

FINAL
ENVIRONMENTAL ASSESSMENT
ADDRESSING RIPARIAN RESTORATION AND STABILIZATION
AT
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA



SEPTEMBER 2012

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE

SEP 2012

2. REPORT TYPE

3. DATES COVERED

00-00-2012 to 00-00-2012

4. TITLE AND SUBTITLE

Final Environmental Assessment Addressing Riparian Restoration and Stabilization at Grand Forks Air Force Base, North Dakota

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

**HQ Air Mobility Command, Integrated Planning Branch, HQ
AMC/A7PI, 507 Symington Drive, Scott AFB, IL, 62225-5022**

8. PERFORMING ORGANIZATION
REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT
NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

Under the Proposed Action, the 319 ABW proposes to restore and stabilize the portion of the riverbank of the Turtle River that runs through the northwestern portion of Grand Forks AFB, limit potential downstream impacts on natural and other resources, and manage and restore the adjacent riparian forest. Three alternatives for implementing the Proposed Action are evaluated in this EA, which are designated as Alternatives 1, 2, and 3. As part of all alternatives under the Proposed Action, the 319 ABW would improve the Turtle River's channel conditions and in-stream habitat by stabilizing and restoring critical areas of bank erosion repairing areas of minor bank erosion, maintaining and planting wide riparian forest buffers where they are narrow or absent, removing trash and other foreign debris from the channel, and monitoring erosion and channel features for changes. The Preferred Alternative (Alternative 1) would also include restoring and managing the riparian forest areas near the Turtle River by selectively cutting primarily unhealthy, diseased, and hazardous trees removing selective trees that need to be eliminated for bank stabilization and other natural resources management purposes; piling woody debris on the forest floor to create organic soils over exposed mineral soils where wood debris has been removed; creating wildlife habitat; interplanting of native saplings; limiting vehicle access; and removing trash and other debris. The EA evaluates the potential environmental consequences of the three alternatives under the Proposed Action, plus the No Action Alternative, on the following nine general impact topics: air quality, noise hazardous materials and wastes, water resources, biological resources, cultural resources, transportation safety and occupational health, and geologic resources.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 183	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18

FINAL
FINDING OF NO SIGNIFICANT IMPACT (FONSI)
AND FINDING OF NO PRACTICABLE ALTERNATIVES (FONPA)

**Environmental Assessment Addressing Riparian Restoration and Stabilization
at Grand Forks Air Force Base, North Dakota**

Overview

Federal actions that potentially involve significant impacts on the environment must be reviewed in accordance with the National Environmental Policy Act (NEPA) and all other applicable laws. The U.S. Air Force (USAF) has completed an Environmental Assessment (EA) to address the potential environmental consequences associated with restoring and stabilizing the portion of the Turtle River that flows through the northwestern portion of Grand Forks Air Force Base (AFB), North Dakota and limiting potential downstream impacts on natural and other resources; and managing and restoring the adjacent riparian forest. The EA analyzed three alternatives to implement the Proposed Action. These alternatives included: Alternative 1, full riparian restoration and stabilization and riparian forest restoration (preferred alternative); Alternative 2, riparian restoration and stabilization with partial riparian forest restoration; and Alternative 3, riparian restoration and stabilization with full riparian forest restoration using Grand Forks AFB and off-installation natural revetment sources. In addition, the EA analyzed implementation of the No Action Alternative.

Alternatives 1, 2, and 3 and the No Action Alternative have been reviewed in accordance with NEPA as implemented by the regulations of the Council on Environmental Quality (CEQ) and USAF requirements under 32 Code of Federal Regulations 989 (*Environmental Impact Analysis Process*). The public and regulatory agency scoping process focused the analyses on the following nine resource areas: air quality, noise, hazardous materials and wastes, water resources, biological resources, cultural resources, transportation, safety and occupational health, and geologic resources. As discussed in the EA, it was concluded that no significant environmental impacts will occur from implementation of Alternatives 1, 2, or 3. In addition, an analysis of Alternatives 1, 2, and 3, in conjunction with other present and proposed activities, concluded that no significant cumulative environmental impacts will occur. Details of the potential environmental consequences can be found in the attached EA.

Conclusions

Public Review. Based on the description of the Proposed Action as set forth in the EA, all activities were found to comply with the criteria and standards of environmental quality, and coordinated with the appropriate Federal, state, and local agencies. The draft of the EA and FONSI/FONPA were made available to the public for a 30-day review period. No public comments were received on the Draft EA. Seven comment letters from public agencies were received on the Draft EA. Federal, state, and local agencies were coordinated with throughout the EA process and comments were incorporated into the analysis of potential environmental impacts performed as part of this EA. To initiate early project-specific consultations regarding the Proposed Action under NEPA and Section 106 of the National Historic Preservation Act, as well as in furtherance of the Grand Forks AFB broader consultation responsibilities to the tribes, Grand Forks AFB sent a letter requesting consultation to each affiliated tribe describing the Proposed Action on Grand Forks AFB and asking them to identify any concerns they might have. During this early consultation effort, Grand Forks AFB received comments from Native American tribes regarding the proposed project. No additional comments from Native American tribal representatives were received during the 30-day review period for the Draft EA.

Finding of No Practicable Alternative. Pursuant to EO 11988, *Floodplain Management* and EO 11990, *Protection of Wetlands*, it is USAF policy to avoid constructing new facilities and conducting other ground-disturbing activities within a 100-year floodplain or wetland, where practicable. Alternatives 1, 2, and 3 are located within the 100-year floodplain and the Turtle River is considered a water of the United States. No construction activities will take place within any wetland habitats; therefore, the three alternatives will not

result in any direct impacts on wetland habitat. Because of the nature of the Proposed Action, short-term, minor to moderate, direct and indirect, adverse impacts cannot be avoided on waters of the United States. In addition, impacts on floodplains will be short-term, minor, and adverse, and long-term, beneficial.

During stabilization activities, work will be conducted on the banks and within the river and floodplains, which could disturb sediment and slightly increase sedimentation temporarily. Once stabilization activities have ceased, long-term, moderate, beneficial impacts on water resources will occur. Erosion and sedimentation rates will decrease, water quality will improve, and channel morphology will return to more natural conditions, with the river channel becoming less entrenched over time.

Removal of any trees (i.e., trees that are determined to be hazardous or jeopardize the integrity of proposed bioengineered structures) and trash from the river channel will result in short- and long-term, beneficial impacts on flow and water quality. Trees and debris can impede flow, contribute to flood hazards, and alter flow from natural conditions. Removal of trash will decrease the potential of leaching of chemicals into the water. Overall, water quality will increase from implementation of the Proposed Action as trash will be removed while sedimentation (i.e., turbidity) will decrease.

Effects on wetlands, waters of the United States, and the 100-year floodplain will not be significant and will be reduced to the maximum extent possible through project design, following guidance specified in the Integrated Natural Resources Management Plan, and implementation of environmental protection measures and construction best management practices (BMPs) as outlined in Appendixes C and D of the EA. Any necessary agency coordination and required permits will be acquired prior to commencing any groundbreaking construction activities.


Pursuant to EO 11988, EO 11990, and the authority delegated by Secretary of the Air Force Order 791.1, *Environment*, and taking the above information into account, I find that there is no practicable alternative to this action and that Alternatives 1, 2, and 3 include all practicable measures to minimize harm to the environment. This decision has been made after taking into account all submitted information, and considering a full range of practical alternatives that will meet project requirements and are within the legal authority of the USAF.

Finding of No Significant Impact. Based on the information and analysis presented in the EA conducted in accordance with the requirements of the NEPA, the CEQ Regulations, implementing regulations set forth in 32 CFR 989 (EIAP), as amended, and after a review of the agency comments submitted during the 30-day public comment period, I conclude that implementation of Alternatives 1, 2, or 3 will not result in significant impacts on the quality of the human or natural environment. For these reasons, a FONSI/FONPA is approved and preparation of an Environmental Impact Statement is not warranted.

This decision has been made after taking into account all submitted information, and considering a full range of practical alternatives that will meet project requirements and are within the legal authority of the USAF.



TIMOTHY S. GREEN
Brigadier General, USAF
Director of Installations and Mission Support



Date

Attachment: *Final Environmental Assessment Addressing Riparian Restoration and Stabilization at Grand Forks Air Force Base, North Dakota*

ABBREVIATIONS AND ACRONYMS

µg/m ³	micrograms per cubic meter	EIA	Energy Information Administration
319th	319th Civil Engineer Squadron/Asset Management Flight	EIAP	Environmental Impact Analysis Process
CES/CEA		EIS	Environmental Impact Statement
319 ABW	319th Air Base Wing	EISA	Energy Independence and Security Act
ACHP	Advisory Council on Historic Preservation	ELG	Effluent Limitations Guideline
AFB	Air Force Base	EO	Executive Order
AFI	Air Force Instruction	ERP	Environmental Restoration Program
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health	ESA	Endangered Species Act
AFPD	Air Force Policy Directive	ESCP	erosion and sediment control plan
AMC	Air Mobility Command	FAA	Federal Aviation Administration
AOC	Area of Concern	FEMA	Federal Emergency Management Agency
APE	area of potential effect	FIRM	Flood Insurance Rate Map
AQCR	Air Quality Control Region	FONPA	Finding of No Practicable Alternative
ARPA	Archaeological Resources Protection Act	FONSI	Finding of No Significant Impact
AST	aboveground storage tank	FPPA	Farmland Protection Policy Act
ATV	all-terrain vehicle	FR	Federal Register
bgs	below ground surface	ft ²	square foot
BMP	best management practice	FY	fiscal year
BRAC	Base Realignment and Closure	GHG	greenhouse gas
CAA	Clean Air Act	gpm	gallons per minute
CAIS	Chemical Agent Identification Sets	GSU	Geographically-Separated Unit
CBP	U.S. Customs and Border Protection	HAP	hazardous air pollutant
CEQ	Council on Environmental Quality	HUD	U.S. Department of Housing and Urban Development
CFR	Code of Federal Regulations	HQ	headquarters
CGP	Construction General Permit	I	Interstate
CO	carbon monoxide	IO	Isolated Occurrence
CO ₂	carbon dioxide	ICRMP	Integrated Cultural Resources Management Plan
CWA	Clean Water Act	INRMP	Integrated Natural Resources Management Plan
dba	A-weighted decibels		
DHS	Department of Homeland Security		
DNL	Day-Night Average Sound Level		
DOD	Department of Defense		
EA	Environmental Assessment		

continued on inside back cover →

← continued from inside front cover

IICEP	Interagency and Intergovernmental Coordination for Environmental Planning	O ₃	ozone
LID	low-impact development	OSHA	Occupational Safety and Health Administration
MBTA	Migratory Bird Treaty Act	Pb	lead
mg/m ³	milligrams per cubic meter	pCi/L	picocuries per liter
MMRP	Military Munitions Response Program	P.L.	Public Law
MSDS	Material Safety Data Sheets	POL	petroleum, oil, and lubricants
msl	mean sea level	PM ₁₀	particulate matter less than 10 microns in diameter
NAAQS	National Ambient Air Quality Standards	PM _{2.5}	particulate matter less than 2.5 microns in diameter
NAGPRA	Native American Graves Protection and Repatriation Act	ppb	parts per billion
NEPA	National Environmental Policy Act	ppm	parts per million
NDAAQS	North Dakota Ambient Air Quality Standards	PSD	Prevention of Significant Deterioration
NDDH	North Dakota Department of Health	RCRA	Resource Conservation and Recovery Act of 1976
NDDH/DWQ	North Dakota Department of Health/Division of Water Quality	ROI	region of influence
NDGFD	North Dakota Game and Fish Department	RPA	Remotely Piloted Aircraft
NDNHP	North Dakota Natural Heritage Program	RRRC	Red River Regional Council
NHPA	National Historic Preservation Act	SDWA	Safe Drinking Water Act
NIOSH	National Institute for Occupational Safety and Health	SHPO	State Historic Preservation Office
NO _x	nitrogen oxides	SHSND	State Historical Society of North Dakota
NO ₂	nitrogen dioxide	SIP	State Implementation Plan
NOA	Notice of Availability	SO ₂	sulfur dioxide
NPDES	National Pollution Discharge Elimination System	SPCC	Spill Prevention, Control, and Countermeasures
NRCS	Natural Resources Conservation Service	SSPP	Strategic Sustainability Performance Plan
NRHP	National Register of Historic Places	SWMU	Solid Waste Management Unit
NTU	nephelometric turbidity unit	SWPPP	Storm Water Pollution Prevention Plan
NWI	National Wetlands Inventory	TMDL	Total Maximum Daily Load
NWR	National Wildlife Refuge	tpy	tons per year
		UFC	Unified Facilities Criteria
		U.S.C.	United States Code
		USACE	U.S. Army Corps of Engineers
		USAF	U.S. Air Force
		USEPA	U.S. Environmental Protection Agency
		USFWS	U.S. Fish and Wildlife Service
		UST	underground storage tank
		UXO	unexploded ordnance
		VOC	volatile organic compound

COVER SHEET

FINAL ENVIRONMENTAL ASSESSMENT ADDRESSING RIPARIAN RESTORATION AND STABILIZATION AT GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

Responsible Agencies: U.S. Air Force (USAF), 319th Air Base Wing (319 ABW), Grand Forks Air Force Base (AFB) and Air Mobility Command.

Affected Location: Grand Forks AFB, North Dakota.

Report Designation: Final Environmental Assessment (EA).

Abstract: Under the Proposed Action, the 319 ABW proposes to restore and stabilize the portion of the riverbank of the Turtle River that runs through the northwestern portion of Grand Forks AFB, limit potential downstream impacts on natural and other resources, and manage and restore the adjacent riparian forest. Three alternatives for implementing the Proposed Action are evaluated in this EA, which are designated as Alternatives 1, 2, and 3.

As part of all alternatives under the Proposed Action, the 319 ABW would improve the Turtle River's channel conditions and in-stream habitat by stabilizing and restoring critical areas of bank erosion, repairing areas of minor bank erosion, maintaining and planting wide riparian forest buffers where they are narrow or absent, removing trash and other foreign debris from the channel, and monitoring erosion and channel features for changes.

The Preferred Alternative (Alternative 1) would also include restoring and managing the riparian forest areas near the Turtle River by selectively cutting primarily unhealthy, diseased, and hazardous trees; removing selective trees that need to be eliminated for bank stabilization and other natural resources management purposes; piling woody debris on the forest floor to create organic soils over exposed mineral soils where wood debris has been removed; creating wildlife habitat; interplanting of native saplings; limiting vehicle access; and removing trash and other debris.

The EA evaluates the potential environmental consequences of the three alternatives under the Proposed Action, plus the No Action Alternative, on the following nine general impact topics: air quality, noise, hazardous materials and wastes, water resources, biological resources, cultural resources, transportation, safety and occupational health, and geologic resources.

Inquiries regarding this document should be sent to the Public Affairs Office, 319th Air Base Wing, 701 Eielson Street, Room 211, Grand Forks Air Force Base, North Dakota 58205.

FINAL

**ENVIRONMENTAL ASSESSMENT
ADDRESSING RIPARIAN RESTORATION AND
STABILIZATION
AT
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA**

**HEADQUARTERS AIR MOBILITY COMMAND
INTEGRATED PLANNING BRANCH
507 SYMINGTON DRIVE
SCOTT AIR FORCE BASE, ILLINOIS 62225-5022**

SEPTEMBER 2012

**FINAL
ENVIRONMENTAL ASSESSMENT ADDRESSING RIPARIAN RESTORATION AND STABILIZATION
AT
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA**

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS.....INSIDE FRONT AND BACK COVERS

COVER SHEET

1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION 1-1

1.1 BACKGROUND 1-1

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION 1-1

1.3 GRAND FORKS AFB LOCATION AND MISSION..... 1-2

1.4 SUMMARY OF KEY ENVIRONMENTAL COMPLIANCE REQUIREMENTS 1-2

1.4.1 National Environmental Policy Act 1-2

1.4.2 Integration of Other Environmental Statutes and Regulations..... 1-5

1.4.3 Scope of the Analysis 1-5

1.4.4 Interagency and Intergovernmental Coordination for Environmental
Planning (IICEP), Native American Tribal Consultation, and Public
Involvement..... 1-8

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES.....2-1

2.1 ALTERNATIVE 1 – FULL RIPARIAN RESTORATION AND STABILIZATION AND
RIPARIAN FOREST RESTORATION (PREFERRED ALTERNATIVE) 2-1

2.2 ALTERNATIVE 2 – RIPARIAN RESTORATION AND STABILIZATION WITH PARTIAL
RIPARIAN FOREST RESTORATION..... 2-6

2.3 ALTERNATIVE 3 – RIPARIAN RESTORATION AND STABILIZATION WITH FULL
RIPARIAN FOREST RESTORATION USING GRAND FORKS AFB AND
OFF-INSTALLATION NATURAL REVETMENT SOURCES 2-7

2.4 ALTERNATIVE 4 - NO ACTION ALTERNATIVE 2-7

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS 2-9

2.6 DECISION TO BE MADE AND IDENTIFICATION OF THE PREFERRED ALTERNATIVE 2-9

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES3-1

3.1 AIR QUALITY 3-2

3.1.1 Definition of the Resource 3-2

3.1.2 Description of the Affected Environment 3-5

3.1.3 Environmental Consequences 3-5

3.2 NOISE..... 3-8

3.2.1 Definition of the Resource 3-8

3.2.2 Description of Affected Environment 3-10

3.2.3 Environmental Consequences 3-10

3.3 HAZARDOUS MATERIALS AND WASTES..... 3-14

3.3.1 Definition of the Resource 3-14

3.3.2 Description of Affected Environment 3-15

3.3.3 Environmental Consequences 3-17

TABLE OF CONTENTS (CONTINUED)

3.4 WATER RESOURCES 3-19
3.4.1 Definition of the Resource 3-19
3.4.2 Description of Affected Environment 3-22
3.4.3 Environmental Consequences 3-27
3.5 BIOLOGICAL RESOURCES 3-30
3.5.1 Definition of the Resource 3-30
3.5.2 Description of Affected Environment 3-31
3.5.3 Environmental Consequences 3-35
3.6 CULTURAL RESOURCES 3-40
3.6.1 Definition of the Resource 3-40
3.6.2 Description of Affected Environment 3-41
3.6.3 Environmental Consequences 3-42
3.7 TRANSPORTATION 3-45
3.7.1 Definition of the Resource 3-45
3.7.2 Description of Affected Environment 3-45
3.7.3 Environmental Consequences 3-45
3.8 SAFETY AND OCCUPATIONAL HEALTH 3-47
3.8.1 Definition of the Resource 3-47
3.8.2 Description of Affected Environment 3-48
3.8.3 Environmental Consequences 3-48
3.9 GEOLOGICAL RESOURCES 3-50
3.9.1 Definition of the Resource 3-50
3.9.2 Description of Affected Environment 3-51
3.9.3 Environmental Consequences 3-52
4. CUMULATIVE AND OTHER EFFECTS 4-1
4.1 DEFINITION OF CUMULATIVE EFFECTS 4-1
4.2 PROJECTS CONSIDERED FOR POTENTIAL CUMULATIVE EFFECTS 4-1
4.3 CUMULATIVE EFFECTS ON RESOURCE AREAS 4-2
4.4 COMPATIBILITY OF PROPOSED ACTION WITH THE OBJECTIVES OF FEDERAL,
REGIONAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS 4-8
4.5 RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN’S ENVIRONMENT AND
MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY 4-8
4.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES 4-8
5. REFERENCES 5-1
6. LIST OF PREPARERS 6-1

APPENDICES

- A. Interagency and Intergovernmental Coordination for Environmental Planning (ICEP), Native American Consultation, and Public Involvement Correspondence**
- B. Summary of Air Quality Conformity Analysis**
- C. Floodplain Management Plan**
- D. Management Requirements and Environmental Protection Measures for Wetlands and Other Waters of the United States**

FIGURES

1-1	Grand Forks AFB and Surrounding Areas	1-3
1-2	Grand Forks AFB and Proposed Project Area.....	1-4
2-1	Grand Forks AFB Detailed Project Location Map - North	2-2
2-2	Grand Forks AFB Detailed Project Location Map - South	2-3
2-3	Example of Natural Revetment Installation	2-4
2-4	Example of Live Waddle Siltation Fence.....	2-5
2-5	Examples of Other Potential Erosion-Stabilization Methods.....	2-5
2-6	Alternative 3 Project Areas Including the Scotch Pine Harvest Area	2-8
3-1	1995 DNL Noise Contours at Grand Forks AFB	3-11
3-2	Water Resources within the Project Area.....	3-25
3-3	Water Resources at Grand Forks AFB	3-26

TABLES

1-1	Listing of Applicable Statutes and Regulations.....	1-6
3-1	National and State Ambient Air Quality Standards.....	3-3
3-2	Local and Regional Air Emissions Inventory for the Proposed Action (2002).....	3-5
3-3	Estimated Air Emissions Resulting from Alternative 1	3-7
3-4	Estimated Air Emissions Resulting from Alternative 3	3-8
3-5	Sound Levels and Human Response	3-9
3-6	Predicted Noise Levels for Construction Equipment	3-12
3-7	Predicted Noise Levels from Construction Activities	3-12
4-1	Past, Present, and Future Actions Within and Immediately Adjacent to the Project Area.....	4-2
4-2	Cumulative Effects on Resource Areas.....	4-3

THIS PAGE INTENTIONALLY LEFT BLANK

1. Purpose of and Need for the Proposed Action

This Environmental Assessment (EA) describes and analyzes Grand Forks Air Force Base's (AFB) proposal to restore and stabilize the portion of the Turtle River bank that runs through the northwestern portion of Grand Forks AFB and to manage and restore the adjacent riparian forest. This section presents the purpose of and need for the Proposed Action, the location and mission of Grand Forks AFB, and a summary of key environmental compliance requirements.

1.1 Background

The 319th Civil Engineer Squadron/Asset Management Flight (319th CES/CEA) at Grand Forks AFB proposes to complete the U.S. Air Force (USAF) Environmental Impact Analysis Process (EIAP) to determine the potential environmental impacts that would result from restoring and stabilizing the portion of the riverbank of the Turtle River that runs through the northwestern portion of Grand Forks AFB; limit potential downstream impacts on natural and other resources, and manage and restore the adjacent riparian forest. A riparian area is defined as relating to or living on the bank of a natural watercourse, and is the interface between land and an adjacent river or stream.

Although the Turtle River and adjacent riparian areas within the northwestern portion of Grand Forks AFB are considered to be in a healthy condition, several problems have been identified that could risk degradation of both the Turtle River channel and riparian forest areas. Changes have occurred within the watershed over the past 50 years, including more intensive agriculture, increased drainage, creation of in-channel storage and dams, and encroachment of residential developments. The regional climate has also undergone changes over the past decade, including increased annual precipitation and higher temperatures. Major flood events over the past 5 years have also rapidly altered channel morphology, moved significant quantities of large woody debris, and blocked and clogged the Turtle River's water flow while increasing sediment loads in the Turtle River. All factors have contributed to the Turtle River shifting from a C-type channel (stable pattern, dimension, and profile) to an F-type channel (highly incised where the flood-prone area is wholly contained within the active channel) in several locations. Active areas of erosion have developed along the Turtle River where shear stress from flood flows were high, sandy soils were unconsolidated, and riparian vegetation became weak or displaced by invasive species.

Although the adjacent riparian forest is in a relatively healthy condition, several problem areas exist that would be addressed through active natural resources management. Forest and grassy upland areas have not been actively managed during the past 25 years. Areas of the riparian forest have decreased in functional value with limited regeneration capabilities. Invasive species, disease, and damage from white-tailed deer and human use are all problems that have been identified. Open, grassy upland areas are dominated by aggressive brome grass with patches of invasive species. These areas have grown stagnant and show little potential for regeneration by native tree and shrub species or conversion to native prairie grasslands. In addition, there is a moderate amount of trash and miscellaneous debris that can be found scattered throughout the forest area and along the Turtle River's banks (GFAFB 2006).

1.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to restore and stabilize the portion of the riverbank of the Turtle River that runs through the northwestern corner of Grand Forks AFB; limit potential downstream impacts on water quality, recreation, flood control, and fish and wildlife habitat; and restore the overall health of the adjacent riparian forest.

The primary need for the Proposed Action is to protect the Turtle River corridor, which is one of the valuable natural resources areas on Grand Forks AFB. It has been identified for protection and enhancement in the Integrated Natural Resources Management Plan (INRMP) (GFAFB 2011), and coordination has occurred with the North Dakota Game and Fish Department (NDGFD) and the U.S. Fish and Wildlife Service (USFWS). From the standpoint of landscape ecology, the narrow, wooded Turtle River corridor, which extends from Turtle River State Park past Grand Forks AFB and continues eastward past Kellys Slough, is probably the most important link connecting natural ecosystems in the immediate Grand Forks AFB area. The Turtle River and its wooded banks serve as a habitat and as a corridor for native wildlife and migratory and breeding bird habitat. Grand Forks AFB is obligated to comply with the Migratory Bird Treaty Act (MBTA) of 1918 and other laws designated to protect migratory birds, threatened and endangered species, wetlands, and other natural resources while balancing the requirements of its military mission.

A second need for the Proposed Action is to comply with Federal, state, and local regulations to limit downstream water quality degradation by reducing channel and bank erosion, which causes sedimentation to increase, and sediments to accumulate and disperse in the waters of the Turtle River. By protecting the Turtle River corridor against further erosion, the Proposed Action also would prevent potential losses of important paleosols and cultural resources.

An additional need for the Proposed Action is to bring Grand Forks AFB into compliance with the Federal Noxious Weed Act (7 United States Code [U.S.C.] 2801 et seq.) and Executive Order (EO) 13112, *Invasive Species*, which require Federal agencies to control noxious weeds on Federal properties by removing noxious and invasive species along the Turtle River and adjacent riparian forest areas.

1.3 Grand Forks AFB Location and Mission

Grand Forks AFB is a USAF installation under the Air Mobility Command (AMC). The 319th Air Base Wing (319 ABW), which serves as the host wing, provides base operational support to wing personnel, three tenant units, and nine Geographically Separated Units. Grand Forks AFB trains, deploys, and redeploys more than 1,300 airmen in support of the Air Expeditionary Force and combatant commander requirements. Grand Forks AFB provides facilities and equipment support for the Department of Homeland Security (DHS), U.S. Customs and Border Protection (CBP), and the 69th Reconnaissance Group. Grand Forks AFB also provides logistical, medical, civil engineer, contracting, communications, security and force support, and facilities and equipment valued at \$2.2 billion, and executes a budget of \$48 million. Tenants on Grand Forks AFB include the Air Force Audit Agency, the U.S. Army Corps of Engineers (USACE), and the DHS. The installation is in Grand Forks County, near the North Dakota-Minnesota state boundary, north of and adjacent to the City of Emerado and is 15 miles west of the City of Grand Forks (see **Figure 1-1**). **Figure 1-2** shows a close-up of the installation and proposed project area.

1.4 Summary of Key Environmental Compliance Requirements

1.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. Section 4321–4347) is a Federal statute requiring the identification and analysis of potential environmental impacts associated with proposed Federal actions before those actions are taken. The intent of NEPA is to help decisionmakers make well-informed decisions based on an understanding of the potential environmental consequences,

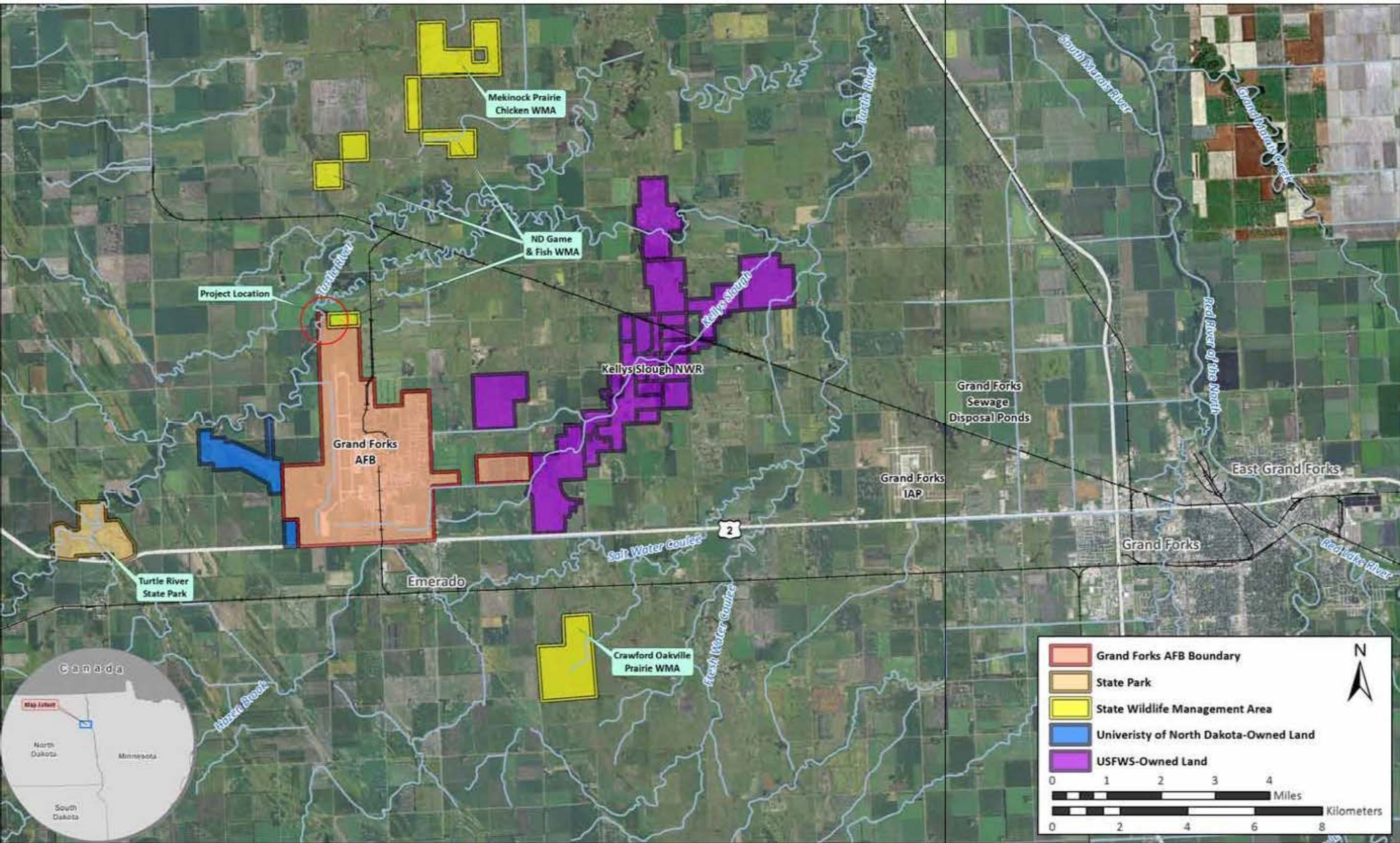


Figure 1-1. Grand Forks AFB and Surrounding Areas

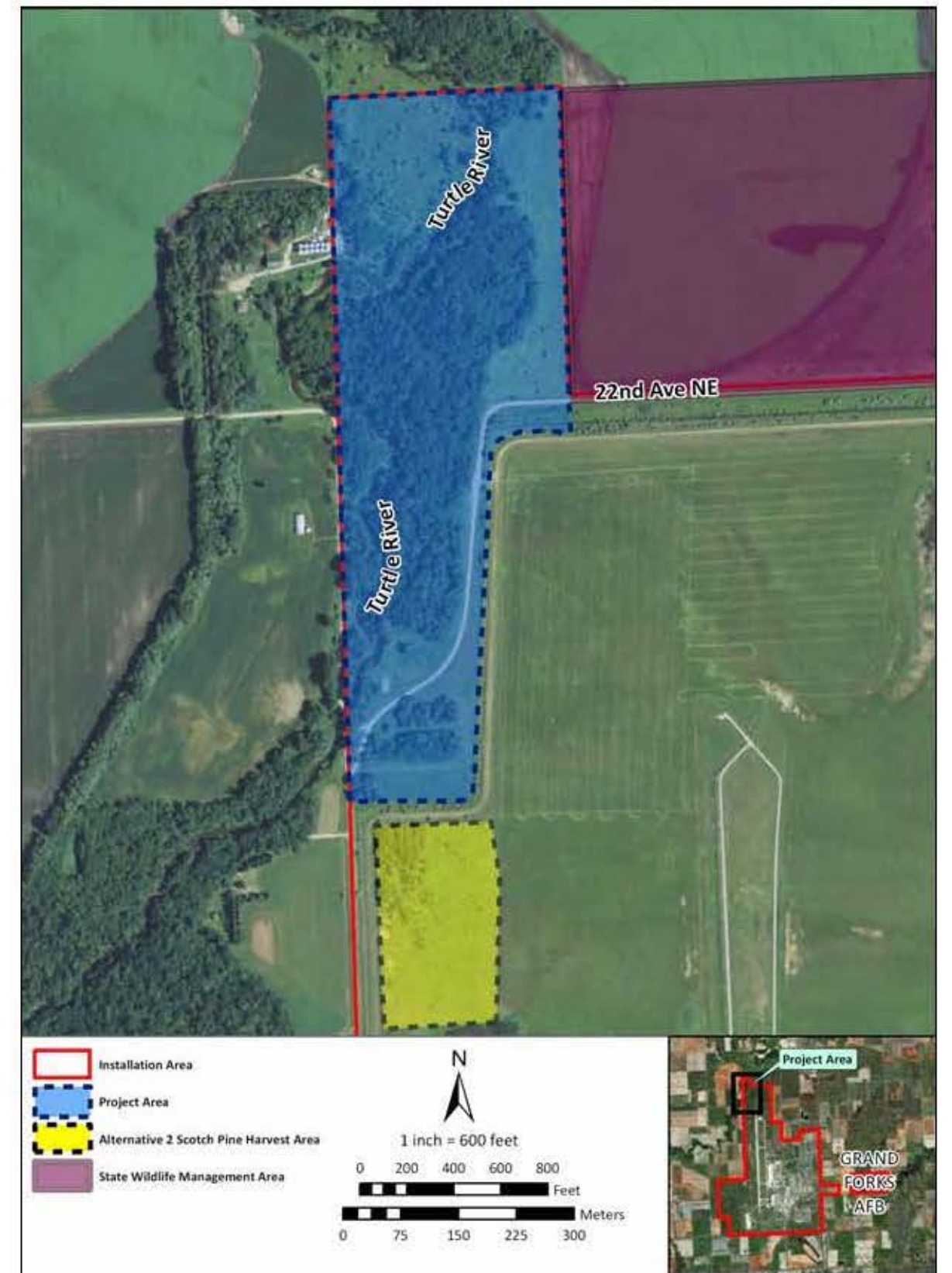


Figure 1-2. Grand Forks AFB and Proposed Project Area

and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) that was charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA. The CEQ regulations mandate that all Federal agencies use a prescribed structured approach to environmental impact analysis. This approach also requires Federal agencies to use an interdisciplinary and systematic approach in their decisionmaking process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action.

The process for implementing NEPA is codified in Title 40 of the Code of Federal Regulations (CFR), Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. The CEQ was established under NEPA to implement and oversee Federal policy in this process. The CEQ regulations specify that an EA be prepared to briefly provide evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA), where a FONPA is appropriate, or whether the preparation of an Environmental Impact Statement (EIS) is necessary. The EA can aid in an agency’s compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required.

Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, states that the USAF will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The USAF’s implementing regulation for NEPA is *Environmental Impact Analysis Process*, 32 CFR Part 989, as amended.

1.4.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decisionmaking process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decisionmaker to have a comprehensive view of key environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated “with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively.”

1.4.3 Scope of the Analysis

This EA examines potential effects of the three alternatives under the Proposed Action, plus the No Action Alternative, on nine resource areas: air quality, noise, hazardous materials and wastes, water resources, biological resources, cultural resources, transportation, safety and occupational health, and geologic resources. These resources could be affected by the Proposed Action and include applicable elements of the human environment that are prompted for review by EO, regulation, or policy. While not comprehensive, a list of potentially applicable laws, regulations, policies, and planning criteria is provided in **Table 1-1**.

Some environmental resources and conditions that are often analyzed in an EA have been omitted from this analysis. The following details the basis for such exclusions:

- **Land Use.** All activities associated with the Proposed Action would be consistent with present and foreseeable land use patterns at Grand Forks AFB. Implementation of the Proposed Action would not significantly alter the existing land use at Grand Forks AFB. Accordingly, the USAF has omitted detailed examination of land use.

Table 1-1. Listing of Applicable Statutes and Regulations

Regulation	Source
Air Quality	
Clean Air Act of 1970 and Amendments of 1977 and 1990, including the General Conformity Rule and the Greenhouse Gas Tailoring Rule	42 U.S.C. 7401 et seq., as amended
Air Quality Compliance	Air Force Instruction (AFI) 32-7040
Federal Leadership in Environmental, Energy, and Economic Performance (5 October 2009)	EO 13514
Noise	
Noise Control Act of 1972	42 U.S.C. 4901 et seq., Public Law (P.L.) 92-574
Air Installation Compatible Use Zone Program	AFI 32-7063
Hazardous Materials and Wastes	
Resource Conservation and Recovery Act of 1976	42 U.S.C. 6901, as amended
Comprehensive Environmental Response, Compensation, and Liability Act of 1980	42 U.S.C. 103
Pollution Prevention Act of 1990	42 U.S.C. 133
Toxic Substance Control Act of 1976	15 U.S.C. 53
Superfund Amendments and Reauthorization Act of 1986	26 U.S.C. 9507
Strengthening Federal Environmental, Energy, and Transportation	EO 13423
Solid and Hazardous Waste Compliance	AFI 32-7042
Environmental Restoration Program	AFI 32-7020
Federal Compliance with Pollution Control Standards	EO 12088
Defense Environmental Restoration Program	10 U.S.C. 2701 et seq.
Water Resources	
Clean Water Act of 1972	33 U.S.C. 1251 et seq., as amended
Safe Drinking Water Act of 1974	42 U.S.C. 300
Water Quality Compliance	AFI 32-7041
Protection of Wetlands (24 May 1977)	EO 11990
Floodplain Management (24 May 1977)	EO 11988
Biological Resources	
Endangered Species Act of 1973	16 U.S.C. 1531-1543
Migratory Bird Treaty Act of 1918	16 U.S.C. 703-712
Sikes Act Improvement Act of 1977	16 U.S.C. 670a-670o, 74 Stat. 1052
Bald and Golden Eagle Protection Act of 1940	16 U.S.C. 668-668c, as amended
Invasive Species (3 February 1999)	EO 13112
Protection and Enhancement of Environmental Quality (5 March 1970)	EO 11514

Regulation	Source
Biological Resources (continued)	
Federal Leadership in Environmental, Energy, and Economic Performance (5 October 2009)	EO 13514
Conservation of Migratory Birds (10 January 2001)	EO 13186
Integrated Natural Resources Management	AFI 32-7064
Sale of certain interests in land; logs	10 U.S.C. 2665
Cultural Resources	
National Historic Preservation Act of 1966	16 U.S.C. 470 et seq., as amended
Archaeological Resources Protection Act of 1979	16 U.S.C. 470a-11, as amended
American Indian Religious Freedom Act of 1978	P.L. 95-341 and 42 U.S.C. 1996, as amended
The Native American Graves Protection and Repatriation Act of 1990	P.L. 101-601 and 25 U.S.C. 3001–3013
Protection and Enhancement of the Cultural Environment (13 May 1971)	EO 11593
Indian Sacred Sites (24 May 1996)	EO 13007
Consultation and Coordination with Indian Tribal Governments (6 November 2000)	EO 13175
Preserve America (3 March 2003)	EO 13287
Cultural Resource Management	AFI 32-7065
Transportation	
Hazardous Material Transportation Act of 1975	49 U.S.C. 1761
Safety and Occupational Health	
Air Force Occupational and Environmental Safety, Fire Protection, and Health Program	AFI 91-302
USAF Mishap Prevention Program	AFI 91-202
Protection of Children from Environmental Health and Safety Risks (23 April 1997)	EO 13045
Geological Resources	
Farmland Protection Policy Act of 1981	7 U.S.C. 4201

- **Socioeconomics.** The Proposed Action does not involve any activities that would directly affect off-installation activities, or directly or indirectly contribute to changes in socioeconomic resources. There would be no change in the number of personnel assigned to Grand Forks AFB and no changes in area population or associated changes in demand for housing and services. Accordingly, the USAF has omitted detailed examination of socioeconomics in this EA.
- **Environmental Justice.** The Proposed Action does not involve any activities that would contribute to changes in low-income or minority populations because all work would be

performed within the installation boundary. Accordingly, the USAF has omitted detailed examination of environmental justice.

1.4.4 Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), Native American Tribal Consultation, and Public Involvement

IICEP. NEPA requirements help ensure that environmental information is made available to the public during the decisionmaking process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process. The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. Air Force Instruction (AFI) 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning*, requires the USAF to implement the IICEP process, which is used for the purpose of agency coordination and implements scoping requirements.

Through the IICEP process, Grand Forks AFB notified relevant Federal, state, and local agencies of the Proposed Action and alternatives and provided them sufficient time to make known their environmental concerns specific to the action. The IICEP process also provided Grand Forks AFB the opportunity to cooperate with and consider state and local views in implementing the Federal proposal. IICEP materials related to this action are included in **Appendix A**.

Native American Tribal Consultation. EO 13175, *Consultation and Coordination with Indian Tribal Governments* (6 November 2000) directs Federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. Consultation under EO 13175 is distinct from project-specific consultation with a tribe under NEPA or Section 106 of the NHPA, and has as a goal to build a dialogue and constructive, government-to-government relationship between a federal agency and a given tribal government. To comply with the various legal mandates, federally recognized tribes that are affiliated historically within the Grand Forks AFB geographic region are invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. Because many tribes were displaced from their original homelands during the historical period, tribes with cultural roots in an area might not currently reside in the region where the proposed undertaking would occur. Effective consultation requires identification of tribes based on ethnographic and historical data and not simply a tribe's current proximity to a project area. The tribal consultation process is distinct from NEPA coordination or the IICEP processes and requires separate notification of all relevant tribes by Grand Forks AFB. The timelines for tribal consultation are also distinct from those of intergovernmental consultations. The Grand Forks AFB Government representative point-of-contact for Native American tribes is the Installation Commander. The Grand Forks AFB Government point-of-contact for consultation with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) is the Cultural Resources Manager.

Consultation regarding specific proposed projects must begin very early in the process. Regarding the timing of this Proposed Action under NEPA and Section 106 of the NHPA with the current need for Grand Forks AFB to build and strengthen government-to-government relationships with tribes, Grand Forks AFB initiated early project-specific consultation dually with an inquiry to build and/or continue a working government framework with each tribe by sending a letter to each affiliated tribe. Personal phone calls were made to each tribe after receipt of the letter to determine if they had any project specific concerns and/or if they desired to begin work on a government-to-government framework to facilitate future consultations. Building meaningful tribal relationships as started with this Proposed Action and previous environmental assessments is a separate Grand Forks AFB initiative under EO 13175. A list of

all Native American tribal governments consulted regarding this action and a summary of responses received from this early consultation are included in **Appendix A**. During early consultation efforts, Grand Forks AFB received comments from Native American tribes regarding the proposed project. A summary of these comments can be found in **Appendix A**. In addition, the Draft EA was made available to the list of Native American tribes included in **Appendix A** for a 30-day review period. No additional comments from Native American tribal representatives were received during the 30-day review period for the Draft EA.

Public Involvement. Concurrent with the completion of the Draft EA, a Notice of Availability (NOA) was published in the *Grand Forks Herald* and the Draft EA was made available to the public for a 30-day review period. The NOA was issued to solicit comments on the Proposed Action and to involve the local community in the decisionmaking process. Several comment letters from various agencies were received during the 30-day review period. A list of the agencies is provided below.

- North Dakota State Water Commission
- North Dakota Department of Health
- Natural Resources Conservation Service
- North Dakota Parks and Recreation Department
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service.

No public comments were received on the Draft EA. A summary of the comments received on the Draft EA is provided in **Appendix A**. Agency comments on the Draft EA were considered prior to a USAF decision being made as to whether or not to approve the FONSI/FONPA.

THIS PAGE INTENTIONALLY LEFT BLANK

2. Description of Proposed Action and Alternatives

This section describes the four alternatives, including the No Action Alternative, which have been evaluated to implement the USAF's proposal to restore and stabilize the portion of the riverbank of the Turtle River that runs through the northwestern portion of Grand Forks AFB and to manage and restore the adjacent riparian forest. This section also describes the decision to be made and identifies the Preferred Alternative.

2.1 Alternative 1 – Full Riparian Restoration and Stabilization and Riparian Forest Restoration (Preferred Alternative)

Under Alternative 1, the 319th CES/CEA proposes to restore and stabilize the portion of the Turtle River bank that runs through the northwestern portion of Grand Forks AFB and manage and restore the adjacent riparian forest. Alternative 1 would be scheduled to occur in either 2013 or 2014, but could be accomplished earlier, depending on availability of funding.

Full Riparian Restoration and Stabilization.

The Red River Regional Council (RRRC) conducted a survey in support of the *Assess and Recommendations for Riparian Stabilization and Restoration of the Turtle River within the Grand Forks Air Force Base, North Dakota* study in December 2006 (RRRC 2006). The 2006 RRRC Study identified streambank erosion areas, accumulations of large woody debris, and large trash items in the project area and provided recommendations for restoration in the project area. As part of this EA, a survey of the project area was conducted in October 2010 to verify the results of the



2006 RRRC Study and to identify any new areas for potential restoration (HDR 2010a). The 2010 survey confirmed that the previously identified areas of large woody debris and erosion in the 2006 RRRC Study still exist and are currently more extensive (HDR 2010a). The 2010 survey also identified eight new areas of large woody debris and three new erosion areas (HDR 2010a). All areas of large woody debris, streambank erosion, natural revetments, tree plantings, and trash in the project area are shown in **Figures 2-1** and **2-2**. **Figures 2-1** and **2-2** also show potential construction access route entry points through the riparian forest that have been selected from previously disturbed areas.

