

August 15, 2005

Ms. Michele DiGeamberardino
Naval Facilities Engineering Command, Northern Division
10 Industrial Highway
Mail Stop #82
Lester, PA 19113

Re: Final Preliminary Assessment Report
Naval Weapons Station Earle, Colts Neck, New Jersey
Contract N62472-02-D-1300

Dear Ms. DiGeamberardino:

Malcolm Pirnie is pleased to provide to the Naval Facilities Engineering Command, Northern Division, the **Final Preliminary Assessment Report** for the Conservation Club Range at NWS Earle, Colts Neck, New Jersey.

An electronic copy of this Final Report including maps and source data will be available two weeks following submittal of the hard copies.

Thank you for the opportunity to work with you on this project. We look forward to continuing our relationship with the Naval Facilities Engineering Command, Northern Division. Please contact me at (914) 641-2690 if you have any questions or comments.

Very truly yours,

MALCOLM PIRNIE, INC.



John Logigian
Team Leader

Enclosure

cc: Malcolm Pirnie – Cheryl Kennedy (1 copy)

**FINAL
PRELIMINARY ASSESSMENT
NAVAL WEAPONS STATION EARLE
CONSERVATION CLUB RANGE
COLTS NECK, NEW JERSEY**

AUGUST 2005

Prepared for:

**Naval Facilities Engineering Command
Engineering Field Activity, Northeast**
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Mail Stop #82
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**FINAL
PRELIMINARY ASSESSMENT
NAVAL WEAPONS STATION EARLE
CONSERVATION CLUB RANGE
COLTS NECK, NEW JERSEY**

DoD Contract Number: N62472-02-D-1300

Reviewed and Approved by:

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Malcolm Pirnie, Inc. prepared this report at the direction of Engineering Field Activity, Northeast. This document should be used only with the approval of the Engineering Field Activity, Northeast. This report is based, in part, on information provided in other documents, and is subject to the limitations and qualifications presented in the referenced documents.

AUGUST 2005

Table of Contents

ACRONYMS I

GLOSSARY OF TERMS..... III

EXECUTIVE SUMMARY1

1. INTRODUCTION..... 1-1

1.1. PURPOSE 1-2

1.2. PROGRAMMATIC FRAMEWORK 1-2

1.3. PROJECT MANAGEMENT..... 1-3

1.4. PRELIMINARY ASSESSMENT APPROACH 1-4

2. INSTALLATION BACKGROUND..... 2-1

2.1. LOCATION AND SETTING..... 2-2

2.2. INSTALLATION HISTORY 2-4

2.3. MUNITIONS RELATED TRAINING / STORAGE / USAGE 2-5

3. PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS..... 3-1

3.1. CLIMATE..... 3-1

3.2. TOPOGRAPHY 3-1

3.3. GEOLOGY..... 3-2

3.4. SOIL AND VEGETATION TYPES 3-2

3.5. HYDROLOGY..... 3-3

3.6. HYDROGEOLOGY 3-4

3.7. CULTURAL AND NATURAL RESOURCES..... 3-5

3.8. ENDANGERED AND SPECIAL STATUS SPECIES..... 3-5

4. SUMMARY OF DATA COLLECTION EFFORT 4-1

4.1. HISTORICAL ARCHIVE REPOSITORIES (OFF-SITE)..... 4-1

4.2. PERSONAL INTERVIEWS 4-3

4.3. ON-SITE DATA REPOSITORIES..... 4-5

4.4. VISUAL SURVEY..... 4-5

4.5. OFF-SITE DATA SOURCES..... 4-6

5. SITE CHARACTERISTICS..... 5-1

5.1. CONSERVATION CLUB RANGE 5-1

5.1.1. History and Site Description..... 5-1

 5.1.1.1. Topography 5-1

 5.1.1.2. Geology..... 5-4

 5.1.1.3. Soil and Vegetation Types 5-4

 5.1.1.4. Hydrology 5-4

 5.1.1.5. Hydrogeology 5-5

 5.1.1.6. Cultural and Natural Resources 5-5

 5.1.1.7. Endangered and Special Status Species 5-6

5.1.2. Visual Survey Observations and Results..... 5-6

5.1.3. Munitions and Munitions Related Materials Associated with the Site 5-8

5.1.4.	<i>MEC Presence</i>	5-9
5.1.4.1.	Known MEC Areas	5-9
5.1.4.2.	Suspected MEC Areas	5-9
5.1.4.3.	Areas Not Suspected to Contain MEC.....	5-9
5.1.5.	<i>Ordnance Penetration Estimates</i>	5-9
5.1.6.	<i>Munitions Constituents</i>	5-10
5.1.7.	<i>Contaminant Migration Routes</i>	5-10
5.1.8.	<i>Receptors</i>	5-10
5.1.8.1.	Nearby Populations	5-11
5.1.8.2.	Buildings Near/Within Site.....	5-12
5.1.8.3.	Utilities On/Near Site.....	5-12
5.1.9.	<i>Land Use</i>	5-12
5.1.10.	<i>Access Controls / Restrictions</i>	5-12
5.1.11.	<i>Conceptual Site Model</i>	5-13
5.1.12.	<i>Summary</i>	5-24

APPENDICES

Appendix A: References

Appendix B: Project Source Data – General

Appendix C: Project Source Data – Site Specific
C-1: Conservation Club Range

Appendix D: Ordnance Technical Data Sheets

Appendix E: No Further Action Letter

LIST OF MAPS

MAP 2.1-1: NWS EARLE LOCATION MAP.....	2-3
MAP 2.3-1: AREA LOCATION MAP CONSERVATION CLUB RANGE.....	2-6
MAP 5.1-1: VISUAL SURVEY: CONSERVATION CLUB RANGE.....	5-2
MAP 5.1-2: RANGE/SITE DETAILS: CONSERVATION CLUB RANGE.....	5-3

LIST OF FIGURES

FIGURE 5.1-1: MC Exposure Pathway Analysis.....	5-23
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LIST OF TABLES

TABLE 3.8-1: SUMMARY OF KNOWN OR POTENTIAL PROTECTED SPECIES	3-7
TABLE 5.1-1: CONCEPTUAL SITE MODEL INFORMATION PROFILES – CONSERVATION CLUB RANGE	5-14

ACRONYMS

BRAC	Base Realignment and Closure
CD	Compact Disc
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long Term Environmental Action Navy Program
CSM	Conceptual Site Model
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
EFANE	Engineering Field Activity, Northeast
EOD	Explosive Ordnance Disposal
FUDS	Formerly Used Defense Site
FY	Fiscal Year
GIS	Geographic Information System
GPS	Geographic Positioning System
IAW	In Accordance With
INRMP	Integrated Natural Resources Management Plan
LANTDIV	Atlantic Division
MEC	Munitions and Explosives of Concern
MC	Munitions Constituents
MMRP	Military Munitions Response Program
MRP	Munitions Response Program
NAVFAC	Naval Facilities Engineering Command
NCP	National Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NWS EARLE	Naval Weapons Station, EARLE
NRHP	National Registry of Historic Places
OE	Ordnance and Explosives
OU	Operable Unit
PA	Preliminary Assessment
POC	Point of Contact

FINAL PRELIMINARY ASSESSMENT

RG	Record Groups
RPM	Remedial Project Manager
SARA	Superfund Amendment and Reauthorization Act
SCS	Soil Conservation Service
U.S.	United States
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S Environmental Protection Agency
WW II	World War II

GLOSSARY OF TERMS

Base Realignment and Closure (BRAC) – A Department of Defense (DoD) program that focuses on compliance and cleanup efforts at military installations undergoing closure or re-alignment, as authorized by Congress in four rounds of base closures for 1988, 1991, 1993, and 1995. (DERP Management Guidance, September, 2001)

Closed Range – A range that has been taken out of service as a range and that either has been put to new uses that are incompatible with range activities or is not considered by the military to be a potential range area. A closed range is still under the control of a DoD component. (DERP Management Guidance, September, 2001)

Defense Site – All locations that are or were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used or was permitted for the treatment or disposal of military munitions. (10 U.S.C. 2710(e)(1))

Discarded Military Munitions – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))

Explosive Ordnance Disposal (EOD) – The detection, identification, field evaluation, rendering-safe, recovery, and final disposal of unexploded explosive ordnance (UXO). It may also include the rendering-safe and/or disposal of EO (explosive ordnance) which has become hazardous by damage or deterioration, when disposal of such EO requires techniques, procedures, or equipment which exceed the normal requirements for routine disposal. (OPNAVINST 8027.1G, 14 Feb 92)

Explosives Safety – A condition where operational capability and readiness, personnel, property, and the environment are protected from the unacceptable effects of an ammunition or explosives mishap. (DoD Directive 6055.9 July 1996)

Formerly Used Defense Site (FUDS) – Real property that was formerly owned by, leased by, possessed by, or otherwise under the jurisdiction of the Secretary of Defense or the Components (including governmental entities that are the legal predecessors of DoD or the Components) and those real properties where accountability rested with DoD but where activities at the property were conducted by contractors (i.e., government-owned, contractor-operated (GOCO) properties) that were transferred from DoD control prior to October 17, 1986. The status of a site as a FUDS is irrespective of current ownership or current responsibility within the federal government. (DERP Management Guidance, September, 2001)

Munitions Constituents (MC) – Any materials originating from unexploded ordnance, discarded military munitions or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710 (e)(4))

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means: unexploded ordnance, discarded military munitions or munitions constituents (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard. (OUSD(AT&L) 18 December 2003)

Operational Range – A range that is under the jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities, or although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities. (10 U.S.C. 101 (e)(3))

Other than Operational Range – Encompasses closed, transferred and transferring ranges.

Range – A designated land or water area set aside, managed, and used for range activities of the DoD. Ranges include firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access and exclusionary areas, and airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration. (10 U.S.C. 101 (e)(3))

FINAL PRELIMINARY ASSESSMENT

Transferred Range – A property formerly used as a military range that is no longer under military control and had been leased by the DoD, transferred, or returned from the DoD to another entity, including federal entities. This includes a range that is no longer under military control but was used under the terms of a withdrawal, executive order, special-use permit or authorization, right-of-way, public land order, or other instrument issued by the federal land manager. (DERP Management Guidance, September, 2001)

Transferring Range – A range that is proposed to be transferred or returned from the DoD to another entity, including federal entities. This includes a range that is used under the terms of a withdrawal, executive order, act of Congress, special-use permit or authorization, right-of-way, public land order, or other instrument issued by the federal land manager or property owner. An operational or closed range will not be considered a “transferring range” until the transfer is imminent. (DERP Management Guidance, September, 2001)

Unexploded Ordnance – Military munitions that have been primed, fused, armed, or otherwise prepared for action; have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and remain unexploded either by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5))

EXECUTIVE SUMMARY

The Department of Defense (DoD) has established the Military Munitions Response Program under the Defense Environmental Restoration Program (DERP) to address munitions and explosives of concern (MEC) (including unexploded ordnance (UXO) and discarded military munitions (DMM)) and munitions constituents (MC) at other than operational military ranges and other sites. Closed, transferred, and transferring military ranges and sites not located on an operational range are considered other than operational. This report addresses other than operational ranges and sites at an active installation. It may include transferring and/or transferred ranges and munition disposal sites associated with an active installation if they are not included in Base Realignment and Closure (BRAC) or Formerly Used Defense Site (FUDS) programs.

This report represents a Preliminary Assessment (PA) for the Naval Weapons Station Earle (NWS Earle), New Jersey. The DoD, Navy, and United States Environmental Protection Agency (USEPA) guidance for conducting and documenting PAs was followed and tailored, where appropriate, to address the unique aspects of MEC and MC.

Naval Facilities Engineering Command, Engineering Field Activity, Northeast (EFANE) retained Malcolm Pirnie, Inc. (Malcolm Pirnie) to conduct a PA of the Conservation Club Range at the NWS Earle under DoD Contract Number N62472-02-D-1300. Malcolm Pirnie conducted a site visit at NWS Earle, in Colts Neck New Jersey on June 23 and June 24, 2003. During this visit, Malcolm Pirnie collected information needed to complete a PA on the Conservation Club Range identified in the Navy inventory as an "other than operational" Munitions Response Program (MRP) site. Malcolm Pirnie used the following sources of data: data repositories at NWS Earle; off-site historical archive repositories (through a subcontractor); other off-site repositories, such as local libraries and museums (through the internet); and personal interviews with Naval personnel (e.g., members of the Environmental Department and the Engineering Division). A site walk and visual survey (with metal detection sweeps for health and safety) of the subject property was also conducted. This document provides the PA for the Conservation Club Range at NWS Earle.

NWS Earle's primary mission is providing logistical, technical and material support to the fleet in a variety of areas ranging from combat subsystems and retail ammunition management to ordnance packaging, handling and storage. Since NWS Earle is a weapons station, it handles, stores, transports, renovates and issues all types of weapons and ammunition. NWS Earle is located in the New Jersey shore region, an area along the Atlantic Coast about mid-state. The station is composed of two separate areas: Mainside (10,428 acres), located in the township of Colts Neck, and the Waterfront Area (706 acres), on Sandy Hook Bay, adjacent to the town of Leonardo. The areas are connected by Normandy Road, a 15-mile military road and rail line.

Mainside contains ordnance storage areas and the majority of NWS Earle's departments and facilities. Mainside is comparable to a self-sufficient small town with its own police and fire departments, homes, office buildings, restaurants, and recreational facilities. The Waterfront Area is a 700-acre trident-shaped pier complex that extends 2.2 miles into Sandy Hook Bay and comprises 2.9 miles of pier/trestle area. The pier is fully capable of providing ammunition to nearly every class of ship operated by the Navy and United States Coast Guard.

The Conservation Club Range comprises approximately six acres and is located in the eastern part of the Mainside area, slightly south of the Wayside Ordnance Storage Area. The range was constructed in the mid-1970s and used infrequently for about five years. The range was established as a skeet and trap range, classified for small arms (shotguns) and used for recreation. Also, a group of "muzzle loading" weapons enthusiasts occasionally used the range. Since closure, the range has lain fallow and allowed to return to its pre-developed state.

A visual survey along pre-selected transects with concurrent pulse induction metal detector sweeps (for health and safety) failed to provide any visual evidence of range use such as clay targets (or fragments) or scarred trees or to detect any spent shot (or other metal fragments) in the soil at the Conservation Club Range. This includes the firing areas and berms (the highest feature in the range area) where expended shot would be expected. In addition, available data and interviews with site personnel indicate this range was used infrequently. Thus, to date, no spent shot was detected in the soils and no clay targets (or fragments) were found in the range area.

With regard to groundwater, as the range was infrequently used, and as no spent lead shot was observed on or in the soil, the question of migration of lead from soil to groundwater is precluded.

1. INTRODUCTION

The Department of Defense (DoD) has established the Military Munitions Response Program under the Defense Environmental Restoration Program (DERP) to address munitions and explosives of concern (MEC) (including unexploded ordnance (UXO) and discarded military munitions (DMM)) and munitions constituents (MC) at other than operational military ranges and other sites. Closed, transferred, and transferring military ranges and sites not located on an operational range are considered other than operational. This report addresses other than operational ranges and sites at an active installation. It may include transferring and/or transferred ranges and munition disposal sites associated with an active installation if they are not included in Base Realignment and Closure (BRAC) or Formerly Used Defense Site (FUDS) programs.

The DoD and the United States Navy are currently establishing policy and guidance for munitions response actions under the Navy Munitions Response Program (MRP) (Dept. of Defense, March 2000, January 2003). However, key program drivers developed to date conclude that munitions response actions will be conducted under the process outlined in the National Contingency Plan (NCP) (40 CFR 300) as authorized by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. 99-499, (hereinafter CERCLA). This report represents a Preliminary Assessment (PA) for the Naval Weapons Station Earle (NWS Earle), in Monmouth County, New Jersey (NJ). DoD, Navy, and U.S. Environmental Protection Agency (USEPA) guidance for conducting and documenting PAs were followed and tailored, where appropriate, to address the unique aspects of MEC and MC.

This PA is organized into the following sections:

- Section 1 – Introduction
- Section 2 – Installation Background
- Section 3 – Physical and Environmental Characteristics
- Section 4 – Summary of the Data Collection Effort
- Section 5 – Site Characteristics

The following supporting information is appended to this PA:

- References (Appendix A)

- Project Source Data – General (Appendix B)
- Project Source Data – Site Specific (Appendix C)
- Ordnance Technical Data Sheets (Appendix D)
- No Further Action Letter (Appendix E)

An interactive compact disc (CD) is included with this PA. The CD contains electronic files of the report text, tables, and figures; appendices; project source data; additional site photographs; and interactive maps of the installation and site.

1.1. Purpose

This PA summarizes the history of munitions use for the Conservation Club Range at NWS Earle. The PA provides an assessment of the current conditions with respect to MEC and MC. The PA provides the necessary information for Navy and regulatory decision-makers to: 1) eliminate from further consideration those MEC sites that pose minimal or no threat to public health or the environment; 2) differentiate MEC sites that may not require further munitions response actions from those that will require further investigation and/or munitions response actions; 3) determine if an imminent explosives safety hazard from MEC is present that warrants an accelerated response action; and 4) determine if an imminent hazard from MC to human health, and the environment is present and warrants an accelerated response action.

1.2. Programmatic Framework

The regulatory structure for managing Navy MRP sites is guided by a complex mixture of federal, state, and local laws, as well as DoD and Navy regulations and guidance, and provides the necessary information for Navy decision makers. The key legislation, policy, and guidance directing the program includes, but is not limited to, the following:

Defense Environmental Restoration Program (DERP) Management Guidance (September 2001)

The DERP Management Guidance establishes a MRP element for MEC and MC defense sites. The history of DERP dates back to the SARA of 1986¹. The scope of the DERP is defined in 10

¹ SARA was signed into law on October 17, 1986, and CERCLA of 1980, 42 U.S.C. §9601 et seq. Related sections in Title 10 of the U.S.C. (10 U.S.C. §§2702-2710 and §§2810-2811) further define the program.

United States Code (U.S.C.) §2701(b), which states that the:

Goals of the program shall include the following: ... (1) The identification, investigation, research and development, and cleanup of contamination from hazardous substances, and pollutants and contaminants. (2) Correction of other environmental damage (such as detection and disposal of unexploded ordnance) which creates an imminent and substantial endangerment to the public health or welfare or to the environment ...

Draft DoD Directive Military Munitions Response Policy on Other Than Operational Ranges

The DoD Directive is scheduled to be finalized in fiscal year (FY) 2004 pending review and concurrence from the DoD services. The Draft DoD Directive 4715.MRP (September 2003 version) states that munitions response will be conducted “in accordance with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)”.

National Defense Authorization Act (FY02) (Sections 311-312)

Sections 311-312 of the National Defense Authorization Act of FY02 reinforced the DoD’s 2001 DERP Management Guidance by tasking the DoD to develop and maintain an inventory of defense sites that are known or suspected to contain MEC and MC. Section 311 requires the DoD to develop a protocol for prioritizing defense sites for response activities in consultation with the states and Tribes. Section 312 requires the DoD to create a separate program element to ensure that the DoD can identify and track munitions response funding.

The September 2001 Management Guidance for the DERP and the Defense Authorization Act 2002, described above, established the MRP. The DoD provides program guidance and methods for conducting a baseline inventory of defense sites containing, or potentially containing, MEC and/or MC. The Navy baseline inventory of sites was completed in FY 2002 and was used to establish the sites where PAs are needed to further evaluate and characterize MEC and MC.

1.3. Project Management

This PA was coordinated and managed by the Navy Engineering Field Activity, Northeast (EFANE), a component of the Atlantic Division (LANTDIV) of the Naval Facilities Engineering Command (NAVFAC). The EFANE performs engineering functions for Navy installations throughout the northeast U.S. and is the Program Manager for this PA. Malcolm Pirnie, Inc. was contracted to prepare this PA. The Navy Remedial Project Manager (RPM) and the installation

points of contact (POC) for the Conservation Club Range at NWS Earle provided valuable information and assistance throughout the PA data collection process.

1.4. Preliminary Assessment Approach

CERCLA implementing guidance, which was prepared for sites contaminated with hazardous substances, describes the PA as a limited-scope investigation based upon existing and available data. However, the guidance also states that the PA process developed under CERCLA is not equally applicable to all sites and all contaminants and that variation from the guidance may be necessary. Sites containing MEC are prime examples of sites where the generic CERCLA process is incomplete. Unique explosives safety issues associated with MEC cannot be assessed solely with the parameters developed for chemical and hazardous waste contaminants. While this PA generally follows CERCLA guidance, certain elements of the report have been tailored to address the unique explosives safety aspects of MEC.

The PA process for each of the sites involves collecting and reviewing existing and available information about the site. Data collection activities included off-site and on-site research and interviews. It also included a visual survey to assess physical evidence that might indicate the presence of MEC (e.g., discarded munitions items, ordnance penetration holes, scarred trees) and MC (e.g.; ground scarring, stressed vegetation, chemical residue) at the site. The Malcolm Pirnie data collection team conducted the on-site portion of the data collection and visual survey on June 23 and 24, 2003.

This PA is inclusive and makes use of all available data relating to munitions use at NWS Earle, including historical records, field data, anecdotal evidence, interviews with site personnel, and professional knowledge and experience. It is based, in part, on information provided in documents referenced in Appendix A and is subject to the limitations and qualifications presented in the referenced documents.

2. INSTALLATION BACKGROUND

The primary mission of NWS Earle is to provide logistical, technical and material support to the fleet in a variety of areas ranging from combat subsystems and retail ammunition management to ordnance packaging, handling and storage. Since NWS Earle is a weapons station, it handles, stores, transports, renovates and issues all types of weapons and ammunition (NWS Earle, not dated).

