



# Proposed Remedial Action Plan

## Munitions Response Site (MRS) UXO-001

### Historic Munitions Disposal Area

#### Naval Air Station Patuxent River

#### St. Mary's County, Maryland

January 2023

This **Proposed Remedial Action Plan (PRAP)**<sup>1</sup> identifies the rationale and preferred remedial alternative of Institutional Controls for **Munitions Response Site (MRS) UXO-001** at Naval Air Station (NAS) Patuxent River in St. Mary's County, Maryland (**Figure 1**). This document satisfies the public participation requirements of Section 117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, 42 United States Code (U.S.C.) §9617(a), and the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**, 40 *Code of Federal Regulations* (CFR) §300.430(f)(3); explains the history of MRS UXO-001; summarizes the **Remedial Investigation (RI)**, which included the use of **Digital Geophysical Mapping (DGM)** and completion of a **Non-Time Critical Removal Action (NTCRA)**; and presents the remedial alternatives evaluated in the **Feasibility Study (FS)**, as documented in the RI/FS report for the site (CH2M HILL, Inc. [CH2M], 2022).

The purpose of this PRAP is to identify the preferred remedial alternative, describe the other remedial alternatives that were considered, and facilitate community involvement that is critical to selection of a final remedy. A glossary of key terms used throughout this document is attached, and the terms are identified in bold print the first time each appears. Public comment is invited and encouraged on the preferred remedial alternative at MRS UXO-001. Information on how to participate in this decision-making process is presented in Section 10, Community Participation, of this PRAP.

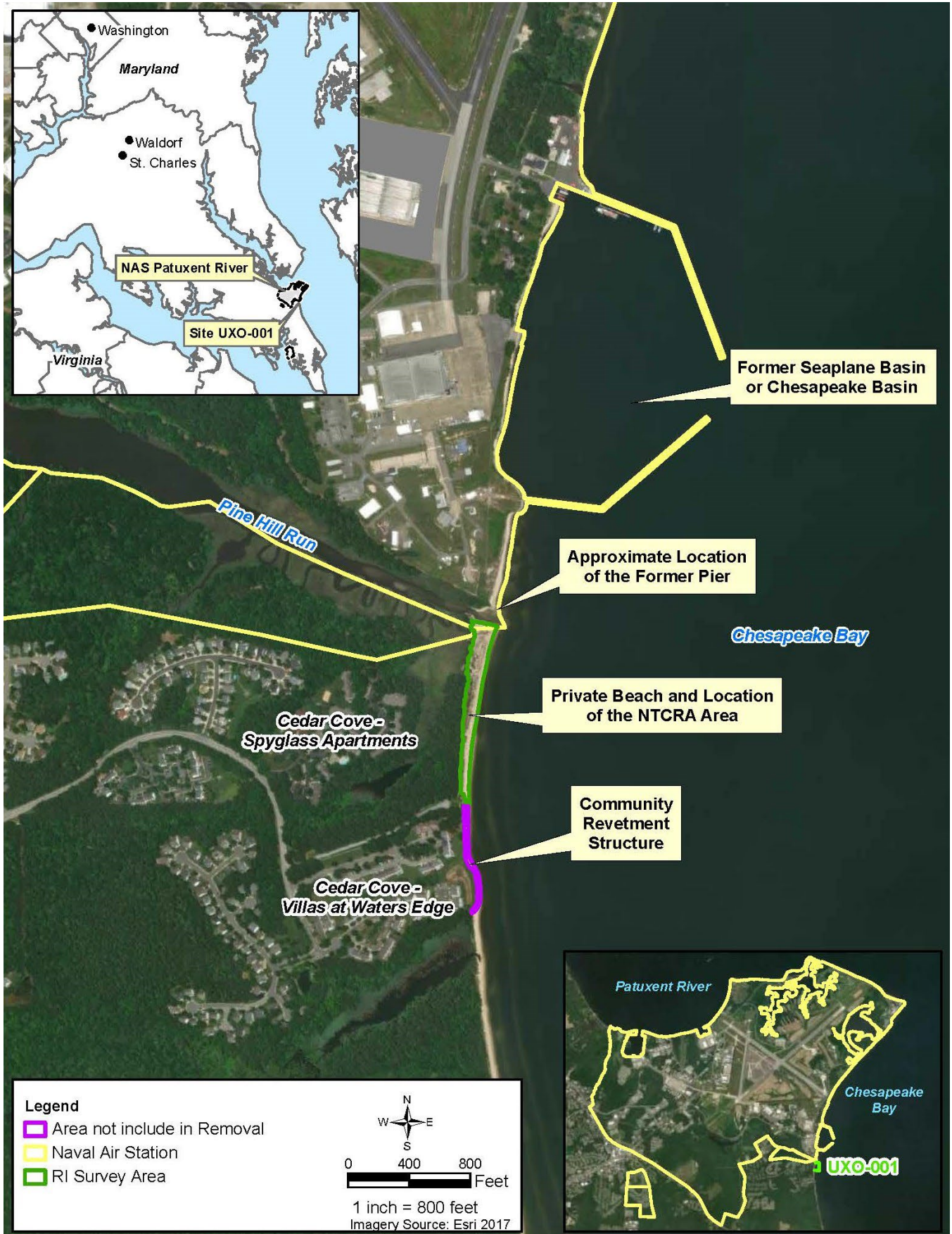
## 1 Introduction

NAS Patuxent River was listed on the **National Priorities List (NPL)** on June 30, 1994, and 46 sites were identified at the installation for inclusion in the **Environmental Restoration (ER) Program**. The U.S. Department of the Navy (Navy) and the **U.S. Environmental Protection Agency (USEPA)** signed a **Federal Facilities Agreement (FFA)** in December 2000 to establish roles/responsibilities of the Navy and USEPA for CERCLA cleanup activities. This PRAP is issued jointly by the Navy, the lead agency for site activities, and USEPA, the lead regulatory agency, in consultation with the **Maryland Department of the Environment (MDE)**, the support regulatory agency.