As a result of the INRMP and the 2006 and 2010 surveys, 319th CES/CEA has decided to improve the Turtle River and associated riverbank areas by stabilizing and restoring critical areas of bank erosion using bioengineering techniques (i.e., no rock riprap would be used as part of Alternative 1), and repairing areas of minor bank erosion with bioengineering and planting of native tree and shrub buffers. The overall goal of the Proposed Action is to stabilize the river channel and banks to moderate the natural processes that have become out of balance, protect cultural resources, reduce sedimentation, improve channel conditions and water quality, and provide improved stream habitat.

The restoration designs associated with Alternative 1 would work with the river system, actively advancing it to a more stable condition while not stopping erosion from occurring or forcing the river to remain stationary.

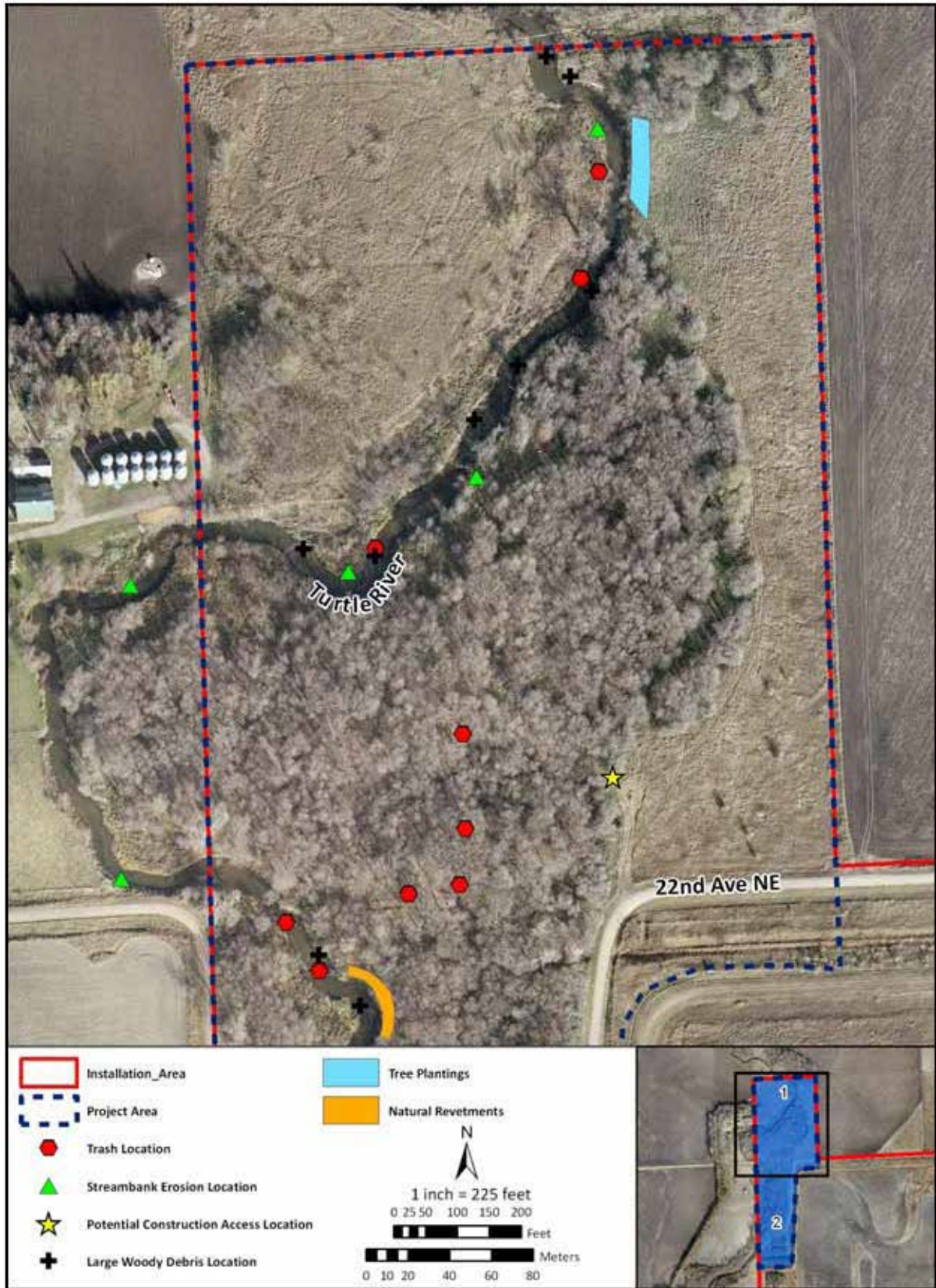


Figure 2-1. Grand Forks AFB Detailed Project Location Map - North

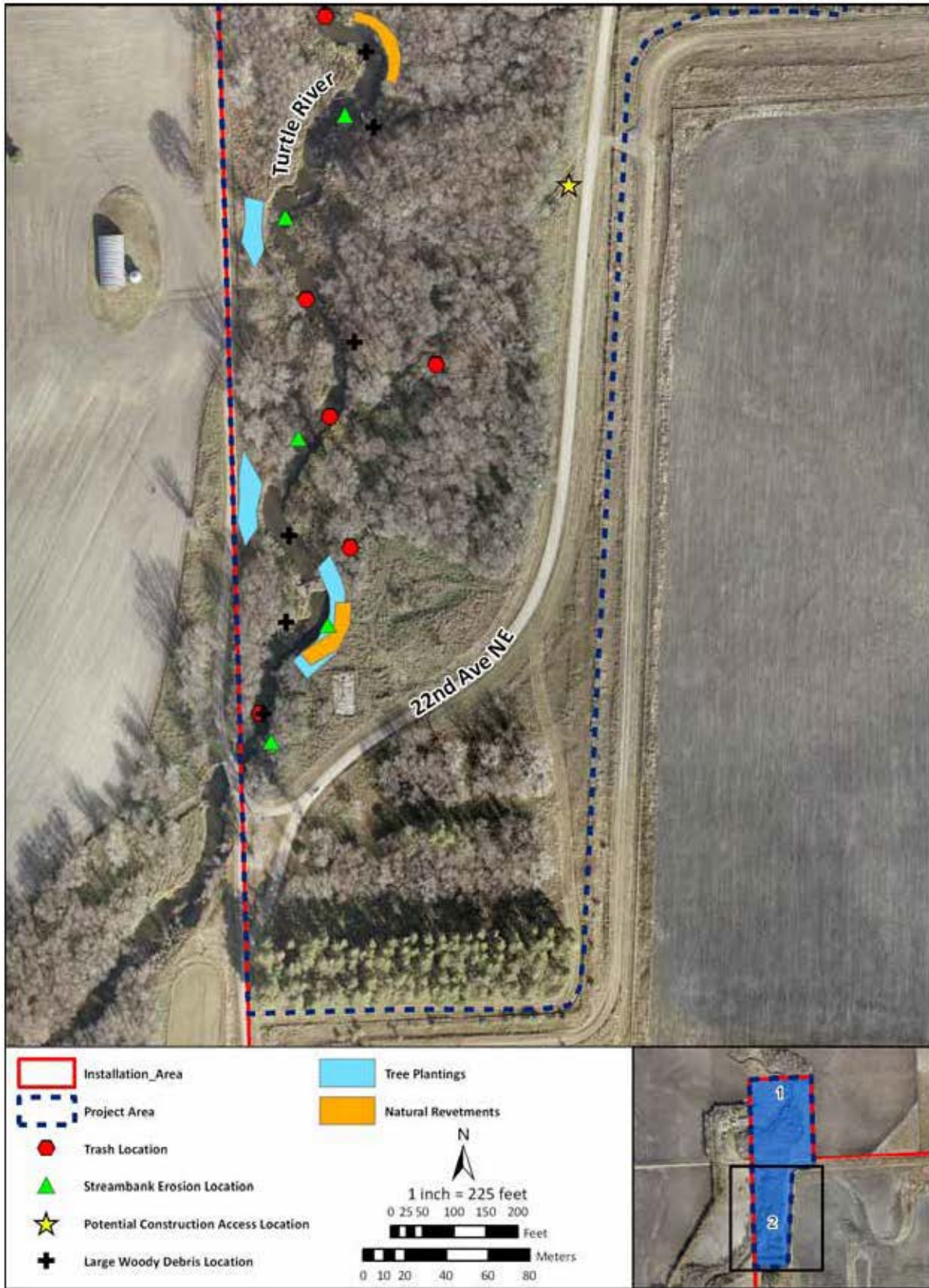


Figure 2-2. Grand Forks AFB Detailed Project Location Map - South

Beaver dams and fallen trees would be left in place to the greatest extent possible. However, some trees that have fallen into the Turtle River might have to be removed if they are determined to be hazardous or if they jeopardize the integrity of proposed bioengineered structures. The objective of the construction methods used as part of Alternative 1 is to minimize potential disturbance from heavy equipment along the banks of the Turtle River.

The installation of natural revetments would be the preferred bioengineering practice for areas of major erosion that would be employed under Alternative 1. . Natural revetments would protect the toe of the slope. The contractor would be responsible for selecting the location of harvested natural revetments and, therefore, the location has not yet been determined. Alternative 1 would only use the natural revetment species listed in the 2006 RRRC Study. Currently, three natural revetment areas are planned as part of Alternative 1; however, other erosion areas might need to use natural revetments, if deemed appropriate. Natural revetments would be constructed by anchoring conifer trees to the streambank in two or three rows below and above the normal water level elevation. The conifer trees would be between 10 to 12 feet in height, and branch lengths would be about 2 to 4 feet at the base (8-foot branch diameter). Applicable revetment species would include scotch pine (*Pinus sylvestris*), blue spruce (*Picea pungens*), eastern red cedar (*Juniperus virginiana*), and rocky mountain juniper (*Juniperus scopulorum*). The natural revetments would be anchored to the bank using screw-type earth anchors or deadman anchors and braided aircraft cable or by using metal T-stakes or oak stakes driven into the bank. Construction equipment used to install natural revetments could include backhoes, saws, shovels, cable cutters, pry bars, tools for driving and setting anchors, and tools for couplings. An example of natural revetment installation is shown in **Figure 2-3**.

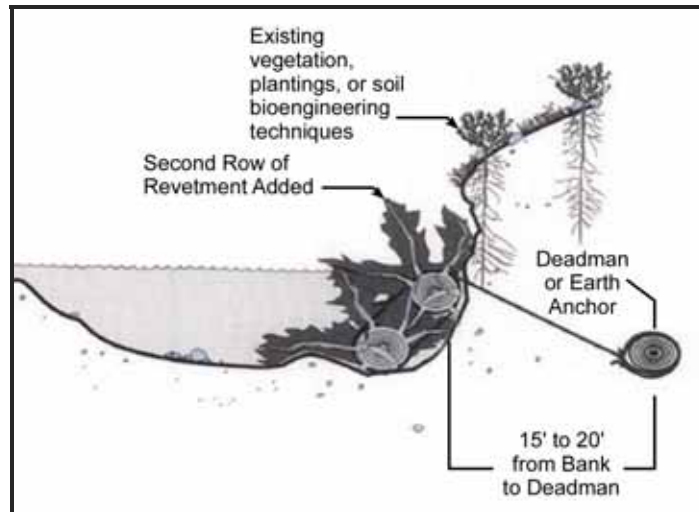


Figure 2-3. Example of Natural Revetment Installation

Other erosion-protection techniques planned include the use of live wattle siltation fences, if applicable to site conditions. Grass covers much of the banks of the Turtle River, but there are some areas where the soils are actively eroding and too sandy to support grass species. In these locations, it would be advisable to install bioengineering options that would trap sand falling from the banks above and prevent further erosion during flood conditions. A live wattle or fence could be installed at the bottom of the steepest point of the streambank where a bench forms and sand accumulates. An example of a live wattle siltation fence is shown in **Figure 2-4**.

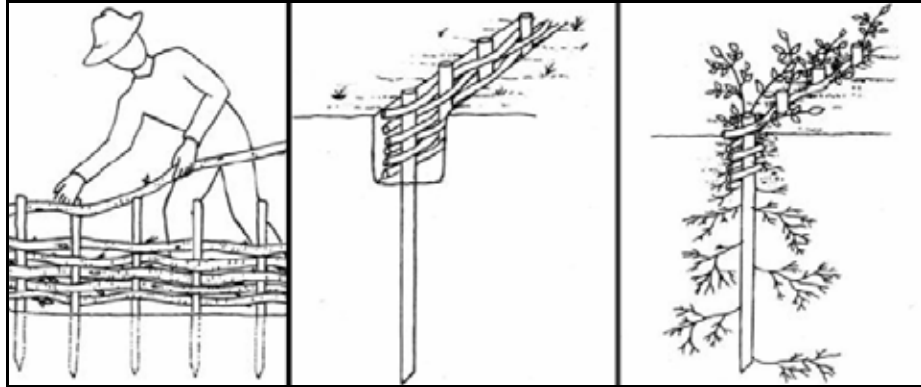
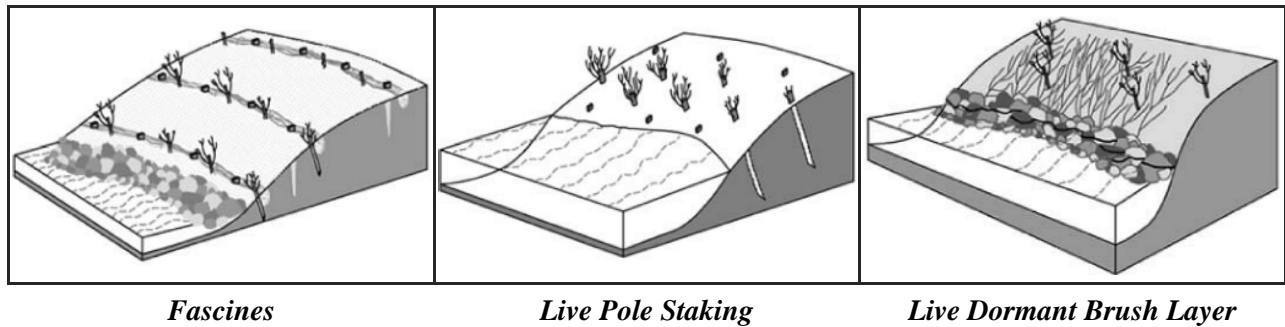


Figure 2-4. Example of Live Wattle Siltation Fence

In addition, stabilizing and restoring the banks to a functioning condition could include using construction equipment (e.g., backhoe or trackhoe) to cut or reshape the steep banks to a stable slope and installing any combination of wooden fascines, live pole plantings, live dormant brush layers, or clump plantings. A fascine is a rough bundle of brushwood used for strengthening earthen structures. Above that, the reshaped bank could be seeded with a native grass and forb mix, covered with an erosion-control blanket, and planted with rooted tree and shrub conservation stock. The design for each of the identified streambank erosion locations could be similar but would need to be tailored to the specific channel characteristics at each erosion site. Examples of some of these other erosion-stabilization techniques that might be used as part of Alternative 1 are illustrated in **Figure 2-5**.



Fascines

Live Pole Staking

Live Dormant Brush Layer

Figure 2-5. Examples of Other Potential Erosion-Stabilization Methods

Alternative 1 would also include maintaining and planting wide riparian forest buffers where existing buffers are narrow or absent, removing trash and other foreign debris from the channel, and monitoring erosion and channel features for changes, which could lead to scouring or further bank erosion. In addition, the 319th CES/CEA would monitor the Turtle River’s channel, banks, and adjacent riparian forest areas annually to determine how rapidly changes are occurring.

The riparian forest buffer would likely consist of five rows of shrubs, beginning at the top of the bank, spaced every 2 to 3 feet apart. As recommended in the 2006 RRRC Study (RRRC 2006), the first three rows could include redosier dogwood (*Cornus sericea*), false indigo (*Amorpha fruticosa*), and sandbar willow (*Salix interior*), staggered on 3-foot spacing within the rows. Above the dogwood and false indigo, two rows of Woods’ rose (*Rosa woodsii*) could be planted at similar spacing. Ten feet upland from the last row of Woods’ rose, four rows of trees would be planted at 6-foot spacing between the trees in each row. The rows should be spaced 10 feet apart. Tree species could include basswood (*Tilia americana*), hackberry (*Celtis occidentalis*), bur oak (*Quercus macrocarpa*), or other species suited to the

soils. Tree plantings would be conservation grade, bare-root tree and shrub stock and would come from regional nurseries or from the Grand Forks County Soil Conservation District. The trees and shrubs would be planted by hand into prepared sites. Shelters could be placed around the trees (not shrubs) to prevent damage from deer or beavers. Construction equipment that would be used to plant trees would include tools for scalping the area as required for site preparation for hand planting. Herbicides and mechanical means would be implemented as needed to remove existing vegetation for site preparation, accelerate regeneration, and control invasive and noxious plant species.

Full Riparian Forest Restoration. Under Alternative 1, restoring and managing the riparian forest areas near the Turtle River would be accomplished by selectively cutting primarily unhealthy, diseased, and hazardous trees; removing selective trees that need to be eliminated for bank stabilization and other natural resources management; piling woody debris on the forest floor to create organic soils over exposed mineral soils where wood debris has been removed; creating wildlife habitat; interplanting native saplings; limiting vehicle access; and removing trash and other debris. Areas for tree plantings in the adjacent riparian forest area would be determined based on the need to accelerate regeneration. Grass areas would also be managed for regeneration of forest species or progression toward native prairie grasslands. This would include chemical suppression by hand or all-terrain vehicle (ATV) spraying of invasive brome grass and weeds combined with the direct seeding or planting of native species.



Specific riparian forest management efforts under Alternative 1 would include protecting the area from destructive practices such as off-trail ATV use, paintball use, and cutting of young, healthy trees; unmanaged grazing and wildfires; monitoring for insects and disease such as Dutch Elm disease, gypsy moths, tent worms, or other pathogens that could damage the forest health; and removal and control of noxious weeds such as leafy spurge (*Euphorbia esula*) and Canada thistle (*Cirsium arvense*), and invasive tree and shrub species such as Russian olive (*Elaeagnus angustifolia*) and common buckthorn (*Rhamnus cathartica*). In addition, efforts would be taken to monitor use and damage from deer and beaver activity in the forest. Grand Forks AFB would continue to encourage deer management through bow hunting or other means to decrease impacts. The riparian forest and prairie grassland areas would be monitored as needed during establishment and every 5 years thereafter, as changes would occur more slowly in these areas.

2.2 Alternative 2 – Riparian Restoration and Stabilization with Partial Riparian Forest Restoration

Riparian Restoration and Stabilization. Alternative 2 would follow the same riparian restoration and stabilization procedures and construction methods as Alternative 1 (see **Section 2.1**). All construction methods under Alternative 2 would be the same as described under Alternative 1 in **Section 2.1**.

Partial Riparian Forest Restoration. Alternative 2 would include only partial restoration and management of the riparian forest areas near the Turtle River through interplanting of native saplings, limiting vehicle access, and removing trash and other debris. Grass areas would also be managed for

regeneration of forest species or progression toward native prairie grasslands. This would also include chemical suppression by hand or ATV spraying of invasive brome grass and weeds combined with the direct seeding or planting of native species. Noxious weeds such as leafy spurge and Canada thistle, and invasive tree and shrub species such as Russian olive and common buckthorn, would be removed and controlled. In addition, the riparian forest and prairie grassland areas would be monitored as needed during establishment and every 5 years thereafter. Alternative 2 would not include selectively cutting unhealthy, diseased, and dead trees; piling woody debris on the forest floor to create organic soils and expose mineral soils where wood debris has been removed.

2.3 Alternative 3 – Riparian Restoration and Stabilization with Full Riparian Forest Restoration Using Grand Forks AFB and Off-Installation Natural Revetment Sources

Riparian Restoration and Stabilization.

Alternative 3 would follow the same riparian restoration and stabilization procedures and construction methods as Alternative 1 (see **Section 2.1**). However, Alternative 3 would include using trees on Grand Forks AFB and some additional trees from off the installation, if needed, as a source for the natural revetment restoration systems along the Turtle River. If off-installation natural revetment sources are needed, then the contractor would be responsible for selecting the location of these natural revetment sources. An excellent source of natural revetment for this project can be found on Grand Forks AFB, directly south of the Turtle River project area and north of Runway 35 (see **Figure 2.6**). This 9.95-acre natural revetment source area is mostly composed of scotch pines and brome grass species. Some of these trees could reach the imaginary surfaces identified for airfield approach-departure safety in the near future. If these trees breach these surfaces, they must be topped or removed to meet continued airfield mission safety requirements.



Those trees meeting the correct diameter and height requirements for this project would be harvested by hand using chainsaws and trucked to the appropriate revetment site. All removed trees would be cut to ground-grade and the tree stumps would be left in place for soil stabilization. After harvest, the entire area would be revegetated with appropriate grass species for potential hay lease and maintained in accordance with airfield maintenance requirements.

Riparian Forest Restoration. Alternative 3 would follow the same riparian forest restoration methods as Alternative 1 (see **Section 2.1**).

2.4 Alternative 4 - No Action Alternative

CEQ regulations require consideration of the No Action Alternative for all proposed actions. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential alternatives can be compared and consequently it would be carried forward for further evaluation in the EA.



Figure 2-6. Alternative 3 Project Areas Including the Scotch Pine Harvest Area

Under the No Action Alternative, the 319th CES/CEA would not restore and stabilize the portion of the riverbank of the Turtle River that runs through the northwestern portion of Grand Forks AFB or manage and restore the adjacent riparian forest. The No Action Alternative would not address the requirements of the INRMP or the Sikes Act, obligations specified in the MBTA, and the concerns expressed by the RRRC. The Turtle River's channel and banks would continue to erode, sedimentation would continue to accumulate, and water quality would continue to degrade. In addition, noxious weeds and invasive species in the riparian forest would not be removed. The 319 ABW would be in violation of the Federal Noxious Weed Act (7 U.S.C. 2801 et seq.) and EO 13112, Invasive Species, which require Federal agencies to control noxious weeds on Federal properties.

2.5 Alternatives Considered But Eliminated From Further Analysis

Grand Forks AFB considered restoring only the Turtle River's channel and not the adjacent riparian forest. The focus of this alternative was only to restore the areas of high erosion and extensive accumulation of large woody debris in the channel. However, this alternative does not meet the purpose of and need for the Proposed Action as described in **Section 1.2** to restore the overall health of the adjacent riparian forest and, therefore, was eliminated from further detailed analysis.

Grand Forks AFB also considered an alternative to repair erosion on the riverbank of the Turtle River by using other forms of erosion control such as placing rocks or concrete riprap on the banks. However, the USFWS does not support the use of permanent rip-rap such as rocks and concrete, which could harden the banks of the Turtle River, causing potential adverse affects and requiring close monitoring. In addition, hardening the banks of the Turtle River would not allow the river to evolve and is likely to cause erosion downstream. Therefore, this alternative was eliminated from further detailed analysis.

2.6 Decision to be Made and Identification of the Preferred Alternative

This EA will support decisionmaking as to whether or not further environmental analysis must be accomplished in the form of an EIS. Implementation of Alternative 1 is the Preferred Alternative in this EA. The final decision on significance of the Preferred Alternative's impacts will be based on the discussions in **Sections 3** and **4**. In this EA, Grand Forks AFB provides an evaluation of whether the Alternatives 1, 2, or 3 would result in any significant impacts. Where such impacts are predicted, Grand Forks AFB would provide mitigation to reduce impacts to below the level of significance, undertake the preparation of an EIS addressing the Proposed Action, or abandon the Proposed Action. The EA will also be used to guide Grand Forks AFB in implementing the Proposed Action in a manner consistent with USAF standards for environmental stewardship should a specific alternative be approved for implementation.

THIS PAGE INTENTIONALLY LEFT BLANK

3. Affected Environment and Environmental Consequences

All potentially relevant resource areas were initially considered for analysis in this EA. In compliance with NEPA, CEQ, and EIAP 32 CFR Part 989 guidelines, the following discussion of the affected environment and environmental consequences focuses only on those resource areas considered potentially subject to impacts and with potentially significant environmental issues. This section includes air quality, noise, hazardous materials and wastes, water resources, biological resources, cultural resources, transportation, safety and occupational health, and geologic resources. Each of the four alternatives identified in **Section 2** were evaluated for their potential to affect physical, biological, and socioeconomic resources in accordance with CEQ guidelines at 40 CFR 1508.8.

The following discussion elaborates on the nature of the characteristics that might relate to various impacts:

- **Short-term or long-term.** These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term impacts are those that are more likely to be persistent and chronic.
- **Direct or indirect.** A direct impact is caused by and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- **Negligible, minor, moderate, or major.** These relative terms are used to characterize the magnitude or intensity of an impact. Negligible impacts are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate impact is readily apparent. A major impact is one that is severely adverse or exceptionally beneficial.
- **Adverse or beneficial.** An adverse impact is one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.
- **Context.** The context of an impact can be localized or more widespread (e.g., regional).
- **Intensity.** The intensity of an impact is determined through consideration of several factors, including whether an alternative might have an adverse impact on the unique characteristics of an area (e.g., historical resources, ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Impacts are also considered in terms of their potential for violation of Federal, state, or local environmental laws; their controversial nature; the degree of uncertainty or unknown impacts, or unique or unknown risks; if there are precedent-setting impacts; and their cumulative effects (see **Chapter 4**).

3.1 Air Quality

3.1.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these “criteria pollutants” in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological “air basin,” and the prevailing meteorological conditions.

The CAA directed the U.S. Environmental Protection Agency (USEPA) to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM_{10}] and particulate matter equal to or less than 2.5 microns in diameter [$\text{PM}_{2.5}$], and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. North Dakota has adopted the NAAQS and has implemented a more stringent set of standards for SO_2 , which are termed the North Dakota Ambient Air Quality Standards (NDAAQs). **Table 3-1** presents the primary and secondary USEPA NAAQS and NDAAQs.

Although O_3 is considered a criteria air pollutant and is measurable in the atmosphere, it is not often considered a regulated air pollutant when calculating emissions because O_3 is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or “ O_3 precursors.” These O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric O_3 concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO_2 .

The USEPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either “attainment,” “nonattainment,” “maintenance,” or “unclassified” for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment but is now attainment; and an unclassified air quality designation by USEPA means that there is not enough information to appropriately classify an AQCR, so the area is considered attainment. In accordance with the CAA, each state must develop a State Implementation Plan (SIP), which is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS.

The General Conformity Rule requires that any Federal action meet the requirements of a SIP or Federal Implementation Plan. More specifically, CAA conformity is ensured when a Federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other

milestones toward achieving compliance with the NAAQS. The General Conformity Rule applies only to significant actions in nonattainment or maintenance areas.

Table 3-1. National and State Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard		Secondary Standard
		Federal	State	
CO	8-hour ⁽⁵⁾	9 ppm (10 mg/m ³)	Same	None
	1-hour ⁽⁵⁾	35 ppm (40 mg/m ³)	Same	None
Pb	Rolling 3-Month Average ⁽⁶⁾	0.15 µg/m ³ ⁽¹⁾	Same	Same as Primary
NO ₂	Annual ⁽⁷⁾	53 ppb ⁽²⁾	Same	Same as Primary
	1-hour ⁽⁸⁾	100 ppb	--	None
PM ₁₀	24-hour ⁽⁹⁾	150 µg/m ³	Same	Same as Primary
PM _{2.5}	Annual ⁽¹⁰⁾	15 µg/m ³	Same	Same as Primary
	24-hour ⁽⁸⁾	35 µg/m ³	Same	Same as Primary
O ₃	8-hour ⁽¹¹⁾	0.075 ppm ⁽¹⁰⁾	Same	Same as Primary
SO ₂	1-hour ⁽¹²⁾	75 ppb ⁽¹²⁾	0.273 ppm	None
	3-hour ⁽⁵⁾	--	0.5ppm	0.5 ppm

Sources: USEPA 2011a, NDDH 2011

Notes: Parenthetical values are approximate equivalent concentrations.

- Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
- The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.
- Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
- Final rule signed June 2, 2010. The 1971 annual (0.3 ppm) and 24-hour (0.14 ppm) SO₂ standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.
- Not to be exceeded more than once per year
- Not to be exceeded
- Annual Mean
- 98th percentile, averaged over 3 years
- Not to be exceeded more than once per year on average over 3 years.
- Annual mean, averaged over 3 years
- Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
- 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.

Key: ppm = parts per million; ppb = parts per billion; mg/m³ = milligrams per cubic meter; µg/m³ = micrograms per cubic meter

In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour O₃, PM_{2.5}, and regional haze standards that were promulgated in that year. The 1-hour O₃ standard will no longer apply to an area 1 year after the effective date of the designation of that area for the 8-hour O₃ NAAQS. The effective designation date for most areas was 15 June 2004. USEPA designated PM_{2.5} nonattainment areas in December 2004, and finalized the PM_{2.5} implementation rule in January 2005. No county in the State of North Dakota was identified as being nonattainment for the PM_{2.5} standard.

Title V of the CAA Amendments of 1990 requires states and local agencies to issue permits for major stationary sources. A major stationary source has the potential to emit more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant (HAP), or 25 tpy of any combination of HAPs. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality. Section 112 of the CAA defines the sources and kinds of HAPs.

Greenhouse Gas Emissions. Greenhouse gases (GHG) are gaseous emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO₂), methane, and nitrous oxide. GHGs are primarily produced by the burning of fossil fuels and through industrial and biological processes. On 22 September 2009, the USEPA issued a final rule for mandatory GHG reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on CO₂ and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of CO₂ equivalent emissions per year but excludes mobile source emissions. The first emissions report is due in 2011 for 2010 emissions. GHG emissions will also be factors in Prevention of Significant Deterioration (PSD) and Title V permitting and reporting, according to a USEPA rulemaking issued on 3 June 2010 (75 Federal Register [FR] 31514). GHG emissions thresholds of significance for permitting of stationary sources are 75,000 tons CO₂ equivalent per year and 100,000 tons CO₂ equivalent per year under these permit programs.

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, was signed in October 2009 and requires agencies to set goals for reducing GHG emissions. One requirement within EO 13514 is the development and implementation of an agency Strategic Sustainability Performance Plan (SSPP) that prioritizes agency actions based on lifecycle return on investment. Each SSPP is required to identify, among other things, “agency activities, policies, plans, procedures, and practices” and “specific agency goals, a schedule, milestones, and approaches for achieving results, and quantifiable metrics” relevant to the implementation of EO 13514. On 26 August 2010, Department of Defense (DOD) released its SSPP to the public. This implementation plan describes specific actions the DOD will take to achieve its individual GHG reduction targets, reduce long-term costs, and meet the full range of goals of the EO. All SSPPs segregate GHG emissions into three categories: Scope 1, Scope 2, and Scope 3 emissions. Scope 1 GHG emissions are those directly occurring from sources that are owned or controlled by the agency. Scope 2 emissions are indirect emissions generated in the production of electricity, heat, or steam purchased by the agency. Scope 3 emissions are other indirect GHG emissions that result from agency activities but from sources that are not owned or directly controlled by the agency. The GHG goals in the DOD SSPP include reducing Scope 1 and Scope 2 GHG emissions by 34 percent by 2020, relative to fiscal year (FY) 2008 emissions, and reducing Scope 3 GHG emissions by 13.5 percent by 2020, relative to FY 2008 emissions (DOD 2010c).

Federal PSD regulations apply to major stationary sources (e.g., sources with the potential to emit 250 tpy of any criteria pollutant) in attainment areas, and major modifications to major stationary sources (e.g., change that adds 0.6 tpy for lead, or 10 tpy to 100 tpy depending on the criteria pollutant, to the facility’s potential to emit). Additional PSD permitting thresholds apply to increases in stationary source GHG emissions, as discussed previously. PSD permitting can also apply to a proposed project that is a modification with a net emissions increase to an existing PSD major source and (1) the proposed project is within 10 kilometers of national parks or wilderness areas (i.e., Class I Areas), and (2) regulated stationary source pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 µg/m³ or more (40 CFR 52.21[b][23][iii]). PSD regulations also define ambient air increments, limiting the allowable increases to any area’s baseline air contaminant concentrations, based on the area’s class designation (40 CFR 52.21[c]). Because Grand Forks AFB is

not located within 10 kilometers of a Class I area, is not an existing PSD major source, and there are no stationary source emissions increases proposed under the Proposed Action, PSD regulations do not apply and are not discussed further in this EA (USEPA 2011b).

3.1.2 Description of the Affected Environment

Grand Forks AFB is located in Grand Forks County, which is within North Dakota AQCR 172. AQCR 172 consists of all the counties in North Dakota with the exception of Metropolitan Fargo, North Dakota. As defined in 40 CFR 81.335, Grand Forks County is designated as attainment/unclassifiable for all criteria pollutants (USEPA 2010a).

The most recent emissions inventories for Grand Forks County and AQCR 172 are shown in **Table 3-2**. Grand Forks County is considered the local area of influence, and AQCR 172 is considered the regional area of influence for the air quality analysis.

Table 3-2. Local and Regional Air Emissions Inventory for the Proposed Action (2002)

	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO₂ (tpy)	PM₁₀ (tpy)	PM_{2.5} (tpy)
Grand Forks County, ND	3,786	2,952	22,947	1,381	12,711	2,034
AQCR 172	36,630	16,704	118,068	5,576	145,387	23,540

Source: USEPA 2009a

The U.S. Department of Energy, Energy Information Administration (EIA), estimates that gross CO₂ emissions in North Dakota were 53 million metric tons in 2008 (EIA 2010).

The North Dakota Department of Health (NDDH) regulates air quality for the State of North Dakota. Grand Forks AFB is classified as a major source of emissions and has an Air Pollution Control Title V Permit to Operate (NDDH 2007). As required by the NDDH, Grand Forks AFB calculates annual criteria pollutant emissions from stationary sources and provides this information to the NDDH. There are various sources on-installation that emit criteria pollutants and HAPs, including generators, boilers, hot water heaters, fuel storage tanks, gasoline service stations, surface coatings/paint booths, and miscellaneous chemical usage.

3.1.3 Environmental Consequences

3.1.3.1 Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS “attainment” areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any Evaluation Criteria established by a SIP or permit limitations/requirements

- Emissions representing an increase of 100 tpy for any attainment criteria pollutant (NO_x, VOCs, CO, PM₁₀, PM_{2.5}, SO₂), unless the proposed activity qualifies for an exemption under the Federal General Conformity Rule.

Although the 100 tpy threshold is not a regulatory driven threshold, it is being applied as a conservative measure of significance in attainment areas. The rationale for this conservative threshold is that it is consistent with the highest General Conformity *de minimis* levels for nonattainment areas and maintenance areas. In addition, it is consistent with Federal stationary source major source thresholds for Title V permitting which formed the basis for the nonattainment *de minimis* levels.

3.1.3.2 Alternative 1

Alternative 1 would generate temporary air pollutant emissions. The construction projects associated with Alternative 1 would generate air pollutant emissions as a result of the equipment and vehicles that would be used in grading, filling, unpaved road construction, tree cutting, and construction operations, but these emissions would be temporary and would not be expected to generate any offsite effects. Alternative 1 would not result in a net increase in personnel or commuter vehicles. Therefore, emissions from existing personnel and commuter vehicles under Alternative 1 would not result in an adverse impact on regional air quality.

Construction operations would result in short-term emissions of criteria pollutants as combustion products from construction equipment. Emissions of all criteria pollutants would result from construction activities including combustion of fuels from on-road haul trucks transporting materials and construction commuter emissions.

Construction projects would generate particulate matter emissions as fugitive dust from ground-disturbing activities. Fugitive dust emissions would be greatest during initial site-preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. Appropriate fugitive dust-control measures would be employed during construction activities to suppress emissions.

The EIA estimates that in 2005, gross CO₂ emissions in North Dakota were 53 million metric tons (EIA 2010). Approximately 121 metric tons of CO₂ were estimated to be emitted by Alternative 1, which is less than 0.0002 percent of the North Dakota statewide CO₂ emissions. Therefore, Alternative 1 would have a negligible contribution towards the North Dakota statewide GHG inventory. GHG emissions associated with Alternative 1 are from mobile source emissions, which do not apply to the GHG stationary source reporting and permitting thresholds discussed in **Section 3.1.1**.

Construction emissions were estimated using the USEPA EMFAC 2007 and OFFROAD 2007 emission model's emissions factors. It is estimated that the following construction equipment would be used to implement Alternative 1: scrapers, front-end loaders, motor graders, backhoes, haul trucks, water trucks, hydraulic pumps, and chainsaws. It is estimated that two pieces of each of the above construction equipment types would be used during the course of Alternative 1. It is also estimated construction would take approximately 6 months to complete (120 working days). Emissions from Alternative 1 are summarized in **Table 3-3**. Emissions estimation spreadsheets and summary of the methodology used are included in **Appendix B**.

Since Grand Forks AFB is classified as an attainment area for all criteria pollutants, General Conformity Rule requirements are not applicable. As shown in **Table 3-3**, Alternative 1 would generate emissions

well below 100 tons for all criteria pollutants, the emissions would be short-term, and all criteria pollutant emissions are well below significant criteria thresholds described in **Section 3.1.3.1**.

Conclusion. Construction activities associated with Alternative 1 would not have significant effects on air quality at Grand Forks AFB or on regional or local air quality.

Table 3-3. Estimated Air Emissions Resulting from Alternative 1

Activity	NO _x tpy	VOC tpy	CO tpy	SO ₂ tpy	PM ₁₀ tpy	PM _{2.5} tpy	CO ₂ tpy
Construction Combustion	0.871	0.117	0.512	0.001	0.046	0.046	114.798
Construction Fugitive Dust	--	--	--	--	1.274	0.127	--
Haul Trucks	0.014	0.010	0.040	0.001	0.016	0.004	3.442
Construction Commuters	0.013	0.013	0.119	< 0.001	0.001	0.001	15.778
Total Alternative 1 Emissions	0.898	0.140	0.671	0.002	1.338	0.179	134.017*
Percent of AQCR 172 Inventory	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001 **

Note: * Represents GHG emissions. ** Percent of State of North Dakota CO₂ emissions.

3.1.3.3 Alternative 2

Alternative 2 would have similar but lower levels of impact on air quality than Alternative 1. Emissions under Alternative 2 would be below those shown in **Table 3-3**; therefore, construction activities associated with this alternative would not have significant effects on air quality at Grand Forks AFB or on the regional or local area. Since Grand Forks AFB is classified as an attainment area for all criteria pollutants, General Conformity Rule requirements are not applicable. As shown in **Table 3-3**, the Proposed Action would generate emissions well below 100 tons for all criteria pollutants, the emissions would be short-term, and all criteria pollutant emissions are well below significant criteria thresholds described in **Section 3.1.3.1**.

Conclusion. Construction activities associated with Alternative 2 would not have significant effects on air quality at Grand Forks AFB or on regional or local air quality.

3.1.3.4 Alternative 3

Impacts on air quality from Alternative 3 would be similar to those described for Alternative 1 in **Section 3.1.3.2**. However, an additional 9.95 acres of land would be disturbed to harvest trees south of the project site, there would be emissions from chainsaws during tree harvesting activities, additional construction equipment would be required because of the larger land disturbance, and emissions from haul trucks transporting harvest materials would be slightly smaller since there is a shorter distance to travel. Emissions from Alternative 3 are summarized in **Table 3-4**. Emissions estimation spreadsheets and a summary of the methodology used are included in **Appendix B**.

Since Grand Forks AFB is classified as an attainment area for all criteria pollutants, General Conformity Rule requirements are not applicable. As shown in **Table 3-4**, Alternative 3 would generate emissions well below 100 tons for all criteria pollutants, the emissions would be short-term, and all criteria pollutant emissions are well below significant criteria thresholds described in **Section 3.1.3.1**.

Conclusion. Construction activities associated with Alternative 3 would not have significant effects on air quality at Grand Forks AFB or on regional or local air quality.

Table 3-4. Estimated Air Emissions Resulting from Alternative 3

Activity	NO _x tpy	VOC tpy	CO tpy	SO ₂ tpy	PM ₁₀ tpy	PM _{2.5} tpy	CO ₂ tpy
Construction Combustion	7.688	1.038	4.264	0.010	0.394	0.394	885.795
Construction Fugitive Dust	--	--	--	--	1.274	0.127	--
Haul Trucks	0.011	0.008	0.034	0.001	0.014	0.004	2.891
Construction Commuters	0.013	0.013	0.119	< 0.001	0.001	0.001	15.778
Total Alternative 3 Emissions	7.712	1.059	4.416	0.011	1.683	0.526	904.463*
Percent of AQCR 172 Inventory	0.004	0.002	0.001	< 0.001	< 0.001	< 0.001	0.001 **

Notes: * Represents GHG emissions. ** Percent of State of North Dakota CO₂ emissions (USEPA 2009a).

3.1.3.5 Alternative 4 - No Action Alternative

Under the No Action Alternative, the continued stream bank erosion and sedimentation, the continuation of water quality degradation, and the continued existence of noxious weeds and invasive species in the riparian forest would have no impact at all on the local or regional air quality environment. Therefore, no direct or indirect adverse impacts would be expected on local or regional air quality from implementation of the No Action Alternative.

3.2 Noise

3.2.1 Definition of the Resource

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on a rooftop. Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. How an individual responds to the sound source will determine if the sound is viewed as music to one’s ears or as annoying noise. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

Noise Metrics and Regulations. Although human response to noise varies, measurements can be calculated with instruments that record instantaneous sound levels in decibels. A-weighted decibel (dBA) is used to characterize sound levels that can be sensed by the human ear. “A-weighted” denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event. The threshold of audibility is generally within the range of 10 to 25 dBA for normal hearing. The threshold of pain occurs at the upper boundary of audibility, which is normally in the region of 135 dBA

(USEPA 1981a). **Table 3-5** compares common sounds and shows how they rank in terms of the effects of hearing. As shown, a whisper is normally 30 dBA and considered to be very quiet while an air conditioning unit 20 feet away is considered an intrusive noise at 60 dBA. Noise levels can become annoying at 80 dBA and very annoying at 90 dBA. To the human ear, each 10 dBA increase seems twice as loud (USEPA 1981b).

Table 3-5. Sound Levels and Human Response

Noise Level (dBA)	Common Sounds	Effect
10	Just audible	Negligible*
30	Soft whisper (15 feet)	Very quiet
50	Light auto traffic (100 feet)	Quiet
60	Air conditioning unit (20 feet)	Intrusive
70	Noisy restaurant or freeway traffic	Telephone use difficult
80	Alarm clock (2 feet)	Annoying
90	Heavy truck (50 feet) or city traffic	Very annoying Hearing damage (8 hours)
100	Garbage truck	Very annoying*
110	Pile drivers	Strained vocal effort*
120	Jet takeoff (200 feet) or auto horn (3 feet)	Maximum vocal effort
140	Carrier deck jet operation	Painfully loud

Sources: USEPA 1981b and *HDR extrapolation

Federal Regulations. Under the Noise Control Act of 1972, the Occupational Safety and Health Administration (OSHA) established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed to is 115 dBA and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

Sound levels, resulting from multiple single events, are used to characterize noise effects from aircraft or vehicle activity and are measured in Day-Night Average Sound Level (DNL). The DNL noise metric incorporates a “penalty” for nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10-dBA penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL values are obtained by averaging sound exposure levels over a given 24-hour period. DNL is the designated noise metric of the Federal Aviation Administration (FAA), U.S. Department of Housing and Urban Development (HUD), USEPA, and DOD for modeling airport environments.

According to the USAF, the FAA, and the HUD criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where the noise exposure exceeds 75 dBA DNL, “normally unacceptable” in regions exposed to noise between 65 and 75 dBA DNL, and “normally acceptable” in areas exposed to noise of 65 dBA DNL or less. The Federal Interagency Committee on Noise developed land use compatibility guidelines for noise in terms of a DNL sound level (FICON 1992). For outdoor

activities, the USEPA recommends 55 dBA DNL as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (USEPA 1974).

State and Local Regulations. The State of North Dakota and Grand Forks County do not have noise control regulations (O'Clair 2011, Magnuson 2011).

3.2.2 Description of Affected Environment

The ambient noise environment around Grand Forks AFB is affected mainly by military aircraft operations and automobile traffic. In accordance with the 2005 Base Realignment and Closure (BRAC) directives, the mission at Grand Forks AFB has transitioned from supporting air transport of people and cargo and air refueling using KC-135 aircraft to supporting Remotely Piloted Aircraft (RPA), including Global Hawks and Predators (GFAFB 2010a). However, at the time of this study the RPA mission has not yet fully bedded down at the installation. Therefore, the DNL noise contours for the KC-135 mission provided in the 1995 *Air Installation Compatible Use Zone Study at Grand Forks AFB* (USAF 1995) are the official noise contours for the installation (Slivnik 2011). As shown on **Figure 3-1**, the DNL noise contours from KC-135 and military transient aircraft operations extend roughly north and south along the runway, and to the west. The 65 to 69 dBA DNL noise contour is approximately 575 feet southeast of the proposed project area.

Vehicle use associated with military operations at Grand Forks AFB consists of passenger, delivery and fuel trucks, and military vehicles. Passenger vehicles compose most of the vehicles present at Grand Forks AFB and the surrounding community roadways. For analysis of potential construction traffic and haul routes, please see **Section 3.7, Transportation**.

Considering the military aircraft operations, military training operations, and vehicle traffic at and adjacent to Grand Forks AFB, the ambient sound environment around Grand Forks AFB is likely to resemble an urban atmosphere.

3.2.3 Environmental Consequences

3.2.3.1 Evaluation Criteria

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., if the total number of sensitive receptors to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level). Projected noise effects were evaluated qualitatively for the alternatives considered.

3.2.3.2 Alternative 1

The sources of noise under Alternative 1 that could impact human and wildlife populations include construction activities. These sources are addressed as follows.

