U.S. Fish & Wildlife Service

Revised Comprehensive Conservation Plan

Tetlin National Wildlife Refuge

September 2008



U.S. Fish and Wildlife Service Mission Statement

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.

Refuge Mission Statement

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

—National Wildlife Refuge System Improvement Act of 1997

The comprehensive conservation plan details program planning levels that are substantially greater than current budget allocations and, as such, is for strategic planning and program prioritization purposes only. This plan does not constitute a commitment for staffing increases or funding for future refuge-specific land acquisitions, construction projects, or operational and maintenance increases.

Photo: *Lynx (Lynx Canadensis) is a predator common throughout the northern boreal forests of Tetlin National Wildlife Refuge. (Photo H. Timm, USFWS.)*

Revised Comprehensive Conservation Plan

for the

Tetlin National Wildlife Refuge

September 2008

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Dear Reader:

The Revised Comprehensive Conservation Plan (Plan) for Tetlin National Wildlife Refuge will guide management of the Refuge for the next 15 years. The Plan provides a vision, goals, and objectives for future management of the Refuge. It addresses the issues raised during public scoping and comments received during public review of the draft plan. Based upon comments received we adopted Alternative B (Preferred Alternative) from the draft plan.

Comments received during the public review of the draft plan and our responses to them are included in this document in Appendix J. The environmental assessment and draft plan are on file with our offices in Tok and Anchorage.

Draft compatibility determinations for Tetlin National Wildlife Refuge were included in the draft revised comprehensive conservation plan and comments were accepted as part of the review of this plan. Our responses to comments on those draft compatibility determinations can also be found in Appendix J. The final signed compatibility determinations are in Appendix E. A discussion of compatibility determinations can be found in Chapter 3, section 3.2.4.2. More information on the compatibility process can be found at the refuge office or at http://alaska.fws.gov/nwr/planning/completed.htm.

You may obtain a copy of the Plan, a summary, or a compact disk containing both at the offices listed below. You may also view the Plan on line at http://alaska.fws.gov/nwr/planning/plans.htm.

Requests for copies of the plan, CD-ROM, or further information should be directed to:

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We thank everyone who participated in the planning and public involvement process. Your comments helped us prepare a better plan for the future of Tetlin Refuge.

Contents

Title Page i
Cover Letter iii
Table of Contents v
Acronyms and Abbreviations xi

1. Introduction 1-1
1.1 Purpose of and Need for Action 1-2
1.2 Historical Perspective and Refuge Establishment 1-3
1.3 Refuge Purposes, Vision, and Goals 1-3
1.3.1 Purposes of Tetlin National Wildlife Refuge 1-3
1.3.2 Refuge Vision Statement 1-3
1.3.3 Refuge Goals 1-4
1.4 Refuge Environment 1-5
1.5 Special Values of the Refuge 1-5
1.5.1 Migratory Corridor 1-5
1.5.2 Waterfowl 1-5
1.5.3 Bird Diversity 1-6
1.5.4 Glacial Dunes 1-6
1.5.5 Scottie Creek Historic and Cultural Resources 1-6
1.6 Legal and Administrative Planning Requirements 1-6
1.7 The Planning Process for Tetlin Refuge 1-7
1.7.1 Design the Planning Process (Preplanning) 1-8
1.7.2 Initiate Public Involvement and Scoping 1-8
1.7.3 Determine Significant Planning Issues 1-8
1.7.4 Develop and Analyze Alternatives 1-9
1.7.5 Prepare Draft Plan and Environmental Assessment 1-9
1.7.6 Prepare and Adopt a Final Plan 1-9
1.7.7 Implement Plan, Monitor, and Evaluate 1-9
1.7.8 Review and Revise Plan 1-9
1.8 Significant Planning Issues 1-10
1.8.1 Issue 1. Visitor services role of Tetlin Refuge in the Upper Tanana Valley 1-10
1.8.2 Issue 2. Public use facilities and access 1-10
1.8.3 Issue 3. Management of fire to protect resources and property 1-11
1.8.4 Issue 4. Habitat management 1-11
1.8.5 Issue 5. Fisheries Management 1-11

2. Revised Conservation Plan for Tetlin National Wildlife Refuge 2-1
2.1 Planning Context 2-1
2.1.1 The U.S. Fish and Wildlife Service 2-1
2.1.2 The National Wildlife Refuge System 2-1
2.2 Principles for Managing the National Wildlife Refuge System 2-2
2.3 Goals and Objectives 2-3
2.4 General Management Direction (The Revised Comprehensive Plan) 2-28
2.4.1 Management Categories 2-28
2.4.2 Management Direction by Program 2-29
2.4.2.1 Visitor Services and Public Use Management 2-29
2.4.2.2 Public Use Facilities and Access 2-29
2.4.2.3 Recreational Uses 2-34
2.4.2.4 Subsistence Uses 2-34
2.4.2.5 Fire Management 2-34
2.4.2.6 Fish, Wildlife, and Habitat Management 2-35
2.4.2.7 Environmental Contaminants 2-39
2.4.2.8 Funding and Personnel 2-39

3. Management Policies and Guidelines for Tetlin National Wildlife Refuge 3-1
3.1 Management Categories 3-1
3.1.1 Minimal Management 3-1
3.1.2 Moderate Management 3-2
3.1.3 Intensive Management 3-3
3.1.4 Special Management 3-3
3.1.4.1 Management of Selected Lands 3-4
3.2 Management Policies and Guidelines 3-4
3.2.1 Management Emergencies 3-4
3.2.2 Land Exchanges and Acquisitions 3-4
3.2.3 Land Protection Plans 3-5
3.2.4 Appropriate Refuge Uses and Compatibility 3-5
3.2.4.1 Appropriate Refuge Uses 3-5
3.2.4.2 Compatibility Determinations 3-6
3.2.5 Mitigation 3-7
3.2.6 Cooperation and Coordination with Others 3-8
3.2.6.1 Federal, State and Local Governments 3-8
3.2.6.2 Tribes and Native American Organizations 3-9
3.2.6.3 Owners of Refuge Inholdings and Adjacent Lands 3-9
3.2.6.4 Fish and Wildlife Service Jurisdiction over Waters within Tetlin Refuge 3-9
3.2.6.5 Other Constituencies 3-9
3.2.7 Ecosystem and Landscape Management 3-10
3.2.7.1 Air Quality 3-10
3.2.7.2 Water Resources (Hydrology) Management 3-10
3.2.7.3 Visual Resource Management 3-11
3.2.7.4 Cultural, Historical, and Paleontological Resources 3-12
3.2.8 Fish and Wildlife Habitat Management 3-13
3.2.8.1 Habitat Management 3-13
3.2.8.2 Fire Management 3-14
3.2.9 Fish and Wildlife Population Management 3-17
3.2.9.1 Wildlife Inventory and Monitoring Plan 3-17
3.2.9.2 Scientific Peer Review 3-18
3.2.9.3 Compliance with the Animal Welfare Act 3-18
3.2.9.4 Marking and Banding 3-18
3.2.9.5 Threatened or Endangered Species 3-18
3.2.9.6 Reintroductions 3-18
3.2.9.7 Fish and Wildlife Control 3-19
3.2.9.8 Management of Non-native, Invasive, and Pest Species 3-20
3.2.9.9 Disease Prevention and Control 3-21
3.2.9.10 Fishery Restoration 3-21
3.2.9.11 Fishery Enhancement 3-21
3.2.10 Subsistence Use Management 3-21
3.2.10.1 Access for Subsistence Purposes 3-22
3.2.10.2 Section 810 Evaluations 3-23
3.2.11 Public Access and Transportation Management 3-23
3.2.11.1 Snowmachines, Motorboats, Airplanes, and Non-motorized Surface Transportation . 3-23
3.2.11.2 Off-Road Vehicles 3-23
3.2.11.3 Helicopters 3-23
3.2.11.4 Access to Inholdings 3-23
3.2.11.5 Temporary Access 3-24
3.2.11.6 Subsistence Access 3-24
3.2.11.7 Transportation and Utility Systems 3-24
3.2.11.8 State Transportation Planning 3-25

3.2.11.9 RS 2477 Rights-of-Way ... 3-25
3.2.11.10 17(b) Easements ... 3-25
3.2.11.11 Navigation Aids and other Facilities ... 3-25
3.2.12 Recreation and Other Public Use ... 3-26
3.2.13 Public Use Facilities ... 3-26
3.2.13.1 Cabins ... 3-27
3.2.13.2 Temporary Facilities for the Taking of Fish and Wildlife ... 3-27
3.2.14 Outreach ... 3-28
3.2.15 Commercial Use Management ... 3-28
3.2.15.1 Commercial Recreation Services ... 3-29
3.2.15.2 Mineral Exploration and Development ... 3-29
3.2.15.3 Commercial Fishing and Related Facilities ... 3-30
3.2.15.4 Commercial Harvest of Timber and Firewood ... 3-30
3.2.15.5 Commercial Gathering of Other Resources ... 3-31
3.2.15.6 Commercial Filming and Recording Activities ... 3-31
3.2.15.7 Other Commercial Uses ... 3-31
3.2.16 Environmental Contaminants Identification and Cleanup ... 3-31
3.2.17 Administration of Tetlin National Wildlife Refuge ... 3-32
3.2.17.1 Administrative Sites and Visitor Facilities ... 3-32
3.2.17.2 Refuge Management Plans ... 3-32
3.2.18 Alaska Mineral Resource Assessment Program ... 3-33
3.3 Management Categories Table ... 3-33
3.3.1 Introduction ... 3-33
3.3.2 Definitions for Management Categories Table ... 3-34

4. Refuge Resources ... 4-1
4.1 Physical Environment ... 4-1
4.1.1 Land Status ... 4-1
4.1.2 Climate ... 4-5
4.1.3 Topography ... 4-6
4.1.4 Geology ... 4-7
4.1.5 Glaciation ... 4-7
4.1.6 Mineral Occurrences ... 4-7
4.1.7 Soils and Permafrost ... 4-8
4.1.8 Nutrients and Nutrient Cycling ... 4-8
4.1.9 Water Resources ... 4-9
4.1.9.1 Rivers and Streams ... 4-9
4.1.9.2 Lakes, Ponds, and Wetlands ... 4-9
4.1.9.3 Surface Water Quality ... 4-10
4.1.10 Fire Regime of the Upper Tanana Valley ... 4-10
4.1.10.1 Fire Occurrence and Frequency ... 4-10
4.1.10.2 Fire Size ... 4-10
4.1.10.3 Fire Season ... 4-12
4.1.10.4 Fire Return Interval ... 4-13
4.2 Biological Environment ... 4-13
4.2.1 The Boreal Forest Ecosystem ... 4-13
4.2.2 Vegetation ... 4-13
4.2.2.1 Invasive Non-native Plant Species ... 4-15
4.2.3 Boreal Forest Succession and Habitat Mosaics ... 4-15
4.2.4 Fire Severity ... 4-16
4.2.4.1 Fire Severity–Black and White Spruce Forests ... 4-16
4.2.4.2 Fire Severity–Hardwood and Mixed Spruce/Hardwood Forests ... 4-16
4.2.4.3 Fire Severity–Shrublands and Sedge Tussock-mixed Shrub Tundra ... 4-17
4.2.5 Amphibians ... 4-17

4.2.6 Fish 4-17
4.2.7 Birds 4-18
4.2.7.1 Passerines 4-19
4.2.7.2 Waterfowl 4-19
4.2.7.3 Marsh and Waterbirds 4-20
4.2.7.4 Shorebirds, Gulls, Terns, and Allied Species 4-20
4.2.7.5 Raptors 4-20
4.2.7.6 Upland Game Birds 4-22
4.2.8 Mammals 4-22
4.2.8.1 Carnivores 4-22
4.2.8.2 Ungulates 4-23
4.2.8.3 Furbearers 4-24
4.2.8.4 Small Mammals 4-25
4.2.9 Threatened, Endangered, and Sensitive Wildlife and Plants 4-26
4.3 Human Environment 4-27
4.3.1 Cultural Resources 4-27
4.3.1.1 Prehistory of the Upper Tanana Valley 4-27
4.3.1.2 Prehistoric and Cultural Use of Fire 4-27
4.3.1.3 Modern History of the Upper Tanana Valley 4-28
4.3.1.4 Modern Use and Management of Fire 4-29
4.3.1.5 Historic and Cultural Sites 4-30
4.3.2 Population Trends and Composition 4-30
4.3.3 Sociocultural Systems 4-32
4.3.3.1 Subsistence Way of Life 4-32
4.3.3.2 Kinship and Social Organization 4-33
4.3.3.3 Intraregional Interactions 4-33
4.3.3.4 Community Infrastructure 4-33
4.3.4 Economic Conditions 4-34
4.3.4.1 Employment 4-34
4.3.4.2 Income 4-35
4.3.5 Public Use 4-35
4.3.5.1 Facilities 4-36
4.3.6 Access and Transportation 4-36
4.3.7 Subsistence 4-40
4.3.7.1 Large Mammals 4-40
4.3.7.2 Waterfowl and Other Migratory Birds 4-41
4.3.7.3 Fish 4-42
4.3.7.4 Upland birds 4-43
4.3.7.5 Plant Resources 4-43
4.3.7.6 Furbearers 4-43
4.3.8 Recreation 4-44
4.3.8.1 Hunting 4-44
4.3.8.2 Fishing 4-44
4.3.8.3 Non-consumptive Recreational Use 4-45
4.3.8.4 Environmental Education and Interpretation 4-45
4.3.9 Economic Use 4-46
4.3.9.1 Trapping 4-46
4.3.9.2 Guiding and Transporter Services 4-47
4.4 Wilderness Values 4-48
4.4.1 Characteristics Common to All Units 4-49
4.4.2 Tetlin Flats Unit 4-50
4.4.3 South Central Area 4-50
4.4.4 Cheslina Area 4-50

4.4.5 Wellesley Lake/Scottie Creek Area 4-53
4.5 River Values 4-53
4.5.1 Scottie-Desper Creeks 4-53
4.5.2 Chisana River 4-54
4.5.3 Nabesna River 4-54
4.5.4 Kalutna River 4-55
4.6 Refuge Infrastructure and Administration 4-55
4.6.1 Administrative Facilities 4-55
4.6.2 Refuge Staffing 4-55

5. Implementation and Monitoring 5-1
5.1 Step-Down Plans 5-1
5.1.1 Wildlife Inventory and Monitoring Plan (1986) 5-1
5.1.2 Cultural Resource Guide (1997) 5-1
5.1.3 Fire Management Plan (2001) 5-2
5.1.4 Fisheries Management Plan (1990) 5-2
5.1.5 Land Protection Plan (2001) 5-2
5.1.6 Public Use Management Plan (Visitor Services Plan) (1997) 5-2
5.1.7 Station Safety Plan (2005) 5-2
5.2 Partnership Opportunities 5-3
5.3 Monitoring and Evaluation 5-4
5.4 Plan Amendment and Revision 5-4
5.5 ORV Closure Regulations 5-4

Appendices

Appendix A: Legal Guidance and Planning Coordination
Appendix B: Coordination with the State of Alaska
Appendix C: Species List
Appendix D: Easements and Rights-of-Way
Appendix E: Compatibility Determinations
Appendix F: Section 810 Evaluation
Appendix G: Preparers
Appendix H: Glossary
Appendix I: References Cited
Appendix J: Responses to Comments
Appendix K: Finding of No Significant Impact

Figures

Figure 1-1. Alaska National Wildlife Refuges....1-1
Figure 2-1 Management categories – Revised Conservation Plan....2-31
Figure 2-2. Fire management options – Revised Conservation Plan....2-37
Figure 4-1. General land status – Tetlin National Wildlife Refuge....4-3
Figure 4-2. Climate information at Northway, Alaska....4-6
Figure 4-3. Tok area fires by cause 1956–2006....4-11
Figure 4-4. Tok area burned acres by cause 1956–2006....4-11
Figure 4-5. Tok area lightning fire season, cumulative data 1990–2002....4-12
Figure 4-6. Successional trajectories in interior Alaska along soil temperature and moisture gradients (Chapin 2004)....4-16
Figure 4-7. Raptor Nesting Areas....4-21
Figure 4-8. Current facilities and access....4-37
Figure 4-9. Alaska Highway and Tetlin Refuge Visitor Center summer visitation 1995–2004....4-46
Figure 4-10. Wilderness Review Units (from USFWS 1987a)....4-51
Figure D-1. 17(b) easements and proposed RS-2477 routes on Tetlin Refuge....D-3

Tables

Table 2-1. Annual base funding needed to implement the Revised Comprehensive Conservation Plan....2-40
Table 2-2. Current staffing and additional staffing needed to implement the Revised Comprehensive Conservation Plan....2-40
Table 3-1. Alaska Interagency Wildland Fire Management Plan management options used within Tetlin Refuge....3-15
Table 3-2. Activities, public uses, commercial uses, and facilities by management category....3-35
Table 4-1. Land Status of Tetlin Refuge (all acreage figures based on BLM case file records)....4-2
Table 4-2. Population characteristics of communities with customary and traditional use of Tetlin Refuge: 1960–2000....4-31
Table 4-3. Employment and income for local communities: 2000 (Sources: DCED 2004)....4-35
Table 4-4. Number of groups (people) using Tetlin Refuge administrative cabins....4-39
Table 4-5. Comparison of migratory bird harvest in Upper Tanana Valley communities, Alaska: 1987 and 2000 (Andersen and Jennings 2001)....4-41
Table 4-6. Estimated pounds of non-salmon fish harvested in Upper Tanana River communities: 2004 and 2005 (Friend et al. In Press).....4-42
Table 4-7. Existing administrative facilities for Tetlin Refuge....4-56
Table 4-8. Additional facilities needed to support current refuge programs....4-58
Table D-1. Estimated mileage of State-claimed RS 2477 routes within the boundaries of Tetlin Refuge....D-2

Acronyms and Abbreviations

ADA	Americans with Disabilities Act
ADF&G	Alaska Department of Fish & Game
ADOTPF	Alaska Department of Transportation and Public Facilities
ADNR	Alaska Department of Natural Resources
AFS	Alaska Fire Service
AGA	Alaska Geographic Association
AIWFMP	Alaska Interagency Wildland Fire Management Plan
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act of 1980
APLIC	Alaska Public Lands Information Center
ATV	All-Terrain Vehicle
BLM	Bureau of Land Management
BLM/AFS	Bureau of Land Management Alaska Fire Service
B.P.	Before present
CE	Categorical Exclusion
EA	Environmental Assessment
EIN	Easement Identification Number
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FONSI	Finding of No Significant Impact
FSB	Federal Subsistence Board
FTE	Full-time equivalent
GIS	Geographic Information System
GMU	Game Management Unit
IACP	International Association of Chiefs of Police
IACUC	Institutional Animal Care and Use Committee
IBA	Important Bird Area
LMRDA	Land Management Research Demonstration Area
MCH	Mentasta Caribou Herd
MMOU	Master Memorandum of Understanding
NWR	National Wildlife Refuge
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
ORV	Off-road vehicle

RAC	Regional Advisory Council
TNWR	Tetlin National Wildlife Refuge
Tok APLIC	Tok Interagency Alaska Public Lands Information Center
USFWS	U.S. Fish and Wildlife Service
WFSA	Wildland Firestation Situation Analysis

1. Introduction

This document is the Final Revised Comprehensive Conservation Plan (Revised Conservation Plan, Plan) for management of Tetlin National Wildlife Refuge (Tetlin Refuge, Refuge). It replaces the management direction for Tetlin Refuge described in the original Tetlin National Wildlife Refuge Final Comprehensive Conservation Plan, Environmental Impact Statement, Wilderness Review (1987 Tetlin Conservation Plan, 1987 Conservation Plan) (USFWS 1987a) and associated Record of Decision (USFWS 1987b) adopted in 1987.

The U.S. Fish and Wildlife Service (Service) administers approximately 700,000 acres of land and water in eastern interior Alaska's Upper Tanana Valley as Tetlin Refuge (Figure 1-1). This chapter provides background information that establishes the framework used to develop this document, including (1) purpose of and need for the Revised Conservation Plan; (2) an overview of the Refuge, including historical perspective and refuge establishment; purposes, vision, and goals of the Refuge; and the environmental setting; (3) the legal and administrative planning requirement; and (4) the planning process, including identification of significant planning issues addressed in the Plan.

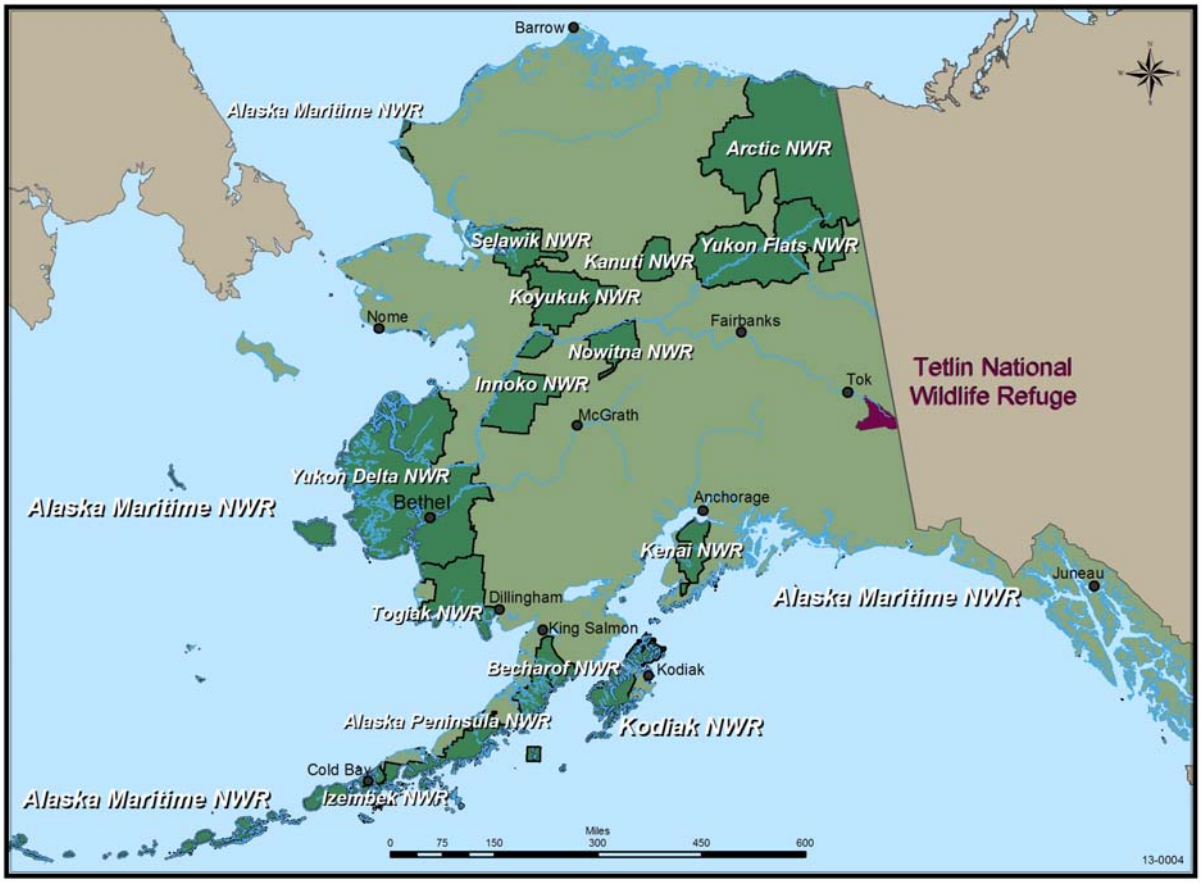


Figure 1-1. Alaska National Wildlife Refuges

1.1 Purpose of and Need for Action

This is a revision of the 1987 Tetlin Conservation Plan. Comprehensive conservation plans provide broad policy guidance and establish management directions for a refuge. They define long-term goals and objectives toward which refuge management activities are directed, and identify which uses are appropriate and may be compatible with the purposes of the refuge and mission of the National Wildlife Refuge System (Refuge System). Comprehensive conservation plans are dynamic documents, requiring periodic review and updating.

Federal statute, specifically section 304(g) of the Alaska National Interest Lands Conservation Act of 1980 as amended, 16 U.S.C. 140hh-3233, 43 U.S.C. 1602-1784 (ANILCA), directs the Secretary of the Interior to prepare, and from time to time revise, a ". . . comprehensive conservation plan . . . for each refuge (in Alaska) . . ."

The Service revised the 1987 Tetlin Conservation Plan to provide direction for management of the Refuge for the next 15 years. The Revised Conservation Plan follows guidance found in ANILCA and other Federal laws, primarily the National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee (Refuge Administration Act); and the National Environmental Policy Act of 1969 as amended, 42 U.S.C. 4321-4347 (NEPA) as implemented by the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR 1500-1508. Revising the 1987 Tetlin Conservation Plan allows the Service to:

- Update management direction related to national and regional policies and guidelines implementing Federal laws governing refuge management;
- Incorporate new scientific information on refuge resources; and
- Re-evaluate current refuge management direction based on changing public demands for use of the refuge and its resources, and changing environmental conditions.

In addition to the preceding requirements, a comprehensive conservation plan also serves to:

- Ensure that the purposes of the Refuge and the mission of the Refuge System are being fulfilled;
- Ensure that national policy is incorporated into the management of the Refuge;
- Ensure that opportunities are available for interested parties to participate in the development of management direction;
- Provide a systematic process for making and documenting decisions about refuge resources;
- Establish broad management direction for refuge programs and activities;
- Provide continuity in refuge management;
- Provide a basis for budget and personnel requests; and
- Provide a basis for evaluating accomplishments.

1.2 Historical Perspective and Refuge Establishment

Beginning with the first clearly demonstrated human occupation 10,000–11,000 years ago, the Upper Tanana Valley (Valley) became one of the most concentrated areas of prehistoric settlement in interior Alaska[1]. Because the Valley was not glaciated during the most recent ice age, it remained an important corridor for migratory birds, wildlife, and people.

Despite Euro-American influences associated with fur trading and gold mining beginning in the 1870s, the region remained substantially unaltered culturally or physically until the 1940s. With the beginning of World War II and construction of the Alaska Highway, the Upper Tanana Valley became the only overland travel route to Alaska from the continental 48 states. The Alaska Highway, Tok Cut-off Highway, and the nearby Taylor Highway (built soon after), continue to have a profound effect on the Upper Tanana Valley.

On December 2, 1980, President Jimmy Carter signed into law the Alaska National Interest Lands Conservation Act. This act, among other things, established the Tetlin National Wildlife Refuge.

1.3 Refuge Purposes, Vision, and Goals

1.3.1 Purposes of Tetlin National Wildlife Refuge

Section 302(4)(B) of ANILCA states:

> "The purposes for which the Tetlin National Wildlife Refuge is established and shall be managed include—
>
> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities."

1.3.2 Refuge Vision Statement

Through collaboration with a diverse network of partners and through the highest principles of conservation, Tetlin National Wildlife Refuge will foster a strong land ethic, scientific leadership, and opportunities for people to discover meaningful relationships with nature in a dynamic and changing landscape. Management will focus on the Refuge's natural character, biological

[1] Interior Alaska is that portion of the State between the Alaska Mountain Range and the Brooks Mountain Range.

integrity, and scientific values as driven by biological and physical processes. As stewards of Tetlin Refuge, we will strive to achieve the purposes of the Refuge and the mission of the National Wildlife Refuge System, maintain ecosystem integrity, provide for subsistence opportunities, and facilitate wildlife-dependent recreation. As a result, Tetlin Refuge will perpetuate its unique history and continuing role as a vital passageway for fish, wildlife, plants, people, and cultures.

1.3.3 Refuge Goals

Refuge goals are based on the purposes of Tetlin Refuge and the refuge vision statement. They reflect the contribution of the Refuge to the Refuge System, as well as other key management responsibilities that stem from law and policy. The Revised Conservation Plan resulting from this planning process must work toward meeting all of these goals.

Goal A: Conserve fish and wildlife populations representative of the natural diversity of the Upper Tanana Valley and the boreal forest ecosystem.

Goal B: Conserve plant populations and habitats representative of the natural diversity of the Upper Tanana Valley and the boreal forest ecosystem.

Goal C: Recognizing the position of Tetlin Refuge along three major flyways, and conserve migratory birds and their habitats to fulfill our international responsibilities under the Migratory Bird Treaty Act.

Goal D: Contribute to the protection and preservation of the cultural heritage of the Upper Tanana Valley.

Goal E: Maintain a fire management program for Tetlin Refuge that reflects the natural role of wildland fires in maintaining diversity and productivity in the boreal forest and supports refuge purposes and habitat management goals, while providing an appropriate level of protection for human life, property, and identified cultural and natural resources.

Goal F: Through partnerships with agencies and institutions in the United States and Canada, continue to coordinate research and monitoring efforts to expand our understanding of the underlying ecological mechanisms related to fire and how these mechanisms effect change in vegetation and animal populations within the Upper Tanana Valley and the boreal forest ecosystem.

Goal G: Provide subsistence opportunities for rural residents, compatible with other refuge purposes.

Goal H: Maintain the integrity and environmental health of waters and aquatic habitats within the Upper Tanana River drainage.

Goal I: Enhance understanding and appreciation of Tetlin Refuge's purposes, special values, and management goals, and promote stewardship of natural and cultural resources through comprehensive environmental education and interpretation programs and visitor services facilities.

Goal J: Provide compatible wildlife-dependent recreation opportunities for people to explore, enjoy, and learn about the dynamic landscape and natural diversity of Tetlin Refuge.

Goal K: Enhance stewardship of natural resources through strong local, State, tribal, national, and international partnerships.

Goal L: Improve collaboration and communication with and support for local resource users and the communities of the Upper Tanana Valley through development of a "Good Neighbor Policy" that is sensitive to social, political, cultural, and economic needs within the local area.

1.4 Refuge Environment

The external boundaries of Tetlin National Wildlife Refuge encompass approximately 932,000 acres; approximately 700,000 acres of those lands are refuge lands. The remaining lands belong to Native corporations, the State of Alaska, or private individuals. The Refuge is located northeast of the Alaska Range, adjacent to the U.S.- Canada border in the headwaters of the Tanana River. It is bordered to the south by Wrangell-St. Elias National Park and Preserve, Canada to the east, and the Alaska Highway along its northeast border. The Refuge lies within the Nabesna/Chisana River Basin in the Upper Tanana Valley. The large, flat basin of the Upper Tanana River Valley is filled with sediments deposited in glacial moraines and outwash plains, creating a landscape dominated by lakes, ponds, and wetland tundra. Most of the Refuge is rolling lowlands; however, the Mentasta Mountains in the southwest corner are rugged, glacier-carved peaks reaching elevations of 8,000 feet.

Tetlin Refuge is one of the most diverse interior refuges in Alaska. The vegetation is a complex mixture of spruce forests, mixed woodlands, shrub lands, and tussock peatlands that are interspersed with innumerable streams, ponds, lakes, and other wetlands. The landscape provides valuable habitat for a wide variety of fish and wildlife species, including 14 fish species, nearly 200 bird species, 44 mammal species, and one amphibian species, that are known to use the Refuge for at least part of each year (see species list in appendix C).

1.5 Special Values of the Refuge

Section 304(g) of ANILCA directs the Secretary of the Interior to identify and describe "special values of the refuge, as well as any other archaeological, cultural, ecological, geological, historical, paleontological, scenic, or wilderness values of the refuge." The following special values have been identified for Tetlin Refuge.

1.5.1 Migratory Corridor

Because the Upper Tanana Valley was not glaciated during the last ice age, animals, plants, and people have passed through this area for at least 10,000 years, traveling from Asia, the Arctic, and other areas of Alaska to the rest of the North American continent. Today, the Upper Tanana Valley, including what is now Tetlin Refuge, continues to serve as one of the most significant migratory bird corridors in the world, being located along three major flyways. The extensive wetlands, rivers, ponds and forests of the Refuge provide resting and breeding habitat for hundreds of thousands of migratory birds. Spectacular migrations of lesser sandhill cranes and both tundra and trumpeter swans occur each spring and fall. Up to 200,000 cranes, approximately one-half of the mid-continental population, migrate through this corridor.

The northeast side of the Refuge borders the Alaska Highway, which is the primary surface transportation corridor for people traveling to and from Alaska. The Refuge's proximity to the Alaska Highway gives many residents and travelers the opportunity to experience the wildlife, scenery, and other resource values of the Refuge. The Refuge, which is the northern-most part of the largest contiguous network of public land and protected areas on earth, provides numerous travelers entering Alaska via the Alaska Highway their first exposure to public lands in Alaska.

1.5.2 Waterfowl

Tetlin Refuge supports one of the highest densities of breeding waterfowl found in Alaska (USFWS 1987a), and annually produces 35,000 to 65,000 ducklings to flight stage. Tetlin Refuge

provides habitat for 143 breeding and 43 migrating bird species, and serves as a major migration corridor during spring and fall. The Refuge and the Upper Tanana Valley also support about 10 percent of the continental population of trumpeter swans. This importance of the Valley has been formally recognized by the National Audubon Society through its designation as an Important Bird Area.

1.5.3 Bird Diversity

As the easternmost interior refuge in Alaska, coupled with its location within a major bird migration corridor, Tetlin Refuge supports bird species that are rare (see Appendix H: Glossary for definition) or absent elsewhere in the State. Some of these species nest on the Refuge, including blue-winged teal, ring-necked duck, osprey, sharp-tailed grouse, and red-winged blackbird. The American coot, sora, and brown-headed cowbird, which are regularly found on the Refuge, are rare or absent throughout most of Alaska. The Tetlin Flats area also provides habitat for the largest concentration of nesting ospreys in Alaska (Hughes and Wright 1990). Bald eagles are common nesters along the major rivers and shorelines of the larger lakes on the Refuge, and cliffs provide nesting platforms for peregrine falcons.

1.5.4 Glacial Dunes

Composed of wind-blown glacial flour (or loess) that stabilized during the late Wisconsin glacial period to post-glacial times (12,400–6,200 years before present), the parabolic dunes southeast of Northway and at Big John Hill are geologic formations uncommon elsewhere in interior Alaska.

1.5.5 Scottie Creek Historic and Cultural Resources

This area in the southeastern portion of the Refuge has the highest density of historic and prehistoric archaeological resources documented for any area managed by the Refuge. Dating of materials recovered from nearby Beaver Creek in the Yukon indicate this portion of the Upper Tanana Valley has been inhabited for more than 10,000 years (Clark 2001). A limited number of archaeological investigations, interviews with local residents, past surveys, reports, and other documentation have established the significance of this area since prehistoric times for fishing, hunting, gathering, trapping, trading, and travel throughout the Upper Tanana Valley. Local residents still express a strong and deeply personal relationship to this area through shared memories and continued subsistence use. Based upon the area's long and important history within the region, future archaeological survey efforts could further establish its historic and cultural significance to our understanding of early human settlement and migratory patterns of fish and wildlife throughout North America.

