPA purposes.

Response to Comment K-15. Figures 6.1.8-1, 6.1.8-2, and the figure on page C-105 of Appendix C were checked and updated, as needed, to ensure landing area consistency for the Final EIS. The analysis for all of the proposed landing locations were checked and verified as accurate in the Draft EIS. As shown in Figure 6.1.8-2, no significant impacts would result for any parts of the City of San Clemente due to the

proposed MV-22 training operations at MCB Camp Pendleton. Thus, mitigation is not required. Please see response to Comment K-5.

Response to Comment K-16. Flight paths for airspace activity are shown in Appendix C of the Draft EIS (see also pages C-90 and C-91 of Appendix C of the Final EIS). Flight paths for the HOLF are shown in Appendix C of the Final EIS (pages C-105 and C-106). Typical MV-22 training flights would not occur over any parts of the City of San Clemente. As such, the EIS provides a thorough and appropriate analysis of the proposed action's noise impacts for NEPA purposes, and no revisions to the analysis are necessary. Please also see response to Comment K-15.

Response to Comment K-17. Please see response to Comment K-16.

Response to Comment K-18. Please see response to Comment K-16. Noise modeling of the HOLF included ingress and egress routes, which are shown on pages C-105 and C-106 in Appendix C of the Final EIS. The initial point for ingress from the south is south of San Onofre Nuclear Generating Station. The flight path continues northeasterly up San Onofre Canyon, then northwesterly through a canyon connecting the San Onofre and San Mateo canyons, to the HOLF. The initial point from the north is Point Yankee, which is near the northernmost point of San Mateo canyon. The flight path continues southwesterly through San Mateo canyon to the HOLF.

Approach paths to other landing areas proposed for use by the MV-22 were not modeled because of the relatively random nature to which most of the landing areas are approached. Instead of spreading the operations over a wide area, which tends to lessen the overall noise exposure, landing area operations were conservatively modeled in relatively small concentrated areas to account for many relatively random flight paths 'converging' and acoustically adding to each other near each landing area. As such, the EIS provides a thorough and appropriate analysis of the proposed action's noise impacts for NEPA purposes, and no revisions to the analysis are necessary.

Response to Comment K-19. The Draft EIS treats each MCB Camp Pendleton neighbor equally in terms of quality and quantity of analysis, adhering to industry standards for noise modeling.

Response to Comment K-20. Section 6.1.16 of the EIS discusses the impacts of the proposed action on safety and environmental health due to wildfire potential at MCB Camp Pendleton and the wildfire management strategies that the proposed action would adhere to. It also incorporates by reference implementation of the biological resources avoidance and minimization measures and the mitigation measures discussed in section 6.1.14 (pages 6-78 through 6-81) of the Draft EIS including the Fire Incident Reporting, Review, and Adaptive Management principles that would be implemented to minimize risk of fire due to engine exhaust. As such, the EIS provides a thorough and appropriate analysis of the proposed action's impacts due to wildfire risk for NEPA purposes, and no revisions to the analysis are necessary.

Response to Comment K-21. Please see response to comment K-20.

Response to Comment K-22. The avoidance and minimization measures provided in section 6.1.14, specifically, the Range and Training Regulations and Wing Standard Operating Procedures (SOP) Update and the Fire Incident Reporting, Review, and Adaptive Training Management, provide a comprehensive overview of the actions that would be taken and standards that would be adhered to by the proposed action to reduce fire related impacts. As such, the EIS provides a thorough and appropriate analysis of the proposed action's impacts due to wildfire risk for NEPA purposes, and no revisions to the analysis are necessary.

Response to Comment K-23. The U.S. Marine Corps shares the concern about the potential for wildfire ignition and has developed a comprehensive approach to managing the risk from wildfires including a variety of precautionary operational restrictions under conditions of high fire danger identified in the comment. See response to comment K-20. Additionally, proposed restrictions include the use of the MV-22 under red and orange Fire Danger Rating days, despite the lack of evidence that MV-22 causes fires under operational conditions. Maintenance and management of vegetation at CAL sites is not proposed because mowed vegetation would detract substantially from training realism, compromising the effectiveness of the training.

Response to Comment K-24. The exhaust deflectors are on at all times and are immediately activated when weight is applied to the main landing gear wheels (i.e., during landing). Additionally, the MV-22 NATOPS has been modified such that pilots are not allowed to land in an unprepared landing zone if the deflectors are inoperative. The text of section 6.1 has been revised in the Final EIS to reflect this clarification.

Response to Comment K-25. The U.S. Marine Corps will continue its coordination with the City of San Clemente regarding this proposed action.

Response to Comment K-26. Thank you for your comments.

THE NAVAJO NATION

JOE SHRILEY, JR.
PRESIDENT

BEN SHELLY
VICE-PRESIDENT

March 19, 2009

Naval Facilities Engineering Command Southwest
MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

Dear Project Manager:

Our apology for an oversight and missing the deadline date of our response to your request, and that the Navajo Nation Historic Preservation Department – Traditional Culture Program (NNHPD-TCP) is in receipt of the proposed project the Department of the Navy prepared, a Draft Environmental Impact Statement (EIS) for the purposed basing of the MV-22 Osprey Tilt-rotor aircraft in the Western United States. L-1

After reviewing your consultation documents, HPD-TCP has concluded the proposed undertaking/project area **will not impact** any Navajo traditional cultural properties. The HPD-TCP, on behalf of the Navajo Nation has no concerns at this time. L-2

However, the determination made by the HPD-TCP does not necessarily mean that the Navajo Nation has no interest or concerns with the proposed project. We thank the United States Marine Corps for their valiant efforts in serving our Nation. L-3

The HPD-TCP appreciates the United States Marine Corps' consultation efforts, pursuant to 36 CFR Pt. 800.1 (c)(2)(iii). Should you have any additional concerns and/or questions, do not hesitate to contact me electronically at tonyjoe@navajo.org or telephone at 928-871-7750. Mr. Kelly Francis will be taking over all Section 106 Consultations soon within the near future.

Sincerely,

Tony H. Joe, Jr., Supervisory Anthropologist *(Section 106 Consultations)*
Historic Preservation Department – Traditional Culture Program

TCP 2009-440
CC: Office File/Chrono

HISTORIC PRESERVATION DEPARTMENT P O BOX 4950 WINDOW ROCK, ARIZONA 86515 928 871.7198(V) 928 871 7886(FAX)

Response to Comments

Response to Comment L-1. Thank you for your comments.

Response to Comment L-2. The U.S. Marine Corps understands that the HPD-TCP has concluded the proposed undertaking will not impact any Navajo traditional cultural properties, and that the HDP-TCP, on behalf of the Navajo Nation, has no concerns at this time.

Response to Comment L-3. The U.S. Marine Corps will continue consultation efforts with the Navajo Nation on this and other proposed undertakings.

-----Original Message-----
From: Peter Steere [mailto:peter.steere@tonation-nsn.gov]
Sent: Friday, April 03, 2009 15:59
To: Likins CIV Zachery H
Subject: MV 22 Project Draft EIS Comments

MEMORANDUM

DATE: April 3, 2009

TO: Zachery H. Likinns
Marine Corps Installations West
Environmental Plans, Natural and Cultural Resources
Box 555200, Bldg. 22165
Marines Corps Base, Camp Pendleton, California 92055-5200

FROM: Peter L. Steere, Manger, Cultural Affairs Office
Tohono O'odham Nation
P.O. Box 837
Sells, Arizona 85634RE: MV 22 Project Draft EIS

RE: MV 22 Project Draft EIS

M-1 Thank you for consulting with the Tohono O'odham Nation on the proposed MV 22 Draft EIS.

As you know the Traditional-Use Lands of the Tohono O'odham Nation extend west to the Yuma area and include portions of the western side of the Barry M. Goldwater Range.

In reviewing the draft EIS we have the following comments, questions and suggestions:

M-2 1. It is our understanding the MV 22 squadrons will be stationed some of the time at the Marine Corps Air Station at Yuma for exercises and training.

M-3 2. The Cultural Resource Review starting on page 3-150 focuses on the California part of the project

and does not include any review of cultural resources on the west side of the Goldwater Range where

MV 22 squadrons will conduct training exercises.

M-4 3. The Cultural Resources section (Affected Environment) that starts on page 4-83 does not include and discussion on cultural resources that are located on the west side of the Goldwater Range where MV 22 squadrons will conduct training exercises.

M-5 4. We have concerns over safety issues relating to this type of aircraft.

M-6 5. Need more details on types of training exercises that will be held on the west side of the Goldwater Range

M-7 6. We have concerns about MV22 training exercises and possible impacts they may have on cultural sites located on the west side of the Goldwater Range that are significant to the Tohono O'odham Nation and other tribes.

M-8 7. Have cultural surveys been completed on those portions of the west

side of the Goldwater Range that will be used by MV 22 squadrons for exercises - if so please send copies of cultural reports. M-8

8. MV 22 aircraft are nicknamed "fire starters." How will this issue be addressed in terms of fire safety on M-9

Goldwater Range.

9. We assume that the MV 22 squadrons will not be flying over the Tohono O'odham Nation lands. M-10

10. We assume the MV 22 squadrons will not be flying over the Cabeza Prieta National Wildlife Refuge or the Organ Pipe Cactus National Monument. M-11

Response to Comments

Response to Comment M-1. Thank you for your comments. Please see responses to L-2 through L-11 below.

Response to Comment M-2. Some of the proposed basing alternatives include MCAS Yuma. However, the Preferred Alternative is a split basing between MCAS Miramar and MCAS Camp Pendleton. Training operations within the Barry M. Goldwater Range West (BMGR-West) would occur regardless of where the aircraft are based.

Response to Comment M-3. Environmental impacts of the proposed action (construction and operations) are assessed for each air station in Chapters 3 (MCAS Miramar), 4 (MCAS Camp Pendleton), and 5 (MCAS Yuma). Environmental impacts associated with the training operations (including potential impacts on cultural resources) are assessed in section 6.1 (MCB Camp Pendleton), section 6.2 (Bob Stump Training Range Complex [Chocolate Mountain Aerial Bombing and Gunnery Range, BMGR-West, R-2510 and R-2512]), section 6.3 (MCAGCC), and section 6.4 (Military Training Routes). The analysis of cultural resources for the Bob Stump Training Range Complex can be found on pages 6-156 through 6-163 of the Draft EIS.

Response to Comment M-4. Please see response to comment M-3.

Response to Comment M-5. The U.S. Marine Corps look forward to continued government-to-government consultations with the Tohono O'odham Nation to address any issues regarding safety of the MV-22 aircraft, proposed operations, and/or cultural resources.

Response to Comment M-6. Please see response to comment M-5.

Response to Comment M-7. A comprehensive package for consultation with the State Historic Preservation Office (SHPO) has been prepared, which reviews previous survey coverage and presence of archaeological sites within the Area of Potential Effects (APE) of BMGR-West. It also includes proposed mitigation measures to address lack of complete survey coverage and potential impacts on recorded archaeological sites. This package will be provided to the Tohono O'odham Nation for review and comment.

Response to Comment M-8. Please see response to comment M-7.

Response to Comment M-9. As described in section 6.2.14 (Biological Resources) and section 6.2.16 (Safety and Environmental Health) of the Draft EIS, operation of the MV-22 aircraft has not been identified as a common cause for fires. The current configuration includes a heat exhaust shield and modified lighting covers to further reduce the potential. Additionally, the likelihood for a fire appears to be very low at the Bob Stump Training Range Complex, because of the low flammability of most common plant species and sparseness of vegetation. Measures were also incorporated into the EIS to further reduce the potential for training-related fires (see pages 6-154 through 6-155 of the Draft EIS).

Response to Comment M-10. This is correct; no MV-22 training flights are currently proposed over Tohono O'odham National lands.

Response to Comment M-11. Proposed MV-22 training operations include flying over the Cabeza Prieta National Wildlife Refuge during special exercises like the Weapons Tactics Instructors (WTI) course (see Figure 6.2.8-2 on page 6-111 of the Draft EIS for the resultant noise exposure over the Refuge). This is similar to CH-46 operations currently conducted over the Refuge. No MV-22 training flights are currently proposed over Organ Pipe Cactus National Monument.

THE COCOPAH INDIAN TRIBE
Cultural Resource Department
County 15th & Avenue G
Somerton, Arizona 85350
Telephone (928) 627-4849
Cell (928) 503-2291
Fax (928) 627-3173

CCR-030-08-003

April 3, 2009

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

RE: Comments on the Draft EIS for the West Coast Basing of the MV-22

The Cocopah Indian Tribe appreciates your consultation efforts on this project. We are pleased that you contacted the Cocopah on this cultural resource issue for the purpose of solicitation of our input and to address our concerns on this matter. At this time we would like to make these comments: N-1

1. The project area lays within the traditional lands of the Cocopah, therefore this project is within an area of great concern to the tribe. N-2
2. This department does not feel that we can comment on the Draft EIS and fully assess the impacts of this project without the benefit of review of the cultural resources survey report. N-3
3. Mitigation for impacts can not be made until the entire landing zone areas have been surveyed, National Register eligibility has been assigned, and consultation has been completed. N-4
4. Tribes are sovereign nations and, as such, should not be expected to provide comments during the public review period. This department will provide further comments on this project during the Section 106 Consultation period. N-5

N-6 If you have any questions or need additional information please feel free to contact the cultural resource department. We will be happy to assist you with any future concerns or questions.

Sincerely,

H. Jill McCormick

Cultural Resource Manager

Response to Comments

Response to Comment N-1. Thank you for your comments. Please see responses to N-2 through N-6 below.

Response to Comment N-2. The U.S. Marine Corps acknowledges that the project area is situated within a geographic area of concern for the Cocopah.

Response to Comment N-3. A comprehensive package for consultation with the State Historic Preservation Office (SHPO) has been prepared, which reviews previous survey coverage and presence of archaeological sites within the Area of Potential Effects (APE). It also includes proposed mitigation measures to address lack of complete survey coverage and potential impacts on recorded archaeological sites. This package will be provided to the Cocopah Indian Tribe for review and comment.

Response to Comment N-4. Please see response to comment N-3.

Response to Comment N-5. The U.S. Marine Corps look forward to continued government-to-government consultations with the Cocopah Indian Tribe to address any issues or concerns regarding this undertaking.

Response to Comment N-6. Thank you for your comments.

San Diego County Archaeological Society, Inc.

Environmental Review Committee

13 March 2009

To: Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 pacific Highway
San Diego, California 92132-5190

Subject: Draft Environmental Impact Statement
West Coast Basing of the MV-22 Aircraft

Dear Project Manager:

I have reviewed the cultural resources aspects of the subject DEIS on behalf of this committee of the San Diego County Archaeological Society. O-1

Based on the information contained in the DEIS, we have the following comments:

1. In various places, such as Table 7.2-3, of the DEIS, possible impacts to cultural resources resulting from the V-22's downwash is addressed. Site CA-SDI-14493, for example, is to be capped to prevent disturbance by the downwash. We appreciate and concur with the Navy's concern with that potential impact. O-2

2. Not addressed, however, is the potential for impact on buried or capped cultural material from the significant heat plume from the V-22's engines. Has the Government investigated this potential impact, to determine the susceptibility of the likely subsurface material to heat, and how much the soil temperature will rise in the cases of aircraft held in the landing site for the longest anticipated period and/or under repeated use of the same landing site? Isn't this information necessary to determine how thick the cap must be? O-3

3. One other concern that is not addressed is that if any cultural sites containing rock art are near landing sites, indirect impacts from blowing dust and exhaust heat and chemical content could potentially result. The project mitigation measures should address this possibility, including the additional effects of ambient wind, when landing sites are selected. O-4

4. Section 7.6.5 of the DEIS identifies the mitigation measures to be taken to avoid impacts to CA-SDI-10156/12599/H at MCAS Camp Pendleton. We suggest consideration be given to temporary fencing to help prevent intrusion of construction equipment into the site area at any times the archaeological and Native American monitors are not present. O-5

P.O. Box 81106 • San Diego, CA 92138-1106 • (858) 538-0935

O-6 Thank you for including SDCAS in the distribution of the DEIS for this project, and for your consideration of the above comments.