The RI/FS for MRS UXO-001 was completed under the Navy, Naval Facilities Engineering Systems Command (NAVFAC) Washington, and the document was approved by the Navy, USEPA, and MDE. The RI was an in-depth study designed to gather data needed to determine the potential extent of **munitions and explosives of concern (MEC)** and **material potentially presenting an explosive hazard (MPPEH)** at the site. During the FS process, remedial alternatives were evaluated to identify a preferred remedial alternative. This PRAP presents the main findings and general conclusions of the RI/FS for MRS UXO-001.

<sup>1</sup> All terms presented in **bold print** are defined in the glossary.

Figure 1. MRS UXO-001 Location





MRS UXO-001, which was referred to as Strike Beach in the FFA signed in December 2000 by the Navy and USEPA, is located south of the NAS Patuxent River installation fence and consists of a private beach along the Chesapeake Bay that is owned by the Cedar Cove Subdivision (**Figure 1**). No former range activities have been conducted at the site, but it is located adjacent and downgradient of historic munitions disposal areas at the former seaplane basin and a former pier located at NAS Patuxent River. Based on the munitions characterization efforts conducted during the RI, remedial alternatives were evaluated during the FS to address potential hazards associated with MEC and MPPEH for current and anticipated future land uses. The preferred remedial alternative for MRS UXO-001 was identified as “Institutional Controls” during the FS process.

This PRAP summarizes information contained in the RI/FS report regarding a number of surveys and previous munitions recovery sweeps at the historic munitions disposal areas, as well as details presented in the other documents referenced. These other documents are available in the **Administrative Record** file located online and at the public repositories for NAS Patuxent River (the pertinent documents and the Administrative Record locations are identified in Section 10, Community Participation, of this PRAP).

The Navy, USEPA, and MDE will jointly select the remedy for MRS UXO-001 after reviewing and evaluating all written and oral comments submitted during the 30-day **public comment period**. The Navy, USEPA, and MDE may alter the preferred remedial alternative or select another action altogether based on any new pertinent information or applicable public comments.

Public input is an important aspect of the remedy selection process for MRS UXO-001, and the public is encouraged to provide feedback on this PRAP. After the public comment period has ended and the submitted comments and information have been reviewed and considered, the Navy, in conjunction with USEPA and MDE, will document the final selected remedy for MRS UXO-001 in a **Record of Decision (ROD)**. Any comments or questions received during the public comment period will be documented in the **Responsiveness Summary** section of the ROD.

## 2 Site Description and Background

NAS Patuxent River is located at the confluence of the Patuxent River and Chesapeake Bay in St. Mary’s County, Maryland (**Figure 1**). Since its inception in 1942, NAS Patuxent River has been one of the main centers for testing naval aircraft and equipment for the Navy.

As stated, MRS UXO-001 is located south of the NAS Patuxent River installation fence and consists of a private beach along the Chesapeake Bay that is owned by the Cedar Cove Subdivision. The private beach is bounded to the north by Pine Hill Run, which drains from within NAS Patuxent River to the Chesapeake Bay; to the south by a community revetment structure (stone revetment for erosion control); to the east by the low tide level of the Chesapeake Bay; and to the west by a wooded area (**Figure 1**). The adjacent residential community of Cedar Cove has an apartment complex and approximately 200 homes. Per an October 2014 Administrative Change by the Navy, the near-shore water portion of MRS UXO-001 was incorporated into MRS UXO-003, Former Water Ranges, and will be investigated as part of these historic ranges associated with NAS Patuxent River. More specifically, the water portion of MRS UXO-001 is part of the machine gun firing fan used by the historic Machine Gun Range at the former seaplane Chesapeake Basin from approximately 1945 and until the 1970s.

MRS UXO-001 consists of silty sand with a gentle slope eastward toward the Chesapeake Bay. The private beach is used for recreational activities. St. Mary’s County constructed a number of erosion control measures at the beach, including a stone revetment at the southern end that was expanded after 2010, and a series of reinforced concrete pipe sections along the shoreline (some buried in the sand, some exposed at the surface).

As stated, no former range activities have been conducted at MRS UXO-001. From approximately 1954 to 1974, NAS Patuxent River personnel discarded a variety of excess munitions, both live and inert, into the Chesapeake Bay. At that time, it was standard practice to dispose of old munitions into open water. This practice was halted at NAS Patuxent River in 1974. Ordnance was discarded into the Chesapeake Bay from the following two locations at NAS Patuxent River:

- Along the seawalls of the former seaplane basin constructed in 1942 (the “Chesapeake Basin” as shown on **Figure 1**) that extends approximately 1,200 to 1,300 feet from the shore into the Chesapeake Bay (depending on the shoreline). Based on the locations where discarded munitions have been recovered, the majority of the munitions were discarded inside the former seaplane basin.
- A pier (no longer exists) located approximately 700 feet south of the former seaplane basin. The pier extended approximately 125 feet into the Chesapeake Bay near the current installation fence on the north side of Pine Hill Run (**Figure 1**). Disposal of excess munitions from this location is anecdotal (Lateulere and LaFleur, 1992).

Over time, the munitions items disposed into the water were moved by tides and currents and eventually some items started washing up on the shore both within and beyond the limits of the

original, known disposal areas. NAS Patuxent River has responded to the appearance of munitions and debris along the shoreline in and around the historic munitions disposal areas for over 30 years. From 1977 to 1993, the Navy conducted periodic surveys and cleanup activities of the former seaplane basin and nearby beaches, including sweeps by divers as far as 300 feet offshore. These surveys and cleanup activities are summarized in **Table 1**.

## Historical Activities

There have been a number of surveys and recovery operations conducted by Navy Explosive Ordnance Disposal (EOD) teams at the historic munitions disposal areas. **Table 1** presents a chronological list that briefly summarizes the purpose, scope, and results of these surveys, sweeps, and investigations beginning with the four major munitions recovery efforts conducted by EOD personnel in 1977, 1979, 1987, and 1991.