1.6 Legal and Administrative Planning Requirements

The Alaska National Interest Lands Conservation Act (ANILCA) provides direction for preparing and revising comprehensive conservation plans for each refuge in Alaska. Section 304(g)(2) of ANILCA specifies that prior to developing a plan for any refuge, we must identify and describe:

> "(A) the populations and habitats of the fish and wildlife resources of the refuge;
>
> (B) the special values of the refuge, as well as any other archeological, cultural, ecological, geological, historical, paleontological, scenic, or wilderness values of the refuge;

(C) areas within the refuge suitable for use as administrative sites or visitor facilities, or for visitor services, as provided for in sections 1305 and 1306 of this Act;

(D) present and potential requirements for access with respect to the refuge, as provided for in Title XI [of ANILCA]; and

(E) significant problems which may adversely affect the populations and habitats of fish and wildlife identified and described under subparagraph (A)."

Section 304(g)(3) of ANILCA states each comprehensive conservation plan shall:

"(A) be based upon the identifications and the descriptions required to be made under paragraph 2 [Section 304(g)(2) above]—

(i) designate areas within the refuge according to their respective resources and values;

(ii) specify the programs for conserving fish and wildlife and the programs relating to maintaining the values referred to in paragraph (2)(B) [listed above], proposed to be implemented within each such area; and

(iii) specify the uses within each such area which may be compatible with the major purposes of the refuge; and

(B) set forth those opportunities which will be provided within the refuge for fish and wildlife-oriented recreation, ecological research, environmental education, and interpretation of refuge resources and values, if such recreation, research, education, and interpretation is compatible with the purposes of the refuge."

In preparing the plans, we are required to ensure adequate interagency coordination and public participation. Specifically, interested and affected parties such as State agencies, Native corporations, local residents, and political subdivisions must be provided meaningful opportunities to present their views. Furthermore, prior to adopting a plan, we must issue notice of its availability in the *Federal Register*, make copies available in regional offices of the Fish and Wildlife Service throughout the U.S., and provide an opportunity for public review and comment.

1.7 The Planning Process for Tetlin Refuge

This section describes the process used to develop this Revised Conservation Plan and environmental assessment (EA). The process is consistent with the planning requirements specified in section 304(g) of ANILCA; the Refuge System Administration Act, as amended; the Service's planning policy (602 FW 1 and 3); the National Environmental Policy Act (42 U.S.C. 4321-4347); and the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500–1508). The Service is using an eight-step planning process to revise the 1987 Tetlin Conservation Plan:

1) Design the planning process (also called preplanning).

2) Initiate public involvement and scoping.

3) Determine significant issues.

4) Develop and analyze alternatives.

5) Prepare draft conservation plan and environmental assessment.

6) Prepare and adopt a final plan and finding of no significant impact.

7) Implement, monitor, and evaluate the plan.

8) Review and revise the plan.

1.7.1 Design the Planning Process (Preplanning)

In late 2004, the Service began reviewing the 1987 Tetlin Conservation Plan to determine if it should be revised or a new plan prepared. The Service found that, in most cases, on-the-ground management actions were meeting refuge objectives. However, some management direction needed to be updated. New laws (such as the Refuge System Improvement Act), new regulations and policies, and other changes (such as Federal management of subsistence on Alaska refuges) needed to be incorporated into the Revised Conservation Plan. For these reasons, the Service decided that a revision of the 1987 Tetlin Refuge Conservation Plan was necessary.

The Service then identified all relevant laws, regulations, policies, and other direction that would have to be considered during revision of the 1987 Conservation Plan. These are discussed in appendix A. The Service also reviewed data available on refuge resources and uses, and identified some areas in which additional work was required.

1.7.2 Initiate Public Involvement and Scoping

This step informed people that the conservation plan revision process was beginning and that we were soliciting input on what should be addressed in the revision. Formal scoping began with publication of the Notice of Intent to revise the Tetlin Refuge Conservation Plan and prepare an EIS, which was published in the *Federal Register* on December 7, 2004 (Vol. 69 No. 234, pp. 70704-70705).

In January 2005, a newsletter announcing the revision and seeking comments was mailed to 1,900 individuals and organizations. Copies of the newsletter were sent to all post office box holders in Northway, Tetlin, Tok, Mentasta Lake, Tanacross, and Dot Lake. Additional copies were mailed to organizations and individuals on the Tetlin Refuge mailing list. The newsletter contained information about the Refuge, described issues identified by the refuge staff, and provided an opportunity for the public to identify other issues that should be addressed during revision of the conservation plan.

Public meetings to gather input were held in communities adjacent to Tetlin Refuge and in Delta Junction. Eighteen people attended the meetings, and 33 individuals or organizations provided written or oral comments. Potential issues identified by the public included public access, visitor facilities, fire management, protection of wildlife populations, habitat conservation and protection of the Refuge's primitive, natural condition. Following analysis of the comments, we determined that an environmental impact statement (EIS) was not needed and that an environmental assessment (EA) would fulfill all requirements of NEPA. A Notice explaining the decision to conduct the environmental analysis for the revision of the Tetlin Refuge Conservation Plan with an EA rather than an EIS was published in the *Federal Register* on July 25, 2006 (Vol. 71, No. 142, pp. 42116-42117).

1.7.3 Determine Significant Planning Issues

The planning team reviewed the issues raised by the public, refuge staff, and other Service divisions during the comment period to determine the significant planning issues to be addressed in the revised Comprehensive Plan. Significant planning issues are those issues where multiple approaches to resolving the issue will be evaluated as part of the planning process. Section 1.8

provides more detail on the process used to identify the significant planning issues and what those issues are.

1.7.4 Develop and Analyze Alternatives

Following determination of the significant planning issues in early March 2005, the planning team developed three preliminary alternatives for management of the Refuge. These preliminary alternatives were presented to tribal councils, State agencies, and local government agencies in the affected area with comments, suggestions, and questions solicited. No comments were received, and refuge staff made only minor revisions to the preliminary alternatives during this review. These alternatives were then presented to the regional director and other members of Service leadership at briefings in late March and early April 2005 for their concurrence.

1.7.5 Prepare Draft Plan and Environmental Assessment

This step produced a draft plan for public review. It described three alternatives (including current management) for managing Tetlin Refuge over the next 15 years. It included an analysis of the potential impacts of implementing each alternative and described how the Service determined its preferred alternative (Alternative B). It included a description of management common to all the alternatives—management that would remain the same no matter which alternative was implemented. The Service's Notice of Availability of the Draft Conservation Plan was published in the *Federal Register* on October 3, 2007 (Vol. 72, No. 191, pp. 56371-56372). During the public review and comment period, the Service held public meetings in Fairbanks, Tok, Northway, Tetlin, and Tanacross. The public review period ended on January 18, 2008.

1.7.6 Prepare and Adopt a Final Plan

The planning team reviewed and analyzed all comments received on the Draft Conservation Plan (see appendix J), modified the draft as needed, and developed the Final Revised Comprehensive Conservation Plan. A Finding of No Significant Impact (FONSI) was signed by the regional director on July 24, 2008 (see appendix K). A Notice of Availability has been published in the *Federal Register*, and the Final Revised Comprehensive Conservation Plan and FONSI have now been distributed to the public.

1.7.7 Implement Plan, Monitor, and Evaluate

Upon approval of the FONSI and Revised Conservation Plan, refuge staff began implementing the management changes and actions called for in the revised Plan. A critical component of management is monitoring—measuring resource and social conditions to make sure that progress is being made toward meeting refuge purposes, goals, and objectives. Monitoring includes determining if the Refuge is implementing the Plan and if actions being taken are effective in meeting the objectives. The Refuge will use an adaptive management approach, which means that information gained from monitoring will be used to evaluate and, as needed, modify refuge objectives.

1.7.8 Review and Revise Plan

Service policy directs that the Refuge review the Revised Conservation Plan annually to assess the need for change. The Service will revise the Plan when important new information becomes available, when ecological conditions change, or when the need to do so is identified during a review. If major changes are proposed, public meetings may be held and a new environmental assessment (or an environmental impact statement) may be necessary. Consultation with

appropriate State agencies and others will occur during any future revisions. Full review and revision of the Plan will occur every 15 years, more often if necessary. The Service will continue to inform and involve the public through appropriate means (such as reporting on activities at village meetings and via updates or other mailings) throughout the implementation and monitoring process.

1.8 Significant Planning Issues

Five significant planning issues were identified for consideration during revision of the 1987 Tetlin Conservation Plan. These issues reflect problems or opportunities that the Refuge can address in a variety of ways. The management direction described in chapters 2 and 3 comprise the chosen alternative for addressing these issues.

Many issues were identified from public and agency comments during the scoping process. Several of those issues were outside the scope of the revision process, and others are addressed through existing laws, regulations, or policies or do not lend themselves to more than one course of action.

The following discussion briefly describes each of the five significant planning issues (in no particular order). Note that significant issues may be raised by only a few people familiar with a specific area or problem (either by the public or by staff) or they may be of national interest and generate a number of comments from across the country. The Service's role in identifying and analyzing the issues is to objectively consider a wide range of approaches that could be taken to address each issue.

1.8.1 Issue 1. Visitor services role of Tetlin Refuge in the Upper Tanana Valley

Currently, Tetlin Refuge offers comprehensive interpretive and environmental education programs and supports a wide range of wildlife-dependent recreation opportunities. In addition, the Refuge is increasing its capacity to provide public outreach and recreational opportunities along the Alaska Highway (e.g., at the Seaton Roadhouse site) and with the Alaska Public Lands Information Center in Tok. As a result of our management actions, changes are expected to occur that will affect public use of the Upper Tanana Valley.

In addition to changes in public use resulting from our management actions, we the Service anticipates increased recreational demand as summer tourist travel increases; increased participation in subsistence activities resulting from increasing populations of local communities; and changes in visitation patterns resulting from improved transportation systems (e.g., Taylor Highway paving project, Alaska railroad extensions) and major development projects (e.g., proposed Alaska natural gas pipeline). Given these potential changes, the Refuge needed to evaluate and consider its long-term management direction for providing compatible wildlife-dependent public use opportunities. Significant increases in fuel prices, which have occurred since this planning issues was developed, will also likely affect refuge visitation and use, but the level of such impacts is unknown at this time.

1.8.2 Issue 2. Public use facilities and access

Both the Refuge and the public recognize access and associated facilities as appropriate and necessary in providing opportunities for existing compatible wildlife-dependent public uses within the Refuge. The Refuge currently provides, or is implementing existing plans to provide, a variety of public facilities along the Alaska Highway. These include: interpretive visitor centers, highway pullouts, hiking trails, interpretive walking trails, parking areas, campgrounds, wildlife

viewing blinds, and boat launches. In addition, the Refuge continues to make remote administrative cabins available for public use. The public continues to express desire for additional public use opportunities along the Alaska Highway and in remote backcountry areas of the Refuge. The Refuge evaluated options for improving and/or increasing opportunities for compatible wildlife-dependent public use of the Refuge and enhancing visitor experiences.

1.8.3 Issue 3. Management of fire to protect resources and property

The public continues to express a growing concern that current fire management policies do not provide adequate protection for various resources and private property within and adjacent to the Refuge. The Refuge recognizes fire as a natural and necessary process in the Upper Tanana Valley; however, the protection of life, health, property, and natural and cultural resources must also be considered in its fire management decisions. Within the framework of national, departmental, and Service wildland fire policy and the Alaska Interagency Wildland Fire Management Plan, the Refuge explored the full range of fire management options available, including natural fire, prescribed fire, and chemical and mechanical fuels treatments in order to reduce the threat that fires on the Refuge pose to resources and private property.

1.8.4 Issue 4. Habitat management

The 1987 Tetlin Conservation Plan contains management direction for burning a specified number of acres annually on the Refuge in order to maintain or improve waterfowl nesting habitat and moose browse production. The Refuge considered this management direction, given the existing natural fire regime and the potential effects of large-scale prescribed burning on the ecological health and diversity of the Upper Tanana Valley, and evaluated a range of alternatives for applying prescribed fire and natural fire as wildlife habitat management tools within the Refuge.

1.8.5 Issue 5. Fisheries Management

The 1987 Tetlin Conservation Plan identified several actions aimed at reintroducing fish stocks and enhancing recreational fishing opportunities within the Refuge. Most of these management strategies and policies were developed with limited supporting data and insufficient impact assessments. In light of regional and national policies now in place, the Refuge re-evaluated these management activities and determined that fisheries management should be focused on maintaining native species in their natural diversity and abundance, not on the production of larger fish to provide trophy recreational fishing opportunities.

2. Revised Conservation Plan for Tetlin National Wildlife Refuge

This chapter describes the planning context within which the Comprehensive Conservation Plan (Conservation Plan) was developed, the underlying goals and objectives, and the general management direction for Tetlin National Wildlife Refuge (Tetlin Refuge, Refuge). Chapter 3 provides the revised management policies and guidelines that were developed to provide uniform management direction for national wildlife refuges in the Alaska Region of the U.S. Fish and Wildlife Service (Service). This Plan adopts those management policies and guidelines.

This chapter is divided into four sections. The Planning Context and Principles for Managing National Wildlife Refuges are presented in section 2.1 and 2.2. Goals and objectives are presented in section 2.3. The General Management Direction (Revised Conservation Plan) is described in section 2.4.

2.1 Planning Context

The Tetlin Refuge is part of the National Wildlife Refuge System (Refuge System) administered by the U.S. Fish and Wildlife Service. It must be managed in a manner that reflects national priorities and contributes to the mission and goals of the Service and entire Refuge System, as well as specific refuge goals and purposes.

2.1.1 The U.S. Fish and Wildlife Service

Part of the Department of the Interior, the Service is the principal Federal agency responsible for conserving, protecting, and enhancing the nation's fish, wildlife, plants, and their habitats. In addition to administering the Refuge System, the Service operates national fish hatcheries, fishery resource offices, and ecological services field stations. The Service also enforces Federal wildlife laws, administers the Endangered Species Act, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, and helps foreign governments with their conservation efforts. It oversees the Federal Aid in Wildlife Restoration program, which distributes to State fish and wildlife agencies hundreds of millions of dollars derived from excise taxes on fishing and hunting equipment.

The mission of the U.S. Fish and Wildlife Service is:

> *working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people (Service Manual 602FW 1.6W).*

2.1.2 The National Wildlife Refuge System

The National Wildlife Refuge System comprises more than 96 million acres of Federal lands, encompassing more than 545 national wildlife refuges, thousands of small wetlands, and other special management areas. Refuge System lands are located in all 50 states and the territories of the United States. Alaska contains 16 national wildlife refuges (Figure 1-1). These refuge lands contain a wide range of habitats with varied terrain including mountains, glaciers, tundra, grasslands, wetlands, lakes, woodlands, and rivers. Together, the 16 refuges comprise 76.8 million acres and constitute about 80 percent of the National Wildlife Refuge System.

Although the Refuge System was created to conserve fish, wildlife, plants, and their habitats, it also provides the public with opportunities to participate in compatible wildlife-dependent

recreation, including fishing, hunting, wildlife observation and photography, and environmental education and interpretation on Refuge System lands and to better appreciate the value of and need for fish and wildlife conservation.

The mission of the Refuge System is:

> *to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (Refuge Administration Act; 16 U.S.C. 668dd[a][2]).*

2.2 Principles for Managing the National Wildlife Refuge System

The Refuge System Administration Act, as amended, states that each refuge shall be managed to fulfill both the mission of the Refuge System and the purposes for which the individual refuge was established. It requires that any use of a Refuge be compatible, which is defined as a use that will not materially interfere with or detract from fulfillment of the mission of the Refuge System or the purposes of the refuge. The determination of whether a use is compatible is based on sound professional judgment of the refuge manager and is subject to public review.

The 1997 amendments to the Refuge Administration Act identified a number of principles to guide management of the Refuge System. Those principles require that we administer the refuges to:

- Conserve fish, wildlife, and plants, and their habitats within the Refuge System;
- Maintain biological integrity, diversity, and environmental health of the Refuge System;
- Carry out the mission of the Refuge System and the purposes of each refuge (except that, if a conflict exists, refuge purposes are protected first);
- Ensure effective coordination, interaction, and cooperation with adjacent landowners and State fish and wildlife agencies;
- Maintain adequate water quantity and water quality to meet refuge and system purposes and acquire necessary water rights under State law;
- Recognize hunting, fishing, wildlife observation and photography, and environmental education and interpretation as the priority general public uses of the Refuge System;
- Provide opportunities for compatible priority wildlife-dependent public uses within the Refuge System;
- Provide enhanced consideration for priority wildlife-dependent uses over other general public uses in planning and management within the Refuge System;
- Provide increased opportunities for families to experience compatible wildlife-dependent recreation, particularly traditional outdoor activities such as fishing and hunting; and
- Monitor the status and trends of fish, wildlife, and plants within each refuge.

To maintain the health of individual refuges, and the National Wildlife Refuge System as a whole, managers must anticipate future conditions. Managers must endeavor to avoid adverse impacts and take positive actions to conserve and protect refuge resources. Effective management also depends on acknowledging resource relationships and acknowledging that refuges are parts of larger ecosystems. Refuge managers work together with partners, including other refuges,

Federal and State agencies, tribal and other governments, Native organizations and entities, and nongovernmental organizations and groups, to protect, conserve, enhance, or restore all native fish, wildlife (including invertebrates), plants, and their habitats.

2.3 Goals and Objectives

The Tetlin Refuge vision statement and purposes (see chapter 1) provide the framework for developing goals and objectives for managing the Refuge. Goals are broad statements of desired future conditions. Objectives are more concise statements of what the Refuge wants to accomplish.

Objectives identified for one goal are often applicable to other goals. To avoid unnecessary duplication, each objective is listed only under the goal that represents the clearest connection.

Cooperation with State and Federal agencies and other organizations is a critical component to successfully meeting most of the objectives listed in the following text. This cooperation can take a variety of forms, ranging from reviewing and revising study plans and reports to cooperating on data collection and report completion.

A. Conserve fish and wildlife populations representative of the natural diversity of the Upper Tanana Valley and the boreal forest ecosystem.

A.1 Objective: Within two years of the Plan's approval, revise the Tetlin Refuge Wildlife Inventory and Monitoring Plan (TNWR 1986) to include statistical benchmarks and/or management action thresholds for trust, harvested, and indicator species. (Also relates to Goals C, E, F, G, and H.)

Rationale: An inventory and monitoring step-down plan is required by Service Manual 701 FW 2, Inventory and Monitoring of Populations. The existing plan was last revised in 1986 and does not reflect new legislation or changes to Service policy and refuge goals and objectives. The revised plan will outline the techniques and schedules for routinely conducted inventories and monitoring efforts, and ensure information is collected in a biologically and statistically sound manner. As outlined in 602 FW 4 of the Service Manual, the revised Refuge Wildlife Inventory and Monitoring Plan will achieve goals and objectives of the Revised Conservation Plan through specific, achievable strategies (including those developed as part of Objectives A.5, A.6, A.7, A.8, A.11, A.12, B.3, C.9, C.10, and F.4) to be carried out on the Refuge as part of its biological program.

A.2 Objective: Within three years of the Plan's approval, assist the Fairbanks Fish and Wildlife Field Office in updating or revising the Tetlin Refuge Fisheries Management Plan (USFWS 1990). (Also relates to Goals G, H, and J.)

Rationale: The 1990 Tetlin Refuge Fisheries Management Plan is a five year step-down plan that provides numerous strategies for achieving refuge goals and objectives, and addresses various issues and concerns regarding fisheries resources on the Refuge. A revision of the Fisheries Management Plan is needed to accurately reflect current Service policy and refuge management direction.

A.3 Objective: Continue aerial surveys of moose on the Refuge and adjacent lands at regular intervals of no more than five years to determine population trend in

cooperation with the Alaska Department of Fish and Game (ADF&G), Wrangell-St. Elias National Park and Preserve, and Ministry of Yukon Environment. (Also relates to Goals G and K.)

Rationale: Moose are integral to the Refuge, both in terms of ecological function and harvest opportunities. Data from standardized surveys allow Federal and State land managers to provide guidance on hunting regulations that require current information.

A.4 Objective: Within five years of funding, complete efforts to determine the seasonal distribution and important habitats of the moose population which occupies Tetlin Refuge and surrounding lands. (Also relates to Goals B, E, and G.)

Rationale: Moose occur throughout the boreal landscape and are culturally and economically important to humans in interior Alaska. Longstanding concerns about moose availability and harvest opportunities have been voiced by local users. Delineating the distribution and habitat use of the local moose population will allow us to identify and address potential management issues (e.g., hunting, wildfire management, development).

A.5 Objective: Continue aerial surveys to determine the distribution and density of wolves on the Refuge and surrounding lands and incorporate a protocol for periodic monitoring into the revised Wildlife Inventory and Monitoring Plan. (Also relates to Goal G.)

Rationale: Wolves are part of the natural diversity that the Refuge is mandated to conserve under Alaska National Interest Lands Conservation Act (ANILCA) and, as top-level predators, wolves are an important component of the Refuge's ecosystem. Recent actions by the Alaska Board of Game to liberalize wolf hunting regulations and implement wolf population reduction programs, including efforts on lands adjacent to Tetlin Refuge, have generated controversy regarding wolf management. These surveys will provide us with a means to monitor population trends and assess the effects of harvest and predator control on wide-ranging wolf packs whose ranges include refuge lands. In addition, the data will provide valuable information toward understanding the relationship between wolves and prey species in the area.

A.6 Objective: In cooperation with partners in Alaska and Canada, continue to quantify snowshoe hare population cycles and incorporate monitoring protocols into the revised Wildlife Inventory and Monitoring Plan. (Also relates to Goals B, G, and K.)

Rationale: The snowshoe hare is a keystone herbivore in the boreal forest with the potential to affect other species both as prey and as a competitor, and by changing plant characteristics through their browsing. Lynx and several raptors, in particular, respond favorably to increasing populations of snowshoe hares. These data are critical for interpretation of wildlife population trends.

A.7 Objective: Within five years of the Plan's approval, determine the distribution, relative abundance, and/or density of black and brown bear on the Refuge and incorporate procedures for periodic monitoring into the revised Wildlife Inventory and Monitoring Plan. (Also relates to Goal G.)

Rationale: Additional information about area bear populations that utilize the Refuge is needed. Recent actions by the Alaska Board of Game that are intended to reduce bear populations and their predation on big game animals in many areas of the State, including areas adjacent to Tetlin Refuge, have generated controversy regarding bear population management. Refuge surveys will provide a means to assess bear populations and trends on lands within and near the Refuge, and valuable baseline information towards understanding the relationship between bears and prey species in the Upper Tanana Valley.

A.8 Objective: Within five years of the Plan's approval, conduct surveys to determine the relative abundance and winter distribution of furbearers, including marten, mink, weasel, lynx, fox, and coyote, on the Refuge and incorporate monitoring protocols into the revised Wildlife Inventory and Monitoring Plan. (Also relates to Goals E and G.)

Rationale: Additional information about area furbearer populations and their distribution on the Refuge and adjacent lands is needed. Furbearers are a significant component of the Refuge's natural diversity, and have subsistence, cultural, and economic value to local residents. Data on the distribution and relative abundance of furbearers are needed to evaluate the effects of fire management and harvest on furbearer populations.

A.9 Objective: In cooperation with Wrangell-St. Elias National Park and Preserve, Alaska Department of Fish and Game, and the U.S. Geological Survey, continue winter reconnaissance flights to document caribou numbers and distribution on the Refuge and surrounding lands. (Also relates to Goals G and K.)

Rationale: Caribou are currently periodic winter migrants onto the Refuge. When present, they provide subsistence hunting opportunity and serve as a prey source for wolves and other carnivores. The Refuge seasonally monitors caribou density and distribution within the Refuge through aerial tracking of radio collared individuals. This information is used to manage the winter subsistence caribou harvest as part of the Mentasta Caribou Management Plan. This plan sets fall harvest quotas and bag limits for the Mentasta Caribou Herd that allow for subsistence use and a strategy to minimize incidental harvest during winter hunts targeted for the Nelchina and Fortymile Caribou Herds.

A.10 Objective: Continue to develop partnerships to monitor stocks, assess the harvest, and fill data gaps for management of humpback whitefish. (Also relates to Goals G and H.)

Rationale: Humpback whitefish are an important component of local native culture and the primary subsistence fishery species in the Upper Tanana Valley. Concerns expressed by local residents about possible declines in humpback whitefish populations led to a cooperative study incorporating traditional ecological knowledge and scientific methods. Using radio telemetry and involvement from local rural residents, this project has located two significant spawning areas within the Refuge on the Nabesna and Chisana rivers and several important fishing areas.

A.11 Objective: Within two years of revising the Refuge Fisheries Management Plan, initiate baseline inventories to describe distributions and important habitats of burbot, northern pike, Arctic grayling, and lake trout. (Also relates to Goals G and H.)

Rationale: There is limited information about distributions, crucial habitats, or harvest for these species. These fish species are harvested for subsistence and recreational purposes, and they are seasonally important as supplements to subsistence humpback whitefish harvests. More information is needed to effectively manage these species.

A.12 Objective: Within five years of the Plan's approval, determine the distribution and relative abundance of wolverine on the Refuge and adjacent lands and incorporate a monitoring protocol into the revised Wildlife Inventory and Monitoring Plan. (Also relates to Goal G.)

Rationale: Wolverine were once considered a common species throughout Tetlin Refuge; however, they are now only generally found in the foothills and more inaccessible mountainous areas. Wolverines are part of the natural diversity that the Refuge is mandated to conserve under ANILCA and, as top-level predators, wolverines can be a gauge of the health of the Refuge's ecosystem. Wolverines are also highly valued by trappers. These data will establish a baseline for monitoring trends in wolverine populations.

A.13 Objective: Within five years of the Plan's approval, determine the distribution and relative abundance of muskrats on the Refuge and incorporate monitoring protocols into the revised Wildlife Inventory and Monitoring Plan. (Also relates to Goal G.)

Rationale: Muskrats were once the most heavily harvested furbearer in the region and are still heavily harvested during population highs. Muskrat has also been identified by local subsistence users as a species of special concern, as population levels are believed to be low. These data will provide a baseline for the distribution and relative abundance of muskrat on the Refuge and identify important habitats. Long-term monitoring will identify environmental variables that affect abundance and increase our understanding of population cycles.

A.14 Objective: Continue to collaborate with Ecological Services in conducting studies of abnormal wood frogs within and/or adjacent to the Refuge. (Also relates to Goal H.)

Rationale: Only one amphibian species is known to occur on Tetlin Refuge. Increased sightings of malformed frogs throughout North America raised concerns about possible exposure to environmental contaminants. Collecting baseline data within the Alaska Highway corridor and at remote sites will allow the Refuge to compare trends over time and bolster current statewide efforts.

A.15 Objective: Within 10 years of the Plan's approval, work with partners to develop and implement strategies for the inventory of terrestrial invertebrates on Tetlin Refuge, including, but not limited to, bark beetles and forest defoliators, and incorporate them into the revised Wildlife Inventory and Monitoring Plan. (Also relates to Goals B, C, E, F, and K.)

Rationale: The importance of insects and other invertebrates in the function of forest ecosystems has been long recognized. However, additional information is needed to more fully understand and quantify their role in the boreal forest and establish a baseline for measuring changes in species diversity and population density over time.

A.16 Objective: Continue to implement and update existing cooperative management plans for refuge resources (e.g., Mentasta Caribou Management Plan), and develop new plans with appropriate partners. (Also relates to Goals B, E, F, G, and K.)

Rationale: Tetlin Refuge will continue to develop good working relationships with adjacent landowners and agencies. Such relationships allow for better management across boundaries of locally important wildlife species.

A.17 Objective: Within five years of the Plan's approval and in cooperation with Wrangell-St. Elias National Park and Preserve and Alaska Department of Fish and Game, investigate the importance of refuge lands to the local Dall's sheep population. (Also relates to Goals B, G, and K.)

Rationale: Adjacent to and south of Tetlin Refuge, the Wrangell-St. Elias National Park and Preserve contains one of the largest concentrations of Dall's sheep in North America. A small portion of that population is found in the extreme southwestern portion of Tetlin Refuge, in the Mentasta Mountains. This effort will help document the contribution of refuge lands to the population as a whole. These cooperative efforts with other conservation units help keep the data accurate and lend support to ecosystem integrity rather than management by borders.

A.18 Objective: Fully implement the law enforcement recommendations from the Deployment Model developed by the International Association of Chiefs of Police (IACP). Increase law enforcement staffing to the recommended level of 2.4 full-time equivalents (FTEs) to increase visitor protection and resource protection patrols. Also increase cooperative work with both the State of Alaska and U.S. Customs and Border Protection. Fully implement recommendations within 10 years of the Plan's approval. (Also relates to Goals C, D, G, and J.)

Rationale: A review of refuge law enforcement capabilities conducted in 2004 recommended strategies for improving visitor safety and compliance with existing rules and regulations. For Tetlin Refuge, these strategies involve commitments beyond current funding and staffing; 10 years is a reasonable estimated time frame for implementing the approved deployment model.

A.19 Objective: Improve compliance with rules and regulations to protect and conserve refuge resources by improving public knowledge and understanding of applicable rules and regulations. (Also relates to Goals C, D, G, and J.)

Rationale: Violations are not always intentional and often are simply due to misunderstandings, misinformation, or lack of knowledge. By improving public knowledge and understanding of various rules and regulations, the public will have a more enjoyable and safe refuge experience. To accomplish this objective, refuge environmental education activities will include law enforcement information and will

incorporate efforts to contact and educate refuge visitors and users about applicable refuge rules and regulations. Implementation of this objective is dependent upon the completion of objective A.18.

B. Conserve plant populations and habitats representative of the natural diversity of the Upper Tanana Valley and the boreal forest ecosystem.

B.1 Objective: Within two years of the Plan's approval, create a landcover map of vegetation communities in the Upper Tanana Valley using satellite imagery. (Also relates to Goals A, C, E, F, G, and H.)

Rationale: Satellite imagery will be used to generate a vegetation/habitat map. Many species such as moose, caribou, brown bear, black bear, wolves, wolverines, and migratory birds are not confined within the administrative boundaries of the Refuge. Vegetation maps are extremely beneficial for wildlife monitoring, wildfire modeling, recreation planning, and biological research; the Refuge needs both the current distribution of habitats and a cost-effective way to monitor changes in those habitats.

B.2 Objective: Within one year of completion of the refuge landcover map (Objective B.1), develop applicable data crosswalks to fire fuels classification systems, including the National Fire Danger Rating System, Canadian Forest Fire Danger Rating System, Canadian Forest Fire Behavior Prediction System, and the National Fire Fuel Laboratory system. (Also relates to Goal E.)

Rationale: Datasets will provide base inputs for short- and long-term fire behavior modeling using existing predictive software. These fire behavior models are used to develop fuels mitigation plans, prescribed fire plans, hazard fuel treatment plans, Wildland Fire Situation Analyses, and Wildland Fire Implementation Plans.

B.3 Objective: Within five years of the Plan's approval, complete the development of terrestrial and aquatic invasive species inventory and monitoring strategies and incorporate them into the Wildlife Inventory and Monitoring Plan and the Habitat Management Plan. (Also relates to Goals A, C, E, F, G, and H.)

Rationale: The Alaska Highway is a corridor for the spread of invasive species; several species of invasive plants have already been documented. Continued development in the highway corridor and construction projects such as the proposed natural gas pipeline will increase the potential for establishment of invasive species. Increased floatplane and boat access, and disturbance by fire and flooding, may also increase the spread of invasive species to remote parts of the Refuge. Non-native plants and animals transplanted to new areas can compete with native species, affect fisheries, and significantly alter existing ecosystems. This plan will help with early detection and eradication of invasive species on and adjacent to refuge lands.

B.4 Objective: Document fire progression on active refuge fires. (Also relates to Goal E.)

Rationale: Fire progression data can be used to validate and refine fire spread models and improve future predictions of spread.

B.5 Objective: Within five years of the Plan's approval, initiate research into the effects of development on the natural diversity of the fish and wildlife resources and their habitats on the Refuge. (Also relates to Goals A, C, E, F, G, H, K and L.)

Rationale: The Refuge will develop academic and non-governmental partnerships to evaluate human impacts on the natural diversity of the Upper Tanana Valley. Recently, several major transportation and pipeline projects have been proposed in or adjacent to the Refuge. Potential impacts of these activities are varied. For example, vehicular traffic (including aircraft and snowmobiles) can impact wildlife through direct mortality or by inhibiting their movements. Public use and access associated with roads and other linear features increases the likelihood of brown and black bear mortalities due to defense of life and property. Wildfire suppression and residential development are other potential disturbances in the area. The Refuge needs more information to address the cumulative effects of these activities, to forecast how they will likely change in the near future, and to mitigate the impacts.

B.6 Objective: At five-year intervals or after a significant disturbance, develop and implement strategies to monitor landscape changes of both vegetation and physical features. (Also relates to Goals A, C, E, F, G, and H.)

Rationale: The Refuge will monitor landscape-level changes in vegetation (e.g., as a result of fire, insect outbreak) and physical features (e.g., rivers, roads) using tools such as satellite imagery. This technology provides an extremely cost-effective and reasonably accurate method for assessing vegetation and wildlife habitat change over time, updating refuge landcover maps, assessing the long-term effects of climate change, and assessing the effectiveness of various fire management decisions.

B.7 Objective: Within two years of a fire's occurrence on the Refuge, develop a fire severity map if sufficient data are available. (Also relates to Goal F.)

Rationale: Severity estimates in conjunction with vegetative change can be used to estimate post-fire erosion potential, predict the susceptibility of a burned area to invasion by non-native species, and provide a baseline for future habitat research within a burned area.

B.8 Objective: Within five years of funding, complete an inventory of plants across all refuge habitat types. (Also relates to Goals E, F, and G.)

Rationale: Tetlin Refuge has an obligation to protect natural plant diversity. Previous inventories have begun to document the variety of plants on Tetlin Refuge, including surveys of lichens and bryophytes. Voucher specimens from these inventories are housed in the refuge herbarium and associated database. Completing this inventory will provide important baseline information against which to compare changes over time, including documenting the presence of rare or endangered plant species. The database and voucher specimen collection also provide a valuable resource for teaching and as a reference collection.

B.9 Objective: Within one year of funding, initiate research into the impacts of snowmobile use on vegetation and hydrology in relation to snow depth on Tetlin Refuge. (Also relates to Goals A and H.)

Rationale: Under certain conditions, snowmobiles may significantly alter soil temperature regimes and insulating properties through compaction (Wanek 1971, Wanek and Schumacher 1975). Consequently, the survival of some plants may be jeopardized due to deep freezing. This, coupled with physical damage and erosion caused by direct contact with the machines, could produce significant changes in natural vegetation. Snowmobile trails in some areas have also been shown to alter hydrology (Manning 1979). This information will help the Refuge manage important habitats potentially affected by snowmobile activities.

B.10 Objective: Within 10 years of the Plan's approval, archive existing biological and abiotic information into relational databases that will be compatible with the Refuge's Geographic Information System (GIS). (Also relates to Goals A, C, D, E, F, G, and H.)

Rationale: GIS can be a powerful tool for assembling, storing, manipulating, and displaying geographically referenced information. For example, information on refuge fish populations currently resides in file folders and various electronic files. Assembling this information into relational databases that are compatible with the Refuge's GIS will make this information readily accessible to more users, minimize duplication of effort, and maximize GIS implementation as a management tool.

B.11 Objective: Continue to convert all historic aerial photography of the Refuge into geo-referenced, orthorectified digital images. (Also relates to Goals D, E, F, and H.)