NWS Earle is also home to many tenant organizations. These tenants include Combat Logistics Group Two, Shore Intermediate Maintenance Activity, Mobile Mine Assembly Unit Three, Superintendent of Shipbuilding Portsmouth Detachment Earle, Explosive Ordnance Disposal Mobile Unit Two Detachment Earle, Atlantic Ordnance Command Detachment Earle, Public Works Center Site Earle, and the Packaging, Handling, Storage, and Transportation Center .

NWS Earle is located in the New Jersey "shore region", entirely in Monmouth County, in an area along the Atlantic Coast about mid-state. The station is composed of two separate areas: Mainside, located in the township of Colts Neck, and the Waterfront Area, on Sandy Hook Bay. The areas are connected by Normandy Road, a 15-mile military road and rail line.

The Mainside area contains ordnance storage areas and the majority of Earle's departments and facilities. Mainside is comparable to a small town with its own police and fire departments, homes, office buildings, restaurants, and recreational facilities.

The Waterfront Area is the trident-shaped pier complex that extends 2.2 miles into Sandy Hook Bay and comprises 2.9 miles of pier/trestle area. The pier is fully capable of providing ammunition to nearly every class of ship operated by the Navy and United States Coast Guard.

The waterfront complex is also the homeport to the USS Detroit. The Atlantic Ordnance Command Detachment Earle performs the station's primary mission - providing ammunition to the fleet. An integrated work force of military and civilian personnel operates the inland storage, renovation, transshipment and demilitarization facilities. NWS Earle is the only major ammunition depot serving fleet units on the coast north of Virginia.

The following sections provide general information about NWS Earle, including its location and setting; a brief history of the installation; its missions over time; and a history of munitions related training, storage, and usage.

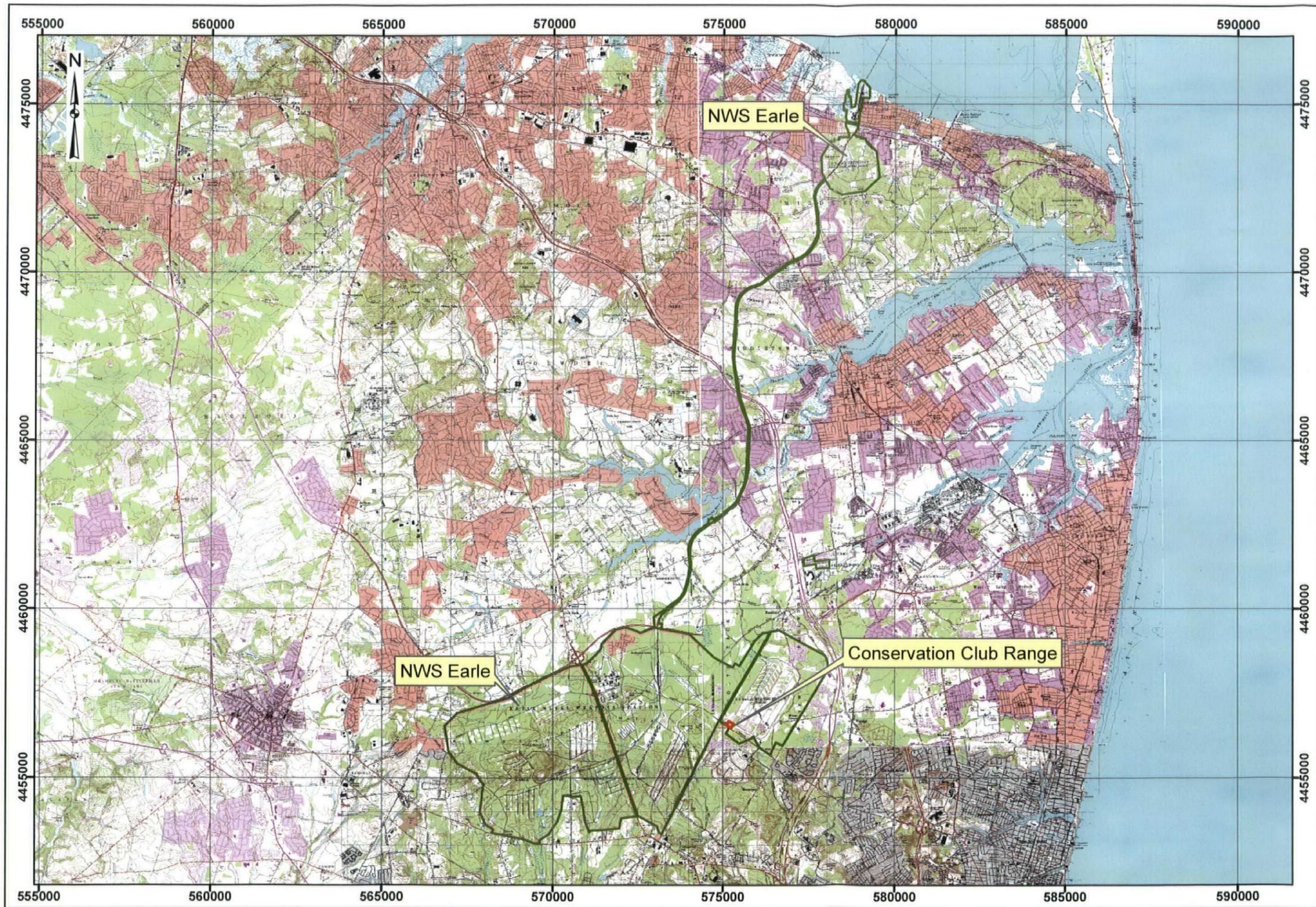
2.1. Location and Setting

NWS Earle is located in the New Jersey “shore region” in Monmouth County in an area along the Atlantic Coast about mid-state (Map 2.1-1). Geographically, NWS Earle and the surrounding area are located within the Outer Coastal Plain within the region known as the Laurentian Mixed Forest.

As stated, the station is composed of two separate areas : Mainside (10,428 acres) in the township of Colts Neck (about six miles from the Atlantic Ocean), and the Waterfront Area (706 acres), on Sandy Hook Bay, adjacent to the town of Leonardo. Both areas are connected by Normandy Road, a 15-mile military road and rail line. Mainside is located 47 miles south of New York City (Manhattan), while the Waterfront Area is located 4 miles west of Sandy Hook and 7 miles south of Staten Island. The Conservation Club Range is located in the Mainside portion of the facility.

Mainside is bordered by County Road 33 to the south and County Road 18 to the north. County Road 34 bisects Mainside from north to south. Local roads form the eastern and western boundaries. The area surrounding Mainside is composed of small farms and small suburban towns, villages, and developments, the largest being the township of Colts Neck to the north.

Map 2.1-1 depicts the location of NWS Earle and the Conservation Club Range.



**Preliminary Assessment
NWS Earle, Colts Neck, New Jersey**



**MALCOLM
PIRNE**

**Map 2.1-1
Area Location Map
Conservation Club Range**

Legend

-  Installation Boundary
-  Conservation Club Range



Data Source: USGS, 7.5 Minute Series
Topographic Survey Map
Adelphia, NJ, 1981
Asbury Park, NJ, 2001
Farmingdale, NJ, 2001
Freehold, NJ, 1981
Keyport, NJ, 2000
Long Branch, NJ, 1981
Marlboro, NJ, 2000
Sandy Hook West, NJ, 2001
South Amboy, NJ, 2000

Coordinate System: UTM Zone 18N
Datum: NAD 83
Units: Meters

Contract: N62472-02-D-1300
Edition: Final Preliminary Assessment
Date: August 2005



2.2. Installation History

Originally, the installation, Naval Ammunition Depot Earle, named after Rear Admiral Ralph Earle, the Chief of the Bureau of Ordnance during World War I, was built during World War II to help with the war effort. At the time, a pressing need developed for an ammunition depot in the greater New York City area. A site in Monmouth County, New Jersey was chosen and construction began August 1943. The installation consisted of two distinct areas each with unique advantages. A waterfront location (Waterfront Area) provided ships with a safe and operationally advantageous port to take on ammunition, while an inland storage area (Mainside), safe from possible submarine bombardment, provided access to commercial rail facilities with lines coming from the west, where the majority of ammunition shipments originated. As noted, on August 2, 1943, construction began and, in a short time, storage bunkers, a road and rail network, numerous buildings, and a pier complex were built. The installation was commissioned on December 13, 1943 as the Naval Ammunition Depot Earle (<http://www.globalsecurity.org/military/facility/earle.htm>).

Naval Ammunition Depot Earle continued to develop after World War II, keeping pace with the changing needs of the Navy. The command's name was changed in 1974 from Naval Ammunition Depot Earle to Naval Weapons Station Earle (NWS Earle). The mission of NWS Earle has remained the same, providing support to the fleet.

The Atlantic Ordnance Command Detachment Earle performs NWS Earle's primary mission, providing ammunition to the fleet. An integrated work force of military and civilian personnel operate the inland storage, renovation, and transshipment facilities. The Packaging, Handling, Storage and Transportation Center is the engineering agent of the Naval Sea Systems Command and Naval Air Systems Command in the field of weapons systems. The Packaging, Handling, Storage and Transportation Center also manages handling equipment and containers for the fleet and shore stations, including design, testing, acquisition, in-service engineering and logistical support. The Public Work Center at NWS Earle maintains the facilities, manages housing and operates and maintains vehicles (<http://www.cnrne.navy.mil/alist/earle/earle.htm>).

NWS Earle (Mainside) is comparable to a small town with homes, office buildings, industrial plants, banks, medical facilities, and fitness and religious centers. NWS Earle has its own police

force responsible for law enforcement and visitor control and also the oversight of a civilian guard force that provides gate guards and roving patrols.

2.3. Munitions Related Training / Storage / Usage

NWS Earle is an ordnance storage facility. Existing ordnance facilities at NWS Earle consist of the Wayside Ordnance Storage Area in the eastern portion of the Mainside area, Ordnance Storage Groups 5 and 6 in the central area and Ordnance Groups 8, 9, 10, 11, 12, and 13 in the western area (Map 2.3 -1). In addition, the central area has “Holding Yards Groups A and B”. These Ordnance facilities supplied the Waterfront Area of NWS Earle and the fleet.

In addition to the formal ordnance storage areas, NWS Earle has one active permitted range, and five closed ranges/sites. These are:

<u>Range/Site</u>	<u>Status</u>
Ordnance Demilitarization Site	Active
Skeet Range on Landfill	Closed In Accordance With (IAW) CERCLA
Shooter’s Club Range on the Landfill West of Army Barricades	Closed IAW CERCLA
Contract Ordnance Disposal Area	Closed IAW CERCLA
Closed Pistol Ranges	Closed IAW CERCLA
Conservation Club Range	Closed

Of these, the last is the range of interest to this PA.

Conservation Club Range

The Conservation Club Range (Navy Inventory number N6921308) comprises approximately six acres including a shooters area, berms, and buffer areas with indigenous vegetation. It is located in the eastern portion of the Mainside area, slightly south of the Wayside Ordnance Storage Area. According to interviews (Mr. Richard Covalleski—retired civilian employee and Conservation Club leader) and aerial photographs, the Conservation Club Range was established as a skeet and trap shooting range. Also, a group of “muzzle loading” weapons enthusiasts occasionally used the range. It was constructed in the early-1970s and closed about five years later. Anecdotal information (Mr. Covalleski) indicates the range was not frequently used.

**Preliminary Assessment
NWS Earle, Colts Neck, New Jersey**



**MALCOLM
PIRNIE**

**Map 2.3-1
Local Area Location Map
Conservation Club Range**

Legend

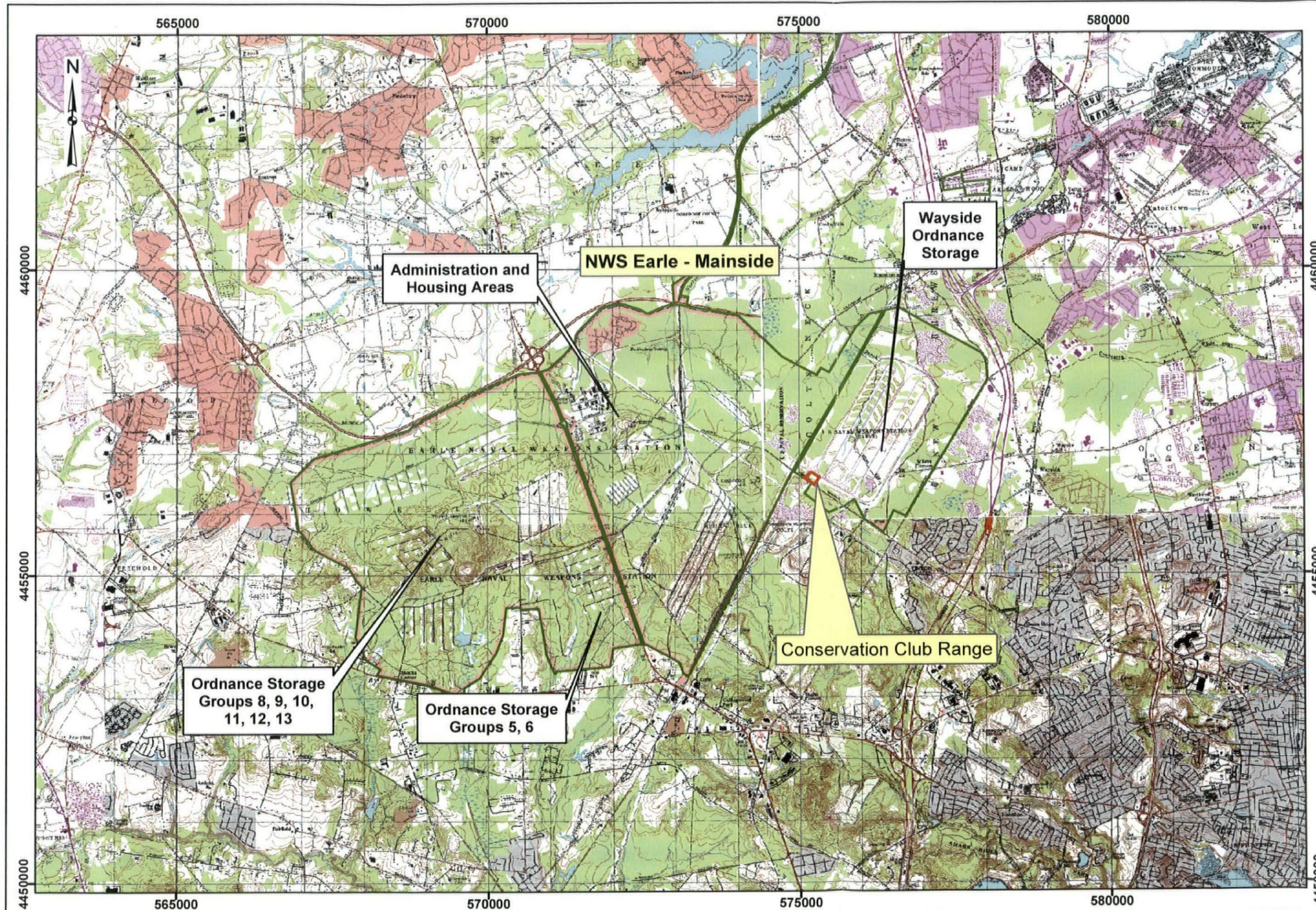
-  Installation Boundary
-  Conservation Club Range



Data Source: USGS 7.5 Minute Series
Topographic Survey Map
Adelphia, NJ, 1981
Asbury Park, NJ, 2001
Farmingdale, NJ, 2001
Freehold, NJ, 1981
Long Branch, NJ, 1981
Marlboro, NJ, 2000

Coordinate System: UTM Zone 18N
Datum: NAD 83
Units: Meters

Contract: N62472-02-D-1300
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3. PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

The following sections provide general information for NWS Earle including its climate; topography; geology; soil and vegetation types; hydrology; hydrogeology; cultural and natural resources; and endangered species.

3.1. Climate

The climate at NWS Earle and surrounding areas is in general temperate humid, characterized by warm summers and moderate winters. January is generally the coldest month with an average temperature of 31°F and July is generally the warmest month with average temperature of 74 °F. The normal growing season begins in mid-April and lasts approximately 178 days until late October (specifically April 23 to October 18th). The area has an average of 47 inches of precipitation per year. Precipitation falls fairly uniformly throughout the year, though fall and winter are slightly drier than spring and summer. Precipitation ranges from 3.4 to 5.0 inches per month. Winds on average blow from the northwest during the months of December through March. Winds in the summer can be more variable and can come from the southwest or can be sea breezes from the east (Monmouth County Mosquito Extermination Commission, 2003; Source: <http://www.visitmonmouth.com/mosquito/ctycli.html>,2003).

3.2. Topography

Monmouth County lies within the Atlantic Coastal Plain Physiographic Province. The topography is characterized by a prominent belt of hills flanked by lowlands and less prominent hills. The topographic profile of NWS Earle is characterized by a group of hills (the Hominy Hills) with elevations ranging from 200 feet to 307 feet (Throckmorton Hill) intersected with meadows and low-lying wetlands. The Hominy Hills have a pronounced north slope and are a drainage divide between the Freehold-Colts Neck Lowland in the north and the Lakewood Plain in the south. The NWS Earle administration area, located in the Freehold-Colts Neck Lowland, is fairly level with elevations ranging from 80 to 160 feet above mean sea level (Integrated Natural Resources Management Plan, (INRMP), 2002, Monmouth County Mosquito Extermination Commission, 2003; Source: <http://www.visitmonmouth.com/mosquito/ctyctopo.html>,2003).

The Conservation Club Range is in the Lakewood Plain in a level area slightly southwest of Oak Hill on the southern portion of the Wayside Ordnance Storage Area. The topography of the area of the Conservation Club Range is flat with the berm being the highest feature in the six acres.

3.3. Geology

The NWS Earle Mainside area is situated within the Outer Coastal Plain physiographic region of New Jersey. The Outer Coastal Plain is made of sedimentary deposits dating from the Tertiary period (65-1.6 million years ago) with overlying deposits of sand and gravel. Each sea invasion deposited clays, silts, sands and gravel. When the seas retreated, these deposits were exposed to erosion and some returned to the ocean. The resulting wedge of sediments reaches a thickness of nearly 4,000 feet toward the southeast. Overlying these coarse sediments are patches of more recent sand and gravel deposits laid by the melting of northern glaciers. In general, unconsolidated clays, silts, sands, and gravels mark the lower elevations of the region. In addition, the Outer Coastal Plain has a higher quartz sand content resulting in lower fertility and low water-holding capacity (INRMP, 2002).

3.4. Soil and Vegetation Types

NWS Earle soils were classified by the United States Department of Agriculture (USDA), Soil Conservation Service (SCS) in 1989 as part of their published soil survey for Monmouth County. Soil classification maps were superimposed on aerial photographs taken between 1980 and 1983. There are five soil associations and 28 soil series found on NWS Earle (C. F. Jablonski et al., 1989).

The Lakewood-Lakehurst-Evesboro-Klej association is composed of nearly level to moderately level sandy soils on upland, usually forested areas. The Atsion series consists of poorly drained soils on upland flats (a hydric soil type). The Tinton-Collington-Colts Neck association is composed of nearly level to steep, loamy soils on upland areas. The Freehold-Urban Land-Holmdel association consists of nearly level to steep, loamy soils and urban land areas found on uplands. The Freehold-Urban Land-Collington association consists of nearly level to moderately steep, loamy soils and urban areas found on uplands.

In general, the vegetation at NWS Earle is either forest or grassy developed areas. The latter include earth-covered ordnance magazines, lawns of administrative and residential areas and at

one time the “shooters” area of the Conservation Club Range. Forest areas found on NWS Earle include mixed oak, oak and pine, mixed hardwoods, hardwoods and pine, pine, and marsh.

On the Conservation Club Range and surrounding areas the predominant vegetation consists of hardwoods and pine. The dominant species of a hardwood and pine community are pitch pine, red maple and sweetgum. Other species in abundance include white oak, American holly, black gum, scarlet oak, high bush blueberry, flowering dogwood, black locust, arrow-wood, and common greenbrier. On the former range firing line and the areas leading to the existing berm (northeast direction) and tree line (northwest direction) the vegetation consists of short dense grass and brush. Past the berm and tree line the vegetation consists of dense brush and small trees, primarily pitch pine. Specific species were not identified.

Last, a wetland is located across the adjacent dirt road, on the eastern and southeastern sides of the range. The wetland is classified as Palustrine Forested Broadleaved Deciduous (Soil Conservation Service Classification PFO1). There is no indication or documentation that this wetland, or portion thereof, was part of the Conservation Club Range or impacted by the construction or operation of the range (i.e., the firing arc was not in the direction of the wetland).

3.5. Hydrology

The NWS Earle Mainside area is divided into three watershed basins that are formed by the Hominy Hills ridge, the Manasquan River Watershed Basin, the Navesink Swimming River Watershed Basin, and the Shark River Watershed Basin. Marsh Bog and Mingamahone Brooks, tributaries of the Manasquan River, drain the southern portion of Mainside (Manasquan River Watershed Basin). Shark River drains the eastern portion (Shark River Watershed Basin). Mine Brook, Hockhockson Brook, Yellow Brook Northwest and Pine Brook drain the northern portion (Navesink Swimming River Watershed Basin). Each of the riverine systems originates on NWS Earle Mainside (Monmouth County Planning Board, 2002).

As regards the Conservation Club Range, it is in the Navesink Swimming River Watershed Basin. The nearest water bodies are Horse Pond (1820 feet southwest of the range) in the Shark River Watershed Basin and Intransit Pond (3000 feet east of the range) in the Navesink Basin. A small wet depression (natural catch basin) was noted during the site walk north of the berm and along the dirt road on the eastern side of the range.

3.6. Hydrogeology

The Magothy Aquifer formation underlies NWS Earle. This aquifer is composed of permeable sand beds of the late Cretaceous age (140-65 million years ago). Confining units of silt and clay overlie this aquifer. Locally, this aquifer is divided into the Wenonah-Mount Laurel Aquifer, the Englishtown Aquifer, and the upper Magothy portion of the Raritan-Magothy Aquifer (Monmouth County Planning Board, 2002) .