Construction Sound Levels. Construction work can cause an increase in sound that is well above the ambient level. A variety of sounds are emitted from loaders, trucks, saws, and other work equipment. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area. **Table 3-6** lists noise levels associated with

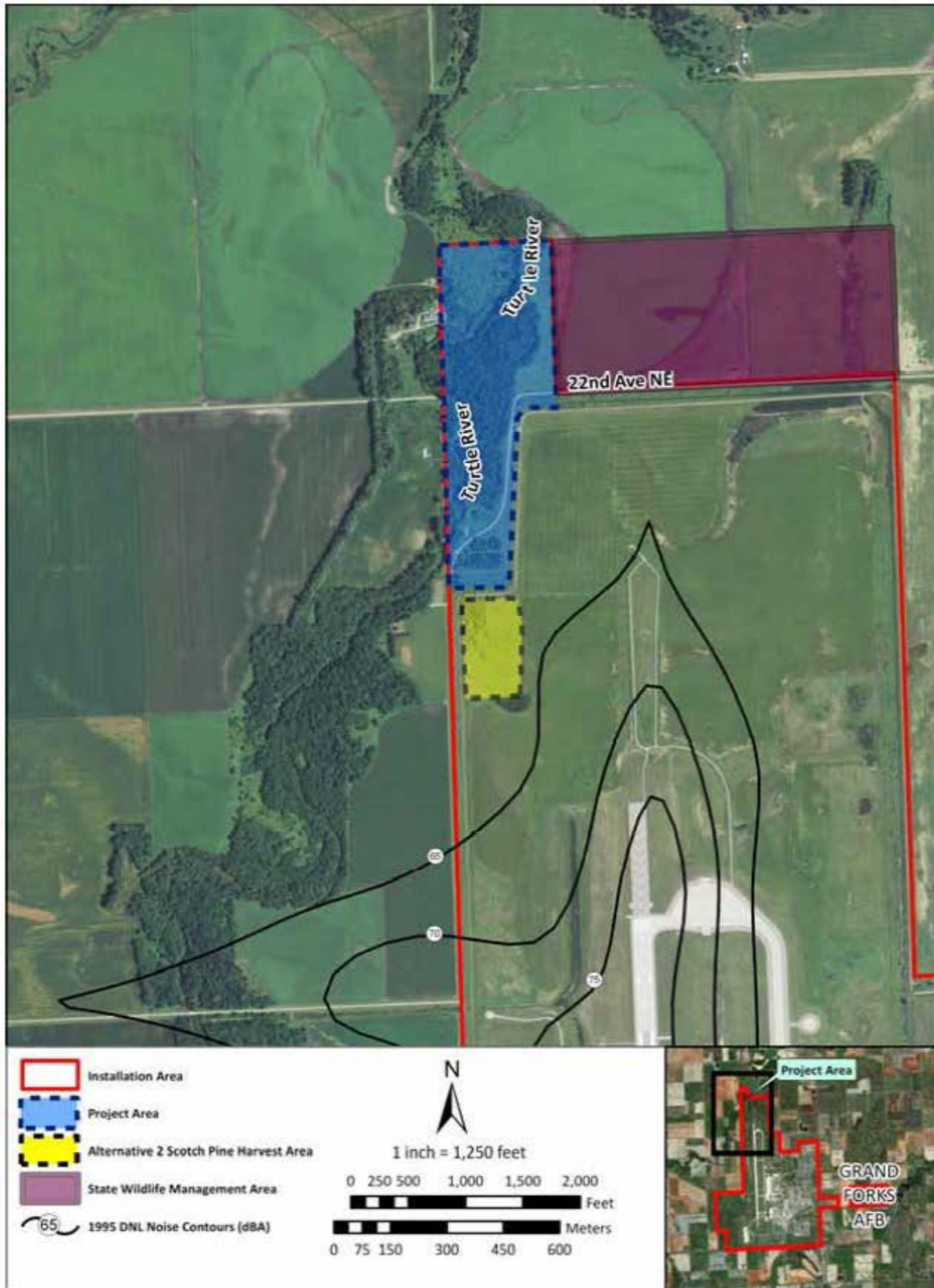


Figure 3-1. 1995 DNL Noise Contours at Grand Forks AFB

the expected construction equipment under Alternative 1. The type and number of equipment is provided for estimation purposes, since the project has not reached the design stage. Impact-type construction equipment (e.g., pile drivers) are not expected to be necessary. The equipment shown in **Table 3-6** would generate a small amount of vibration in the immediate area of the equipment (e.g., starting the excavation pump); however, this vibration is not expected to be noticeable outside of the immediate project area. Therefore, vibration from construction equipment is not expected to be a concern, and is not discussed further in this EA.

Table 3-6. Predicted Noise Levels for Construction Equipment

Construction Equipment	Number Estimated	Predicted Noise Level at 50 feet (dBA) for Each Piece of Equipment
Frontend Loader	2	72–85
Scraper	2	80–93
Grader	2	80–93
Truck	4	83–94
Backhoe	2	72–93
Chainsaw	2	72–82
Hydraulic Excavator Pump	2	68–71

Source of predicted noise levels: USEPA 1971

Construction Activities. The project components of Alternative 1 consist of riparian restoration and stabilization using construction equipment and methods as discussed in **Section 2.1**. Noise from construction activities varies depending on the type of construction equipment being used, the area that the action would occur in, and the distance from the noise source. To predict how construction activities would impact adjacent human and wildlife populations, noise from the probable construction was estimated. For example, as shown in **Table 3-6**, construction usually involves several pieces of equipment (e.g., backhoes and graders) that can be used simultaneously. Under Alternative 1, the cumulative noise from the construction equipment during the busiest day was estimated to determine the total impact of noise from construction activities at a given distance. Examples of expected cumulative construction noise during daytime hours at specified distances are shown in **Table 3-7**. These levels show the estimated noise from three pieces of construction equipment running simultaneously and were predicted at 50, 100, 200, 400, 800, and 1,200 feet from the source of the noise.

Table 3-7. Predicted Noise Levels from Construction Activities

Distance from Noise Source	Predicted Noise Level
50 feet	94 dBA
100 feet	88 dBA
200 feet	82 dBA
400 feet	76 dBA
800 feet	70 dBA
1,200 feet	66 dBA

The noise from construction equipment would be localized, short-term, and intermittent during machinery operations. Heavy construction equipment would be used periodically during construction; therefore, noise levels from the equipment would fluctuate throughout the day. The proposed construction would be expected to result in noise levels comparable to those indicated in **Table 3-7**.

The land surrounding the project area is rural and only one residence is in the vicinity of proposed Alternative 1 activities. Persons accessing this residence would be expected to experience construction-related noise levels of approximately 76 to 82 dBA.

Noise generation would last only for the duration of construction activities (i.e., approximately 6 months or 120 working days). Although the State of North Dakota and Grand Forks County do not have any limitations on construction noise (see **Section 3.2.1**), Grand Forks AFB would isolate construction activities to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Construction-related noise would also diminish as construction-related activities moved farther away from the receptor. Consequently, construction-related activities associated with Alternative 1 would result in short-term, direct, minor, adverse impacts on the noise environment in the vicinity of construction activities.

As shown on **Figure 3-1**, noise contours from aircraft operations at Grand Forks AFB are southeast of the area where Alternative 1 would occur. A potential noise-sensitive receptor is approximately 0.5 miles (2,635 feet) northwest of the 65 to 69 dBA DNL noise contour; a 2010 noise study for the new RPA mission estimated noise levels at this receptor to be approximately 60 dBA DNL (GFAFB 2010a). Since multiple single noise events create the cumulative DNL value, the actual sound levels that a person hears within the area of the DNL noise zones fluctuates throughout a 24-hour period. People or wildlife residing in an area exposed to noise of 60 dBA DNL would likely experience frequent noise fluctuations throughout the day due to aircraft overflights. Consequently, human and wildlife populations adjacent to the project site are accustomed to fluctuations of noise levels. Construction noise at the potential noise-sensitive receptor was estimated at 76 to 82 dBA, which is not expected to be a significant increase in noise levels as compared to aircraft overflights.

Construction personnel workers would be working in close proximity to construction equipment and as such could be exposed to noise levels above 90 dBA. This is above the permissible noise exposure level as defined by OSHA (29 CFR 1910.95). High noise exposure levels would be reduced to insignificant levels through feasible administrative or engineering controls, or the use of Best Management Practices (BMPs) such as the use of hearing protection equipment. Therefore, noise impacts on construction workers would be in compliance with applicable OSHA standards and would not result in a significant impact.

Vehicular Noise. Short-term, minor, adverse effects on the noise environment are anticipated from the increase in construction vehicle traffic under Alternative 1. Access to the project area would be from U.S. Highway 2 to County Road 3 to 21st Avenue NE to 26th Street to 22nd Avenue NE. 27th Street SNE would also be used to access the western portions of the project area. The additional traffic resulting from construction vehicles would likely cause minor increases in noise levels on noise-sensitive populations adjacent to these roadways.

Conclusion. Construction-related activities and vehicular noise under Alternative 1 would not result in significant impacts on the noise environment.

3.2.3.3 Alternative 2

As discussed in **Section 2.2**, the construction methods under Alternative 2 would be the same as described under Alternative 1. Therefore, implementation of Alternative 2 would be expected to result in similar short-term, direct, minor, adverse effects on the acoustical environment as those discussed for Alternative 1 from the use of construction equipment and vehicles.

Conclusion. Construction-related activities and vehicular noise under Alternative 2 would not result in significant impacts on the noise environment.

3.2.3.4 Alternative 3

The construction equipment that is expected to be used under Alternative 3 (e.g., including chainsaws and trucks for harvesting trees) is included in **Table 3-6**. Noise from construction equipment associated with Alternative 3 is reflected in the estimated construction noise levels provided in **Table 3-7**. Since the main project area is the same under Alternative 3 as for Alternative 1, implementation of Alternative 3 would be expected to result in similar short-term, direct, minor, adverse effects on the acoustical environment as those discussed for Alternative 1 from the use of construction equipment and vehicles.

However, under Alternative 3, additional construction activities would occur in the proposed scotch pine harvest area as shown in **Figure 2-6**. The proposed construction activities are expected to result in noise levels comparable to those indicated in **Table 3-7**. A potential noise-sensitive receptor is approximately 1,280 feet northwest of the proposed scotch pine harvest area. As such, persons accessing this residence could experience noise levels of less than 61 dBA during construction activities. Similar to the discussion of impacts in Alternative 1, human and wildlife populations within and adjacent to proposed Alternative 3 activities are accustomed to fluctuations of noise levels. Construction noise at the potential noise-sensitive receptor was estimated at less than 66 dBA, which would not be expected to be a significant increase in noise levels as compared to aircraft overflights.

Conclusion. Construction-related activities and vehicular noise under Alternative 3 would not result in significant impacts on the noise environment.

3.2.3.5 Alternative 4 - No Action Alternative

Under the No Action Alternative, the continued stream bank erosion and sedimentation, the continuation of water quality degradation, and the continued existence of noxious weeds and invasive species in the riparian forest would have no impact at all on the noise environment. Therefore, no direct or indirect adverse impacts would be expected on the noise environment from implementation of the No Action Alternative.

3.3 Hazardous Materials and Wastes

3.3.1 Definition of the Resource

Hazardous materials are defined by 49 CFR 171.8 as “hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions” in 49 CFR Part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR Parts 105–180.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 U.S.C. 6903(5), as amended by the Hazardous and Solid Waste Amendments, as “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

The DOD has developed the Environmental Restoration Program (ERP), which facilitates environmentally responsible land management through investigation and cleanup of contaminated sites on military installations (active installations, installations subject to BRAC, and formerly used defense sites). The Installation Restoration Program and the Military Munitions Response Program (MMRP) are components of the ERP. The Installation Restoration Program requires each DOD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The MMRP addresses nonoperational rangelands that are suspected or known to contain unexploded ordnance (UXO), discarded military munitions, or munitions constituent contamination.

For the USAF, AFPD 32-70, *Environmental Quality*, and the AFI 32-7000 series incorporate the requirements of all Federal regulations, and other AFIs and DOD Directives for the management of hazardous materials, hazardous wastes, and special hazards. Evaluation extends to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of the Proposed Action.

3.3.2 Description of Affected Environment

Hazardous Materials. Hazardous materials and petroleum products such as fuels, flammable solvents, paints, corrosives, pesticides, and cleaners are used throughout Grand Forks AFB for various functions including aircraft maintenance, aircraft ground equipment maintenance, ground vehicle maintenance, and facilities maintenance (CBP 2008). However, no hazardous materials are stored or used within the proposed project areas.

Hazardous Wastes. The 319 ABW maintains a Hazardous Waste Management Plan (GF AFB 2008a) as directed by AFI 32-7042, *Solid and Hazardous Waste Compliance*, and Air Force Pamphlet 32-7043, *Hazardous Waste Management*. This plan prescribes the roles and responsibilities of all members of Grand Forks AFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes procedures to comply with applicable Federal, state, and local standards for solid waste and hazardous waste management. However, no hazardous wastes are stored or used within the proposed project areas.

Petroleum, Oils, and Lubricants. AFI 32-7044, *Storage Tank Compliance*, implements AFPD 32-70. It identifies compliance requirements for underground storage tank (USTs), aboveground storage tank (ASTs), and associated piping that store petroleum products and hazardous substances. USTs are subject to regulation under RCRA, 42 U.S.C. 6901, and 40 CFR 280. An inventory of ASTs and USTs is maintained at Grand Forks AFB and includes the location, contents, capacity, containment measures, status, and installation dates. However, no ASTs, USTs, or associated piping exist within the proposed project areas.

Pesticides and Herbicides. AFI 32-1053, *Integrated Pest Management Program*, provides guidance for pest management programs at USAF installations. It implements AFPD 32-10, *Installations and Facilities*, and DOD Instruction 4150.07, *DOD Pest Management Program*.

Pest management practices at Grand Forks AFB are covered in the Pest Management Plan (GFAFB 2007a). Herbicides are applied in improved areas at Grand Forks AFB to control dandelions. Aerial spraying is conducted by Youngstown over the entire installation to control mosquitoes. Pesticide use at the installation is primarily for mosquito control, accomplished through installationwide aerial spraying of Altosid™ larvicide and Trumpet™ adulticide. Certified personnel from the 319 CES Entomology Flight and a grounds maintenance contractor perform ground-level pesticide application, as needed (GFAFB 2008b). Military public health maintains records on all pesticide applicators (CBP 2008). The pesticide chlordane has not historically been used on Grand Forks AFB (GFAFB 2007a).

All pesticides used on the installation are USEPA- or state-registered. Nonstandard pesticides are managed by the Pest Management Coordinator. Pesticide spills are remediated in accordance with the Spill Prevention, Control, and Countermeasures (SPCC) Plan and Installation Spill Control Plan (GFAFB 2003a).

Grand Forks AFB has a noxious weed inventory and control plan that identifies several species of noxious weeds, such as Canada thistle, perennial sow thistle, absinth wormwood, spotted knapweed, bull thistle, and leafy spurge. EO 13112, North Dakota Law 63-01.1-01 and Public Law (P.L.) 93-629 require landowners to eradicate or control the spread of noxious weeds. The herbicide Tordon 22K is recommended by the plan to eradicate these species. The installation's grounds maintenance contractor uses Roundup and 2,4-dichlorophenoxyacetic acid (2,4-D) for weed killing. The herbicide 2,4-D is widely used to kill unwanted broad-leaf plants. Roundup contains glyphosate and isopropyl amine salt, and is a popular, effective herbicide. Mixing of herbicides occurs at the grounds maintenance contractor's off-installation location and then they are transported on-installation for application.

Radon. Radon is a naturally occurring radioactive gas found in soils and rocks. It comes from the natural breakdown or decay of uranium. Radon has the tendency to accumulate in enclosed spaces that are usually below ground and poorly ventilated (e.g., basements). Radon is an odorless, colorless gas that has been determined to increase the risk of developing lung cancer. In general, the risk increases as the level of radon and length of exposure increase. The USEPA has established a guidance radon level of 4 picocuries per liter (pCi/L) in indoor air for residences; however, no standards have been established for outdoor construction.

Environmental Restoration Program and Military Munitions Response Program. Grand Forks AFB has seven ERP sites and two Areas of Concern (AOCs) that consist of historic landfills, fire training areas, past equipment maintenance activity areas, gasoline stations, and the bulk petroleum, oil, and lubricants (POL) transfer area. There are no known or suspected MMRP sites at Grand Forks AFB. A total of 48 suspected AOCs were added to the ERP list by the NDDH in September 1993. These additional AOCs were grouped with the ERP sites into 20 Solid Waste Management Units (SWMUs). The SWMUs are subject to RCRA Corrective Action and are regulated by Grand Forks AFB RCRA Corrective Action permits. Primary contaminants in soils and sediments include elevated levels of VOCs, semivolatile organic compounds, polycyclic aromatic hydrocarbons, and total petroleum hydrocarbons. Primary contaminants in groundwater include fuels and solvents (USAF 2008a). In addition to ERP sites, several monitoring wells are in place to monitor groundwater quality. No ERP sites, AOCs, suspected AOCs, or known MMRP sites are within or adjacent to the proposed project areas. Therefore, detailed examination of ERP and MMRP issues will not be discussed further in this EA.

3.3.3 Environmental Consequences

3.3.3.1 Evaluation Criteria

Impacts on hazardous materials and waste were assessed by evaluating the degree to which the Proposed Action could cause worker, resident, or visitor exposure to hazardous materials or waste; whether the Proposed Action would lead to noncompliance with applicable Federal and state regulations or increase the amounts generated or procured beyond current waste management procedures and capacities; and whether the Proposed Action would disturb an ERP site or create/contribute to an ERP site resulting in adverse effects on human health or the environment.

3.3.3.2 Alternative 1

Hazardous Materials. Short-term, minor, adverse impacts are anticipated. Alternative 1 would require the use of POLs for construction equipment. There would be no new chemicals or toxic substances used or stored at the installation in conjunction with Alternative 1. Therefore, no significant impacts are anticipated.

In accordance with Section 2.5 of AFI 32-7086, the use of hazardous materials by contractors must be authorized prior to their use or being brought onto the installation. The contractor would be required to develop and submit a site-specific Tier I SPCC Plan to Grand Forks AFB and submit Material Safety Data Sheets to Grand Forks AFB for approval of all hazardous materials prior to bringing them on the installation. The contractor would be responsible for the management of hazardous materials in accordance with Federal, state, and local regulations. The use of hazardous materials in construction equipment would be in accordance with practices established at Grand Forks AFB. BMPs would be followed to ensure that contamination from a spill does not occur. If a release of hazardous materials should occur, the appropriate measures as outlined in the SPCC Plan would be followed: emergency first responders would be called, the National Response Center would be contacted, and all appropriate installation personnel would be notified. The contractor would also be responsible for all appropriate clean-up measures should a spill occur.

Hazardous Wastes. Short-term, minor, adverse impacts are anticipated. The contractor chosen to implement Alternative 1 could generate small quantities of hazardous waste such as spent herbicides during construction. However, impacts from the generation of hazardous wastes would be expected to be minimal and short-term. Spent herbicides used during construction would be recycled or used elsewhere in accordance with established procedures to minimize the generation of hazardous wastes.

The contractor chosen to implement Alternative 1 would remove trash and debris that were illegally dumped within the project site such as vehicle batteries, washers, and dryers, and other miscellaneous materials. Hazardous wastes discovered during implementation of Alternative 1 would not be expected to exceed the capacities of local existing hazardous waste disposal facilities. The contractor chosen to implement Alternative 1 would be responsible for proper disposal of hazardous wastes in accordance with Federal, state, and local regulations and would be required to dispose of these wastes at an USEPA-approved landfill. The contractor chosen to implement Alternative 1 would also be required to follow all requirements specified in the Hazardous Waste Management Plan for Grand Forks AFB.

Petroleum, Oil, and Lubricants. Short-term, minor, adverse impacts are anticipated. Temporary storage tanks might be necessary for fueling of construction equipment during the restoration and stabilization activities. Contractors would be required to follow, prepare, and adhere to a site-specific SPCC plan prior to the start of construction activities. When heavy equipment is used, spills and leaks of oil and hydraulic fluid could occur. If a POL spill should occur, the appropriate measures as outlined in the SPCC Plan

would be followed beginning with the immediate contact of appropriate installation personnel. The contractor would also be responsible for all appropriate clean-up measures.

Pesticides and Herbicides. Short-term, minor, adverse impacts would be expected from the use of herbicides during implementation of Alternative 1. Herbicides would be used at the proposed project sites as needed to remove existing vegetation for site preparation, accelerate regeneration, and control invasive and noxious plant species. In the past, for example, Grand Forks AFB has used Plateau; 2, 4-D amine; Round-Up; Milestone; Widematch; Commando Curtail; and Rodeo. Use of one of these herbicides, or a similar product, as part of Alternative 1 would be limited to the project area and would not significantly increase the quantity of herbicide use at the installation. Additionally, all herbicides would be applied in accordance with Federal, state, and local regulations and the installation's Pest Management Plan.

Alternative 1 would not require any change in the quantities of pesticides used or significantly alter pesticide application areas. In accordance with the installation's Pest Management Plan, Grand Forks AFB uses the least toxic method for controlling pests encountered at the installation. If required, pesticide applications at the project site would be conducted according to Federal, state, and local regulations and the installation's Pest Management Plan.

Radon. No impacts would be expected from radon at the proposed project sites. Naturally occurring radon in the soil would be minimal and would not pose a threat to the health of construction workers on site.

Conclusion. No significant impacts on the environment would be expected from the use of hazardous materials or generation of hazardous wastes under Alternative 1.

3.3.3.3 Alternative 2

The impacts from implementation of Alternative 2 would be similar to those described for Alternative 1.

Conclusion. No significant impacts on the environment would be expected from the use of hazardous materials or generation of hazardous wastes under Alternative 2.

3.3.3.4 Alternative 3

The impacts from implementation of Alternative 3 would be similar to those described for Alternative 1.

Conclusion. No significant impacts on the environment would be expected from the use of hazardous materials or generation of hazardous wastes under Alternative 3.

3.3.3.5 Alternative 4 - No Action Alternative

Under the No Action Alternative, the continued stream bank erosion and sedimentation, the continuation of water quality degradation, and the continued existence of noxious weeds and invasive species in the riparian forest would have no impact at all on hazardous materials and waste management. Therefore, no impacts on hazardous materials and waste management would be expected as a result of the Proposed Action not being implemented.

3.4 Water Resources

3.4.1 Definition of the Resource

Water resources are natural and man-made sources of water that are available for use by and for the benefit of humans and the environment. Water resources relevant to Grand Forks AFB's location in North Dakota include groundwater, surface water, floodplains, and wetlands. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes. Hydrology concerns the distribution of water to water resources through the processes of evapotranspiration, atmospheric transport, precipitation, surface runoff and flow, and subsurface flow. Hydrology results primarily from temperature and total precipitation that determine evapotranspiration rates, topography that determines rate and direction of surface flow, and soil and geologic properties that determine rate of subsurface flow and recharge to the groundwater reservoir.

Groundwater. Groundwater is water that exists in the saturated zone beneath the Earth's surface in pore spaces and fractures, and includes aquifers. Groundwater is recharged through percolation of water on the ground's surface (e.g., precipitation and surface water bodies) and upward movement of water in lower aquifers through capillary movement. Groundwater is an essential resource that can be used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. The interface between the groundwater potentiometric surface (i.e., depth to groundwater below ground surface) and surface topography often results in streams, rivers, and lakes.

Groundwater quality and quantity are regulated under several programs. The Federal Underground Injection Control regulations, authorized under the Safe Drinking Water Act (SDWA), require a permit for the discharge or disposal of fluids into a well. The Federal Sole Source Aquifer regulations, also authorized under the SDWA, protect aquifers that are critical to water supply.

Surface Water. Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contribution to the economic, ecological, recreational, and human health of a community or locale. Waters of the United States are defined within the Clean Water Act (CWA), as amended, and jurisdiction is addressed by the USEPA and the USACE. These agencies assert jurisdiction over (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) nonnavigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that directly abut such tributaries. Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into waters of the United States including wetlands. Encroachment into waters of the United States and wetlands requires permits from the state and the Federal government. Wetland hydrology is discussed within this section. **Section 3.5** provides a discussion of wetland habitat occurring within the action areas and adjacent wetlands that might be affected by the actions being considered.

Per Section 401 of the CWA, any applicant for a Federal license or permit to conduct any activity including the construction or operation of facilities, which could result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the state in which the discharge originates or will originate. North Dakota relies on Section 401 water quality certification as its primary form of state-level wetlands regulation. The Section 401 program is administered by the North Dakota Department of Health/Division of Water Quality (NDDH/DWQ). In making certification decisions, the NDDH/DWQ is primarily concerned with the construction and environmental disturbance requirements pertaining to soils, surface waters, and fill materials. A nonregulatory agency policy document requires that "fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land

resources will be protected against compaction, vegetation loss, and unnecessary damage.” If a project does not meet this and other minimum requirements of the NDDH/DWQ, the permit is denied, and necessary conditions are communicated before reapplication (ELI 2008).

A water body can be deemed impaired if water quality analyses conclude that exceedances of the water quality standards established by the CWA occur. The CWA requires that states establish a Section 303(d) list to identify impaired waters and establish Total Maximum Daily Loads (TMDLs) for the source(s) causing the impairment. A TMDL is the maximum amount of a substance that can be assimilated by a water body without causing impairment. The CWA also mandated the National Pollutant Discharge Elimination System (NPDES) program, which regulates the discharge of point (end of pipe) and nonpoint (storm water) sources of water pollution and requires a permit for any discharge of pollutants into waters of the United States.

Storm water (water from precipitation events) is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade surface waters. Proper storm water flow management, which can be intensified by high proportions of impervious surfaces associated with buildings, roads, and parking lots, is important to the management of surface water quality and natural flow characteristics. Prolonged increases in storm water volume and velocity associated with development and increased impervious surfaces has potential to impact adjacent streams as a result of streambank erosion and channel widening or down cutting associated with the adjustment of the stream to the change in flow characteristics. Storm water management systems are typically designed to contain runoff on site during construction, and to maintain predevelopment storm water flow characteristics following development through either the application of infiltration or retention practices. Failure to size storm water systems appropriately to hold or delay conveyance of the largest predicted precipitation event often leads to downstream flooding and the environmental and economic damages associated with flooding.

The USEPA published the technology-based Final Effluent Limitations Guidelines (ELGs) and New Performance Standards for the Construction and Development Point Source Category on 1 December 2009 to control the discharge of pollutants from construction sites. The Rule became effective on 1 February 2010. After this date, all USEPA- or state-issued permits were to be revised to incorporate and address the ELG requirements, with the exception of the 280 nephelometric turbidity units (NTUs) numeric limitation for turbidity, which has been suspended while the USEPA further evaluates this limitation. The USEPA currently regulates large and small (greater than 1 acre) construction activity through the 2012 Construction General Permit (CGP). Permittees must select, install, and maintain effective erosion- and sedimentation-control BMPs as identified in the 2012 CGP, including the following:

- Sediment controls (e.g., sediment basins, sediment traps, silt fences, vegetative buffer strips)
- Offsite sediment tracking and dust control
- Runoff management
- Post-construction storm water management
- Erosion control and stabilization
- Spill/release prevention.

Construction activities, such as clearing, grading, trenching, and excavating, disturb soils and sediment. If not managed properly, disturbed soils and sediments can easily be washed into nearby water bodies during storm events, where water quality is reduced. Section 438 of the Energy Independence and Security Act (EISA) (42 U.S.C. 17094) establishes into law new storm water design requirements for Federal construction projects that disturb a footprint of greater than 5,000 square feet (ft²) of land. EISA Section 438 requirements are independent of storm water requirements under the CWA. The project

footprint consists of all horizontal hard surface and disturbed areas associated with project development. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology shall be modeled or calculated using recognized tools and must include site-specific factors such as soil type, ground cover, and ground slope. Site design shall incorporate storm water retention and reuse technologies such as bioretention areas, permeable pavements, cisterns/recycling, and green roofs to the maximum extent technically feasible. Post-construction analyses would be conducted to evaluate the effectiveness of the as-built storm water reduction features (DOD 2010a). These regulations have been incorporated into applicable DOD Unified Facilities Criteria (UFC) in April 2010, which stated that low-impact development (LID) features would need to be incorporated into new construction activities to comply with the restrictions on storm water management promulgated by EISA Section 438. LID is a storm water management strategy designed to maintain site hydrology and mitigate the adverse impacts of storm water runoff and nonpoint source pollution. LIDs can manage the increase in runoff between pre- and post-development conditions on the project site through interception, infiltration, storage, or evapotranspiration processes before the runoff is conveyed to receiving waters. Examples of the methods include bioretention, permeable pavements, cisterns/recycling, and green roofs (DOD 2010b). Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Storm water Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* (USEPA 2009b).

Floodplains. Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters. The living and nonliving parts of natural floodplains interact with each other to create dynamic systems in which each component helps to maintain the characteristics of the environment that support it. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and diversification of plants and animals. Floodplains provide a broad area to spread out and temporarily store floodwaters. This reduces flood peaks and velocities and the potential for erosion. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body (FEMA 1986).

Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, the size of the watershed above the floodplain, and upstream development. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain as an area within which there is a 1 percent chance of inundation by a flood event in a given year. Certain facilities inherently pose too great a risk to be in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of FEMA Flood Insurance Rate Maps (FIRMs), which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains to the maximum extent possible wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities" for the following actions:

- Acquiring, managing, and disposing of Federal lands and facilities
- Providing federally undertaken, financed, or assisted construction and improvements

- Conducting Federal activities and programs affecting land use, including water and related land resources planning, regulation, and licensing activities.

A FONPA must accompany the FONSI stating why there are no practicable alternatives to development within or affecting floodplain areas.

Wetlands. The USACE defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR Part 329). Wetlands perform several hydrologic functions, including water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands).

EO 11990, *Protection of Wetlands*, (24 May 1977) directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands. In accordance with EO 11990 and 32 CFR Part 989, a FONPA must accompany the FONSI stating why there are no practicable alternatives to development within or affecting wetland and floodplain areas.

3.4.2 Description of Affected Environment

Groundwater. Groundwater within Grand Forks County occurs in unconsolidated glacial drift deposits and in rocks of Cretaceous- and Ordovician-age underlying the glacial deposits. Subsurface water flows primarily to the east, and the aquifers present include the Dakota Aquifer and the Emerado Aquifer.

The deepest aquifer is found in the Ordovician-aged Red River Formation. Yield varies depending on joints and fractures within the formation, and the groundwater is very saline. The Dakota aquifer is the principal bedrock aquifer among the Great Plains states providing groundwater to wells at rates ranging from 2 to 50 gallons per minute (gpm). The Dakota aquifer, which is approximately 250 feet below ground surface (bgs), is very saline and is used primarily for livestock watering as it is considered unsuitable for domestic consumption or industrial use. The water level within the aquifer has dropped nearly 20 feet in the past several years due to increased use for agricultural purposes (GFAFB 2011).

The uppermost aquifer is the Emerado Aquifer, a major glacial drift aquifer underlying Grand Forks AFB approximately 50 to 75 feet bgs. Groundwater is confined under an artesian head, and well yields can vary from rates of 50 to 500 gpm. Water quality within the aquifer is poor, with high levels of dissolved solids and salinity. This is potentially attributable to upward seepage of groundwater from bedrock aquifers. The Emerado Aquifer is confined both above and below by a clayey glacial till (GFAFB 2011).

None of the described aquifers are sole-source providers (USEPA 2010b). Potable water for Grand Forks AFB is obtained from surface water sources including the Red River and Red Lake River through the City of Grand Forks (GFAFB 2011).

Five wells are present along the Turtle River within 10 miles of where the riparian restoration is proposed. According to the North Dakota State Water Commission, three wells exist at the site of the Proposed Action and two wells are within 10 miles downstream (to the northeast) of the Proposed Action. Wells proximal to the Proposed Action consist of an irrigation well at a depth of 92 feet, an observation well at a depth of 120 feet, and a closed (plugged) observation well at a depth of 200 feet. There are no data provided by the North Dakota State Water Commission defining the aquifer(s) tapped into by these wells. Of the two wells within 10 miles downstream of the Proposed Action, one is approximately 3.5 miles from the site of the Proposed Action and is an observation well; no depth or aquifer information is provided. Another well is approximately 10 miles from the site of the Proposed Action and is a stock well. No data are provided for the well depth or aquifer (NDSWC 2011).

Surface Water. Surface water surrounding Grand Forks AFB includes rivers, streams, and numerous wetlands (see **Figure 1-1**). Grand Forks AFB is within the Red River Basin, which drains 48,490 square miles. The Red River Basin's tributaries typically have relatively steep upper reaches that spill into the flat main stem valley floor in the lakebed of former glacial Lake Agassiz (see **Section 3.9, Geological Resources**) (USACE 2011).

The Turtle River is the only primary body of water that is present on Grand Forks AFB; however, Kellys Slough within the Kellys Slough National Wildlife Refuge (NWR), is approximately 2 miles east of Grand Forks AFB. Just beyond the southern boundary of the installation is Hazen Brook, which flows to the east along the southern side of U.S. Highway 2. The Turtle River is designated as a jurisdictional water of the United States and Kellys Slough and Hazen Brook are not jurisdictional.

The Turtle River flows through the northwestern corner of the installation boundary, meandering in a northeasterly direction. It eventually empties into Lake Winnipeg in Canada via the Red River within the Red River Drainage Basin. Turtle River is part of the 685-square-mile Turtle River Watershed in northeastern North Dakota (GFCSCD 2011). Within the boundaries of Grand Forks AFB, Turtle River flows for approximately 3,666 feet (RRRC 2006). Peak flows occur in April, consistent with spring thaw, and minimum flows occur in January and February. Flows are managed on this river by the flood-control structure in Larimore, North Dakota.

Turtle River has been classified as a Class 2 stream by the NDDH, with water quality sufficient to sustain fish populations and suitable for irrigation and recreational purposes (GFAFB 2007b). However, the river has been placed on North Dakota's 2010 Section 303(d) priority waterbody list due to elevated cadmium, selenium, and sediment/siltation (NDDH 2010). TMDLs have not yet been determined for these constituents. Most of the impairments to the Turtle River are caused or influenced by streambank and channel erosion and can be improved through the establishment of a proper functioning riparian corridor (RRRC 2006). However, because of these impairments, the river has been deemed fully supporting but threatened with respect to fish and other aquatic biota, municipal and domestic uses, and recreation (NDDH 2010). Trash and large woody debris are also present throughout this reach of the river.

During a 2006 study conducted by the RRRC to ascertain streambank morphology of Turtle River, it was determined that high flood flow had been responsible for transporting large amounts of sediment and had exacerbated erosion by removing streambank sediment. Over time, as the climate has become wetter, the Turtle River channel has widened and cut down into the streambed. The river is entrenched for short lengths within the Grand Forks AFB boundaries; some of these sections appear to be attenuating back to natural conditions with more stable banks. During the study, it was apparent that severe erosion occurred outside of meanders, especially where vegetation was sparse (see **Figures 2-1** and **2-2**). The study also identified deep scour holes, riffles, and pools, with depths of at least 3 feet. The average water depth ranged from 1.22 to 2.91 feet during the study, which was conducted during summer months when water levels were low. Bankfull depths typically correspond to a depth where the channel fills to the point at

which it would spill onto the floodplain. Within the stretch of Turtle River that flows through the installation, bankfull depths ranged from 2.23 to 4.37 feet (RRRC 2006).

The channel assessment portion of the study indicated that Turtle River is both C- and F-type channels according to the Rosgen classification system (Rosgen 1996). The C-type channel is defined as a slightly entrenched meandering channel with an established floodplain. This type of channel can experience considerable lateral migration, as influenced by the condition of the adjacent riparian vegetation. Sediment supply might be high, especially if the banks are highly susceptible to erosion and the channel is vulnerable to lateral and vertical changes in response to disturbances in the watershed such as dam construction or shifts in land use and hydrology (Rosgen 1996). F-type channels are similar to C-type but are more entrenched. F-type channels also transport high sediment loads in the presence of erodible streambanks. Because of high bank heights and increased depth to the water table, riparian vegetation associated with this channel type has little influence on bank stability. If new slope toes can be established, riparian vegetation could develop and promote bank stability along the areas classified as an F-type channel (Rosgen 1996). Turtle River is considered an F-type channel to the northeast of the farm located on the westside of the river, and in the northernmost stretch of the river within the installation boundary (RRRC 2006).

The other prominent nearby surface water feature, Kellys Slough NWR, is within a wide, marshy floodplain approximately 2 miles east of the installation. Surface water runoff is received from the eastern half of Grand Forks AFB; effluent is also received from water treatment lagoons maintained by the installation to the east of Grand Forks AFB. Drainage from Kellys Slough NWR flows to the northeast into the Turtle River and eventually into the Red River. The Red River runs beyond the eastern portion of the installation, approximately 15 miles away. The Red Lake River supplies a portion of the drinking water supply to Grand Forks AFB.

Storm water drainage at Grand Forks AFB occurs through four drainage ditches (i.e., southeast, northeast, northwest, and west) and nine outfalls. The outfalls convey drainage into Kellys Slough NWR and eventually into Turtle River. Facilities on Grand Forks AFB discharge sanitary wastewater to sewage treatment lagoons to the east of the main installation. The sewage treatment lagoons are approximately 320 acres and discharge to the east into Kellys Slough (GFAFB 2009). The sewage treatment lagoons are classified as lakes according to the National Wetlands Inventory (NWI).

Floodplains. The Red River Basin is subject to frequent floods that affect urban and rural infrastructure and agricultural production (USACE 2011). Turtle River is the only river to cross the Grand Forks AFB boundary; therefore, a portion of the 100-year floodplain for the Turtle River is present in the northwesternmost corner of the installation. Flooding is estimated to occur along Turtle River every 0.8 to 1.5 years (RRRC 2006). According to the FEMA FIRM Panel No. 38035C0525E (effective 17 December 2010), the 100-year floodplain associated with Turtle River extends along the northwestern panhandle of the installation boundary, adjacent to 22nd Avenue (see **Figure 3-2**) (FEMA 2010). This area is classified as Zone A, indicating it is within the 100-year floodplain. Areas within the floodplain are required to comply with National Flood Insurance Program floodplain management requirements, such as constructing buildings above base flood level and obtaining flood insurance coverage. There are also 100-year floodplains along the southeastern boundary of the sewage treatment lagoons associated with Kellys Slough.

Wetlands. The Red River Basin contains thousands of natural wetlands and prairie potholes. These wetlands have a profound effect on the hydrologic flow regime of streams and the residence time of water within the basin. These wetland areas generally occur in areas of poorly drained soils in shallow depressions formed on glacial and lacustrine plains. Wetlands on Grand Forks AFB occur frequently in drainageways, low-lying depressions, and potholes (see **Figure 3-3**).

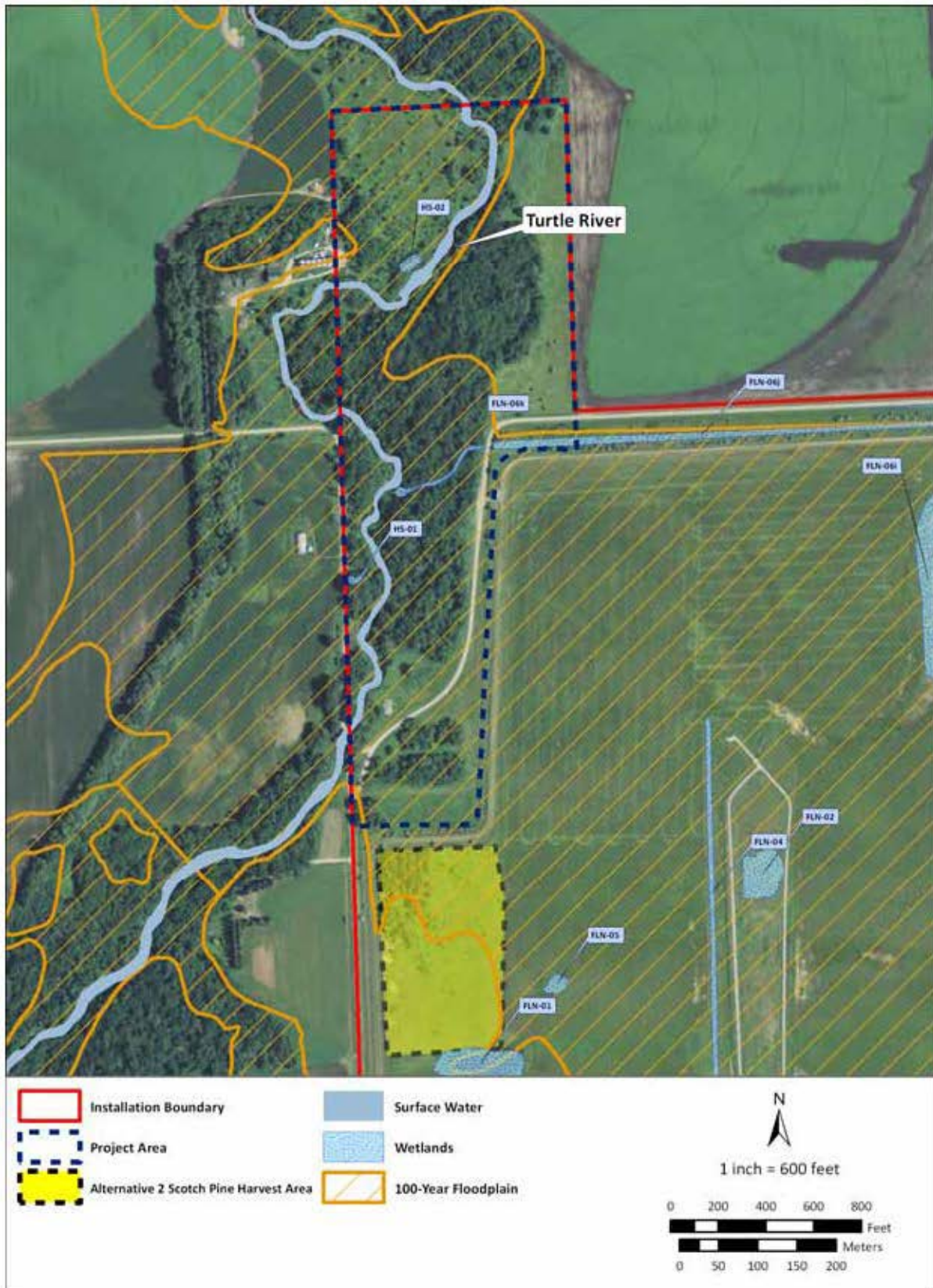


Figure 3-2. Water Resources within the Project Area

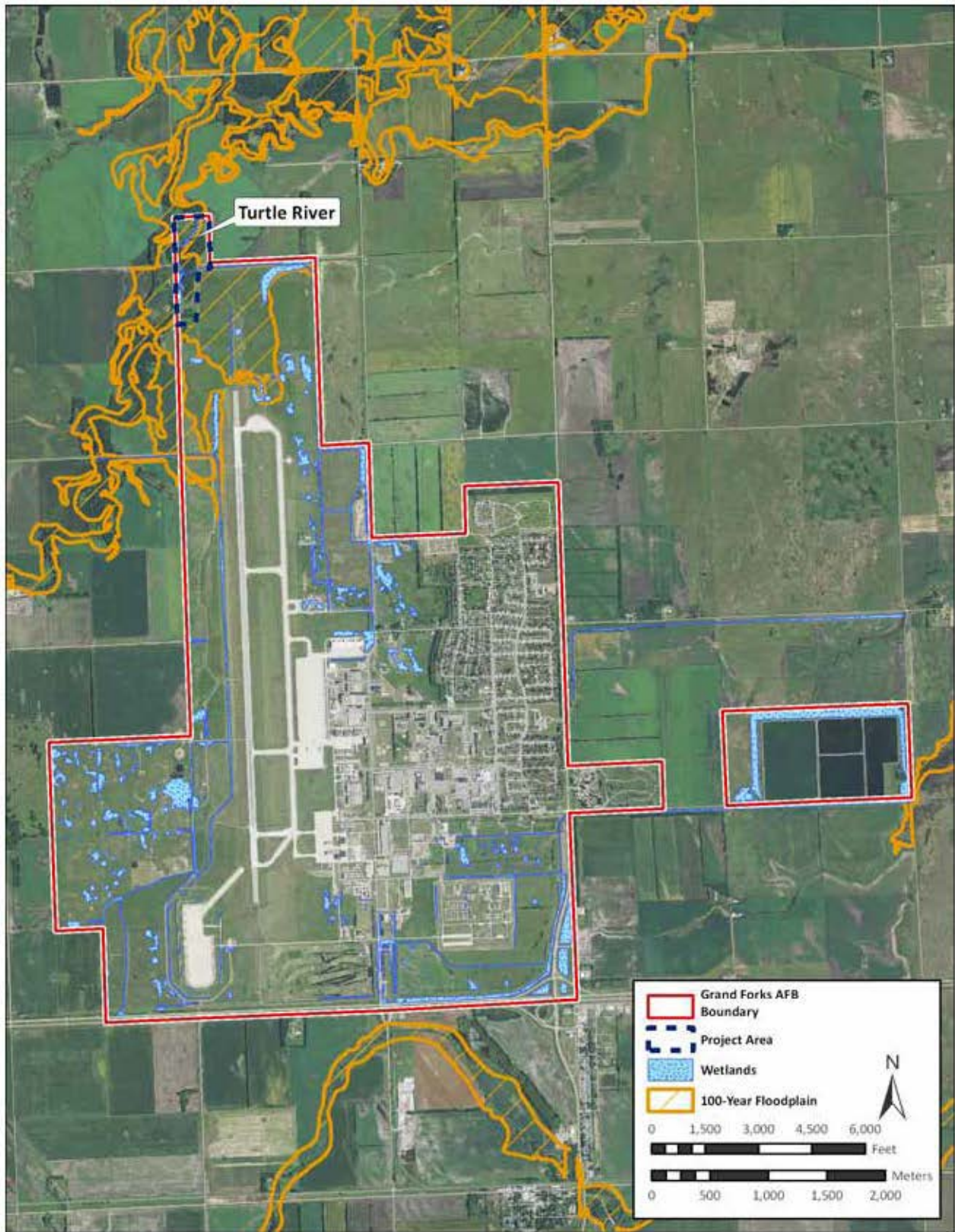


Figure 3-3. Water Resources at Grand Forks AFB

Three acres of riverine wetlands are present in the northwestern corner of the installation along the Turtle River, within the proposed project area. Riverine wetlands, such as those found within the site of the Proposed Action, are those that occur within the river channel and are dominated by emergent vegetation. Two small wetlands (drainages) are delineated just beyond the tree planting and other ground-disturbing activities associated with the Proposed Action. When inundated, riverine wetlands provide habitat for water-tolerant plants such as willows, and aquatic animals such as tadpoles and immature fish (see **Section 3.5** for a discussion on wetland biota).

