

APPENDIX A

Interim Action Ranges MRA Conceptual Site Model

8.0 INTERIM ACTION RANGES MRA CONCEPTUAL SITE MODEL

The Interim Action Ranges MRA CSM profiles are based on existing information and data provided by the Army and contained in the Fort Ord Administrative Record. Tables and figures associated with the Interim Action Ranges MRA are located at the end of Section 8.0.

8.1 Interim Action Ranges MRA Facility Profile

The facility profile provides information on location, physical boundaries, roadways and access, structures and utilities, historical military use, and administrative controls associated with the MRA.

8.1.1 Boundaries and Access

The Interim Action Ranges MRA is located in the north-central portion of the former Fort Ord, within the boundary of the former impact area. The Interim Action Ranges MRA is bordered by the Parker Flats MRA to the north, the Seaside MRA to the east, and the former impact area to the southeast, south, and southwest (Figure 8.1-1). The Interim Action Ranges MRA is contained within the jurisdictional boundaries of the City of Seaside and Monterey County.

The Interim Action Ranges MRA encompasses approximately 231 acres and fully contains the following five USACE property transfer parcels: E38, E39, E40, E41, and E42 (Table 8.1-1 and Figure 8.1-1).

Access into the Interim Action Ranges MRA is along Eucalyptus Road to the north, which is a roadway currently closed to vehicle traffic. Access to Eucalyptus Road is restricted by barriers (at the General Jim Moore Boulevard/Eucalyptus Road and Parker Flats Road/Eucalyptus Road intersections) and barricades marked with “road closed” signs (at the Parker Flats Cutoff/Eucalyptus Road intersection). Eucalyptus Road will serve as a major roadway of the FORA transportation network following road improvement construction.

Eucalyptus Road is bound by four-strand barbed-wire fencing reinforced with concertina wire, with locked chain-link gates and concertina wire to restrict access into the MRA. Warning signs indicating “U.S. Government Property-No Trespassing” and “Danger-Explosives Area” are posted along the fence line and locked gates. A number of unpaved roadways and dirt trails located throughout the MRA (Figure 8.1-1). Detailed information on roadways and access is provided in Table 8.1-2.

8.1.2 Structure and Utilities

The Interim Action Ranges MRA contains three existing buildings or structures (Figure 8.1-1; Army 2007). Detailed information concerning location, size, description of structures, presence of ACM and/or LBP, if evaluated, and year constructed is provided in Table 8.1-3.

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The Interim Action Ranges MRA is not served by any utilities. However, a water line crosses the northeastern corner of the MRA (Figure 8.1-1). More detailed information on utilities within the MRA is provided in Table 8.1-2.

8.1.3 Historical Military Use

Initial use of the Interim Action Ranges MRA began in approximately 1917 when the U.S. government purchased more than 15,000 acres of land and designated it as an artillery range. Although no training maps from this time period have been found, pre-World War II-era military munitions have been removed during previous Army response actions within the Interim Action Ranges MRA.

Figure 8.1-2 shows the locations of known firing ranges and training sites within the MRA. Table 8.1-4 summarizes the historical military uses of these areas within the Interim Action Ranges MRA. The Interim Action Range MRA contains the firing points for Ranges 43, 44, 45, 46, 47, and 48. It is expected that munitions activity within the Interim Action Ranges MRA occurred within the firing points on the ranges previously used for weapons training activities. The firing points for the ranges are located along the northern portion of the MRA. Historical ranges usage is summarized as follows:

- Range 43 - Platoon live-fire course, mortar training
- Range 44 - Antitank weapons
- Range 45 - Grenade Launcher
- Range 46 - Small Arms
- Range 47 - 40mm Grenades
- Range 48: Weapons familiarization, sniper, mortar, machine gun

To facilitate previous MEC investigations and removal activities, the historical use areas were designated as MRS 43-48 (Table 8.1.1 and Figure 8.1-3). The MRS was identified through a review of Fort Ord records (USACE 1997a). Table 8.1-4 identifies the historical military uses of the Interim Action Ranges MRA.

8.1.4 Administrative Controls

A number of administrative controls have been and will be imposed on the Interim Action Ranges MRA, including land use covenants, city and county ordinances, FORA resolutions, an MOA between FORA and the DTSC, habitat-related requirements, and BOs. The applicable administrative controls are described in more detail in Table 8.1-5. These administrative controls are enforceable and place constraints on field-related activities and future development activities until such time that remediation has been completed and the regulatory agencies have made a determination as to the closure status of the MRA.

8.2 Interim Action Ranges MRA Physical Profile

The physical profile provides information on topography, geology, vegetation, surface water, and groundwater associated with the MRA that may affect the location, movement, detectability, and recovery of military munitions.

8.2.1 Topography and Geology

The terrain of the Interim Action Ranges MRA is relatively flat. The elevation ranges from approximately 370 to approximately 530 feet msl with 2 to 15 percent slopes (Figure 8.2-1). The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil type present in the Interim Action Ranges MRA is Arnold-Santa Ynez Complex with Baywood Sand in the northwestern portion of the MRA (Figure 8.2-1). Soil conditions at the MRA consist predominantly of weathered dune sand, which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys. Table 8.2-1 provides more detailed information on the geology of the former Fort Ord and soils encountered within the MRA.

8.2.2 Vegetation

Vegetation in the Interim Action Ranges MRA consists primarily of maritime chaparral (Table 8.2-2 and Figure 8.2-2; USACE/Jones & Stokes 1992). Before the prescribed burn in 2003, most of the Interim Action Ranges MRA was covered by dense, 4- to 5-foot-tall maritime chaparral. Patches of annual grassland habitats exist along the western and southern boundaries of the MRA. There are areas within the MRA that are overgrown with poison oak.

8.2.3 Surface Water and Groundwater

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of a number of groundwater monitoring wells on former Fort Ord property near the Interim Action Ranges MRA. The Interim Action Ranges MRA overlies the Seaside groundwater basin, which is structurally complex and divided into several sub-basins. The depth to groundwater is estimated to be greater than 100 feet bgs. No wells are located within the MRA. The occurrence of groundwater beneath the MRA is not expected to influence geophysical surveys conducted for MEC remediation activities.

Reportedly, no surface-water features or delineated wetlands are present on the Interim Action Ranges MRA; however, an aquatic feature is present over 4,500 feet to the east-southeast of the MRA.

8.3 Interim Action Ranges MRA Release Profile

The release profile provides information on the MRA with respect to investigation and removal history, location and extent of military munitions, such as MEC, MPPEH, and MD, and history and conditions of HTW.

8.3.1 Investigation and Removal History

Previous work in the Interim Action Ranges MRA includes grid sampling, Ordnance and Explosives (OE) support for the establishment of trails and fuel breaks, limited surface removal, a surface TCRA, OE support for the prescribed burn, and removal actions. The following describes the investigation and removal operations performed by the Army in the Interim Action Ranges MRA:

- Range 44 Trail Sampling – 4-foot grid sampling and MEC removal at 11 15-foot by 100-foot grids in April 1997 (USA 2001d)
- Range 44 Subsurface Removal – 4-foot MEC removal at two 100-foot by 100-foot grids in April 1997 (USA 2001k and Parsons 2007)
- Range 44 Grid Sampling – grid sampling at one 100-foot by 100-foot grid in August 1997 (Parsons 2007)
- Range 44 Special Case Area Surface Removal – surface removal of any MEC, non MEC-like MD, or general metallic debris items greater than 2 inches in any dimension encountered within accessible areas from March 19-30, 2007 (Shaw 2007)
- OE-15A Grid Sampling (Range 46) – 100 percent sampling to a depth of 4 feet at three 100-foot by 100-foot grids in October 1997 (USA 2000a)
- OE-15B Grid Sampling – 100 percent sampling to a depth of 4 feet at two 100-foot by 100-foot grids in October 1997 (USA 2000d)
- Evolution Road Fuel Break Reestablishment – 4-foot MEC removal at 53 15-foot by 100-foot grids from November 1997 to January 1998 (USA 2001p)
- Blue Line Fuel Break Establishment – 4-foot MEC removal at 56 100-foot by 30-foot grids from May to June 1998 (USA 2001p)
- Impact Area Grid Sampling – 100 percent grid sampling and 4-foot MEC removal at six 100-foot by 100-foot grids from March to August 1999 (USA 2000a)
- Range 46 Lead-Contamination Soil Remediation Project – Grid sampling and 4-foot MEC removal to support efforts to remediate spent SAA and lead contamination at nine 100-foot by 100-foot grids from April to August 1999 (Parsons 2007)
- Range 45 Safety Surface Removal – Surface removal conducted in response to trespassing incidents at 11 100-foot by 100-foot grids from April to October 1999 (Parsons 2007)

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- Impact Area Fuel Break Maintenance – Surface and subsurface removals conducted to establish fuel breaks at 62 45-foot by 100-foot grids, 52 30-foot by 100-foot grids, and 89 15-foot by 100-foot grids from February to August 2001 (Parsons 2006a)
- Surface Time Critical Removal Action in Visible Areas at 37 1,000-foot by 1,000-foot grids from August to December 2001 (Parsons 2002b)
- MRS-Ranges 43-48 Interim Action – Visual surface removal from November 2003 to February 2004 (Parsons 2007)
- Analog removal to depth at 1,261 100-foot by 100-foot grids from December 2003 to July 2005 (Parsons 2007)
- Range 45 sifting and sorting operations – Sifting and sorting in 14-acre area to a depth of 2 feet and Range 45 pad deconstruction from May to October 2005 (USA 2001q)
- Range 45 analog removal and digital geophysical mapping – Range 45 scraped areas at eight 100-foot by 100-foot grids from October to November 2005 (USA 2001q)
- Range 43-48 digital mapping and excavation operations – Accessible areas subject to analog removal included 1,249 100-foot by 100-foot grids from July 2004 to November 2005 (Parsons 2007)
- The Interim Action at Ranges 43-48 designated several areas as Special Case Areas or non-completed areas. Subsurface removal was not completed due to high concentration of debris/anomalies and other reasons (Parsons 2007)
- Preparatory Action – Fire preparation and control work was completed between August and October 2002 in preparation for the Ranges 43-48 prescribed burn (Parsons 2004a)
- Prescribed Burn – A prescribed burn was conducted in October 2003 on Ranges 43-48 to clear vegetation from the ranges so that MEC removal teams could safely operate geophysical detection instruments over the site. The prescribed burn cleared approximately 95 percent of the vegetation covering the site, revealing numerous MEC previously hidden by the brush (Parsons 2004a)

These investigations, sampling, and removal actions are summarized in Table 8.3-1. During the removal actions, 20 burial pits containing MEC were discovered in the MRA (Figure 8.3-2). Table 8.3-2 provides more detail on the specific types of MEC recovered from these burial pits. The results of these investigations and removal actions with respect to the types of MEC recovered are summarized in Table 8.3-3, and MEC and MD are shown on Figures 8.3-1, 8.3-2, and 8.3-3.

8.3.2 Types of MEC Recovered and Hazard Classification

Table 8.3-3 includes a summary of MEC recovered from the Interim Action Ranges MRA and associated hazard classification scores. All MEC removed from the MRA were identified and assigned a hazard classification. Hazard classification scores range from 0 to 3 according to the following descriptions:

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Hazard Classification Score	Description
0	Inert MEC that will cause no injury
1	MEC that will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities
2	MEC that will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities
3	MEC that will kill an individual if detonated by an individual's activities

The hazard classification provides a qualitative assessment of risk for MEC. These classifications will be used as inputs in future risk assessments for the Interim Action Ranges MRA. It should be noted that SAA is not considered in the risk assessment because SAA poses no explosive risk.

8.3.3 Location of MEC and MD

Figures 8.3-1, 8.3-2, and 8.3-3 show the location of MEC and MD previously removed from the Interim Action Ranges MRA. A summary of the MEC and MD encountered during previous investigations and removal actions in the Interim Action Ranges MRA is provided in Table 8.3-4 and included:

- 10,165 UXO items
- 84 DMM items
- 125 ISD items (MPPEH that could not be classified as UXO, DMM, or MD)
- 196,996 pounds of MD (includes MD-E and MD-F items if weights were documented)

The greatest concentrations of MEC and MD were encountered in the vicinity of Ranges 44 and 45. The MEC found during sifting operations in Range 45 are not shown on Figure 8.3-1, but are included in Table 8.3-3. The weight of MD ranges from zero to greater than 100 pounds per grid. The MD collected during sifting operations at Range 45 are not shown on Figure 8.3-1. Additional research is needed to verify whether the grids showing that no MD was found in a grid are an accurate representation of data. It appears that these zero MD grids are in areas where no subsurface removal actions have been accomplished. The MD identified on Figures 8.3-1 and 8.3-3 includes SAS but not SAA. Approximately 227 acres of the MRA were designated as SCAs or non-completed areas as shown on Figure 8.3-4.

The MMRP database indicates that the majority of the MEC removed from the MRA were located on the surface; however, this observation may not include subsurface MEC removed during the Range 44 sifting operations. Figure 8.3-5 shows the distribution of MEC recovered at specified depth intervals.

8.3.4 HTW History and Conditions

A BRA was conducted by the Army to evaluate the potential presence of COCs related to HTW at known or suspected small arms ranges and military munitions training sites within the former Fort Ord (Shaw/MACTEC 2006). The areas are identified as HAs. The objectives of the BRA investigation activities were to identify which HAs could be eliminated from consideration for potential remediation related to COCs, and to identify areas that require additional investigation for potential chemical contamination or should be considered for remediation/habitat mapping related to COCs.

Table 8.3-5 summarizes the findings of the BRA with respect to HTW for each range. Based on the BRA, further evaluation was recommended for HA-43 (Range 43) and HA-44 (Range 44) based upon the presence of munitions constituents (lead and/or HMX) detected in soil samples. Ranges 43 and 44 will be remediated by the Army in accordance with the “Final Feasibility Study Addendum Site 39 Ranges, Former Fort Ord, California, Revision 0” (Shaw/MACTEC 2008). No further action has been recommended for the other HAs identified within this MRA (Army 2007).

8.3.5 Regulatory Status

Work completed to date has been documented in after action reports, which have received regulatory reviews; however, the regulatory agencies have identified the following outstanding issue:

- The CERCLA process must be completed for the Interim Action Ranges MRA, including development of an RI/FS, development of a Proposed Plan, and completion of a ROD

8.4 Interim Action Ranges MRA Land Use and Exposure Profile

The land use and exposure profile provides information on the MRA with respect to cultural resources, the current and reasonably foreseeable future uses of the land, and the potential human receptors that may be exposed to military munitions.

8.4.1 Cultural Resources

According to archaeological records, the greater Monterey Peninsula was occupied by Native American groups, including the Ohlone (Costanoan) Indians (EA 1991). Monterey County has designated the southeastern margin of the former Fort Ord as an archaeologically sensitive zone based on two known archaeological sites (EA 1991). The remaining portions of the former Fort Ord have been designated as having low or no archaeological sensitivity. The Interim Action Ranges MRA is located in the north-central portion of the former Fort Ord in an area designated as having low to no archaeological sensitivity.

Actions to be taken at the Interim Action Ranges MRA will be in compliance with the Programmatic Agreement Among the Department of the Army, the Advisory Council on

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Historic Preservation, and the California State Historic Preservation Officer Regarding the Base Closure and Realignment Actions at Fort Ord, California.

8.4.2 Current Land Use

The current uses for the MRA include habitat. There are residual structures that were in support of the training at the MRA, but these have been abandoned. There is also evidence of trespasser activity and illegal dumping.

8.4.3 Reasonably Foreseeable Future Land Use

Table 8.4-1 and Figure 8.4-1 identify the proposed uses of the MRA by parcel. As indicated in the Base Reuse Plan, this area is planned for development with borderland interface and habitat reserve. It is important to note that the general development land use category encompasses infrastructure activities such as roadway and utility construction as well as commercial/retail, parks, and borderland activities.

8.4.4 Potential Receptors

A number of potential human receptors that could come in contact with residual MEC have been identified for current and future land use scenarios. The potential human receptors include:

- Construction Workers (persons conducting surface and subsurface construction activities) – current/future
- Utility Workers (persons installing and maintaining surface and subsurface utilities) – current/future
- Trespassers (persons not authorized to enter or use an area) – current/future
- Firefighters (may require installation of fire breaks) – current/future
- Emergency Response Workers (police and emergency medical technicians conducting surface activities) – current/future
- Ancillary Workers (biologist, archaeologists) – current/future
- Recreational Users (persons biking or on foot) - future

8.5 Interim Action Ranges MRA Ecological Profile

The ecological profile provides information on the MRA with respect to biological resources, plant communities and habitats, threatened and endangered species, and habitat management. This information is discussed below and provided in Table 8.5-1.

As discussed in Section 8.3.4, COCs related to HTW have been previously addressed or will be addressed by the Army. Therefore, potential exposure of ecological receptors to the

primary risk factors have been mitigated or will be mitigated to an acceptable level and ecological receptor exposure is not considered further in this CSM.

The HMP identifies the Interim Action Ranges MRA as development with borderland interface areas along an NRMA interface and habitat reserve (Figure 8.5-1). The NRMA separates the development category land from the adjacent habitat reserve area. The NRMA and habitat reserve areas support plant and animal species that require implementation of mitigation measures identified in the HMP to ensure compliance with the ESA and to minimize impacts to listed species.

FORA will implement the mitigation requirements identified in the HMP for MEC activities in accordance with the BOs developed during formal consultation between the Army and the USFWS under Section 7 of the ESA. For habitat areas, these measures include conducting habitat monitoring in compliance with Chapter 3 of the HMP (USACE 1997b). For borderland areas, FORA will follow best management practices while conducting work to prevent the spread of exotic species, limit erosion, and limit access to the NRMA.

8.5.1 Major Plant Communities and Ecological Habitats

Vegetation in the Interim Action Ranges MRA consists primarily of maritime chaparral (Table 8.2-2 and Figure 8.2-2; USACE/Jones & Stokes 1992). Before the prescribed burn, most of the Interim Action Ranges MRA was covered by dense, 4- to 5-foot-tall maritime chaparral. Patches of annual grassland habitats exist along the western and southern boundaries of the MRA. There are areas within the MRA that are overgrown with poison oak.