Rationale: Historic aerial photography is a valuable asset to managers and researchers monitoring changes in resources caused by natural or anthropogenic disturbances. Due to the extensive and frequent coverage, aerial photography is exceptionally valuable, including from a strictly historic perspective. Digital reproduction will help preserve the data in the event the original photography is damaged or lost.

C. Recognizing the position of Tetlin Refuge along three major flyways, conserve migratory birds and their habitats to fulfill our international responsibilities under the Migratory Bird Treaty Act.

C.1 Objective: Continue contributions to regional, national, and international efforts to monitor long-term trends in relative population size and distribution of landbirds that occur in Alaska. (Also relates to Goals B, G and K.)

Rationale: Policy (Service Manual 601 FW 3) dictates that each refuge should consider their contribution to the biological integrity, diversity, and environmental health at multiple landscape scales. Tetlin Refuge has a comprehensive landbird monitoring program that uses various survey methods to gather data on species occurrence, relative abundance, seasonal distribution, migration, and population trend. This integrated effort contributes to the long-term understanding of landbirds both on the Refuge and across the boreal forest.

C.2 Objective: In cooperation with partners in Alaska and the Yukon, continue to monitor landbirds during fall migration to document population trend and productivity. (Also relates to Goal K.)

Rationale: The Refuge maintains a fall migration monitoring station in collaboration with a network of stations across Alaska and the Yukon. Migration monitoring is especially useful for tracking changes in populations of bird species that occur in remote roadless areas. Capturing and banding landbirds during migration provides information on sex, age, and condition not usually available from other survey methods. This data contributes to baseline and long-term information on species composition, relative abundance, demographics, and seasonal patterns of migration.

C.3 Objective: Determine annual abundance and productivity of waterfowl across a range of habitat types in the Upper Tanana Valley. (Also relates to Goals B, E, F, G, and H.)

Rationale: Tetlin Refuge was set aside, in part, for its unique waterfowl values, and it has one of the highest densities of breeding waterfowl found in Alaska: 35,000–65,000 ducklings are produced annually. Recent changes to the Migratory Bird Treaty Act have established a spring and summer migratory bird subsistence hunt with limited regulations that have the potential to affect the conservation of this group of species. The data collected during this effort can identify habitats important for nesting and brood rearing, and provide baseline data that can be used to assess localized impacts of subsistence harvest.

C.4 Objective: Continue to monitor breeding population occupancy and productivity, habitat use, and food habits of raptors in Game Management Unit 12. (Also relates to Goals B and E.)

Rationale: Raptors are an important part of the natural diversity that the Refuge is mandated to conserve under ANILCA and, because they are at the top of complex food webs, raptors serve as an excellent gauge of environmental health and quality. The Tetlin–Northway Flats area provides habitat for the largest concentration of nesting ospreys in Alaska. The Upper Tanana Valley also supports an increasing population of peregrine falcons, which were removed from the Endangered Species List in 1999. Current efforts monitor the breeding status, productivity, and relative abundance of raptors, and the importance of lake, river, wetland and cliff nesting habitats within Tetlin Refuge and Game Management Unit 12.

C.5 Objective: Continue surveys at five-year intervals to determine the distribution, abundance, and productivity of trumpeter swans in the Upper Tanana Valley. (Also relates to Goals E, G, H, and K.)

Rationale: Tetlin Refuge provides important habitat for migrating swans during spring and fall. The Upper Tanana Valley also has a rapidly expanding breeding population of trumpeter swans. The Refuge presently conducts late fall productivity surveys every five years in conjunction with a statewide effort. Our survey contributes to the regional management of the species, identifies important nesting and staging areas, and helps document the contribution of refuge lands to the population as a whole.

C.6 Objective: Within one year of funding, initiate a study of sandhill cranes to estimate population size, timing of migration, and important staging areas within the Upper Tanana Valley. (Also relates to Goals B, G, and H.)

Rationale: During spring and fall migration, up to one-half of the mid-continent population of sandhill cranes (approximately 200,000 birds) passes through the Tanana River Valley. Recent changes to the Migratory Bird Treaty Act have established a spring and summer migratory bird subsistence hunt with limited regulations that have the potential to affect the conservation of this population.

C.7 Objective: Within two years of funding, replicate the 1979 study of wetland habitat and water quality as related to waterfowl use in the Scottie–Desper Creek area. (Also relates to Goals B, G, and H.)

Rationale: Water is an extremely important resource on Tetlin Refuge, and the Scottie–Desper Creek area has been identified as an important waterfowl nesting and production area. This area was studied in 1979 to evaluate waterfowl habitat in the Scottie–Desper Creek wetlands. There is a unique opportunity to replicate this earlier work and document changes over time in an important area.

C.8 Objective: Within one year of funding, initiate a study to compare nesting success, productivity, and availability of high-quality peregrine falcon habitat between nest sites along rivers and those within the Alaska Highway corridor. (Also relates to Goals B and H.)

Rationale: The peregrine falcon was removed from the Endangered Species List in 1999, and the population has rebounded in the Upper Tanana Valley, as it has elsewhere in North America. In the last decade, numerous new nesting sites have been established along the Alaska Highway corridor in road cuts and rock quarries. Our monitoring efforts have detected vastly differing rates of success and productivity between nests in these artificial sites and those in naturally formed cliffs along the Tanana River. A unique opportunity exists to identify habitat components important to increased nest success and productivity.

C.9 Objective: Within five years of the Plan's approval, establish monitoring strategies to determine the distribution and migration timing for shorebirds, gulls, terns and allied species. Incorporate these strategies into the revised Wildlife Inventory and Monitoring Plan. (Also relates to Goals G and H.)

Rationale: Some 26 species of shorebirds occur on Tetlin Refuge, many of which are migrants passing between wintering and breeding grounds. Little is known about the distribution and migration timing of these species on the Refuge and surrounding areas. Recent changes to the Migratory Bird Treaty Act have established a spring and summer migratory bird subsistence hunt with limited regulations that has the potential to affect conservation of these species. Monitoring is needed to acquire information on distribution and relative abundance, and to measure potential effects of subsistence harvest.

C.10 Objective: In cooperation with Boreal Partners in Flight, continue to develop and implement population monitoring surveys for owls in the Upper Tanana Valley and

incorporate the data into the revised Wildlife Inventory and Monitoring Plan. (Also relates to Goals G and K.)

Rationale: This effort contributes to larger scale projects to monitor owls in Alaska and the Yukon. The current monitoring effort documents the breeding status and relative abundance of boreal, great horned, and great gray owls on Tetlin Refuge and the Upper Tanana Valley. Recent changes to the Migratory Bird Treaty Act have established a spring and summer subsistence hunt for great horned owls with limited regulations that has the potential to affect the conservation of local populations.

C.11 Objective: Continue to collaborate with a local rehabilitation program for short-term care and release of injured raptors and other birds. (Also relates to Goals I, K, and L.)

Rationale: The Refuge currently collaborates with local individuals for the care and transport of injured raptors and other birds. This program demonstrates the Refuge's commitment to wildlife and its trust resources, and provides excellent outreach opportunities.

D. Contribute to the protection and preservation of the cultural heritage and natural history of the Upper Tanana Valley.

D.1 Objective: Continue to cooperate with Native entities, other agencies, and universities to enhance and develop programs to work with elders and other knowledge bearers to capture traditional knowledge relating to the cultural and natural history of Tetlin Refuge.

Rationale: By utilizing the traditional ecological knowledge of the tradition bearers, two things are accomplished. The traditions that were previously transmitted verbally will be documented for future generations, thus ensuring that the culture continues and baseline knowledge about flora, fauna, and events on refuge lands will be available to compare and contrast current distribution, health, status, and events.

D.2 Objective: Continue to cooperate with Native entities and other agencies to increase training and educational opportunities for local residents in the fields of natural and cultural resources to fill technical and professional positions on the Refuge and elsewhere. (Also relates to Goal G.)

Rationale: By augmenting traditional knowledge with educational and training programs necessary for meeting position requirements, we can assist local residents in becoming qualified to fill technical and professional positions in the field of natural and cultural resources.

D.3 Objective: Within two years of funding, begin to identify, document, map, and research cultural resources in at least three of four important archaeological areas. (Also supports Goal E.)

Rationale: Identifying, documenting, and mapping cultural resources within Tetlin Refuge is required by the National Historic Preservation Act and Service policy. It is critical to do it while there are still elders who possess in-depth knowledge of cultural resources. Additional information is needed to protect cultural resources

from fire, fire management activities, recreational use, and other activities occurring on the Refuge. Accurate maps of cultural information are critical for identifying potential threats and prioritizing the protection of these resources. Further, the Refuge has a key role in introducing visitors who enter the State by motor vehicle to Native culture in our interpretive programs and exhibits at the visitors' center.

D.4 Objective: Update, in cooperation with Native groups and other local entities, the 1996 Cultural Resource Guide for Tetlin Refuge by 2011 (15 years after it was completed). The document should include a comprehensive overview and management plan to research, interpret, and protect cultural resources on refuge lands to maximize benefits to all concerned.

Rationale: Elders with the most in-depth knowledge are passing away at a rapid pace and it is critical to gain all the knowledge that they can impart to us for use in making management decisions and insuring good stewardship of cultural resources. Local people have an interest in cultural resources and refuge projects affecting those resources. It is the obligation and legal responsibility of Tetlin Refuge to consult with others regarding the information sought and the projects conducted, and to share the outcomes and products of these efforts. Updating this plan will allow the refuge staff to better understand where to concentrate inventory and survey efforts.

E. Maintain a fire management program for Tetlin Refuge that reflects the natural role of wildland fires in maintaining diversity and productivity in the boreal forest and supports refuge purposes and habitat management goals, while providing an appropriate level of protection for human life, property, and identified cultural and natural resources.

E.1 Objective: Within five years of Plan's approval, inventory and map structures and other cultural resources in and around the Refuge at risk from wildland fire and/or fire management activities. (Also relates to Goal D.)

Rationale: Effective planning for prescribed and wildland fire requires identification of any sites that may require protection during the course of an incident. By locating sites prior to an incident occurring, many last minute tactical changes can be avoided, and incident management safety and effectiveness can be increased.

E.2 Objective: Within five years of approval of the Plan, and in cooperation with the affected communities and landowners, develop individual mitigation plans for communities and other sites identified as being at risk from wildland fire originating on the Refuge. (Also relates to Goal D.)

Rationale: Pre-suppression efforts such as fuelbreaks, thinning, and homeowner awareness programs can significantly reduce the risk of damage due to a wildland fire originating on the Refuge and can result in considerable suppression cost savings.

E.3 Objective: Within 10 years of the Plan's approval, assess the effectiveness of thinned fuel breaks in the Upper Tanana Valley and monitor long-term changes in thinned fuels and any unanticipated consequences of thinning such as insect infestation or invasive species spread. (Also relates to Goal B.)

Rationale: There are few data to support the effectiveness and desirability of shaded fuel breaks in interior Alaska. In spite of this, most community protection projects to date have employed this method. To increase the efficiency and effectiveness of future efforts, an analysis is required.

E.4 Objective: Within 10 years of the Plan's approval, evaluate weather data from the current refuge weather system and determine whether additional stations will significantly improve the system's predictive capability. (Also relates to Goal F.)

Rationale: Some evidence reveals that existing weather stations poorly represent actual conditions in the southeast corner of the Refuge. An additional permanent Remote Automated Weather Station (RAWS) or the incorporation of data from Beaver Creek, YT, Canada, may significantly improve our ability to predict the behavior of fires in that portion of the Refuge.

E.5 Objective: Within two years of the Plan's approval, revise the Refuge Fire Management Plan (TNWR 2001) to reflect changes in the Revised Comprehensive Conservation Plan and in national fire policy, and to reflect the best available knowledge and experience regarding use of natural and prescribed fire as tools for habitat management.

Rationale: The current Refuge Fire Management Plan (TNWR 2001) requires numerous revisions regarding smoke management, prescribed fire, wildland fire use, monitoring, and strategic outlook.

E.6 Objective: In collaboration with local partners, annually assess the Alaska Interagency Wildland Fire Management Plan (AWFCG 1998) management option boundaries within the Refuge, and submit necessary change recommendations to the Alaska Wildland Fire Coordinating Group.

Rationale: Changes in land status, improvements and use patterns, and fire history affect how management options should best be deployed across the landscape. Annual assessment will ensure options reflect current needs.

E.7 Objective: Within two years of the Plan's approval, update GIS data relevant to fire management, and have data readily available on a portable external hard drive to be used by Refuge fire personnel and by incident management teams during fires.

Rationale: Ready access to current spatial data can speed the planning process during a fire incident and facilitate efficient and safe management operations.

F. Through partnerships with agencies and institutions in the United States and Canada, continue to coordinate research and monitoring efforts to expand our understanding of the underlying ecological mechanisms related to fire and how these mechanisms effect change in vegetation and animal populations within the Upper Tanana Valley and the boreal forest ecosystem.

F.1 Objective: Within one year of funding, fully implement the designated National Wildlife Refuge System *Fulfilling the Promise* Land Management Research

Demonstration Area (LMRDA) for the boreal forest ecosystem. (Also relates to Goals A, B, C, D, E, G, and H.)

Rationale: Goal WH18 in the U.S. Fish and Wildlife Service's strategic plan entitled *Fulfilling the Promise* specifies the designation of Land Management Research Demonstration Areas to facilitate the development, testing, teaching, publishing, and demonstration of management techniques (USFWS 1999). Tetlin Refuge is one of only two LMRDAs established in Alaska and the only one accessible through the road system. Under the LMRDA program, Tetlin Refuge will monitor a selection of animal, plant, and physical elements essential to understanding the ecology and dynamics of fire across the boreal forest.

F.2 Objective: Within two years of funding and in cooperation with the science community (e.g., universities, research stations, and other agencies), initiate cooperative research projects to expand our understanding of the underlying ecological mechanisms related to fire and how these mechanisms affect change in vegetation and animal populations by using these data to identify relations among various environmental processes in the boreal forest ecosystem. (Also relates to Goals A, B, C, E, G, H, and K.)

Rationale: As the LMRDA-designated refuge for the boreal forest ecosystem, Tetlin Refuge will provide opportunities for scientific research. Despite public use, proximity to development, and road accessibility, Tetlin Refuge sustains a relatively high degree of ecological integrity. We will develop the Refuge into a designated center for research on boreal forest ecology and management. The funds and expertise needed to develop this program will be achieved though collaborative partnerships with other agencies and universities.

F.3 Objective: Within two years of funding, initiate a program that establishes Tetlin Refuge as a regional, interagency training facility for management and monitoring in the boreal forest ecosystem. (Also relates to Goals A, B, C, E, G, H, and K.)

Rationale: As the LMRDA-designated refuge for the boreal forest ecosystem, Tetlin Refuge will work to provide opportunities for land management training in boreal forest ecology and management. Training opportunities in Alaska are limited, and the costs of travel are often prohibitive; Tetlin Refuge is one of only two refuges in Alaska easily accessible by road. Managers in the boreal forest ecosystem must cooperatively use every opportunity to provide training opportunities. Cooperative interagency training will build camaraderie and familiarity across agencies, improving communications and operational capabilities.

F.4 Objective: Within two years of funding, develop inventory and monitoring strategies to assess the effects of fire on moose and caribou habitat quality, and incorporate the strategies into the revised Wildlife Inventory and Monitoring Plan and Habitat Management Plan. (Also relates to Goals A, B, C, E, and G.)

Rationale: Both moose and caribou are locally important to subsistence users, and it is important to quantify and monitor the availability of quality habitat for both species. Both moose and caribou habitat and population dynamics are affected to some extent by fire. The character of these relationships in the Upper Tanana Valley, however,

remains unclear. The amount, species, and quality of forage regrowth after fire depend on several factors. The composition of the pre-fire community and time of year, and also fire intensity, size, and burn patterns are all important to monitor. This information will assist the Refuge and others responsible for management of habitat and wildlife in managing moose and caribou populations and fire.

F.5 Objective: Within five years of the Plan's approval, initiate long-term studies of small mammal distribution and relative abundance in relation to fire severity. (Also relates to Goals A, B, and E.)

Rationale: Periodic fire is one of the primary natural forces that form the mosaic of habitats present on Tetlin Refuge. Vegetation regrowth after fire often affects forage availability and the distribution of animals. The amount, species, and quality of vegetative regrowth after fire depend on several factors. Fire severity can affect the rate of vegetative succession and post-fire regrowth. Small mammals (primarily lemmings and voles) are an important prey item for many mammalian and avian predators. Although fire has been shown to be beneficial for some species of small mammals, little is known about how small mammals respond over time to a range of fire severity within various vegetation types.

F.6 Objective: Within two years of funding, initiate a study to investigate the relationship between berry production and fire severity. (Also relates Goals B, E, and G.)

Rationale: Wild berries are an important component of annual subsistence harvest and Native culture. Berries are also seasonally important to many migratory birds, some furbearers, small mammals, and bears. Fire severity can affect the rate of vegetative succession and post-fire establishment of berry producing plants. This study will provide a better understanding of the relationships between fire severity and the distribution, abundance, and annual fruit production following fire.

F.7 Objective: Within five years of the Plan's approval, evaluate distributions of furbearer populations, including but not limited to wolverine, red fox, marten, mink, weasel, and lynx, in relation to fire severity. (Also relates to Goals A, B, E, and G.)

Rationale: Furbearers are a significant component of the Refuge's natural diversity; they have subsistence, cultural, and economic value to local residents. In the boreal forest, a range of post-fire seral stages provide habitat requisites for furbearers. Fire severity can affect the rate of vegetative succession and post-fire recolonization of many species. New technology that employs remote sensing provides estimates of fire severity at the landscape scale. This effort will improve our understanding of the short-term and long-term response of furbearers to fire.

G. Provide subsistence opportunities for rural residents, compatible with other refuge purposes.

G.1 Objective: As a continuing commitment, regularly attend meetings, provide information regarding the status of subsistence resources and their use, and comment on proposals related to subsistence management within Tetlin Refuge to maintain a

respectful dialogue with refuge resource stakeholders and subsistence users. (Also relates to Goals A, B, C, E, F, and H.)

Rationale: The Refuge is mandated by ANILCA to provide the opportunity for continued subsistence uses by local residents, when compatible with other refuge purposes. However, it is essential that affected parties work cooperatively toward common subsistence goals.

G.2 Objective: Within two years of the Plan's approval, determine the total annual harvest of migratory bird species within the Upper Tanana Valley with sufficient accuracy and precision to ensure long-term conservation. (Also relates to Goals A, C, and H.)

Rationale: The Refuge lies within a major migration corridor that channels birds through the Upper Tanana Valley each spring and fall. A recent amendment to the Migratory Bird Treaty Act established a spring and summer migratory bird subsistence hunt that has the potential to affect the conservation of many species. A cornerstone of the amendment was that no new tradition of hunting would be established, and the current level of harvest would remain the same. However, the new regulations include an expansive species list, including shorebirds, cranes, and owls, and a prolonged season with no bag limits. Moreover, residents of many Upper Tanana and Copper River Valley communities are eligible to participate in this hunt. An estimate of harvest is needed to ensure long-term conservation and to monitor the level of harvest on trust species.

G.3 Objective: Continue outreach efforts within the communities of Dot Lake, Mentasta, Northway, Tanacross, Tetlin, and Tok, including programs, activities, and partnerships that develop understanding and appreciation of resource threats and user conflicts, and promote conservation of fish, wildlife, and their habitats. (Also relates to Goals A, B, C, E, G, H, and K.)

Rationale: The Refuge's primary purpose is to conserve fish and wildlife populations and habitats in their natural diversity. With over 200 vertebrate species and 300 species of vascular plants, an effective strategy for ensuring long-term conservation of these resources will rely on partnerships with local communities, tribal representatives, and other organizations. By working with a team-building focus, communicating with those who have a stake in the conservation and preservation of the cultural and natural resources located on refuge lands, a platform for cooperation and consensus building will be laid. Further, trust will develop, which can be relied upon when more difficult issues directly pertaining to subsistence may arise.

G.4 Objective: Within 10 years of the Plan's approval and in cooperation with ADF&G, assess the accuracy and reliability of current harvest monitoring strategies for mammals within the Refuge, and, where appropriate, develop and initiate a statistically valid harvest survey. (Also relates to Goals A, C, and K.)

Rationale: In Game Management Unit (GMU) 12, there is a sealing or reporting requirement for the harvest of species such as moose, caribou, wolf, and bear. However, the reliability of monitoring harvest from this information is unknown. Furthermore, there are currently no harvest reporting requirements for species such

as marten, muskrat, fox, or hare. Past efforts to monitor subsistence harvest have predominately focused on Native villages. However, many individuals participating in local hunts reside outside such communities. Given budget constraints, a complete census of all households is unlikely. The development of a statistically valid household survey representative of actual use may provide a more accurate assessment of harvest trends.

G.5 Objective: Within three years of the Plan's approval, develop educational materials addressing mortality and displacement of wildlife by wildfires. (Also relates to Goals A, B, C, E, and G.)

Rationale: Longstanding concerns about the effects of wildland fire on subsistence opportunities have been voiced by local users. The unprecedented 2004 fire season may have reinforced the perception of some local subsistence users that large fires negatively affect harvest opportunities. Outreach efforts will provide the results of studies examining post-fire distribution of wildlife and information on current fire management goals and objectives.

G.6 Objective: Within 10 years of the Plan's approval, map the seasonal distribution and intensity of subsistence activities on Tetlin Refuge.

Rationale: To effectively provide continued subsistence opportunities and manage for healthy populations of fish, wildlife, and plants, it is necessary for the Refuge to identify the intensity and distribution of subsistence activities across the Refuge. The majority of information relating to the location and intensity of subsistence activities was gathered in the late 1980s and early 1990s and does not reflect more recent changes in subsistence lifestyles, demographics, bag limits, or hunting seasons; and it is becoming less useful for making management decisions. Updated information will assist with management of natural resources and identify potential areas of user conflict.

H. Maintain the integrity and environmental health of waters and aquatic habitats within the upper Tanana River drainage.

H.1 Objective: Continue to support the USFWS Water Resources Branch in their efforts to secure refuge instream water rights and monitor long-term water flow and quality. (Also relates to Goals A, B, C, F, and G.)

Rationale: The Water Resources Branch plans to monitor up to six stream gages for five years, including periodic water quality sampling up to five times annually. Once this work is completed, the Refuge will continue to maintain stream gages at selected sites and conduct periodic water quality sampling (contingent on funding). Stream flow and water quality data will enhance habitat and biological monitoring projects and will be especially useful in studies of fire effects, waterfowl, swans, shorebirds, other waterbirds, raptors, moose, and small mammals.

H.2 Objective: In cooperation with the Natural Resources Conservation Service, continue to measure monthly snow courses during winter. (Also relates to Goals A, B, E, F, G, and K.)

Rationale: The amount, duration, and water content of snow on the Refuge can affect a variety of factors, including distribution and overwinter survival of wildlife, timing of spring bird migration, spring flooding and nutrient input to lakes, and the timing and probability of fire the following spring. These data are used to annually produce stream flow forecasts for the Tanana drainage.

H.3 Objective: Within five years of the Plan's approval, replicate and expand water parameter sampling of refuge wetlands and lake resources. (Also relates to Goals A, B, C, E, F, and G.)

Rationale: One purpose of Tetlin Refuge is to ensure water quality and quantity necessary for the conservation of fish, wildlife, and their habitats. Water parameters on several refuge wetlands, streams, rivers, and lakes were sampled from 1984 to 1992. Replicating these efforts will allow the Refuge to make comparisons over time, and expanding the inventory will be useful in studies of fire effects, waterfowl, swans, shorebirds, other waterbirds, raptors, moose and small mammals.

H.4 Objective: Within two years of funding, seek collaboration with the Water Resources Branch to initiate a monitoring program for refuge waters that includes investigating anthropogenic influences on water quality. (Also related to Goals A, B, C, E, F, G, and K.)

Rationale: One purpose of Tetlin Refuge is to ensure water quality and quantity necessary for the conservation of fish, wildlife, and their habitats. Little is known about pollution affecting waters within the Refuge. Increasing development and human activities on the Refuge and other adjacent lands have the potential to cause impacts to water quality. Improper waste disposal, motor boats, and snowmobiles are some of the known sources of pollution within the Refuge. Other sources of contaminants could include non-renewable resource extraction, long-range atmospheric deposition, and/or past management practices. Environmental contaminants can travel from other areas in the world and accumulate in the Arctic. Arctic and subarctic environments are especially vulnerable to the long-range air and water transport of containments because once chemicals reach colder climates, less volatilization occurs. Gathering data will help the Refuge compare changes over time and assess the impacts from pollution and contamination sources on and near the Refuge.

H.5 Objective: Within five years of funding, develop a water budget and hydrologic models for the upper Tanana Watershed. (Also relates to Goals A, B, C, E, F, and G.)

Rationale: A water budget tracks the input, storage, movement and output of water within a basin. Changes due to fire, climatic change, development, and water or land use practices can result in changes to the water budget. Developing water budgets and hydrologic models will increase our knowledge base, provide a valuable tool to guide future research, and assist us in making informed management decisions.

H.6 Objective: Within 10 years of the Plan's approval, work with partners to develop and implement strategies for the inventory of aquatic invertebrates in some refuge streams and lakes. (Also relates to Goals B, C, E, F, and K.)

Rationale: The ecologic importance of aquatic invertebrates in the function of aquatic systems has been long recognized. They are also important biological indicators of the biological health, ecological and physical changes, and contaminants in aquatic environments. Additional information is needed to more fully understand and quantify their role in refuge streams and lakes, and to establish a baseline for measuring changes in species diversity and population density over time.

I. Enhance understanding and appreciation of Tetlin Refuge's purposes, special values, and management goals, and promote stewardship of natural and cultural resources through comprehensive environmental education and interpretation programs and visitor services facilities.

I.1 Objective: In cooperation with interagency and community partners, Tetlin Refuge will continue to play a key role in the development of the Tok Interagency Alaska Public Lands Information Center (Tok APLIC). Refuge staff will participate in project support, building and site design, and all aspects of interpretation from conception through construction. (Also relates to Goal L.)

Rationale: Since conception of the Tok APLIC in 2001, Tetlin Refuge has been a key partner with the Alaska Department of Transportation and Public Facilities (ADOTPF) and the Department of Economic and Community Development in building public support, interpretive concept planning, and facilities design.

I.2 Objective: Administer and maintain the Tok APLIC as part of the Refuge's continuing commitment to providing quality visitor services.

Rationale: As part of the cooperative agreement with ADOTPF, the Refuge will be responsible for administration and maintenance of the Tok APLIC. Based on predicted increases in visitation along the Alaska Highway (Bowker 2001, Bowker et al. 1999), this facility could serve over 100,000 people a year.

I.3 Objective: Continue developing creative and effective curricula that target key resource issues and experiential educational opportunities for all ages, and work with educators and parents towards implementation.

Rationale: Tetlin Refuge has been very successful in developing original resource curricula for target audiences and has worked effectively with the local school district to implement these programs. The Refuge would like to expand its efforts with experiential, resource-based education.

I.4 Objective: Construct well-designed outdoor settings for education and interpretive programs in conjunction with the Tok APLIC for use with school groups, local residents, and visitors.

Rationale: The Tok APLIC could reach 80,000 people each year with its education and interpretive programs. Many topics associated with the main interpretive theme should be conveyed in an outdoor setting rather than through costly interior exhibits.

I.5 Objective: Through revision of the Tetlin Refuge Public Use Management Plan (USFWS 1997a) (now called a Visitor Services Plan) and in conjunction with development of the Tok APLIC, redirect the focus and design of the Tetlin Refuge Visitor Center toward interpretation of the unique aspects of Tetlin Refuge and other refuges in Alaska.

Rationale: The original exhibits at the Tetlin Refuge Visitor Center were designed and constructed in 1989. They are dated, worn, deteriorated, malfunctioning, and in need of replacement. To compliment the themes of migration, the Borderlands region, and the National Wildlife Refuge System to be featured at the new Tok APLIC, the Refuge will develop new exhibits for the Tetlin Refuge Visitor Center that focus on the unique aspects of Tetlin Refuge and refuges in Alaska. This concept would be based upon the complete visitor experience provided by State and Federal agencies throughout the Upper Tanana Valley.

I.6 Objective: For each refuge interpretive and environmental education program, develop reliable methods to assess the degree to which programs enhance understanding and appreciation of refuge purposes, special values, and management goals. Program target goals and evaluation tools will be developed and implemented within five years of the Plan's approval.

Rationale: To develop high-quality interpretive and environmental education programs, the Refuge must have means for assessing the effectiveness of programs and identify improvements.

I.7 Objective: Within five years of the Plan's approval, at least 80 percent of Upper Tanana Valley kindergarten through 12th grade students and those in alternative learning programs will have an opportunity to participate in at least one environmental education program focusing on key refuge resource conservation issues.

Rationale: During the 2003–2004 school year, 60 percent of Upper Tanana Valley kindergarten through 12th grade students participated in at least one of the Refuge's environmental education programs. The goal of the environmental education program is to promote understanding of key refuge resources, promote stewardship, and instill responsible, environmentally conscious behavior.

I.8 Objective: Continue with and maximize long-term partnerships with community organizations and volunteers to help meet the educational goals and objectives of the Refuge. Increase partnership contributions to educational projects by 10 percent within three years of the Plan's approval.

Rationale: In the past, Tetlin Refuge has been successful with education and interpretive projects made possible through partnerships that contribute resources, time, and funding. The Refuge is interested in sustaining and developing new partnerships with long-term commitments.

I.9 Objective: Re-evaluate and update at least one refuge outreach tool every six months.

Rationale: Currently, the Refuge utilizes a variety of communication tools (e.g., Internet site, electronic newsletter, printed newspaper articles, audiovisual programs, brochures, kiosk panels, etc.). These tools allow the Refuge to provide the public with more accurate and up-to-date information, but only if they are periodically evaluated, updated, and consistently distributed.

I.10 Objective: Increase the Refuge's capacity to utilize skilled volunteers to supplement seasonal staffing.

Rationale: Current facilities for seasonal staff are inadequate or absent in key locations. New facilities are needed to accommodate additional volunteers or facilities hosts.

I.11 Objective: Establish a permanent refuge program to annually provide one high school level field research course related to priority refuge resource issues.

Rationale: An eight-week high school credit course, offered each summer since 1997, is one of the Refuge's most effective education programs. High school students learn about priority resource issues through extensive research and field work. The continued operation of this significant program is tenuous and uncertain due to intermittent annual grant funding.

I.12 Objective: Continue education, interpretive, and wildlife-dependent recreation programs at refuge campgrounds, and expand to accommodate larger school and visitor groups in a comfortable outdoor classroom setting within eight years of the Plan's approval.

Rationale: Deadman Lake Campground is a primary location for many outdoor education and interpretation programs. To avoid program cancellation due to inclement weather, temporary structures are erected but have limited capacity and use. The Refuge would like to create a comfortable outdoor setting for larger groups to engage in educational activities.

I.13 Objective: In cooperation with local village organizations, create opportunities to educate youth in traditional subsistence ways related to fish, wildlife, and plants of the Refuge. The Refuge Information Technician, Native Park Rangers and the Lead Educator from the Refuge will initiate plans with at least one local village council for a summer program within three years of the Plan's approval (also relates to Goal D.)

Rationale: The Refuge can play an important role in perpetuating the continued use of subsistence resources by providing educational settings on the Refuge where elders can teach traditional uses of refuge resources to interested youth.

I.14 Objective: Through partnerships with neighboring conservation units, regional learning institutes, and State universities, develop an integrated multi-site approach to college-level courses.

Rationale: The proximity of Tetlin Refuge to Wrangell–St. Elias National Park and Preserve and Federal and territorial parks in Yukon, Canada, creates a unique opportunity for comparative multi-site field investigations of land features, habitats, and wildlife.

I.15 Objective: Upgrade the Tetlin Refuge Visitor Center to reduce the noise, pollution, and cost of operation by 50 percent within five years of completing the Revised Conservation Plan.

Rationale: The Tetlin Refuge Visitor Center is located in a remote area and is powered by a diesel generator that requires significant amounts of staff time to operate and maintain. The generator contributes a noticeable amount of background noise that degrades the quality of the visitor experience and produces more pollution than newer technologies. Improvements and upgrades are needed to reduce operational costs and impacts and to compensate for reduced funding and maintenance staffing.

I.16 Objective: Increase visitation to the Tetlin Refuge Visitor Center by 10 percent within three years of the Revised Conservation Plan's approval.

Rationale: Visitation to the Tetlin Refuge Visitor Center is far below capacity of this facility. The Refuge needs to take effective measures to increase visitation at the Tetlin Refuge Visitor Center to educate and inform as many summer visitors as possible.

I.17 Objective: Within three years of the Plan's approval, and in cooperation with ADOTPF, develop strategies consistent with Service policies and guidelines to standardize refuge signage; and develop a schedule for revising, repairing, and replacing refuge signs. These strategies will be incorporated into the Refuge Visitor Services Plan.

Rationale: Current refuge signage is incomplete and may be ineffective. Better and more consistent signage will improve visitor information and safety along the Alaska Highway and at refuge facilities.

I.18 Objective: Develop and implement a program to provide refuge visitors an understanding of wildlife-viewing opportunities available on the Refuge and throughout Alaska within eight years of completing the Plan.

Rationale: Wildlife viewing is a primary activity for people who travel to Alaska. Often visitors' wildlife viewing expectations are not realistic, particularly when it comes to the likelihood of seeing the charismatic mega-fauna throughout Alaska. Located at the gateway to Alaska, Tetlin Refuge can have a great impact on wildlife-viewing education to enhance the visitors' Alaska wildlife-viewing experience.

I.19 Objective: Upgrade inventory and selection at the Alaska Geographic Association (AGA) sales outlets to offer visitors and residents popular educational materials relating to refuge resources. Increase sales revenues by 15 percent within five years of the Plan's approval to generate more funding for refuge education and outreach programs.

Rationale: Educational materials provided through the AGA sales outlets help facilitate public appreciation and understanding for refuge resources. Expanding selection and inventory at the sales outlet will increase sales revenues that can be used to fund outreach programs.

J. Provide compatible wildlife-dependent recreation opportunities that enable people to explore, enjoy, and learn about the dynamic landscape and natural diversity of Tetlin Refuge.

J.1 Objective: Develop and implement strategies within five years of funding that provide wildlife-dependent recreational opportunities at the Seaton Roadhouse site, accommodating use by local residents and visitors.

Rationale: The 25-acre site in the vicinity of the former Seaton Roadhouse has more potential for offering a variety of wildlife-dependent recreational opportunities than any other site on the Refuge. This site is one of the few highway-accessible upland areas of the Refuge. This area offers great opportunities for interpretation, wildlife viewing, photography, and recreational hiking. The plan for this site will include a 2.5-mile system of trails that includes trail interpretation, a handicap-accessible wildlife viewing platform, trailhead kiosk, and parking area.

J.2 Objective: Increase accessibility for visitors with limited mobility to extend their visit and enjoy wildlife-dependent recreation at Tetlin Refuge.