*Table 1. Summary of Historical Surveys, Sweeps, and Investigations*

Year/Activity	Key Findings
1977 Survey/Sweep	In May and June 1977, EOD divers swept the former seaplane basin including both sides of the southern seawall within 100 feet of the shore and within 30 feet of the seawall. Larger items were recovered inside the basin and small arms ammunition was recovered outside the basin. The 1977 sweep also included a survey dive along both sides of the northern seawall with no munitions items found (EOD Detachment, Dahlgren Laboratory, 1977).
1979 Survey/Sweep	In January 1979, EOD divers using a Mark 9 ordnance locator surveyed along the shoreline inside the former seaplane basin and within 55 feet along both sides of the seawalls (inside and outside the basin). Items were not removed during this effort. All items were observed within 35 feet of the seawalls, with most of the items along the southern seawall up to 500 feet from the shore, where the seawall turns. Primarily observed items were small arms ammunition along the shoreline and outside the southern seawall, with larger items inside the former basin. Items observed along the shoreline inside the basin were within 30 feet of the shore. The divers also performed circular searches (50-foot radius) throughout the inside of the basin with no items observed. The shoreline north of the basin was searched with no items observed (EOD Group Two, Detachment Dahlgren, 1979). In July and August 1979, EOD divers swept the entire former seaplane basin up to 35 feet from the inboard and outboard sides of the seawalls and within 30 feet of the shore inside the basin (NAS Patuxent River, 1979). The majority of larger items were recovered in the first two sweeps in May and June 1977. Larger items (mostly inert) were recovered inside the basin and small arms ammunition was recovered outside the basin in July and August 1979.
1987 Survey/Sweep	In September 1987, EOD divers swept the inboard and outboard sides of the southern seawall, and an area extending approximately 2,200 feet south of Pine Hill Run from the shore out into the Chesapeake Bay approximately as far as the seawalls. Approximately 1,100 pounds of ordnance were recovered, including rocket motors and warheads (up to 5-inch), 20-millimeter (mm) cartridges, flares, and small arms ammunition. The record does not describe where the items were found in the search area (EOD Group Two, Detachment Dahlgren, 1987; NAS Patuxent River, 1987).
1991 Survey/Sweep	In July 1991, EOD personnel swept an approximately one-half-mile-long stretch of beach south of the former seaplane basin from the high-water mark to a water depth of 4 feet at low tide. Munitions items recovered were similar to the 1987 EOD sweep and included 2.75-inch rocket motors, a 2.75-inch rocket warhead, a 3-inch projectile (unknown), 5-inch projectiles (unknown), 20-mm projectiles, flares/signal devices, and small arms ammunition. All items were recovered along the fence line in the water (EOD Group Two, Detachment Dahlgren, 1991).

Year/Activity	Key Findings
1985 and 1990 Utility Clearances	EOD personnel conducted limited clearances for the installation of a sewer line in 1985 and an underwater fiber optic cable in 1990. Both of these clearances occurred in the area of Pine Hill Run (Lateulere and LaFleur, 1992). During the 1990 clearance for the underwater cable, available files indicate that a small amount of small arms ammunition was recovered along with two Zuni 5-inch aerial rockets (Garrison, 1990).
1985 through 1991 Biannual Sweeps	It was reported that a program was started in 1985 by Strike Aircraft Ordnance personnel for biannual sweeps of the beach area below the seawall (Mowbray, 1992a). Historical records have confirmed details of the sweeps conducted by Navy personnel in 1987 and 1991, but no records of sweeps in 1985 and 1989 were identified. However, the list of items recovered and shipped to Dahlgren for disposal after the 1991 sweep included "Items Previously Held by NAS Weapons Since at Least 890731" (EOD Group Two, Detachment Dahlgren, 1991), which suggests either a sweep was conducted in 1989, or storage of items previously recovered during regular visual inspections of the beach.
Mid-1980s through Mid-1990s Visual Inspections	From 1984 or 1985 to the mid-1990s (or possibly later), Strike Directorate personnel conducted twice-weekly visual inspections at low tide and after severe storms on the beaches south of the former seaplane basin including walking outside the station fence and even further off station property down to the residential area (Mowbray, 1992a). If present, small caliber ordnance was recovered during these inspections; larger ordnance, if any, required a call to others for help (Mowbray, 1992a). Small arms ammunition items recovered in the 1980s beach inspections were accumulated and periodically shipped by barge to Bloodsworth Island for disposal (Lateulere and LaFleur, 1992; Smith, 1994; Mowbray, 1993a; EOD Group Two, Detachment Dahlgren, 1985; EOD Group Two, Detachment Dahlgren, 1987).
1992 Discoveries	In 1992, a member of the Cedar Cove Homeowners Association (HOA) contacted NAS Patuxent River about small arms ammunition washing ashore on the community's private beach and reported this had occurred a number of times. Around 1990, a young person brought home a 20-mm projectile from the beach; this was reported to the Navy in 1992 and the item was subsequently collected by Navy EOD (Mowbray, 1992b). Base personnel followed up with a phone call and attended a board meeting of the Cedar Cove HOA to discuss the Navy's past cleanup efforts and future activities. In 1993, the Navy briefed the Cedar Cove HOA general membership about the issue and the Navy's past cleanup efforts, as well as plans to move the fence line from the edge of the former seaplane basin south to the property line and to continue sweeps of the beach (Mowbray, 1993b). NAS Patuxent River posted a No Trespassing sign facing the beach on the outside of the fence line approximately 400 feet south of the basin warning of the possibility for unexploded ordnance items.
1996 Levee Construction	In 1996, an approximately 300-foot-long rock levee was installed by the Navy along the southern side of the Pine Hill Run outlet to help control the shifting of the stream's outlet and to compartmentalize the beach between the stream and the former seaplane basin. The eastern end of the levee extends into the Chesapeake Bay approximately 50 feet from the shore.
2010 through 2013 Site Inspection	<p>In 2010, a Site Inspection (SI) was performed for the private beach area (CH2M, 2013). The objective of the SI was to perform a geophysical investigation to determine the potential presence or absence of MEC and MPPEH along the privately-owned beach and in (or on) the underwater sediment extending approximately 600 feet from the shore. No munitions-related items were identified on the surface or within crevices between the riprap on the beach. A total of 721 subsurface targets were identified above the targeting threshold of 3 millivolts (mV). In general, anomaly density was lowest in the northern portion of the survey area, with large areas having few to no anomalies. At least 145 anomalies (approximately 20 percent) were visible non-munitions-related items at the surface. The remaining 576 anomalies potentially represented subsurface MEC, although many of these anomalies were located in the vicinity of the non-munitions-related erosion control structures and debris in the southern area of the private beach.</p> <p>The 2010 SI also included DGM of an approximately 35-acre underwater area adjacent to the beach, between the high tide water mark and extending approximately 600 feet into the Chesapeake Bay. The marine DGM survey identified a total of 375 anomalies. This included targets interpreted as having the appropriate size for munitions previously removed in the area. It was determined that more metallic items may be present in the area than those detected, as MEC items previously removed were as small as 20-mm projectiles and these items would typically be detected only if a geophysical sensor were within approximately 0.5 to 0.75 meter of the item (depending on its orientation), which was not the case for the marine survey.</p> <p>The SI Report (CH2M, 2013) concluded that the results of the historical and geophysical investigations provided sufficient basis for proceeding to the RI phase to determine if detected targets were munitions. The report noted that MRS UXO-001 is located in a dynamic environment; changes to the site may occur through weather events, tidal influence from the Chesapeake Bay, and human activity that may result in changes in the anomaly locations (CH2M, 2013). Therefore, the SI report concluded that the SI data should be considered a snap-shot of conditions that existed at the time of the investigation.</p>

