

# Proposed Remedial Action Plan

UXO 15 Puerto Ferro  
Atlantic Fleet Weapons Training Area - Vieques  
Former Vieques Naval Training Range  
Vieques, Puerto Rico  
July 2021

## 1. Introduction

This **Proposed Plan** identifies the **preferred alternative** and associated rationale for UXO 15, located at the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico. UXO 15 is also known as Operable Unit (OU) 26 in the Superfund Enterprise Management System (SEMS), which is a database maintained by the **United States Environmental Protection Agency (EPA)** to track the progress at hazardous waste sites. UXO 15, comprising approximately 536 acres, is located in the southwestern portion of the former 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. UXO 15 is the location where ordnance transport and offloading to support training exercises were likely conducted.

This Proposed Plan summarizes this OU's history, the results of previous environmental investigations and removal actions, and the preferred alternative to address the conditions at UXO 15, and it solicits and facilitates public review of and comment on the preferred alternative as well as the other alternatives presented.

This document is issued by the Department of the Navy (Navy), Naval Facilities Engineering Systems Command (NAVFAC) Atlantic, and EPA Region 2, in

### Mark Your Calendar for the Public Comment Period

July 26 – August 24, 2021

#### Submit Written Comments



The Navy and EPA will accept written comments on this Proposed Plan during the public comment period. To submit comments or obtain further information, please refer to the insert page.

### Attend the Public Meeting Virtually

August 4, 2021 at 5:00 p.m.



Access this link to join the meeting via MS Teams Platform

<https://tinyurl.com/3f5jwxn7>

Join by phone by dialing: 1-787-650-6946

Meeting ID: 116 604 434 8 #

The Navy will hold a public meeting to present and discuss the preferred remedial alternative as well as the other alternatives considered. Verbal and written comments will also be accepted at this meeting.

### Location of Administrative Record File

Online at: <https://go.usa.gov/xRHxY>

consultation with the **Department of the Interior (DOI)** and the **Puerto Rico Department of Natural**

**and Environmental Resources (PRDNER).** This Proposed Plan fulfills the public participation requirements in Section 117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** and Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP).**

Beginning in 2000, a number of investigations were conducted at UXO 15 to determine the nature and extent of **munitions and explosives of concern (MEC)** and contaminants that may have been released to the environment because of historical military training activities. Because of its reported use as a support area, very few MEC were anticipated to be present at UXO 15. This supposition was supported by subsequent investigations and non-time-critical removal actions (NTCRAs) that had been performed, during which only two MEC items were identified within UXO 15, neither of which was in areas planned for public use.

Based on the munitions removal activities already performed, current and anticipated future land use as a wildlife refuge with localized recreational use and the results of the **Remedial Investigation (RI)**, the preferred alternative for UXO 15 is surface MEC removal in planned public use areas and **land use controls (LUCs).**

The Navy and EPA, in consultation with DOI and PRDNER, will make the final decision on the preferred alternative for UXO 15 after reviewing and considering all information submitted during the 30-day **public comment period.** If warranted, based on public comments and/or new information, the preferred alternative proposed in this document may be modified, or another alternative described in this Proposed Plan may be considered.

This Proposed Plan summarizes information that can be found in greater detail in the **RI/Feasibility Study (FS)** Report (CH2M, 2020) and other documents

associated with the various investigations and removal actions (see Section 2.3), which are contained in the **Administrative Record** for UXO 15. Key terms are identified in **bold print** the first time they appear and a glossary of key terms used in this document is presented in Section 10.

## 2. Site Background

### 2.1 Facility Description and History

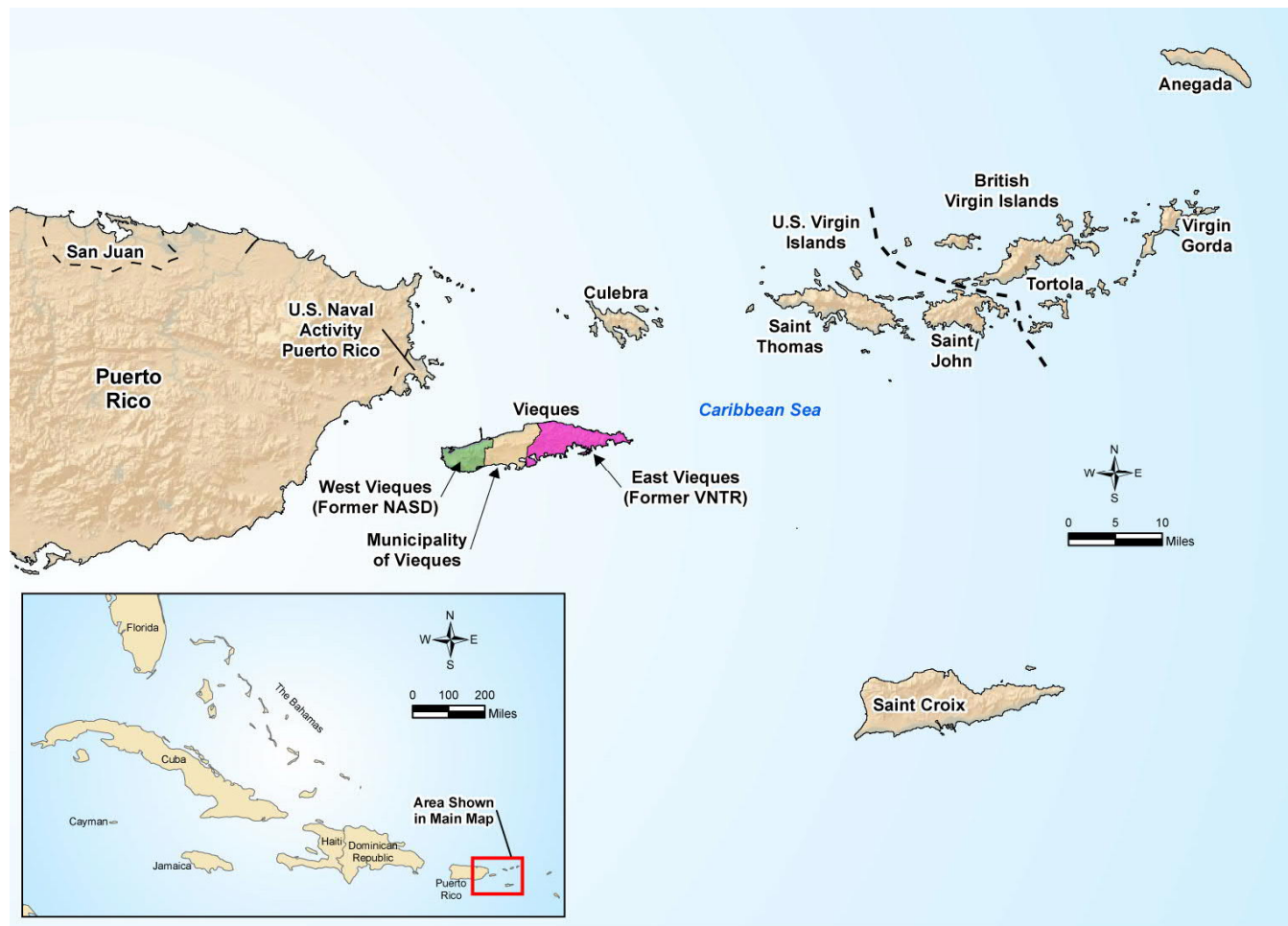
Vieques is an island located in the Caribbean Sea approximately 7 miles southeast of the eastern tip of the main island of Puerto Rico (Figure 1). Other than the main island of Puerto Rico itself, Vieques is the largest island of the Commonwealth. It is approximately 20 miles long and 4.5 miles wide and has an area of approximately 33,088 acres (51 square miles).

The Navy purchased portions of Vieques in the early 1940s to conduct activities related to military training. Operations within the former Naval Ammunition Support Detachment, the western one-third of Vieques, consisted mainly of ammunition loading and storage, vehicle and facility maintenance, and some training. Operations within the former VNTR, the eastern one-half of Vieques, comprised various aspects of naval gunfire training, including air-to-ground ordnance delivery and amphibious landings, as well as housing the main base of operations for these activities at Camp García. In accordance with a January 30, 2000, Presidential Directive to the Secretary of Defense, the Navy ceased training exercises at the former VNTR on April 30, 2003, at which time the land was transferred to the DOI to be managed by the **United States Fish and Wildlife Service (USFWS)** as a **National Wildlife Refuge.** The former VNTR is approximately 14,600 acres and comprises the EMA, Surface Impact Area (SIA), Live Impact Area (LIA), and Eastern Conservation Area (ECA) (See Figure 2).

On February 11, 2005, the Atlantic Fleet Weapons Training Area – Vieques (also known as AFWTA-Vieques) was added to the **National Priorities List (NPL)**, which required all subsequent environmental restoration activities for Navy Installation Restoration (IR) sites on Vieques to be conducted under CERCLA. On September 7, 2007, the Navy, DOI, EPA, and the