3.4.3 Environmental Consequences

3.4.3.1 Evaluation Criteria

Evaluation criteria for effects on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. A proposed action could have significant effects with respect to water resources if any of the following were to occur:

- Substantially reduce water availability or supply to existing users (i.e., groundwater and surface water)
- Overdraft of groundwater basins
- Exceed safe annual yield of water supply sources
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations adopted to protect water resources
- Substantially adversely affect water quality
- Endanger public health by creating or worsening hazardous health conditions
- Occurrence of a proposed action in an area with a high probability of flooding.

Determination of the significance of wetland impacts is based on (1) loss of wetland acreage, (2) the function and value of the wetland, (3) the proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (4) the sensitivity of the wetland to proposed activities, and (5) the duration of ecological ramifications. Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected or if wetland acreage is lost.

3.4.3.2 Alternative 1

Short-term, minor to moderate, direct and indirect adverse impacts would be anticipated on water resources upon implementing Alternative 1. Because stabilization activities would be conducted within floodplains, a signed FONSI/FONPA would be required prior to stabilization commencement. The project will be implemented in accordance with guidance specified in the INRMP (GFAFB 2011). In addition, a floodplain management plan has been developed to guide future actions, including the Proposed Action, being considered for location in the 100-year floodplain on Grand Forks AFB (see **Appendix C**).

Grand Forks AFB would be required to obtain a permit under Section 404 of the CWA for actions determined to adversely impact jurisdictional waters of the United States on the installation through dredging or placement of fill. It is likely that discharge into waters of the United States from Alternative 1 would occur, and Grand Forks AFB would be required to undergo Section 401 water quality certification and obtain an NPDES permit prior to conducting construction activities. It is possible that

the extent of the floodplain could be locally altered due to bank stabilization techniques that would reconfigure the streambanks. Impacts on floodplains would be short-term, minor, and adverse, and long-term, beneficial. No impacts on groundwater would be anticipated by implementing Alternative 1 as the most surficial aquifer is confined, and no groundwater would be used. Furthermore, changes to surface water hydrology from restoration activities would not affect groundwater as well depths are deep and, therefore, groundwater recharge would not likely occur from surface waters. Negligible impacts would occur on water supply from the use of water during stabilization activities.

Compliance with EISA Section 438, and adherence to an erosion and sediment control plan (ESCP) and storm water pollution prevention plan (SWPPP), should prevent surface water degradation. The project will be implemented in accordance with guidance specified in the INRMP (GFAFB 2011) and appropriate BMPs, as discussed in **Appendix D**, to minimize the potential for adverse effects on waters of the United States.

Grand Forks AFB would be required to meet the non-numeric effluent limitations of the CWA for its NPDES permit and design, install, and maintain effective erosion and sedimentation controls in accordance with the requirements stipulated in the 2012 CGP. The implementation of these non-numeric effluent limitations would minimize short-term, adverse effects on surface waters from erosion, sedimentation, and pollution.

During stabilization activities, work would be conducted on the banks and within the river and floodplains, which could disturb sediment and slightly increase sedimentation temporarily. Once stabilization activities have ceased, long-term, moderate, beneficial impacts on water resources would occur. Erosion and sedimentation rates would decrease, water quality would improve, and channel morphology should return to more natural conditions, with the river channel becoming less entrenched over time.

Removal of any trees (i.e., trees that are determined to be hazardous or jeopardize the integrity of proposed bioengineered structures) and trash from the river channel would result in short- and long-term, beneficial impacts on flow and water quality. Trees and debris can impede flow, contribute to flood hazards, alter flow from natural conditions, and increase bank erosion. Removal of trash would decrease the potential of leaching of chemicals into the water. Overall, water quality would increase from implementation of Alternative 1 as trash would be removed and sedimentation (i.e., turbidity) would decrease.

Alternative 1 would not be anticipated to negatively impact the levels of cadmium, selenium, or siltation/sedimentation that are currently being investigated for development of TMDLs. Conversely, because storm water runoff would decline due to restored soil and vegetation, levels of siltation/sedimentation should decrease.

In areas where soil is too sandy to support much vegetation, the live wattle fence or other natural revetments, including wooden fascines, live pole plantings, live dormant brush layers, or clump plantings, would be installed to halt erosion and sedimentation. Additional vegetation planted within the riparian forest would decrease the velocity and volume of storm water runoff into Turtle River, which would further decrease erosion and sedimentation rates. Because steep banks could be cut or shaped to a more gradual slope that is more stable, vegetation would be better situated to flourish, which would further stabilize the bank and decrease rates of erosion and sedimentation. Moreover, functions and values of floodplains and wetlands adjacent to Turtle River would be enhanced. It is likely that floodplains would become more productive, with additional nutrients deposited from river water to nourish soil and terrestrial inputs such as carbon from vegetation.

No construction within wetland areas would occur. Wetland hydrology could be slightly altered as storm water runoff would decrease and percolation of storm water into soils could increase due to the increase in vegetative cover and improved soil quality.

Short-term, minor to moderate impacts on water resources would be expected during tree planting activities as land would be disturbed, and erosion and sedimentation could increase temporarily if BMPs are not implemented. However, EISA Section 438 requires that pre-development site hydrology mimic post-development site hydrology. By complying with EISA Section 438, there should be no net increase in storm water runoff during or after construction activities.

Planting by mechanical means would be expected to generate greater impacts than hand-planting, especially if heavy machinery is required along the riverbanks. Canopy cover (which can help regulate river temperature) and carbon inputs from vegetation (which can provide food sources for some aquatic species) are currently at a minimum because the stream is separated from its floodplain. Therefore, stabilization can improve both habitat potential and water quality (see **Section 3.5**, Biological Resources, for a discussion on aquatic habitats and species). Successful installation of natural revetments would result in decelerated erosion and invoke ecosystem recovery. However, the structures can be vulnerable after installation but before sufficient sediment has been deposited within the woody debris matrix to counteract buoyant forces. Another vulnerable period would occur when the structures decompose and disintegrate if colonization by vegetation is not rapid. Proposed monitoring of the revetments and implementation of fortifying strategies, if necessary, would deter these scenarios from occurring.

The application of herbicides on targeted species would have a long-term, negligible, adverse impact on water quality with the use of proper application practices. In addition, the use of buffers around surface water bodies would further reduce the possibility of movement of herbicides into water resources from drift or storm water runoff. If an accidental spill occurs within the site of Alternative 1, it would be collected and disposed of in accordance with manufacturer's specifications. Application methods, weather conditions, and timing are other important criteria to consider to reduce surface water contamination.

Construction of access roads would require removal of vegetation and possibly grading. BMPs would be implemented to reduce the potential for increased erosion and sedimentation and comply with EISA Section 438. Once stabilization activities have ceased, the access roads would be planted with native vegetation. Long-term impacts on water resources could be anticipated from the compaction of soils that could alter groundwater flow. However, in general, long-term impacts would be beneficial as the banks would be stabilized and erosion curtailed. In the long term, reestablishing the riparian forest, and promoting soil development, would aid in stabilizing floodplain soil and riverbanks, thereby decreasing erosion and sedimentation potential. Storm water runoff volume and velocity would decrease as storm water could percolate into the soil. Long-term impacts from planting vegetation in the riparian buffer would be beneficial on water resources.

Finally, it is important to recognize that the long-term river morphology outlook depends upon a watershed-wide strategy to control grade and upstream sediment sources so that the new morphology developed by Alternative 1 could approach dynamic equilibrium with water and sediment inputs. Alternative 1 is a step towards achieving this goal.

Conclusion. No significant impacts on water resources would be expected from the implementation of Alternative 1.

3.4.3.3 Alternative 2

Impacts on water resources from implementing Alternative 2 would be similar to, but not as beneficial as, those associated with Alternative 1. Because the riparian forest would only be partially restored, erosion and sedimentation would not decrease as much as under Alternative 1. In addition, storm water velocity and volume would not decrease as much as that which would be expected under Alternative 1. Surface runoff would continue in areas where soil development would not be promoted, as woody debris would not be placed on exposed mineral soil. No construction would occur within wetland areas.

Conclusion. No significant impacts on water resources would be expected from the implementation of Alternative 2.

3.4.3.4 Alternative 3

Short-term, adverse impacts from implementing Alternative 3 would be similar to, but greater than, those described for Alternative 1. Removal of the scotch pine grove could result in additional sedimentation if adequate BMPs were not properly implemented. Under Alternative 3, the scotch pines would be cut and the stumps would be ground; however, the stumps and roots would be left in place, thereby minimizing disturbances to soils and the potential for soil erosion. It is likely that discharge into wetlands or waters of the United States from Alternative 3 would occur. Therefore, Grand Forks AFB would be required to undergo Section 401 water quality certification and obtain an NPDES permit prior to conducting construction activities. No construction within wetland areas would occur. Once the area has been revegetated with native vegetation, impacts would be reduced to long-term and negligible.

Conclusion. No significant impacts on water resources would be expected from the implementation of Alternative 3.

3.4.3.5 Alternative 4 - No Action Alternative

Under the No Action Alternative, the reach of river in the project area would continue to evolve without being actively managed. Erosion and sedimentation would likely continue, and the streambank would become more destabilized. Turbidity rates, and other water quality factors, would degrade, and could impact the river's status as being fully supporting but threatened with respect to fish and other aquatic biota, municipal and domestic uses, and recreation. The channel could degrade to an F-type channel as it becomes more entrenched. Floodplains would continue to be segregated from the channel and would no longer serve their purpose. Downstream flooding would be exacerbated once the connection between the floodplain and river channel has been adequately severed. Wetlands would lose a critical hydrologic input, possibly threatening the status as a wetland.

3.5 Biological Resources

3.5.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species designated by the USFWS along with any species identified by the NDGFD as Species of Conservation Priority and species listed by the North Dakota Natural Heritage Program (NDNHP). Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the Endangered Species Act (ESA) and sensitive ecological areas as designated by state or Federal rulings. Sensitive habitats also include wetlands, plant communities that

are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats).

Biological resources include wetlands, which are important natural systems and habitats because of the diverse biological and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, unique plant and wildlife habitat provision, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The USACE defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR Part 329).

North Dakota relies on CWQ Section 401 water quality certification as its primary form of state-level wetlands regulation. The Section 401 program is administered by the NDDH/DWQ. In making certification decisions, the NDDH/DWQ is primarily concerned with the construction and environmental disturbance requirements pertaining to soils, surface waters, and fill materials. A nonregulatory agency policy document requires that “fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.” If a project does not meet this and other minimum requirements of the NDDH/DWQ, the permit is denied, and necessary conditions are communicated before re-application (ELI 2008).

3.5.2 Description of Affected Environment

Vegetation. General vegetation and cover types for the project area are shown in **Figure 3-4**. The project area occurs within the wooded riparian corridor along the Turtle River. Tree species in the project area include bur oak, American basswood, box elder (*Acer negundo*), American elm (*Ulmus americana*), cottonwood (*Populus deltoides*), and green ash (*Fraxinus pennsylvanica*). European buckthorn, a highly invasive exotic species, chokecherry (*Prunus virginiana*), and woods’ rose are common woody understory species. Nonwoody understory species include smooth brome grass (*Bromus inermis*), golden rod (*Solidago* spp.), burdock (*Arctium minus*), maximillian sunflower (*Helianthus maximillianii*), jack-in-the-pulpit (*Arisaema triphyllum*), white violet (*Viola canadensis*), wood nettle (*Laportea canadensis*), stinging nettle (*Urtica dioica*), beggars-ticks (*Bidens frondosa*), and waterleaf (*Hydrophyllum virginianum*) (GFAFB 2011). Protected and rare plant communities are discussed under Protected and Sensitive Species.

The riparian forest surrounding and adjacent to the Turtle River is considered to be in a relatively healthy condition with problems that can be addressed through active management. The forest and grassy upland areas have been unmanaged during at least the last 25 years and areas of the riparian forest have notably limited vegetation regeneration. Invasive species, disease, pressure from whitetail deer, and human use are all common problems found within this forested area. Open, grassy upland areas are dominated by aggressive brome grass with patches of invasive species. These areas are stagnant and show little potential for regeneration of trees and shrubs or conversion to native prairie grasslands. In addition, there is a moderate amount of trash and miscellaneous debris that can be found scattered throughout the forest area and along the Turtle River’s banks (GFAFB 2006).

A small stand of scotch pines occurs directly south of the Turtle River project area and north of Runway 35 (see **Figure 2.6**). This 9.95-acre area is mostly composed of scotch pines and brome grass species and is proposed as a source for natural revegetation for riparian restoration under Alternative 2 (see

Section 2.3). North Dakota scotch pines are one of the most common woody plants attacked by borers and are highly susceptible to pine wilt. Common diseases of scotch pines include *Cyclaneusma* needle cast, western gall rust, and *Lophodermium* needle cast. Scotch pines are used extensively for conservation and windbreaks because of the excellent nesting sites and winter cover for wildlife they provide (GFAFB 2011).

Four noxious weeds are known to occur within the project area: absinth wormwood (*Artemisia absinthium*), Canada thistle, musk thistle (*Carduus nutans*), and leafy spurge, (GFAFB 2003a). P.L. 93-629, *Federal Noxious Weed Act*, mandates control of noxious weeds by limiting possible weed seed transport from infested areas to noninfested sites. The spread of noxious weeds is controlled by avoiding activities in or adjacent to heavily infested areas, removing seed sources and propagules from the site prior to conducting activities, or limiting operations to nonseed-producing seasons. Following activities which expose the soil, mitigation can be achieved by covering the area with weed-seed-free mulch or seeding the area with native species. Covering the soil reduces the germination of weed seeds, maintains soil moisture, and minimizes erosion.

Wildlife. The project area provides diversity in habitat to the surrounding homogenous agricultural matrix for a variety of wildlife. Mammals that are known to occur within the project area include white-tailed deer (*Odocoileus virginianus*), red squirrel (*Tamiasciurus hudsonicus*), and beaver (*Castor canadensis*) (HDR 2010b, GFAFB 2011). An active beaver dam was observed along Turtle River during the fall 2009 biological survey (GFAFB 2010c). Other mammals known to occur in the area and that are likely to either inhabit or traverse the project area include red fox (*Vulpes vulpes*), eastern gray squirrel (*Sciurus carolinensis*), badger (*Taxidea taxus*), muskrat (*Ondatra zibethica*), eastern cottontail (*Silvilagus floridanus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*) shrews (*Sorex* spp.), white-footed mouse (*Peromyscus leucopus*), deer mouse (*P. maniculatus*), silver-haired bat (*Lasionycteris noctivagans*), and red bat (*Lasiurs borealis*) (GFAFB 2010b, GFAFB 2010c).

Silver-haired bat and eastern red bats are both tree-roosting bat species. Silver-haired bat maternity roosts occur mostly in tree cavities and solitary bats (males and non-maternity females) roost in cavities or under loose bark of trees (Schmidt 2003). Red bats tend to use mature, hardwood-dominated forests and roost in deciduous trees where they can camouflage with the foliage (Leput 2004). Both species have young during the summer. Eastern red bats and silver-haired bats are migratory species and generally only occur in North Dakota during the summer months (Cryan 2003).

Birds that are known to occur within the project area include woodpecker (*Picoide* sp.), vireo (*Vireo* sp.), northern flicker (*Colaptes auratus*), northern harrier (*Circus cyaneus*), American crow (*Corvus brachyrhynchos*), American robin (*Turdus migratorius*), American Bittern (*Botaurus lentiginosus*), Black tern (*Chlidonias niger*), Black-billed cuckoo (*Coccyzus erythrophthalmus*), Red-headed woodpecker (*Melanerpes erythrocephalus*), Solitary sandpiper (*Tringa solitaria*) and red-tailed hawk (*Buteo jamaicensis*) (HDR 2010a, GFAFB 2011). Other species that have been observed in the project area include brown-headed cowbird (*Molothrus ater*), clay-colored sparrow (*Spizella pallida*), western meadowlark (*Sturnella neglecta*), American goldfinch (*Spinus tristis*), red-winged blackbird (*Agelaius phoeniceus*), mourning dove (*Zenaida macroura*), cliff swallow (*Petrochelidon pyrrhonota*), common grackle (*Quiscalus quiscula*), chestnut-sided warbler (*Dendroica pensylvanica*) white-throated sparrow (*Zonotrichia albicollis*) (USAF 2008b). Both the great horned owl (*Bubo virginianus*) and least flycatcher (*Empidonax minimus*) are known to nest within the project area (USAF 2008b). Although the majority of bird species that occur in the project area are migrants traveling through the area (USAF 2008b), due to the unique habitat type the project area provides when compared to the surrounding agricultural habitat, it is highly likely that other bird species nest in the project area.

Several species of amphibians and reptiles have been observed in the project area. These include the American toad (*Bufo hmiophrys*), northern leopard frog (*Rana pipiens*), wood frog (*Rana sylvatica*), common garter snake (*Thamnophis sirtalis*) and painted turtle (*Chrysemys picta*).

Carp along with several species of minnow are known to occur within the project area (GFAFB 2010b). Game fish species that occur in portions of the Turtle River, which flows through the project area, include northern pike (*Esox lucius*), white sucker (*Catostomus commersonii*), rock bass (*Ambloplites rupestris*), black bullhead (*Ameiurus melas*), and channel catfish (*Ictalurus punctatus*). The State of North Dakota stocks the Turtle River upstream of the project area with brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) each spring near Turtle River State Park (GFAFB 2010c).

Protected and Sensitive Species. No federally listed threatened or endangered species are known to occur in the project area (GFAFB 2010c). There is no critical or significant habitat present within the project area as defined by the USFWS (GFAFB 2010b). Species identified through communication with the USFWS as having the potential to reside in the vicinity include gray wolf (*C. lupus*) and whooping crane (*Grus americana*) (USFWS 2010). Any wolves occurring in the project area would likely be transient since the habitat does not appear to be large enough to support a breeding population (USFWS 2010). The project area does not contain suitable stopover feeding or roosting habitat for the whooping crane (GFAFB 2010b).

Although bald eagles (*Haliaeetus leucocephalus*) were recently delisted from the ESA, they are still protected under the Bald and Golden Eagle Protection Act of 1984. Bald eagles are also listed by the NDNHP as S1 (critically imperiled) and as endangered by the North Dakota Chapter of the Wildlife Society. The bald eagle is also classified as having a moderate level of conservation priority (Level II) by the NDGFD in its 100 species of conservation priority (NDGFD 2004). Bald eagles migrate throughout North Dakota during the spring and fall, but generally follow the major river systems of the state (GFAFB 2011). Bald eagles observed at Grand Forks AFB have been documented harassing waterfowl near the sewage lagoons, occasionally seen feeding on road kill in the area, and observed hunting in the Turtle River riparian area (GFAFB 2011). The bald eagle was most recently documented within the project area during the 2009 winter bird survey (GFAFB 2010c). No eagle nests have been observed on or near the project area (GFAFB 2011, GFAFB 2010c). The closest documented bald eagle nest to the project area is approximately 2 miles east of the installation on the west side of Kellys Slough NWR. Golden eagles (*Aquila chrysaetos*), also protected under the Bald and Golden Eagle Protection Act and listed as a Level II species of conservation priority by NDGFD, were also observed migrating through the area near the lagoons during the spring months of 2009 and 2010 (GFAFB 2011, NDGFD 2004).

The northern leopard frog, a state-ranked S1 (critically imperiled) species, was documented within the project area during the spring 2009 survey (GFAFB 2010c). The western United States population of the northern leopard frog is currently under review by the USFWS for listing as a federally threatened species (USFWS 2009, GFAFB 2010c). Northern leopard frogs use wetlands and shallow ponds as breeding and tadpole habitat (Smith and Keinath 2007). Following reproduction, adult northern leopard frogs move into upland habitats (primarily meadows and grasslands) in which they may feed for the summer (Smith and Keinath 2007). The northern leopard frog is one of the more terrestrial of the frogs in the Ranidae family, using a considerable amount of upland habitat around breeding ponds (Smith and Keinath 2007). In the fall, subadult and adult frogs migrate to overwintering sites. Leopard frogs likely overwinter in the bottoms of flowing streams, such as the Turtle River, and ponds that are large enough that they do not freeze solid in winter (Smith and Keinath 2007). Streams are important migration and dispersal corridors for adult and young frogs (Smith and Keinath 2007). Leopard frogs were observed within the riparian forest of the project area during the October 2010 biological resources reconnaissance survey for this EA (HDR 2010a). These frogs were potentially migrating through the riparian forest to the Turtle River to overwinter.

Three fauna species designated S3 (vulnerable) by the NDNHP have been observed in the project area, including the pileated woodpecker (*Dryocopus pileatus*), chestnut-sided warbler, and white-throated sparrow (GFAFB 2010c, USAF 2008b). Pileated woodpeckers were observed in the project area during the 2009 winter bird survey (GFAFB 2010c). This species is considered uncommon in Grand Forks County but stays in its territory year-round and uses large trees in deciduous or coniferous forests as its main habitat (Cornell University 2011a). Chestnut-sided warblers were documented in the project area during the June 2007 breeding bird survey (USAF 2008b). Chestnut-sided warbler habitat includes fairly dense upland thickets of young or second-growth deciduous forest composed of small trees and tall shrubs (GFAFB 2010c). White-throated sparrows were also documented in the project area during the June 2007 breeding bird survey (USAF 2008b). White-throated sparrow habitat includes coniferous and mixed forests with numerous openings that have low, dense vegetation (GFAFB 2010c).

In addition, the northern harrier, classified as having a moderate level of conservation priority (Level II) by the NDGFD, has been observed in the project area (GFAFB 2011, USAF 2008b). Northern harrier habitat includes open wetlands, meadows, pastures, prairies, grasslands, croplands, and riparian woodlands. Their nests are placed on the ground in open fields or meadows (Cornell University 2011b).

Two state-ranked (as defined by the NDNHP) plant species are known to occur in the project area, including Dutchman's breeches (*Dicentra cucullaria*) and eastern prickly gooseberry (*Ribes cynosbati*) (GFAFB 2011). Dutchman's breeches is ranked as S1 (critically impaired) and the eastern prickly gooseberry is ranked as S3 (vulnerable). Turtle River and the adjacent lowland woodland forest have been identified as high quality natural areas by the NDNHP. This lowland forest and Turtle River provide a unique habitat at Grand Forks AFB for species that rely on moist soils, open forests, or streams for their survival (GFAFB 2010c).

Several species of neotropical migratory birds have been observed in the project area (USAF 2008b). Neotropical migratory birds are those species that spend approximately 8 months of the year wintering in Central and South America and the remaining months on their breeding grounds in North America's temperate latitudes. Migratory birds are protected under the MBTA and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*.

Wetland Habitat. Based on the 2004 Wetland Assessment for Grand Forks AFB, four wetland areas occur within the project area. Wetland boundaries are shown in **Figure 3-2**. Of the four wetlands, two are palustrine forested wetlands (HS-01 and HS-02), one is palustrine scrub/shrub wetland (FLN-06), and one is palustrine emergent wetland (FLN-06). The Turtle River is defined as a riverine streambed and is a known water of the United States (GFAFB 2004). Although the wetland boundaries have not been submitted to the USACE for jurisdictional determination (GFAFB 2007b), the wetlands are geographically located within the landscape where USACE jurisdiction can be assumed (USACE 2007). The palustrine scrub/shrub wetland is located within a drainage ditch that runs across the project area into the Turtle River. The vegetation of the scrub/shrub wetland consists mainly of cattail (*Typha sp.*) and sandbar willow (*Salix exigua*) (GFAFB 2007b). The forested wetlands are found along the banks of the Turtle River. One of the wetlands, located in the northern end of the project area, is a remnant ox-bow of the Turtle River (GFAFB 2007b). The vegetation of the forested wetlands consists mainly of green ash, quaking aspen (*Populus tremuloides*), and box elder (GFAFB 2007b). The palustrine emergent wetland is directly south of the scotch pine area; the vegetation of the emergent wetland consists mainly of cattail (GFAFB 2007b).

3.5.3 Environmental Consequences

3.5.3.1 Evaluation Criteria

Potential impacts were assessed by identifying the nature and potential importance of biological resources in potentially affected areas, and identifying activities that could directly or indirectly affect biological resources. The significance of effects on biological resources is based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to proposed activities, and (4) the duration of ecological effects. A habitat perspective is used to provide a framework for analysis of general classes of effects (e.g., noise, human disturbance).

3.5.3.2 Alternative 1

Vegetation. Alternative 1 would be expected to result in short-term, minor, adverse impacts on vegetation in the project area during construction activities. Alternative 1 would require 2.53 acres of ground disturbance where vegetation would be removed during construction. These areas would be revegetated with native plantings after the completion of construction. Clearing of riparian areas within the project area would be minimized under Alternative 1 by using previously disturbed areas for construction access to the greatest extent possible and limiting use of heavy equipment to designated construction zones.

Several components of Alternative 1 would result in long-term, beneficial impacts on the vegetation community of the project area. The creation of new riparian forest habitat would result in a net gain of 1.28 acres of riparian forest vegetation community in the project area. Created riparian forest areas that would result from Alternative 1 are shown in **Figures 2-1** and **2-2**. Forest management activities within the project area would impact the riparian community by promoting the growth of native vegetation and forest regeneration. These activities include selectively cutting primarily unhealthy, diseased, and hazardous trees; removing selective trees that need to be eliminated for bank stabilization and other natural resources management; piling woody debris on the forest floor to create organic soils over exposed mineral soils where wood debris has been removed; interplanting of native saplings; limiting vehicle access; and removing trash and other debris. All trees harvested during these activities and determined to have a market value would be managed in accordance with Chapter 8, Forest Management of AFI 32-7064, U.S.C. 2665, and all other USAF and DOD policies and regulations. Per AFI 32-7064, Grand Forks AFB may not give away, abandon or destroy forest products with marketable value and must collect payment for all forest products with economic value that are harvested on USAF lands. Forest products may not be traded for goods or services nor used to offset contract costs associated with construction, land clearing, or other contracted activity. These restrictions do not apply to materials determined to have no commercial value, as determined by the HQ AFCEE Forester or local state forestry office.

Along with protecting the area from destructive practices such as off-trail ATV use; paintball; cutting of young, healthy trees; unmanaged grazing and wildfires; monitoring for insects and disease such as Dutch Elm disease, gypsy moths, tent worms, or other pathogens that could damage the forest health. During construction activities, soils would be exposed and vegetation would be sparse in some areas, thus allowing opportunities for noxious weeds to become established in those areas. However, once these activities have ceased, the disturbed areas would be replanted with native vegetation. Therefore, noxious weeds would not be expected to become permanently established in disturbed areas and no adverse impacts from noxious weeds would be expected. The combination of these actions would result in long-term, major, beneficial impacts on the project area.

Wildlife. Alternative 1 would have direct, short-term and intermittent, negligible to minor, adverse impacts on wildlife due to noise disturbances as a result of construction activities and heavy equipment use. Noise-generating construction equipment used under Alternative 1 would likely include chainsaws (72–82 dBA), a backhoe (72–93 dBA), a trackhoe (noise level similar to backhoe), and trucks (83–94 dBA). High noise events could cause wildlife to engage in escape or avoidance behaviors, resulting in short-term, minor, adverse effects. Noise can also distort or mask bird’s communication signals (e.g., songs, warning calls, fledgling begging calls) and ability to find prey or detect predators. Increases in ambient noise can reduce communication, inhibit predator detection, and increase energy expenditures (USEPA 1980). If noise persists in a particular area, animals could leave their habitat and avoid it permanently. The physiological and ecological consequences could be serious to species survival if the new habitat has inferior conditions. Avoidance behavior by animals requires the expenditures of excess energy that is needed for survival (e.g., finding new food sources, water sources, and breeding and nesting habitats), all essential activities for survival requiring energy expenditure (USEPA 1980).

Since Alternative 1 would only cause temporary increases in noise and would not permanently increase the ambient noise level in the project area, most wildlife species in the project area would be expected to quickly recover once the construction activities have ceased for the day and after the construction period is complete. Construction noises would only be expected to affect individual animals within close proximity to the noise sources. Population-level impacts would not occur. Furthermore, because the project area is in relatively close proximity to the north end of the runway, it is assumed that wildlife species within the project area and vicinity are accustomed to frequent noise disturbances. Long-term, minor, beneficial effects on wildlife in the project area would be expected from protecting the Turtle River riparian area from off-trail ATV and paintball use. Long-term noise levels and disturbances within the project area would be expected to decrease from these protections.

Removal of trees within the riparian forest could adversely impact silver-haired bats and eastern red bats if conducted within the summer months. Both species could use trees or snags within the project area as maternity and solitary roosts. Removal of trees during the summer months could remove roosting habitat, adversely impact roosting behavior, or result in mortality of young. It is recommended that all trees to be removed in the project area be felled outside of the maternity season when the occurrence of these species is not expected.

Clearing and construction activities associated with bank stabilization along the Turtle River under Alternative 1 could cause increased turbidity levels within the Turtle River due to runoff from cleared areas during construction, which might result in short-term, negligible to minor, adverse impacts on aquatic species. Long-term, indirect, moderate to major, beneficial impacts on aquatic species within the Turtle River would be expected from bank stabilization preventing further erosion of the river bank and subsequent degradations in water quality.

The provisions included under Alternative 1 that would allow for the removal of select accumulations of large woody debris from within the channel of the Turtle River would result in direct, negligible, adverse impacts on aquatic species in the Turtle River. Accumulations of woody debris provide food and cover for several aquatic species known to occur within the Turtle River (GFAFB 2006). However, the removal of large woody debris from the channel within the project area would promote fish passage throughout the channel, along with helping improve water quality by preventing further bank and bed degradation. In addition, the woody debris areas represent a small area of habitat within the Turtle River (GFAFB 2006). Therefore, impacts on aquatic species are expected to be negligible.

Monitoring activities proposed as part of active management of the project area under Alternative 1 could determine that either deer or beaver, or a combination of both species, is having a significant detrimental effect on the project area. If this occurs, increased efforts to discourage these species from the project

area could be required. These activities would not be considered a significant impact, as they would result in minor, beneficial impacts on vegetation in the project area and subsequent beneficial impacts on other fauna species occurring in the project area. Any actions performed to discourage deer and beaver from damaging the project area would comply with protocols for deer and beaver management contained within the Grand Forks AFB INRMP (GFAFB 2011). Overall, long-term, major, beneficial impacts on wildlife would result from the active management activities included under Alternative 1.

Protected and Sensitive Species. No federally listed threatened or endangered species are known to occur in the project area. Therefore, no impacts on federally listed threatened or endangered species would be expected from Alternative 1.

The USFWS has identified the gray wolf and the whooping crane as having the potential of occurring within the project area (GFAFB 2010b). Any wolves that occur in the project area would be transient and Alternative 1 would not remove any potential wolf habitat and would only cause temporary noise disturbance. There is no suitable stopover feeding or roosting habitat for the whooping crane located within the project area. Therefore, no impacts on gray wolves or whooping cranes are anticipated from Alternative 1. In a letter dated May 3, 2011, the USFWS stated that it is unlikely that whooping cranes or gray wolves would be affected by the Proposed Action.

Northern leopard frogs have been observed in the spring and fall months within the project area, likely migrating between spring breeding, summer upland feeding, and overwintering habitats. Under Alternative 1, vegetation would need to be cleared for temporary construction access roads through the riparian forest in the project area. The operation of heavy equipment and tree-felling activities within the riparian forest have potential to disturb the forest floor and result in inadvertent mortality due to trampling of northern leopard frogs potentially occurring within the project area. These impacts could be avoided if Alternative 1 is implemented in the late summer or early fall, when frogs are anticipated to be further upland in meadow/grassland habitats.

Short-term and intermittent, negligible to minor, adverse impacts on the pileated woodpecker, chestnut-sided warbler, white-throated sparrow, and northern harrier would be expected from temporary noise disturbances during construction. These impacts would be similar to those described for wildlife. Long-term, minor, beneficial impacts on these state-ranked S3 species would be expected from riparian habitat restoration efforts. Interplanting of native tree saplings would be particularly beneficial for the chestnut-sided warbler, because it would enhance its preferred habitat (i.e., fairly dense thickets of young or second-growth deciduous forest composed of small trees and tall shrubs) (GFAFB 2010c). Other than short-term, adverse impacts from construction noise, no other impacts on northern harriers would be expected from Alternative 1. Northern harrier hunting and nesting habitat occurs within open fields, which would not be disturbed by the implementation of Alternative 1.

Prior to any tree removal activities within the project area's riparian forest, site-specific surveys for the two state-ranked plant species, Dutchman's breeches and eastern prickly gooseberry, would be conducted. Any discovered state-ranked plant should be clearly flagged and avoided during tree removal and revetment construction activities. Clearing area boundaries should be adjusted and buffer areas should be established around the critical areas to avoid impacts on the individual plants. No impacts on these species would be expected provided these BMPs are implemented.

The MBTA and EO 13186 require Federal agencies to minimize or avoid impacts on migratory birds. BMPs, which are discussed as follows for migratory birds, are recommended for reduction or avoidance of impacts on migratory bird species, including state-listed species (GFAFB 2011), within the project area if trees are to be removed under Alternative 1.

- Any construction or clearing activities requiring tree removal should be performed before migratory birds return to the project area or after all young have fledged to avoid incidental take (i.e., before 1 February or after 15 July).
- If construction or clearing activities are scheduled to start during the period when migratory birds are present, a site-specific survey for nesting migratory birds should be performed immediately prior to the activities.
- If nesting birds are found during the survey, buffer areas should be established around nests. Activities should be deferred in buffer areas until birds have left the nest. Confirmation that all young have fledged should be made by a qualified biologist.

If Alternative 1 were to result in adverse impacts on migratory birds, the impacts would be considered negligible. The implementation of these BMPs would minimize any direct adverse impacts on migratory birds, including state-listed species that occur in the project area.

Habitat restoration and management activities described in Alternative 1 would be expected to result in long-term, moderate to major, beneficial impacts on migratory birds, including state-listed species.

The Bald and Golden Eagle Protection Act could apply to the implementation of Alternative 1 if it is determined that a bald eagle nest could be affected. Bald eagles have been witnessed in the project area (GFAFB 2011); however, no eagle nests have been observed on or near the project area and no critical habitat for this species has been designated in Grand Forks County (GFAFB 2011). In a letter dated May 3, 2011, the USFWS recommended that prior to the initiation of any tree-removal activities or new activities that could disturb nesting eagles, Grand Forks AFB should perform a survey for any bald or golden eagle nests within 0.5 miles of the project area. Nest surveys should be conducted between March 1 and May 15, before leaf-out so that nests are visible. If a bald eagle nest is discovered near the project area, the USFWS and NDGFD would be consulted to ensure compliance with the Bald and Golden Eagle Protection Act and state regulations; therefore, the implementation of Alternative 1 is not expected to have adverse effects on bald eagles.

Wetland Habitat. No construction activities would take place within wetland habitat. Therefore, Alternative 1 would not result in any direct impacts on wetland habitat.

Bank-stabilization activities would occur adjacent to the palustrine scrub/shrub wetland within the project area. Indirect impacts on adjacent wetlands would be avoided through proper design and implementation of appropriate environmental protection measures and BMPs as presented in **Appendix D**.

Conclusion. No significant impacts on biological resources would be expected from the implementation of Alternative 1.

3.5.3.3 Alternative 2

Impacts on biological resources under Alternative 2 would be similar to the impacts discussed in **Section 3.5.3.1** for Alternative 1, with the following exceptions.

The exclusion of the removal of unhealthy, diseased, and dead trees from the project area under Alternative 2 would result in direct, negligible, beneficial impacts on vegetation, wildlife, and protected and sensitive species due to a reduced amount of clearing activities that would take place within the project area. This would also result in long-term, negligible to minor, adverse impacts on vegetation, wildlife, and protected and sensitive species in the project area by not fully implementing management activities to promote forest health and regeneration to its fullest extent.

Conclusion. No significant impacts on biological resources would be expected from the implementation of Alternative 2.

3.5.3.4 Alternative 3

Impacts on biological resources under Alternative 3 would be similar to the impacts discussed in **Section 3.5.3.1** for Alternative 1, with the following exceptions.

Additional short-term, minor, adverse impacts on vegetation and wildlife would result from the clearing of the scotch pine area directly south of the project area (see **Figure 2-3**). The removal of these trees for use as construction materials in natural revetments would result in an additional 9.95 acres of clearing near the project area. Impacts on non-targeted vegetation would be minimized by using previously disturbed areas for construction access to the greatest extent possible and limiting use of heavy equipment to designated construction zones. The short-term, minor, adverse impacts that would result from the clearing of the scotch pine area would not affect the long-term, major, beneficial impacts on biological resources caused by actions associated with Alternative 3.

Removal of the scotch pine stand could adversely impact the tree-roosting bat species, particularly silver-haired bats, on Grand Forks AFB if conducted within the summer months. Silver-haired bats could use any snags or trees with cavities as roosting habitat. Eastern red bats prefer deciduous trees for nesting and would not be expected to occur within the scotch pine stand. Removal of trees with cavities during the summer months could remove roosting habitat, adversely impact roosting behavior, or result in mortality of young. It is recommended that all trees to be removed in the project area be felled outside of the maternity season when the occurrence of silver-haired bats is not expected.

Long-term, minor, adverse impacts on pileated woodpeckers and white-throated sparrows would be expected from the permanent removal of the 9.95-acre scotch pine stand under Alternative 3. Both of these species use coniferous forests as habitat and could be expected to use this scotch pine stand. These species would be required to find other territories in the vicinity. Harvesting these trees outside of the breeding and nesting seasons (1 February through 15 July), would minimize impacts on these species because active nests would not be disturbed and birds would likely relocate more easily since other birds would not be expected to be defending territories as aggressively. Leaving snags (dead standing trees) in place in the Turtle River riparian forest would minimize impacts on pileated woodpeckers by leaving trees that provide nesting and feeding habitat in the project area.

All Scotch Pine trees not being used to construct revetments in support of the Proposed Action and determined to have a market value would be managed in accordance with Chapter 8, Forest Management of AFI 32-7064, U.S.C. 2665, and all other USAF and DOD policies and regulations.

Clearing of the scotch pine area should be performed prior to migratory birds arriving to the project area or after all young have fledged in order to avoid adverse impacts on migratory birds and for compliance with the MBTA. If clearing activities cannot occur outside of nesting season, BMPs discussed in the protected and sensitive species discussions in **Section 3.5.3.2** would need to be implemented to avoid or minimize impacts on migratory birds.

Conclusion. No significant impacts on biological resources would be expected from the implementation of Alternative 3.

3.5.3.5 Alternative 4 - No Action Alternative

No impacts from construction and clearing activities would take place under the No Action Alternative. As discussed in **Section 1.2**, the Turtle River corridor has been identified in the Grand Forks AFB INRMP for protection and enhancement (GFAFB 2011). Under the No Action Alternative the project area would continue to degrade because of destructive practices occurring in the Project Area and the uncontrolled spread of noxious weeds and invasive species. This degradation would result in long-term, minor, adverse impacts on all of the biological resources of the project area. In addition, the No Action Alternative would not comply with EO 13112 or conditions identified within the Grand Forks AFB INRMP.

Under the No Action Alternative, conditions described in **Section 3.4.3.5**, including increased turbidity and degradations of water quality, would result in indirect, minor, adverse impacts on aquatic species within the Turtle River.

3.6 Cultural Resources

3.6.1 Definition of the Resource

Cultural resources are located on Grand Forks AFB and have been recorded as the result of projects in compliance with Section 106 and 110 of the National Historic Preservation Act (NHPA) of 1966 as amended. Cultural resources on Grand Forks AFB consist of archaeological resources, architectural resources, and isolated finds of prehistoric or historic artifacts (GFAFB 1996).

Cultural resources is an umbrella term for many heritage-related resources, including prehistoric and historic sites, buildings, structures, districts, or any other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Depending on the condition and historic use, such resources might provide insight into the cultural practices of previous civilizations or they might retain cultural and religious significance to modern groups.

Several Federal laws and regulations govern protection of cultural resources, including the NHPA of 1966, the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (ARPA) (1979), and the Native American Graves Protection and Repatriation Act (NAGPRA) (1990).

Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites, where human activity has left physical evidence of that activity but no structures remain standing); architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance); or resources of traditional, religious, or cultural significance to Native American tribes.

Archaeological resources comprise areas where human activity has measurably altered the earth, or deposits of physical remains are found (e.g., projectile points and bottles). Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to be considered eligible for the National Register of Historic Places (NRHP). More recent structures, such as Cold War-era resources, might warrant protection if they are of exceptional importance or if they have the potential to gain significance in the future.

Resources of traditional, religious, or cultural significance to Native American tribes can include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

The EA process and the consultation process prescribed in Section 106 of the NHPA require an assessment of the potential impact of an undertaking on historic properties that are within the proposed project's area of potential effect (APE), which is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." Under Section 110 of the NHPA, Federal agencies are required to inventory resources under their purview and nominate those eligible to the NRHP. In accordance with the NHPA, consultation with the SHPO is required regarding determination of potential effects of an undertaking on historic properties. Project-specific consultation with federally-recognized Indian tribes would occur under NEPA and Section 106 of the NHPA. A federally recognized Native American tribe would be a consultative party under the NHPA, if the APE contains any historic properties of significance. While none are known to exist for this project, consultation is on-going in furtherance of establishing government-to-government relationships in accordance with EO 13175.

3.6.2 Description of Affected Environment

Although Grand Forks AFB began in 1954 with the escalation of the Cold War between the United States and the Soviet Union, it is an installation rich in history. Several archaeological investigations have been conducted at Grand Forks AFB. Surveyed areas generally include the area around the north end of the runway to the installation boundaries, the area between the west boundary and the runway, the area from the southwest corner of the runway to the west and south installation boundaries, and the area along the south boundary and southeast corner up to developed acreage at the south edge of the installation. The remainder of acreage at the installation is previously disturbed due to construction grading for the Air Force facilities. An archaeological survey was conducted in 1989 on the western side of the installation for Section 106 compliance for the proposed Peacekeeper Rail Garrison program (USAF 2008c). The 1989 survey encompassed 364 acres total, 235 acres within the installation boundaries at the southwestern corner of the runway. The 1989 survey identified two archaeological sites, a low-density prehistoric lithic scatter (32GF124), the remains of the 19th-century Mulligan farmstead (32GF125), two isolated prehistoric finds (32GFX304 and 32GFX305), and one historic find (32GFX329). All were evaluated as not eligible for the NRHP and the North Dakota SHPO concurred with these findings.

An installationwide survey was conducted in 1996 to locate and inventory cultural resources (USAF 2008c). The 1996 survey identified four farmstead sites (one with an isolated prehistoric flake), one isolated prehistoric find, and two isolated historic finds. All were evaluated as not eligible for the NRHP. The research design for the 1996 survey divided the installation into areas of high, medium, and low probability for archaeological resources. Areas of high probability are located in the northwestern corner of the installation boundary on the Turtle River terrace (approximately 100 acres) and at three historic sites west of the runway. An area of medium probability was identified along the Emerado Beach ridge (1,400 acres) along the northern end of the runway. Low-probability areas include 1,400 acres at the northeastern corner of the runway, east and west sides of the runway, and along the southern installation boundary; and 3,479 acres of previously disturbed land composing the remaining acreage on the installation. In total, approximately 975 of the acres thought to be of high or low probability for archaeological sites have been surveyed to date.

The project area is within the area determined as high probability for archaeological resources. High-probability areas include 100 acres along the terraces of Turtle River. This area was investigated for archaeological resources by a pedestrian survey for buried cultural remains (GFAFB 1996).

According to the Grand Forks AFB Integrated Cultural Resources Management Plan (ICRMP), the terraces along Turtle River are archaeologically sensitive due to buried paleosols, which are recognized as old buried soil and landscapes (GFAFB 2008c). Three distinct areas have been designated as areas of concern and potential projects or activities that might involve ground disturbance of more than 60 centimeters below the surface. Monitoring and survey during ground-disturbing activities in and adjacent to proposed projects within these sensitive areas were recommended by the State Historical Society of North Dakota (SHSND) in 2004 in reference to a proposed project. The project was not implemented (GFAFB 2008c); therefore, the monitoring and surveys were not completed.

The 1996 archaeological survey recorded four of the six known cultural resources within the project area. The four cultural resources include two historic archaeological sites (32GF3072 and 32GF3073), one Isolated Occurrence (IO) (32GFX184), and one bridge indicated as an architectural resource (32GF3223) (GFAFB 1996).

Both archaeological sites (32GF3072 and 32GF3073) are on the east side of Turtle River and recorded as farmsteads that date circa 1890 to 1955. Very little cultural material was observed and the house foundations are extant. Both sites have been recommended as not eligible for listing on the NRHP (GFAFB 1996).

The single IO is a suspected iron latch and a wire fragment. It is on the west side of Turtle River and within an area that might have been plowed in the past and exposed to erosion and possible flooding. The artifacts are not associated with an event and are not significant; therefore, the site has been recommended as not eligible for listing on the NRHP. A 1996 survey recommended no further work for 32GFX184 (GFAFB 1996).

In addition to the cultural resources identified within the project area, two paleosols were identified in the cutbank of Turtle River during the shovel testing on the Turtle River terraces. The paleosol was suspected to be Holocene in age and more than 100 years old, might contain cultural material, and is considered archaeologically sensitive. No cultural resources were observed in the buried paleosols during the 1996 archaeological investigation along Turtle River (GFAFB 1996).

The architectural resource (32GF3223) is a bridge on the southern end of the APE and spans Turtle River. It was built in 1949 and was included in a North Dakota bridge survey by Hufstetler & McCormick in 2000. The bridge was evaluated as not eligible for listing on the NRHP due to lack of integrity (GFAFB 2008c).

According to the ICRMP, resources significant to Native American tribes have not been identified; therefore, no known traditional, sacred, or culturally significant sites or areas have been identified on Grand Forks AFB.

3.6.3 Environmental Consequences

3.6.3.1 Evaluation Criteria

Under Section 106 of the NHPA, adverse effects on historic properties can include any of the following:

- Physically altering, damaging, or destroying all or part of a resource
- Altering characteristics of the surrounding environment that contribute to the resource's significance

- Introducing visual or audible elements that are out of character with the property or that alter its setting
- Neglecting the resource to the extent that it deteriorates or is destroyed
- The sale, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

For the analysis of effects of the Proposed Action on archaeological resources, the APE includes both direct impacts from ground-disturbing activity, and indirect impacts resulting from undertakings outside of site locations. Impacts on cultural resources includes potential effects on buildings, sites, structures, districts, and objects eligible for or included in the NRHP; cultural items as defined in the NAGPRA; archaeological resources as defined by the ARPA; and archaeological artifact collections and associated records as defined by 36 CFR part 79.