Sincerely,

James W. Royle, Jr., Chairperson
Environmental Review Committee

cc: SDCAS President
File

P.O. Box 81106 • San Diego, CA 92138-1106 • (858) 538-0935

Response to Comments

Response to Comment O-1. Thank you for your comments. Please see responses to comments O-2 through O-6 below.

Response to Comment O-2. Thank you for your comment. The U.S. Marine Corps is committed to protecting the cultural and natural resources within its jurisdiction.

Response to Comment O-3. The archaeological site in question is approximately 35 feet away from the landing site. With the use of heat deflectors on the MV-22 (standard practice), it is not expected that heat will be a significant issue for this site. The main concern is regarding downwash (see response to Comment O-4). Based on further discussions with MCB Camp Pendleton, the Final EIS was revised to include site eligibility testing for CA-SDI-14493 to determine the horizontal and vertical extent of the site as well as its eligibility for inclusion on the National Register of Historic Places. Further mitigation, such as capping, may be refined based on results of the site testing.

Response to Comment O-4. Since the publication of the Draft EIS, the U.S. Marine Corps has expanded the Area of Potential Effects (APE) to include a 350-buffer area around the point of landing to account for any potential impact on archaeological sites located near the landing areas. The cultural resource sections in the Final EIS have been revised based on this analysis. In some cases, additional mitigation measures have been added to avoid or minimize potential impacts.

Response to Comment O-5. *Topomai* is in a restricted zone on the air station; under Federal Aviation Association requirements, nothing can be in those areas as they need to be completely cleared of any obstructions. Additionally, the site has been well studied, with reliable understanding of the vertical and horizontal extent of its archaeological deposits. Based on an analysis of the APE, proposed construction is not expected to impact the site. MCAS Camp Pendleton has also gone to great lengths to keep the location of *Topomai* restricted. Therefore, in this case, fencing is considered more of a potential detriment (by revealing the site location), which overrides the minor benefit it may offer.

Response to Comment O-6. Thank you for your comments.

-----Original Message-----
From: ffdw@san.rr.com [mailto:ffdw@san.rr.com]
Sent: Tuesday, March 24, 2009 5:57 PM
To: comments@marinescience.saic.com
Subject: Commenting on Draft EIS on MV-22

Having these public meetings in March does not allow enough time for people and groups to comment on the Draft EIS by April 3. I suggest moving the comment period out a month to allow more time for comment by community groups and others. **P-1**

Thank you.

Faye Detsky-Weil
Torrey Pines Community Planning Group
13464 Calais Drive
Del Mar, CA 92014-3524
ffdw@san.rr.com
858-481-4036

Response to Comments

Response to Comment P-1. Thank you for your comment. The Department of the Navy provided the standard review period (45 days), as required under NEPA, and took additional steps not required by NEPA to make the document publicly accessible and to solicit public input.

MTAC

Miramar Technical Advisory Committee

April 3, 2009

Naval Facilities Engineering
Command Southwest
ATTN: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

SUBJECT: Comments re the Draft EIS for the West Coast Basing of the MV-22

After reading the Draft EIS re the MV-22, it is our conclusion that the Preferred Alternative of basing eight squadrons (96 aircraft) at MCAS Miramar and two squadrons (24 aircraft) at Camp Pendleton is the most feasible solution for basing the MV-22 on the West Coast. Miramar's proximity to land-based training areas, as well as to ships, represents a major advantage for basing eight squadrons of MV-22s at MCAS Miramar. **Q-1**

Comments listed below refer to that Maximum Partial Basing Alternative. Comparisons will be made to the Full Basing, ten-squadron alternative; however, no reference will be made to the two-squadron alternative which should not be considered as it would severely diminish Miramar's long-term mission. With the MV-22 replacing the current fleet of less-capable 1960s-era CH-46 medium lift helicopters, there will be 48 additional aircraft based at MCAS Miramar by 2020. The MV-22 is compatible with current aircraft based at Miramar as well as with the future basing of the F-35B Joint Strike Fighter, scheduled to replace the F/A-18 in the 3rd and 4th MAW. **Q-2**

<u>MV-22 Capabilities:</u> The MV-22 tilt-rotor aircraft is a new type of aircraft for the Marine Corps that will meet mission requirements well into the 21st century, as compared to the CH-46 helicopter it replaces. The aircraft utilizes tilt-rotor technology to provide the maneuverability and lift of a helicopter, and in fixed-wing mode, flies four times farther than the CH-46, goes twice as fast and carries twice as much payload. **Q-3**

The aircraft has significant capabilities that have been proven in over 18 months of combat. The MV-22 requires less maintenance and has significant technical improvements over the CH-46. The high performance level of the MV-22 in a combat situation enables it to get in and out of an area rapidly, limiting the time it can come under fire. It has a long-distance factor that enables the aircraft to fly overseas with mid-air refueling, thus eliminating the need for it to be delivered by ship or air transport. That not only saves money and time, but it enables the aircraft

Q-3 to arrive at its destination fully ready to perform its mission. In medical emergencies, the MV-22 arrives at the scene well within the "golden hour," recognized as the time frame that offers the best chance for patient survival.

Q-4 Construction: Three hangars, additional apron space, wash racks and fuel pits would have to be built and other facilities will have to be reworked to accommodate the aircraft. Under the eight-squadron alternative, construction will be limited to the north side of the runway at Miramar where hangars and support facilities are currently located. Proposed construction and renovation projects for the MV-22 are consistent with the established Accident Potential Zones (APZs) and would not result in any greater safety risk.

The eight squadron scenario is preferable to the full-basing plan of ten squadrons as it eliminates significant construction that would have to take place south of the runway into undeveloped areas. The full-basing plan would require hangars, concrete aprons, taxiways, a parking lot, and a 1500-foot bridge to utilize the Harris Plant Road off ramp – all in addition to the new construction that would also be needed north of the runway.

Transition from helicopters to the MV-22 is scheduled to occur between 2010 and 2020, with two CH-46 squadrons being replaced by MV-22s each year. Main construction activities are anticipated primarily between 2010 and 2014 with construction noise expected to be contained on the base. It is not anticipated that construction traffic would have any more significant impacts to surrounding roadways than previous and current construction projects at Miramar have had during the 12 years Miramar has been a Marine Corps base (since October 1, 1997).

Q-5 Noise: The MV-22 is much quieter than existing aircraft operating at Miramar on a single-event basis. When the Marines arrived at Miramar in 1997, residents were told that many of the noisier helicopters would ultimately be replaced by quieter aircraft; and the MV-22 is fulfilling that plan.

With its rotors in the horizontal position, the MV-22 cannot take off or land like an airplane and 75% of take offs are expected to be "rolling" with the remaining 25% "vertical." As it climbs, the MV-22 converts to fixed-wing mode enabling it to achieve altitude much quicker and fly twice as fast as the current CH-46. What that means to surrounding communities is that the noise level is less as the aircraft achieves altitude faster than the CH-46 and departs the airspace in a shorter period of time, generating much less noise.

Q-6 Flight Paths: Since the aircraft flies as a turbo-prop, it will follow the same flight routes as fixed-wing aircraft departing and arriving at Miramar. MCAS Miramar flight patterns and routes are the results of years of safe practices and modifications and are readily adaptable to MV-22 use. No new tracks or routes will be necessary for MV-22 operations at Miramar. Residents will see a reduction in the use of the current helicopter flight routes as more MV-22s replace the CH-46s at Miramar, which will translate to a reduction in noise.

MTRs: Draft EIS Pages ES-6 and 2-7 refer to Military Training Routes (MTRs), defined as an MV-22 operation. The MTR is further defined as: "A corridor of airspace used by the military, usually for the purpose of conducting low-altitude, high-speed training. MTRs are described by a centerline, with defined horizontal limits on either side of the centerline, and vertical limits expressed as minimum and maximum altitudes along the flight track." In this limited definition, there are questions of how these flight tracks will operate within the existing corridors; and what, if any, impacts there will be on the communities surrounding Miramar. **Q-7**

Training: MV-22 simulators are expected to arrive at Miramar before the end of 2009. With a significant of pilot training taking place in the simulator, aircraft wear and tear will be saved, as well as fuel expense. It is hoped that this will reduce the number of initial training flights necessary for new pilots, cutting down on the number of training operations conducted at and around the base. **Q-8**

Operations: Basing the MV-22 at Miramar will result in 48 additional aircraft being added over a ten-year period. When all MV-22s are assigned and operational at Miramar, it is estimated that there will be an increase of 22,246 airfield operations. Although there is a projection of 39,568 MV-22 annual operations a year at Miramar, they will be performed by quieter aircraft and will eliminate over 17,000 CH-46 noisier annual operations. Of the 17,000 CH-46 operations being eliminated, nearly 6,000 of those are local touch-and-go operations. The MV-22 will conduct numerous operations at military ranges with the majority at the Barry M. Goldwater Range in Yuma and at Camp Pendleton, with others at the Chocolate Mountain Range and at Twentynine Palms. **Q-9**

The MV-22 arrives at its destination twice as fast as the CH-46, raising the question as to whether pilots will require additional flight time to accumulate the maximum number of hours needed to qualify. If that is the case, it appears that there is the possibility that more operations could have to be added. to the current projected schedules to make up those hours, unless the additional needed flight hours would be made up at the ranges. **Q-10**

Accident Potential Zones (APZs). There will be a 20% increase in operations over existing conditions with the introduction of the MV-22 at Miramar, but this increase falls within the historic use of the airfield. Since the MV-22 will follow established approach and departure patterns and will require no new flight tracks, flight activity and subsequent operations will not result in any greater safety risk; therefore, no significant impacts related to APZs will occur. **Q-11**

Safety: According to the Draft EIS, because there is no significant impact on safety and environmental health, no mitigation measures are necessary. Initial safety concerns of the MV-22 that occurred during trials, prior to 2000, have been re-engineered with improvements to the aircraft's electrical and hydraulic systems. Further, the addition of redundant systems within the aircraft have added significantly to improved safety. The aircraft has since logged more than 26,000 hours without a major mishap and has successfully spent 18 months in combat operations. **Q-12**

Q-13 Bird Strikes: Since the January 15, 2009 bird strike involving a U.S. Airways jet departing from LaGuardia Airport in New York, there is increased awareness of bird strike activity involving aircraft safety It is noted in the Draft EIS that the Bird Air Strike Hazard (BASH) Program active at Miramar has been successful in controlling bird activity, as well as the City of San Diego's bird abatement program at the landfill adjacent to MCAS Miramar. It is further noted that there have been six reported bird strikes to the MV-22 resulting in only minor damage. One pilot reported that after he encountered a bird strike in the MV-22, automated systems immediately put the aircraft in a safe flying mode until he was able to make a safe emergency landing. He added that the airplane is very capable and very forgiving.

Q-14 Fire Risk: San Diego has a high fire risk and, as the Draft EIS noted, 17,600 acres of natural vegetation burned on Miramar during the Cedar Fire of 2003. With that awareness, it's noted that in the Appendix of the Draft EIS, a memo raises the question of grass fires due to the hot exhaust (up to 515 deg F) from the MV-22 with the nacelles in the vertical position. It adds that an exhaust deflector system is installed on the MV-22 which serves to deflect the exhaust gasses outward, away from the aircraft and from the ground. The memo states that under normal operations with over 44,000 MV-22 flight hours, operations in numerous "unprepared landing zones" have resulted in no documented fires. This is acceptable, as long as the deflectors are operational. Since it is further noted that the deflector system "can be de-selected by the pilot," it is recommended that it be emphasized to pilots during training, and reinforced in manuals, that the deflector system remain in place during flight operations at MCAS Miramar.

Q-15 Environmental Issues: It is noted on Table 3.7-6. that the projected air pollution emissions for carbon monoxide due to MV-22 operations at MCAS Miramar will be reduced from those of the CH-46 by over 50 tons a year, and for volatile organic compounds reduced by nearly 34 tons annually. Although ozone levels would increase with MV-22 operations, according to the Draft EIS, these emissions will conform to the State Implementation Plan (SIP).

Q-16 Budget Considerations: Page ES-7 of the Draft EIS says, "Regardless of the alternative chosen, the existing squadrons of CH-46E at MCAS Miramar and MCAS Camp Pendleton, as well as the CH-46E and CH53E squadrons at Edwards AFB, would be removed. Therefore, the proposed action may result in a net decrease of aircraft at a given installation." With potential DoD budget cuts, it raises a question as to whether all eight squadrons of MV-22s will ultimately be delivered to Miramar. It seems prudent to have a contingency plan should there be an unforeseen, significant decrease in MV-22 deliveries, rather than adhering to the above statement that could result in having no MV-22 or CH-46 aircraft stationed at MCAS Miramar at all.

Q-17 In order to retain a full complement of aircraft at Miramar, a retention plan for many of the retired East Coast CH-46s should be implemented. That would invilve relocating retiring CH-46s to the West Coast as a source of parts to keep the fleet of CH-46s viable. This would sustain Miramar's mission until future budget allocations could be made for the MV-22s to resume delivery. It does not seem prudent to retire CH-46 squadrons at Miramar prior to having a viable MV-22 squadron as a replacement.

We reaffirm the selection of the Preferred Alternative of eight squadrons of MV-22 aircraft to Miramar with two squadrons to Camp Pendleton as the most viable alternative for basing the MV-22s on the West Coast. **Q-18**

Sincerely,

Barbara Baker, Chair
Miramar Technical Advisory Committee (MTAC)
11243 Moranda Court, San Diego, CA 92128

Robert Chamberlain
Bob Dingeman
John Dryden
Jerry Harris
Chuck McGill
James Panknin
William Reschke

Members, Miramar Technical Advisory Committee

The MTAC is a non-political, stand-alone technical advisory committee that makes recommendations on technical issues relating to MCAS Miramar air space. MTAC members review, evaluate and work toward recommending resolution of issues relating to flight patterns, altitude, noise, safety and other issues of related concern to local residents in the MCAS Miramar area.

Response to Comments

Response to Comment Q-1. Thank you for your review of the Draft EIS.

Response to Comment Q-2. Please see responses to Q-2 through Q-18 below.

Response to Comment Q-3. This is an accurate overview of information presented in the Draft EIS and during the public meetings. One note is that, as stated in page 2-1 of the Draft EIS, the MV-22 is shipboard compatible (able to land and take-off from ships) with the world's first complete blade fold and storage system that allows aircraft to be easily accommodated aboard ship. It is able to operate off L-class amphibious ships, amphibious assault general purpose and multi-purpose class ships, and can also operate from, and be stowed on, aircraft carriers.

Response to Comment Q-4. This is an accurate overview of proposed construction. The Draft EIS does disclose that construction-related traffic at MCAS Miramar under both the Full Basing and Maximum Partial Basing Alternatives would be a significant portion of the total traffic volumes for the segment of Miramar Way between Kearny Villa Road and Interstate-15.