8.5.2 Threatened and Endangered Species and Critical Habitat

Special-status biological resources are those resources, including plant, wildlife, and native biological communities, that receive various levels of protection under local, state, or federal laws, regulations, or policies. The closure and disposal of former Fort Ord is considered a major federal action that could affect several species proposed for listing or listed as threatened or endangered under the federal ESA.

The HMP for former Fort Ord complies with the USFWS BOs and establishes the guidelines for the conservation and management of wildlife and plant species and habitats that largely depend on former Fort Ord land for survival (USACE 1997b). The HMP incorporated conservation measures pursuant to USFWS BOs dated prior to issuance of the HMP in April 1997. Since April 1997, three additional BOs have been issued that are relevant to MEC removal activities (USFWS 1999, 2002, and 2005). Future MEC remediation is required to be consistent with the applicable conservation measures.

Threatened or endangered plant species identified as having possible occurrence in the Interim Action Ranges MRA include sand gilia (endangered) and Monterey spineflower (threatened). A portion of the Interim Action Ranges MRA has been designated as critical habitat for the Monterey spineflower by the USFWS.

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In 2004, the CTS was identified as a threatened species. CTS may be found as far as 2 km from aquatic breeding habitats. As shown on Figure 8.5-1, it is possible the CTS may be found in the Interim Action Ranges MRA as the MRA is within 2 km of aquatic features (i.e., vernal pools, ponds) that may provide habitat for the CTS.

8.5.3 Other Communities and Species of Concern

As identified in the HMP, a number of species could be found on the Interim Action Ranges MRA, which have been identified in Table 8.5-2 by parcel. The vegetation on the MRA consists primarily of maritime chaparral. The following species are identified in the HMP as having possible occurrence in the Interim Action Ranges MRA: sandmat manzanita and California linderiella.

8.6 Interim Action Ranges MRA Pathway Analysis

Per the discussion in Sections 8.3.4 and 8.5, potential exposure of human and ecological receptors to COCs related to the HTW program has been evaluated by the Army; based on the Army's evaluation, further action relative to the COCs is required for Ranges 43 and 44. These remedial actions will be conducted by the Army in accordance with the "Final Feasibility Study Addendum Site 39 Ranges, Former Fort Ord, California, Revision 0" (Shaw/MACTEC 2008) and not under the ESCA RP. Therefore, no further discussion of potential exposure to human or ecological receptors to COCs relative to the HTW program is presented in this pathway analysis. The primary focus of the exposure pathway analysis is for human health risk from MEC that are potentially present.

8.6.1 Exposure Pathways

An exposure pathway analysis was conducted for the Interim Action Ranges MRA using the information gathered in the CSM profiles. Exposure pathways for the Interim Action Ranges MRA are presented on Figure 8.6-1 and discussed below.

Source

Source areas within the Interim Action Ranges MRA were addressed during the Army's previous removal actions, with the exception of SCAs and non-completed areas (Figure 8.3-4). The historical source areas within the Interim Action Ranges MRA are shown on Figure 8.1-3, and recovered MEC and MD from the MRA are shown on Figures 8.3-1, 8.3-2, and 8.3-3. The source areas include firing points, target areas, and range safety fans for military weapons training and troop training and maneuver areas. It is anticipated that SCAs and non-completed areas would contain types of MEC similar to those found in adjacent areas.

Figure 8.6-2 illustrates the most likely release mechanisms for MEC being found in the Interim Action Ranges MRA, which included:

- Mishandling/Loss, Abandonment, or Burial (Military Weapons Training)

- Direct Firing (Military Weapons Training)
- Indirect Firing (Military Weapons Training)
- Thrown (Military Weapons Training)
- Firing, Intentional Placement, Mishandling/Loss, Abandonment, and Burial (Troop Training and Maneuvers)

Access

The Interim Action Ranges MRA is restricted by barded-wire fencing surrounding the former impact area and road barricades along Eucalyptus Road.

Receptor / Activity

Table 8.6-1 identifies the potential human receptors and exposure media as Ground Surface or Below Grade. The risk is greatest in areas having no history of subsurface MEC removal actions.

8.6.2 Exposure Pathway Analysis

As discussed above, Figure 8.6-1 graphically presents the exposure pathways analysis for the Interim Action Ranges MRA. The graphic shows the current and future potentially incomplete and potentially complete pathways for activities in the Interim Action Ranges MRA.

There remains a risk of MEC exposure to current and future receptors during intrusive activities. The risk of surface exposure was greatly reduced as a result of surface removal actions and sifting operations. Three current and three future receptors anticipated to conduct subsurface activities would be at risk of exposure. This pathway could be complete if subsurface activities occur in the SCAs and non-completed areas. The SCAs and non-completed areas are in the area designated as habitat; therefore, it is less likely that the receptors would conduct subsurface activities in those areas, although some lighter intensity intrusive activities may be required occasionally (e.g., biologists driving stakes as part of the biological monitoring requirements in habitat areas per the HMP).

8.7 Interim Action Ranges MRA Conclusions and Recommendations

Potential exposure of human and ecological receptors to COCs related to the HTW program has been or will be evaluated by the Army. No further action relative to the COCs is required under the ESCA RP. The CSM has identified a potential for human health risk associated with residual (or potentially present) MEC in the Interim Action Ranges MRA.

As required by the AOC, the SEDR provides conclusions and recommendations for each MRA. Generally, the SEDR recommendations identify that a particular MRA falls into one or more of the following categories:

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- No response action or no further response action is appropriate
- Response action is necessary
- Additional data are required to fill data gaps
- Proceed to RI

The MEC encountered within the Interim Action Ranges MRA are consistent with the historical use as a military weapons training and troop training area. Army has conducted removal actions over the majority of the MRA. The Interim Action Ranges MRA falls into the category of proceed to RI. Based on the information presented in the CSM for the Interim Action Ranges MRA, the recommendation is:

- Proceed with Documentation – Prepare RI/FS and subsequent ROD.

The proposed pathway to regulatory closure incorporating the above recommendation is presented in Section 13.0 of this SEDR.

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Table 8.1-1

Interim Action Ranges MRA –Parcel Numbers, Acreage, and MRS Identifiers

USACE Parcel Number (for land transfer)	Acreage (approximate)	MRS Identifier
E38	18	MRS-Ranges 43-48
E39	166	MRS-Ranges 43-48
E40	25	MRS-Ranges 43-48
E41	9	MRS-Ranges 43-48
E42	13	MRS-Ranges 43-48
MRA TOTAL	231	

Table 8.1-2

Interim Action Ranges MRA – Site Features

Feature	Description
Roadways	<ul style="list-style-type: none"> Access into the MRA is along Eucalyptus Road to the north, which is a roadway currently closed to vehicle traffic. Eucalyptus Road will serve as a major roadway of the FORA transportation network following road improvement construction. There are a number of unpaved roadway and dirt trails located throughout the MRA.
Structures and Utilities	<ul style="list-style-type: none"> The MRA contains three existing buildings and structures, which include an observation tower, range support building at Range 45, and field latrines. The MRA is not served by any utilities. A water line crosses the northeastern corner of the MRA
Fencing and Access	<ul style="list-style-type: none"> Access to Eucalyptus road is restricted by barriers (at the General Jim Moore Boulevard/Eucalyptus Road and Parker Flats Road/Eucalyptus Road intersections) and barricades marked with “road closed” signs (at the Parker Flats Cutoff/Eucalyptus Road intersection). The MRA is located within the former impact area which is surrounded by barded-wire fencing to restrict access to the property.

Table 8.1-3

Interim Action Ranges MRA – Existing Structures and Buildings

Parcel Number	Facility Number	Area (square feet)	Description	Asbestos-Containing Material	Lead-Based Paint	Year Built
E40	2A41	435	Building, Range 45	Unknown	Unknown	Unknown
E40	3917	95	Observation Tower	Unknown	YES	1956
E40	R9451	171	Field Range Latrines	Unknown	NO	1984

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Table 8.1-4
Interim Action Ranges MRA – Historical Military Use

Location	Description
Range 43	<ul style="list-style-type: none"> Range used as a platoon live-fire course and mortar training. Items found or used on the range included: <ul style="list-style-type: none"> Grenades (hand, fragmentation) Mortars (4.2-inch, HE, WP; 60mm, target practice, illumination; 81mm HE, WP, TP, illumination) Projectiles (37mm, LE; 40mm grenade launcher, smoke, practice; 57mm, HE; 75mm, HE, shrapnel; 105mm smoke, HE; 155mm smoke) Rockets (66mm, LAW) SAA
Range 44	<ul style="list-style-type: none"> Range used for antitank weapons. Items found or used on the range included: <ul style="list-style-type: none"> Mines (antipersonnel, practice) Missiles (Dragon guided; practice and HEAT) Projectiles (37mm armor-piercing; 40mm, grenade, HE, practice; 84mm, HEAT; 90mm, recoilless rifle, HEAT) Rockets (35mm LAW, subcaliber; 66mm LAW, HEAT; 66mm incendiary)
Range 45	<ul style="list-style-type: none"> Range used for grenade launchers. Items found or used on the range included: <ul style="list-style-type: none"> Grenades (hand, illumination, smoke, practice) Mortars (60mm, HE, practice) Mines (antipersonnel, practice) Projectiles (14.5mm and 22mm subcaliber; 40mm grenade, practice, HE, smoke, illumination) Rockets (35mm subcaliber; 66mm LAW (HEAT from Range 44); 66mm incendiary)
Range 46	<ul style="list-style-type: none"> Range used for small arms. Items found or used on the range included small arms (pistols and rifles).
Range 47	<ul style="list-style-type: none"> Range used for grenade training. Items found or used on the range included grenades (40mm, HE).
Range 48	<ul style="list-style-type: none"> Range used for weapons familiarization, sniper, mortar, and machine gun grenade launchers. Items found or used on the range included: <ul style="list-style-type: none"> Grenades (hand, fragmentation; rifle, practice) Mines (antitank, practice; antipersonnel, practice) Missiles (Dragon guided, HEAT) Mortars (4.2-inch, HE; 60mm, HE, TP, illumination; 81mm, HE, WP, TP, illumination) Projectiles (22mm subcaliber; 40mm grenade launcher, HE; 57mm, HE; 75mm, HE;

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Location	Description
	<p>84mm, practice, HEAT; 105mm HE, smoke, illuminating; 155mm, smoke)</p> <ul style="list-style-type: none">• Rockets (2.36-inch, practice; 3.5-inch, practice; 35mm subcaliber, practice; 66mm LAW HEAT; 66mm incendiary)• Signal (illumination)• Small arms

References: USACE 1997a and Parsons 2007

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Table 8.1-5
Interim Action Ranges MRA – Administrative Controls

Type	Description
Land Use Covenants	<ul style="list-style-type: none"> To further ensure protection of human health and the environment, the Army has agreed to enter into CRUPs with the State of California. The CRUPs place additional use restrictions on all of the transferring property, as appropriate. Due to Fort Ord's former use as a military installation, the property may contain MEC and there remains a risk of encountering subsurface MEC. Any person conducting ground disturbing or intrusive activities (e.g., digging or drilling) must comply with the applicable municipal code. Any alterations, additions, or improvements to the property in any way that may violate excavation restrictions are prohibited. No actual or potential hazard exists on the surface of the property from MEC that may be in the subsurface of the property provided the CRUPs are adhered to (Army 2007) The CRUPs are defined in the "Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxics Substances Control Concerning the Monitoring and Reporting of Environmental Restrictions on the Former Fort Ord, Monterey County, California." These restrictions involve the enforcement of site review and reporting requirements and agency cost recovery/reimbursement requirements as imposed by the DTSC.
Restrictions to Digging / Excavation	<ul style="list-style-type: none"> City of Seaside Ordinance No. 259 amending the municipal code referred to as Chapter 15.34 and Monterey County Ordinance 16.10. These ordinances prohibit excavation, digging, development, or ground disturbance of any type on the former Fort Ord that involves the displacement of 10 or more cubic yards of soil without approval.
FORA Resolution 98-1	<ul style="list-style-type: none"> An approved FORA resolution that contains proposed and suggested measures to avoid or minimize hazardous material impact.
ESCA MOA	<ul style="list-style-type: none"> MOA between FORA and the jurisdictions for the purpose of defining terms of an agreement for holding and managing (ownership and responsibilities) property while remedial work is accomplished under an ESCA. MOA establishes FORA's ownership during the MEC remediation period; identifies that jurisdictions need to provide public safety response from police, fire, and other emergency personnel as needed; establishes control of access to ESCA properties during the MEC remediation period; and agreement that access to properties will be governed by the restrictions included in the Land Use Covenant accompanying the transfer of the property.
Habitat Management Plan	<ul style="list-style-type: none"> This MRA is identified as development with borderlands interface and habitat reserve. The requirements for the borderlands interface have both short and long-term requirements. Interim requirements include the maintenance of firebreaks and vehicle barriers where appropriate. Long-term requirements apply as development occurs. Except for the habitat reserve and borderland interface parcels, the MRA is available for development once the future regulatory requirements have been completed. The HMP incorporated conservation measures pursuant to USFWS BOs dated prior to issuance of the HMP in April 1997. Specific MEC activities were addressed in Chapter 3 of the HMP (USACE 1997b).

Table 8.1-5
Interim Action Ranges MRA – Administrative Controls

Type	Description
Biological Opinions/ Critical Habitat	<ul style="list-style-type: none">• Since the release of the HMP, three additional BOs have been issued that are relevant to the MEC remediation period (USFWS 1999, 2002, and 2005). Accordingly, some information has been updated and additions have been made to the sections that address MEC activities.• A portion of the Interim Action Ranges MRA has been designated as critical habitat for the Monterey spineflower.• Future MEC work is required to be consistent with the applicable conservation measures.

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.2-1
Interim Action Ranges MRA – Geology and Soils

Type	Description
General Geology	<ul style="list-style-type: none"> The former Fort Ord is located within the Coast Ranges Geomorphic Province, which consists of northwest-trending mountain ranges, broad basins, and elongated valleys generally paralleling the major geologic structures. The former Fort Ord is located at the transition between the mountains of the Santa Lucia Range and the Sierra de la Salinas to the south and southeast, respectively, and the lowlands of the Salinas River Valley to the north. The geology of the former Fort Ord generally reflects this transitional condition. Older, consolidated rocks are characteristically exposed in the mountains near the southern base boundary but are buried under a northward-thickening sequence of younger, unconsolidated alluvial fan and fluvial sediments in the valleys and lowlands to the north. In the coastal lowlands, these younger sediments commonly interfinger with marine deposits. The former Fort Ord and the adjacent areas are underlain, from depth to ground surface, by one or more of the following older, consolidated units: Mesozoic granite and metamorphic rocks; Miocene marine sedimentary rocks of the Monterey Formation; and upper Miocene to lower Pliocene marine sandstone of the Santa Margarita Formation (and possibly the Pancho Rico and/or Purisima Formations). Locally, these units are overlain and obscured by geologically younger sediments, including: Pliocene-Pleistocene alluvial fan, lake, and fluvial deposits of the Paso Robles Formation; Pleistocene eolian and fluvial sands of the Aromas Sand; Pleistocene to Holocene valley fill deposits consisting of poorly consolidated gravel, sand, silt, and clay; Pleistocene and Holocene dune sands; recent beach sand and alluvium. Depth to groundwater is likely to be more than 100 feet bgs. Layers of perched groundwater may be present.
Topography and Soils	<ul style="list-style-type: none"> Terrain of the MRA is relatively flat. Elevation ranges from approximately 370 to 530 feet msl with 2 to 15 percent slopes. The surface soils are characterized as eolian (sand dune) and terrace (river deposits); which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil type present in the MRA is Arnold-Santa Ynez Complex with a smaller area of Baywood Sand with 2 to 15 percent slopes in the northeastern portion of the MRA.

References: EA 1991, HLA 1995, and the Fort Ord MMRP Database

Table 8.2-2
Interim Action Ranges MRA – Vegetation

USACE Parcel Number	MRS Identifier	Vegetation
E38	MRS-Ranges 43-48	Maritime Chaparral
E39	MRS-Ranges 43-48	Maritime Chaparral
E40	MRS-Ranges 43-48	Maritime Chaparral
E41	MRS-Ranges 43-48	Maritime Chaparral
E42	MRS-Ranges 43-48	Maritime Chaparral

Reference: USACE/Jones & Stokes 1992

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-1

Interim Action Ranges MRA – Investigation, Sampling, and Removal Activities

Activity	Summary
Range 44	<ul style="list-style-type: none"> Trail Sampling (April 1997) - Grid sampling was conducted with Schonstedt magnetometers to a 4-foot depth on a 15-foot-wide trail. The trail linked approximately 5-acres in and around Range 44. During the establishment of the Range 44 trail, no MEC was encountered (USA 2001d). Range 44 Grid Subsurface Removal (April 1997) - A 4-foot removal was conducted with Schonstedt magnetometers on two 100-foot-by-100-foot grids in Range 44 (grids 05A and 05B) (USA 2001k and Parsons 2007). Range 44 Grid Sampling (August 1997) - Sampling was performed on a grid in Range 44 that contained a target. No MEC items or munitions debris were encountered during this sampling activity (Parsons 2007). Range 44 Special Case Area Surface Removal (March 2007) – Surface removal of any MEC, non-MEC-like MD, or general metallic debris items greater than 2 inches in any dimension encountered within accessible areas (Shaw 2007)
Range 45	<ul style="list-style-type: none"> April and October 1999, a surface removal was performed on Range 45 as an immediate safety action in response to trespassing incidents that occurred at Range 44 and Range 45 (USA 2001q and Parsons 2007).
Range 46	<ul style="list-style-type: none"> Between April and August 1999, a 4-foot analog removal operation was conducted on nine grids around Range 46 to support efforts to remediate spent SAA and lead-contaminated soil around the firing line. Of the 27 cleared grids, all or a portion of nine were located on the border of MRS-SEA.4 and Ranges 43-48 (Grids 23AP, 23AQ, 23AR, 23AS, 22AO, 22AP, 22AR, and 22AS) (Parsons 2007). No MEC were found on the grids.
Ranges 43-48	<ul style="list-style-type: none"> The Army determined that Ranges 43-48 warranted an interim action because of their proximity and increased accessibility to the public, the threat of trespassing, and most importantly, the highly dangerous MEC on or near the surface of the ranges. The interim action entailed a geophysical survey including analog removal and mapping post-removal conditions between November 2003 and December 2005 (Parsons 2007). A visual surface search was conducted in the Range 43-48 area to search for MEC, munitions debris and range-related debris (2 inches or larger) (Parsons 2007). The analog removal was conducted in two phases: 1) range target removal and target path clearance; and 2) analog removal to depth on 1,251 grids (Parsons 2007). The recommended cleanup solution for Range 45 involved scraping the top 2 feet of soil and sifting operations on a 14-acre area. The sorting operation produced 1,086 MEC (40mm HE projectiles, practice 35mm rockets, hand grenades) and 3,432 MD-E items. A total of 139,259 pounds of MD and RRD was recovered during the sifting operation (Parsons 2007). Digital mapping, reacquisition and excavation operations in the Range 45 grids (that had been under the 2-foot layer of soil that was scraped/sifted). The Range 45 pad asphalt and base was removed after sifting operations completed and analog and digital removal operations were conducted on approximately 1.7 acres in 8 grids of the Range 45 pad area (Parsons 2007). Approximately 227 acres of the removal area were designated as SCAs or non-completed areas. Figure 8.3-4 shows the location of SCAs and non-completed areas (Parsons 2007).