The Wenonah-Mount Laurel Aquifer is predominately composed of fine to medium glauconitic sand; the Englishtown Aquifer is composed of fine to medium sand with some beds of silt and clay; and the Magothy Aquifer consists of well stratified to cross-bedded, fine to medium sand. Each aquifer is separated from the underlying aquifer by a confining unit, usually of silt or clay.

In 1985, the New Jersey Water Supply Administration declared these aquifers "Critical Area # 1". Critical Area #1 is one of two areas in New Jersey where state law prohibits water allocations being issued in critical aquifers within these areas. This designation was imposed because of excessive water withdrawals that had the potential to significantly threaten the long-term integrity of the water supply source. An outside water company, the New Jersey American Water Company, supplies drinking water for NWS Earle Mainside.

There are no specific data on the hydrogeology beneath the Conservation Club Range, however documentation on a site some 2500 feet northwest of the Conservation Club Range was reviewed (Brown and Root, 1997). This site was part of a Remedial Action at Operable Unit 1 (OU-1) under the Navy's Comprehensive Long-Term Environmental Action Navy Program (CLEAN). OU-1 was composed of two sites, Site 4 and Site 5. Site 5 was a landfill approximately eight (8) acres in extent covered with sand and vegetative soils. Approximately two and one-half (2.5) acres of Site 5 was converted to a skeet/trap shooting range (Shooter's Club Range on the Landfill West of Army Barricades-Navy Inventory Number N6921305). The hydrogeology of Site 5 is as follows. Groundwater in the Kirkwood and Vincetown aquifer occurs under unconfined conditions and the formations are interpreted to be hydraulically interconnected. The direction of shallow groundwater flow is generally towards the northeast (Brown and Root, 1997). In the absence of specific data, it is assumed this is the case for groundwater movement under the Conservation Club Range. However, while a number of groundwater samples were

taken at Site 5, as the site was a landfill, the concentrations of constituents in the Site 5 groundwater would not reflect the same conditions at the Conservation Club Range.

3.7. Cultural and Natural Resources

An architectural resources survey at NWS Earle was conducted in 1996. This survey summarized the architectural resources under the jurisdiction of NWS Earle and involved inventory and National Register of Historic Places (NRHP) evaluation of 453 buildings and structures erected prior to 1946 and the description of post-1946 buildings and structures. Among the pre-1946 buildings and structures, 14 meet the NRHP criteria. Of the post-1946 buildings and structures, none were deemed of exceptional significance as required under NRHP criteria for resources less than 50 years of age (INRMP, 2002).

In 1990 a cultural survey of NWS Earle was conducted (INRMP, 2002). The survey summarized the archeological resources under the jurisdiction of the installation. The survey indicated 13 locations in the Mainside area that have a high potential for containing prehistoric sites. These locations include:

- Undisturbed summits and slopes of prominent cuestas (Throckmorton Hill, Lippincott Hill, the unnamed hill, Oak Hill);
- Well-drained soils on stream headwaters and stream terraces;
- Well-drained soils on margins of inland swamps;
- Well-drained soils adjacent to soils capable of supporting Atlantic white cedar; and
- Upland locations with the Hockhockson Swamp.

Of these, the closest to the Conservation Club Range is Oak Hill.

The only intact historical cultural resource at NWS Earle is the Schenk-Walling Cemetery.

3.8. Endangered and Special Status Species

In an effort to inventory the natural resources at NWS Earle, three federally protected species surveys were conducted since 1988. These surveys have identified the locations of each rare species population (INRMP, 2002).

FINAL PRELIMINARY ASSESSMENT

The New Jersey Department of Environmental Protection (NJDEP), Division of Fish and Wildlife, Endangered and Nongame Species Program, was contracted to survey/inventory the protected natural resources at NWS Earle in 1988. In 1996 and 1999, the results were reviewed and updated for changes in the status of listed species (INRMP, 2002).

The 1988 survey identified 15 rare species: four birds (pied-billed grebe, red-shouldered hawk, merlin, and barred owl); one amphibian (pine barren treefrog); two insects (Bluet damselfly and Noctuid moth); and eight plants (swamp-pink, New Jersey rush, Knieskern's beaked rush, pine barren reedgrass, slender nut rush, pale beak rush, curly grass fern, and Barratt's sedge). The 1988 survey was updated in 1996 and 1999. Table 3-1 identifies the protected/rare species located at NWS Earle and their federal and state status (INRMP, 2002).

The occurrence of any of these species on the Conservation Club Range could not be determined; however the habitat of the range could support any number of the listed species.

**Table 3.8-1:
Summary of Known or Potential Protected Species**

Scientific Name ¹	Common Name	Federal Status ²	State Status ³	State Rank ⁴
<i>Accipiter cooperii</i>	Cooper's hawk	N/A	E	S2
<i>Podilymbus podiceps</i>	Pied-billed grebe	N/A	E	S1
<i>Strix varia</i>	Barred owl	N/A	T	S3
<i>Buteo lineatus</i>	Red-shouldered hawk	N/A	T	S3
<i>Falco columbarius</i>	Merlin	N/A	N/A	N
<i>Hyla andersonii</i>	Pine Barrens treefrog	N/A	E	S4
<i>Enallagma recurvatum</i>	Bluet damselfly	N/A	N/A	S3
<i>Chytonix sensilis</i>	Noctuid moth	N/A	N/A	S1
<i>Helonias bullata</i>	Swamp-pink	T	E	S3
<i>Juncus caesariensis</i>	New Jersey rush	N/A	E	S3
<i>Rhynchospora knieskernii</i>	Knieskern's beaked rush	T	E	S1
<i>Calamovilfa brevipilis</i>	Pine barren reedgrass	N/A	T	S3
<i>Scleria minor</i>	Slender nut rush	N/A	N/A	S3
<i>Rhynchospora pallida</i>	Pale beak rush	N/A	N/A	S3
<i>Schizaea pusilla</i>	Curly grass fern	N/A	T	S3
<i>Carex barrattii</i>	Barratt's sedge	N/A	N/A	S4

1 All species listed in this table are known to occur or have known habitat that is present at NWS Earle.

2 Federal: E =Endangered, T= Threatened, C= Candidate, N/A = Non Applicable

3 State: E =Endangered, T= Threatened, N/A = Non Applicable

4 State Rank

S1 = Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or otherwise very vulnerable to extirpation in the state.

S2 = Imperiled in New Jersey because of rarity (6-20 occurrences) or otherwise very vulnerable to extirpation in the state.

S3 = Rare or uncommon (21-100 occurrences in New Jersey)

S4 = Apparently secure in New Jersey with many occurrences

N = Non-breeding population

N/A = Non Applicable

+

4. SUMMARY OF DATA COLLECTION EFFORT

Five primary sources of information were researched as part of the data collection effort for the PA. The sources of data included:

- 1) Historical archives;
- 2) Personal interviews;
- 3) Installation data repositories;
- 4) Visual survey; and
- 5) Off-site data sources and repositories, such as local libraries and museums.

These five sources of data are discussed below, along with their relative application to this PA.

4.1. Historical Archive Repositories (off-site)

The data collection team reviewed archival records located at the National Archives in College Park, Maryland, and in Washington, D.C. The data collection team researched the following records and record groups (RG) for documents relating to munitions usage at NWS Earle. An asterisk (*) indicates the material was photocopied.

Textual Records:

RG 38, Chief of Naval Operations

- General Correspondence, 1943-1944, Box 296
- General Correspondence, 1944-1945, Box 743
- General Correspondence, 1945-1946, Boxes 1117* 1179

RG 71, Bureau of Yards and Docks

- Naval Property Case Files, Boxes 802*, 803*, 804, 805*, 806, 807*, 808*
- Unprocessed Naval Property Case Files, Boxes 1-3, 5-10, 38, 44*, 45*, 46-49

RG 74, Bureau of Ordnance:

- Entry 25-M, General Correspondence, 1943, Confidential, Box 409
- Entry 25-O, General Correspondence, 1943, Restricted, Box 703
- Entry 25-U, General Correspondence, 1944, Confidential, Box 597

FINAL PRELIMINARY ASSESSMENT

- Entry 25-V, General Correspondence, 1944, Restricted, Boxes 1276, 1277*, 1278-1280
- Entry 1003 A, General Correspondence, 1948, Boxes 135*, 221, 222, 223*
- Entry 1003 A, General Correspondence, 1949, Boxes 544*, 658, 659
- Construction and Procurement Subject Files
- 1945, Boxes 1575*, 1576*, 1577*, 1578*, 1579*, 1580*, 1581*
- 1946, Boxes 402*, 403*, 404*, 405*
- 1947, Boxes 305*, 306*

RG 77, Chief of Engineers

- Entry 391, Construction Completion Reports, 1917-1943, Boxes 200, 201
- Entry 391-B, Formerly Classified Construction Completion Reports, 1917-1943, Box 64

RG 334, Records of Inter-Service Agencies, Armed Forces Explosives Safety Board

- Entry 15, Explosion Files, # 77, 78

RG 407, Adjutant General

- Entry 360, Formerly Classified Project Decimal Files, 1943-1945, Box 3337
- Entry 363, Unclassified Project Decimal Files, 1940-1945, Boxes 4323, 4324, 4339, 4340, 4343, 4353, 4456
- Entry 363, Unclassified Project Decimal Files, 1946-1948, Box 1713
- Entry 363, Unclassified Project Decimal Files, 1949-1950, Box 1069
- Entry 363, Unclassified Project Decimal Files, 1951-1952, Boxes 1018, 1019, 1022, 1024
- Entry 363, Unclassified Project Decimal Files, 1953-1954, Boxes 376, 382, 383

Cartographic Records:

RG 23, Coast and Geodetic Survey

- Folders for Charts 1000

RG 71, Bureau of Yards and Docks

- Maps for facility 370*, codes 1, 2, 3, 15, 16, 32, 34, 42, 44-48
- Series II Index Boxes 54, 55
- Series II Microfilm, Reels 350*, 1336*

RG 385, Naval Facilities Engineering Command, 1917-1989

- Architectural and Engineering Plans, Box 256*
- Restricted UIC Architectural and Engineering Plans, Boxes N7, N8

Aerial Photos:

RG 373, Defense Intelligence Agency

- Cans ON 2982, ON 3743

4.2. Personal Interviews

Malcolm Pirnie's data collection team visited the following offices located at NWS Earle to interview representatives and research records related to the activity that was conducted at the site:

- Environmental Department
- Engineering Division
- Public Works Department
- Real Property/Real Estate
- Safety and Security Office
- Public Affairs Office

A summary of the personnel interviewed and general information obtained from each office is presented below. These interviews focused on the Conservation Club Range.

Environmental Department - Mr. Lawrence Stefan Burg (Larry Burg) was the primary point of contact (POC) for the Navy range inventory and the data collection portion of the NWS Earle Preliminary Assessment (Ms. Alicia Hartmann is the current POC). Mr. Burg was also part of the GIS Team at NWS Earle. In addition to Mr. Burg, the data collection team interviewed Ms. Michele DiGeambeardino, EFANE Navy Remediation Project Manager (RPM), and Mr. David Ely, Environmental Protection Specialist, NWS Earle. Mr. Ely provided the team access to various environmental documents, maps, aerial photographs and studies conducted at NWS Earle.

Mr. Tom Gentile (Base Forester-Natural Resources Manager) provided additional information regarding the history of the range and immediate area. Mr. Gentile also noted that the range area is in typical pine barrens habitat although NWS Earle is not delineated in the Pinelands National Reserve or recognized by the New Jersey Pinelands Commission District. Last, he noted that there is no timber harvest on site as the tree species are not of timber quality.

In addition to the above, Mr. Burg contacted various facility offices including the Engineering Division, Range Control, Public Works, Real Property/Real Estate, Safety, and Security. The information received from these contacts was incorporated into our discussions with Mr. Burg.

An interview was conducted with Mr. Jim Daverso (Security) who was the Range Manager for the Shooter's Club. Mr. Daverso indicated that the originator and former manager of the Conservation Club Range was Mr. Richard Covaleski.

Mr. Richard Covaleski was contacted by phone and a telephone interview was conducted. His responses were documented and sent to him for review, comment, and confirmation, which was obtained. Mr. Richard Covaleski retired from NWS Earle in 2001 after a thirty-five (35) year career. He held numerous positions during his career and retired as a "Safety Program Analyst". As the originator and manager of the Conservation Club Range he provided a history of the range not obtainable from other sources. According to Mr. Covaleski, the Conservation Club Range was developed early in the 1970s (about 1971) but never officially "opened" as a "safety clearance" was never secured. The original intent was to construct a trap/skeet range for the "Conservation Club", an "environmental/conservation" club that met in the former gatehouse building (C-47) leading to Asbury Road. The Conservation Club's mission was to promote conservation such as the construction of fishing ponds. A trap/skeet range qualified as a Conservation Club project. After completion of the range, it was used infrequently due to lack of equipment as the equipment initially purchased by the Club was stolen. When skeet equipment was available, it was officially owned by the NWS Earle Morale Welfare and Recreation Department for recreational use on NWS Earle ranges. This included a locked trap house required for security of the spring traps/throwers. After a time, the equipment was moved to another range. Mr. Covaleski estimates that over the 5-year period the Conservation Club Range was used, a total of about a dozen boxes of shells were expended (25 shells in a box).

In addition to Conservation Club members, the range was occasionally used by “black powder” enthusiasts, using muzzle loaded weapons. Black Powder enthusiasts would typically recover their balls after shooting. In both cases, Mr. Covaleski remembers that the use of the range was very infrequent. The Conservation Club Range was available for about 5 years and fell in disuse. It was never officially closed. During the time it was “unofficially” active, the configuration, location of firing lines, berms, and clear areas remained the same as when it was constructed.

4.3. On-Site Data Repositories

Malcolm Pirnie reviewed files and drawings located in the Environmental Department at NWS Earle. Malcolm Pirnie made copies of files of interest, particularly the aerial photographs. Other information, such as the Installation Natural Resources Management Plan, was provided by Mr. Burg after the site visit.

4.4. Visual Survey

The data collection team conducted a visual survey of the Conservation Club Range as part of the data collection effort for the PA. The purpose of the visual survey was to identify any MEC ordnance related materials (e.g., expended rounds, fragmentation, range debris, old targets), any evidence of MC (such as ground scarring, stressed or scarred vegetation, or chemical residue) and/or surface features that could provide additional information to aid in the characterization of the site. The visual survey was also used to enhance, augment, or confirm the archival data and, in some cases, provide new data to the team.

A walkover visual survey of the Conservation Club Range and concurrent sweeps along the walkover transects with a pulse induction metal detector survey (for health and safety) was conducted by the site team with the NWS Earle Environmental Department on June 23, 2003. The team was equipped with the Trimble Portable Geographic Position System (GPS) unit for coordinate locations and Fisher M-Scope Pulse Induction Metal Detector. The Fisher M-Scope (M-Scope) responds to all metals with no motion required. A description of the area surveyed and the results of the survey are provided in Section 5.

4.5. Off-Site Data Sources

The data collection team contacted the Monmouth County Historical Society to obtain additional historical information regarding the site. The information obtained was a general history of NWS Earle.

5. SITE CHARACTERISTICS

The following sections provide site-specific information about the Conservation Club Range located on NWS Earle including history and site description; land use; access controls and restrictions; visual survey observation and results; contaminant migration routes; and receptors.

5.1. CONSERVATION CLUB RANGE

5.1.1. History and Site Description

The Conservation Club Range, which comprises approximately six acres, is located in the eastern part of the Mainside area of NWS Earle, slightly south of the Wayside Ordnance Storage Area. According to available information (interviews, aerial photographs, etc.) the range was constructed in the mid-1970s and fell in disuse by 1981. The range was established as a recreational skeet and trap range, classified for small arms (shotguns). Since becoming non-operational, the range has lain fallow and allowed to return to its pre-developed state (Map 5.1-1).

Open fields, trees, and grass surround the Conservation Club Range. The area directly to the east of the Conservation Club Range (across the road) is a wetlands area. A former access gate to NWS Earle lies approximately 100 feet to the south of the Conservation Club Range. The installation boundary lies to the southwest and south of the range. A utility transformer station lies about 150 feet further south. To the north of the range lies the Wayside Ordnance Storage Area while to the west is scrub pine.

5.1.1.1. Topography

The topography of the Conservation Club Range is basically flat with a gentle slope from the firing line going upwards to the area of the berm. The berm is on the northeast side of the range approximately 4 to 5 feet high and 2 feet wide and is the highest feature in the area (Map 5.1-2).

Preliminary Assessment
NWS Earle, Colts Neck, New Jersey



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Map 5.1-1
Visual Survey
Conservation Club Range

Legend

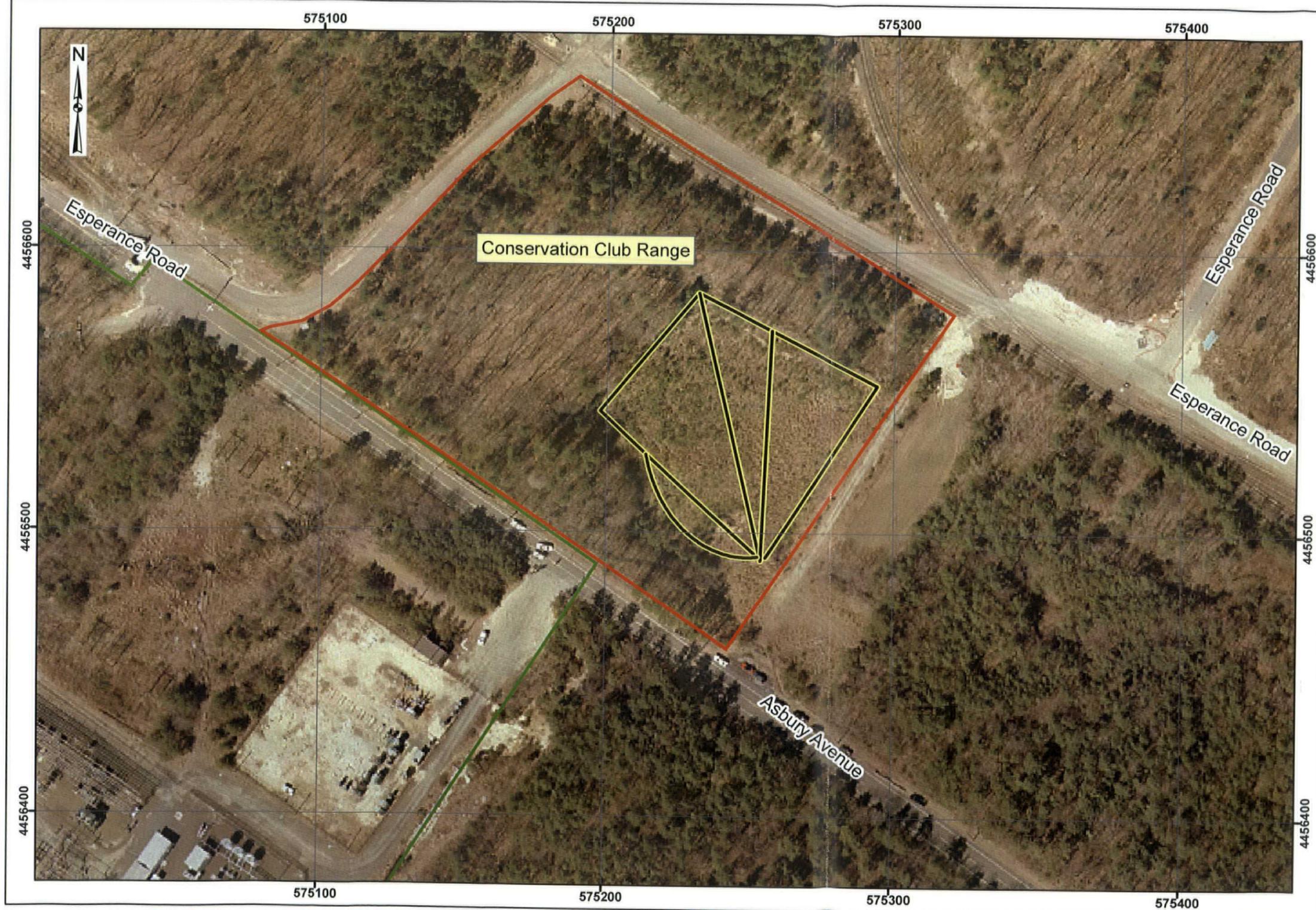
- Installation Boundary
- Conservation Club Range
- Site Reconnaissance



Data Source: NWS Earle, Aerial Photo, 1997
NWS Earle, GIS Data, 2003

Coordinate System: UTM Zone 18N
Datum: NAD 83
Units: Meters

Contract: N62472-02-D-1300
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Preliminary Assessment
NWS Earle, Colts Neck, New Jersey

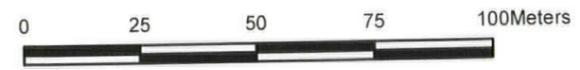


MALCOLM
PIRNIÉ

Map 5.1-2
Range/Site Details
Conservation Club Range

Legend

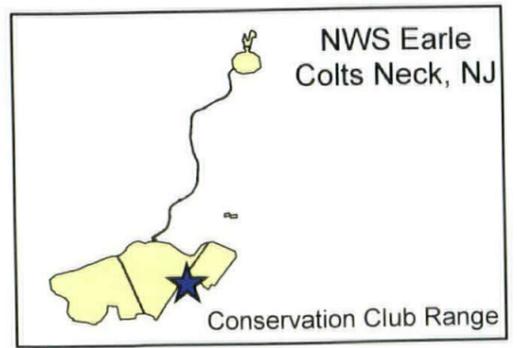
- Installation Boundary
- Roads
- Railroads
- Contours
- Landmark Features
- Conservation Club Range



Data Source: NWS Earle, Aerial Photo, 1997
NWS Earle, GIS Data, 2003

Coordinate System: UTM Zone 18N
Datum: NAD 83
Units: Meters

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5.1.1.2. Geology

NWS Earle (and the Conservation Club Range) is within the Atlantic Coastal Plain Physiographic Province. The upper sections are composed of unconsolidated Cretaceous to Quaternary sediments.

