



Record of Decision

UXO 17 Potential Area of Concern EE

Atlantic Fleet Weapons Training Area – Vieques

Former Vieques Naval Training Range

Vieques, Puerto Rico

April 2024

1. Declaration

1.1 Site Name and Location

This Record of Decision (ROD*) documents the selected remedy for Potential Area of Concern (PAOC) EE, located on the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico. The former VNTR is part of the Atlantic Fleet Weapons Training Area (AFWTA) – Vieques, which was placed on the National Priorities List (NPL) on February 11, 2005 (Superfund Enterprise Management System [SEMS] identification number: PRN000204694). The former VNTR is now part of the Vieques National Wildlife Refuge that is managed by the United States Fish and Wildlife Service (USFWS), a bureau of the Department of the Interior (DOI). PAOC EE is part of UXO 17, also known as Operable Unit (OU) 27 in SEMS.

PAOC EE comprises approximately 128 acres in the south-central portion of the former VNTR's Eastern Maneuver Area (EMA), which was established in 1947 to provide areas and ranges for the training of Marine amphibious units and battalion landing teams in exercises that included amphibious landings, small-arms fire, artillery and tank fire, shore fire control, and combat engineering tasks. PAOC EE is the beach and immediate surrounding area where military training activities associated with amphibious landings at Playa La Chiva (referred to during military training as "Blue Beach") occurred and where material potentially presenting an explosive hazard (MPPEH) was found on the ground surface and in the subsurface. Historical records indicate the training activities at PAOC EE were not intended to be "live-fire," but instead were intended to utilize blank ammunition.

Although a relatively low quantity of munitions and explosives of concern (MEC) is anticipated to be present at PAOC EE based on the significant munitions removal previously conducted and the number of MEC recovered during these activities (only 38 MEC [approximately 0.04 percent] among 87,896 total items related to military training), it is possible MEC may be present in areas planned for future use. Because a future land user (e.g., recreational user, maintenance worker, or land crab consumer) may encounter MEC at PAOC EE, a Remedial Investigation (RI)/Feasibility Study (FS) was conducted to assess the nature and extent of MEC and potentially related contamination, and to evaluate remedial alternatives to address the potential MEC explosive hazard to potential land users. Because no site-related unacceptable human health or ecological risks were identified, no action is necessary to be protective of potential human and ecological receptors (current or potential future) with respect to exposure to chemical constituents in site media.

* This acronym, and all others used in this document, can be found in alphabetical order in Section 4 of this document.

1.2 Statement of Basis and Purpose

The remedy described in this ROD was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Department of the Navy (Navy), Naval Facilities Engineering Systems Command Atlantic (NAVFAC), United States Environmental Protection Agency (EPA) Region 2, Commonwealth of Puerto Rico, and DOI entered into a Federal Facility Agreement (FFA) in 2007 as a result of the NPL listing and pursuant to CERCLA. The FFA establishes the procedural framework and schedule for implementing CERCLA response actions for Vieques.

This decision is undertaken pursuant to the President's authority under CERCLA Section 104, as delegated to EPA and the Navy in accordance with Executive Order 12580, and in compliance with the process set out in CERCLA Section 120. The selection of the remedy is authorized pursuant to CERCLA Section 104, and the selected remedy will be carried out in accordance with CERCLA Section 121. The Navy is the lead response agency for AFWTA-Vieques and is responsible for taking all appropriate CERCLA response actions necessary to protect public health, welfare, and the environment.

This remedy is being jointly selected by the Navy and EPA, with concurrence of DOI and the Puerto Rico Department of Natural and Environmental Resources (PRDNER). This decision is based on information contained in the Administrative Record file for PAOC EE. Information not specifically summarized in this ROD or its references, but contained in the Administrative Record, has been considered and is relevant to the remedy selection for PAOC EE. Thus, the ROD is based upon and relies on the Administrative Record file for PAOC EE in making this decision. This ROD was prepared in accordance with EPA ROD guidance, specifically *A Guide¹ to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA, 1999) and *Toolkit² for Preparing CERCLA Records of Decision* (EPA, 2011), a supplement to the 1999 guidance for producing higher quality and more user-friendly RODs. The result is a ROD format that is conducive for the general public to read and understand the information upon which the decisions for PAOC EE were made, including references to technical resources presented in the Administrative Record file for PAOC EE.

1.3 Scope and Role of Response Action

Although only about 0.04 percent of munition items recovered at PAOC EE during past removals were MEC and all munition findings support historical information that suggests predominately inert munitions and small arms ammunition (SAA) were used during training exercises at PAOC EE, there is potential explosive hazard posed by MEC that may be present in planned land use areas. However, based on RI findings, no chemical contamination from past munitions-related activities was identified posing unacceptable human health or ecological risks, including no contaminant leaching concern for groundwater, associated with current or planned use. Therefore, the selected remedy will address the potential remaining explosive hazards to ensure PAOC EE can be used as planned.

UXO 17 is one of 19 munitions response sites associated with AFWTA-Vieques that have been or currently are being evaluated in accordance with CERCLA under the Navy's Munitions Response Program (MRP). In addition to PAOC EE, UXO 17 includes Photo-identified (PI) areas PI 14 and PI 21 and PAOC FF (all three of which were closed out of CERCLA with No Action Decision Documents), and Playuela and Playa Caracas (referred to during military training as "Red Beach"), none of which is associated or contiguous with PAOC EE. The Site Management Plan for Vieques further

details the investigation history and the schedule for CERCLA investigations/response activities at the former AFWTA-Vieques, and it is updated annually. The response action selected in this ROD is intended to be the final remedy for PAOC EE and does not include or affect any other OUs at AFWTA-Vieques or other areas of UXO 17 under the CERCLA process. The final determinations for the other OUs and other areas of UXO 17 within AFWTA-Vieques have been documented in past decision documents or will be documented in future decision documents. PAOC EE is the seventh MRP site or area of a site within AFWTA-Vieques for which a final remedy determination has been made.

1.4 Description of Selected Remedy

The selected remedy for PAOC EE is Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas to address MEC that potentially remains onsite, as described in Section 2.7. This remedy reduces potential explosive hazards, preserves important ecological habitat, is protective of human health, and supports public access under the USFWS land use plan. If USFWS chooses not to maintain any portions of the public access areas, such that these areas become overgrown and inaccessible to the public, then the Navy will cease to perform land use control (LUC) and MEC long-term monitoring (LTM) in these areas. The Navy will not clear vegetation in order to provide access to areas that USFWS chooses not to maintain as accessible to the public. However, should USFWS decide not to maintain an area for public accessibility but at a future date decide to reopen the same area for public access, the Navy will provide on-call MEC support during vegetation clearing performed by USFWS. Further, if during an LUC/MEC monitoring event conducted in response to named hurricanes or other events that may threaten the integrity of LUCs or potentially expose MEC, areas USFWS has been maintaining as publicly accessible are observed to have become inaccessible as a result of downed vegetation, the Navy will provide on-call MEC support during vegetation/debris clearing performed by USFWS.

The components of the selected remedy are:

- Subsurface MEC clearance within the public areas identified by USFWS for land management and recreational activities where subsurface clearance has not already taken place during historical investigation and removal activities.
- LUC implementation (e.g., educational kiosks/signage and administrative mechanisms, such as trail markers/monuments) to reduce the potential for people to access areas outside authorized, accessible public-use areas.
- An LUC and MEC LTM program, including periodic site inspections for trespassing, erosion, MEC/munitions debris (MD) occurrence in accessible public-access areas, and the integrity and effectiveness of physical LUCs. Any MEC/MD discovered during the LTM program will be removed.

1.5 Statutory Determination

The selected remedy for PAOC EE meets the statutory requirements of CERCLA Section 121 and is protective of human health and the environment, complies with Federal and Commonwealth regulations that are applicable or relevant and appropriate to the remedial action, is cost-effective, utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, and complies with the preference for treatment as a principal element.

Although unlikely, because MEC posing explosive hazards may remain at PAOC EE following implementation of the remedial action, in addition to this remedy the Navy will conduct statutorily required reviews every five years to ensure that the remedy remains protective of human health and the environment.

1.6 Navy Authorizing Signature for the Record of Decision for PAOC EE, Atlantic Fleet Weapons Training Area – Vieques



J. R. Cirvello
Environmental Business Line Manager
Naval Facilities Engineering Systems Command Atlantic

25 Jun 2024
Date

1.7 EPA Authorizing Signature for the Record of Decision for PAOC EE, Atlantic Fleet Weapons Training Area – Vieques

Evangelista, Pat Digitally signed by Evangelista,
Pat
Date: 2024.09.12 09:19:56 -04'00'

September 12, 2024

Pat Evangelista
Director, Superfund and Emergency Management Division
Environmental Protection Agency Region 2

Date

1.8 *DOI Concurrence Signature for the Record of Decision for PAOC EE, Atlantic Fleet Weapons Training Area – Vieques*

JOAN MOONEY

Digitally signed by JOAN
MOONEY

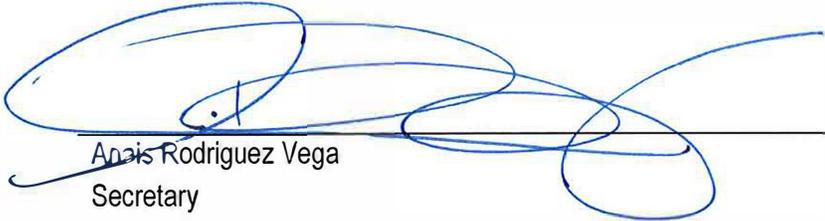
Date: 2024.08.20 10:48:38 -04'00'

Joan M. Mooney

Principal Deputy Assistant Secretary Exercising the Delegated Authority of the
Assistant Secretary – Policy, Management and Budget
Department of the Interior

Date

1.9 PRDNER Concurrence Signature for the Record of Decision for PAOC EE, Atlantic Fleet Weapons Training Area – Vieques



Anais Rodriguez Vega
Secretary
Puerto Rico Department of Natural and Environmental Resources

APR 22 2024

Date

2. Decision Summary

Vieques is approximately 7 miles southeast of the eastern tip of the main island of Puerto Rico (Figure 1). Aside from mainland Puerto Rico, Vieques is the largest island in the Commonwealth of Puerto Rico, encompassing 33,088 acres (51 square miles).

The Navy purchased large portions of Vieques in the early 1940s to conduct activities related to military training. Operations within the former VNTR included various aspects of naval gunfire training, such as air-to-ground ordnance delivery and amphibious landings, as well as housing the main base of operations for these activities at Camp Garcia. The former VNTR is approximately 14,600 acres and is comprised of former military training areas known as the EMA, Surface Impact Area (SIA), Live Impact Area (LIA), and Eastern Conservation Area (ECA) (Figure 2).

The Navy ceased training exercises at the former VNTR on April 30, 2003, in accordance with the Presidential Directive to the Secretary of Defense dated January 30, 2000, when the land was transferred to the DOI, to be managed by USFWS as a National Wildlife Refuge. On February 11, 2005, AFWTA-Vieques was added to the NPL, which required all subsequent environmental restoration activities for Navy sites on Vieques to be conducted under CERCLA. On September 7, 2007, the Navy, DOI, EPA, and the Commonwealth of Puerto Rico finalized an FFA that established the procedural framework and schedule for implementing the CERCLA activities for Vieques. The Navy retains the primary responsibility under the FFA for conducting the environmental investigations and cleanup of the property, as warranted.

2.1 PAOC EE

2.1.1 Site Description and History

PAOC EE comprises approximately 128 acres in the south-central portion of the EMA (Figure 2) and was used for military training activities associated with amphibious landings at Playa La Chiva/Blue Beach. The area encompasses Playa La Chiva and areas just inland, including Punta Conejo (Figure 3). As no live-fire activities are known to have occurred at PAOC EE, findings associated with past investigations and removals are consistent with what would be expected for amphibious landings, establishing a beachhead, and related ship-to-shore activities.

2.1.2 Site Characteristics

The ground elevation at PAOC EE ranges from about 30 feet above mean sea level (amsl) inland to sea level at the coastline. However, most of the site is relatively flat, with an elevation of about 10 feet or less amsl. Laguna La Chiva is an approximately 10-acre estuarine lagoon located immediately northwest of PAOC EE with a hydrologic connection to the Caribbean Sea that bisects the far western end of PAOC EE (Figure 3).

PAOC EE contains a variety of environmental habitats, including primarily thick thorn scrub, a mangrove fringe to the northwest along Laguna La Chiva, and beach with some rocky outcrops along the southern boundary, including Punta Conejo. The predominant vegetation community consists of forested areas of mixed invasive and native species that provide suitable land crab habitat.

Generalized groundwater flow at PAOC EE is anticipated to be southward toward the ocean (Figure 4) and is likely to be tidally influenced, especially near the shoreline. Because of the site's proximity to the ocean, groundwater at PAOC EE is likely shallow and brackish to saline from sea water intrusion.