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-1

Interim Action Ranges MRA – Investigation, Sampling, and Removal Activities

Activity	Summary
Evolution Road Fuel Break Re-establishment	<ul style="list-style-type: none"> November 1997 to January 1998 - Fuels breaks inside the former impact area were reestablished as part of a wildfire safety and control program. Vegetation clearance operations and a 4-foot analog removal were conducted to re-establish the fuel breaks (USA 2001p). Fifty-three contiguous 15-foot by 100-foot grids of the Evolution Road fuel break (originally called Maverick Road) form the western boundary of Ranges 43-48 (USA 2001p).
OE-15A Grid Sampling (Range 46)	<ul style="list-style-type: none"> October 1997 – 100 percent grid sampling to a depth of 4 feet at three 100-foot by 100-foot grids (USA 2000a). No UXO found. Expended 40mm practice grenades and 3.5-inch practice rockets found on surface in Grid #1. Grid #2 contained four large burial pits with 86 expended 3.5-inch practice rockets.
OE-15B Grid Sampling	<ul style="list-style-type: none"> October 1997 – 100 percent sampling to a depth of 4 feet at two 100-foot by 100-foot grids (USA 2000d). Two MEC items (M222 Dragon guided missile and 81mm M68 training projectile) were found in Grid G14. No MEC were found in Grid G13.
Blue Line Fuel Break Establishment	<ul style="list-style-type: none"> Between May and June 1998, as part of the former impact area wildfire safety and control program, vegetation clearance operations and a 4-foot removal with Schonstedt magnetometers were conducted along the 30-foot wide, 6-mile long fuel break that runs along the interior of the former impact area (USA 2001p).
Impact Area	<ul style="list-style-type: none"> Between March and August 1999, 213 100-foot by 100-foot grids in MRS-MOCO.2, MRS-SEA.1-4, MRS-DRO.2, and MRS-MOCO.1 were sampled to determine the need and scope of future removal actions. Six sample grids (G-6, G-13, G-20, G-22, G-24, and G-26) were placed in the 25-acre southern section of MRS-MOCO.2, which is inside the Ranges 43-48 sites. A 100 percent of each grid was investigated with the Schonstedt magnetometer (USA 2000a and 2001m)
Impact Area Fuel Break Maintenance	<ul style="list-style-type: none"> In 2001, 47 miles of old roads, trails, and fuel breaks that had been used regularly during military training activities were restored to divide the former impact area into fire-defensible polygons. Surface removals were conducted on the 15-foot-wide sides of each fuel break, and a 4-foot removal (with deeper excavations approved by the USACE OESS) was performed with Schonstedts on some of the fuel breaks grid centers (Parsons 2006a). The present fuel break roads surrounding Ranges 43-48 were established during the maintenance work. A 15-foot-wide, surface cleared fuel break was placed along the interior of the paved Eucalyptus road, inside the former Impact area. The 45-foot-wide Orion Road and Broadway Avenue fuels breaks (collectively referred to as Pipeline Road at the time) were established, as a subsurface removal was conducted on the 25-foot-wide centers of the dirt roads and a surface removal was performed on the 15-foot-wide sides. For Evolution Road, a 30-foot-wide surface cleared fuel break was added to the inside of the 15-foot-wide, subsurface cleared fuel break established in 1997 to 1998 (Parsons 2006a).
Surface Time-Critical Removal Action	<ul style="list-style-type: none"> Between August and December 2001, a TCRA was performed over the former Ranges 43-48 site to remove MEC, munitions debris, and RRD from the surface of the site's open and accessible areas (Parsons 2002b) Vegetation was not disturbed during this action. The surface TRCA was required to

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-1

Interim Action Ranges MRA – Investigation, Sampling, and Removal Activities

Activity	Summary
	address the imminent threat to public safety posed by the site's accessibility and proximity to the public, the types and quantities of MEC known to be present on the site, and the site's susceptibility to trespassing.
Preparatory Action	<ul style="list-style-type: none"> Between August and October 2002, fire preparation and control work was completed in preparation for the Ranges 43-48 prescribed burn (Parsons 2004a). The preparatory action entailed removing or relocating debris on the site such as tires, wooden structures, and utility poles; cutting vegetation around structures and utility poles that were not removed; cutting the brush and pruning/removing trees around the site perimeter; and performing fire prevention work around the Fitch Park housing area.
Prescribed Burn	<ul style="list-style-type: none"> In October 2003, a prescribed burn was conducted on Ranges 43-48. The vegetation needed to be cleared from the ranges so MEC removal teams could safely operate geophysical detection instruments over the site and locate and destroy MEC. The prescribed burn cleared the vegetation from approximately 95 percent of the site, revealing numerous MEC previously hidden by the brush (Parsons 2004a).

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-2
Interim Action Ranges MRA – Burial Pits Containing MEC

Location	Grid	Pit No. *	Type	Item Description	Qty	Depth (inches bgs)
Ranges 43-48	B2J8G8		UXO	Projectile, 22mm, subcaliber, practice, M744	1	12
			UXO	Rocket, 35mm, subcaliber, practice, M73	3	12
			UXO	Rocket motors, M222/M223 (Dragon)	3	12
	B2J7I0		UXO	Ordnance components	2	15
	C2A8C8	1	DMM	Propellant, 60mm, wafers, mortar	1	48
			UXO	Ordnance components	10	48
			UXO	Fuze, projectile, PD, M48 series	4	48
			UXO	Rocket, 35mm, subcaliber, practice, M73	1	48
			DMM	Cartridge, 75mm, blank, M337	1	48
		2	UXO	Projectile, 20mm, HE, M56A3	1	8
			UXO	Projectile, 37mm, LE, MK II	2	8
			UXO	Projectile, 81mm, mortar, HE, M374 series	1	8
			UXO	Fuze, projectile, TSQ, M55	11	8
		3	UXO	Fuze, projectile, TSQ, M55	3	2
		4	UXO	Fuze, trench mortar, PD, MK VI	1	5
		5	UXO	Rocket, 66mm, HEAT, M72 series	1	12
		6	UXO	Rocket, 35mm, subcaliber, practice, M73	4	8
	C2A9G6		UXO	Fuze, grenade, hand, M10 series	13	5
	C2A9H6		DMM	Fuze, grenade, hand, practice, M205 series	25	12
	C2A8H3		UXO	Grenade, hand, illuminating, MK I	3	36
			UXO	Grenade, rifle, smoke, WP, M19A1	1	36
			UXO	Rocket motors, M222/M223 (Dragon)	1	36
			UXO	Pyrotechnic mixture, illuminating	1	36
	C2A7I0		UXO	Simulator, projectile, airburst, M74 series	6	24
	C2A8		DMM	Rocket, 35mm, practice, subcaliber, M73	1	0
	C2A8I4		UXO	Grenade, hand, illuminating, MK I	8	36
			UXO	Ordnance components	2	36
	C2A8J3		UXO	Projectile, 60mm, mortar, illuminating, M83 series	1	12
	C2B9B7		UXO	Ordnance components	4	48
	C2B8B0		UXO	Simulator, projectile, airburst, M74 series	3	48

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-2

Interim Action Ranges MRA – Burial Pits Containing MEC

Location	Grid	Pit No. *	Type	Item Description	Qty	Depth (inches bgs)
	C2B8E8		UXO	Flare, surface, trip, M49 series	2	18
			UXO	Grenade, hand, illuminating, MK I	1	18
	MRS-15 RNG 45		UXO	Projectile, 40mm, HE, M381	1	0
	MRS-15 EDCBND_FB 06 S		DMM	Rocket, 35mm, practice, subcaliber, M73	7	6
			DMM	Rocket, 35mm, practice, subcaliber, M73	14	12

Note: * - If more than one found in grid.

Reference: Fort Ord MMRP Database

Please note: Munitions descriptions have been taken directly from the Army's MMRP Database and/or other historical documents. Any errors in terminology, filler type, and/or discrepancies between model number and caliber/size are a result of misinformation from the data sources.

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-3
Interim Action Ranges MRA – Types of MEC Removed and Hazard Classification

MEC ITEMS	UXO	DMM	ISD	Hazard Classification
40MM (Model Unknown)	0	0	1	NS
75MM (Model Unknown)	0	0	2	NS
Box Of Fuzes (Model Unknown)	0	0	1	NS
Cap, blasting, electric, M6	0	1	0	1
Cartridge case, 40mm (projectile removed/case intact)	1	1	0	1
Cartridge, 20mm, target practice, M204	1	0	0	1
Cartridge, 20mm, TP-T, M220	0	2	0	NS
Cartridge, 40mm, practice, M382	0	1	0	1
Cartridge, 40mm, practice, M781	0	19	0	1
Cartridge, 75mm, blank, M337	0	1	0	2
Cartridge, ignition, M2 series	6	0	0	1
Charge, 0.25lbs, demolition, TNT	1	0	0	2
Explosive, bulk, HE	6	2	0	NS
Firing device, pressure, M1A1	1	0	0	1
Firing device, release, M1	1	0	0	1
Flare, parachute, trip, M48	1	0	0	2
Flare, surface, trip, M49 series	42	0	0	1
Fuze, bomb, nose, M103	2	0	0	2
Fuze, grenade, hand, M10 series	91	2	0	1
Fuze, grenade, hand, M204 series	0	2	0	1
Fuze, grenade, hand, practice, M205 series	1	25	0	1
Fuze, grenade, hand, practice, M228	0	1	0	1
Fuze, mine, antitank, practice, M604	1	0	0	1
Fuze, projectile, combination, M1907	2	0	0	1
Fuze, projectile, mechanical time super quick, M772	1	0	0	1
Fuze, projectile, point detonating, M46	1	0	0	2
Fuze, projectile, point detonating, M47	1	0	0	2
Fuze, projectile, point detonating, M48 series	14	0	0	2
Fuze, projectile, point detonating, M503 series	2	0	0	2
Fuze, projectile, point detonating, M52 series	2	0	0	2
Fuze, projectile, point detonating, M524 series	1	0	0	2

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-3

Interim Action Ranges MRA – Types of MEC Removed and Hazard Classification

MEC ITEMS	UXO	DMM	ISD	Hazard Classification
Fuze, projectile, point detonating, M53 series	2	0	0	2
Fuze, projectile, point detonating, M557	1	0	0	2
Fuze, projectile, powder train time fuze, M84 series	1	0	0	2
Fuze, projectile, time (fixed), M65	1	0	0	2
Fuze, projectile, time super quick, M548	1	0	0	2
Fuze, projectile, time super quick, M55	14	0	0	2
Fuze, trench mortar, point detonating, MK VI	2	0	0	2
Grenade, hand, fragmentation, M67	3	0	1	3
Grenade, hand, fragmentation, MK II	2	0	0	3
Grenade, hand, Illumination, MK I	24	0	0	1
Grenade, hand, practice, M69	1	0	0	1
Grenade, hand, practice, MK II	3	0	0	1
Grenade, hand, smoke, commercial (model unknown) (civilian)	1	0	0	1
Grenade, hand, smoke, HC, AN-M8	3	0	0	1
Grenade, hand, smoke, M18 series	4	0	0	1
Grenade, hand, smoke, white phosphorous, M15	4	0	0	3
Grenade, rifle, antitank, M9 series	1	0	0	3
Grenade, rifle, smoke, white phosphorous, M19A1	5	0	0	3
Grenades, HE, 40MM, M550 (Model Unknown)	0	0	3	NS
HE, 40MM, M550 (Model Unknown)	0	0	2	NS
HE-T, 20MM (Model Unknown)	0	0	1	NS
Missile, guided, high explosive antitank, M222 (Dragon)	1	0	0	3
Missile, guided, practice, M231 (Dragon)	19	0	0	1
Ordnance Components	312	1	0	NS
Parachute, Green Star (Model Unknown)	0	0	1	NS
Primer, igniter tube, M5	1	0	0	1
Primer, igniter tube, M57	2	0	0	1
Projectile, 105mm, high explosive, M1	2	0	0	3
Projectile, 105mm, illumination, M314 series	2	0	0	2
Projectile, 14.5mm, subcaliber, practice, M181 series	78	0	0	1
Projectile, 155mm, high explosive, MK 1	1	0	0	3

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-3
Interim Action Ranges MRA – Types of MEC Removed and Hazard Classification

MEC ITEMS	UXO	DMM	ISD	Hazard Classification
Projectile, 155mm, Smoke, BE, M116 series	3	0	0	2
Projectile, 20mm, high explosive incendiary, M56A3	2	0	0	3
Projectile, 20mm, target practice, M204	2	0	0	0
Projectile, 22mm, subcaliber, practice, M744	1,467	0	0	1
Projectile, 25mm, subcaliber, M379	1	0	0	1
Projectile, 37mm, high explosive, M54	2	0	0	3
Projectile, 37mm, low explosive, MK I	3	0	0	3
Projectile, 37mm, low explosive, MK II	2	0	0	3
Projectile, 37mm, target practice, M63 MOD1	1	0	0	2
Projectile, 4.2inch, mortar, high explosive, M3 series	3	0	0	3
Projectile, 4.2inch, mortar, smoke, white phosphorous, M328 series	2	0	0	3
Projectile, 40mm, cluster, white star, M585	2	0	4	1
Projectile, 40mm, CS, M651	6	0	0	1
Projectile, 40mm, high explosive dual-purpose, M430	12	0	1	3
Projectile, 40mm, high explosive dual-purpose, M433	7	0	0	3
Projectile, 40mm, high explosive, M381	147	0	18	3
Projectile, 40mm, high explosive, M383	28	0	0	3
Projectile, 40mm, high explosive, M384	13	0	0	3
Projectile, 40mm, high explosive, M386	9	0	0	3
Projectile, 40mm, high explosive, M397	12	0	0	3
Projectile, 155mm, Smoke, BE, M116 series	3	0	0	2
Projectile, 40mm, high explosive, M406	31	0	0	3
Projectile, 40mm, high explosive, M441	1	0	0	3
Projectile, 40mm, parachute, illumination, M583 series	6	0	0	1
Projectile, 40mm, parachute, star, M662	3	0	0	1
Projectile, 40mm, Practice, (model unknown)	6	0	0	2
Projectile, 40mm, practice, M382	6	0	0	1
Projectile, 40mm, practice, M407A1	49	0	0	1
Projectile, 40mm, smoke, M680 series	5	0	0	1
Projectile, 40mm, smoke, M713 series	32	0	7	1
Projectile, 50mm, Mortar, Type89, Japanese NI	4	0	0	3

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-3

Interim Action Ranges MRA – Types of MEC Removed and Hazard Classification

MEC ITEMS	UXO	DMM	ISD	Hazard Classification
Projectile, 57mm, high explosive antitank, M307	2	0	0	3
Projectile, 57mm, high explosive, M306 series	108	0	1	3
Projectile, 57mm, target practice, M306 series	1	0	0	1
Projectile, 60mm, mortar, high explosive, M49 series	59	0	0	3
Projectile, 60mm, mortar, high explosive, M720	4	0	0	3
Projectile, 60mm, mortar, illumination, M721	3	0	0	2
Projectile, 60mm, mortar, illumination, M83 series	26	0	0	2
Projectile, 60mm, mortar, practice, M50 series	3	0	0	2
Projectile, 75mm, high explosive, M309	5	0	0	3
Projectile, 75mm, high explosive, M41A1	1	0	0	3
Projectile, 75mm, high explosive, M48	10	0	0	3
Projectile, 75mm, high explosive, MK I	2	0	0	3
Projectile, 75mm, Shrapnel, MK I	4	0	0	3
Projectile, 76mm, high explosive, M352	5	0	0	3
Projectile, 81mm, mortar (model unknown)	0	0	1	3
Projectile, 81mm, mortar, Flare Shell, T-23	2	0	0	1
Projectile, 81mm, mortar, high explosive, M362	4	0	0	3
Projectile, 81mm, mortar, high explosive, M374 series	3	0	0	3
Projectile, 81mm, mortar, high explosive, M43 series	18	0	0	3
Projectile, 81mm, mortar, high explosive, M56	1	0	0	3
Projectile, 81mm, mortar, illumination, M301 series	10	0	0	2
Projectile, 81mm, mortar, illumination, M853A1	1	0	0	2
Projectile, 81mm, mortar, practice, M43 series	1	0	0	2
Projectile, 81mm, mortar, smoke, white phosphorous, M375 series	1	0	0	3
Projectile, 81mm, mortar, smoke, white phosphorous, M57 series	1	0	0	3
Projectile, 84mm, high explosive antitank, M136 series (AT-4)	111	0	13	3
Projectile, 90mm, high explosive antitank, M348	8	0	1	3
Projectile, 90mm, high explosive antitank, M371A1	13	0	0	3
Projectile, HE, 40MM, M550 (Model Unknown)	0	0	1	NS

Table 8.3-3
Interim Action Ranges MRA – Types of MEC Removed and Hazard Classification

MEC ITEMS	UXO	DMM	ISD	Hazard Classification
Propellant, 60mm, wafers, mortar	0	1	0	1
Pyrotechnic mixture, illumination	13	0	0	1
Pyrotechnic mixture, smoke	14	0	0	1
Rifle, Grenade, HE, 40MM, M550 (Model Unknown)	0	0	1	NS
Rocket motors, M222/M223 (DRAGON)	87	0	0	1
Rocket, 3.5inch, high explosive antitank, M28 series	1	0	0	3
Rocket, 3.5inch, practice, M29 series	0	0	1	0
Rocket, 35mm, subcaliber, practice, M73	6,663	25	30	1
Rocket, 66mm, high explosive antitank, M72 series	305	0	27	3
Rocket, 66mm, incendiary, TPA, M74	98	0	6	3
Signal, ground, rifle, parachute, M17 series	2	0	0	1
Signal, illumination, AN-M43 series	1	0	0	1
Signal, illumination, ground, M125 series	8	0	0	2
Signal, illumination, ground, M126 series	5	0	0	2
Signal, illumination, ground, parachute, rifle, M19 series	1	0	0	1
Signal, illumination, M187	2	0	0	1
Signal, illumination, M51A1	1	0	0	1
Signal, smoke, ground, M166 series	1	0	0	1
Simulator, flash artillery, M110	1	0	0	1
Simulator, launching, antitank guided missile and rocket, M22	1	0	0	1
Simulator, projectile, airburst, M74 series	17	0	0	1
STAR, 40MM (Model Unknown)	0	0	1	NS
MRA TOTAL	10,165	84	125	

Note: NS – Not Specified

Reference: Fort Ord MMRP Database

Please note: Munitions descriptions have been taken directly from the Army's MMRP Database and/or other historical documents. Any errors in terminology, filler type, and/or discrepancies between model number and caliber/size are a result of misinformation from the data sources.