Response to Comment Q-5. As tabulated in Table 6.1.14-4 of the Draft EIS, the MV-22 is approximately 5 dB quieter than the CH-46E on a single-event basis.

Response to Comment Q-6. This is correct in that the MV-22 would utilize existing fixed and rotary wing routes.

Response to Comment Q-7. Military Training Routes (MTRs) are a form of Special Use Airspace, like a Military Operating Area (MOA) or Restricted Area, and are published by the Department of Defense. MTRs are not for ingress/egress of airfields. MTRs may begin/end in the general vicinity of an air station, but their purpose is not to help aviators navigate to/from a runway or pad. As described in section 6.4.8, the Draft EIS examined seven MTRs shown in Figure 6.4.2-1. As stated in section 6.4.8, the Preferred Alternative would not cause a significant increase in existing noise (CNELmr) levels from MTR activity.

Response to Comment Q-8. This is an accurate statement regarding training.

Response to Comment Q-9. This is an accurate statement regarding training. The only clarification is that of the over 17,000 current CH-46 operations at MCAS Miramar, close to 9,000 (vs 6,000) of these are local touch-and-go operations (see Table 3.2-2 of the Draft EIS).

Response to Comment Q-10. When compiling the list of proposed MV-22 operations, all requirements for flight training were taken into consideration. In fact, as the pool of experienced MV-22 pilots increases over time, it is expected that the number of annual training operations will decrease from what was modeled in the Draft EIS. This is discussed on pages 2-9 through 2-10 of the Draft EIS.

Response to Comment Q-11. This is an accurate statement of what is presented in the Draft EIS for the Preferred Alternative at MCAS Miramar.

Response to Comment Q-12. This is an accurate overview of information presented in the Draft EIS and during the public meetings.

Response to Comment Q-13. This is an accurate overview of information presented in the Draft EIS and during the public meetings.

Response to Comment Q-14. The exhaust deflectors are automatically activated when weight is applied to the main landing gear wheels (i.e., during landing). Additionally, the MV-22 NATOPS has been modified such that pilots are not allowed to land in an unprepared landing zone if the deflectors are inoperative. The text of section 6.1 has been revised in the Final EIS to reflect this clarification.

Response to Comment Q-15. The Final EIS also concludes that proposed emissions within San Diego County would conform to the most recent federally-approved ozone State Implementation Plan (SIP) for the San Diego Air Basin, which is the *Ozone Redesignation Request and Maintenance Plan for San Diego County* (*1-Hour Ozone Maintenance Plan)* (SDCAPCD 2002).

Response to Comment Q-16. A CH-46 squadron would only be retired when a squadron of MV-22 aircraft is ready to transition in. The purpose of the statement cited from page ES-7 was meant to acknowledge that, depending on alternative selected, some installations may end up with an overall decrease of aircraft. For example, if the Full Basing Alternative at MCAS Miramar was selected, then both MCAS Camp Pendleton and Edwards AFB would end up with a net decrease in aircraft.

Response to Comment Q-17. Please see response to comment Q-16.

Response to Comment Q-18. Thank you for your comments.

United States Marine Corps
West Coast Basing of the MV-22
Environmental Impact Statement

Comment Form

Location: [illegible] **Date:** [illegible]

Thank you for providing comments on the United States Marine Corps Proposed MV-22 West Coast Basing EIS. Please provide comments no later than April 3, 2009. Comments may be submitted at the meeting, by visiting the project Web site at www.mv22eiswest.net., or via U.S. Postal Service to the address below.

[illegible] THE COMBINED EIS IMPACTS OF THE F-35B AND THE MV-22 AT MCAS MIRAMAR R-1

Please Print - Additional space is provided on the back

1. Name
2. Address

1. Please check here [X] if you would like to be on the mailing list.
2. Please check here [X] if you would like your name/address kept private.
3. Would you like to receive a copy of the Final EIS? Yes [X] No

Please give this form to one of the Marine Corps representatives, place in the drop box, or mail by April 3, 2009 to:

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

Response to Comments

Response to Comment R-1. Chapter 8 of the Draft EIS addresses the potential for cumulative impacts due to future actions, such as basing the F-35B Joint Strike Fighter at MCAS Miramar, in conjunction with the proposed basing of the MV-22. Additionally, an EIS for the West Coast Basing of the F-35B is currently being prepared, which would include comprehensive noise modeling. This EIS will evaluate potential noise and other impacts from proposed F-35B operations in addition to noise from MV-22 operations. If impacts are significant, the U.S. Marine Corps will evaluate potential mitigation measures, such as modifying flight paths.

United States Marine Corps
West Coast Basing of the MV-22
Environmental Impact Statement

Comment Form

Location: San Clemente **Date:** 3-31-09

Re Camp Pendleton Location

Thank you for providing comments on the United States Marine Corps Proposed MV-22 West Coast Basing EIS. Please provide comments no later than April 3, 2009. Comments may be submitted at the meeting, by visiting the project Web site at www.mv22eiswest.net., or via U.S. Postal Service to the address below.

Camp Pendleton should not be considered for basing the MV-22 because it would have a very dangerous impact on the people living on the border of San Clemente and Camp Pendleton. The reasons for not basing the MV-22 are as follows! S-1

(1). The flight path between the houses and the mountains is very narrow. Noxious emissions would accumulate in this area to unhealthfals levels because the mountains act as a barrier to normal flow of air. Sound seems to resonate in this narrow path and could reach unhealthy levels of noise S-2 S-3 pollution. (2) we live in a high probability fire S-4

Please Print – Additional space is provided on the back

1. Name [redacted]
2. Address [redacted]

1. Please check here [X] if you would like to be on the mailing list.
2. Please check here [X] if you would like your name/address kept private.
3. Would you like to receive a copy of the Final EIS? Yes X No____

[illegible] of the Marine Corps representatives, place in the drop box, or mail by April 3, 2009 to:

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

S-4 zone. Our extremely high fire insurance rates attest to this fact. This area is so risky that it is very difficult to get fire insurance. Should a crash occur in this path, fire would spread rapidly because of high winds that are frequently found here. Also, fog is a frequent concern, which can present problems of visability. Run off of

S-5 gasoline and other chemicals can present fire hazards and can pollute the ground with runoff to the San Mateo Creek.

S-6 Camp Pendleton consists of many hundreds of acres, so why is the northern most part the only location to be considered for housing this aircraft that poses great risk to the people? It would be more logical and safer for the base to be located at Miramar and Yuma, excluding Camp Pendleton entirely.

S-7 In closing, we need more detailed info on noise/air pollution and safety of the aircraft.

S-8 Thank you for the opportunity to express my concerns.

For more information or to submit comments, please contact:

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

Web site: www.mv22eiswest.net

Response to Comments

Response to Comment S-1. Thank you for your comments. Please see responses to S-2 through S-8 below.

Response to Comment S-2. Conditions that limit atmospheric dispersion, such as calm winds and clear nights with surface-based temperature inversions, would increase the ambient concentration of proposed aircraft emissions within MCB Camp Pendleton and the identified adjacent housing areas. However, due to the intermittent occurrence of proposed aircraft emissions and their relatively low emission levels, the impact of these emissions would not contribute to an exceedance of a national or state ambient air quality standard, as identified in the Draft EIS. Since these standards represent allowable atmospheric concentrations at which the public health and welfare are protected and they include reasonable margins of safety to protect the more sensitive individuals in the population, proposed aircraft emissions within and adjacent to MCB Camp Pendleton would not accumulate to unhealthful levels.

Response to Comment S-3. The Draft EIS examined existing and proposed aircraft activity at MCB Camp Pendleton, including sites near the border of the base and San Clemente. Noise exposure of 65 dB CNELmr from existing and proposed activities would be within the MCB Camp Pendleton boundary, and no significant noise impacts would occur outside of the MCB Camp Pendleton boundary as a result of the proposed action.

Response to Comment S-4. The U.S. Marine Corps shares the concern about the potential for wildfire ignition and has developed a comprehensive approach to managing the risk from wildfires including a variety of precautionary operational restrictions under conditions of high fire danger identified in the comment. These include restrictions on the use of the MV-22 under red and orange Fire Danger Rating days, despite the lack of evidence that MV-22 causes fires under operational conditions, as discussed in section 6.1.4 of the Draft EIS.

Response to Comment S-5. There are no proposed improvements at MCB Camp Pendleton, and the proposed improvements at MCAS Camp Pendleton are not located within the watershed of San Mateo Creek. However, with respect to potential gasoline spills in drainages and creeks in the vicinity of MCAS Miramar, section 4.11.2, subsection *Incidental Spills and Construction Waste*, indicates that numerous plans and policies would be implemented to prevent migration of incidental spills to local soils and water resources. Such plans and policies would include, but not limited to, a site-specific Stormwater Pollution Prevention Plan (SWPPP) and Spill Prevention, Control, and Countermeasure (SPCC) plan. Therefore, the EIS provides a thorough and adequate analysis of the proposed action's water resource impacts for NEPA purposes, and no revisions to the analysis are necessary.

Response to Comment S-6. The Preferred Alternative is a split basing between MCAS Miramar (8-squadrons) and MCAS Camp Pendleton (2-squadrons). Training operations within MCB Camp Pendleton would occur regardless of where the aircraft are based. MCB Camp Pendleton is an important training area for the MV-22, because the MV-22 will work closely with the First Marine Expeditionary Force (I MEF), which is permanently based at MCB Camp Pendleton and surrounding installations.

1 **Response to Comment S-7**. Please see responses to comments S-2 through S-6.

2 **Response to Comment S-8**. Thank you for your comments.

From: MV-22 EIS Comments [comments@marinescience.saic.com]
Sent: Monday, March 30, 2009 10:36 AM
To: Pattison, A. Trevor; Foster, Karen A.; Gomez, Catrina D.
Subject: FW: OSPREY

Follow Up Flag: Follow up
Flag Status: Flagged

From: ronald brabbin [mailto:ronbrabbin@gmail.com]
Sent: Saturday, March 28, 2009 9:12 AM
To: comments@marinescience.saic.com
Subject: OSPREY

To whom it may concern,
I would like to suggest using a surplus Aircraft carrier as a base for the Ospreys. This ship could be anchored just about any place along our coast or even Los Angeles harbor. This carrier would already have quarters for crews and eating facilities and maintenance facilities. **T-1**
The Ospreys could land and take off without flying close to houses and not create noise over residents.
This would serve a better purpose than a carrier becoming a museum.
Sincerely.
Ronald Brabbin
9328 Danbury St.
Cypress, Ca. 90630
1 714 827-6332

Response to Comments

1 **Response to Comment T-1**. Thank you for your interesting idea.

From: MV-22 EIS Comments [comments@marinescience.saic.com]
Sent: Monday, March 30, 2009 10:36 AM
To: Pattison, A. Trevor; Foster, Karen A.; Gomez, Catrina D.
Subject: FW: Osprey - San Clemente and HUSH

Follow Up Flag: Follow up
Flag Status: Flagged

From: RICHARD BRIZZOLARA [mailto:rbrizzolara@msn.com]
Sent: Saturday, March 28, 2009 12:37 PM
To: comments@marinescience.saic.com
Subject: FW: Osprey - San Clemente and HUSH

From: rbrizzolara@msn.com
To: coments@marinescience.saic.com
Subject: Osprey - San Clemente and HUSH
Date: Sat, 28 Mar 2009 10:41:18 -0700

Dear Sirs.

I just finished reading a article in the Orange County Register regarding the Marines planed usage of the MV-22 Osprey at Camp Pendleton and San Clementes residents concerns. U-1

I have lived in Tustin California for many years now and remember the Tustin Marine Helicopter Base. Yes it was possible to hear them flying training missions throughout the day and night. I also have relatives who live in Irvine and yes, we could hear the Marine jets flying there as well. It was all just part of life here in
OC.

Perhaps the HUSH enthusiasts would prefer that the Marines stop all of the training flights, suspend all field artillery practice and any other noise making activities. Would the rather have their streets filled with people running around wearing "shemaghs" and carrying AK-47's and RPG's. That should make them happy knowing that their efforts to stop the noise making Marines to their knees was a success!

Does San Clemente have a noise ban on Police, Fire and Ambulance sirens or what about trains blowing their horns? I would think that one would hear more of these in one day then you would a couple of Osprey flying overhead.

Bottom line is...
The military has a job to do and part of which is to train it's personal with all types
of vehicles and aircrafts. Let them do their jobs in training the worlds best fighting
force (there's a reason for that..its called TRAINING) and worry more about the pollution cased from the Swallows every year. Life isn't always perfect and at times

we just have to live with its irritants. A major advantage to allowing the military to train its forces is something called Freedom!

HUSH, worry more about your City issues and let the military do its job! Flying a few times over you City isn't going to bring on San Clemente demise.

Richard Brizzolara

Response to Comments

1 **Response to Comment U-1**. Thank you for your comment and your support for the project.

From: MV-22 EIS Comments [comments@marinescience.saic.com]
Sent: Monday, March 30, 2009 10:36 AM
To: Pattison, A. Trevor; Foster, Karen A.; Gomez, Catrina D.
Subject: FW: about Draft EIS for the basing of the MV-22 west coast

Follow Up Flag: Follow up
Flag Status: Flagged

From: Reader111@aol.com [mailto:Reader111@aol.com]
Sent: Saturday, March 28, 2009 9:25 PM
To: comments@marinescience.saic.com
Subject: about Draft EIS for the basing of the MV-22 west coast

To whom it may concern,

First, I want to say Thank you for your service to our country. Second, I was wondering How I might obtain a copy of the "Draft EIS for the basing of the MV-22 west coast"? **V-1**

Sincerely, Jim Brushaber

411 Dorothy St. #22

El Cajon,CA 92019

619-818-3736

A Good Credit Score is 700 or Above. See yours in just 2 easy steps!

Response to Comments

Response to Comment V-1. Thank you for your comment. A CD of the Draft EIS was sent to Mr. Brushaber, at this request.

March 24, 2009

Jim Cronin
Homeowner
Torrey Hills

Naval Facilities
Engineering Command Southwest

Dear Sir or Madam,

I would like to comment on the basing of aircraft considerations, particularly the MV-22 Osprey Helicopters. W-1

I don't understand why any helicopters need to be based at Miramar which is already the wrong place to have a military air base. Granted Miramar was here a long time before San Diego became developed but the fact remains that San Diego did develop and now we have a major military air base right in the middle of the 6 most populated cities in the country adding NOISE and more NOISE not to mention the 4 people killed recently when a fighter jet went down in a nearby neighborhood to Miramar. W-2

Camp Pendleton is a much better solution for basing helicopters. What better place for training new pilots than the wide open expanse of Camp Pendleton where there isn't a neighborhood or even a home within miles. There would be no more helicopters flying over homes shaking the walls and scarring our children. Even being based at Miramar, I can't understand why the helicopters can't do all the training they need to do right on the grounds of Miramar. Why do they have to fly over neighborhoods? W-3 W-4

Let's try to do something that makes sense and respects the peace of the people who live in an already too noisy world.

Thank you for your consideration.

Respectfully,

Jim Cronin

Response to Comments

Response to Comment W-1. Thank you for your comments. Please see responses to W-2 through W-4 below.

Response to Comment W-2. A discussion of the process for developing the alternatives for the proposed action is provided in section 2.2 of the Draft EIS. A two-tiered screening process was applied to narrow and then focus the possible basing alternatives to feasible alternatives for this EIS. Based on this screening process, MCAS Miramar was one of three stations selected as a feasible basing alternative for the proposed action. As discussed in section 2.3.1 of the Draft EIS, MCAS Miramar was selected as a logical alternative for basing the MV-22 primarily because 1) four squadrons of CH-46Es that would be replaced by the MV-22 are currently stationed at MCAS Miramar thereby freeing up existing apron and hangar space that could be used by the MV-22 aircraft (e.g., this is cost-effective), and 2) the close proximity of MCAS Miramar to training areas at MCB Camp Pendleton represent a major efficiency advantage for basing the MV-22 squadrons at this station.