Under NEPA, impacts on cultural resources are assessed as short-term or long-term; direct or indirect; and minor, moderate, or significant. Under Section 106 of the NHPA, the Proposed Action might have no effect, no adverse effect, or an adverse effect on historic properties.

3.6.3.2 Alternative 1

There would be no significant impacts on cultural resources expected from implementation of Alternative 1. By letter dated 14 April 2011, the North Dakota SHPO has concurred with a finding of "No Historic Properties Affected" for Alternative 1 under Section 106 of the NHPA (Paaverud 2011). There are no known cultural resources that would be affected by Alternative 1, although the alternative is proposed in an area with paleosols that may indicate buried archaeological site(s) may exist. Since this is an area where survey would be impractical since any sites would be buried, Grand Forks AFB will follow Sections 4.2.1.2 and 4.2.1.3 of the ICRMP and will conduct cultural resource monitoring by a qualified archaeologist and do so in a manner approved by the SHSND during clearing and earth-disturbing activities. If any cultural materials are found, the work supervisor is to immediately contact the Grand Forks AFB Cultural Resources Manager. Given that the sensitive area is a buried soil, it is possible that cultural resources may be found.

During early consultation efforts, the installation received comments from Native American tribes regarding the proposed project. One Native American tribe was concerned if the area had been surveyed for cultural resources or sites. If it had not been surveyed, the tribe desired monitoring actions during earth moving work. In accordance with the ICRMP, the installation will conduct cultural resources monitoring by a qualified archaeologist and do so in a manner approved by the SHSND during clearing and earth-disturbing activities. No other tribe provided comments on this action.

The ICRMP recommends vegetative cover as a strategy to prevent loss or damage to the archaeologically sensitive area of Turtle River. The riparian restoration and stabilization project could result in a decrease in erosion, and activities such as off-trail vehicle use and unmanaged grazing would be deterred. Deeply buried cultural materials, if they exist, may be protected by the riparian forest restoration effort.

Conclusion. No significant impacts on cultural resources would be expected from the implementation of Alternative 1.

3.6.3.3 Alternative 2

There would be no significant impacts on cultural resources expected from implementation of Alternative 2. By letter dated 14 April 2011, the North Dakota SHPO has concurred with a finding of “No Historic Properties Affected” under Section 106 of the NHPA (Paaverud 2011). Like Alternative 1, there are no known cultural resources that would be affected by Alternative 2, although the alternative is proposed in an area with paleosols that may indicate buried archaeological site may exist. For Alternative 2, Grand Forks AFB will follow Sections 4.2.1.2 and 4.2.1.3 of the ICRMP and will conduct cultural resource monitoring by a qualified archaeologist and do so in a manner approved by the SHSND during clearing and earth-disturbing activities. If any cultural materials are found, the work supervisor is to immediately contact the Grand Forks AFB Cultural Resources Manager. Given that the sensitive area is a buried soil, it is possible that cultural resources may be found. The ICRMP recommends vegetative cover as a strategy to prevent loss or damage to the archaeologically sensitive area of Turtle River. The riparian restoration and stabilization project could result in a decrease in erosion, and activities such as off-trail vehicle use and unmanaged grazing would be deterred. Deeply buried cultural materials, if they exist, may be protected by the riparian forest restoration effort.

Conclusion. No significant impacts on cultural resources would be expected from the implementation of Alternative 2.

3.6.3.4 Alternative 3

There are no significant impacts on cultural resources expected from the implementation of Alternative 3. The North Dakota SHPO has concurred with a finding of “No Historic Properties Affected” under Section 106 of the NHPA (Paaverud 2011). There are no known cultural resources that would be affected by Alternative 3, although the alternative is proposed in an area with paleosols that may indicate buried archaeological site may exist. For Alternative 3, Grand Forks AFB will follow Sections 4.2.1.2 and 4.2.1.3 of the ICRMP and will conduct cultural resource monitoring by a qualified archaeologist and do so in a manner approved by the SHSND during clearing and earth-disturbing activities. If any cultural materials are found, the work supervisor is to immediately contact the Grand Forks AFB Cultural Resources Manager. Given that the sensitive area is a buried soil, it is possible that cultural resources may be found. The ICRMP recommends vegetative cover as a strategy to prevent loss or damage to the archaeologically sensitive area of Turtle River. The riparian restoration and stabilization project could result in a decrease in erosion, and activities such as off-trail vehicle use and unmanaged grazing would be deterred. Deeply buried cultural materials, if they exist, may be protected by the riparian forest restoration effort.

Conclusion. No significant impacts on cultural resources would be expected from the implementation of Alternative 3.

3.6.3.5 Alternative 4 - No Action Alternative

Under the No Action Alternative, continued erosion of Turtle River’s channel and banks could lead to a potential loss of archaeological resources and information potential. This alternative would have a long-term, indirect, minor, adverse impact on cultural resources and paleosols located on the terrace east of Turtle River. Cultural resources are nonrenewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered.

3.7 Transportation

3.7.1 Definition of the Resource

The transportation resource is defined as the system of roadways and highways that are in the vicinity of the proposed project area and could reasonably be expected to be impacted by the Proposed Action.

3.7.2 Description of Affected Environment

U.S. Highway 2 serves as the primary access to the installation from Interstate (I)-29. County Road 3 and Eielson Street provide access to the installation from U.S. Highway 2. I-29 is less than 10 miles east of the installation and the major north/south highway corridor along the North Dakota-Minnesota border.

There are two entrances to Grand Forks AFB. The primary entrance is the main gate, which is open 24 hours per day and provides access to Steen Boulevard. The south gate, a secondary entrance that is open on a limited basis, connects U.S. Highway 2 to Eielson Street (USAF 2006).

The primary vehicular routes on the installation include Steen Boulevard, J Street, and Eielson Street. Steen Boulevard serves as the center of the installation's roadway system. It begins at the main installation entrance on County Road 3 and ends at the flightline to the west. Four primary intersections along Steen Boulevard access two family housing entrances, commercial area access, and flightline operations access. Eielson Street provides north-south access to the installation. J Street runs parallel and west of County Road 3 and provides a corridor for the east side of the installation.

Access to the project area would be from U.S. Highway 2 to County Road 3 to 21st Avenue NE to 26th Street to 22nd Avenue NE. 27th Street SNE would also be used to access the western portions of the project area.

Recent traffic engineering studies have evaluated the patterns along this corridor and aim to improve traffic flow through upgrades. The average volume during peak traffic hours at the J Street-Steen Boulevard intersection are as follows: 802 vehicles (7:00 a.m. to 8:00 a.m.), 482 vehicles (12:00 p.m. to 1:00 p.m.), and 993 vehicles (4:00 p.m. to 5:00 p.m.). Given that the average capacity for urban arterial roads is 1,500 vehicles per hour per lane, Grand Forks AFB has good traffic flow even during peak traffic periods, and the roadways adjacent to the installation are capable of accommodating peak traffic flow (USAF 2006, USAF and Gannett Fleming 2004). The traffic engineering studies have not been conducted on the roadways adjacent to the project area.

Grand Forks AFB has a 6-mile, multi-use trail system on the installation that connects housing areas to the rest of the installation. The trail facilitates the separation of pedestrians and vehicular traffic (USAF 2006). There are no official trails in the project area; however, unofficial trails have been created in the riparian forest area.

3.7.3 Environmental Consequences

3.7.3.1 Evaluation Criteria

Impacts on transportation are considered to be adverse if the Proposed Action would result in a substantial increase in traffic, which is defined as more than 50 trips per hour, on local roadways. Project trip generation is based on an estimate of the number of equipment and crew members that would be present during construction activities.

3.7.3.2 Alternative 1

Under Alternative 1, the 319th CES/CEA proposes to restore and stabilize the portion of the Turtle River that flows through the northwestern portion of Grand Forks AFB and manage and restore the adjacent riparian forest. Access to the project area would be from U.S. Highway 2 to County Road 3 to 21st Avenue NE to 26th Street to 22nd Avenue NE. 27th Street SNE would also be used to access the western portions of the project area. The access roads are well-maintained with the County Road 3 paved and the other roads unpaved. There would also be approximately three temporary construction access roads within the project area boundaries. These temporary construction access roads would be established in already disturbed corridors. Some vegetation removal would be necessary to establish these temporary construction access roads. Further discussion of impacts and associated BMPs with establishment of these temporary construction access roads is provided in **Section 3.4, Water Resources**.

Short-term, minor impacts on traffic circulation due to the presence of construction trucks and traffic would be anticipated. The construction period of Alternative 1 would be approximately 6 months or 120 working days. Alternative 1 would require delivery of materials to the construction site and removal of debris from the erosion sites and the riparian forest. Construction traffic would comprise a small percentage of the total existing traffic and many of the vehicles would be driven to and kept on site or within the staging areas for the duration of construction activities, resulting in relatively few additional trips. Approximately four haul trucks for material transport including water would be required for Alternative 1. Two haul trucks would bring saplings, aggregate, and additional materials for construction activities under Alternative 1 to the project area. These two haul trucks would travel 20 miles roundtrip. It is estimated that approximately 82 total round-trips for hauling materials would be conducted during the construction period. Two water trucks would bring water to the project area from the golf course at Grand Forks AFB. Additional water connections are available at Grand Forks AFB within a mile of the project area. It is estimated that approximately 258 total round-trips for water delivery would be conducted during the construction period. The construction labor force is estimated to average 12 persons over the construction period.

Therefore, potential increases in traffic volumes associated with construction under Alternative 1 would be temporary. Heavy vehicles are frequently on Grand Forks AFB roadways; therefore, the vehicles necessary for construction would be expected to have a minor, adverse impact on Grand Forks AFB and surrounding roads. In addition, any surface damage to Grand Forks AFB or local roads used for construction haul routes would be repaired to pre-construction conditions. The determination of pre-construction conditions would be at the discretion of Grand Forks AFB in consultation with regional and local transit authorities. No road or lane closures would be required for construction under Alternative 1. In addition, upon completion of construction activities, there would be no long-term increases in traffic volumes since maintenance of the erosion sites and riparian forest would be minimal. Therefore, no long-term, adverse, direct or indirect impacts on transportation systems are anticipated.

Conclusion. No significant impacts on the transportation system at Grand Forks AFB or in the regional area would be expected from the implementation of Alternative 1.

3.7.3.3 Alternative 2

Impacts on traffic circulation from implementing Alternative 2 would be similar to those described in **Section 3.7.3.2** for Alternative 1. Therefore, the construction activities associated with Alternative 2 would not have significant effects on the transportation system at Grand Forks AFB or in the regional area. In addition, there would be no long-term, adverse, direct or indirect impacts on the transportation system as a result of implementing Alternative 2.

Conclusion. No significant impacts on the transportation system at Grand Forks AFB or in the regional area would be expected from the implementation of Alternative 2.

3.7.3.4 Alternative 3

Alternative 3 would follow the same riparian restoration and stabilization procedures and construction methods as Alternative 1. However, Alternative 3 would include natural revetment sources located on Grand Forks AFB and off the installation, if needed. The proposed source of natural revetment for the project occurring on Grand Forks AFB is directly south of the Turtle River project area and north of Runway 35. Therefore, haul trucks bringing natural revetments to the project area for construction would only travel 1 mile roundtrip rather than 20 miles roundtrip as proposed under Alternatives 1 and 2. However, haul trucks bringing saplings, aggregate, and additional materials for construction activities under Alternative 3 would still need to travel approximately 20 miles roundtrip to the project area.

As a result, impacts on traffic circulation from implementing Alternative 3 would be similar to those described in **Section 3.7.3.2** for Alternative 1. Therefore, the construction activities associated with Alternative 3 would not have significant effects on the transportation system at Grand Forks AFB or in the regional area. In addition, there would be no long-term, adverse, direct or indirect impacts on the transportation system as a result of implementing Alternative 3.

Conclusion. No significant impacts on the transportation system at Grand Forks AFB or in the regional area would be expected from the implementation of Alternative 3.

3.7.3.5 Alternative 4 - No Action Alternative

Under the No Action Alternative, the continued stream bank erosion and sedimentation, the continuation of water quality degradation, and the continued existence of noxious weeds and invasive species in the riparian forest would have no impact at all traffic and transportation. As a result, there would be no change or impacts on the transportation system at Grand Forks AFB or in the regional area.

3.8 Safety and Occupational Health

3.8.1 Definition of the Resource

A safe environment is one in which the potential for death, serious bodily injury or illness, or property damage is eliminated or reduced as much as possible. Human health and safety addresses workers' health and safety during burning, demolition, and construction activities, and public safety during burning, demolition, and construction activities and subsequent operations of those facilities.

Construction site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DOD and USAF regulations designed to comply with standards issued by OSHA and USEPA. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation,

maintenance and repair activities, and the creation of extremely noisy environments. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

AFI 91-202, *USAF Mishap Prevention Program*, implements AFD 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the BASH Program), assigns responsibilities for program elements, and contains program management information. This instruction applies to all USAF personnel. AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*, implements AFD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, these standards ensure all USAF workplaces meet Federal safety and health requirements. This instruction applies to all USAF activities.

3.8.2 Description of Affected Environment

Construction Safety. All contractors performing construction activities are responsible for following ground safety regulations and workers compensation programs and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and availability of Material Safety Data Sheets (MSDS). Industrial hygiene is the responsibility of contractors, as applicable. Contractor responsibilities are to review potentially hazardous workplace operation; to monitor exposure to workplace chemicals (e.g., asbestos, lead, hazardous material), physical hazards (e.g., noise propagation), and biological agents (e.g., infectious waste); to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures.

Explosives and Munitions Safety. Explosive safety clearance zones at Grand Forks AFB are established around facilities used for the storage, handling, or maintenance of munitions. Explosive Safety Quantity Distance arcs on Grand Forks AFB are mostly located in the southeastern portion of the installation and the northeastern side of the airfield. There are also Explosive Safety Quantity Distance arcs associated with the munitions storage area and the hazardous cargo parking pad (GFAFB 2010b). There are no Explosive Safety Quantity Distance Zones in the project area.

3.8.3 Environmental Consequences

3.8.3.1 Evaluation Criteria

Any increase in safety risks would be considered an adverse effect on safety. The Proposed Action would have a significant effect with respect to health and safety if the following were to occur:

- Substantially increase risks associated with the safety of construction personnel, contractors, or the local community
- Substantially hinder the ability to respond to an emergency
- Introduce a new health or safety risk for which Grand Forks AFB is not prepared or does not have adequate management and response plans in place.

3.8.3.2 Alternative 1

Short-term, minor, adverse impacts on safety would be anticipated due to the potential slight increase in the short-term risks associated with construction activities that would occur during the normal workday. During all phases of Alternative 1, safety standards required by the OSHA and National Institute for Occupational Safety and Health (NIOSH) would be followed. Workers would be required to wear protective gear such as ear protection, steel-toed boots, hard hat, gloves, and other appropriate safety gear. Construction areas would be fenced and appropriately marked with signs and placards. Construction equipment and associated trucks transporting material to and from the construction sites would be directed to roads and streets that carry minimum vehicles as described in **Section 3.7.3.2**.

Although no Explosive Safety Quantity Distance Zones, UXOs, or MMRP sites are in the proposed project area, there is still the possibility of encountering munitions, UXO, and Chemical Agent Identification Sets (CAIS) below the ground surface during construction activities. If inadvertent discovery of munitions, UXO, or CAIS occurs during construction activities, activities would be stopped and the environmental protection measures described in **Section 3.8.4** would be followed.

The following environmental protection measures would be conducted during construction to further reduce potential impacts on construction workers and others accessing the construction site.

Measure 1: Ground Safety Requirements and Coordination. All contractors performing construction activities at Grand Forks AFB are responsible for following ground safety regulations and worker compensation programs. In addition, all contractors are required to conduct construction activities in a manner that does not pose any risk to its workers or installation personnel. An industrial hygiene program addresses exposure to hazardous materials, use of personal protective equipment, and the availability of MSDS. Industrial hygiene is the responsibility of contractors, as applicable.

Measure 2: Munitions, UXO, and CAIS Advisory. If any suspected military munitions, UXO, or CAIS is found during construction activities, work would stop in the area, personnel would move away from the site, and Grand Forks Explosive Ordnance Disposal Flight would be contacted.

Conclusion. No significant impacts on safety or occupational health would be expected from the implementation of Alternative 1.

3.8.3.3 Alternative 2

Impacts on safety from implementing Alternative 2 would be similar to those described in **Section 3.8.3.2** for Alternative 1. Therefore, the construction activities associated with Alternative 2 would not have significant effects on safety at Grand Forks AFB or in the regional area. In addition, there would be no long-term, adverse, direct or indirect impacts on safety as a result of implementing Alternative 2.

Conclusion. No significant impacts on safety or occupational health would be expected from the implementation of Alternative 2.

3.8.3.4 Alternative 3

Alternative 3 would follow the same riparian restoration and stabilization procedures and construction methods as Alternative 1. However, Alternative 3 would include natural revetment sources located on Grand Forks AFB and off the installation.

As a result, impacts on safety from implementing Alternative 3 would be similar to those described in **Section 3.8.3.2** for Alternative 1. Therefore, the construction activities associated with Alternative 3 would not have significant effects on safety at Grand Forks AFB or in the regional area. In addition, there would be no long-term, adverse, direct or indirect impacts on safety as a result of implementing Alternative 3.

Conclusion. No significant impacts on safety or occupational health would be expected from the implementation of Alternative 3.

3.8.3.5 Alternative 4 - No Action Alternative

Under the No Action Alternative, the continued stream bank erosion and sedimentation, the continuation of water quality degradation, and the continued existence of noxious weeds and invasive species in the riparian forest would have no impact at all on safety or occupational health. As a result, there would be no change or impacts on safety at Grand Forks AFB or in the regional area.

3.9 Geological Resources

3.9.1 Definition of the Resource

Geological resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards and paleontology.

Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The soil qualities, growing season, and moisture supply are needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. The land could be cropland, pasture, rangeland, or other land, but not urban built-up land or water. The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Act also ensures that Federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland.

The implementing procedures of the FPPA and Natural Resources Conservation Service (NRCS) require Federal agencies to evaluate the adverse effects (direct and indirect) of their activities on prime and unique farmland, and farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects. Determination of whether an area is considered prime or unique farmland

and potential impacts associated with a proposed action is based on preparation of the farmland conversion impact rating form AD-1006 for areas where prime farmland soils occur and by applying criteria established at Section 658.5 of the FPPA (7 CFR 658). The NRCS is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act (see 7 CFR Part 658, 5 July 1984).

Geologic hazards are defined as a natural geologic event that can endanger human lives and threaten property. Examples of geologic hazards include earthquakes, landslides, rock falls, ground subsidence, and avalanches.

3.9.2 Description of Affected Environment

Regional Geology. Grand Forks AFB is in the Central Lowland Physiographic Province along the flat former glacial Lake Agassiz Plain. Grand Forks AFB is situated near the eastern edge of the Williston Structural Basin with bedrock strata dipping gently towards the center of the basin in the west (USAF 2006). Precambrian-aged bedrock (4.5 billion to 543 million years before present) is overlain by 130 feet of glacial till and 95 feet of lacustrine deposits. The glacial deposits are composed of silts and clays with occasional sand and gravel lenses (CBP 2008). Wave-washed glacial deposits are interspersed with fine lacustrine sands, silts, and clays. Turtle River cuts through these deposits, exposing a variety of materials including fine-grained, well-sorted beach sands, cobble and gravel lenses, glacial erratic boulders, and heavy lake-bottom clay (RRRC 2006).

Topography. Grand Forks AFB is characterized by flat to gently sloped topography, with a northeastward slope of about 1.5 to 2 feet per mile on the installation (CBP 2008). Elevations range from 900 feet above mean sea level (msl) on the western side of the installation to 880 feet above msl on the eastern side. At the site of the Proposed Action, the land slopes approximately 2 to 3 feet per mile (RRRC 2006).

Soils. Grand Forks AFB is underlain by six loamy soil associations with varying amounts of sand: the Antler-Gilby-Svea, the Bearden-Antler, the Glyndon-Gardens, the Delle-Cashel, the Ojata, and the Wyndmere-Tiffany-Arveson (GFAFB 2003b). Soils at Grand Forks AFB are deep, fairly level, and somewhat poorly to moderately well-drained with a high shrink-swell potential (CBP 2008). These soils are also highly susceptible to wind erosion. The soils adjacent to Turtle River on the northwestern side of the installation boundary include Velva, Overly, and LaDelle soils. The Velva soil is a sandy loam common to well-drained floodplains. It is found directly adjacent to Turtle River and is frequently flooded and subject to overflow and abandoned meandering channels (cutoff meander). The LaDelle silty loam is a well-drained soil found on older floodplains and stream terraces. It is also subject to abandoned channels, steep cutbanks, and escarpments. Farther removed from the floodplain are areas of Overly silty clay and Bearden silty clay loam. These soils are common in the Lake Agassiz plain and are moderately to poorly drained, forming wet areas during spring runoff and shortly after heavy rainfall (USDA 1981).

According to the NRCS Web Soil Survey, all areas proposed for disturbance for the natural revetment and tree planting areas are mapped as the Velva sandy loam with 0 to 6 percent slopes. These soils are occasionally flooded, and are not considered to be prime farmland soils (NRCS 2011). As evident by the existing streambank erosion, these soils are very susceptible to erosion.

The LaDelle silt loam (0 to 2 percent slopes) is mapped in both the northern and southern construction access locations, although the eastern portion of the southern construction access location is mapped as the Velva sandy loam (0 to 6 percent slopes). Both soils are rated as good for vehicle trafficability.

Soils for Scotch pine forest are mapped as Antler silt loam (0 to 1 percent slopes) in the western portion of the forest and the Ojata silty clay loam (0 to 1 percent slopes) in the east (NRCS 2011).

Prime Farmland. Of the soil units mapped within the site of the Proposed Action, the LaDelle silt loam and the Antler silt loam are considered to be a prime farmland soils (NRCS 2011). However, no agricultural use of these lands presently occurs or is planned to occur. Therefore, areas where these soils occur would not be considered prime farmland.

Sediments. The 2006 *Assess and Recommendations for Riparian Stabilization and Restoration of the Turtle River within the Grand Forks Air Force Base, North Dakota* (RRRC 2006) study found that sediments within Turtle River are primarily composed of sand and gravel-sized particles. However, in one area (west of the site of the Proposed Action and northeast of 22nd Avenue), sediments had smaller grain sizes and were composed of silts and sands. As indicated by the smaller grain size, the flow here is likely slower due to the influence of the upstream dam or from storm water runoff from an adjacent road (see **Section 3.4** for additional information on water resources). In several other areas, cobbles and boulders are present. Because larger-sized grains require more energy to move them, cobbles are indicative of greater river flow velocity. Boulders are generally too large to move via fluvial systems, and have been deposited either by glacial melt or anthropogenic activities. These locations with larger grain sizes have a positive correlation with areas marked on **Figures 2-1** and **2-2** as streambank erosion locations.

Geologic Hazards. The potential for damaging seismic activity at the installation is low as North Dakota is seismically stable. Infrequent, small earthquakes could occur within North Dakota, but it is unlikely that any serious damage to structures would occur (USGS 2005).

3.9.3 Environmental Consequences

3.9.3.1 Evaluation Criteria

Protection of unique geological features, minimization of soil/sediment erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion-control measures, and structural engineering design are incorporated into project development.

Effects on geological resources were assessed by evaluating the following:

- Potential to destroy unique geological features
- Potential for soil erosion
- Proximity to or impact on geologic hazards (such as locating a proposed action in a seismic zone)
- Potential to affect soil or geological structures that control groundwater quality or groundwater availability
- Alteration of soil structure or function.

3.9.3.2 Alternative 1

Implementation of Alternative 1 would be anticipated to result in short-term, minor to moderate, adverse impacts and long-term, beneficial impacts on soils. No impacts on geology or prime farmland soils, or from geologic hazards, would be expected.

Construction and operation of the access roads and staging areas would be expected to result in short- and long-term, minor, adverse effects on soils. Soils would be disturbed, vegetation would be cleared, and grading would occur. Clearing of vegetation would increase erosion and sedimentation potential. ESCPs would be developed and implemented both during and following site development to contain soil and runoff on site, and would reduce potential for adverse effects associated with erosion and sedimentation and transport of sediments in runoff.

In addition, soil disturbance on steep slopes has the potential to result in excessive erosion due to instability of the disturbed soils and high runoff energy and velocity. BMPs, such as keeping construction vehicles away from streambanks, would be implemented so that no additional impacts from erosion and sedimentation would occur. Sediments within the riverbed would be disturbed and compacted if restoration activities occurred within the river.

It is anticipated that short-term, minor, adverse impacts on soil would occur from herbicide applications, as some chemicals (e.g., glyphosate found in Roundup Pro™) adsorb strongly to soil, so the soil chemistry would be altered temporarily until the chemicals have adequately degraded from microbial action. Short-term, negligible impacts could occur after weedy vegetation has died but before other vegetation has become established as soils would be exposed. Soil could locally be more susceptible to erosion and sedimentation before vegetation has reestablished. Long-term impacts from herbicide applications would be anticipated to be negligible.

Long-term impacts would be expected from compaction of soils under the weight of vehicles and other construction equipment. Compaction of soils would result in disturbance and modification of soil structure. Soil productivity, which is the capacity of the soil to produce vegetative biomass, would decline in disturbed areas and be eliminated in those areas within the footprint of roadways. Loss of soil structure due to compaction from foot and vehicle traffic could result in changes in drainage patterns. Access roads and staging areas would be revegetated once stabilization activities have ceased; therefore, long-term, minor impacts on soils from access roads would be anticipated.

Although some long-term, adverse impacts from compaction of soils could occur, in general, long-term, beneficial impacts would be anticipated as erosion and sedimentation rates would decline. Soils would be stabilized in areas where planting of vegetation is proposed. Soil would begin to restore due to the placement of organic matter on bare earth, thereby resulting in the beginning of the process of soil formation, and soil productivity would increase.

Channel erosion often occurs when the introduction of quick-moving storm water increases the flow rate of the stream, which deepens the channel and undermines the side slopes, causing the bank to eventually slump under its own weight (GADNR undated). Because decreasing levels of streambed elevation over time can be attributable to an increase in runoff from a watershed, the opposite is also true: over the long-term, it is possible that river sediments would become more fine-grained, as storm water velocity would slow due to implementation of Alternative 1, and less energy would be available to transport sediment (Fischenich and Little 2007). During storm events when river flow is increased, it is likely that erosion within the riverbed would occur at slower rates than at present if more fine-grained sediments have been deposited. This is because fine-grained sediment particles such as clays tend to stick together when wet and more energy would be required to initiate erosion.

Although erosion within the riverbed would be anticipated to decrease in response to the increase of smaller, stickier sediment particles and less energy from slower flows, it is anticipated that climate change over time would result in more intense and more frequent precipitation events, including rapid snowmelts. In addition, episodic flooding would introduce faster storm water velocity that could transport larger sediment grains. Therefore, it is important that channel stabilization and other restoration features

associated with Alternative 1 be evaluated and maintained periodically to keep pace with anticipated changes in climate.

BMPs would be implemented to minimize soil erosion during construction activities; therefore, no significant adverse impacts on the soils would be anticipated. BMPs could include installing silt fencing and sediment traps, applying water to disturbed soil, and revegetating disturbed areas as soon as possible after the disturbance, as appropriate. In the event of a spill, the installation's SPCC Plan would be followed to quickly contain and clean up a spill (see **Section 3.3**, Hazardous Materials and Wastes). There remains the possibility that a spill or leak could occur, but implementation of BMPs identified in the SPCC plan would minimize the potential for and extent of associated contamination. An SPCC plan would be followed to quickly contain any leaks or spills generated from construction vehicles.

Conclusion. No significant impacts on geological resources would be expected from the implementation of Alternative 1.

3.9.3.3 Alternative 2

Impacts on soils from implementing Alternative 2 would be anticipated to be less than those described for Alternative 1 because less soil would be disturbed during tree-planting activities. In addition, because woody debris would not be placed on the forest floor to create organic soils, the beneficial impacts from soil formation would not occur. Soils would not accumulate as much or at as high of a rate. Soils with a higher organic content would be capable of a larger amount of vegetation, which would result in soils that are more stable and resistant to erosion. Therefore, erosion and sedimentation under Alternative 2 would not decrease as quickly as under Alternative 1.

Conclusion. No significant impacts on geological resources would be expected from the implementation of Alternative 2.

3.9.3.4 Alternative 3

Implementing Alternative 3 would be anticipated to result in similar, but slightly greater, short-term adverse impacts on soil than Alternative 1. Soils would be disturbed by construction equipment required to remove selected trees from the Scotch pine grove. Short-term, minor to moderate impacts on soils would be anticipated during construction activities. Once stabilization activities have ceased, impacts would be anticipated to be long-term, beneficial from decreased erosion potential. However, in areas where scotch pine trees would be replaced by grasses, soil formation would not occur as quickly as is presently occurring as there would be less organic material (i.e., pine needles) deposited and decomposing to become humus.

Conclusion. No significant impacts on geological resources would be expected from the implementation of Alternative 3.

3.9.3.5 Alternative 4 - No Action Alternative

Implementing the No Action Alternative would be anticipated to result in long-term, moderate adverse impacts on soils as erosion along the river bank would continue. Soil formation processes would continue to slow along the banks. Larger sediment grains would likely continue to increase due to the increased storm water runoff velocity, which could alter the character of the aquatic habitat (please see **Section 3.3** and **Section 3.4** for a description on water resources and biological resources).

4. Cumulative and Other Effects

4.1 Definition of Cumulative Effects

CEQ defines cumulative effects as the “impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time by various agencies (Federal, state, and local) or individuals. Informed decisionmaking is served by consideration of cumulative effects resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future. Reasonably foreseeable future actions consist of activities that have been approved and can be evaluated with respect to their effects.

4.2 Projects Considered for Potential Cumulative Effects

The geographic region of influence (ROI) is an important consideration when discussing cumulative effects. For the purposes of this analysis, the ROI was determined to be Grand Forks AFB and the adjacent communities (i.e., Grand Forks Metropolitan Area and Grand Forks County).

The Grand Forks Metropolitan Area is at the eastern-central portion of Grand Forks County and serves as a regional center for northeastern North Dakota and northwestern Minnesota. Agriculture is the most important industry in Grand Forks County and the majority of the economy is driven by the generation or processing of agricultural products. Government services are also an important segment of the local economy. Overall, the future vision for Grand Forks County is to promote the majority of growth where municipal services are available and manage rural residential growth, while preserving agricultural and native resources. The vision for Grand Forks County is to develop a cohesive countywide land use pattern that ensures compatibility and functional relationships among activities and between jurisdictions. Future land use plans include the following (Grand Forks County 2006):

- The Urban Expansion Area, adjacent to the Grand Forks Metropolitan Area, is anticipated to receive municipal services within the next 50 years. The Urban Expansion Area will be sized to accommodate growth through 2055.
- The aesthetics and environmental quality within the commercial and industrial land use area will be maintained and upgraded, where necessary.
- Growth occurring on a phased-basis, providing for a logical extension of urban and rural growth patterns and related community services.

An effort was undertaken to identify other projects for evaluation in the context of the cumulative effects analysis. This was further developed through review of public documents and information gained from the coordination with various applicable agencies.

There are no formal projects proposed within or immediately adjacent to the project area other than the Proposed Action. However, there are some actions which take place on an occasional basis (see **Table 4-1**). The actions shown in **Table 4-1** are anticipated to continue on an occasional basis over the next 5 years.

Table 4-1. Past, Present, and Future Actions Within and Immediately Adjacent to the Project Area

Action	Description
Bow Hunting	Bow hunting is conducted within and adjacent to the project area during scheduled hunting seasons each fall.
Training	Grand Forks AFB, Reserve Officer Training Corps, and National Guard forces occasionally conduct training exercises within the project area. This training can consist of battle drills in preparation for upcoming missions. No live or blank ammunition is used during these training exercises. All training exercises are conducted during daylight hours. No fires, earth-moving activities, or heavy equipment is allowed during these exercises. BMPs are recommended moving in and out of this area to prevent the spread of invasive species, and to give consideration for several species of concern and migratory birds.
Forest Management	Grand Forks AFB occasionally conducts forest management activities within the project area including surveying species, removing infected trees and those fallen trees deemed a safety hazard, nonnative invasive and noxious species surveys and management, trash removal, tree and shrub planting, tree transplanting, or removal for all trees which penetrate the 7 to 1 imaginary surface approach zone of the airfield.
Beaver Control	Grand Forks AFB occasionally traps or relocates beavers.
Wildlife Viewing	Pedestrians are allowed to conduct wildlife viewing and hiking within the project area to include bird watching activities.
Haying	Grand Forks AFB conducts vegetative management control by mowing of hay and grass species adjacent to the riparian area.

The actions presented in **Table 4-1** would be expected to occur concurrently, if implemented with the Proposed Action. Some of these actions could result in effects on air quality as a result of ground disturbance that would produce fugitive dust, and use of heavy construction equipment that would produce air emissions. However, these effects on air quality would be limited to Grand Forks AFB. In addition, effects on air quality would be of a finite duration, lasting only during the period associated with ground-disturbing activities. Effects on soils and water resources could occur from ground-disturbing activities during site preparation when soils could be eroded and sedimentation of nearby water bodies could occur. Effects would be reduced by implementing BMPs as described in **Chapter 3**. Furthermore, there are no projects proposed at the installation that would be affected by the Proposed Action nor would the Proposed Action affect any projects proposed at the installation.

4.3 Cumulative Effects on Resource Areas

Table 4-2 summarizes potential cumulative effects on the various resource areas from Alternatives 1, 2, and 3 when combined with other past, present, and reasonably foreseeable future activities, which are presented in **Table 4-1**.

Table 4-2. Cumulative Effects on Resource Areas

Resource	Past Actions	Current Background Activities	Proposed Action (Alternatives 1, 2, and 3)	Known Future Actions	Cumulative Effects
Air Quality	Grand Forks County classified as being in attainment or as unclassifiable for all criteria pollutants.	Emissions from aircraft, vehicles, and stationary sources such as generators, boilers, hot water heaters, fuel storage tanks, gasoline service stations, surface coating/paint booths, and miscellaneous chemical usage.	Potential dust generation during construction activities.	Continued increases in development and renovation activities, mission operations, haying, and forest management could cause temporary effects. Continued increase in small arms range use and aircraft operations could result in long-term effects.	Minor, long-term, adverse effects on air quality. The magnitude of cumulative effects would remain low beyond completion of the construction components of the Proposed Action. No significant effect.
Noise	Aircraft operations are a dominant component of the noise environment. Development is restricted to compatible uses when noise levels exceed 65 dBA.	Aircraft activities and small arms fire are the dominant noise sources.	Minor, short-term, adverse effects from construction.	Continued increases in development and renovation activities, mission operations, haying, and forest management could result in temporary increases in noise. Continued increases in small arms range use and aircraft operations could result in long-term increases in noise.	Aircraft activities along with small arms fire would remain the dominant noise sources. No significant effect.

Resource	Past Actions	Current Background Activities	Proposed Action (Alternatives 1, 2, and 3)	Known Future Actions	Cumulative Effects
Hazardous Materials and Wastes	Seven ERP sites and two AOCs have been identified.	Grand Forks AFB monitors and manages ERP sites. Hazardous materials and wastes managed according to appropriate regulations and management plans.	Small quantities of materials used and wastes generated during construction of the Proposed Action. Potential for workers to encounter unknown hazardous materials and wastes within the project area.	Development and growth of industrial uses could increase hazardous material use and waste generated, but not to levels that cannot be managed by current practices.	Construction activities would have a minor effect on hazardous materials and wastes. No significant effect.
Water Resources	Surface water quality moderately impacted by past construction and demolition activities.	Pollution from industrial and municipal sources is generally moderate.	Potential sedimentation from construction activities. Proposed Action would involve construction activities in the floodplain of the Turtle River.	Continued development of area could result in temporary sedimentation.	Long-term effects from new construction projects would be minor and potentially offset by beneficial effects from demolition projects and removal of impervious surface area. Proposed Action would reduce erosion and sedimentation rates and improve water quality. No significant effect.

Resource	Past Actions	Current Background Activities	Proposed Action (Alternatives 1, 2, and 3)	Known Future Actions	Cumulative Effects
Biological Resources	Degraded habitat of sensitive and common wildlife species. No Federal-listed species or significant habitat present. Occasional use by state-listed species, species of concern, and migratory birds.	Presence and operation of facilities impact wildlife and their habitat, state-listed species, species of concern, and migratory birds.	Minor disturbance of vegetation and habitat from construction. No effects on wetlands. No significant habitat for threatened and endangered species. Minor disturbance of occasional-use habitat from construction.	Continued development of area, training activities, and forest management, could impact vegetation communities, wildlife habitat, and wetlands. Continued development of area, beaver control, bow hunting, and wildlife viewing could have minor effects on state-listed species, species of concern, migratory birds, and their occasional-use habitat.	Direct, minor effects from the permanent loss of vegetation, habitat, and wetlands from future actions. Permanent loss of occasional-use habitat by threatened and endangered species would be minimized through continued natural resources management. No significant effect.
Cultural Resources	No NRHP eligible archaeological sites or built resources. Unknown traditional cultural properties or impacts.	No NRHP eligible archaeological sites or built resources. Unknown traditional cultural properties or impacts.	Construction activities would not affect cultural resources and have been coordinated with the SHPO.	No NRHP eligible archaeological sites or built resources. Unknown traditional cultural properties or impacts.	No expected impacts on cultural resources would occur from ongoing or planned projects within and immediately adjacent to the proposed area.

Resource	Past Actions	Current Background Activities	Proposed Action (Alternatives 1, 2, and 3)	Known Future Actions	Cumulative Effects
Transportation	Traffic infrastructure has been constructed on installation, resulting in beneficial impacts on traffic circulation. There were short-term, adverse impacts on traffic circulation due to road and lane closures during construction activities.	Traffic infrastructure is maintained on the installation. Short-term, adverse impacts on traffic circulation due to road and lane closures during construction activities.	Short-term, minor impacts on traffic circulation during construction activities.	Projects would result in short-term, adverse impacts on traffic circulation due to road and lane closures during construction activities.	Projects would result in short-term, adverse impacts on traffic circulation due to road and lane closures during construction activities; however, long-term and cumulative impacts would not be anticipated to be significant. The Proposed Action would have no significant effect.
Safety	Past renovation, demolition, and construction activities have resulted in short-term construction safety risks.	Non-airfield development constrained in clear zones, accident potential zones, and imaginary surfaces. Quantity distance arcs constrained for safety reasons.	Short-term effects from construction safety risks during construction activities.	Continued renovation, demolition, and construction could cause temporary safety risks.	Construction safety risks would cease beyond completion of the construction components of the Proposed Action. No long-term or significant effects.

Resource	Past Actions	Current Background Activities	Proposed Action (Alternatives 1, 2, and 3)	Known Future Actions	Cumulative Effects
<p>Geological Resources</p>	<p>Soils moderately impacted from previous disturbance and modification.</p>	<p>Storm water-control measures that favor infiltration are used to minimize erosion and sedimentation during storm events.</p>	<p>Short-term effects from potential soil runoff and sedimentation during construction activities. Long-term effects from soil compaction; however, long-term, beneficial impacts would be anticipated as erosion and sedimentation rates would decline.</p>	<p>Continued demolition and construction activities, training operations, and forest management could temporarily increase soil runoff and sedimentation. Continued clearing of vegetation could result in complete removal of soil or soil modification.</p>	<p>Increases in soil runoff and sedimentation would cease beyond the completion of construction activities. The effects from the long-term decline or total loss in soil productivity from clearing vegetation, paving, and grading would be minimized by revegetation. No significant effect.</p>

4.4 Compatibility of Proposed Action with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

Impacts on the ground surface as a result of the Proposed Action would occur entirely within the boundaries of Grand Forks AFB. Construction activities would not result in any significant or incompatible land use changes on- or off-installation. The Proposed Action would be consistent with current and future land use zones. Consequently, construction activities would not be in conflict with future land use policies or objectives at Grand Forks AFB. Furthermore, the Proposed Action would not conflict with any applicable land use ordinances or designated clear zones off Grand Forks AFB.

4.5 Relationship Between Short-Term Uses of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

Short-term uses of the biophysical components of human environment include direct construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of the human environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

Several kinds of activities could result in short-term resource uses that compromise long-term productivity. Filling of wetlands or loss of other especially important habitats and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

The Proposed Action would not result in an intensification of land use at Grand Forks AFB and in the surrounding area. Implementation of the Proposed Action would not represent a significant loss of open space. Therefore, it is anticipated that the Proposed Action would not result in any cumulative land use or aesthetic impacts. Long-term productivity of these sites would be increased by the implementation of the Proposed Action.

4.6 Irreversible and Irrecoverable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources would have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of energy resources and changes to biological habitats and wetlands. The use of these resources is considered to be permanent.

Energy Resources. No significant impacts would be expected on energy resources used as a result of the Proposed Action, though any energy resources consumed would be irretrievably lost. These include petroleum-based products (e.g., gasoline and diesel). During construction, gasoline and diesel would be used for the operation of construction vehicles. During operation, gasoline or diesel would be used for the operation of privately owned and government-owned vehicles. Consumption of energy resources would not place a significant demand on their availability in the region.

Biological Habitat. The Proposed Action would temporarily result in the loss of some vegetation and wildlife habitat at the proposed construction areas.

Wetlands and Other Waters of the United States. Short-term, minor to moderate impacts on water resources would be expected during tree-planting activities as land would be disturbed, and erosion and sedimentation could increase temporarily if BMPs are not implemented. Construction of access roads

would require removal of vegetation and possibly grading. BMPs would be implemented to reduce the potential for increased erosion and sedimentation and comply with EISA Section 438. Once stabilization activities have ceased, the access roads would be planted with native vegetation. Long-term impacts on water resources could be anticipated from the compaction of soils that could alter groundwater flow. However, in general, long-term impacts would be beneficial as the banks would be stabilized and erosion curtailed. The Proposed Action would temporarily result in minor losses of waters of the United States (i.e., Turtle River) at the proposed construction areas; however, the functions and values of floodplains and wetlands adjacent to the Turtle River would be enhanced by the Proposed Action; therefore, the minor losses of waters of the United States compared to the beneficial effects of the Proposed Action would be negligible.

THIS PAGE INTENTIONALLY LEFT BLANK

5. References

- CBP 2008 U.S. Customs and Border Protection (CBP). 2008. *Draft Environmental Assessment (EA) for the Beddown and Flight Operations of Unmanned Aerial Systems (UAS) at Grand Forks Air Force Base, North Dakota, U.S. Customs and Border Protection Air and Marine*. June 2008.
- Cornell University 2011a Cornell University. 2011. "Pileated Woodpecker." All About Birds. Cornell Lab of Ornithology. Available online: <http://www.allaboutbirds.org/guide/northern_harrier/lifehistory>. Accessed 25 August 2011.
- Cornell University 2011b Cornell University. 2011. "Northern Harrier." All About Birds. Cornell Lab of Ornithology. Available online: <http://www.allaboutbirds.org/guide/Pileated_Woodpecker/lifehistory>. Accessed 25 August 2011.
- Cryan 2003 Cryan, P.M. 2003. Seasonal Distribution of Migratory Tree Bats (*Lasiurus* and *Lasionycteris*) in North America. U.S. Geological Survey Staff- Published Research. University of Nebraska- Lincoln.
- DOD 2010a Department of Defense (DOD). 2010. Memorandum from Dorothy Robyn (Office of the Under Secretary of Defense) regarding DOD Implementation of Storm Water Requirements under Section 438 of the Energy Independence and Security Act. 19 January 2010.
- DOD 2010b DOD. 2010. *Unified Facilities Criteria (UFC): Low Impact Development*. 6 April 2010.
- DOD 2010c DOD. 2010. Office of the Deputy Under Secretary of Defense (ODUSD), *Department of Defense Strategic Sustainability Performance Plan, FY2010, Public Release Version*. Released date: 9 September 2010. Available online <http://www.acq.osd.mil/ie/download/green_energy/dod_sustainability/DoD%20SSP-P-PUBLIC-26Aug10.pdf>. Accessed on 20 September 2010.
- EIA 2010 Energy Information Administration (EIA). 2010. State Carbon Dioxide Emissions, Emissions Detail for the State of North Dakota. Released date: 26 October 2010. Available online <http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html>. Accessed 5 May 2011.
- ELI 2008 Environmental Law Institute (ELI). 2008. *State Wetland Protection: Status, Trends, & Model Approaches. Appendix: State Profiles*. "North Dakota." 2008.
- FEMA 1986 Federal Emergency Management Agency (FEMA). 1986. A Unified National Program for Floodplain Management, March 1986.
- FEMA 2010 FEMA. 2010. "Flood Insurance Rate Map, Grand Forks County, North Dakota and Incorporated Areas." Map No. 38035C0525E, effective December 17, 2010. Available online <http://rnc.mapmodteam.com/RMC/CountyMaps>. Accessed 21 April 2011.