Year/Activity	Key Findings
2018 Engineering Evaluation/Cost Analysis and Action Memorandum	Prior to the RI, the Navy completed an Engineering Evaluation/Cost Analysis and Action Memorandum for MRS UXO-001. Because the private beach is not owned by the Navy, extensive community coordination efforts occurred prior to mobilization for the RI field efforts (October 2018 DGM survey followed by November 2018 NTCRA), including obtaining a right of entry from the property owner and a public meeting in September 2018 (NAVFAC, 2018).
2018 Remedial Investigation (DGM Survey)	Based on the results of the 2010 SI DGM surveys and the potential presence of MEC and MPPEH, RI field efforts were conducted at MRS UXO-001 in October 2018 in accordance with the CERCLA process. Geophysical operations included the following tasks: establishment of an Instrument Verification Strip (IVS) and acquisition of geophysical data at the IVS to confirm system capabilities and proper operation, quality control (QC) seeding, DGM, data processing, and anomaly selection. The DGM survey indicated the presence of 96 subsurface geophysical anomalies potentially representing MEC, four QC seeds, and five saturated response areas (SRAs) in which individual anomalies could not be reliably selected as a result of the high density or wide high amplitude response area of anomalies. In addition, there were five data gap areas that could not be accessed with the DGM equipment due to the presence of concrete erosion barriers, picnic tables, fire rings, a fence, and vegetation (CH2M, 2022).
2018 Remedial Investigation (NTCRA)	Based on the results of the RI DGM survey, a NTCRA was conducted in November 2018 to remove the 96 subsurface geophysical anomalies and four QC seeds identified in October 2018, and to complete a “mag and dig” of anomalies in the five SRAs and five data gap areas. NTCRA results at the 100 DGM anomalies showed no munitions-related items were identified. The anomalies consisted of QC seeds and non-munitions-related debris including nails, wire, scrap metal and a land survey pin. Two QC seeds were no longer present, which was attributed to erosion caused by a hurricane that impacted the shoreline after the October 2018 DGM survey and before the November 2018 NTCRA. As documented in the After Action Report (CH2M, 2019) and Construction Closeout Report (CH2M, 2020), no munitions-related items were identified; MEC and MPPEH were not encountered (CH2M, 2022).

### 3 Site Characteristics

This section presents the pertinent physical characteristics of NAS Patuxent River (geography, topography, climate, geology, hydrology, and hydrogeology), along with an indication of the current/future land use at MRS UXO-001.

Most of NAS Patuxent River is a flat plain that protrudes into the Chesapeake Bay at the mouth of the Patuxent River. Ground surface elevations in the lowland areas may be as high as 40 feet above mean sea level (msl) but are typically less than 20 feet above msl. In the southwestern part of the installation, the land rises to an upland plateau, where ground surface elevations range from 40 to 120 feet above msl.

The climate of St. Mary’s County is moderated by its proximity to the Chesapeake Bay and the Atlantic Ocean. The climate is predominantly continental and is characterized by seasonal and daily fluctuations. According to the Maryland State Office of Climatology, the average winter temperature is 36.6 degrees Fahrenheit (°F), whereas the average summer temperature is 74.9 °F. In St. Mary’s County, the warmest and coldest months of the year are July (mean temperature of 77 °F) and January (mean temperature of 35.5 °F), respectively.

Annual precipitation averages 42 inches. July is typically the wettest month of the year, averaging 4.8 inches of precipitation. October is the driest month of the year, averaging 2.7 inches of precipitation. In general, precipitation is distributed evenly throughout the year.

NAS Patuxent River is in the Coastal Plain physiographic province, approximately 50 miles southeast of the Piedmont physiographic province. The Coastal Plain sediments consist of a thick sequence of unconsolidated sand, clay, and gravel that dips gently (less than 1 degree) to the east and southeast (Fred C. Hart Associates, Inc., 1984). The thickness of the sedimentary units varies from approximately 2,000 feet in the northwestern part of St. Mary’s County to 3,000 feet in the southeastern area of the county. Near NAS Patuxent River, the unconsolidated Coastal Plain sediments overlie crystalline rocks.

The Patuxent River Basin occupies approximately 930 square miles and receives drainage from seven counties in Maryland. Near NAS Patuxent River, the river is estuarine, so tidal action overrides stream flow and is a major influence on river stage and stream velocity. The drainage divide between the Potomac River and Patuxent River closely follows Route 235, which borders NAS Patuxent River to the southwest. Most streams draining Patuxent River



originate on the northeast side of Route 235 and drain into NAS Patuxent River. Streams that originate on NAS Patuxent River stay within the installation boundaries until draining into Patuxent River or the Chesapeake Bay.

Surface drainage at NAS Patuxent River is to short streams that dissect the upland plateau. The streams occupy small valleys that descend rapidly toward the Patuxent River and the Chesapeake Bay. Flow in these streams typically is intermittent, but several have continuous flow and discharge into ponds, the Patuxent River, or the Chesapeake Bay. The largest stream at the installation is Pine Hill Run, which flows along the upland plateau. Both upland and lowland habitats drain Pine Hill Run, which is shallow and drains toward the Chesapeake Bay (Fred C. Hart Associates, Inc., 1984).