Detailed noise modeling was conducted in conjunction with the preparation of the Draft EIS, as discussed in section 3.8 for MCAS Miramar. As indicated in the Draft EIS, no significant noise impacts would result from basing the MV-22 at MCAS Miramar.

The U.S. Marine Corps also takes very seriously concerns regarding aircraft and public safety. As indicated in Draft EIS section 3.16.2, emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the MV-22 and associated equipment. Additionally, the Draft EIS indicates that basing of the MV-22 at MCAS Miramar would not result in significant impacts to safety.

Response to Comment W-3. Although MCAS Miramar is part of the Preferred Alternative for basing the MV-22, the air station is too small to accommodate the required training operations needed for a pilot and crew to become proficient and ready to deploy overseas. Therefore, proposed training operations would occur at MCB Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC at Twentynine Palms; these training ranges would provide the pilot and his crew with a variety of training conditions and environments that model real-world conditions.

Response to Comment W-4. Please see response to comment W-3.

From: Max Dao [evasian_racing@msn.com]
Sent: Monday, March 30, 2009 9:04 PM
To: comments@marinescience.saic.com
Subject: comments & questions

As a reader of the Orange County register I have read Vik Jolly's article ["residents question new aircraft," Orange County, Local 14, March 28] over and over and have my own ideas about it. Jolly's wrote about San Clemente officials' letter in 2000 sent to the Navy that the Ospreys might cause noise pollution and environmental degradation. He also wrote about San Clemente outraged residents' HUSH (Homeowners United to stop the helicopters) that HUSH demands the restrictions of the Marines helicopter traffic. San Clemente officials' letter and HUSH's demand remind me of many South Vietnamese, including sleeper agents demanded U.S. troops and their allied forcers' withdrawals and South Vietnam Armed Forces' stop fighting against communist North Vietnamese invaders during the Vietnam War. Ironically, these South Vietnamese sought asylum in America as political refugees and now come back to communist Vietnam as "Vietnamese patriots." I wonder if San Clemente officials and HUSH think hard before they demand. Obviously, they ignore "Country First" and America's safety, even their safety and go on for their demand. I want to ask San Clemente officials and HUSH only one question. The question is: have you ever wanted another Sept. 11 terrorist attacks in America? **Xa-1**

With warmest regards,
Ken Dao

Express your personality in color! Preview and select themes for Hotmail®. See how.

Response to Comments

Response to Comment Xa-1. Thank you for your comments and your support of the project.

Response to Comment Xb-1. The U.S. Marine Corps is proud of the MV-22 and is looking forward to basing the aircraft on the West Coast.

Response to Comment Xb-2. Thank you for your support of the project.

Dear Sir,

I have lived in Yuma full time for nine years. I am looking forward to the F35 Joint strike fighters coming here.

In fact I feel well protected whenever I see any military aircraft flying by.

I'm also looking forward to seeing the MV-22 Osprey.

Please pass that to MV22 homebasing and F-35 project manager

Thanks for your service

Joan Davidson

Y-1

Response to Comments

1 **Response to Comment Y-1**. Thank you for your comment and your support of the project.

March 28, '09

Dear Sir:

Due to the population density in the San Clemente and San Diego areas, we think the MV-22 Osprey Helicopter should be flown in a more remote area. Z-1

We live in the San Clemente area and the Military helicopters fly over a lot. We love airplanes, but the helicopters going up and down the coast fly very low when it is overcast - they shake the house. They are very noisey too! Z-2

We and most of our friends feel the Osprey should be in a more remote area. Z-3

Respectfully,
Dale and Audrey
Downing

Response to Comments

Response to Comment Z-1. Thank you for your comments. Proposed training operations would occur at MCB Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC at Twentynine Palms; these training ranges would provide the pilot and his crew with a variety of training conditions and environments that model real-world conditions. Please note that only about 37 percent of the proposed training operations would occur at MCB Camp Pendleton, and the rest would occur in more remote locations.

Response to Comment Z-2. Military helicopters can transit MCB Camp Pendleton by several routes, one of which is along the coast. Modeled routes are shown in Appendix C of the Final EIS. The MV-22 would also utilize these routes; however, the MV-22 is approximately 5 dB quieter than a CH-46E on a single-event basis.

Response to Comment Z-3. See response to comment Z-1.

Mr and Mrs Richard Dupuis

5 square du Trocadero

75116 Paris, France

email : peggydupuis@orange.fr

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Coast Highway
San Diego, CA 92132-5190

Subject : MV-22 aircraft in Camp Pendelton

Dear Sir /Madame,

We are new owners of a residential property located at 32 calle Ameno in San Clemente, CA. We have recently purchased this property as our future secondary résidence due to its calm and serene location and neighborhood. AA-1

For ours and our children's health sake, we oppose that the MV-22 be housed in Camp Pendleton.

Sincerely,

Benelda Dupuis

Response to Comments

1 **Response to Comment AA-1**. Thank you for your comments. Your objection is noted.

United States Marine Corps
West Coast Basing of the MV-22
Environmental Impact Statement

Comment Form

Location: Scripps Ranch **Date:** MAR 24 09

Thank you for providing comments on the United States Marine Corps Proposed MV-22 West Coast Basing EIS. Please provide comments no later than April 3, 2009. Comments may be submitted at the meeting, by visiting the project Web site at www.mv22eiswest.net., or via U.S. Postal Service to the address below.

Has the speed differential between CH-53, MV-22 and F-18 been adequately addressed when the intention is for V-22 to fly existing standard instrument departures and arrivals? **BB-1**

I.E. CH-53 120 kts, V-22 - 220 kts, F-18 - 320 +.

Is this going to require even more deviations from published routes to ensure safe lateral and vertical separation of aircraft? **BB-2**

When published routes/altitudes are ignored - noise issues arise.

Please Print – Additional space is provided on the back

1. Name Jeffrey C FREDERICK
2. Address 16384 Avenida Suavidad
   SAN Diego, CA 92128

1. Please check here ☑ if you would like to be on the mailing list.
2. Please check here ☐ if you would like your name/address kept private.
3. Would you like to receive a copy of the Final EIS? Yes ✓ No____

Please give this form to one of the Marine Corps representatives, place in the drop box, or mail by April 3, 2009 to:

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

Response to Comments

Response to Comment BB-1. Thank you for your comments. No new traffic patterns or flight corridors are planned under the proposed action. When the MV-22 flies in fixed wing mode, it will follow fixed wing flight corridors. When it flies in rotary wing mode, it will follow rotary wing flight corridors.

Air Traffic Control (ATC) is aware of the speed differential between existing aircraft and the MV-22 with regard to departures and arrivals. ATC will sequence aircraft in/out of the air station. Normal airspace de-confliction by Air Traffic Control will resolve the issues of dissimilar aircraft operations within the airspace. In addition, a minimum separation of 500 feet is maintained between aircraft during maneuvers or training operations. This is no different than how air traffic is handled in traffic patterns where slow moving private aircraft and commercial jet liners share air traffic approach and departure routes in the airport environments within the Nation Airspace System. The text of the Final EIS in section 3.2 (MCAS Miramar Airfields and Airspace) has been revised to clarify this process for de-confliction of the MV-22 and other aircraft within the same airspace.

Response to Comment BB-2. Please see response to comment BB-1.

From: Jones Family [Jones92128@att.net]
Sent: Thursday, April 02, 2009 7:39 PM
To: comments@marinescience.saic.com
Cc: Jones92128@att.net
Subject: Comments regarding the MV-22 Aircraft

April 2, 2009

To: Naval Facilities Engineering Command Southwest, Attn: MV-22 Hombasing EIS Project Manager

Dear Project Manager:

When we bought our home in the community of Rancho Bernardo we were not in a flight zone for military aircraft. We lived a peaceful existence. Just a few minutes ago, our evening dinner was interrupted with rattling windows and dishes as a small military helicopter few over our home. It was so low it barely cleared Battle Mountain. We could only imagine how loud the helicopter was to the people in the homes on the hill north of us. When these squadrons are in town they fly over our home sometimes two, third, four helicopters in a row. They fly low and are not keeping with flying directly over the freeway. Not only are they loud (you can barely hear yourself think), they rattle the windows and shake the house. They have even awoke us at night. There's always a concern that one of them will crash into our homes. They have made emergency landings close to the neighborhood. Even the rabbits and the birds seem affected by these monsters. **CC-1**

Please don't bring these huge MV-22 aircraft to San Diego. And while you're thinking about MV-22 why would you ruin and jeopardize civilian lives with any aircraft flying over residential areas. It's only a matter of time before one does crash and kill us. (Case in point, the University City tragedy.) **CC-2**

Why don't you station they at Camp Pendleton where they can fly out over the ocean. Or better yet, put them in the middle of nowhere. **CC-3**

KEEP THEM OUT OF RESIDENTIAL NEIGHBORHOODS THAT WERE BUILT BEFORE THE AIRCRAFT WERE HERE!!

Respectfully,

Michael and Beverly Jones
12082 Verano Court, San Diego, CA 92128
Jones92128@att.net

Response to Comments

Response to Comment CC-1. Thank you for your comments. The MV-22 would utilize existing fixed and rotary wing routes to/from an airfield (e.g., MCAS Miramar or MCAS Camp Pendleton). However, away from the airfield, the MV-22 would more often fly like a fixed wing aircraft (higher/faster) than a helicopter (lower/slower), which, as indicated in the Draft EIS, would mean reduced noise compared to the helicopters.

Response to Comment CC-2. The U.S. Marine Corps takes very seriously concerns regarding aircraft and public safety. As indicated in Draft EIS section 3.16.2, emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the MV-22 and associated equipment. Additionally, the Draft EIS indicates that basing of the MV-22 at MCAS Miramar would not result in significant impacts to safety.

Response to Comment CC-3. Regardless of basing alternative ultimately selected, proposed training operations would occur at MCB Camp Pendleton, the Bob Stump Training Range Complex, and MCAGCC at Twentynine Palms; these training ranges would provide the pilot and his crew with a variety of training conditions and environments that model real-world conditions. Please note that about 37 percent of the proposed training operations would occur at MCB Camp Pendleton, and the rest would occur in more remote locations.

From: Ed [louparents@cox.net]
Sent: Friday, April 03, 2009 9:47 AM
To: comments@marinescience.saic.com
Subject: MV-22 Environmental Impact Study in San Clemente, CA

To Whom it May Concern,

I attended the meeting on Wednesday, March 25, 2009, at Vista Del Mar Middle School, and was impressed with the information available and the very nice and well-spoken representatives available for one-on-one conversations regarding our concerns. **DD-1**

I support the Military and understand the necessity for updating equipment. I also support the quality of life in this beautiful area of San Clemente, and do not wish to see an avoidable negative impact affect this area. **DD-2**

Your studies presented for this impact are impressive. However, the only "true" study that could put my mind to rest would be a "live" demonstration of the MV-22 flying in this area in the "designated corridors". If you could do that for us in San Clemente, whose quality of life as we know it will be directly impacted by this decision to upgrade to the MV-22, that would go a long way to gaining support for this project, if the demonstration proves your data to be accurate. **DD-3**

I respectfully request your consideration of this suggestion. Computer Analysis and Studies are wonderful tools. However, there is nothing more accurate than actually getting out in the field and seeing how it works! **DD-4**

Thanking you for your time and attention to this matter, I remain

Sincerely,

Dale Kewitz, A Concerned San Clemente Resident
10 Calle Ameno
San Clemente, Ca 92672
E-Mail: louparents@cox.net
Cell Phone: 951-454-5167

Response to Comments

Response to Comment DD-1. Thank you for attending the public meeting and for your positive feedback regarding the meeting format.

Response to Comment DD-2. Thank you for your continuing support of the military.

Response to Comment DD-3. Due to the extremely high operational tempo required for training and preparing our MV-22 squadrons to deploy to combat, along with our limited number of available MV-22 aircraft and aircrew, we are unable to provide a MV-22 for a live demonstration of flight corridors near San Clemente at this time. We acknowledge the great interest in this platform from the public's perspective, and will continue to assess our opportunities as they arise to provide a MV-22 demonstration in support of the west coast introduction.

Response to Comment DD-4. Please see response to comment DD-3. Thank you for your comments.

From: D. Leichtling [d.light@cox.net]
Sent: Thursday, April 02, 2009 11:53 AM
To: comments@marinescience.saic.com
Subject: MV-22 Osprey basing comments

Importance: High

Sir

1. I support the basing of MV-22 aircraft and want to commend the process you are using to gather comments from the public! Lindbergh's expansion should model your process! EE-1

2. I believe that these new tilt-rotor aircraft are not only much safer but they will be much quieter because they can takeoff and land like an airplane.

3. As a rated helicopter flight instructor (civilian) myself, I believe that these aircraft are the Best DESIGN for the future and they will prove to be "great neighbors"; should San Diego need help (earthquake, major fires, terrorist attack, etc.) these aircraft will be pre-positioned to provide San Diego's FEMA first responders with an asset that other Cities can only dream of!
+ I hope the military will consider equipping these aircraft with removable water bladders in order to make each of them into a huge firefighting asset that the entire Western US can use!

4. San Diego's importance as a major military base will only help to insure our local economy's financial health and also provide many additional jobs for all the civilian's supporting this new technology aircraft.

5. I predict that this aircraft design will be so successful that San Diego "pushes" for the civilian version in order to reduce our own airport's congestion and inability to expand Lindbergh's runways! The Osprey's ability to carry many passengers fast will allow the civilian model to "ferry" folks from all the regional airports to San Diego while reducing congestion.

I would like to be the first to say, "WELCOME ABOARD, we will be lucky to have you in San Diego!".

Don Leichtling

Response to Comments

1 **Response to Comment EE-1**. Thank you for your comments and your support of the project.

United States Marine Corps
West Coast Basing of the MV-22
Environmental Impact Statement

Comment Form

Location: SCRIPPS RANCH **Date:** 3-24-09

Thank you for providing comments on the United States Marine Corps Proposed MV-22 West Coast Basing EIS. Please provide comments no later than April 3, 2009. Comments may be submitted at the meeting, by visiting the project Web site at www.mv22eiswest.net., or via U.S. Postal Service to the address below.

EXCELLENT OPEN HOUSE EVENT. LOTS OF GOOD INFO PROVIDED ON ALL ASPECTS THAT MIGHT POTENTIALLY IMPACT OUR COMMUNITY. GOOD SENSE OF USMC ACTING AS A GOOD NEIGHBOR. LOOK FORWARD TO A SMOOTH TRANSITION! FF-1

Please Print – Additional space is provided on the back

1. Name JOHN LOWE
2. Address 10231 RUE SAINT JACQUES
   SAN DIEGO, CA 92131

1. Please check here [X] if you would like to be on the mailing list.
2. Please check here [ ] if you would like your name/address kept private.
3. Would you like to receive a copy of the Final EIS? Yes X No ___

Please give this form to one of the Marine Corps representatives, place in the drop box, or mail by April 3, 2009 to:

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

Response to Comments

Response to Comment FF-1. Thank you for attending the public meeting and for your positive feedback regarding the meeting format. The U.S. Marine Corps is proud of the MV-22 and is looking forward to basing the aircraft on the West Coast.