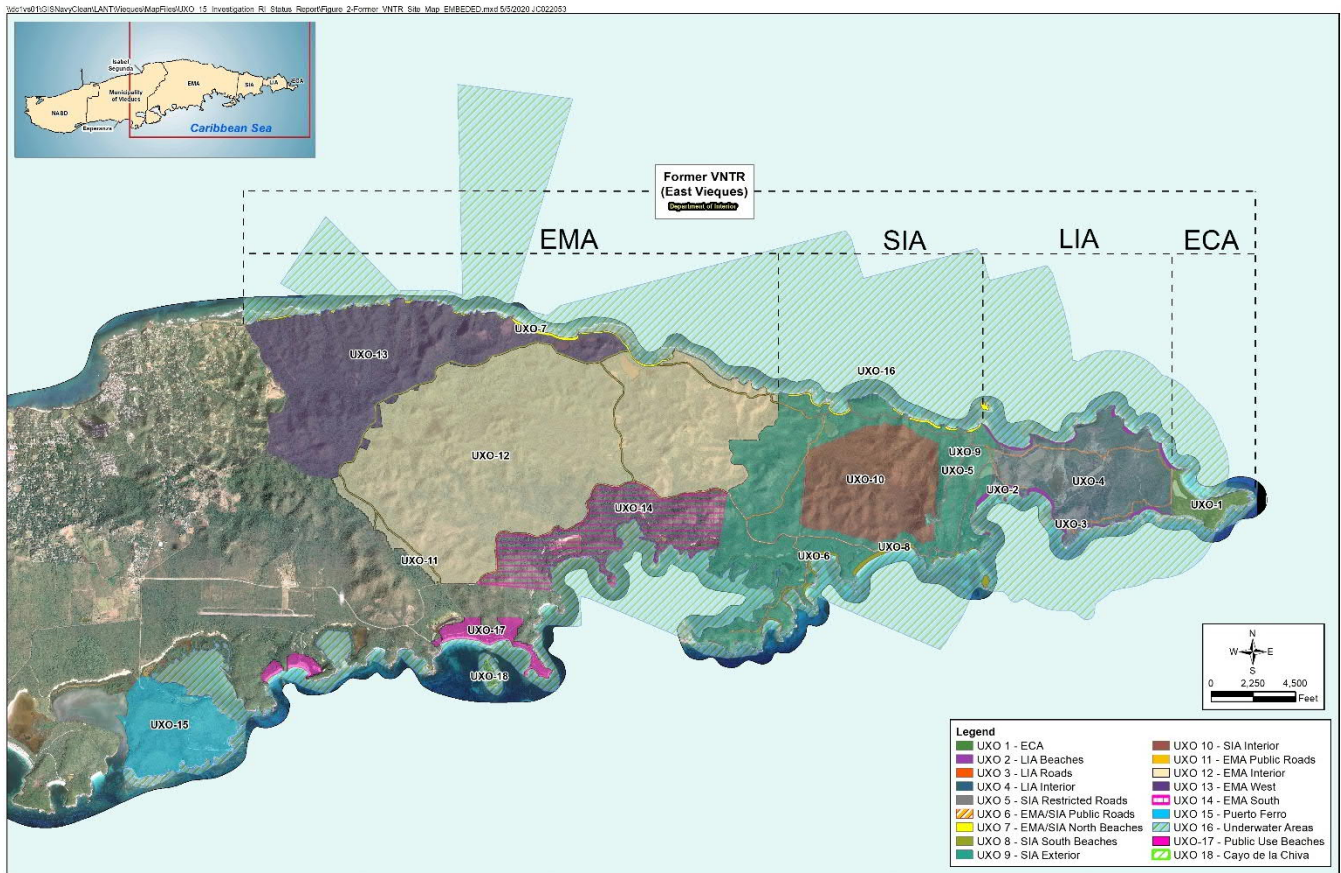
Commonwealth of Puerto Rico finalized a **Federal Facility Agreement (FFA)** that established the procedural framework and general schedule for implementing the CERCLA activities for Vieques. The Navy retains the primary responsibility under the FFA for conducting the environmental investigations and cleanup of the property, as warranted.

**Figure 1 – Regional Location Map**





**Figure 2 – UXO 15 Location Map**



## 2.2 Site Description

UXO 15 comprises the 536-acre Puerto Ferro peninsula located in the southwestern portion of the EMA (Figure 2). The area was primarily used for temporary ordnance storage, transport, and loading/offloading in support of military training activities and is not contiguous with the other UXO sites within the EMA, all of which are being addressed separately from UXO 15.

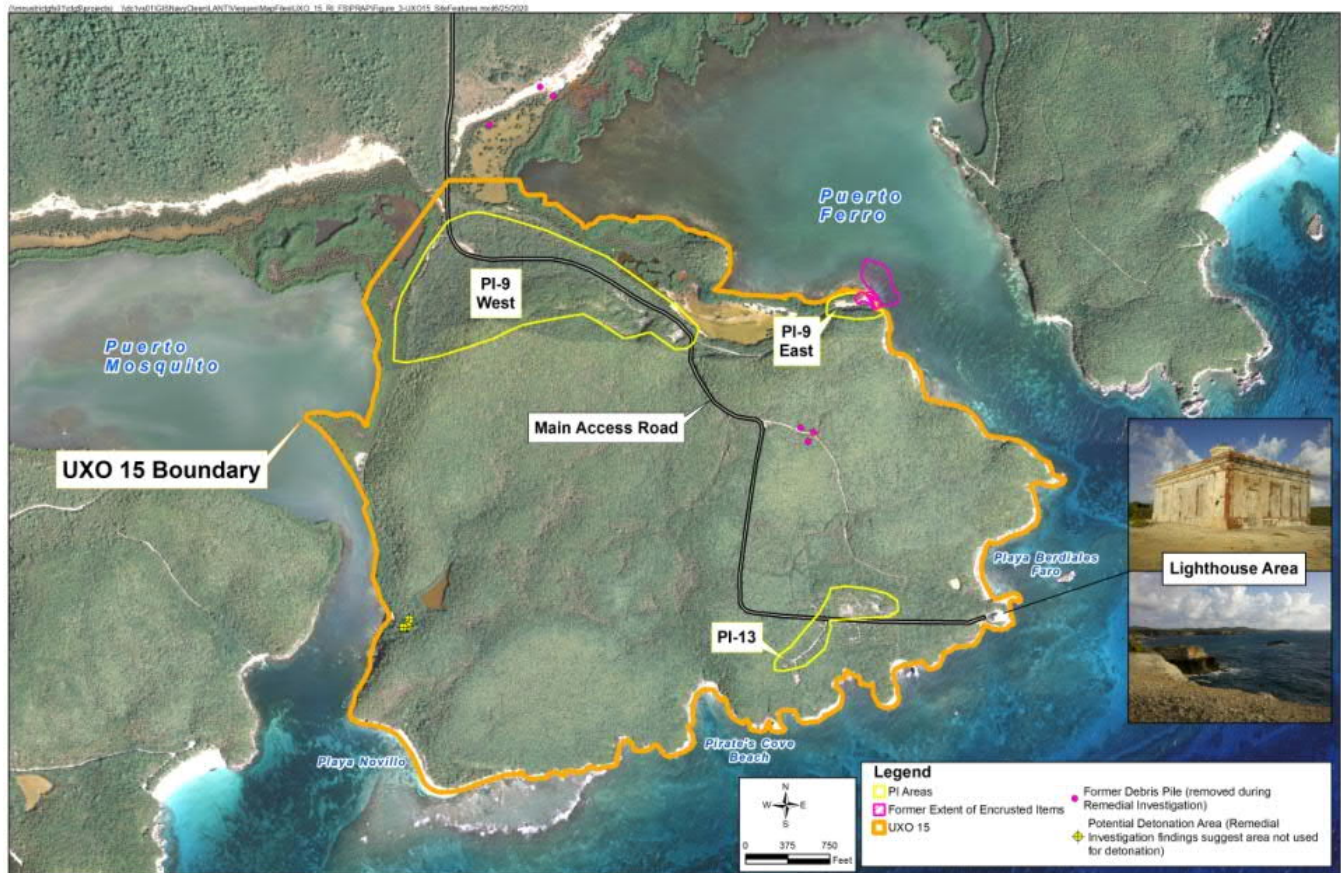
UXO 15 includes two Photo Identified (PI) sites (PI 9 East and West and PI 13) (Figure 3). PI 9 West, located in the northwestern portion of UXO 15, was likely used for temporary ammunition storage; investigation findings suggest it was not used for ammunition disposal (see Section 2.3). PI 9 East, located in the northeastern corner of UXO 15, was likely used for ordnance transport and loading/offloading activities. PI 13, located in the southeastern portion of UXO 15, was reportedly used as a firing

point from which rocket-related ordnance was launched to the LIA/SIA; however, no evidence of this use was found during the RI or previous investigations. A potential ordnance detonation area identified within UXO 15 was investigated during the RI, the findings of which suggest the area was unlikely used for munitions disposal by detonation (see Section 2.3).

## 2.3 Summary of Previous Investigations

Several environmental investigations and munitions removal actions have been conducted at or have included portions of UXO 15, beginning in 2000. The following subsections summarize the purpose, scope, and results of environmental investigations and removal actions completed to date. The dates provided in the subsection headings refer to the dates the investigation/removal action fieldwork was performed. Environmental **media** characterization was conducted from August 2012 through April 2018 while implementing the RI.

**Figure 3 – UXO 15 Site Features**



### **Phase I Resource Conservation and Recovery Act Facility Investigation (2000-2004)**

A Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was conducted to determine whether releases of hazardous wastes, solid wastes, or hazardous constituents may have occurred at various sites, including PI 9 and PI 13, which were identified via aerial photograph analysis performed in 2000 to support the RFI. Based on the results of site reconnaissance performed in 2001, the Phase I RFI Report contained a recommendation that PI 9 be further evaluated for munitions and munitions constituents under the Munitions Response Program (MRP) and an inspection for potential MEC at PI 13.

### **Preliminary Range Assessment (2002-2003)**

A Preliminary Range Assessment (PRA) was conducted in 2002 for various sites within the former VNTR, including PI 9 at UXO 15. The PRA included a reconnaissance of approximately 40 percent of PI 9

East with a metal detector to evaluate subsurface magnetic anomaly density potentially representing MEC. No MEC were found at UXO 15 during the PRA.

### **Environmental Baseline Survey (2002-2003)**

An Environmental Baseline Survey (EBS) 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 UXO 15. Findings indicated PI 9 East was an area likely used for loading and offloading of munitions, PI 9 West was likely used for temporary storage of munitions within earthen-berm areas and possible open burn/open detonation (OB/OD) operations, and PI 13 may have been the firing point from which rocket-related ordnance was launched to the LIA/SIA in the 1950s and 1960s; however, no evidence of



these uses at PI 13 was observed during site reconnaissance.

#### **Expanded Range Assessment/Site Inspection (2005-2008)**

An Expanded Range Assessment/Site Inspection (ERA/SI) was conducted from January 2005 through December 2008 within the former VNTR, including UXO 15. Visual and magnetometer-assisted transect surveys were conducted across approximately six percent (32 acres) of UXO 15. No MEC were found; a total of 32 **munitions debris (MD)** items were identified, consisting mostly of empty marine artillery casings. Additionally, five small debris piles were identified in various locations within UXO 15, and encrusted empty munitions casings were identified at PI 9 East. The ERA/SI contained a recommendation that further investigation/assessment be conducted of the debris piles, nearshore MD at PI 9 East, and subsurface anomalies to determine if MEC were present and evaluate the need for an RI/FS.

#### **Non-Time-Critical Removal Action at the Main Access Road, Lighthouse Area, Trails, and Beaches (2014)**

An NTCRA was conducted in 2014 to facilitate near-term public access via the main road to areas around the historic Spanish lighthouse (including the adjacent parking area, trail, and Puerto Ferro Lighthouse Beach [Playa Berdiales Faro]), as well as along two planned north-south trails and Pirate's Cove Beach. The NTCRA along the main road from the UXO 15 entrance to the lighthouse included the installation of hazard warning signs/monuments and educational kiosks to guide access along the main road to the lighthouse area and adjacent beach and to deter access to the remaining restricted areas of UXO 15. MEC clearance was not necessary along this road because the road was constructed with geotextile and 6-inch thick aggregate in 2007, along with an embankment for drainage that extended up to 11 feet from the edge of the road; **unexploded ordnance**

**(UXO)** support was provided during this construction, and no MEC were identified.

Additionally, MEC clearance at the lighthouse area, parking area, and trails was performed to an approximate maximum depth of 1 foot below ground surface (bgs) using a metal detector because of the shallow nature of the bedrock. Only non-munitions-related debris was found and removed from around the lighthouse and its associated parking area, and no munitions-related items or debris of any kind were identified along the trails.

