NEA
NORTHERN ECOLOGICAL ASSOCIATES, INC

Maine Office:
451 Presumpscot Street
Portland, Maine 04103

New York Office:
33 Park Street
Canton, New York 13617

DRAFT

PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

IMPLEMENTATION OF THE INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN FOR PICATINNY ARSENAL

ROCKAWAY TOWNSHIP, MORRIS COUNTY, NEW JERSEY

Contract Number: DACW51-97-D-0010
Delivery Order: 70

Prepared for:

U.S. Army Corps of Engineers
New York District
26 Federal Plaza
New York, New York 10278-0090

Prepared by:

Northern Ecological Associates, Inc.
451 Presumpscot Street
Portland, Maine 04103

April 2001

Programmatic Environmental Assessment

IMPLEMENTATION OF THE CULTURAL RESOURCES MANAGEMENT PLAN FOR PICATINNY ARSENAL

U.S. Army Tank-automotive Armaments Command-
Armament Research, Development and Engineering Center (TACOM-ARDEC)
Picatinny Arsenal, New Jersey

Proponent: _____ 1/18/01
Timothy Miller — Date
Chief, Environmental and Natural Resources Team

Concur: _____ 1/18/01
Christina Gray — Date
NEPA Program Manager

Concur: _____ 1/30/01
Thomas J. Solecki — Date
Chief, Environmental Affairs Division

Concur: _____ 1 Feb 01
Robert Souders — Date
Security Division

Concur: _____ 3/20/01
Francis A. Cassidy — Date
Chief, Legal Office

Approved by: _____ 3/28/01
John D. Costea — Date
Assistant Garrison Commander

EXECUTIVE SUMMARY

Proposed Action

The U.S. Army Corps of Engineers (USACE), New York District, proposes to implement an Integrated Cultural Resources Management Plan (ICRMP) at the Picatinny Arsenal. The Picatinny Arsenal is a U.S. Army installation occupying approximately 6,500 acres in Rockaway Township, Morris County, New Jersey.

The U.S. Army, as a Federal agency, is required to comply with several federal statutes, regulations, and Executive Orders regarding cultural resources, in addition to Army Regulation (AR) 200-4 "Cultural Resource Management" (30 October 1997). AR 200-4 details U.S. Army policy regarding cultural resource management and outlines procedures for complying with all applicable cultural resource regulations. In addition, AR-200-4 directs each Army installation to develop an ICRMP in order to successfully balance cultural resources management requirements with mission requirements. In accordance with AR 200-4, the Army has developed an ICRMP addressing cultural resources at the Picatinny Arsenal.

The purpose of this Draft Programmatic Environmental Assessment (DPEA) is to determine if any potential significant environmental impacts would result from implementing this ICRMP. This DPEA has been prepared in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality Regulations Implementing NEPA (40 CFR 1500-1508).

The purpose of the ICRMP is to provide guidelines and procedures for managing, protecting, and preserving cultural resources on the Picatinny Arsenal property. In accordance with this objective, the ICRMP includes several components: a summary of the cultural resource studies completed at the Arsenal; guidance on protecting and preserving known sites; identification of areas where further cultural resource investigations are recommended; specific guidelines for the appropriate methods of preservation, repair, and replacement of original building materials in historic district structures at the Arsenal; and a Management Plan that establishes protocol for coordinating Army activities with the New Jersey Historic Preservation Officer (NJHPO). The ICRMP Management Plan protocol will become part of a Programmatic Memorandum of Agreement (PMOA) between the Army, the NJHPO, and the Advisory Council on Historic Preservation (ACHP).

A primary objective of the ICRMP is to integrate cultural resources management and compliance as it applies to routine installation operations, such as building maintenance, structural rehabilitation, and mothballing of historic buildings, as well as with new facility planning and construction of capital projects. In addition, the Management Plan within the ICRMP will facilitate coordination between Arsenal staff and the NJHPO regarding the activities at the installation that have the potential to affect cultural resources.

Summary of Environmental Impacts

Implementation of the ICRMP would result in minor or no impact to environmental resources or the effective implementation of the integrated management plans the Army has established to manage natural resources at the Arsenal. Similarly, implementation of the ICRMP would have negligible to no impact on environmental resources or socio-economic conditions in the region surrounding the Arsenal property.

Negligible or no impacts to geologic resources, water resources, air resources, socio-economics, transportation networks, aesthetic and scenic resources, or recreation in and around the Picatinny Arsenal would result from implementation of the ICRMP.

A number of federally and state listed threatened, endangered, and special concern plant and wildlife species are known to occur at Picatinny Arsenal. Based on the guidelines presented in the ICRMP, the only species that may potentially be affected is the eastern wood rat (*Neotoma floridana ssp magister*) (federal special concern, state endangered), which can occur in buildings including historic structures that may be candidates for mothballing (*i.e.*, temporary closure of vacant or unused buildings to protect them from weather and vandalism until future re-use). The structural preservation guidelines in the ICRMP call for the extermination and control of pests, including rodents, prior to mothballing. However, the ICRMP would be implemented in coordination with the Arsenal's Integrated Natural Resource Management Plan (INRMP) and any individual conservation plans that have been developed for these species, so that protection measures already afforded to these species in these plans will not be changed or negated.

Minor impacts to other biological resources, such as vegetation and wetlands, could potentially occur as a result of conducting the recommended cultural resources investigations at the Picatinny Arsenal, if excavations are required in wetlands or vegetated areas. However, these impacts would be temporary. In addition, the Army would continue to comply with all applicable federal environmental regulations regarding these resources, in accordance with the established INRMP.

The ICRMP addresses the establishment of defined historic districts in certain areas of the Arsenal property, and prescribes guidelines for the proper maintenance, renovation, and repair of historic structures. Consequently, the ICRMP will affect land use by imposing certain restrictions and instructions for activities affecting these historic structures. However, the standard guidance document that addresses existing and proposed future land use at the Picatinny Arsenal indicates that cultural resources will be preserved. Therefore, the ICRMP would not conflict with the land use plan already established at the Arsenal.

No significant negative impacts to ongoing or planned hazardous, toxic, and radiation waste (HTRW) remediation efforts at the Arsenal are expected. Although remedial actions will be occurring in certain areas of the Arsenal throughout the next two decades, implementation of the ICRMP will not significantly affect the remediation process.

One of the proposed historic districts, Historic District 3, is within a high-priority (maximum relative risk) HTRW area of the Arsenal. No impacts to remediation efforts in this area are

anticipated from implementation of the ICRMP. Any preservation or cultural resource investigation activities that may be planned for areas of HTRW and/or remediation activities would be carefully coordinated with HTRW staff and any ongoing HTRW activities.

Existing unexploded ordnance (UXO) and other contamination at the Arsenal may potentially impede the full implementation of the large-scale cultural resources investigations recommended in the ICRMP. Considerations of safety, cost, and effort associated with the recommended cultural resource excavations/investigations in certain areas may reduce the feasibility of completing them.

The implementation of the ICRMP would require the irreversible and irretrievable commitment of resources in the form of manpower and monetary costs of completing regular, systematic cultural resources investigation and revision of the ICRMP every 5 years. In addition, the costs of repairing, renovating, or maintaining certain historic buildings in accordance with specifications prescribed in the ICRMP represent a commitment of resources that may be considered irretrievable.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
IMPLEMENTATION OF THE INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN FOR PICATINNY ARSENAL
ROCKAWAY TOWNSHIP, MORRIS COUNTY, NEW JERSEY

I. NAME OF ACTION

The proposed action is Implementation of an Integrated Cultural Resources Management Plan (ICRMP) for managing, protecting, and preserving cultural resources at the Picatinny Arsenal. Picatinny Arsenal is a United States Army installation occupying approximately 6,500 acres in Rockaway Township, Morris County, New Jersey.

II. DESCRIPTION OF ACTION

a. Proposed Action: The Proposed Action is the implementation of an ICRMP that provides guidelines and procedures for managing Picatinny Arsenal's cultural resources. The ICRMP is intended to integrate cultural resources management as it applies to the Arsenal's mission, routine operations such as general building maintenance, structural rehabilitation, mothballing of historic buildings, and future development. This action is proposed in order to comply with U.S. Army policy and other applicable statutes, regulations, and Executive Orders regarding protection of cultural resources.

b. Alternatives: In accordance with regulations promulgated by the Council on Environmental Quality (CEQ) 43 Code of Federal Regulations (CFR), Part 1500, Section 1502.14(d), the No Action Alternative was considered. Under the No Action Alternative, the ICRMP would not be implemented and the cultural resource management procedures currently in effect at the Arsenal would continue. Although the No Action Alternative would not necessarily inhibit the protection of cultural resources or compliance with applicable regulations, the time and agency coordination efficiencies allowed through the use of the ICRMP and associated Programmatic Memorandum of Agreement (PMOA) would not be realized under the No Action Alternative.

   Due to the nature of the Proposed Action and associated governing implementation requirements, no other alternatives were considered. Similarly, no comments, issues, or controversies have been identified that would justify the development of alternatives involving implementation of only certain parts of the ICRMP.

III. ANTICIPATED ENVIRONMENTAL IMPACTS

No significant adverse environmental or cumulative impacts are expected to result from implementing the ICRMP. The ICRMP will facilitate planning for further cultural resource investigations and protection/preservation of known cultural resource sites. The integrated approach for the cultural resources management program and agency

coordination process will streamline the program currently in effect at the Arsenal, leading to increased efficiency of regulatory review and approvals and reduced program implementation costs. In addition, implementation of the ICRMP will help the Army's cultural resources staff to ensure all activities on the Picatinny Arsenal are in compliance the federal statutes, regulations, and Executive Orders governing cultural resources.

IV. CONCLUSION

Given there are no anticipated significant impacts associated with the proposed implementation of the ICRMP, this action has been determined to have no adverse environmental impact on the quality of the environment. An Environmental Impact Statement is, therefore, not required.

_____

Roger A. Behringer
Lieutenant Colonel, U.S. Army
Garrison Commander, Picatinny Arsenal

TABLE OF CONTENTS

SECTION — PAGE

EXECUTIVE SUMMARY

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

LIST OF DPEA FIGURES iii
LIST OF DPEA TABLES iii
LIST OF DPEA ABBREVIATIONS AND ACRONYMS IV

1.0 INTRODUCTION 1
1.1 PICATINNY ARSENAL LOCATION AND MISSION 1
1.2 PURPOSE AND NEED 3
1.3 PROPOSED ACTION 5
1.4 NO ACTION ALTERNATIVE 6
1.5 OTHER ALTERNATIVES 7
2.0 EXISTING ENVIRONMENT 8
2.1 GEOLOGIC RESOURCES 8
2.1.1 Geology 8
2.1.2 Topography 8
2.1.3 Soils 9
2.1.4 Minerals 9
2.2 WATER RESOURCES 11
2.2.1 Regional Hydrogeology 11
2.2.2 Groundwater 11
2.2.3 Surface Water 11
2.2.4 Floodplains 12
2.3 AIR RESOURCES 12
2.3.1 Climate & Meteorology 12
2.3.2 Air Quality 12
2.3.3 Noise 13
2.4 BIOLOGICAL RESOURCES 13
2.4.1 Vegetation—Uplands and Wetlands 14
2.4.2 Wildlife—Mammals, Birds, Reptiles & Amphibians, Fish, and Shellfish 16
2.4.3 Essential Fish Habitat 17
2.4.4 Threatened and Endangered Species—Federal and State 17
2.5 CULTURAL RESOURCES 20
2.5.1 Overview 20
2.5.2 Types of Cultural Resources Known or Anticipated 22
2.5.3 Impacts Anticipated from Undertakings 24
2.5.4 Management Procedures 24

TABLE OF CONTENTS (continued)

SECTION		PAGE
2.6	SOCIOECONOMICS	25
2.6.1	Demographic Characterization	25
2.6.2	Economy and Income	25
2.6.3	Housing	26
2.7	LAND USE	26
2.8	TRANSPORTATION	28
2.9	HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)	28
2.10	AESTHETIC AND SCENIC RESOURCES	29
2.11	RECREATION	30
3.0	ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION	31
3.1	GEOLOGIC RESOURCES	31
3.1.1	Geology	31
3.1.2	Topography	31
3.1.3	Soils	31
3.1.4	Minerals	31
3.2	WATER RESOURCES	32
3.2.1	Regional Hydrogeology	32
3.2.2	Groundwater	32
3.2.3	Surface Water	32
3.2.4	Floodplains	32
3.3	AIR RESOURCES	33
3.3.1	Climate & Meteorology	33
3.3.2	Air Quality	33
3.3.3	Noise	33
3.4	BIOLOGICAL RESOURCES	33
3.4.1	Vegetation—Uplands and Wetlands	33
3.4.2	Wildlife—Mammals, Birds, Reptiles, Amphibians, Fish, and Shellfish	34
3.4.3	Essential Fish Habitat	34
3.4.4	Threatened and Endangered Species—Federal and State	34
3.5	CULTURAL RESOURCES	34
3.6	SOCIOECONOMICS	35
3.7	LAND USE	35
3.8	TRANSPORTATION	36
3.9	HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)	36
3.10	AESTHETIC AND SCENIC RESOURCES	36
3.11	RECREATION	37
3.12	ENVIRONMENTAL JUSTICE	37
3.13	IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES	38
3.14	CUMULATIVE IMPACTS	38

TABLE OF CONTENTS (continued)

SECTION		PAGE
4.0	LIST OF PREPARERS	39
5.0	COORDINATION WITH REGULATORY AGENCIES	40
6.0	REFERENCES	41

LIST OF DPEA FIGURES

DPEA FIGURE	PAGE
FIGURE 1.1: PICATINNY ARSENAL SITE LOCATION MAP	2
FIGURE 2.1: SOILS AT PICATINNY ARSENAL	10
FIGURE 2.2: NATIONAL WETLANDS INVENTORY COVER TYPES AT PICATINNY ARSENAL.	15

LIST OF DPEA TABLES

DPEA TABLE	PAGE
TABLE 2.1: WETLAND COVER TYPES AT PICATINNY ARSENAL.	14
TABLE 2.2: THREATENED AND ENDANGERED PLANT SPECIES FOUND AT PICATINNY ARSENAL	18
TABLE 2.3: THREATENED AND ENDANGERED ANIMAL SPECIES FOUND AT PICATINNY ARSENAL	19
TABLE 4.1. LIST OF PREPARERS.	39

LIST OF DPEA ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AHPA	Archaeological and Historic Data Preservation Act
AIRFA	American Indian Religious Freedom Act
AOC	Areas of Concern
AR	Army Regulation
ARDEC	U.S. Army Armament Research, Development, and Engineering Center
ARPA	Archaeological Resources Protection Act
Arsenal	Picatinny Arsenal
dBA	A-weighted decibel
DOD	Department of Defense
DPEA	Draft Programmatic Environmental Assessment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMSA	Consolidated Metropolitan Statistical Area
CRM	Cultural Resources Manager
DSERTS	Defense Site Environmental Restoration Tracking System
EA	Environmental Assessment
EFH	Essential Fish Habitat
FEMA	Federal Emergency Management Agency
HABS/HAER	Historic American Building/Historic American Engineering Record
HTRW	Hazardous, Toxic, and Radioactive Waste
HUC	Hydrologic Unit Code
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
Ldn	Day-night noise level
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NJDEP	New Jersey Department of Environmental Protection
NJHPO	New Jersey Historic Preservation Officer
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
ONJSC	Office of the New Jersey State Climatologist
PCBs	Polychlorinated Biphenyls
PEA	Programmatic Environmental Assessment
PMOA	Programmatic Memorandum of Agreement
PMSA	Primary Metropolitan Statistical Area
PSI	Pollution Standards Index
RAB	Restoration Advisory Board
RC	Response Complete

LIST OF PDPEA ACRONYMS AND ABBREVIATIONS (continued)

SVOCs	Semi-Volatile Organic Compounds
TACOM	U.S. Army Tank – Automotive and Armaments Command
TCE	Trichloroethylene
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Center
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds
WES	Waterways Experiment Station

1.0 INTRODUCTION

This Programmatic Environmental Assessment (EA) was prepared pursuant to the National Environmental Policy Act (NEPA) to evaluate potential environmental impacts that may result from the implementation of an Integrated Cultural Resources Management Plan (ICRMP) at the Picatinny Arsenal (Arsenal) in Rockaway Township, Morris County, New Jersey. This section introduces the location and mission of the Picatinny Arsenal, identifies the purpose and need for the proposed action, describes the proposed action, and identifies alternatives to the proposed action that were evaluated.