5.1.1.3. Soil and Vegetation Types

The soils of the Conservation Club Range are classified as Atsion Sand or udorthents as indicated on a soil classification map, "Soil Series of NWS Earle", (INRMP, 2002). The eastern half of the Conservation Club Range is classified as composed of "Atsion Sand", a poorly drained soil with a moderately rapid to rapid permeability. Organic content is moderate and un-limed areas are extremely acidic. As such, it is possible for metals to leach from the soil to the groundwater.

The western half of the Conservation Club Range is udorthents ("UA" smooth) which has no characteristic profile, representative of fill placed on top of the original soil. The udorthents area is the result of the construction of the adjacent ordnance storage area prior to construction of the range.

The general plant community in the Conservation Club Range and surrounding area consists of hardwoods and pine. On the range firing line and the areas leading to the berm (northeast direction) and tree line (northwest direction) the vegetation consists of short, dense grass, briars and brush. The vegetation past the berm and tree line consists of dense brush and small trees, primarily pitch pine. Specific species were not identified.

Given the above, erosion on the range would be minimal along with minimal frost heave.

5.1.1.4. Hydrology

The Conservation Club Range is in the Navesink Swimming River Watershed Basin. The nearest water bodies are Horse Pond (1,830 feet southwest of the range) in the Shark River Watershed Basin and Intransit Pond (3,000 feet east of the range) in the Navesink Basin. A small wet depression was noted during the site walk north of the berm and along the dirt road on the eastern side of the range. What little runoff is not absorbed flows into this depression.

A wetland is located adjacent to (across the dirt road) and on the eastern and southeastern sides of the range. The wetland is classified as Palustrine Forested Broadleaved Deciduous (PFO1).

5.1.1.5. Hydrogeology

The Magothy Aquifer underlies NWS Earle and the Conservation Club Range and is composed of permeable sand beds of the late Cretaceous age. Confining units of silt and clay overlie this aquifer. Other local, shallower aquifers include the Englishtown Formation, the Wenonah Formation and Mt. Laurel Sand.

There are no specific data on the hydrogeology beneath the range. The hydrogeology of Site 5 however (about 2500 feet northwest of the range) indicates unconfined shallow groundwater in the Kirkwood and Vincetown Formations (Brown and Root, 1997). The groundwater flow at Site 5 is generally towards the northeast.

5.1.1.6. Cultural and Natural Resources

As described in Section 3.7, an architectural resources survey at NWS Earle was conducted in 1996. This survey summarized the architectural resources under the jurisdiction of NWS Earle and involved inventory and National Register of Historic Places (NRHP) evaluation of 453 buildings and structures erected prior to 1946 and the description of post-1946 buildings and structures. Among the pre-1946 buildings and structures, 14 meet the NRHP criteria. Of the post-1946 buildings and structures, none were deemed of exceptional significance as required under NRHP criteria for resources less than 50 years of age (INRMP, 2002).

A cultural survey of NWS Earle was conducted in 1990 (INRMP, 2002). The survey summarized the archeological resources under the jurisdiction of the installation. The survey indicated 13 locations in the Mainside area that have a high potential for containing prehistoric sites.

The only intact historical cultural resource at NWS Earle is the Schenk-Walling Cemetery.

5.1.1.7. Endangered and Special Status Species

As discussed in Section 3.8, in an effort to inventory the natural resources at NWS Earle, three federally protected species surveys were conducted since 1988. These surveys have identified the locations of each rare species population (INRMP, 2002). The list of known or potential protected species is presented in Table 3.8-1. As discussed in Section 3.8, the occurrence of any of these species on the Conservation Club Range could not be determined; however the habitat of the range could support any number of the listed species.

5.1.2. *Visual Survey Observations and Results*

As discussed in Section 4.4, a walkover visual survey and concurrent sweeps along the walkover transects with a pulse induction metal detector (for health and safety) of the Conservation Club Range was conducted by the site team with members of the NWS Earle Environmental Department.

The team was equipped with the Trimble Portable GPS unit for coordinate locations and Fisher M-Scope Pulse Induction Metal Detector. The Fisher M-Scope (M-Scope) responds to all metals with no motion required. It is sufficiently sensitive to pick up small metal fragments in the surface soil. The M-Scope was used for health and safety considerations. It is also assumed that no "maintenance" was conducted on the soils. That is, there was no turning of the soil that would have placed shot fragments or other MC below the surface. Thus a quantity of shot in the soil, or other MC, could be detected by the M-Scope Pulse Induction Metal Detector. Specifics of the survey are presented below.

The team arrived at the Conservation Club Range on June 23, 2003. The weather conditions were excellent for visual observations: clear sky, no wind, with a temperature in warm to hot range (85 °F). The site team consisted of two Malcolm Pirnie personnel, two EOD specialists from the Malcolm Pirnie Team, and two representatives from the NWS Earle Environmental Department. The initial observation by the team was that the range area was overgrown with brush, briars and high grass in the shooter's area (southwest corner) to briars, small pines (10 to 12 ft high) and miscellaneous fauna in the areas away from the shooter's area.

FINAL PRELIMINARY ASSESSMENT

The location of the Conservation Club Range was verified with the GPS unit. The location was 599587 E and 518192 N-NJ State Plane Coordinates, which was the same as the listed origin of the Conservation Club Range (599600 E and 518200 N). The sensitivity of the Fisher M-Scope was spot checked and was sufficiently sensitive to detect foil wrap and steel-toed boots.

Transects were walked radiating out from the origin (shooter's area) with the M-Scope, that is to the NE, NNE, N, NW, W from the south or origin. The M-Scope was slowly moved perpendicular to the forward movement to assure that "targets" would be detected. The arc provided a swath of six feet, three feet on either side of each transect.

Map 5.1-1 presents the approximate location of the transects. Five transects were walked outward from the origin. The direction and approximate distances were as follows: NE 225 feet along the perimeter of the range, NNE 225 feet to the berm, N 270 feet to the berm, NW 180 feet to the tree line, and along the western perimeter about 200 feet. In addition both sides of the approximately 250-foot long berm (a 12 foot swath) on the northeast side of the range (250 feet) were checked. No metal, spent shot, foil wrap, or other metal fragments or trash, were found in any of the "sweeps", including the areas on either side of the berm.

In addition to the transects, the area around the origin (shooters' area) area was thoroughly scanned. Again, no metal (spent shot, foil wrap, or other metal fragments or trash) was found.

Visual inspection was also conducted. The visual inspection was performed during the prior transects and additional transects throughout the area. Clay target fragments and other material expected to be on a sheet/trap range was the focus of the inspection. No clay target fragments were found. One shotgun "wad" (a fiber or plastic spacer/cup inserted between the power and shot in a shotgun shell) was recovered in the wooded area about 135 feet NW of the origin under some pine needles. This area also had a small berm. Closer inspection of the berm did not reveal any evidence that the area was used for either skeet or trap shooting. Additionally, visual inspection of the larger trees did not indicate any scarring or damage due to firearms.

The location of the berm and other landmarks were determined using the GPS. These were used to further delineate the range.

In summary, with the exception of the single shotgun “wad”, there was no direct evidence of spent shot, clay target fragments or other material to visually confirm that the site was used as a range.

Lastly, there were no buildings in the area. The range and surrounding area appeared undisturbed and seemed to have lain fallow for an extended period of time.

A visual depiction of the site reconnaissance is provided on Map 5.1-1 located at the end of Section 5.1. Additional range/site details are illustrated on Map 5.1-2 also located at the end of Section 5.1.

5.1.3. Munitions and Munitions Related Materials Associated with the Site

This section describes the munitions or munitions related materials known or suspected to be at the Conservation Club Range, including the types and estimated maximum penetration depths. This includes both MEC and non-hazardous munitions related scrap (e.g., fragmentation, base plates, inert mortar fins).

There is no documentation regarding the munitions associated with the Conservation Club Range. As the Range was established for trap and skeet shooting, munitions would be limited to small arms, such as shotgun shells. This includes 12 gauge, 16 gauge, 20 gauge, 28 gauge and 0.410 bore. For the muzzle loaded weapons, the “ball” or slug would have been hand made and were typically collected after firing.

Some ordnance items have unique characteristics that require special consideration or cause specific concerns for munitions response managers as a site progresses through the munitions response and/or remedial process. For example, special attention ordnance includes ordnance items that either have a very high hazard level or may cause concerns among regulators and stakeholders. Such ordnance items include ordnance filled with Chemical Warfare Materiel (CWM) (safety concern), electrically-fuzed ordnance (safety concern), and depleted uranium (DU) associated ordnance (public relations concern). As part of the PA, special attention ordnance known or suspected to be at the site, are highlighted in this section of the report.

Based on conversations with Environmental Department personnel at NWS Earle during the PA process and discussions with the range developer, no special consideration ordnance was and is known or suspected to be present at the Conservation Club Range.

5.1.4. MEC Presence

The Conservation Club Range has been subdivided and categorized into one of three levels of MEC presence including: Known MEC Areas, Suspect MEC Areas, and Areas where No Evidence exists to indicate that MEC is known or is suspected to be at the site. The MEC presence is discussed below.

5.1.4.1. Known MEC Areas

There are no known MEC areas associated with the Conservation Club Range.

5.1.4.2. Suspected MEC Areas

There are no suspected MEC areas associated with the Conservation Club Range.

5.1.4.3. Areas Not Suspected to Contain MEC

Based on available documents collected and conversations with Environmental Department personnel at NWS Earle during the PA process and the range developer, the 6-acre area of the former Conservation Club Range is not suspected to contain MEC as munitions fired on the range are not categorized as MEC.

5.1.5. Ordnance Penetration Estimates

The depth to which munitions penetrate below the ground surface depends on many factors, including the type of soil, the angle of impact, the size of the munition, the velocity at impact, and site-specific environmental conditions. Over the years, the DoD has studied and modeled munitions penetration depths and has issued various guidance and technical documents on the subject. The technical documents, however, apply to air dropped and indirect fire weapons and do not apply to skeet ranges. By design, skeet ammunition is dispersed as pellets over a small area in the direction of fire. According to the *Navy Programming Guide* (1958), the minimum surface danger zone for a skeet range is 900 feet. Pellets dispersed from a shotgun would be

deposited on the ground surface well within this zone and would not penetrate the ground surface unless disturbed.

At the Conservation Club Range, muzzle loaded weapons were also assumed to be used. The “balls” or slugs from the latter were assumed to be retrieved by the shooters. The site visit corroborated that the Conservation Club Range was designed so that the spent lead shot would have impacted the berms.

5.1.6. Munitions Constituents

Munitions constituents associated with shotgun skeet/trap shooting potentially include: lead, lead styphnate/lead azide, antimony, arsenic, copper, tin, zinc, iron, and polycyclic aromatic hydrocarbons (PAHs) associated with clay targets.

Based on interviews with NWS Earle personnel and the results of the visual and pulse induction metal detector survey, historic information on the range, the relatively short period of operation (about 5 years) and nominal use of the range, the likelihood of MC being on the Conservation Club Range is minimal.

5.1.7. Contaminant Migration Routes

Munitions constituents associated with shotgun skeet and trap shooting potentially include: lead, lead styphnate/lead azide, antimony, arsenic, copper, tin, zinc, iron, and polycyclic aromatic hydrocarbons (PAHs) associated with clay targets. Munitions constituents from muzzle-loaded weapons consist of the lead ball or slug, however these were retrieved by the shooters. Lead from shot in soil can become soluble and migrate through the soil into the local aquifer. As indicated previously however, no lead shot or metal fragments of any kind were detected in the range area. This corroborates information gathered during interviews that indicated the Conservation Club Range was seldom used.

5.1.8. Receptors

There are three groups of potential human receptors (Navy personnel, trespassers, and authorized hunters) and one group of potential biota receptors (wildlife) at the Conservation Club Range.

Current potential human receptors include Navy personnel (e.g., conducting regular patrols), trespassers, and authorized hunters (i.e., authorized Navy and civilian personnel and their dependants). Trespassers are extremely unlikely to occur at the range due to the security fencing and periodic perimeter patrols; however, trespassers are considered potential receptors due to the range's proximity to the installation boundary and public road (Asbury Avenue). Current biota receptors include the flora (predominantly grassland, hardwoods, and pine species) and fauna (large mammals such as deer, small mammals such as rabbits, reptiles/amphibians, and bird species) present at the site.

Future development at the range is unlikely due to the proximity to the Wayside Ordnance Storage Area and assumption that NWS Earle will remain a Navy installation into the foreseeable future.

Other than the range's proximity to a wetland, there are no land use restrictions that would prevent the Navy from erecting a small building as a security post (as was the case in the past) or some other use. Therefore, all current potential receptors are also considered potential future receptors and Navy personnel and/or Navy contractors that may conduct potential future wildlife or land management techniques or construct a building would also be future receptors.

Regarding animal receptors, as indicated in the NWS Earle Integrated Natural Resource Management Plan, the range is not currently located in a prescribed burn area (INRMP, 2002). However, wildlife food plots were previously maintained at and adjacent to the range. This practice was discontinued due to high maintenance costs. The range could be among areas selected in the future for some wildlife or land management technique such as disking, mowing, or prescribed burning.

5.1.8.1. Nearby Populations

As described previously, the Conservation Club Range is located near the southern border of the installation. The Conservation Club Range is also adjacent to the Wayside Ordnance Storage Area of the installation. There are no residential or office areas to the west, north or east of the former range.

NWS Earle Mainside is home to a combined workforce of approximately 500 military and civilian personnel. Nearby in the township, the population of Colts Neck Township was 12,331

in 2001, with a population density of 389 residents per square mile. According to the Monmouth County Department of Planning (May 2002), the population of Monmouth County in 2000 was 615,301 with a population density of 1304 persons per square mile.

5.1.8.2. Buildings Near/Within Site

Historically, there was a gate and gatehouse adjacent to the Conservation Club Range (Gate 24-Wayside/Asbury Gate). This gatehouse was building C-47 and its associated sanitary system. The building was demolished. The sanitary system was abandoned. There are no other structures near or within the site.

5.1.8.3. Utilities On/Near Site

There is an electrical utility line along the road parallel to the eastern boundary of the Conservation Club Range. Some 380 feet southwest of the Conservation Club Range, off of the NWS Earle property, there is an electrical transformer substation. Also, during the site visit a stand up water valve for fire protection was also noted near the former gate. No other utilities are on or near the Conservation Club Range.

5.1.9. Land Use

Open fields, trees, and grass surround the Conservation Club Range. The area directly to the east of the Conservation Club Range (across the road) is a wetlands area. A former access gate to NWS Earle lies approximately 100 feet to the south of the Conservation Club Range. The installation boundary lies to the south of the range along the former access gate from Asbury Road. A utility transformer station lies about 150 feet further south. To the north of the range lies the Wayside Ordnance Storage Area while to the west is scrub pine.

The land use for the Conservation Club Range and NWS Earle is not expected to change in the foreseeable future.

5.1.10. Access Controls / Restrictions

The property comprising NWS Earle Mainside is bounded by security fencing, with security at all entrances. The Conservation Club Range is contained within NWS Earle. Initial access to the

installation (the administration area), is through the manned security checkpoint at the main gate. Access from the administration area to the range requires going through an internal security gate leading to the Wayside Ordnance Storage Area. There are no signs directing to or indicating the former range. The boundary of the ordnance storage area, the range and NWS Earle is along the southern edge of the installation and is patrolled by security patrols in land vehicles.

The Conservation Club Range is also located in a potentially constrained area with respect to land use. Potential constraints of unused land at NWS Earle include man-made or natural conditions such as wetlands, wetland buffers, flood prone areas, archaeologically sensitive areas, threatened and/or endangered species, Pinelands protected plants, and ordnance storage and safety areas.

5.1.11. Conceptual Site Model

This Conceptual Site Model (CSM) was developed following guidance documents issued by the USEPA for hazardous waste sites and the U.S. Army Corps of Engineers (USACE) for ordnance and explosives (OE) sites. Guidance documents included the USEPA's Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (EPA/540/G-89/004) and the USACE CSM Guidance Development of Integrated Conceptual Site Models for Environmental Ordnance and Explosives (OE) Sites, which was final as of February 2003.

The CSM describes the site and its environmental setting. The CSM presents information regarding: 1) MEC and/or MC known or suspected to be at the site; 2) current and future reasonably anticipated or proposed uses of the real property; and 3) actual, potentially complete, or incomplete exposure pathways that link them. The CSM is the basis for the risk evaluation, prioritization, and remediation cost estimate.

The CSM is presented in a series of information profiles that presents information about the site. The information profiles are included in Table 5.1-1 below.

Table 5.1-1: Conceptual Site Model Information Profiles – Conservation Club Range		
Profile Type	Information Needs	Preliminary Assessment Findings
Range/Site Profile	Installation Name	NWS Earle
	Installation Location	Colts Neck, Monmouth County, New Jersey
	Range/Site Name	Conservation Club Range
	Range/Site Location	Slightly south of the southwest corner of the Wayside Ordnance Storage Area. West of the former building C-47 (Gate 24 the Wayside Asbury Gate). Asbury Avenue forms the southern boundary of the Range.
	Range/Site History	The range was constructed in the mid-1970s and closed by 1981. Non-operational status was a consequence of never begin officially opened (lacked a safety clearance) and minimal-use.
	Range/Site Area and Layout	The range is in a trapezoidal area bounded by roads with the base along Asbury Avenue (640 feet) and sides 476 and 472 feet. The top of the trapezoid is 518 feet. A rectangular cleared area was the firing area beginning at the southeast corner. Previously a “T” shape firing line was located in this corner. Targets were released from the firing line in a 90-degree arc from the northeast to the northwest. A berm was constructed about 200 feet from the firing line. The range was approximately 6.3 acres in area.
Range/Site Structures	Aerial photographs indicate the “T” shape firing line as the only structure on the range. Former building C-47 (Gate 24-Wayside/Asbury Gate) was located some 16 feet southeast of the firing line. There is a record of a septic tank in proximity to the former building that has not been located during a separate investigation. There is also a standup water valve for fire protection in the vicinity of the former firing line. A chain link metal fence is along the boundary of Asbury Avenue.	

Table 5.1-1: Conceptual Site Model Information Profiles – Conservation Club Range

Profile Type	Information Needs	Preliminary Assessment Findings
	Range/Site Boundaries	<p>SE: The range boundary is about 476 feet in length along a dirt road (designated Road A-1 in 1944).</p> <p>SW: This boundary is a chain link metal fence about 640 feet long, parallel to Asbury Avenue (a public road). This is part of the NWS boundary. Note a utility transformation station is about 82 feet SW of Asbury Ave.</p> <p>NW: This boundary is about 472 feet long and is parallel to an unnamed asphalt road.</p> <p>NE: This boundary is about 518 feet long and is parallel to an unnamed asphalt road.</p>
	Range/Site Security	<p>The range is located within the NWS Earle fence. No further security was evident in the vicinity of the range. The fence is a standard 8 foot high “commercial” chain link fence topped with 2 foot barbwire at a 45-degree angle.</p> <p>NWS Earle is a secure site with armed guards at the entrance. All vehicles and personnel are screened prior to entry. Patrols in vehicles are also periodically evident throughout the site.</p>
Munitions/ Release Profile	Munitions Types	<p>Specific ordnance types used at the range were not documented, however, general shotgun ammunition for skeet and trap shooting includes: 12 gauge, 16 gauge, 20 gauge, 28 gauge and 0.410 bore shotgun shells. Muzzle loaded weapons employing black power were also used on the range.</p>
	Maximum Probability Penetration Depth	<p>Given the type of “munitions” used on the range, it is expected that any spent shot would be on the surface.</p>
	MEC Density	<p>None</p>
	MEC Scrap/Fragments	<p>None</p>
	Associated Munitions Constituents	<p>Lead, lead styphnate/lead azide, antimony, arsenic, copper, tin, zinc, iron, PAHs.</p>

FINAL PRELIMINARY ASSESSMENT

Table 5.1-1: Conceptual Site Model Information Profiles – Conservation Club Range		
Profile Type	Information Needs	Preliminary Assessment Findings
	Migration Routes/Release Mechanisms	About half of the area of the range has acidic soils. As such, it is possible for spent shot (metals) to leach from the soil to the groundwater. Erosion could also occur. Human intervention is not anticipated as current and future land use is to leave the range and surrounding area undeveloped.
Physical Profile	Climate	New Jersey Pine Barrens climate with four well defined seasons (Closest Weather Station-Freehold, New Jersey). Highest temperatures occur in July (annually 84°F or higher occur on an average of 31 days). Coldest temperatures occur mid-January through mid- February (annually 21°F or lower for 33 days). Based on the climate type, wind and water erosion and frost heave are common
	Topography	The topography is basically flat with a gentle slope from the firing line going upwards to the area of the berm. The berm is on the northeast side of the range approximately 4 to 6 feet high and 2 feet wide and is the highest feature in the area.
	Geology	NWS Earle (and Conservation Club Range) is within the Atlantic Coastal Plain Physiographic Province. The upper sections are composed of unconsolidated Cretaceous to Quaternary sediments.
	Soil	The eastern half of the range is classified as composed of "Atsion Sand", a poorly drained soil with a moderately rapid to rapid permeability. Organic content is moderate and un-limed areas are extremely acidic. The western half of the range is udorthents ("UA" smooth) no characteristic profile, representative of fill placed on top of the original soil. The udorthents area is the result of the adjacent ordnance storage prior to construction of the range.