Digital geophysical mapping was used in the sandy portion of Playa Berdiales Faro and Pirate's Cove Beach from the vegetation line to the edge of the water, with anomaly removal to a maximum depth of 4-feet bgs (or to depth of water) at all of the identified geophysical anomalies. No MEC or MD were identified at any of these areas.

#### **Non-Time-Critical Removal Action at the Southwest Beach (2015)**

An NTCRA was completed in 2015 at the Southwest Beach (Playa Novillo) to facilitate future public access to the beach. A geophysical survey was conducted along the sandy portion of the beach from the vegetation line to the edge of the water, with removal of geophysical anomalies to a depth of 4-feet bgs. No MEC were identified on the Southwest Beach (Playa Novillo).

#### **Non-Time-Critical Removal Action at PI 9 East and Adjacent UXO 16 Encrusted Munitions (2017-2019)**

An NTCRA was completed in 2018 to reduce potential explosive hazards by removing the encrusted munitions-related items identified at PI 9 East in UXO 15 and within UXO 16 (Underwater Area) immediately adjacent to PI 9 East. A temporary cofferdam was installed to dewater the area, and a remote excavator was used to remove the encrusted munitions-related items. Approximately 900 debris items were removed, but no MEC were encountered.

### Post-Hurricane Maria MEC Inspection (2017)

In 2017, Hurricane Maria severely impacted Playa Berdiales Faro and the surrounding area. Following the hurricane, an MEC inspection was conducted using a magnetometer at the public use areas at UXO 15. No MEC were identified during the post-hurricane inspection.

### Remedial Investigation/Feasibility Study (2012-2018)

An RI/FS was conducted at UXO 15 to assess the nature and extent of contamination, to assess potential risks to human health and the environment, and to evaluate remedial alternatives. The RI was implemented in two separate but related components: one focused on MEC and one focused on chemical contaminants in soil and sediment.

Based on previous investigations/removals and the MEC characterization component of the RI, it was concluded that although MEC is potentially present within UXO 15, the MEC density estimates (i.e., number of MEC found per acre) is very low for the site. Only two MEC items (both **discarded military munitions [DMM]**, a type of MEC) were found within UXO 15, constituting an MEC density of approximately 0.1 MEC per surface acre cleared or 1 MEC in every 10 acres. This finding is consistent with historical information that indicates UXO 15 was not used for military training that included such activities as firing, bombing, maneuvers, etc. For perspective, over 20,000 MEC have been identified in UXO 9 (another munitions site on Vieques unrelated to UXO 15 and used for activities such as those listed previously), constituting a density of over 100 MEC per acre surface cleared. This information was used to help evaluate remedial alternatives to address explosive hazards associated with MEC potentially present at the site, with consideration of the anticipated land uses.

The environmental characterization component of the RI characterized the horizontal and vertical extent of contamination in the soil and sediment and associated

human health and ecological risks. Using the soil and sediment data, a **Human Health Risk Assessment (HHRA)** and **Ecological Risk Assessment (ERA)** were completed during the RI. The HHRA and ERA identified no **unacceptable risks** to human health or the environment as a result of the past munitions-related activities at UXO 15. Therefore, no remedial action is necessary to be protective of potential human and ecological **receptors** (current or future) with respect to chemical contaminants in environmental media within UXO 15.

Based on this information, an FS was conducted to evaluate remedial alternatives to address MEC potentially remaining at UXO 15 in accordance with EPA guidance. Three MEC remedial alternatives were developed and screened against feasibility evaluation criteria, as defined in the NCP, and discussed in further detail later in this Proposed Plan.

## 3. Site Characteristics

### 3.1 Physical Characteristics

The ground elevation at UXO 15 ranges from about 30 feet above mean sea level (amsl) inland to sea level at the coastline. The topographically higher areas generally slope toward the ocean. Steep cliff faces tend to form the eastern and southern portions of UXO 15 while a relatively thin mangrove forest forms the western boundary with Puerto Mosquito.

UXO 15 contains a variety of environmental habitats, including dry scrub forest on hilltops and ridges; a mangrove forest associated with lagoons, salt/sand flats, or tidal mud flats; evergreen scrub habitat; exposed limestone areas; and areas of mixed native, naturalized, and invasive species.

Generalized **groundwater** flow at UXO 15 is anticipated to be toward Puerto Mosquito to the west, Puerto Ferro to the north and east, and the ocean to the south, and is likely to be tidally influenced, especially near the shorelines. Because of UXO 15's proximity to the ocean and existence primarily in

limestone, groundwater at UXO 15 is likely brackish to saline and hard.

### **3.2 Nature and Extent of Contamination**

Of the 2,240 items recovered during the ERA/SI, NTCRAs, and RI at UXO 15, only two were MEC; both were grenades [one tear gas and one 40-millimeter] found within PI 9 West, and both were found on the ground surface with one potentially unearthed when excavating a trench through a berm during the RI. Approximately 65% of the items (1,467) were non-munitions debris such as pallets, fencing material, general trash/debris, steel matting, and partially buried drums. The remaining items were MD, most of which (653) were munitions casings recovered from PI 9 East where munitions loading/offloading occurred.

This information supports historical knowledge that UXO 15 was likely used for support activities for training activities that took place elsewhere on the former VNTR. While there is the potential for MEC to remain at UXO 15, information collected during historical investigations and actions indicates there are likely relatively few MEC present (i.e., less than 0.01 percent of items recovered were MEC), especially in planned public use areas where MEC clearance already has been completed or is recommended in this Proposed Plan.

The RI included the collection of 48 soil and 22 sediment samples from the locations shown on Figure 4. To ensure appropriate characterization of the site, sampling activities focused on areas with the highest potential for contamination, including the locations of soil berms, drums, the potential detonation and excavation areas, and debris piles. All samples were analyzed for explosives and metals, and a subset of samples (those collected from berm trenches and former drum locations) were also analyzed for volatile

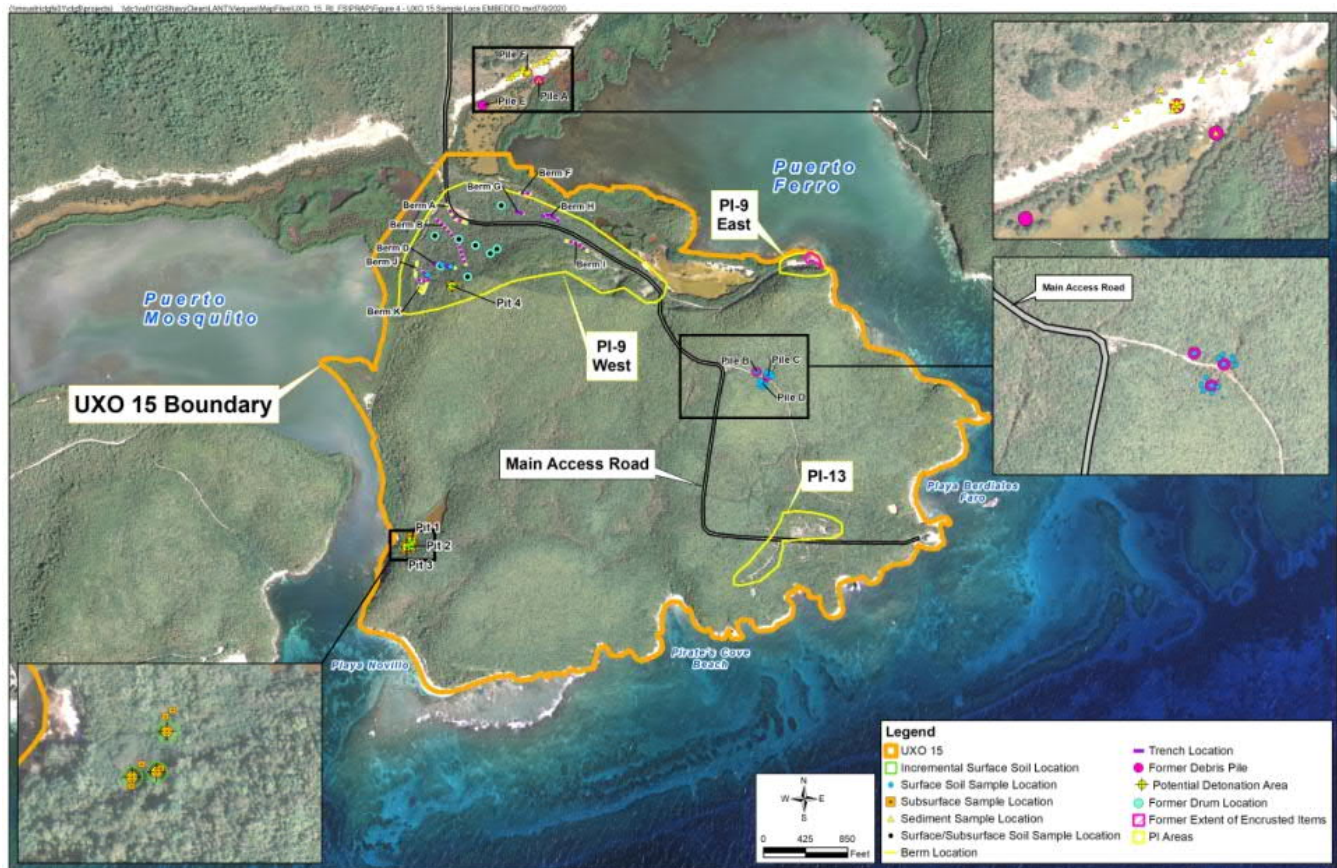
organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs).

No explosives or PCBs were detected in any samples collected at UXO 15. Detections of VOCs, SVOCs, and pesticides were sporadic and isolated and most were below EPA **Regional (risk-based) Screening Levels (RSLs)** and ecological risk-based levels. The potential for contaminants attributable to past Navy training activities to leach to groundwater was also evaluated to determine whether groundwater sampling was warranted. This evaluation indicated leaching to groundwater is not a concern at UXO 15 based on multiple lines of evidence, including: (1) the most likely contaminant source areas (debris piles) were removed, (2) very little impact from munitions-related contamination was observed during the RI, and (3) many of the constituents evaluated are naturally occurring and/or not associated with munitions. Metals detections were evaluated following a process agreed to by all 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 concentrations**. The metals concentrations detected in soil and sediment at UXO 15 were attributable to background, or if potentially site-related, they posed no unacceptable risk and were located in small, isolated areas at concentrations not expected to cause a concern of leaching to groundwater.