Section 2.0 describes the environmental resources and conditions that currently exist at Picatinny Arsenal, including geologic resources, water resources, air resources, biological resources, cultural resources, socioeconomics, land use, transportation, hazardous waste, scenic resources, and recreational resources.

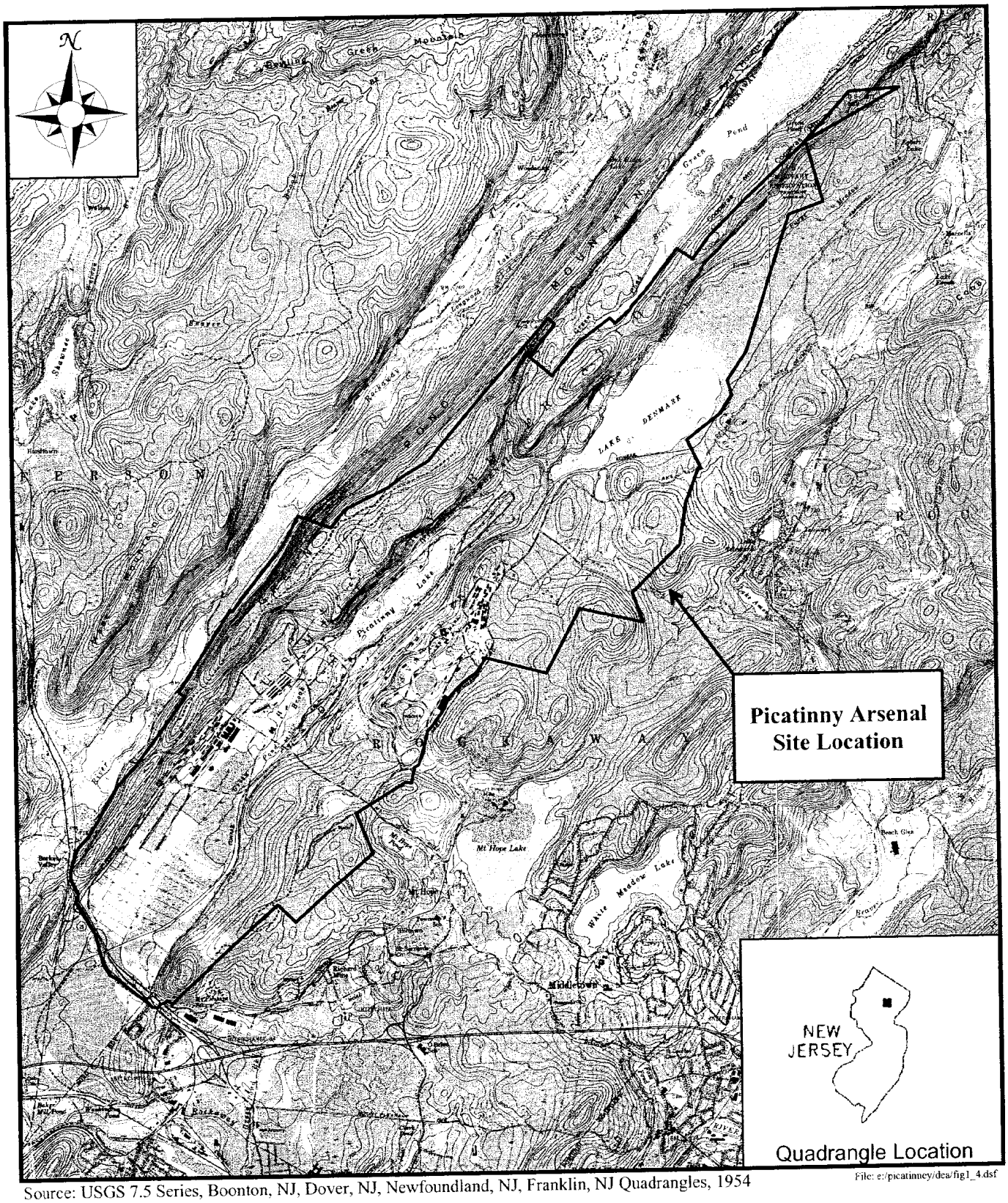
Section 3.0 identifies the environmental consequences of the proposed action and alternatives. Section 3.0 also addresses environmental justice issues, addresses any irreversible and irretrievable commitment of resources, and discusses cumulative impacts. Section 4.0 outlines the extent of coordination with regulatory agencies that was completed during preparation of the ICRMP and this EA. Section 5.0 lists the authors of this Programmatic EA, and finally, Section 6.0 provides a list of references cited in this EA.

1.1 PICATINNY ARSENAL LOCATION AND MISSION

Picatinny Arsenal occupies approximately 6,500 acres in Rockaway Township, Morris County, northern New Jersey, and is located about 28 miles northwest of New York City. Figure 1.1 provides the site location and general patterns of development at Picatinny Arsenal.

Originally established by the U.S. Congress as a powder depot in 1880, the installation broadened its activities in 1911 to include research and development in weaponry science. During the World War I era, the Arsenal began operating weapons testing and control laboratories.

Picatinny Arsenal is home to the U.S. Army Armament Research, Development, and Engineering Center (ARDEC). The ARDEC is a subordinate command of the U.S. Army Tank – Automotive and Armaments Command (TACOM). In addition to TACOM-ARDEC, several other Department of Defense (DOD) tenant organizations are located at Picatinny Arsenal, including the Program Executive Officer for Ground and Combat Support Systems, several Project Managers, and other related organizations (U.S. Army Environmental Center [USAEC] 1999).



Source: USGS 7.5 Series, Boonton, NJ, Dover, NJ, Newfoundland, NJ, Franklin, NJ Quadrangles, 1954

File: e:/picatinney/dea/fig1_4.dsf

5000 0 5000

1 inch = Approximatly 5000 feet

Figure 1.1: Picatinny Arsenal Site Location Map.

Picatinny Arsenal's mission consists primarily of research and development of explosives and propellants for the Army. Although the installation has functioned in the past as a major manufacturer of munitions and ordnance for wartime use, present-day manufacturing at the Arsenal is generally limited to creating prototypes for testing. In particular, the Arsenal's mission consists of implementing life-cycle engineering processes in research, development, field support, and demilitarization of ammunition, weapons, fire control, and associated items. The Arsenal's mission also includes procuring and managing initial production quantities of materials, and providing technical support to soldiers and equipment in the field. The Arsenal maintains a technology base to facilitate the design, development, procurement, production, and life-cycle support of assigned material or transitioned technologies (USAEC 1999). The Arsenal is the largest Army installation in the United States that is devoted solely to research and development (Panamerican Consultants 1998).

1.2 PURPOSE AND NEED

The purpose of the ICRMP is to provide guidelines and procedures for managing, protecting, and preserving cultural resources on the Picatinny Arsenal property. The U.S. Army, as a federal agency, is required to comply with several federal statutes, regulations, and Executive Orders regarding cultural resources. The major statutes, regulations, and Executive Orders that protect cultural resources and establish compliance requirements include:

- National Historic Preservation Act (NHPA) of 1966 (as amended);
- Army Regulation (AR) 200-4 "Cultural Resources Management" (30 October 1997);
- National Environmental Policy Act (NEPA) of 1969;
- Executive Orders 11593 and 13007, and White House Memoranda of 29 April 1994;
- Archaeological and Historic Data Preservation Act of 1974 (AHPA);
- Antiquities Act of 1906;
- Archaeological Resources Protection Act of 1979 (ARPA);
- American Indian Religious Freedom Act of 1978 (as amended) (AIRFA);
- Native American Graves Protection and Repatriation Act of 1990 (NAGPRA); and,
- Curation of Federally Owned and Administered Collections (12 September 1990).

AR 200-4 details U.S. Army policy regarding cultural resources management, and outlines Army procedures for complying with all applicable cultural resources regulations. AR 200-4 directs each Army installation to develop an ICRMP in order to successfully balance cultural resources management requirements with mission requirements.

Reasonably foreseeable future activities that have potential to affect cultural resources at the Arsenal include: building expansion, new building construction, repair and preventative maintenance of historic buildings, building demolition, "mothballing" of buildings (temporary closure of vacant or unused buildings to protect them from weather and vandalism until future re-use), and certain types of grounds maintenance and improvements. In addition, transferal or leasing of real estate, agricultural or forestry management activities, recreational use, and testing activities associated with research conducted at the Arsenal have the potential to affect Arsenal

cultural resources. The Army is also exploring the potential opportunity and feasibility of constructing larger developments such as an aquatic center on the Arsenal property, for which compliance responsibilities regarding cultural resources would apply.

Due to the Arsenal's long history of operation and the historic uses of the land before the Arsenal was established, there are numerous areas of cultural resource sensitivity within the installation boundaries. This sensitivity includes both historic and prehistoric sensitivity. Based on criteria established by accepted cultural resource predictive models, locations of archaeologically sensitive areas at the Arsenal have been identified and mapped, along with locations of disturbed areas and possibly disturbed areas.

The ICRMP contains a cultural resources inventory for the Arsenal property that combines previously gathered data with newly available information, and also identifies data gaps and the additional field investigations necessary to fill these gaps. Despite the completion of numerous cultural resource surveys, management reports, and historic structures reports, only approximately 108 acres of the 6,500-acre Arsenal have been investigated to the Phase IB cultural resources investigation level (*i.e.*, determining the presence/absence of cultural artifacts in delineated sensitive areas through subsurface/shovel testing).

Although the cultural resources inventory at the Arsenal includes archaeological resources (*i.e.*, buried historic and prehistoric resources), the majority of known cultural resources at the Arsenal are historic standing structures (Panamerican Consultants 1998). Investigations have assessed 500 structures constructed prior to 1946 for their historic integrity, both individually and as grouped into defined districts. Based on these assessments, 443 structures were determined to be ineligible for the National Register of Historic Places (NRHP). The remaining 57 structures consisted of 51 structures that were determined to be eligible for the NRHP as contributing structures to the three historic districts: the Administrative and Research District, the 600 Ordnance Testing Area, and Test Area E, Naval Air Rocket Test Station (NARTS) (Panamerican Consultants 1999b). Four additional structures were determined to be non-contributing structures to one or more of these three districts. Two additional structures were determined to be individually eligible for the NRHP: Building 3250, Navy Hill Commander's Quarters, and 3316, Fire House/Stable (Panamerican Consultants 1999b).

Seven historic properties at the Arsenal have been recommended for inclusion in the New Jersey Register of Historic Places, including the Cannon Gates, the Hessian Cemetery (Revolutionary War-era), Middle Forge (18th Century iron forge), the Army's memorial commemorating the forge, and three historic buildings (the ARDEC and Naval Commanders' houses and the fire house) (Panamerican Consultants 1998).

Additionally, 11 prehistoric sites have been identified within the Arsenal boundaries. These sites have been assigned Smithsonian Site Registration numbers and recorded at the New Jersey State Museum. Four prehistoric sites have been reported as surface finds by secondary sources, but have not yet been investigated. Eleven historic period archaeological sites have been identified at the Arsenal, and are associated with iron forge and farmstead sites (Panamerican Consultants 1998).

1.3 PROPOSED ACTION

The Proposed Action addressed in this EA is the implementation of an ICRMP that complies with AR 200-4 and other applicable statutes, regulations, and Executive Orders in order to manage Picatinny Arsenal's cultural resources.

Integrated management is defined as the process by which coordinated planning and application of management strategies result in greater combined resource benefits than that which would be achieved by the separate and independent management of the resources (Van De Venter 1996). An ICRMP sets forth goals and objectives and charts a course toward achievement of stated goals. The ICRMP is a comprehensive document containing several components, which together form the basis of, and framework for, the ongoing and future cultural resource management activities at the Picatinny Arsenal. The following paragraphs describe the components of the ICRMP.

The ICRMP summarizes the various cultural resource studies that have been completed at the Arsenal and documents the survey methods used. A primary objective of the ICRMP is managing cultural resources by providing guidance on protecting and preserving known sites, and outlining areas where further investigation is warranted to adequately identify and evaluate the resources present throughout the Arsenal. The ICRMP includes recommendations for the completion of cultural resource investigations on a regular or continual basis throughout culturally sensitive areas of the base, as funds are appropriated. The Army intends to revise the ICRMP every 5 years, at which time existing data can be supplemented and updated as additional research is completed, and supplemental guidance can be incorporated if necessary to make the plan more complete, useful, and/or effective.

The ICRMP is intended to integrate cultural resources management as it applies to routine installation operations such as general building maintenance, structural rehabilitation, and mothballing of historic buildings. An extensive list of treatment plans for historic structures within the NRHP-eligible historic districts includes specific guidelines for the appropriate methods of preservation, repair, and replacement of original building materials.

The ICRMP prescribes procedures for coordinating cultural resources compliance with facility planning and capital projects such as major building additions and other new construction. In addition, the ICRMP details the procedures to follow in the event that unexpected cultural resources or human burials are discovered during construction, or if there is unintentional damage to a cultural resource.

Finally, the ICRMP includes a Management Plan that establishes specific protocols and procedures for coordinating Army activities with the New Jersey Historic Preservation Officer (NJHPO). These procedures are presented in a decision-making flowchart structure that is organized according to the potential for activities to damage or impact cultural resources. The flowchart prescribes the required level of cultural resources investigation and coordination with the NJHPO for reasonably foreseeable actions/activities at the Arsenal. In accordance with this Management Plan, if the Picatinny Arsenal Cultural Resources Manager follows the procedures

in the flowchart and determines that a proposed activity will not adversely affect cultural resources, the activity would be allowed to proceed without prior NJHPO review and approval. These activities would be reported to the NJHPO in an annual report after they are constructed and implemented. However, certain actions/activities in areas of high cultural resource sensitivity would still require NJHPO review and approval before implementation.

These ICRMP Management Plan protocols and procedures are part of a Programmatic Memorandum of Agreement (PMOA) between the Army, the NJHPO, and the Advisory Council on Historic Preservation (ACHP). In accordance with the PMOA, activities would still be evaluated on a project-specific basis and conducted in accordance with all applicable cultural resource regulations. However, the programmatic objective of the ICRMP and the PMOA is to streamline the current cultural resources management and coordination process, by enabling the Army to proceed with projects that will not affect cultural resources (using general guidelines approved by the NJHPO and ACHP), without review and prior approval requirements.

1.4 No Action Alternative

In accordance with regulations promulgated by the Council on Environmental Quality (CEQ) 43 Code of Federal Regulations (CFR), Part 1500, Section 1502.14(d), a No Action Alternative must be considered. Although Picatinny Arsenal has not yet implemented an ICRMP, the past and ongoing activities at the Arsenal have been coordinated and conducted on a per-project basis such that the Army achieves compliance with all applicable federal regulations governing cultural resources. Under the No Action Alternative, the ICRMP would not be implemented and the cultural resource management procedures currently in effect would continue. Therefore, the No Action Alternative would not necessarily result in the absence of protection of cultural resources or noncompliance with applicable regulations.

However, the time and agency coordination efficiencies allowed through use of the ICRMP and associated PMOA would not be realized under the No Action Alternative. For example, cultural resource investigations would continue to be conducted within specific project areas as individual projects or activities are proposed. After the required research, often time-consuming field investigations, and reporting are completed, review by and formal approval from the NJHPO would be required for even minor projects that are not expected to affect cultural resources. This process would result in potential time constraints and construction delays for every proposed activity.