Figure 1. Regional Location Map

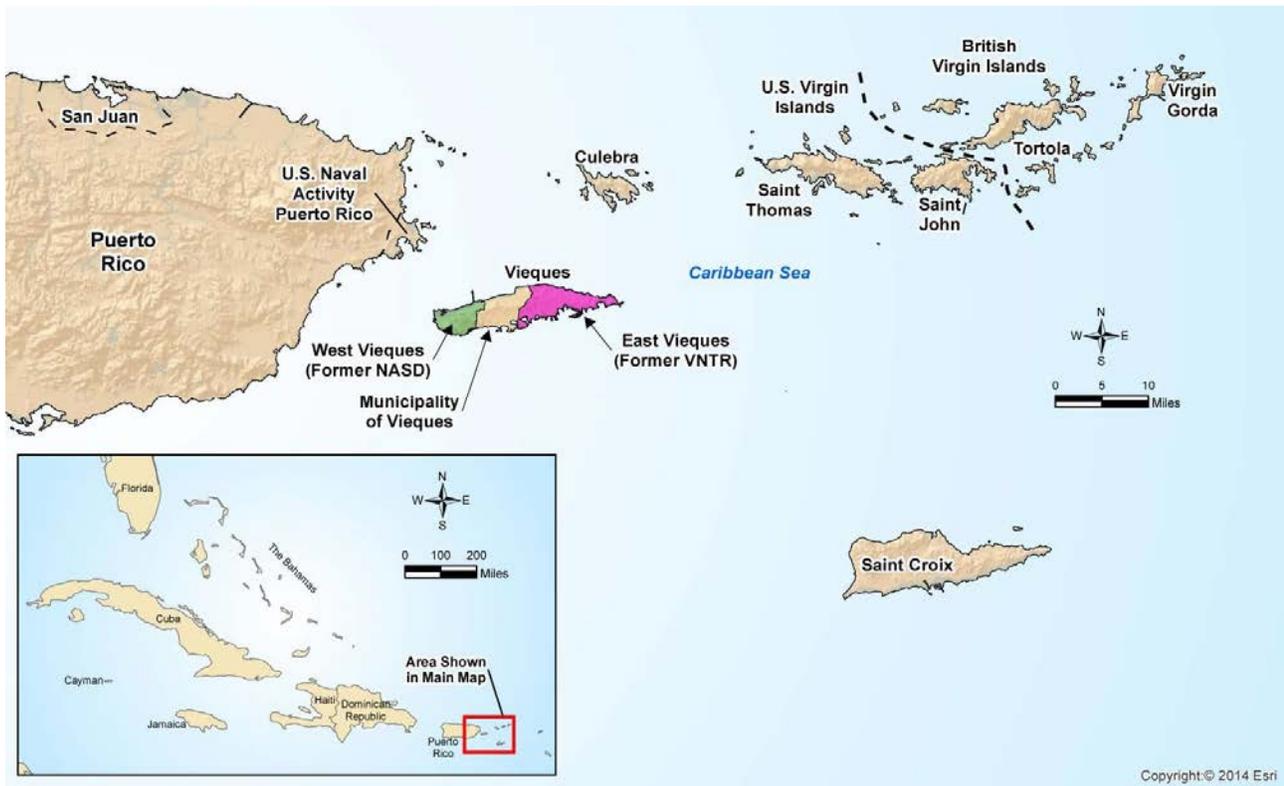


Figure 2. Former VNTR Location Map

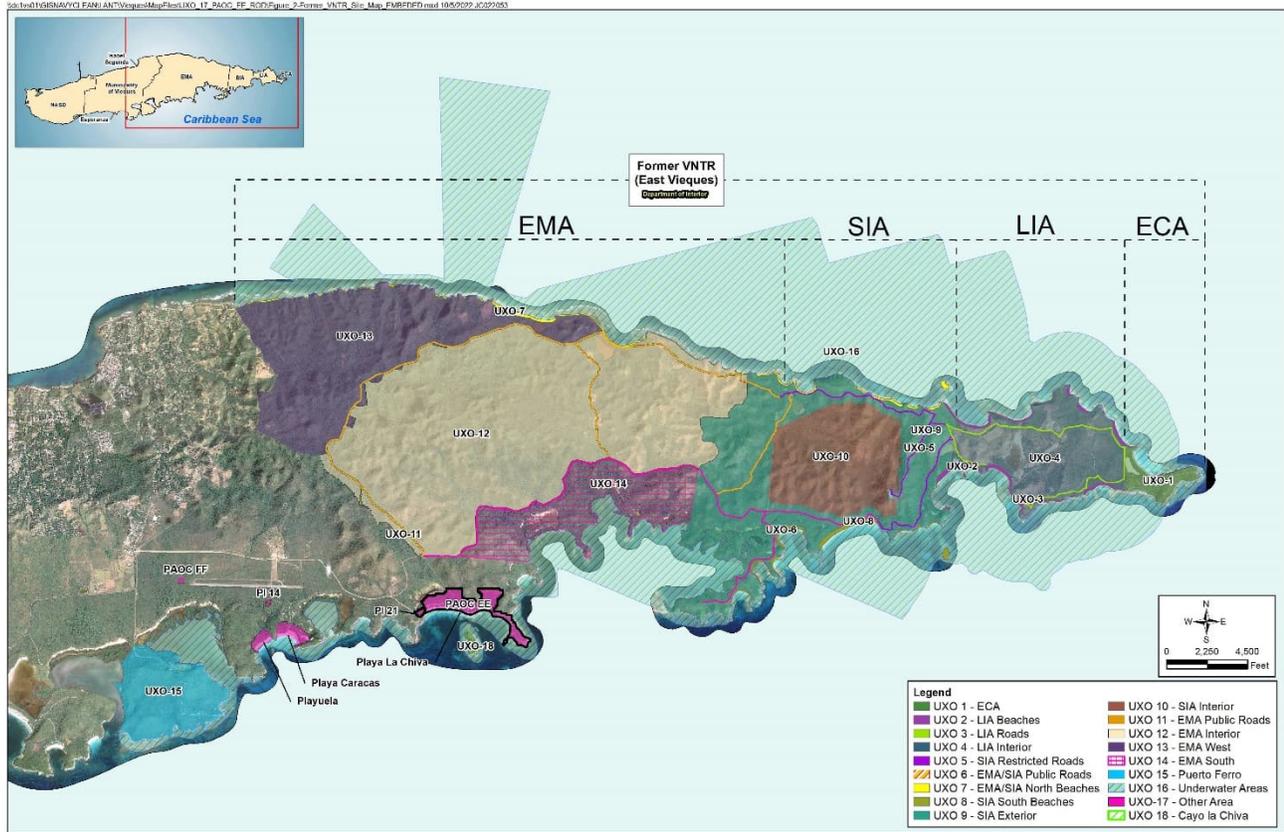


Figure 3. PAOC EE Site Features

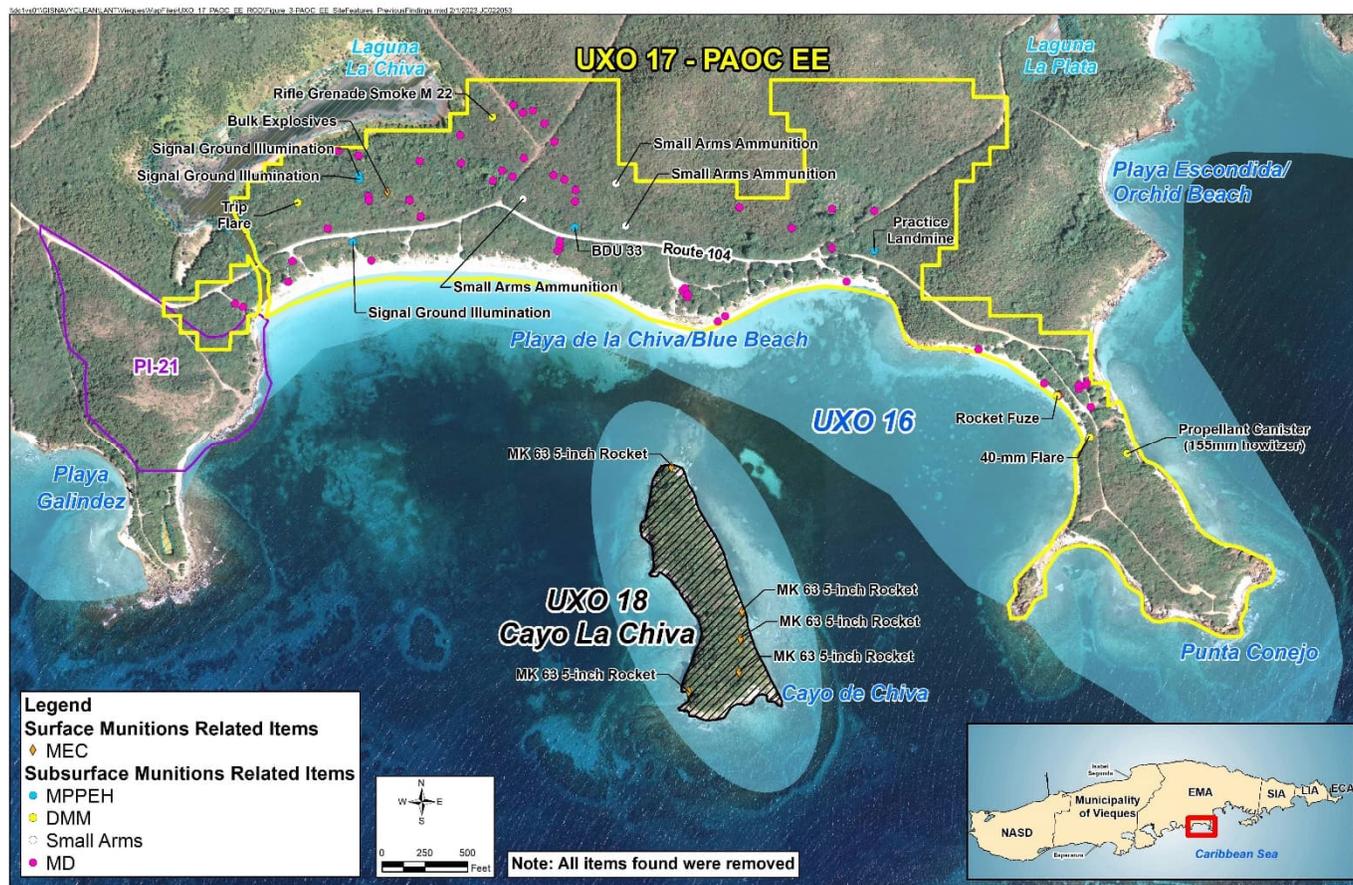
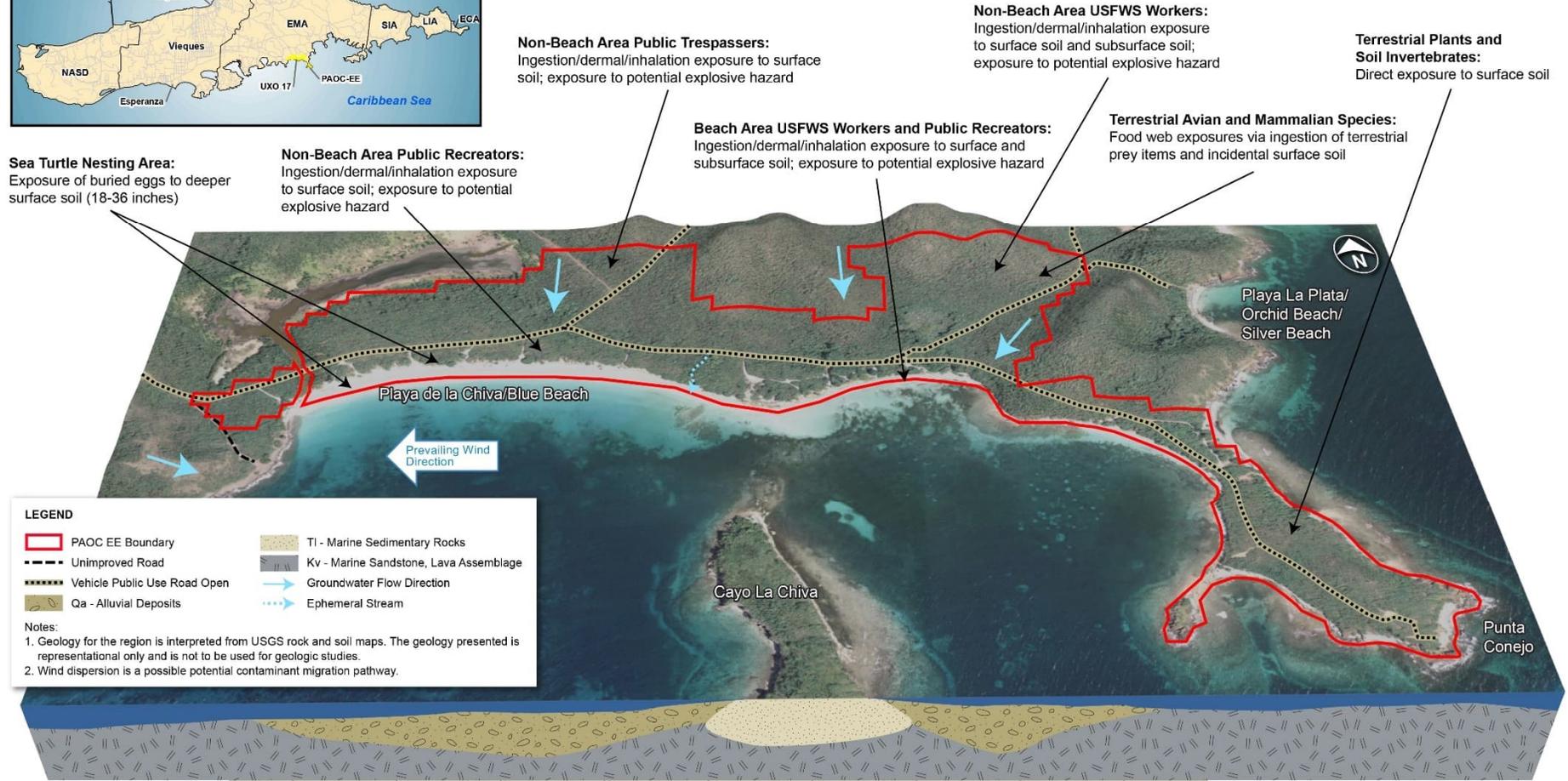


Figure 4. PAOC EE Conceptual Site Model

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2.1.3 Summary of Previous Investigations for PAOC EE

Several environmental investigations and munitions removal actions have been conducted at or included PAOC EE beginning in 2002. Table 1 summarizes the purpose, scope, and pertinent results of previous investigations and munitions removal activities performed at or relevant to PAOC EE.