The regional hydrogeological system of the Coastal Plain near NAS Patuxent River consists of several **aquifers** within the geologic units previously discussed. From shallowest to deepest, the aquifers of primary interest with respect to NAS Patuxent River are the surficial aquifer, the Piney Point-Nanjemoy aquifer, the Aquia aquifer, and the Patapsco aquifer. The surficial (water table) aquifer, the shallowest aquifer beneath NAS Patuxent River, occurs in the Lowland deposits (i.e., clay, silt, sand, and gravel), is unconfined, and ranges in thickness from 10 to 100 feet (U.S. Geological Survey [USGS], 2007). The St. Mary's Formation, as one formation of the low-permeability Chesapeake Group, functions primarily as a confining unit underlying the surficial aquifer. This confining unit is approximately 210 to 250 feet thick (USGS, 2007). The Piney Point-Nanjemoy, Aquia, and Upper Patapsco aquifers are deeper, confined aquifers below the St. Mary's Formation (Fred C. Hart Associates, Inc., 1984). The Aquia and Patapsco aquifers are the primary source of potable water for NAS Patuxent River and surrounding areas (Klohe and Feehley, 2001).

Groundwater from the surficial aquifer discharges to surface water bodies, including ponds, streams, the Patuxent River, and the Chesapeake Bay. Groundwater flow from the surficial aquifer across the installation is predominately towards the Patuxent River and the Chesapeake Bay and away from facility residences and businesses. The surficial aquifer is recharged by precipitation and infiltration. The surficial aquifer is not used by NAS Patuxent River nor has it been permitted for drinking water use by the St. Mary's County Health Department since 1976 (Rose, 1998).

MRS UXO-001, located south of NAS Patuxent River, is comprised of a private beach owned by the Cedar Cove Subdivision. The beach area is currently used for recreational activities by residents of the adjacent community, and it is bounded to the north by Pine Hill Run, which drains into the Chesapeake Bay; to the south by a community revetment structure (stone revetment for erosion control); to the east by the low tide level of the Chesapeake Bay; and to the west by a wooded area. Future land use of the site is expected to be the same as current land use.

## 4 Summary of Site Risks

The risks to human health and the environment is the potential for unintentional contact with discarded military munitions present at the private beach resulting from historical disposal operations at NAS Patuxent River immediately to the north. Although originally disposed of offshore to the north, it cannot be ruled out that discarded military munitions may be present on or near the beach surface and subsurface.

The only munitions item recovered from the private beach area was a 20-mm projectile in or about 1990. The types of MEC and MPPEH previously recovered near the private beach include 20-mm projectiles, 2.75-inch rocket motors, 2.75-inch rocket warheads, 2.75-inch fuel inserts, 3-inch projectiles (unknown), 4-inch rocket motors, 5-inch projectiles (unknown), 5-inch rocket warheads, and Zuni 5-inch rocket motors. The other items listed are based on items recovered during EOD sweeps in 1987, 1990, 1991, and 1993 in areas south of the former seaplane basin. In 1987 and 1991, the Navy conducted sweeps that included the private beach. A review of records from the 1987 EOD sweep confirms no munitions items were found at the private beach. The items recovered during the 1991 EOD sweep were all found near the mouth of Pine Hill Run. No items were recovered at the private beach. Historically, large bombs have been recovered from the historic munitions disposal area, but it is unlikely and not expected that the large MEC items would have been transported from the disposal area to the private beach; in fact, large MEC items have not been encountered outside of the historic munitions disposal area during the numerous sweeps.

The exposure route for MEC and/or MPPEH to potential human receptors at the site is direct exposure to discarded military munitions at the

private beach resulting from historical disposal operations at NAS Patuxent River immediately to the north. Although it is unlikely that munitions-related items remain at MRS UXO-001 since none were identified during the RI and NTCRA, it cannot be ruled out that discarded military munitions may be present on or near the beach surface and subsurface.

## 5 Scope/Role of Response Actions

The response action is intended to be the final remedy of MRS UXO-001, and it does not include nor affect other sites under CERCLA. In cooperation with USEPA and MDE, and in accordance with applicable guidance and consultation, the Navy performed investigations at MRS UXO-001 to evaluate the potential extent of MEC and MPPEH and to assess the potential risks to human health. As stated, human health risks would come from direct exposure to discarded military munitions. Although results of these investigations indicate it is highly unlikely that MEC and MPPEH are present at the private beach resulting from historical disposal operations immediately to the north, to address any uncertainty the Navy proposes the most conservative approach to ensure protection of human health and assumes the potential for MEC and MPPEH to be present. Therefore, the Navy evaluated remedial alternatives to address the potential for any remaining MEC and MPPEH at the site. The preferred remedial alternative presented in this PRAP is intended to address explosive hazards and provide institutional controls within the site boundaries.

## 6 Remedial Action Objectives

The **Remedial Action Objectives (RAOs)** consist of specific goals for protecting human health, and they also reflect the potential for MEC and MPPEH to remain at MRS UXO-001. Based on the current and potential future land uses, RAOs were developed to be protective of current and potential future receptors, in accordance with the current land use and potential future land use, when evaluating potential remedial alternatives. The RAOs for MRS UXO-001 are as follows:

- Reduce the explosive hazard associated with MEC and MPPEH compatible with the current and anticipated future land uses.

- Reduce the potential for exposure of human receptors to MEC and MPPEH.

## 7 Summary of Remedial Alternatives

This section presents a summary of the two remedial alternatives evaluated to meet the RAOs for MRS UXO-001. These remedial alternatives, which were developed by assembling remedial technologies and representative process options after the initial screening process, were based on site-specific considerations primarily related to the nature of MEC and MPPEH observed at MRS UXO-001, as well as the site physical characteristics. A detailed analysis of the remedial alternatives is presented in the RI/FS report (CH2M, 2022).

### Alternative 1 – No Further Action

The “No Further Action” alternative, required by the NCP, consists of performing no remedial action and is the baseline against which the effectiveness of the other remedial alternative was compared. Under this alternative, no control or remediation would be implemented at the site. It is not a viable option considered for this site.