In addition, with the No Action Alternative, a comprehensive document summarizing the past cultural resources investigations and results, outlining additional investigation needs, and specifying historic preservation guidelines for conducting routine operation and maintenance activities at the Arsenal would not be widely distributed among applicable Arsenal staff. Therefore, communication of the procedures for cultural resource compliance may be less formally "institutionalized," and thereby may be less effective than implementation of an ICRMP. Moreover, if the ICRMP were not implemented, the Picatinny Arsenal would not be in compliance with Army Regulation 200-4, which directs each installation to develop an ICRMP.

1.5 OTHER ALTERNATIVES

Due to the nature of the Proposed Action and associated governing implementation requirements, no other alternatives were considered. Similarly, no comments, issues, or controversies have been identified that would justify the development of alternatives involving implementation of only certain parts of the ICRMP.

2.0 EXISTING ENVIRONMENT

This section describes the existing natural and social environmental resources in and around the Picatinny Arsenal.

2.1 GEOLOGIC RESOURCES

2.1.1 Geology

Picatinny Arsenal is located in the Green Pond Brook Valley region of Morris County in the New Jersey Highlands. The Highlands, which consist of steep ridges and low valleys, were formed during the Precambrian to Devonian era by folding and faulting rock and by at least three periods of glaciation (Harte *et al.* 1986). Picatinny Arsenal is located in a glaciated valley southwest of Picatinny Lake and is surrounded by ridges that run in a northeasterly to southwesterly direction.

Ridges and valleys within the Arsenal are typically underlain by glacial stratified drift that overlays either glacial till or bedrock. The till exists as ground, recessional, or terminal moraines (Harte *et al.* 1986). The bedrock in the eastern section of the Arsenal consists of Pre-Cambrian granite gneiss. A younger Cambrian and Silurian bedrock consisting of quartz conglomerate and sandstone exists in the western half of the Arsenal and a Leithsville Formation, consisting of dolomite, runs southwest from Picatinny Lake. Thin bands of Hardystone Quartzite separate the Leithsville Formation from the granite gneiss. The softer Cambrian rock located between the granite and Silurian rock enabled the formation of the valleys and steep ridges in this area of Morris County (US Army Corps of Engineers [USACE] 1995). A lack of continuity of bedrock is noted throughout the Arsenal and is attributed to historic erosion and glaciation (Panamerican Consultants 1998). Bedrock outcrops, common throughout the higher elevations at the Arsenal, offer aesthetic views of the valleys below.

Mining of some of the rock found in the Highlands is common (USAEC 1999) although no mining is presently conducted in the Arsenal itself.

2.1.2 Topography

The Arsenal is located within a rectangular shaped valley, enclosed by the steep and rocky Green Pond Mountain range to the west, a more gently sloping, unnamed ridge to the southeast, and Green Pond and the Copperas Mountains to the northwest. The Copperas Mountains approach 1,200 feet in elevation and the unnamed southeastern ridge has an elevation of 1,100 feet (United States Geological Survey [USGS] 1991). The elevation of the valley area at the Picatinny Arsenal is roughly 700 feet; it is relatively flat, and contains some wetlands and areas that are prone to flooding. Fill historically has been added to slightly increase the elevation in sections of the Arsenal to provide support to buildings and other structures (Harte *et al.* 1986).

2.1.3 Soils

Layers of sediment and till cover the valleys and compose the soil component of the New Jersey Highlands. During the glacial periods, soil was stripped from the higher elevations and was re-deposited on the lower slopes and in the valleys. This scenario is evident at the Arsenal where deposition depths range from 1 to 2 feet on the lower slopes to many feet in the valley. These soils are derived from bedrock, glacial till, and colluvium and have textures ranging from gravelly loamy sand to silty loam (Van De Venter 1996).

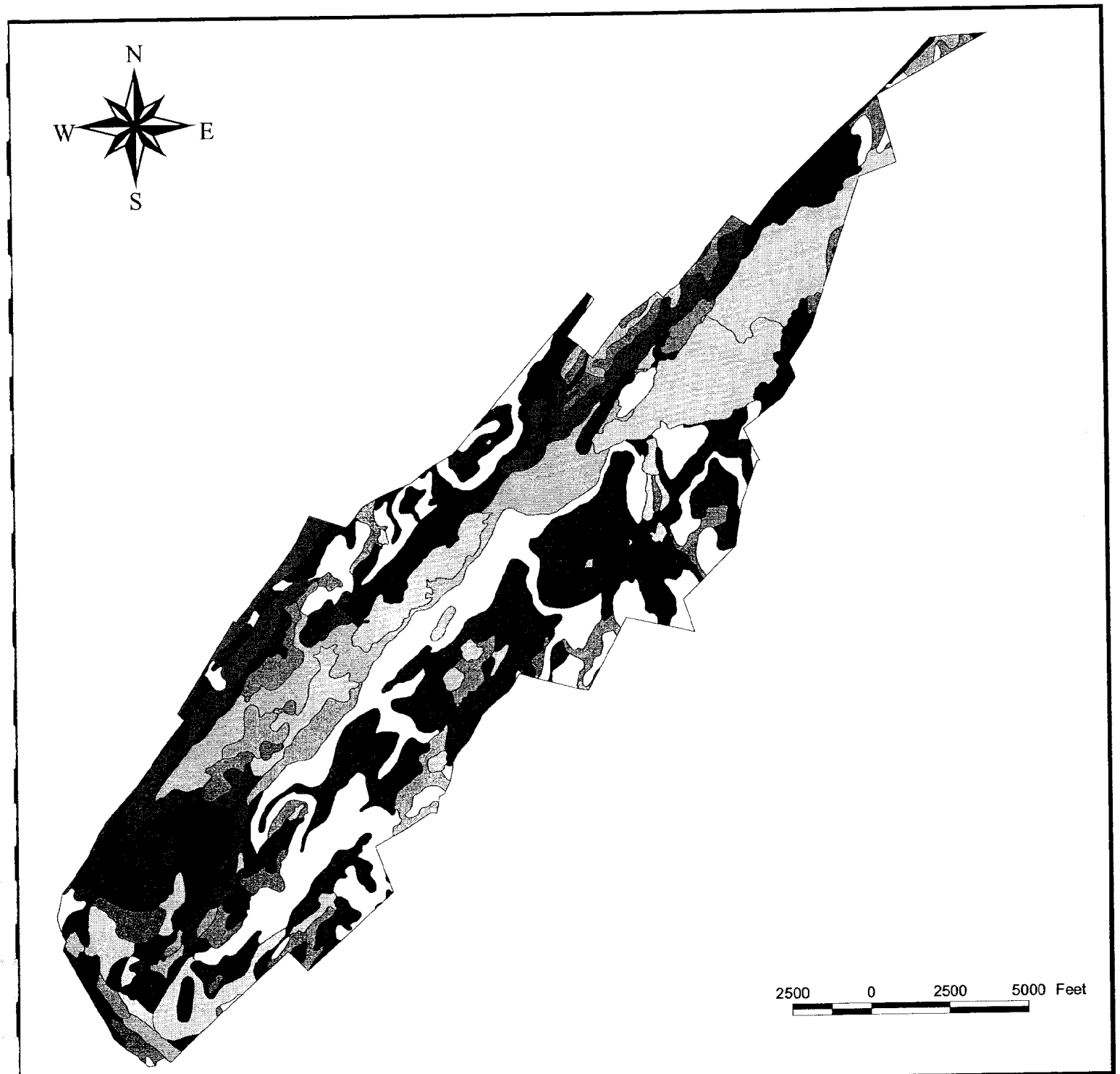
The Arsenal is underlain by 23 soil types, with percolation capabilities ranging from very poorly drained to excessively drained (see Figure 2.1). Soils from the Rockaway-Hibernia-Urban land association are predominant. These soils often form in glacial till and in areas where bedrock outcrops are present. The most common type of soil within the Arsenal property is the fragiudult, which includes both the Hibernia and Rockaway series. These are deep upland soils, found on slopes of 3% to 25%. Soils found on the steeper, 25% to 45% slopes are the Rockaway gravelly to extremely stony sandy loams and the Rockaway-Rock Outcrop complex (Waterways Experiment Station [WES] 1995). Seven hydric soil types are known to exist in depressions and near the streams within the Arsenal. These soils have percolation capabilities ranging from somewhat poorly drained to very poorly drained (US Department of Agriculture [USDA] 1976).

Historically, the types of soils found within this section of New Jersey have not been suitable for farming because they are either too stony, found on steep slopes or have inadequate drainage (USDA 1976). Due to the poor quality of soils and the nature of the Picatinny Arsenal's mission, there are no agricultural or grazing outleases in effect on the installation. Soils at the Arsenal are suitable for the construction of buildings and facilities (USDA 1976). Disturbed soils are therefore common throughout the Arsenal. These soils are noted in the sanitary landfill, in an area of reclaimed wetland, and in areas where parking lots, roads, housing, and buildings have been constructed.

2.1.4 Minerals

The mineral composition of the rock at the Arsenal has shaped some of its history. Deposits of iron and uranium found throughout this area were historically mined. Before the Arsenal was established, iron ore was smelted at the site to produce various types of armament used by the Continental Army during the Revolutionary War (USAEC 1999). Currently there are no active quarries or mines within the Arsenal, although quarrying of different types of rock and mineral is common through other areas of the Highlands.

The gneissic bedrock has a mixed mineralogy of magnetite, quartz and oligoclase, with trace amounts of orthoclase, biotite and hornblende (Eby 1976). In addition, subterranean cavities and limestone caves can be found in the Highlands. These features result from dissolution of the limestone by groundwater. Rocks with a high carbonic content can be found where sinkholes exist and contribute to high groundwater quality in this area (USAEC 1999).



File: e:/picatinny/dea/statsgo5.prj

Source: U.S. Department of Agriculture, Soil Conservation Service, New Jersey, State Soil Geographic (STATSGO) 1994

KEY TO SOIL TYPES:

Adr	Adrian muck
Car	Carlisle muck
HhmCa	Hibernia loam, 3 to 15 percent slopes, stony
HhmDb	Hibernia loam, 15 to 25 percent slopes, very stony
OtsC	Otisville gravelly loamy sand, 3 to 15 percent slopes
PHF	Pits, gravel
PohB	Pompton sandy loam, 3 to 8 percent slopes
PrkA	Preakness sandy loam, 0 to 3 percent slopes
PrsdA	Preakness Variant sandy loam, 0 to 3 percent slopes
RNC	Rock outcrop
RNRE	Rock outcrop-Rockaway complex, 15 to 35 percent slopes
RkgBb	Ridgebury loam, 0 to 8 percent slopes, very stony
RkgBc	Ridgebury loam, 0 to 8 percent slopes, extremely stony
RobCb	Rockaway sandy loam, 8 to 15 percent slopes, very stony
RobDc	Rockaway sandy loam, 15 to 25 percent slopes, extremely stony
RomC	Rockaway-Rock outcrop complex, 8 to 15 percent slopes
RomD	Rockaway-Rock outcrop complex, 15 to 25 percent slopes
RomE	Rockaway-Rock outcrop complex, 25 to 45 percent slopes
UR	Urban land
URROC	Urban land-Rockaway complex, 3 to 15 percent slopes
URROD	Urban land-Rockaway complex, 15 to 25 percent slopes
Udz	Udorthents, refuse substratum
WATER	Water
Whvb	Whitman loam, very stony

Figure 2.1: Soils at Picatinny Arsenal.

2.2 WATER RESOURCES

2.2.1 Regional Hydrogeology

Picatinny Arsenal is located in the New England, or Reading Prong, physiographic province of New Jersey (USGS 1997). This area, also know as the Highlands, is characterized by long narrow valleys situated between rugged ridges that range in elevation from 1,100 to 1,400 feet (Panamerican Consultants 1998). The New England Province is located north of the Fall Line, the boundary between the Coastal Plain and Non-Coastal Plain provinces. The New Jersey land mass north of the Fall Line is underlain by consolidated sedimentary and igneous rocks where groundwater storage and flow occurs in rock fractures (USGS 1996). The most recent glacial stage (Wisconsinan) left deposits that have completely or partly filled some of the valleys in this region with unconsolidated sand and gravel deposits of the Quaternary age (USGS 1997). These unconsolidated deposits of glacial outwash and stream-valley alluvium comprise the surficial aquifer system of this region.

2.2.2 Groundwater

The Arsenal is located above the non-coastal plain Highlands crystalline aquifer system, which is overlain by the surficial aquifer system (USGS 1997). In 1985, fresh groundwater withdrawals in Morris County were 10 to 50 million gallons per day (USGS 1997). The Arsenal drinking water source is the Unconsolidated Quarternary Aquifer System (Rockaway River Basin Area), which is designated as a Sole Source Aquifer (United States Environmental Protection Agency [USEPA] 1998). The Arsenal water supply serves a population of approximately 3,500 (USEPA 1999a). Greater than fifty percent (50%) of the drinking water for the aquifer service area is supplied by this Aquifer System (USEPA 1998). Sole Source Aquifer designations require USEPA review of any proposed projects within the designated area that receive federal financial assistance. The designation protects drinking water supplies in areas with few or no alternative sources to the ground water resource, and where if contamination occurred, using an alternative source would be extremely expensive. Public water supply systems in this aquifer have been contaminated by halogenated hydrocarbons and other volatile organics (USEPA 1998). Contaminant sources that have been identified include gasoline storage tanks, gasoline spills, oil/wastes separator operations, and septic tank effluent.

2.2.3 Surface Water

The USGS hierarchical hydrologic unit code (HUC) is a nationwide system used to divide the United States into progressively smaller hydrologic units. According to the USGS HUC, Picatinny Arsenal is located in the Hackensack-Passaic sub-basin (watershed) of the Lower Hudson basin in the Lower Hudson-Long Island Subregion of the Mid-Atlantic Region drainage (Seaber *et al.* 1987). The Hackensack-Passaic watershed is 179 miles long along its boundary, encompasses an area of approximately 1,123 square miles, and contains 495 lakes and 1,287 river miles (USEPA 1999b).

Surface water is a prominent feature at Picatinny Arsenal (see Figure 1.1). The primary drainage is Green Pond Brook, a tributary to the Rockaway River, which bisects the Arsenal from the northeast to the southwest. It is joined by Burnt Meadow Brook, a drainage of Lake Denmark,

before flowing into Picatinny Lake. From Picatinny Lake, Green Pond Brook continues to flow southwest out of the Arsenal before reaching its confluence with the Rockaway River, approximately 1 mile downstream.

2.2.4 Floodplains

Picatinny Arsenal has a flood zone designation of "D" (*i.e.*, area of undetermined, but possible, flood hazards) (FEMA 1986). Flood zone designations are determined using the elevation datum used to compute flood elevations. Accordingly, because Green Pond Brook occupies the lowest relative topographic elevation on the installation, it can be inferred that flood zones would likely coincide with increasing isometric elevation contours away from this natural drainage.

2.3 AIR RESOURCES

2.3.1 Climate & Meteorology

New Jersey, located in the mid-Atlantic coastal region of the U.S., is halfway between the Equator and the North Pole. Variable weather is an attribute of the state, which is affected by wet, dry, hot, and cold airstreams. Measurable precipitation falls on approximately 120 days; fall is the driest season with an average of 8 days of measurable precipitation, while an average of 9 to 12 days of measurable precipitation per month occurs during the rest of the year (ONJSC 1999). Mean annual precipitation between 1951 and 1980 was greater than 48 inches, while runoff was approximately 25 inches (USGS 1997). Temperature has been measured at 100°F or higher, and 0°F or below, at every weather station in the State. The average number of freeze-free days in the northern Highlands is 163 while the central and southern interior, and coastal regions of the State have 179 and 217 freeze free days, respectively.

Picatinny Arsenal is located in the Northern climate zone, one of five distinct climate zones in New Jersey (ONJSC 1999). Prevailing winds are from the northwest in the winter and from the southwest in the summer; consequently, the region's climate is typically unaffected by the Atlantic Ocean to the east. Storm systems tracking from the Mississippi Valley, the Great Lakes, and the St. Lawrence Valley are largely responsible for precipitation in this zone. Cloud formation and precipitation are increased by orographic effects. This zone exhibits a colder temperature regime than the rest of the state in the winter and has the shortest growing season with 155 days. Snowfall can occur between October 15 and April 30 in the Highlands and averages between 40 to 50 inches.