Table 1. Previous Investigations and Munitions Removal Activities

Previous Investigation*	Date	Investigation Activities
MEC Investigation at Playa La Chiva	2002-2003	<p>An Archive Records Search showed that Playa La Chiva/Blue Beach was formerly utilized for military training activities and indicated that only blank ammunition was used on this beach during training exercises (Tippetts et al., 1979). Although records indicated that no live fire was performed, an MEC investigation was completed within the sandy portion of the beach (area between the vegetation and shoreline) and beach access trails in December 2002. No MEC was identified.</p> <p>An additional munitions investigation of Playa La Chiva/Blue Beach was conducted in association with the 2003 land transfer to inspect the sandy portion of the beach for MEC/MPPEH. The investigation consisted of performing a surface clearance and removing a subset of subsurface geophysical anomalies identified via digital geophysical mapping (DGM). No MEC/MPPEH were found on the ground surface and none of the subsurface geophysical anomalies removed was MEC/MPPEH.</p>
Environmental Baseline Survey (EBS)	2002-2003	An Environmental Baseline Survey ³ (NAVFAC, 2003) was conducted in 2002 to document the environmental conditions at the former VNTR in anticipation of the transfer of jurisdiction to the DOI. The EBS included site inspections, interviews, and additional aerial photograph evaluation for the former VNTR, including PAOC EE.
Expanded Range Assessment/Site Inspection (ERA/SI)	2005-2009	An Expanded Range Assessment/Site Inspection ⁴ was conducted between 2005 and 2009 within the former VNTR, including PAOC EE (CH2M, 2010). The ERA/SI included a magnetometer-assisted inspection of Punta Conejo and removal of any magnetic anomalies detected. No MEC/MPPEH were found on the ground surface and none of the subsurface magnetic anomalies removed was MEC/MPPEH. However, fibrous matting, metallic debris, and small arms blank ammunition were identified on the eastern portion of Punta Conejo. Therefore, PAOC EE was recommended to be further investigated for potential presence of MEC.
Preliminary Assessment/Site Inspection (PA/SI) of Punta Conejo	2011	A Preliminary Assessment/Site Inspection ⁵ was conducted in 2011 at Punta Conejo to further evaluate the potential presence of MEC (CH2M, 2012). The PA/SI involved performing a DGM survey across all 18 acres of Punta Conejo and removing a subset of the subsurface geophysical anomalies. Two MEC items were identified and determined to be discarded military munitions (MK-50 decoy flare and an M203 propellant for a 155-mm howitzer, the latter being the only MEC item found at PAOC EE below 1-foot bgs). The remaining excavated anomalies consisted of small arms ammunition (SAA), range-related debris (RRD), and non-munitions related debris.
Additional Munitions Investigation of Playa La Chiva and Adjacent Area	2013	A follow-up investigation of Playa La Chiva and adjacent area was conducted in June 2013 as a result of finding MEC at nearby Cayo La Chiva, offshore of Playa La Chiva. Cayo La Chiva is munitions response site UXO 18, which was addressed via its own ROD and remedial action. The additional munitions

Table 1. Previous Investigations and Munitions Removal Activities

Previous Investigation*	Date	Investigation Activities
		<p>investigation consisted of a DGM survey on the sandy portion of the beach, the public parking areas and pathways, and transects within the vegetated area north of Route 104, with subsequent excavation of all identified subsurface anomalies to a maximum depth of 2 feet north of Route 104 and a maximum depth of 4 feet south of Route 104, including the beach proper, associated parking areas, and the trails between them. No MEC/MPPEH were identified on the ground surface, but 12 MEC/MPPEH were found in the subsurface comprising bulk explosives, flares, practice bomb and practice anti-tank mine, rocket fuze, and rifle grenade. Additionally, approximately 1,000 SAA were found in one location and approximately 450 MD were identified within the investigation area. All of the MEC/MPPEH, SAA, and 93 percent of the MD were found within the first foot below ground surface.</p>
<p>PAOC EE Time-Critical Removal Action (TCRA)</p>	<p>2014</p>	<p>Based on the findings of the 2013 additional munitions investigation of Playa La Chiva and adjacent area, a Time-Critical Removal Action⁶ was conducted within the area of planned public use and immediately adjacent areas in 2014 to reduce the explosive hazard associated with the potential presence of surface and subsurface MEC/MPPEH (CH2M, 2015). Surface and subsurface MEC clearance was conducted using a magnetometer to identify magnetic anomalies on and beneath the ground surface. The TCRA identified and removed over 100,000 metallic items from approximately 10,000 anomaly locations and identified a total of 24 MEC and 5 MPPEH items. The remaining items were identified as inert metal pieces or did not otherwise present a significant explosive hazard, including 3,596 SAA that were identified and removed.</p>
<p>PAOC EE Remedial Investigation/Feasibility Study (RI/FS)</p>	<p>2017</p>	<p>A Remedial Investigation/Feasibility Study⁷ (CH2M, 2019) was conducted at PAOC EE to assess the nature and extent of MEC and potential environmental contamination, to assess potential risks to human health and the environment, and to evaluate remedial alternatives for PAOC EE (CH2M, 2019). The RI was implemented in two separate, but related, components – one focusing on MEC and one focusing on chemical contaminants in soil. Risk assessments performed during the RI determined there are no unacceptable risks to human health or the environment⁸ as a result of past munitions-related activities posed by constituent concentrations in site media, which indicates no action is required for environmental media.</p> <p>Based on historical military training information and the MEC characterization component of the RI, it was concluded that relatively few MEC are potentially present at PAOC EE, especially considering the significant amount of munitions removal conducted during the TCRA and previous investigations. However, in accordance with EPA guidance an FS was warranted to evaluate remedial alternatives to address potential explosive hazards⁹ associated with the potential presence of MEC at PAOC EE. A more detailed description of the RI findings for PAOC EE are presented in Sections 2.1.4 through 2.1.6 and a detailed discussion of the remedial alternatives evaluated in the FS is presented in Section 2.6 of this ROD.</p>

* Documentation associated with the listed activities is available in the Administrative Record and provides detailed information used to support the remedy selection for PAOC EE.

2.1.4 Nature and Extent of Contamination

As discussed in Section 2.1.3 and summarized in Table 1, beginning in 2002, a number of investigations and a TCRA were conducted at PAOC EE that helped determine the nature and extent of MEC and other munitions-related material. The MEC findings from these investigations and TCRA suggest predominantly inert munitions and SAA were used during training exercises in the area. There is no record of munitions burial or explosive munitions being fired at the site.

Only 38 MEC (i.e., approximately 0.04 percent) were found among the 87,896 total items recovered across the site that were related to military training and 98 percent of the total items found during historical investigations at PAOC EE were in the top 1 foot. While the depth of intrusive investigations during historical investigation varied by location, in general the maximum depths of intrusive investigation within the "upland areas" and "beach areas" were approximately 2 feet and 4 feet, respectively. Only one MEC item was found deeper than 1 foot during these historical investigations. Because 98 percent of items found during historical investigations were detected in the top 1 foot and only one MEC item was found below 1 foot, intrusive investigations during the TCRA had a maximum depth of 1 foot.

Of the 7,928 munitions items recovered across the site, 4,596 were SAA (i.e., approximately 58 percent). The 38 MEC included flares, propellant, bulk explosives, practice bomb, practice mines, mortar, rocket fuze, tear gas cartridge, blasting caps, and grenades. All items found during historical investigations and removal action were removed from the site and all MEC discovered were destroyed through detonation.

To ensure appropriate characterization of PAOC EE, soil sampling activities focused on: (1) areas with the highest potential for contamination (i.e., locations where MEC were identified, locations with the highest densities of MD, and a former drum location), (2) highest potential exposure areas (i.e., beach areas used by human receptors and by sea turtles as nesting habitat), and (3) representative areas where subsurface anomalies were left in place during the TCRA. A total of 66 soil samples from 35 soil sample locations were collected and analyzed for explosives and metals, and a subset of samples was also analyzed for polycyclic aromatic hydrocarbons (PAHs).

No PAHs were detected in any sample. There was only one explosive (nitroglycerin) detection and in only 1 sample out of 66 total samples. As shown in Table 2, the nitroglycerin concentration was below the human health and ecological screening levels, but above the soil screening level associated with leaching. Other soil samples collected in this area did not contain nitroglycerine, which suggests that nitroglycerin was localized at this location and would therefore not present a leaching concern to groundwater. Metals detections were evaluated following a process developed by the stakeholder agencies, which is based on a scientific assessment of the concentration of each metal to determine whether it is associated with a munitions constituent or other potential contaminant source, such as its location relative to other detections, whether it is a natural constituent of the soils, and whether it is present at levels consistent with background. The metals detected in samples collected at PAOC EE, including those contributing to unacceptable risk calculations, were determined to be unassociated with the munition types found at the site (e.g., arsenic), present in trace amount in munitions (e.g., cadmium, selenium), or spatially isolated and insignificant with respect to potential exposure (e.g., copper). In fact, the vast majority of metals concentrations detected were within the range of concentrations in the background dataset. In addition, leaching of contaminants to groundwater was determined not to be a concern at PAOC EE. This conclusion is based on multiple lines of evidence, including: (1) the most likely

contaminant source areas (i.e., munitions) were removed, (2) many of the constituents evaluated are naturally occurring and/or not associated with munitions and/or were located within soil at isolated areas at concentrations unlikely to cause a concern of leaching to groundwater, and (3) data collected from nearby sites located at similar distances to the coastline indicate that groundwater at PAOC EE is brackish or saline and therefore unpotable without treatment. The risk-based conclusions reached based on evaluation of the PAOC EE data are provided in Section 2.1.6.

Table 2. Soil Exceedances for PAOC EE

Environmental Media	COPC	Maximum Concentration Detected Above Screening Criteria and Background ¹	Vieques (East) Background UTL Zone TI SS*	Screening Criteria			
				Soil Screening Level (migration to groundwater) (November 2018)	Adjusted Residential Screening Criteria (November 2018)	Adjusted RSL for Residential Soil (November 2018)	Vieques Ecological Screening Value
Surface and Subsurface Soil	<i>Explosives (µg/kg)</i>						
	Nitroglycerin ²	200	--	0.85	630	8,200	13,000
	<i>Total Inorganics (mg/kg)</i>						
	Aluminum	41,200	35,000	30,000	7,700	100,000	--
	Antimony	4.1	--	0.27	3.1	47	78
	Arsenic	9.3	1.6	0.29	0.68	3.0	18
	Cadmium	3.1	2.2	0.38	7.1	98	32
	Chromium	204	72	100,000	0.3	6.3	64
	Hexavalent Chromium	12	--	0.00067	0.3	6.3	0.4
	Cobalt	25.4	26	0.27	2.3	35	13
	Copper	253	94	46	310	4,700	70
	Iron	59,100	43,200	350	5,500	82,000	--
	Lead	910	5.4	14	400	800	120
	Manganese	2,390	1,630	28	180	2,600	220
	Nickel	40.4	41	26	150	2,600	38
	Selenium	0.78	0.51	0.26	39	580	0.52
	Thallium	0.29	0.13	0.14	0.14	1.2	1.0

Notes:

Adjusted RSL corresponds to a risk of 1×10^{-6} and an adjusted HQ of 0.1, as applicable. The adjusted HQ is used for initial screening of data from sites where more than one constituent with the same toxic endpoint (e.g., target organ, reproductivity, etc.) might be present. EPA RSLs are not adjusted for carcinogenic constituents; therefore, adjusted and unadjusted RSLs for carcinogenic constituents are the same. The November 2018 RSLs were available during the RI; although several RSLs (as well as other screening levels) may have been updated since that time, the updated values do not alter the human health or ecological risk assessment conclusions.

*For metals data, an exceedance is not considered if the result is less than background.

¹ The range of concentrations detected is presented in the Remedial Investigation/Feasibility Study Report (CH2M, 2019).

² Detected in only 1 of 66 soil samples.

Table 2. Soil Exceedances for PAOC EE

<p> $\mu\text{g}/\text{kg}$ = micrograms per kilogram COPC = constituent of potential concern HQ = hazard quotient MCL = Maximum Contaminant Level mg/kg = milligrams per kilogram RSL = Regional Screening Level UTL = upper tolerance limit </p>
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2.1.5 Current and Potential Future Land and Resource Uses

The former VNTR occupies approximately 14,600 acres, most of which is undeveloped, and is bounded by the Municipality of Vieques to the west, and the Caribbean Sea to the north, south, and east. The land that includes PAOC EE is under the administrative jurisdiction of the DOI and managed by USFWS as part of the Vieques National Wildlife Refuge, as mandated by legislation. Accordingly, USFWS prepared a [Comprehensive Conservation Plan/Environmental Impact Statement](#) ¹⁰ (CCP/EIS) for the Vieques National Wildlife Refuge that provides long-term guidance for the management and public use of these lands (USFWS, 2007). There is currently public access allowed in certain parts of PAOC EE, including Playa La Chiva. Based on the CCP/EIS, USFWS has identified and mapped locations of additional planned recreational features and public use areas, including areas/trails for vehicles, biking, horseback riding, fishing, land crabbing, parking, and picnicking. The current and planned public use areas are shown in Figure 5.

Although groundwater in Vieques is classified as a potable water supply by the Commonwealth of Puerto Rico, there is no current or planned groundwater use within PAOC EE or anywhere on Vieques. Potable water supply on Vieques is derived from the Rio Blanco on the main island of Puerto Rico and supplied to Vieques via pipeline by the Puerto Rico Aqueduct and Sewer Authority (PRASA). Further, as noted previously, groundwater at PAOC EE is brackish or saline and therefore unpotable without treatment.

2.1.6 Summary of Site Risks

The results of the Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) conducted for PAOC EE during the RI are discussed in the following subsections and summarized in Table 3. The complete HHRA and ERA are provided in the RI/FS Report (CH2M, 2019), which is available in the Administrative Record file.