The risk-based conclusions reached based on evaluation of the UXO 15 data are provided in Section 4.



Figure 4 – UXO 15 Sample Locations



## 4. Summary of Site Risks

Summaries of the HHRA and ERA results for UXO 15 are included in the following subsections and in Table 1. Figure 5 presents a graphical representation of the Conceptual Site Model (CSM) for UXO 15, including the planned/likely human and ecological receptors at UXO 15 that were considered in the HHRA and ERA. The complete HHRA and ERA are provided in the RI/FS Report (CH2M, 2020), which is available in the Administrative Record (link provided on first page of this Proposed Plan).

While the munitions removal actions described in Section 2 reduced explosive hazards and only two MEC have been found at UXO 15, potential explosive hazards associated with munitions on the surface and in the subsurface possibly remaining at UXO 15 are considered in the remedy evaluation and selection process that is the subject of this Proposed Plan.

### 4.1 Human Health Risk Assessment

An HHRA was conducted to evaluate potential human health risks associated with exposure to constituents detected in soil and sediment at UXO 15. Maximum detected concentrations of constituents were compared to EPA RSLs, and **constituents of potential concern (COPCs)** were identified based on exceedances of these screening levels. Human health risks were then evaluated for these COPCs under current and potential future human exposure scenarios at UXO 15. Exposure scenarios that were evaluated were recreational users, including visitors to the lighthouse as well as people utilizing trails and associated areas around the peninsula for such activities as hiking, horseback riding, bicycling, and land crabbing; USFWS workers; and trespassers in areas not open to the public. The recreational user exposure scenario was used to conservatively represent the trespasser exposure scenario.

Calculated health risks are based on an estimate of the potential **cancer risk** and the potential **non-cancer hazard**, the latter of which is expressed as a **hazard index (HI)**. A detailed explanation of how human health risk is assessed is provided in the “What is Human Health Risk and How is it Calculated?”

informational box. No **contaminants of concern (COCs)** were identified during the HHRA, and therefore, no unacceptable human health risks associated with chemical constituents are present at UXO 15.

## What is Human Health Risk and How is it Calculated?

A Human Health Risk Assessment (HHRA) estimates the likelihood of health problems occurring if no cleanup actions were taken at a site. This is also referred to as “baseline risk.” HHRA’s are conducted using a stepped process (as outlined in Navy and EPA HHRA policy and guidance). To estimate baseline risk at a site, the Navy performs the following four-step process:

Step 1: Data Collection and Evaluation

Step 2: Exposure Assessment

Step 3: Toxicity Assessment

Step 4: Risk Characterization

During Data Collection and Evaluation (**Step 1**), the concentrations of chemicals detected at a site are evaluated, including:

- Identifying and evaluating area(s) where site-related chemicals may be found (source areas) and at what concentrations
- Evaluating potential movement (transport) of chemicals in the environment
- Comparing site concentrations to risk-based screening levels to determine which chemicals may pose the greatest threat to human health (called constituents of potential concern [COPCs]). Constituents are not excluded from the risk assessment process if they are within the range of background.

In **Step 2**, the Exposure Assessment, potential exposures to the COPCs identified in Step 1 are evaluated. This step includes:

- Identifying possible exposure media (for example, soil, air, groundwater, surface water, and/or sediment)
- Evaluating if/how people may be exposed (exposure pathways)
- Evaluating routes of exposure (for example, ingestion)
- Identifying the concentrations of COPCs to which people might be exposed
- Identifying the potential frequency and length of exposure (i.e., how often and how long)
- Calculating a reasonable maximum exposure (RME) dose that portrays the highest level of human exposure that could reasonably be expected to occur

In the Toxicity Assessment (**Step 3**), both cancer and non-cancer toxicity values are identified for oral, dermal, and inhalation exposures to the COPCs. The toxicity values are identified using the hierarchy of toxicity value sources approved by EPA.

**Step 4** is Risk Characterization, where the information developed in Steps 1 through 3 is used to estimate potential risk to people. The following approach is used:

- Two types of risk are considered: cancer risk and non-cancer hazard
- The likelihood of developing cancer as a result of site exposure is expressed as an upper-bound probability; for example, a 1 in 10,000 chance. In other words, for every 10,000 people that might be exposed under the conditions identified in Step 2, one additional case of cancer may occur as a result of site exposure. Unacceptable risk exists when the **Excess Lifetime Cancer Risk (ELCR)** of  $1 \times 10^{-4}$  (1 in 10,000) is exceeded.
- For non-cancer health effects, a hazard index (HI) is calculated. The HI represents the ratio between the reference dose, which is the dose at which no adverse health effects are expected to occur over a lifetime of exposure, and the RME dose for a person contacting COPCs at the site. The key concept here is that a threshold level (measured as an HI of 1) exists below which no non-cancer health effects are expected to occur. However, it should be noted that an HI > 1 does not mean that health effects will occur, only that the non-cancer hazard is unacceptable.

- The potential risks from the individual COPCs and exposure pathways are summed, and a total site risk is calculated for each receptor
- The uncertainties associated with the risk estimates are presented and their effects on the conclusions of the HHRA are discussed. This often includes further evaluation to determine if the chemicals are associated with releases from site activities or if the concentrations are consistent with background levels, especially for metals, which are inherent to environmental media.

## 4.2 Ecological Risk Assessment

The ERA evaluated potential ecological (plants and animals) risks associated with exposure to constituents detected in soil and sediment using established ecological effects values to assess risks

from direct exposure by organisms as well as via the food chain. No COCs were identified for soil, sediment, or food web exposure at UXO 15. Therefore, no unacceptable ecological risks were identified, and no further evaluation or action is warranted for ecological receptors at UXO 15.

## What is Ecological Risk and How is it Calculated?

An Ecological Risk Assessment (ERA) is conceptually similar to a Human Health Risk Assessment (HHRA) except that it evaluates the potential risks and impacts to ecological receptors (plants, wild and domesticated animals, habitats [such as wetlands], and communities [groups of interacting plant and animal species]). ERAs are conducted using a tiered, step-wise process (as outlined in Navy and EPA ERA policy and/or guidance) and are punctuated with Scientific Management Decision Points (SMDPs). SMDPs represent points in the ERA process where agreement among stakeholders on conclusions, actions, or methodologies is needed so that the ERA process can continue (or terminate) in a technically defensible manner. The results of the ERA at a particular SMDP are used to determine how the ERA process should proceed, for example, to the next step in the process or directly to a later step. The process continues until a final decision has been reached (i.e., remedial action if unacceptable risks are identified, or no further action if **acceptable risks** are identified). The process can also be iterative if data needs are identified at any step; the needed data are collected and the process starts again at the point appropriate to the type of data collected.

An ERA has three principal components:

### 1. Problem Formulation establishes the goals, scope, and focus of the ERA and includes:

- Compiling and reviewing existing information on the habitats, plants, and animals that are present on or near the site
- Identifying and evaluating area(s) where site-related chemicals may be found (source areas) and at what concentrations
- Evaluating potential movement (transport) of chemicals in the environment
- Identifying possible exposure media (for example soil, air, surface water, and/or sediment)
- Evaluating if/how the plants and animals may be exposed (exposure pathways)
- Evaluating routes of exposure (for example, ingestion)
- Identifying specific receptors (plants and animals) that could be exposed
- Specifying how the risk will be measured (assessment and measurement endpoints) for all complete exposure pathways

### 2. Risk Analysis which includes:

- Exposure Estimate - An estimate of potential exposures (concentrations of chemicals in applicable media) to plants and animals (receptors). This includes direct exposures of chemicals in site media (such as soil) to lower trophic level receptors (organisms low on the food chain such as plants and insects) and upper trophic level receptors (organisms higher on the food chain such as birds and mammals). This also includes the estimated chemicals' dose to upper trophic level receptors via consumption of chemicals accumulated in lower food chain organisms.
- Effects Assessment - The concentrations of chemicals at which an adverse effect may occur are determined

### 3. Risk Calculation or Characterization:

- The information developed in the first two steps is used to estimate the potential risk to plants and/or animals by comparing the exposure estimates with the effects threshold



- Also included is an evaluation of the uncertainties (potential degree of error) associated with the predicted risk estimate and their effects on ERA conclusions

The three principal components of an ERA are implemented as an 8-step, 3-tier process as follows:

- 1. Screening-Level ERA (Steps 1-2; Tier 1)** – The Screening Level ERA (SLERA) conducts an assessment of ecological risk using the three principal components described previously and very conservative assumptions (such as using maximum chemical concentrations).
- 2. Baseline ERA (Steps 3-7; Tier 2)** – If potential risks are identified in the SLERA, a Baseline ERA (BERA) is typically conducted. The BERA is a reiteration of the three principal components described previously but uses more site-specific and realistic exposure assumptions, as well as additional methods not included in the SLERA, such as consideration of background concentrations. The BERA may also include the collection of site-specific data (such as measuring the concentrations of chemicals in the tissues of plants and/or animals) to address key risk issues identified in the SLERA.
- 3. Risk Management (Step 8; Tier 3)** – Step 8 develops recommendations on ways to address any unacceptable ecological risks that are identified in the BERA and may also include other activities, such as evaluating remedial alternatives.