COMMENTS REGARDING DRAFT EIS – West Coast Basing of the MV-22

These comments concern the noise study at MCAS Miramar; however, they also apply to MCAS Camp Pendleton and Yuma. Wyle Laboratories has been a strong proponent of the use of alternate noise metrics. However, this study limits its analysis to CNEL contours. Current California case law indicates that single event noise metrics should be used in conjunction with CNEL noise contours. Therefore, this EIS should also present other noise metrics. The computer programs used in this noise study easily generate these metrics. **GG-1**

1. Use of A-weighting: Use of A-weighting underestimates the noise contribution of frequencies below 1000 Hz when the loudness is above about 40 Phon. While the FAA requires the use of A-weighting, the analysis should also be done with a more realistic dynamic weighting function. Numerous technical articles support this suggestion. **GG-2**
2. In Figures 3.8.1 to 3.8.5 it is difficult to determine where the noise contours are relative to the streets. I suggest that the street be made more visible. **GG-3**
3. In the CNEL contours the noise contribution of the helicopters and MV-22s is overwhelmed by the noise contribution of the F-18s. I suggest that a separate noise contour be done for the helicopters plus MV-22s and another for the fixed wing aircraft, i.e. F-18s. This would better indicate the change due to basing MV-22s at Miramar. This should also include what will happen when the F-35s are based at Miramar. **GG-4**
4. Inclusion of alternate metrics: Analysis using the metrics L_{max}, TA, and NA should be included (defined in Appendix C). **GG-5**
5. A map showing the flight tracks should be included. **GG-6**
6. A single event exposure map (SEL contour) should be included for a CH-46E, a MV-22, and a F-22 during takeoff, and landing. This would show the fundamental noise differences between the aircraft. **GG-7**
7. Also needed is the unweighted frequency spectrum for each aircraft during takeoff and landing below the flight path. This would allow comparison of the differences in frequency content between aircraft since the use of A-weighting minimizes this difference. **GG-8**

Finally, in Section 3.3.3 on page 3-7, line 1-8, no mention is made of the University City and Clairemont community plans. **GG-9**

Richard J. Prutow, Ph.D., M.D.

Response to Comments

Response to Comment GG-1. The Draft EIS does address other noise metrics in addition to CNEL. Single-event metrics of Sound Exposure Level (SEL) and Maximum (A-weighted) Sound Level (Lmax) were computed for the MV-22 and CH-46E (see Table 6.1.14-4 on page 6-70 of the Draft EIS). For MCAS Miramar, as reported in section 3.8 and in more detail in Appendix C, the Draft EIS also examined the potential for indoor speech interference and sleep disturbance to 17 representative noise-sensitive residential receptors in the vicinity of MCAS Miramar for both open and closed windows conditions. For the study of these effects, as described in Appendix C, the Number of Events (NA) equal to or greater than various SEL and Lmax thresholds were computed.

Response to Comment GG-2. The Draft EIS utilized Department of Defense-approved noise models and methodology, including the use of A-weighted sound levels. As described in Appendix C-3, A-weighting approximates the human ear's lower sensitivity to frequencies less than approximately 500 Hertz (Hz) and greater than approximately 1,000 Hz.

Response to Comment GG-3. Based on comment G-6, the noise figures for MCAS Miramar have been updated to include land use information. Due to the addition of land use information and given the scale of the figure, it would be difficult to clearly identify streets. Thus, street names were not added to the referenced figure. However, the figure shows main highways and interstates as points of reference.

Response to Comment GG-4. It is agreed that the F/A-18 aircraft dominate the aircraft noise environment at MCAS Miramar. However, the Draft EIS makes the correct comparison between aircraft noise environments (i.e., between the existing noise environment and the timeframe when the MV-22/CH-46E transition would be complete). As the existing noise environment includes F/A-18 aircraft, it was included in the comparison. Because the proposed action involves MV-22, which is far less noisy on a single-event basis than the F/A-18, the addition of MV-22 operations (and subtraction of CH-46E operations) produces a relatively small change (increase) in the overall aircraft noise environment. Therefore, the EIS provides a thorough and appropriate analysis of the proposed action's noise impacts for NEPA purposes, and no revisions to the analysis are necessary.

Page 8-18 of the Draft EIS addresses the potential for cumulative noise impacts due to future actions such as basing the F-35B Joint Strike Fighter at MCAS Miramar. The U.S. Marine Corps is currently developing an EIS for the West Coast Basing of the F-35B and will evaluate potential noise and other impacts from proposed F-35B operations in addition to noise from MV-22 operations.

Response to Comment GG-5. Please see response to comment GG-1. Time-Above (TA) was not utilized as it is not currently supported by the Noisemap model.

Response to Comment GG-6. Maps of flight tracks associated with MCAS Miramar are shown in Appendix C of the Draft EIS (see also pages C-11 through C-13 of Appendix C in the Final EIS).

Response to Comment GG-7. The Department of the Navy uses CNEL to evaluate noise impacts for NEPA purposes, and this is accepted practice. As such, the EIS provides a thorough and appropriate

analysis of the proposed action's noise impacts for NEPA purposes, and no revisions to the analysis are necessary.

Response to Comment GG-8. Please see response to comment GG-7.

Response to Comment GG-9. Text has been added to the Final EIS, as suggested, to include information regarding the University City and Clairemont community plans.

From: dan sicoli [mailto:dansicoli@hotmail.com]
Sent: Monday, March 23, 2009 4:08 PM
To: comments@marinescience.saic.com
Subject: draft eis

Why is this even open for discussion. The USMC should make this decision without any public input. This type of thinking and courtesy given to the public is a big part of the problems in America. This blows my mind that this is even in the newspaper for comment. Let me guess, a large highly paid committee or task force came up with brilliant idea of wasting time and resources. Well, here's my comment, why don't we let the Commandant of the USMC, and his Marines involved with this mission and program decide how and where it should be implemented. Semper Fi **HH-1**
Il Professionista Sicoli

Response to Comments

Response to Comment HH-1. Thank you for your support of the military and for this project. The U.S. Marine Corps and Department of Navy take seriously their responsibility for facilitating pubic and agency input to ensure a high quality environmental analysis document, and to meet National Environmental Policy Act requirements.

Proposal for
Community Area Response for Emergency Situations
Or
C.A.R.E.S.

In Response to the Draft E.I.S. for the
MV-22

03-24-09

After the FA-18 crash of December 2008, in the community of University City, there has been a realization of the need for a rapid response from military fire vehicles and crews. The addition of the MV-22, which has a checkered safety record, to the daily flight operations at Miramar, is of concern. II-1

As stated by Commanding Officer Col. Christopher E. O'Connor in a public forum after the crash, the first responders to the crash site were military fire foam trucks and their crews. They were pre positioned at the end of the runway prior to the crash and then took "an unconventional rout" to the crash site. This was through a seldom used gate at the west end of the runway, then proceeding through the Miramar Nursery and on to the surface streets of University City. This fast response and the use of military assets in fighting the crash related fire prevented the spread of the fire and the further loss of property and possibly life.

Due to the fact that University City is on a direct line and in extremely close proximity to the end of the runway, it is felt that regular training of emergency personnel and equipment, would add to the safety of the entire community.

With the addition of the MV-22 and the possible addition of the F-35B Joint Strike Fighter (a single engine STOVL), safety is of major concern going forward.

Please consider this proposal: II-2

1. Have emergency crews and their equipment train on a regular basis in the use of the gate at the west end of the runway and to become familiar with the streets and the community of University City.
2. Have a coordinated operation and communication plan with the SDFD.
3. Review flight paths for declared air emergencies and the use of "emergency corridors".

These additions would be greatly appreciated by the community and demonstrate the militaries commitment to the safety of the public. II-3

Thank you.

David Skillin

Response to Comments

Response to Comment II-1. MCAS Miramar has a long history of shared training and support with the San Diego Fire Department, including a Mutual Aid Agreement under the federal Reciprocal Fire Protection Act. The Department of the Navy considers training of emergency responders a high priority and will continue to emphasize it. Following the F/A-18 crash of December 2008, the Marine Corps reviewed all aspects of that event, including the flight path taken and the use of the Runway 6 approach corridor.

Response to Comment II-2. Please see response to comment II-1.

Response to Comment II-3. Thank you for your comments.

H. Rick & Brenda Tavares
1805 La Posta Road – Campo, California 91906-2206
619-478-1136 – sgt1@sciti.com

23 March 2009

Naval Facilities Engineering Common Southwest
ATTN: MV-22-Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, California 92132-5190

"Progress, like freedom itself, is never free!" And the Osprey was new, novel and brilliant idea that was long overdue, or was it? JJ-1

I remember back – many years ago. I vividly recall seeing a newsreel in a local, small town cinema. You, I hope, can remember the drill? Fifty cents would get you a seat to a two-reel western, usually Tom Mix or Lash Larue, along with ten comics and an ongoing serial! And if you were really lucky, you might even afford a small bag of popcorn in the bargain!

Also slipped in for good measure, would be a newsreel on current events, progress, or even Time Marches On!

I especially recall news clips on the Korean War, a war that would eventually claim the lives of well-over 50,000 "Patriotic Americans." In these casualty numbers was also listed a long time friend of the family, as well as my wife's uncle, Corporal Melvin H. Morgan, 24th Infantry Division, U.S. Army. He was captured on 11 July 1950 and died from starvation at the age of 20 on 6 December 1950 in a North Korean Prisoner of War Facility.

Getting back to current affairs and their relationship to the past, I still recall seeing a strange-looking aircraft called, I believe, "The Flying Pogo Stick." It was a vertical takeoff, counter rotating propeller contraption that landed and took off straight up like a Flash Gordon rocket ship on stilts!

This was, after all, some six decades ago, and no innovation comes without its fair share of setbacks and detractors. And no progress is ever made without its share of dissention as well, as the vested outcries of the short-sighted will attest!

The Osprey - "Like The March From The Propeller To The Jet Engine", is quintessentially needed for our defense!" And as for those who continue to echo the age-old lament of "not in my back yard", this is the same (near fatal) drool that rallied many a fool to near extinction away back in the late 1930s. This was also the same short-sighted and anemic rallying call that fed the rust of failure, as well as the blindness of complacency that caught us with our pants down on 7 December 1941!

JJ-1 **Also, and for the record, has anyone in our financially-strapped government ever considered refurbishing all of those Marine helicopters that are soon to be replaced? Maybe we could supply these aged Marine Choppers (at a price) to the Iraqis or the Saudis, the friendly ones of course, so that they can help to protect their own illustrious backsides?**

VERITAS (Truth)

Rick Tavares

Rick, Brenda and Sean Tavares

Cc: President Obama
Commander Mike Chapman (White House)
Major Doug Johnson (Pentagon)
Ex-Senator Robert Morgan
Robert Flores, Voter Outreach, Sec. of State. Az.
J.W. August (ABC – San Diego)
Scott Tavares (Chief EMT & Lead Surveillance Officer)
Sean G. Tavares (Aerospace Engineer)
Liz Crone (ERAU)
Congressman Robert Filner
Shorty Estabrook – Tiger Survivors Group
Dr. James Malinak

Response to Comments

Response to Comment JJ-1. Thank you for your comments and your support of the project. The U.S. Marine Corps is proud of the MV-22 and is looking forward to basing the aircraft on the West Coast.

At this point, the plan is to retire the CH-46E.

3-25-09

NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5192

ATTN: MV-22 HOMEBASING EIS PROJECT MANAGER

DEAR SIR.

I STRONGLY OPPOSE PLACING THE 8 SQUARDRONS OF MV-22s AT THE MIRAMAR MARINE CORPS AIR STATION!!!!!!!!!!!!!! ONE OF THE REASONS WE MOVED, A NUMBER OF YEARS AGO, FROM THE POINT LOMA AREA AND BOUGHT A HOUSE IN MIRA MESA WAS TO GET AWAY FROM THE AIRPORT NOISE!!! KK-1

PLEASE, PLEASE, PLEASE CONSIDER ANOTHER PLACE. THIS AREA IS TOO RESIDENTIAL.

THANK YOU,

J.E. TUCKER

Response to Comments

Response to Comment KK-1. Thank you for your comments. Detailed noise modeling was conducting in conjunction with the preparation of the Draft EIS, as discussed in section 3.8 for MCAS Miramar. As indicated in the Draft EIS, no significant noise impacts would result from basing the MV-22 at MCAS Miramar. Additionally, as stated in section 6.4.8, the Preferred Alternative would not cause a significant increase in existing noise (CNELmr) levels from Military Training Route activity.

United States Marine Corps
West Coast Basing of the MV-22
Environmental Impact Statement

Comment Form

Location: San Diego **Date:** March 24, '09

Thank you for providing comments on the United States Marine Corps Proposed MV-22 West Coast Basing EIS. Please provide comments no later than April 3, 2009. Comments may be submitted at the meeting, by visiting the project Web site at www.mv22eiswest.net., or via U.S. Postal Service to the address below.

After scanning the DEIS I discovered an error on the Flight Profiles section of the Appendix. Most of the profiles show a "hospital" site on the I-15 Corridor to the east, near Miramar Lake - South of Mira Mesa Blvd. There is no hospital in the area + it should be eliminated on all the Profiles. LL-1

The scoping session has been very valuable with information concentrated in one area. Thank you. Looking forward to the preferred siting of Miramar - 8 + Pendleton - 2. Thank you. LL-2

Please Print - Additional space is provided on the back

1. Name Barbara Baker
2. Address 11243 Moranda Ct
   San Diego, CA 92128

1. Please check here [X] if you would like to be on the mailing list.
2. Please check here [ ] if you would like your name/address kept private.
3. Would you like to receive a copy of the Final EIS? Yes X No

Please give this form to one of the Marine Corps representatives, place in the drop box, or mail by April 3, 2009 to:

Naval Facilities Engineering Command Southwest
Attn: MV-22 Homebasing EIS Project Manager
1220 Pacific Highway
San Diego, CA 92132-5190

Response to Comments

Response to Comment LL-1. Thank you for your comments. The points shown on the profile maps of Appendix C are navigational aid locations. The one labeled "Hospital" is referred to in the pilot charts as "MED Impact Bldg". The profile maps were changed for the Final EIS to show "MED Impact Bldg" for this location.

Response to Comment LL-2. Thank you for attending the public meeting and for your positive feedback regarding the meeting format. The U.S. Marine Corps is proud of the MV-22 and is looking forward to basing the aircraft on the West Coast.