Figure 5. USFWS Planned Land Use at PAOC EE

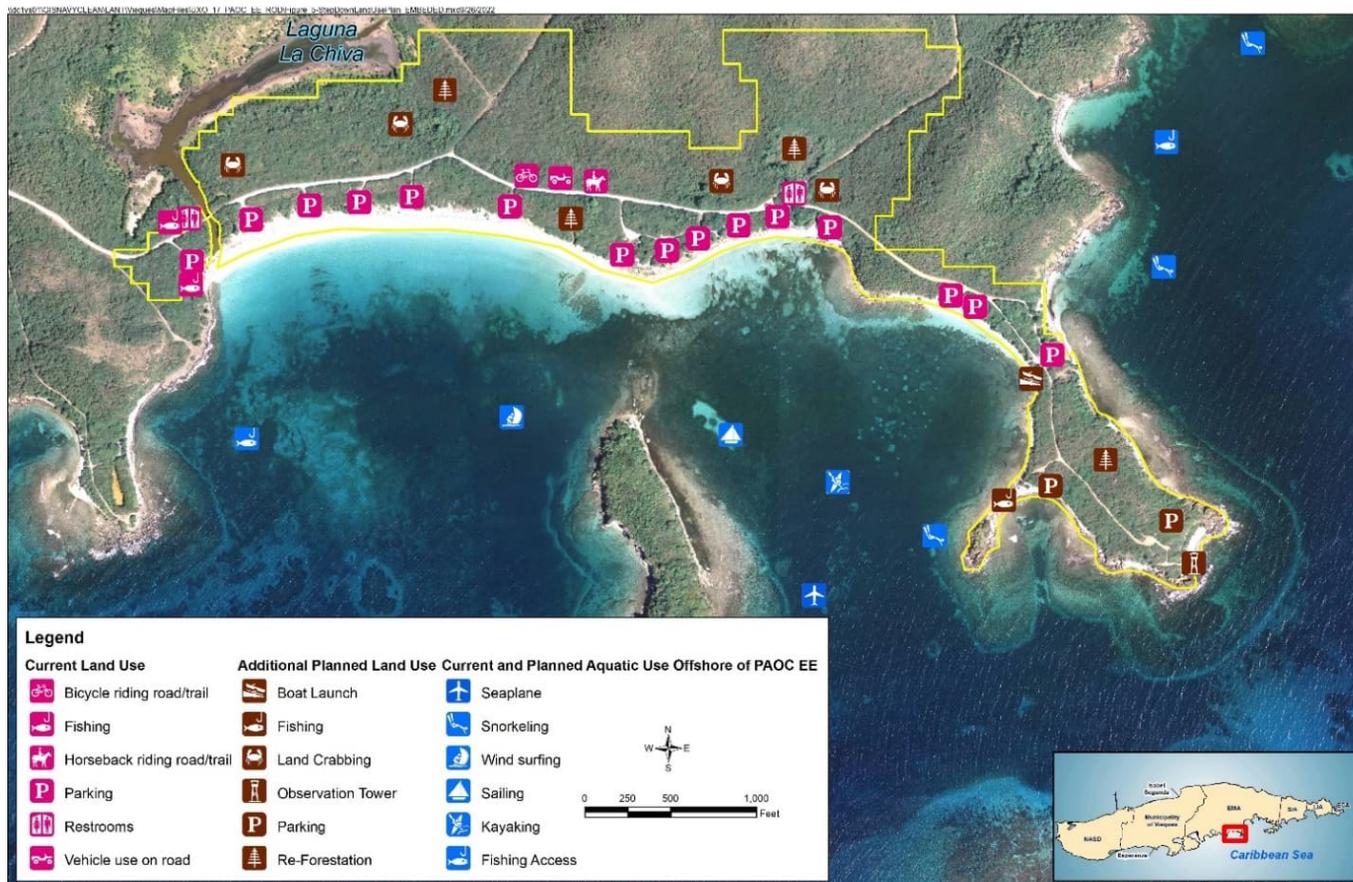


Table 3. PAOC EE Risk Assessment Results

Receptors	Human Health Risk
Current/Future Recreational Users* (beach area)	Adult – ELCR = 4×10^{-7} and HI < 1.0 Child – ELCR = 1×10^{-6} and HI < 1.0 Acceptable
Current/Future Recreational Users* (non-beach area)	Adult – ELCR = 6×10^{-7} and HI < 1.0 Child – ELCR = 3×10^{-6} and HI < 1.0 Acceptable
Current/Future USFWS Workers (non-beach area**)	ELCR = 3×10^{-7} and HI < 1.0 Acceptable
Potential Current/Future Land Crab Consumers	Adult – 2×10^{-5} ELCR and HI > 1 (arsenic) Child – 1×10^{-4} ELCR and HI > 1 (arsenic, selenium, copper, cadmium) Although calculations indicate unacceptable cancer hazard risk for child consumers and unacceptable non-cancer hazard for adult and child consumers, metals concentrations responsible for calculated values are attributable to natural conditions; therefore, no unacceptable risk or non-cancer hazard associated with past munitions-related activities. Section 2.1.4 describes the

Table 3. PAOC EE Risk Assessment Results

Receptors	Human Health Risk
	process used to determine whether metals concentrations are attributable to natural conditions.
Unacceptable ELCR = $> 1 \times 10^{-4}$ Unacceptable HI = > 1 * The recreational user exposure scenario was used to conservatively represent the trespasser exposure scenario ** No COPCs were identified for USFWS workers in the beach area (i.e., no constituent concentrations exceeded risk-based criteria); thus, potential risks are acceptable for that exposure scenario without the need for quantitative risk assessment ELCR = excess lifetime cancer risk HI = hazard index	
Receptors	Ecological Risk
Soil Organisms (invertebrates, plants)	<p>HQs ≥ 1 (hexavalent chromium, iron, lead, and manganese)</p> <p>Iron and manganese, which are essential nutrients for plants and were detected in all 32 samples, exceeded ecological screening values protective of plants in several samples. However, the sitewide mean and 95% UCL concentrations are comparable to background; therefore, ecological risks associated with these metals is acceptable.</p> <p>The ecological screening value for lead, which is also protective of plants, was exceeded in only 2 of 32 samples. Considering the isolated nature of these two exceedances and a sitewide lead average HQ < 1.0, ecological risk associated with lead is acceptable.</p> <p>Like lead, the screening value for hexavalent chromium that is protective of plants was exceeded in 4 of the 32 samples. The sitewide average of hexavalent chromium concentration resulted in an HQ greater than 1. However, the sitewide exceedance appears to be the result of a single surface soil sample taken at 0 to 12 inches. The sample was taken in an area that contained a high density of scrap material (103 items in a 30-meter grid), which has since been removed. Evidence that this hexavalent chromium concentration was isolated is that it was not detected in the subsurface soil sample collected from 12 to 18 inches at the same location and not detected in a soil sample 50 feet away. Therefore, it is reasonable to conclude that this hexavalent chromium concentration is not impacting the vegetative community at the site.</p>
Turtle Nest Eggs	HQs < 1.0 Acceptable
Birds and Mammals	HQs < 1.0 Acceptable
Unacceptable HQ = ≥ 1 ; identified in the Baseline ERA as a contaminant of potential concern warranting further risk evaluation	

Human Health Risk Assessment PAOC EE

An HHRA was conducted to evaluate potential human health risks associated with exposure to constituents detected in soil at PAOC EE. Maximum detected concentrations of constituents were compared to EPA RSLs, and COPCs were identified for direct exposure pathways based on exceedances of these screening levels. COPCs for the indirect exposure to constituents in soil through consumption of biota (land crabs) were selected using both quantitative (based

on screening level comparison) and qualitative (based on constituents' bioaccumulation potential) approaches. Table 2 in Section 2.1.4 identifies constituents detected above screening criteria used for the PAOC EE human health and ecological risk assessments. Constituents in the table that exceeded the human health adjusted RSLs were identified as COPCs for quantitative evaluation.

Human health risks were quantitatively evaluated for current and potential future human receptors exposed to COPCs in site soil at PAOC EE under reasonable maximum exposure (RME) scenarios. Exposure scenarios that were evaluated were: (1) recreational users, including visitors to the beach as well as people utilizing roads/trails/areas associated with current and planned land use for such activities as horseback riding, bicycling, and land crabbing; (2) USFWS workers; and (3) trespassers in areas not open to the public. The recreational user exposure scenario was used to conservatively represent the trespasser exposure scenario because of the lower anticipated exposure frequency and duration for a trespasser relative to a recreational user. The potential non-cancer hazards, expressed as the HI, and cancer risk estimates, expressed as the ELCR, were calculated using RME assumptions.

Contaminants of concern (COCs) were not identified for any constituents in soil because: (1) constituent concentrations were below RSLs for the particular exposure scenario, (2) risk estimates for site-related chemicals were below threshold values (the upper end of EPA's acceptable ELCR range of 10^{-4} , non-cancer HI of 1, and 5 percent probability of blood lead levels [BLLs] exceeding 10 micrograms per deciliter [$\mu\text{g}/\text{dL}$]), or (3) constituents detected at levels resulting in potentially unacceptable risks are attributable to natural background levels or are not site-related.

Ecological Risk Assessment PAOC EE

The ERA was conducted to evaluate potential ecological (plant and animal) risks associated with exposure to constituents detected in soil at PAOC EE using literature-based ecological effects values to assess risks from direct exposure by organisms as well as via the food chain. For the initial ERA screening step, maximum soil concentrations (for directly exposed plants and animals) and maximum exposure doses (for food chain exposed wildlife) were compared with corresponding Ecological Screening Values (ESVs) or Toxicity Reference Values (TRVs) to derive risk estimates using the HQ method. HQs are calculated by dividing the chemical concentration by the corresponding ESV or by dividing the exposure dose by the ingestion-based TRV. HQs equaling or exceeding 1 indicate the potential for unacceptable risk because the chemical concentration or dose equals or exceeds the ESV or TRV; these chemicals were identified as COPCs.

Because the screening step HQs are the result of using intentionally conservative assumptions, HQs greater than or equal to 1 do not necessarily indicate that unacceptable risks are present. Thus, for the COPCs identified in the screening step the ERA proceeds to a refined evaluation of exposure estimates using less conservative, but more realistic, assumptions such as using mean exposure concentrations and consideration of background concentrations. This information was considered in a risk evaluation to determine whether unacceptable risks may exist, the results of which are described in Table 3.

Based on the risk evaluation, no unacceptable risks to directly exposed plants and animals and other wildlife potentially feeding on those plants and animals were identified. Thus, no COCs were identified for soil or food web exposures at PAOC EE.

Three sea turtle species are known to nest at UXO 17 comprising the endangered hawksbill sea turtle (*Eretmochelys imbricata*) and leatherback sea turtle (*Dermochelys coriacea*), and the threatened green sea turtle (*Chelonia mydas*). Currently there is no critical habitat present at UXO 17; however, Playa La Chiva (Blue Beach) from the mean high-water line to the toe of the secondary dune has been proposed by U.S. Fish and Wildlife Service as critical habitat for the green sea turtle.

2.2 Explosive Hazard

Relative to other UXO sites within the former VNTR, the anticipated number of MEC within the PAOC EE area of UXO 17 is very low, based on information gathered during the TCRA and investigations that involved munitions removal performed there. However, potential explosive hazard remains at PAOC EE, associated with the possible presence of MEC in the subsurface and from MEC that may become exposed on the surface as a result of erosion.

2.3 Basis for Response Action

In cooperation with EPA, DOI, and the Commonwealth, and in accordance with applicable guidance, the Navy performed investigations and munitions removal at PAOC EE to reduce the explosive hazard, to evaluate the nature and extent of MEC and potentially associated contamination, to assess the potential risks to human health and the environment from exposure to PAOC EE soil, and to evaluate remedial alternatives for their suitability to further reduce possible explosive hazards remaining at the site.

No unacceptable human health or ecological risks from exposure to chemicals as a result of past munitions-related activities in PAOC EE soil were identified. However, the Navy evaluated remedial alternatives and ultimately selected a response action in conjunction with EPA to address potential explosive hazards remaining because there is the potential for MEC to be present in authorized, accessible public-use areas, or where it may become exposed in these areas over time from erosion.

2.4 Principal Threat Waste

MEC, specifically discarded military munitions (DMM) or unexploded ordnance (UXO), if any, that remains present at PAOC EE may constitute a principal threat waste (PTW) because of the potential for it to pose an explosive hazard if the material is moved, handled, or disturbed. The selected remedy includes additional MEC clearance, LUCs, and inspections to limit the potential for people to encounter MEC that may remain. During historical investigations and the removal action, a total of 38 MEC items were found and removed from the 128 acres that comprise PAOC EE. If potential MEC is later found at PAOC EE, Department of Defense (DoD) explosive ordnance disposal personnel or similarly qualified personnel will evaluate the material to determine if it poses an explosive hazard. Material that is determined to pose an explosive hazard will normally be treated onsite or removed for destruction per applicable DoD explosives safety standards and environmental laws and regulations. In these cases, the Navy, EPA, DOI, and the Commonwealth will consult, in accordance with the terms of the Vieques FFA, to make a determination as to whether the material should, as defined by CERCLA, the NCP, and EPA guidance, be classified as PTW. If the material is deemed to be PTW, the Navy will conduct the actions necessary to ensure protectiveness of human health and the environment to address unacceptable risks posed by the material designated as PTW.

2.5 Remedial Action Objective

Remedial Action Objectives (RAOs) are cleanup objectives that specify contaminants to be cleaned up, the cleanup standard, the area of cleanup, and the time required to achieve cleanup, for the purpose of protecting human health and the environment. The following RAO was developed to be protective of current, potential future, and hypothetical receptors, in accordance with the current and anticipated future land use for PAOC EE:

- Reduce the risk of exposure to potential munitions-related explosive hazards to be consistent with current and anticipated future land use set forth in Public Law 106-398, as amended by Public Law 107-107, which requires the land containing PAOC EE to be managed by USFWS as a National Wildlife Refuge.

An RAO for groundwater has not been developed because soil data indicate general absence or low concentrations of potential contaminants and there are no leaching concerns. Additionally, data collected from nearby sites located at similar distances to the coastline indicate that groundwater at PAOC EE is brackish or saline and therefore unpotable without treatment. Potable water is provided to Vieques from the main island of Puerto Rico, and there are no plans to use groundwater at PAOC EE for potable purposes or agriculture. As a result, groundwater does not present an unacceptable human health or ecological risk. However, two wells will be installed so that long-term groundwater monitoring can be considered as a means to evaluate long-term trends in contaminant concentrations. Including the potential for long-term groundwater monitoring as part of the remedial action is a conservative approach because it provides a mechanism for assuring that the consideration of long-term impacts associated with potential source areas across PAOC EE, if any, are evaluated and addressed as appropriate.