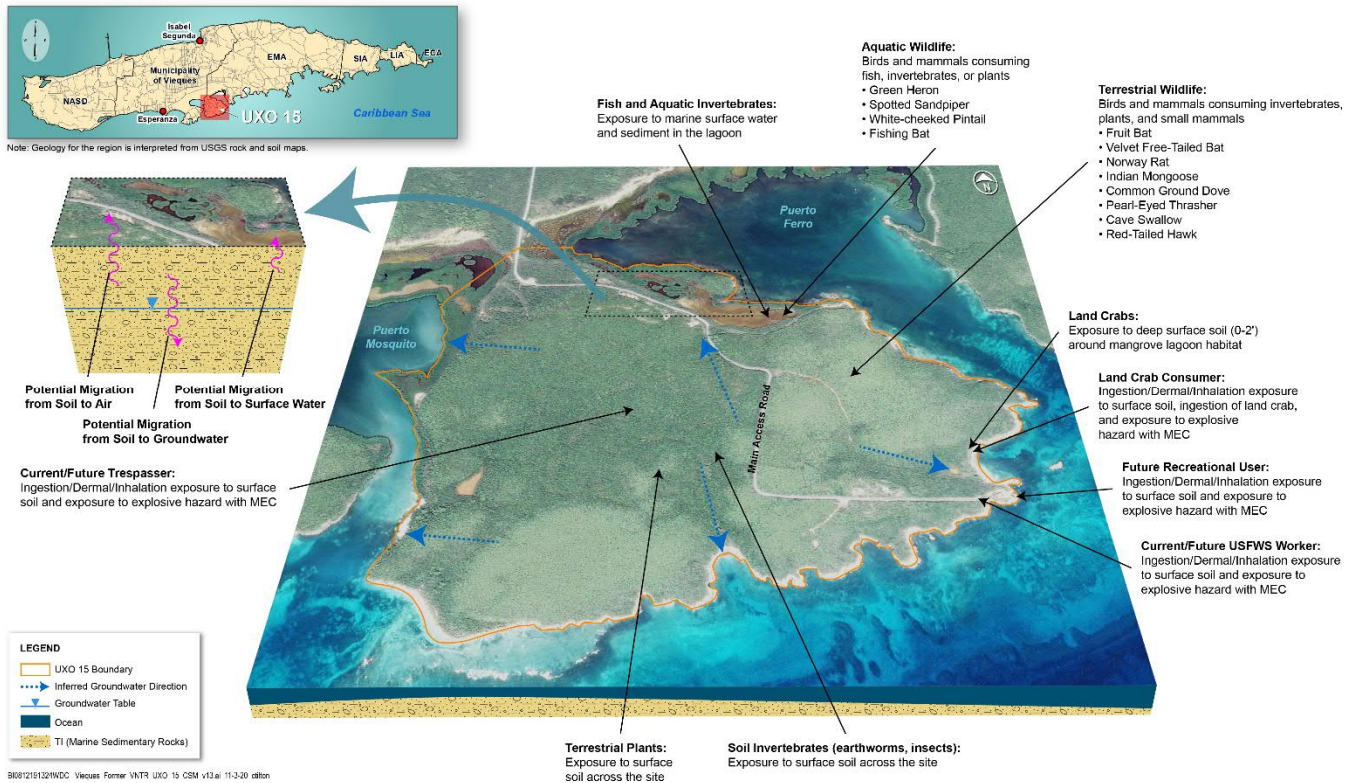
**Table 1 – UXO 15 Risk Assessment Results**

Receptors	Human Health Risk
Current/Future Trespassers	Adult – Cumulative ELCR ranging from $4 \times 10^{-6}$ to $4 \times 10^{-7}$ and HI < 1 Youth – Cumulative ELCR ranging from $3 \times 10^{-6}$ to $3 \times 10^{-7}$ and HI < 1 <b>Acceptable</b>
Future Recreational Users	Adult – Cumulative ELCR ranging from $4 \times 10^{-6}$ to $1 \times 10^{-7}$ and HI < 1 Child – Cumulative ELCR ranging from $1 \times 10^{-5}$ to $4 \times 10^{-7}$ and HI < 1 <b>Acceptable</b>
Current/Future USFWS Workers	Cumulative ELCR ranging from $2 \times 10^{-6}$ to $2 \times 10^{-7}$ and HI < 1 <b>Acceptable</b>
Potential Current/Future Land Crab Consumers	Adult – $2 \times 10^{-5}$ cumulative ELCR, two target organ specific HI > 1 (cardiovascular [HI = 7] and dermal [HI = 7] because of arsenic); the probability of blood lead levels (BLLs) exceeding 10 micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ) is less than 5% Child – $9 \times 10^{-5}$ cumulative ELCR, three target organ specific HI > 1 (cardiovascular [HI = 116] because of arsenic, dermal [HI = 117] because of arsenic with a smaller contribution from selenium), gastrointestinal [HI = 3] because of copper); the probability of BLLs exceeding 10 $\mu\text{g}/\text{dL}$ is less than 5% <b>Although calculations indicate 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 3.2 describes the process used to determine whether metals concentrations are attributable to natural conditions.</b>
HHRA Notes: ELCR = excess lifetime cancer risk HI = hazard index Unacceptable ELCR = $>1 \times 10^{-4}$ Unacceptable HI = $>1$	

**Table 1 – UXO 15 Risk Assessment Results**

Media	Ecological Risk
	All Receptors
Soil, Sediment, and Food Web Exposures	Acceptable

**Figure 5 – UXO 15 Conceptual Site Model**



### 4.3 Principal Threat Waste

MEC, specifically DMM or UXO, if any, that remains present at UXO 15 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 preferred alternative includes additional MEC clearance, LUCs and inspections to limit the potential for people to encounter MEC. During historical investigations and removal actions, a total of two MEC items were found and removed from the 536 acres that comprise UXO 15. If potential MEC is later found at UXO 15, 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.

## 5. Scope and Role of Response Action

In cooperation with EPA, PRDNER, and USFWS, and in accordance with the FFA and applicable guidance, the Navy performed investigations at UXO 15 to evaluate the nature and extent of contamination and to assess the potential risks to human health and the environment. In addition, several NTCRAs were conducted to clear (in other words, search for and, if found, remove) MEC from the surface and subsurface within areas planned for public use at UXO 15. Although only two MEC were identified and removed at UXO 15, there is still potential explosive hazard because of the possibility of munitions remaining at UXO 15. The preferred alternative described in this Proposed Plan will address potential explosive hazard to ensure UXO 15 can be used for the planned wildlife refuge with localized recreational activities, as described in USFWS' Comprehensive Conservation Plan (CCP) and subsequent Step-down Plan for the area (Figure 6). The response action is intended to be the final remedy for UXO 15 and does not include or substantively affect any other sites under the CERCLA process.

To date, remedies have been selected for five other munitions response sites, UXOs 1, 12, 14, and 18, located on the former VNTR on the eastern portion of the island, and Solid Waste Management Unit 4, located on the former Naval Ammunition Support Detachment in western Vieques. None of the remedies associated with other sites includes or affects this remedy for UXO 15.

## 6. Remedial Action Objectives

**Remedial Action Objectives (RAOs)** are standards that define the extent to which sites require cleanup to protect human health and/or the environment. The following RAO was developed to be protective of current and potential future receptors, in accordance

with the current and anticipated future land use (i.e., wildlife refuge with localized recreational use):

- Reduce the risk of exposure to potential munitions-related explosive hazards to be consistent with current and anticipated future land use identified by USFWS in accordance with its CCP and as set forth in Public Law 106-398, as amended by Public Law 107-107, which requires the land where UXO 15 is located, among others, to be managed by USFWS as a National Wildlife Refuge.
- Reduce or prevent the potential for unauthorized access to portions of UXO 15.

An RAO for groundwater is not necessary for UXO 15 because no contaminants representing a leaching concern for groundwater were identified, as detailed in the RI/FS Report (CH2M, 2020).

## 7. Summary of Remedial Alternatives

The following three remedial alternatives were developed and considered to address potential MEC explosive hazards:

- Alternative 1 – No Action
- Alternative 2 – Surface MEC Removal in Planned Public Use Areas and Land Use Controls (Figure 7)
- Alternative 3 – Surface and Subsurface MEC Removal in Planned Public Use Areas and Land Use Controls (Figure 8)

These remedial alternatives were developed and evaluated in the RI/FS Report (CH2M, 2020). Following the screening of various technologies, the remedial alternatives summarized in Table 2 were selected for detailed evaluation and comparative analysis. To support evaluation of these alternatives, USFWS has identified and mapped locations of proposed recreational features and public use areas, such as vehicular, biking, horseback riding, and hiking



along trails and roads; parking; and land crabbing within certain areas of UXO 15, along with offshore activities such as fishing, kayaking, surfing, snorkeling,

and swimming. These proposed public use areas are shown in Figure 6.