1
2
3 THE DEPARTMENT OF THE NAVY
4 MV-22 AIRCRAFT WEST COAST BASING
5 ENVIRONMENTAL IMPACT STATEMENT
6
7 PUBLIC SCOPING MEETING
8
9
10
11
12
13 GILA RIDGE HIGH SCHOOL
14 7151 EAST 24TH STREET
15 YUMA, ARIZONA
16 MARCH 26, 2009
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22 REPORTED BY: IRENE R. KEATING, CSR NO. 8143
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1 I N D E X
2

3 PUBLIC COMMENTS PAGE

4

5 Craig Williams 3

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National Court Reporters, Inc. 888-800-9656

1 YUMA, ARIZONA

2 THURSDAY, MARCH 26, 2009

3 4:00 PM - 7:00 PM

4 * * *

5

PHa-1 6 MR. WILLIAMS: I'm for it. Let me see. I'm the

7 Airport Director of Yuma International Airport. And PHa-1
8 speaking on behalf of the airport, the Yuma County Airport
9 Authority supports any kind of basing of the Osprey here,
10 whether it's, you know, on a rotating basis or
11 permanently, or however it works out, because I think it's
12 good for the airport and good for the community and good
13 for jobs, in every which way. So the Airport Authority
14 supports this initiative and supports the position that
15 MCS Yuma is taking.
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National Court Reporters, Inc. 888-800-9656

1 STATE OF CALIFORNIA)
2) SS:
3 COUNTY OF IMPERIAL)
4
5 I, Irene R. Keating, CSR No. 8143, a Certified
6 Shorthand Reporter in and for the County of Imperial,
7 State of California, do hereby certify:
8 That I was present at the time and place herein set
9 forth, that I reported in machine shorthand the

10 proceedings had in the above-entitled matter, and that the
11 foregoing transcription is a full, true and correct
12 transcription of the proceedings had.
13 Dated this 3rd day of April, 2009, at El Centro,
14 California.
15
16
17 _____
IRENE R. KEATING
18 CERTIFIED SHORTHAND REPORTER NO. 8143
19
20
21
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1 UNITED STATES MARINE CORPS

2 WEST COAST BASING OF THE MV-22

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10 ENVIRONMENTAL IMPACT STATEMENT

11 Volume 1 - Pages 1 through 10

12 San Clemente, California

13 March 25, 2009

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18 REPORTED BY CLAIRE A. WANNER, CSR NO. 12965

19

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1 UNITED STATES MARINE CORPS

2 WEST COAST BASING OF THE MV-22

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10 ENVIRONMENTAL IMPACT STATEMENT,
11 commencing at the hour of 5:00 p.m. on Wednesday,
12 March 25, 2009, at 1130 Avenida Talega, San Clemente,
13 California, before Claire A. Wanner, Certified
14 Shorthand Reporter in and for the State of California.
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PHb-1
1 MR. MALAMUD: B-r-a-d. Last name is
2 M-a-l-a-m-u-d.
3 I have the following question: We're
4 concerned as homeowners near the base of the ingress
5 and egress of the Osprey into the canyon, which is just

6 south of San Clemente. Our concern is to restrict the PHb-1
7 flights to come from the direct south or east of the
8 hall and not to allow the helicopters to run up the
9 canyons from the ocean or back to the ocean. That way
10 the noise will be minimizing to our neighborhoods and
11 still allow the Osprey to be based in Camp Pendleton.
12 That's really all I want to say.
13
14 MR. HACK: John H-a-c-k. PHb-2
15 My concern is that the environmental impact
16 report is incomplete in that it does not take into
17 account -- okay. Here's the area where the demarcation
18 is between the base and the city of Oceanside. Here's
19 the flight path, flight pattern, and that we have
20 helicopters currently flying over the city all hours of
21 the day and night probably 300 days out of the year.
22 Also up here in this area in Fallbrook they
23 have an area up there where they come up and fly around
24 over Fallbrook as well too. I would like to see the
25 aircraft confined to flying over the base unless they

4

1 were like going someplace or coming back from there.
2 The environmental impact report lists two
3 impact areas, Whiskey and Zulu I think it is. There's
4 other ones: There's impact areas of X-ray; Etton
5 (phonetic) range; Area 401; Area 403, which is about
6 500 meters from the Area 409; and Quebec impact area.
7 And, let's see, there's another one that I can't tell
8 the name. It's next to Bravo area over on the

PHb-2

9 San Clemente side. I think the aircraft might be
10 flying close -- aircraft support in these areas and
11 flying in and out of there.
12 Also, I'm concerned about the fire dangers in
13 light of recent fires that have been started on the
14 base. It seems like the aircraft are pretty safe and
15 are going to be pretty quiet. So in that regard, I
16 think it's going to be better than what they're flying
17 now.
18 Address is 4050 Via Los Padres, Oceanside,
19 California 92057, and my phone number is (760)672-2717.
20 And I have one more thing too, sorry.
21 Occasionally we have aircraft flying over the
22 city at extremely low altitudes. A month ago we had
23 six Cobras fly over at about 200 feet. About a month
24 ago we had an H-46 fly over at about 300 feet. I
25 understand the operational altitude for aircraft

5

1 entering and leaving the feet is 2500 feet, and I'd
2 like to be sure that that was strictly enforced.
3 In that regard, if there is a problem on the
4 plane they have more time to make a decision as to, you
5 know, where to try and put down and whatnot. But at
6 200 feet if a Cobra snaps a tail rotor, it would be on
7 the ground in about 10 seconds.
8 All right. That's it.
9

PHb-3

10 MR. MALAMUD: I have two more.
11 I spoke with the person who wrote the sound

12 portion of the EIR and was informed that the flight **PHb-3**
13 pattern into the HOLF on the north part of the base
14 will be to the south and to the east and will not be
15 over the canyon and to or from the ocean.
16 I wanted to have that put into the EIR, at
17 their suggestion, so that the flight patterns will stay
18 in the back portion of the canyon and not towards the
19 ocean where military housing and civilian housing is
20 located.
21 I'd also like to request that the measurements
22 be verified -- I'm sorry -- the computer measurements
23 be verified by actual sound measurements. I don't
24 understand why we would use computer modeling when we
25 can actually get the actual sound through measurement

6

1 of actual flight patterns
2 That's all I have to say
3
4 MS. SANCHEZ: E-s-t-h-e-r S-a-n-c-h-e-z. **PHb-4**
5 Very upset about this. I received zero notice
6 personally of this. Since we're a city that is
7 directly affected by this, I would have appreciated
8 some notice, e-mail, letter, presentation to the
9 Council. In fact, I had requested that we have someone
10 come to the City Council at our next meeting, which is
11 April 1st, 5:00 o'clock to speak for at least five
12 minutes to let people know that the air space is over
13 Oceanside, City of Oceanside, which means that our
14 residents are in some -- have some risk of public

PHb-4

safety issues, especially in the light of the history of the accidents of this helicopter.

I've been on the council for eight years. Never once did I get a call or a visit of any kind or an e-mail letting me know that our city was included in this project. And there certainly have not been any public meetings or hearings in the City of Oceanside during the last eight years.

I would prefer the alternative that would pose zero risk to our residents. So that would be -- I believe that's Alternative 1, which has them all at

Miramar Air Station and zero at Camp Pendleton.

Okay.

PHb-5

MS. FREEDMAN: Mary Freedman, F-r-e-e-d-m-a-n.

My comment is that I really don't want the large aircraft landing on the HOLF. I'm a resident of San Clemente, I live directly above it. Sound travels up. Every time an aircraft comes down, the sound goes up the hill and impacts me.

There's a concern also about wind, which the winds are -- when the direction of the winds change, my sound barrier's much worse. And pollution would be brought right up into my backyard, basically.

That's it. That's enough. I don't want this thing. I don't want any of the things. I don't care if they change their thing, I just want them to do it in Arizona.

18

19 MR. FREEDMAN: My name is David Freedman, **PHb-6**

20 F-r-e-e-d-m-a-n.

21 My comments are I think that the Marines do

22 need some new aircraft. I don't think they need to

23 base them at Camp Pendleton. I think pollution-wise

24 and air quality-wise they'll suffer more here than if

25 they put them in Yuma. And it would be a lot easier on

1 the aircraft and make them live longer with the climate

2 there than it is here because you don't have all the

3 corrosive from the salt waters and the air, the mist in

4 the air. It's a much drier climate.

5 We do live where you look at -- we look over

6 the Camp San Mateo mountain, and I enjoy the shooting

7 of the guns and the light bombings. I really think

8 they're out there protecting us. I think it's a

9 wonderful thing; doesn't bother me in the least.

10 And that's really my comments. I just think

11 that they should find a better place for them.

12

13 MS. HOLDEN: Sue Holden, H-o-l-d-e-n. **PHb-7**

14 I'm a resident of San Clemente and live on the

15 southern end of town where the HOLF is in site and in

16 hearing distance. And I'm concerned about the noise

17 with the activity of the 22s and would prefer that they

18 be stationed at Yuma.

19 I guess that's it.

20

PHb-8

21 MR. HOLDEN: Jim Holden, H-o-l-d-e-n.

22 First I'd like to say I think we've been very

23 supportive of the whole Pendleton base for years. We

24 live up on the ridge and, you know, we've felt the

25 effects of the vacuum from the big bombs they blast and

1 whatnot for many, many years. And the helicopters,

2 hey, you know, it's the sound of freedom.

3 However, our concern would be an increased

4 volume of noise because it does get noisy out there.

5 And if there is an alternative. If Yuma -- you know,

6 the majority of the traffic of people is over there.

7 It would please us very much, as well as some

8 unpopulated parts of Miramar.

9 I'm not familiar with those bases, but it

10 would sure make sense to us if there was an unpopulated

11 area of those two bases for the alternative, we'd very

12 much appreciate it. Thank you.

13

14 (Whereupon, the comments concluded.)

15 * * * * *

16

17

18

19

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21

22

23

I, Claire A. Wanner, a Certified Shorthand Reporter of the State of California, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were placed under oath; that a verbatim record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; further, that the foregoing is an accurate transcription thereof.

Dated: This _____ day of _____,
_____,
at San Diego, California.

_____

Claire A. Wanner
CSR No. 12965

UNITED STATES MARINE CORPS

WEST COAST BASING OF THE MV-22

ENVIRONMENTAL IMPACT STATEMENT

Volume 1 - Pages 1 through 5

San Diego, California

March 24, 2009

REPORTED BY CLAIRE A. WANNER, CSR NO. 12965

UNITED STATES MARINE CORPS

WEST COAST BASING OF THE MV-22

3
4
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9
10 ENVIRONMENTAL IMPACT STATEMENT,
11 commencing at the hour of 4:30 p.m. on Tuesday,
12 March 24, 2009, at 10301 Scripps Lake Drive, San Diego,
13 California, before Claire A. Wanner, Certified
14 Shorthand Reporter in and for the State of California.
15
16
17
18
19
20
21
22
23
24
25

PHc-1 1 MR. FROMAN: David Froman, F-r-o-m-a-n.
2 I'm a resident of Scripps Ranch. I live south
3 of Pomerado on the very east edge just about a mile
4 north of the approach and Runway 27.
5 First, I want to thank those responsible for

6 producing this forum where we can come express our
7 views and also learn more about this particular
8 development in our community.
9 I'm a retired Navy commander, a former naval
10 flight officer with 1,000 hours in the E-2B Hawk Eye
11 Aircraft with over 200 Carrier landings, so I have some
12 familiarity with some of the issues involved here. I
13 am impressed by the MV-22's noise profile, and I
14 understand the necessity of replacing the aging H-46.
15 At the same time I'm concerned about the community
16 impact that we would have if all 10 squadrons are based
17 at Miramar. I'm particularly concerned about traffic
18 congestion, increased numbers of landings, and, of
19 course, the approach noise generated in my
20 neighborhood.
21 Therefore, I would support one of the middle
22 alternatives of either eight or two squadrons based at
23 Miramar. Eight seems a little high to me, but if
24 that's the way things have to go, I understand it, and
25 I'll probably live with it.

PHc-1

4

1 Finally, I'd just like to say that I'm
2 impressed by the organization of this particular
3 opportunity to inform the public and by the
4 professionalism of all those who talked to me this
5 evening.
6
7 MR. MILES: Marvin, M-a-r-v-i-n, last name is
8 Miles, M-i-l-e-s.

PHc-2

PHc-2

Obviously we prefer the eight squadrons here at Miramar alternative. My only concern is housing, if they're going to do the housing on Miramar. Seems like the access -- if they're going to do housing where we think it's going to be, which is out here in northeast corner of the base, it would be a challenge to get access to Pomerado Road. And probably the best alternative would have a road stay on the base and connect in at Kearny Villa Road.

I think that's about it. Just looking forward to having a new aircraft.

(Whereupon, the public comments concluded.)

* * * * *

I, Claire A. Wanner, a Certified Shorthand Reporter of the State of California, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were placed under oath; that a verbatim record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; further, that the foregoing is an accurate transcription thereof.

12

13 Dated: This _____ day of _____,

14 _____,

15 at San Diego, California.

16

17

18

19

20

21 _____

Claire A. Wanner

22 CSR No. 12965

23

24

25

Response to Comments

Response to Comment PHa-1. Thank you for attending the public meeting and for your comments and your support of the project.

Response to Comment PHb-1. Flight paths for the Helicopter Outlying Landing Field (HOLF) have been added to Appendix C of the Final EIS (pages C-105 and C-106). Typical MV-22 training flights would not occur over any parts of the City of San Clemente. The initial point for ingress from the south to the HOLF is south of San Onofre Nuclear Generating Station. The flight path continues northeasterly up San Onofre Canyon, then northwesterly through a canyon connecting the San Onofre and San Mateo canyons, to the HOLF. The initial point from the north is Point Yankee, which is near the northernmost point of San Mateo canyon. The flight path continues southwesterly through San Mateo canyon to the HOLF. Additionally, as indicated in the Draft EIS, no significant noise impacts would result from training operations at MCB Camp Pendleton.

Response to Comment PHb-2. Thank you for attending the public meeting and for your comments. A breakdown of the existing rotary wing and fixed wing operations at MCB Camp Pendleton are shown in Table 6.1.2-1 of the Draft EIS. As indicated in the Draft EIS, the MV-22 would operate at existing range facilities, and established Special Use Airspace would not be expanded or modified with implementation of the proposed training operations. As such and as indicated in the Draft EIS, the proposed action would not result in significant impacts on range operations. The EIS provides a thorough and adequate analysis of the proposed action's airspace impacts for NEPA purposes.

The U.S. Marine Corps shares the concern about the potential for wildfire ignition and has developed a comprehensive approach to managing the risk from wildfires including a variety of precautionary operational restrictions under conditions of high fire danger identified in the comment. Section 6.1.16 of the EIS discusses wildfire potential, management, and impacts. It also incorporates by reference the discussion in section 6.1.14 (pages 6-78 through 6-81) of the Draft EIS regarding the adaptive management principles that would be applied to minimize risk of fire due to engine exhaust. These include restrictions on the use of the MV-22 under red and orange Fire Danger Rating days, despite the lack of evidence that MV-22 causes fires under operational conditions.

If you believe that a military aircraft from MCAS/MCB Camp Pendleton has violated the airspace over your community in an illegal manner or taken some negative flight action that results in harm to the community, please bring such issues to the Base's attention providing specific details and information about the incident at issue.

Response to Comment PHb-3. Thank you for attending the public meeting and for your comments. Ingress/egress routes to/from the Helicopter Outlying Landing Field (HOLF) have been added to Appendix C of the Final EIS (pages C-105 and C-106). Typical MV-22 training flights would not occur over any parts of the City of San Clemente. The initial point for ingress for the HOLF from the south is south of San Onofre Nuclear Generating Station. The flight path continues northeasterly up San Onofre Canyon, then northwesterly through a canyon connecting the San Onofre and San Mateo canyons, to

the HOLF. The initial point from the north is Point Yankee, which is near the northernmost point of San Mateo canyon. The flight path continues southwesterly through San Mateo canyon to the HOLF.

The computer modeling is based on dedicated and detailed acoustic measurements of each of the subject aircraft. For the CH-46E and the MV-22, the aircraft were flown past detailed microphone arrays for many different types of overflights to cover the operating envelope of the rotorcraft. The multi-dimensional measurements were then processed and installed into the computer model so that aircraft noise for these rotorcraft could be studied for any location. Before release for general use, the output from the computer model is compared against the measurement data and validated.

Response to Comment PHb-4. Thank you for attending the public meeting and for your comments. A notice of availability of the Draft EIS for public comment, information regarding the three open house sessions, and a CD of the Draft EIS was sent to the City Manager.