2.3.2 Air Quality

The USEPA assesses air quality according to the National Ambient Air Quality Standards for six criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), and sulfur dioxide (SO_2). Commonly cited sources of criteria pollutants include automobile exhaust emissions, fossil fuel (coal and oil) fired power plants, oil refineries, ore smelters, storage and transfer operations involving solvents, and industrial emissions, among others.

Picatinny Arsenal is considered part of the Primary Metropolitan Statistical Area (PMSA) for Newark, New Jersey. In a broader geographical context, the Arsenal is located in the

Consolidated Metropolitan Statistical Area (CMSA) for New York-Northern New Jersey-Long Island. According to the National Air Quality and Emissions Trends Report (USEPA 1997), the New York CMSA is considered a nonattainment area for carbon monoxide and is classified as an extreme/severe nonattainment area for ozone. In general, New York MSA air quality trends from 1988 to 1997 reflect decreasing quality for CO, NO_2, PM, and SO_2, while concentrations of Pb and O_3 have not changed significantly. Air quality trends from 1988 to 1997 in the Newark PMSA have shown a decrease in CO, Pb, and SO_2 and O_3, while there was no significant change in NO_2 or PM.

The USEPA's Pollution Standards Index (PSI), a measure of community-wide air quality based on daily measured concentrations of six criteria pollutants, is reported in media outlets serving metropolitan areas with populations exceeding 200,000. The PSI index corresponds to a health descriptor that ranges between 0 and 500 (*i.e.*, 0-50 is good; 50-100 is moderate; 100-200 is unhealthful; 200-300 is very unhealthful; and, >300 is hazardous). Ninety-one PSI values have been reported for Morris County in 1999. The median and maximum reported PSI was 33 and 56, respectively (USEPA 1999c). The reported data indicates that overall air quality in Morris County was "good" during 1999.

2.3.3 Noise

Noise is generally defined as unwanted sound. The day-night noise level (Ldn) is the most widely used descriptor of community noise levels. The unit of measure of the Ldn is the A-weighted decibel (dBA), which closely approximates the frequency responses of human hearing.

The primary source of noise in the Project Area is vehicular traffic on local roadways. Intermittent and louder sources of noise include submachine and large caliber gunfire, the hum of tank engines, and the movement of helicopters overhead. Noise level measurements have not been obtained in the Project Area. In lieu of field measurements, the noise levels at the Arsenal can be approximated using existing land uses. The USEPA (1978) document "Protective Noise Levels" lists typical day-night levels for various outdoor locations. The dominant land uses on the Arsenal are industrial, commercial, and a mixture of rural and clustered housing. Mean outdoor day-night sound levels characteristic of these land uses range from 60 to 80 dBA (USEPA 1978). However, sound levels greater than 80 dBA are likely to occur given the nature and frequency of military operations at the Arsenal.

2.4 BIOLOGICAL RESOURCES

Biological resources include native vegetation and animals, and their associated habitats. Due to its long-standing history and prudent management of resources, the Arsenal serves as an island of biodiversity in an increasingly urbanized area. The topographically diverse landscape of the Arsenal includes forested ridge tops, talus slopes, abandoned mine shafts, bottomland hardwoods, mesophytic wetlands, conifer stands, old fields, riparian sites, shrub stands, wetlands, brooks, and ponds, which in turn sustain an diverse floral and faunal population. The conservation and management of these resources is directed by the Picatinny Arsenal Integrated Natural Resources Management Plan (INRMP) (Van De Venter 1996). Picatinny Arsenal

biological resource data presented in this EA were taken from several reports, and surveys conducted in part for the preparation of the 5-Year INRMP.

2.4.1 Vegetation—Uplands and Wetlands

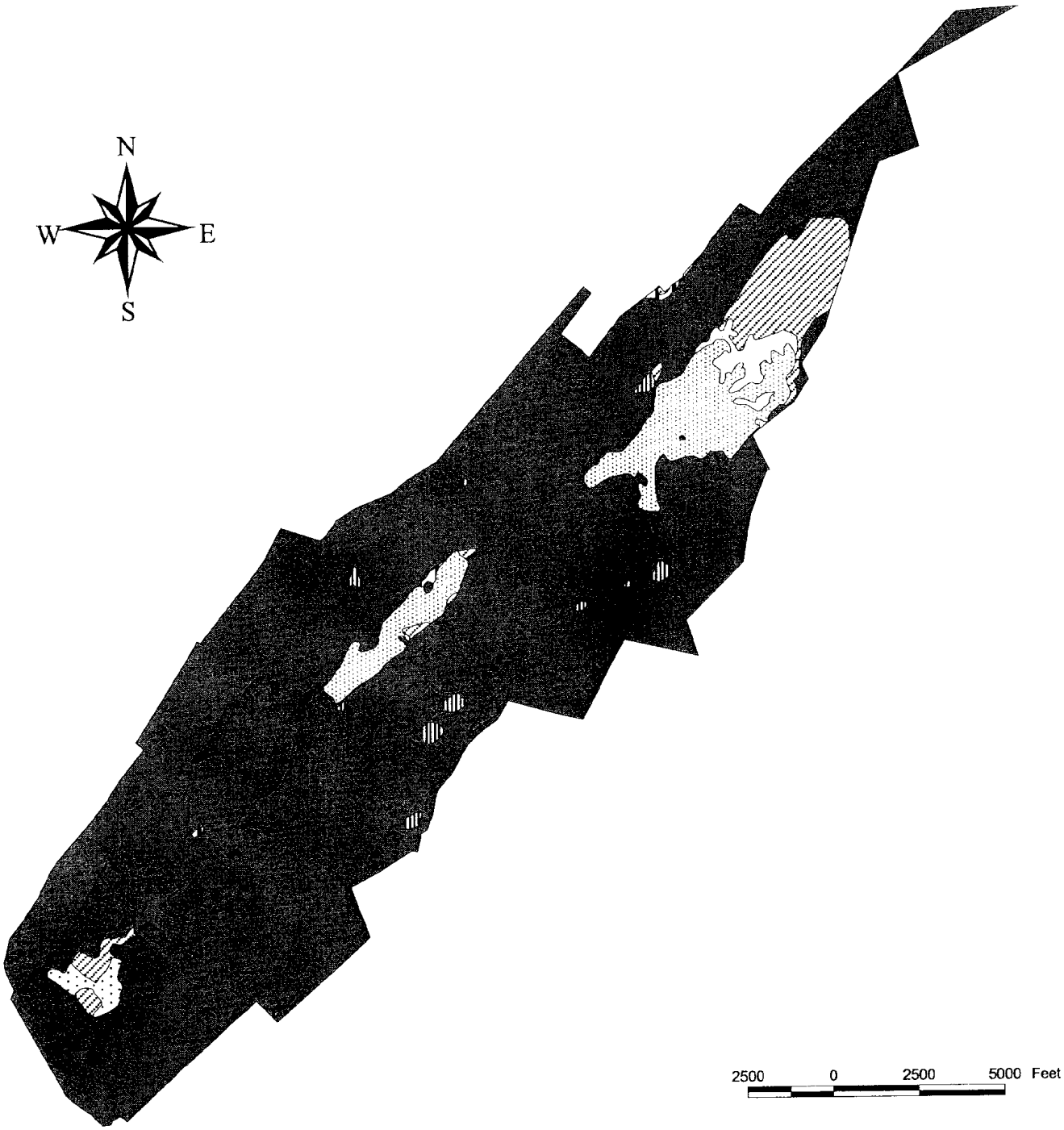
Over 700 species of non-vascular and vascular plants have been documented on the Arsenal. Arsenal upland vegetation is mostly forested, and dominated by the northern hardwood and mixed oak types. Northern hardwood forests are characterized by sugar maple (*Acer saccharum)*, and to a lesser extent white ash (*Fraxinus americana*), beech (*Fagus grandifolia)*, and red maple (*Acer rubrum*). Mixed oak forest consists of species from the red and white oak groups, including black oak (*Quercus velutina*) and chestnut oak (*Quercus prinus*), respectively. Aspen/gray birch stands can be found on forest borders, where fields are being converted to forests by these successional species. Stands of this type can be monotypic or a heterogeneous mixture of bigtooth aspen (*Populus grandidentata*), quaking aspen (*Populus tremuloides*), and gray birch (*Betula populifolia*) (Van de Venter 1996). Silvicultural practices on the Arsenal focus on wildlife value and production of timber for saw logs and firewood. Hardwood and hemlock forest stands are the most intensively managed due to their economic value; aspen/gray birch stands are managed for their wildlife value. Arsenal landscaping is done using native trees, shrubs, forbs, and ferns to the greatest extent practical.

The 6,500 acres of land encompassed by the Arsenal include 1,250 acres of wetlands (Van de Venter 1996) (see Figure 2.2). Two major wetland systems exist on the Arsenal: lacustrine and palustrine. In declining order of acreage, wetland cover types include deciduous forest, open water, and scrub/shrub cover types. Wetland cover types as a percentage of Arsenal acreage is provided in Table 2.1.

TABLE 2.1: WETLAND COVER TYPES AT PICATINNY ARSENAL.

WETLAND TYPE	DOMINANT VEGETATION	% OF TOTAL ACREAGE AT THE ARSENAL
Deciduous forest	Red maple	39.0
	Yellow birch, maple	2.5
	Grey birch, poplar	1.5
Coniferous forest	Hemlock	<1.0
Scrub/Shrub	Various species	18.0
Emergent Marsh	Various species	3.0
Man Made	Various species	0.5
Lacustrine	Various species	36.0

Source: (Van de Venter 1996). Compiled by Northern Ecological Associates, Inc. 2000.



Source: U.S. Fish & Wildlife Service, National Wetlands Inventory, Boonton, NJ, Dover, NJ, Newfoundland, NJ 1979

File: e:/picatinny/dea/nwi5.prj

KEY TO WETLAND COVER TYPES:

L1OW	LACUSTRINE LIMNETIC/OPEN WATER
PEM	PALUSTRINE, EMERGENT WETLAND
PFO/SS1	PALUSTRINE, FORESTED WETLAND/SCRUB -SHRUB WETLAND, BROAD-LEAFED DECIDUOUS
PFO1	PALUSTRINE, FORESTED WETLAND, BROAD-LEAFED DECIDUOUS
POW	PALUSTRINE/OPEN WATER
PSS1	PALUSTRINE/SCRUB-SHRUB WETLAND,BROAD LEAFED DECIDUOUS
PSS1/EM	PALUSTRINE/SCRUB-SHRUB WETLAND, BROAD-LEAFED DECIDUOUS/EMERGENT WETLAND
PSS1/OW	PALUSTRINE/SCRUB-SHRUB WETLAND, BROAD-LEAFED DECIDUOUS, OPEN WATER
U	UPLAND

Figure 2.2: National Wetland Inventory Cover Types at Picatinny Arsenal.

2.4.2 Wildlife—Mammals, Birds, Reptiles & Amphibians, Fish, and Shellfish

The diverse array of habitat found on the Arsenal supports over 300 species of vertebrates and 280 species of invertebrates.

Commonly observed mammals on the Arsenal include the beaver (*Castor canadensis*), porcupine (*Erethizon dorsatum*), woodchuck (*Marmota monax*), eastern gray squirrel (*Sciurus carolinensis),* white tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes)*, striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*) (Van de Venter 1996).

Of the 208 recorded bird species observed on the Arsenal, only 39 are year-round residents. The remainder includes transient species that may occasionally stop over during seasonal migration (Van de Venter 1996). Songbirds include the cedar waxwing (*Bombycilla cedrorum*), indigo bunting (*Passerina cyanea*), purple martin (*Progne subis*), and the scarlet tanager (*Piranga olivacea*). Raptors include Coopers hawk (*Accipiter cooperii*), common barn owl (*Tyto alba*), bald eagle (*Haliaeetus leucocephalus*), and the great horned owl (*Bubo virginianus*). Game birds such as the wood duck (*Aix sponsa*), wild turkey (*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), and ruffed grouse (*Bonasa umbellus*) are also common. An extensive list of nongame birds includes the great egret (*Ardea alba*), killdeer (*Charadrius vociferus*), downy woodpecker (*Picoides pubescens*), and the yellow-billed cuckoo (*Coccyzus americanus*).

Herpetofauna is an inclusive term used to collectively describe amphibians and reptiles. The Arsenal's herpetofauna is typical of similar areas in northern New Jersey, and consists of 21 species of amphibians, and 19 reptiles. Common herpetiles that occur at the Arsenal include the red-spotted newt (*Notophthalmus viridescens*), American toad (*Bufo americanus*), bullfrog (*Rana catesbeiana*), eastern painted turtle (*Chrysemys picta*), snapping turtle (*Chelydra serpentina*), garter snake (*Thamnophis sirtalis*), and black rat snake (*Elaphe obsoleta*) (Van de Venter 1996).

Twenty-four species of warm, cool, and cold-water fish are found on the Arsenal. Chain pickerel (*Esox niger*), largemouth bass (*Micropterus salmoides*), and pumpkinseed (*Lepomis gibbosus*) are common. Cold-water fish are limited to stocked populations of rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and brook trout (*Salvelinus fontinalis*). The Arsenal supports a native, self-sustaining brook trout population considered to be a remnant of the native regional population. The state of New Jersey lists the native brook trout as a species of special concern.

A detailed investigation of shellfish resources on the Arsenal has not been conducted, but is one of the goals of the 5-Year Agenda for Fish and Wildlife Management. Monitoring for the introduction of the highly invasive zebra mussel in Arsenal ponds is also in the Agenda (Van de Venter 1996).

Hunting, trapping, and fishing opportunities on the Arsenal are open to installation personnel and individuals, and groups and clubs associated with the Arsenal, such as retired military. Use by

the general public is currently prohibited. Deer, small game, furbearer, and freshwater fish regulations are set forth by the New Jersey Fish and Game Department.

2.4.3 Essential Fish Habitat

Pursuant to Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), federal agencies are required to consult with the National Marine Fisheries Service (NMFS) regarding any action they authorize, fund, or undertake that may adversely affect Essential Fish Habitat (EFH). EFH has been designated by the NMFS for the purpose of protecting and conserving the habitat of marine, estuarine, and anadromous finfish, mollusks and crustaceans (NMFS 1999). Fish habitat at the Arsenal consists only of freshwater environments. Therefore, no designated EFH exists at the Arsenal due to the absence of marine or estuarine environments.

2.4.4 Threatened and Endangered Species—Federal and State

DOD facilities are required to protect federally listed threatened and endangered plant and animal species. It is also the policy of Picatinny Arsenal to avoid impacts to state listed endangered plant and animal species. There are no federally listed plant species known to exist on the Arsenal (see Table 2.2). The Indiana bat (*Myotis sodalis*) and the bog turtle (*Clemmys muhlenbergi*) are the only permanent residents falling under federal designation. The bald eagle and peregrine falcon (*Falco peregrinus*) are typically observed in this region during migratory flyovers. Populations of the Eastern woodrat (*Neotoma floridana ssp. magister*) have existed on the Arsenal in the past, but have not been seen since extirpation in 1985. A detailed list of federally and state listed threatened and endangered animal species known to occur on the Picatinny Arsenal is provided in Table 2.3.

Local habitat loss for each of these species is of prime concern. Habitat needing protection includes Indiana bat hibernacula on adjacent private land, and trees used for summer maternity roosts on the Arsenal. Wetland habitat preferred by the bog turtle is threatened by changes in hydrology, wetland alteration, and natural vegetational succession. The Army's Natural Resource Department staff have established ongoing coordination with the U.S. Fish and Wildlife Service (USFWS) and are developing individual species management plans to protect these species and enhance associated habitat at the Arsenal.