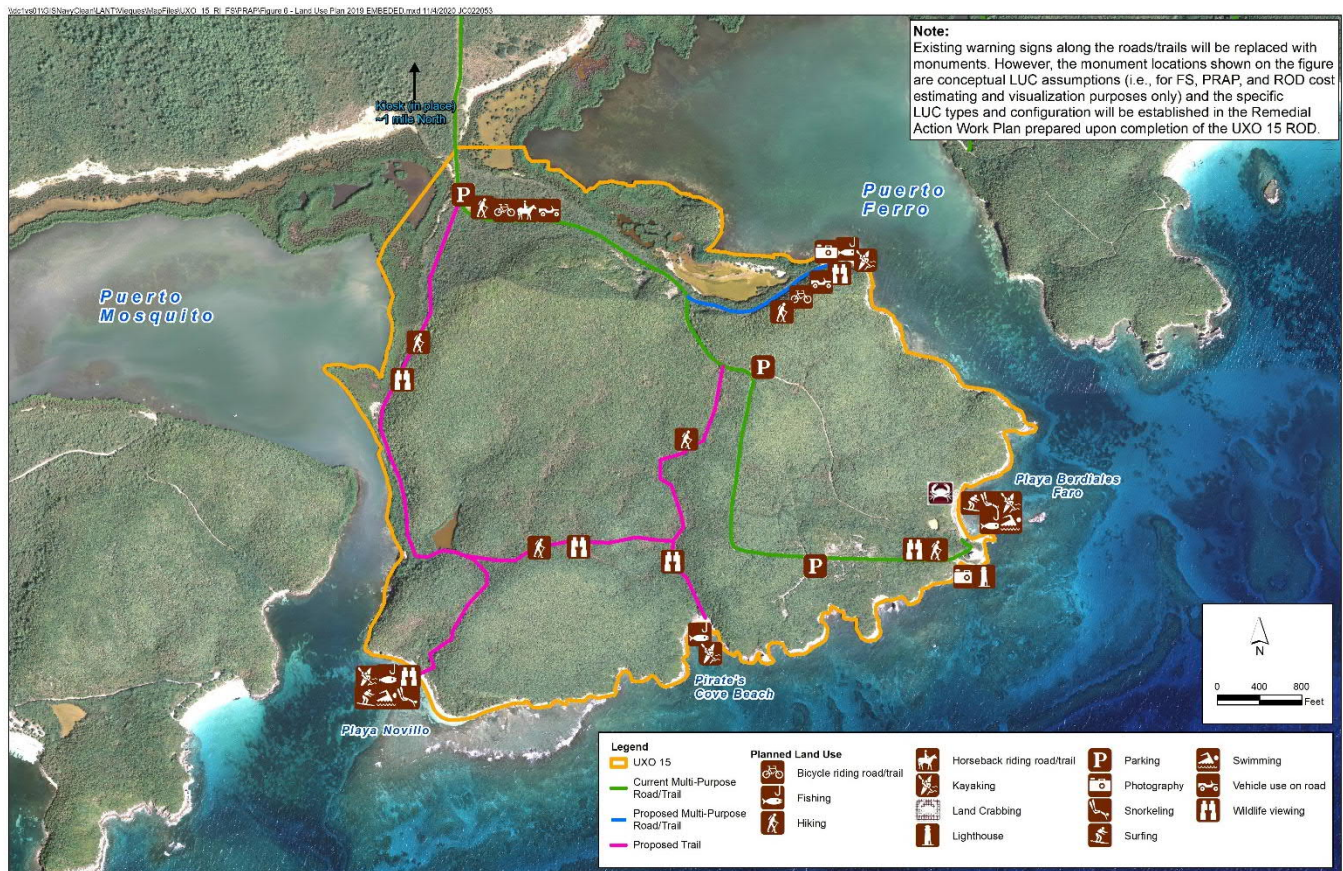
**Table 2 – Remedial Alternatives**

Alternative	Components	Details	Cost
<b>1. No Action</b> No action and no restriction on activities.			Capital Cost: \$0
<b>2. Surface MEC Removal in Planned Public Use Areas and Land Use Controls</b> Manages MEC explosive hazards by searching for and, if found, removing additional surface/near-surface MEC to support planned recreational activities, reducing the potential for unauthorized access to portions of the site by guiding site users to areas intended for access, and performing periodic inspections to evaluate/maintain LUC integrity and effectiveness and identify and remove any exposed MEC/MD.	<ul style="list-style-type: none"> <li>– Surface/near-surface MEC clearance</li> <li>– LUCs, including physical mechanisms (e.g., educational kiosk/signs) and administrative processes (e.g., use restrictions)</li> <li>– Monitoring, including removal of any MEC identified</li> </ul>	<ul style="list-style-type: none"> <li>– Conducting an instrument-aided (e.g., hand-held magnetometer) visual surface inspection of the trail, multipurpose road/trail, and parking area that were not previously cleared (Figure 7) to identify and remove MEC and munitions-related debris on or near the ground surface. It is noted that the planned parking area not previously cleared is in an area where bedrock is anticipated to be at or near-surface (within 1-foot bgs), as was the parking area near the lighthouse.</li> <li>– Implementing LUCs (e.g., educational kiosk/monuments and administrative mechanisms) to reduce the potential for human contact with potential MEC by guiding access to approved areas and discouraging unauthorized access and activities, such as restrictions on intrusive activities and groundwater use. The specific LUC requirements, including the associated checklist, would be included in a monitoring plan associated with the remedy that would be submitted for regulatory review.</li> <li>– Establishing an MEC/LUC monitoring program, including periodic inspections for trespassing in restricted areas, MEC/MD recurrence in public-access areas, and the integrity and effectiveness of physical LUCs. Any MEC/MD discovered during implementation of the monitoring program would be removed. Construction support, as warranted, would also be conducted in support of USFWS road maintenance activities.</li> </ul>	Capital Cost: \$387,000 Present Value of Future, Annual Monitoring and Maintenance Costs: \$314,000 <b>Total Present-Worth Cost: \$701,000</b> Assumed timeframe: 30 years (including monitoring and maintenance)

**Table 2 – Remedial Alternatives**

Alternative	Components	Details	Cost
<b>3. Surface and Subsurface MEC Removal in Planned Public Use Areas and Land Use Controls</b> Manages MEC explosive hazards by removing surface (as described under Alternative 2) and additional subsurface MEC to support potential future recreational activities, reducing the potential for unauthorized access to portions of the site, guiding site users to areas intended for access, and performing periodic inspections to identify and remove exposed MEC.	<ul style="list-style-type: none"> <li>– Surface and subsurface MEC clearance</li> <li>– LUCs (as described under Alternative 2)</li> <li>– Monitoring (as described under Alternative 2)</li> </ul>	<ul style="list-style-type: none"> <li>– Conducting surface and subsurface MEC clearance utilizing digital geophysical mapping along the trail (to maximum depth of 1 foot), multipurpose road/trail (to a maximum depth of 2 feet), and parking area (to a maximum depth of 2 feet) that were not previously cleared (Figure 8) to identify and remove any MEC and munitions-related debris on and beneath the ground surface.</li> <li>– Implementing LUCs as described under Alternative 2</li> <li>– Establishing an MEC/LUC monitoring program as described under Alternative 2</li> </ul>	<p>Capital Cost: \$547,000</p> <p>Present Value of Future, Annual Monitoring and Maintenance Costs: \$314,000</p> <p>Total Present-Worth Cost: <b>\$861,000</b></p> <p>Assumed timeframe: 30 years (including monitoring and maintenance)</p>

**Figure 6 - USFWS Land Use Plan**



Inclusion of the No Action Alternative is required under the NCP as a basis of comparison for the other alternatives. Each remedial alternative for UXO 15 was evaluated with respect to the first seven of the nine evaluation criteria provided in the NCP. The alternatives were then compared to one another with respect to each NCP criterion. Following the public comment period on this Proposed Plan, the preferred alternative will be evaluated further against the remaining two criteria (Commonwealth acceptance and community acceptance).

The NCP outlines the approach for comparing remedial alternatives. As mentioned above, the evaluation of the alternatives under the NCP involves nine evaluation criteria, which consist of a combination of “threshold,” “primary balancing,” and “modifying” criteria (Table 3). To be considered for selection as the preferred alternative, a remedial alternative must meet the two threshold criteria. The five primary balancing criteria, which are technical criteria based on environmental protection, cost, and engineering feasibility, are then considered to determine which alternative provides the best combination of attributes. Finally, upon receipt of public comments on this Proposed Plan, the preferred alternative is evaluated further against the two modifying criteria.

### **7.1 Relative Evaluation of Alternatives**

The comparative analysis of alternatives with respect to the first seven evaluation criteria is summarized in the remainder of this section. The UXO 15 RI/FS Report (CH2M, 2020) provides a more-detailed discussion of the evaluation and includes tables that provide a relative ranking of the alternatives.

### **7.2 Threshold Criteria**

#### **Overall Protection of Human Health and the Environment**

Alternative 1 (no action) is not protective because the RAO would not be attained. The remaining alternatives are protective of human health and the environment by reducing the exposure to MEC by

guiding access to areas planned for public use, performing periodic MEC inspections, and conducting additional MEC clearance. While Alternative 3 would theoretically achieve a higher level of explosive hazard protection based on the inclusion of subsurface MEC clearance, the actual degree of additional protection would likely be negligible given the significant MEC investigations and clearance efforts that have already taken place and that no MEC was ever found during past removal actions along the roads/trails. In addition, Alternative 3 would have the potential for higher impact to the environment and increased worker safety risks due to the need to perform more ground disturbance and intrusive anomaly removal.

#### **Compliance with Applicable or Relevant and Appropriate Requirements**

With the exception of Alternative 1 (No Action), the alternatives comply with the **Applicable or Relevant and Appropriate Requirements (ARARs)**, which consist of Federal Location-specific ARARs, which address coastal zones and migratory bird areas and endangered species, and Federal and Commonwealth Action-specific ARARs, which address land disturbance and munitions, stormwater, spill, and waste management.

### **7.3 Primary Balancing Criteria**

#### **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. Alternatives 2 and 3 provide long-term effectiveness and permanence using LUCs combined with additional MEC clearance. Because of the significant munitions clearance activities already conducted at UXO 15, the low number of MEC found (only two MEC have been found), and the absence of MEC within anticipated public use areas where MEC clearance was previously performed, Alternative 2 has comparable long-term effectiveness and permanence to Alternative 3, the



latter of which is anticipated to provide only a marginally higher level of long-term effectiveness than Alternative 2 because while subsurface anomaly removal would occur under only Alternative 3, it is determined to be unlikely that subsurface MEC will be discovered based on historical clearance activities. Further, contact with the subsurface within the areas that have not previously been cleared (trail segments and parking area) is unlikely based on the anticipated future uses.

### **Reduction in Toxicity, Mobility, or Volume through Treatment**

While removing MEC may not technically be considered treatment, it is substantively similar to treatment, especially with respect to consideration of this evaluation criterion, as any MEC found would be demilitarized (rendered safe) prior to disposal. Alternative 1 does not result in any additional reduction in toxicity, mobility, or volume (TMV). Alternative 3 has a marginally higher theoretical degree of reduction in TMV than Alternative 2 because it includes the screening for and, if present, removal of subsurface MEC (i.e., clearance) within planned public use areas versus only surface/near-surface MEC clearance of Alternative 2. However, as noted previously, implementation of Alternative 3 would likely produce very little or no increase in discovered MEC.

### **Short-Term Effectiveness**

Alternative 1 would not pose short-term difficulties because no action would occur, but it would not achieve short-term effectiveness and, therefore, it would not achieve the RAO. Both Alternatives 2 and 3 could be implemented almost immediately after a remedy is selected and the associated Work Plan is finalized. Alternative 2 would have a marginally higher degree of short-term effectiveness because, relative to Alternative 3, it would present somewhat lower risks to

the community and/or workers during the remedial action, lower potential environmental impacts, and shorter time until the RAO is achieved because it would not involve heavy machinery and associated excavations that are part of Alternative 3.

### **Implementability**

Alternative 1 requires no action or implementation. Alternative 2 is technically feasible and could facilitate public access in the areas intended for this use by USFWS. The implementability of Alternative 3 would be similar to Alternative 2, but it would be marginally more logistically challenging because of the subsurface MEC clearance. While both Alternatives 2 and 3 could be implemented with standard equipment and materials, Alternative 3 may require replacement and/or restoration of habitat that is damaged/destroyed during subsurface MEC clearance activities.

### **Cost**

Alternative 1 is the most cost effective but does not meet the RAO. Alternatives 2 and 3 meet the RAO and have present-worth costs of \$701,000 and \$861,000, respectively.

## **7.4 Modifying Criteria**

Commonwealth Acceptance. Commonwealth involvement has been continual throughout the CERCLA process for UXO 15, and PRDNER supports the preferred alternative. However, PRDNER's formal concurrence is pending following the review of all comments received during the public comment period.

Community Acceptance. Community acceptance will be evaluated after the public comment period for this Proposed Plan, and substantive public comments will be documented and addressed in a responsiveness summary as part of any **Record of Decision (ROD)** for UXO 15 that is executed documenting the selection of a remedy.