Rationale: A number of facilities at Deadman Lake, including restrooms, boardwalks, and a boat dock, are now available for people with limited mobility. Additional facilities that comply with the Americans with Disabilities Act (ADA) are needed at Deadman Lake and other locations to take full advantage of existing ADA facilities and to maximize recreational opportunities.

J.3 Objective: Conduct maintenance on established trailheads, trails, campground access roads, and boat launches annually or as needed for continued public access to the Refuge.

Rationale: Current facilities must meet or exceed minimum Service standards to maintain opportunities for safe and enjoyable wildlife-dependent public use of the Refuge.

J.4 Objective: Continue to provide and expand education, interpretation, and wildlife-dependent recreation programs with associated facilities at Hidden Lake Trail.

Rationale: This one-mile trail leading through the boreal forest to a lake stocked with rainbow trout was rehabilitated in 2004 to improve hiking conditions. The trail goes through several different habitats, and good wildlife viewing opportunities for beaver and moose exist around the lake.

J.5 Objective: As an ongoing commitment, provide better information relating to refuge access from the Alaska Highway for compatible wildlife-dependent public uses with information updated every five years.

Rationale: Currently, there are several easements that offer limited access to areas within the Refuge. Due to the complex land ownership pattern along the Alaska Highway, detailed access information is critical for public participation in recreational and subsistence activities. Strategic lands have been identified in the Tetlin Refuge Land Protection Plan (USFWS 2001a) for public easement or acquisition from willing landowners.

J.6 Objective: Continue to provide backcountry canoeing opportunities that allow the public to explore and enjoy wetland and riverine habitats significant to Tetlin Refuge.

Rationale: Canoe travel facilitates a wide variety of compatible public uses and is one of the best ways to experience Tetlin Refuge. Visitor information on canoeing opportunities on the refuge is limited. Improvements to several areas on and off the Refuge would encourage canoeing on the Refuge.

J.7 Objective: Continue to provide opportunities for multi-day backcountry trips within the Refuge that allow the public to experience and explore the dynamic landscape and wildlife of the Refuge in solitude. A range of opportunities will incorporate various methods of access.

Rationale: A number of visitors and local residents desire this type of refuge experience. The modes of access (floatplane, snowmachine, canoe), although limiting, will shape the desired experience.

K. Enhance stewardship of natural resources through strong local, State, tribal, national, and international partnerships.

Refuge management direction aimed toward this goal is accomplished through the following objectives: A.3, A.6, A.9, A.14, A.15, A.16, B.2, B.3, C.1, C.2, C.5, C.10, C.11, E.6, F.2, F.3, G.3, G.4, H.2, and H.4.

L. Improve collaboration and communication with and support for local resource users and the communities of the Upper Tanana Valley through development of a "Good Neighbor Policy" that is sensitive to social, political, cultural, and economic needs within the local area.

L.1 Objective: Improve the Refuge's ability to manage day-to-day operations and respond to critical management situations by working with local communities to establish staffed satellite facilities and necessary equipment near the village of Northway within five years of the Plan's approval.

Rationale: While Tok provides the services needed for year-round refuge operations, the distance from other facilities along the Alaska Highway and the Refuge itself present logistical problems and added cost, especially during the busy summer work season. A satellite facility would provide a cost-effective solution to these problems. At the same time, this approach would strengthen ties between the Refuge and the community of Northway and provide added economic benefit.

L.2 Objective: Cooperate with the Alaska Division of Forestry, the Alaska Fire Service, and local tribal governments to facilitate the training of cultural resource advisors for local communities within two years of the Plan's approval.

Rationale: To avoid the loss or destruction of valuable cultural resources, known sites need to be identified and prioritized as part of the Refuge Fire Management Plan (TNWR 2001) and in any prescribed burn plans prior to fire ignitions. Knowledgeable and experienced local residents should provide input into these plans and are also needed to provide recommendations during fire suppression activities. During the 2004 fire season, many sites were identified as they were being threatened by fires. Testimony to this effect was also heard at the 2005 Refuge Cultural Resources Summit. Summit participants suggested having cultural resource advisors from each affected community provide on-the-ground recommendations and technical advice to fire crews.

L.3 Objective: Work with area communities to increase grants and other funding sources for projects that benefit refuge resources and local economies.

Rationale: The Refuge has limited capability to fund cooperative projects alone. By increasing the amount of grant monies available to local communities, the Refuge could more easily accomplish these projects through matching funds.

L.4 Objective: Within two years of completing this Plan, develop formal partnership agreements, such as memoranda of understanding or agreement, with local tribes and community organizations, including but not limited to the village councils of Northway, Tetlin, and Tanacross, the Tok Lion's Club, and the Tok Chamber of Commerce.

Rationale: Through the Fish and Wildlife Service's strategic plan (USFWS 1999), the Service has identified partnerships with states, tribes, and nonprofit organizations, and has formal agreements with the business community as a necessary strategy in building broad support for the Service and national wildlife refuges. Tetlin Refuge is actively involved with a number of State, local, and tribal partners. Establishing formal agreements with these and other partners will further build the mutual relationship between the Refuge, as a visitor attraction, and local communities in providing visitor services.

L.5 Objective: Develop three creative incentives to encourage refuge staff to participate in community groups and activities within one year of the Plan's approval.

Rationale: The refuge staff is involved in many community functions. Increasing the level of employee involvement with Upper Tanana Valley communities will build relationships, foster support for refuge objectives, and result in a less contentious environment when politically sensitive and/or controversial issues need resolution.

L.6 Objective: Within five years of the Plan's completion, the Refuge will establish the necessary protocols for formal consultation with the tribal governments of the Upper Tanana Valley.

Rationale: Regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications is mandated by Executive Order 13175. It is critical that the Refuge develop protocols necessary to

comply with the directive and strengthen government-to-government relationships. Further, it will serve to enhance cooperative efforts by showing respect to the authority of the tribal councils.

L.7 Objective: Tetlin Refuge will work toward the preservation, display, and interpretation of cultural resources by meeting with tribal entities to initiate and continue development of a cultural center.

Rationale: The Refuge, as an auxiliary supporter, is prepared to assist efforts made by local Native tribes to build a cultural learning center where cultural activities may be shared and practiced for cultural edification and/or economic development. A cultural center would contribute to the enhancement of Tok as the "gateway to Alaska" with a rich cultural history and contemporary cultural presence. It would be complimentary to the proposed world class visitor center, which the Refuge is also an active participant in establishing.

2.4 General Management Direction (The Revised Comprehensive Plan)

Most of the general management direction for the Refuge will continue to follow the same courses of action as under the 1987 Conservation Plan (USFWS 1987a) as modified by subsequent step-down management plans (e.g. Tetlin Public Use Management Plan [USFWS 1997a], Tetlin Fisheries Management Plan [USFWS 1990], and Tetlin Fire Management Plan [TNWR 2001]). The revised plan includes the refuge vision statement (chapter 1, section 1.3.2 in this document) and refuge goals and objectives (chapter 2, section 2.3 in this document). Regional management policies and guidelines, as modified for Tetlin Refuge, are presented in chapter 3 of this document. Other changes from the 1987 plan are summarized below.

- Wildlife-dependent public uses and related facilities: Existing opportunities for public use of the Refuge would increase as long as they are compatible with refuge purposes and Service mandates. Some facilities would be upgraded, and some new facilities constructed. Access would be improved, particularly near the Alaska Highway, to promote day use and to provide additional backcountry opportunities.
- Fire Management: Fire would continue to be managed using a variety of tools, including suppression, wildland fire use, prescribed fire, non-fire fuels treatments, and emergency rehabilitation and restoration. But the emphasis under new management directions would shift from suppression and landscape-scale prescribed burning based on fixed annual acreage targets to Fire Use and fuels reduction treatments designed to increase the number of acres that can be burned safely under a Wildland Fire Use strategy. In addition, prescribed fire may be used to achieve specific management objectives related to habitat maintenance and restoration, the Land Management and Research Demonstration Program, and environmental education.
- Fisheries Management: All fisheries would be managed within their historic distribution and population cycles to maintain natural diversity and stability of ecosystems within the Refuge.

2.4.1 Management Categories

Three management categories apply to lands within Tetlin Refuge, as in the 1987 Conservation Plan. Of the 682,604 acres administered by Tetlin Refuge, approximately 564,300 acres (82.7 percent) are classified Minimal Management, approximately 116,600 acres (17.1 percent) are classified Moderate Management, and approximately 1,700 acres (less than 1 percent) are classified Intensive Management (see Figure 2-1). The lands classified as Intensive Management form a buffer strip along the Alaska Highway from the Tetlin Refuge Visitor Center to the

Alaska-Yukon border. Approximately 40 acres at the Seaton Roadhouse site were reclassified from Minimal Management to Moderate Management to allow development of additional facilities and increased wildlife-dependent public use opportunities, as called for in the 1997 Public Use Management Plan (USFWS 1997a). Selected lands will be managed under the same management category as surrounding refuge lands until conveyed (or until the selection is denied).

2.4.2 Management Direction by Program

2.4.2.1 Visitor Services and Public Use Management

The Revised Conservation Plan seeks formal recognition of Tok as a "Gateway Community." Under the Gateway Community concept, the Refuge we recognize Tok's role in providing essential services that make public use and administration of Tetlin Refuge possible. The Service will seek partnerships consistent with promoting the Borderlands Region and Tetlin Refuge as a destination for summer travelers. Establishing Tok as a destination will encourage extended visitation to the area, increase visitation to the Refuge, and increase participation in activities and events throughout the Upper Tanana Valley. The Service will actively seek cooperative agreements with local communities, tribal governments, and refuge partners to enhance the number and quality of environmental education, interpretation, and recreational opportunities available off-refuge. These agreements will provide opportunities that support or are in conjunction with refuge programs.

2.4.2.2 Public Use Facilities and Access

Currently a number of facilities and points of access to the Refuge are available that provide both subsistence and wildlife-dependent recreational opportunities to the public. The Revised Conservation Plan is to maintain, improve, and provide access to these facilities and propose new opportunities. The thresholds to maintain compatibility with refuge purposes; specific actions to provide visitor experiences; design, location, and size of proposed facilities; and other details to implement management direction will be spelled out through a new Visitor Services Plan for Tetlin Refuge (revision of the 1997 Tetlin Refuge Public Use Management Plan) (USFWS 1997a).

Visitor Centers and Kiosks. To improve visitor services throughout the Upper Tanana Valley and further the mission of the U.S. Fish and Wildlife Service, work will continue with the Alaska Public Lands Information Center (APLIC), the Alaska Department of Transportation and Public Facilities, other agencies, tribes, and partners to finalize plans and construct an interagency visitor center in Tok.

Once completed, this interagency visitor center will provide interpretive exhibits and presentations on the natural, cultural, political, and economic history of State and Federal lands, and available public recreation opportunities and resources. Specific interpretive displays and presentations will describe attributes of the Borderlands Region and Tetlin National Wildlife Refuge. The proposed facility will include a theater to accommodate visitors from several tour buses, and provide a location for community events and a classroom for environmental education purposes. There will be a trip planning area with resources available to assist visitors in determining where they might like to go and what they can expect to see and do. Staff at the visitor information desk will be available to answer additional questions from visitors. Outdoor facilities of the Tok APLIC will include interpretive trails, picnic area, rest area, and parking area.

Interpretive Pullouts. Highway travelers can enjoy wildlife viewing and photography of the Tetlin Refuge and Upper Tanana Valley at five pullouts along the Alaska Highway and learn more about the natural processes and wildlife resources of the Refuge from the interpretive panels at each location. These pullouts will continue to be maintained, and additional signs will be posted to make each pullout more visible. Many travelers use these interpretive pullouts as rest areas; however, with no restrooms or trash facilities available, conditions can become unsightly and unsanitary. The Revised Conservation Plan requires working with the Alaska Department of Transportation and Public Facilities to construct restrooms and trash facilities at the most easily accessible and heavily used pullouts, and seeking partners willing to participate in a cooperative agreement for the maintenance of all highway pullouts between Tok and the Alaska-Yukon border.

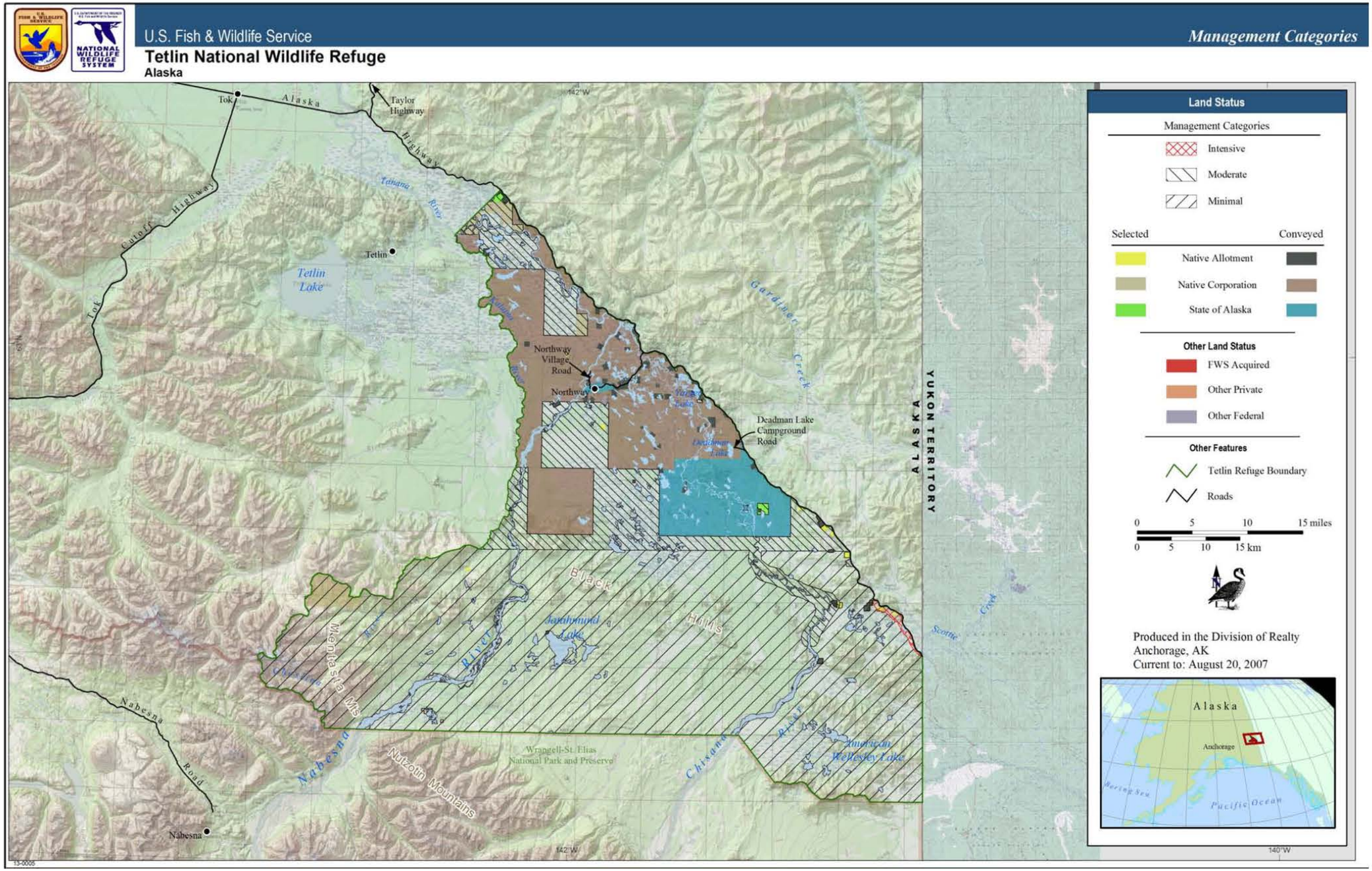
Development of the Seaton Roadhouse Site. Development of facilities and access at the Seaton Roadhouse Site is underway, per direction in the 1987 Conservation Plan. This includes rehabilitation of the one-mile abandoned section of the Alaska Highway leading to the site, development of a parking area adequate to accommodate the level of use anticipated at the site, and hiking trails, including a short interpretive trail with a wheelchair-accessible wildlife viewing platform and benches. Additional and longer hiking trails (less than 10 miles in length) will be constructed in the future to provide additional wildlife viewing and photography opportunities in the summer and additional subsistence opportunities for local residents.

In areas furthest from the parking area, campsites will be established to provide a quieter and more primitive experience than at Deadman Lake or Lakeview campgrounds. Trail segments closest to the parking area will be barrier-free to accommodate visitors who require a wheelchair or have limited mobility.

Campgrounds. Tetlin Refuge will continue to administer and maintain the Deadman Lake and Lakeview campgrounds along the Alaska Highway under a long-term lease with the State of Alaska or pursue purchase of the campgrounds from the State. Both campgrounds need some site rehabilitation, basic maintenance, and repairs. The Service will work to meet or exceed basic standards for campsites, including fully graveled and leveled parking areas free of overhanging brush and other obstructions or safety hazards, fully functional picnic tables, fire rings with grating, and provision of potable water sources. Each campground would include clean and fully functional waste facilities and posted written information regarding campground rules, precautions, and etiquette. Additional public use facilities will be constructed at both campgrounds, designed to provide additional wildlife-dependent recreational opportunities for overnight campground guests and for day use visitors. Examples of potential facilities include boardwalks, wildlife viewing blinds, and small boat docks.

The access roads (totaling just over two miles in length) from the Alaska Highway will be upgraded within six years to improve access and allow for a longer season of use (currently from late-May to early-October, depending on weather conditions). Poor road conditions due to improper drainage and a roadbed of native materials (glacial till/loess) result in the late opening of the campgrounds and sustained problems throughout the season. During the spring thaw and rainy periods, road conditions deteriorate rapidly, making travel difficult and unsafe. Heavy recreational vehicles and large trucks can easily damage the roadbeds. Extending the season of use is not possible without major improvements to prevent damage that requires costly repairs.

Figure 2-1. Management Categories – Revised Comprehensive Conservation Plan.



The campgrounds will continue to provide the same number of overnight camping opportunities at any given time, but increased day use will be possible through additional facilities. Consistent with the visitor services role of the Refuge described previously, the Refuge will cooperate with the State, local communities, tribal governments, and other partners to encourage additional camping opportunities outside the Refuge. The Refuge will implement a voluntary donation program at each campground on a trial basis, which will include visitor information regarding use of donations. A mandatory fee program may be implemented if significant campground amenities or improvements can be provided in the future. The Refuge will abandon any fee collection that is not cost-effective to administer (using criteria from the Federal Lands Recreation Enhancement Act) or that significantly diminishes participation in campground interpretive and educational programs.

River and Trailhead Access. The Refuge will continue to maintain the public boat launch and parking area at the Chisana River Bridge near Northway. In addition, modifications will be made to the launch as necessary. Currently, the boat launch does not provide reliable river access, as the Chisana River continually silts in the launch; frequent maintenance is required to provide reliable, safe, and easy access. Although not on refuge lands, this boat launch is on an Alaska Native Claims Settlement Act (ANCSA) 17(b) easement reserved for public access. The Revised Conservation Plan ensures this boat launch continues to provide public access to the Chisana River and the Refuge. The Refuge will work with partners to establish cooperative agreements for the maintenance of this site and any additional boat launch sites that may be developed for public access to the Refuge.

Through the 1987 Conservation Plan (USFWS 1987a) and the 2001 Tetlin Refuge Land Protection Plan (USFWS 2001a), private lands were identified that could provide additional public access to the Refuge. These sites were prioritized and, under the Revised Conservation Plan, the Service will continue working with willing landowners to acquire public access easements across these lands or to buy lands from willing sellers to permanently secure public access to areas within the Refuge.

In addition, marking and signing of existing refuge access points will be improved. Most points of access to primitive backcountry trails within the Refuge are currently not marked and are difficult to locate. This situation often discourages the public from using these access points and creates the potential for unintentional trespass violations.

Canoe Routes. Under the Revised Conservation Plan, canoe routes will be established within the Refuge. Public launches, take-out areas, portages, and points of interest will be signed and marked on maps available to the public. Adding information (e.g., appropriate Leave-No-Trace camping practices for the back country and basic safety information) to existing refuge information will make traveling through these areas easier and add to the visitor experience, knowledge, and appreciation of Tetlin Refuge and its purposes. Routes will most likely be established on easily accessible waterways of low to moderate technical difficulty and moderate to high wildlife observation potential (e.g., Scottie and Desper creeks) to provide quality opportunities for visitors with a broad range of skills and abilities.

Trails. In addition to maintained trails at the Seaton Roadhouse site, the Tetlin Refuge Visitor Center, Deadman Lake Campground, Hidden Lake, and Airs Hill, there are other existing trails within the Refuge that are not maintained. Most of these trails pass through low wetland areas and are used primarily during winter by snowmobile or dogsled. Other unmaintained trails provide opportunities to experience the Refuge on horseback or on foot during the summer. Under the Revised Conservation Plan, these trails will be marked, and some trails will be cleared

of deadfalls and brush to make travel easier and safer while preserving their primitive character. These primitive trails will receive only minimal maintenance with improvements or realignments only for resource protection.

Cabins. The three administrative cabins (at Jatahmund and American Wellesley lakes and on the Nabesna River) will be maintained and continue to be available for public use when not needed for refuge projects or programs. Public outreach will be conducted to encourage use of the three cabins during times that do not conflict with refuge needs. This public outreach is intended to redistribute use to avoid scheduling conflicts and will allow continued public use while ensuring availability for refuge operations under the existing cabin reservation system. If this additional public outreach is unsuccessful in eliminating schedule conflicts, public use of these administrative cabins will be restricted during certain times of the year.

2.4.2.3 Recreational Uses

Wildlife observation and photography, environmental education and interpretation, and recreational fishing and hunting are the six wildlife-dependent priority public uses identified in the 1997 Refuge System Improvement Act. The act specifies these uses should be encouraged where compatible with refuge purposes. Under the Revised Conservation Plan, the recreational opportunities that currently exist will continue to be provided. These include existing opportunities described under Public Use Facilities and Access (see previous section) and various outreach programs described in the Refuge Public Use Management Plan (USFWS 1997a).

2.4.2.4 Subsistence Uses

Providing continued subsistence opportunities is one purpose of Tetlin Refuge. The Service will increase efforts to monitor fish, wildlife, and plant populations and their harvest to ensure these uses remain compatible with other refuge purposes. The Plan proposes maintaining or increasing opportunities for access to subsistence resources within the Refuge. Appendix F is the ANILCA section 810 evaluation of the potential effects (on subsistence use and users) of implementing the Revised Conservation Plan for Tetlin Refuge.

2.4.2.5 Fire Management

The Revised Conservation Plan will continue to manage fire activity on the Refuge using a variety of tools, including suppression, wildland fire use, prescribed fire, thinning and other non-fire fuel treatments, and emergency rehabilitation and restoration. The emphasis under the Revised Conservation Plan will shift from suppression and landscape-scale prescribed burning based on fixed annual acreage targets to Wildland Fire Use and fuel reduction treatments designed to increase the number of acres that can be burned safely under a Fire Use strategy. In addition, prescribed fire may be used to achieve specific management objectives related to habitat maintenance and restoration, the Land Management and Research Demonstration Program, and environmental education.

General Fire. The Alaska Department of Natural Resources, Division of Forestry, will continue to coordinate suppression of fires in the Upper Tanana Valley, including those on refuge lands.

Tetlin Refuge will continue to maintain personnel and equipment in Tok with secondary fire suppression capabilities and will work with landowners, native groups, the Division of Forestry,

and the Bureau of Land Management's Alaska Fire Service (AFS) to help provide the Upper Tanana Valley with integrated and effective fire management.

Protection of Property. Under the revised plan, suppression activities will continue to be conducted according to the Alaska Interagency Wildland Fire Management Plan (AWFCG 1998) and the Tetlin Refuge Fire Management Plan (TNWR 2001), but allowances will be made for significant changes in location and distribution of the four Alaska Interagency Wildland Fire Management Plan (AIWFMP) fire management options to accomplish management goals (see Figure 2-2). It was necessary to add a buffer of Full Management in the eastern part of the Refuge to protect the increased human residency and development that has occurred in this area. The concept of a continuous 13-mile-long fuel break along the northern edge of the Refuge (south of the Native- and State-owned lands) will be abandoned in favor of localized fuels treatments. In addition, the Refuge will explore the possibility of staging a Type VI Engine module in the community of Northway.

2.4.2.6 Fish, Wildlife, and Habitat Management

The fish, wildlife, and habitat goals (Goals A, B, C, E, and F) and associated objectives are directed toward conserving and monitoring the Refuge's natural diversity of species and habitats. Management will allow continued inventory and monitoring to provide information necessary to understand and protect fish and wildlife resources and habitats on the Refuge. As funding and resources permit, proactive inventory and monitoring, and targeted research will be conducted to expand knowledge of fish, wildlife, and habitat resources. Fish, wildlife, and habitat research and management activities will emphasize maintenance of the natural environment.

Habitat Management. The Revised Conservation Plan emphasizes use of wildland fire to maintain ecological diversity and achieve management objectives in lieu of relying on a prescribed burning program or allowing wildland fires to burn large portions of the Refuge to achieve management objectives. Wildland Fire Use will be permitted on all refuge lands falling within the AIWFMP Limited and Modified fire management options after the conversion date (normally July 10, but it may vary depending on weather conditions in any given year). Prescribed fire, mechanical and chemical treatments, natural fire, and fire suppression will continue to be used as management tools; but under the Revised Conservation Plan, annual prescribed burning acreage targets to improve wildlife habitats will be abandoned. Use of prescribed fire as a habitat management tool will be based on individual treatment plans designed to achieve specific management objectives.

Fisheries Management. Fisheries management under the Revised Conservation Plan will focus on providing important habitat for a number of fish species, many of which are important subsistence resources. Recent studies in the Upper Tanana Valley highlight the importance of accurate life histories of these fisheries and their management. Work will continue with the Alaska Department of Fish and Game (ADF&G), Native entities, and others to gather additional life history information about whitefish and other important fisheries within the Refuge as further defined in the revised Fishery Management Plan for Tetlin Refuge.

Under the Revised Conservation Plan, the management intent for larger fish to provide trophy recreational fishing opportunities will be dropped, and the Refuge will be managed consistent with the Service's Policy on Maintaining Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System (Service Manual 601 FW 3) to ensure native species are managed in their natural diversity and abundance. The Refuge will work with the State of Alaska

to conserve fish populations, recognizing that populations may experience fluctuations in abundance because of environmental factors and may require management actions for conservation purposes.

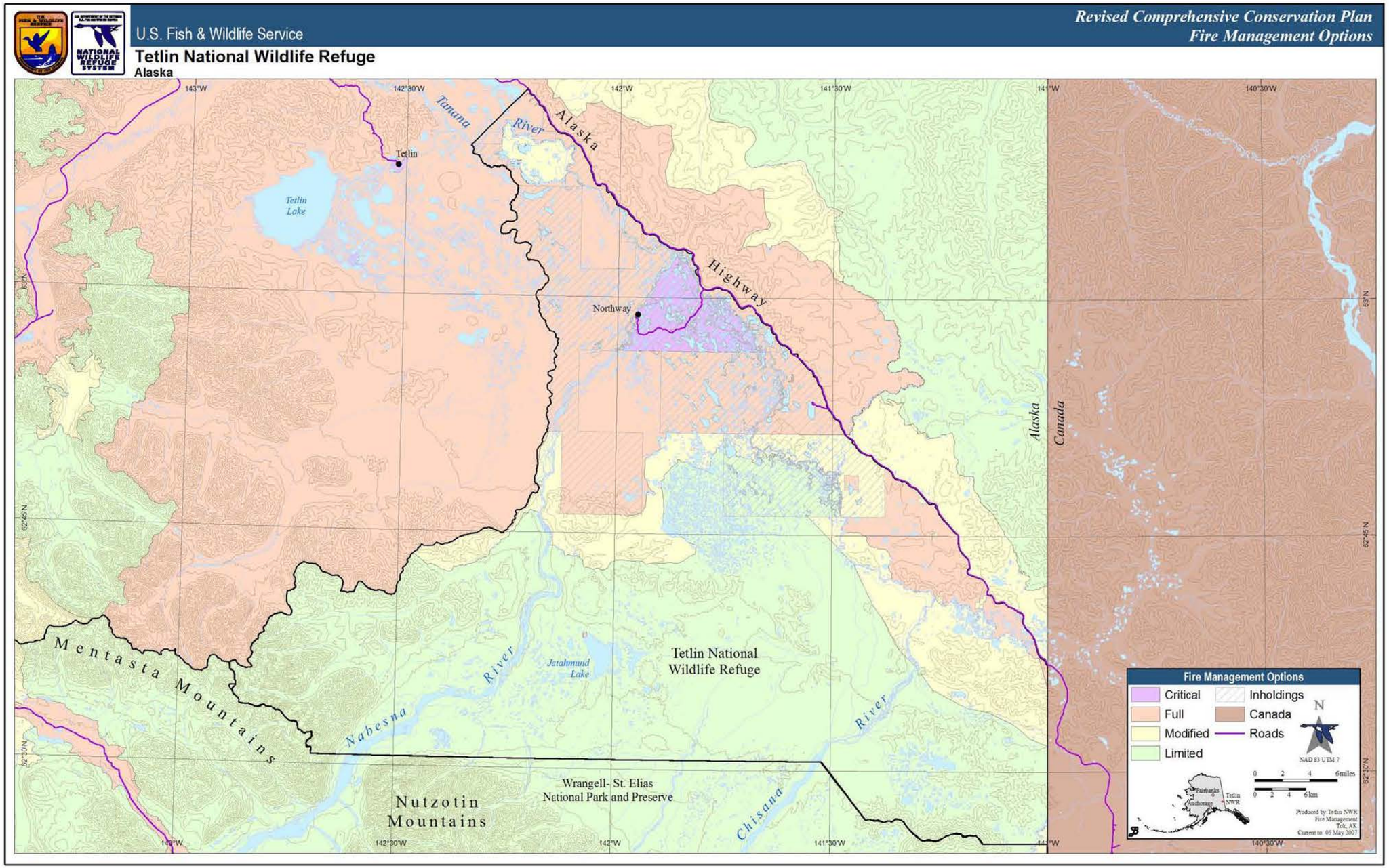
Although the Refuge will be managed to maintain the genetic variability of wild, native fish stocks, the Refuge will allow ADF&G to continue to periodically restock Hidden Lake with rainbow trout to enhance highway-accessible fishing opportunities. This ADF&G project is a "put, grow, and take" fishery with stocking schedules and numbers determined through the Alaska Statewide Stocking Plan (ADF&G 2007). Although rainbow trout are not native to the Upper Tanana region, there is minimal risk of the trout escaping the lake and becoming established on the Refuge. Hidden Lake is an isolated waterbody that does not support natural fish populations, and the ADF&G stocking program includes provisions to safeguard against potential escapement of stocked fish and establishment of rainbow trout populations outside of the stocked lake.

The Fisheries Management Plan (USFWS 1990) for the Refuge, completed in 1990 in cooperation with ADF&G, guides Service fisheries management activities on Tetlin Refuge. Scheduled for revision in 2011, this step-down plan will provide more specific guidance for management of refuge fishery resources and use opportunities.

Migratory Bird Management. In 2001, the Migratory Bird Co-management Council proposed amendments to the International Migratory Bird Treaty Act that were adopted to allow subsistence hunting and egg-gathering opportunities during the nesting season. Subsequently, liberalized regulations were adopted for subsistence use of migratory birds and their eggs (presently 92 species). In light of these changes, more accurate and extensive baseline population and harvest information would be gathered under the Revised Conservation Plan to ensure healthy populations are maintained, to continue providing for subsistence opportunities, and to fulfill the Service's obligation in meeting the requirements of the International Migratory Bird Treaty Act.

Invasive Species. Invasive plants and other non-native species represent a relatively new and growing threat to the environmental integrity of the Upper Tanana Valley. Proximity of the refuge boundary to the Alaska Highway allows visitor access to the Refuge through trails and streams. These visitors may provide the means of spreading invasive plant species onto refuge lands through their clothing, vehicles, and recreational gear. Other non-native species, such as mammals and insects, may be expanding their range due to changes in climate that may allow them to thrive on refuge lands. A program has been initiated to detect and monitor invasive plant species along the Alaska Highway. This program would be expanded to include direction for preventing, controlling, and eradicating invasive species within and adjacent to the Refuge. The Revised Conservation Plan provides only broad management direction and does not go into specific management details regarding control or prevention of invasive species expansions onto refuge lands. Plans for eradication of invasive species will be subject to internal review and will require specific environmental analysis, including a NEPA evaluation and a compatibility determination.

Figure 2-2. Fire management option – Revised Comprehensive Conservation Plan



2.4.2.7 Environmental Contaminants

Past development and construction activities—primarily associated with World War II era military facilities such as the Alaska Highway, Northway (Staging Field) Airfield, Canol Pipeline, and the Haines to Fairbanks Pipeline (used by the Army to transport petroleum products from 1954 to 1973)—within and adjacent to Tetlin Refuge have introduced a variety of contaminants into the Upper Tanana Valley and the Refuge. Petroleum hydrocarbons are the primary contaminants of concern at these former military sites. Concerns have also been raised regarding reported past use of herbicides along the pipeline corridor; however, sampling in 2005 did not detect persistent residues. Another known contaminant site on the Refuge is the former Seaton Roadhouse, which included a gas station and automotive repair shop. Contaminants cleanup at this site will be required.

Current and future planned activities also have the potential to create additional sources of contamination, including spills or development activities outside of refuge boundaries. The Service's Environmental Contaminants Program has completed an assessment of known contaminant threats on the Refuge (USFWS 2007a) and, in the future, could work with the Refuge to document baseline environmental conditions and establish a plan for long-term monitoring as developments occur within or adjacent to the Refuge.

2.4.2.8 Funding and Personnel

In fiscal year (FY) 2007, the Refuge's base operational budget was $1,742,000, which included $1,478,000 for general refuge operations and $264,000 in fire management base funds. To maintain the current level of services, an additional $610,000 of base funding will be necessary to balance the offsets of fixed costs and short-term inflation. In FY 2007, the Refuge had a staff of 20 permanent employees, including 11 permanent full time (PFT) and 9 permanent seasonal or part-time (PPT) employees, and 7 temporary seasonal employees. The Refuge also relies heavily on partnerships and volunteers to sustain the level of Refuge operations and services that were being provided. In 2007, 28 Refuge volunteers contributed 1,409 hours to the refuge operations. More information about current personnel levels and additional needs are provided in the Refuge Resources chapter (chapter 4, section 4.6.2) of this document.

Implementation of the Revised Conservation Plan will require additional funding and staffing for the construction of new facilities, trails, and roads; for additional maintenance needs, replacement of equipment, and expansion of the biological and fire management programs; and to provide full funding of existing programs. Table 2-1 reflects the annual base funding necessary to fully implement the Revised Conservation Plan. The long-term adjustments to the base budget reflect the needed short-term adjustments indicated previously plus increases necessary to implement new and expanded projects identified in this Plan. In addition to the annual base funding needs identified in Table 2-1, the Refuge will need approximately $14,200,000 for construction projects involving new or expanded visitor service facilities, road improvements, and additional headquarters and housing facilities for new permanent employees. The needed funding levels presented in the table do not include the estimated $12,090,000 needed to construct and furnish the proposed Interagency Public Lands Information Center in Tok. The funding for that facility will require supplemental funding and coordination with other agencies sharing those costs.