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-4

Interim Action Ranges MRA – Summary of Recovered MEC and MD

Type	Summary
UXO	10,165 items
DMM	84 items
ISD	125 items (MPPEH that could not be classified as UXO, DMM, or MD)
MD	196,996 pounds of MD (includes MD-E and MD-F items if weights were documented)
Aerial Extent	<ul style="list-style-type: none"> • The greatest concentrations of MEC and MD were encountered in the vicinity of Ranges 44 and 45. • The MEC and MD found during sifting operations in Range 45 is not shown on Figure 8.3-1, but is included in Table 8.3-3. • The MD collected during sifting operation at Range 45 is not shown on Figure 8.3-1. Additional research is needed to verify if the grids showing that no MD was found in a grid is an accurate representation of data. It appears that these zero MD grids are in areas where no subsurface removal actions have been accomplished. • Approximately 227 acres of the MRA were designated as SCAs or non-completed areas as shown on Figure 8.3-4.
Vertical Extent	<ul style="list-style-type: none"> • The majority of the MEC removed from the MRA were located on the surface; however, this observation may not include subsurface MEC items removed during the Range 45 sifting operations.

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.3-5
Interim Action Ranges MRA – HTW History and Conditions

Type	Summary
Range 43	<ul style="list-style-type: none"> The evaluation of HA-43 (Range 43) included a literature search, review of the information gathered during the munitions response at the site, site reconnaissance and investigation sampling. Sampling results identified lead above ecological risk screening levels. Based on the presence of lead in soil it was recommended in the BRA that an evaluation of remedial alternatives be conducted in the Small Arm Ammunition Feasibility Study.
Range 44	<ul style="list-style-type: none"> HA-44 (Range 44) MC was detected at during sampling conducted as part of the basewide RI/FS. Site reconnaissance and investigation sampling were performed under the BRA. Elevated concentrations of the explosive compound HMX and lead were detected during BRA sampling. Based on the presence of HMX and lead in soil it was recommended in the BRA that HA-44 be evaluated for potential remediation of MC.
Range 45	<ul style="list-style-type: none"> The evaluation of HA-45 (Range 45) included a literature search, and sampling conducted during the base wide RI/FS. Site reconnaissance and investigation sampling were performed under the BRA. Because no explosive residues or elevated metals concentrations were found, no further action related to MC at HA-45 was recommended under the BRA.
Range 46	<ul style="list-style-type: none"> The evaluation of HA-46H (Range 46) included a literature search, site reconnaissance, and investigation sampling. Surface soil samples were collected to evaluate whether explosive residue or metals were present in areas where high numbers of military munitions or SAA were found. Because no explosive residues or elevated metals concentrations were found, no further action related to MC was recommended under the BRA.
Range 47	<ul style="list-style-type: none"> The evaluation of HA-47 (Range 47) included a literature search and review of the information gathered during the munitions response (MEC removal) at MRS-Ranges 43-48. Surface soil samples were collected to evaluate whether explosive residue or metals were present in areas where high numbers of military munitions or SAA were found. Because no explosive residues or elevated metals concentrations were found, no further action related to MC was recommended under the BRA.

Reference: Army 2007

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.4-1
Interim Action Ranges MRA - Future Land Use by Parcel

USACE Parcel Number	MRS Number	Land Use Category	Description	Acreage
E38	MRS-Ranges 43-48	Habitat	Reserve - MPC	18
E39	MRS-Ranges 43-48	Habitat	Reserve - MPC Firing Range Buffer	166
E40	MRS-Ranges 43-48	Development	MPC Rifle Range	19
	MRS-Ranges 43-48	Development	MPC Rifle Range	6
E41	MRS-Ranges 43-48	Habitat	Reserve - MPC	9
E42	MRS-Ranges 43-48	Habitat	Reserve - MPC	13
MRA - TOTAL				231

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.5-1
Interim Action Ranges MRA – Ecological Information

Type	Summary
Biological	<ul style="list-style-type: none"> • Dominant vegetation in the area is maritime chaparral. This biological community is described below: <ul style="list-style-type: none"> ◦ Maritime chaparral is one of the dominant vegetation type within Fort Ord, characterized by a wide variety of evergreen, sclerophyllus (hard-leaved) shrubs occurring in moderate to high density on sandy, well-drained substrates within the zone of coastal fog. This community is primarily dominated by shaggy-barked manzanita. Other species found in the shrub layer include chamise, toro manzanita, sandmat manzanita, toyon, blue blossom ceanothus and Monterey ceanothus. The greatest diversity of wildlife species at former Fort Ord occur in the chaparral. Birds such as orange-crowned warbler, rufous-sided towhee, and California quail nest in the chaparral. Small mammals such as California mouse and brush rabbit forage in this habitat and serve as prey for gray fox, bobcat, spotted skunk and western rattlesnake.
Habitat Management Plan / Biological Opinions	<ul style="list-style-type: none"> • The USFWS BO required that a habitat management plan be developed and implemented to reduce the incidental take of listed species and loss of habitat that supports these species. The HMP for former Fort Ord complies with the BO and establishes the guidelines for the conservation and management of wildlife and plant species and habitats that largely depend on former Fort Ord land for survival. The HMP incorporated conservation measures pursuant to BOs dated prior to issuance of the HMP in April 1997. • To maintain compliance with habitat management and monitoring requirements presented in the HMP biological resources are monitored after MEC removal activities have been completed. The HMP specifies mitigation measures to monitor the successful regeneration of species and habitat following removal of MEC. Monitoring includes conducting follow-up monitoring for a period of 5 years following MEC removal to document habitat conditions. Since the inception of the MEC removal program the Army had elected to augment the monitoring program, where feasible to include the collection of baseline data prior to MEC removal. Baseline data have been collected to provide additional information on preexisting species composition and distribution of herbaceous annual sensitive species. Both baseline and follow-up data are used to compare community regeneration to HMP success criteria. • The HMP identifies the area as development with borderland development along portions of the boundaries adjacent to the NRMA interface. The NRMA separates the development category land from the adjacent habitat reserve area. The NRMA and habitat reserve areas support plant and animal species that require implementation of mitigation measures identified in the HMP to insure compliance with the ESA and to minimize impacts to listed species. • The HMP identified principal management categories. The Interim Action Ranges MRA is identified as development with borderlands interface and habitat reserve. These principal management categories are defined as: <ul style="list-style-type: none"> ◦ Development - lands in which no management restrictions are contained under the HMP although future landowners will still be required to comply with environmental laws enforced by the federal, state, and local agencies, including the ESA. Some plans for salvage of biological resources for these parcels may be specified. ◦ Habitat Reserve – land in which no development is allowed. Management goals for the area are conservation and enhancement of threatened and endangered species. ◦ Borderland Development Area – land abutting the Natural Resources Management Area that is slated for development. Management of these lands includes no restrictions except along the development/reserve interface.

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.5-1
Interim Action Ranges MRA – Ecological Information

Type	Summary
	<ul style="list-style-type: none"> FORA will implement the mitigation requirements identified in the HMP in accordance with the BO developed during formal consultation between the Army and the USFWS under Section 7 of the ESA. For habitat areas these measures include conducting habitat monitoring in compliance with Chapter 3 of the HMP (USACE 1997b). Since April 1997, three additional BOs have been issued that are relevant to the MEC remediation activities (USFWS 1999, 2002, and 2005). Future MEC remediation is required to be consistent with the applicable conservation measures.
Threatened and Endangered Species/ Critical Habitat	<ul style="list-style-type: none"> Special-status biological resources are those resources, including plant, wildlife and native biological communities that receive various levels of protection under local, state, or federal laws, regulations, or policies. The closure and disposal of former Fort Ord is considered a major federal action that could affect several species proposed for listing or listed as threatened or endangered under the federal ESA. Threatened or endangered plant species identified as having possible occurrence in the Interim Action Ranges MRA include sand gilia (endangered) and Monterey spineflower (threatened). In 2004, the CTS was identified as a threatened species. CTS may be found as far as 2 km from aquatic breeding habitats. Most of the Interim Action Ranges MRA is located within 2 km of an aquatic feature in which CTS may be present. A portion of the Interim Action Ranges MRA has been designated as Critical Habitat for the Monterey spineflower.

Section 8 – Interim Action Ranges MRA Conceptual Site Model

Table 8.5-2

Interim Action Ranges MRA – HMP Category by Parcel and Possible Occurrence of HMP Species

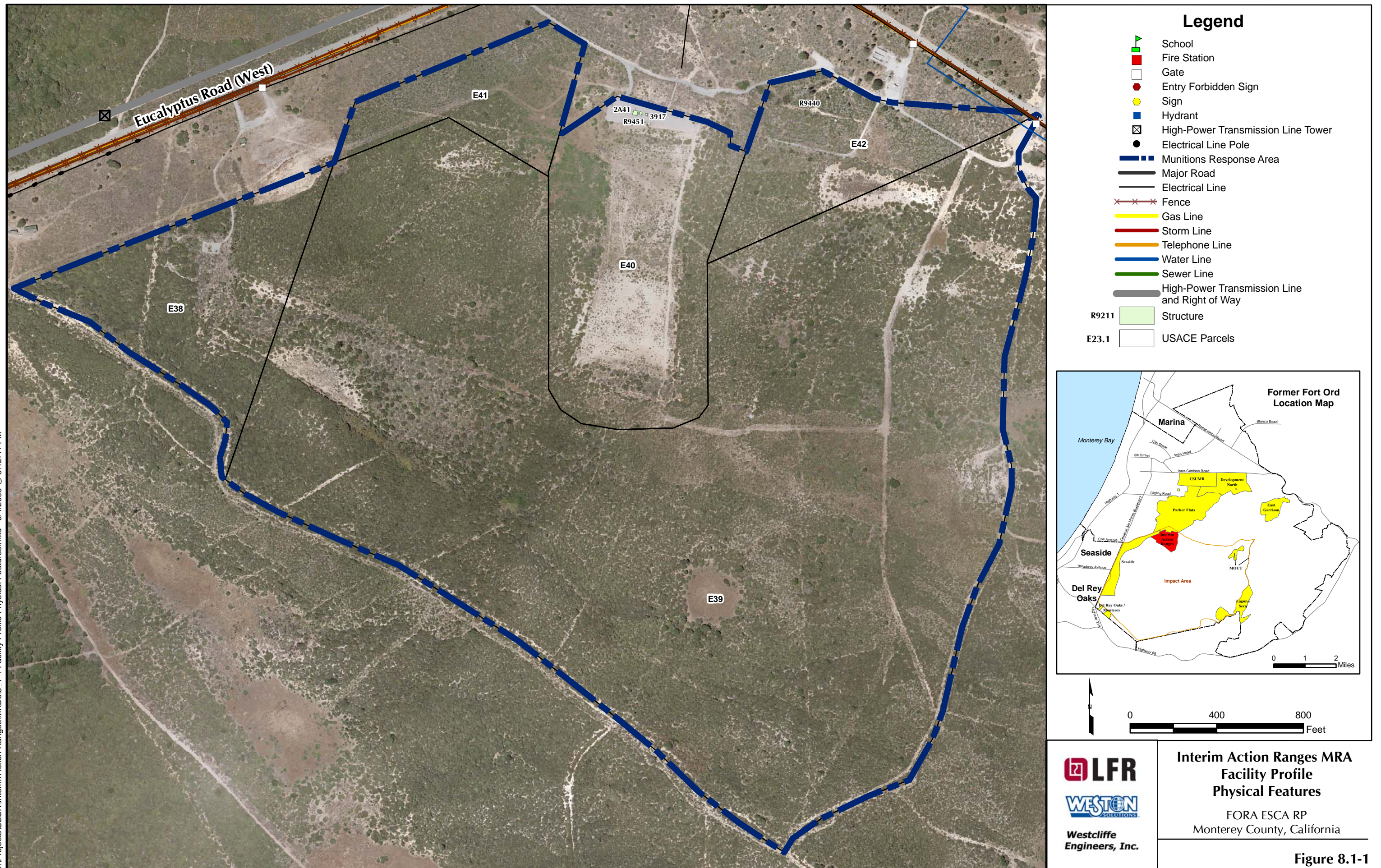
USACE Parcel Number	HMP Designated Use	HMP Species
E38	Habitat Reserve	sand gilia; Monterey spineflower; Seaside bird's beak; toro manzanita; sandmat manzanita; Monterey ceanothus; Eastwood's ericameria; coast wallflower; Hooker's manzanita; California linderiella; California red-legged frog; California black legless lizard; Monterey ornate shrew
E39	Habitat Reserve	sand gilia; Monterey spineflower; Seaside bird's beak; toro manzanita; sandmat manzanita; Monterey ceanothus; Eastwood's ericameria; coast wallflower; Hooker's manzanita; California linderiella; California red-legged frog; California black legless lizard; California tiger salamander; Monterey ornate shrew
E40	Development (includes a borderland buffer along the NRMA Interface)	Monterey spineflower; Seaside bird's beak; sandmat manzanita; Monterey ceanothus; Eastwood's ericameria; California tiger salamander; California black legless lizard
E41	Habitat Reserve	sand gilia; Monterey spineflower; Seaside bird's beak; toro manzanita; sandmat manzanita; Monterey ceanothus; Eastwood's ericameria; coast wallflower; Hooker's manzanita; California linderiella; California red-legged frog; California black legless lizard; Monterey ornate shrew
E42	Habitat Reserve	Monterey spineflower; Seaside bird's beak; sandmat manzanita; Monterey ceanothus; Eastwood's ericameria; California tiger salamander; California black legless lizard

Reference: USACE 1997b

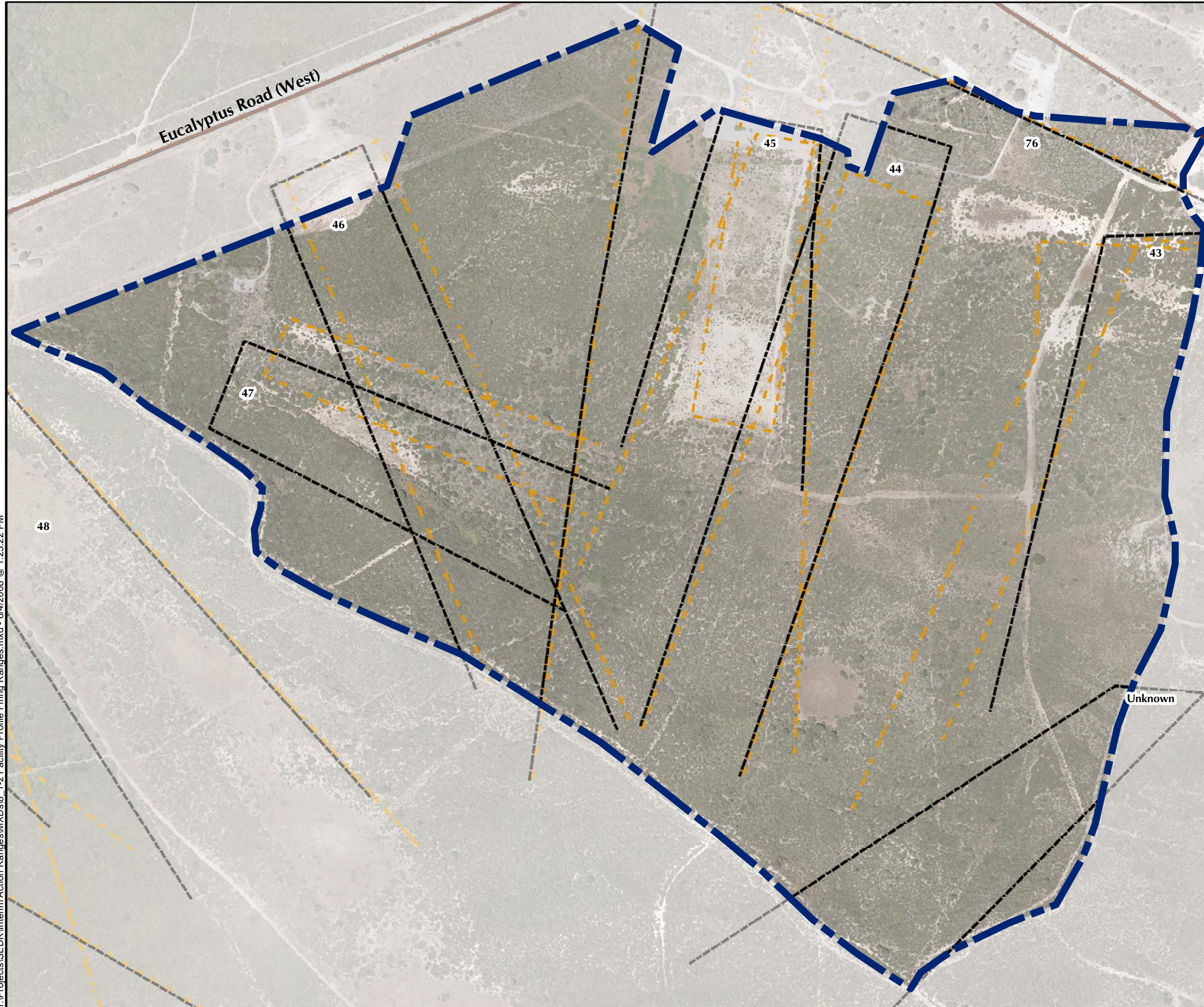
Table 8.6-1

Interim Action Ranges MRA – Potential Receptors and Exposure Media

Potential Receptor	Exposure Media			Exposure Media		
	Current	Ground Surface	Below Grade	Future	Ground Surface	Below Grade
Construction Workers	✓	✓	✓	✓	✓	✓
Utility Workers	✓	✓	✓	✓	✓	✓
Trespassers	✓	✓		✓	✓	
Firefighters	✓	✓	✓	✓	✓	✓
Emergency Response Workers	✓	✓		✓	✓	
Ancillary Workers	✓	✓	✓	✓	✓	✓
Recreational Users				✓	✓	✓