Table 5.1-1: Conceptual Site Model Information Profiles – Conservation Club Range

Profile Type	Information Needs	Preliminary Assessment Findings
	Hydrogeology	<p>The Magothy Aquifer underlies NWS Earle and the Conservation Club Range and is composed of permeable sand beds of the late Cretaceous age. Confining units of silt and clay overlie this aquifer. Other local, shallower aquifers include the Englishtown Formation, the Wenonah Formation and Mt. Laurel Sand. The New Jersey Water Supply Administration has declared these aquifers Critical Area 1. (Critical Area 1 is one of two areas in New Jersey where state law prohibits water allocations being issued in critical aquifers within these areas.) Drinking water for the installation is supplied by New Jersey American Water Company.</p> <p>There are no specific data on the hydrogeology beneath the range. The hydrogeology of Site 5 however (about 2500 feet NW of the range) indicates unconfined shallow groundwater in the Kirkwood and Vincetown Formations. The groundwater flow at site 5 is generally towards the northeast.</p>
	Hydrology	<p>The range is in the Navesink Swimming River Watershed Basin. The nearest water bodies are Horse Pond (1800 feet southwest of the range) in the Shark River Watershed Basin and Intransit Pond (3000 feet east of the range) in the Navesink Basin. A small wet depression was noted during the site walk north of the berm and along the dirt road on the eastern side of the range.</p> <p>A wetland is located adjacent to (on the other side of the dirt road) and on the eastern and southeastern sides of the range. The wetland is classified as Palustrine Forested Broadleaved Deciduous (PFO1).</p>
	Vegetation	<p>The general plant community in the range and surrounding area consists of hardwoods and pine. On the range firing line and the areas leading to the berm (northeast direction) and tree line (northwest direction) the vegetation consists of short, dense grass, briars, and brush. Past the berm and tree line the vegetation consists of dense brush and small trees, primarily pitch pine. Specific species were not identified.</p>

Table 5.1-1: Conceptual Site Model Information Profiles – Conservation Club Range

Profile Type	Information Needs	Preliminary Assessment Findings
Land Use and Exposure Profile	Current Land Use	The range is currently not operational. The area is identified as open to hunting for military, civilian personnel, and their dependents.
	Current Human Receptors	The range is located slightly less than 2 miles from the active site administration area in an area not frequented by site personnel. Thus the potential for on-site receptors is minimal. The range is adjacent to a public road (Asbury Avenue) and across the street from a utility transformer station. Potential receptors would include Navy personnel conducting regular security patrols authorized hunters and trespassers.
	Current Activities (frequency, nature of activity)	Navy personnel activities (conducting patrols) would be non-intrusive (walking over the range) and their exposure to MEC and/or MC would be from the surface. Trespassers and authorized hunters, although unlikely, would be conducting similar non-intrusive activities such as walking over the range.
	Potential Future Land Use	Future development at the range is unlikely due to the proximity to the Wayside Ordnance Storage Area and likelihood that NWS Earle will remain a Navy installation into the foreseeable future. As indicated in the NWS Earle Integrated Natural Resource Management Plan, the range is not currently located in a prescribed burn area. However, wildlife food plots were previously maintained at and adjacent to the range. This practice was discontinued due to high maintenance costs. The range could be among areas selected in the future for some wildlife or land management technique such as disking, mowing, and prescribed burning to maintain areas in early successional stages, for instance, which provides good nesting and foraging habitat for a number of songbird and small mammal species. Other than the range's proximity to a wetland, there are no land use restrictions that would prevent the Navy from erecting a small building as a security post or some other use.

Table 5.1-1: Conceptual Site Model Information Profiles – Conservation Club Range

Profile Type	Information Needs	Preliminary Assessment Findings
	Potential Future Human Receptors	Most likely the current receptors will continue to be receptors in the future. In addition, should any buildings be erected at the range or any conservation measures take place, Navy personnel and/or Navy contractors, conducting such work would be future receptors.
	Potential Future Land Use-Related Activities:	Anticipated future land use and activities are likely to remain the same as the current.
	Zoning/Land Use Restrictions	None other than that associated with ordnance storage and regulations associated with the adjacent wetlands
	Demographics/Zoning	The population of Colts Neck Township was 12,331 in 2001, with a population density of 389 residents/square mile. According to the Monmouth County Department of Planning (May 2002), the population of Monmouth County in 2000 was 615,301 with a population density of 1304 persons/square mile. Approximately 1,900 residents live within a 3-mile radius of NWS Earle and there are approximately 500 homes on the installation.
	Beneficial Resources	The Magothy Aquifer, Englishtown Formation, the Wenonah Formation, and the Mt. Laurel Sand are classified by the New Jersey Water Supply Administration as Critical Area 1.
Ecological Profile	Habitat Type	Hardwoods and pine forest, successional field with primarily pitch pine
	Degree of Disturbance	<p>Although habitat at the range had been disturbed in the past when it was created, the range has not been used in some time and as such has reverted back to a natural state.</p> <p>The degree of disturbance is “Low”, the range is and will be unused, habitat and species present are and will be undisturbed (i.e., undisturbed grassland, forest, wetland, lake).</p>

Table 5.1-1: Conceptual Site Model Information Profiles – Conservation Club Range

Profile Type	Information Needs	Preliminary Assessment Findings
	Ecological Receptors	Common wildlife species in forested areas at NWS Earle include whitetail deer (<i>Odocoileus virginianus</i>), white-footed mouse (<i>Peromyscus leucopus</i>), pine vole (<i>Microtus pinetorum</i>), eastern gray squirrel (<i>Sciurus carolinensis</i>), raccoon (<i>Procyon lotor</i>), Virginia opossum (<i>Didelphis virginiana</i>), woodchuck (<i>Marmota monax</i>), red fox (<i>Vulpes vulpes</i>), common gray fox (<i>Urocyon cinereoargenteus</i>), eastern chipmunk (<i>Tamias striatus</i>), masked shrew (<i>Sorex cinereus</i>), least shrew (<i>Cryptotis parva</i>), long-tailed weasel (<i>Mustela frenata</i>), and eastern mole (<i>Scalopus aquaticus</i>). Common wildlife in grassy fields and disturbed areas at NWS Earle include eastern cottontail (<i>Sylvilagus floridanus</i>), white-footed mouse, meadow vole (<i>Microtus pennsylvanicus</i>), and meadow jumping mouse (<i>Zapus hudsonius</i>).
	Federal Endangered Species:	None
	Federal Threatened Species:	Swamp Pink (<i>Helonias bullata</i>)
	State Endangered Species:	Coopers Hawk (<i>Accipiter cooperii</i>), Pied-billed grebe (<i>Podilymbus podiceps</i>), Pine Barrens treefrog (<i>Hyla andersonii</i>), Swamp pink (<i>Helonias bullata</i>), New Jersey rush (<i>Juncus caesariensis</i>), Knieskern's beaked rush (<i>Rhynchospora knieskernii</i>)
	State Threatened Species:	Barred Owl (<i>Strix varia</i>), Red-shouldered hawk (<i>Buteo lineatus</i>), Pine barren reedgrass (<i>Calamovilfa brevipilis</i>), Curly grass fern (<i>Schizaea pusilla</i>)
	Other Ecological Receptors:	None
	Relationship of MEC/MC Sources to Habitat and Potential Receptors	Ecological receptors may come into direct contact with MC (in soil), or MC that migrate from surface soil via storm water runoff to the adjacent wetland area. Ecological receptors may also come into contact with MC that has been incorporated into the food chain (bioaccumulated in plants and animals).

A key element of the CSM is the exposure pathway analysis. For MEC, a complete or potentially complete exposure pathway must include the following components: 1) a source (e.g., locations

where MEC are expected to be found); 2) access (e.g., controlled or uncontrolled access, items on the surface or within the subsurface); 3) an activity (e.g., non-intrusive grounds maintenance or intrusive construction); and 4) receptors (e.g., Navy personnel, construction workers, recreational users, authorized visitors, or trespassers). It is important to recognize that environmental mechanisms (e.g., erosion) and/or human intervention may result in the repositioning of MEC.

For MC, a complete or potentially complete exposure pathway must include the following components: 1) a source (e.g., locations where MC are expected to be found); 2) an exposure medium (e.g., surface soil); 3) an exposure route (e.g., dermal contact); and 4) receptors (e.g., Navy personnel, construction workers, recreational users, authorized visitors, or trespassers). If the point of exposure is not at the same location as the source, the pathway may also include a release mechanism (e.g., volatilization) and a transport medium (e.g., air).

The potential interactions between the source and receptors are assessed differently between MEC and MC. For MC, interaction between the source and receptors involves a release mechanism for the MC, an exposure medium that contains the MC, and an exposure route that places the receptor into contact with the contaminated medium. For MEC, interaction between the potential receptors and an MEC source has two components. The receptor must have access to the source and must engage in some activity that results in contact with individual MEC items within the source area.

MEC Exposure Pathway Analysis

While the Conservation Club Range is accessible currently to Navy personnel, authorized hunters (i.e., Navy and civilian personnel and their dependents), and wildlife that may use the area, there are no complete exposure pathways. Essentially, the basis for all identified exposure pathways being incomplete is there is no source of MEC or MEC expected at the range. Specifically, only shotguns were used for skeet and trap shooting. Additionally some muzzle loaded weapons were used. MEC are not expected at the range.

MC Exposure Pathway Analysis

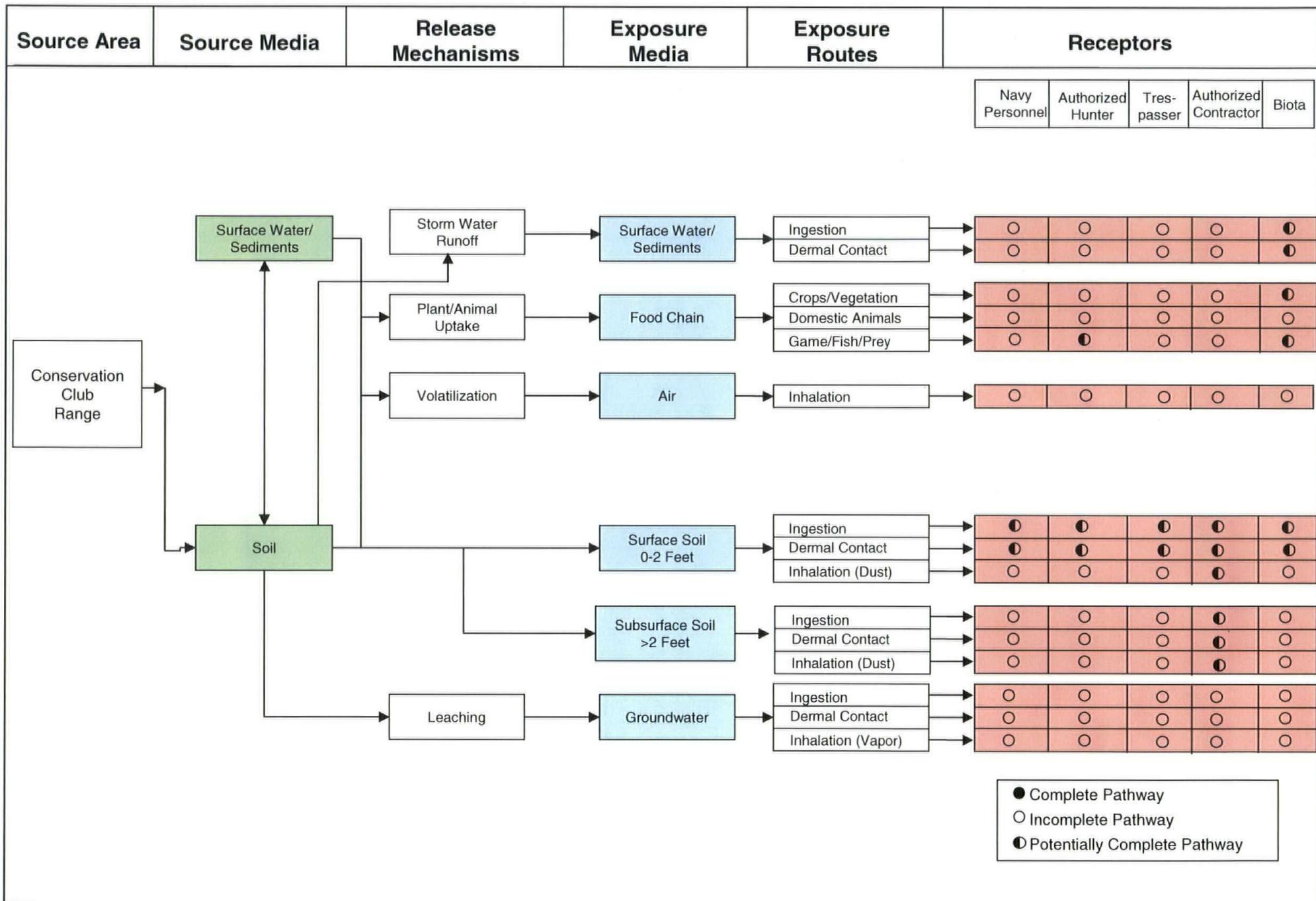
As shown on Figure 5.1-1, although MC is not anticipated to occur at high concentrations at the Conservation Club Range due to the historical (anecdotal) evidence that the range was seldom

used and no spent shot or fragments of clay targets were observed during the visual survey and pulse induction metal detector survey, several potentially complete exposure pathways were identified.

Soil potentially impacted by MC does represent a potential source medium, as illustrated in Figure 5.1-1. Potential receptors include both human (Navy personnel, authorized hunters, trespassers, authorized contractors) and ecological receptors (biota) that may come in direct contact with soil. Potentially complete exposure pathways exist for both human and ecological receptors via direct contact with surface soil and subsequent inadvertent ingestion and dermal contact. Inhalation of dust is not considered a complete exposure pathway for current receptors (i.e., Navy personnel performing patrols and authorized hunters) due to the amount of vegetative cover and non-intrusive nature (walking across the range) of their activities. Complete exposure pathways may also potentially exist for authorized contractors should any development of the range occur in the future. Authorized contractors constructing a building, road, and/or excavating for utilities or conducting wildlife or land management techniques could be exposed to soil via inadvertent ingestion, dermal contact, and inhalation of dust generated during construction.

Soil also represents a potential exposure medium when considering plant/animal uptake for biota (including game such as deer and wild turkey) and human receptors consuming the affected biota (e.g., hunting).

No surface water is in the area. Groundwater may present an exposure medium, but impacts by MC are not anticipated as MC is not anticipated. In addition, for groundwater, sufficient evidence for a complete exposure pathway does not exist.



● Complete Pathway
 ○ Incomplete Pathway
 ◐ Potentially Complete Pathway



Prepared for: 

PRELIMINARY ASSESSMENT – FINAL PA REPORT
 CONSERVATION CLUB RANGE – MC EXPOSURE PATHWAY ANALYSIS
 MC EARLE, NEW JERSEY

MALCOLM PIRNIE, INC.

FIGURE 5.1-1

5.1.12. Summary

Based upon the information presented in the previous sections, beginning in the mid-1970s, the Conservation Club Range was available for skeet and trap shooting. During the time the range was available however, it was infrequently used. A firing line was located at the range entrance, and clay targets were launched from a "T" firing area. Berms were constructed at the ends of the firing area. Anecdotal information indicates the range was also occasionally used by muzzle loading weapons enthusiasts.

A visual survey along pre-selected transects concurrently employing pulse induction metal detector sweeps (for health and safety) failed to locate any evidence of range use such as clay targets (or fragments), or detect any spent shot (or metal fragments) in the soil at the Conservation Club Range. This includes the firing areas and berms (the highest feature in the range area) where expended shot would be expected. One shotgun "wad" (a fiber or plastic spacer/cup inserted between the power and shot in a shotgun shell) was recovered in a wooded area by a small berm northwest of the firing area. Additionally, visual inspection of the larger trees did not indicate any damage due to firearms.

Historical documentation and discussions with current and retired NWS Earle personnel indicate that no other explosives or munitions were used on the Conservation Club Range, and that the range was not used for purposes other than recreation. Additionally, according to the developer of the Conservation Club, the range was used for a relatively short period of time, about 5-years, and was used infrequently during that time. He also estimated that less than a dozen boxes of shells were expended on the range (300 rounds) during the period it was open. Currently, the Conservation Club Range is not used for military or other purposes, and lies fallow near the southern boundary of the installation.

Thus, to date, no clay targets (or fragments) were found in the range area, and no expended shot was found in the soil, leading to the conclusion of no MC on the range.

With regard to groundwater, the lack of MC in the soil precludes any pathway to groundwater.

Appendix A: References

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- 2) *U.S. Code, Title X., Section 2703*, 2001.
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- 4) *DoD Directive on Explosives Safety DoD Directive 6055.9 (DoD Ammunition and Explosives Safety Standards)*, Prepared by: DoD Explosives Safety Board (DDESB), July 2002.
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Appendix B: Project Source Data – General

U.S. Naval Weapons Station Earle

Integrated Natural Resources Management Plan

Plan Years
2001-2010

Prepared for:



Atlantic Division,
Naval Facilities
Engineering Command
Norfolk, Virginia



Naval Weapons
Station Earle
Colts Neck,
New Jersey

November 2001



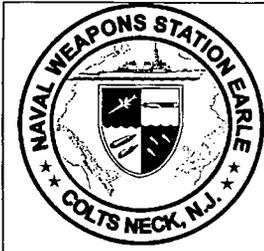
Executive Summary

This Integrated Natural Resources Management Plan (INRMP) was developed for Naval Weapons Station (NWS) Earle, New Jersey, to comply with:

- Sikes Act, 16 U.S. Code 670 a;
- Department of Defense Instruction (DODINST) 4715.3 (Environmental Conservation Program); and
- Operating Naval Instruction (OPNAVINST) 5090.1B CH-2, Chapter 22 (Natural Resources Management) and 27 (Natural Resources Damages).

This INRMP covers the 10-year period 2001-2010, but will be continually monitored, reviewed annually, and revised and reapproved after five years. The plan utilizes an ecosystem-based approach to integrate the management of land, fish and wildlife, forests, aquatic resources, and outdoor recreation at NWS Earle.

An INRMP project matrix was developed for NWS Earle (Table ES-1). The plan addresses land management practices that reduce grounds maintenance costs, protect the land and facilities, conserve soil and water, improve wildlife diversity and habitat, and improve outdoor recreation opportunities. Implementation of this plan will help NWS Earle achieve ecosystem-based natural resources management objectives and will serve to demonstrate the installation's commitment to the best possible stewardship of its natural resources consistent with its military mission.



Naval Weapons Station Earle

History and Mission

Naval Weapons Station Earle's history began in 1943, when a pressing need developed for an Ammunition Depot in the greater New York area to support the war effort. A board was established to locate a suitable site, and chose Earle's present location in New Jersey because it offered many advantages.

The location provided ships with a safe and operationally advantageous port to take on ammunition, and it also had access to commercial rail facilities with lines coming from the west, where the majority of ammunition shipments originated.

The rural location of the site also allowed for minimal dislocation of the local population.

On Aug. 2, 1943, construction began on what was to be Naval Ammunition Depot Earle, named after Rear Admiral Ralph Earle, the Chief of the Bureau of Ordnance during World War One. The depot was commissioned on Dec. 13, 1943.

There was still a long way to go to complete N.A.D. Earle. That work included building the military road and railway connecting main-side complex, the waterfront complex and the pier. The pier stretches 2.2 miles into the Sandy Hook bay and comprises 2.9 miles of pier/trestle surface area.

Earle continued to develop after World War II, keeping pace with the changing needs of the Navy. In 1974, Earle's name was officially changed to Naval Weapons Station Earle.

The Station is divided into two sections: Main-side, located in Colts Neck, and the Waterfront Area, on Sandy Hook Bay, located in the Leonardo section of Middletown.

Both areas are connected by Normandy road, a 15-mile military road and rail line.

Mainside

The 10,000+ acres in Colts Neck, house the majority of Earle's departments and facilities.

The Atlantic Ordnance Command, Detachment Earle perform the station's primary mission - providing ammunition to the fleet. An integrated work-force of military and civilian personnel operate the inland storage, renovation, transshipment and demilitarization facilities.

Over the years, the Station has taken on many important functions.

The Packaging, Handling, Stowage and Transportability (PHST) Center has become the engineering agent for the Naval Sea Systems and Naval Air Systems Command in the field of weapons systems. The PHST Center also manages handling equipment and containers for the fleet and shore stations, including design, testing, acquisition, in-service engineering and logistical support. A main-side facility houses the personnel involved in weapons handling and container design, test and acquisition.

The Public Works Center maintains a site at Earle and keeps Earle running smoothly day-to-day. It maintains our facilities, manages our housing and operates and maintains our vehicles.

Earle is, in many ways, like a small town with homes, office buildings, industrial plants, banks, medical facilities, fitness centers, chapel, eating facilities, cars and trucks.

As with most towns, Earle has its own police force which is responsible for law enforcement and visitor control, and also oversees a civilian guard force which provides gate guards and roving patrols.

There are 560 houses at the main-side complex. At main-side, a Family Services Center, Community Center, Child Development Center, the Windjammer Club, Navy Exchange store, and the Auto Hobby Shop serve our residents.

A full range of services area available to military personnel stationed here. Among these services are: Religious services, a career counselor, medical clinic, personnel office, credit union and Navy/marine Corps Relief Society.

Because of our unique makeup, Earle is home to many kinds of wildlife such as rabbits, squirrels, quail, grouse, deer and turkey vultures. The Station has also taken part in projects to repopulate various species of fish and wild turkeys in New Jersey.

Personnel at Earle can participate in both archery and firearm hunting.

Fishing is also popular with ponds, streams and the Waterfront Pier complex.

Waterfront

At the Waterfront complex, the Atlantic Ordnance Command provides ammunition for nearly every class of ship operated by the United States Navy and Coast Guard as well as commercial vessels from other countries.

The Port Services Division, located on the Pier Complex, provides a full range of services for visiting and homeported ships.

Our mission requires a vigorous safety program. One important aspect of Safety at Earle is fire prevention and fire fighting. We have two fire stations: one main-side and one at the waterfront.