Table 2-1. Annual base funding needed to implement the Revised Comprehensive Conservation Plan

Item	Short-Term Needs (1–3 Years)	Long-Term Needs (3–15 Years)
Refuge Operations	$2,010,000	$2,800,000
Annual Maintenance	$290,000	$380,000
Fire Funding	$350,000	$390,000
Total Annual Budget Needs	$2,650,000	$3,570,000

Table 2-2 indicates the Refuge's 2007 staffing level and additional staffing needed to fully implement the Revised Conservation Plan. The additional staffing needs include 1–2 law enforcement positions, an additional maintenance position, a refuge operations specialist, 3 interpretive park rangers, an education specialist, 3 biologists, 1–2 fire technicians/fire fighters, 1–2 refuge information technicians, and 3–4 biological technicians or interns.

Table 2-2. Current staffing and additional staffing needed to implement the Revised Comprehensive Conservation Plan

Item	Current (2007) Staffing	Additional Short-Term Needs (1–3 Years)	Additional Long-Term Needs (3–15 Years)
Permanent Full-Time Employees	11	4	7–8
Permanent Seasonal (Part-Time) Employees	9	2	4–6
Temporary Seasonal (Part-Time) Employees	7	3	4–6
Volunteers	28	4–6	6–8

3. Management Policies and Guidelines for Tetlin National Wildlife Refuge

This chapter presents an overview of the management direction for the Tetlin National Wildlife Refuge (Tetlin Refuge, Refuge). The primary sources of this management direction are the laws governing the National Wildlife Refuge System (Refuge System) and the regulations, policies, and other guidance, both national and regional, developed to implement these laws. Although each refuge is unique, it is only one piece of this system. The management direction presented here represents the common base for management of the Alaska refuges and identifies appropriate sideboards for management of individual refuges.

Some deviations from these region-wide management policies and guidelines are likely to appear in each comprehensive conservation plan, given differing establishing orders or refuge purposes. Any refuge-specific departures will be clearly described, along with supporting rationale, in each revised comprehensive conservation plan.

This document contains the following:

- Descriptions of the management categories and their associated general management intent.
- Policies and guidelines specific to each category.
- A table that displays activities, public uses, commercial uses, and facilities by management category.

The management category descriptions are not the same as those from the previous (1980s) round of comprehensive conservation plans. They have evolved over the course of the planning process. These management category descriptions will remain constant for all the plans unless a well-justified exception is warranted.

Until the final revised comprehensive conservation plan is adopted for a refuge, if there is any conflict between the existing refuge plan and these management guidelines, the direction in the existing plan will take precedence, unless the conflict is the result of changes in law, judicial rulings, or other non-discretionary guidance.

3.1 Management Categories

Five management categories, ranging from Intensive management to designated Wilderness, are used to describe management levels throughout the refuges in Alaska. Lands administered by Tetlin Refuge fall into three of these five management categories; Intensive, Moderate, and Minimal. A management category is used to define the level of human activity appropriate to a specific area of the Refuge. It is a set of refuge management directions applied to an area, in light of its resources and existing and potential uses, to facilitate management and the accomplishment of refuge purposes and goals. The Management Activities Table (Table 3-2) shows those management activities, public uses, commercial uses, and facilities that may be allowed in each management category and under what conditions.

3.1.1 Minimal Management

Minimal management is designed to maintain the natural environment with very little evidence of human-caused change. Habitats should be allowed to change and function through natural

processes. Administration will ensure that the resource values and environmental characteristics identified in the comprehensive conservation plan are conserved. Public uses, economic activities, and facilities should minimize disturbance to habitats and resources. Ground-disturbing activities are to be avoided whenever possible.

Management actions in this category focus on understanding natural systems and monitoring the health of refuge resources. Generally, no roads or permanent structures are allowed (except cabins and trails). Temporary structures may be allowed in situations in which removal is planned after the period of authorized use and the site can be rehabilitated using plants native to the immediate area. Existing cabins may be allowed for administrative, public use, subsistence, or commercial or economic (e.g., guiding) purposes. New subsistence or commercial cabins may be authorized if no reasonable alternatives exist. Public use or administrative cabins may be constructed if necessary for health and safety.

Public use of the Refuge for wildlife-dependent recreation and subsistence activities is encouraged. Public use facilities are not generally provided. Mechanized and motorized equipment may be allowed when the overall impacts are temporary or where its use furthers management goals.

If a transportation or utility system, as defined in section 1102 of the Alaska National Interest Lands Conservation Act (ANILCA), is proposed to cross an area in Minimal management, the authorization process would incorporate a corresponding comprehensive conservation plan amendment to change the management category in the affected area from Minimal management to Moderate or Intensive management, as appropriate.

Compatible economic activities may be allowed where the evidence of those activities does not last past the season of use, except as noted in the preceding discussion of cabins. The primary economic activities are likely to be guiding and outfitting of recreation activities such as hunting, fishing, hiking, river floating, and sightseeing. All economic activities and facilities require authorizations such as special use permits.

3.1.2 Moderate Management

Moderate management is meant to allow compatible management actions, public uses, commercial uses, and facilities that may result in changes to the natural environment that are temporary, or permanent, but small in scale and that do not disrupt natural processes. The natural landscape is the dominant feature of Moderate management areas, although signs of human actions may be visible.

Management actions in the category of Moderate management will focus on maintaining, restoring, or enhancing habitats to maintain healthy populations of plants and animals where natural processes predominate. For example, logging and prescribed burning may be used to convert mature forests to earlier native seral stages to enhance browse for moose. In general, management facilities, both temporary and permanent, will be allowed for the purposes of gathering data needed to understand and manage resources and natural systems of the Refuge. Structures will be designed to minimize overall visual impact.

Public facilities provided in Moderate management will, while protecting habitats and resources, allow the public to enjoy and use refuge resources in low numbers over a large area, or they will encourage the short-term enjoyment of the Refuge in focused areas. The emphasis is on small facilities that encourage outdoor experiences. Facilities such as public use cabins, rustic

campgrounds, kiosks, viewing platforms, trails, and toilets may be provided. Facilities will be designed to blend with the surrounding environment.

Compatible economic activities may be allowed where impacts to natural processes and habitats are temporary (e.g., small-scale logging where an earlier seral stage meets management goals; facilities in support of guiding and outfitting services, such as tent platforms or cabins that encourage enhanced public use). All economic activities and facilities require authorizations such as special use permits.

3.1.3 Intensive Management

This category is designed to allow compatible management actions, public facilities, and economic activities that may result in alterations to the natural environment. In Intensive management areas, the presence of human intervention may be very apparent. Roads, buildings, and other structures are likely to be seen. Intensive management is applied to the smallest area reasonable to accommodate the intended uses. When Intensive management is proposed for an area, the specific purposes for its establishment will be described.

Natural processes or habitats may be modified through human intervention. Habitats may be highly modified to enhance conditions for one or more animal species. For example, water regimes may be artificially controlled to improve habitat for waterfowl.

High levels of public use may be accommodated and encouraged through modifications to the natural environment, such as paving, buildings, developed campgrounds, and other facilities that could alter the natural environment in specific areas. Public facilities are designed to provide a safe and enjoyable experience of the natural environment and an increased understanding of refuge resources for a wide range of visitors. Facilities may accommodate a large number of visitors while protecting refuge resources from damage through overuse.

Compatible economic uses of refuge resources that result in alterations to the natural environment may be authorized in Intensive management areas. All economic uses are subject to the compatibility standard, must contribute to the purposes of the Refuge, and require official authorizations such as special use permits.

3.1.4 Special Management

Some refuges may contain or fall within Special Management designations. Such areas are managed within one of the categories described previously but may have additional management emphasis or requirements because of their status. There are two Special Management designations applicable to the Tetlin Refuge.

The Tetlin Refuge is one of 14 refuges in the country designated as a Land Management Research and Demonstration Area (LMRDA). The LMRDAs are intended to serve as centers of investigation, innovation, and instruction in wildlife and habitat management. The Tetlin Refuge LMRDA designation focuses on studies of the effects of wildland fire; oil, gas and mining development; subsistence uses; and increasing tourism on boreal forest habitat.

The Upper Tanana Valley, which includes the Tetlin Refuge, is a recognized "Important Bird Area" (IBA). The IBA designation carries no management requirements but recognizes the biological significance of the Upper Tanana Valley to migratory bird conservation.

3.1.4.1 Management of Selected Lands

The Service retains management responsibility for lands selected but not yet conveyed to Native village and regional corporations or to the State of Alaska. The appropriate Native corporation or agency of the State of Alaska will be contacted and its views considered prior to issuing a permit involving these lands. Fees collected for special use or right-of-way permits will be held in escrow until the selected lands are conveyed or relinquished. Management of these lands will be the same as for adjacent refuge lands.

3.2 Management Policies and Guidelines

Refuge management is governed by Federal laws such as the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd), as amended (Refuge Administration Act); the National Wildlife Refuge System Improvement Act of 1997, an amendment to the Refuge Administration Act (P.L. 105-57) (Refuge Improvement Act); and ANILCA; by regulations implementing these laws; by treaties; by Service policy; and by principles of sound resource management—which establish standards for resource management or limit the range of potential activities that may be allowed on the Refuge.

The ANILCA authorizes traditional activities such as subsistence, the exercise of valid commercial fishing rights, hunting, fishing, and trapping in accordance with State and Federal laws. Under Service regulations implementing this direction, "[p]ublic recreation activities within the Alaska National Wildlife Refuges are authorized as long as such activities are conducted in a manner compatible with the purposes for which the areas were established" (50 CFR 36.31[a]). Such recreation activities include but are not limited to sightseeing, nature observations and photography, hunting, fishing, boating, camping, hiking, picnicking, and other related activities. The Refuge Administration Act, as amended by the Refuge Improvement Act, defines "wildlife-dependent recreation" and "wildlife-dependent recreational use" as "hunting, fishing, wildlife observation and photography, or environmental education and interpretation" (16 U.S.C. § 668ee). These uses are encouraged and will receive emphasis in management of public use on refuges.

3.2.1 Management Emergencies

It may be necessary, when emergencies occur on the Refuge, to deviate from policies and guidelines discussed in the comprehensive conservation plan. Activities not allowed on the Refuge or under a specific management category, as shown in Table 3-2, may occur during or as a result of emergencies. For example, if naturally occurring or human-caused actions (e.g., landslides, floods, fires, droughts) adversely affect refuge resources, it may be necessary to undertake rehabilitation, restoration, habitat improvement, water management, fisheries enhancement, or other actions that would not otherwise be allowed to the same extent on the Refuge. Threats to human health and safety may also result during emergencies. In emergencies, the refuge manager is authorized to take prudent and reasonable actions to protect human life and to address immediate health, safety, or critical resource-protection needs.

3.2.2 Land Exchanges and Acquisitions

Under section 1302 of ANILCA, and subject to certain restrictions, the Service may acquire by purchase, donation, or exchange any lands within the boundaries of Alaska refuges. Proposed land exchanges or acquisitions must benefit fish and wildlife resources, satisfy other purposes for which the Refuge was established, or be necessary to satisfy other national interests. The Service

can also purchase conservation easements or enter into cooperative management agreements to meet these objectives.

3.2.3 Land Protection Plans

Department of Interior and Service policies require development of a step-down plan, called a land protection plan, addressing priorities for habitat conservation within refuge boundaries. Land protection plans inform private landowners what land within refuge boundaries the Service would like to see conserved for fish and wildlife habitat. The plans do the following:

- Identify the private lands within the refuge boundary that the Service believes should be conserved.
- Display the relative protection priority for each parcel.
- Discuss alternative means of land and resource conservation.
- Analyze the impacts on local residents of acquisition.

The Service only acquires land from willing landowners. It is Service policy to acquire land only when other methods of achieving goals are not appropriate, available, or effective. Sometimes resource conservation goals can be met through cooperative management agreements with landowners or by similar means. The Refuge will work with all landowners to ensure that overall fish and wildlife and habitat values within the Refuge are conserved.
A land protection plan for the Refuge was completed in 2001 (USFWS 2001a).

A pre-acquisition environmental site assessment is required for all real property proposed for acquisition by the Service or for public domain lands returning to Service jurisdiction (Service Manual 341 FW 3).

3.2.4 Appropriate Refuge Uses and Compatibility

Comprehensive conservation plans include a review of the appropriateness and compatibility of existing refuge uses and of any planned future public uses.

3.2.4.1 Appropriate Refuge Uses

All uses of a national wildlife refuge over which the Service has jurisdiction must be determined to be appropriate uses under the Appropriate Refuge Uses Policy (Service Manual 630 FW 1). An appropriate use of a national wildlife refuge is a proposed or existing use on a refuge that meets at least one of the following four conditions.

(1) The use is a wildlife-dependent recreational use as identified in the Refuge Improvement Act (hunting, fishing, wildlife observation and photography, and environmental education and interpretation).

(2) The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Refuge Improvement Act was signed into law.

(3) The use involves the take of fish and wildlife under State regulations.

(4) The refuge manager has evaluated the use following guidelines in the Service Manual 603 FW 1.11 (listed in the subsequent text) and found it appropriate.

(a) Do we have jurisdiction over the use?

(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?

(c) Is the use consistent with applicable Executive Orders, Department and Service policies?

(d) Is the use consistent with public safety?

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?

(g) Is the use manageable within available budget and staff?

(h) Will the use be manageable in the future within existing resources?

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality, compatible, wildlife-dependent recreation into the future?

This plan identifies those existing and proposed uses that are found appropriate and compatible. Final compatibility determinations are included as appendix E of this plan. The following uses have been found appropriate: commercial hunting services (guiding and outfitting), commercial air transporter services, scientific research, subsistence activities, and State of Alaska management activities. Appropriate use documentation is on file with the refuge headquarters and the Alaska Regional Office. If additional uses not addressed in this plan are proposed for the Refuge, the refuge manager will determine if they are appropriate uses following guidance in the Service Manual (603 FW 1).

3.2.4.2 Compatibility Determinations

The Refuge Administration Act states that "the Secretary [of the Interior] is authorized, under such regulations as he [or she] may prescribe, to… permit the use of any area within the [Refuge] System for any purpose, including but not limited to hunting, fishing, public recreation and accommodations, and access whenever he [or she] determines that such uses are compatible . . . ."

A compatible use is a proposed or existing wildlife-dependent recreation use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with nor detract from the fulfillment of the Refuge System mission or the purposes for which the national wildlife refuge was established. Economic uses must contribute to achieving refuge purposes and the Refuge System mission.

Compatibility determinations are not required for refuge management activities, except economic activities. They are also not required where statute directs mandatory approval of the activity, as in the case of facilities for national defense.

If a use is found to be incompatible, the Refuge would follow normal administrative procedures for stopping the action. If the use was a new use requiring a special use permit, the refuge manager would not issue a permit. If the use was an existing use already under permit, the refuge manager would work with the permittee to modify the use to make it compatible or would terminate the permit.

Ending incompatible uses that do not require a special use permit or other formal authorization, or that cannot be addressed by other Federal or State agencies, would require the Refuge to go through the normal rule-making process. This would include publishing the proposed regulations in the *Federal Register* and providing opportunity for public comment.

Compatibility determinations for existing hunting, fishing, wildlife observation and photography, and environmental education and interpretation must be re-evaluated with the preparation or revision of a comprehensive conservation plan or at least every 15 years, whichever is earlier. Refuge compatibility determinations for all other uses must be re-evaluated every 10 years or earlier if conditions change or significant new information relative to the use and its effects becomes available.

To review completed compatibility determinations for all refuges in Alaska, go to http://alaska.fws.gov/nwr/planning/completed.htm.

Additional details on applying compatibility standards and completing refuge compatibility determinations are found in the compatibility regulations at 50 CFR (Parts 25, 26, and 29) and in the Service Manual (603 FW 2).

3.2.5 Mitigation

In the interest of serving the public, it is the policy of the Service, throughout the nation, to seek to prevent, reduce, or compensate for losses of fish, wildlife, and their habitats, and uses thereof, from land and water development. To that end, the Service developed a Mitigation Policy in 1981 that includes measures ranging from avoiding an activity that results in loss of such resources to seeking compensation by replacement of or substitution for resource loss.

The Service will promulgate regulations, develop stipulations, and issue permits to reduce or eliminate potential adverse impacts resulting from compatible activities that may be authorized under this plan. These regulations, stipulations, and permits would mitigate impacts in a variety of means, as stipulated in the Mitigation Policy guidelines (Service Manual 501 FW 2.1). The means, in order of application, are as follows:

1. Avoiding the impact altogether by not taking a certain action or parts of an action.

2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

5. Compensating for the impact by replacing or providing substitute resources or environments.

When determining activities or uses are compatible, projects should be designed first to avoid adverse impacts. The Service generally does not allow compensatory mitigation on Refuge System lands. Only in limited and exceptional circumstances related to existing rights-of-way could compensatory mitigation be used to find a use compatible. The Service Manual (501 FW 2 and 603 FW 2) provides more information.

Mitigation may consist of standard stipulations such as those attached to right-of-way permits; special stipulations that may be attached to leases or permits on a site-specific basis; and site-specific, project-specific mitigation identified through detailed step-down management plans or the environmental assessment process. In all instances, mitigation must support the mission of the Refuge System and must be compatible with the purposes of the Refuge. The degree, type, and extent of mitigation undertaken would depend on the site-specific conditions present and the management goals and objectives of the action being implemented.

3.2.6 Cooperation and Coordination with Others

3.2.6.1 Federal, State and Local Governments

The Refuge will continue to work closely with those Federal, State, and local governments and agencies whose programs affect, or are affected by, the Refuge. State and local government input will be sought during the development of regulatory policies addressing management of the Refuge System (Executive Order 13083, Federalism). When possible, the Service will participate in interagency activities (such as joint fish and wildlife surveys and co-funded research), cooperative agreements, sharing data, and sharing equipment and/or aircraft costs to meet mutual management goals and objectives.

The Refuge and the State of Alaska will cooperatively manage fish and wildlife resources within the Refuge. The Master Memorandum of Understanding between the Service and the Alaska Department of Fish and Game, dated March 13, 1982, defines the cooperative management roles of each agency (see appendix B). In this agreement, the Alaska Department of Fish and Game agreed to "recognize the Service as the agency with the responsibility to manage migratory birds, endangered species, and other species mandated by Federal law, and on Service lands in Alaska to conserve fish and wildlife and their habitats and regulate human use." Correspondingly, the Service agreed to "recognize the (Alaska) Department (of Fish & Game) as the agency with the primary responsibility to manage fish and resident wildlife within the State of Alaska." Further discussion of intergovernmental cooperation regarding the preservation, use, and management of fish and wildlife resources is found in 43 CFR 24, "Department of the Interior Fish & Wildlife Policy: State and Federal Relationships."

The Service does not require refuge compatibility determinations for State wildlife management activities on a national wildlife refuge pursuant to a cooperative agreement between the State and the Service where the refuge manager has made a written determination that such activities support fulfilling the refuge purposes or the Refuge System mission. When the activity proposed by the State is not part of a cooperative agreement or the State is not acting as the Service's agent, a special use permit may be required, and a refuge compatibility determination will need to be completed before the activity may be allowed. Separate refuge compatibility determinations addressing specific proposals will be required for State management activities that propose predator management, fish and wildlife control (with the exception of emergency removal of individual rogue animals), reintroduction of species, non-native species management, pest

management, disease prevention and control, fishery restoration, fishery enhancement, native fish introductions, non-native species introductions, construction of facilities, helicopter and off-road vehicle access, or any other unpermitted activity that could alter ecosystems on the Refuge.

The Service will cooperate with other State agencies, such as the Department of Natural Resources and Department of Transportation and Public Facilities, on matters of mutual interest and may enter into informal and formal management agreements.

3.2.6.2 Tribes and Native American Organizations

The Service's Native American Policy (USFWS 1994) identifies general principles that guide the Service's government-to-government relationships with tribal governments in the conservation of fish and wildlife resources. Additional guidance has been provided by Executive Order 13084, Consultation and Coordination with Indian Tribal Governments, issued May 14, 1998, and the Department of the Interior–Alaska Policy on Government-to-Government Relations with Alaska Native Tribes, issued January 18, 2001 (USDI 2001). The Refuge will maintain government-to-government relationships with tribal governments. The Refuge will also work directly with regional and village corporations and respect Native American cultural values when planning and implementing refuge programs.

3.2.6.3 Owners of Refuge Inholdings and Adjacent Lands

The Refuge will work cooperatively with inholders and adjacent landowners, providing information on refuge management activities and policies. The Refuge will consult periodically with them regarding topics of mutual interest; will respond promptly to concerns over refuge programs; and will participate in cooperative projects (e.g., water quality monitoring and fish and wildlife management).

3.2.6.4 Fish and Wildlife Service Jurisdiction over Waters within Tetlin Refuge

Where the United States holds title to submerged lands beneath waters within the Refuge, the Service has jurisdiction over certain activities on the water. In 1980, under ANILCA, the United States Congress established or expanded 16 national wildlife refuges. These areas of land and water may contain both navigable and non-navigable waters. Where waterbodies are non-navigable within the Refuge, the Service has management authority over most activities on water where adjacent uplands are federally owned. Where State of Alaska lands exist beneath navigable waterbodies or where the State, a Native corporation, or a Native allotee owns the adjacent uplands within areas of the Refuge where the withdrawal process started after statehood, the Service's management authority is more limited.

The Service's statutory authority to manage these lands and waters comes from ANILCA; the Service manages these lands pursuant to the Refuge Administration Act. Under provisions of ANILCA, the Service manages the Federal subsistence program on all inland waters within and adjacent to the external boundaries of the Refuge (50 CFR 100.3[b]).

3.2.6.5 Other Constituencies

The Refuge will inform local communities, special interest groups, and others who have expressed an interest in or are affected by refuge programs about refuge management policies and activities. The Refuge will seek input from these constituents when issues arise that may affect how the Refuge is managed. When appropriate, local residents and other stakeholders will be asked to

participate in refuge activities so their expertise and local knowledge can be incorporated into refuge management.

3.2.7 Ecosystem and Landscape Management

Species do not function alone; they function together in the environment as part of an ecosystem. Refuge resources will be managed by employing ecosystem management concepts. Individual species are viewed as integral to the diversity of those ecosystems and as such are indicators of the healthy functioning of the entire ecosystem. When the Service identifies species to use as indicators of the health of an ecosystem, it will do so through a rigorous peer-reviewed scientific process involving experts from other Federal agencies and the Alaska Department of Fish and Game.

Inventorying, monitoring, and maintaining comprehensive databases of selected ecosystem components are critical for making refuge management decisions and for ensuring proper long-term ecosystem stewardship. This includes regular and recurring monitoring of status and trends of ecosystem components such as fish, wildlife, plants, climatic conditions, soils, and waterbodies. All monitoring will employ appropriate disciplines, new technologies, and scientific capabilities whenever practical.

3.2.7.1 Air Quality

The Service's authorities for air quality management are included in several laws. The most direct mandates to manage air resources are found in the Clean Air Act.

The Service is required by the Clean Air Act to preserve, protect, and enhance air quality and air quality-related values on Service lands. Air quality-related values include visibility, plants, animals, soil, water quality, cultural and historical resources, and virtually all resources that are dependent upon and affected by air quality.

Class I air quality sites receive the highest level of protection. Very little deterioration is allowed in these areas, and the Federal land manager has an "affirmative responsibility" to protect air quality-related values on those lands. With the exception of three Class I air quality sites in designated Wilderness on the Alaska Maritime National Wildlife Refuge, all other lands managed by the Service in Alaska are classified as Class II and receive protection through the Clean Air Act. Moderate deterioration, associated with well-managed growth, is allowed in Class II areas.

If air quality or related resources are at risk, the refuge manager will work with the Service's Air Quality Branch; the regional air quality coordinator; the Alaska Department of Environmental Conservation and other State, local, and Federal agencies; and the public, as appropriate, in developing an air quality management plan as outlined in the Service Manual (563 FW 2.8).

3.2.7.2 Water Resources (Hydrology) Management

Every national wildlife refuge in Alaska shares the common purpose of ensuring that water resources are maintained and protected. The ANILCA mandates that the Service safeguard water quality and necessary water quantity within refuges, and conserve fish and wildlife populations and habitats in their natural diversity.

Water is a fundamental ecological resource of Tetlin Refuge. Major glacial rivers, smaller non-glacial rivers, lakes, ponds, and wetlands constitute the surface water types that are significant ecological components. A water resources management strategy addresses the hydrology values

and needs of the Refuge and reduces uncertainty of environmental integrity. Steps to guide the strategy include: 1) identify existing aquatic resources data, 2) identify indicators that serve as "barometers of health" for the aquatic system with respect to target values, 3) assess the current water resource condition, 4) identify stressors influencing the aquatic environment, and 5) identify strategies to protect and preserve the desired habitat conditions.

Although the Service has reserved water rights sufficient to accomplish the purposes of the refuges, the Refuge Administration Act and the Service Manual (403 FW 1 through 3) direct the Service to obtain, to the extent practicable, water supplies of adequate quantity and quality for Service facilities, for refuge purposes, and as trust resources; and to obtain the legal right to use that water through State laws, regulations, and procedures.

The Alaska Region of the Service conducted a water resources threats analysis (Harle 1994) for the purpose of guiding water resource investigations and protecting water resources by acquiring instream water rights. Based on the results of the threats analysis, the Service's regional office developed a strategic plan for systematically quantifying the surface water on refuges within Alaska (Bayha et al. 1997).

Using existing data, or through the collection of hydrologic and biologic data, the Service applies to the State of Alaska for appropriative water rights, for instream water reservations and for water withdrawals to meet the Service's needs. Establishing State water rights is only part of a management strategy to protect refuge resources and to understand ecosystem processes. Collection of hydrologic data allows the Service to accomplish the following:

- Plan flood-plain and riparian zone management.
- Estimate flow for ungauged streams within the Refuge.
- Supplement historical or current fisheries and wildlife studies.
- Detect and evaluate future natural or human-induced changes in the hydrologic system.
- Provide stream profile and velocity data for the design of fish weirs or other structures.
- Estimate the potential for future flooding and erosion.
- Analyze the impacts of proposed projects on stream flow and water supply.
- Provide a basis for decision-making about commercial operations on some important streams.
- Provide baseline water quality information.

All facilities and activities on refuges must comply with pollution-control standards set by Federal laws (e.g., the Clean Water Act 33 U.S.C. 1251 and the Safe Drinking Water Act 42 U.S.C. 300f); State laws where Federal law so provides; and the regulations, policies, and standards implementing these laws.

3.2.7.3 Visual Resource Management

Visual resource management has two primary purposes: (1) to manage the quality of the visual environment and (2) to reduce the visual impact of development activities. To accomplish these purposes, the Refuge will identify and maintain scenic values and will, within the constraints imposed by the comprehensive conservation plan, minimize the visual impacts of refuge development and uses. All activities and facilities on the Refuge will be designed to blend into the

landscape to the extent practical. The Service will cooperate with other Federal, State, local, tribal, and private agencies and organizations to prevent significant deterioration of visual resources.

3.2.7.4 Cultural, Historical, and Paleontological Resources

The Service has long-term responsibilities for cultural resources on refuge lands. Cultural resources on refuge lands are managed under a number of laws, executive orders, and regulations, including the Antiquities Act; the National Historic Preservation Act, as amended; the Archaeological Resources Protection Act; the American Indian Religious Freedom Act; the Native American Graves Protection and Repatriation Act; Executive Order 11593, Protection and Enhancement of the Cultural Environment; Executive Order 13007, Indian Sacred Sites; and 36 CFR 800.

The 1980 amendments to the National Historic Preservation Act direct the Service to inventory and evaluate cultural resources for their eligibility for inclusion on the National Register of Historic Places. Pending a complete evaluation, all cultural resources will be considered potentially eligible for the National Register of Historic Places. All significant historic, archaeological, cultural, and paleontological resources on the Refuge will be protected and managed in accordance with Federal and State law.

Due to limited time, funding, and staffing, the Service has designated priorities in evaluating cultural resources on refuge lands. When funds become available, the Refuge will initiate inventories and evaluations as prioritized in the 1996 Tetlin Refuge Cultural Resource Guide. The cultural resource plan provides guidance for cultural resource management on the Refuge. It outlines legal mandates and considerations, reviews current information about resources, and establishes goals and objectives for the program. The cultural resource plan should be updated every five years. Sites determined to be eligible for the National Register will be protected with an appropriate cultural resources management plan.

To avoid causing impacts to any potential sites when development is proposed, a qualified archaeologist will investigate records and reported sites and will examine each area. Priority areas for future investigation identified in the 1996 Cultural Resource Guide include Scottie, Desper, and Moose-Chindagiekne creeks; Jatahmund, American Wellesley, Pickerel, and Deadman lakes; and the Cheslina River.

It is illegal to collect archaeological materials and/or paleontological remains on the Refuge without a permit. Historic aircraft and other World War II material will be managed in accordance with the policy published December 20, 1985, in the *Federal Register* (FR 50:51952-51953). These materials may be collected on refuge lands only as authorized by a permit issued to a qualified organization or individual. Cultural resource research permits will only be issued to qualified individuals operating under appropriate research designs. The Refuge will encourage archaeologists, historians, ethnologists, and paleontologists from educational institutions and other government agencies to pursue their research interests on refuge lands as long as these research interests are compatible with refuge purposes. Research that collects data from threatened sites and minimizes disturbance to intact sites will be encouraged.

When any Federal undertaking—including any action funded or authorized by the Federal government and having the potential to directly or indirectly affect any archaeological or historic site—is planned, a consultation must be initiated with the State Historic Preservation Officer, under section 106 of the National Historic Preservation Act. If sites that may be affected are found in the project area, their significance will be evaluated to determine their eligibility for

inclusion in the National Register of Historic Places. For eligible sites, consultation will result in a course of action causing the least possible impact. Impacts may be minimized in a variety of ways, including relocation or redesign of a project, site hardening, mitigation through information collection, or cancellation of the project if no alternatives are feasible. To protect archaeological and historic sites, other uses may be precluded. Private interests proposing to conduct commercial uses on the Refuge will normally be required to fund studies necessary for consultation and for mitigation of impacts.

The Refuge will implement Executive Order 13007, Indian Sacred Sites, allowing access to identified sacred sites and avoiding adversely affecting the physical integrity of these sites. Where appropriate, the Service will maintain the confidentiality of sacred sites.

Further information on cultural resources management can be found in the Service Manual (614 FW 1 through 5) and the Cultural Resources Management Handbook (USFWS 1992).

3.2.8 Fish and Wildlife Habitat Management

3.2.8.1 Habitat Management

Habitats are managed in keeping with the purposes, goals, and objectives of a refuge. In Alaska, this means habitats are largely managed to maintain natural diversity and natural processes. However, in some cases, habitats are manipulated to maintain or improve conditions for selected fish and wildlife populations, to control invasive plant species, or to manage fire fuels on refuge lands. These habitat management and manipulation activities will be carried out in support of the purposes, goals, and objectives of the Refuge. Generally, refuges use the least intrusive management measures needed. Where practical and economically feasible, habitat management practices should maintain a natural appearance on the landscape. Habitat management practices, even those carried out for the benefit of a single species or small group of species, will, to the extent possible, maintain the natural diversity of native (indigenous) wildlife species and habitat types.

Habitat management and manipulation may be achieved by mechanical, chemical, and manual methods, including the use of fire, or by a combination of methods. Mechanical treatment could include mechanical removal, crushing, cutting, or mowing. When applicable, State and Federal guidelines for timber management will be followed. Mechanical treatment could also include the construction of fish passages, fish ladders, fish barriers, water impoundments and structures such as fences or artificial nests, and raising or lowering of water levels to manage wildlife or waterfowl habitat. Riparian or aquatic habitat management and manipulation may be achieved by acquiring instream flow reservations or making beneficial water diversions.

Chemical treatment involves the use of chemicals to restore nutrient levels in a lake system (fertilization) for fisheries restoration, to reduce hazardous fuels, or to eliminate invasive plant and animal species, normally by killing them or destroying their ability to spread or prosper. Before chemical treatment is approved for use, the Refuge will analyze the need for action, the options for treatment, and the potential impacts of those options through the National Environmental Policy Act (NEPA) process. Pest control, including integrated pest management, is discussed in section 3.2.9.8 of this chapter.

Manual treatment could include the use of hand tools to remove, reduce, or modify plants or to modify habitats (e.g., removal of beaver dams).

Aquatic habitat modification may include activities and structures such as streambank restoration, passage structures, and fish barriers or obstacle removal that results in physical modification of aquatic or riparian habitats to benefit fish species. These activities would be undertaken to maintain or restore native fish populations and may require appropriate NEPA compliance and refuge compatibility determinations.

3.2.8.2 Fire Management

Fire management is the full range of activities necessary to conserve, protect, and enhance habitat and to maintain desired ecological conditions for the benefit of fish and wildlife. Fire management activities include preparedness, emergency suppression operations, wildland fire use, fire prevention, education, monitoring, research, prescribed fire, hazardous fuel reduction, and mechanical treatments. All activities will be conducted in accordance with refuge, Service, and Department of Interior policies and approved interagency and refuge-specific fire management plans. Additional guidance on fire management can be found in the Service Manual (621 FW 1 through 3).

Fire management plans provide the basis for integrating fire as a critical natural process into other refuge plans and activities at a landscape scale. The Tetlin Refuge Fire Management Plan (TNWR 2001) provides specific information on the application and management of fire on the Refuge. The Alaska Interagency Wildland Fire Management Plan provides a cooperative framework and operational guidelines for the suppression of wildland fires. The suppression of human-caused and unwanted wildland fires and the use of nature-caused wildland fires and prescribed fires as management tools are important management prerogatives.

Wildland Fire Suppression. Fire suppression activity is the work of confining, constraining, controlling, or monitoring a fire or portion of a fire to protect, prevent, or reduce the loss of identified values. Suppression takes place, with the highest priority being the safety of firefighters and the public, using the appropriate management response based on values to be protected. The Alaska Interagency Wildland Fire Management Plan, amended in October 1998, is the guiding document for suppression actions. The plan establishes four management options—critical, full, modified, and limited—that direct a range of wildlife fire management responses. Refuge lands have been classified using these fire management options with all facilities mapped.

The Bureau of Land Management Alaska Fire Service (BLM/AFS) provides emergency suppression services on refuge lands in Alaska (Department Manual 620 DM 2), as directed by the refuge manager. Through a cooperative agreement with BLM/AFS, the State of Alaska Division of Forestry provides emergency suppression services on refuge lands in State protection zones, as directed by the refuge manager. Tetlin Refuge is located in the Tok Area Fire Management Zone with suppression services provided by the State of Alaska's Department of Natural Resources, Division of Forestry.

Wildland Fire Use. Wildland fire use is the application of the appropriate management response to naturally ignited wildland fires to accomplish resource management objectives outlined in fire management plans. Wildland fires may be used to protect, maintain, and enhance natural and cultural resources; as nearly as possible, wildland fires will be allowed to function in their natural ecological role. Optional management is described in the Refuge Fire Management Plan.