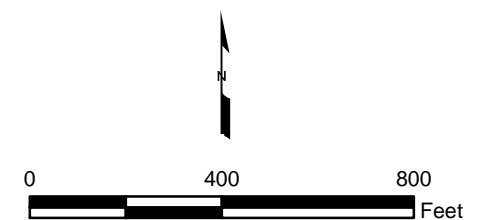
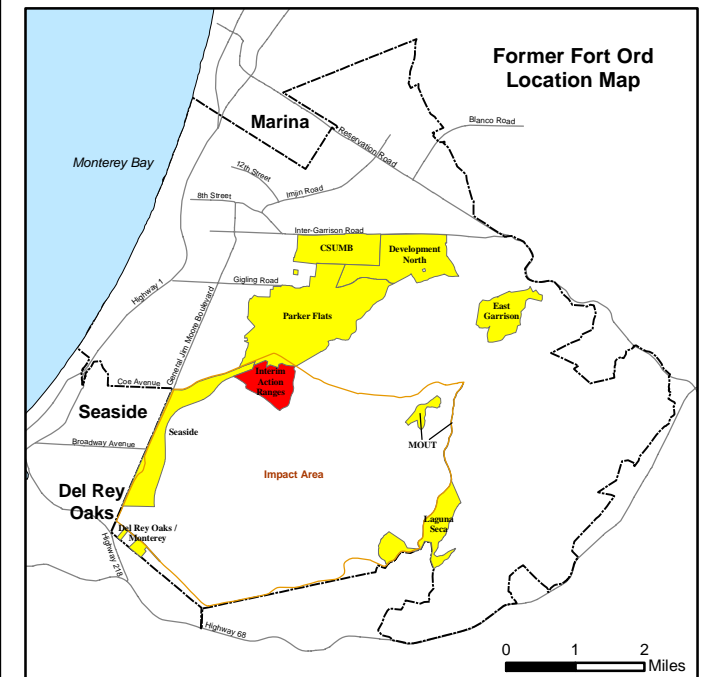


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Legend

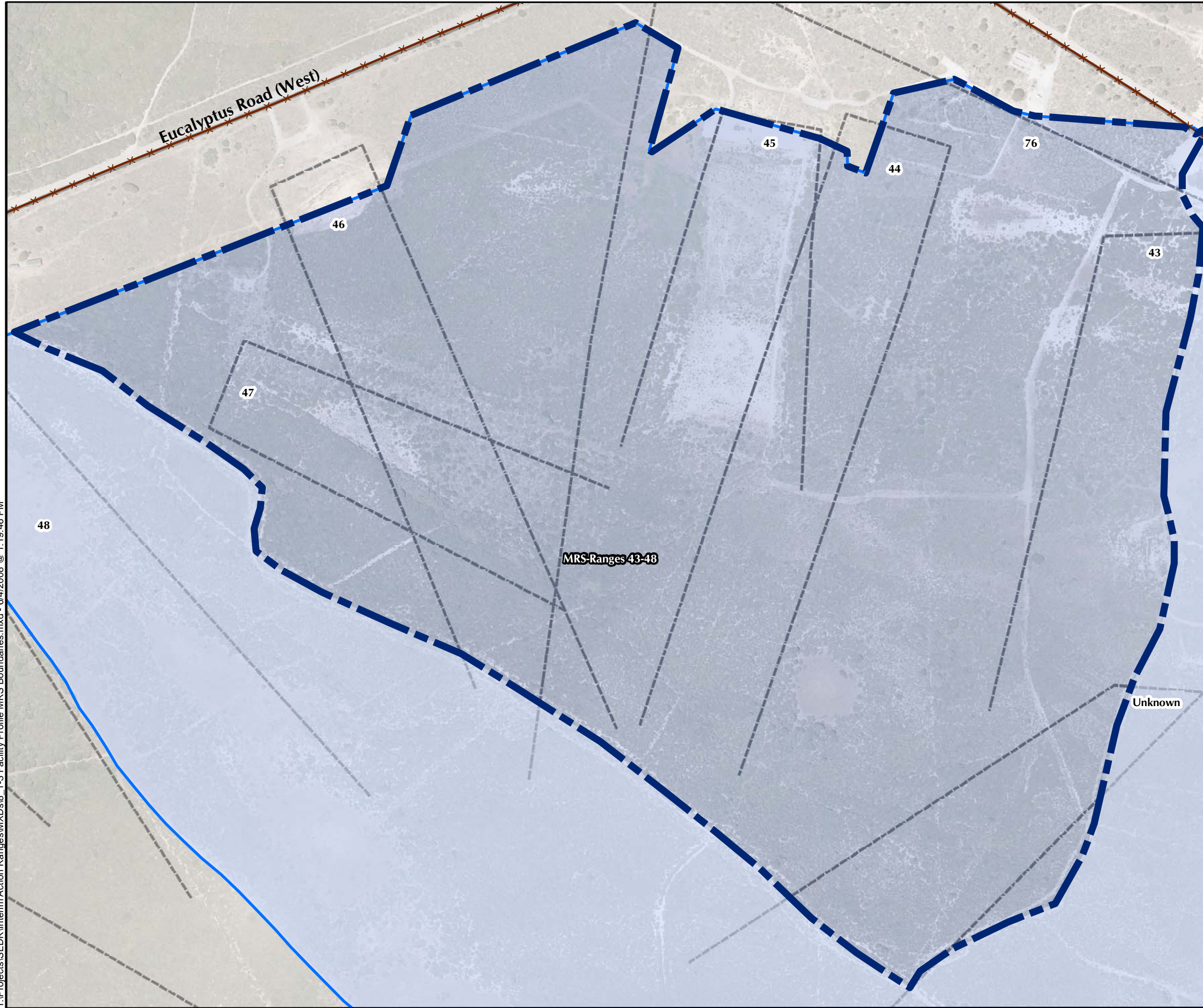
- ■ ■ Munitions Response Area
- 42 ■ ■ ■ Firing Range
- ■ ■ Historical Range
- Major Road
- ✕ ✕ Fence



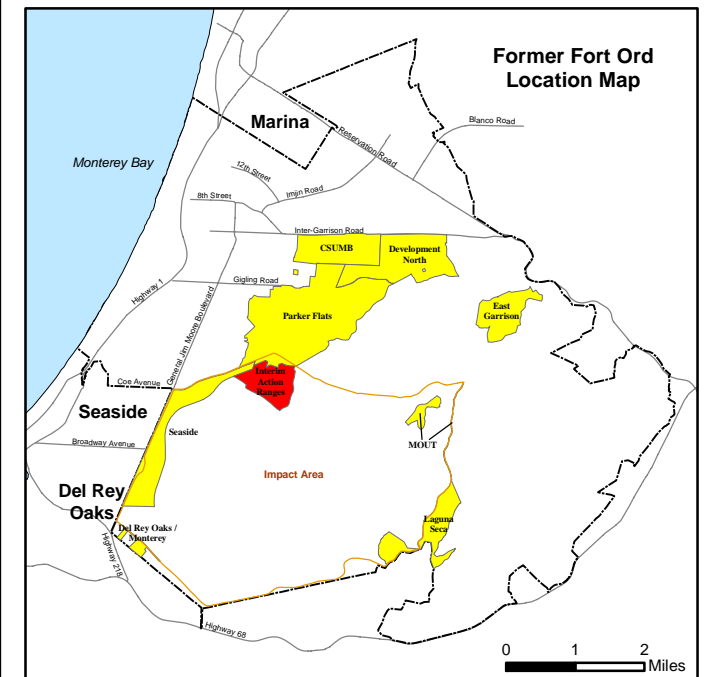
Interim Action Ranges MRA
Facility Profile
Ranges and Training Sites
FORA ESCA RP
Monterey County, California

Figure 8.1-2

T:\Projects\SED\Interim Action Ranges\MXD\8 1-3 Facility Profile MRS Boundaries.mxd - 6/4/2008 @ 1:19:46 PM



- ### Legend
- Munitions Response Area
 - Major Road
 - Fence
 - Firing Range
 - Munitions Response Site
- MRS-Ranges 43-48**

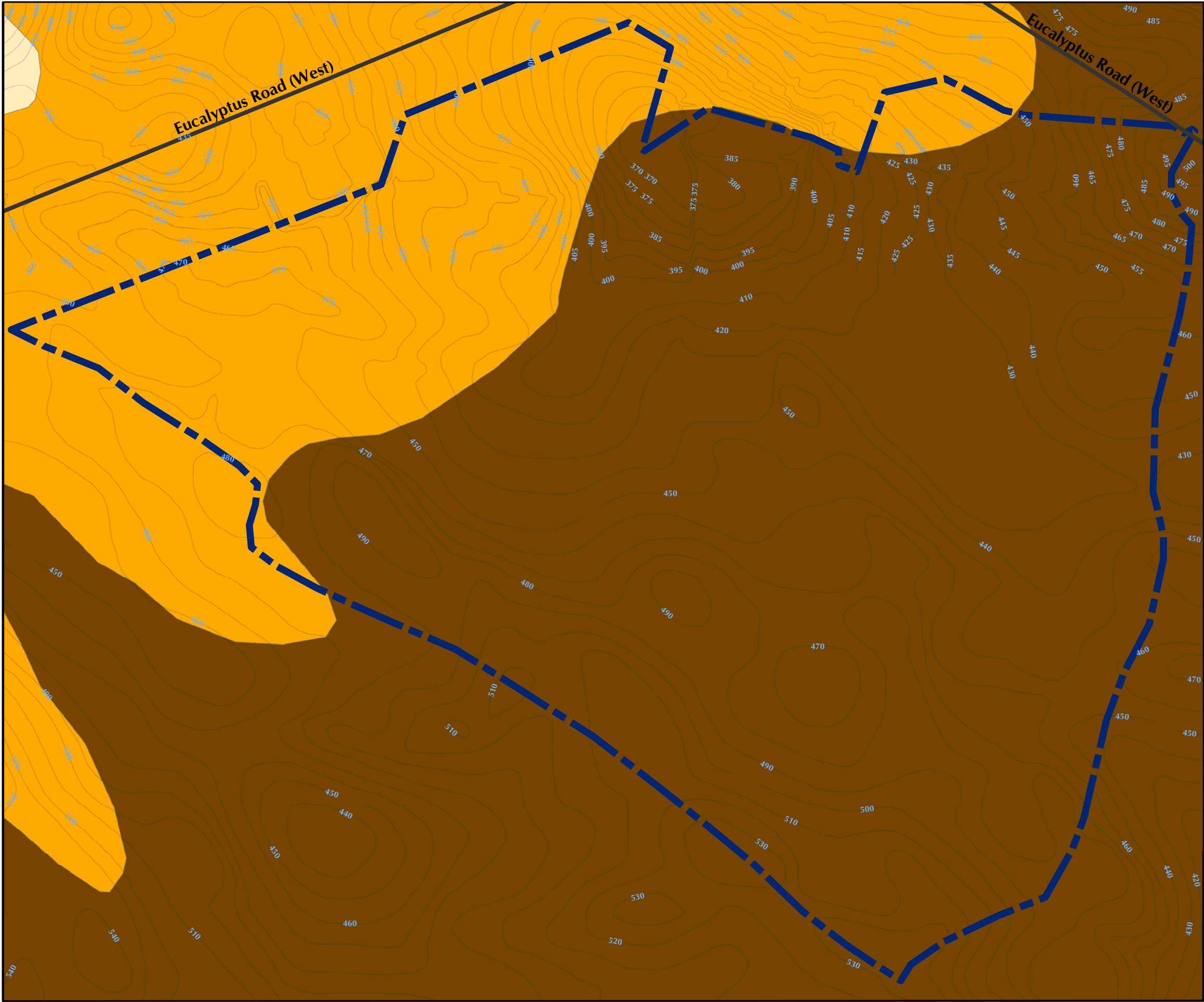


**Interim Action Ranges MRA
Facility Profile
Munitions Response Site Boundaries**

FORA ESCA RP
Monterey County, California

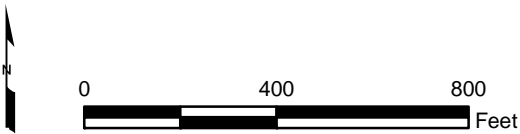
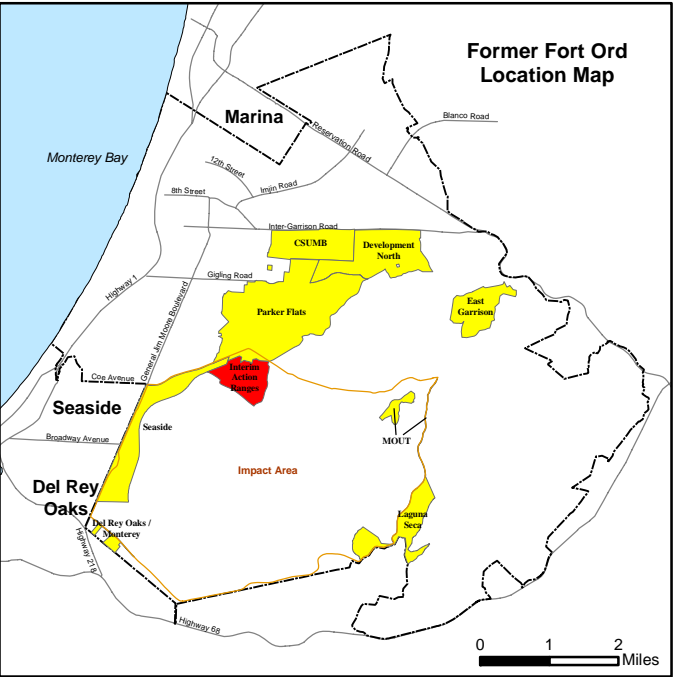
Figure 8.1-3