TABLE 2.2: THREATENED AND ENDANGERED PLANT SPECIES FOUND AT PICATINNY ARSENAL.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	STATE RANK	GLOBAL RANK
Ferns and Fern Allies					
Asplenium bradleyi	Bradley's spleenwort	--	E	S1	G3
Equisetum pratense	Meadow horsetail	--	E	S1	G5
Lycopodium annotinum	Stiff clubmoss	--	E	S1	G5
Grasses					
Cinna latifolia	Slender wood reedgrass	--	E	S1	G5
Aquatic Plants					
Hottonia inflata	Featherfoil	--	E	S1	G3/G4
Lobelia dortmanna	Water lobelia	--	E	SH	G4
Potamogeton robbinsii	Robbin's pondweed	--	E	S1	G5
Utricularia minor	Lesser bladderwort	--	E	S1	G5
Sparganium angustifolium	Narrow leaved bur reed	--	E	SH	?
Forbs					
Clitoria mariana	Butterfly pea	--	E	S1	G5
Desmodium humifusum	Trailing tick trefoil	--	E	SH	G1/G2
Sisyrinchium montanum	Common blue eyed grass	--	E	S1	G5
Triadenum fraseri	Fraser's marsh Saint John's wort	--	E	S1	G?
Trees					
Ilex montana	Largeleaf holly	--	E	S1	G5

Legend
T = Threatened
E = Endangered
SC = Special Concern
SH = Historical occurrence in NJ
-- = Not listed

? = dubious or questionable
S/G1 = critically imperiled
S/G2 = imperiled
G3 = rare
G4 = apparently secure
G5 = demonstrably secure

Source: (Van de Venter 1996). Compiled by Northern Ecological Associates, Inc. 2000.

TABLE 2.3: THREATENED AND ENDANGERED ANIMAL SPECIES FOUND AT PICATINNY ARSENAL.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	STATE RANK	GLOBAL RANK
Reptiles					
Clemmys insculpta	Wood turtle	--	T	S3	G5
Clemmys muhlenbergi	Bog turtle	T	E	S2	G3
Crotalus horridus	Timber rattlesnake	--	E	S2	G5T5
Birds					
Ammodramus savannarum	Grasshopper sparrow	--	T	S1	G4
Accipiter gentilis	Northern goshawk	--	T	S2	G4
Ardea herodias	Great blue heron	--	T	S2	G5
Asio otus	Long-eared owl	--	T	S3	G5
Bartramia longicauda	Upland sandpiper	--	E	S1	G5
Buteo lineatus	Red-shouldered hawk	--	E	S2	G5
Dolichonyx oryzivorus	Bobolink	--	T	S2	G5
Egretta caerulea	Little blue heron	--	T	S3	G5
Falco peregrinus	Peregrine falcon	E	E	S1	G3
Haliaeetus leucocephalus	Bald eagle	T	E	S1	G3
Melanerpes erythrocephalus	Red-headed woodpecker	--	T	S2	G5
Passerculus sandwichensis	Savannah sparrow	--	T	S2	G5
Pandion haliaetus	Osprey	--	T	S3	G5
Podilymbus podiceps	Pied-billed grebe	--	E	S1	G5
Pooecetes gramineus	Vesper sparrow	--	E	S2	G5
Strix varia	Barred owl	--	T	S3	G5
Mammals					
Felis rufus	Bobcat	--	E	S2	G5
Myotis sodalis	Indiana bat	E			
Neotoma floridana ssp. magister	Eastern woodrat	SC	E	S2	G5T4

Legend
T = Threatened
E = Endangered
SC = Special Concern
G3 = rare
G4 = apparently secure
G5 = demonstrably secure
S/G1 = critically imperiled
S/G2 = imperiled
T4, T5 = infraspecific taxon ranks
-- = Not Listed

Source: (Van de Venter 1996). Compiled by Northern Ecological Associates, Inc. 2000

2.5 CULTURAL RESOURCES

Cultural resources are nonrenewable resources whose values may be diminished by physical disturbances. These resources include buildings, structures, objects, landscapes, and archaeological sites, as well as places of importance to a culture or community for reasons of history, religion, or science.

2.5.1 Overview

The following is a brief summary of the culture history of Picatinny Arsenal and the surrounding region, including both Native American occupation, as well as Euro-American occupation. A longer discussion of this culture history for the Picatinny Arsenal area is presented in the ICRMP.

Initial human occupation of the general vicinity of Picatinny Arsenal may have occurred as early as approximately 11,000 to 8,000 BC during the Paleo-Indian Tradition. This cultural tradition has traditionally been viewed as one that utilized a subsistence strategy based on big-game hunting of such largely extinct species such as mastodon, mammoth, caribou and moose-elk. A variety of smaller game such as white-tailed deer were also exploited, as well as fish and numerous wild plant species (Panamerican Consultants, Inc. 1998). A reconstruction of the paleo-environment for this general time period suggests that central New Jersey was a mosaic of tundra and mixed hardwood-coniferous forests that would have sustained such animal and plant populations associated with the Paleo-Indian cultural tradition's subsistence and food procurement strategies (Funk 1972, Salwen 1975, Marshall 1982, as cited in Panamerican Consultants 1998).

Paleo-Indian sites are typically characterized by specific lithic assemblages including fluted projectile points known as Clovis points, as well as leaf-shape and ovate bifacial knives. Fifteen fluted points have been identified for the Highlands physiographic region within which the Picatinny Arsenal is located; six of these fluted points were found within the boundaries of Morris County. Other diagnostic Paleo-Indian artifacts such as end-scrapers that were often designed with graving spurs, unifacial side-scrapers, knives and retouched flakes, drills, awls and gravers have also been found in the general vicinity of Picatinny Arsenal, including those found at the Plenge Site in Warren County to the west, and the Port Mobil Site on Staten Island, New York, to the east. Pollen analysis at a more distant site, the Shawnee-Minisink Site near the Delaware Water Gap, along with recovery of additional typical Paleo-Indian lithic material, supports this view of the Paleo-Indian subsistence strategy (Panamerican Consultants 1998).

Circa 8000 BC, the general paleo-environment began to change, characterized by reforestation of the Northeast in general, including the northern New Jersey area, with a pine-hemlock-oak cover. Generally concurrent with this change in the vegetative cover of the physical environment, the Paleo-Indian cultural tradition gave way gradually to the Archaic Period cultural tradition. The Archaic Period is a relatively long cultural tradition, lasting for approximately 7000 years between roughly 8000 and 1000 BC, and is typically subdivided into the Early Archaic Period, the Middle Archaic Period, and the Late or Terminal Archaic Period. Overall the Archaic Period

is characterized by a stylistic changes in lithic assemblages, an apparent increase in population, changes in subsistence strategies, and a less nomadic settlement system that becomes increasingly regionally specific (Panamerican Consultants 1998).

Archaic Period lithic assemblages consisted of bifurcated base point as well as points with serrated edges, continued use of end and side scrapers, and the appearance of spokeshaves, drills, gravers, choppers, hammers and anvil stones. By the Middle Archaic Period (circa 6000 to 4000 BC), ground and polished stone tools appeared, including bannerstones and bell-shaped pestles. Subsistence strategies continued to utilize the predominant animal and plant species in the area. However, the proportion of plant and aquatic species found in the archaeological record of Archaic Period sites increased relative to terrestrial animal species, suggesting greater utilization of a wider variety of seasonally available foodstuffs within a greater variety of micro-environments. Archaic Period sites have been identified in the general vicinity of the Picatinny Arsenal, and include both open-air sites near Lake Hopatcong and Lake Denmark, and a rockshelter site near Longwood Lake. Other Archaic Period sites have been identified around northern New Jersey, including, but not limited to, sites on Staten Island, and near Tottenville, Medford, and Marlton, New Jersey (Panamerican Consultants 1998).

The third prehistoric cultural tradition in the general vicinity of Picatinny Arsenal is defined as the Woodland Period, dating between approximately 1000 BC to approximately 1500 AD. This cultural period is characterized by a number of changes in both subsistence strategies and in social organization. The appearance and increasing diversity and sophistication of ceramics that appear in the archaeological record period characterize the Woodland. In addition to the appearance of ceramics, the Woodland Period is also characterized by distinct lithic styles and assemblages that include tools for hunting, butchering, hide preparation, fishing, plant processing, cooking, woodworking, and domestic activities (Kraft and Mounier 1982 as cited in Panamerican Consultants 1998).

The subsistence strategy for Woodland Period cultures also shifted over time, with horticulture becoming increasingly important relative to hunting and gathering, particularly with the spread of domesticated plant species such as gourds, corn, beans and squash. Generally concurrent with the rise of horticulture as a means of subsistence, Woodland Period groups tended to become increasingly sedentary, with large settlements located along rivers with broad, easily cultivated floodplain soils. In general, these larger Woodland sites tend to be associated with the Delaware River Valley to the south and west of the Morris County. Although Woodland Period sites have been identified in the Highlands physiographic province, they tend to be small, unfortified, dispersed farmsteads or hamlets rather than large settlements (Panamerican Consultants 1998).

By the end of the Woodland Period, just before the time of European contact, two distinct Woodland Period cultures had developed in New Jersey: the proto-Munsee and the Proto-Unami groups (Kraft 1986 as cited in Panamerican Consultants 1998). At least one historic Native American group, the Munsee, has been associated with the general vicinity of the Picatinny Arsenal. The Munsee have been identified as cultural descendants of Proto-Munsee speaking groups of the Late Woodland Period (Panamerican Consultants 1998).

Euro-American settlement in the vicinity of the Picatinny Arsenal, particularly the Highlands physiographic region in general, appears to have been begun in the early 18th century, and was associated with the iron industry, including mining and foundry work, associated with the iron-rich strata exposed in the sharp relief of the Highland physiographic region. Such settlement was organized in the form of large tracts of land (numbering in the thousands of acres). Huge areas of forested land were necessary to obtain lumber for charcoal, which was then used in the foundry processes associated with both bloomery forges and with finery forges (Panamerican Consultants 1998). At least three iron forges were established in the immediate area of the Picatinny Arsenal in the 18th century: the Picatinny or Middle forge, established in 1749; the Lower Forge, established in 1750; and the Upper or Burnt Meadow Forge, also established in 1750 (Panamerican Consultants 1998).

The establishment of these forges is associated with a number of manmade and natural features/structures, including streams and waterways, dams, hearths, blast furnaces and foundry buildings. Other types of settlement also occurred with the establishment of these iron foundries, including charcoal kilns, settlements composed of residential and commercial structures that supported iron-working communities, and dispersed farmsteads that would have provided foodstuffs for residents. As the iron industry in the Picatinny Arsenal area declined in the mid 19th century, attempts were made to redevelop the large tracts of land for the timber and ice industries, or were subdivided into smaller tracts for individual farmers or for recreational property (Panamerican Consultants 1998).

In 1880, the first land purchases were made to establish what would eventually become part of the Picatinny Arsenal. The Picatinny Powder Depot was established by the United States government in 1880 on approximately 1800 acres of land, and new types of structures began to appear on the landscape including storage and powder magazines, residences and administrative buildings, and rail lines that tied the Picatinny Powder Depot into regional railroad systems. Between 1893 and 1907, the facility was known as the United States Powder Depot, then changed to the Picatinny Arsenal in 1907, when the first army-owned smokeless powder factory was constructed on the site. The development of the Picatinny Arsenal into a manufacturing facility, and then later into a research facility continued from 1907 onward. Development expanded in response to World War I, and the Picatinny Arsenal was almost entirely rebuilt after a 1926 explosion at the adjacent Lake Denmark Powder Depot that destroyed an area over 1 mile in diameter. The significance of the Picatinny Arsenal for munitions research, development, and manufacturing has continued through World War II up to the present day (Panamerican Consultants 1998).

2.5.2 Types of Cultural Resources Known or Anticipated

There are a number of known cultural resources identified for the Picatinny Arsenal, including buildings, structures and archaeological sites, as a result of numerous cultural resource investigations for various parts of the Picatinny Arsenal property. While some of these known cultural resources are of local significance, others have been formally evaluated and have been determined as eligible for the NRHP.

An initial architectural assessment of historic structures at Picatinny Arsenal in 1994 identified 500 structures that were potentially eligible for the NRHP as a single historic district (Harrell 1994, as cited in Panamerican Consultants 1998). A re-evaluation of these same 500+ buildings was initiated when the New Jersey Historic Preservation Office (HPO) determined that the 500 historic structures at Picatinny Arsenal did not have sufficient integrity as a single historic district (Guzzo 1999, as cited in Panamerican Consultants 1999a). The re-evaluation of the 500 historic structures at Picatinny Arsenal subsequently determined that 443 structures were not eligible for the NRHP. The remaining 57 structures were evaluated for NRHP-eligibility as either contributing or non-contributing elements of one of three smaller historic districts at Picatinny Arsenal, or were evaluated for NRHP-eligibility as individual structures.

The Administrative and Research District is the first historic district consisting of 23 contributing structures and one non-contributing structure. The 600 Ordnance Testing Area District is the second historic district, with 26 contributing structures and 3 non-contributing structures. The Test Area E, Naval Air Rocket Test Station District consists of two primary structures (Panamerican Consultants 1999b). Based on subsequent investigation, both of these structures (Buildings 3617 and 3618) were determined to be technically ineligible for listing on the NRHP solely because they had lost their structural integrity, or ability to tell about itself. However, based on consultation with the National Park Service, Historic American Building/Historic American Engineering Record (HABS/HAER), the Army proposes to complete "salvage recordation" of these buildings to HABS/HAER Level II survey standards before the buildings completely deteriorate or are torn down (Santomauro 2000).

Two additional historic structures have been determined to be individually eligible for the NRHP: Building 3250, Navy Hill Commanders' Quarters, and Building 3316, Fire House/Stable (Guzzo 1999, as cited in Panamerican Consultants 1999b).

Limited archaeological investigations have been conducted at the Picatinny Arsenal by a number of cultural resource management consultants. Eleven prehistoric archaeological sites have been identified as a result of these investigations, all of which have been recommended for further testing to determine their eligibility for the NRHP. Four additional prehistoric sites have been historically reported for the Picatinny Arsenal, but their status has not been confirmed at this time. Cultural resource management consultants have also identified at least eleven historic archaeological sites. Four historic archaeological sites have been determined to be eligible for the NRHP: Site A of the Kitchell Homestead, and the Blakely, Palmer, and Palmer/Elliott Homesteads (Rutsch et al 1986, as cited in Panamerican Consultants 1998). The Walton Family Cemetery/Hessian Cemetery, the Cannon Gates, the Middle Forge, and the 1911 ARDEC Commander's House may also be individually eligible for the NRHP (Panamerican Consultants 1998).

In addition to these known cultural resources, a number of previously unidentified cultural resources are anticipated for the Picatinny Arsenal. Because of the area's known prehistoric and historic occupation and development, additional archaeological sites and structures are anticipated for the Picatinny Arsenal. Prehistoric sites are expected to be present, consisting of small temporary or specific-use sites. Historic period sites are also expected, including

structures associated with the iron industry (mines, forges, charcoal kilns, and associated features such as dams and waterways), structures associated with settlement and non-industrial activities (farmsteads, sawmills, gristmills), and miscellaneous structures such as roads, cemeteries, and railroad lines.

2.5.3 Impacts Anticipated from Undertakings

General impacts to cultural resources may occur from undertakings such as ground disturbing activities associated with new building construction or with modification of existing land contours; building revitalization, renovation, rehabilitation and/or demolition; routine maintenance and repair of existing buildings and property; transferal or leasing of real estate; agricultural or forestry management activities; testing activities associated with research conducted at Picatinny Arsenal; and recreational use. General impacts to known or anticipated archaeological sites could result from, but not be limited to, earth-moving activities such as excavating, trenching, blading, borrowing, and filling, as well as damming, contouring or planting ground cover. Additional impacts to known or anticipated archaeological sites could be sustained from testing activities associated with research at Picatinny Arsenal, including missile impacts, explosions, vehicular activity, and field exercises by military personnel; and from recreational activities such as use or development of trails, picnic and camping areas, stream banks, for hiking, hunting, boating and/or fishing. Occasional vandalism to archaeological resources that may be located within rock shelters could also be sustained.