Prescribed Fire. Prescribed fires are ignited by management action to meet specific wildland fuel, vegetation, and habitat management objectives. Prior to each ignition, a written, approved plan

outlining prescription conditions is required. Use of prescribed fires must also comply with the Alaska Enhanced Smoke Management Plan for Prescribed Fire. The plan provides guidance and direction concerning smoke issues related to prescribed fire.

Table 3-1. Alaska Interagency Wildland Fire Management Plan management options used within Tetlin Refuge

Fire Management Option	Intent	Policy
Critical	This option was specifically created to give the highest priority to suppression action on wildland fires that threaten human life, inhabited property, designated physical developments, and structures resources designated as National Historic Landmarks. Fires that threaten a critical site have priority over all other wildland fires. The fire management strategy of the Critical management option is to provide complete protection of the specific identified sites from fire. For clarification, a site referred to under this option could range from a single inhabited structure to an entire village or town.	Fires occurring in or immediately threatening this designation will receive highest priority for protection from wildland fires by immediate and continuing aggressive actions dependent upon the availability of suppression resources.
Full	This option was established for the protection of cultural and historical sites, uninhabited private property, natural resource high-value areas, and other high-value areas that do not involve the protection of human life and inhabited property. Either broad areas or specific sites within a lower management option may be designated as Full Management.	Fires occurring within or immediately threatening this designation will receive aggressive initial attack dependent upon the availability of suppression resources.

Fire Management Option	Intent	Policy
Modified	The Modified management option is intended to be the most flexible option available to land managers/owners. The intent of the Modified management option is to provide a higher level of protection when fire danger is high, probability of significant fire growth is high, and probability of containment is low. A lower level of protection is provided when fire danger decreases, potential for fire growth decreases, and the probability of containment increases. This option should reduce commitment of suppression resources when risks are low. This option also provides increased flexibility in the selection of suppression strategies when risks are high. The Modified option provides a management level between Full and Limited. Unlike Full management areas, the intent is not to minimize burned acres, but to balance acres burned with suppression costs and to accomplish land and resource management objectives. As stated in the original Alaska Interagency Fire Management Plan, Tanana-Minchumina Planning Area, "Lands placed in this category will usually be suited to indirect attack." The essential elements of this option are the evaluation and conversion dates and the WFSA process.	Fires occurring within this designation, before the conversion date, will receive initial attack (a situation similar to that under the Full option), dependent upon availability of suppression resources, unless otherwise directed by the land manager/owner(s) and documented by a WFSA. After the conversion date, the default action for all fires occurring within the Modified management option areas will be routine surveillance (a situation similar to that under the Limited option) to ensure that identified values are protected and that adjacent higher priority management areas are not compromised. Critical and Full management areas are higher priorities for suppression resources than Modified management areas.

Fire Management Option	Intent	Policy
Limited	This category recognizes areas where the cost of suppression may exceed the value of the resources to be protected, the environmental impacts of fire suppression activities may have more negative impacts on the resources than the effects of the fire, or the exclusion of fire may be detrimental to the fire dependent ecosystem. The Limited management option reduces both long-term suppression risks and costs by reducing the frequency of large fires that may burn out of boundaries of Limited management regardless of the suppression effort. It also reduces current suppression costs and makes suppression goals more attainable in years of drought and intense fire activity. The Limited management option may also be chosen for areas where fire occurrence is essential to the biodiversity of the resources protected and the long-term ecological health of the land. Suppression actions may be initiated to keep a fire within the boundary of the management option or to protect identified higher value areas/sites. Site-specific areas that warrant higher levels of protection may occur within limited management areas. Appropriate suppression actions to protect these sites will be taken when warranted, without compromising the intent of the limited management area.	Wildland fires occurring within this designation will be allowed to burn under the influence of natural forces within predetermined areas while continuing protection of human life and site-specific values within the management option. Generally this designation receives the lowest priority for allocations of initial attack resources; however, surveillance may be a high priority.

3.2.9 Fish and Wildlife Population Management

Conservation of habitat is a key element in maintaining the natural diversity of populations on the Refuge, and management of native fish and wildlife populations is an important component of maintaining healthy ecosystems. The Refuge will be managed in accordance with the purposes of the Refuge and consistent with the Policy on Maintaining Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System (Service Manual 601 FW 3) to ensure native species are managed in their natural diversity and abundance.

The Refuge will work with the State of Alaska to conserve fish and wildlife populations, recognizing that populations may experience fluctuations in abundance because of environmental factors and may require management actions for conservation purposes. The Refuge will be managed to maintain the genetic variability of wild, native fish stocks.

3.2.9.1 Wildlife Inventory and Monitoring Plan

To assess presence, relative abundance, distribution, and trends in populations of fish, wildlife, and plants, the Refuge completed a Wildlife Inventory and Monitoring Plan (I&M Plan) (TNWR 1986). The I&M Plan describes objectives, justification, methods, management implications,

geographic scale, report schedules, and database management for studies on species targeted for inventory and monitoring. The I&M Plan includes studies that address environmental parameters (e.g., weather) and hydrology, soils, and fire history to explain potential changes in the distribution, relative abundance, and populations of fish, wildlife, and plants. The Refuge will update the I&M Plan every two years. Every five to eight years, the I&M Plan will be reviewed by the regional refuge biologist and other professional staff prior to final approval by the regional refuge chief.

3.2.9.2 Scientific Peer Review

Biologists, ecologists, botanists, and other refuge personnel conducting scientific investigations will adhere to refuge, regional, Service, and Department of Interior policies on scientific conduct, including the Management of Fish and Wildlife Service Scientific Publications Recommended Outlets, Procedures and Policies. The overall goal of scientific peer review is to ensure that information collected, analyzed, interpreted, and reported to the public, and upon which policy and management decisions are based, meets established standards of the scientific community. To achieve this goal, study plans and reports to be disseminated outside the originating office must be peer-reviewed. The region's peer review procedure is available upon request. The type and level of review shall be commensurate with the potential significance of the scientific information and its likely influence on policy and management actions.

3.2.9.3 Compliance with the Animal Welfare Act

The Animal Welfare Act of 1996, as amended, established legal standards for animal care and use. To prescribe methods and set standards for the design, performance, and conduct of animal care and use, research facilities and Federal agencies must establish an Institutional Animal Care and Use Committee (IACUC). Field studies conducted or authorized by refuge employees within the purview of the Animal Welfare Act will require review and approval of an IACUC. Any refuge study that involves an invasive procedure or that harms or materially alters the behavior of an animal under study should be reviewed and approved by an IACUC prior to implementing field work. Note that a scientific collection permit is also required from the Alaska Department of Fish and Game under 5 Alaska Administrative Code 92.033.

3.2.9.4 Marking and Banding

These activities include fish and wildlife capture, marking, banding, radio-collaring, release, tracking, and other information-gathering techniques. Cooperation with appropriate partners, including the Alaska Department of Fish and Game, will be stressed, and specific protocols will be followed, taking advantage of all appropriate disciplines and new technologies wherever possible.

3.2.9.5 Threatened or Endangered Species

The Refuge will consult with the U.S. Fish and Wildlife Service Ecological Services field office on actions that may affect listed, proposed, or candidate species, or designated or proposed critical habitat. These actions include refuge operations, public use programs, private lands and Federal Assistance activities, promulgating regulations, and issuing permits (USFWS 1973, USFWS 1998).

3.2.9.6 Reintroductions

In general, a species may be introduced on a refuge only if that species is native to the Refuge (i.e., a reintroduction). However, one exception to this management direction will be allowed so the Alaska Department of Fish and Game can continue stocking rainbow trout as a fishery

enhancement project at Hidden Lake, which is within the Refuge. The Rationale for this exception is explained in section 2.4. Definitions of native and nonnative species are found in the glossary (see appendix H).

Reintroductions can be useful tools for restoring species to natural ranges and reestablishing a refuge's natural fish, wildlife, and habitat diversity. Reintroductions would require appropriate NEPA compliance; a review to ensure consistency with the Policy on Maintaining Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System; an ANILCA section 810 determination; and a refuge compatibility determination. Reintroductions also require extensive coordination with adjacent landowners and with the State of Alaska. In evaluating the project, the cause(s) of the extirpation should be evaluated and management actions taken to alleviate the cause(s) prior to reintroduction.

The environmental requirements of the species and the ecological dynamics of the area proposed for the reintroduction need to be thoroughly reviewed prior to a reintroduction. Some factors to consider include behavior, diseases, general ecology of the species, habitat requirements, inter- and intra-species competition, life history, genetics, management practices, population dynamics, and predators. Consideration should be given to whether there have been significant habitat changes since the species' extirpation (e.g., is the area still within the species' natural range?).

3.2.9.7 Fish and Wildlife Control

These activities involve the control, relocation, and/or removal of native species, including predators, to maintain natural diversity of fish, wildlife, and habitats. These management actions may be employed with species of fish and wildlife within their original range to restore other depleted native populations. These activities are subject to appropriate NEPA compliance, an ANILCA section 810 determination, and a refuge compatibility determination.

Predator management includes the relocation, removal, sterilization, and other management of native predators to accomplish management objectives. The Service considers predator management to be a legitimate conservation tool when applied in a prudent and ecologically sound manner and when other alternatives are not practical. The key requirements are that a predator-management program be ecologically sound and biologically justified. In keeping with the Service's mandate to first and foremost maintain the biological integrity, diversity, and environmental health of fish and wildlife populations at the refuge scale, a predator population will not intentionally be reduced below a level consistent with the low end of natural population cycles (see Service Manual 601 FW 3).

A predator-management program requires appropriate NEPA compliance, an ANILCA section 810 determination, and, if conducted by other than the Service or an agent of the Service, a refuge compatibility determination. Alternative management actions must be evaluated prior to pursuing direct predator control activities. Any proposal to allow or implement a predator-management program on national wildlife refuges in Alaska will be subjected to public review and closely coordinated with the Alaska Department of Fish and Game, local communities, tribal governments, and adjacent landowners and/or managers. Predator-management activities must be monitored and evaluated for effectiveness and resource impacts.

Normal environmental education and population management activities—such as trapper education programs and regulation changes that allow for increased harvests of predatory animals by licensed

trappers and hunters—are not considered to be "predator management." The control or extirpation of non-native predators is not considered to be "predator management" (see section 3.2.9.8).

3.2.9.8 Management of Non-native, Invasive, and Pest Species

In general, non-native species (including feral domestic animals) are not compatible with refuge purposes or with Refuge System policies. When a non-native species (fish, wildlife, or plants) occurs on a refuge, the Service may control or eliminate that species. Where a population of a non-native species has already been established on a refuge and this population does not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the Refuge, the species may be managed as part of the Refuge's diverse ecosystems.

Pests are defined as those organisms (vertebrates, invertebrates, plants, and microorganisms and their vectors) that are detrimental to fish, wildlife, human health, fish and wildlife habitat, or established management goals. Pests also include noxious weeds and other organisms that are classified as pests by law (Administrative Manual 30 AM 12).

Invasive species are non-native species whose introduction causes or is likely to cause economic or environmental harm, or harm to human health. The Federal government is prohibited by Executive Order, law, and policy from authorizing, funding, or carrying out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere (Service Manual 620 FW 1). Refuge managers conduct habitat management activities to prevent, control, or eradicate invasive species using techniques described through an integrated pest management plan or other similar management plan. Refuge integrated pest management planning will address the advantages and limitations of potential techniques, including chemical, biological, mechanical, and cultural techniques. Management of invasive species on refuges is guided by the National Strategy for Invasive Species Management and conducted within the context of applicable policy (Service Manual 620 FW 1).

By definition, invasive species cause significant impacts to the land and water resources or to the species of plants and animals that use these habitats. To manage invasive plants, the Refuge will include weed inventories as part of all habitat inventories. The Refuge will review the proposed action's potential to introduce or spread invasive plants and will take measures to reduce the hazards (e.g., require weed-free feed for pack animals).

Introduced vertebrates (e.g., fox and rats) may also adversely affect wildlife populations, particularly in island ecosystems where species historically occurred without vertebrate predators. Presence of these invasive species may interfere with attainment of refuge purposes and management goals.

Pests on refuges may also be controlled to prevent damage to private property, and routine protection of refuge buildings, structures, and facilities is addressed in refuge policy (Refuge Manual 7 RM 14).

The Refuge will coordinate with other landowners and agencies and use integrated pest management practices to enhance the detection, prevention, and management of invasive species and other pests. Use of chemical control measures on refuge lands requires regional office review and approval of a pesticide-use proposal (Administrative Manual 30 AM 12 and Refuge Manual 7 RM 14).

Tetlin Refuge initiated a baseline inventory of non-native plant species in 2005. Following the completion of this inventory, strategies for long-term monitoring and management of these species will be included in various step-down plans.

3.2.9.9 Disease Prevention and Control

Certain disease organisms, viruses, or vectors of disease (e.g., rabies or parasites) may threaten human health or the health and survival of native wildlife or plant species. These threats may be managed or eliminated after consideration of all reasonable options and consultation with the State of Alaska and other concerned parties. This will normally only occur when severe resource damage is likely or when public health or safety is jeopardized. Wherever possible, an integrated approach to pest management will be used in accordance with the Service's Administrative Manual (30 AM 12) and Refuge Manual (7 RM 14). If chemical controls are used, a pesticide use proposal must be approved.

3.2.9.10 Fishery Restoration

Fishery restoration is any management action that increases fishery resources to allow full use of available habitat or to reach a population level based on historical biologic data. Although the goal of restoration is self-sustaining populations, situations may exist in which some form of fishery management or facilities could continue indefinitely.

Where fishery resources have been severely adversely affected, the Refuge will work with the State of Alaska, local tribes, and other partners to restore habitats and populations to appropriate, sustainable conditions. Restoration emphasis will focus on strategies that are the least intrusive to ecosystems and do not compromise the viability or genetic characteristics of the depleted population. This may include regulatory adjustments and/or evaluations of escapement goals.

3.2.9.11 Fishery Enhancement

Fishery enhancement is any management action or set of actions that is applied to a fishery stock to supplement numbers of harvestable fish to a level beyond that which could be naturally produced based on a determination or reasonable estimate of historic levels. This could be accomplished by stocking barren lakes, providing access to barren spawning areas (fish passages), constructing hatcheries, outstocking in productive systems, or fertilizing rearing habitat.

Refuge management priorities will focus on conserving naturally diverse ecosystems. Fishery enhancement facilities for the purpose of artificially increasing fish populations normally will not occur within any management category. However, Alaska Department of Fish and Game will be allowed to continue periodic restocking of Hidden Lake with rainbow trout to maintain this road-accessible recreational fishery enhancement project, which has been in operation since 1982. Otherwise, only small scale stocking projects involving native species will be considered.

Additional proposals for fishery enhancement projects will be subject to the provisions of NEPA regulations, an ANILCA section 810 determination, and a refuge compatibility determination, and must be consistent with applicable Service policies and plans. Only temporary fishery enhancement facilities may be authorized in Minimal Management areas.

3.2.10 Subsistence Use Management

Providing the opportunity for continued subsistence use by local residents is one of the purposes of the Refuge, as stated in title III of ANILCA. Title VIII of ANILCA further provides that rural

Alaska residents engaged in a subsistence way of life be allowed to continue using resources within refuges for traditional purposes. These resources include fish and wildlife, house logs and firewood, and other plant materials (berries, bark, etc.). Many aspects of subsistence management are addressed outside of refuge comprehensive conservation plans. The Federal Subsistence Board, through its rule-making process, addresses seasons, harvest limits, and customary and traditional use determinations. The Federal board has established Regional Subsistence Advisory Councils to provide for meaningful public input to the rule-making process. Regulations implemented by the State regulatory boards would continue to apply on the Refuge if not superseded by Federal subsistence regulations.

The Refuge will work with others to monitor subsistence harvest. The Refuge will supplement the State's ongoing harvest and resource monitoring programs to provide additional information on the status of fish and wildlife populations harvested for subsistence uses. This monitoring is intended to identify potential problems before populations of fish and wildlife become depleted and to ensure preference is given to subsistence users as required by law. All information the Refuge gathers through subsistence monitoring will be shared with local State fish and game advisory committees, tribes, and other entities. Refuge staff attend various subsistence-related meetings, including those of local fish and game advisory committees and Regional Subsistence Advisory Councils, and provide information on the status of subsistence resources and management.

The noncommercial gathering by local rural residents of fruits, berries, mushrooms, and other plant materials for subsistence uses and of dead standing or down timber for firewood is allowed without a special use permit. Harvest of live standing timber for house logs, firewood, or other uses is allowed, although specific requirements vary by size and location. See 50 CFR 36.15 for specific details. Timber stocks subject to subsistence use will also be monitored to ensure they remain available over the long term.

Under section 816 of ANILCA, refuge lands may be closed to the taking of fish and wildlife if closure is deemed necessary for reasons of public safety or administration, or to ensure the continued viability of particular populations of fish or wildlife. Emergency closure to subsistence taking generally would occur only after other consumptive uses competing for the resources were restricted or eliminated.

3.2.10.1 Access for Subsistence Purposes

Access to refuge lands by traditional means will be allowed for subsistence purposes in accordance with section 811 of ANILCA, subject to reasonable regulation (50 CFR 36.12). Traditional means include snowmachines, motorboats, dog teams, and other means of surface transportation traditionally used by local rural residents engaged in subsistence activities. Use of these traditional means of travel will be in compliance with State and Federal law in such a manner to prevent waste of harvested resources or damage to the Refuge and to prevent herding, harassment, hazing, or driving of wildlife.

A traditional use determination completed and approved as part of the Tetlin Refuge Public Use Management Plan (USFWS 1997a) found the use of all-terrain vehicles (ATVs), three-wheelers, four-wheelers, tracked vehicles, or other off-road vehicles (ORVs) was very limited and that these vehicles were not traditionally used for subsistence purposes on the Refuge. Boats and highway vehicles were identified as the primary modes of transportation in the area (USFWS 1997a).

3.2.10.2 Section 810 Evaluations

The Refuge will evaluate the effects of proposed activities on subsistence use to ensure compliance with section 810 of ANILCA. The Refuge will work with the Federal Subsistence Board, Regional Subsistence Advisory Councils, local fish and game advisory committees, tribes, Native corporations, the Alaska Department of Fish and Game, and other appropriate local sources to determine whether a proposed activity would "significantly restrict" subsistence uses. If the Refuge determines that a proposal would probably result in adverse effects to subsistence use, the Refuge would follow the requirements identified in section 810 before making a final decision on the proposal. Appendix F is the ANILCA section 810 evaluation of the potential effects on subsistence use and users of implementing the Revised Conservation Plan for Tetlin Refuge.

3.2.11 Public Access and Transportation Management

3.2.11.1 Snowmachines, Motorboats, Airplanes, and Non-motorized Surface Transportation

Section 1110(a) of ANILCA allows the use of snowmachines (during periods of adequate snow cover and frozen river conditions), motorboats, airplanes, and non-motorized surface transportation methods for traditional activities and for travel to and from villages and homesites. Such access shall be subject to reasonable regulations to protect the natural and other values of the Refuge (43 CFR 36.11). Specific areas may be closed, in accordance with these regulations, to such uses. The refuge manager is responsible for determining when snow cover is adequate to protect the underlying vegetation and soil from damage by snowmachine use.

3.2.11.2 Off-Road Vehicles

The regulations at 43 CFR 36.11(g) restrict the use of off-road vehicles within refuges. The definition of off-road vehicles in 50 CFR 36.2 excludes snowmachines but includes air boats and air-cushion vehicles along with motorized wheeled vehicles. Off-road vehicles may be allowed only on designated routes or areas within Intensive and Moderate management areas or by special use permit.

As part of the Tetlin Refuge Public Use Management Plan (USFWS 1997a), it was determined the use of air boats and air-cushion vehicles would result in extensive impacts to nesting waterfowl within the Refuge. As a result, it was determined no area of the Refuge should be designated for the use of these vehicles.

3.2.11.3 Helicopters

The use of a helicopter in any area other than at designated landing areas pursuant to the terms and conditions of a permit issued by the Service, or pursuant to a memorandum of understanding between the Service and another party, or involved in emergency or search and rescue operations is prohibited (43 CFR 36.11(f)(4)).

Helicopter landings for volcano monitoring, geologic hazards evaluations, and fisheries and wildlife management activities may be authorized under special use permit or other authorization, subject to site-specific stipulations. Helicopter landings for initial-attack fire suppression must comply with operational guidance in the Alaska Interagency Wildland Fire Management Plan.

3.2.11.4 Access to Inholdings

Section 1110(b) of ANILCA ensures adequate and feasible access, for economic or other purposes, across a refuge for any person or entity that has a valid inholding. An inholding is defined as State-owned or privately-owned land, including subsurface rights underlying public lands, valid

mining claims, or other valid occupancy that is within or effectively surrounded by one or more conservation system units. When a right-of-way permit is necessary under this provision (e.g., construction of permanent or long-term facilities), the Service will review and process the application in accordance with regulations at 43 CFR 36 and 50 CFR 29. Such permits are subject to terms and conditions as specified in the regulations.

3.2.11.5 Temporary Access

43 CFR 36.12(a)(2) defines temporary access as "limited, short-term (i.e., up to one year from issuance of the permit) access which does not require permanent facilities for access to State or private lands." Temporary access is limited to survey, geophysical, exploratory, or other temporary uses of nonfederal lands and where access is not otherwise provided for in 43 CFR 36.10 or 43 CFR 36.11.

The Refuge will evaluate applications for temporary access across the Refuge and shall issue a permit with the necessary stipulations and conditions to ensure that the access granted is compatible with the purposes for which the Refuge was established, that it complies with the provisions of section 810 of ANILCA, and that it ensures that no permanent harm will result to refuge resources.

3.2.11.6 Subsistence Access

See Access for Subsistence Purposes under Subsistence Use Management (section 3.2.10.1).

3.2.11.7 Transportation and Utility Systems

Transportation and utility systems include roads, highways, railroads, airports, pipelines, electrical transmission lines, communication systems, and related structures and facilities reasonably and minimally necessary for the construction, operation, and maintenance of such systems (section 1102 of ANILCA). Anyone seeking to acquire a right-of-way across refuge lands for a transportation or utility system must, consistent with 43 CFR 36, file an application with the regional office. Regulations at 43 CFR 36 and 50 CFR 29 establish specific procedures and time constraints for application review, compliance with NEPA, decision-making, and appeals.

The Service will decide whether to approve or disapprove that portion of a transportation or utility system that would cross refuge lands.

A right-of-way for a transportation or utility system across refuge lands can be granted only if the system meets the compatibility standard, the criteria outlined in section 1104(g)(2) of ANILCA, and the regulations at 43 CFR 36.7(a)(2), and if there is no economically feasible and prudent alternative route for the system. If approved, permits issued for a transportation or utility system will contain terms and conditions as required under regulations at 43 CFR 36.9(b) and 50 CFR 29.21 through 29.24. Additional special requirements apply to rights-of-way for pipelines issued under the Mineral Leasing Act of 1920 (30 U.S.C. 185), section 1107(c) of ANILCA, and regulations at 43 CFR 36.9(d).

When considering an application for a transportation or utility system, the authorization process would incorporate a corresponding comprehensive conservation plan amendment to update the desired management category(s) of the affected area if the system were to be approved.

3.2.11.8 State Transportation Planning

Federal transportation planning regulations require each State to develop a long-range statewide transportation plan in consultation and coordination with other government agencies and the public. In Alaska, transportation projects nominated for funding are evaluated and ranked by the Alaska Department of Transportation and Public Facilities. When appropriate, the Refuge will participate in the State transportation planning process and provide input regarding environmental considerations of proposed projects affecting refuge lands and resources. See appendix D of this plan for a discussion of State-identified potential transportation and utility systems that cross refuge lands.

3.2.11.9 RS 2477 Rights-of-Way

The State of Alaska identifies numerous claims to roads, trails, and paths across Federal lands under Revised Statute 2477 (RS 2477), a section in the Mining Act of 1866 that states, "The right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted." RS 2477 was repealed by the Federal Land Policy and Management Act of 1976, subject to valid existing claims.

Assertion and identification of potential rights-of-way does not establish the validity of these claims nor the public's right to use them. The validity of all RS 2477 rights-of-way will be determined on a case-by-case basis, either through the courts or by other legally binding document. The State of Alaska has identified in Alaska Statute 19.30.400 seven routes on Tetlin Refuge it claims may be asserted as rights-of-way under RS 2477 (see Table D-1 and Figure D-1 in appendix D).

3.2.11.10 17(b) Easements

Section 17(b) of the Alaska Native Claims Settlement Act of December 18, 1971, authorizes the Secretary of the Interior to reserve easements on lands conveyed to Native corporations to guarantee access to public lands and waters. Easements across Native lands include linear easements (e.g., roads and trails) and site easements. Site easements are reserved for use as temporary campsites and to change modes of transportation.

The Service is responsible for administering those public easements inside and outside refuge boundaries that provide access to refuge lands. Service authority for administering 17(b) easements is restricted to the lands within the easement. The size, route, and general location of 17(b) easements are identified on maps filed with conveyance documents. Conveyance documents also specify the terms and conditions of use, including the acceptable periods and methods of public access. See appendix D for additional information.

3.2.11.11 Navigation Aids and other Facilities

Section 1310 of ANILCA authorizes reasonable access to and operation and maintenance of existing air and water navigation aids, communications sites, and related facilities. It authorizes existing facilities for weather, climate, and fisheries research and monitoring subject to applicable laws and regulations. It also provides for reasonable access to and operation and maintenance of facilities for national defense and related air and water navigation.

New facilities shall be authorized only after consultation with the head of the Federal department or agency undertaking the establishment, operation, or maintenance and in accordance with mutually agreed to terms and conditions.

3.2.12 Recreation and Other Public Use

Public recreation activities compatible with refuge purposes are authorized unless specifically prohibited (50 CFR 36.31). Compatible recreation uses of the Refuge will continue. The Refuge Administration Act identifies compatible hunting, fishing, wildlife observation and photography, and environmental education and interpretation as priority public uses. These uses are encouraged and will receive emphasis in public use management.

Both consumptive (e.g., hunting, fishing, and trapping) and nonconsumptive (e.g., wildlife observation and photography) recreation uses are appropriate. Some recreational uses are incidental to others. For example, camping and hiking may be related to hunting, fishing, wildlife photography, or other recreational uses.

There is often a fine line between subsistence and recreation use (e.g., berry picking). Subsistence uses are addressed under Subsistence Use Management (section 3.2.10). When it is necessary to restrict the taking of fish and wildlife on a refuge to protect the continued viability of such populations, the taking of fish and wildlife for nonwasteful subsistence uses on refuges shall be accorded priority over the taking of fish and wildlife for other purposes, in accordance with title VIII of ANILCA.

The Refuge will be managed to provide recreation experiences in generally natural wildland settings. Recreation use would be managed consistent with the designated management area category. Intensive and Moderate management areas will be managed for greater concentrations of visitors than will be Minimal management areas. The Refuge will manage all recreation use to avoid crowded conditions and to minimize adverse effects to cultural resources, fish and wildlife, and other special values of the Refuge. “Leave No Trace” will be the standard.

The least intrusive means of managing use will be employed. Education will be the primary management tool for recreation management, using brochures, maps, signs, and personal contacts. However, if voluntary methods fail, other actions may be taken. Actions that may be taken to manage recreation include limiting commercial guiding and outfitting; regulating use and access subject to the provisions of section 1110(a) of ANILCA; and recommending changes in State and/or Federal fishing, hunting, and/or trapping regulations. When necessary, recreation opportunities may be seasonally or otherwise restricted to minimize user conflicts and protect the natural or other values of a refuge.

Any restrictions on public use will follow the public participation and closure procedures at 50 CFR 36, 43 CFR 36, or other applicable regulations. State management actions available through the Master Memorandum of Understanding (see appendix B) and other State management tools will also be used where mutually desirable.

A Public Use Management Plan (also known as a Visitor Services Plan: USFWS 1997a) has been prepared for Tetlin Refuge. This plan will be revised following approval of this comprehensive conservation plan. More specific management plans may be prepared for areas of relatively concentrated use.

3.2.13 Public Use Facilities

Facilities may be provided to support certain recreation and other public uses. Recreation facilities may be located on refuge lands and at administrative sites. Visitor centers and highly developed environmental education and interpretive sites may be located off refuge lands at

administrative sites or other appropriate locations. Public use facilities may include roads, trails, boat launch sites, airstrips, campgrounds, interpretive sites, environmental education sites, visitor centers, public use cabins, visitor contact facilities, and signs.

All new buildings (e.g., visitor centers, restrooms, public use cabins, and visitor-contact buildings), some recreation facilities (e.g., fishing platforms), and additions and alterations to existing buildings will comply with current accessibility standards. Other non-building recreation facilities (e.g., campgrounds, trails) are not currently covered under these standards, although access for the disabled will be considered in the design of new or upgraded facilities. As funds are available, existing buildings will be updated to meet these standards.

The level of development and appearance of facilities will be appropriate for the management category of the area in which they are located. More intensive and sophisticated facilities will be constructed in the Intensive management category; more rustic and rudimentary facilities will occur in the other management categories.

3.2.13.1 Cabins

Special use permits are required for subsistence and commercial cabins. Management of existing cabins and review of proposals for construction of new cabins for traditional uses will be in accordance with the Service's cabin regulations (50 CFR 36.33) and regional cabin policy. Private recreation-use cabins will not be authorized.

Public use cabins are intended to provide the public with unique opportunities to enjoy and use the Refuge. They also help ensure public health and safety in bad weather and emergencies.

Three administrative cabins are available for public use by permit under a first-come, first-served reservation request system. Requests can be made for up to five consecutive days and not more than 120 days in advance. Because these are administrative cabins, refuge management activities take priority over public uses; therefore, requests do not guarantee use of a cabin. However, in the past the Refuge has made, and will continue to make, every effort to keep cabins available for public use during the peak summer and fall use seasons.

3.2.13.2 Temporary Facilities for the Taking of Fish and Wildlife

Per section 1316 of ANILCA, the Refuge will allow the use of temporary campsites, tent platforms, shelters, and other temporary facilities and equipment directly and necessarily related to the taking of fish and wildlife, provided these facilities are not detrimental to refuge purposes. Special use permits may be issued for tent frames, caches, smokehouses, and other facilities. Appropriate stipulations will be included in the special use permits to ensure protection of refuge resources.

The following criteria will be considered in evaluating applications for temporary facilities:

- Where feasible, they will be located in a manner to not displace or compete with existing public uses.
- They will be located away from the vicinity of existing cabins.
- They will be located on sites that are not currently popular campsites.
- They will be located to minimize displacement of wildlife.

The following conditions may be imposed on temporary facility special use permits:

- The time of occupancy will coincide with the State and/or Federal hunting, fishing, and/or trapping season for the species for which the temporary facility is being used.
- At the end of the specified occupancy, tents and other readily portable materials will be removed.
- To the extent feasible, temporary structures will be built with materials that blend into and are compatible with the surrounding landscape.
- To the extent feasible, temporary facilities will be screened from water and located so that they are as unobtrusive as possible when viewed from trails and areas of significant public use.

3.2.14 Outreach

Outreach is two-way communication between the Refuge and the public to establish mutual understanding, promote public involvement, and influence public attitudes and actions. The Refuge will continue to take advantage of partnership opportunities in providing these services, including working with the Alaska Geographic Association; Alaska Public Lands Information Centers; Friends of Alaska National Wildlife Refuges; local, State, and other Federal agencies; local schools; tribal governments; Alaska Native organizations; and others.

Use of outreach as a management tool is key to the success of many of the management activities outlined in this plan. Two outreach activities—environmental education and interpretation—are included in the six priority public uses identified in the Refuge Improvement Act and are purposes identified in ANILCA for which Tetlin Refuge was established. Many other activities are also available for use by the refuge staff in its outreach program, which may be developed in more detail as a step-down management plan. All outreach activities must be continually evaluated to determine whether they fulfill refuge management goals and objectives. The Refuge will ensure that these services are available to all segments of the public, including those with disabilities and those who speak languages other than English.

Refuge staff will work with the news media, attend public meetings and workshops, develop Internet home pages, invite the public to the Refuge (open houses), and foster one-on-one communication.

3.2.15 Commercial Use Management

Commercial uses are activities involving use of a refuge or its resources for a profit. Subsistence uses are not included in commercial uses. Refer to section 3.2.10 for policies related to subsistence.

Except for mining on valid claims under the 1872 Mining Law (of which there are none on Tetlin Refuge lands), other activities where specific property rights are held by entities other than the Federal government, or where specifically exempted by law, all commercial uses must comply with both NEPA and the compatibility requirements of the Refuge Administration Act. A written authorization (such as a special use permit) is required to conduct commercial activities on any refuge. Compliance with NEPA and a refuge compatibility determination will be required prior to deciding whether to authorize a commercial use. Prior to authorizing any economic use of a natural resource, the refuge manager must determine that each use, except for proposed activities authorized by ANILCA, contributes to the achievement of refuge purposes or the Refuge System mission (50 CFR 29.1).

3.2.15.1 Commercial Recreation Services

Air-taxi and water-taxi operators, wildlife-viewing guides, tour operators, recreational fishing guides, big-game hunting guides, and others providing recreation services are required, under 50 CFR 27.97, to obtain special use permits to operate on refuge lands. Where the number of special use permits is limited, refuge managers will award permits competitively (50 CFR 36.41). Special use permits require compliance with all applicable laws and regulations (e.g., United States Coast Guard licensing regulations). Permit stipulations ensure that camps; travel methods; storage of food, fish, and game meat; and activities are compatible with refuge purposes and reduce the potential for impacts to resources and to other refuge users. If problems arise relating to commercial recreation activities—such as disturbance of active nests, conflicts with subsistence use, chronic incidence of bears getting into food, or violations of State or Federal regulations—the Refuge may modify or terminate use under the special use permit stipulations. The Refuge will monitor the number and type of guides and outfitters operating in the Refuge and the number of clients and will, if necessary, further regulate use.

Currently the only commercial recreation service limited by the Refuge is big-game guiding. Tetlin Refuge contains three big-game guide areas. Permits are awarded by a competitive process for a period of five years and may be renewed noncompetitively for another five years, after which time the Service's regional competitive process begins again. Guides are permitted to harvest a limited number of animals each year and must follow a number of permit stipulations as required by regulation, Service policy, and their permit prospectus. Under section 1307 of ANILCA, local preference is provided for all new commercial visitor services except guiding for recreational hunting and fishing. Regulations defining local preference are at 50 CFR 36.37.

3.2.15.2 Mineral Exploration and Development

Oil and Gas Assessment. Geological and geophysical studies, including subsurface core sampling and seismic activities, require special use permits with site-specific stipulations that ensure compatibility with refuge purposes and consistency with the management objectives of this plan. Decisions to allow exploration will be made on a case-by-case basis.

Oil and Gas Leasing. Oil and gas leasing may be allowed only in Intensive management areas. Oil and gas leasing will not be authorized until completion of the following:

- An assessment of potential
- A national interest determination
- A refuge compatibility determination, where applicable
- A comprehensive conservation plan amendment

During this process, the Service will seek the views of State and local governments and other interested parties, in accordance with section 1008(b)(2) of ANILCA.