As required by NEPA and discussed in section 2.5 of the Draft EIS, the Department of the Navy has selected the Preferred Alternative (8-squadrons at MCAS Miramar and 2-squadrons at MCAS Camp Pendleton) because it best reflects both the fundamental and preferred selection criteria for basing of the MV-22, while minimizing adverse environmental effects.

Response to Comment PHb-5. Thank you for attending the public meeting and for your comments. Please see response to comment PHb-3 regarding flight tracts for the HOLF. Although you may hear single-events of helicopters or MV-22 utilizing MCB Camp Pendleton, the cumulative noise environment in terms of Community Noise Equivalent Level (CNEL) outside of MCB Camp Pendleton from aircraft operating within the base would be less than 65 dB, as shown and stated in Chapter 6 of the Draft EIS. Also, away from the airfield, the MV-22 would more often fly like a fixed wing aircraft (higher/faster) than a helicopter (lower/slower), which would mean reduced noise compared to the existing helicopters.

Conditions that limit atmospheric dispersion, such as calm winds and clear nights with surface-based temperature inversions, would increase the ambient concentration of proposed aircraft emissions within MCB Camp Pendleton and the identified adjacent housing areas. However, due to the intermittent occurrence of proposed aircraft emissions and their relatively low emission levels, the impact of these emissions would not contribute to an exceedance of a national or state ambient air quality standard, as identified in the Draft EIS. Since these standards represent allowable atmospheric concentrations at which the public health and welfare are protected and they include reasonable margins of safety to protect the more sensitive individuals in the population, proposed aircraft emissions within and adjacent to MCB Camp Pendleton would not accumulate to unhealthful levels.

Response to Comment PHb-6. Thank you for attending the public meeting and for your comments. Basing an equal amount of MV-22 aircraft in San Diego or Yuma would generate nearly the same amount of emissions at each air base. Additionally, each project alternative would generate the same amount of emissions within the MCB Camp Pendleton ranges, regardless of the basing locations (training would occur at MCB Camp Pendleton independent of whether they are based in San Diego or Yuma). While the baseline air quality conditions within the Yuma region are somewhat cleaner than

those in the San Diego region, the addition of proposed emissions to each region would result in less than significant cumulative impacts, as determined in the Draft and Final EIS.

Response to Comment PHb-7. Thank you for attending the public meeting and for your comments. Please see response to Comment PHb-5.

Response to Comment PHb-8. Thank you for attending the public meeting and for your comments. Considering both the introduction of MV-22 flight operations and the subtraction of CH-46E flight operations, proposed training operations at MCB Camp Pendleton would increase the number of flight operations at the base by approximately 1,900 annually per Table ES-2 of the Draft EIS. However, the MV-22 is quieter than the CH-46E in most flight modes on a single-event basis. Although there would be a slight increase relative to existing conditions, the cumulative noise environment in terms of Community Noise Equivalent Level (CNEL) outside of base boundary from aircraft operating ion base would be less than 65 dB as shown and stated in Chapter 6 of the Draft EIS. See also response to comment PHb-5.

Response to Comment PHc-1. Thank you for attending the public meeting, for your comments, and for your positive feedback regarding the meeting format.

Response to Comment PHc-2. Thank you for attending the public meeting, for your comments, and for your support of the proposed action. There is no proposed housing development at MCAS Miramar associated with the proposed basing of the MV-22. However, there is a separate military housing project associated with the construction of 1,400 military family housing units in East Miramar, as described on page 8-2 (cumulative impacts) of the Draft EIS. The EIS that was prepared specifically for the proposed military family housing included mitigation to minimize associated traffic impacts.

APPENDIX A-2

Scoping Summary Report

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Note: this includes the main text of the Scoping Report and Appendix A. Appendix B and C can be found on the MV-22 EIS project website (*http://www.mv22eiswest.net/*)

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Scoping Summary Report

Environmental Impact Statement for the West Coast Introduction of the MV-22

Final Report
March 2001

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EXECUTIVE SUMMARY

This scoping summary report presents the information from the scoping activities conducted for the environmental impact statement (EIS) for the West Coast Introduction of the MV-22. This document identifies the primary issues and concerns raised by the public during the scoping period. The comments provided by the public will be considered during the technical analysis and preparation of the EIS. This report contains all verbal and written comments submitted during the 57-day public scoping period (6 October 2000 through 1 December 2000). Although the scoping period officially concluded on 1 December 2000, public comments were accepted until 8 December 2000. All comments were categorized into major issue or resource areas and the frequency of comments received from the respective communities are included in the following tables.

Table ES-1. Frequency of Issues Raised During Scoping Process at Edwards AFB

	Resource Areas															
Commenting Category	Airfields and Airspace	Land Use	Socioeconomics	Community Facilities / Services	Transportation	Air Quality	Noise	Infrastructure and Utilities	Cultural Resources	Hazardous Materials	Topography, Geology, and Soils	Water Resources	Biological Resources	Visual Resources	Safety and Environmental Health	Environmental Justice
Federal Agencies	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
State Agencies	2	1	?	?	?	1	?	1	1	1	?	?	?	?	?	?
Local Agencies	7	3	6	1	?	?	?	3	?	?	?	?	?	?	?	?
Local Groups / Organizations	2	3	2	4	?	?	?	1	?	?	?	?	?	?	?	?
Individuals	?	3	3	?	?	1	?	?	?	?	?	?	1	?	?	?
Total	**11**	**10**	**11**	**5**	?	**2**	?	**5**	**1**	**1**	?	?	**1**	?	?	?

Table ES-2. Frequency of Issues Raised During Scoping Process at NAF El Centro

Commenting Category	*Resource Areas*															
	Airfields and Airspace	Land Use	Socioeconomics	Community Facilities / Services	Transportation	Air Quality	Noise	Infrastructure and Utilities	Cultural Resources	Hazardous Materials	Topography, Geology, and Soils	Water Resources	Biological Resources	Visual Resources	Safety and Environmental Health	Environmental Justice
Federal Agencies	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
State Agencies	?	?	?	?	?	?	?	?	1	1	?	?	?	?	?	?
Local Agencies	2	2	?	?	1	?	3	1	?	?	?	1	?	?	?	?
Local Groups / Organizations	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Individuals	1	?	2	?	?	?	1	?	?	?	?	?	?	?	?	?
Total	**3**	**2**	**2**	?	**1**	?	**4**	**1**	**1**	**1**	?	**1**	?	?	?	?

Table ES-3. Frequency of Issues Raised During Scoping Process at MCAS Yuma

Commenting Category	*Resource Areas*															
	Airfields and Airspace	Land Use	Socioeconomics	Community Facilities / Services	Transportation	Air Quality	Noise	Infrastructure and Utilities	Cultural Resources	Hazardous Materials	Topography, Geology, and Soils	Water Resources	Biological Resources	Visual Resources	Safety and Environmental Health	Environmental Justice
Federal Agencies	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
State Agencies	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Local Agencies	1	1	2	5	2	?	?	?	?	1	?	?	1	?	?	?
Local Groups / Organizations	1	?	1	?	?	1	?	1	1	?	?	?	?	?	?	?
Individuals	2	1	2	?	?	1	2	2	1	?	?	?	1	?	3	?
Total	**4**	**2**	**5**	**5**	**2**	**2**	**2**	**3**	**2**	**1**	?	?	**2**	?	**3**	?

Table ES-4. Frequency of Issues Raised During Scoping Process at MCAS Miramar

Commenting Category	*Resource Areas*															
	Airfields and Airspace	Land Use	Socioeconomics	Community Facilities / Services	Transportation	Air Quality	Noise	Infrastructure and Utilities	Cultural Resources	Hazardous Materials	Topography, Geology, and Soils	Water Resources	Biological Resources	Visual Resources	Safety and Environmental Health	Environmental Justice
Federal Agencies	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
State Agencies	?	?	?	?	?	?	1	?	1	1	?	1	2	?	1	?
Local Agencies	4	?	?	?	?	2	2	?	?	1	?	?	?	?	2	?
Local Groups / Organizations	19	1	2	2	?	7	13	?	?	?	?	1	3	?	12	?
Individuals	36	?	3	1	?	12	52	?	1	?	1	1	5	?	40	?
Total	**59**	**1**	**5**	**3**	?	**21**	**68**	?	**2**	**2**	**1**	**3**	**10**	?	**55**	?

Table ES-5. Frequency of Issues Raised During Scoping Process at MCAS Camp Pendleton

Commenting Category	*Resource Areas*															
	Airfields and Airspace	Land Use	Socioeconomics	Community Facilities / Services	Transportation	Air Quality	Noise	Infrastructure and Utilities	Cultural Resources	Hazardous Materials	Topography, Geology, and Soils	Water Resources	Biological Resources	Visual Resources	Safety and Environmental Health	Environmental Justice
Federal Agencies	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
State Agencies	?	?	?	?	?	?	?	?	1	1		1	2	?	1	?
Local Agencies	2	?	?	?	?	1	3	1	?	?	?	?	?	?	2	?
Local Groups / Organizations	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Individuals	13	?	3	1	?	5	28	?	?	?	?	?	?	?	10	?
Total	**15**	?	**3**	**1**	?	**6**	**31**	**1**	**1**	**1**	?	**1**	**2**	?	**13**	?

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C PUBLIC COMMENT LETTERS

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1.0 SCOPING PROCESS

The public scoping period for the West Coast Introduction of the MV-22 EIS officially began on 6 October 2000, with the publication of the Notice of Intent (NOI) in the Federal Register (see Appendix A). The NOI conveyed to the public the intent of the Department of the Navy to prepare an environmental impact statement (EIS) to evaluate the potential effects of the proposed action: The West Coast introduction of the MV-22 to the 3d and 4th Marine Aircraft Wings. The NOI also announced the dates, times, and locations of the public scoping meetings. In addition, the Marine Corps Public Affairs Office issued a press release announcing the dates, times, locations, and purpose of the scoping meetings on 4 October 2000 (Appendix A). Advertisements announcing the scoping meetings were also placed in the following local newspapers on 6 October 2000: Antelope Valley Press, Imperial Valley Press, Yuma Daily Sun, San Diego Union Tribune, North County Times, Orange County Register, and Los Angeles Times (Appendix A). The 57-day public scoping period officially ended on 1 December 2000. However, public comments were accepted until 8 December 2000.

The intent of the scoping process was to provide the opportunity for local communities, government agencies, special interest groups, and the general public to learn about the Marine Corps' proposal and to offer several ways for those interested to express their thoughts regarding the proposal. To accomplish this, seven scoping meetings were held.

2.0 PUBLIC SCOPING MEETINGS

Public scoping meetings were held from 25 October – 9 November 2000, at the seven locations shown in Table 1. The meetings were held in communities near each of the potential basing installations. Two meetings were held for both Marine Corps Air Station (MCAS) Miramar and MCAS Camp Pendleton, each in a different community.

Table 1. Schedule of Scoping Meetings and Attendance

Date	*Location*	*Attendance*
25 October 2000	Desert Inn Lancaster, CA	33
1 November 2000	County Administration Center El Centro, CA	13
2 November 2000	Yuma Main Library Yuma, AZ	36
6 November 2000	Torrey Pines High School San Diego, CA	64
7 November 2000	San Clemente High School San Clemente, CA	26
8 November 2000	Mira Mesa High School San Diego, CA	31
9 November 2000	Fallbrook Community Center Fallbrook, CA	20

3.0 PUBLIC SCOPING MEETING FORMAT

The public scoping meetings were designed with an "open house" format to create a comfortable, more informative atmosphere. Using this format, public participants could speak individually to Marine Corps personnel and other members of the project team. The goals of these meetings were to introduce the communities to the EIS process, provide available project information, answer questions from community members, and solicit public input on important issues and concerns. Over 200 community members attended the meetings, presenting important and challenging questions to the project team.

The meeting format consisted of a sign-in table at the scoping facility entrance and several information stations, each staffed by knowledgeable Marine Corps personnel and/or other members of the project team. Attendees visiting the information stations were provided the opportunity to observe a video of the MV-22 and a continuous play Powerpoint presentation which provided a brief discussion of the proposed action, alternatives, and NEPA process.

4.0 SCOPING PROCESS RESULTS

Meeting participants were offered the opportunity and encouraged to provide their verbal comments directly to a stenographer during each meeting for inclusion in the official scoping record. Transcripts from each of the scoping meetings are presented in Appendix B. Comment forms were also available for attendees to submit written comments. All comments, both written and verbal will receive the same consideration during the preparation of the EIS. Written comments were accepted at the scoping meetings and by mail throughout the public scoping period (Appendix C). The number of comments received by commenting category is summarized for each installation in Table 2.

Table 2. Public Comments Received During the Scoping Process

Commenting Category	*Installation*				
	Edwards AFB	*NAF El Centro*	*MCAS Yuma*	*MCAS Miramar*	*MCAS Camp Pendleton*
Federal Agencies	0	0	0	1	0
State Agencies	3	2	1	4	3
Local Agencies	8	4	4	4	2
Local Groups/ Organizations	9	1	3	16	3
Individuals	6	3	10	63	31
Total	**26**	**10**	**18**	**88**	**39**

The most frequently raised issues during the scoping period varied from installation to installation. With respect to Edwards Air Force Base (AFB) the major issues raised were regarding airfields and airspace, land use, and socioeconomics. At Naval Air Facility (NAF) El Centro comments most frequently expressed concerns about airfields and airspace and noise. Regarding MCAS Yuma, comments most frequently expressed concerns about airfields and

airspace, socioeconomics, and community facilities/services. MCAS Miramar commentors were primarily concerned with airfields and airspace, air quality, noise and vibration, and safety and environmental health. Regarding MCAS Camp Pendleton the public comments were focused on noise and vibration, airfields and airspace, and safety and environmental health. Tables ES-1 – ES-5 summarize the frequency of issues raised by resource area.

During the preparation of the EIS, the Marine Corps will consider the issues and concerns raised by the public during the scoping process. Based on the results of the public scoping process, the EIS will include detailed analyses of the potential resource-specific impacts (e.g., aircraft noise and vibration, flight operations, and safety) for each of the project alternatives. The EIS will include a matrix comparing the environmental impacts associated with each of the alternatives.

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Appendix A

Notice of Intent to Prepare an Environmental Impact Statement

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3810-FF

DEPARTMENT OF DEFENSE

Department of the Navy

NOTICE OF INTENT TO PREPARE AN ENVIRONMENTAL IMPACT STATEMENT FOR THE WEST COAST INTRODUCTION OF THE MV-22 TILT-ROTOR AIRCRAFT TO THIRD AND FOURTH MARINE AIRCRAFT WINGS

AGENCY: Department of the Navy, DOD

ACTION: Notice

SUMMARY: Pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969, as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508), the Department of the Navy intends to prepare an Environmental Impact Statement (EIS) to evaluate the potential environmental effects of the West Coast introduction of the MV-22 tilt-rotor aircraft to the Third and Fourth Marine Aircraft Wings.

DATES: All written comments must be postmarked no later than December 1, 2000.

ADDRESSES: Seven public scoping meetings will be held to receive oral and/or written comments from agencies and interested individuals on environmental concerns that should be addressed in the EIS.