General impacts to existing or anticipated historic buildings and structures could result from, but not be limited to, such activities that would diminish the integrity of historic buildings and structures, particularly maintenance and repair activities that use materials, colors, styles or workmanship that are not compatible with the existing architectural fabric and styles found at Picatinny Arsenal. Historic landscapes associated with specific buildings or historic districts could also be impacted by new construction or by permanent modification to existing structures or land contours.

2.5.4 Management Procedures

The proposed ICRMP consists of a 5-year plan with management recommendations and procedures to complete and maintain the cultural resources inventory for the Picatinny Arsenal. These procedures include locating and testing previously identified archaeological resources, and completing archaeological surveys for those areas of the Picatinny Arsenal that have been determined to be archaeologically sensitive according to sensitivity models identified in the ICRMP and/or that may require archaeological testing according to a Programmatic Agreement between Picatinny Arsenal and the New Jersey Historic Preservation Office. The proposed ICRMP also includes management recommendations and procedures to complete the existing evaluations of previously identified historic properties at Picatinny Arsenal, as well as to continue to evaluate buildings (both exterior features and interior features and equipment), structures and infrastructure at Picatinny Arsenal as they reach the 50-year limit generally required for NRHP-eligibility. The proposed ICRMP presents cultural resources management procedures that are in accordance with applicable federal laws and regulations, including NHPA, AR 200-4, NEPA, Executive Order 11593, AHPA, the Antiquities Act of 1906, ARPA, AIRFA, NAGPRA, the White House Memoranda of 29 April 1994, Executive Order 13007, and the

Curation of Federally-Owned and Administered Collections, September 12, 1990 (Panamerican Consultants 1998).

2.6 SOCIOECONOMICS

The Picatinny Arsenal is part of a regional economic and demographic system closely associated with the nearby metropolitan areas of New York City, New York, and Newark, New Jersey. The general area of Picatinny Arsenal, located in Rockaway and Jefferson townships, Morris County, New Jersey, is considered a mixture of urban, suburban and rural land use (Druetzler 1999). The New Jersey Office of State Planning has characterized about 75% of the land immediately surrounding the Picatinny Arsenal as an "environmentally sensitive" planning area, due to the presence of important and high quality waters, forested areas, and natural heritage sites (NJ Office of State Planning 1999). The remainder of land immediately surrounding the Picatinny Arsenal is considered suburban.

2.6.1 Demographic Characterization

The population for Morris County has been estimated at approximately 428,409, with a total of 148-751 households (Druetzler 1999). The population for Rockaway Township is 19,572; the population for Jefferson Township is 17,825 (Druetzler 1999). Several more densely populated areas located within the vicinity of the Picatinny Arsenal include Morristown, the county seat, with a population of 18,000; the Town of Boonton, with a population of 9,000; the Township of Denville, with a population of 14,000, the Borough of Rockaway, with a population of 6,500; the Town of Dover, with a population of 15,000; and the Borough of Wharton, with a population of about 7,000 (Lev Zetlin Associates 1992).

2.6.2 Economy and Income

The private sector population of Morris County is predominantly composed of executive (~20%), clerical (~18%) and professional (~18%) labor, which together make up almost 60% of the labor force in Morris County. Occupations such as sales, crafts, service, technical, operator, laborer and farming, and private occupations make up the remaining proportion of the work force for Morris County, New Jersey. The nearby communities of Wharton, Dover, Rockaway Borough and Denville Township are all characterized as manufacturing-residential communities with industries associated with the manufacture of synthetic fabrics, wearing apparel, stone clay and glass products and cement pipes, picture frame production, fabrication of specialized tools and equipment, aircraft parts, forging fiberboard containers, phonograph records, pumps and water supply equipment, pressure castings, thermometers, and electronics. The median household income for Morris County is $56,273; the median family income for Morris County is $62,749 (Lev Zetlin Associates 1992).

The Arsenal employed 18,000 people at its peak in 1942. In 1996, the federal workforce numbered approximately 4,500 (Van De Venter 1996), and in 1999 these figures had been reduced to approximately 3,000 (USAEC 1999). Greater than half of the Arsenal's workforce are employed specifically within the research, design and manufacturing activities. In addition to employees, the Picatinny Arsenal also supports active duty military, retirees, civilian employees, reservists and associated family members (Dept. of Army 1999a) and seeks to

involve the local public and private sectors of the surrounding communities in management and development activities at the facility (Dept. of Army 1999b).

The Arsenal also employs civilian contractors that work on the installation on a daily basis. In addition, the Army has established a public/private initiative leasing program that allows civilian businesses and organizations to lease buildings on the property for non-military uses.

2.6.3 Housing

Morris County, New Jersey, has 155,745 housing units, of which 148,751 are occupied. The majority of the vacant housing units are almost equally divided between units that are for rent and units that are for sale. A number of vacant housing units are seasonal, recreational or occasional use units. The majority of housing units in Morris County has between four and nine rooms, and has a value between $150,000 and $400,000. The median value of owner-occupied housing units in Morris County is $217,300 (U.S Census Bureau 1999).

Approximately 280 military personnel and their dependants reside in housing on the Arsenal property (Van De Venter 1996). Housing at Picatinny Arsenal consists of troop and family housing. Troop housing is divided into housing for unaccompanied enlisted personal housing and unaccompanied officer housing, and includes support facilities for enlisted personnel dining, company operations and supply, battalion command and control facilities with classrooms, troop medical clinics, skill development centers and unit chapel. Family housing is divided into dwelling units and their associated facilities and mobile homes and their associated facilities. Fifty-eight of these family housing units are permanent buildings and include one-, two-, and three-story buildings that range in size from single family quarters to two, three and four family units. Unaccompanied personnel housing consist of barracks and guesthouse apartments (Lev Zetlin Associates 1992).

2.7 LAND USE

The Arsenal is located in an area of New Jersey that is generally described as suburban, and is also a popular summer vacation destination. The New Jersey Office of State Planning has characterized about 75% of the land immediately surrounding the Picatinny Arsenal as an "environmentally sensitive" planning area, due to the presence of high quality waters, potable water supply watersheds, important forested areas and natural heritage sites, and wetlands and streams (NJ Office of State Planning 1999). The Arsenal is situated between two steeply sloped ridges in the New Jersey Highlands, and it includes several waterbodies: Lake Denmark, Picatinny Lake, Green Pond Brook, and Burnt Meadow Brook. Structural development at the installation is generally concentrated in the valley and provides approximately 2.7 million square feet of indoor area, of which approximately one-half is used for research activities.

Existing land use at the Arsenal is primarily related to the Arsenal's historic mission involving the research, development, and testing of armaments. The primary mission of the Arsenal involves development of warfare materials, and is an activity requiring industrial land use. Supporting land uses present include commercial and residential land uses. Approximately 4,229.7 acres (or 65.2%) of Picatinny Arsenal's 6,491.0 acres is undeveloped forest or marshland

(Lev Zetlin Associates 1992). Approximately 1,953 acres (30.1%) of the Arsenal is developed, including large industrial and warehouse buildings, ammunition storage, roads and railroads, landscaped and maintained grounds, parking areas, and recreational areas. Commercial and residential resources and facilities provide support to industrial activities at the Arsenal. The Arsenal contains five general land use areas: training areas; research, development, and testing areas; administrative areas; housing and community areas; and parking areas (Panamerican Consultants 1998). The Arsenal contains approximately 2.7 million square feet of indoor space, primarily used for research activities (USAEC 1999). Surface water areas at the Arsenal are used for industrial water supply, recreation, and occasionally for testing activities (Lev Zetlin 1992). Buildings cover approximately 89.9 acres (1.4%), while roadways and railroads cover approximately 325 acres (5%).

Land use patterns at the Arsenal are allocated among the following land use classifications:

1) Airfield;
2) Vehicle Maintenance and Associated Facilities;
3) Industrial;
4) Ammunition Supply and Storage;
5) Administrative;
6) Training/Ranges;
7) Troop Housing;
8) Family Housing;
9) Community; and,
10) Medical.

Future land use at the Arsenal, as proposed in the Land Use Plan (Lev Zetlin Associates 1992), is similar to current land use. The Arsenal's mission calls for the continuation of research and development, but with less emphasis on storage. Development at the Arsenal has historically been constrained by the large areas of space and land required for the production, testing, and storage of explosives. Reducing the level of storage necessary for the Arsenal's mission may enable the Arsenal to phase out some of the land and space requirements that previously constrained development in areas of the Arsenal, and allow more efficient accommodation of future development.

Current and potential future activities involving land use at the Arsenal include the consolidation of explosives laboratories, testing, and bulk storage areas (Lev Zetlin Associates 1992).

The proposed Land Use Plan provides for the preservation of several historic landmarks, including:

1) The Cannon Gates;
2) The Hessian Cemetery;
3) Middle Forge;
4) Middle Forge Memorial;
5) ARDEC Commander's House;

6) Naval Commander's House; and,
7) Fire House.

2.8 TRANSPORTATION

Transportation resources at the Picatinny Arsenal include ground- and air- based transportation networks. Ground-based transportation resources in the vicinity of the Arsenal include roadways, which connect primary highways, secondary roads, several feeder roads, and collector streets in the area. Interstate 80, approximately 0.5 miles from the Arsenal, serves the Rockaway Township area. Access between Interstate 80 and the Arsenal can be obtained via County/State Routes 15 and 661. The Arsenal's main entrance is located on Parker Road, off New Jersey State Route 15. Roads within the Arsenal property are laid out in an orderly grid, with broad roads and collector streets serving the industrial and commercial areas of the Arsenal (Department of the Army 1999c). The roads are primarily used for passenger access (*i.e.,* automobile) and freight vehicles (*i.e.,* tractor-trailers). A truck entrance and weigh station are located on Phipps Road, off New Jersey Route 15 (Department of the Army 1999c).

Air-based transportation includes direct access via helicopter and indirect access via local airport services. There is a helipad at the Arsenal, which is primarily used by the New Jersey National Guard. Airplane access to the Arsenal is available through the Newark International Airport, located approximately 32 miles east of the Arsenal, and the Morristown Airport, located approximately 15 miles southeast of the Arsenal (Van De Venter 1996).

In addition to these transportation resources, the Arsenal includes several hiking trails and bicycling/jogging/walking paths for foot-based transportation. Availability and means of access to certain remote and rural or forested areas of the Arsenal is restricted due to the mission of the Arsenal and the potential for encountering unexploded ordnance (UXO).

2.9 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)

Picatinny Arsenal has been contaminated by historical uses and activities on the installation. The Arsenal was added to the USEPA National Priorities List (Superfund), EPA ID# NJ3210020704, on February 21, 1990 (USEPA 1999d). The primary sources of contamination are metals, Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Trichloroethylene (TCE), Polychlorinated Biphenyls (PCBs), Nitroaromatics, explosives, UXO, propellants, radiological material, and pesticides (TACOM-ARDEC 1999). These contaminants are present in burn areas, buildings, groundwater, soil, sediment, storage tanks (aboveground and underground), and waste lines.

Remediation at the Arsenal is being accomplished under the Installation Restoration Program (IRP), the Department of Defense (DOD) program to identify, investigate, and control hazardous contaminants at active DOD facilities. There are 175 sites at the Arsenal listed in the Defense Site Environmental Restoration Tracking System (DSERTS). Of these 175 sites, 19 have been designated as Response Complete (RC) while others have been designated as Areas of Concern (AOC). The AOC have been divided into three phases for remediation. The highest-priority

sites in the southern area of the Arsenal are being addressed through Phase I. Remediation of the AOC is progressing at various stages throughout the Arsenal. The total Estimated Cost to Completion is approximately $238.9 million over 20 years. Approximately $45.4 million has been spent to date at the Arsenal, primarily on investigation (USDOD 1995). Environmental restoration and monitoring at the Arsenal is expected to be complete by 2020.

A Restoration Advisory Board (RAB) was established in 1995 to facilitate communication between the Army and the local community. The RAB has met quarterly or every other month since its formation. Recent disagreement among the RAB, the community, the Army, and the New Jersey Department of Environmental Protection (NJDEP) over the level of remediation necessary at the Arsenal poses the potential for affecting the schedule of remediation and the acceptable level of cleanup at the Arsenal.

Only one of the historic districts proposed in the ICRMP, Historic District 3, is within an area considered to have maximum relative risk at the Arsenal (Van De Venter 1996). Maximum relative risk is a comparative valuation among several AOC at a site, and indicates the AOC that pose the greatest hazard through a combination of contaminants, migration pathways, and extent of migration through the pathways (TACOM-ARDEC 1999). This area contains four sites that are being addressed in the Phase II Remedial Investigation. Three of the four sites are reaction motors/rocket fuel test areas; the fourth is a helicopter maintenance building (TACOM-ARDEC 1999). Contaminants of concern at these sites include heavy metals and various industrial chemicals associated with previous land use.

2.10 AESTHETIC AND SCENIC RESOURCES

Aesthetic and scenic resources at Picatinny Arsenal encompass various natural and man-made areas. Picatinny Arsenal is nestled in a valley between two ridges, with several natural and man-made waterbodies situated along the valley floor. In keeping with the Arsenal's mission, many of the buildings are industrial in appearance and construction, and date from the early 1900s through the present. The majority of the property at the Arsenal is composed of undeveloped landscape with well-defined clusters of industrial, commercial, and residential development.

Developed portions of the installation date from the inception of the Arsenal in the late 1800s, and include buildings constructed and renovated from that era to the present. The developed areas are neatly organized, with straight roadways and evenly distributed blocks common to military installations. Scenic attractions at the Arsenal include waterbodies such as Picatinny Lake and Lake Denmark, the surrounding hills and mountains, and forested hillsides. Additionally, several historic resources are noted for their aesthetic and scenic values. These include locally important structures such as the Cannon Gates, which mark the entrance to the Arsenal from Parker; and the ARDEC Commander's House, as well as structures that have been determined eligible for the NRHP, such as the Naval Commander's House, and the Fire House (Panamerican Consultants 1998, Guzzo 1999, as cited in Panamerican Consultants 1999a, Panamerican Consultants 1999b).

The undeveloped areas of the site have been addressed in the INRMP, and include approximately 4,672 acres of forest and wetland areas frequented by hunters and outdoor sportsmen (Van De Venter 1996). Section 1.1.7 of the INRMP encourages the preservation of the natural beauty of this area, and states, "Aesthetic considerations are routinely integrated into any habitat modification plans or field management applications."

2.11 RECREATION

Various indoor and outdoor recreational resources exist at the Arsenal. Outdoor resources include lakes and streams, forests, mountains, roadways, and trails. These resources are utilized for a variety of activities including fishing, hunting, hiking, and walking/jogging/bicycling. There is an 18-hole golf course at the Arsenal, available for use by Arsenal personnel (Department of the Army 1999c). A picnic/campground area and ballfield are located at Lake Denmark. Swimming in the lake (or any other natural waterbodies on the Arsenal) is prohibited, although boating, including gas-powered, is permitted on Lake Denmark and Picatinny Lake and swimming is permitted in a swimming pool located near Farley Avenue. The South Basin Pond is used for ice-skating during the winter. A trap/skeet range and an archery range are maintained at the Arsenal by the Picatinny Rod and Gun Club (Van De Venter 1996).

The Arsenal contains a number of areas that are open to hunting and fishing. Approximately 4,700 acres of land is available for hunting, while fishing is allowed at Lake Denmark, South Basin Pond, and Picatinny Lake, as well as other lakes, ponds, and streams. Various species of gamefish, panfish, and trout are present in these waterbodies. Several waterbodies at the Arsenal are stocked with trout three times a year, enhancing recreational fishing opportunities. Access to hunting and fishing areas is restricted to military personnel (active and retired), civilian employees of the Arsenal, and disabled veterans due to the high safety risk posed by potential UXO and activities associated with the Arsenal's mission. The Arsenal provides rules to which sportsman must adhere in order to avoid conflict between recreational access and the Arsenal's mission, and to ensure the safety of recreational users (Van De Venter 1996).