Although most of the station's departments and divisions are located in the administrative area main-side, the majority of military personnel are located at the waterfront.

The Waterfront facility mirrors the Main-side facility in many ways. A gym and fitness center, a pier recreation facility, a sports bar and restaurant, medical/dental and mini-exchange store enhance quality of life for the resident sailors.

Pier Complex

The Station's Pier complex is one of the longest "finger piers" in the world. It is presently comprised of a two-mile long trestle which connects to three finger piers - which are Piers 2, 3, and 4.

One mile from the shore the trestle branches off to Pier 1. At the junction of Piers 2, 3 and 4, a concrete platform exists which supports a forklift/battery recharging shop and the port operations building. This area is known as the "wye".

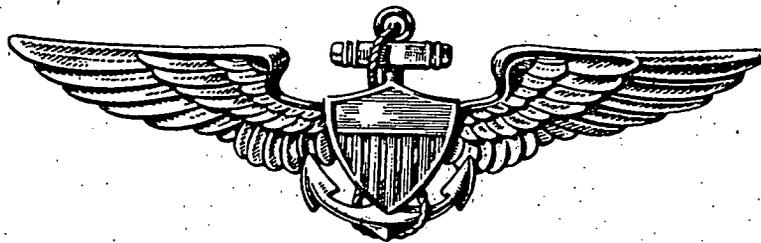
The original piers and trestle were constructed in early 1940s. The "wye" was constructed in 1981 and Pier 4 was completed in 1990, and a new main approach was constructed in 1993.

Since WWII the pier complex has provided ammunition services to almost every class of vessel operated by the Navy and Coast Guard as well as commercially owned vessels from a multitude of nations.

NAVAER 00-100-504

**UNITED STATES NAVAL AERONAUTICAL
SHORE FACILITIES**

PROGRAMMING GUIDE



MARCH 1958

**PREPARED UNDER NAVY, BUREAU OF AERONAUTICS
CONTRACT NO as 57-453-f**

**GROLL, BEACH & ASSOCIATES • BELLANTE & CLAUSS • C. WARREN BOGAN & ASSOCIATES
ARCHITECTS — ENGINEERS**

FOREWORD

The Military Construction *Programming Guide* of the Bureau of Aeronautics contains data which has been compiled from field investigations, from current directives, and from research with the Department of Defense, the Office of the Chief of Naval Operations, and the divisions of the Bureau of Aeronautics and other Bureaus of the Department of the Navy. A reference is given, where applicable, to specific documents, instruction manuals, or other publications as authoritative source information. Original research was undertaken to provide a basis for determining requirements for specific facilities where existing data was incomplete, obsolete, or missing. This research included an analytical evaluation for developing planning and programming data, the results of which were reviewed and approved by the cognizant offices of the Department of the Navy. These planning and programming criteria are subject to revision and to being supplemented by additional information to meet continuing changes in planning and programming policies.

This handbook is arranged in three parts. Part A, INTRODUCTION, includes the authority and responsibilities of the Bureau of Aeronautics in planning and programming for the Shore Station Development Programs. Part B, PROGRAM PLANNING OF NAVY AND MARINE CORPS AIR INSTALLATIONS, covers the general program planning data required for developing a portion of or a complete station or activity, either by new construction or re-evaluation of the existing facilities for deficiencies or modernization. Part C, PROGRAMMING UNDER THE CATEGORY CODE SYSTEM, contains guidance for the submission of projects in Military Construction Programs, and the requirements and methods of determining the scope of line items which may be sponsored by the Chief of the Bureau of Aeronautics in such programs. The allowances stated in Part C, Section 3, herein, should be considered maximum; however, these limits may be exceeded if the activity can conclusively justify that the specific mission of the installation can be accomplished only by such exception. The programmer should note that this handbook treats average facility requirements, and he should exercise care to avoid overprogramming a facility — even a lesser one will accomplish the mission and purpose for which it is required.

This publication, issued under BUAERINST 11012.1A, Sup-1, is the result of a re-evaluation and technical study of considerable scope and magnitude of planning and programming standards and criteria for all aviation shore facilities of the Naval Aeronautical Shore Establishment which are sponsored by the Chief of the Bureau of Aeronautics. This study involves a complete modernization of former planning standards. As elements of this publication are completed and approved, they will be immediately distributed to the field activities and all others concerned. When these are received, the holders of the present publication, *Planning Standards for U. S. Naval and Marine Corps Air Station Facilities*, which has been distributed by BUAERINST 11012.1A, will substitute the superseding criteria of NAVAER 00-100-504 until it is completely replaced by this series of publications. The other publications in this series are described in paragraph A1.04, herein.

When planned construction does not meet the requirements set forth in this handbook, this Bureau shall be advised of the circumstances and approval shall be obtained for a waiver of any deviation from these standards before the project is begun. Suggestions and recommended improvements to this handbook are invited.



R. E. DIXON
Rear Admiral, U.S.N.,
Chief of the Bureau of Aeronautics

TABLE OF CONTENTS

PART A. INTRODUCTION

Section 1. GENERAL

	<i>Page</i>
A1.01 Purpose.....	A-1-1
A1.02 Scope.....	A-1-1
A1.03 Authority and Responsibilities.....	A-1-1
A1.04 Related Publications.....	A-1-2

Section 2. TECHNICAL TERMINOLOGY

A2.01 Abbreviations and Definitions.....	A-2-1
--	-------

PART B. PROGRAM PLANNING

Section 1. GENERAL

B1.01 Purpose.....	B-1-1
B1.02 Scope.....	B-1-1
B1.03 General Policies.....	B-1-1
B1.04 Programming Factors.....	B-1-1
B1.05 Feasibility and Economic Planning.....	B-1-1

Section 2. INTEGRATED AIR BASES

B2.01 General.....	B-2-1
B2.02 Regional Planning.....	B-2-1
B2.03 Development.....	B-2-1
B2.04 Coordination Requirements.....	B-2-1

Section 3. FLEET JET AIR STATION (MASTER-JET)

B3.01 Mission.....	B-3-1
B3.02 Base Loading.....	B-3-1
B3.03 Incrementation—Stage Construction.....	B-3-1
B3.04 Program Requirements.....	B-3-1

Section 4. AIR STATION

B4.01 Mission.....	B-4-1
B4.02 Base Loading.....	B-5-1
B4.03 Incrementation—Stage Construction.....	B-5-1
B4.04 Program Requirements.....	B-5-1

Section 5. AUXILIARY AIR STATION

Page

B5.01	Mission.....	B-5-1
B5.02	Base Loading.....	B-5-1
B5.03	Incrementation—Stage Construction.....	B-5-1
B5.04	Program Requirements.....	B-6-1

Section 6. AUXILIARY LANDING FIELD

B6.01	Mission.....	B-6-1
B6.02	Base Loading.....	B-6-1
B6.03	Incrementation—Stage Construction.....	B-6-1
B6.04	Program Requirements.....	B-6-1

Section 7. OUTLYING FIELD

B7.01	Mission.....	B-7-1
B7.02	Base Loading.....	B-7-1
B7.03	Incrementation—Stage Construction.....	B-7-1
B7.04	Program Requirements.....	B-7-1

Section 8. AIR FACILITY

B8.01	Mission.....	B-8-1
B8.02	Base Loading.....	B-8-1
B8.03	Incrementation—Stage Construction.....	B-8-1
B8.04	Program Requirements.....	B-8-1

Section 9. SPECIAL AIR INSTALLATIONS

B9.01	Types of Activities.....	B-9-1
B9.02	Base Loading.....	B-9-1
B9.03	Incrementation—Stage Construction.....	B-9-1
B9.04	Program Requirements.....	B-9-1

Section 10. ORGANIZATIONAL UNITS

B10.01	Types of Units.....	B-9-1
B10.02	Base Loading.....	B-9-1
B10.03	Incrementation—Stage Construction.....	B-9-1
B10.04	Program Requirements.....	B-9-1

PART C. SHORE STATION DEVELOPMENT PROGRAMS

Section 1. GENERAL

C1.01	Objective.....	C-1-1
C1.02	Development and Submission.....	C-1-1
C1.03	Composition.....	C-1-1
C1.04	Master Shore Station Development Plans.....	C-1-2
C1.05	Advance Planning of Line Items.....	C-1-3

Section 2. PROGRAMMING AIDS

C2.01	Samples.....	C-2-1
C2.02	Selection of Category Code Numbers.....	C-2-1
C2.03	Units of Measure.....	C-2-6
C2.04	Population Application.....	C-2-6
C2.05	Interpolation.....	C-2-6

Section 3. PROGRAMMING REQUIREMENTS

Page

C3.01	General.....	C-3-1
-------	--------------	-------

100 OPERATIONAL AND TRAINING FACILITIES

110	Airfield Pavements.....	100-1
120	Liquid Fueling and Dispensing Facilities.....	100-7
130	Communications, Navigational Aids, and Airfield Lighting.....	100-13
140	Land Operational Facilities.....	100-23
150	Waterfront Operational Facilities.....	100-28
160	Harbor and Coastal Facilities.....	100-31
170	Training Facilities.....	100-32

200 MAINTENANCE AND PRODUCTION FACILITIES

210	Maintenance.....	200-1
-----	------------------	-------

300 RESEARCH, DEVELOPMENT, AND TEST FACILITIES

400 SUPPLY FACILITIES

410	Liquid Fuel Storage.....	400-7
420	Ammunition Storage.....	400-7
430	Cold Storage.....	400-9
440	Storage—Covered.....	400-10
450	Storage—Open.....	400-12

500 HOSPITAL AND MEDICAL FACILITIES

520 10	Station Hospital—Infirmary.....	500-1
540 10	Dental Facilities.....	500-3

600 ADMINISTRATIVE FACILITIES

610	Administrative Buildings.....	600-1
620	Administrative Structures—Underground.....	600-11
690	Administrative Structures—Other.....	600-11

700 HOUSING AND COMMUNITY FACILITIES

710	Family Housing.....	700-1
720	Troop Housing.....	700-5
730	Community Facilities—Personnel Support and Service.....	700-8
740	Community Facilities—Morale, Welfare, and Recreational—Interior.....	700-12
750	Community Facilities—Morale, Welfare, and Recreational—Exterior.....	700-19

800 UTILITIES AND GROUND IMPROVEMENTS

810	Electricity.....	800-1
820	Heat.....	800-3
830	Sewage and Waste.....	800-3
840	Water.....	800-5
850	Roads and Streets.....	800-8
860	Railroad Tracks.....	800-10
870	Ground Improvement Structures.....	800-10
880	Fire and Other Alarm Systems.....	800-11

900 REAL ESTATE

1000 UNDISTRIBUTED ARCHITECTURAL AND ENGINEERING SERVICES

*Index***ILLUSTRATIONS**

<i>Figure</i>	<i>Title</i>	<i>Page</i>
C-2-A	Flow Chart Military Construction Program Public Works Authorization and Appropriation....	C-2-2
C-2-B	NAVEXOS-4091 CODE 111 Runway Extension.....	C-2-3
C-2-C	NAVEXOS-4091 CODE 124 Aircraft Fuel Storage Facilities.....	C-2-4
C-2-D	NAVEXOS-4091 CODE 442 Supply Facilities.....	C-2-5
100-A	Aviation Fuel Outlets Required for Truck Fill Stands.....	100-8
200-A	Typical Applications of Modular Maintenance Facilities.....	200-2
400-A	Additional Storage Space Requirements for Primary Stock Points.....	400-3
400-B	Additional Ammunition and Explosive Storage Space Requirements for Primary Stock Points....	400-4
400-C	Gross Storage Space Requirements for Primary Stock Points.....	400-5
700-A	Shore Based Family Housing Report NAVEXOS-3948 Survey Form.....	700-3
700-B	Shore Based Family Housing Report NAVEXOS-3948 Form Instructions.....	700-4

TABLES

<i>Number</i>	<i>Title</i>	<i>Page</i>
100-A	Aircraft Fuel Storage Based on Average Hourly Flying Consumption.....	100-11
100-B	Antenna Types.....	100-16
100-C	NAMT(M) Basic Requirements Guide.....	100-33
100-D	Instrument Trainer and Procedures Trainer Basic Requirements Guide.....	100-34
100-E	Operational Flight Trainer/Weapons Systems Trainer Basic Requirements Guide.....	100-40
200-A	Basic Maintenance Facilities.....	200-3
200-B	Class F Modular Space Allowance (or Requirement).....	200-4
200-C	Class E Modular Space Allowance (or Requirement).....	200-4
200-D	Class D Modular Space Allowance (or Requirement).....	200-5
200-E	Class C Modular Space Allowance When No Separate Engine Maintenance Facility is Programmed.....	200-5
200-F	Class C Modular Space Allowance When a Separate Engine Maintenance Facility is Programmed..	200-5
200-G	Equivalent Modular Space Allowance.....	200-6
400-A	Basic Formula for Computing Storage Space Requirements for General Supplies.....	400-2
400-B	Basic Formula for Computing Storage Space Requirements for Ammunition and Explosives.....	400-2
400-C	Basic Formula for Computing Gross Storage Space—Ready Issue.....	400-6
400-D	Basic Formula for Computing Gross Building Area—Ready Issue.....	400-6
400-E	Gross Storage Space Factors.....	400-6
400-F	Gross Covered Storage Space Requirements—Fleet Marine Force Activities.....	400-7
500-A	Data in Support of Proposed Station Hospital in the Continental United States and Overseas Military Construction Programs.....	500-1

supports squadrons having mining missions and capability. Basic characteristics of the range are:

(1) Airspace restricted area over water and generally parallel to an adjacent irregular coastline with readily identifiable landmarks, with a coincident water impact area —3 by 8 miles.

(2) Control tower and spotting huts to provide accurate rake information on mine drops from either high or low altitude (400 to 40,000 ft.).

(3) Two-way air-ground communications.

(4) Adequate shelter for target crews.

(5) Pinpoint water targets, if desired.

The required space is necessary both for training in area mining, including pattern drops by aircraft flying in formation, and to encompass the maneuvers of patrol-type aircraft prior to and following the release of mines. Refer to Code 179 20, NAVAER 00-100-503 (Conf), for technical planning information on ranges, and to NAVAER 00-100-502, Vol. I, *Air Contour Maps*, for airspace utilization requirements. Refer to dwg. SE 179 20.5-1, NAVAER 00-100-505, for range layout and target criteria.

Reference:

OPNAV Letter, 30 October 1956, Serial 0413850, *Naval Air Bombing and Gunnery Targets/Areas*.

179 40.1 SMALL-ARMS RANGE

a. **PURPOSE AND FUNCTION.** A small-arms range is an area, either indoor or outdoor, for practice firing of small arms, particularly the .38 or .45 caliber pistol and the .22 and .30 caliber rifles.

b. **REQUIREMENTS.** The use of year-round range facilities is required to provide effective defense and security of Navy and Marine Corps air stations, to meet and maintain proficiency requirements in marksmanship, to encourage small-arms competitive matches (a phase of the training program), to provide a recreational activity for military and civilian personnel, and to assist the small-arms training program of community police and National Guard Forces. Determination of the need for programming a small-arms range at a particular shore establishment depends principally on the judgment of the station commander, as supported by the District Commandant. Other military or civilian ranges in the vicinity should be investigated and considered before programming new ranges. These should be utilized if satisfactory firing schedules can be arranged and it is more economically feasible (considering transportation costs, loss of man-hours and rental charges, if any) to use them than to construct new ones. Existing Navy instructions and training schedule requirements, the number of Naval and Emergency Ground Defense Force units, the size of the security detachment and the mission and size of the station are all contributing factors in determining the number of firing points required at each station. The policy of the Navy is to encourage small-arms marksmanship, and pursuant to this policy a billet has been established for one small-arms instructor in each of the naval districts and river commands and at NAS Pensacola, NAS Memphis, NAS Jacksonville, and NAS Corpus Christi.

The purpose of these billets is to provide the above commands with expert advice and assistance on small-arm training programs, range technique and equipment, and competitive matches. After it has been determined that there are no existing ranges in the vicinity that can be utilized by station forces, the following data can be employed as a guide to determine the number of firing points required.

<i>Indoor ranges</i>	<i>Installation military strength</i>	<i>No. of firing points</i>
Type A	Up to 2,000	6
Type B	3,500	10
Type C	5,000	13
Type D	7,000	15

<i>Outdoor ranges</i>	<i>Installation military strength</i>	<i>No. of firing points</i>
Type A	Up to 2,000	6
Type B	3,500	12
Type C	5,000	16
Type D	7,000	20

Outdoor ranges will normally be programmed for Navy and Marine Corps air installations except where inclement weather conditions predominate. Refer to dwgs. SE 179 40.1-1 and SE 179 40.1-2, NAVAER 00-100-505, for design criteria and layout, including the safety requirements of indoor and outdoor ranges.

References:

BUDOCKS TP-PW-7, 15 March 1954, *Training Facilities*.
 OPNAVINST 8370.2, 28 January 1954, *Small Arms Allowances for Continental U. S. Naval Stations*.
 OPNAVINST 8011.3, 28 February 1955, *Weapons and Ammunition for Civilian Guards*.
 OPNAVINST 3573.7A, 3 December 1956, *Rifle and Pistol Marksmanship Training*.

179 40.2 SKEET RANGE

a. **PURPOSE AND FUNCTION.** A shotgun and skeet range is an outdoor practice facility to train military personnel in the principles of leading, timing, and firing on flying targets. In addition to providing sighting proficiency, it may also serve off-duty recreation purposes.

b. **REQUIREMENTS.** Air installations conducting operational pilot training may be authorized one shotgun and skeet range. The minimum facility consists of two trap houses and five individual firing stations or positions, ammunition, and a service shed or locker. The range should have a danger zone of fire of 900-ft. radius from the shooting field. The facility will also include a control shelter and storage place for clay pigeons. The trap houses are known as the high and low towers. The structures are normally wood-frame construction. Refer to dwg. SE 179 40.2-1, NAVAER 00-100-505, for criteria for the development of a shotgun and skeet range.

179 60 PARADE AND DRILL FIELD

a. **PURPOSE AND FUNCTION.** A parade and drill field may be either a turf or paved surfaced area for the purpose of formation drills, parade and review functions,

Design Analysis Report
for
Final Design Submission
Remedial Action at
Operable Unit 1 (Sites 4 and 5)

Naval Weapons Station Earle
Colts Neck, New Jersey



Northern Division
Naval Facilities Engineering Command
Contract Number N62472-90-D-1298
Contract Task Order 0289

November 1997

**DESIGN ANALYSIS REPORT
FOR
FINAL DESIGN SUBMISSION
REMEDIAL ACTION AT
OPERABLE UNIT 1 (SITES 4 AND 5)**

**NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:
Northern Division
Environmental Branch Code 18
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, Pennsylvania 19113-2090**

**Submitted by:
Brown & Root Environmental
600 Clark Avenue, Suite 3
King of Prussia, Pennsylvania 19406-1433**

**CONTRACT NUMBER N62472-90-D-1298
CONTRACT TASK ORDER 0289**

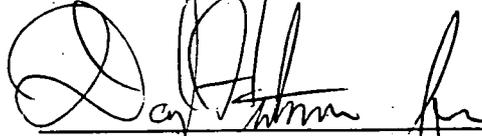
November 1997

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MONMOUTH COUNTY MOSQUITO EXTERMINATION COMMISSION

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Monmouth County Information

Topography

The Monmouth County Planning Board staff had prepared a *Natural Features Study for Monmouth County* in 1975. That study revealed that Monmouth County lies within the Atlantic Coastal Plain Physiographic Province. The topography of the County is characterized by a prominent belt of hills flanked by lowlands and less prominent hills. This prominent belt of hills marks the division between the inner and outer coastal plain in Monmouth County. These hills as well as smaller groups of hills in the county are able to maintain their posture largely because they are slightly more resistant to erosion than surrounding sediments. Although no sediments in the County are consolidated in the strict sense, some strata are composed of marls and clayey sands and offer more resistance to erosion than sands do. Thus, differential erosion has formed the surface features that are seen in Monmouth County today. Also some beds or strata of cemented "ironstones" or sands occur in places and offer considerable resistance to erosion.

The most prominent landform in the County is a ridge, known as the Mount Pleasant Hills, which extends from Keyport southwest to Imlaystown and south into Ocean County. These hills also extend eastward from Keyport to the Navesink Highlands. In the Highlands the hills rise abruptly from sea level to a maximum elevation of 266 feet. From the Highlands westward the Mount Pleasant Hills range in elevation from 200 feet at Chapel Hill, Middletown, to 380 feet at Crawford Hill in Holmdel. Crawford Hill is the highest point in Monmouth County.

West-southwest of Keyport the hills decrease in elevation to about 200 feet near Morganville. West of Morganville the land is hilly but generally less than 100 feet in elevation. Southwest of Keyport the Mount Pleasant Hills become less prominent and the elevations decrease to 140 to 200 feet just west of Freehold. Near Perrineville the belt again is expressed as a series of hills which rise to nearly 360 feet in elevation. Near Clarksburg several hills range between 250 and 320 feet in elevation, however, west of Imlaystown the relief again flattens out (as it does west of Morganville) and the hills only range up to 100 feet or so in elevation.

Lowlands and plains with the exception of a group of hills that stretch from Colts Neck nearly to Eatontown characterize the remainder of the County. This group is called the Hominy Hills and elevations range from near 200 feet to 307 feet on the Naval Weapons Station Earle. NWS Earle is a military installation comprising over five percent of the land area of the County and totally outside the jurisdiction of either the State of New Jersey or the County of Monmouth

Sandy beaches and adjacent lowlands characterize the coastal portions of the County. Elevations of only 30 feet are found in western Long Branch and in Rumson, Fair Haven and Wall Township. If sea level were to rise by fifty feet some three to four miles of the eastern part of the County would fall beneath the water. Only a few isolated hills would extend above the sea between the present Shrewsbury and Navesink Rivers and all of Sandy Hook, Sea Bright and the Bayshore would be covered by water.