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Legend

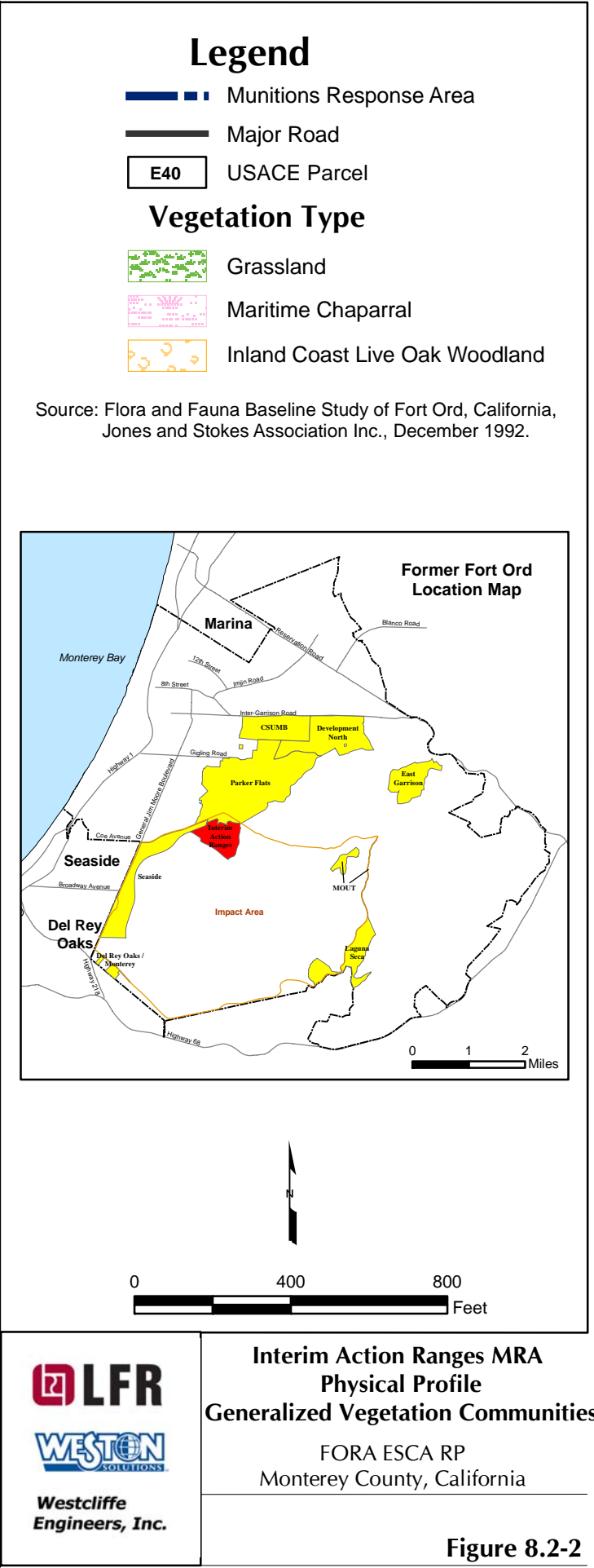
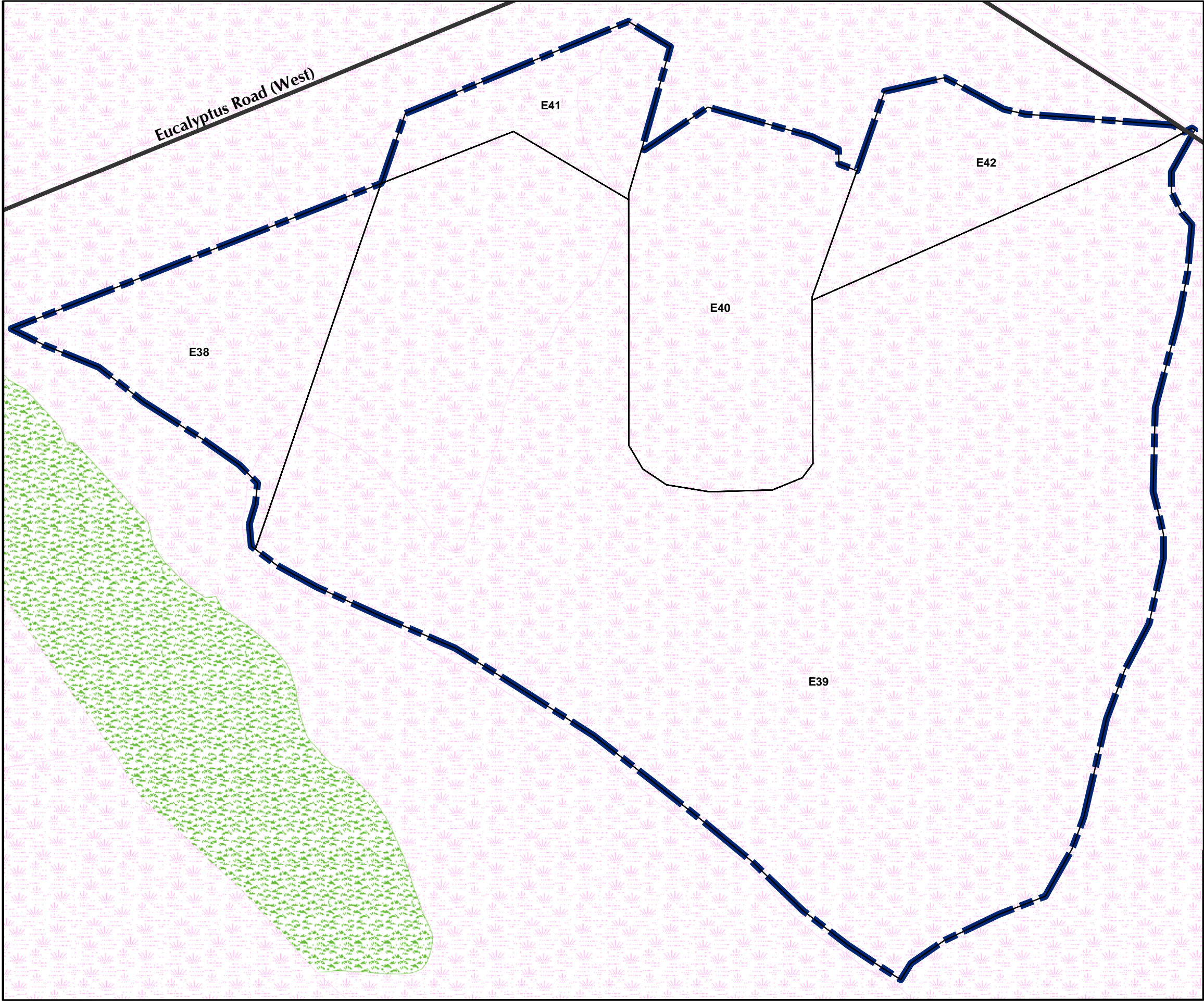
- 540 Topography 5 ft and 10 ft
 - Munitions Response Area
 - Major Road
- ### Soil Type
- Arnold-Santa Ynez Complex
 - Baywood Sand, 2 to 15 Percent Slopes
 - Oceano Loamy Sand, 2 to 15 Percent Slopes



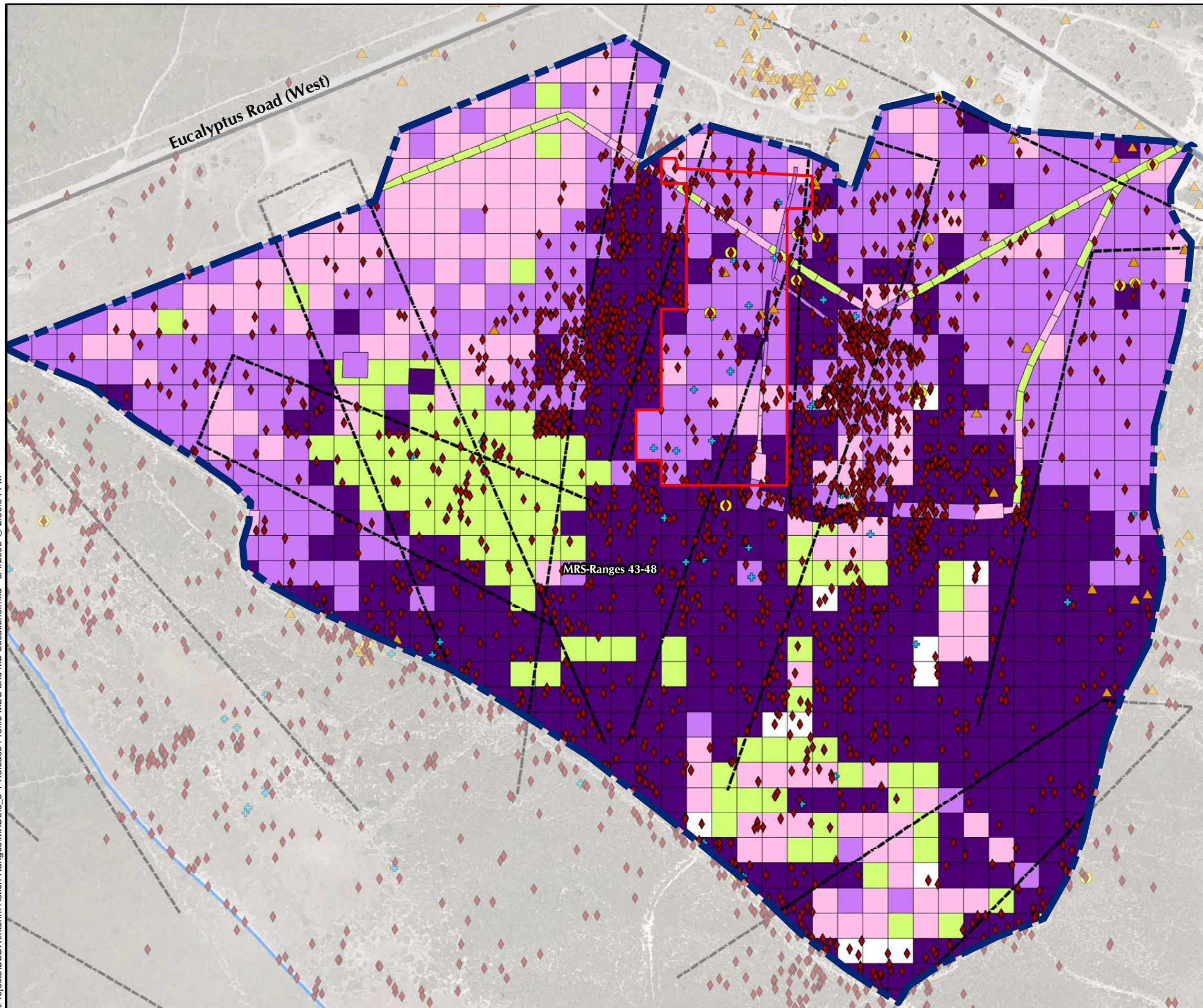
Interim Action Ranges MRA
Physical Profile
Topography and Soil Type
FORA ESCA RP
Monterey County, California

Figure 8.2-1

T:\Projects\SEDRI\Interim Action Ranges\MXDs\8_2-2 Facility Profile Vegetation Communities.mxd - 6/4/2008 @ 1:42:16 PM



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Legend

- Munitions Response Area
- - - Firing Range
- MRS-Ranges 43-48
- Munitions Response Site
- Major Road
- Range 45 Sift Area

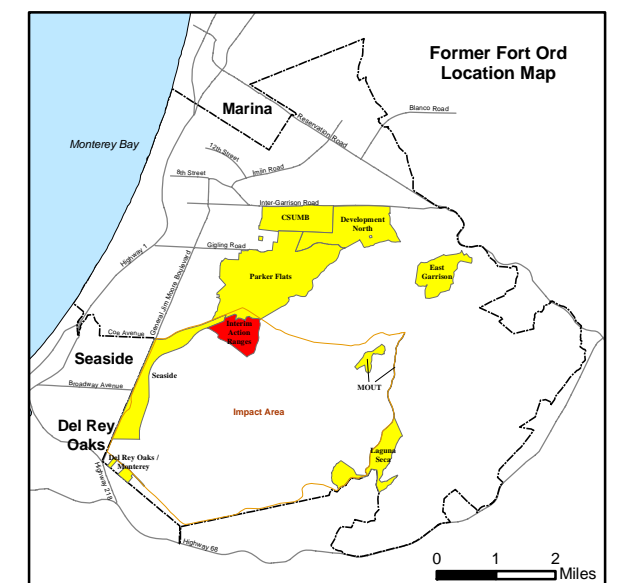
MEC Type

- ◆ Unexploded Ordnance (UXO)
- ▲ Discarded Military Munition (DMM)
- + Insufficient Data (ISD)
- Burial Pit Containing MEC

Munitions Debris (MD) by Weight (total pounds per grid)

- No Data
- 0
- < 10
- 10 to 100
- > 100

Note: Munitions Debris (MD) includes scrap related to small arms ammunition.



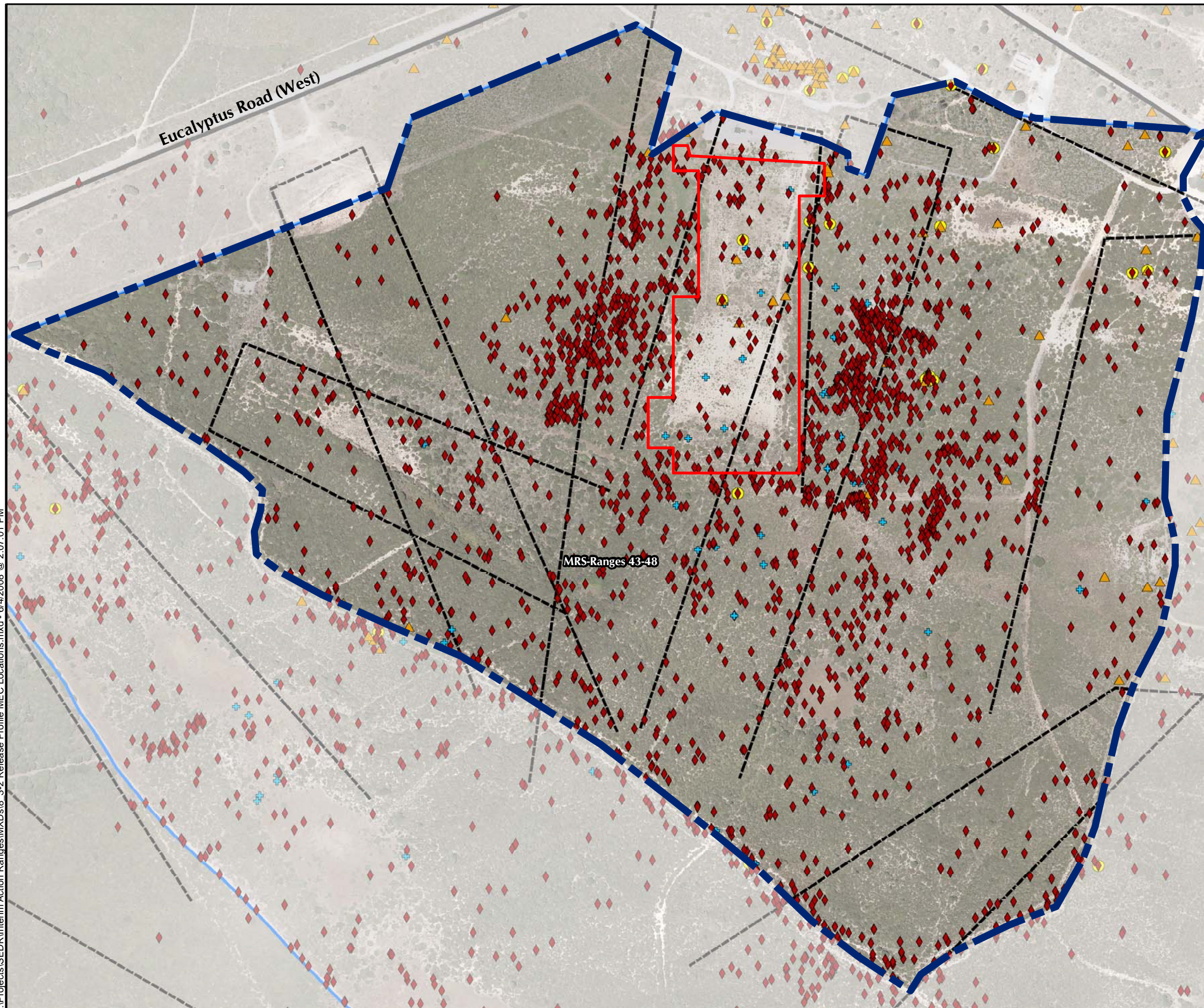
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Feet



Interim Action Ranges MRA
Release Profile
MEC and MD Locations
FORA ESCA RP
Monterey County, California

Figure 8.3-1

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Legend

- ■ ■ Munitions Response Area
- Munitions Response Site

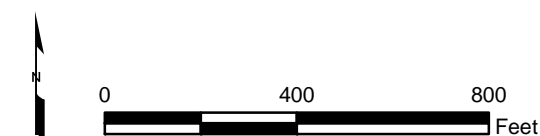
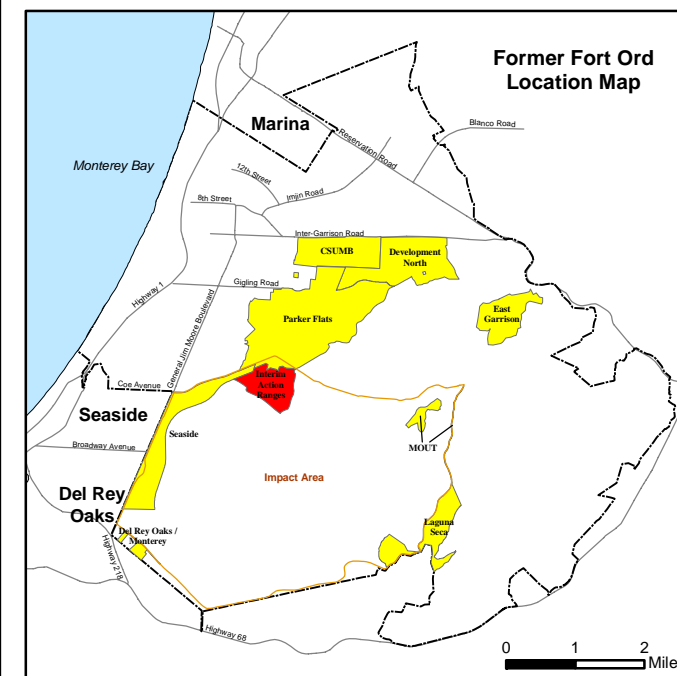
MRS-Ranges 43-48

- - - Firing Range
- Major Road
- Range 45 Sift Area

MEC Type

- ◆ Unexploded Ordnance (UXO)
- ▲ Discarded Military Munition (DMM)
- + Insufficient Data (ISD)
- Burial Pit Containing MEC

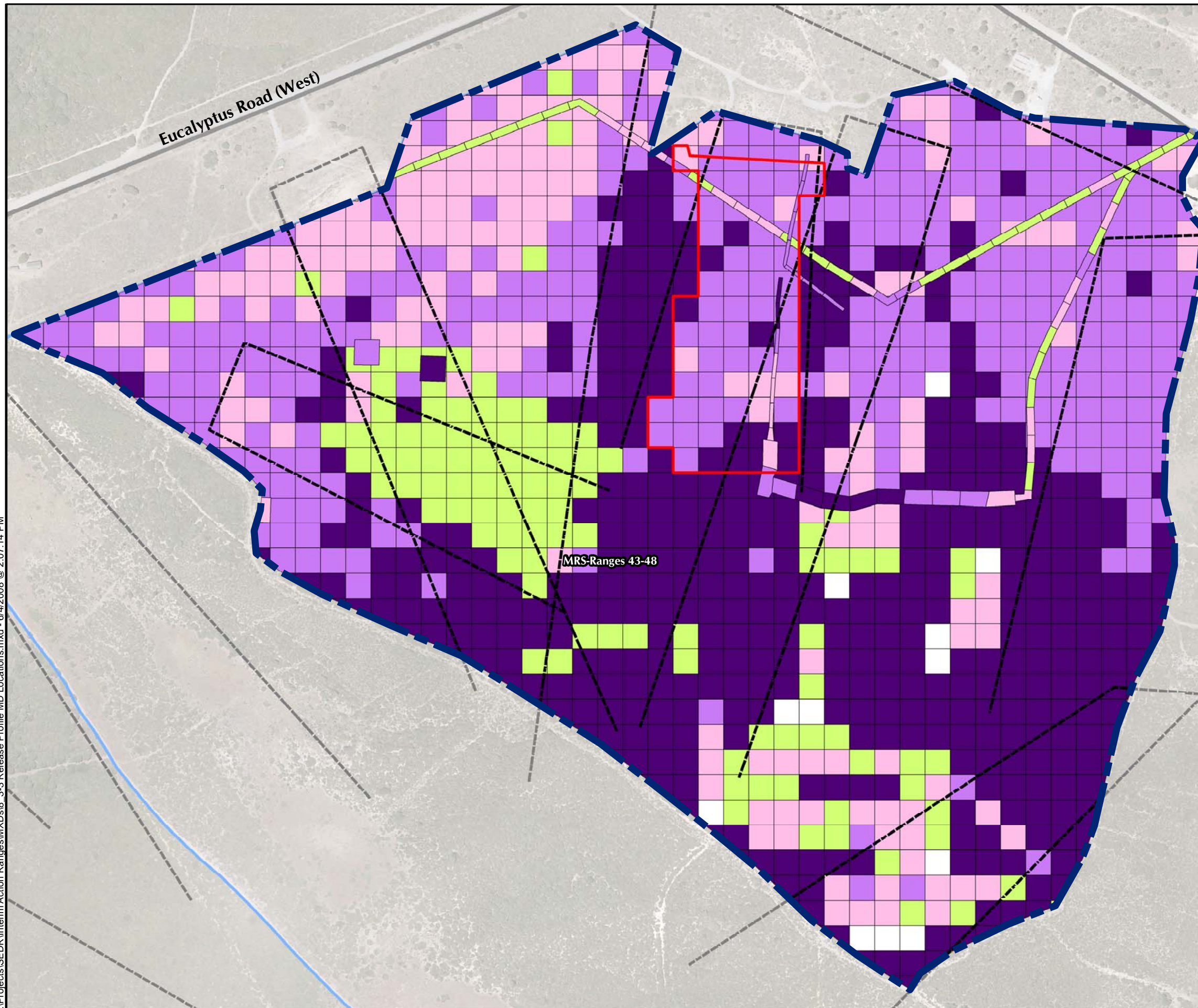
Note: MEC locations may include more than one item.