1. October 25, 2000, from 6:00 pm to 10:00 pm at The Desert Inn, 44219 Sierra Highway, Lancaster, California;

2. November 1, 2000, from 6:00 pm to 10:00 pm at the County Administrative Center, 940 Main Street, Room 211, El Centro, California;

3. November 2, 2000, from 6:00 pm to 9:00 pm at Yuma Main Library, Auditorium, 350 Third Avenue, Yuma, Arizona;

4. November 6, 2000, from 6:00 pm to 10:00 pm at Torrey Pines High School, Lecture Hall, 3710 Del Mar Heights Road, San Diego, California;

5. November 7, 2000, from 6:00 pm to 10:00 pm at San Clemente High School, Little Triton Theater, 700 Avenida Pico, San Clemente, California;

6. November 8, 2000, from 6:00 pm to 10:00 pm at Mira Mesa High School, Auditorium, 10510 Reagan Road, San Diego, California;

7. November 9, 2000, from 6:00 pm to 10:00 pm at the Fallbrook Community Center, 341 Heald Lane, Fallbrook, California.

FOR FURTHER INFORMATION CONTACT: Mr. Doug Gilkey, Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Highway, San Diego, CA 92132-5190; telephone 619-532-3348, fax 619-532-2469, email gilkeyde@efdsw.navfac.navy.mil.

SUPPLEMENTARY INFORMATION: The MV-22 aircraft, known as the Osprey, represents a new technology in military aviation. This aircraft utilizes tilt-rotary technology to enable it to operate like a rotary-wing aircraft and a fixed-wing aircraft. The MV-22 will replace the aging CH-46 and CH-53 rotary-wing aircraft. In December 1999,

the Department of the Navy completed an EIS for introduction of the MV-22 to the Second Marine Aircraft Wing supporting Fleet Marine Force training and operations at Marine Corps Base (MCB) Camp Lejeune, North Carolina.

The proposal being evaluated in this EIS is the basing and operation of seven squadrons of MV-22 aircraft in the Third Marine Aircraft Wing and two squadrons of MV-22 aircraft in the Fourth Marine Aircraft Wing. The primary mission of the MV-22 in the Third and Fourth Marine Aircraft Wings will be to support Fleet Marine Force training and operations at MCB Camp Pendleton; accordingly, alternatives to be considered in the EIS are all aviation facilities within the operational radius of the MV-22 from MCB Camp Pendleton.

This proposal includes construction and/or renovation of facilities to accommodate the aircraft, and associated equipment and personnel. Also, the proposal includes the use of existing and potentially new outlying fields and other landing areas, as well as existing and potentially new airspace for military aircraft in support of both military training and operations.

The Marine Corps is currently evaluating all DoD West Coast installations to develop reasonable MV-22 siting alternatives. To date, five installations have been identified as potential receiving sites: Marine Corps Air Station (MCAS) Camp Pendleton, MCAS Miramar, MCAS Yuma, Naval Air Facility El Centro, and Edwards Air Force Base. Application of screening criteria will identify a range of reasonable alternatives that will be evaluated in the EIS and other siting alternatives may be considered as appropriate.

Environmental issues to be addressed in the EIS include: geological resources, biological resources, water resources, noise, air quality, land use compatibility, cultural resources, socioeconomics, environmental justice, public health and safety, transportation/circulation, aesthetics, utilities, hazardous materials and solid waste.

The Marine Corps will initiate a scoping process for the purpose of determining the extent of issues to be addressed, and identifying the significant issues related to this action. The Marine Corps will hold public scoping meetings as noted in the Addresses Section of this notice. These meetings will be advertised in area newspapers.

Marine Corps representatives will be available at these meetings to receive comments from the public regarding issues of concern to the public. Federal, state and local agencies, and interested individuals are encouraged to take this opportunity to identify environmental concerns that should be addressed during the preparation of the EIS. Agencies and the public are also invited and encouraged to provide written comments on scoping issues in addition to, or in lieu of, oral comments at the public meeting. To be most helpful, scoping comments should clearly describe specific issues or topics that the commentor believes the EIS should address.

Written comments must be postmarked no later than December 1, 2000, and mailed to: Commander, Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Highway, San Diego, CA 92132-5190 (Attn: Mr. Doug Gilkey).

20 Sep 00
Date

DUNCAN HOLADAY
Deputy Assistant Secretary of the Navy
(Installations and Facilities)

(Certified to be a true copy of the original)

Dated: 2 OCT 00

J. L. ROTH,
LCDR, JAGC, USN
Federal Register Liaision Officer.

MARINE CORPS PUBLIC AFFAIRS

Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Highway, San Diego, CA 92132-5190
Contact: Mr. Doug Gilkey
Phone: (619) 532-3348
FAX: (619) 532-2469

FOR IMMEDIATE RELEASE

Navy will prepare Environmental Impact Statement for the MV-22 Osprey

MCAS MIRAMAR, SAN DIEGO (Oct. 4) – The Department of the Navy will prepare an Environmental Impact Statement for the introduction of the MV-22 Osprey to the Third and Fourth Marine Aircraft Wings.

The purpose of the EIS is to evaluate the potential environmental effects of the introduction of the new tilt-rotor aircraft.

The Marine Corps is evaluating all Department of Defense West Coast installations within the operational radius of the MV-22 to develop reasonable site alternatives for the Osprey. To date, five installations have been identified as potential basing sites for the Osprey. These sites are Marine Corps Air Station Camp Pendleton, Marine Corps Air Station Miramar, Marine Corps Air Station Yuma, Naval Air Facility El Centro and Edwards Air Force Base. Other site alternatives may be considered if they are appropriate to the screening criteria.

The Marine Corps will initiate public scoping meetings in October and November to identify significant issues related to the Osprey. Locations, dates and times for these meetings will be published in the Federal Register and advertised in local newspapers on or around October 6. Department of the Navy officials will attend these meetings and receive public comment for use in the study.

Written comments will also be accepted until December 1. Written comments should be mailed to Commander, Southwest Division, Naval Facilities Engineering Command, Attn: Doug Gilkey, 1220 Pacific Highway, SanDiego, CA 92132-5190.

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This is a list of the scheduled public scoping meetings:

1. Edwards AFB October 25, 2000 from 6:00 p.m. to 10:00 p.m. at the Desert Inn, 44219 Sierra Hwy. Lancaster, CA 93534.
2. NAF El Centro November 1, 2000 from 6:00 p.m. to 10:00 p.m. at the County Administrative Center, 940 Main Street, Room 211, El Centro, CA 92243.
3. MCAS Yuma November 2, 2000 from 6:00 p.m. to 9:00 p.m. at the Yuma Main Library Auditorium, 350 Third Avenue, Yuma, AZ 85365.
4. MCAS Miramar November 6, 2000 from 6:00 p.m. to 10:00 p.m. at Torrey Pines High School Lecture Hall, 3710 Del Mar Heights Road, San Diego, CA 92130.
5. MCAS Pendleton November 7, 2000 from 6:00 p.m. to 10:00 p.m. at San Clemente High School Little Triton Theater, 700 Avenida Pico, San Clemente, CA 92673.
6. MCAS Miramar November 8, 200 from 6:00 p.m. to 10:00 p.m. at Mira Mesa High School Auditorium, 10510 Reagan Road, San Diego, CA 92126.
7. MCAS Camp Pendleton November 9, 2000 from 6:00 p.m. to 10:00 p.m. at the Fallbrook Community Center, 341 Herald Lane, Fallbrook, CA 92028.

For more information contact Mr. Doug Gilkey at (619) 532-3348.

--USMC--

Notice of Intent to
Prepare an Environmental Impact Statement for the
West Coast Introduction of the MV-22 Tilt-Rotor Aircraft to
Third and Fourth Marine Aircraft Wings

The Department of the Navy has prepared a Notice of Intent to prepare an Environmental Impact Statement (EIS) for the West Coast introduction of the MV-22 tilt-rotor aircraft, known as the "Osprey," to Third and Fourth Marine Aircraft Wings. The EIS will be prepared pursuant to Section 102 (2) (c) of the National Environmental Policy Act of 1969, as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508). The proposal being evaluated in the EIS is the basing and operation of Third and Fourth Marine Aircraft Wing MV-22 aircraft squadrons. The primary mission of the MV-22 will be to support Fleet Marine Force training and operations at Marine Corps Base (MCB) Camp Pendleton.

Alternatives being considered in the EIS for the basing and operation of the MV-22 squadrons are all aviation facilities within the operational radius of the MV-22 from MCB Camp Pendleton. To date, five installations have been identified as potential receiving sites: Marine Corps Air Station (MCAS) Camp Pendleton, MCAS Miramar, MCAS Yuma, Naval Air Facility El Centro and Edwards Air Force Base. The EIS will evaluate the potential environmental impacts from the adoption of the proposal.

The Marine Corps will initiate a scoping process and conduct scoping meetings in October and November for the purpose of determining the extent of issues to be addressed and to receive comments from the public regarding issues of public concern related to this proposal. The scoping meeting for Edwards Air Force Base is scheduled as follows:

Date: October 25, 2000

Time: 6:00 p.m. - 10:00 p.m.

Location: The Desert Inn
44219 Sierra Hwy.
Lancaster, AZ 93534

Agencies and interested members of the public are encouraged to provide their comments to Marine Corps representatives at the meeting. Written comments are also welcome in addition

to, or in lieu of, oral comments. Written comments must be postmarked no later than December 1, 2000, and should be mailed to Commander, Southwest Division, Naval Facilities Engineering Command, Attn: Doug Gilkey, Code 5NPR.DG, 1220 Pacific Highway, San Diego, CA 92132-5190. For more information please contact Mr. Gilkey by telephone at (619) 532-3348 or by e-mail at gilkeyde@efdsw.navfac.navy.mil.

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Alternatives being considered in the EIS for the basing and operation of the MV-22 squadrons are all aviation facilities within the operational radius of the MV-22 from MCB Camp Pendleton. To date, five installations have been identified as potential receiving sites: Marine Corps Air Station (MCAS) Camp Pendleton, MCAS Miramar, MCAS Yuma, Naval Air Facility El Centro and Edwards Air Force Base. The EIS will evaluate the potential environmental impacts from the adoption of the proposal.

The Marine Corps will initiate a scoping process and conduct scoping meetings in October and November for the purpose of determining the extent of issues to be addressed and to receive comments from the public regarding issues of public concern related to this proposal. The scoping meeting for Naval Air Facility El Centro is scheduled as follows:

Date: November 1, 2000

Time: 6:00 p.m. - 10:00 p.m.

Location: County Administrative Center
940 Main Street, Room 211
El Centro, CA 92243

Agencies and interested members of the public are encouraged to provide their comments to Marine Corps representatives at the meeting. Written comments are also welcome in addition

to, or in lieu of, oral comments. Written comments must be postmarked no later than December 1, 2000, and should be mailed to Commander, Southwest Division, Naval Facilities Engineering Command, Attn: Doug Gilkey, Code 5NPR.DG, 1220 Pacific Highway, San Diego, CA 92132-5190. For more information please contact Mr. Gilkey by telephone at (619) 532-3348 or by e-mail at gilkeyde@efdsw.navfac.navy.mil.

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Alternatives being considered in the EIS for the basing and operation of the MV-22 squadrons are all aviation facilities within the operational radius of the MV-22 from MCB Camp Pendleton. To date, five installations have been identified as potential receiving sites: Marine Corps Air Station (MCAS) Camp Pendleton, MCAS Miramar, MCAS Yuma, Naval Air Facility El Centro and Edwards Air Force Base. The EIS will evaluate the potential environmental impacts from the adoption of the proposal.

The Marine Corps will initiate a scoping process and conduct scoping meetings in October and November for the purpose of determining the extent of issues to be addressed and to receive comments from the public regarding issues of public concern related to this proposal. The scoping meeting for Marine Corp Air Station Yuma is scheduled as follows:

Date: November 2, 2000

Time: 6:00 p.m. - 9:00 p.m.

Location: Yuma Main Library
Auditorium
350 Third Ave.
Yuma, AZ 85365

Agencies and interested members of the public are encouraged to provide their comments to Marine Corps representatives at the meeting. Written comments are also welcome in addition to, or in lieu of, oral comments. Written comments must be postmarked no later than December 1, 2000, and should be mailed to Commander, Southwest Division, Naval Facilities Engineering Command, Attn: Doug Gilkey, Code 5NPR.DG, 1220 Pacific Highway, San Diego, CA 92132-5190. For more information please contact Mr. Gilkey by telephone at (619) 532-3348 or by e-mail at gilkeyde@efdsw.navfac.navy.mil.

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Alternatives being considered in the EIS for the basing and operation of the MV-22 squadrons are all aviation facilities within the operational radius of the MV-22 from MCB Camp Pendleton. To date, five installations have been identified as potential receiving sites: Marine Corps Air Station (MCAS) Camp Pendleton, MCAS Miramar, MCAS Yuma, Naval Air Facility El Centro and Edwards Air Force Base. The EIS will evaluate the potential environmental impacts from the adoption of the proposal.

The Marine Corps will initiate a scoping process and conduct scoping meetings in October and November for the purpose of determining the extent of issues to be addressed and to receive comments from the public regarding issues of public concern related to this proposal. The scoping meetings for Marine Corp Air Station Miramar are scheduled as follows:

Date:	**November 6, 2000**	**November 8, 2000**
Time:	**6:00 p.m. - 10:00 p.m.**	**6:00 p.m. - 10:00 p.m.**
Location:	**Torrey Pines High School** **Lecture Hall** **3710 Del Mar Heights Road** **San Diego, CA 92130**	**Mira Mesa High School** **Auditorium** **10510 Reagan Road** **San Diego, CA 92126**

Agencies and interested members of the public are encouraged to provide their comments to Marine Corps representatives at the meeting. Written comments are also welcome in addition to, or in lieu of, oral comments. Written comments must be postmarked no later than December 1, 2000, and should be mailed to Commander, Southwest Division, Naval Facilities Engineering Command, Attn: Doug Gilkey, Code 5NPR.DG, 1220 Pacific Highway, San Diego, CA 92132-5190. For more information please contact Mr. Gilkey by telephone at (619) 532-3348 or by e-mail at gilkeyde@efdsw.navfac.navy.mil.

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Alternatives being considered in the EIS for the basing and operation of the MV-22 squadrons are all aviation facilities within the operational radius of the MV-22 from MCB Camp Pendleton. To date, five installations have been identified as potential receiving sites: Marine Corps Air Station (MCAS) Camp Pendleton, MCAS Miramar, MCAS Yuma, Naval Air Facility El Centro and Edwards Air Force Base. The EIS will evaluate the potential environmental impacts from the adoption of the proposal.

The Marine Corps will initiate a scoping process and conduct scoping meetings in October and November for the purpose of determining the extent of issues to be addressed and to receive comments from the public regarding issues of public concern related to this proposal. The scoping meetings for Marine Corp Air Station Camp Pendleton are scheduled as follows:

Date:	**November 7, 2000**	**November 9, 2000**
Time:	**6:00 p.m. - 10:00 p.m.**	**6:00 p.m. - 10:00 p.m.**
Location:	**San Clemente High School** **Little Triton Theater** **700 Avenida Pico** **San Clemente, CA 92673**	**Fallbrook Community Center** **341 Heald Lane** **Fallbrook, CA 92028**

Agencies and interested members of the public are encouraged to provide their comments to Marine Corps representatives at the meeting. Written comments are also welcome in addition to, or in lieu of, oral comments. Written comments must be postmarked no later than December 1, 2000, and should be mailed to Commander, Southwest Division, Naval Facilities Engineering Command, Attn: Doug Gilkey, Code 5NPR.DG, 1220 Pacific Highway, San Diego, CA 92132-5190. For more information please contact Mr. Gilkey by telephone at (619) 532-3348 or by e-mail at gilkeyde@efdsw.navfac.navy.mil.