- FICON 1992 Federal Interagency Committee on Noise (FICON). 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues*. August 1992.
- Fischenich and Little 2007 Fischenich, Craig, and Charlie Little. 2007. Sediment Sampling and Analysis for Stream Restoration Projects. Available online <<http://el.erdc.usace.army.mil/elpubs/pdf/sr39.pdf>>. Accessed 4 May 2011.
- GADNR undated Georgia Department of Natural Resources. Undated. Green Growth Guidelines: Streambank Stabilization. Available online <<http://crd.dnr.state.ga.us/assets/documents/GGG4.pdf>>. Accessed 4 May 2011.
- GFAFB 1996 Grand Forks Air Force Base (GFAFB). 1996. *Grand Forks Air Force Base Cultural Resources Survey*. Prepared for Grand Forks Air Force Base by Brian D. Crane, Ph.D., Carter Shields, Victoria Robertson, and Julie Abell.
- GFAFB 2003a GFAFB. 2003. Final Noxious Weed/Invasive Plant Survey report. November 2003.
- GFAFB 2003b GFAFB. 2003. *Draft Environmental Assessment Multiple Operation & Maintenance Construction Projects at Grand Forks AFB, North Dakota*. August 2003.
- GFAFB 2004 GFAFB. 2004. *Wetland Assessment Summary Report 2004 for the Grand Forks Air Force Base*. Prepared by CH2MHILL. December 2004.
- GFAFB 2006 GFAFB. 2006. *Assess and Recommendations for Riparian Stabilization and Restoration of the Turtle River within the Grand Forks Air Force Base, North Dakota*. December 2006. Prepared by Red River Regional Council.
- GFAFB 2007a GFAFB. 2007. *Pest Management Plan for Grand Forks Air Force Base, North Dakota*. April 2007.
- GFAFB 2007b GFAFB. 2007. *Wetland Delineation Summary Report 2006*. Prepared by CH2MHILL. March 2007.
- GFAFB 2008a GFAFB. 2008. *Installation Hazardous Waste Management Plan*. January 2008.
- GFAFB 2008b GFAFB. 2008. *Final Solid Waste Management Plan*. 1 March 2008.
- GFAFB 2008c GFAFB. 2008. *Integrated Cultural Resources Management Plan, Grand Forks Air Force Base, North Dakota*. Prepared for USAF Air Mobility Command by Brian Crane and Rachael Mangum.
- GFAFB 2009 GFAFB. 2009. *Spill Prevention, Control, and Countermeasures (SPCC) Plan*. 30 January 2009.
- GFAFB 2010a GFAFB. 2010. *Final Environmental Impact Statement (EIS) for the BRAC Beddown and Flight Operations of Remotely Piloted Aircraft at Grand Forks Air Force Base, North Dakota*. July 2010.
- GFAFB 2010b GFAFB. 2010. *Final Environmental Assessment Addressing Installation Development at Grand Forks AFB, North Dakota*. July 2010. Prepared by HDR.

- GFAFB 2010c GFAFB. 2010. Final 2009 Biological Survey for Grand Forks Air Force Base, Grand Forks County, North Dakota. July 2010.
- GFAFB 2011 GFAFB. 2011. Integrated Natural Resources Management Plan for Grand Forks Air Force Base, North Dakota.
- GFCSCD 2011 Grand Forks County Soil Conservation District (GFCSCD). 2011. Turtle River Watershed. Available online <<http://gfsd.org/turtleriverwatershed.htm>>. Accessed 13 April 2011.
- Grand Forks County 2006 Grand Forks County. 2006. *Grand Forks County 2035 Land Use Plan*. 7 March 2006. Available online: <<http://www.grandforkscountygov.com/PlanningandZoningAppForms/New%20Documents/Draft%202035%20Land%20Use%20Plan.pdf>>. Accessed 6 May 2011.
- HDR 2010a HDR Inc. (HDR). 2010. *General Biological Resources Reconnaissance Survey, Grand Forks Air Force Base, ND*. October 2010.
- HDR 2010b HDR. 2010. Site Visit Trip Report, Environmental Assessment Addressing Riparian Restoration and Stabilization at GFAFB. October 2010.
- Leput 2004 Leput, D.W. 2004. Eastern Red Bat (*Lasiurus borealis*) and Eastern Pipistrelle (*Pipistrellus subflavus*) Maternal Roost Selection: Implications for Forest Management. A Thesis Presented to the Graduate School of Clemson University. May 2004.
- Magnuson 2011 Magnuson, Lane. 2011. Correspondence between Mr. Lane Magnuson (Grand Forks County Planner) and Ms. Elaine Dubin (HDR) regarding county noise ordinances. 22 August 2011.
- NDDH 2007 North Dakota Department of Health (NDDH). 2007. *Air Pollution Control Title V Permit to Operate*. October 2007.
- NDDH 2010 NDDH. 2010. North Dakota 2010 Integrated Section 305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing Total Maximum Daily Loads. Available online <http://www.ndhealth.gov/wq/sw/Z7_Publications/IntegratedReports/2010_Final_Approved_IntegratedReport_20100423.pdf>. Accessed 12 April 2011.
- NDDH 2011 NDDH. 2011. Ambient Air Quality Standards. Available online: <<http://www.legis.nd.gov/information/acdata/pdf/33-15-02.pdf>>. Accessed on 9 May 2011.
- NDGFD 2004 North Dakota Game and Fish Department (NGFD). 2004. North Dakota's 100 Species of Conservation Priority. North Dakota Outdoors. July 2004. Available online: <<http://gf.nd.gov/multimedia/ndoutdoors/issues/2004/jul/docs/species-intro.pdf>>. Accessed 24 August 2011.

- NDSWC 2011 North Dakota State Water Commission (NDSWC). 2011. Map of well sites in the vicinity of Grand Forks AFB. Available online <<http://mapservice.swc.nd.gov/>>. Accessed 24 August 2011.
- NRCS 2011 Natural Resource Conservation Service (NRCS). 2011. "Web Soil Survey." Available online <<http://websoilsurvey.nrcs.usda.gov/app/websoilsurvey.aspx>>. Accessed 14 April 2011.
- O'Clair 2011 O'Clair, Terry. 2011. Correspondence between Mr. Terry O'Clair (North Dakota State Department of Health, Air Quality Division Director) and Ms. Elaine Dubin (HDR) regarding state noise ordinances. 22 August 2011.
- Paaverud 2011 Paaverud, Merlan E. 2011. Letter from Merlan E Paaverud, Jr., Director of the State Historical Society of North Dakota to Ms. Diane Strom, 319th Civil Engineer Squadron of Grand Forks AFB regarding the Final DOPAA for the Environmental Assessment Addressing Riparian Restoration and Stabilization.
- Rosgen 1996 Rosgen, Dave. 1996. *Applied River Morphology*. Published by Wildland Hydrology, Pagosa Springs, Colorado.
- RRRC 2006 Red River Regional Council (RRRC). 2006. *Assess and Recommendations for Riparian Stabilization and Restoration of the Turtle River within the Grand Forks Air Force Base, North Dakota*. December 2006.
- Schmidt 2003 Schmidt, C.A. 2003. Conservation Assessment for the Silver-Haired Bat in the Black Hills National Forest South Dakota and Wyoming. United States Department of Agriculture, Forest Service. April 2003.
- Slivnik 2011 Slivnik, Kyle. 2011. Correspondence between Mr. Kyle Slivnik (319 CES/CEPD, Grand Forks AFB) and Mr. Sean McCain (HDR) regarding noise contours for Grand Forks AFB. 23 August 2011.
- Smith and Keinath 2007 Smith, B.E. and D.A. Keinath. 2007. Northern Leopard Frog (*Rana pipiens*): A Technical Conservation Assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project. 16 January 2007.
- USACE 2007 U.S. Army Corps of Engineers (USACE). 2007. *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook*. May 2007.
- USACE 2011 USACE. 2011. Red River of the North Basin: Minnesota, North Dakota, South Dakota, and Manitoba Reconnaissance Study. Available online <http://www.mvp.usace.army.mil/fl_damage_reduct/default.asp?pageid=40>. Accessed 13 April 2011.
- USAF 1995 U.S. Air Force (USAF). 1995. Air Installation Compatible Use Zone (AICUZ) Study, Volumes I and II, for Grand Forks AFB. May 1995.
- USAF 2006 USAF. 2006. General Plan: Grand Forks Air Force Base, ND. April 2006.

- USAF 2008a USAF. 2008. *Management Action Plan for Installation Restoration Program for Grand Forks AFB*. October 2008.
- USAF 2008b USAF. 2008. *Migration and Breeding Bird Surveys for the Grand Forks Air Force Base*. Prepared by Tim Driscoll, Ph.D. May 2008.
- USAF 2008c USAF. 2008. Air Force Air Mobility Command. *Final Integrated Cultural Resources Management Plan, Grand Forks Air Force Base, Grand Forks, North Dakota 2008-2012*. 2008.
- USAF and Gannett Fleming 2004 USAF and Gannett Fleming. 2004. *Traffic Engineering Study: Grand Forks Air Force Base, ND*. January 2004.
- USDA 1981 U.S. Department of Agriculture (USDA). 1981. Soil Survey of Grand Forks County, North Dakota. Available online <<http://soildatamart.nrcs.usda.gov/manuscripts/ND035/0/grandforks.pdf>>. Accessed 14 April 2011.
- USEPA 1971 U.S. Environmental Protection Agency (USEPA). 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*. 31 December 1971
- USEPA 1974 USEPA. 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Publication No. 550/9-74-004, Washington D.C. March 1974.
- USEPA 1980 USEPA. 1980. Effects of Noise on Wildlife and Other Animals. Review of Research Since 1971. EPA 550/9-80-100. July 1980.
- USEPA 1981a USEPA. 1981. *Noise Effects Handbook: A Desk Reference to Health and Welfare Effects of Noise*. Office of Noise Abatement and Control. October 1979, Revised July 1981. Available online: <<http://nonoise.org/epa/Roll7/roll7doc27.pdf>>. Accessed 3 March 2010.
- USEPA 1981b USEPA. 1981. *Noise and its Measurement*. January 1981. Available online: <<http://nonoise.org/epa/Roll19/roll19doc49.pdf>>. Accessed 3 March 2010.
- USEPA 2009a USEPA. 2009. *Emissions by Category (AirData Net Tier Report) for North Dakota*. Last updated on 1 June 2009. Available online <<http://www.epa.gov/air/data/geosel.html>>. Accessed on 5 May 2011.
- USEPA 2009b USEPA. 2009. *Technical Guidance on Implementing the Storm water Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*. December 2009.
- USEPA 2010a USEPA. 2010. *Part 81 – Designation of Areas for Air Quality Planning Purposes – Table of Contents, Subpart C – Section 107 Attainment Status Designations, Section 81.335, North Dakota*. Last updated on 16 June 2010. Available online <http://edocket.access.gpo.gov/cfr_2002/julqtr/pdf/40cfr81.335.pdf>. Accessed 5 May 2011.

- USEPA 2010b USEPA. 2010. "Region 8 Sole Source Aquifer (SSA) Program." Available online <<http://www.epa.gov/region8/water/solesource.html>>. Accessed 22 April 2011.
- USEPA 2011a USEPA. 2011. *National Ambient Air Quality Standards*. Last updated on 8 November 2011. Available online <<http://www.epa.gov/air/criteria.html>>. Accessed 23 February 2012.
- USEPA 2011b USEPA. 2011. Mandatory Class I Areas Map. Available online <http://www.epa.gov/ttn/oarpg/t1/fr_notices/classimp.gif>. Accessed on 5 May 2011.
- USFWS 2009 U.S. Fish and Wildlife Service (USFWS). 2009. *Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to List the Northern Leopard Frog (Lithobates [Ranma] pipiens) in the Western United States as Threatened*. 50 CFR Part 17. Federal Register. Vol. 74, No. 125. July 1.
- USFWS 2010 USFWS. 2010. Letter from Ms. Heidi Kuska (USFWS North Dakota Ecological Services Field Office) to Ms. Kristen Rundquist (U.S. Air Force AMC 319 CES/CEAN) regarding threatened and endangered species considerations for the Environmental Assessment of Installation Development at Grand Forks Air Force Base. 1 July 2010.
- USGS 2005 U.S. Geological Survey (USGS). 2005. *North Dakota Notes No. 4: Earthquakes in North Dakota?* Available online: <https://www.dmr.nd.gov/ndgs/ndnotes/ndn4_h.htm>. Accessed 2 May 2011.

6. List of Preparers

Louise Baxter

M.P.A. Public Administration

B.S. Political Science

Years of Experience: 20

Elaine Dubin

B.S. Earth Science

Years of Experience: 4

Linda Fisher

M.S. Environmental Management

B.S. Environmental and Resource Sciences

Years of Experience: 7

Stuart Gottlieb

B.A. Geography

Years of Experience: 8

Lorin Hatch, Ph.D.

Ph.D. Philosophy, Ecology

M.S. Environmental Science/Chemistry

B.S. Biology

Years of Experience: 22

Christopher Holdridge

M.S. Environmental Assessment

B.S. Environmental Science/Chemistry

Years of Experience: 16

Sean McCain

M.A. Business Administration

B.S. Forestry and Natural Resources
Management

Years of Experience: 18

Steven Peluso

B.S. Chemical Engineering

Years of Experience: 26

Tanya Perry

B.S. Environmental Science

B.A. Communications

Years of Experience: 11

Rebecca Ralston

M.S. Forestry

B.S. Natural Resources and Environmental
Sciences

Years of Experience: 9

Jennifer Rose

M.S. Environmental Science and Policy

B.S. Geology

Years of Experience: 5

Christy Smith

B.A. Anthropology

Years of Experience: 14

Suzanne Stone

M.A. Archaeology and Heritage

B.A. Archaeology

Years of Experience: 14

Audrey Stuller

M.S. Environmental Science and Policy

B.S. Wildlife Science

Years of Experience: 6

Michael Swenson

B.A. Biology

Years of Experience: 5

Adam Teepe

M.S. Environmental Science and Management

B.S. Environmental Geology

Years of Experience: 7

Jeffrey Weiler

M.S. Resource Economics/Environmental
Management

B.A. Political Science

Years of Experience: 37

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A

**INTERAGENCY AND INTERGOVERNMENTAL COORDINATION
FOR ENVIRONMENTAL PLANNING (IICEP) MATERIALS
AND NOTICE OF AVAILABILITY (NOA)**

IICEP Letter, IICEP Distribution List, and Agency Comments for the Draft EA and FONSI

The Description of the Proposed Action and Alternatives (DOPAA), prepared to support the preparation of the EA, was made available to the following agencies listed below for a 30-day review period in April 2011 to solicit their comments on the Proposed Action. A summary of comments received on the DOPAA is provided in this appendix.

The Draft EA was made available to the agencies listed below for a 30-day review period. A summary of comments received on the Draft EA is provided in this appendix.

USEPA Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Mr. Jeff Towner
U.S. Fish and Wildlife Service
North Dakota Field Office
3425 Miriam Avenue
Bismarck, ND 58501-7926

U.S. Fish and Wildlife, Migratory Bird Office
P.O. Box 25486 DFC
Denver, CO 80225

U.S. Department of Agriculture
Natural Resources Conservation Service
4775 Technology Circle #1B
Grand Forks, ND 58203-5635

Bismarck Regulatory Office
U.S. Army Corps of Engineers
1513 South 12th Street
Bismarck, ND 58504

Dr. Terry Dwelle, State Health Officer
North Dakota Department of Health
600 East Boulevard Avenue
Department 301
Bismarck, ND 58505-0200

Department of Energy
Western Area Power Administration
ND Maintenance Office
P.O. Box 1173
Bismarck, ND 58202-1173

Division of Community Services
ND Department of Commerce
1600 East Century Avenue, Suite 2
P.O. Box 2057
Bismarck, ND 58202-2057

North Dakota State Water Commission
900 East Boulevard Avenue, Dept 770
Bismarck, ND 58505-0850

Mr. Terry Steinwand, Commissioner
North Dakota Game and Fish
100 North Bismarck Expressway
Bismarck, ND 58505-5095

Mr. Merlen E. Paaverud
State Historic Preservation Officer
State Historical Society of North Dakota
612 East Boulevard Avenue
Bismarck, ND 58505-0830

Tribal Historic Preservation Officer
Indian Affairs Commission
600 East Boulevard Avenue
Bismarck, ND 58505-0300

Bureau of Indian Affairs
3801 Bemidji Avenue NW, Suite 5
Bemidji, MN 56601

Bureau of Indian Affairs
161 Saint Anthony Ave, Suite 919
Saint Paul, MN 55103

Bureau of Indian Affairs
Great Plains Regional Office
115 4th Avenue Southeast
Aberdeen, SD 57401

North Dakota Natural Heritage Program
North Dakota Parks & Recreation Department
1835 Bismarck Expressway
Bismarck, ND 58504

Mr. Steve Crandall, Park Manager
Turtle River State Park
3084 Park Avenue
Arvilla, ND 58214

Red River Regional Council
Chase Building
516 Cooper Avenue, Suite 101
Grafton, ND 58237

Grand Forks County Board of Commissioners
P.O. Box 6372
Grand Forks, ND 58206-6372

Ms. Amanda Hillman, Watershed Coordinator
Grand Forks County Soil Conservation District
4775 Technology Circle STE 1C
Grand Forks, ND 58203

Polk County Board of Commissioners
612 North Broadway, Suite 215
Crookston, MN 56716

City of Grand Forks
P.O. Box 6372
Grand Forks, ND 58206-5200

Summary of Comments Received on the DOPAA

During early consultation efforts, the installation received comment letters from the U.S. Fish and Wildlife Service (USFWS) and the State Historical Society of North Dakota. A summary of their comments are provided below. In addition, copies of these letters are provided on the following pages.

USFWS Correspondence. The installation and the USFWS also had follow up conversations in regards to the letter. The letter stated that the installation should ensure that the project complies with the Migratory Bird Treaty Act, Executive Order 13186, the Endangered Species Act, Executive Order 11990, the Fish and Wildlife Coordination Act, the Bald and Golden Eagle Protection Act, and the Sikes Act.

The USFWS also expressed concerns related to the placement of permanent rip-rap in the Turtle River. The USFWS stated that they would support the waddle siltation fence, live pole use, and conifer revetment procedures as described in the 2006 Red River Regional Council's Study. The USFWS has concerns with using permanent bank stabilization (i.e. rocks) in the stream, because such hardening does not allow the stream to evolve and is likely to cause erosion downstream. Therefore, the USFWS recommends that the spur spec method be adjusted to be used without rock.

The USFWS stated in their letter that whooping cranes may migrate through the project area, but given the project's location in the flyway and the wooded nature of the area, the USFWS considers it unlikely that whooping cranes would be affected by the project. Also the USFWS stated that since gray wolves are transitory in North Dakota and avoid human activity it is unlikely that the project will affect gray wolves. The USWFS recommended prior to tree removal or new activities that may disturb nesting eagles, the installation should perform a survey within 0.5 miles of the project between 1 March and 15 May. If the installation observes an eagle nest within 0.5 miles of the project then the USFWS requests that they be contacted for further consultation.

State Historical Society of North Dakota Correspondence. The State Historical Society of North Dakota reviewed the Proposed Action and concurred with a "No Historic Properties Affected" determination, provided the project remains as described.

THIS PAGE INTENTIONALLY LEFT BLANK



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501



MAY 3 2011

Ms. Mary C. Giltner
Deputy Base Civil Engineer
319 CES/CEAO
525 Tuskegee Airmen Boulevard
Grand Forks AFB, North Dakota

Re: Grand Forks Air Force Base Environmental
Assessment, Riparian Restoration and
Stabilization, North Dakota

Dear Ms. Giltner:

The U.S. Fish and Wildlife Service (Service) has reviewed the Grand Forks Air Force Base (GFAFB) Environmental Assessment, Riparian Restoration and Stabilization, North Dakota in a letter dated May 8, 2011. The proposed project is to restore and stabilize the portion of the Turtle River that flows through the northwestern portion of GFAFB and manage and restore the adjacent riparian forest. The proposed project would stabilize some portions of the channel, repair areas of minor bank erosion, remove accumulations of woody debris from the channel, maintain and plant wide riparian forest buffers, remove trash and other foreign debris from the channel, and monitor erosion and channel features for changes. We offer the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", in accordance with the Memorandum of Understanding among the U.S. Department of Defense and the U.S. Fish and Wildlife Service and the International Association of Fish and Wildlife Agencies for a Cooperative Integrated Natural Resource Management Program on Military Installations (2006), the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), Executive Order 11990 "Protection of Wetlands", Fish and Wildlife Coordination Act (FWCA), the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250), the National Environmental Policy Act (NEPA) (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended), and the Sikes Act (16 USC 670a-670o, 74 Stat. 1052), as amended.

Below are recommendations to assist in complying with each of these authorities. Your plans should integrate these recommendations to ensure compliance. Recommendations addressing the trust resources under Service authorities are tailored to address protective measures for a variety of species. As such, recommended timing restrictions are not identical and the Federal

action agency should evaluate the trust resources that may be affected by the proposed project and utilize the appropriate protective timing restriction accordingly.

General Comments

Some portions of the proposed project will be of benefit to fish and wildlife. Removing trash from the channel and forest, eradicating invasive plants and replanting areas with natives, and limiting destructive practices such as off-road vehicle use, paintball and tree-cutting will benefit the Turtle River and its watershed. Additionally, removing trees infected with a non-native disease or infestation should help overall forest health. However, other proposed portions of the proposed project would likely have negative impacts on the Turtle River and its watershed.

Stabilizing the bank, either using bioengineering or traditional rip-rap methods would likely cause the stream to incise, making it less connected to its floodplain. This loss of connectivity would make the natural area less likely to store water and receive nutrient input from flooding. It may also increase flooding risk downstream. We suggest stabilizing minor bank erosion only where it is needed to protect permanent infrastructure features. Woody debris, both in the channel and in the adjacent riparian forest, provides an important refuge for a number of species as well as serving as a source of primary productivity. While woody debris in the channel may slow water flow in some areas, the natural slack water areas created behind the debris provide refugia for small fish and macroinvertebrates, as well as slowing water flow.

The Turtle River has been identified by the North Dakota Game and Fish Department (NDG&F) as a high priority fishery resource, with reproduction of northern pike, walleye, and sunfishes. However, water quality degradation has been identified as a risk to the Turtle River, with channelization identified as a problem for stream quality. Given that armoring of the banks and woody debris removal are both likely to aggravate this problem, the Service recommends that GFAFB drop those portions of the proposed project.

Threatened, Endangered and Candidate Species

A list of federally endangered and threatened species that may be present within the proposed project's area of influence is enclosed. This list fulfills requirements of the Service under Section 7 of the Endangered Species Act. This list remains valid for 90 days.

Whooping cranes may migrate through the proposed project area, although it is outside of their major migration corridor, where 95% of the migration occurs. Given the proposed projects' location in the flyway and the wooded nature of the area, the Service considers it unlikely that whooping cranes would be affected by the proposed project.

Gray wolves are transitory in North Dakota. While they may move through the area, they avoid human activity and are unlikely to remain in one place for an extended period of time. Therefore, the Service considers it unlikely that the proposed project will affect gray wolves.

Bald and Golden Eagles

The BGEPA prohibits anyone without a permit issued by the Secretary of the Interior from taking bald or golden eagles, including their parts, nests, or eggs. The Act provides criminal and civil penalties for persons who take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle or golden eagle, alive or dead, or any part, nest, or egg thereof. The Act defines take as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. "Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagles return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

The draft Integrated Natural Resources Management Plan (INRMP), sent to us in a letter dated April 7, 2011, states that both bald and golden eagles have been observed on or near the base, although no nesting has been documented on the GFAFB to date. The Service recommends that prior to tree removal or new activities that may disturb nesting eagles, the GFAFB perform a survey within 1/2 mile of the proposed project. Ideally, surveys should be conducted between March 1 and May 15, before leaf-out so that nests are visible. If an eagle nest is observed within 1/2 mile of the proposed project, the Service requests that we be contacted for further consultation. The Service requests that the nest location be documented and reported to Ms. Sandy Johnson at NDG&F, who maintains a file of all known eagle nests. A permit is required for any take of bald or golden eagles or their nests. Permits to take eagles or their nests are available only for legitimate emergencies or as part of a program to protect eagles.

Migratory Birds

The MBTA prohibits the taking, killing, possession, and transportation (among other actions), of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. While the MBTA has no provision for allowing unauthorized take, the Service realizes that some birds may be killed during project construction and operation even if all known reasonable and effective measures to protect birds are used. The Service Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and agencies that have taken effective steps to avoid take of migratory birds, and by encouraging others to implement measures to avoid take of migratory birds. It is not possible to absolve individuals, companies, or agencies from liability even if they implement bird mortality avoidance or other similar protective measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting

individuals, companies, and agencies that take migratory birds without identifying and implementing all reasonable, prudent, and effective measures to avoid that take. Agencies are encouraged to work closely with Service biologists to identify available protective measures when developing project plans and/or avian protection plans, and to implement those measures prior to/during construction or similar activities.

To the extent practicable for invasive species removal and planting, schedule construction for late summer or fall/early winter so as not to disrupt migratory birds during the breeding season (February 1 to July 15, note that if there is a bald or golden eagle nest in the area, the breeding season may extend through August 31). If work is proposed to take place during the breeding season or at any other time which may result in the take of migratory birds, their eggs, or active nests, the Service recommends that the GFAFB implement all practicable measures to avoid all take, such as suspending construction where necessary, and/or maintaining adequate buffers to protect the birds until the young have fledged. The Service further recommends that if you choose to conduct field surveys for nesting birds with the intent of avoiding take, that you maintain any documentation of the presence of migratory birds, eggs, and active nests, along with information regarding the qualifications of the biologist(s) performing the survey(s), and any avoidance measures implemented at the project site. Should surveys or other available information indicate a potential for take of migratory birds, their eggs, or active nests, the Service requests that you contact this office for further coordination on the extent of the impact and the long-term implications of the intended use of the project on migratory bird populations.

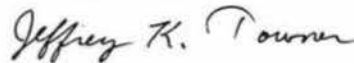
High Quality Habitat Avoidance

For projects with a Federal nexus, Executive Order 11990 Protection of Wetlands, requires Federal agencies to avoid destruction or modification of wetlands to the extent possible.

The Corps of Engineers (Corps) may require a Department of the Army permit for the placement of dredge or fill material into waters of the U.S., including wetlands, or other impacts to waters of the United States. We suggest you contact Mr. Daniel Cimarosti, Regulatory Office, Corps of Engineers, 1513 South 12th Street, Bismarck, North Dakota 58504 (701-255-0015), to determine the Corps' permit requirements.

Thank you for the opportunity to comment on this project. If additional information is required, please have your staff contact Carol Aron of my staff, or contact me directly at (701) 250-4481 or at the letterhead address.

Sincerely,



Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

Enclosure

cc: ND Game and Fish (Attn: J. Schumacher)
U.S. Army Corps of Engineers (Attn: D. Cimarosti)

FEDERAL ENDANGERED SPECIES
FOUND IN GRAND FORKS COUNTY, NORTH DAKOTA

ENDANGERED SPECIES

Birds

Whooping crane (Grus Americana): Aransas-Wood Buffalo Population (264 birds) occurs in North Dakota counties during spring and fall migration between breeding and wintering areas. Whooping cranes prefer to roost overnight in shallow open water wetland habitat with good visibility during migration stopovers.

Mammals

Gray wolf (Canis lupus): Occasional visitor in North Dakota. Most frequently observed in the Turtle Mountains area.



**STATE
HISTORICAL
SOCIETY
OF NORTH DAKOTA**

Jack Dalrymple
Governor of North Dakota

North Dakota
State Historical Board

Chester E. Nelson, Jr.
Bismarck - President

Gerald Gertholz
Valley City - Vice President

Richard Kloubec
Fargo - Secretary

Albert L. Berger
Grand Forks

Calvin Grinnell
New Town

Diane K. Larson
Bismarck

A. Ruic Todd III
Jamestown

Sara Otto Coleman
Director
Tourism Division

Kelly Schmidt
State Treasurer

Alvin A. Jaeger
Secretary of State

Mark A. Zimmerman
Director
Parks and Recreation Department

Francis Ziegler
Director
Department of Transportation

Merlan E. Paaverud, Jr.
Director

Accredited by the
American Association
of Museums since 1986

April 14, 2011

Ms. Diane Strom
319th Civil Engineer Squadron
525 Tuskegee Airmen Boulevard
Grand Forks AFB, North Dakota 58205-6434

ND SHPO 11-1093: Final Description of the Proposed Action and Alternatives (DOPAA) for the Environmental Assessment Addressing Riparian Restoration and Stabilization in portions of [T152N R53W Section 11, SW ¼ and Section 14 NW ¼] Grand Forks Air Force Base, North Dakota

Dear Ms. Strom,

We reviewed ND SHPO 11-1093: Final Description of the Proposed Action and Alternatives (DOPAA) for the Environmental Assessment Addressing Riparian Restoration and Stabilization in portions of [T152N R53W Section 11, SW ¼ and Section 14 NW ¼] Grand Forks Air Force Base, North Dakota, and concur with a "No Historic Properties Affected" determination, provided the project remains as described in Mary Gilmer's letter date stamped April 8, 2011 and the CD "Final DOPAA for an EA Addressing Riparian Restoration and Stabilization at GR AFB, ND."

Thank you for the opportunity to review this project. If you have any questions please contact Susan Quinnell, at (701) 328-3576 or squinnell@nd.gov. Thank you for the excellent documentation package, and the opportunity to review.

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)

THIS PAGE INTENTIONALLY LEFT BLANK

Native American Tribal Consultation Distribution List

The DOPAA was made available to the following Native American tribes in April 2011 to solicit their comments on the Proposed Action. The letter attached to the DOPAA was used both as a government to government relationship under EO 13175 and project specific consultation under Section 106 of the NHPA. A summary of comments received on the DOPAA is provided in this appendix.

The Draft EA was made available to the following Native American tribes for a 30-day review period. No comments from Native American tribal representatives were received during the 30-day review period for the Draft EA.

Spirit Lake Tribe
Myra Pearson, Chairwoman
P.O. Box 359
Fort Totten, ND 58335

Lower Brule Sioux Tribe
Michael Jandreau, Chairman
P.O. Box 187
Lower Brule, SD 57548-0187

Standing Rock Sioux Tribe
Charles W. Murphy, Chairman
P.O. Box D
Fort Yates, ND 58538

Oglala Sioux Tribe
John Yellow Bird Steele, President
P.O. Box 2070
Pine Ridge, SD 57770-2070

Three Affiliated Tribes
Tex G. Hall, Chairman
Fort Berthold Indian Reservation
404 Frontage Road
New Town, ND 58763-9402

Rosebud Sioux Tribe
Rodney Bordeaux, Chairman
P.O. Box 430
Rosebud, SD 57570-0430

Turtle Mountain Band of Chippewa Indians
Merle St. Claire, Chairman
Cory LaVallie, Administrative Assistant
4180 Highway 281
Belcourt, ND 58316

Sisseton-Wahpeton Oyate
Robert Shepherd, Chairman
P.O. Box 509
Agency Village, SD 57262-0509

Cheyenne River Sioux Tribe
Kevin Keckler, Sr., Chairman
P.O. Box 590
Eagle Butte, SD 57625

Yankton Sioux Tribe
Robert Cournoyer, Chairman
P.O. Box 248
Marty, SD 57361-0248

Crow Creek Sioux Tribe
Duane Big Eagle
P.O. Box 50
Fort Thompson, SD 57339-0050

Minnesota Chippewa Tribe
Bois Forte Band of Chippewa
Kevin Leecy, Chairman
5344 Lakeshore Drive
Nett Lake, MN 55772

Flandreau Santee Sioux Tribe
Anthony Reider, President
P.O. Box 283
Flandreau, SD 57028

Minnesota Chippewa Tribe
Fond du Lac Band of Chippewa
Karen R. Diver, Chairwoman
1720 Big Lake Road
Cloquet, MN 55720

Minnesota Chippewa Tribe
Leech Lake Band of Ojibwe
Arthur LaRose, Chairman
115 6th Street NW, Suite E
Cass Lake, MN 56633

Minnesota Chippewa Tribe
White Earth Ojibwe
Erma Vizenor, Chairwoman
White Earth, MN 56591

Minnesota Chippewa Tribe
Mille Lacs Band of Ojibwe
Marge A. Anderson, Chief Executive
43408 Oodena
Onamia, MN 56359

Minnesota Chippewa Tribe
Grand Portage Band
P.O. Box 428
Grand Portage, MN 55605

Red Lake Band of Chippewa Indians
Floyd "Buck" Jourdain, Chairman
P.O. Box 550
Red Lake, MN 56671

Shakopee Mdewakanton Sioux Community
Stanley R. Crooks, Chairman
2330 Sioux Trail NW
Prior Lake, MN 55372

Upper Sioux Indian Community
Kevin Jensvold, Chairman
P.O. Box 147
Granite Falls, MN 56241

Lower Sioux Indian Community
Gabe Prescott, President
P.O. Box 308
Morton, MN 56270

Prairie Island Indian Community
Victoria Winfrey, President
5636 Sturgeon Lake Road
Welch, MN 550

Summary of Comments Received on the DOPAA

During early consultation efforts, Grand Forks AFB received comments from Native American tribes regarding the proposed project. The tribes wanted to determine if the project area had been surveyed for cultural resources or sites. If the project area had not been surveyed, the tribes desired monitoring actions during earth moving work. Grand Forks AFB assured the tribes that surveys of the project area had been conducted and that the installation would conduct cultural resources monitoring by a qualified archaeologist in accordance with the ICRMP and do so in a manner approved by the SHSND during clearing and earth-disturbing activities. No other tribes provided comments on this action during initial consultation efforts or during the 30-day public review period.

THIS PAGE INTENTIONALLY LEFT BLANK

Public Involvement

The Draft EA and FONSI/FONPA were made available to the general public for a 30-day review period. The Notice of Availability (NOA) was published in the *Grand Forks Herald*. A copy of the NOA as it was submitted to the *Grand Forks Herald* can be found below. The Draft EA and FONSI were also made available to the general public at three local libraries (Grand Forks Library, East Grand Forks Campbell Library, and Grand Forks AFB Library). No public comments were received on the Draft EA. A copy of the NOA is provided below.

**PUBLIC NOTICE
United States Air Force**

**Notice of Availability
Draft Environmental Assessment (EA) Addressing
Riparian Restoration and Stabilization at
Grand Forks Air Force Base (AFB), North Dakota**

Headquarters Air Mobility Command, in conjunction with Grand Forks AFB, has completed a Draft EA that evaluates the potential effects of restoring and stabilizing the portion of the Turtle River that flows through the northwestern portion of Grand Forks AFB, limiting potential downstream impacts on natural and other resources, and managing and restoring the adjacent riparian forest.

The analysis considered in detail potential environmental effects of the Proposed Action and the No Action Alternative. The results, as found in the EA, show that the Proposed Action would not have a significant adverse impact on the environment, indicating that a Finding of No Significant Impact would be appropriate. An Environmental Impact Statement would not be necessary to implement the Proposed Action.

Copies of the Draft EA showing the analysis are available for review at the following libraries:

**Grand Forks Library
2110 Library Circle
Grand Forks, ND 58201
701-772-8116**

**East Grand Forks Campbell Library
422 4th Street NW
East Grand Forks, MN 56721
218-773-9354**

**Grand Forks AFB Library
511 Holzapple Street
Grand Forks AFB, ND 58205
701-747-3046**

The document is also available at: <http://www.grandforks.af.mil/library>

Written comments on the Draft EA are invited and will be received for 30 days from the publication of this notice. Comments for consideration by the USAF on this document should be provided in writing to:

**Public Affairs Office
319th Air Base Wing
701 Eielson Street, Room 211
Grand Forks AFB, North Dakota 58205
Email: PublicAffairsOfficeGrandForksAFB@us.af.mil
Phone: 701-747-5023**

Summary of Agency Comments Received on the Draft EA

During the 30-day review period for the Draft EA the installation received comment letters from the North Dakota State Water Commission, the North Dakota Department of Health (NDDH), the Natural Resources Conservation Service (NRCS), the North Dakota Parks and Recreation Department, the U.S. Army Corps of Engineers (USACE), and the U.S. Fish and Wildlife Service (USFWS). A summary of their comments is provided below. In addition, copies of these letters are provided on the following pages.

North Dakota State Water Commission Correspondence. The North Dakota State Water Commission stated in their letter that the Proposed Action would be located in an area designated as Zone A for floodplains. As a result, the North Dakota State Water Commission would like the installation to contact the City Floodplain Administrator.

NDDH Correspondence. The NDDH stated in their letter that the Proposed Action's impacts will be minor and can be controlled by proper construction methods.

NRCS Correspondence. The NRCS stated in their letter that they are in full support of riparian restoration efforts along the Turtle River. The NRCS also stated that the proposed tree plantings should be placed on soils that are suitable for each tree species.

North Dakota Parks and Recreation Department Correspondence. The North Dakota Parks and Recreation Department recommended in their letter that any impacted areas be revegetated with species native to the project area.

USACE Correspondence. The USACE stated in their letter that if the Proposed Action would result in the discharge of fill into waters of the United States then appropriate forms associated with a Clean Water Act Section 404 permit would need to be completed and submitted to the North Dakota USACE Regulatory Office.

USFWS Correspondence. The USFWS stated in their letter that the project as described will have no significant impact on fish and wildlife resources and that no endangered or threatened species are known to occupy the project area. The USFWS Mountain Prairie Region office also commented on the Proposed Action and stated in their letter that they favor Alternative 2. The USFWS Mountain Prairie Region office also requested that additional migratory bird species be included in **Section 3.5, Biological Resources**.



North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
701-328-2750 • TDD 701-328-2750 • FAX 701-328-3696 • INTERNET: <http://swc.nd.gov>

June 6, 2012

Mary Giltner
Department of the Air Force
Headquarters 319 Air Base Wing (AMC)
Grand Forks Air Force Base, ND 58205-6434

ND
CEAW —
CEHO —

Dear Ms. Giltner:

This is in response to your request for review of environmental impacts associated with the Draft Environmental Assessment addressing Riparian Restoration and Stabilization at Grand Forks Air Force Base (AFB), ND.

The proposed project has been reviewed by State Water Commission staff and the following comments are provided:

- There are floodplains identified and/or mapped where these proposed road improvements are to take place. The areas are designated as Zone A. North Dakota has no formal "permitting" authority as a state entity in the National Flood Insurance Program (NFIP) identified floodplain areas. The permitting is always done by the local entity, which has jurisdiction in the area in question. Please work closely with the City Floodplain Administrator. The Floodplain Administrator is Carole McMahon; PO Box 5726, 151 S 4th Street; Grand Forks, ND 58206; 701-780-8412; carole.mcmahon@gfcounty.com.
- It is the responsibility of the project sponsor to ensure that local, state and federal agencies are contacted for any required approvals, permits, and easements.
- All waste material associated with the project must be disposed of properly and not placed in identified floodway areas.
- No sole-source aquifers have been designated in ND.

There are no other concerns associated with this project that affect State Water Commission or State Engineer regulatory responsibilities.

Thank you for the opportunity to provide review comments. If you have any questions, please call me at 701-328-4967.

Sincerely,



Linda Weispfenning
Water Resource Planner

LW.dp/1570

JACK DALRYMPLE, GOVERNOR
CHAIRMAN

TODD SANDO, P.E.
SECRETARY AND STATE ENGINEER



June 6, 2012

Ms. Mary C. Giltner
Deputy Base Civil Engineer
319th CES/CEAO
525 Tuskegee Airmen Boulevard
Grand Forks AFB, ND 58205-6434

Re: Draft EA Addressing Riparian Restoration and Stabilization at
Grand Forks Air Force Base, Grand Forks County

Dear Ms. Giltner:

This department has reviewed the information concerning the above-referenced project submitted under date of May 9, 2012, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. With respect to construction, we have the following comments:

1. All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Any complaints that may arise are to be dealt with in an efficient and effective manner.
2. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.
3. Projects disturbing one or more acres are required to have a permit to discharge storm water runoff until the site is stabilized by the reestablishment of vegetation or other permanent cover. Further information on the storm water permit may be obtained from the Department's website or by calling the Division of Water Quality (701-328-5210). Also, cities may impose additional requirements and/or specific best management practices for construction affecting their storm drainage system. Check with the local officials to be sure any local storm water management considerations are addressed.

Environmental Health
Section Chief's Office
701.328.5150

Division of
Air Quality
701.328.5188

Division of
Municipal Facilities
701.328.5211

Division of
Waste Management
701.328.5166

Division of
Water Quality
701.328.5210

Printed on recycled paper.

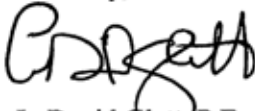
4. Noise from construction activities may have adverse effects on persons who live near the construction area. Noise levels can be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Noise effects can also be minimized by ensuring that construction activities are not conducted during early morning or late evening hours.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

These comments are based on the information provided about the project in the above-referenced submittal. The U.S. Army Corps of Engineers may require a water quality certification from this department for the project if the project is subject to their Section 404 permitting process. Any additional information which may be required by the U.S. Army Corps of Engineers under the process will be considered by this department in our determination regarding the issuance of such a certification.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,



L. David Glatt, P.E., Chief
Environmental Health Section

LDG:cc
Attach.



Construction and Environmental Disturbance Requirements

These represent the minimum requirements of the North Dakota Department of Health. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect the waters of the State of North Dakota. All projects will be designed and implemented to restrict the losses or disturbances of soil, vegetative cover, and pollutants (chemical or biological) from a site.

Soils

Prevent the erosion of exposed soil surfaces and trapping sediments being transported. Examples include, but are not restricted to, sediment dams or berms, diversion dikes, hay bales as erosion checks, riprap, mesh or burlap blankets to hold soil during construction, and immediately establishing vegetative cover on disturbed areas after construction is completed. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.

Surface Waters

All construction which directly or indirectly impacts aquatic systems will be managed to minimize impacts. All attempts will be made to prevent the contamination of water at construction sites from fuel spillage, lubricants, and chemicals, by following safe storage and handling procedures. Stream bank and stream bed disturbances will be controlled to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. The use of pesticides or herbicides in or near these systems is forbidden without approval from this Department.

Fill Material

Any fill material placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds (in toxic concentrations). This includes, but is not limited to, asphalt, tires, treated lumber, and construction debris. The Department may require testing of fill materials. All temporary fills must be removed. Debris and solid wastes will be removed from the site and the impacted areas restored as nearly as possible to the original condition.

Environmental Health
Section Chiefs Office
701.328.5150

Division of
Air Quality
701.328.5188

Division of
Municipal Facilities
701.328.5211

Division of
Waste Management
701.328.5166

Division of
Water Quality
701.328.5210

Printed on recycled paper.

United States Department of Agriculture



Natural Resources Conservation Service
502 Hwy 2 W, Suite 1
Devils Lake, ND 58301

June 6, 2012

Ms. Diane Strom
319 CES/CD
525 Tuskegee Airmen Boulevard
Grand Forks AFB, ND 58205-6434

Subject: Environmental Assessment – Riparian Restoration and Stabilization of Turtle River forested areas.

Dear Ms. Strom,

The draft EA for this project was forwarded to me for review and comments. NRCS is in full support of riparian restoration efforts along the Turtle River. Our agency acknowledges that some temporary, negative impacts may occur to the Turtle River during the completion of project activities. Our primary environmental concern is that these impacts be minimized as much as feasible.

I am attaching a soils map of the project area with two soils reports for your information: Ecological Sites and Conservation Tree and Shrub Groups. It is important that the proposed tree plantings place specific tree species on soils rated as suitable for that species. The Conservation Tree and Shrub Group report shows some soil map units suited to a wide range of tree species (Group 1). However, there are several map units with limited number of tree species that would thrive in those particular soils due to high pH (high calcium carbonate in the soil) or due to periodic excessive wetness.

The NRCS Field Office in Grand Forks can provide assistance with matching tree species to Conservation Tree and Shrub Groups. My staff can provide on-site assistance with soil classification, if desired.

Please contact me if you have any questions or if I can be of further assistance.

Sincerely,

A handwritten signature in black ink that reads "Alan R. Gulsvig".