**Table 3 – Evaluation Criteria for Comparative Analysis of Alternatives**

CERCLA Criteria	Definition
<b>Threshold Criteria</b>	
Protection of human health and the environment	Addresses whether a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
Compliance with ARARs and <b>to-be-considered (TBC)</b> criteria	Addresses whether a remedy will meet all the ARARs or other Federal and Commonwealth/State environmental laws and/or justifies a waiver of the requirements.
<b>Primary Balancing Criteria</b>	
Long-term effectiveness and permanence	Addresses the expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once RAOs have been met.
Reduction in TMV through treatment	Discusses the anticipated performance of the treatment technologies a remedy may employ.
Short-term effectiveness	Considers the time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until clean-up goals are achieved.
Implementability	Evaluates the technical and administrative feasibility of implementing a remedy, including the availability of materials and services needed to implement an option.
Present-worth cost	Compares the estimated initial, operations and maintenance, and present-worth costs.
<b>Modifying Criteria</b>	
Commonwealth/State acceptance	Considers the Commonwealth/State support agency comments on the Proposed Plan.
Community acceptance	Provides the public's general response to the alternatives described in the Proposed Plan and RI/FS Report. The specific responses to the public comments are addressed in the Responsiveness Summary section of the ROD.

## 8. Preferred Alternative

The Navy and EPA, in consultation with DOI and PRDNER, have identified Alternative 2 - Surface MEC Removal in Planned Public Use Areas and Land Use Controls as the preferred alternative for UXO 15 (Figure 7). Based on an evaluation of the data, the information currently available, and the comparative analysis of potential remedial alternatives, the preferred alternative meets the statutory requirements of CERCLA for protection of human health and the

environment under current and anticipated future land use as a wildlife refuge with localized recreational use.

Key elements that make Alternative 2 the preferred alternative are:

- It meets the RAO and is compatible with the planned land use, based on the USFWS CCP and Step-down Plan.
- It reflects the significant MEC clearance that has already been conducted as part of historical munitions removal activities from the areas

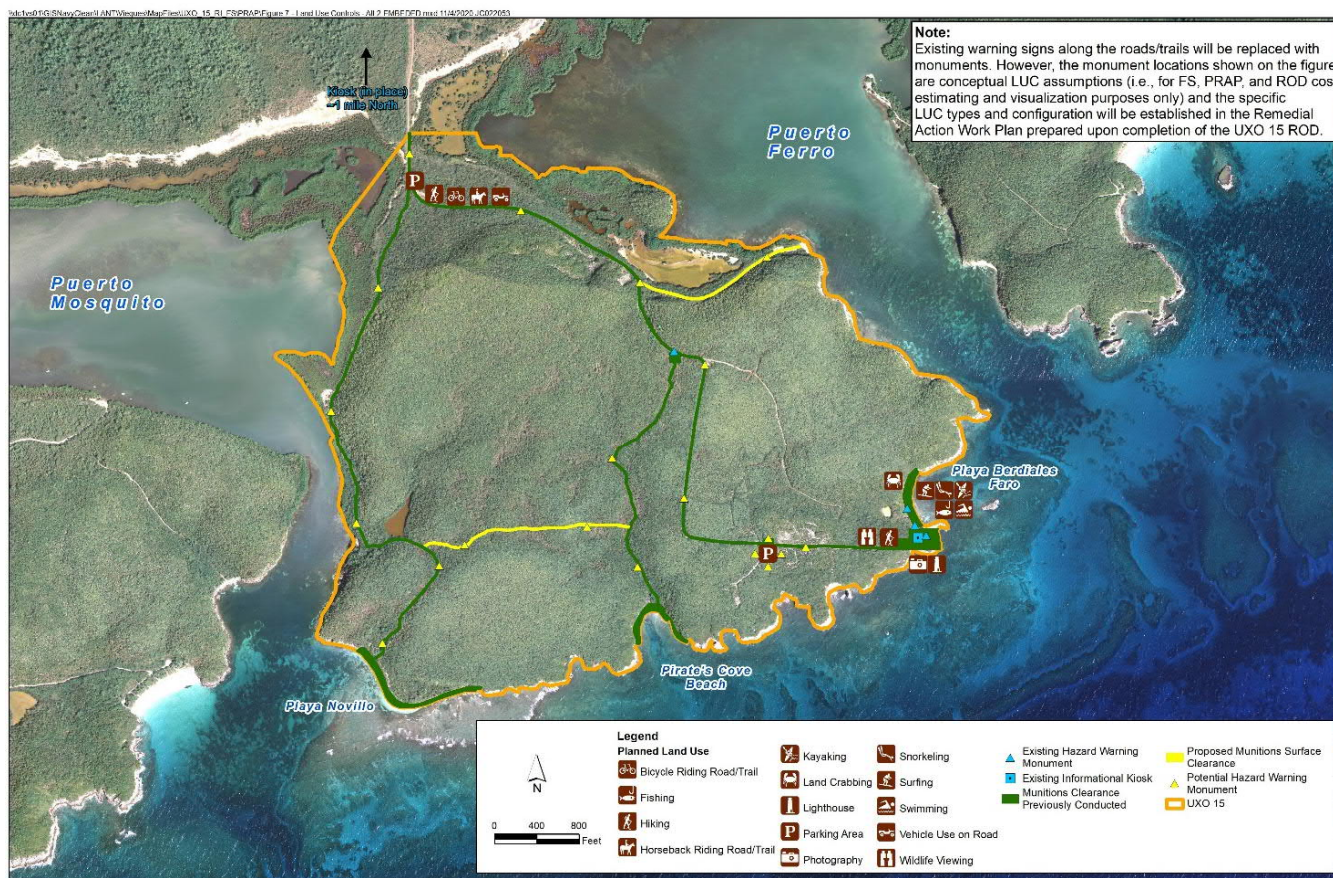
identified by USFWS for future recreational use, such as the main access road to the lighthouse area, several trails, and beaches around the peninsula.

- It requires additional surface/near-surface MEC clearance in areas planned for recreational use that were not previously cleared, it requires implementation of LUCs to guide access to approved areas and control unauthorized access,

and it requires MEC/LUC monitoring to ensure the integrity and effectiveness of the LUCs and monitor for and remove MEC identified in the future.

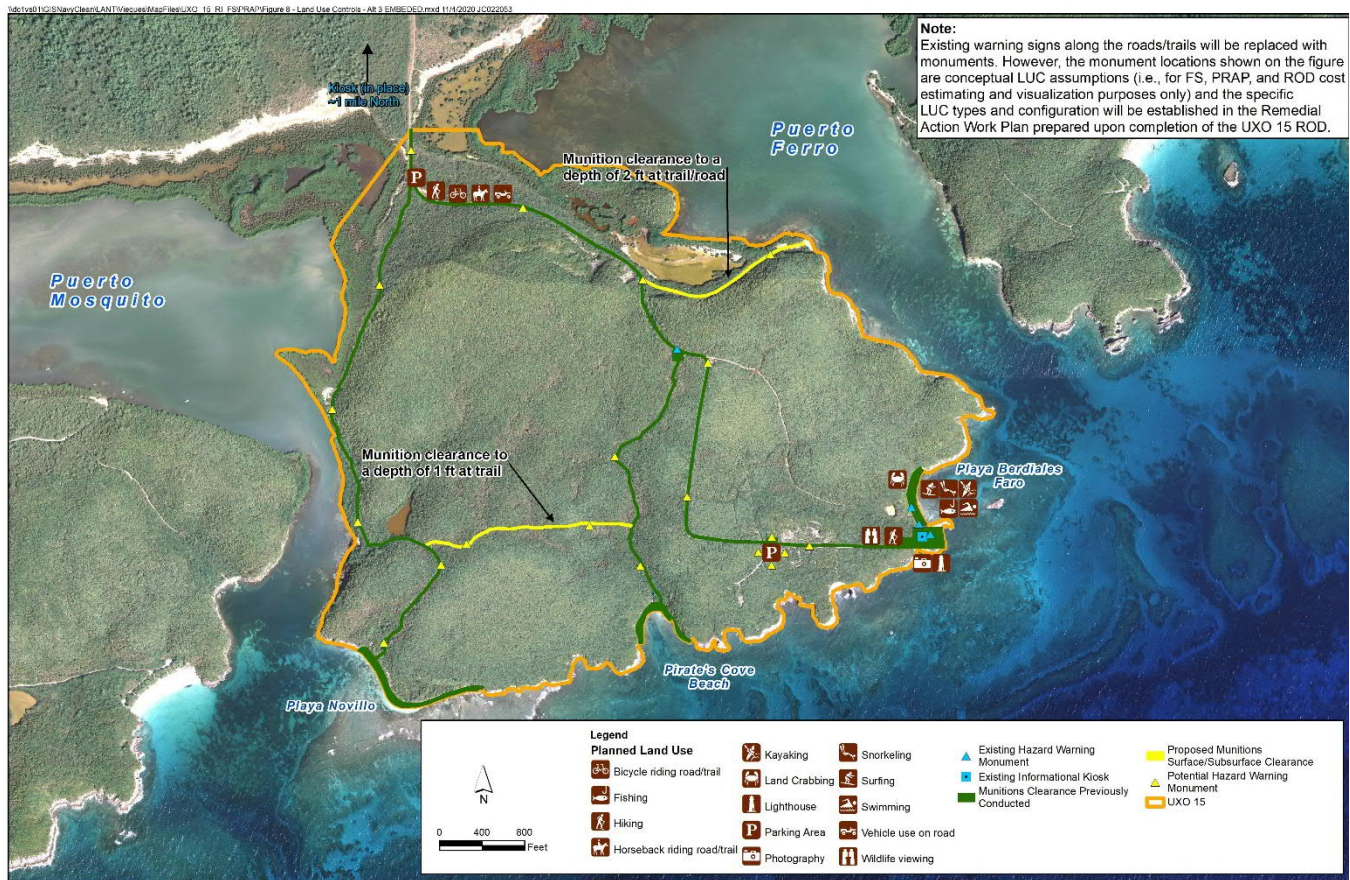
- It avoids the potential for erosion that may be caused by Alternative 3 subsurface MEC clearance, which would not likely substantively reduce explosive hazard, as described in Section 7.3.

**Figure 7 – Alternative 2 Layout**





**Figure 8 – Alternative 3 Layout**



## 9. Community Participation

A community relations program has been ongoing for the Vieques environmental restoration program since 2001. The community relations program fosters two-way communication of investigation and remediation activities between the stakeholder agencies (Navy, EPA, USFWS, and PRDNER) and the public. A Restoration Advisory Board was formed in 2004 to provide for expanded community participation. Regular meetings are held to provide an information exchange among community members, stakeholder agencies, and the Municipality of Vieques. These meetings are open to the public and are held approximately every 3 months.