If leasing is authorized, lease holders will be subject to Federal leasing regulations (43 CFR 3100) and appropriate State regulations. Leases will be subject to stipulations on access, seasonal use, and site restoration; operators would be required to use technology that minimizes impacts on fish, wildlife, and habitat. The Refuge will work closely with leaseholders to minimize adverse effects of mineral exploration and extraction on refuge resources and recreation opportunities.

Sand, Gravel, and Other Common Variety (Saleable) Minerals. Common variety minerals—such as sand, gravel, stone, limestone, pumice, pumicite, cinders, and clay—may be sold pursuant to the Materials Act of July 31, 1947 (30 U.S.C. 601 and 602), as amended. Regulations are found at 43 CFR 3600. Disposal is also authorized under the Refuge Revenue Sharing Act (16 U.S.C. 715s). Also see 612 FW 1 of the Service Manual. Extraction may be authorized, where compatible, in Intensive management areas (which are present on the Refuge) to support construction and maintenance projects on or near refuge lands if no reasonable material sites exist off refuge lands.

Other Mineral Leasing. In general, mineral leasing is not allowed on refuge land. Geothermal leasing is not allowed on refuges under section 1014(c) of the Geothermal Steam Act (30 U.S.C. 1014). Coal mining is also prohibited, subject to valid existing rights, under section 16 of the Federal Coal Leasing Amendment Act of 1975 (30 U.S.C. 201 Notes) and the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272; 43 CFR 3400.2). In specific cases of national need, however, mineral exploration, development, or extraction may be permitted under section 1502 of ANILCA. The President must determine that the national need for the mineral activity outweighs the other public values of the land. Any recommendation by the President would take effect only after enactment of a joint resolution by Congress.

3.2.15.3 Commercial Fishing and Related Facilities

Under section 304(d) of ANILCA, the Service will continue to allow individuals with valid commercial fishing rights or privileges to operate on the Refuge. The use of campsites, cabins, motor vehicles, and aircraft on the Refuge in support of commercial fishing is subject to reasonable regulation. Section 304(d) provides for restricting commercial fishing rights if the use is determined to be inconsistent with refuge purposes *and* to be a "significant expansion of commercial fishing activities . . . beyond the level of such activities during 1979." The Service recognizes that fishery levels are cyclic and will take that into consideration when applying the 1979-level criteria. Any new fishery and related facilities and equipment will have to meet the compatibility standard.

Based upon available information, commercial fishing did not occur within what is now Tetlin Refuge before or during 1979. Local residents are known to have bartered and traded fish with trappers, traders and gold prospectors in the early 1900s, but these activities were part of a subsistence lifestyle and were not pursued for cash profit. Even taking into consideration that fishery levels are cyclic, the lack of evidence to suggest commercial fishing occurred prior to 1979 leads the Refuge to conclude that any future commercial fishing activity should be considered a significant expansion of this activity.

Aquaculture and mariculture support facilities may be allowed in Intensive management, subject to provisions of State and Federal laws. Seafood processing plants will not be allowed.

3.2.15.4 Commercial Harvest of Timber and Firewood

Commercial harvest of timber and firewood will only be authorized under a special use permit and when necessary to fulfill overall refuge management objectives. Within Moderate and Minimal management categories, commercial harvest of timber and firewood to accomplish management objectives will only occur when an approved refuge fire management plan identifies the need to reduce fuel loads in an area. Applicable Federal and State of Alaska guidelines for timber management will be followed.

3.2.15.5 Commercial Gathering of Other Resources

Commercial gathering of other resources (e.g., antlers or mushrooms) requires a special use permit under 50 CFR 27.51 and may be authorized in Intensive and Moderate management.

3.2.15.6 Commercial Filming and Recording Activities

It is Service policy to provide refuge access and/or assistance to firms and individuals in the pursuit of commercial visual and audio recordings when they are compatible with refuge purposes or the mission of the Refuge System. Commercial films, television production, or sound tracks made within refuges for other than news purposes require a special use permit or authorization (43 CFR 5.1).

Commercial filming or recording activities such as videotaping, audio taping, and photography for the purpose of advertising products and services are subject to an A/V Production Permit (Refuge Manual 8 RM 16).

Permits are not required for still photography on refuge lands open to the general public, including commercial still photography, so long as no models or props that are not a part of the site's natural or cultural resources or administrative facilities are used (16 U.S.C. 460l-6d[c]).

3.2.15.7 Other Commercial Uses

Generally, other commercial uses such as grazing, agriculture, and hydroelectric power development will not be allowed. The Refuge will retain existing management direction from the 1987 Plan, which does not allow hydroelectric power development on refuge lands. See section 3.2.11.7 for transmission lines, pipelines, and other rights-of-way mentioned in title XI of ANILCA.

3.2.16 Environmental Contaminants Identification and Cleanup

One goal of the Refuge Administration Act is to maintain the biological integrity, diversity, and environmental health of the Refuge System. In support of this goal, the Service studies environmental contaminants that may threaten trust species (i.e., those species for which the Service has primary jurisdiction) and other resources of the Refuge. This work will continue as new concerns are identified and as funding allows.

An assessment of known or suspected contaminants threats within the Refuge is ongoing as part of the national Contaminants Assessment Process. During comprehensive conservation plan revisions, existing information will be reviewed, and an assessment of potential contaminants threats will be entered into an electronic database. A contaminant assessment report will also be prepared (see USFWS 2007a).

When contaminants are identified on refuge lands, the Service will initiate discussions with the responsible party or parties to remedy the situation. If the Service caused the contamination, funds will be sought to define the extent and type of the contamination and to remedy it. Appropriate environmental regulations—including the Resource Conservation Recovery Act, Comprehensive Environmental Response and Compensation Liability Act, Oil Pollution Act of 1990, and State of Alaska regulations (e.g., 18 AAC 75)—would be followed during remediation work.

All spills of petroleum products and hazardous materials must be reported to the Alaska Department of Environmental Conservation and to the National Response Center. Incidents also

need to be reported to the U.S. Fish and Wildlife Service Regional Spill Response Coordinator. The Refuge will refer to the U.S. Fish and Wildlife Service Region 7 Spill Response Contingency Plan and other relevant plans when responding to spills.

3.2.17 Administration of Tetlin National Wildlife Refuge

3.2.17.1 Administrative Sites and Visitor Facilities

Administrative sites include temporary and permanent field camps, residences, offices, and associated storage; and communication, and transportation facilities. The type of administrative site and level of development will be consistent with the management intent of the management category in which they are constructed. Administrative field camps or other administrative facilities within the Minimal Management category will only be allowed when required to meet management objectives, when no reasonable alternative sites exist, and when the facilities are essential to protect the health and safety of employees. New facilities would only be the minimum required to meet long-term needs.

Fuel storage or other hazardous material storage in conjunction with administrative sites will meet all Federal and State requirements for spill containment and storage.

Under section 1306 of ANILCA, the Secretary of the Interior may establish administrative sites and visitor facilities, either within or outside the boundaries of a conservation system unit, in accordance with the unit's management plan and for the purposes of ensuring the preservation, protection, and proper management of the unit. Section 1306 further states that to the "extent practicable and desirable, the Secretary shall attempt to locate such sites and facilities on Native lands in the vicinity of the unit."

Department of Interior guidelines, developed in 1995 and implementing section 1306, require that prior to initiating a search for an administrative site or visitor facility, site-selection criteria be developed, with public input, and all proposals be evaluated according to the site-selection criteria. If it is determined that Native lands satisfy the site-selection criteria and are desirable and practicable for the intended use, the highest ranked Native lands shall be selected as the preferred site, subject to a specific site evaluation. If no Native lands satisfy the site-selection criteria, the highest ranked parcel will become the preferred site. Public comments will be considered prior to making a final decision.

Applicability of Refuge Regulations to Off-Refuge Administrative and Visitor Facility Sites. Under 50 CFR 36.1(c), the Service is authorized to enforce regulations concerning public safety and protection of government property, and State of Alaska fish and wildlife regulations, on administrative and visitor facility sites that may be held in fee or less-than-fee title and are either inside or outside the approved boundaries of any Alaska national wildlife refuge.

Examples of such facilities administered by the Refuge include the Tetlin Refuge Visitor Center, Deadman Lake Campground, Lakeview Campground, Northway Bunkhouse, and the Tetlin Refuge main office in Tok.

3.2.17.2 Refuge Management Plans

Some management programs are addressed in sufficient detail in the comprehensive conservation plan to be integrated directly into the budgetary process. For other programs, it may be necessary to prepare step-down management plans to implement general strategies identified in

this plan. Additional information on the step-down planning process can be found in 602 FW 3 of the Service Manual.

The following step-down management plans for Tetlin Refuge are required:

Station Safety Plan	Completed; annual review
Land Protection Plan	Completed 2001; next review scheduled for 2015
Fire Management Plan	Completed 2001; next review within three years of the Revised Conservation Plan's approval
Wildlife Inventory and Monitoring Plan	Completed 1986; next review within two years of the Revised Conservation Plan's approval
Public Use Management Plan/Visitor Services Plan	Completed 1997; next review within one year of the Revised Conservation Plan's approval
Fisheries Management Plan	Completed 1990; next review within two years of the Revised Conservation Plan's approval
Spill Prevention Plan	Completed 2004; next review 2008

In addition, the following optional step-down management plans have been or should be developed:

Cultural Resource Management (Guide) Plan	Completed 1996; next review scheduled for 2011 (15 years after completion of initial plan)
Habitat Management Plan	To be completed within five years of the Revised Conservation Plan's approval
Aircraft Incident Plan	To be completed by 2008; annual review

3.2.18 Alaska Mineral Resource Assessment Program

Section 1010 of ANILCA requires that all Federal lands be assessed for their oil, gas, and other mineral potential, although section 304(c) prohibits new hardrock mining on refuges. Mineral assessment techniques that do not have lasting impacts—such as side-scanning radar, trenching, and core drilling—may be allowed throughout the Refuge. Special use permits issued to other government agencies or their contractors for assessment work would include stipulations to ensure that the assessment program is compatible with refuge purposes. For example, stipulations may limit access during nesting, calving, spawning, or other times when fish and wildlife may be especially vulnerable to disturbance.

3.3 Management Categories Table

3.3.1 Introduction

This table lists activities, public uses, commercial uses, and facilities by management category. In some cases, it provides very specific guidance (such as for highway vehicles). In other cases (such as for research and management facilities), the direction is general. While facilities may be

allowed in all management categories, the types of facilities and how they would be constructed and operated vary widely by management category. The descriptions of the management categories reflect a clear distinction in the level of action, type of action, and constraints that may be placed on activities or development within the management categories. They should be used to reflect the desired future condition of the area when site-specific proposals are being evaluated. Activities allowed or authorized within the different categories will be managed differently depending on the management category in which they occur.

3.3.2 Definitions for Management Categories Table

The following are definitions for terms used in the table.

Allowed—Activity, use, or facility is allowed under existing NEPA analysis, appropriate use findings, refuge compatibility determinations, and applicable laws and regulations of the Service, other Federal agencies, and the State of Alaska.

May be allowed—Activity, use, or facility may be allowed subject to site-specific NEPA analysis, an appropriate use finding (when required), a specific refuge compatibility determination (when required), and compliance with all applicable laws and regulations of the Service, other Federal agencies, and the State of Alaska.

May be authorized—Activity, use, or facility may be allowed; a special use permit or other authorization is required.

Not allowed—Activity, use, or facility is not allowed.

The following terms are used:

NEPA analysis—All activities, uses and facilities proposed for a refuge that have the potential to result in significant effects on the environment require an analysis of potential environmental impacts under the National Environmental Policy Act. This analysis may be documented as a categorical exclusion (CE), an environmental assessment (EA), or an environmental impact statement (EIS), depending on the nature of the proposed project.

Appropriate Use—All uses over which the Service has jurisdiction must be determined to be appropriate following direction in Service Manual 630 FW 1. Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are considered appropriate by national policy with no further analysis required. See section 3.2.4.1 for a description of the criteria used to determine if other uses are appropriate.

Compatibility—All activities, uses and facilities allowed on the Refuge, except management actions undertaken by or for the Service, must be compatible with the purposes of the Refuge and the mission of the Refuge System. The analysis that occurs results in a refuge compatibility determination. Management activities undertaken by the Service or by volunteers, cooperators, or contractors working for the Service, with limited exception, are exempt from compatibility review (Part 603 of the Service Manual).

Regulations—All activities, uses and facilities allowed on a refuge must comply with any applicable regulations, as published in the Code of Federal Regulations. Regulations are developed by the Service through a public process to implement the legal authorities under which

the Service manages the Refuge System. For more information on these regulations, see the appropriate topic in the Management Policies and Guidelines (section 3.2 of this chapter). For some activities, other Federal agency and/or State regulations may also apply.

Temporary—A continuous period of time not to exceed 12 months, except as specifically provided otherwise. Special use permits or other authorizations may prescribe a longer period of time, but the structures or other human-made improvements need to be readily and completely dismantled and removed from the site when the period of authorized use terminates.

The following guidelines apply to all activities, uses, and facilities allowed on a refuge.

Area or time restrictions—All activities and uses allowed on a refuge may be restricted in certain areas or at certain times at the discretion of the refuge manager and with the appropriate level of public involvement, by emergency (short-term) or permanent regulation, if necessary to protect refuge resources or human health and safety.

Management emergencies—Activities, uses, and facilities not allowed on a refuge or in specific management categories may be allowed if naturally-occurring or human-caused actions adversely affect refuge resources or threaten human health and safety.

Table 3-2. Activities, public uses, commercial uses, and facilities by management category

Activity	Minimal Management	Moderate Management	Intensive Management
ECOSYSTEM, HABITAT, AND FISH AND WILDLIFE MANAGEMENT			
Ecosystem and Landscape Management			
Collecting Information on and Monitoring Ecosystem Components Data gathering, monitoring and maintaining a comprehensive data base of selected ecosystem components (plants, animals, fish, water, air). (See sections 3.2.9.1 and 3.2.9.2)	Allowed	Allowed	Allowed
Research and Management Access and collection of data necessary for management decisions or to further science by the Service. (See section 3.2.9)	Allowed	Allowed	Allowed
Access and collection of data necessary for management decisions or to further science by ADF&G.	Allowed	Allowed	Allowed
Access and collection of data necessary for management decisions or to further science by other researchers.	May be authorized	May be authorized	May be authorized
Research and Management Facilities May be permanent or temporary structures or camps including weirs, counting towers, and sonar counters. (See section 3.2.17.1)	May be allowed	May be allowed	May be allowed

Activity	Minimal Management	Moderate Management	Intensive Management
Fish and Wildlife Habitat Management			
Describing, Locating, and Mapping Habitats Development of quantitative, written, and graphic descriptions of fish and wildlife habitat including water, food, and shelter components. (See section 3.2.8.1)	Allowed	Allowed	Allowed
Habitat Management (See section 3.2.8.1)			
Mechanical Treatment Activities such as cutting, crushing or mowing of vegetation; water control structures; fencing; or artificial nest structures.	Not allowed; with exceptions consistent with section 3.1.1	May be allowed	May be allowed
Chemical Treatment Use of chemicals to remove or control nonnative species. (See section 3.2.9.8)	May be allowed	May be allowed	May be allowed
Manual Treatment Use of hand tools to remove, reduce, or modify hazardous plant fuels or exotic plant species; or to modify habitats (e.g., remove beaver dams).	May be allowed	May be allowed	May be allowed
Aquatic Habitat Modifications Activities such as stream bank restoration, passage structures, fish barriers, or removal of obstacles that result in physical modification of aquatic habitats to maintain or restore native fish species. (See section 3.2.8.1)	May be allowed	May be allowed	May be allowed
Fire Management—Prescribed Fires Fire ignited by management actions to meet specific management objectives. (See section 3.2.8.2)	May be allowed	May be allowed	May be allowed
Fire Management—Wildland Fire Use The planned use of naturally occurring fires to meet management objectives. (See section 3.2.8.2)	May be allowed	May be allowed	May be allowed
Fire Management—Fire Suppression Management actions intended to protect identified resources from a fire, extinguish a fire, or alter a fire's direction of spread. (See section 3.2.8.2)	Allowed	Allowed	Allowed
Non-native and Pest Plant Control Monitoring, extirpation, control, removal and/or relocation, and other management practices for pest and nonnative plant species. (See section 3.2.9.8)	May be allowed	May be allowed	May be allowed
Water Quality and Quantity Management Monitoring of water quality and quantity to identify baseline data and for management purposes; includes installation of gauging stations. (See section 3.2.7.2)	Allowed	Allowed	Allowed

Activity	Minimal Management	Moderate Management	Intensive Management
Fish and Wildlife Population Management			
Reintroduction of Species The reintroduction of native species to restore natural diversity of fish, wildlife, and habitats. (See section 3.2.9.6)	May be allowed	May be allowed	May be allowed
Fish and Wildlife Control The control, relocation, sterilization, removal or other management of native species, including predators, to maintain natural diversity of fish, wildlife, and habitats; favor other fish or wildlife populations; protect reintroduced, threatened, or endangered species; or restore depleted native populations. (See section 3.2.9.7)	May be allowed	May be allowed	May be allowed
Non-native Species Management The removal or control of non-native species (including predators). (See section 3.2.9.8)	May be allowed	May be allowed	May be allowed
Pest Management and Disease Prevention and Control Relocation or removal of organisms that threaten human health or survival of native fish, wildlife, or plant species. Management practices directed at controlling pathogens that threaten fish, wildlife, and people, such as rabies and parasite control. (See section 3.2.9.9)	May be allowed	May be allowed	May be allowed
Fishery Restoration Actions taken to restore fish access to spawning and rearing habitat, or actions taken to restore populations to historic levels. Includes harvest management, escapement goals, habitat restoration, stocking, egg incubation boxes, and lake fertilization. (See section 3.2.9.10)	May be allowed	May be allowed	May be allowed
Fishery Restoration Facilities Fisheries facilities may be permanent or temporary and may include hatcheries, fish ladders, fish passages, fish barriers, and associated structures. (See sections 3.2.9.10 and 3.2.17.1)	May be authorized	May be authorized	May be authorized
Fishery Enhancement Activities applied to a fish stock to supplement numbers of harvestable fish to a level beyond what could be naturally produced based upon a determination or reasonable estimate of historic levels. (See section 3.2.9.11)	May be allowed	May be allowed	May be allowed
Fishery Enhancement Facilities May be permanent or temporary and may include hatcheries, egg incubation boxes, fish ladders, fish passages, fish barriers, and associated structures. (See sections 3.2.9.11 and 3.2.17.1)	May be authorized	May be authorized	May be authorized

Activity	Minimal Management	Moderate Management	Intensive Management
Native Fish Introductions Movement of native fish species within a drainage on the refuge to areas where they have not historically existed. (See section 3.2.9.6)	May be allowed	May be allowed	May be allowed
Nonnative Species Introductions Introduction of species not naturally occurring within the refuge. (See section 3.2.9.6)	Not allowed	Not allowed except as described in section 3.9	Not allowed
SUBSISTENCE (See section 3.2.10)			
Subsistence Activities			
Fishing, Hunting, Trapping, and Berry Picking The taking of fish and wildlife and other natural resources for personal consumption, as provided by law.	Allowed	Allowed	Allowed
Collection of House Logs and Firewood Harvesting live standing timber greater than 6 inches diameter at breast height for personal or extended family use.	May be authorized	May be authorized	May be authorized
Collection of House Logs and Firewood Harvesting live trees between 3 and 6 inches diameter at breast height for personal or extended family use.	20 trees or less per year allowed; more than 20 trees per year may be authorized	20 trees or less per year allowed; more than 20 trees per year may be authorized	20 trees or less per year allowed; more than 20 trees per year may be authorized
Collection of Plant Materials Harvesting trees less than 3 inches diameter at breast height, dead standing or downed timber, grass, bark, and other plant materials used for subsistence purposes.	Allowed	Allowed	Allowed
Temporary Facilities Establishment and use of tent platforms, shelters, and other temporary facilities and equipment directly related to the taking of fish and wildlife. (See section 3.2.13.2)	Allowed	Allowed	Allowed
Subsistence Cabins – See Cabins (See also section 3.2.13.1)			
Subsistence Access – subject to reasonable regulations under provisions of section 810 of ANILCA (See section 3.2.10.1)			
Snowmobiles, Motorboats, Other Traditional Means of Surface Transportation Use of snowmobiles, motorboats, and other means of surface transportation traditionally employed for subsistence purposes.	Allowed	Allowed	Allowed

Activity	Minimal Management	Moderate Management	Intensive Management
ACCESS (See sections 3.2.11, and 3.2.12) Restrictions subject to provisions of section 1110 of ANILCA as applicable; see also Subsistence Access section in this table.			
Foot	Allowed	Allowed	Allowed
Dogs and Dog Teams	Allowed	Allowed	Allowed
Other Domestic Animals Includes horses, mules, llamas, etc.	Allowed	Allowed	Allowed
Non-motorized Boats Includes canoes, kayaks, rafts, etc.	Allowed	Allowed	Allowed
Snowmachines, Motorboats, Airplanes, Non-motorized Surface Transportation Use of snowmachines, motorboats, airplanes and non-motorized surface transportation methods for traditional activities and for travel to and from villages and homesites.	Allowed	Allowed	Allowed
Highway Vehicles	Not allowed	May be allowed on designated roads	Allowed on all-weather roads
Off-Road Vehicles (All-Terrain Vehicles) Includes air boats and air-cushion vehicles. No routes or areas will be designated on refuge lands for the use of air boats and air cushion vehicles. (See sections 3.2.10.1 and 3.2.11.2)	Not allowed; with exceptions consistent with section 3.2.11.2	May be allowed	May be allowed
Helicopters Includes all rotary-wing aircraft. (See section 3.2.11.3)	May be authorized	May be authorized	May be authorized
PUBLIC USE, RECREATION, and OUTREACH ACTIVITIES Also see ACCESS and Commercial Recreation sections.			
Hunting, Fishing, Wildlife Observation, Wildlife Photography, Interpretation, and Environmental Education Note: All activities listed are priority public uses (See sections 3.2 and 3.2.12)	Allowed	Allowed	Allowed
Trapping, Walking, Hiking, Camping at Undeveloped Sites, and Dog Sledding (See sections 3.2 and 3.2.12)	Allowed	Allowed	Allowed
General Photography See also COMMERCIAL USES. (See sections 3.2 and 3.2.12)	Allowed	Allowed	Allowed
Outreach Activities (See sections 3.1 and 3.2.14)	Allowed	Allowed	Allowed
Public Use and Recreation Facilities – level of development is consistent with management intent of the category (See section 3.2.13)			

Activity	Minimal Management	Moderate Management	Intensive Management
All Weather Roads And associated developments including bridges.	Not allowed	May be allowed	May be allowed
Unimproved Roads Note: while unimproved roads are not allowed in Minimal management, Wilderness and Wild Rivers, roads may exist. In these management categories, the roads would not be designated for use or maintained.	Not allowed	May be allowed	May be allowed
Designated Off-Road Vehicle (All-Terrain Vehicle) Trails and Routes	Not allowed	May be allowed	May be allowed
Roadside Exhibits and Waysides	Not applicable	May be allowed	May be allowed
Constructed and Maintained Airstrips	Not allowed	May be allowed	May be allowed
Cleared Landing Strips and Areas Includes unimproved areas where airplanes land. Minor brush cutting or rock removal by hand is allowed for maintenance.	May be allowed	May be allowed	May be allowed
Constructed Hiking Trails Includes bridges, boardwalks, trailheads, and related facilities.	May be allowed	May be allowed	May be allowed
Designated Hiking Routes Unimproved and unmaintained trails; may be designated by signs, cairns, and/or on maps.	Allowed	Allowed	Allowed
Boat Launches and Docks Designated sites for launching and storing watercraft or tying up a float plane.	May be allowed	May be allowed	May be allowed
Visitor Contact Facilities A variety of staffed and unstaffed facilities providing information on the refuge and its resources to the public; facilities range from visitor centers to kiosks and signs. (See section 3.2.13)	May be allowed	May be allowed	May be allowed
Campgrounds Developed sites accessible by highway vehicles.	Not applicable	May be allowed	May be allowed
Hardened Campsites Areas where people can camp that are accessible by vehicle or on foot but where the only facilities provided are for public health and safety and/or resource protection; may include gravel pads for tents, hardened trails, and/or primitive toilets. (See section 3.1)	Allowed	Allowed	Allowed
Temporary Facilities Includes tent frames, caches, and other similar or related facilities; does not include cabins. See also SUBSISTENCE, COMMERCIAL USES, and Administrative Facilities. (See section 3.2.13.2)	May be authorized	May be authorized	May be authorized
Cabins – also other related structures such as outdoor toilets, food caches, storage sheds, and fish drying racks (See section 3.2.13.1)			

Activity	Minimal Management	Moderate Management	Intensive Management
Public Use Cabin A cabin administered by the Service and available for use by the public; intended only for short-term public recreational use and occupancy.	Existing cabins allowed to remain; new cabins may be allowed	Existing cabins allowed to remain; new cabins may be allowed	Existing cabins allowed to remain; new cabins may be allowed
Administrative Cabin Any cabin primarily used by refuge staff or other authorized personnel for the administration of the refuge. (See section 3.2.17.1)	May be allowed	May be allowed	May be allowed
Subsistence Cabin Any cabin necessary for health and safety and to provide for the continuation of ongoing subsistence activities; **not** for recreational use.	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins may be authorized
Commercial Cabin Any cabin used in association with a commercial operation, including but not limited to commercial fishing activities and recreational guiding services.	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins may be authorized
Other Cabins Cabins associated with authorized uses by other government agencies.	May be authorized	May be authorized	May be authorized
Administrative Facilities (See section 3.2.17.1)			
Administrative Field Camps **Temporary** facilities used by refuge staff and other authorized personnel to support individual (generally) field projects; may include, but not limited to, tent frames and temporary/portable outhouses, shower facilities, storage/maintenance facilities, and caches.	May be allowed	May be allowed	May be allowed
Administrative Field Sites **Permanent** facilities used by refuge staff or other authorized personnel for the administration of the refuge. Includes administrative cabins and related structures (see Cabins) and larger multi-facility administrative sites necessary to support ongoing field projects, research, and other management activities. Temporary facilities, to meet short-term needs, may supplement the permanent facilities at these sites.	Use of existing sites allowed including replacement of existing facilities as necessary; new sites may be allowed	Use of existing sites allowed including replacement of existing facilities as necessary; new sites may be allowed	Use of existing sites allowed including replacement of existing facilities as necessary; new sites may be allowed

Activity	Minimal Management	Moderate Management	Intensive Management
Refuge Administrative Office Complex Facilities necessary to house refuge operations, outreach, and maintenance activities and associated infrastructure; includes staff offices, storage, maintenance, parking lots, and other similar facilities.	Not allowed	Not allowed	May be allowed
Hazardous Materials Storage Sites, including appropriate structures and equipment necessary for the storage and transfer of fuels and other hazardous materials, used for administrative purposes; must be in compliance with all Federal and State requirements.	May be allowed	May be allowed	May be allowed
Residences Residential housing for refuge staff and their families; includes single and multi-family dwellings.	Not allowed	Not allowed	May be allowed
Bunkhouses Quarters to house temporary and similar employees, volunteers, visitors, and other agency personnel.	Not allowed	May be allowed	May be allowed
Aircraft Hangars and Facilities for Storage of Aircraft	Not allowed	Not allowed	May be allowed
Boat Launches and Docks Designated sites for launching and storing watercraft or tying up a float plane.	May be allowed	May be allowed	May be allowed
Radio Repeater Sites Sites used to maintain radio communications equipment; may include helispots for access.	May be allowed	May be allowed	May be allowed
COMMERCIAL USES Except as noted, a special use permit or other authorization is required for economic use of a refuge.			
Guiding and Outfitting	May be authorized	May be authorized	May be authorized
Transporting	May be authorized	May be authorized	May be authorized
Fixed-Wing Air Taxis	May be authorized	May be authorized	May be authorized
Helicopter Air Taxis	May be authorized	May be authorized	May be authorized
Bus and Auto Tours	Not applicable	May be authorized	May be authorized
Mineral Exploration (See section 3.2.15.2) See section 3.2.18 for information on the Alaska Mineral Resource Assessment Program			
Surface Geological Studies Includes surface rock collecting and geological mapping activities (includes helicopter or fixed-wing access).	May be authorized	May be authorized	May be authorized

Activity	Minimal Management	Moderate Management	Intensive Management
Geophysical Exploration and Seismic Studies Examination of subsurface rock formations through devices that set off and record vibrations in the earth. Usually involves mechanized surface transportation, but may be helicopter supported; includes studies conducted for the Department of the Interior.	May be authorized	May be authorized	May be authorized
Core Sampling Using helicopter transported motorized drill rig to extract subsurface rock samples; does not include exploratory wells; includes sampling conducted for Department of the Interior.	May be authorized	May be authorized	May be authorized
Other Geophysical Studies Helicopter-supported gravity and magnetic surveys and other minimal impact activities that do not require mechanized surface transportation.	May be authorized	May be authorized	May be authorized
Mineral Development (see section 3.2.15.2)			
Oil and Gas Leasing Leasing, drilling, and extraction of oil and gas for commercial purposes. Includes all associated above and below ground facilities.	Not allowed	Not allowed	May be authorized
Sale of Sand, Gravel, and Other Common Variety Minerals Extraction of sand, gravel, and other saleable minerals for commercial purposes; includes commercial use by Federal, State, and local agencies.	Not allowed	Not allowed	May be authorized
Other Mineral Leasing Includes the extraction of coal, geothermal resources, potassium, sodium, phosphate, sulfur, or other leasable minerals for commercial purposes. For cases of national need, see section 3.2.15.2.	Not allowed	Not allowed	Not allowed
Mining of Hardrock Minerals Development of valid (pre-ANILCA) mining claims (lode, placer, and mill sites) on refuge lands for the purpose of extracting hardrock minerals.	Not applicable	Not applicable	Not applicable
Other Commercial Activities			
Commercial Filming, Videotaping, and Audiotaping (See section 3.2.15.6)	May be authorized	May be authorized	May be authorized
Grazing (See section 3.2.15.7)	Not allowed	Not allowed	Not allowed
Agriculture (Commercial) (See section 3.2.15.7)	Not allowed	Not allowed	Not allowed
Commercial Fishery Support Facilities At or below 1979 levels. (See section 3.2.15.3)	Not applicable	Not applicable	Not applicable

Activity	Minimal Management	Moderate Management	Intensive Management
Commercial Fishery Support Facilities Above 1979 levels. (See section 3.2.15.3)	May be authorized	May be authorized	May be authorized
Seafood Processing (See section 3.2.15.3)	Not allowed	Not allowed	Not allowed
Aquaculture and Mariculture Support Facilities (See section 3.2.15.3)	Not allowed	Not allowed	May be authorized
Commercial Timber and Firewood Harvest (See section 3.2.15.4)	May be authorized	May be authorized	May be authorized
Commercial Gathering of Other Refuge Resources (See section 3.2.15.5)	Not allowed	May be authorized	May be authorized
Transportation and Utility Systems Includes transmission lines, pipelines, telephone and electrical power lines, oil and gas pipelines, communication systems, roads, airstrips, and other necessary related facilities. Does not include facilities associated with on-refuge oil and gas development. (See section 3.2.11.7)	May be authorized; would require a plan amendment	May be authorized	May be authorized
Navigation Aids and Other Facilities Includes air and water navigation aids and related facilities; communication sites and related facilities; facilities for national defense purposes and related air/water navigation aids; and facilities for weather, climate, and fisheries research and monitoring; includes both private and government facilities. (See section 3.2.11.11)	May be authorized	May be authorized	May be authorized
Major Hydroelectric Power Development Hydroelectric dams creating a change in streamflow with an elevation change and reservoir behind the dam. (See section 3.2.15.7)	Not allowed	Not allowed	Not allowed
Small Hydroelectric Power Development Hydroelectric generation by low-head or instream structures that do not change the flow of the river. (See section 3.2.15.7)	Not Allowed	Not allowed	Not allowed

4. Refuge Resources

This chapter describes the physical, biological, social, and economic components of the ecosystem that could be affected by actions associated with management of Tetlin Refuge. This chapter is divided into six major headings: 4.1 Physical Environment; 4.2 Biological Environment; 4.3 Human Environment; 4.4 Wilderness Values; 4.5 River Values; and 4.6 Refuge Infrastructure and Administration.

4.1 Physical Environment

Encompassing about 932,000 acres in the lower Chisana and Nabesna river drainages, Tetlin Refuge lies in an upland basin at the head of the Tanana Valley. Refuge boundaries form a rough triangle: the base runs east-west between the Canadian border and the Mentasta Mountains along the boundary of the Wrangell-St. Elias National Park and Preserve; the northeast boundary parallels the Alaska Highway; and the northwest boundary borders Tetlin Native Corporation lands. The Ladue and Fortymile river basins and their tributaries lie to the north of Tetlin Refuge.

4.1.1 Land Status

Tetlin Refuge, along with several additional national parks and wildlife refuges in Alaska, were established under the Alaska National Interest Lands Conservation Act of 1980. Drawn based on major ecological features, the boundaries for these new parks and refuges incorporated many lands already owned or selected by private individuals, organizations, or the State. The following discussion provides an overview of land actions occurring both before and after 1980, which shaped the current land ownership patterns within Tetlin Refuge.

Tetlin Refuge includes a large amount of State and private property within its borders. Native corporations own or have selected approximately 16 percent of these lands, while the State of Alaska owns or has selected roughly five percent. There are also numerous Native allotments and privately owned small parcels within the Refuge. The Refuge is bordered on the northeast by the Alaska Highway, with one community, the Native village of Northway, located within the boundary. Tok and the Native villages of Tetlin and Tanacross are located outside but near the Refuge.

World War II brought enormous changes to the Alaska Territory. For the first time, Federal funds and labor (mostly from the War Department) were sent north to build roads, airports, and other facilities. At the same time, numerous land grants, withdrawals, and other land actions occurred in the vicinity of what was to become Tetlin Refuge. In 1941, the Federal government withdrew from the public domain large areas of land near Northway and along the Alaska Highway for various military and civilian purposes. In 1954, private citizens began acquiring lands for homesites and commercial activities under the Trade and Manufacturing Act. Four years later, the first homestead was approved; the following year, the State of Alaska began acquiring land in this area. In 1965, the Northway village site was officially deeded to the residents for a townsite, and two lots along the Alaska Highway were sold to private individuals. The Northway Airport was conveyed to the State of Alaska in 1966, and the first Native allotment was conveyed in 1967. Following the passage of the Alaska Native Claims Settlement Act (ANCSA) in 1971, village and regional corporations began selecting large blocks of land surrounding the village of Northway.

The passage of the Federal Land Policy and Management Act in 1976 repealed the authority for new entries under public land disposal laws. The remaining unappropriated land was retained in Federal control. Although there are still some land selections within the refuge boundary that have not been reviewed, the Bureau of Land management has processed most existing, private land claims over the last 25 years. Current land ownership patterns within the Refuge are unlikely to change substantially (Figure 4-1).