From the above discussion it is evident that although Monmouth County has a varied landscape of lowlands, plains and hills, relatively few areas rise more than a hundred feet or so and the entire County is characterized as coastal plain in nature. A casual reader may comment that this information is superfluous, but it is extremely important when the necessity arises to undertake permitted wetland activities and develop strategies for mosquito control and tick management.

Without the assistance of the Freehold Soil Conservation District and the technical staff of the Natural Resources Conservation Service our ability to map and manage wetland habitat would be considerably more difficult. We also rely upon our partners in Monmouth County government, most notably the Health Department, Planning Board staff, Division of Information Services and the Department of Public Works & Engineering to provide various data and information to help characterize the County.

[County Info Page](#) • [History](#) • [Municipalities](#) • [Drainage Patterns](#) • [Climate](#) • [Mosquito Habitat](#) • [Home Page](#)

Monmouth County Mosquito Extermination Commission
PO Box 162 • Eatontown • New Jersey • 07724
(Tel) 732-542-3630 • (Fax) 732-542-3267
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For more information about this site, contact [Sean Healy](#).



MONMOUTH COUNTY MOSQUITO EXTERMINATION COMMISSION

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Monmouth County Information

Climate

The National Oceanic and Atmospheric Administration takes weather data on a regular basis at locations within Long Branch and Freehold.

The climate of Monmouth County in general is temperate humid and is characterized by warm summers and moderate winters. The climate of Long Branch is classified as maritime with considerable influence from the Atlantic Ocean. Freehold's climate, on the other hand, is classified as continental with only minor influence from the Atlantic Ocean. At both these stations the summer temperatures seldom exceed 100 degrees F but frequently reach into the 90's from late May until early September. Winter readings at both stations rarely drop below 0 degrees F. The mean annual temperature for Monmouth County is 53 degrees F.

The mean number of degree-days (a measure of the departure of the mean daily temperature below 65 degrees F) for Long Branch is 5183 while for Freehold it is 5235. The daily totals are accumulated from July 1st to June 30th and vary greatly from year to year. The accumulated degree-days may be used as an index (at any time during the season) of the effect of past temperatures upon the consumption of power for the heating of homes and places of business. The degree-days for the period July 1, 1997- June 30, 1998 were 3,691. This is the lowest number of degree-days recorded in the past ten years. We will attempt to correlate these data into projections for the 1999 mosquito-breeding season.

The hottest day of record for Long Branch was 106 degrees F in July 1936 and the coldest day was -12 degrees F in February 1934. For Freehold the records of high and low temperature were also 106 degrees F in July 1936 and -20 degrees F in February 1934.

In the Long Branch area the average growing season is 199 days in length, from April 13 to October 29. Temperatures of 32 degrees F or less have been recorded as late as April 30th in the spring and as early as October 4th in the fall. In the Freehold area the growing season averages 178 days in length from April 23rd to October 18th. Temperatures of 32 degrees F or less have been recorded as late as May 17th and as early as September 24th in the fall.

Precipitation in Monmouth County ranges from 45 to 47 inches a year. In Long Branch the average is 45 inches and in Freehold 46 inches a year. The heaviest rainfall amounts Countywide normally occur during the summer months. A drought that lasted from September 1961 through August 1966 was one of

Aut
52.7
73.6
Ave MAY 72.2

the most significant departures from normal precipitation in recent years.

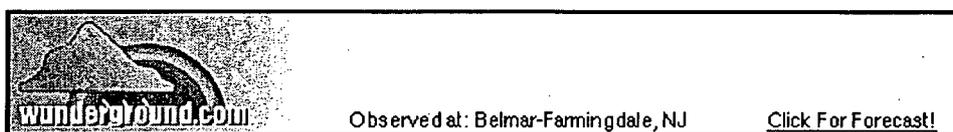
Snowfall on a countywide basis averages around 25 to 26 inches a season. The maximum monthly amount of snow on record for Long Branch was 32.9 inches in December 1947. For Freehold the maximum month of record was December 1957 when 26 inches of snow fell. In the period 1941-1970 the maximum year snowfall for Long Branch was 64.2 inches in the 1947-1948 season. For Freehold the maximum year snowfall was 66.9 inches in the 1957-1958 season. At both stations the majority of snow falls between the months of December and March inclusive, although snow has fallen on all months from October through May inclusive.

Although destructive storms are infrequent in Monmouth County, summer thunderstorms occasionally combine high winds with heavy rainfall, and heavy rains have occurred in connection with hurricanes, which move northward along the mid-Atlantic coast. Additionally, a considerable portion of our summer and autumn rainfall comes from tropical storms that pass near the New Jersey Coast.

The Monmouth County Mosquito Extermination Commission staff will continue to closely monitor climatic conditions to determine their impact on mosquito breeding and the potential for mosquitoes from more tropical areas becoming prevalent as an effect of global warming.

Weather data for both Long Branch and Freehold for 1998 reflect a total rainfall from March 1, 1998 to October 26, 1998 of 33.88 inches in Freehold and 37.62 inches in Long Branch. Although these departures reflect above normal precipitation, they do not reflect the severity of the fluctuation from wet to dry. During the months of July, August, September and October the lack of rainfall created near drought conditions and resulted in a total growing season departure from normal of 3.25 inches and 6.59 inches respectively, after reaching 13.01 inches and 9.62 inches by June 22, 1998.

During 1998 the New Jersey Water Supply Authority in conjunction with the Monmouth County Parks and Recreation Commission utilized the services of the South Jersey Resource and Development Council to obtain a new weather station for Monmouth County. This station located at the Manasquan Reservoir will provide weather data to assist this agency on a real-time basis.



[County Info Page](#) • [History](#) • [Topography](#) • [Municipalities](#) • [Drainage Patterns](#) • [Mosquito Habitat](#) • [Home Page](#)

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**Naval Weapons Station Earle
Environmental Department
Building C-2
Highway 34
Colts Neck, NJ 07722**

NWS Earle has a full-time Natural Resource Manager that can be contacted when an activity or project is proposed in areas that may contain protected species. Phone (732) 866-2295

NWS EARLE'S SENSITIVE PLANTS AND ANIMALS



Pine Barrens tree frog. Courtesy New Jersey Division of Fish and Wildlife



Swamp pink. Courtesy of Thomas Breden



Bluet damselfly

PROTECTED AND RARE SPECIES LIKELY TO BE ENCOUNTERED AT NWS EARLE

Pine Barrens tree frog

- Average length is 1 1/4-2 inches.
- Characterized by bright green body with lavender side stripes bordered in white.
- Inhabits swamps and bogs in Pine Barrens.
- Listed as state endangered.

Cooper's hawk

- Crow sized, broad-winged, long-tailed hawk.
- Slate colored back and upper wings.
- White breast and belly marked with reddish bars.
- Long banded tail rounded at the tip.
- Hunts in open forests.
- Listed as state endangered.

Red-shouldered hawk

- Reddish shoulders and wing linings with extensive pale spotting above.
- Chest has dark streaks on reddish chest.
- Inhabits moist, mixed woodlands near water.



Red-shoulder hawk . Courtesy of The Center for Wildlife Education, Georgia Southern Uni-

Merlin

- Adult male is gray-blue above; whereas, females and juveniles are dark brown.
- Narrow tails with various widths of colored bands.
- Primarily feed on birds, small rodents, and large insects.
- Found in a variety of habits, but nests in open woods or wooded prairies.
- Listed as state threatened.

Barred owl

- Distinctive call that repeats syllables that sounds like "who-cooks-for-you, who-cooks-for-you-all."
- Inhabits dense coniferous or mixed upland woods and wooded river bottoms and swamps.
- Color scheme includes dark barring on upper breast and streaking below.
- Listed as state threatened.



Barred owl. Courtesy of The Center for Wildlife Education, Georgia Southern University.

Pied-billed grebe

- Pigeon-sized, small, plump-bodied water bird.
- Brown with dark crown and back.
- Short stubby bill.
- Found in salt marshes and inshore waters.
- Listed as state endangered.



Pied-billed grebe habitat at NWS Earle. Courtesy of Rudi Reinecke

Pine Barren reedgrass

- Flowering culms range in height between 1½ and 5 feet.
- Inflorescence is open with ascending to spreading branches.
- Leaf blades to 10 inches in length, with lower leaves persistent to rhizome.
- Found in swamps and bogs in the Pine Barrens.
- Listed as state threatened.

Curly grass fern

- Plants reaching 2 inches in height.
- Sterile fronds are very thin, pale green, which form delicate curls.
- Fertile fronds "v"-shaped bearing 3 to 7 pairs of leaflets.
- Found in wetlands on sandy flats and hummocks, logs in bogs, and/or along drainages.
- Native to the Pine Barrens.
- Listed as state threatened.



Curly grass fern. Courtesy of Cynthia Coritz

Swamp pink

- Average flowering stalk height is 1-3 feet tall.
- Stocky, hollow stem terminated by bright pink egg-shaped flower cluster blooming in early spring.
- Lance shaped leaves lying in a basal rosette.
- Found in wetlands that are well saturated but not completely inundated.
- Listed as federally threatened and state endangered.



Swamp pink. Courtesy of USDA Plants

Knieskern's beaked-rush

- Plant height ranges between 1-24 inches tall.
- Member of the sedge family with clusters of inconspicuous flowers along the entire length of its slender stems.
- Short narrow leaves.

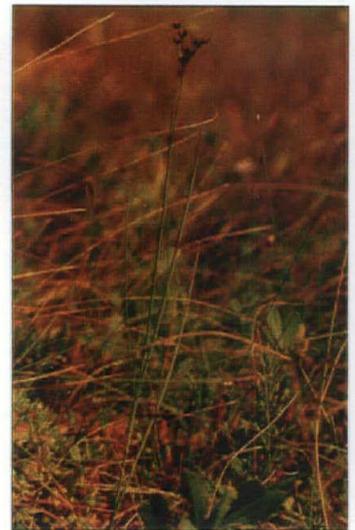


Wetland habitat.

- Native to New Jersey
- Found in wetland habitats that are either disturbed or in the early successional stage.
- Listed as federally threatened and state endangered.

New Jersey rush

- Plant height ranges between 1-3 feet tall.
- Stems are erect with long, narrow sheathing leaves and terminated by a branched inflorescence with inconspicuous flowers.
- Found in deep peat bogs.
- Listed as state endangered.



New Jersey Rush. Courtesy of Nova Scotia Museum of Natural History

WHAT IS SPECIAL ABOUT NWS EARLE'S PLANTS AND ANIMALS?

NWS Earle possesses a number of unique natural community types that support a wide variety of plant and animal species. Some of these species are considered to be threatened or endangered by State and Federal governments. A few of the species are reported to be endemic to New Jersey. This means the species is found only in New Jersey and nowhere else in the world.

WHAT ARE THREATENED AND ENDANGERED SPECIES?

Threatened and endangered species are plants and animals that are at risk of becoming extinct. Extinct means there is no longer a living representative of a specific species. An endangered species is a species in immediate danger of becoming extinct. A threatened species is likely to become endangered if conditions surrounding the species continue to deteriorate.

There are more than 600 federally threatened and endangered species in the U. S. today.



The bald eagle was once listed as endangered due to threats from hunting and pesticide use. Populations of this national symbol have now recovered and the eagle is no longer listed as endangered. Photo courtesy of USFWS /Robert Fields

HOW DOES EXTINCTION OCCUR?

Although extinction can occur naturally, the main cause is the destruction of habitat upon which a particular species depends. Other causes of extinction



Passenger pigeon. Courtesy Tony Schenk

include: pollution, pesticides, disease, overfishing, hunting, collecting, and introduction of non-native species into areas where they do not naturally occur. Non-native species can cause extinction by outcompeting native species for

critical resources within the habitat. The passenger pigeon, for example, may have been the most abundant bird on earth at one time, but became extinct in 1914 due to habitat loss and overhunting.

WHY PROTECT THREATENED AND ENDANGERED SPECIES?

All species, including humans, depend on other species for survival. By studying other species, we have learned new ways to grow foods, develop medicines, build houses and develop transportation. However, there are many species that may have significant ecological, scientific, medical, or agricultural values that have not yet been studied. In recognition of the importance of threatened and endangered species, laws have been enacted to protect them. The Endangered Species Act of 1973 as amended, declares that threatened and endangered species shall be protected by

law. This law prohibits "harming" or otherwise taking a listed species by any person and prohibits Federal agencies from performing any action likely to jeopardize the existence of the species.

HOW CAN YOU HELP THREATENED AND ENDANGERED SPECIES?

Threatened and endangered species need your help. Here are some ways you can get involved:

- Support those who work to protect species and their habitats like the U. S. Fish and Wildlife Service, National Park Service, National Audubon Society, and other public and private organizations.
- Avoid collecting plants and animals from the wild. Enjoy them in their natural settings.
- Plant native grasses, plants, and trees instead of non-native ornamentals.
- Avoid using harmful chemicals.
- Join a conservation organization or community group.
- Voice your support for endangered species protection by contacting government representatives.

United States
Environmental Protection
Agency

EPA-902-B-01-001
January 2001
Region 2



Best Management Practices for Lead at Outdoor Shooting Ranges



Best Management Practices for Lead at Outdoor Shooting Ranges

Notice

This manual is intended to provide useful general information to shooting range owners/operators. The United States Environmental Protection Agency (EPA) does not certify or approve ranges, range design or lead management practices. While every effort has been made to provide up-to-date technical information, this manual is not to be used as a substitute for consultation with scientists, engineers, attorneys, and other appropriate professionals who should be called upon to make specific recommendations for individual range design and lead management.

Any variation between applicable regulations and the summaries contained in this guidance document are unintentional, and, in the case of such variations, the requirements of the regulations govern.

This guidance was developed by EPA Region 2 in cooperation with a few states as well as many EPA offices. In addition, EPA, with the assistance of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) provided all 50 states with an opportunity to review the RCRA regulatory portion of the guidance. At the time of printing, about 40 states had contacted the EPA and given their support and concurrence. EPA is continuing to get the agreement of the remaining states. Therefore, it appears that most, if not all, states will share the same view as to how lead shot is regulated.

Following the steps set forth in this guidance should result in compliance with applicable regulations. EPA does not make any guarantee or assume any liability with respect to the use of any information or recommendations contained in this document.

This guidance does not constitute rulemaking by the EPA and may not be relied on to create a substantive or procedural right or benefit enforceable, at law or in equity, by any person.

Acknowledgements

The USEPA would like to acknowledge the support of:

- The National Rifle Association of America
- The National Shooting Sports Foundation
- The Wildlife Management Institute
- Mark Begley, of the Massachusetts Department of Environmental Protection
- Mr. Dick Peddicord, of Dick Peddicord and Company, Inc.

These participants provided valuable information and assistance as peer reviewers in the development of the manual and their efforts are truly appreciated. EPA also wishes to give special thanks to Dr. Charles W. Sever of Okie Environmental Consulting, L.L.C., Inc., Mr. Mike Warminsky of Brice Environmental Services Corp., and Mr. Victor Ordija of Sporting Goods Properties. The EPA also wishes to acknowledge and thank the many others who provided important comments and insight, and especially those individuals who took the time to meet with us in person or on the phone.

Cover photo by: Mr. Jack Hoyt, EPA Region 2

Statement of Goals

The goals of this manual are:

- to inform shooting ranges :
 - that the United States Environmental Protection Agency's (EPA) purpose in developing and distributing this manual is to assist range owners and operators to operate in an environmentally protective manner.

 - to promote an understanding of:
 - why lead is an environmental, public and regulatory concern,
 - what laws and regulations apply,
 - the benefits of applying good management practices,
 - what can be done to successfully manage lead,
 - why implementing lead best management practices is an integral part of environmental stewardship,
 - how to minimize litigation risk.

 - to promote action by ranges to:
 - adopt and implement best management practices for managing lead,
 - recycle a finite natural resource,
 - become a model for other ranges through proper lead management,
 - advocate environmental stewardship.
-

For additional copies of this manual, please contact:

United States Environmental Protection Agency
Division of Enforcement and Compliance Assistance
RCRA Compliance Branch
290 Broadway 22nd Fl.
New York, New York 10007-1866

Tel: 212-637-4145
Fax: 212-637-4949

Copies of this manual along with any additions or updates can also be obtained on-line at
www.epa.gov/region2/waste/leadshot

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Appendix C: Project Source Data – Site Specific

Appendix C-1: Conservation Club Range

**Preliminary Assessment
Site Visit Data / Collection Summary Report
Navy MRP**

Site: Naval Weapons Station Earle, Colts Neck, New Jersey
Prepared By: Kenneth J. Kaiser, P.E., Team Leader
Prepared: 27 June 2003

The scheduled site visit to Naval Weapons Station (NWS) Earle in Colts Neck, New Jersey was conducted 23 June through 24 June 2003. The purpose of the visit was to collect information needed to complete preliminary assessment report (PA) on other than operational ranges and munitions sites identified in the Navy inventory, as provided in Malcolm Pirnie's Statement of Work for NWS Earle, dated 4 February 2003 (Project #10, Contract No. N62472-02-D-1300). This document presents a preliminary summary of the site visit and data collection effort to date. The draft PA will provide additional details on the data collected.

Malcolm Pirnie Team Members: Ken Kaiser (Team Leader), Les Skoski (Deputy Team Leader), Hope Nemickas and Cindy How (Malcolm Pirnie, Inc. (MP)) and two EOD specialists, Bill Walenius and John Doig (Environmental Chemical Corp. (ECC)).

Navy Representative(s): Michele DiGeambeardino- EFA NE Remedial Project Manager; Lawrence S. Burg- Environmental Engineer-NWS Earle Environmental Dept.; Dave Ely-Environmental Protection Specialist- NWS Earle Environmental Dept.; and Brooke Dziedzicki-Summer Intern- NWS Earle Environmental Dept.

Primary Installation POC: Mr. Larry Burg

PA Sites (1): Conservation Club Range – a former small arms range reportedly constructed for installation personnel recreational use as a trap and skeet range. The information reviewed to date could not confirm the use of this range.

Activities Conducted Prior To Site Visit

Prior to the site visit, Malcolm Pirnie collected range related records from the National Archives in Washington D.C. and reviewed the information available in the Navy range inventory database.

Briefings

An In-Brief was conducted at NWS Earle during the first day of the site visit (attendees listed above). At the conclusion of the site visit an exit brief and discussion was held with Mr. Larry Burg.

Installation Location, History and Mission

NWS Earle is located in the New Jersey "shore region" an area along the Atlantic Coast about Mid-state. The station is divided into two sections: Mainside (10,428

acres), located in Colts Neck, and the Waterfront Area (706 acres), on Sandy Hook Bay, adjacent to the town of Leonardo. Both areas are connected by Normandy Road, a 15-mile military road and rail line. Mainside is located 47 miles south of New York City (Manhattan) and 18 miles southwest (SW) of Sandy Hook while the Waterfront Area is located 4 miles west of Sandy Hook and 7 miles southeast (SE) of Staten Island. The Conservation Club Range is located in the Mainside portion of the facility.

The installation, Naval Ammunition Depot (N.A.D.) Earle –named after Rear Admiral Ralph Earle, the Chief of the Bureau of Ordnance during World War I – was built during World War II to help with the war effort. At the time, a pressing need developed for an ammunition depot in the greater New York City area. A site in Monmouth County, New Jersey was chosen and construction began August 1943. The installation consisted of two distinct areas each with unique advantages. A waterfront location (Waterfront) provided ships with a safe and operationally advantageous port to take on ammunition, while an inland storage area (Mainside), safe from possible submarine bombardment, provided access to commercial rail facilities with lines coming from the west, where the majority of ammunition shipments originated. As noted, on August 2, 1943, construction began and in a short time, storage bunkers, a road and rail network, numerous buildings, and a pier complex were built. The installation was commissioned on December 13, 1943 as the Naval Ammunition Depot Earle. Earle continued to develop after World War II, keeping pace with the changing needs of the Navy. The command's name was changed in 1974 from Naval Ammunition Depot to Naval Weapons Station (NWS).

The Mainside area is more than 10,000 acres that contains ordnance storage areas and the majority of Earle's departments and facilities. Mainside is in many ways like a small town with its own police and fire departments, homes, office buildings, restaurants, and recreational facilities.

The Waterfront area is the trident-shaped pier complex that extends 2.2 miles into Sandy Hook Bay and comprises 2.9 miles of pier/trestle area. The pier is fully capable of providing ammunition to nearly every class of ship operated by the United States Navy and Coast Guard.

The waterfront complex is also the homeport to USS Seattle, USS Detroit, USS Supply, USS Arctic, and Combat Logistics Group 2. Since June 1, 1997 the USS Supply moved to Earle. Earle provides logistical, technical and material support to the fleet in a variety of areas ranging from combat subsystems and retail ammunition management to ordnance packaging, handling and storage. Since Earle is a weapons station, it handles, stores, transports, renovates and issues all types of weapons and ammunition.

Naval Weapons Station Earle is also home to many tenant organizations. These tenants include Combat Logistics Group Two, Shore Intermediate Maintenance Activity, Mobile Mine Assembly Unit Three, Superintendent of Shipbuilding Portsmouth Detachment Earle, Explosive Ordnance Disposal Mobile Unit Two

Detachment Earle, Atlantic Ordnance Command Detachment Earle, Public Works Center Site Earle, and the Packaging, Handling, Storage, and Transportation Center.

The 10,000 acres that comprise Mainside, house the majority of Earle's departments and facilities. The Ordnance Detachment performs the station's primary mission - providing ammunition to the fleet. An integrated work force of military and civilian personnel operates the inland storage, renovation, transshipment and demilitarization facilities.

Summary of Site Visit Activities

The Malcolm Pirnie Team Members (site team) met with the following Navy representatives, Monday June 23, 2004:

Michele DiGeambeardino- EFA NE Navy Remedial Project Manager,
Lawrence S. Burg- Environmental Engineer-NWS Earle Environmental Dept.,
Dave Ely-Environmental Protection Specialist- NWS Earle Environmental Dept.,
Brooke Dziejzicki-Summer Intern- NWS Earle Environmental Dept.