Interim Action Ranges MRA
Release Profile
MEC Locations
FORA ESCA RP
Monterey County, California

Figure 8.3-2

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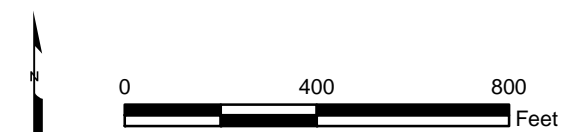
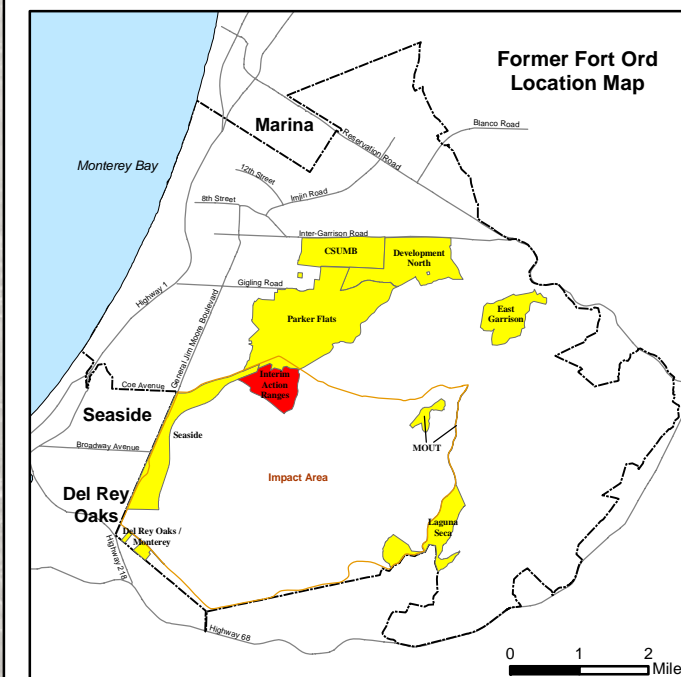
Legend

- Munitions Response Area
- Munitions Response Site
- Firing Range
- Major Road
- Range 45 Sift Area

Munitions Debris (MD) by Weight (total pounds per grid)

- No Data
- 0
- < 10
- 10 to 100
- > 100

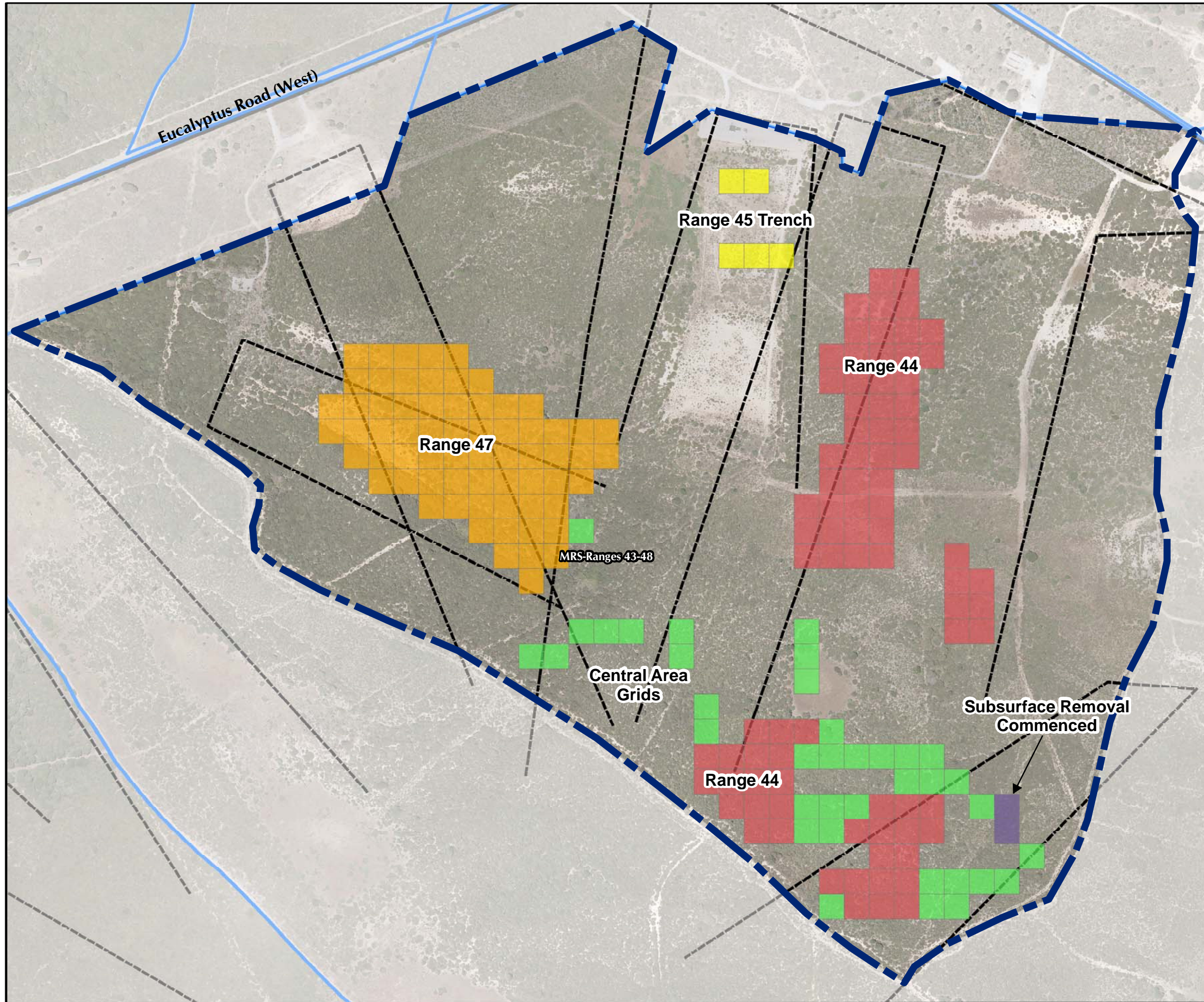
Note: Munitions Debris (MD) includes scrap related to small arms ammunition.



**Interim Action Ranges MRA
Release Profile
MD Locations**
FORA ESCA RP
Monterey County, California

Figure 8.3-3

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Legend

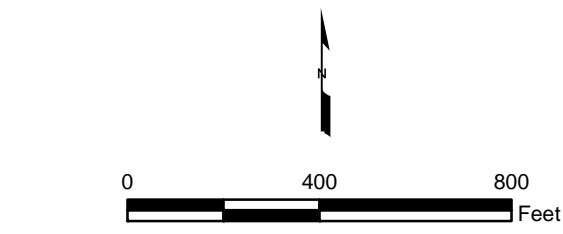
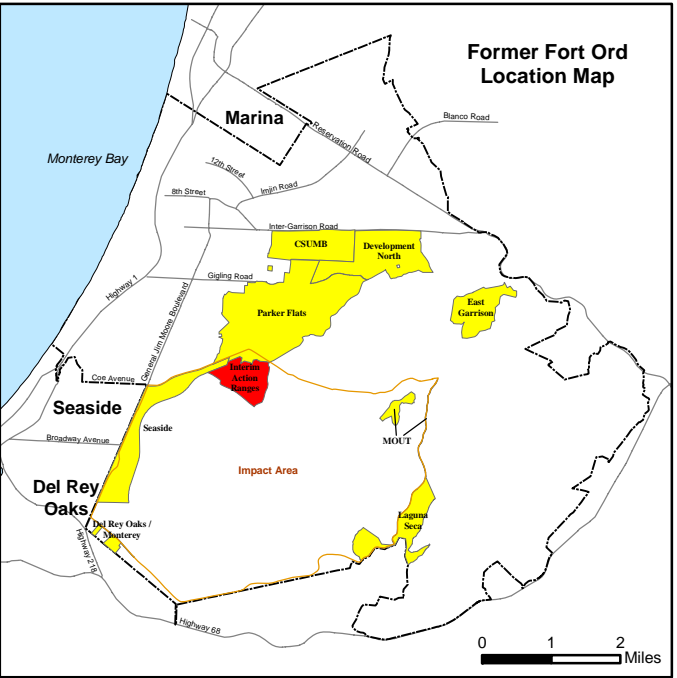
- Munitions Response Area
- Munitions Response Site
- Firing Range
- Major Road

Special Case Areas

- Range 44
- Range 45 Trench
- Range 47

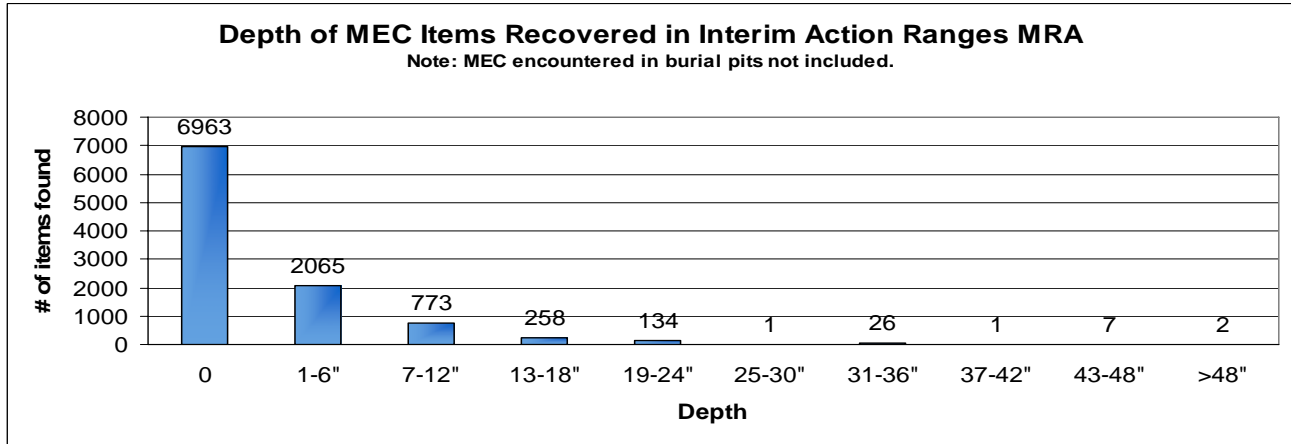
Non-Completed Areas

- No Subsurface Investigation
- Subsurface Removal Commenced



**Interim Action Ranges MRA
Release Profile
Special Case Areas**
FORA ESCA RP
Monterey County, California

Figure 8.3-4



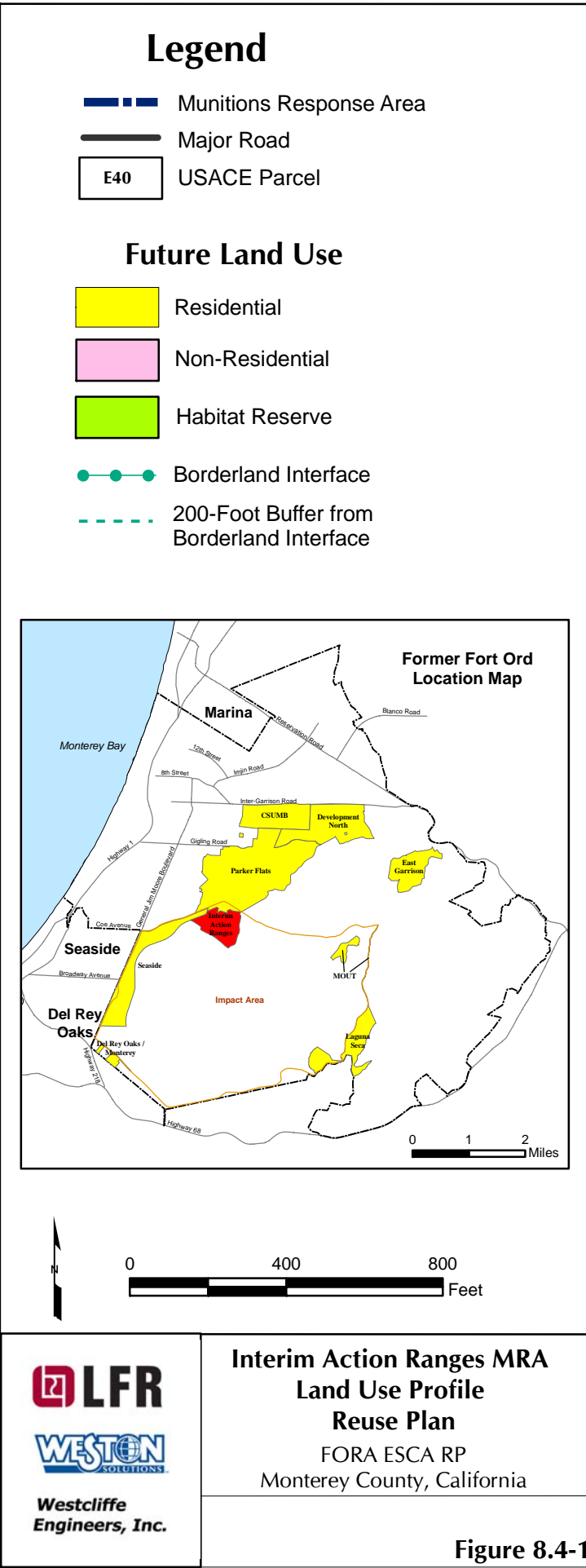
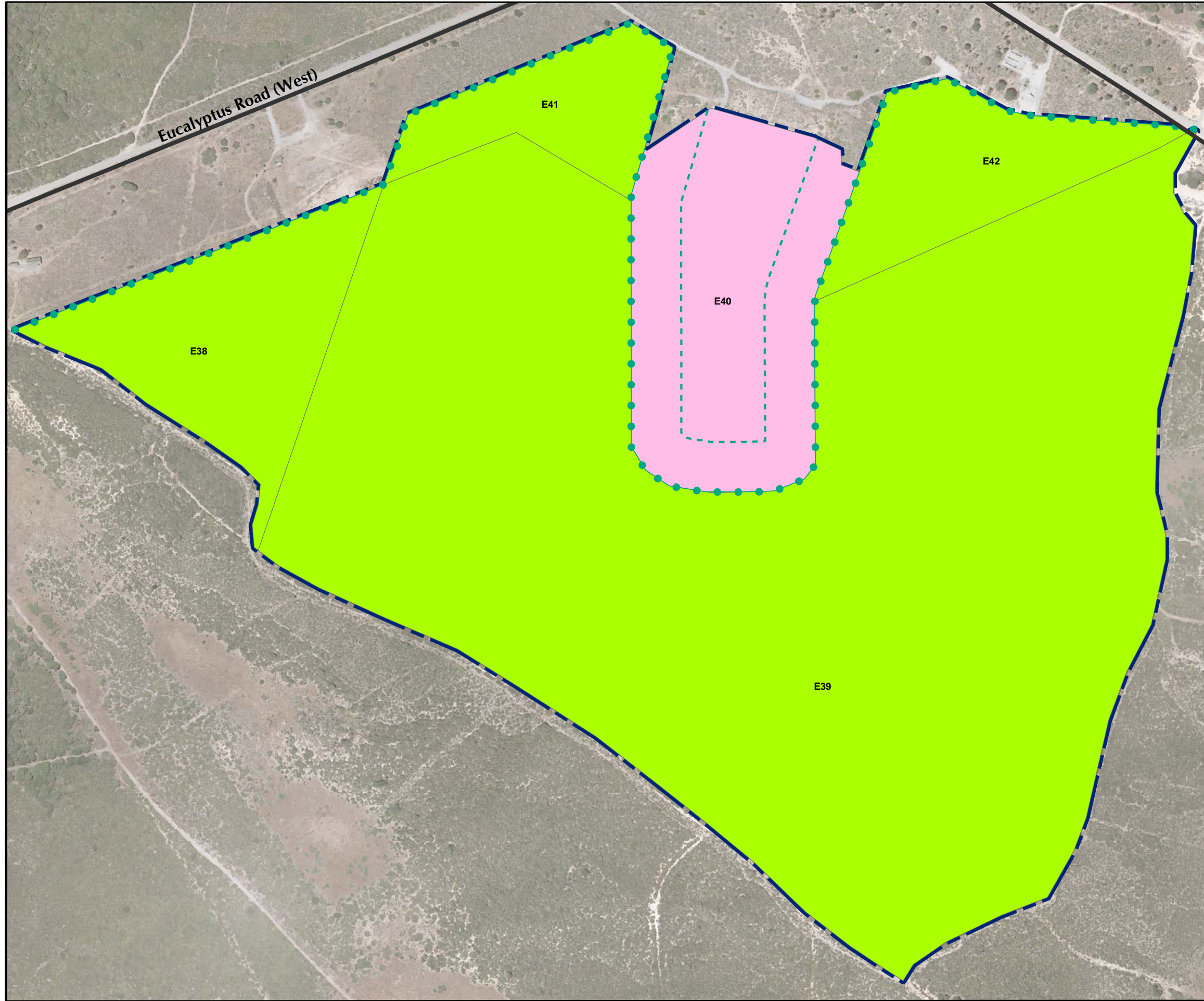
**Westcliffe
Engineers, Inc.**