2.6 Description and Comparative Analysis of Remedial Alternatives

Remedial alternatives were developed based on site-specific considerations related to the potential explosive hazard, site conditions, and both current and planned land use.

2.6.1 Description of Remedial Alternatives

Table 4 summarizes the alternatives included in the evaluation, including a listing and description of the major components and estimated cost of each alternative. The following four remedial alternatives were developed to address potential MEC explosive hazards:

- Alternative 1 – No Action
- Alternative 2 – Land Use Controls
- Alternative 3 – Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas
- Alternative 4 – Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas and Remainder of the Eastern Peninsula Area

These remedial alternatives were developed and evaluated in the RI/FS Report (CH2M, 2019). To support evaluation of the alternatives, USFWS has identified and mapped locations of recreational features and public-use areas planned to be installed/authorized/maintained by USFWS, such as vehicular, biking, and horseback riding along trails and roads; parking and picnicking; and land crabbing within certain portions of PAOC EE, along with offshore activities such as

fishing, kayaking, sailing, and snorkeling. These proposed land use areas are shown in Figure 5. The Navy is not responsible for maintaining accessibility to authorized public use areas. Rather, it will be USFWS' responsibility to choose whether to maintain these areas in an accessible manner (e.g., keep the vegetation cut back at/along the intended public use areas) because this activity is associated with the land use, not the remedial action. In fact, if public use areas are not maintained and become inaccessible, the potential for human exposure in those areas would be reduced or eliminated. Nonetheless, the Navy's responsibility will be to provide inspections of accessible portions of public use areas (as well as where trespassing is evident) and remove any MEC identified. Should USFWS decide not to retain certain areas as public-use areas, LUC/MEC monitoring will be discontinued in these locations, except in areas where continued access is evident (e.g., via trespassing).

Consistent with the NCP, a no action alternative was evaluated as a baseline for the comparative analysis. Three additional alternatives were evaluated for their potential to meet the RAO.

2.6.2 Comparative Analysis of Remedial Alternatives

Each remedial alternative for PAOC EE was evaluated with respect to the [nine evaluation criteria](#) ¹¹ provided in the NCP. The alternatives were then compared to one another with respect to each NCP criterion. The RI/FS Report (CH2M, 2019) provides details and a comparison of the remedial alternatives considered.

The remedial alternatives summarized in Table 4 and shown in Figures 6, 7, and 8 were selected for detailed evaluation and comparative analysis. The assumptions regarding each alternative are conceptual, but sufficient for cost-estimating and evaluation purposes. The details of the alternative selected by this ROD will be provided in the associated remedial action work plan, including the actual number, types, and locations of signs or other educational/warning mechanisms installed, which will be based on such factors as site conditions, accessibility by vehicles, dense jungle conditions, and actual needs.

Table 4. Remedial Alternatives

Alternative	Components	Details	Cost
1. No Action No action and no restriction on activities.			Capital Cost: \$0
2. Land Use Controls Manages MEC explosive hazards by reducing the potential for unauthorized access to portions of PAOC EE and for performing periodic LUC and MEC inspections to evaluate the integrity and effectiveness of LUCs and identify and remove exposed MEC.	<ul style="list-style-type: none"> – LUCs, including physical mechanisms (e.g., educational kiosk/signs) and administrative processes (e.g., special use permits) – LTM, including removal of any MEC identified 	<ul style="list-style-type: none"> – Implementing LUCs (e.g., educational kiosk/signage and administrative mechanisms) to discourage unauthorized access, including intrusive activities (i.e., digging) and groundwater use. The specific LUC implementation requirements would be included in an LTM plan associated with the remedy that would be submitted for regulatory review. – An LUC and MEC LTM program would be established, including periodic site inspections for trespassing, erosion, MEC/MD recurrence in public-access 	Capital Cost: \$191,000 Present Value of Future, Annual LTM Costs: \$700,000 Total Present-Worth Cost: \$891,000 Assumed timeframe: 30 years (including LTM)

Table 4. Remedial Alternatives

Alternative	Components	Details	Cost
		<p>areas, and the integrity and effectiveness of physical LUCs. Any MEC/MD discovered during implementation of the LTM program would be removed and properly disposed. The specific LUC/MEC monitoring requirements, including the associated checklist, would be included in an LTM plan submitted for regulatory review. The LTM plan would include any groundwater monitoring requirements.</p> <ul style="list-style-type: none"> - As noted previously, it will be USFWS' responsibility to choose whether to maintain any authorized public-use area as accessible. The Navy will not be responsible for cutting vegetation or otherwise making areas accessible for public use or LUC/MEC monitoring. 	
<p>3. Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas</p> <p>Manages MEC explosive hazards by removing subsurface MEC to support potential future recreational activities, reducing the potential for unauthorized access to portions of PAOC EE, and performing periodic LUC and MEC inspections to evaluate the integrity and effectiveness of LUCs and identify and remove exposed MEC.</p>	<ul style="list-style-type: none"> - LUCs (as described under Alternative 2) - LTM (as described under Alternative 2) - Subsurface MEC clearance 	<ul style="list-style-type: none"> - Implementing, monitoring, and maintaining LUCs as described under Alternative 2 - Implementing an MEC LTM program as described under Alternative 2 - Habitat survey and vegetation cutting would be required for subsurface MEC clearance - Subsurface MEC clearance within the public use areas where subsurface clearance has not already taken place during historical investigation and removal activities would be performed. Specifically: <ul style="list-style-type: none"> o Removal of subsurface anomalies previously identified but not removed within the beach area to an assumed maximum depth of 4 feet below ground surface (bgs) o Removal of subsurface anomalies at and immediately around the Punta Canejo planned boat ramp and planned observation tower to an assumed maximum depth of 4 feet bgs o Removal of subsurface anomalies within the Punta Conejo planned road and planned parking areas and the unimproved road at the 	<p>Capital Cost: \$979,000</p> <p>Present Value of Future, Annual LTM Costs: \$700,000</p> <p>Total Present-Worth Cost: \$1,679,000</p> <p>Assumed timeframe: 30 years (including LTM)</p>

Table 4. Remedial Alternatives

Alternative	Components	Details	Cost
		western boundary of PAOC EE to an assumed maximum depth of 2 feet bgs	
<p>4. Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas and Remainder of the Eastern Peninsula Area</p> <p>Manages MEC explosive hazards by removing subsurface MEC to support potential future recreational activities and within the entire Eastern Peninsula Area (Punta Conejo), reducing the potential for unauthorized access to portions of PAOC EE, and performing periodic LUC and MEC inspections to evaluate the integrity and effectiveness of LUCs and identify and remove exposed MEC.</p>	<ul style="list-style-type: none"> – LUCs (as described under Alternative 2) – LTM (as described under Alternative 2) – Subsurface MEC clearance 	<ul style="list-style-type: none"> – Implementing, monitoring, and maintaining LUCs as described under Alternative 2 – Implementing an MEC LTM program as described under Alternative 2 – Habitat and vegetation cutting would be required for subsurface MEC clearance – Subsurface MEC clearance as described under Alternative 3 with the addition of MEC clearance to an assumed maximum depth of 2 feet bgs for the entire Eastern Peninsula (Punta Conejo) not already MEC-cleared 	<p>Capital Cost: \$1,877,000</p> <p>Present Value of Future, Annual LTM Costs: \$700,000</p> <p>Total Present-Worth Cost: \$2,577,000</p> <p>Assumed timeframe: 30 years (including LTM)</p>

Figure 6. Conceptual Layout of Alternative 2 - Land Use Controls

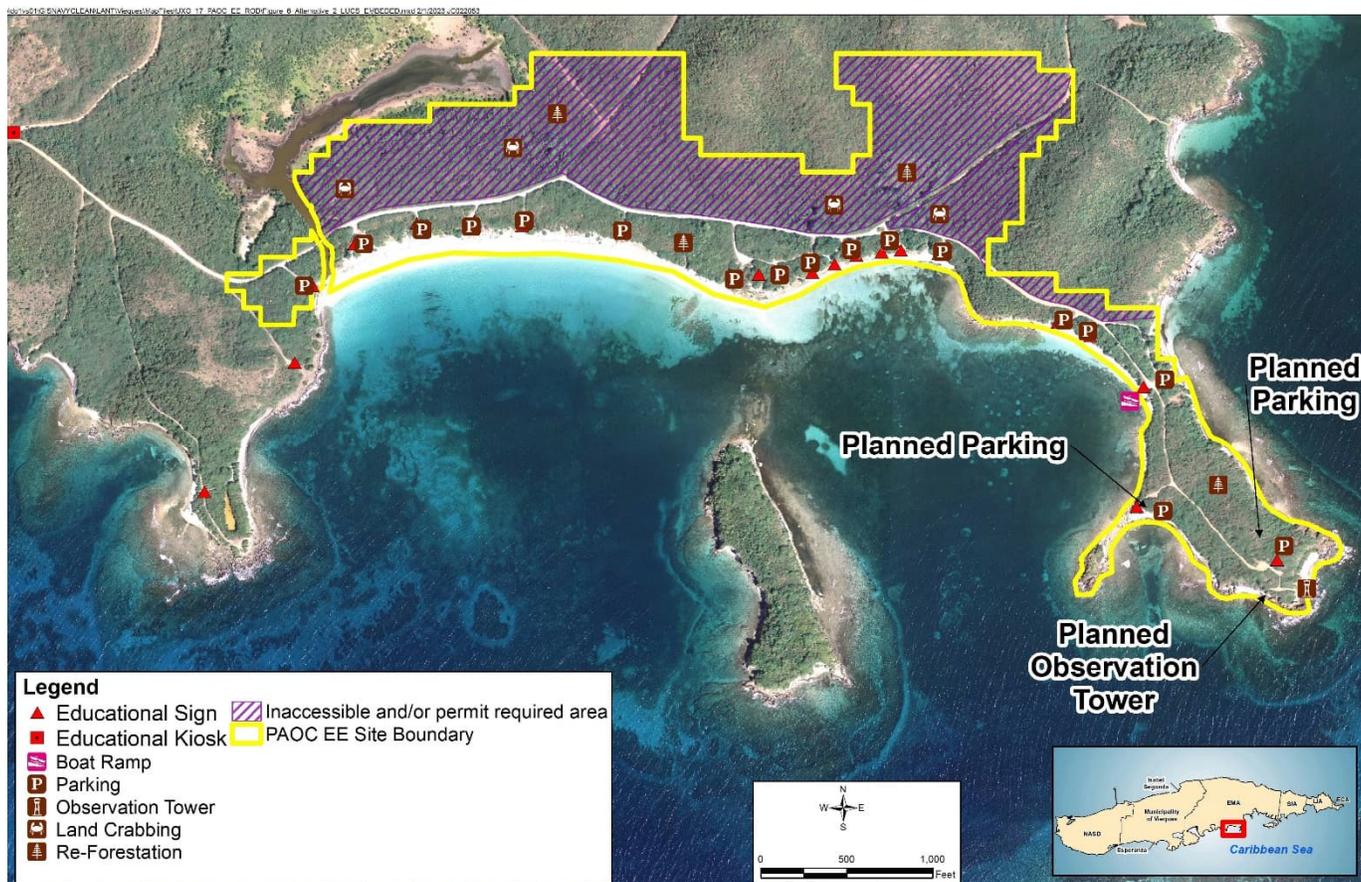


Figure 7. Conceptual Layout of Alternative 3 – Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas

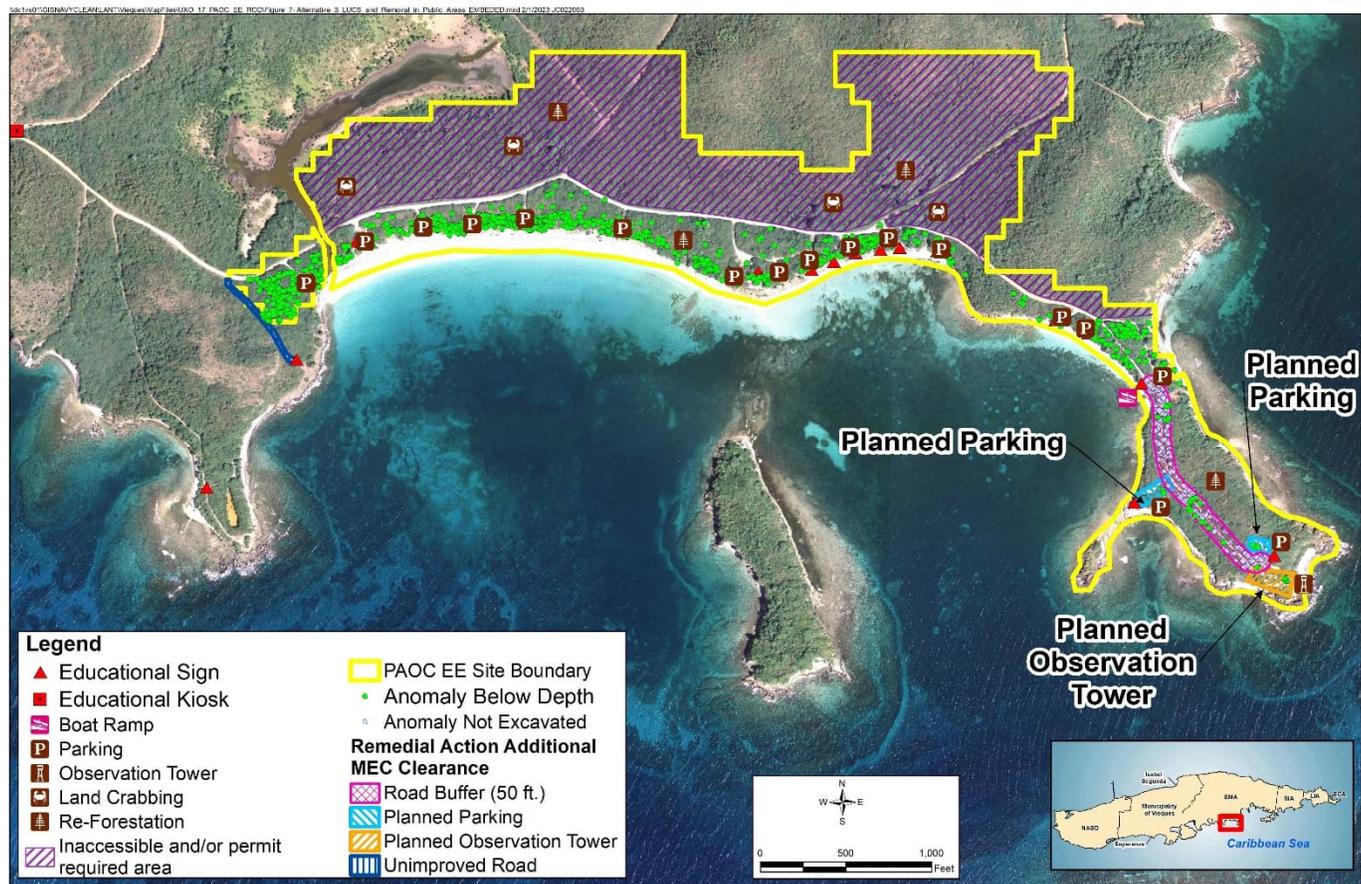
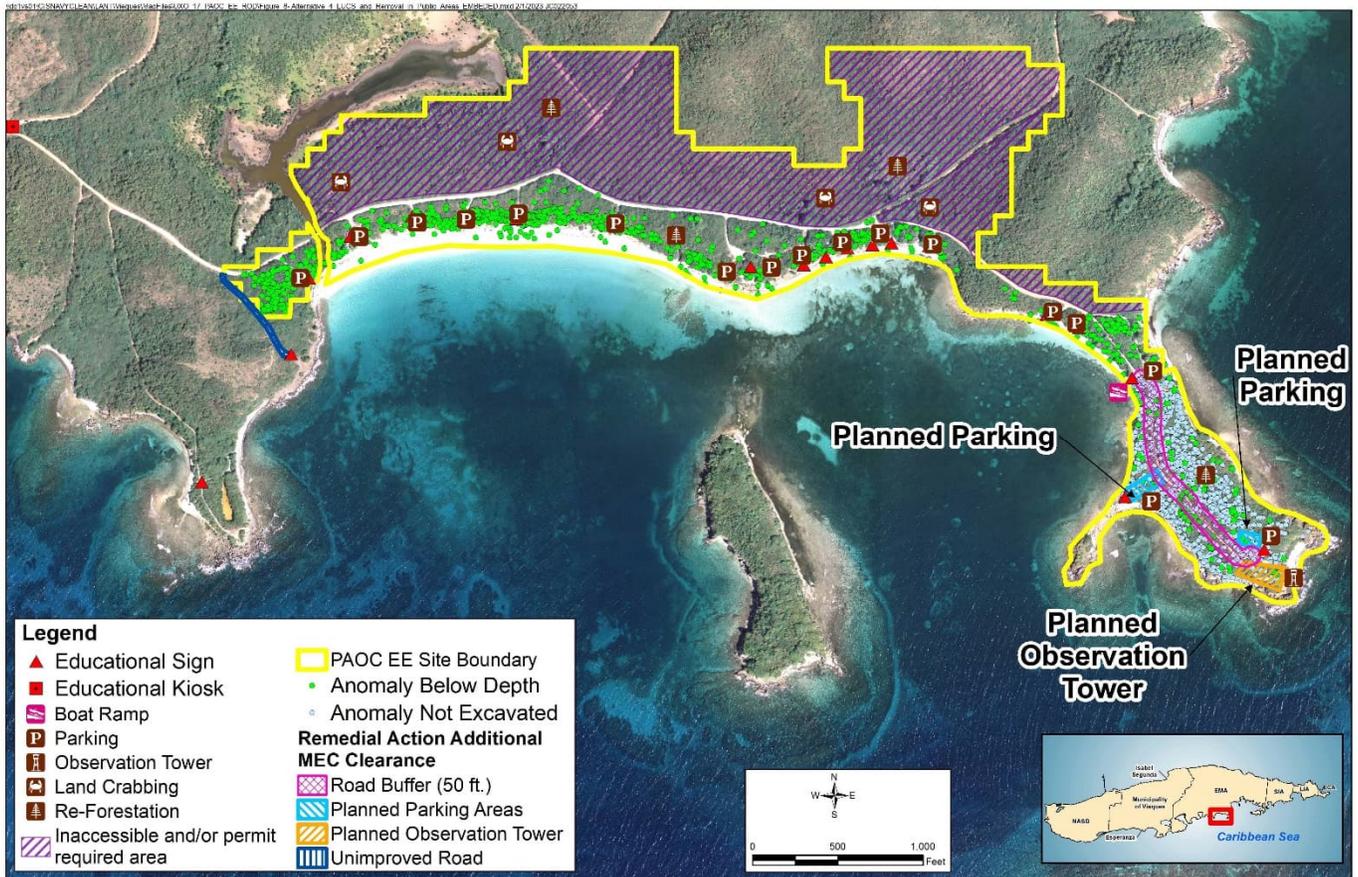


Figure 8. Conceptual Layout of Alternative 4 – Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas and Remainder of the Eastern Peninsula Area



2.6.3 Threshold Criteria

The two threshold criteria listed in this subsection are statutory requirements that the chosen alternative must satisfy. Alternatives that do not meet the threshold criteria are not eligible for selection as the final remedy.

Overall Protection of Human Health and the Environment

Alternative 1 (no action) is not protective and does not achieve the RAO. The remaining alternatives are protective of human health and the environment by reducing the exposure to MEC by reducing the potential for people to access areas outside authorized, accessible public use areas, performing periodic LUC and MEC inspections, and for Alternatives 3 and 4 conducting additional MEC clearance.

Compliance with Applicable or Relevant and Appropriate Requirements

A complete list of the Applicable or Relevant and Appropriate Requirements (ARARs¹²), comprising Federal Location-specific ARARs, which address coastal zones and migratory bird areas and threatened or endangered species, and Federal and Commonwealth Action-specific ARARs, which address land disturbance and munitions, stormwater, spill, and management of waste, are included in Attachment A. Alternatives 2, 3, and 4 would comply with ARARs.

2.6.4 Primary Balancing Criteria

The five primary balancing criteria listed in this subsection are used to identify major benefit trade-offs among the alternatives. These trade-offs are balanced to help identify the preferred alternative.

Long-term Effectiveness and Permanence

Alternative 1 would provide some long-term effectiveness based on the MEC clearance that has already been performed and the low quantity of MEC found, but it would provide no mechanism to assess conditions or implement LUCs. Alternative 2 provides long-term effectiveness and permanence using LUCs. Alternatives 3 and 4 provide a higher level of long-term effectiveness and permanence using LUCs combined with additional MEC clearance. While Alternative 4 provides the highest amount of long-term effectiveness and permanence because of the inclusion of MEC removal within the entirety of Punta Conejo, the additional level of protectiveness is likely minimal compared to Alternative 3 because: (1) only a small amount of MEC was identified within the peninsula during historical removal activities and (2) all areas of Punta Conejo planned for public use have either undergone MEC clearance in the past or will undergo MEC clearance under Alternative 3. Furthermore, USFWS has no plans to expand the areas of land management and/or public access within PAOC EE beyond what is provided in the current CCP step-down plan. Even if expanded access is planned in the future, the additional level of protectiveness associated with Alternative 4 would likely be minimal because of the very low quantity of MEC estimated to be potentially remaining across the site.

Reduction in Toxicity, Mobility, and Volume through Treatment

While removing MEC may not technically be considered as treatment, for MEC that must be detonated for disposal, it is substantively similar to treatment, especially with respect to consideration of this evaluation criterion. Alternative 1 does not result in any additional reduction in toxicity, mobility, and volume (TMV). Alternative 3 has a slightly higher degree of reduction in TMV than Alternative 2 because it includes the screening for and, if present, removal and detonation, if necessary, of surface and subsurface MEC (i.e., clearance) within planned public use areas versus removal of MEC only if discovered during LTM (or reported by the agencies or public). Alternative 4 would likely produce a very small number of additional MEC over that produced via Alternative 3; therefore, Alternative 4 would result in only a marginally higher degree in reduction of TMV compared to Alternative 3.

Short-term Effectiveness

Alternative 1 would not pose short-term difficulties because no action would occur, but because it would not achieve overall protection of human health and the environment, it would not achieve the RAO. Alternative 2 can be implemented almost immediately after a ROD and remedial action work plan are finalized because it involves implementation of LUCs and periodic monitoring with the potential for future MEC removal, which has the least short-term construction impacts of the three active remedial alternatives. Alternatives 3 and 4 would take longer to implement and pose greater potential environmental impacts as a result of additional vegetation clearance and MEC removal activities associated with increased construction activities compared to Alternative 2. Alternative 4 would take longer to implement than Alternative 3 because of the larger area where MEC clearance would take place. Although erosion-control measures would be implemented for both Alternative 3 and 4, the risk of erosion and runoff from de-vegetated areas to the adjacent ocean is higher for Alternative 4 than Alternative 3 because a much larger area (approximately 18 acres) would require de-vegetation.

Implementability

Alternative 1 requires no further action or implementation but does not meet the RAO. Alternative 2 is technically feasible and could facilitate public and USFWS access in the areas intended for use by USFWS through the use of LUCs. Alternative 3 is technically and administratively feasible but would be logistically more challenging than Alternative 2 because of construction and vegetation, munitions, and waste management logistics associated with the MEC removal. Alternative 4 would be considered more logistically challenging than Alternative 3 because of the larger area requiring de-vegetation and MEC removal and the proximity of the peninsula to the ocean.

Cost

Alternative 1 is the most cost effective but does not meet the RAO. Alternatives 2, 3, and 4 meet the RAO and have present-worth costs of \$891,000, \$1,679,000, and \$2,577,000, respectively.

2.6.5 Modifying Criteria

The modifying criteria represent the level of Commonwealth and community acceptance of the proposed remedial alternative.

Commonwealth Acceptance. Commonwealth involvement has been continual throughout the CERCLA process for PAOC EE, and PRDNER supports and concurs with the preferred alternative for PAOC EE.

Community Acceptance. The Proposed Plan was issued for public review from May 25 to July 24, 2022, and it was discussed at a Virtual Public Meeting held on MS Teams (with phone dial-in) on June 1, 2022. Several clarifying questions were asked and addressed at the meeting. Substantive public comments were documented and addressed in the Responsiveness Summary (Attachment B). Public comments demonstrated no opposition to or request for modification of the proposed remedial action.

2.7 Selected Remedy

The selected remedy for PAOC EE is Alternative 3 – Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas. This selected remedy is the preferred alternative that was presented in the Proposed Plan. Details of the selected remedy (i.e., Alternative 3) can be found within Table 4 of this ROD.

2.7.1 Rationale for Selected Remedy

Based on the evaluation of the data, information currently available, including the anticipated land use provided by USFWS, and the comparative analysis, the preferred alternative meets the statutory requirements of CERCLA for protection of human health and the environment under current and projected future land use as a wildlife refuge with focused areas of recreational use.

2.7.2 Description of Selected Remedy

Alternative 3 – Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas involves subsurface MEC removal from areas that have been identified for recreational use where past MEC removal was not performed. Because MEC may still be present at the site following the MEC removal, LUCs and LTM will be employed and maintained to ensure the remedy remains effective in the long-term. While addressing the explosive hazards associated with MEC potentially present at the site is the specific objective of the remedial action, if small arms ammunition is

found during remedial action implementation or associated monitoring, it will be removed and disposed of accordingly. The details of Alternative 3 are provided in Table 4. The statutorily-required five-year reviews will also be performed every five years to assure human health and the environment are being protected.

Key elements that make Alternative 3 the preferred alternative are:

- It meets the RAO and is compatible with the planned land use, based on the USFWS CCP and associated step-down plan. Should USFWS not maintain accessibility to authorized public-use areas or not retain certain areas as public-use areas, the Navy will not be responsible for maintaining accessibility, but will be responsible for continuing to perform LUC/MEC monitoring in current/former public-use areas where access is observed to still be occurring.
- It reflects significant surface and subsurface MEC removal conducted as part of historical munitions removal activities, including the TCRA, from the areas identified by USFWS for future recreational and refuge use.
- It results in the performance of additional subsurface MEC searches and, if discovered, the removal in areas planned for recreational use and it includes an MEC LTM program to monitor for and remove MEC identified in the future.
- It eliminates unnecessary vegetation and ecological habitat disruption and eliminates the erosion potential that would be produced by large-scale removal of vegetation and ecological habitat associated with the MEC removal on Punta Conejo (Alternative 4), which would not substantively reduce explosive hazard.
- It results in the implementation, monitoring, and maintenance of LUCs to discourage unauthorized access, including intrusive activities (i.e., digging).

2.7.3 Expected Outcomes of the Selected Remedy

The expected outcome of the selected remedy is that the RAO for PAOC EE will be met and that potential explosive hazards will be reduced to levels appropriately supportive of the planned land use.

Within 90 days following selection of the remedy, the Navy will prepare, in accordance with EPA guidance, and submit to EPA, DOI, and PRDNER for review and concurrence, the PAOC EE Remedial Action Work Plan that includes an LUC Plan, LTM Plan, and a plan for subsurface MEC removal from public use areas or areas where MEC may be discovered in the future as a result of natural or other occurrences, such as soil erosion. While the potential for explosive hazards remains, the Navy will be responsible for implementing, maintaining, inspecting, and reporting on the accessible LUCs in accordance with the ROD and associated MEC removal, LUC, and LTM plans. As noted previously, it will be USFWS' responsibility to choose whether to maintain the public use areas in an accessible manner (e.g., keep the vegetation cut back at/along the intended public use areas) because this activity is associated with the land use, not the remedial action.

2.7.4 Statutory Determinations

In accordance with the NCP, the selected remedy meets the following statutory determinations.