Public input is a key element in the decision-making process. Nearby residents and other interested parties are strongly encouraged to use the comment period to relay any questions and comments about the preferred alternative or any of the other alternatives identified in

this Proposed Plan for UXO 15. Following the public comment period, the Navy will summarize and respond to substantive comments in a responsiveness summary, which will be documented in any ROD that sets forth a remedy for UXO 15.

This Proposed Plan fulfills the public participation requirements of CERCLA Section 117(a), which specifies that the lead agency (the Navy) must publish a plan outlining any remedial alternatives evaluated for a site and identify the preferred alternative. The Community Involvement Plan and technical reports supporting the preferred alternative for UXO 15 are available for public review in the Administrative Record at: <https://go.usa.gov/xRHxY>.

Additionally, paper copies of the UXO 15 Proposed Plan are available at the EPA office in Vieques.

The public comment period for this Proposed Plan provides an opportunity for input regarding the remedy selection process for UXO 15. The public comment

period will be from July 26 to August 24, 2021, and a public meeting will be held on August 4, 2021, at 5:00 p.m. by connecting to the Virtual Meeting on MS Teams <https://tinyurl.com/3f5jwxn7> or

**Join by phone by dialing 1-787-650-6946,**

**Meeting ID: 116 604 434 8 #**

All interested parties are encouraged to attend the public meeting to learn more about the preferred alternative for UXO 15. The meeting will provide an additional opportunity to submit comments on this Proposed Plan.

Comments on the preferred alternative, or this Proposed Plan, must be postmarked no later than August 24, 2021. On the basis of comments or new information, the Navy and EPA, in consultation with DOI and PRDNER, may modify the preferred alternative or choose another alternative. The comment page included as part of this Proposed Plan may be used to provide comments to the Navy. However, questions or comments can be submitted to any of the individuals listed in the blue boxes during the 30-day public comment period.

Note: This Proposed Plan is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of this Proposed Plan is the official version.

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## 10. Glossary

**Acceptable Risk and Non-Cancer Hazard:** EPA's human health acceptable risk range for Superfund hazardous waste sites is  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ , meaning there is 1 additional chance in 10,000 ( $1 \times 10^{-4}$ ) to 1 additional chance in 1 million ( $1 \times 10^{-6}$ ) that a person may develop cancer if exposed to contaminants at a site that is not remediated. EPA's acceptable non-cancer hazard (risk) threshold for Superfund sites is a hazard index less than or equal to 1, meaning that if the exposure at a particular site is less than or equal to the threshold, there is not a concern for potential non-cancer effects associated with exposure to potentially site-related contaminants. For ecological health, acceptable risk is the result of a weight-of-evidence assessment that finds ecological exposure pathways to site chemicals are incomplete, or that contaminant exposure concentrations are below ecological toxicity values, are not bioavailable, and/or are attributable to background.

**Administrative Record:** A compilation of documents and information supporting a decision at a CERCLA site (i.e., this proposed remedy at UXO 15) that is made available to the public for review.

**Applicable or Relevant and Appropriate Requirements (ARARs):** CERCLA Section 121 (d)(2)(A) requires that remedial actions meet any state or federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate.

**Background Concentrations:** Concentrations of naturally occurring and anthropogenic (because of human activities) constituents, such as inorganic constituents, found in groundwater, soil, sediment, and surface water at levels not influenced by site-specific releases. Background concentrations of some inorganics and other constituents are often at levels that may pose a risk to human health or the environment. However, background concentrations of site chemicals are factored into risk management determinations to ensure remedial actions are not implemented for constituents whose concentrations are attributable to background conditions and not indicative of a site-related release.

**Cancer Risk:** Cancer risks are expressed as a number reflecting the increased chance that a person will develop cancer if exposed to chemicals or substances, as described in the Human Health Risk Assessment (HHRA).

**Contaminant of Concern (COC):** A contaminant that contributes risk or hazard above acceptable levels to a receptor.

**Constituent of Potential Concern (COPC):** A chemical at the site that may be hazardous to human health or the environment as a result of its detected concentrations.

**Comprehensive Environmental Response, Compensation and Liability Act (CERCLA):** A Federal law passed in 1980 (United States Code Title 42, Chapter 103), commonly referred to as the

“Superfund” Program, that provides for cleanup and emergency response in connection with numerous existing, inactive hazardous substance disposal sites that endanger public health and safety or the environment. CERCLA has been amended from time to time.

**Discarded Military Munitions (DMM):** Unfired military munitions that have been abandoned, discarded, or improperly disposed of and may still be capable of functioning (for example, exploding).

**Department of the Interior (DOI):** Landowner of the National Wildlife Refuge.

**Ecological Risk Assessment (ERA):** A qualitative and quantitative evaluation of the risk posed to ecological receptors (i.e., plants and animals) by the presence of specific pollutants. Elements include identification of the hazardous substances present in the environmental media, assessment of exposure and exposure pathways, assessment of the toxicity of the site’s hazardous substances, and characterization of ecological risks.

**Excess Lifetime Cancer Risk (ELCR):** Potential carcinogenic effects that are characterized by estimating the probability of cancer incidence in a population of individuals for a specific lifetime from projected intakes (and exposures) and chemical-specific dose-response data.

**Feasibility Study (FS):** A study undertaken by the lead agency to develop and evaluate options for remedial action. The FS emphasizes data analysis and is generally performed concurrently with the RI. The data from the RI is used to define the objectives of the response action, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives.

**Federal Facility Agreement (FFA):** A legal agreement between the Navy, DOI, EPA, and the Commonwealth of Puerto Rico that establishes the procedural framework and general schedule for implementing the CERCLA activities for Vieques.



**Groundwater:** The supply of water beneath the Earth's surface that occurs in the pore spaces between soil grains or within fractures in geologic formations that are fully saturated.

**Hazard Index (HI):** The HI represents a measure of the potential for non-carcinogenic effects from exposure to COPCs. A "threshold level" (measured as an HI of 1) exists below which no non-cancer health effects are expected to occur.

**Human Health Risk Assessment (HHRA):** A qualitative and quantitative evaluation of the risk posed to human health by the presence of specific pollutants. Elements include identification of the hazardous substances present in the environmental media, assessment of exposure and exposure pathways, assessment of the toxicity of the site's hazardous substances, and characterization of human health risks.

**Land Use Control (LUC):** Physical, legal, or administrative methods that restrict the use of or limits access to property to reduce risks to human health and the environment.

**Media (singular, Medium):** Soil, groundwater, surface water, or sediment at the site.

**Munitions and Explosives of Concern (MEC):** Distinguishes specific categories of military munitions that may pose unique explosive risks and comprises unexploded ordnance, discarded military munitions, and munitions constituents at concentrations high enough to pose an explosive hazard.

**Munitions Debris (MD):** Non-explosive remnants of munitions remaining after munitions use, demilitarization, or disposal.

**National Oil and Hazardous Substances Pollution Contingency Plan (NCP):** The Federal regulations (Code of Federal Regulations [CFR], Volume 40, Part 300 [40 CFR Part 300]) that guide determination of the sites to be addressed under both the Superfund

(CERCLA) program and the program to prevent or control spills into surface waters or elsewhere.

**National Priorities List (NPL):** A list developed by EPA of uncontrolled hazardous substance release sites in the United States that are considered priorities for long-term remedial evaluation and response.

**National Wildlife Refuge:** A protected area within the United States managed by the United States Fish and Wildlife Service for the conservation of wildlife and plants.

**Non-Cancer Hazard:** Non-cancer hazards (or risk) are expressed as a quotient that compares the potential exposure to contaminants at a particular site to the acceptable level of exposure. There is a level of exposure (the reference dose) below which it is unlikely for even a sensitive population to experience adverse health effects.

**Preferred Alternative:** In a proposed plan, the preferred alternative is one of the alternatives developed that is being offered to the public as the proposed remedy for consideration or comment. It is evaluated when presented to the public by applying the nine criteria specified in the NCP for evaluating remedial alternatives. The Preferred Alternative is the proposed remedy that, in this case, the Navy and EPA believe meets the threshold criteria and is deemed to provide the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria.

**Present-Worth Cost:** Total present-day cost to complete the proposed remedy.

**Proposed Plan:** A document that presents the preferred remedial alternative and requests public input regarding its proposed selection.

**Public Comment Period:** The time allowed for the members of a potentially affected community to express views and concerns regarding an action proposed to be taken at a site, such as a rulemaking, permit, or remedy selection.

**Puerto Rico Department of Natural and Environmental Resources (PRDNER):** The agency responsible for protecting natural resources, Commonwealth-owned conservation areas, submerged lands, and the coastal zone in the Commonwealth of Puerto Rico.

**Receptors:** Humans, animals, or plants that may be exposed to contaminants related to a given site.

**Record of Decision (ROD):** A legal document that describes the cleanup action or remedy selected for a site and the basis for choosing that remedy, and including the public comments that were considered regarding the selected remedy.

**Remedial Action Objectives (RAOs):** Statements that define the extent to which sites require cleanup to protect human health and the environment.

**Remedial Investigation (RI):** A study in support of the selection of a remedy at a site where hazardous substances have been released. The RI identifies the nature and extent of contamination and assesses human health and ecological risk associated with the contamination.

**Regional (risk-based) Screening Level (RSL):** A screening criterion designed to evaluate constituent concentrations in environmental media for potential risk to human health.

**To-be-considered Criteria:** Non-promulgated regulatory criteria, advisories, guidance, and proposed standards that have been issued by the Federal or State government that are not legally binding and do not have the legal status of ARARs. However, TBC criteria may be useful for developing remedial alternatives and for determining the necessary level of cleanup for protection of human health and the environment.

**Unacceptable Risk:** Excess lifetime cancer risk that exceeds EPA's acceptable risk range for Superfund hazardous waste sites of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  or a non-cancer hazard in excess of EPA's target level of 1.

**Unexploded Ordnance:** Prepared (primed, fused, armed) and put into action (fired, dropped, launched, projected, placed) military munitions that did not function as intended (for example, explode) and may still be capable of functioning.

**United States Environmental Protection Agency (EPA):** The Federal agency responsible for administration and enforcement of CERCLA (and other Federal environmental statutes and regulations).

**United States Fish and Wildlife Service (USFWS):** The Federal agency responsible for the management of the DOI-owned land and the protection of trust species (e.g., threatened and endangered species and migratory birds) on Vieques.

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Place  
stamp  
here

NAVFAC Atlantic

Attention: Code EV31 / Mr. Kevin Cloe

6506 Hampton Blvd.

Norfolk, VA 23508-1278