The Arsenal houses several indoor recreational resources for use by Installation personnel and the public. Restaurants, a gymnasium, and the Arsenal museum provide further cultural and recreational opportunities for residents and visitors to the Arsenal.

As part of a public/private partnership, an area of the Arsenal has been identified as a potential location for an aquatic center (Lare 1999). This park would be developed by, and accessible to, both the Arsenal employees/residents and the general public. The INRMP has identified recreation as a potential source of resource degradation if the Arsenal is opened to the public (USAEC 1999), although the INRMP cites as an objective the provision of recreational benefits "from fish and wildlife resources to both Installation personnel and the general public" (ARDEC - INRMP Section IV-1).

3.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

This section identifies the impacts or consequences to the natural and social environment that may result from implementing the ICRMP at the Picatinny Arsenal.

3.1 GEOLOGIC RESOURCES

3.1.1 Geology

Impacts to geology would be considered significant if proposed disturbances permanently alter landforms and result in landslides, subsidence, or increased flooding that damages existing facilities. In addition, the aesthetic value attributed to the geology within the Arsenal could be compromised. However, it is not anticipated that disturbances resulting from the implementation of the ICRMP would be of this magnitude, and therefore impacts to geology would be too insignificant to measure or temporary in nature.

No impacts to geology are anticipated from the No Action Alternative.

3.1.2 Topography

Impacts to topography would be considered significant if proposed disturbances permanently alter landforms or existing drainage patterns within the Arsenal and create a potential for flooding and erosion.

Minor disturbances that cause localized changes in topography would not likely affect the overall landscape topography or have a major effect on drainage, soil stability or aesthetics. Best management practices would also be implemented as necessary to prevent erosion events that might jeopardize topographic integrity.

No impacts to topography are anticipated from the No Action Alternative.

3.1.3 Soils

Impacts to soils would be considered significant if proposed disturbances alter large sections of land within the Arsenal and create a situation where erosion potential of the soil increases. However, proper erosion and sedimentation controls and methods would be used to prevent any large or small-scale erosion event. In addition, areas disturbed by implementation of the ICRMP would be stabilized after the work is completed. For these reasons, impacts to the soil resource would be temporary in nature. Similarly, no significant impact on soil productivity is expected.

No impacts to soils are anticipated from the No Action Alternative.

3.1.4 Minerals

Impacts to minerals would be considered significant if proposed disturbances permanently alter existing landforms and render active or planned mines or quarries unproductive. The

recoverable mineral content in the soils could be lost if disturbances resulted in severe erosion or subsidence.

However, there are no active or planned mines or quarries within the Arsenal, therefore, no significant impacts will result from implementation of the ICRMP. In addition, during disturbances, proper erosion and sedimentation controls and methods would be used as necessary to prevent any large-scale erosion event and therefore the integrity of the soil, including the mineral resource, would be maintained. Disturbed areas would be stabilized after construction activities are completed.

No impacts to mineral resources are anticipated from the No Action Alternative.

3.2 WATER RESOURCES

3.2.1 Regional Hydrogeology

Implementation of policies and procedures outlined in the Picatinny Arsenal ICRMP will not have any direct or indirect, adverse or beneficial impacts on regional hydrogeology.

No impacts to regional hydrogeology are anticipated from the No Action Alternative.

3.2.2 Groundwater

Implementation of policies and procedures outlined in the Picatinny Arsenal ICRMP will not have any direct or indirect, adverse or beneficial impacts on groundwater.

No impacts to groundwater are anticipated from the No Action Alternative.

3.2.3 Surface Water

Implementation of the Picatinny Arsenal ICRMP is not anticipated to have any direct or indirect, adverse or beneficial impacts on surface water. Adverse short-term impacts could occur if proper erosion control measures are not taken during archaeological excavations. Excavations near surface waterbodies could result in sedimentation or short-term increases in turbidity if erosion control devices are absent or improperly installed.

No impacts to surface water are anticipated from the No Action Alternative.

3.2.4 Floodplains

Implementation of policies and procedures outlined in the Picatinny Arsenal ICRMP will not have any direct or indirect, adverse or beneficial impacts on floodplains.

No impacts to floodplains are anticipated from the No Action Alternative.

3.3 AIR RESOURCES

3.3.1 Climate & Meteorology

Implementation of policies and procedures outlined in the Picatinny Arsenal ICRMP will not have any direct or indirect, adverse or beneficial impacts on climate or meteorology.

No impacts to the climate or meteorology are anticipated from the No Action Alternative.

3.3.2 Air Quality

Implementation of policies and procedures outlined in the Picatinny Arsenal ICRMP will not have any direct or indirect, adverse or beneficial impacts on air quality.

No impacts to air quality are anticipated from the No Action Alternative.

3.3.3 Noise

Implementation of the Picatinny Arsenal ICRMP is not anticipated to have any direct or indirect, adverse or beneficial impacts on noise levels. Increased sound levels could occur if motorized earth moving equipment were required for an archaeological excavation, however, increased sound levels would only be temporary in nature.

No impacts to noise levels are anticipated from the No Action Alternative.

3.4 BIOLOGICAL RESOURCES

Impacts to biological resources resulting from the implementation of the ICRMP would be direct, but minor. As part of its standard operations, the Army complies with all applicable federal environmental regulations and statutes that protect environmental resources. Implementation of the ICRMP would not change or negate INRMP standard procedures, which would continue to be followed for all ongoing and proposed activities at the Arsenal. Excavations and investigations of historic and prehistoric sites have the potential to affect biological resources, but impacts would be short term. However, because additions and new construction would be limited to the expansion of existing buildings, impacts to biological resources would likely be minimal. Other types of site construction include the repair and replacement of preexisting curbing, benches, fountains, stone walls, and gates and would not lead to new disturbances, and therefore would not impact biological resources.

3.4.1 Vegetation—Uplands and Wetlands

Unless federally listed as a threatened or endangered plant species, alteration of upland vegetation would not conflict with Picatinny Arsenal's existing INRMP. Under the Proposed Action, minor impacts to upland vegetation may occur, but would be temporary in nature. Impacts may include brush clearing or tree removal for expansion or upkeep of buildings. The No Action Alternative would rely on similarly pre-established criteria and would have a similar impact on uplands.

Impacts to wetlands would occur if activities resulted in draining, ditching, deposition of fill, or irrigation and/or installation of levees and impoundments (USACE 1987). The Army's standard procedure for complying with the Clean Water Act would still be followed as required for all ongoing and proposed activities at the Arsenal. The action(s) would comply with the New Jersey Freshwater Wetlands Regulations. Procedures for minimizing and/or mitigating impacts would be implemented and funded as required.

3.4.2 Wildlife—Mammals, Birds, Reptiles, Amphibians, Fish, and Shellfish

Impacts to wildlife would be considered significant if they resulted in habitat destruction and subsequent degradation to the resident population. Under the Proposed Action, any impact to wildlife would be evaluated and coordinated with the INRMP and other currently established wildlife management plans. The No Action Alternative would rely on similarly pre-established criteria and would have no impact on wildlife resources.

3.4.3 Essential Fish Habitat

Essential Fish Habitat does not exist at the Arsenal, as described in Section 2.4.3. Therefore, no impact to EFH would result from implementation of the Proposed Action.

3.4.4 Threatened and Endangered Species—Federal and State

The Eastern wood rat is the only foreseeable threatened/endangered species that may be affected by the ICRMP. Populations of the Eastern wood rat have existed on the Arsenal in the past, but have not been seen since extirpation in 1985. The preferred habitat of the wood rat is rocky talus slopes, but they will also live in buildings (Grondahl 1995). One of the structural preservation guidelines in the ICRMP calls for the extermination and control of pests including termites and rodents during mothballing (Panamerican Consultants 1998). Any structure in need of pest management should be investigated for the possible presence of these animals.

Impacts to the Indiana bat and bog turtle are expected to be minimal to nonexistent. Integration of individual conservation plans for each of these two animals with the proposed ICRMP will afford protection to these animals and their habitat.

3.5 Cultural Resources

Implementation of the proposed ICRMP would bring the Picatinny Arsenal into compliance with AR 200-4, which directs each installation to develop an integrated ICRMP. This would be done using the recommended management practices and procedures agreed upon in the final ICRMP, which would assist the Picatinny Arsenal in identifying and managing the known and anticipated cultural resources within the facility.

The No Action Alternative to implementing the proposed ICRMP would result in non-compliance of the Picatinny Arsenal with regard to AR 200-4, which directs each installation to develop an integrated ICRMP.

3.6 SOCIOECONOMICS

Socioeconomic conditions for Morris County, New Jersey, and for Picatinny Arsenal in particular, would not be changed by the implementation of the ICRMP. No impact is expected from this undertaking.

Socioeconomic conditions for Morris County, New Jersey, in general, and for Picatinny Arsenal in particular, also would not be changed by the No-Action Alternative.

3.7 LAND USE

Impacts to existing land use at the Arsenal as a result of implementation of the ICRMP are not expected to be significant or negative. The evaluation and grouping of certain areas into historic districts (Districts) before any projects are proposed in these areas is likely to enable a more efficient and "streamlined" method for appropriately evaluating cumulative impacts of development within and around these Districts. Therefore, although current regulations require compliance with the Section 106 statutes on a per-project basis, implementation of an ICRMP is likely to facilitate early intervention, relocation, or mitigation of activities that might negatively affect cultural resources at the Arsenal. Implementation of the ICRMP also is likely to yield a more accurate evaluation of alternatives to proposed projects that may impact cultural resources.

By adopting development and renovation guidelines for specific Districts and activities, the ICRMP will affect land use by imposing certain restrictions and instructions for development. For example, the Arsenal or regional Cultural Resources Manager (CRM) can determine whether a proposed project or activity would likely affect a cultural resource at the Arsenal, and based on this determination may require an identification and evaluation of the resource followed by measures to avoid or minimize the adverse impact (Panamerican Consultants 1998).

As the mission of the Arsenal has shifted to focus more on research and development, and less on storage of explosives, the traditional land uses that required large areas of storage and buffer space may become available for more compact and efficient development applications (Lev Zetlin Associates 1992). This may allow development to be more concentrated in currently developed areas, and may reduce development pressure on areas containing cultural resources. Increased availability of area for development may allow greater flexibility in selection of locations for large developments such as an Armament Technology College, various electrical and infrastructure upgrades and maintenance, and an aquatic center being considered at the Arsenal.

The Long Range Land Use Plan cites the preservation of several historic landmarks, including the Cannon Gates, the Hessian Cemetery, Middle Forge, Middle Forge Memorial, ARDEC Commander's House, Naval Commander's House, and the Fire House as an objective for future land use (Lev Zetlin Associates 1992). Overall, no negative or significant impact to current and proposed future land use at the Arsenal is anticipated as a result of implementation of the ICRMP. The existing and proposed future land use guidance indicates that cultural resources

will be preserved, therefore no significant or negative impact to cultural resources is anticipated as a result of current or proposed future land use activities at the Arsenal.

3.8 TRANSPORTATION

No impacts to transportation resources or activities at the Arsenal are expected to result from implementation of the ICRMP. The ICRMP would primarily involve the evaluation and designation of individual structures and creation of Historic Districts. Neither of these activities is likely to affect current of future transportation resources at the Arsenal.

3.9 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)

No significant negative impacts to ongoing or planned HTRW remediation efforts at the Arsenal are expected to result from implementation of the ICRMP. However, existing UXO and other contamination at the Arsenal may impede the full implementation of the ICRMP. The ICRMP proposes large-scale cultural resources investigations that may have the potential to encounter UXO and other contamination during excavations. Considerations of safety, cost, and effort associated with the cultural resource excavations/investigations in these areas may reduce the feasibility of completing them.

Most of the Historic Districts proposed in the ICRMP are not located in areas of significant contamination. Only one of the proposed historic districts, Historic District 3, is within a high-priority (maximum relative risk) area of the Arsenal (Van De Venter 1996). No impact to, or resulting from, remediation efforts in this area is anticipated as a result of implementation of the ICRMP, because the focus of the ICRMP is on preservation and restoration of buildings and resources within the historic districts, not on development or demolition. Additionally, the ICRMP will not absolve future preservation or restoration efforts from the requirements of meeting all applicable environmental and safety guidance.

Although remedial actions at the Arsenal will be occurring throughout the next two decades implementation of the ICRMP will not significantly affect the remediation process. Most of the significant HTRW Areas of Concern (AOC) are not located in the proposed historic districts, and any preservation or cultural resource investigation activities that may be planned for buildings and areas outside these districts would be carefully coordinated with HTRW remediation activities. The schedule for and level of remediation may change, based upon the extent and results of discussions among the RAB and involved federal/state agencies, but any change in either of these factors is not likely to affect or be affected by implementation of the ICRMP.

3.10 AESTHETIC AND SCENIC RESOURCES

No significant or negative impacts to aesthetics and scenic resources at the Arsenal are expected to result from implementation of the ICRMP. Minor positive impacts may result from the preservation and historic enhancement of NRHP-eligible and listed properties. A cumulative positive impact on aesthetic and scenic resources may result from the designation of historic districts and the associated land use and development restrictions at the Arsenal. Over time, as

various buildings in the historic districts are renovated according to era standards, the sum of several restored buildings in the area may create an aesthetically-pleasing environment with overall scenic value greater than would be achieved on a per-project evaluation basis.

Mothballing is a potential alternative to demolition for eligible historic buildings for which productive or economically feasible current and foreseeable future uses have not been assigned. This interim measure provides for the temporary closure of a building to ensure the building's protection from the weather and vandalism while its future is being determined. This may provide a short-term enhancement of aesthetic values by covering buildings that are vacant and/or in disrepair. However, mothballing may result in a short-term negative impact to the aesthetic value of buildings that are not in disrepair and may be more aesthetically valuable without boarded windows and other visible signs of interim preservation. Overall, no significant or negative impacts to aesthetic and scenic resources at the Arsenal are expected to occur due to implementation of the proposed ICRMP, although minor, positive impacts may occur.

3.11 RECREATION

No significant or negative impacts to existing recreational resources at the Arsenal are expected to result from implementation of the proposed ICRMP. Designation of the three proposed Historic Districts and the two individually eligible historic structures, and the comprehensive inventory and evaluation of cultural resources at the site, are not likely to negatively impact the Arsenal's outdoor and indoor recreational resources. The ICRMP would provide a more comprehensive approach to cultural resources at the Arsenal, and may contribute to the recreational attraction of the Arsenal for cultural/educational reasons, because Historic Districts would be established for cultural resource preservation.

The proposed Historic Districts and the two individually eligible historic structures are located in previously developed areas of the Arsenal; therefore no negative impacts to rural and undeveloped areas are likely to result. However, as a result of cultural resources investigations that would be conducted upon implementation of the proposed ICRMP, additional areas may be cleared of UXO. Impacts to the recreational resources within developed areas of the Arsenal would be limited to temporary obstruction or limitation of access to recreational facilities during periods of site investigation.

3.12 ENVIRONMENTAL JUSTICE

In accordance with Executive Order 12898 (dated February 11, 1994), federal agencies are required to identify and address the potential for disproportionately high and adverse environmental and human health effects on minority and low-income populations, resulting from the agencies' programs, policies, and activities.

Based on the information presented in sections 3.1 through 3.11 of this Draft Programmatic EA, no significant or unacceptable adverse environmental or human health effects are expected to result from the Proposed Action. Therefore, there would be no disproportionately high and adverse impact to minority or low-income populations.

3.13 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The Army and the Army's cultural resource consultants would commit irreversible and irretrievable resources to the implementation of the ICRMP, in the form of the monetary and manpower costs of regular cultural resources investigation and revision of the ICRMP every 5 years. The labor costs of the cultural resources investigations recommended in the ICRMP may be greater than currently allocated for cultural resources investigation, because the ICRMP proposes investigations in areas that may not otherwise be investigated when cultural resources compliance is managed on a per-project, site-specific basis.