### Alternative 2 – Institutional Controls

Alternative 2 involves using institutional controls (ICs) at the private beach to provide information to those accessing the beach via signage, perform 5-year reviews, and conduct community outreach meetings to include 3R training for munitions (**Figure 2**). The major components and assumptions for Alternative 2 are:

ICs will be implemented at the private beach to inform residents and visitors of the potential hazard of the presence of MEC and MPPEH:

- The sign that currently exists within the fence line of NAS Patuxent River will remain until the remedy is complete.
- 5-year reviews will be conducted for 30 years; the process will include a letter to be sent to the Cedar Cove HOA that states the Navy will be notified if any actions are taken by the Cedar Cove community regarding the stone revetment at the southern end of the private beach. This area was not included in the 2018 DGM and 2018 NTCRA efforts due to the stone revetment overlaying this area.



- Community outreach meetings for 3Rs training will be scheduled, with public notices being published in the local newspaper to notify residents of the meeting dates and times

Figure 2. 3Rs of Explosives Safety



**Recognize** – when you may have come across a munition, and that munitions are dangerous.

**Retreat** – do not approach, touch, move, or disturb a suspected munition, but carefully leave the area.

**Report** – immediately what you saw and where you saw it to local law enforcement – call 9-1-1.

Table 2. Comparison of Remedial Alternatives

Criteria	Alternative 1	Alternative 2
	No Further Action	Institutional Controls
<b>THRESHOLD CRITERIA</b>		
Overall Protection of Human Health and the Environment	X	✓
Compliance with ARARs	X	✓
<b>BALANCING CRITERIA</b>		
Long-term Effectiveness and Permanence	○	●
Reduction of Toxicity, Mobility, or Volume through Treatment	○	◐
Short-term Effectiveness	○	●
Implementability	○	●
Cost (Total Present Value)	\$0	\$175,000
<b>MODIFYING CRITERIA</b>		
State Acceptance	To Be Determined	To Be Determined
Community Acceptance	To Be Determined	To Be Determined

✓ - threshold criterion met    X - threshold criterion not met    ● - excellent    ◐ - good    ◑ - satisfactory    ◒ - poor    ○ - not met

## 8 Evaluation of Remedial Alternatives

The NCP outlines the approach for comparing remedial alternatives using nine **evaluation criteria**: two threshold criteria (must be met) and five balancing criteria form the basis of the comparison (see **Table 2** for MRS UXO-001), and two modifying criteria are included after public input to facilitate a comparison of the relative performance of the alternatives and to provide a means to identify their advantages and disadvantages. The nine criteria are:

Threshold:

1. Overall protection of human health and the environment
2. Compliance with **Applicable or Relevant and Appropriate Requirements (ARARs)**

Balancing:

3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility, or volume through treatment
5. Short-term effectiveness
6. Implementability
7. Cost

Modifying:

8. State acceptance
9. Community acceptance

The remedial alternatives presented in Section 7 were evaluated in a detailed analysis during the RI/FS relative to the threshold and balancing criteria to help select a preferred remedial alternative. Modifying criteria (i.e., state acceptance and community acceptance) will be evaluated upon receipt of the public's comments on this PRAP after the 30-day public comment period. **Table 2** summarizes a qualitative assessment of how each alternative satisfies the evaluation criteria, and how the alternatives compare to each other based on the criteria. The following text provides explanation of the specific ARARs for MRS UXO-001 and further evaluation of the alternatives to overall protection of human health and the environment, and compliance with the ARARs.

A detailed list of ARARs for MRS UXO-001 is included in the RI/FS report (CH2M, 2022). ARARs can be action-specific, chemical-specific, or location-specific. The action-specific ARARs for MRS UXO-001 include munitions management via public awareness and notification. The location-specific ARARs for MRS UXO-001 include coastal zone and migratory bird considerations. There are no chemical-specific ARARs for MRS UXO-001. Alternative 1 does not meet the RAOs nor the threshold criteria of compliance with ARARs and protection of human health and the environment; therefore, it will not be discussed further in this analysis. Alternative 2 meets the RAOs and ARARs and would provide protection from future risks.

Alternative 2 is the only viable option for MRS UXO-001. This alternative provides protection of human health; complies with ARARs; achieves good short-term and long-term effectiveness; is easy to implement; and is the most cost effective.

## 9 Preferred Remedial Alternative

The preferred remedial alternative at MRS UXO-001 is Alternative 2 - Institutional Controls. This alternative is proposed because it protects human receptors, causes little impact to the environment, and is cost-effective.

The preferred remedial alternative meets the threshold criteria and provides acceptable results with respect to the balancing criteria. The Navy expects the preferred remedial alternative to satisfy the following statutory requirements of CERCLA §121(b): (1) to be protective of human health and the environment; (2) to comply with ARARs (or justify a

waiver); (3) to be cost-effective; (4) to utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) to satisfy the preference for treatment as a principle element, or explain why the preference for treatment will not be met. The preferred remedial alternative can change in response to public comments or new information. The Navy and USEPA will select the final remedy for MRS UXO-001; regulatory stakeholders (USEPA and MDE) will provide final concurrence with the selected remedy, following review of all comments received during the public comment period.

As shown in **Table 2**, the estimated **total present worth cost** for Alternative 2 - Institutional Controls is approximately \$175,000, which represents an amount expected to be within the -30% to +50% accuracy range of the actual project costs.

## 10 Community Participation

Community participation is a key part of the decision-making process for MRS UXO-001. Local individuals and anyone interested in the CERCLA process at MRS UXO-001 are encouraged to provide input on the PRAP for this site by using the public comment period to identify any issues and concerns. The Navy will summarize and respond to public comments and all submitted information, as documented in the Responsiveness Summary section of the ROD.

### Public Comment Period

The public comment period provides the public time to review and comment on the information provided in the PRAP. The 30-day public comment period will begin February 1, 2023, and end March 2, 2023. The public may use a public computer at the St. Mary's County Library to access the public website, PRAP, and other technical reports for MRS UXO-001.

### Public Meeting

A **public meeting** will be held on March 8, 2023, at the Frank Knox Employee Development Center, Building 2189, Room 100, located adjacent to NAS Patuxent River Gate 2. Anyone interested in MRS UXO-001 is invited to attend this meeting to learn more about the preferred remedial alternative for the site (Alternative 2 - Institutional Controls), ask questions, and submit comments.