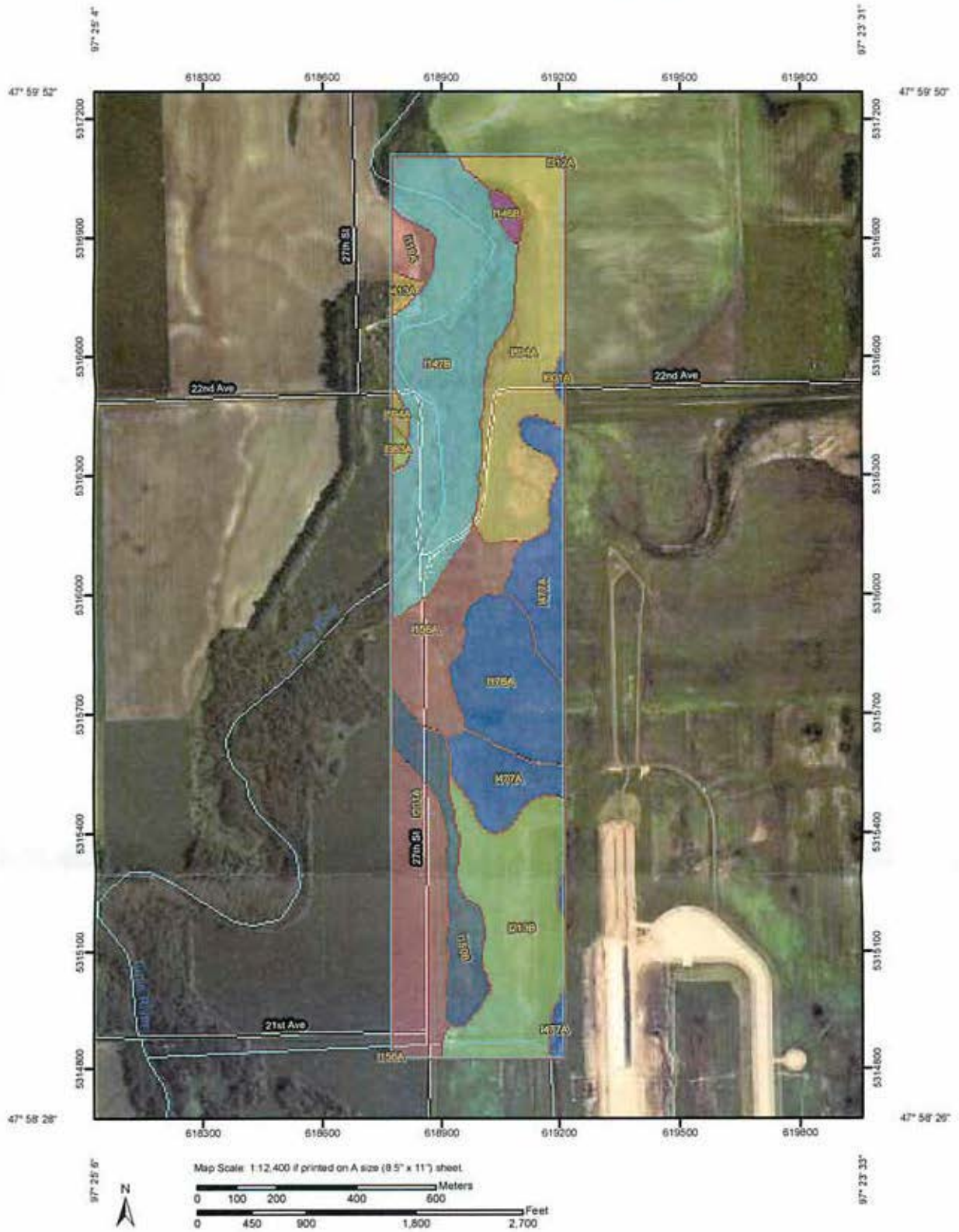
Alan R. Gulsvig
MLRA Soil Survey Project Leader
Ph (701) 662-7967, ext. 155

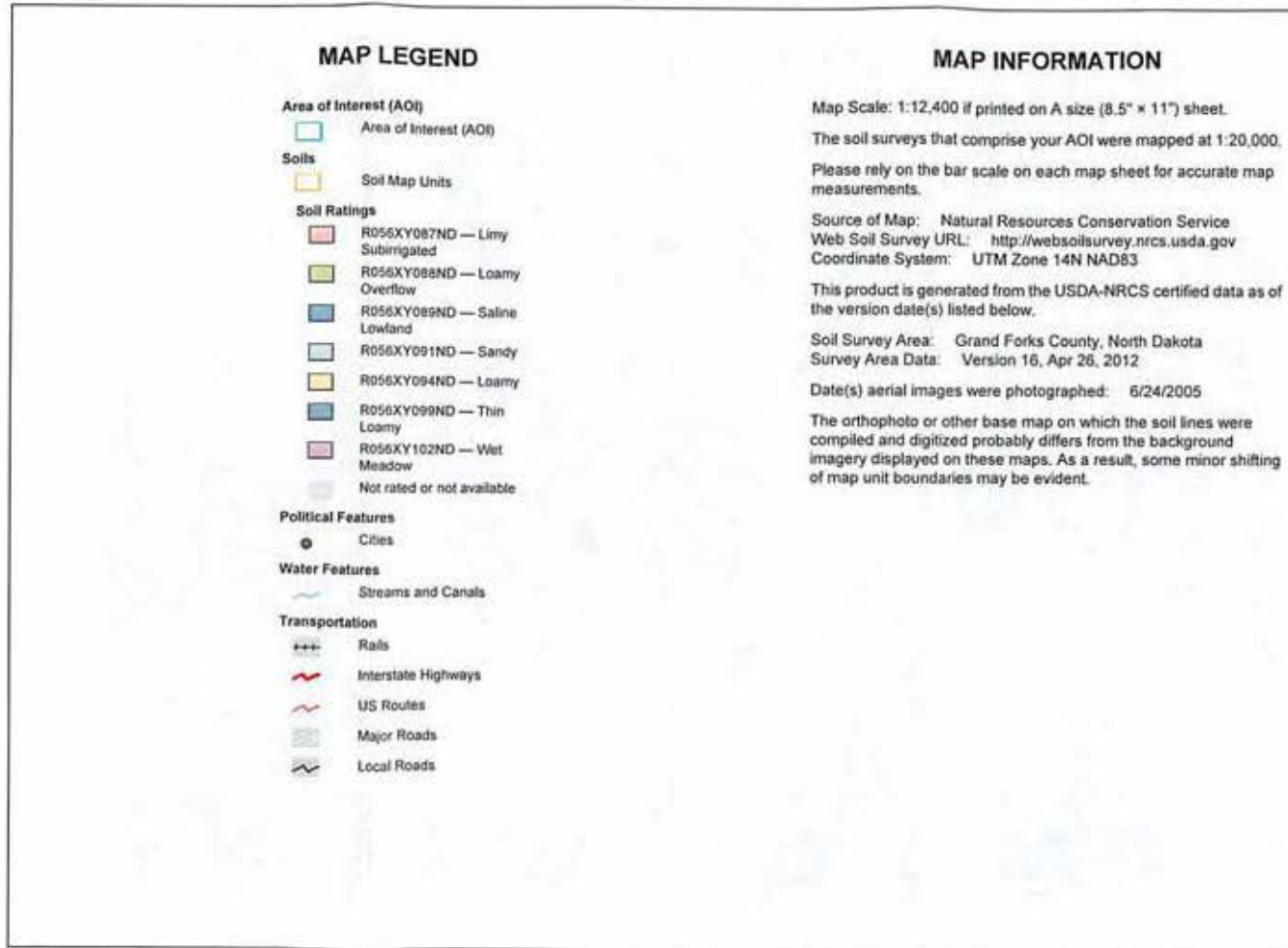
The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources.

An Equal Opportunity Provider and Employer

Received 8 Jun 12

All Ecological Sites — Rangeland—Grand Forks County, North Dakota





All Ecological Sites — Rangeland

Grand Forks County, North Dakota					
Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
I119A	Bearden silty clay loam, 0 to 1 percent slopes	Bearden (60%)	R056XY087ND — Limy Subirrigated	3.5	1.4%
		Bearden, slightly saline (10%)	R056XY087ND — Limy Subirrigated		
		Kindred (10%)	R056XY095ND — Subirrigated		
		Bearden, moderately saline (5%)	R056XY089ND — Saline Lowland		
		Overly (4%)	R056XY088ND — Loamy Overflow		
		Colvin (3%)	R056XY102ND — Wet Meadow		
		Fargo (3%)	R056XY084ND — Clayey		
		Perella (3%)	R056XY102ND — Wet Meadow		
I146B	Lamoure-Fluvaquents, channeled complex, 0 to 6 percent slopes, frequently flooded	Lamoure, frequently flooded (45%)	R056XY102ND — Wet Meadow	1.6	0.7%
		Fluvaquents, channeled, frequently flooded (40%)			
		Rauville (9%)	R056XY101ND — Shallow Marsh		
		LaDelle (6%)	R056XY094ND — Loamy		
I147B	Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded	Velva (80%)	R056XY091ND — Sandy	59.1	24.0%
		Fluvaquents, channeled, frequently flooded (10%)			
		Lamoure (4%)	R056XY102ND — Wet Meadow		
		Rauville (4%)	R056XY101ND — Shallow Marsh		
		Sioux (2%)	R056XY100ND — Very Shallow		
I150B	Zell, fine-silty-LaDelle silt loams, 2 to 6 percent slopes	Zell (55%)	R056XY099ND — Thin Loamy	14.6	5.9%
		LaDelle (35%)	R056XY094ND — Loamy		
		Bearden (5%)	R056XY087ND — Limy Subirrigated		
		Lamoure (5%)	R056XY102ND — Wet Meadow		

Grand Forks County, North Dakota					
Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
I156A	Antler silt loam, 0 to 1 percent slopes	Antler (80%)	R056XY087ND — Limy Subirrigated	18.2	7.4%
		Antler, moderately saline (5%)	R056XY089ND — Saline Lowland		
		Lankin (5%)	R056XY094ND — Loamy		
		Mustinka (5%)	R056XY084ND — Clayey		
		Winger (5%)	R056XY102ND — Wet Meadow		
I176A	Ojata silty clay loam, 0 to 1 percent slopes	Ojata (85%)	R056XY089ND — Saline Lowland	21.9	8.9%
		Colvin (10%)	R056XY102ND — Wet Meadow		
		Bearden (5%)	R056XY087ND — Limy Subirrigated		
I201A	Glyndon silt loam, 0 to 1 percent slopes	Glyndon (80%)	R056XY087ND — Limy Subirrigated	23.5	9.5%
		Borup (5%)	R056XY102ND — Wet Meadow		
		Tiffany (5%)	R056XY102ND — Wet Meadow		
		Gardena (4%)	R056XY088ND — Loamy Overflow		
		Perella (3%)	R056XY102ND — Wet Meadow		
		Wyndmere (3%)	R056XY087ND — Limy Subirrigated		
I213B	Embden fine sandy loam, 2 to 6 percent slopes	Embden (55%)	R056XY088ND — Loamy Overflow	37.1	15.0%
		Egeland (10%)	R056XY091ND — Sandy		
		Embden, nearly level (10%)	R056XY088ND — Loamy Overflow		
		Maddock (10%)	R056XY090ND — Sands		
		Delamere (5%)	R056XY095ND — Subirrigated		
		Hecla (5%)	R056XY091ND — Sandy		
		Tiffany (5%)	R056XY102ND — Wet Meadow		

Grand Forks County, North Dakota					
Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
I312A	Wyndmere fine sandy loam, 0 to 1 percent slopes	Wyndmere (70%)	R056XY087ND — Limy Subirrigated	0.0	0.0%
		Mantador (8%)	R056XY095ND — Subirrigated		
		Arveson (5%)	R056XY102ND — Wet Meadow		
		Delamere (5%)	R056XY095ND — Subirrigated		
		Embden (5%)	R056XY088ND — Loamy Overflow		
		Ulen (5%)	R056XY087ND — Limy Subirrigated		
		Tiffany (2%)	R056XY102ND — Wet Meadow		
I383A	Overly silty clay loam, 0 to 2 percent slopes	Overly (75%)	R056XY088ND — Loamy Overflow	0.9	0.4%
		Bearden (10%)	R056XY087ND — Limy Subirrigated		
		Kindred (7%)	R056XY095ND — Subirrigated		
		Bearden, moderately saline (4%)	R056XY089ND — Saline Lowland		
		Perella (4%)	R056XY102ND — Wet Meadow		
I413A	Lankin loam, 0 to 2 percent slopes	Lankin (68%)	R056XY094ND — Loamy	1.3	0.5%
		Swenoda (10%)	R056XY088ND — Loamy Overflow		
		Fordville (8%)	R056XY094ND — Loamy		
		Wyard (8%)	R056XY095ND — Subirrigated		
		Bohnsack (3%)	R056XY087ND — Limy Subirrigated		
		Tonka (3%)	R056XY102ND — Wet Meadow		
I477A	Antler silty clay loam, saline, 0 to 1 percent slopes	Antler, moderately saline (75%)	R056XY089ND — Saline Lowland	25.3	10.3%
		Doran (7%)	R056XY095ND — Subirrigated		
		Gilby (7%)	R056XY087ND — Limy Subirrigated		
		Mustinka (6%)	R056XY084ND — Clayey		
		Winger, moderately saline (5%)	R056XY089ND — Saline Lowland		

All Ecological Sites – Rangeland–Grand Forks County, North Dakota

Grand Forks County, North Dakota					
Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres In AOI	Percent of AOI
I594A	LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded	LaDelle (90%)	R056XY094ND — Loamy	39.1	15.8%
		Fairdale (5%)	R056XY088ND — Loamy Overflow		
		Lamoure (3%)	R056XY102ND — Wet Meadow		
		Rauville (2%)	R056XY101ND — Shallow Marsh		
I601A	Bearden silty clay loam, saline, 0 to 1 percent slopes	Bearden, moderately saline (75%)	R056XY089ND — Saline Lowland	0.6	0.2%
		Bearden, slightly saline (10%)	R056XY087ND — Limy Subirrigated		
		Colvin, slightly saline (8%)	R056XY102ND — Wet Meadow		
		Perella (4%)	R056XY102ND — Wet Meadow		
		Overly (3%)	R056XY088ND — Loamy Overflow		
Totals for Area of Interest				246.7	100.0%

Conservation Tree and Shrub Suitability Groups

Conservation tree and shrub suitability groups are a set of groups that consist of soils in which the kinds and degrees of the hazards and limitations that affect the survival and growth of trees and shrubs in conservation plantings are about the same. Descriptions of the groups are provided in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet at <http://soils.usda.gov/technical/>.

Report—Conservation Tree and Shrub Suitability Groups

[Absence of an entry indicates that a conservation tree and shrub suitability group is not assigned]

Conservation Tree and Shrub Suitability Groups— Grand Forks County, North Dakota		
Map unit symbol and soil name	Pct. of map unit	Conservation tree/shrub group
I119A—Bearden silty clay loam, 0 to 1 percent slopes		
Bearden	60	2KK
I146B—Lamoure-Fluvaquents, channeled complex, 0 to 6 percent slopes, frequently flooded		
Lamoure, frequently flooded	45	10
Fluvaquents, channeled, frequently flooded	40	10
I147B—Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded		
Velva	80	5
I150B—Zell, fine-silty-LaDelle silt loams, 2 to 6 percent slopes		
Zell	55	8K
LaDelle	35	1
I156A—Antler silt loam, 0 to 1 percent slopes		
Antler	80	2KK
I176A—Ojata silty clay loam, 0 to 1 percent slopes		
Ojata	85	10
I201A—Glyndon silt loam, 0 to 1 percent slopes		
Glyndon	80	2KK
I213B—Embden fine sandy loam, 2 to 6 percent slopes		
Embden	55	1
I312A—Wyndmere fine sandy loam, 0 to 1 percent slopes		
Wyndmere	70	2KK
I383A—Overly silty clay loam, 0 to 2 percent slopes		
Overly	75	1
I413A—Lankin loam, 0 to 2 percent slopes		
Lankin	68	1

Conservation Tree and Shrub Suitability Groups—Grand Forks County, North Dakota

Conservation Tree and Shrub Suitability Groups— Grand Forks County, North Dakota		
Map unit symbol and soil name	Pct. of map unit	Conservation tree/shrub group
I477A—Antler silty clay loam, saline, 0 to 1 percent slopes		
Antler, moderately saline	75	10
I594A—LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded		
LaDelle	90	1
I601A—Bearden silty clay loam, saline, 0 to 1 percent slopes		
Bearden, moderately saline	75	10

Data Source Information

Soil Survey Area: Grand Forks County, North Dakota
 Survey Area Data: Version 16, Apr 26, 2012



Jack Dalrymple, Governor
Mark A. Zimmerman, Director

1600 East Century Avenue, Suite 3
Bismarck, ND 58503-0649
Phone 701-328-5357
Fax 701-328-5363
E-mail parkrec@nd.gov
www.parkrec.nd.gov

June 4, 2012

Mary C Giltner
319th CES/CEAO
525 Tuskegee Airmen Blvd.
Grand Forks AFB, North Dakota 58205-6434

MLG
ISSUE CEA

Dear Ms. Giltner,

The North Dakota Parks and Recreation Department (the Department) has reviewed the above referenced proposed riparian restoration and stabilization project at the Grand Forks Air Force Base, North Dakota.

Our agency scope of authority and expertise covers recreation and biological resources (in particular rare plants and ecological communities). The project as defined does not affect state park lands that we manage or Land and Water Conservation Fund recreation projects that we coordinate.

The North Dakota Natural Heritage biological conservation database has been reviewed to determine if any plant or animal species of concern or other significant ecological communities are known to occur within an approximate one-mile radius of the project area. Based on this review, several occurrences have been documented as occurring within immediate section or in the adjacent sections of the project area. Please see the attached spreadsheet and map for more information on these occurrences.

Because this information is not based on a comprehensive inventory, there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database. The lack of data for any project area cannot be construed to mean that no significant features are present. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Regarding any reclamation efforts, we recommend that any impacted areas be revegetated with species native to the project area.

We appreciate your commitment to rare plant, animal and ecological community conservation, management and inter-agency cooperation to date. For additional information please contact Kathy Duttonhefner (701-328-5370 or kjduttonhefner@nd.gov) of our staff. Thank you for the opportunity to comment on this proposed project.

Sincerely,

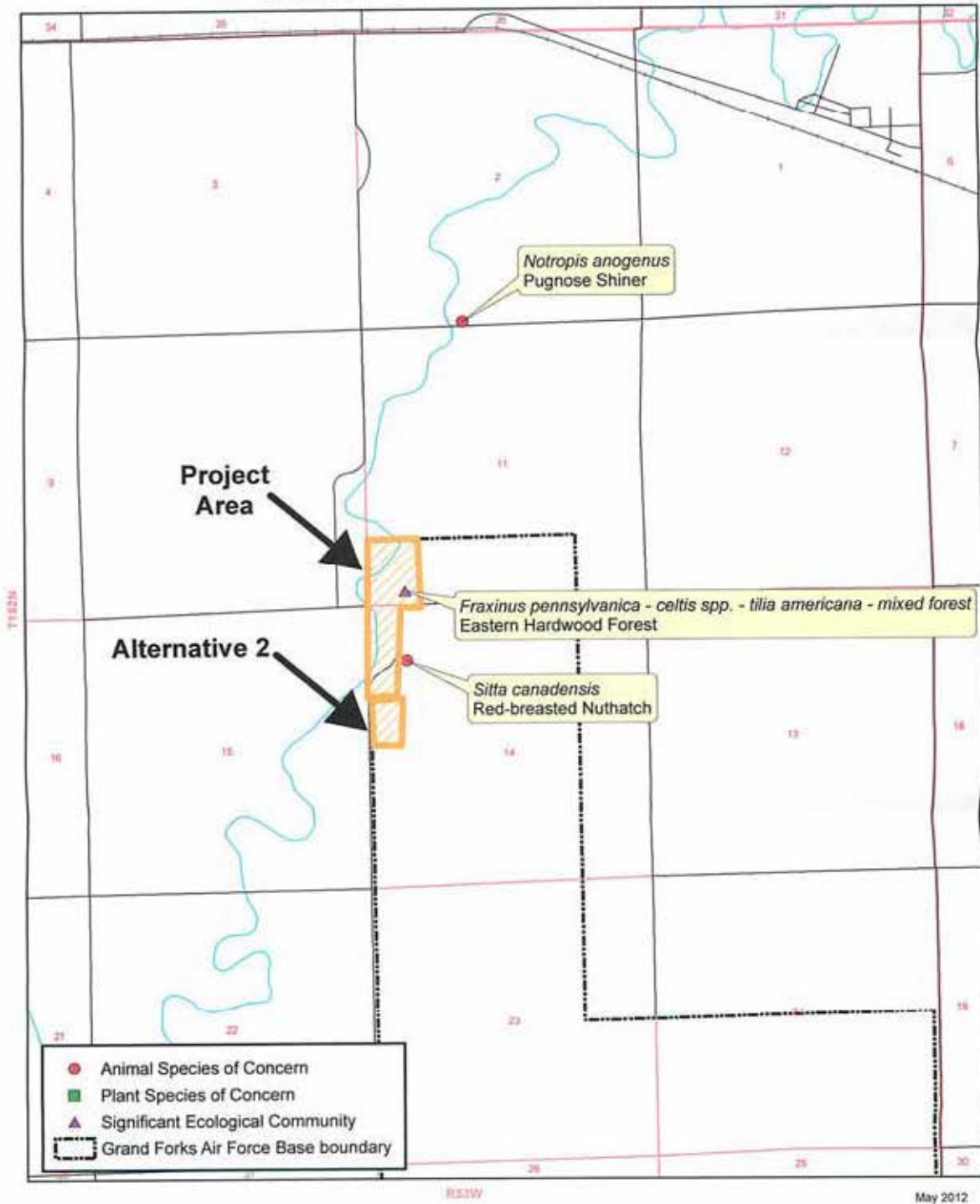
Jesse Hanson, Manager
Planning and Natural Resources Division

RUSNDNHI*2011-142KD5/30/2012DL6.17.2012

.....
Play in our backyard!

Received 15 Jun 12.

North Dakota Parks and Recreation Department
 North Dakota Natural Heritage Inventory



North Dakota Natural Heritage Inventory
Rare Animal and Plant Species and Significant Ecological Communities

State Scientific Name	State Common Name	State Rank	Global Rank	Federal Status	Township Range Section	County	Last Observation	Estimated Representation Accuracy	Precision
Fraxinus pennsylvanica - celtis spp. - tilia americana - mixed forest	Eastern Hardwood Forest	S3	GNR		152N053W - 11; 152N053W - 14	Grand Forks	1993-10		S
Notropis anogenus	Pugnose Shiner	S1	G3		152N053W - 02; 152N053W - 11; 152N053W - 15; 153N052W - 31; 152N053W - 14; 152N053W - 03; 152N053W - 01; 152N053W - 12; 152N053W - 10; 152N053W - 13; 153N053W - 35; 153N053W - 36	Grand Forks	1982-06-04		M
Sitta canadensis	Red-breasted Nuthatch	S4	G5		152N053W - 14	Grand Forks	1993-10		S

North Dakota Natural Heritage Inventory Biological and Conservation Data Disclaimer

The quantity and quality of data collected by the North Dakota Natural Heritage Inventory are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in North Dakota have never been thoroughly surveyed, and new species are still being discovered. For these reasons, the Natural Heritage Inventory cannot provide a definite statement on the presence, absence, or condition of biological elements in any part of North Dakota. Natural Heritage data summarize the existing information known at the time of the request. Our data are continually upgraded and information is continually being added to the database. This data should never be regarded as final statements on the elements or areas that are being considered, nor should they be substituted for on-site surveys.

Estimated Representation Accuracy

Value that indicates the approximate percentage of the Element Occurrence Representation (EO Rep) that was observed to be occupied by the species or community (versus buffer area added for locational uncertainty). Use of estimated representation accuracy provides a common index for the consistent comparison of EO reps, thus helping to ensure that aggregated data are correctly analyzed and interpreted.

Very high (>95%)
High (>80%, <= 95%)
Medium (>20%, <= 80%)
Low (>0%, <= 20%)
Unknown
(null) - Not assessed

Precision

A single-letter code for the precision used to map the Element Occurrence (EO) on a U.S. Geological Survey (USGS) 7.5' (or 15') topographic quadrangle map, based on the previous Heritage methodology in which EOs were located on paper maps using dots.

S - Seconds: accuracy of locality mappable within a three-second radius; 100 meters from the centerpoint
M - Minute: accuracy of locality mappable within a one-minute radius; 2 km from the centerpoint
G - General: accuracy of locality mappable to map or place name precision only; 8 km from centerpoint
U - Unmappable



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
1513 SOUTH 12TH STREET
BISMARCK ND 58504-6640
June 15, 2012

North Dakota Regulatory Office

NWO-2008-2903-BIS

MEMORANDUM FOR: Grand Forks Air Force Base
ATTN: Mary C. Giltner
Deputy Base Civil Engineer
319 CES/CEAO
525 Tuskegee Airmen Boulevard
Grand Forks AFB, North Dakota 58205-6434

*MCG 21 Jun 12
CEA*

SUBJECT: Project Number NWO-2008-2903-BIS: Draft Environmental Assessment (EA)
Addressing Riparian Restoration and Stabilization at the Grand Forks Air Force Base (AFB),
North Dakota.

1. We have reviewed the information provided in the above mentioned project. The Air Mobility Command (AMC) and the 319 Air Base Wing (ABW) are preparing a Draft EA for proposed improvements to the Turtle River's channel conditions and in-stream habitat. The proposed action would include stabilizing and restoring critical areas of bank erosion, repairing areas of minor bank erosion, removing accumulations of woody debris, maintaining and planting wide riparian forest buffers, removing trash and other foreign debris from the channel, and monitoring erosion and channel features for changes. The action would also include restoring and managing the riparian forest areas near the Turtle River using various natural resource management practices.

2. The Corps of Engineers regulates the discharge of dredged or fill material into waters of the United States under Section 404 of the Clean Water Act. Section 404 of the Clean Water Act (33 USC §1344) prohibits the discharge of fill material into waters of the United States without a Department of the Army permit. Fill material includes, but is not limited to, earth, clay, rock, etc. Waters of the United States could include, but are not limited to, streams, ditches, coulees, ponds, lakes, and their adjacent wetlands. The Turtle River and its adjacent wetlands are considered waters of the United States.

3. If this project would result in the discharge of fill into waters of the United States, including the Turtle River, please complete the enclosed application and submit it to the North Dakota Regulatory Office, on the letterhead address. If you have CWA questions, permitting questions, are unsure as to what constitutes a discharge of fill, and/or are unsure of what constitutes waters of the United States, do not hesitate to contact me at the above address or by telephone (701-255-0015) and reference project NWO-2008-2903.

Patsy Crooke
Project Manager
North Dakota Regulatory Office

Attachment: ENG Form 4345

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT <i>(33 CFR 325)</i>			OMB APPROVAL NO. 0710-0003 EXPIRES: 31 August 2012		
Public reporting burden for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.					
PRIVACY ACT STATEMENT					
Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.					
(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)					
1. APPLICATION NO.		2. FIELD OFFICE CODE		3. DATE RECEIVED	
				4. DATE APPLICATION COMPLETE	
(ITEMS BELOW TO BE FILLED BY APPLICANT)					
5. APPLICANT'S NAME:			8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)		
First - Middle - Last -			First - Middle - Last -		
Company -			Company -		
E-mail Address -			E-mail Address -		
6. APPLICANT'S ADDRESS:			9. AGENT'S ADDRESS		
Address -			Address -		
City - State - Zip - Country -			City - State - Zip - Country -		
7. APPLICANT'S PHONE NOS. W/AREA CODE			10. AGENT'S PHONE NOS. W/AREA CODE		
a. Residence b. Business c. Fax			a. Residence b. Business c. Fax		
STATEMENT OF AUTHORIZATION					
11. I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.					
_____			_____		
APPLICANT'S SIGNATURE			DATE		
NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY					
12. PROJECT NAME OR TITLE (see instructions)					
13. NAME OF WATERBODY, IF KNOWN (if applicable)			14. PROJECT STREET ADDRESS (if applicable)		
			Address		
15. LOCATION OF PROJECT			City - State - Zip -		
Latitude: *N					
Longitude: *W					
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)					
State Tax Parcel ID Municipality					
Section - Township - Range -					
17. DIRECTIONS TO THE SITE					

18. Nature of Activity (Description of project, include all features)

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type	Type	Type
Amount in Cubic Yards	Amount in Cubic Yards	Amount in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)
 Acres
 Or
 Liner Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

24. Is Any Portion of the Work Already Complete? Yes No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

Address –
 City – State – Zip –

26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

 SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

ENG FORM 4345, SEPT 2009

**Instructions for Preparing a
Department of the Army Permit Application**

Blocks 1 through 4. To be completed by Corps of Engineers.

Block 5. Applicant's Name. Enter the name and the E-mail address of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the name of the organization and responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked Block 5.

Block 6. Address of Applicant. Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked Block 6.

Block 7. Applicant Telephone Number(s). Please provide the number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed, if you choose to have an agent.

Block 8. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer, or any other person or organization. Note: An agent is not required.

Blocks 9 and 10. Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where he / she can be reached during normal business hours.

Block 11. Statement of Authorization. To be completed by applicant, if an agent is to be employed.

Block 12. Proposed Project Name or Title. Please provide name identifying the proposed project, e.g., Landmark Plaza, Bumeds Hills Subdivision, or Edsall Commercial Center.

Block 13. Name of Waterbody. Please provide the name of any stream, lake, marsh, or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14. Proposed Project Street Address. If the proposed project is located at a site having a street address (not a box number), please enter it here.

Block 15. Location of Proposed Project. Enter the latitude and longitude of where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked Block 15.

Block 16. Other Location Descriptions. If available, provide the Tax Parcel Identification number of the site, Section, Township, and Range of the site (if known), and / or local Municipality that the site is located in.

Block 17. Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site. You may also provide description of the proposed project location, such as lot numbers, tract numbers, or you may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile downstream from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed project site if known.

Block 18. Nature of Activity. Describe the overall activity or project. Give appropriate dimensions of structures such as wing walls, dikes (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles, or float-supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked Block 18.

Block 19. Proposed Project Purpose. Describe the purpose and need for the proposed project. What will it be used for and why? Also include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

Block 20. Reasons for Discharge. If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

Block 21. Types of Material Being Discharged and the Amount of Each Type in Cubic Yards. Describe the material to be discharged and amount of each material to be discharged within Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

Block 22. Surface Areas of Wetlands or Other Waters Filled. Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked Block 22.

Block 23. Description of Avoidance, Minimization, and Compensation. Provide a brief explanation describing how impacts to waters of the United States are being avoided and minimized on the project site. Also provide a brief description of how impacts to waters of the United States will be compensated for, or a brief statement explaining why compensatory mitigation should not be required for those impacts.

Block 24. Is Any Portion of the Work Already Complete? Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square feet). If the work was done under an existing Corps permit, identify the authorization, if possible.

Block 25. Names and Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Project Site. List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked Block 24.

Information regarding adjacent landowners is usually available through the office of the tax assessor in the county or counties where the project is to be developed.

Block 26. Information about Approvals or Denials by Other Agencies. You may need the approval of other federal, state, or local agencies for your project. Identify any applications you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

Block 27. Signature of Applicant or Agent. The application must be signed by the owner or other authorized party (agent). This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

DRAWINGS AND ILLUSTRATIONS

General Information.

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a Vicinity Map, a Plan View or a Typical Cross-Section Map. Identify each illustration with a figure or attachment number.

Please submit one original, or good quality copy, of all drawings on 8½ x11 inch plain white paper (electronic media may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations.

Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross-section). **While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate, and contain all necessary information.**



DEPARTMENT OF THE AIR FORCE
 HEADQUARTERS 319TH AIR BASE WING (AMC)
 GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

MAY 9 2012

MEMORANDUM FOR SEE DISTRIBUTION LIST

FROM: 319 CES/CD
 525 Tuskegee Airmen Boulevard
 Grand Forks AFB, North Dakota 58205-6434

SUBJECT: Draft Environmental Assessment (EA) Addressing Riparian Restoration and Stabilization at Grand Forks Air Force Base (AFB), North Dakota

1. The Air Mobility Command (AMC) and the 319th Air Base Wing (319 ABW) are preparing a Draft EA addressing riparian restoration and stabilization at Grand Forks AFB, North Dakota. The environmental impact analysis process for this proposal is being conducted in accordance with Council on Environmental Quality regulations pursuant to the requirements of the National Environmental Policy Act of 1969. The Draft EA with FONSI/FONPA is included with this correspondence as an attachment.
2. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the attached Draft EA and solicit your comments concerning the proposal and any potential environmental concerns you may have. Please provide written comments or information regarding the Proposed Action and alternatives. Appendix A of the Draft EA contains a listing of those Federal, state, and local agencies and Native American tribes that have been contacted. If there are any additional agencies or tribes that you feel should review and comment on the proposed activities, please include them in your distribution of this letter and the attached materials.
3. Please provide any comments or information directly to 319th CES/CEAO, 525 Tuskegee Airmen Boulevard, Grand Forks AFB, North Dakota 58205-6434 within 30 days of receipt of this letter. If members of your staff have any questions, our point-of-contact for the Draft EA is Ms. Diane Strom, who can be reached at 701-747-6394 or by email at diane.strom@us.af.mil. Thank you for your assistance.

Mary Giltner
 MARY GILTNER
 Deputy Base Civil Engineer

Attachment:
 Draft EA Addressing Riparian Restoration and Stabilization at Grand Forks AFB, ND

U.S. FISH AND WILDLIFE SERVICE
 ECOLOGICAL SERVICES
 ND FIELD OFFICE

Project as described will have no significant impact on fish and wildlife resources. No endangered or threatened species are known to occupy the project area. IF PROJECT DESIGN CHANGES ARE MADE, PLEASE SUBMIT PLANS FOR REVIEW.

6-7-12
 Date *Jeffrey K. Towner*
 Jeffrey K. Towner
 Field Supervisor

Received 12 June 12 .



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region



Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225-0486

ADDRESS:
LOCATION:
134 Union Blvd.

Lakewood, Colorado 80228-1807

MAILING
STREET

MEMORANDUM

DATE: July 2, 2012

TO: Diane Strom, Environmental Impact Analysis Program

FROM: Adrianna Araya, Migratory Bird Program

SUBJECT: Grand Forks AFB draft EA Addressing Riparian Restoration and Stabilization

Thank you for the opportunity to review the draft EA for Grand Forks Air Force Base (GFAFB) on the above subject. Overall the document was well written and thoughtful, particularly with regards to including actions that will assist with minimizing negative impacts to migratory birds within the project area.

After considering the proposed action and alternatives and the resulting impacts that each would potentially have on migratory birds and their habitats, Alternative 2 – Riparian Restoration and Stabilization with Partial Riparian Forest Restoration, is the favored alternative. This decision is supported by the following summary of alternative actions and where appropriate, I have also included recommendations or points for further consideration.

Preferred Alternative (Alternative 1): Full Riparian Restoration and Stabilization and Riparian Forest Restoration

Riparian restoration would stabilize and restore critical areas of bank erosion using bioengineering techniques and repair areas of minor bank erosion with bioengineering and planting of native tree and shrub buffers. Riparian forest restoration involves cutting primarily unhealthy, diseased, and hazardous trees, removing selective trees for bank stabilization, piling woody debris to create organic soils, interplanting native saplings, limiting vehicle access, and removing trash and other debris.

Other management efforts would include protecting the area from destructive practices such as off-trail ATV use, paintball use, and cutting of young, healthy trees, and unmanaged grazing and wildfires. Monitoring would occur for insects, disease, and deer and beaver damage and efforts to remove and control noxious weeds. Riparian forest and prairie grassland areas would be monitored as needed during establishment and every 5 years thereafter.

From a broad, landscape level scale, I would not recommend additional trees be planted in an area that is historically prairie/prairie pothole. However, the number of native trees that would be planted in natural revegetations (1.28 acres) would be negligible compared to what currently exists.

It is difficult to assess the full impacts under Alternative 1 (2 and 3) without knowing when project activities will occur during the year. There are no construction schedules or monitoring plans to refer to ...no mention of when things will be done only an approximation of construction activities as 6 months or 120 working days (3.2 Noise). Having these details (even by month number i.e. month 1, 2, 3, etc.) would better support the ambitious goals under Alternative 1 and ability to address concerns for migratory birds.

Alternative 2: Riparian Restoration and Stabilization with Partial Riparian Forest Restoration

Riparian restoration would not be as robust as in Alternative 1 but would include interplanting of native saplings, limiting vehicle access, and removing trash and other debris. Grass areas of the forest would be managed and noxious weeds removed and controlled. Riparian forest and prairie grassland areas would be monitored as needed during establishment and every 5 years thereafter.

This Alternative may be more realistic to accomplish within a six month time frame, especially if construction delays occur. However, there are some other critical management issues mentioned under Alternative 1 such as vehicle access, off-trail ATV use, paintball use, and cutting of young, healthy trees, that would seem possible to address under Alternative 2 by posting signs and/or making on-site visits in identified problem areas by Conservation Officers or other authorities.

Alternative 3: Riparian Restoration and Stabilization with Full Riparian Forest Restoration Using Grand Forks AFB and Off-Installation Natural Revegetation Sources

Riparian restoration would be the same as in Alternative 1 but rather than using trees and shrubs from regional nurseries or from the Grand Forks County Soil Conservation District, trees would come from an adjacent area on the Grand Forks AFB and if necessary, from off the installation.

Using existing resources at Grand Forks AFB to restore and stabilize eroded banks along the Turtle River could off-set concerns about the planting of additional trees in this otherwise historically prairie/prairie pothole landscape. However, the harvest area is said to be important for some migratory bird species, notably the pileated woodpecker and white-throated sparrow (3-39). In addition, some of the trees in the harvest area are already at a height to be a safety concern for air traffic.

Alternative 4: No Action Alternative

None of the activities described in the former Alternatives would be undertaken and therefore no negative impacts would occur aside from the continued deterioration of the Turtle River riparian system in the designated project area.

Provided that migratory birds are afforded protection from existing laws and conservation practices, the long-term benefits of restoring the riparian system in the project area may out-weight the short-term impacts.

Specific comments relative to impact topics: Noise (3.2)

As with other wildlife, migratory birds are sensitive to noise disturbance and depending on level (dBA) and duration, may be negatively impacted by construction activities particularly during the nesting

season. While birds are nesting, either incubating eggs or tending to young, they spend more time at the nest site and are more vulnerable to noise emitted by construction equipment. From the disturbance, parents may be more likely to abandon eggs or young resulting in unpermitted, incidental take. As mentioned in the draft EA, noise can also distort or mask bird's communication signals and ability to find prey or detect predators. Finally, birds with active nests may use avoidance behaviors that require additional (wasted) energy expenditures.

It is noted that Fig 3.1 is a measure of the noise produced by the former KC-135 aircraft. How does the noise from the different missions KC-135 vs. RPA compare? Based on Table 3-7, it appears that if construction were unavoidable during the nesting season, an active nest found at more than 1,200 ft. would fall in the "normally acceptable" noise level range. Nests found within 1200 ft. may require additional protection from construction noise.

Page 3-13, paragraph 1, describes a "potential noise-sensitive receptor approximately 0.5 miles northwest of the 65 to 69 dBA DNL noise contour" but never identifies the receptor? Although the 2010 noise study for the new RPA mission estimated noise levels at this receptor to be approximately 60 dBA a "normally acceptable" rating, construction noise at the potential noise-sensitive receptor was estimated at 76 to 82 dBA which according to criteria is "clearly unacceptable" (p3-9).

Specific comments relative to impact topics: Biological Resources (3.5)

While considering Biological Resources and within the context of sensitive biological resources, please include the Service's Birds of Conservation Concern (http://library.fws.gov/Bird_Publications/BCC2008.pdf). Birds that are known to occur within the project area are listed on page 3-32. Other birds documented in the draft INRMP for Grand Forks AFB (4/2011), Table 5-2, *Documented GFAFB Species of Concern on GFAFB*, include the following riparian associated species that, if found, are priorities for conservation action:

American Bittern
Bald Eagle
Black Tern
Black-billed Cuckoo
Red-headed Woodpecker
Solitary Sandpiper

Page 3-36, paragraph 3, describes concerns about the removal of trees within the riparian forest that are available to bats for maternity and solitary roosting. These same concerns should also be extended to migratory birds.

Undoubtedly, the Turtle River restoration project will yield long-term benefits to many species of migratory birds that use the area for nesting, resting, and feeding. Regardless of the Alternative ultimately chosen (except 4), to minimize the number of migratory birds impacted by the project, it is key that activities are conducted outside of the nesting season. Additional adherence to BMPs (including MBTA and EO 13186) described on pages 3-37 and 3-38 are critical to successful conservation and management of our migratory bird resource.

If you have any questions, please contact me at 303-236-4405 or by email at adrianna_araya@fws.gov.

APPENDIX B

SUMMARY AIR QUALITY CONFORMITY ANALYSIS

Air Quality Emissions from Alternative 1

	NO_x (ton)	VOC (ton)	CO (ton)	SO₂ (ton)	PM₁₀ (ton)	PM_{2.5} (ton)	CO₂ (ton)
Construction Combustion	0.871	0.117	0.512	0.001	0.046	0.046	114.798
Construction Fugitive Dust	-	-	-	-	1.274	0.127	-
Haul Trucks	0.012	0.008	0.035	0.001	0.014	0.004	2.975
Construction Commuter	0.013	0.013	0.119	0.0002	0.001	0.001	15.778
TOTAL	0.896	0.139	0.666	0.002	1.335	0.178	133.550

Note: Total PM_{10/2.5} fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO₂ emissions converted to metric tons = **121.130 metric tons**
 State of North Dakota's CO₂ emissions = **52,968,738 metric tons (EIA 2010)**
 Percent of North Dakota's CO₂ emissions = **0.0002% metric tons**

Source: U.S. Department of Energy/Energy Information Administration (EIA). 2010. State Carbon Dioxide Emissions Summary for the State of North Dakota. Available online: <http://www.eia.doe.gov/oiat/1605/state/state_emissions.html>. Accessed 5 May 2011.

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because Alternative 1 is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

State of North Dakota Air Quality Control Region 172

Year	Point and Area Sources Combined					
	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
2002	175,514	47,619	336,817	167,843	379,954	67,046

Source: USEPA-AirData NET Tier Report (<http://www.epa.gov/air/data/geosel.html>). Site visited on 5 May 2011.

Alternative 1 Emissions Compared to State of North Dakota AQCR 172 Emissions

	Point and Area Sources Combined					
	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
Regional Emissions	175,514	47,619	336,817	167,843	379,954	67,046
Emissions	0.90	0.14	0.67	0.002	1.34	0.18
% of Regional	0.001%	0.0003%	0.0002%	0.0000001	0.0004%	0.0003%

Summary
 Estimated Emissions for Alternative 1

Air Quality Emissions from Alternative 3

	NO_x (ton)	VOC (ton)	CO (ton)	SO₂ (ton)	PM₁₀ (ton)	PM_{2.5} (ton)	CO₂ (ton)
Construction Combustion	7,688	1,038	4,264	0.010	0.394	0.394	885,795
Construction Fugitive Dust	-	-	-	-	1.274	0.127	-
Haul Trucks	0.010	0.007	0.028	0.001	0.011	0.003	2,423
Construction Commuter	0.013	0.013	0.119	0.0002	0.001	0.001	15,778
TOTAL	7.711	1.058	4.411	0.011	1.681	0.526	903,996

Note: Total PM_{10/2.5} fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO₂ emissions converted to metric tons = **819,924 metric tons**
 State of North Dakota's CO₂ emissions = **52,968,738 metric tons (EIA 2010)**
 Percent of North Dakota's CO₂ emissions = **0.002% metric tons**

Source: U.S. Department of Energy/Energy Information Administration (EIA). 2010. State Carbon Dioxide Emissions Summary for the State of North Dakota. Available online: <http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html>. Accessed 5 May 2011.

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because Alternative 3 is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

State of North Dakota Air Quality Control Region 172

Year	Point and Area Sources Combined					
	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
2002	175,514	47,619	336,817	167,843	379,954	67,046

Source: USEPA-AirData NET Tier Report (<http://www.epa.gov/air/data/geosel.html>). Site visited on 5 May 2011.

Alternative 3 Emissions Compared to State of North Dakota AQCR 172 Emissions

	Point and Area Sources Combined					
	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
Regional Emissions	175,514	47,619	336,817	167,843	379,954	67,046
Emissions	7.71	1.06	4.41	0.011	1.68	0.53
% of Regional	0.004%	0.002%	0.001%	0.0000001	0.0004%	0.001%

Summary
 Estimated Emissions for Alternative 3

APPENDIX C
FLOODPLAIN MANAGEMENT PLAN

1. Introduction

Grand Forks Air Force Base (AFB) developed this Floodplain Management Plan (FPMP) in conjunction with the *Environmental Assessment Addressing Riparian Restoration and Stabilization at Grand Forks Air Force Base, North Dakota* to guide future actions that are being considered for development in the 100-year floodplain. Executive Order (EO) 11988, *Floodplain Management*, seeks to avoid construction of facilities or structures within floodplains to reduce the risk of flood loss; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains.

This document provides an overview of regulations, an inventory of structures and assets currently in the floodplain within the Grand Forks AFB installation boundary, and guidelines for future development. The FPMP serves to provide corrective and preventive measures for reducing flood damage to structures, and to maintain the functions and values of the floodplain.

1.1. Purpose and Need

Proposed construction by a Federal agency within a floodplain must comply with EO 11988, *Floodplain Management*, and the appropriate National Flood Insurance Program guidelines. **Section 2** provides more details on these regulations including state and local programs.

The purpose of this FPMP is to help guide future development at Grand Forks AFB in relation to the 100-year floodplain. EO 11988 seeks to avoid construction of facilities or structures within floodplains to reduce the risk of flooding; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains. Some of these beneficial values include increasing water quality through the prevention of erosion, recharging groundwater by soil infiltration, enhancing biological productivity by supporting a high rate of plant growth, and providing habitat for fish and wildlife. Approximately 4 percent (256 acres) of the landmass at Grand Forks AFB is within the 100-year floodplain. This document provides an overview of regulations, an inventory of structures and assets in the floodplain at Grand Forks AFB, and guidelines for future development.

The U.S. Air Force (USAF) is required to prepare a Finding of No Practicable Alternative (FONPA) in accordance with EO 11988, *Floodplain Management*; EO 11990, *Wetlands Protection*; and 32 Code of Federal Regulations (CFR) 989 Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process* (EIAP). FONPAs are prepared in conjunction with Environmental Assessments (EAs) or Environmental Impact Statements and are attached to a Finding of No Significant Impact (FONSI) or a Record of Decision (ROD).

A FONPA is required for all projects proposed in the 100-year floodplain at Grand Forks AFB. The project EIAP documentation, along with the FONPA, requires Headquarters (HQ) Air Mobility Command (AMC) approval. This approval cycle at Grand Forks AFB is time-consuming and has delayed the start of construction projects. To streamline the Grand Forks AFB EIAP, this document will serve as a guide to be followed when conducting activities such as new construction within the 100-year floodplain. It would also serve as an inclusion for future Grand Forks AFB FONPA documentation as part of the USAF EIAP.

1.2. Location

Grand Forks AFB is a 5,773-acre military installation in Grand Forks County, North Dakota, near the North Dakota-Minnesota state boundary. The installation is within the Red River Basin, with floodplains

identified on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) along Turtle River in the northwestern portion of the installation and along the southeastern boundary of the sewage treatment lagoons associated with Kellys Slough National Wildlife Reservation (NWR).

Approximately 4 percent (256 acres) of the landmass at Grand Forks AFB is in the 100-year floodplain. Furthermore, approximately 12 percent of landmass outside the floodplain on Grand Forks AFB is designated as runway and airfield and is constrained from being developed for safety reasons (clear zones, noise constraints). In addition to land constrained by the runway and airfield, 5 percent of the land is occupied by drainage ditches, culverts, roads, and sidewalks. Therefore, approximately 4,479 acres (78 percent) are outside the 100-year floodplain and are suitable for development (see **Table 1-1**).

Table 1-1. Land Use and the 100-Year Floodplain at Grand Forks AFB

Description	Acres
Total Acres at Grand Forks AFB	5,773
Acres in the 100-Year Floodplain	256
Remaining Acres Outside the 100-Year Floodplain	5,517
Acres Outside the 100-Year Floodplain Containing Constraints	1,038
Remaining Acres Outside the 100-Year Floodplain Suitable for Future Development	4,479

1.3. Grand Forks AFB Water Resources

1.3.1. Groundwater

Groundwater within Grand Forks County occurs in unconsolidated glacial drift deposits and in rocks of Cretaceous- and Ordovician-age underlying the glacial deposits. Subsurface water flows primarily to the east, and the aquifers present include the Dakota Aquifer and the Emerado Aquifer.

The deepest aquifer is found in the Ordovician-aged Red River Formation. Yield varies depending on joints and fractures within the formation, and the groundwater is very saline. The Dakota aquifer is the principal bedrock aquifer among the Great Plains states providing groundwater to wells at rates ranging from 2 to 50 gallons per minute (gpm). The Dakota aquifer, which is approximately 250 feet below ground surface (bgs), is very saline and is used primarily for livestock watering as it is considered unsuitable for domestic consumption or industrial use. The water level within the aquifer has dropped nearly 20 feet in the past several years due to increased use for agricultural purposes (GFAFB 2011).