An overview of the project scope and objectives was presented by Ken Kaiser as a formal In-Brief. Copies of the In-Brief were distributed and discussed. Using the In-Brief slides as a basis, Larry Burg and Dave Ely provided the names of various individuals in other NWS Earle departments who could potentially contribute to the data gathering effort.

Mr. Dave Ely, who has been at NWS Earle for over 30 years, provided a brief verbal history of the Conservation Club Range. Additionally, Mr. Burg and Mr. Ely provided a verbal review of the recent environmental history of NWS Earle, particularly the investigation and the remediation of sites in the proximity of the Conservation Club Range. They also provided insight on the general surface and subsurface hydrology or the installation.

A brief review and discussion of the current data in the U.S. Navy Closed, Transferred, and Transferring Range and other sites Questionnaire-Ranges Information (All Ordnance Types) for EARLE NWS (the NAVFAC Database) was conducted including potential updates provided by MP regarding the location of the ranges on NWS Earle.

The group then split to a field team and data resource team. The field team proceeded to the Conservation Club Range to conduct a walkover and magnetometer survey (see Attachment A for further details). The data resource team began working with NWS Environmental Department personnel to locate, copy and review pertinent documents and maps and set up interviews. A series of documents were located, both hard and electronically copied. Document clearance was requested and is expected shortly.

In addition to document research, interviews were conducted with available personnel including Larry Burg and Dave Ely and Tom Gentile (a long term employee). Additionally, Mr. Burg contacted a various department representatives, none of whom

ATTACHMENT A
Conservation Club Range Site Walk

On completion of the introduction and In-Brief, the following drove to the location of the former Conservation Club Range to conduct the site walkover:

Malcolm Pirnie, Inc.-Les Skoski and Cindy How
Environmental Chemical Corp.- Bill Walenius and John Doig
NWS Earle Environmental Department-Dave Ely and Brooke Dzedzicki

The area was overgrown with brush, briars and high grass in the Shooter Area (southwest corner) to briars, small pines (10 to 12 ft high) and miscellaneous fauna in the areas away from the Shooter Area. The location was checked with the GPS unit (599587 E and 518192 N-NJ State Plane Coordinates); this corresponds to the coordinates provided for Conservation Club Range (599600 E and 518200 N). The sensitivity of the Fisher M-Scope was checked with the steel-toed boots.

Transects were walked radiating out from the origin with the M-Scope. The M-Scope was slowly moved perpendicular to the forward movement to assure that "targets" would be detected. The arc provided a swath of six feet, three feet on either side of the transect. Five transects were mapped radially outward from the origin. The direction and distances were approximately: NE 225 feet along the perimeter of the range, NNE 225 feet to the berm, N 270 feet to the berm, NW 180 feet to the tree line, and along the western perimeter about 200 feet. In addition both sides of the approximately 250 foot long berm (a 12 foot swath) on the NE side of the range (250 feet) was checked. No metal (sheet shoot, trap shoot, foil wrap, or other metal trash) was detected in any of the "sweeps", including the area on either side of the berm.

In addition to the transects, the area around the origin, i.e., Shooters Area was thoroughly scanned. No metal was detected.

Visual inspection was also conducted. One shotgun "wad" was discovered in the wooded area about 135 feet NW of the origin under some pine needles. This area also had a small berm. Close inspection of the berm did not reveal any evidence that the area was actively used for either skeet or trap shooting. Additionally visual inspection of the larger trees did not indicate any damage due to firearms.

The location of the berm and other landmarks were determined using the GPS. These will be used to further delineate the range in the PA.

In summary, there was little direct evidence or visual confirmation that the site was used as a range.

had relevant information. A review was also conducted of aerial photographs from 1969, 1978, 1981, 1987, and 1997.

Ken Kaiser conducted an exit brief for Mr. Burg and Mr. Ely on June 24th.

Additional Land Ranges

- Site 1 – Ordnance Demilitarization Site
- Site 11 – Contract Ordnance Disposal Area
- Site 3 – Skeet Range on Landfill
- Site 5 – Shooter's Club Range on Landfill West of Army Barricades
- Sites 24 and 25 – Closed Pistol Ranges
- No other additional sites identified.

NWS Earle Identified Issues/Concerns

- None identified.

Future Data Collection

During discussion with the NWS Earle contacts, it was noted that additional interviews may provide additional data related to the Conservation Club Range, specifically:

- Mr. Rich Covaleski, who is believed to have been the Range Manager during his tenure at the installation.

Mr. Burg will contact Mr. Covaleski and arrange for an interview with a member of the MP Team.

Attachment

Data Collection Questionnaire

Conservation Club Range - NWS Earle

Date *January 20, 2004*

Interviewed by telephone (813 907-0199 *rcrcrc@juno.com*)

Interviewer: Les Skoski (Malcolm Pirnie)

Person Responding to Questionnaire: Mr. Richard Covaleski

Current Status: *Retired*

Date Retired- *August 2001*

Prior Status (civilian or military employee): *Civilian Employee*

Years at NWS Earle: *thirty five (35) started in 1966*

Final Position and Title at NWS Earle: *Program Analyst with Safety. Formerly Transport Supervisor. Held other titles and positions throughout his career.*

Relationship to Conservation Club Range (developed, managed, Club Leader):
As the chairman of the buildings and ground committee, Mr. Covaleski was the Conservation Club leader. Their mission was to promote conservation such as the construction of fishing ponds and other conservation projects. Note this was the early 1970's as noted in the use of "conservation" rather than "environmental".

Other Connections to Conservation Club Range:
See above.

Questionnaire –The Conservation Club Range:

The following is excerpted from the draft Preliminary Assessment:

"The Conservation Club Range comprises approximately six (6) acres and is located in the eastern part of the Mainside Area of NWS Earle, slightly south of the Wayside Ordnance Storage Area. The range was opened in the mid-1970s and closed by 1991. The range was established as a skeet and trap range, classified for small arms (shotguns). Since closure, the range has lain fallow and allowed to return to its pre-developed state.

A review of available data, a walkover and magnetometer survey failed to find any metals (primarily lead shot) or clay targets in the soil at the Conservation Club Range. This includes

the firing areas and berms where expended shot would be expected. In addition, interviews with site personnel indicate this range was used infrequently. “

1. When did the Conservation Club Range open and when did it close?
The Conservation Club Range was developed but never officially opened, that is never received a safety clearance. The safety clearance was refused due to security concerns as the Vietnam conflict escalated in the early and mid 1970's.
2. Why was it opened? Is there any documentation associated with its opening (e.g. Environmental Assessment)
The original intent was as a “conservation club range” near the Conservation Club. The Conservation Club was housed in the former gatehouse building (C-47) adjacent to the range.
3. Why was it closed? Is there any documentation associated with its closing (e.g. Environmental Assessment)
It was never officially closed but was not used after about five years.
4. Was it always the Conservation Club Range or was a range there under a different name?
It was always known as the Conservation Club Range.
5. Was the Conservation Club Range only used for skeet/trap shooting?
No, a group of “black powder” enthusiasts (muzzle loaded weapons) occasionally used the range. Targets (about two by two feet) were set up in front of the berm as a backstop. Weapons were fired west from the cleared area (firing area). Shooters would typically recover the balls after shooting for reuse. Time period mid-1970's.
6. Were clay targets used on the Conservation Club Range?
Yes but not a lot. The range was active for about 5 years. A locked trap house was required for security of the spring traps/throwers. Over the time period in question about a dozen boxes of shells were used. The trap house was taken to another range.
7. Who used the Conservation Club Range when it was open (i.e., military, civilian, recreational, police or Government agencies including ATF, FBI etc)?
Primarily military officers and some civilian employees. The range was recreational.
8. How frequently was the Conservation Club Range used?
Very infrequently.
9. What types of ordnance was used at the Conservation Club Range?
Shotguns and muzzle loaded (“black powder”) weapons.
10. Were there any cleanup activities conducted at the Conservation Club Range?
If yes, when and is there any documentation?
No
11. Was the configuration of the site change during its use? That is, were firing lines, berms, keep constant or did the configuration change?

The configuration did not change from the original.

12. Is there any other information that could assist?

None

Thank you for your time and help.

Appendix D: Ordnance Technical Data Sheets

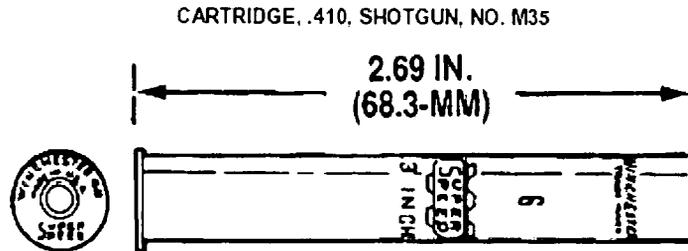
Ordnance Technical Data Sheets
NWS Earle Conservation Club Range

Ordnance Technical Data Sheets

Trap Range

Ordnance Technical Data Sheet

Cartridge, .410, Shotgun, No. M35



Nomenclature: .410, Shotgun, No. M35
Ordnance Family: Small Arms Ammunition
DODIC: 1305-A055
Filler: Smokeless Powder
Filler weight:
Item weight: 430 gr
Diameter: mm (.410 in)
Length: 68.3 mm (2.69 in)
Maximum Range: Not Provided
Fuze: Percussion

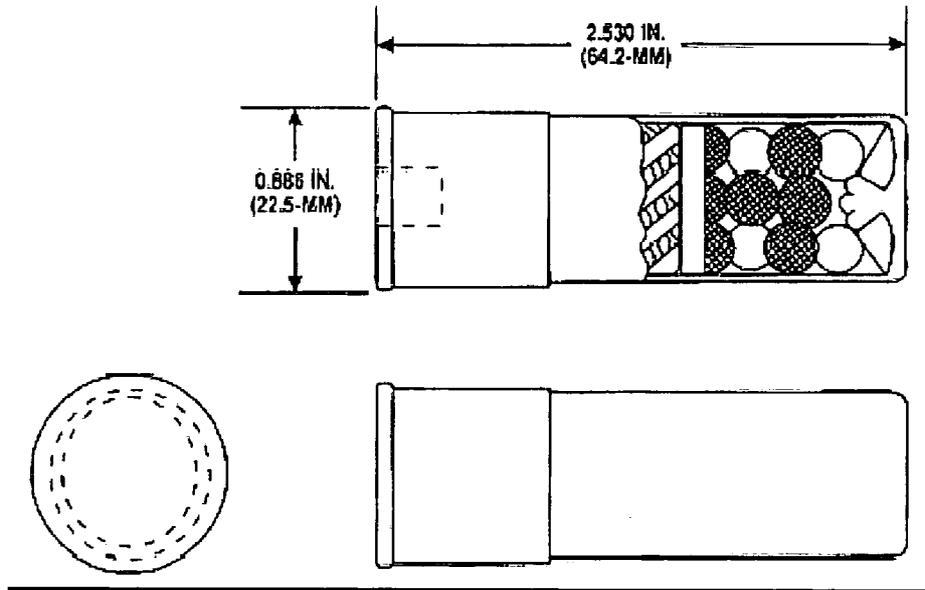
Usage: Rifle/Shotgun, Caliber .22/.410 Bore, Survival, M6. The cartridge is intended for use in survival weapons against small game.

Description: The cartridge case can be paper, plastic or all aluminum, and is loaded with smokeless powder and No. 6 copper-coated lead shot.

Reference: TM 43-0001-27

Ordnance Technical Data Sheet

Cartridge, 12 Gage, Shotgun, No. M247



Nomenclature:	12 Gage, Shotgun, No. M247
Ordnance Family:	Small Arms
DODIC:	1305-A011
Filler:	Smokeless Powder
Filler weight:	Not provided
Item weight:	740 gr
Diameter:	22.5 mm (.886 in)
Length:	64.2 mm (2.530 in)
Maximum Range:	Not Provided
Fuze:	Percussion

Usage: Military issue, riot-type shotgun, 20-in barrel cylinder bore. The cartridge is intended for use against small game and for riot control weapons.

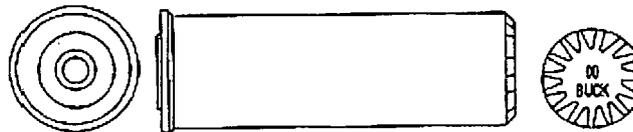
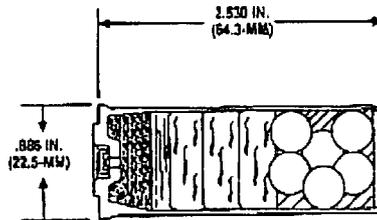
Description: The cartridge case may be paper or plastic, and is loaded with smokeless powder and No. 4 hard chilled shot.

Reference: TM43-0001-27

Ordnance Technical Data Sheet

12 Gage Shotgun, NO 00

CARTRIDGE, 12 GAGE, SHOTGUN, NO. 00, M162



Nomenclature:	12 Gage Shotgun, NO 00
Ordnance Family:	Small Arms
DODIC:	A011
Filler:	Smokeless Powder
Filler weight:	± Various
Item weight:	791 gr
Diameter:	.886 in
Length:	2.53 in. (64.3 mm)

Usage: Military issue shotgun, 2-3/4 inch chamber. The cartridge is intended for guard and combat use.

Description: The cartridge case is all plastic, and is loaded with smokeless powder and No. 00 commercial shot.

Reference: TM 43-0001-27

Ordnance Technical Data Sheet

12-Gauge Shotgun

The 12-gauge shotgun is usable by military forces in protection of key facilities, security, or crowd control. Field commanders and soldiers will have effective non-lethal capability increasing flexibility in the application of force during military operations.

The M1012 and M1013 Cartridges are non-lethal, low-hazard, non-shrapnel producing devices fired from a 12 gauge shot gun. They are designed to inflict less than lethal trauma. They are intended to confuse, disorient and distract a person(s) who may be a potential threat to friendly force personnel. These devices are usable by military forces in protection of key facilities, security or crowd control. Field commanders and soldiers will have effective non-lethal capability thereby increasing flexibility in the application of force during military operations.

Non-lethal ammunition can be identified by GREEN color and is clearly marked as "non-lethal". The M1012 and M1013 can be lethal if improperly used. There is a potential hazardous effect out to (75.7 meters) 250 feet for the M1012 cartridge and out to (37.9 meters) 125 feet for the M1013 cartridges.

Both cartridges will be fired from standard military 12-gauge shotguns. The Winchester Model 1200 is a manually operated, repeating shotgun of the slide action, hammerless and takedown type, with a 20" barrel. It has a capacity of five rounds, one (1) in the chamber, and four (4) 2.3" shells in the magazine. The Mossberg 500 is manually operated, slide action, internal hammer, 12-gauge riot-type shotguns with a 17 / 20" barrel. They are Type II-Class I (takedown receiver) shotgun. The total chamber and magazine of six- (6) 2-3/4" (7.0 cm.) shells and five- (5) 3" (7.6 cm.) magnum shells.

While there has been a few gauges of shotguns since their beginning, the field of choices for gauge are now today narrowed down to 10ga. 12ga. 16ga. 20ga. 28ga. and .410cal. if the 410 were an actual gauge it would be 67 gauge.

Shotgun Bore Diameter

10-Gauge = Bore Diameter of .775 inches

12-Gauge = Bore Diameter of .729 inches

16-Gauge = Bore Diameter of .662 inches

20-Gauge = Bore Diameter of .615 inches

28-Gauge = Bore Diameter of .550 inches

67-Gauge = Bore Diameter of .410 inches

Shotgun Chamber Length

10-Gauge = Chamber Length of 2.875 inches - 3.500 inches

12-Gauge = Chamber Length of 2.750 inches - 3.500 inches

16-Gauge = Chamber Length of 2.750 inches

20-Gauge = Chamber Length of 2.750 inches - 3.000 inches

28-Gauge = Chamber Length of 2.875 inches

67-Gauge/.410 = Chamber Length of 3.000 inches

Buckshot has either a few large pellets or a bunch of smaller pellets. The smaller pellets have a better chance of scoring a hit due to the sheer number of pellets, but the severity of the wound won't be as great as a hit from a larger pellet. The standard buckshot is worthless against armored targets except for taking out the legs and arms, hoping for enough wounds to cause incapacitation.

000 Buck - 8 lead pellets (0.36")

00 Buck - 9 lead pellets (0.33")

0 Buck - 12 lead pellets (0.32")

1 Buck - 16 lead pellets (0.30")

4 Buck - 27 lead pellets (0.24")

QB 8 - 8 pellets (Armor Piercing) - Quadrangle Buck is made from a steel cylinder cut into two layers of four pie-shaped pieces per layer. The numerous sharp edges gives excellent penetration; however, the light weight and poor ballistic shape limits its effective range. The Quadrangle Slug (12 gauge shotgun only) is a revolutionary slug designed as a nonexplosive fragmenting munition intended specifically as an anti-vehicle or anti-material slug. It is capable of disabling automobiles, light aircraft, and marine vessels. This is due to eight pie-shaped hardened steel pellets wrapped in a cylindrical plastic boot (to protect the bore of the shotgun).

Flechettes - 32 flechettes (Armor Piercing) - Flechettes are essentially small steel nails with tiny fins swaged into the rear.

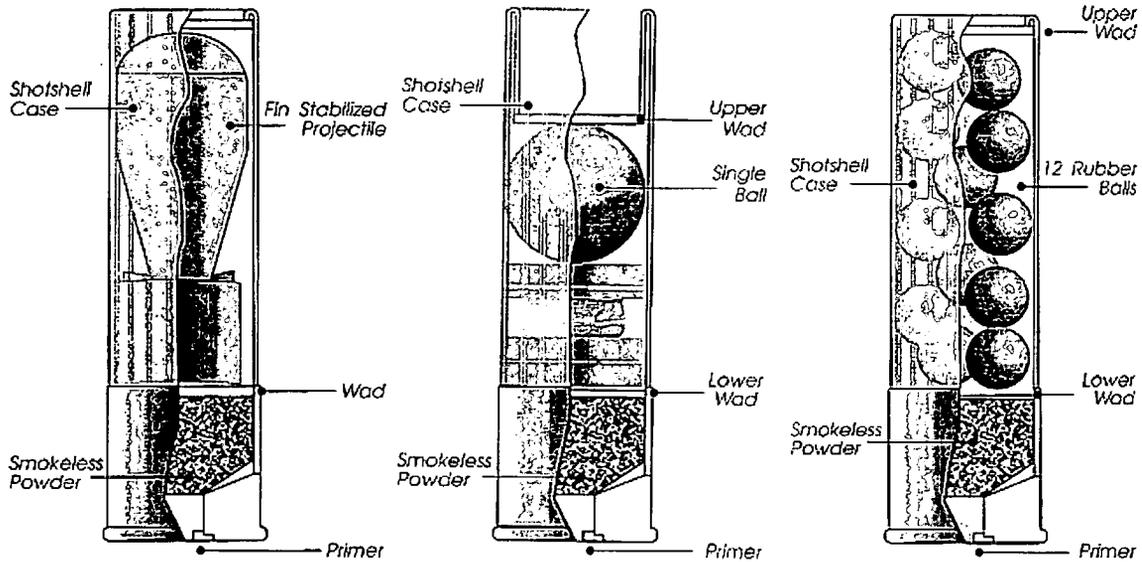
Slug - Slugs will pretty well flatten any target, armored or not; however, the issue of over penetration will determine whether you want to take the solid or the hollow-point slug.

Slug HP - Hollow-point slugs. Less penetration than regular slugs.

Baton - Rubber batons. Used for training.

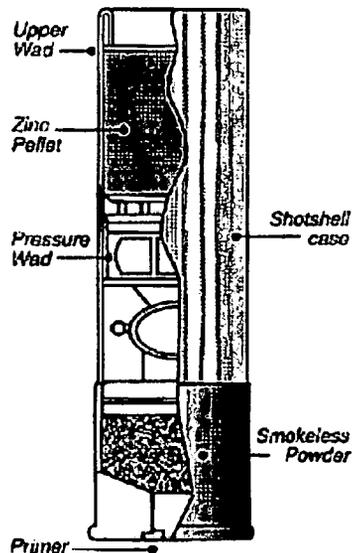
12 GAUGE NON LETHAL POINT AND CROWD CONTROL

- Two different cartridges, one provides capability of temporarily incapacitating point target and the other provides capability of controlling a crowd
- Non Lethal Capability at Approximately 10-70 FT
- For Close quarter engagement 10-70 FT
- Complements 5.56 MM Non lethal and 40MM Non lethal



12 GAUGE BREACHING ROUND

- Defeat Door Lock Mechanisms, Hinges and Pad Locks on Wooden Doors
- Reduce Risk of Noncombatant Injuries, Ricochets and Fratricide



Appendix E: No Further Action Letter



State of New Jersey

Department of Environmental Protection

James E. McGreevey
Governor

Bradley M. Campbell
Commissioner

DEC 28 2004

Michele DiGeambeardino
Remedial Project Manager
Naval Facilities Engineering Command
10 Industrial Highway
Code 1821, Mail Stop 82
Lester, PA 19113-2090

Dear Mrs. DiGeambeardino:

Re: Preliminary Assessment Report for the Conservation Club Range
Naval Weapons Station Earle
Colts Neck Township, Monmouth Co.

The New Jersey Department of Environmental Protection (NJDEP) has reviewed the above referenced document prepared by Malcolm Pirnie, Inc., dated November 2004. The NJDEP approves this document in its current form; no further modifications are necessary. The NJDEP agrees with Malcolm Pirnie's findings that a "No Further Action" determination for this potential Area of Concern is warranted.

If you have any questions, please do not hesitate to call me at (609)-633-7237.

Sincerely,

Bob Marcolina, Case Manager
Bureau of Case Management

cc: Alicia Hartmann, NWS Earle
Jessica Mollin, EPA

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610 595 0555 P. 02/02

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