To submit written comments or information regarding MRS UXO-001 Historic Munitions Disposal Area, please contact one of the following representatives:

**Public Affairs Officer, NAS Patuxent River**

Attn: Mr. Patrick Gordon  
Public Affairs Officer  
22268 Cedar Point Road  
Building 409  
Patuxent River, MD 20670-1154  
301-757-3343

**U.S. Environmental Protection Agency**

Attn: Ms. Jenna O'Brien  
USEPA Region III, Code 3SD11  
1600 John F. Kennedy Boulevard  
Philadelphia, PA 19103-2029  
215-814-3396

**Maryland Department of the Environment**

Attn: Mrs. Jenny Herman  
Land Restoration Program/Land and Materials  
Administration  
1800 Washington Boulevard, Suite 625  
Baltimore, MD 21230-1719  
410-537-3319

Comments submitted in writing must be postmarked no later than March 9, 2023. Based on comments or new information received, the Navy, USEPA, and MDE may modify the PRAP.

## Record of Decision

Following the public comment period, the Navy, USEPA, and MDE will decide whether the preferred remedial alternative should be modified or whether another alternative should be selected for MRS UXO-001. If the modifications fundamentally change the PRAP, then additional public comment may be solicited. If there is no modification needed to the PRAP, then the Navy, USEPA, and MDE will prepare and sign a ROD. All comments received during the public meeting and public comment period will be summarized, and responses will be provided in the Responsiveness Summary section of the ROD. The ROD is the document that will present the selected remedy and will be included in the Administrative Record file.

## Administrative Record

The Administrative Record contains all the information used to select the preferred remedy for MRS UXO-001 and provides important background and site investigation information in more detail

than is presented in this PRAP. The following is a list of the primary documents in the Administrative Record where pertinent site-related information can be obtained:

- CH2M HILL, Inc. (CH2M). 2013. *Final Site Inspection Report for Area of Concern UXO-001 – Historic Munitions Disposal Area, Naval Air Station Patuxent River, St. Mary's County, Maryland*. April.
- CH2M HILL, Inc. (CH2M). 2019. *After Action Report, UXO 001 Historic Munitions Disposal Area Removal Action, Naval Air Station Patuxent River, St. Mary's County, Maryland*. December.
- CH2M HILL, Inc. (CH2M). 2020. *Construction Closeout Report, UXO-001 Historic Munitions Disposal Area Removal Action, Naval Air Station Patuxent River, St. Mary's County, Maryland*. January.
- CH2M HILL, Inc. (CH2M). 2022. *Final Remedial Investigation/Feasibility Study, Munitions Response Site (MRS) UXO-001 Historic Munitions Disposal Area, Naval Air Station Patuxent River, St. Mary's County, Maryland*. March.
- Explosive Ordnance Disposal (EOD) Detachment, Naval Surface Weapons Center, Dahlgren Laboratory. 1977. Memo to Naval Air Test Center, Patuxent River, "Ordnance Recovery and Inert Certification Operation Report." June 9.
- Explosive Ordnance Disposal (EOD) Group Two, Detachment Dahlgren. 1979. Memo to NAS Patuxent River, "NAS Patuxent River, MD Ordnance Clearance Project; report of." October 29.
- Explosive Ordnance Disposal (EOD) Group Two, Detachment Dahlgren. 1985. Memo to Naval Sea Systems Command, "Disposal of Hazardous Small Arms Ammunition." December 16.
- Explosive Ordnance Disposal (EOD) Group Two, Detachment Dahlgren. 1987. Memo to NAS Patuxent River, "Ordnance Survey and Clearance at Strike Area, NAS Patuxent River, Maryland." November 5.
- Explosive Ordnance Disposal (EOD) Group Two, Detachment Dahlgren. 1991. Memo to NAS Patuxent River, "Ordnance Clearance at Strike Area, NAS Patuxent River, Maryland." July 22.



- Fred C. Hart Associates, Inc. 1984. *Initial Assessment Study, Naval Air Station, Patuxent River, Maryland.*
- Garrison, Chuck, CHESDIV. 1990. Untitled summary of clearance conducted for proposed cable route. February.
- Karson, Lieutenant John J. 1988. Memo to NAS Patuxent River, "Informal Investigation into the Disposal of Ordnance in the Vicinity of the Chesapeake Bay Seaplane Basin." March 16.
- Klohe, C.A. and C.E. Feehley. 2001. "Hydrogeology and Ground-Water Quality of the Piney-Point Nanjemoy, and Aquia Aquifers, Naval Air Station Patuxent River and Webster Outlying Field, St. Mary's County, Maryland." U.S. Geological Survey Water Resources Investigation Report 01-4029.
- Lateulere, Chuck, and Daniel LaFleur, Naval Ordnance Station Indian Head, Ordnance Environmental Support Office. 1992. *Draft Trip Report.* December 4.
- Mowbray, Ken (NAS Patuxent River Public Works Environmental). 1992a. Memo, "IR Site 10 Information and Recommendations." October 23.
- Mowbray, Ken (NAS Patuxent River Public Works Environmental). 1992b. Record of Telephone conversation with Patrick Cohi (President, Cedar Cove Homeowners Association). October 30.
- Mowbray, Ken (NAS Patuxent River Public Works Environmental). 1993a. Memo, "Ordnance Sweep at Strike Beach." October 22.
- Mowbray, Ken (NAS Patuxent River Public Works Environmental). 1993b. Memo, "Strike Beach Ordnance." April 30.
- Naval Air Station (NAS) Patuxent River. 1979. Memo to Commander EOD Group Two, "NAS Patuxent River Maryland Ordnance Clearance Project; report of." September 17.
- Naval Air Station (NAS) Patuxent River. 1987. Ordnance Survey and Clearance at Strike Area, NAS Patuxent River, Maryland. November 5.
- Naval Facilities Engineering Systems Command (NAVFAC) Washington. 2018. *Action Memorandum for Munitions Response Site UXO-001 Historic Munitions Disposal Area, Naval Air*

*Station Patuxent River, St. Mary's County, Maryland.* March.