- Protection of Human Health and the Environment - The selected remedy is protective of human health and the environment by controlling land use and access, limiting negative impacts to the environment and site workers

(associated with vegetation clearance and land disturbance), reducing the potential for people to access areas outside authorized, accessible public use areas, by performing subsurface MEC removal in public use areas, and by performing LTM to monitor the effectiveness of LUCs and remove any MEC identified.

- Compliance with ARARs - The selected remedy will comply with Federal and Commonwealth ARARs presented herein (Attachment A, Tables A-1 through A-6).
- Cost-Effectiveness - The selected remedy provides the best value relative to the planned land use.
- Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable - The selected remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be used in a practicable manner at PAOC EE because any MEC found during remedy implementation and associated LTM will be removed and treated (detonated).
- Preference for Treatment as a Principal Element - The selected remedy results in additional reduction in TMV through subsurface MEC removal (if found) and permanent treatment (detonation).

2.8 Community Participation

The Navy, in consultation with the EPA, Commonwealth, and USFWS, established a community relations program for the Vieques Environmental Restoration Program in 2001. The program promotes communication regarding various OU investigations and response activities between the stakeholder agencies (Navy, EPA, Commonwealth, and USFWS) and the public. The community relations program formed a Restoration Advisory Board (RAB) in 2004 to further encourage community involvement. RAB meetings are held approximately every three months and are open to the public for participation. A summary of the community participation activities associated with this action are discussed in the next section.

3. Responsiveness Summary

The Responsiveness Summary is a concise summary of substantive comments received from the public during the public comment period and the associated responses. The Responsiveness Summary was prepared in accordance with guidance in *Community Relations in Superfund: A Handbook*¹³ (EPA, 1992) after the public comment period ended on July 24, 2022.

3.1 Overview

The Proposed Plan that was presented to the public identified that *Alternative 3 – Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas* is warranted at PAOC EE to protect human health and the environment.

3.2 Community Involvement Process

In accordance with CERCLA Section 117(a), the Navy issued the Proposed Plan for public comment starting May 25, 2022 and ending July 24, 2022. The Navy and EPA held a virtual [public meeting](#)¹⁴ via the ZOOM platform (with phone dial-in) to discuss the Proposed Plan on June 1, 2022.

The Proposed Plan and previous investigation and removal reports for PAOC EE were available during the public comment period and are currently available in the Administrative Record for this remedial decision. The Administrative Record is accessible to the public via: <https://go.usa.gov/xSfZg>

3.3 Summary of the Public Comment Period

During the PAOC EE Proposed Plan public comment period, no written comments were received; however, comments were made during the public meeting. The responses to public comments by the Navy and EPA, in consultation with DOI and PRDNER, are presented in the Responsiveness Summary, which is included as Attachment B of this ROD. No public comments were received during the public comment period that warranted changes to the selected remedy.



Acronyms

4. Acronyms

µg/dL	micrograms per deciliter
µg/kg	micrograms per kilogram
AFWTA	Atlantic Fleet Weapons Training Area
amsl	above mean sea level
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BLL	blood lead level
CCP/EIS	Comprehensive Conservation Plan/Environmental Impact Statement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
COPC	constituent of potential concern
DGM	digital geophysical mapping
DMM	discarded military munitions
DoD	Department of Defense
DOI	Department of the Interior
EBS	Environmental Baseline Survey
ECA	Eastern Conservation Area
ELCR	excess lifetime cancer risk
EMA	Eastern Maneuver Area
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ERA/SI	Expanded Range Assessment/Site Inspection
ESV	Ecological Screening Value
FFA	Federal Facility Agreement
FS	Feasibility Study

HHRA	Human Health Risk Assessment
HI	hazard index
HQ	hazard quotient
LIA	Live Impact Area
LTM	long-term monitoring
LUC	land use control
MCL	Maximum Contaminant Level
MD	munitions debris
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
MPPEH	material potentially presenting an explosive hazard
MRP	Munitions Response Program
NAVFAC	Naval Facilities Engineering Systems Command Atlantic
Navy	Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OU	Operable Unit
PA/SI	Preliminary Assessment/Site Inspection
PAH	polycyclic aromatic hydrocarbon
PAOC	Potential Area of Concern
PI	Photo Identified (site)
PRASA	Puerto Rico Aqueduct and Sewer Authority
PRDNER	Puerto Rico Department of Natural and Environmental Resources
PTW	principal threat waste
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RI	Remedial Investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RSL	Regional Screening Level
SAA	small arms ammunition
SEMS	Superfund Enterprise Management System
SIA	Surface Impact Area
TCRA	Time-Critical Removal Action
TMV	toxicity, mobility, and volume
TRV	Toxicity Reference Value

USFWS United States Fish and Wildlife Service
UTL upper tolerance limit
UXO unexploded ordnance
VNTR Vieques Naval Training Range



References

5. References

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
Ref. 1	Guide	Section 1.2	EPA. 1999. <i>A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents</i> . July.
Ref. 2	Toolkit	Section 1.2	EPA. 2011. <i>Toolkit for Preparing CERCLA Records of Decision</i> . September.
Ref. 3	Environmental Baseline Survey	Section 2.1.3	NAVFAC. 2003. <i>Environmental Baseline Survey, Vieques Naval Training Range, Vieques Island, Puerto Rico</i> . Draft Final. April.
Ref. 4	Expanded Range Assessment/Site Inspection	Section 2.1.3	CH2M. 2010. <i>Expanded Range Assessment/Site Inspection Report, Former Vieques Naval Training Range, Vieques, Puerto Rico</i> . September.
Ref. 5	Preliminary Assessment/Site Inspection	Section 2.1.3	CH2M. 2012. <i>Technical Memorandum: PAOC EE PA/SI Results, Former Vieques Naval Training Range, Vieques, Puerto Rico</i> . March 27.
Ref. 6	Time-Critical Removal Action	Section 2.1.3	CH2M. 2015. <i>UXO 17 Potential Area of Concern EE Time-Critical Removal Action After Action Report</i> . October.
Ref. 7	Remedial Investigation/Feasibility Study	Section 2.1.3	CH2M. 2019. <i>UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico</i> . June.
Ref. 8	no unacceptable risks to human health or the environment	Section 2.1.3	CH2M. 2019. <i>UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico</i> . June.
Ref. 9	remedial alternatives to address potential explosive hazards	Section 2.1.3	CH2M. 2019. <i>UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico</i> . June.
Ref. 10	Comprehensive Conservation Plan/Environmental Impact Statement	Section 2.1.5	USFWS. 2007. <i>Vieques National Wildlife Refuge Final Comprehensive Conservation Plan and Environmental Impact Statement, Vieques, Puerto Rico</i> . August
Ref. 11	nine evaluation criteria	Section 2.6.2	CH2M. 2019. <i>UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico</i> . June.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
Ref. 12	ARARs	Section 2.6.3	CH2M. 20219. <i>UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico</i> . June.
Ref. 13	Community Relations in Superfund: A Handbook	Section 3	EPA. 1992. <i>Community Relations in Superfund: A Handbook</i> . January.
Ref. 14	public meeting	Section 3.2	Proposed Remedial Action Plan for UXO 17 PAOC EE, Former Vieques Naval Training Range, Vieques, Puerto Rico, Public Meeting Transcript. June 1, 2022.

Attachment A
Applicable Relevant and Appropriate Requirements

Table A-1

Federal Chemical-Specific ARARs

UXO 17 PAOC EE Record of Decision

Former Vieques Naval Training Range, Vieques, Puerto Rico

Media	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
No federal chemical-specific ARARs apply.						

Source: UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report (CH2M, 2019)

Table A-2

Puerto Rico Chemical-Specific ARARs

UXO 17 PAOC EE Record of Decision

Former Vieques Naval Training Range, Vieques, Puerto Rico

Media	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
No Puerto Rico chemical-specific ARARs apply.						

Source: UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report (CH2M, 2019)

Table A-3

Federal Location-Specific ARARs

UXO 17 PAOC EE Record of Decision

Former Vieques Naval Training Range, Vieques, Puerto Rico

Location	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Coastal Zone Management Act						
Coastal zone or area that will affect the coastal zone	Federal activities must be consistent with, to the maximum extent practicable, State coastal zone management programs. Federal agencies must supply the State with a consistency determination.	Activity taking place in a wetland, flood plain, estuary, beach, dune, barrier island, coral reef, and fish and wildlife and their habitat, within the coastal zone.	15 CFR 930.33(a)(1), (a)(2), (b); .35(a), (b); .36(a); .39(b), (c)	2, 3, and 4	Applicable	Activities at UXO 17 that will affect Puerto Rico's coastal zone will be consistent to the maximum extent practicable with Puerto Rico's enforceable policies. Activities performed onsite and in compliance with CERCLA are not subject to administrative review; however, the enforceable policies included in the Commonwealth's Coastal Zone Management Plan will be considered in developing and implementing the remedy.
Migratory Bird Treaty Act						
Migratory bird habitat	Protects almost all species of native birds in the United States from unregulated taking.	Presence of migratory birds.	16 USC 703	2, 3, and 4	Applicable	The site is located in the Atlantic Americas Migratory Flyway. If migratory birds, or their nests or eggs, are identified at the site, operations will not destroy the birds, nests or eggs unless necessary to comply with the RAO. Activities performed onsite and in compliance with CERCLA are not subject to permits or administrative review; however, the substantive requirements of a permit to disturb these sites will be met if they cannot be avoided.
Endangered Species Act 1978						
Endangered species habitat	Actions to protect endangered or threatened species and prevent adversely impacting critical habitat.	Presence of protected species or their critical habitat.	16 USC 1538(a)(1)(B)	2, 3, and 4	Applicable	Several threatened or endangered species and proposed critical habitat have been identified within UXO 17. If protected species are present at the site during the response action, steps will be taken to prevent adverse impacts. Such steps may include adjusting the response action to either avoid beach action during turtle the nesting season, or nest monitoring in advance to allow for nest-appropriate avoidance measures. Activities will avoid identified critical habitat areas or, if they cannot be avoided, actions resulting in permanent impact will be avoided. Activities performed onsite and in compliance with CERCLA are not subject to permits or administrative review; however, the substantive requirements of a permit to disturb these sites will be met if they cannot be avoided.

Table A-3

Federal Location-Specific ARARs

UXO 17 PAOC EE Record of Decision

Former Vieques Naval Training Range, Vieques, Puerto Rico

Location	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Archaeological Resources Protection Act of 1979						
Locations of archaeological significance	Provides for the preservation of historically and archaeologically significant artifacts.	Applies to archaeological sites and artifacts.	16 USC 470ee(a)	2, 3, and 4	Applicable	Cultural resources are present in the project area. It is possible that the remedial action may take place where cultural resources exist. Procedures may be necessary to avoid impact to these resources to the maximum extent practical. Activities performed onsite and in compliance with CERCLA are not subject to permits or administrative review; however, the substantive requirements of a permit to disturb these sites will be met if they cannot be avoided.

Source: UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report (CH2M, 2019)

Table A-4

Puerto Rico Location-Specific ARARs

UXO 17 PAOC EE Record of Decision

Former Vieques Naval Training Range, Vieques, Puerto Rico

Location	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
No Puerto Rico Location-Specific ARARs apply.						

Source: UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report (CH2M, 2019)

Table A-5

Federal Action-Specific ARARs

UXO 17 PAOC EE Record of Decision

Former Vieques Naval Training Range, Vieques, Puerto Rico

Action	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Stormwater Pollution Prevention						
Performing activities that will disturb greater than one acre of land	Requires the development and implementation of best management practices and erosion and sedimentation control measures during construction activity.	Implementation of construction activities that will disturb more than one acre of land.	one to five acres: 40 CFR 122.26(a)(1)(ii), (a)(9)(i)(B), (b)(15); 122.44(k)(2) and (s)(1) five acres or more: 40 CFR 122.26(a)(1)(ii), (a)(9)(i)(b), (b)(14)(x); 122.44(k)(2) and (s)(2)	3 and 4	Applicable	If the selected remedy disturbs greater than, or equal to, one acre of land, the following are required: - Implement appropriate erosion and sediment control best management practices - control waste at the construction site - prepare and implement a Storm Water Pollution Prevention Plan Since activities are taking place onsite and in compliance with CERCLA, the substantive requirements will be met, but a permit will not be required.
Military Munitions Management						
Management of military munitions	Specifies management requirements for those military munitions that are no longer exempt from the definition of solid waste	Management of unused military munitions that have been disposed of or fired/used military munitions that have been removed from the range.	40 CFR 266.202(b) and (c) ; 205 (a) and (b)	2, 3, and 4	Applicable	Munitions items discovered that are no longer exempt from the definition of solid waste will be managed in accordance with applicable regulations.
Spill Pollution, Control, and Countermeasures						
Storage of fuels and oils (petroleum and non-petroleum) onsite	If storage capacity limits are exceeded a Spill, Prevention, Control, and Countermeasures Plan must be prepared and implemented with procedures, methods, equipment, and other requirements to prevent the discharge of into or upon the navigable waters of the United States.	Total onsite storage capacity exceeding 1,320 gallons in containers that are 55 gallons or larger in size. Empty or partially filled containers must still have their entire volume included in the summation.	40 CFR 112.1(b) through (d), 112.3 [excluding paragraph f], 112.5 through 8, and 12	3 and 4	Applicable	It is anticipated that fuels or other oils will be stored onsite. If the storage capacity in containers that are 55 gallons or greater is equal to or exceeds 1,320 gallons a Spill Prevention, Control, and Countermeasure (SPCC) Plan must be prepared and implemented. Containers include oil (including those oils used for enhanced biodegradation) and fuel reservoirs in equipment.