The uppermost aquifer is the Emerado Aquifer, a major glacial drift aquifer underlying Grand Forks AFB approximately 50 to 75 feet bgs. Groundwater is confined under an artesian head, and well yields can vary from rates of 50 to 500 gpm. Water quality within the aquifer is poor, with high levels of dissolved solids and salinity. This is potentially attributable to upward seepage of groundwater from bedrock aquifers. The Emerado Aquifer is confined both above and below by a clayey glacial till (GFAFB 2011).

None of the described aquifers are sole-source providers (USEPA 2010). Potable water for Grand Forks AFB is obtained from surface water sources including the Red River and Red Lake River through the City of Grand Forks (GFAFB 2011).

1.3.2. Surface Water

Surface water surrounding Grand Forks AFB includes rivers, streams, and numerous wetlands. Grand Forks AFB is within the Red River Basin, which drains 48,490 square miles. The Red River Basin's tributaries typically have relatively steep upper reaches that spill into the flat main stem valley floor in the lakebed of former glacial Lake Agassiz (USACE 2011).

The Turtle River is the only primary body of water that is present on Grand Forks AFB; however, Kellys Slough, within the Kellys Slough NWR is approximately 2 miles east of Grand Forks AFB. Just beyond the southern boundary of the installation is Hazen Brook, which flows to the east along the southern side of U.S. Highway 2. Turtle River is a jurisdictional water of the United States, Kellys Slough and Hazen Brook are not.

The Turtle River flows through the northwestern corner of the installation boundary, meandering in a northeasterly direction. It eventually empties into Lake Winnipeg in Canada via the Red River, within the Red River Drainage Basin. Turtle River is part of the 685-square-mile Turtle River Watershed in northeastern North Dakota (GFCSCD 2011). Within the boundaries of Grand Forks AFB, Turtle River flows for approximately 3,666 feet (RRRC 2006). Peak flows occur in April, consistent with spring thaw, and minimum flows occur in January and February. Flows are managed on this river by the flood-control structure in Larimore, North Dakota.

Turtle River has been classified as a Class 2 stream by the North Dakota Department of Health, with water quality sufficient to sustain fish populations and suitable for irrigation and recreational purposes (GFAFB 2007). However, the river has been placed on North Dakota's 2010 Section 303(d) priority waterbody list due to elevated cadmium, selenium, and sediment/siltation (NDDH 2010). TMDLs have not yet been determined for these constituents. Most of the impairments to the Turtle River are caused or influenced by streambank and channel erosion and can be improved through the establishment of a proper functioning riparian corridor (RRRC 2006). However, because of these impairments, the river has been deemed fully supporting but threatened with respect to fish and other aquatic biota, municipal and domestic uses, and recreation (NDDH 2010). Trash and large woody debris are also present throughout this reach of the river.

During a 2006 study conducted by the RRRC to ascertain streambank morphology of Turtle River, it was determined that high flood flow had been responsible for transporting large amounts of sediment and had exacerbated erosion by removing streambank sediment. Over time, as the climate has become wetter, the Turtle River channel has widened and cut down into the streambed. The river is entrenched for short lengths within the Grand Forks AFB boundaries; some of these sections appear to be attenuating back to natural conditions with more stable banks. During the study, it was apparent that severe erosion occurred outside of meanders, especially where vegetation was sparse. The study also identified deep scour holes, riffles, and pools, with depths of at least 3 feet. The average water depth ranged from 1.22 to 2.91 feet during the study, which was conducted during summer months when water levels were low. Bankfull depths typically correspond to a depth where the channel fills to the point at which it would spill onto the floodplain. Within the stretch of Turtle River that flows through the installation, bankfull depths ranged from 2.23 to 4.37 feet (RRRC 2006).

The channel assessment portion of the study indicated that Turtle River is both C- and F-type channels according to the Rosgen classification system (Rosgen 1996). The C-type channel is defined as a slightly entrenched meandering channel with an established floodplain. This type of channel can experience considerable lateral migration, as influenced by the condition of the adjacent riparian vegetation. Sediment supply might be high, especially if the banks are highly susceptible to erosion and the channel is vulnerable to lateral and vertical changes in response to disturbances in the watershed such as dam

construction or shifts in land use and hydrology (Rosgen 1996) F-type channels are similar to C-type but are more entrenched. F-type channels also transport high sediment loads in the presence of erodible streambanks. Because of high bank heights and increased depth to the water table, riparian vegetation associated with this channel type has little influence on bank stability. If new slope toes can be established, riparian vegetation could develop and promote bank stability along the areas classified as an F-type channel (Rosgen 1996). Turtle River is considered an F-type channel to the northeast of the farm located on the westside of the river, and in the northernmost stretch of the river within the installation boundary (RRRC 2006).

The other prominent surface water feature, Kellys Slough NWR, is within a wide, marshy floodplain approximately 2 miles east of the installation. Surface water runoff is received from the eastern half of Grand Forks AFB; effluent is also received from water treatment lagoons maintained by the installation to the east of Grand Forks AFB. Drainage from Kellys Slough NWR flows to the northeast into the Turtle River and eventually into the Red River. The Red River runs beyond the eastern portion of the installation, approximately 15 miles away. The Red Lake River supplies a portion of the drinking water supply to Grand Forks AFB.

Storm water drainage at Grand Forks AFB occurs through four drainage ditches (i.e., southeast, northeast, northwest, and west) and nine outfalls. The outfalls convey drainage into Kellys Slough NWR and eventually into Turtle River. Facilities on Grand Forks AFB discharge sanitary wastewater to sewage treatment lagoons to the east of the main installation. The sewage treatment lagoons are approximately 320 acres and discharge to the east into Kellys Slough (GFAFB 2009). The sewage treatment lagoons are classified as lakes according to the National Wetlands Inventory.

1.3.3. Floodplains

The Red River Basin is subject to frequent floods that affect urban and rural infrastructure and agricultural production (USACE 2011). Turtle River is the only river to cross the Grand Forks AFB boundary; therefore, a portion of the 100-year floodplain for the Turtle River is present in the northwesternmost corner of the installation. Flooding is estimated to occur along Turtle River every 0.8 to 1.5 years (RRRC 2006). According to the FEMA FIRM Panel No. 38035C0525E (effective 17 December 2010), the 100-year floodplain associated with Turtle River extends along the northwestern panhandle of the installation boundary, adjacent to 22nd Avenue (FEMA 2010). This area is classified as Zone A, indicating it is within the 100-year floodplain. Areas within the floodplain are required to comply with National Flood Insurance Program floodplain management requirements, such as constructing buildings above base flood level and obtaining flood insurance coverage. There are also 100-year floodplains along the southeastern boundary of the sewage treatment lagoons associated with Kellys Slough.

1.3.4. Wetlands

The Red River Basin contains thousands of natural wetlands and prairie potholes. These wetlands have a profound effect on the hydrologic flow regime of streams and the residence time of water within the basin. These wetland areas generally occur in areas of poorly drained soils in shallow depressions formed on glacial and lacustrine plains. Wetlands on Grand Forks AFB occur frequently in drainageways, low-lying depressions, and potholes.

The current total acreages of wetlands that were calculated using GIS data indicate that Grand Forks AFB has 284 wetlands composing 308 acres. Jurisdictional determinations from the USACE expire after 5 years. Most of the installation's jurisdictional determinations are beyond the 5-year lifespan and have expired. It is likely that those wetlands with expired jurisdictional determinations would be determined

jurisdictional by the USACE if surveyed again. There are 30 wetlands with current jurisdictional determinations composing approximately 23 acres.

Of the installation's wetlands inventory, palustrine wetlands predominate at 305 acres (99 percent of the inventory). Palustrine wetlands include all nontidal wetlands dominated by trees, shrubs, emergents, mosses, or lichen. Of the 305 acres of palustrine wetlands, there is a 47-acre palustrine emergent/lacustrine wetland north of the installation sewage lagoons. Lacustrine wetlands are situated in a topographic depression or a dammed river channel and lacks trees, shrubs, persistent emergents, emergent mosses, or lichen.

The remaining 3 acres consist of riverine wetland present in the northwestern corner of the installation along the Turtle River, within the proposed project area. Riverine wetlands, such as those found within the site of the Proposed Action, are those that occur within the river channel and are dominated by emergent vegetation. Two small wetlands (drainages) are delineated just beyond the tree planting and other ground-disturbance activities associated with the Proposed Action. When inundated, riverine wetlands provide habitat for water-tolerant plants such as willows, and aquatic animals such as tadpoles and immature fish.

1.4. Land Cover

Land cover can affect both the degree of storm water infiltration and runoff following precipitation events. Land cover with more natural areas (i.e., wetlands, forests) and less development within floodplains typically has lower exposure to flooding. Natural land cover has various properties that help to regulate water flows both above and below ground. For example, forest canopy and leaf litter aid in attenuating the impact of raindrops on the earth's surface, thereby reducing soil erosion and sedimentation. Plant roots secure the soil in place, especially on steeper slopes, and absorb water. Openings in leaf litter and soil pores permit the infiltration of water, which percolates through soil into the groundwater. Soil erosion and sedimentation can result when natural ground cover is insufficient, such as within urban areas. Urban areas are associated with a proliferation of impervious surfaces, such as paved roads, parking lots, and rooftops. Developed areas result in an increased velocity of storm water runoff and a decrease in storm water infiltration, which reduces groundwater recharge (Columbia University 2009).

It is estimated that more than 50 percent of the original forest cover in many watersheds in eastern North Dakota has been cleared for agricultural use in the past 50 years (USEPA undated). In addition, much of Grand Forks AFB is developed; however, storm water management areas reduce the impact of increased impervious surfaces and potential hydrological changes due to development. In addition, the 140 acres of shelterbelts and other tree plantings accomplished by Grand Forks AFB has assisted in slowing storm water runoff and increasing infiltration.

1.5. Causes of Flooding in the Grand Forks Area

Flooding in the Grand Forks area is caused primarily by the water within the Red River and Turtle River overtopping their banks.

The Red River flows to the north, and spring snowmelt in the south is trapped as the flow of water is confined to the north attempts due to frozen areas. Floodwaters overflow the banks of the river and cover a wide geographic area of the nearly flat Red River Valley. Levees have been constructed along the river to quell flooding impacts, but major flooding events have occurred along the Red River and Turtle River in 1997 (from an active winter storm season with eight blizzards and rapid spring snowmelt), 2000, 2004,

2009, and 2011 (USACE 1998, USGS 2011). Since official record keeping began in 1882, major floods affecting large areas of the Red River Basin have occurred once every 4 to 6 years (Bolles et al. undated).

In addition to flooding from overtopped rivers, the low relief in the county also makes the area highly susceptible to overland flooding, which occurs after extreme rain events or the spring snow melt. Rainfall during April through September accounts for about 75 percent of North Dakota's precipitation, with a mean of 13 to 20 inches annually. During winter, snowfalls are usually less than 1 inch per storm event and total snowfall averages less than 3 feet annually (USACE 1998). The combination of frozen ground, saturated soils, or impermeable clay soils prevents water from soaking into the ground. The result is a widespread, slow-moving mass of water that inundates large areas.

2. Floodplain Management and Development Regulations

This section provides summaries of Federal, state, and local regulations related to management and construction within a floodplain. State and local regulations are provided for general reference.

2.1. Federal Regulations

2.1.1. EO 11988, Floodplain Management

EO 11988 seeks to avoid construction of facilities or structures within floodplains to reduce the risk of flood loss; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains.

When the only practicable alternative consistent with the law and with the policy set forth in the EO requires siting in a floodplain, the agency shall design or modify its action to minimize potential harm to or within the floodplain, consistent with regulations issued in accordance with Section 2(d) of the EO, and prepare and circulate a notice explaining why the action is proposed to be in the floodplain. The construction of Federal structures and facilities must be in accordance with the standards, criteria, and intent of the National Flood Insurance Program (NFIP). New structures can deviate from this only to the extent that the standards of the NFIP are demonstrably inappropriate for a given type of structure or facility. If new construction or substantial rehabilitation is proposed to be in a floodplain, accepted floodproofing and other flood-protection measures would need to be applied. To achieve flood protection, agencies would elevate structures above the base flood level rather than filling in land, wherever practicable.

2.1.2. National Flood Insurance Program Regulations

The NFIP was created by Congress in 1968 to provide federally backed flood insurance coverage, because flood insurance was generally unavailable from private insurance companies. The NFIP is also intended to reduce future flood losses by identifying floodprone areas and ensuring that new development in these areas is adequately protected from flood damage. FEMA, through the Federal Insurance Administration, makes flood insurance available to the residents of a participating community provided that the community adopts and enforces adequate floodplain management regulations that meet the minimum NFIP requirements. The NFIP encourages communities to adopt floodplain management ordinances that exceed the minimum NFIP criteria. Included in the NFIP requirements, found in 44 CFR, are minimum building design and construction standards for buildings in SFHAs (FEMA 1994).

The Federal Interagency Floodplain Management Task Force has identified four floodplain management strategies for reducing the human economic losses from flooding and minimizing the losses of natural and beneficial floodplain resources. Each strategy includes specific tools that can be used to achieve the management objectives. **Table 2-1** shows the strategies and tools developed for floodplain management.

FEMA has developed Technical Bulletins to provide specific guidance for complying with the minimum requirements of existing NFIP regulations. The NFIP regulations that specifically apply to the design of floodproofing for nonresidential buildings are within Section 60.3(c)(3), which states that the community shall require that all new construction and substantial improvement of nonresidential structures have the lowest floor (including the basement) elevated to or above the base flood level, or be designed so that below the base flood level the structure and associated utilities are watertight with walls substantially impermeable, and that structural components have the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

Table 2-1. FEMA Floodplain Management Strategies

Strategy	Objective	Tools
1. Modify Human Susceptibility to Flood Damage	Reduce disruption by avoiding hazardous, uneconomic, or unwise use of floodplains.	Regulate floodplain use through zoning codes, preserve land in floodplain as open space, elevate buildings, prepare for flooding through forecasting, restore and preserve natural resources and functions of floodplains.
2. Modify the Impact of Flooding	Assist individuals to prepare for, respond to, and recover from a flood.	Provide information to assist self-help measures, follow flood emergency measures, prepare post-flood recovery plans and programs, and implement mitigation plans.
3. Modify Flooding	Develop projects that control floodwater.	Build dams and reservoirs to store excess water, build dikes and floodwalls, alter channels to make them more efficient, divert high flows around developed areas, store excess runoff with onsite detention, develop shoreline protection measures, control runoff from areas outside the floodplain.
4. Preserve and Restore Natural Resources	Renew the vitality and purpose of floodplains by reestablishing and maintaining floodplain environments in their natural state.	Implement land use regulations to steer development outside of sensitive or natural areas, preserve open space, relocate buildings, restore floodplains and wetlands, preserve natural functions and habitats, provide education on floodplain resources and functions and how to protect them, conduct beach nourishment and dune building to protect inland development.

Source: FEMA 1998

In addition, Section 60.3(c)(4) states that where nonresidential structures are intended to be watertight below the base flood level, a registered professional engineer or architect should review the structural design plans and certify that the design and methods of construction are in accordance with accepted standards to meet application floodplain provisions found in Section 60.3(c) (3) (ii) or 60.3 (c) (8) (ii) and that a record of the certificate is maintained with the official designated by the community.

Section 60.3(c)(8) further states that the community shall require within any zoned classified as “AD” on the FEMA FIRM that all new construction or substantial improvements of non-residential structures have the lowest floor (including the basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community’s FIRM. Also, structures should be completely floodproofed to the base flood level, including utility and sanitary facilities, to meet the floodproofing standard as specified in Section 60.3(c)(3)(ii).

2.1.3. FEMA Technical Bulletin 3-93: Nonresidential Floodproofing Requirements Certification

The FEMA bulletin describes design, construction, and planning requirements for floodproofing nonresidential buildings under the NFIP regulations and how to correctly complete the NFIP’s Floodproofing Certificate for NonResidential Structures form (FEMA 1994). A Floodproofing Certificate for NonResidential Structures (FEMA Form 81-65) has been developed by FEMA for use in

the certification of nonresidential floodproofing designs. Because of the increased potential for significant building damage due to the failure of the floodproofing system, the NFIP requires a design certification for all floodproofed buildings (FEMA 1994). The following are the minimum engineering considerations for floodproofing:

- The building must be watertight.
- The building's utilities and sanitary facilities, including heating, air conditioning, electrical, water supply, and sanitary sewage services, must be located above the base flood elevation, completely enclosed within the building's watertight walls, or made watertight and capable of resisting damage during flood conditions.
- All of the building's structural components must be capable of resisting specific flood-related forces.
- As with all construction that falls under the NFIP regulations, the building must meet the requirements of all applicable portions of state and local building codes.

2.2. State Regulations

2.2.1. The North Dakota Department of Commerce

Floodplain management in North Dakota is authorized by the North Dakota Floodplain Management Act of 1981, North Dakota Century Code Chapter 61-16.2 as amended in 1999 and in 2003 (State of North Dakota 2003). This legislation authorizes the Office of the State Engineer to undertake activities to identify flood hazards and to assist communities that participate in the NFIP. This Act also adopts the NFIP by reference into the North Dakota Century Code.

Section 1602 of the North Dakota Building Code contains the Structural Design Requirements for building construction. Section 1612 to 1626 contains specific standards for flood loads. The design and construction of structures within flood hazard areas must comply with the American Society of Civil Engineers 24, a referenced standard in the International Building Code. The entire code can be viewed at the following Web site: <http://www.archive.org/details/gov.nd.building>.

2.3. Local Regulations

2.3.1. Grand Forks County

The floodproofing code of the City of Fargo, North Dakota, and its Appendix, has been adopted for Grand Forks County (Grand Forks County 1987). All building permits must be obtained before construction or development begins within any area of special flood hazard. Elevation certificates are required for any building in the floodplain. Development permits require certification by a registered professional engineer or architect that the floodproofing methods for any non-residential structure meet the floodproofing criteria in Section 21-0604, *Provisions for Flood Hazard Reduction*, of the City of Fargo Municipal Code (City of Fargo 2010).

2.3.2. City of Grand Forks

Grand Forks City Code: Floodway and Floodplain Districts, Section 18-0220, as amended, applies to flood hazard areas within the jurisdiction of the city. The city requires a permit for new development and substantial addition or alteration to existing structures (City of Grand Forks 2010).

THIS PAGE INTENTIONALLY LEFT BLANK

3. Land Use in the 100-Year Floodplain

There is currently one building, Building 872, the north end instrument landing system localizer, within the 100-year floodplain. There are 213 acres of land classified as Airfield Operations, 1 acre classified as Industrial, and 42 acres classified as Outdoor Recreation in the 100-year floodplain. **Figure 3-1** provides an aerial view of Grand Forks AFB and the FEMA flood map data.

3.1. The Use of GIS for Future Land Use

A Geographic Information System (GIS) is a collection of computer hardware, software, and geographic data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. ESRI's ArcGIS 10 software was used to analyze existing spatial data on Grand Forks AFB that was provided by Grand Forks AFB. To calculate installation structures within the 100-year floodplain, the CLIP tool in ESRI's Arc Toolbox was used to clip the buildings feature class (provided in GFAFB_CIP.mdb) with the flood zone area feature class (provided in GFAFB_MDS.mdb).

This operation will take the Input features (buildings) and Clip feature (100-year floodplain) and extract all of the Input features that exist within the boundary of the Clip feature. To calculate the acreage of runways/taxiways and recreation areas within the 100-year floodplain, the CLIP tool in ESRI's Arc Toolbox can be used to clip the current land use area (provided in GFAFB_MDS.mdb) with the flood zone area (mentioned above). This operation will take the Input features (runways/taxiways and recreation areas) and Clip feature (100-year floodplain) and extract all of the Input features that exist within the boundary of the Clip feature. The current land zone area classified the land use into several categories including Airfield Operations, Industrial, and Outdoor Recreation. The area in acres can be calculated using a script in XToolsPro. By using this methodology to determine the structures and land use present in the 100-year floodplain, Grand Forks AFB can ensure that future land use within the floodplain is compatible.

3.2. Guidelines for Future Land Use

Avoiding construction in the floodplain would prevent potential future loss and damage to structures and assets, and preserve the floodplain's beneficial values. EO 11988 encourages Federal agencies to avoid construction in the floodplain. However, at times, construction within the floodplain can be necessary or inevitable. When construction within the floodplain is deemed necessary, certain precautionary measures can be taken to preclude loss or damage to structures or the floodplain. The following paragraphs detail floodplain management and compliance considerations, and guidelines for constructing within the floodplain.

3.3. Floodplain Management and Compliance

Table 3-1 provides a summary of operating procedures for floodplain management and compliance.

3.4. Construction Guidelines

If the following guidelines for construction and storm water management activities are followed properly, the loss and damage to structures; the impact on human safety, health, and welfare; and the impact on the beneficial floodplain values can be reduced or prevented.

- All new structures not used solely for parking, storage, or infrastructure utilities that can't be impacted by flooding constructed on Grand Forks AFB should be elevated above the base floodplain elevation.

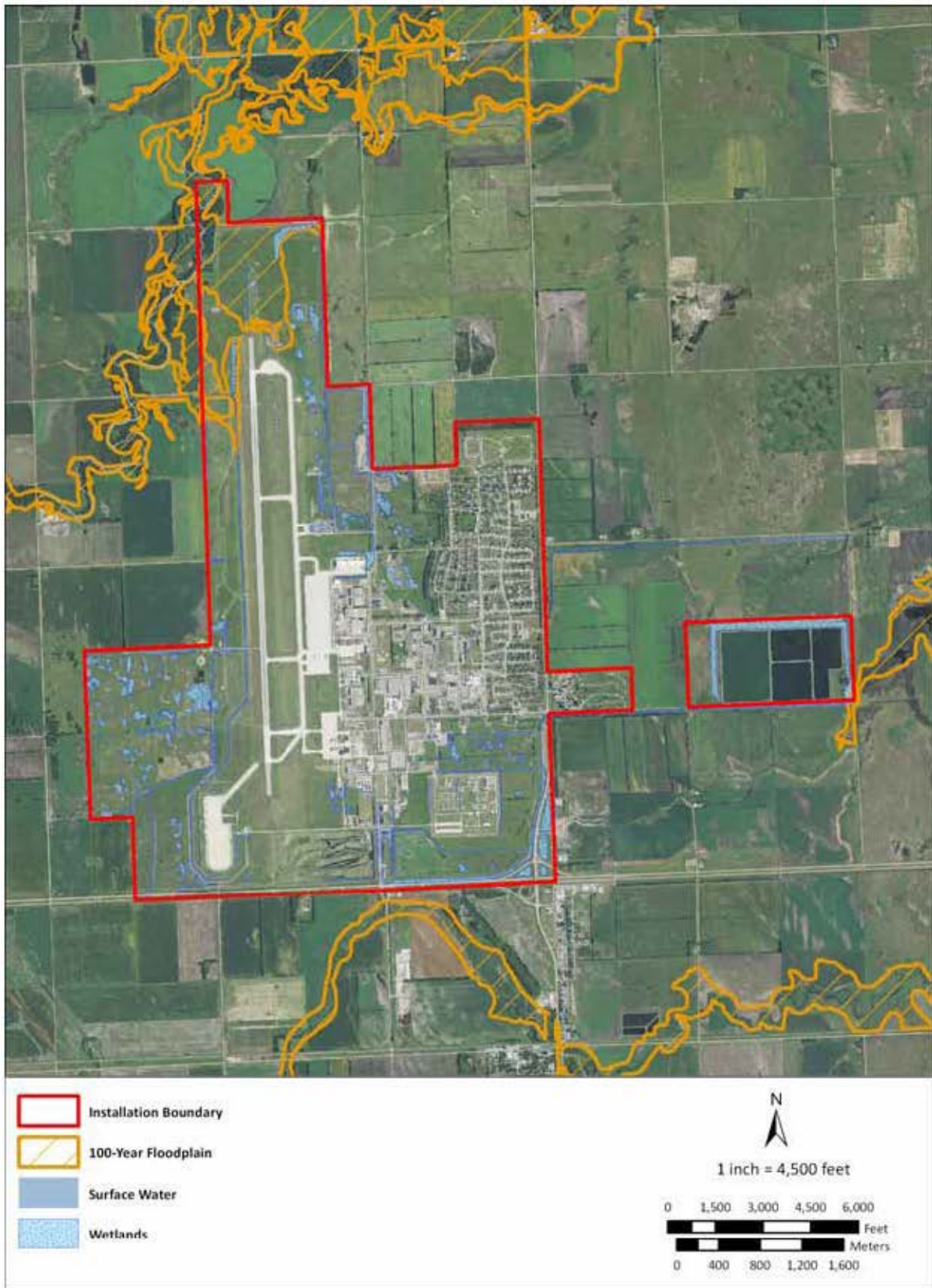


Figure 3-1. 100-year Floodplain Mapped within Grand Forks AFB

Table 3-1. Summary of Operating Procedures for Floodplain Management

Procedure	Description
Determine whether the action will occur in the floodplain	Review the FEMA FIRM and GIS maps. See Section 3 . Proceed with the action if the action occurs in an area outside of the floodplain, or it affects a structure or area that would not be damaged in the event of a flood, such as a tower or facilities solely used for parking.
Identify and evaluate practicable alternatives for those actions proposed to be located in the floodplain	See Section 4 .
Identify the impacts of the action in the floodplain	Identify all direct, indirect, and cumulative impacts of the action including human health and safety and floodplain functions and values.
Review Federal, state, and local regulations and prepare a Public Notice for the action	See Section 2 . Notify local government agencies. Address public comments.
Minimize threats to life, property, and the natural functions and values of the floodplain	See Section 3 .
Issue FONPA and public explanation	Include the location, flood-protection techniques being used, and other mitigation that will be used to minimize floodplain impacts.
Implement the action	See Section 4 .

- The lowest floor (including basement) should be elevated above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM, or together with attendant utility and sanitary facilities, be completely floodproofed to the (base flood) level to meet the floodproofing standard.
- A registered professional engineer or architect should develop or review structural design, specifications, and plans for the construction, and should certify that the design and methods of construction are in accordance with the accepted standards of practice.
- Sensitive equipment should be placed on the upper levels of buildings or flood-proofed if they cannot be placed in these areas. Utilities should be floodproofed to prevent damage.
- Implement the creation of new storm water retention areas as needed for all projects that add impervious surfaces. Storm water retention areas should be maintained for invasive plant species, which can interfere with the drainage.
- Sidewalks, parking lots, and roads should be constructed with pervious material. Pervious materials permit water to enter the ground by virtue of their porous nature or by large spaces in the material. This material limits the direct discharge of pollutants into the environment and reduces the impacts of pollution. Pervious surfaces can be made of concrete, asphalt, open-celled stones, and gravel that are mixed in a manner that creates an open cell structure allowing water and air to pass through.
- Non-residential parking garages constructed below grade should be constructed in accordance with FEMA’s Technical Bulletin 3, *Non-Residential Floodproofing—Requirements and*

Certification. A critical feature of floodproofing for a below-grade parking garage is the interface of the garage access ramp and the street. The garage entry should be constructed above the base floodplain elevation (FEMA 1993).

4. Use of this Plan with the Environmental Impact Analysis Process

This FPMP would be used in conjunction with the Grand Forks AFB EIAP. Grand Forks AFB will strive to contain future development to areas outside of the 100-year floodplain. However, in some cases, it might be necessary to construct in the floodplain. **Sections 2, 3, and 4** of this plan provide guidelines that describe how construction activities are to be accomplished with the floodplain. Following the construction practices outlined in this FPMP will ensure Grand Forks AFB remains in compliance with floodplain management regulations provided in EO 11988 and the FEMA.

This document becomes a planning tool for the planners and programmers for the future development on Grand Forks AFB. The EA has established that there is a need for development within the Grand Forks AFB floodplain. The EA has been assigned a FONSI (and FONPA) with the stipulation that proposed activities (i.e., riparian restoration) will comply with the practices presented in this FPMP. The EA analyzed riparian restoration activities (the Proposed Action) to determine if significant cumulative impacts on resources such as air quality, noise, socioeconomics, and hazardous materials and waste would occur. The Proposed Action was also evaluated for conflicts or impacts on existing installation constraints such as wetlands, Quantity-Distance safety arcs, Environmental Restoration Program sites, threatened and endangered species habitat, airfield restrictions, and cultural resources. The EA determined that the Proposed Action would not significantly impact the environment or resources at Grand Forks AFB.

THIS PAGE INTENTIONALLY LEFT BLANK

5. References

- Bolles et al. undated Bolles, Bethany, Xixi Wang, Lynette de Silva, Heith Dokken, Gerald Groenewold, Wesley Peck, and Edward Steadman. Undated. “An Innovative, Basinwide Approach to Flood Mitigation: The Waffle Project.” Available online <<http://www.undeerc.org/waffle/info/pdfs/bb-floodmitigation.pdf>>. Accessed 24 August 2011.
- City of Fargo 2010 City of Fargo. 2010. City of Fargo Municipal Code, Chapter 21. Available online <<http://www.ci.fargo.nd.us/attachments/8a86cc60-5bbc-47e9-b973-27537fb0f169/21%20-%20Building%20Code.pdf>>. Accessed 13 September 2011.
- City of Grand Forks 2010 City of Grand Forks. 2010. *Ordinance Number 4310, An ordinance amending the Comprehensive Plan, amending Chapter XVIII, Article 8, Comprehensive Plan; Section 18-0802, Elements of the Grand Forks City Code of 1987, as amended, pertaining to the Grand Forks Year 2035 Land Use Plan Update.* Available online <<http://www.grandforksgov.com/Reports/4310.pdf>>. Accessed 29 August 2011.
- Columbia University 2009 Columbia University. 2009. “LUCC and the Hydrological Cycle”. Available online <http://sedac.ciesin.columbia.edu/tg/guide_glue.jsp?ds=6&rd=lu>. Accessed 16 May 2011.
- FEMA 1993 Federal Emergency Management Administration (FEMA). 1993. Technical Bulletin 6-93. *Below-Grand Parking Requirements for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program.* Available online <<http://www.fema.gov/library/viewRecord.do?id=1719>>. Accessed 12 April 2011.
- FEMA 1994 FEMA. 1994. *National Flood Insurance Program Manual.* Available online <<http://www.fema.gov/library/viewRecord.do?id=2108>>. Accessed 21 April 2011.
- FEMA 1998 FEMA. 1998. *Managing Floodplain Development Through the National Flood Insurance Program.* Available online <http://www.fema.gov/pdf/floodplain/is_9_complete.pdf#nameddest=sfha>. Accessed 21 April 2011.
- FEMA 2010 FEMA. 2010. “Flood Insurance Rate Map, Grand Forks County, North Dakota and Incorporated Areas.” Map No. 38035C0525E, effective December 17, 2010. Available online <<http://rnc.mapmodteam.com/RMC/CountyMaps>>. Accessed 21 April 2011.
- GFAFB 2011 Grand Forks AFB (GFAFB). 2011. *Integrated Natural Resources Management Plan for Grand Forks Air Force Base, North Dakota.* 2011.
- GFAFB 2007 GFAFB. 2007. *Wetland Delineation Summary Report 2006.* Prepared by CH2MHILL. March 2007.
- GFAFB 2009 GFAFB. 2009. *Spill Prevention, Control, and Countermeasures (SPCC) Plan.* 30 January 2009.

- Grand Forks County 1987 Grand Forks County. 1987. *Grand Forks, North Dakota Code of Ordinances*. Available online <<http://library.municode.com/index.aspx?clientID=11792&stateID=34&statename=North%20Dakota>>. Accessed 13 September 2011.
- GFCSCD 2011 Grand Forks County Soil Conservation District (GFCSCD). 2011. Turtle River Watershed. Available online <<http://gfsd.org/turtleriverwatershed.htm>>. Accessed 13 April 2011.
- NDDH 2010 North Dakota Department of Health (NDDH). 2010. North Dakota 2010 Integrated Section 305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing Total Maximum Daily Loads. Available online <http://www.ndhealth.gov/wq/sw/Z7_Publications/IntegratedReports/2010_Final_Approved_IntegratedReport_20100423.pdf>. Accessed 12 April 2011.
- Rosgen 1996 Rosgen, Dave. 1996. *Applied River Morphology*. Published by Wildland Hydrology, Pagosa Springs, Colorado.
- RRRC 2006 Red River Regional Council (RRRC). 2006. *Assess and Recommendations for Riparian Stabilization and Restoration of the Turtle River within the Grand Forks Air Force Base, North Dakota*. December 2006.
- State of North Dakota 2003 State of North Dakota. 2003. *North Dakota Floodplain Management Act of 1981, North Dakota Century Code Chapter 61-16.2*.
- USACE 1998 U.S. Army Corps of Engineers (USACE). 1998. *Final Environmental Impact Statement: Flood Control, East Grand Forks, Minnesota, Grand Forks, North Dakota*. Available online <<http://www.mvp.usace.army.mil/docs/projs/eisfinal.pdf>>. Accessed 20 July 2011.
- USACE 2011 USACE. 2011. Red River of the North Basin: Minnesota, North Dakota, South Dakota, and Manitoba Reconnaissance Study. Available online <http://www.mvp.usace.army.mil/fl_damage_reduct/default.asp?pageid=40>. Accessed 13 April 2011.
- USEPA undated U.S. Environmental Protection Agency (USEPA). Undated. *Red River Basin Riparian Project: Turtle River Site Passes the Test*. Available online <<http://www.epa.gov/region8/water/nps/ndredriver.pdf>>. Accessed 24 August 2011.
- USEPA 2010 USEPA. 2010. "Region 8 Sole Source Aquifer (SSA) Program." Available online <<http://www.epa.gov/region8/water/solesource.html>>. Accessed 22 April 2011.
- USGS 2011 U.S. Geological Survey (USGS). 2011. "North Dakota Water Science Center: 05082625 Turtle River at Turtle R State Park Nr Arvilla, ND." Available online <<http://nd.water.usgs.gov/floodtracking/charts/05082625.html>>. Accessed 24 August 2011.

APPENDIX D

MANAGEMENT REQUIREMENTS AND ENVIRONMENTAL PROTECTION MEASURES FOR WETLANDS AND OTHER WATERS OF THE UNITED STATES

1. Introduction

Grand Forks Air Force Base (AFB) has prepared an Environmental Assessment (EA) to analyze impacts on the restoration and stabilization of the Turtle River bank that runs through the northwestern portion of the installation. The purpose of river restoration and stabilization in this area is to limit potential downstream impacts on natural and other resources and manage and restore the adjacent riparian forest.

As part of the Proposed Action, the 319th Air Base Wing would improve the Turtle River's channel conditions and in-stream habitat by stabilizing and restoring critical areas of bank erosion, repairing areas of minor bank erosion, maintaining and planting wide riparian forest buffers where they are narrow or absent, removing trash and other foreign debris from the channel, and monitoring erosion and channel features for changes.

The riparian forest areas near the Turtle River would be restored and managed by selectively cutting primarily unhealthy, diseased, and hazardous trees; removing selective trees that need to be eliminated for bank stabilization and other natural resources management; piling woody debris on the forest floor to create organic soils over exposed mineral soils where wood debris has been removed; creating wildlife habitat; interplanting of native saplings; limiting vehicle access; and removing trash and other debris.

Turtle River is a jurisdictional water of the United States, and 3 acres of riverine wetlands are present in the northwestern corner of the installation along the Turtle River, within the proposed project area. In addition, two small wetlands (drainages) are delineated just beyond the tree planting and other ground-disturbance activities associated with the Proposed Action. Therefore, wetlands or other waters of the United States that exist at Grand Forks AFB provide a potential constraint to the proposed restoration and management activities along Turtle River. The purpose of this document is to provide management tools to avoid or minimize any direct or indirect, adverse effects that could occur on wetlands or other waters of the United States due to implementation of the Proposed Action addressed in the EA.

Examples of adverse effects on waters of the United States include filling, excavating, flooding, draining, clearing, or similar changes affecting wetlands or open water areas. Direct impacts on wetlands would result from disturbances that occur within the wetland. Common direct impacts on wetlands include filling, grading, removal of vegetation, construction, and changes in water levels or drainage patterns. Most disturbances that result in direct impacts on wetlands are addressed through Federal and state wetland regulatory programs. Indirect impacts on wetlands can result from disturbances that occur in areas outside of the wetland, such as adjacent uplands and other wetlands or waterways. Common indirect impacts include the influx of surface water and sediments, fragmentation of a wetland from a contiguous wetland complex, loss of recharge area, or changes in local drainage patterns.

The proposed projects analyzed in the EA have potential to cause minor to moderate, direct, adverse impacts on wetlands or other jurisdictional waters of the United States (e.g., dredging or placement of fill). Stabilization activities would be conducted on the banks and within the river, and tree-planting activities would be conducted adjacent to Turtle River, which could disturb sediment and slightly increase sedimentation temporarily. All potential direct and indirect adverse impacts would be avoided to the maximum extent practicable through design and implementation of measures outlined in this document. Project design would be coordinated with Grand Forks AFB. Projects identified within the EA would be compliant with the Energy Independence and Security Act Section 438 to maintain pre-development hydrology velocity, volume, and temperature. The project would also adhere to a site-specific, erosion and sediment control plan and storm water pollution prevention plan (SWPPP) to prevent surface water degradation. In addition, a wetlands management plan for the installation also is currently being developed.

2. Laws and Regulations

Protection of wetlands and other waters of the United States is mandated by both Federal and state laws and regulations. At the Federal level, wetlands are protected as a subset of the waters of the United States under Section 404 of the Clean Water Act (CWA). The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The U.S. Army Corps of Engineers (USACE) defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 Code of Federal Regulations [CFR] Part 329). Section 404 of the CWA establishes a program to regulate the discharge of dredge and fill material into waters of the United States, including wetlands. Grand Forks AFB would be required to obtain a Section 404 Standard Individual Permit or applicable Nationwide Permit from USACE if proposed projects are determined to adversely impact wetlands on the installation through dredging or placement of fill within wetlands. The USACE, pursuant to Section 404 of the CWA, requires compliance with the Section 404(b)(1) guidelines for wetland-filling activities that are deemed “non-water-dependent.” Non-water-dependent projects do not need to be located in wetlands or other waters to fulfill their basic project purpose. These guidelines first require avoiding impacts through selection of projects with the least environmental effect, and, second, through taking the appropriate and practicable steps to minimize impacts. Lastly, wetland compensation would be required for any loss of wetlands, pursuant to the policy for wetlands in DODI 4715.3, *Natural Resources Conservation Program*, which states that “DOD Components shall ensure no net loss of size, function, and value of wetlands, and will preserve the natural and beneficial values of wetlands in carrying out activities in accordance with EO 11990...and the White House Office on Environmental Policy...”

Section 401 of the CWA requires state agencies to evaluate projects that will result in the discharge into waters of the United States to determine whether the discharge will violate the state’s water quality standards. Per Section 401 of CWA, any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which could result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the state in which the discharge originates or will originate. North Dakota relies on Section 401 water quality certification as its primary form of state-level wetlands regulation. The Section 401 program is administered by the North Dakota Department of Health, Division of Water Quality (NDDH/DWQ). In making certification decisions, the NDDH/DWQ is primarily concerned with the construction and environmental disturbance requirements pertaining to soils, surface waters, and fill materials. A non-regulatory agency policy document requires that “fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.” If a project does not meet this and other minimum requirements of the NDDH/DWQ, the permit is denied, and necessary conditions are communicated before reapplication. A Section 401 Water Quality Certification is required for activities that require Federal permits such as a Section 404 permit. Mitigation or compensation for the impacts made on wetlands or other waters of the United States would be required in order to comply with the no net loss policy stated in DoDI4715.3.

Executive Order (EO) 11990, *Protection of Wetlands*, (May 24, 1977) directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands. In accordance with EO 11990 and 32 CFR Part 989, a Finding of No Practicable Alternative (FONPA) must accompany the

Finding of No Significant Impact (FONSI) stating why there are no practicable alternatives to development within or affecting wetland areas.

It is U.S. Air Force (USAF) policy to avoid constructing new facilities within areas containing wetlands, where practicable. Proposed actions that could impact wetlands, even if the affected area is not within a jurisdictional wetland boundary, require an environmental impact analysis in accordance with NEPA and the USAF Environmental Impact Analysis Process at 32 CFR Part 989. The proposed action must include all practicable measures to minimize harm to wetlands.

3. Environmental Protection Measures for Wetlands and Other Waters of the United States

If a project is anticipated to affect wetlands or other waters of the United States, a sequence of actions has been identified to offset effects, known as the mitigation sequence, to guide mitigation decisions and determine the type and level of mitigation required under the CWA Section 404. The sequence of steps is avoid, minimize, and compensate, as appropriate. If effects on a wetland cannot be avoided, they must be minimized. Following minimization, any unavoidable impacts must be compensated. Compensation can include wetland restoration, creation, enhancement, or preservation. This document focuses on techniques to avoid or minimize effects on wetlands or other waters of the United States.

3.1 Avoiding Effects on Wetlands or Other Waters of the United States

Avoidance of effects on wetlands or other waters of the United States results in the least environmental effect on these resources. Avoidance can be most effective through project design that sites a project in an area that would result in no direct or indirect effects on wetlands or other waters of the United States. In addition to avoidance through design, effects could be avoided by flagging the boundary of a wetland or water of the United States to delineate areas to avoid, and ensuring construction vehicles and workers remain outside of the flagged boundary.

3.2 Minimizing Effects on Wetlands or Other Waters of the United States

If impacts cannot be completely avoided, reduction of effects is evaluated based on the type and extent of the impact on wetlands or waters of the United States. Indirect effects could occur on wetlands or other waters of the United States that are in proximity to proposed project activities. Implementation of the following management practices, where appropriate, would minimize potential for indirect impacts on wetlands and other waters of the United States that are adjacent to proposed activities. These practices include construction controls and natural resources controls.

Construction Controls

- The wetlands and other waters of the United States should be clearly flagged prior to commencement of construction activities. This would prevent construction workers from entering these wetlands and potentially placing fill within the wetlands or trampling wetland vegetation.
- Construction activities should be phased, if logically possible, so that smaller areas of land are disturbed at one period of time. This would result in less soil exposed at one time, and would reduce the potential for erosion and deposition of sediment into wetlands or other waters of the United States.

- Water quality-control features such as sedimentation basins and detention or retention ponds, if part of the design, should be installed as applicable prior to initiation of construction activities. Temporary basins and silt traps would be constructed as necessary to contain sediment and runoff on the construction area. Hay bales and silt fences should be used to minimize transport of sediments off the project area.
- All fuels and other potentially hazardous materials should be contained and stored appropriately. In the event of a spill, procedures outlined in the installation's Spill Prevention, Control, and Countermeasure Plan (SPCC) would be followed to quickly contain and clean up a spill.
- An erosion and sediment control plan, typically part of the Storm water Pollution Prevention Plan (SWPPP) and directed by the installation Storm water Program Manager, is usually developed prior to initiation of construction activities and adhered to during development.
- Erosion-control structures, if required in the SWPPP, should be installed downgradient of the construction site in sloped areas adjacent to wetlands and other water bodies. The structures should be regularly maintained and removed once vegetation has been reestablished. All storm water controls will be approved through the installation Storm water Program Manager.
- Site grading should be conducted in a manner that would direct storm water runoff generated from construction activities away from nearby wetlands or waters of the United States, but existing drainage patterns and hydrology should be maintained. Best management practices such as installation of silt fencing along wetland buffers would aid in prevention of siltation if natural site hydrology directs storm water runoff to the wetlands.
- Avoid transport and crossing actions through wetlands at all times. When crossing wetlands is unavoidable, access paths should be located along high ground with appropriate mats, docks or boardwalks as applicable rather than filling a wetland to simply cover it. Storm water runoff originating from the construction site should be diverted and sedimentation controls implemented to avoid discharging into the wetland.
- When wetland crossings cannot be avoided, the use of heavy machinery in wetlands should be minimized by installing construction barriers at the edge of the proposed area of disturbance.
- Construction activities should be restricted to drier periods during the year, if logically possible. Minimum flows for Turtle River occur in January and February; however, work in the winter would be impossible for the project. It is recommended that project work, if possible, be conducted in the fall timeframe.
- Construction debris should not be disposed of in wetlands. Debris and waste should be disposed of in accordance with all local, state, and federal laws.

Natural Resources Controls

- An SWPPP should be developed and implemented to prevent surface water degradation of wetlands within close proximity of project sites.
- Storm water runoff originating from impervious surfaces should be routed through storm water treatment facilities prior to discharging into surface waters. Existing drainageways should be preserved. Water should not be diverted away from or towards wetlands and other waters of the United States. This aids in maintaining the existing hydrology. All storm water controls are approved by the installation Storm water Program Manager.
- A buffer surrounding wetlands and waters of the United States should be established on wetlands identified at Grand Forks AFB. Buffers reduce adverse effects of development, most importantly in relationship to slope and vegetative cover. Maintaining dense shrubs or forested vegetation in

areas with steep slopes provides the greatest protection from polluted runoff. In addition, buffer effectiveness increases with buffer width. As buffer width increases, the effectiveness of removing sediments, nutrients, bacteria, and other pollutants from surface water runoff increases.

- Removal of vegetation should be minimized. In areas where excavation is not proposed but vegetation removal is necessary, vegetation should be cut at the ground level, leaving roots intact. Disturbed areas should be seeded, sodded, or planted with indigenous material as soon as possible after construction activities are completed, as appropriate.
- The spread of noxious weeds can be controlled by avoiding activities in or adjacent to heavily infested areas, removing seed sources and propagules from the site prior to conducting activities, or limiting operations to nonseed-producing seasons. Following activities that expose the soil, mitigation can be achieved by covering the area with weed-seed free mulch or seeding the area with native species. Soil should be covered to reduce the germination of weed seeds, maintain soil moisture, and minimize erosion.
-

4. Project-Specific Considerations

During the design phase and prior to submitting necessary permit applications for any direct wetland impacts, a more detailed analysis for avoidance and minimization of effects would be conducted for each proposed project. Proposed projects would be designed to avoid direct impacts on wetlands and other waters of the United States. If direct effects could not be avoided, mitigation and correspondence with regulatory and resource agencies would commence, and permitting would be obtained. Direct effects would be expected from activities conducted within Turtle River, and avoidance, minimization of effects, and mitigation would be implemented, as necessary. Additional specifications would be developed as appropriate for each proposed project. The final specifications could include specific minimization techniques and the development of management plans for storm water runoff, vegetation, grading, and any other appropriate planning documents.

THIS PAGE INTENTIONALLY LEFT BLANK