- Rose. 1998. Letter to Rick Tarr (NAS Patuxent River Public Works) from Ann Rose, St. Mary's County Health Department, RE: Shallow well use near Area B Fishing Point, December 1, 1998.
- Smith, Bayly. 1994. "Site 10 Strike Beach Ordnance Disposal" (site summary). March 11.
- U.S. Geological Survey (USGS). 2007. *Hydrogeology of the Piney Point-Nanjemoy, Aquia, and Upper Patapsco Aquifers, Naval Air Station Patuxent River and Webster Outlying Field, St. Mary's County, Maryland, 2000-06.* Scientific Investigation Report 2006-5266.

The PRAP and final technical reports are available to the public at the following locations:

St. Mary's County Public Library,  
Lexington Park Branch  
21677 FDR Boulevard  
Lexington Park, MD 20653  
301-863-8188

Hours are:

Monday-Thursday: 9:00 a.m.-8:00 p.m.

Friday and Saturday: 9:00 a.m.-5:00 p.m.

Sunday: 1:00 p.m. – 5:00 p.m.

NAS Patuxent River ER Program Public Website:

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

For more information about the ER Program, please contact:

Public Affairs Officer – NAS Patuxent River

Attn: Mr. Patrick Gordon

22268 Cedar Point Road

Building 409

Patuxent River, MD 20670-1154

Telephone: 301-757-3343

## 11

## Glossary of Terms

**Administrative Record:** A record made available to the public that includes all information considered and relied on in the selection of a remedy for a site.

**ARAR – Applicable or Relevant and Appropriate Requirements:** Federal or state environmental rules and regulations. ARARs can be classified as one of three types: chemical-specific for the contaminants in question; location-specific for the type of environment in which the site is located (e.g.,

wetland, floodplain); and action-specific for the particular remedial actions contemplated.

**Aquifer:** Rock or sediment in a geologic formation, group of formations, or part of a formation that is saturated with water and sufficiently permeable to conduct groundwater and yield economically sufficient quantities of water to wells or springs.

**CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act:** CERCLA (1980), also known as the Superfund Law, as amended by the Superfund Amendments and Reauthorization Act of 1986, provides the authority and procedures for responding to releases of hazardous substances, pollutants, and contaminants from inactive hazardous waste disposal sites.

**DGM – Digital Geophysical Mapping:** Technology used to identify subsurface anomalies that may result from buried MEC. Resulting data are used to characterize the nature and extent of MEC during remedial investigations or guide follow-on intrusive excavations during removal actions.

**ER Program – Environmental Restoration Program:** The term used to describe the Navy's environmental program.

**Evaluation Criteria:** The NCP describes nine objectives or criteria against which each remedial alternative must be assessed for the comparative analysis of alternatives. The nine criteria are: overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost; state acceptance; and community acceptance.

**FFA – Federal Facilities Agreement:** A legal agreement between the Navy, the USEPA, and in some cases the state agency, which governs the administrative process for the cleanup under CERCLA. The FFA establishes roles and responsibilities, outlines working relationships between these parties, and allows the USEPA and the state to review all work in support of remedy selection at an NPL site.

**FS – Feasibility Study:** The study that develops and analyzes the potential cleanup alternatives for a site. The feasibility study usually recommends selection of a cost-effective alternative.

**MEC – munitions and explosives of concern:** Specific categories of military munitions that may

pose unique explosives safety risks, such as unexploded ordnance present in high enough concentrations to pose an explosive hazard.

**MDE – Maryland Department of the Environment:** The Maryland state government agency responsible for enforcing State environmental regulations.

**MPPEH – material potentially presenting an explosive hazard:** Material owned or controlled by the Department of Defense that, prior to determination of its explosive safety status, potentially contains explosives, munitions, or a high enough concentration of explosives that the material presents an explosive hazard.

**MRS – Munitions Response Site:** A site that is known or suspected to contain unexploded ordnance, discarded military munitions, or munitions constituents.

**NCP – National Oil and Hazardous Substances Pollution Contingency Plan:** The NCP provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

**NPL – National Priorities List:** USEPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response. The list is based primarily on the score a site receives on the Hazard Ranking System. USEPA is required to update the NPL at least yearly.

**NTCRA – Non-Time Critical Removal Action:** CERCLA removal action with an available planning period of at least 6 months to prevent, stabilize, mitigate, or eliminate the release or threat of release of hazardous substances to the environment.

**PRAP – Proposed Remedial Action Plan:** A plan in which the lead agency summarizes for the public the preferred cleanup strategy for a site. The PRAP is issued for public review to satisfy the public participation requirement of the Superfund Amendments and Reauthorization Act of 1986. The PRAP may be prepared either as a fact sheet or as a more detailed document.

**Public Comment Period:** A time for the public to review and comment on various documents and actions taken, either by the Navy or regulatory stakeholders. A minimum 30-day public comment period is held to allow community members to

review the Administrative Record file and review and comment on the PRAP.

**Public Meeting:** The meeting where the lead agency presents and discusses the PRAP and accepts written and oral comments and questions from the community members.

**RAO – Remedial Action Objective:** General cleanup objectives designed to protect human health and the environment.

**Responsiveness Summary:** A summary of oral and written public comments received by the lead agency during a comment period and the responses to the comments prepared by the lead agency. The Responsiveness Summary is an important part of the ROD, highlighting community concerns for decision makers.

**RI – Remedial Investigation:** An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site and to evaluate the potential risks posed by exposure of people, plants, and animals to the contamination.

**ROD – Record of Decision:** The document that explains which cleanup alternative(s) will be used at an NPL site. The ROD is based on information and technical analysis generated during the RI/FS and consideration of public comments and community concerns. The ROD explains the remedy selection process and is issued by the Navy and regulatory stakeholders following the public comment period.

**Total Present Worth Cost:** The total present value cost assumes the entire amount of money required to implement the alternative is invested today and the money accumulates interest over the life span of the alternative. Total present value costs take into consideration the interest rate and timeframe of the alternative.

**USEPA – U.S. Environmental Protection Agency:** The governmental agency that leads the nation's environmental science, research, education, and assessment efforts, and enforcement of environmental laws and regulations.