Source: UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report (CH2M, 2019)

Table A-6

Puerto Rico Action-Specific ARARs

UXO 17 PAOC EE Record of Decision

Former Vieques Naval Training Range, Vieques, Puerto Rico

Action	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Erosion and Sediment Control						
Land disturbance	A Control of Erosion and Sediment (CES) Plan and a Work Plan must be prepared for any activities that involve the alteration of ground or soil conditions that have not been specifically excluded.	Disturbance of more than 40 cubic meters of soil during construction activity.	Puerto Rico Regulation 5754.1230(B), (C)	3, 4	Applicable	Disturbing more than 40 cubic meters of soil is unlikely; however, a CES and Work Plan will be prepared for this activity if disturbance threshold is to be exceeded. However, because activities are taking place onsite and in compliance with CERCLA, a permit will not be required and the CES Plan and Work Plan will not be subject to administrative review or approval by the by the Oficina de Gerencia de Permisos (OGPe)
Fugitive Dust						
Production of fugitive dust	Take reasonable precautions to prevent particulate matter from becoming airborne during activities such as land clearing, soil or material hauling. Immediately clean up any soil spilled during transport. Do not cause or permit the discharge of visible emissions of fugitive dust beyond the boundary line of the property on which the emissions originate.	Construction and material hauling activities causing particulate matter to become airborne.	Puerto Rico Regulation 5300.404(A)(1), (4), (7); (B)	2, 3, and 4	Applicable	Applicable to activities that produce fugitive dust. Dust control measures will be implemented, if necessary.
Noise						
Performing construction activities that generate noise	No construction activity may be performed at night or in such a way that vibrations are produced that can be felt beyond the property boundary. If equipment used in construction is not manufactured in accordance with USEPA standards for newly manufactured equipment then it may not produce noise that exceeds 70 dBA.	Construction activity including earthwork.	Puerto Rico Regulation 3418.3.1.5(A),(C); 3.1.10; 3.1.13; and 4.1	2, 3 and 4	Applicable	Noise pollution during earthwork, including any MEC removal and demolition, will be prevented, if necessary.
Waste Management						
Management of non-hazardous solid waste onsite in containers and piles	Non-hazardous solid waste staged onsite must not create a hazard or public nuisance.	Generation of non-hazardous solid waste that is managed onsite in containers or in piles.	Puerto Rico Non-Hazardous Solid Waste Regulation 531.H	2, 3, and 4	Applicable	It is possible non-hazardous solid wastes will be generated during the implementation of these alternatives. If necessary, wastes will be sampled to confirm characterization prior to disposal. It will be assumed that Material Documented as Safe (MDAS) is regulated as scrap metal.

Source: UXO 17 PAOC EE Remedial Investigation/Feasibility Study Report (CH2M, 2019)

Attachment B
Responsiveness Summary for PAOC EE

Responsiveness Summary

Proposed Plan UXO 17 PAOC EE

Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

1. Introduction

This responsiveness summary provides a summary of the substantive comments submitted by the public on the Potential Area of Concern (PAOC) EE Proposed Plan, also referred to as Proposed Remedial Action Plan (PRAP), issued by the Department of the Navy, Naval Facilities Engineering Systems Command Atlantic (NAVFAC) and the United States Environmental Protection Agency (EPA) in consultation with the United States Department of the Interior (DOI) and the Puerto Rico Department of Natural and Environmental Resources (PRDNER). The responsiveness summary was prepared in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and 40 CFR 300.430(f)(3)(F), Section 117(b) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9230.0-06 (Superfund Responsiveness Summaries).

The PAOC EE Proposed Plan was issued for public comment from May 25 to July 24, 2022, which included a 30-day review extension. The Navy, EPA, PRDNER, and the United States Fish and Wildlife Service (USFWS, a bureau of DOI), the Vieques National Wildlife Refuge (VNWR) administrator, held a virtual public meeting via the ZOOM platform to discuss the Proposed Plan on Wednesday June 1, 2022. During the public meeting questions and comments regarding the proposed remedial alternative, as well as other alternatives, were made, for which the Navy and other stakeholder agencies provided feedback. No comments/questions were submitted to NAVFAC, EPA, USFWS, DOI, or PRDNER other than during the public meeting. A summary of the public meeting comments/questions and the associated responses is provided in **Section 4** of this Responsiveness Summary.

PAOC EE comprises the 128-acres located in the south-central portion of the Eastern Maneuver Area (EMA), located within the western portion of the former Vieques Naval Training Range (VNTR). As detailed in the Proposed Plan, the Navy and EPA, with concurrence of DOI and PRDNER, identified Alternative 3 – Land Use Controls and Subsurface Anomaly Removal in Planned Public Use Areas as the preferred alternative for PAOC EE. The alternative was determined to be appropriate because it is protective of human health and the environment based on current and planned land use as part of the VNWR with areas of recreational use.

Key elements of Alternative 3 are:

- Meets the RAO and is compatible with the planned land use, based on the USFWS Comprehensive Conservation Plan and associated step-down plan.
- Reflects significant surface and subsurface munitions and explosives of concern (MEC) removal conducted as part of historical munitions removal activities, including the time-critical removal action (TCRA), from the areas identified by USFWS for future recreational and refuge use.
- Performs additional subsurface MEC searches and, if discovered, removal in areas planned for recreational use and it includes an MEC long-term monitoring (LTM) program to monitor for and remove MEC identified in the future.

- Eliminates unnecessary vegetation and ecological habitat disruption and eliminates erosion potential that would be produced by large-scale removal of vegetation and ecological habitat associated with the MEC removal on Punta Conejo (Alternative 4) that would not substantively reduce explosive hazard.
- Implements, monitors, and maintains land use controls (LUCs) to discourage unauthorized access, including intrusive activities (i.e., digging).

2. Community Involvement Activities Associated with PAOC EE

This section summarizes the community involvement activities associated with the investigation and munitions cleanup at PAOC EE. The community involvement activities discussed below were designed to ensure the community was informed and had the opportunity to provide feedback and input throughout the investigation and cleanup process.

Community Involvement Plan: The Navy, EPA, PRDNER, and DOI/USFWS, collectively referred to as the stakeholder agencies, worked jointly to update the Community Involvement Plan (CIP) in 2022 with input from community members and stakeholders via surveys and agency-community meetings. The CIP defines the mechanisms used to facilitate communication between the community and the agencies involved in the cleanup of former Navy lands in Vieques. As such, the CIP is designed to foster two-way communication whereby the community can provide input into the site characterization and cleanup activities and the stakeholder agencies can keep the community informed about the cleanup progress. In recognition of the large number of Spanish-speaking residents, the Navy translated the CIP into Spanish.

Information Repositories: The Navy maintains an information repository where the public can review documents associated with PAOC EE. The repository is located at: <https://go.usa.gov/xSfZq>. In addition, the Navy submitted the following key documents to the Vieques Restoration Advisory Board (RAB) to solicit community comment and input prior to issuing the final versions of the documents and placing them in the Administrative Record:

- Environmental Baseline Survey (2003) – Documents the environmental conditions from site inspections, interviews, and additional aerial photograph evaluation for the former VNTR, including PAOC EE.
- Preliminary Range Assessment Report, including MEC Investigation at Playa La Chiva (Blue Beach) (July 2003) – Documents the archival records search to gather information on past military training activities at Playa La Chiva (Blue Beach) and the results of an MEC surface clearance and MEC subsurface investigation with follow-on intrusive investigations of a subset of identified subsurface anomaly sources.
- Expanded Range Assessment/Site Inspection Report (2010) – Documents the findings of an inspection of Punta Conejo and removal of items found on the ground surface and in the subsurface.
- Preliminary Assessment/Site Inspection Report for Punta Conejo (2012) – Documents the results of the digital geophysical mapping (DGM) across Punta Conejo and removal of subsurface geophysical anomalies.
- Additional Munitions Investigation of Playa La Chiva and Adjacent Area (2013) – Involved a DGM survey of Playa La Chiva (Blue Beach) and associated parking areas and pathways to the beach and excavation of all identified subsurface anomaly locations. The findings are documented in the PAOC EE TCRA After Action Report.
- PAOC EE Time-Critical Removal Action After Action Report (2015) – Documents the findings of the surface and subsurface MEC clearance conducted within planned public use and adjacent areas to reduce explosive hazard.
- PAOC EE Remedial Investigation/Feasibility Study Report (2019) – Describes the results of the nature and extent of contamination and associated human health and ecological risk assessments, and the remedial alternatives evaluation to address hazards associated with potential MEC that may remain at PAOC EE.

Informational flyers and newsletters are regularly distributed to keep the Vieques community informed about Vieques cleanup activities. Information specific to PAOC EE was included in the following flyers/newsletters:

- April 2017 Newsletter – Described the planned Remedial Investigation for PAOC EE, including soil samples to be collected for nature and extent of contamination determination and human health and ecological risk assessments.
- April 2017 Flyer – Included information about preliminary investigations and cleanup at PAOC EE, including Playa La Chiva. In addition, provided information about the Remedial Investigation for these areas.
- July 2017 Flyer – Included information on the ongoing and upcoming Remedial Investigation field activities at PAOC EE.
- May 2022 Newsletter – Announced the public availability of the PAOC EE Proposed Plan for review and comment, and the public meeting information.

Additionally, social media was used to support information sharing with the public. The following are announcements posted on the Vieques Environmental Restoration Facebook page,

<https://www.facebook.com/ViequesRestoration>:

- May 2022 Newsletter and Public Notice – Announced the public availability of the PAOC Proposed Plan for review and comment, and public meeting information.
- June 2022 – PAOC EE Proposed Plan virtual public meeting announcement.
- July 2022 Announced the extension of the public comment period for the PAOC EE Proposed Plan. The public comment period, which began on May 25, 2022, was extended 30 days through July 24, 2022.

Restoration Advisory Board: The Vieques RAB comprises of community members and representatives from stakeholder government agencies. The objective of the RAB is to foster communication among the community, regulators, and other stakeholders associated with or interested in the Vieques cleanup. RAB meetings serve as a forum to share information on the environmental restoration process. The community was updated, and input was solicited regarding the investigation and cleanup progress associated with PAOC EE during the following RAB meetings:

- October 2010 – Provided an update about the planned Preliminary Assessment/Site Inspection (PA/SI) for PAOC EE, including the associated Workplan.
- November 2010 – Provided an update for the PAOC EE PA/SI.
- February 2011 – Provided an update on the PA/SI Workplan.
- March 2012 – Provided an update on PA/SI field activities at PAOC EE.
- June 2013 – Provided an update on the Playa La Chiva and adjacent area Additional Munitions Investigation.
- August 2014 – Provided update on the TCRA at PAOC EE.
- November 2014 – Provided an update on TCRA field activities for PAOC EE.
- May 2016 – Discussed RAB review of the Remedial Investigation Sampling and Analysis Plan Addendum for PAOC EE.

Presentations made and minutes from the RAB meetings listed above, including any comments/questions posed and the associated responses, can be found on the Vieques Public Website at the following link:

<https://go.usa.gov/xSfWS>

3. Summary of Commenters' Major Points Regarding the PAOC EE Proposed Remedial Action

No public comments or questions were received outside of those received during the PRAP public meeting, and none represented a major point or theme regarding the proposed final action for PAOC EE. Therefore, **Section 4** provides all substantive questions/comments received during the public meeting and their associated responses.

4. Summary of Specific Questions Regarding the PAOC EE Proposed Remedial Action

This section provides specific questions regarding the PAOC EE Proposed Plan that were asked at the public meeting (questions and responses are edited for clarity and additional detail, and as necessary, to account for translation from Spanish to English).

4.1 Question: According to the standards of the PRAP, what constitutes an acceptable risk and how do you measure such a risk?

Response: Risk is assessed according to EPA regulation and associated guidance. When a sample is taken and analyzed, the concentrations of contaminants of potential concern are measured and then compared to the concentration stated in the screening level (referred to as "risk standard" during the public meeting), generally prepared by EPA or the Commonwealth of Puerto Rico. If the measured concentration is below the screening level, then that risk is not considered unacceptable (i.e., the risk is acceptable). If the concentration is above the screening level, the contaminant concentration is considered, along with concentrations above screening levels of contaminants of potential concern, in a quantitative risk assessment performed in accordance with standard EPA guidance. If the results of the quantitative risk assessment are below risk threshold values established by EPA, the risk is acceptable. Once the quantitative risk assessment is conducted, the concentrations of any inorganic constituents (also referred to as "metals") that contribute to unacceptable risk are further evaluated. The purpose of the further evaluation is to distinguish their presence as a result of past military training (in the case of PAOC EE) from their presence because they are naturally occurring (in other words, part of the natural geologic makeup of the island), commonly referred to as "natural background." Because screening levels are established independent of what concentrations exist in nature, it is common for natural levels of inorganics in the environment to exceed these screening levels.

4.2 Question: In Alternative 3, the procedure refers to removing subsurface anomalies in the beach areas that were previously identified, but not removed. If these items were identified previously, why were they not removed?

Response: Some items were found to be below the groundwater table and unable to be removed at the time. Alternative 3 would address the removal of these items as well as any other potential items encountered to a maximum depth of 4 feet below ground surface in the beach areas. Note: Alternative 3 also includes removal of subsurface anomalies at and immediately around the Punta Conejo planned boat ramp and planned observation tower to a maximum depth of 4 feet below ground surface and removal of subsurface anomalies within the Punta Conejo planned road and parking areas and the unimproved road at the western boundary of PAOC EE to a maximum depth of 2 feet below ground surface.

4.3 Question: There is language in the PAOC EE PRAP table that summarizes the results of the human health risk assessment that states “Although calculations indicate unacceptable cancer risk for child consumers, and unacceptable non-cancer hazard for adult and child consumers, metal concentrations responsible for calculated values are attributable to natural condition.” While I understand this contamination was not caused by Navy activities, is this the case only in this area of the refuge or all over Vieques? If I live on Vieques and I eat crabs, am I at risk?

Response: The sampling the Navy is conducting under CERCLA includes many types of metals, which are also naturally occurring in the environment, referred to as “natural background.” Sometimes the natural occurrence of metals indicates some level of risk, but in the case of PAOC EE, it was determined these levels are not related to Navy activities. It is also important to note that natural levels (i.e., background) are due simply to the geologic conditions and other natural processes that exist all over Vieques and are therefore not contamination. As indicated in the response to Question 4.1, screening levels are established independently of the natural levels that exist in the environment and, therefore, it is common for natural levels of inorganics in the environment to exceed these screening levels. With respect to land crab consumption, there are layers of assumptions regarding the amount of crab consumed such as the number of meals per week, per year, etc., and that is where some of these numbers result in unacceptable risk.