**Interim Action Ranges MRA
Distribution of MEC
Recovered by Depth Interval**

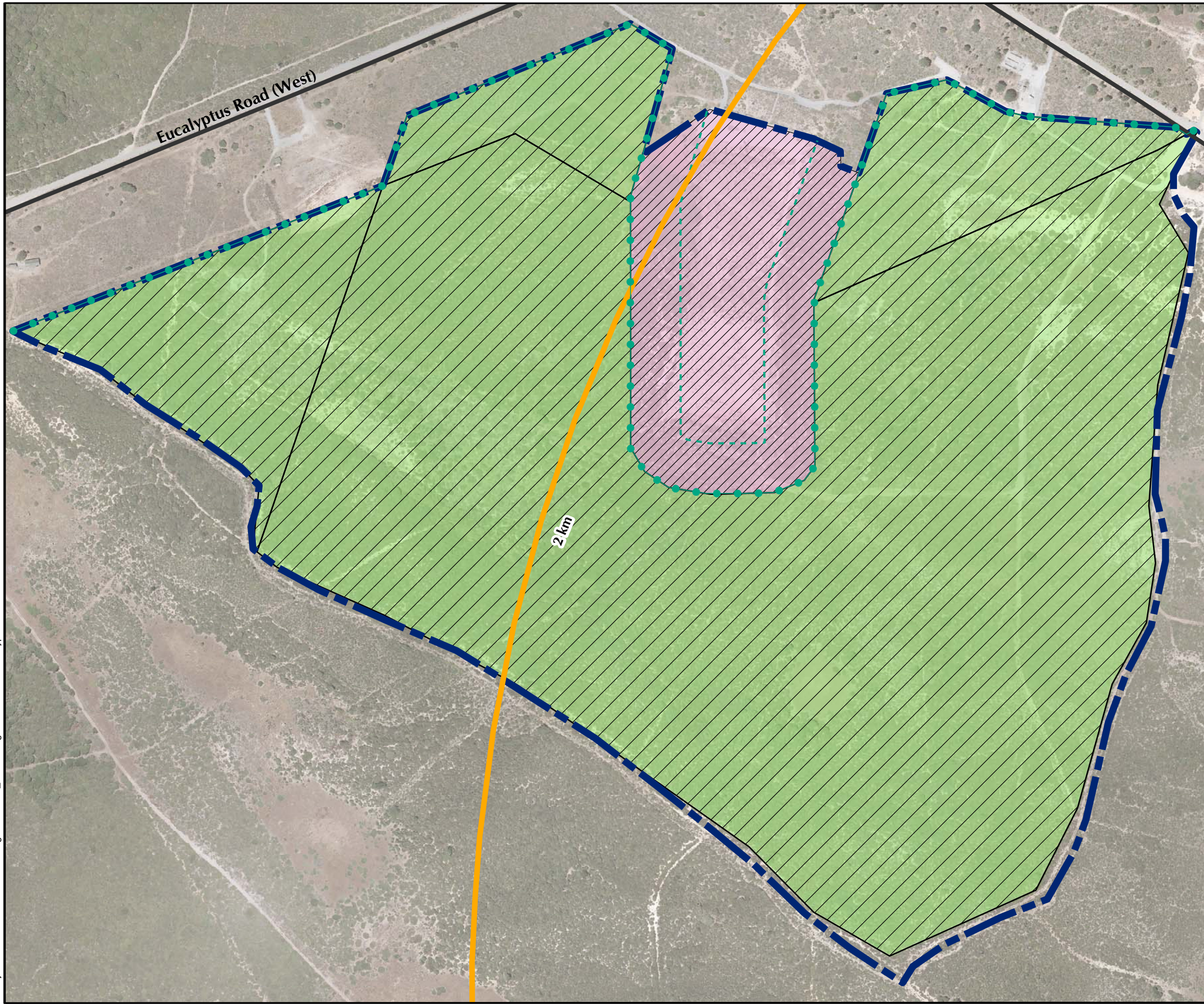
FORA ESCA RP
Monterey County, California

Figure 8.3-5

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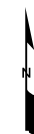
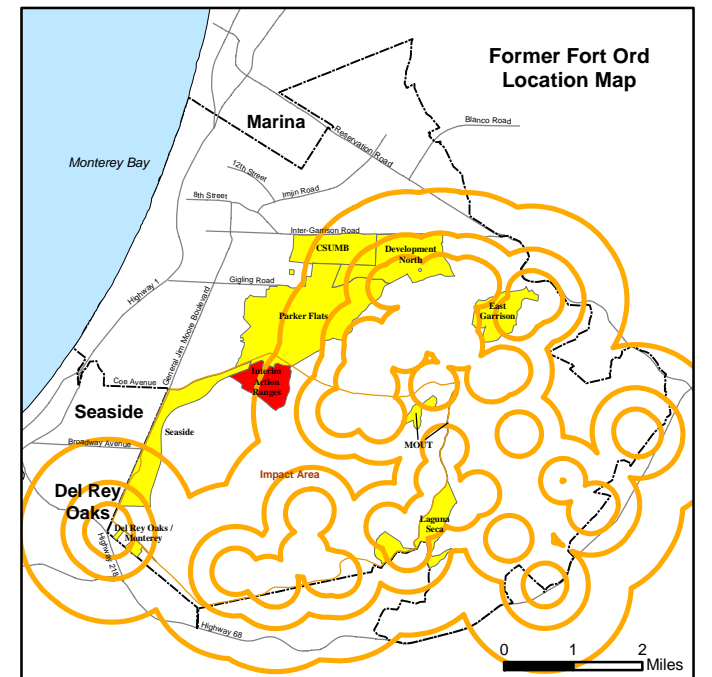


Legend

- Munitions Response Area
- California Tiger Salamander Buffer
- Major Road
- Borderland Interface
- 200-Foot Buffer from Borderland Interface

Habitat Management Plan Category

- Development (includes future Residential and Non-Residential areas)
- Development with Reserve or Restrictions
- Habitat Corridor
- Habitat Corridor with Development
- Habitat Reserve

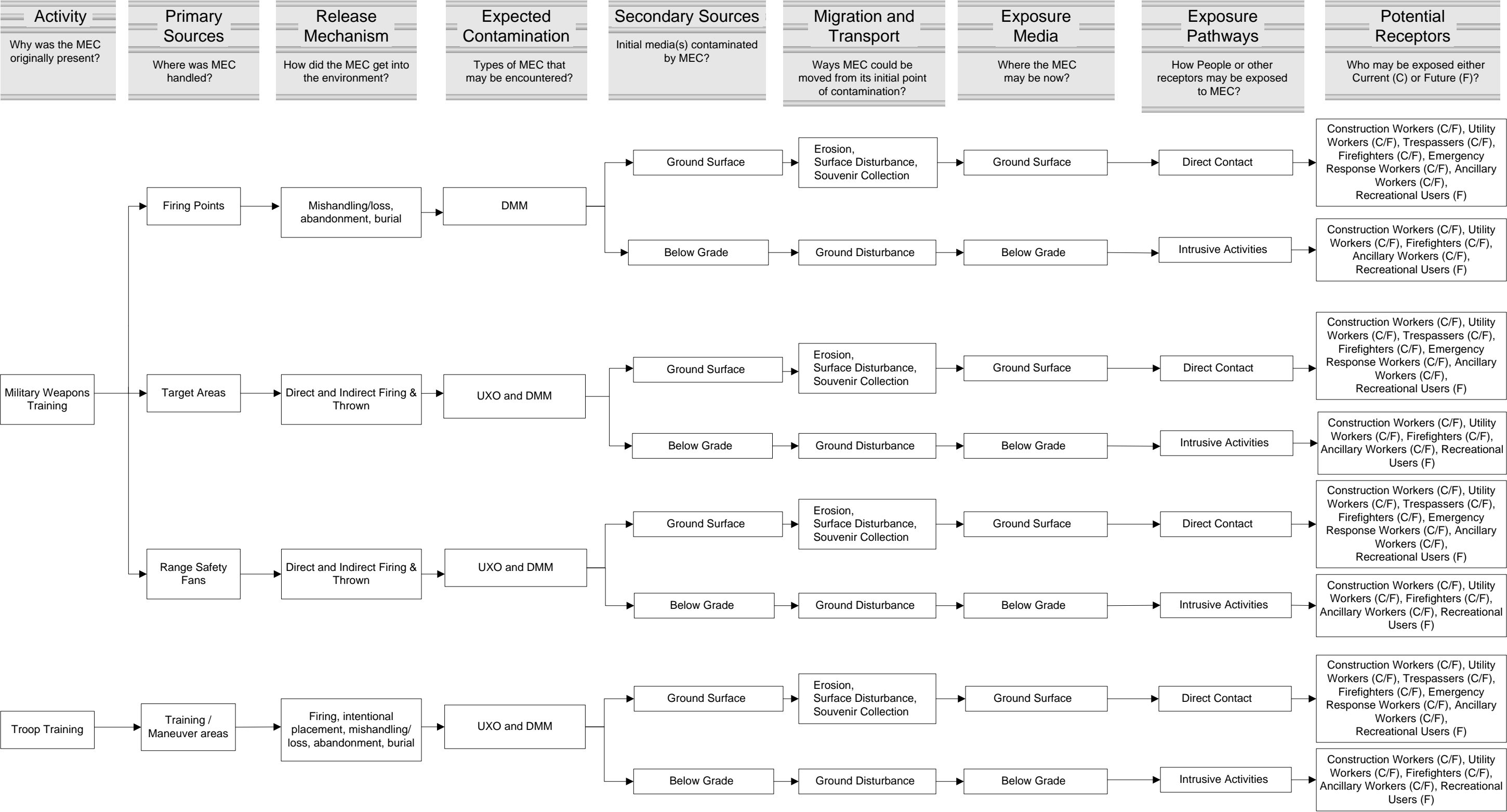




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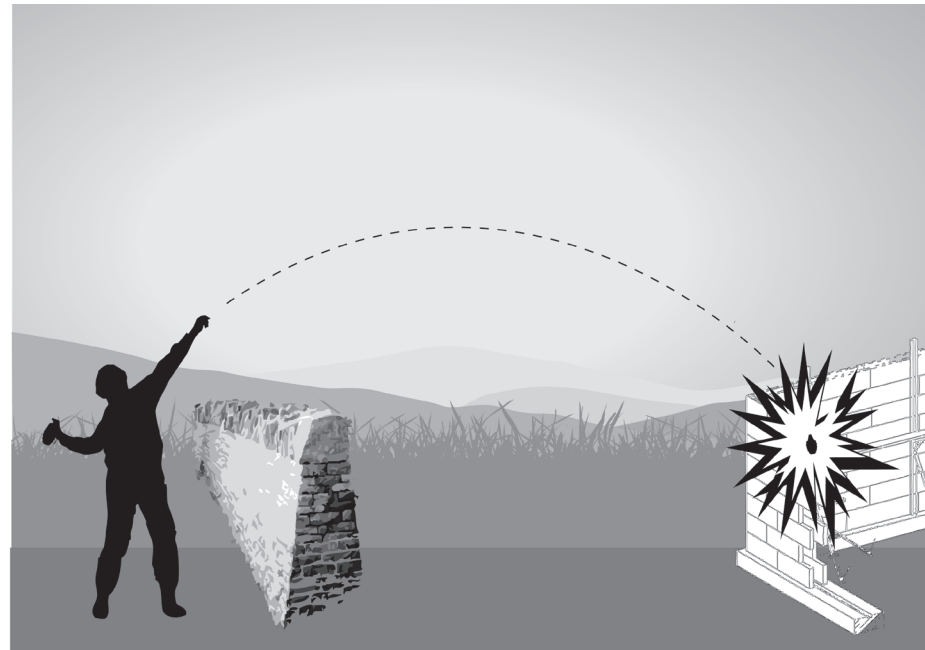
Interim Action Ranges MRA
Ecological Profile
Habitat Type
FORA ESCA RP
Monterey County, California

Figure 8.5-1




Westcliffe Engineers, Inc.

Interim Action Ranges MRA Pathway Analysis Flowchart
FORA ESCA RP
Monterey County, California
Figure 8.6-1



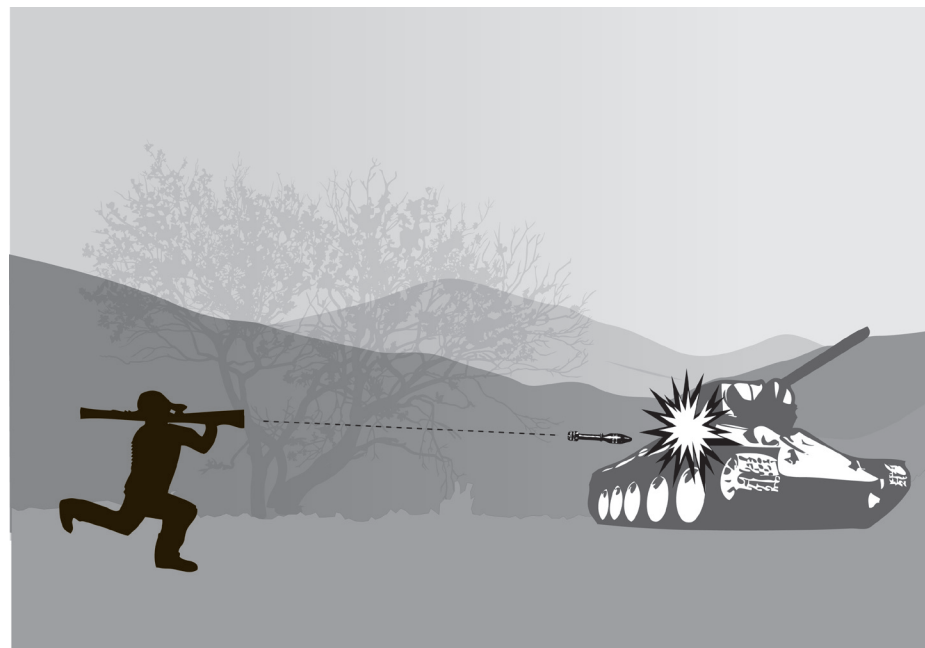
Thrown Ordnance



Burial / Mishandling / Loss



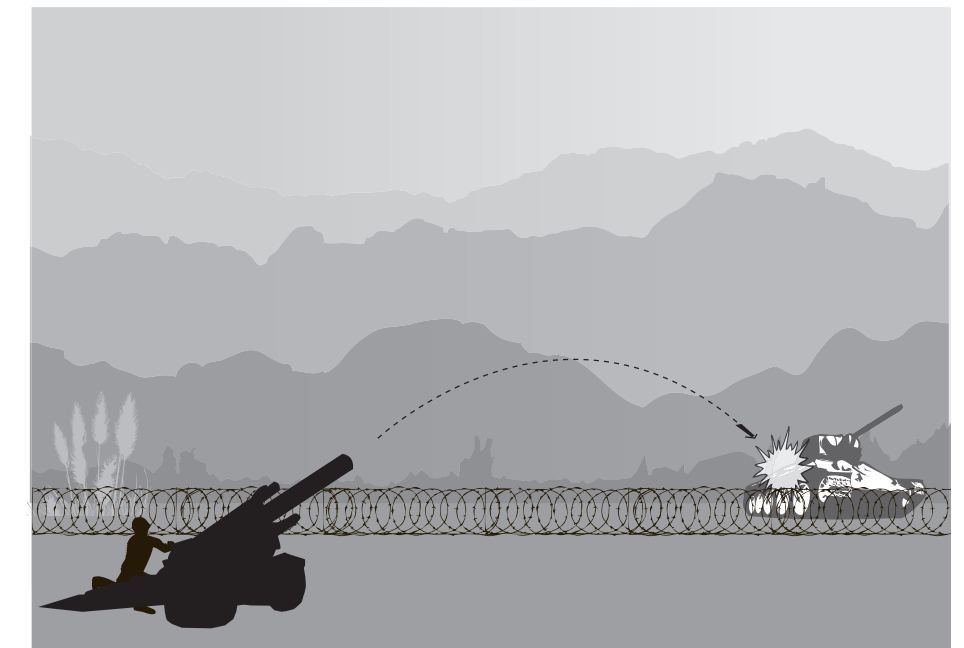
Troop Training



Direct Fire



Indirect Fire



Indirect Fire