In addition, the costs of repairing, renovating, or maintaining certain historic buildings in accordance with specifications prescribed in the ICRMP represent a commitment of resources that may be considered irretrievable.

Conversely, implementation of the ICRMP would help to ensure that cultural resources, which are non-renewable resources, are not irreversibly and irretrievably lost.

No significant irreversible and irretrievable commitment of natural resources such as soil, water, air, fossil fuels, electricity, and land would be necessary to accommodate this Proposed Action.

3.14 CUMULATIVE IMPACTS

No adverse cumulative impacts are expected to result from implementing the ICRMP. The integrated approach for the cultural resources management program and agency coordination process will streamline the current program, leading to increased efficiency of regulatory review and approvals and reduced program implementation costs. In addition, implementation of the ICRMP will help the Army's cultural resources staff to ensure all activities on the Picatinny Arsenal are in compliance the federal statutes, regulations, and Executive Orders governing cultural resources.

4.0 LIST OF PREPARERS

A list of the preparers of this Programmatic EA is provided below, including name, position, and role.

TABLE 4.1. LIST OF PREPARERS.

Name	Position	Role in PEA Preparation
U.S. Army Corps of Engineers, New York District		
Nancy Brighton	Archaeologist	Project Management Review
Northern Ecological Associates, Inc.		
David J. Santillo	Principal	Program Manager, Principal Review
Sandra Lare	Project Manager	Introduction, Picatinny Arsenal Location and Mission, Purpose and Need, Proposed Action, No Action Alternative, Other Alternatives, Environmental Justice, Irreversible and Irretrievable Commitment of Resources, Cumulative Impacts, Document Review
Daniel Marquis	Deputy Project Manager	Water Resources, Air Resources
Irene Garvey	Associate Scientist	Geologic Resources
Christopher Carlton	Associate Environmental Planner	Land Use, Transportation, Hazardous, Toxic, and Radioactive Waste (HTRW), Aesthetic and Scenic Resources, and Recreation
Natasha Snyder	Senior Cultural Resource Specialist	Cultural Resources, Socioeconomics
Shawn Jalbert	Associate Scientist	Biological Resources

5.0 COORDINATION WITH REGULATORY AGENCIES

The USACE and the Picatinny Arsenal environmental staff will coordinate with the New Jersey HPO to execute a final PMOA formally accepting the provisions of the ICRMP. In addition, the Army and its cultural resource consultants have coordinated with local and state agencies and organizations to obtain historic and prehistoric information regarding the Arsenal and surrounding area, to complete the numerous existing cultural resource investigation reports.

The USEPA, USFWS, and NJDEP are participating in the review of this Draft EA. In addition, this Draft EA is being distributed to local interested agencies and parties pursuant to NEPA.

6.0 REFERENCES

Department of the Army. 1999a. *Picatinny Morale, Welfare, and Recreation.* [Online] In Department of the Army Morale, Welfare, and Recreation Office. Available: http://www.pica.army.mil/mwr/ [1999, December 15].

Department of the Army. April, 1999b. *Picatinny Arsenal Public/Private Partnership.* [Online] In Department of the Picatinny Arsenal Army Public/Partnership: Site Assets. Available: http://www.pica.army.mil/picatinny/ [1999, December 15].

Department of the Army. 1999c. *Visitor's Guide.* [Online] In Department of the Army Picatinny Visitor's Guide. Available: http://w3.pica.army.mil/visitor [1999, December 10].

Druetzler, Frank J. 1999. *Facts and Figures.* [Online] In Morris County Board of Chosen Freeholders. Available: http://www.co.morris.nj.us [1999, December 15].

Eby, C. F. 1976. Soil Survey of Morris County, New Jersey. United States Department of Agriculture, Soil Conservation Service, in cooperation with New Jersey Agricultural Experiment Station, Cook College, Rutgers University, and the New Jersey Department of Agriculture, State Soil Conservation Committee, U.S. Government Printing Office, Washington, D.C.

Federal Emergency Management Agency (FEMA). 1986. National Flood Insurance Program, Flood Insurance Rate Map (FIRM), Township of Rockaway, New Jersey, Morris County: Community-Panel Number 340360 0003 B.

Funk, Robert E. 1972. Early Man in the Northeast and the Late Glacial Environment. *Man in the Northeast* 4:7-42.

Grondahl, Chris. February 1995. The Woodrat: A Furry Friend to the West. North Dakota Outdoors. [Online]. Available: http://www.und.edu/org/ndwild/woodrat.html

Guzzo, Dorothy P. 1999. Correspondence dated July 2, Dorothy P. Guzzo, Deputy State Historic Preservation Officer, Division of Parks & Forestry, Department of Environmental Protection, State of New Jersey, and Ronald H. Kraus, Director, Public Works, Department of the Army, Picatinny Arsenal.

Harrell, Pauline Chase. 1994. Evaluation of Structures Built Prior to 1946 at Picatinny Arsenal, New Jersey. WCH Industries, Inc., Waltham, MA, in association with Boston Affiliates, Inc., Boston MA. Prepared for U.S. Army Corps of Engineers, New York District, New York.

Harte, P.T., B. P. Sargent, E.F. Vowinkel. 1986. Description of test-drilling program at Picatinny Arsenal, New Jersey, 1982-1984. U.S. Geological Survey Open File Report 86-316.

Kraft, Herbert. 1986. The Lenape: Archaeology, History, and Ethnology. The New Jersey Historical Society, Newark.

Kraft, Herbert C. and R. Alan Mounier. 1982. The Late Woodland Period In New Jersey: ca. 1000 BC-1600BC. In *New Jersey's Archaeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chelser, pp. 139-184. Office of New Jersey Heritage, New Jersey Department of Environmental Protection, Trenton.

Lare, Sandra. December 1999. Internal Memorandum: Summary of Kickoff Meeting for Picatinny Arsenal PEA for Implementation of Integrated Cultural Resources Management Plan, held on November 17, 1999 with staff from the USACE, New York District, Picatinny Arsenal, and Northern Ecological Associates, Inc., Rockaway Township, New Jersey.

Lev Zetlin Associates, Inc. 1992. Future Development Master Plan for U.S. Army Armament Research, Development and Engineering Center, Picatinny Arsenal, New Jersey. Prepared for the U.S. Army Corps of Engineers, New York District.

Marshall, Sydne B. 1982. Aboriginal Settlement in New Jersey During the Paleo-Indian Cultural Period, ca. 10,000 BC-6000 BC. In *New Jersey's Archaeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chelser, pp. 134-184. Office of New Jersey Heritage, New Jersey Department of Environmental Protection, Trenton.

National Marine Fisheries Service. October 1999. *Guide to Essential Fish Habitat Designations in the Northeastern United States*. [Online] Available: http://www.nero.nmfs.gov/ro/doc/webintro/.html [October 1999].

New Jersey Office of State Planning. 1999. The Highlands Region – Overview. [Online] Available: http://www.state.nj.us/osp/doc/highland.

Office of the New Jersey State Climatologist--Rutgers University (ONJSC). June 1999. *Climate Overview*. [Online] In New Jersey State Climatologist. Available: http://climate.rutgers.edu/stateclim/overview.html [1999, December 10].

Panamerican Consultants, Inc. 1998. *Integrated Cultural Resources Management Plan for the Picatinny Arsenal, Rockaway, Township, Morris County, New Jersey*. Final Draft Report prepared for the United States Army Corps of Engineers, New York District (Contract No. DACW51-95-D-0024, Work Order No. 02).

Panamerican Consultants, Inc. 1999a. *Architectural Assessment of Historic Structures at Picatinny Arsenal, Morris County, New Jersey.* Final Report prepared for the United States Army Corps of Engineers, New York District (Contract No. DACW51-95-D-0024, Work Order No. 19).

Panamerican Consultants, Inc. 1999b. *Definition of Historic Districts for Picatinny Arsenal, Morris County, New Jersey.* Final Report prepared for the United States Army Corps of Engineers, New York District (Contract No. DACW51-95-D-0024, Work Order No. 19).

Rutsch, E.S., W. Sandy, R.F. Porter, and L.G. Bianchi. 1986. Cultural Resource Investigation of the Proposed Mt. Hope Pumped Storage Hydroelectric Facility and Transmission Lines Rockaway and Jefferson Townships, Morris County, New Jersey. Historic Conservation and Interpretation, Inc., Newton, New Jersey. Prepared for Tippetts-Abbett-McCarthy-Stratton, New York and Bloomfield, New Jersey.

Salwen, Bert. 1975. Post Glacial Environments and Cultural Change in the Hudson River Basin. *Man in the Northeast* 10:43-70.

Santomauro, Frank, P.E. 2000. Letter communication on May 19, 2000 from Frank Santomauro, P.E., Chief, Planning Division, U.S. Army Corps of Engineers, New York District, to Dorothy P. Guzzo, Deputy Historic Preservation Officer, New Jersey Historic Preservation Office, Trenton, New Jersey.

Seaber, P.R., Kapinos, F.P., and G.L. Knapp. 1987. Hydrologic Unit Maps: U.S. Geological Survey Water-Supply Paper 2294, 63 p.

U.S. Army Armament Research, Development and Engineering Center (ARDEC). August 1996. Map of CERCLA Relative Risk at Picatinny Arsenal.

U.S. Army Corps of Engineers (USACE). 1995. Identification and Analysis of Wetlands, Floodplains Threatened and Endangered Species and Archaeological Geomorphology at Picatinny Arsenal, New Jersey Vol. 1: Text. U. S. Army Corp of Engineers Waterways Experiment Station.

U.S. Army Environmental Center (USAEC). August 1999. Draft Environmental Assessment for Implementation of an Integrated Natural Resource Management Plan for Picatinny Arsenal. Prepared for U.S. Army Materiel Command (USAMC).

U.S. Army Tank-Automotive and Armaments Command, Armament Research, Development and Engineering Center (TACOM-ARDEC). March 1999. Installation Action Plan for Fiscal Year 1999. Prepared by Installation Restoration Team, Environmental Affairs Division.

U.S. Census Bureau. December 1999. *New Jersey State Quickfacts.* [Online] in United States Census Bureau. Available: http://www.census.gov/index [1999, December 15].

U.S. Department of Agriculture. 1976. Soil Survey of Morris County, New Jersey. Soil Conservation Service in cooperation with the New Jersey Agricultural Experiment Station Cook College, Rutgers University and the New Jersey Department of Agriculture State Soil Conservation Committee.

U.S. Department of Defense (USDOD). 1996. Defense Environmental Restoration Program Annual Report to Congress for Fiscal Year 1995 (Volume 1) [Online]. Available: http://www.dtic.mil/envirodod/derpreport95/vol_2/nara013.html [December 1999].

U.S. Environmental Protection Agency (USEPA). 1978. Protective Noise Levels. A Supplement to the USEPA Report: Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA/ONAC 550/9-74-004, March, 1974, Office of Noise Abatement and Control, Washington, D.C.

USEPA. 1997. National Air Quality and Emissions Trends Report, EPA 454/R-98-016, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711.

USEPA. April 1998. *Unconsolidated Quaternary Aquifer System (Rockaway River Basin Area).* [Online] In USEPA Region 2, Morris County, New Jersey. Available: http://www.epa.gov/region02/water/rockaway.htm [1999, December 6].

USEPA. October, 1999a. *SDWIS Facilities for Hackensack-Passaic, USGS Cataloging Unit: 02030103.* [Online] In USEPA Surf Your Watershed – Hackensack/Passaic Community Water Sources. Available: http://www.epa.gov/surf3/hucs/02030103/ [1999, December 6].

USEPA. December, 1999b. *Watershed Profile, Hackensack Passaic, USGS Cataloging Unit 02030103.* [Online] In USEPA Surf Your Watershed – Hackensack/Passaic. Available: http://www.epa.gov/surf3/hucs/02030103 [1999, December 6].

USEPA. December, 1999c. *New Jersey Air Quality Monitors PSI Report.* [Online] In USEPA Office of Air Quality Planning And Standards AIRSData for Morris County, New Jersey. Available: http://www.epa.gov/airprogm/airs/data/monpsi.htm [1999, December 6].

USEPA. 1999d. *USEPA Region 2: Superfund Site Summaries.* [Online] In USEPA Region 2 Superfund Program. Available: http://www.epa.gov/region02/superfnd/superfnd.htm [1999, December 6].

United States Geological Survey (USGS). 1997. Ground Water Atlas of the United States: Segment 11, Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, West Virginia. Hydrologic Investigations Atlas 730-L, US Geological Survey, Reston, Virginia.

USGS. 1996. National Water Summary on Wetland Resources. United States Geological Survey Water-Supply Paper 2425, United States Government Printing Office, Washington, D.C.

Van De Venter, J.D. 1996. Five-Year Integrated Natural Resources Management Plan. U.S. Army Armament Research, Development, and Engineering Center, Picatinny Arsenal, New Jersey. Environmental & Natural Resources Division, Directorate of Public Works, Garrison Headquarters.

Waterways Experiment Station (WES), U.S. Army Corps of Engineers. 1995. Identification and Analysis of Wetlands, Floodplains Threatened and Endangered Species and Archaeological Geomorphology at Picatinny Arsenal, New Jersey Vol. 1: Text. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS. Prepared for U.S. Army Corps of Environmental Center, Aberdeen Proving Ground, MD, and U.S. Army Armament Research, Development and Engineering Center, Picatinny Arsenal, New Jersey.

AFFIDAVIT (PROOF) OF PUBLICATION

STATE OF NEW JERSEY, } SS.
Morris County

LINDA LEAMY

Of full age, being fully sworn according to law, doth depose and say that she/~~he~~ is employed in the Advertising Marketing Services Dept. of Morris County's **Daily Record** a newspaper printed and published at Parsippany in the County of Morris, in this State, and generally circulating in Morris, Warren, Sussex, Essex, Union, Passaic and Somerset counties, and the notice, of which the annexed is printed copy, has been published in said newspaper once in each week for at least 2 weeks ~~successfully~~, the first publication being made the 23rd day of May A.D.20 01 and the last publication being made the 27th day of May A.D. 20 01

Linda Leamy

Sworn to and subscribed before me

this 30th day of May

A.D. 2001

Sharon Glover *Notary Public*

SHARON GLOVER
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Nov. 28, 2004

LEGAL NOTICE
NOTICE OF AVAILABILITY

The U.S. Army Armament Research, Development and Engineering Center, Picatinny Arsenal, New Jersey has prepared a draft programmatic environmental assessment (EA) for the **implementation of an Integrated Cultural Resources Management Plan (ICRMP).** The purpose of the plan is to provide guidelines and procedures for managing, protecting, and preserving cultural resources management and compliance as it applies to routine installation operations, such as building maintenance, structural rehabilitation, and mothballing of historic buildings, as well as with new facility planning and construction of capital projects. In addition, a management Plan with the ICRMP will facilitate coordination between Arsenal staff and the NJHPO regarding the activities at the installation that have the potential to affect cultural resources. The ICRMP Management Plan protocol will become part of the Programmatic memorandum of Agreement (PMOA) between the Army, the New Jersey Historic Preservation Office (NJHPO), and the Advisory Council on Historic Preservation (ACHP).

The draft EA has resulted in a finding of no significant impact (FONSI) based on the conclusion that these activities pose no significant threat to the environment at Picatinny Arsenal.

Copies of the EA and the FONSI may be reviewed at the Science and Technical Information Library (Bldg. 59) and Public Affairs Office (Bldg. 1) at the Picatinny Arsenal, and the Rockaway Township Main Library, 61 Mt. Hope Road, Rockaway.

The deadline for submission of written comments is 30 days after publication of this notice. Written comments should be **sent to:** Commander, U.S. Army Armament Research, Development, and Engineering Center, Attention: AMSTA-AR-PSE, Christina Gray, Bldg. 319, Picatinny Arsenal, NJ 07086-5000.

For further information, please **contact** the Picatinny Arsenal Public Affairs Office at **973-724-6364.**

P.F.$79.20,2-T,5/23,27 7914217008