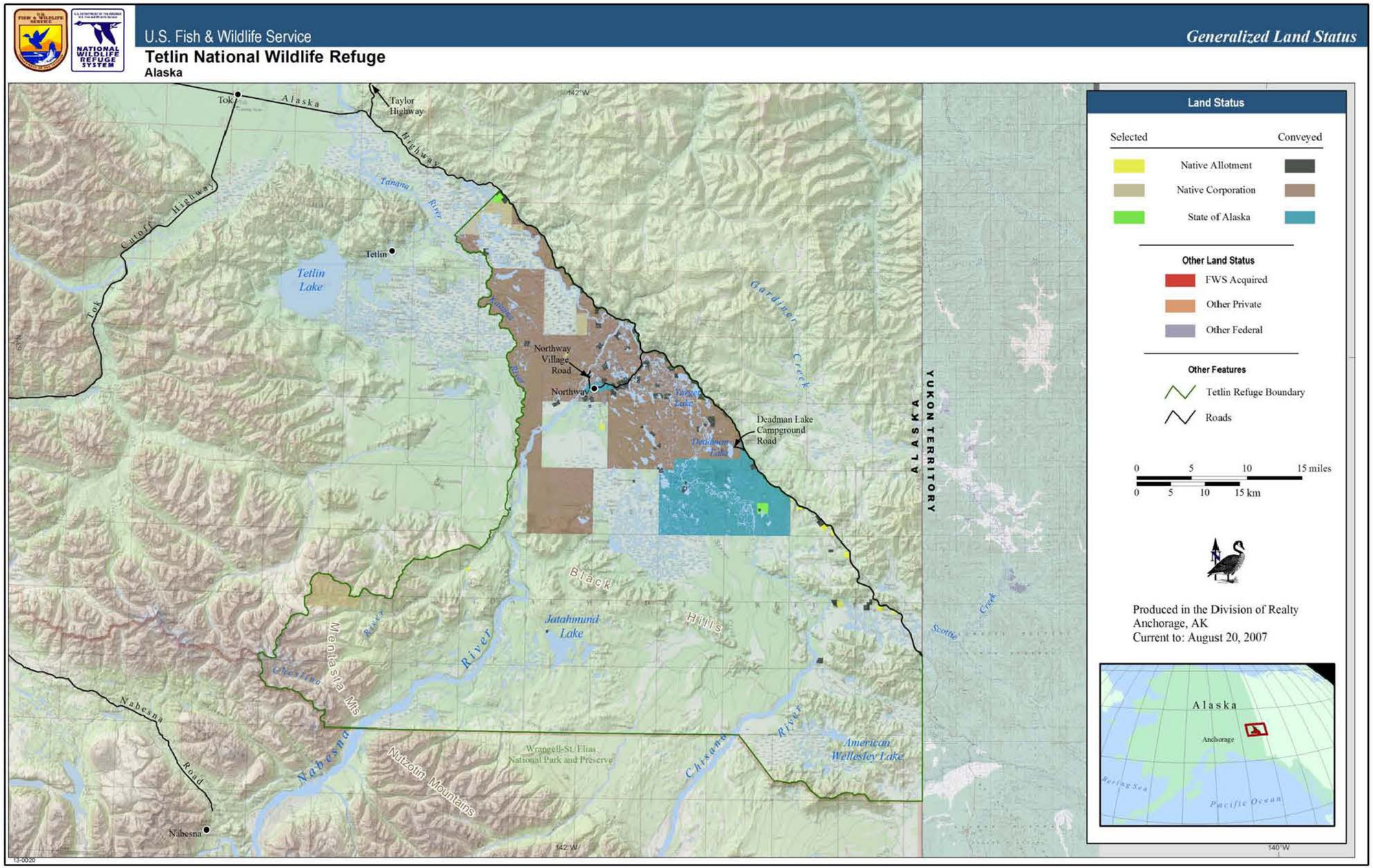
Major legislation affecting land ownership on Alaskan refuges includes the Alaska Statehood Act, the Alaska Native Claims Settlement Act as amended, the Alaska National Interest Lands Conservation Act as amended, the Submerged Lands Act of 1953, the Homestead Act of 1862, and the Native Allotment Act as amended. These acts transferred lands from Federal to State and Native ownership.

Table 4-1. Land Status of Tetlin Refuge (all acreage figures based on BLM case file records)

Land Status Surface Estate	Acres Conveyed	Acres Selected	Acres Other	Acres Total	Percent Total
Northway Natives Incorporated					
Townsite	48	0	0	48	0.0%
ANCSA Village 12(a)(1)	76,280	4,083	0	80,363	8.6%
Doyon Limited					
ANCSA Regional 12(c)	60,565	1,296	0	61,861	6.6%
Ahtna Incorporated					
ANCSA 14(h)(1)	0	186	0	186	0.0%
ANCSA 14(h)(8)	0	6,669	0	6,669	0.7%
Native Allotments	6,957	1,449	0	8,406	0.9%
Private Landowners					
Highway Lots	12	0	0	12	0.0%
Homesites	13	0	0	13	0.0%
Trade & Manufacturing	76	0	0	76	0.0%
State of Alaska	45,070	971	0	46,041	5.0%
Withdrawals					
Civilian	0	0	185	185	0.0%
Military	0	0	45	45	0.0%
Submerged Lands[1]			45,375	45,375	4.9%
Tetlin National Wildlife Refuge	0	0	682,604	682,604	73.3%
Overlapping Land Selections	0	-384	0	-384	0.0%
All Lands	189,021	14,270	728,209	931,500	100.0%

[1] This acreage figure is an estimate of all submerged lands contained within the Tetlin Refuge boundary. Using the 1/63,360 scale hydrography coverages prepared by the U.S. Geological Survey, the combined acreage of all lakes greater than 50 acres, and the Nabesna, Chisana, and Tanana rivers within the refuge boundary were calculated using ArcInfo software. Navigability, for purposes of establishing land title ownership (as defined by Federal case law criteria), determines who owns the submerged lands beneath waterbodies of Tetlin Refuge. If navigable, the State owns the submerged lands. If non-navigable, the adjacent upland owner (e.g. the United States, an individual, or a village corporation) owns the submerged lands.

Figure 4-1. General Land Status – Tetlin National Wildlife Refuge.



The land status of Tetlin Refuge changes regularly as selected lands are conveyed, exchanged, or relinquished. Table 4-1 summarizes land status within the Refuge as of September 2005. Figure 4-1 shows the ownership of uplands, wetlands, and lakes smaller than 50 acres within the Refuge. Of the approximately 930,000 acres within the refuge boundary, approximately 73 percent is owned by the Federal government. The remaining land has been selected or conveyed. Selected lands are administered by the Refuge until conveyance. Ownership of the majority of submerged lands within the external boundaries of Tetlin Refuge is unresolved. Disputed ownership of submerged lands is resolved through Federal administrative actions of the Bureau of Land Management, or through judicial rulings of Federal courts. Two current examples of disputed submerged land ownership and navigability regard the upper reaches of the Chisana and Nabesna rivers within the Refuge.

4.1.2 Climate

The continental subarctic climate of Tetlin Refuge is characterized by large seasonal temperature extremes (see Figure 4-2). Summer temperatures may be as high as 95 degrees Fahrenheit, although they usually range from 40 to 80 degrees Fahrenheit. Winter temperatures recorded at Northway are frequently the lowest in the state, dropping as low as 72 degrees below zero Fahrenheit. Winds are uncommon during these very cold and dry periods. These conditions make the Upper Tanana Valley one of the coldest inhabited places in North America.

More than half of the 9.6 inches average annual precipitation occurs during the summer, usually the result of thunderstorms. Though recent summers have been very dry, extended rainy periods do occur during some summers. Snow can occur during any month, but the Refuge is usually snow free from mid-June to mid-August. Average annual snowfall is 37 inches with total accumulations of 12 to 24 inches. Snow in the region typically has a low density, resulting in low water content.

In addition to rain, summer convective storms also produce lightning, the primary natural cause of fires within and around the Refuge. Surface moisture and differential heating due to topography and vegetation are contributors to convective activity (Dissing and Verbyla 2004). South of the Refuge, the Nutzotin Mountains are too high to produce much lightning. The broad flat topography that characterizes most of the Refuge produces a much greater density of lightning strikes than the high country to the south but significantly fewer strikes than the more mountainous terrain of the Fortymile and Ladue river basins to the north (Butteri 2004).

It is widely accepted by the scientific community that the earth, which has always experienced climate variation, is now undergoing a period of rapid climate change that is enhanced by anthropogenic atmospheric carbon enrichment during the past 100 years (Inkley et al. 2004). Historical trends and projections of declining snow cover during this century portend changes in boreal and alpine ecosystems. If air temperatures increase at projected rates, alpine snow cover will likely recede (IPCC 1996). Even small amounts of warming may eliminate some wetland plant and animal species in alpine regions (Burkett and Kusler 2000). Interactions and changes in forest dynamics due to disease and insects are also very likely in areas where warming is greater (Inkley et al. 2004).

Such climate change has the potential to affect fish, wildlife, and plants throughout North America—either directly or indirectly through responses to changing habitat conditions. The geographic ranges of North American flora and fauna are expected to shift upwards in elevation and

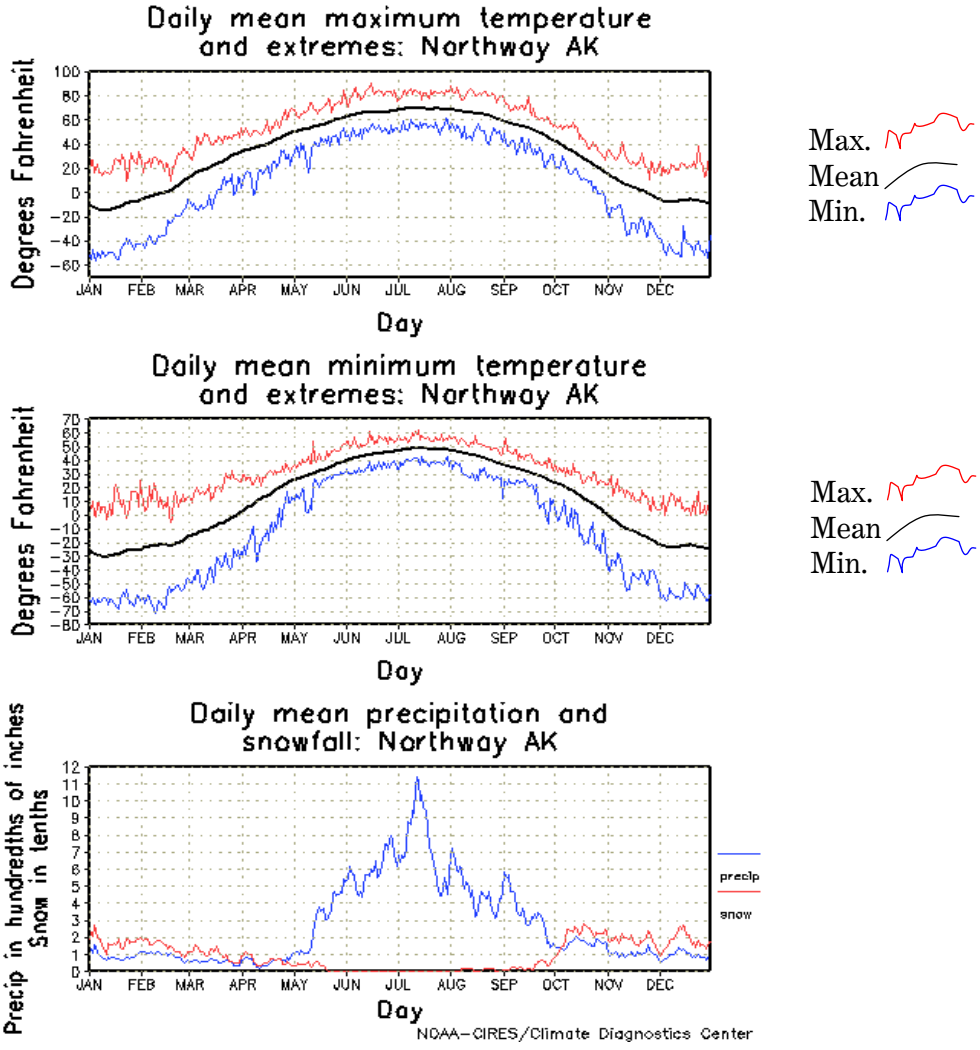
northward over the next 100 years (IPCC 2002). Although the response will be diverse, such shifts could cause significant restructuring of existing plant and animal communities (Inkley et al. 2004).

4.1.3 Topography

Elevation across the Refuge averages 1,800 feet, ranging from 1,650 feet at the Tanana River to 8,000 feet along the crest of the Mentasta Mountains. The Nabesna, Chisana, and Tanana rivers, their tributaries, and associated sloughs and wetlands characterize the topography in Tetlin Refuge.

The Black Hills provide some relief between the Nabesna and Chisana rivers. East of the Chisana River at the southeast end of the Refuge, the high ground from Airs Hill to Wellesley Mountain constitutes a segment of the divide between the Tanana and White river basins. Northeast of the Black Hills, the broad floor of the Tanana Valley is dotted with numerous lakes, ponds, and meander scars on a nearly flat plain at most 15 miles wide. Superimposed on this plain are large, vegetated, windblown dunes of glacial flour. The largest concentration of dunes are southeast of Northway and in the area of Big John Hill.

Figure 4-2. Climate information at Northway, Alaska



4.1.4 Geology

Alaska is geologically a mosaic of sutured land masses that geologists refer to as "terranes." The oldest terrane on the Refuge, the Yukon-Tanana, is also the oldest part of Alaska, or the first to be added to the margin of ancient North America perhaps 180 to 200 million years ago (Jones et al. 1982). The Yukon-Tanana is distinctive in that it is one of the few terranes made of rock originally formed as continental rock. The youngest terrane is Wrangellia; it collided with what was then the continental margin about 90 million years ago.

The rocks that make up these various terranes vary depending upon their initial formation. Most terranes associated with the Refuge contain granitic bedrock, conglomerates, coarse sandstone, lava flows, and igneous intrusions (USFWS 1987a).

Two major "strike-slip" fault systems are associated with these terranes, and earthquake activity is frequent. The Denali and Totschunda fault systems extend northwest to southeast across the southwest corner of the Refuge. Along the Denali fault, earthquakes of up to 7.9 on the Richter scale have occurred as recently as November 2003 in the Northway and Mentasta Lake areas.

4.1.5 Glaciation

Formed by glacial processes, the large and flat Northway basin of the Upper Tanana Valley is filled with sediments deposited in moraines and outwash plains. These Quaternary age (0–2 million years before present [B.P.]) unconsolidated glacial, glaciofluvial, and fluvial deposits of silt, sand, and gravel several hundred feet thick cover nearly all the Refuge (Bascle et al. 1988). They were carried directly by huge glaciers from the massive ice cap covering the Wrangell Mountains, whose maximum extent once ranged as far north as the Black Hills, or indirectly by their meltwater streams and waterbodies. Quaternary deposition within the Refuge began during two major Pleistocene glacial periods: the Black Hills glaciation of Illinoian age, and the more recent Jatahmund Lake glaciation of Wisconsinan age. The Mesozoic sediments (slate, graywacke and conglomerate) that form the Mentasta and Nutzotin Mountains of the Alaska Range were also covered in ice with only the highest peaks protruding at the time of maximum glaciation (Moffit et al. 1910). The resulting landscape is dominated by lakes, ponds, wetlands, streams, and the braided, glacier-fed Nabesna and Chisana rivers. Several small receding remnant glaciers remain in the southwest corner of the Refuge on high peaks at the head of the Cheslina River drainage.

Eolian deposits of sand and silt (loess) carried by winds off the glaciers formed dunes now found along much of the Alaska Highway corridor in roughly parallel waves, which stabilized from late Wisconsinan and post-glacial times (12,400–6,200 years B.P.).

4.1.6 Mineral Occurrences

Few igneous rocks (the primary source of metallic minerals) have been found within Tetlin Refuge, indicating little or no potential for valuable mineral deposits in most areas. Large portions of the Upper Tanana Valley have been investigated for mineral potential (Richter et al. 1975b). These investigations indicate deposits of valuable minerals, such as precious metals, are located primarily to the north and south of the Refuge.

An area from the Black Hills to Mirror Creek contains undivided sedimentary and mafic volcanic rock, possibly favorable for copper, zinc, silver, or gold deposits (Anderson 1982). Other igneous intrusions are on the west side of the Refuge near Fern Lake and are the probable source of Cheslina River placer gold deposits reported by Moffit (1954).

Stream sediments contain anomalous amounts of gold in streams west of Jatahmund Lake and in a northern tributary of the Nabesna River. These anomalies indicate the existence of upstream sources that may contain concentrated metal, although no such sources have been identified to date. Stream sediments south of the Black Hills, from Mirror Creek to Stuver Creek, are anomalously high in chromium and nickel. Magnetic anomalies in the area between Mirror Creek and Takomahto Lake are a possible sign of above-average nickel and chromium content. Although this area is mostly covered by surficial deposits, an outcropping rich in iron and magnesium is located south of Mirror Creek, with an isolated fragment of massive chromite (chrome oxide) nearby (Richter et al. 1975a).

4.1.7 Soils and Permafrost

The soils of Tetlin Refuge are dominated by fine-grained silts and clays mixed with pockets of sand, gravel, and organic deposits. Drainage through these soils is generally poor, resulting in discontinuous layers of permafrost at or near the surface. The extensive stands of black spruce that cover shallow permafrost areas are a good indicator of its presence. Black spruce stands are punctuated by white spruce, balsam poplar, and aspen on the south and west facing slopes of hills and along the fringes of larger waterbodies where a combination of more soil warmth and/or better soil drainage reduce or eliminate surface permafrost.

Historical trends and projections of declining snow cover during this century predict many changes in boreal and alpine ecosystems. For example, duration and depth of snow cover are key variables in determining the hydrology of alpine wetlands (Inkley et al. 2004). Tetlin Refuge is in a zone of discontinuous permafrost, although frozen areas outnumber unfrozen areas. Permafrost influences plant growth because it impedes the downward penetration of roots, keeps the active soil layer cool, and inhibits water percolation. The active layer (the layer of soil that freezes and thaws each year) insulates permafrost. As permafrost thaws in alpine areas and Arctic regions, changes in groundwater mobility and increased slumping and flooding may occur, converting forests to grasslands and bogs (Parson 2001). Permafrost thawing affects the groundwater table as well, and is a significant factor in lake drying. Presence or absence of permafrost is probably the most important threshold regulating the structure and functioning of Alaska's boreal forest (Chapin 2004).

4.1.8 Nutrients and Nutrient Cycling

In the absence of any major disturbance (such as fire or flooding), boreal forest communities tend to accumulate large amounts of nutrients in plant tissue and other organic matter. In the cold Arctic climate, the process of decomposition is very slow in comparison with other temperate forest communities; and as forest succession progresses, these processes are slowed further. Where permafrost is present, many nutrients are tied up in frozen organic layers and are unavailable to plants (Heilman 1966; Heilman 1968). The formation of permafrost prevents root penetration and water movement, which removes or leaches soil nutrients and effectively locks up many nutrients for decades or centuries. As shrub and deciduous trees are replaced by white and black spruce, nutrients available for grazers (such as moose) in the form of willow and alder decline and are instead concentrated into large trees and thick organic layers of feather mosses and lichens. The cooling of this organic matter from a dense overstory of mature spruce further reduces the microbial and insect activity that tends to break down dead and decaying plant matter.

4.1.9 Water Resources

Approximately five percent of Tetlin Refuge is covered in water—including rivers, streams, lakes, and ponds. Flooding is a natural disturbance process that helps to maintain habitat complexity and recharge lake and riparian nutrients. Flooding occurs after ice breakup during spring runoff in the non-glacial streams. Ice jams commonly block rivers already swollen by snowmelt runoff. Although the flood waters quickly recede, vegetation patterns, water quality, and drainage patterns may be altered over large portions of the Refuge, affecting habitat availability and quality for many fish and wildlife species. This annual flooding is responsible for creating and maintaining the diverse habitats that support the rich wildlife community of this Refuge.

4.1.9.1 Rivers and Streams

Tetlin Refuge is drained by the Nabesna and Chisana rivers. Both rivers originate from glaciers in the Wrangell Mountains within the Wrangell-St. Elias National Park and Preserve, south of the Refuge. They braid and meander north to their confluence near Northway Village, where they form the Tanana River. The Kalutna River, a tributary of the Tanana River, forms a portion of the Refuge's western boundary. Watersheds on Tetlin Refuge are poorly defined, as the land between major rivers has very low relief (Lyons 2002).

Discharge from the glacial Nabesna and Chisana rivers begins to increase in late April or May due to melting snowpack. By the time the snow is gone, the glaciers begin to melt and the discharge continues to increase. The peak in the annual discharge normally occurs in late July to early August, with variations each day as the headwater glaciers thaw each day and freeze each night. By late August to early September, the discharge steadily decreases to winter low flow conditions.

For example, based on 23 years of gage measurements for the Chisana River, the average discharge ranged from a winter low of about 800 cubic feet per second to a summer high of about 6,400 cubic feet per second. The greatest discharge recorded was 12,000 cubic feet per second on June 28, 1964.

The Chisana River is approximately 110 miles long and drains 3,300 square miles. Important tributaries of the Chisana include Stuver and Mirror creeks, which drain the southern plateau; Scottie and Desper creeks, which flow from the Tanana Uplands northeast of the Refuge; and Gardiner Creek, which originates in the Tanana Uplands north of the Refuge.

The Nabesna River is approximately 75 miles long and drains 2,100 square miles. Important tributaries of the Nabesna include the Cheslina River, which flows down the only high mountain-enclosed valley on the Refuge, and Lick Creek, which drains a portion of the Nutzotin Mountains.

Non-glacial streams are smaller and originate in the foothills that lie both north and south of Tetlin Refuge. In general, the discharge increases rapidly in May with the melting snowpack, peaking by early June, and then returning to a medium to low flow. Sharp spikes in the discharge may be expected during the summer in response to thunderstorms.

4.1.9.2 Lakes, Ponds, and Wetlands

Lakes and ponds range in size from less than an acre to nearly 3,000 acres. The northern portion of Tetlin Refuge is almost entirely occupied by wetlands. Smaller wetlands can be found near the eastern boundary along Scottie and Desper creeks, Mirror Creek, and American Wellesley Lakes. On the southern plateau, there are also small concentrations of ponds around Jatahmund Lake

and Pickerel Lake. Fish and wildlife productivity is greatest in the lowland complexes of ponds, marshes, and streams in the northern portion of the Refuge.

4.1.9.3 Surface Water Quality

Both the Chisana and Nabesna rivers carry large loads of suspended solids that are deposited in the lowlands. Normal summer sediment concentrations from streams draining the Wrangell Mountains range from 500 to 2,000 milligrams per liter (USFWS 1987a). Most river waters contain only natural minerals in moderate amounts, but certain water quality samples taken within the Refuge have exceeded Alaska water quality criteria for protection of aquatic life. This is not entirely unexpected, as the Refuge contains highly mineralized soils that contribute to elevated background mineral concentrations in stream water. Water quality parameters can be very different for highly turbid waters of glacial rivers such as the Nabesna and Chisana rivers. The Chisana and Nabesna rivers have fairly hard water, normal pH, and relatively high levels of calcium and magnesium (USFWS 1987a). One lake in the northwest corner of the Refuge has been documented with an iron content above recommended State drinking water standards (0.71 milligrams per liter).

There are no documented long-term water quality problems associated with placer mining in the Cheslina River, Nabesna River, and Scottie Creek drainages upstream from the Refuge. However, accurate and detailed assessments of water quality for these streams have not been completed. There is little known pollution entering the Refuge, and past incidents such as fuel spills adjacent to the Refuge have not been shown to have any negative effects on refuge resources.

4.1.10 Fire Regime of the Upper Tanana Valley

At a regional scale, the occurrence, frequency, size, season of occurrence, distribution, intensity, and severity of fire in the upper Tanana Valley remain much as they have for several thousand years. The most significant changes to this natural fire regime are confined to road corridors and areas surrounding local communities.

4.1.10.1 Fire Occurrence and Frequency

There is evidence of wildland fire through most of the upper Tanana Valley below 2,500 feet in elevation. Though reliable records have only been kept since the 1950s, fire has played a major role in influencing both distribution and diversity of habitats in the upper Tanana. Until the 1940s, nearly all fire occurrences were the result of lightning, although there is evidence that local Athabascan residents used wildfire for various purposes. From 1956 through 2006, 66 percent of the 1,100 fires in the Tok Area fire management zone were human-caused (see Figure 4-3).

4.1.10.2 Fire Size

Although lightning is responsible for only 33 percent of 1956–2006 ignitions in the Upper Tanana Valley, lightning fires account for nearly 90 percent of the total number of acres burned over that same period (Figure 4-4). Human-caused fires are most prevalent in populated areas where values at risk often require aggressive suppression efforts. Most human-caused fires are initially attacked and suppressed at a small size, whereas many remote lightning fires are allowed to burn until they go out naturally. In the absence of active suppression, the final sizes of Upper Tanana Valley fires are determined by a variety of factors. The later in the season a fire starts, the less time it has to spread. Weather is important not only on ignition day but over the duration of the

fire. Fires can hold over during long periods of moist weather and become active again after a drying period. High winds can cause a fire to quickly grow. Fuel continuity also determines whether a fire can continue to grow. Waterbodies and rocky areas are firm barriers that can only be breached by spotting. Hardwood stands, wet areas, and old burns may also serve as barriers;

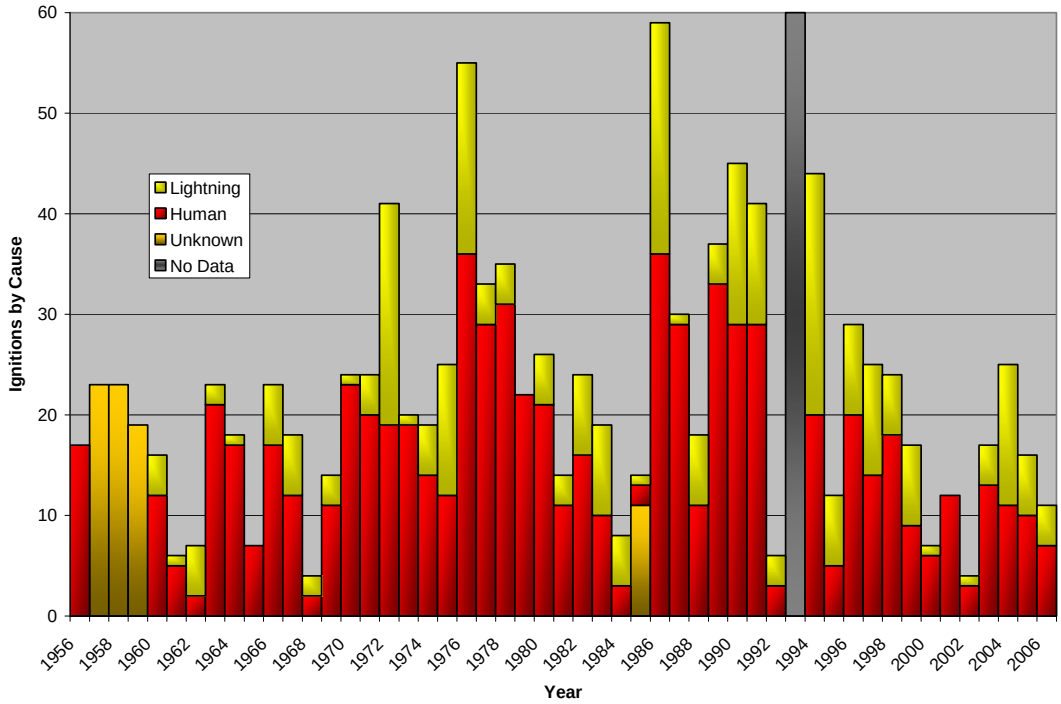


Figure 4-3. Tok area fires by cause 1956–2006

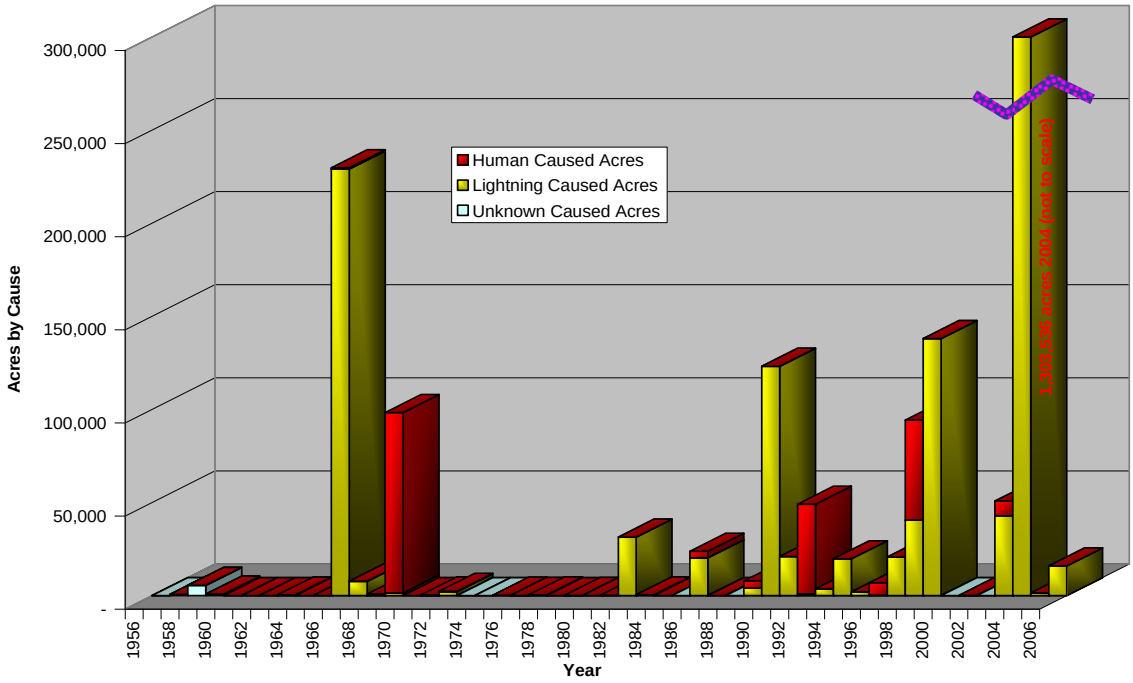


Figure 4-4. Tok area burned acres by cause 1956–2006

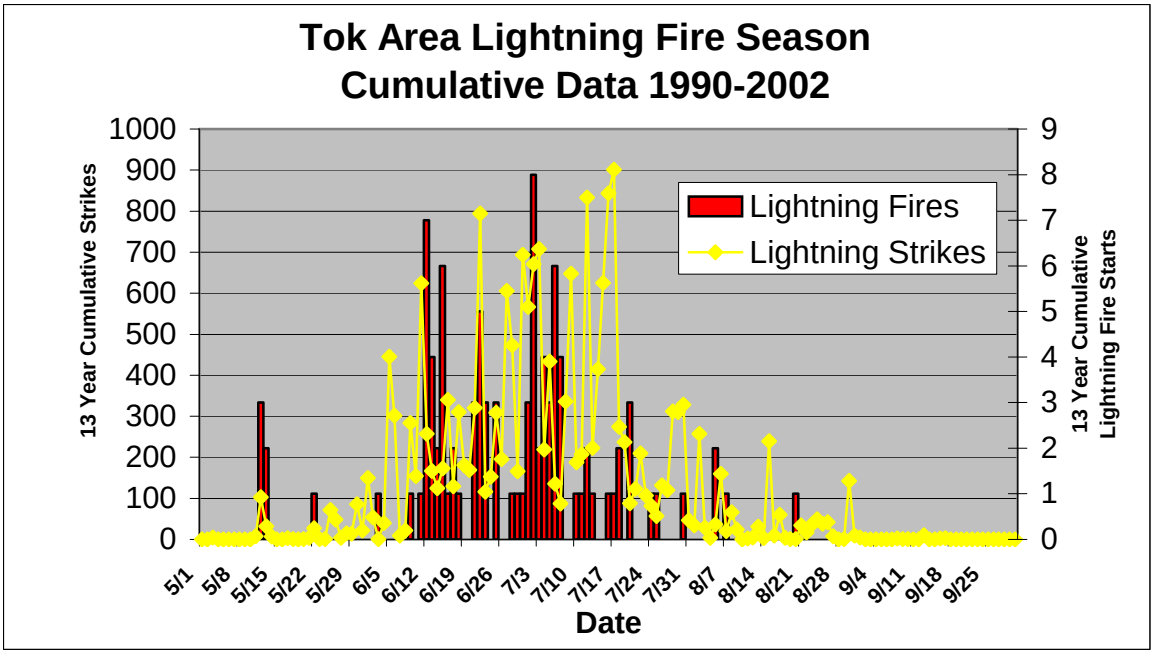


Figure 4-5. Tok area lightning fire season, cumulative data 1990–2002

reduced fuels within these areas will usually limit fire behavior and slow spread. Consequently, some fires may burn only a few square feet, while others that continue throughout a summer burn thousands or even hundreds of thousands of acres. From 1956 through 2006, a total of 1,172 Tok Area fires burned 2,263,956 acres. Just 16 fires accounted for over two million of these acres; and in 2004 alone, three million Tok Area acres burned.

Record temperatures and drought conditions in 2004 allowed six lightning-caused fires in the Upper Tanana Valley and adjacent Fortymile River Valley to burn over 1.7 million acres—more area than all fires in the previous 45 years combined. The 42,600-acre Black Hills fire in 2003 accounted for more than 40 percent of all acreage burned by wildfire within the Refuge over the past 18 years. It was the largest single wildfire in the Refuge's 25 year history.

4.1.10.3 Fire Season

Fire season in the Upper Tanana Valley is highly variable (Figure 4-5). In some years, it begins as soon as the snow has melted in early to mid-May. Typically, these early fires are human caused, though lightning-caused fires may also occur. Because of the low moisture content in local snow, the severity of this early season is more dependent on spring breakup conditions than it is on the amount of overwinter precipitation. Rapid thawing allows moisture to percolate downward, leaving surface fuels dry, while a slow breakup impedes drying by holding moisture close to the surface above frozen layers. Early season fires tend not to burn deeply but may burn intensely and spread quickly across the surface.

As green-up progresses and live fuel moistures rise during late May and early June, fires become less frequent for a time. As days lengthen further, increased differential heating becomes more conducive to convective activity and causes surface fuels to dry in the absence of significant rain. This effect peaks from mid-June to mid-July and is the basis for the main upper Tanana lightning

fire season. This period coincides with increased human presence in the wildlands and the majority of human-caused fires. The most active fire years are often characterized by large, stable high-pressure systems over the interior, which results in prolonged periods of hot, dry weather and more frequent low-precipitation thunderstorms. Other years are characterized by a series of low-pressure systems that sweep across the valley and bring widespread rain.

By mid-July, thunderstorm activity begins to lessen due to shorter days and less intense sunlight. Fuels can remain dry, allowing ongoing fires to continue burning; however, new ignitions occur less often. Typically, large high-pressure systems give way to systemic moisture sometime in August. Without moisture, a late season can extend into September, usually relying on careless hunters for ignition sources. Although fires can burn into October if snowfall is delayed, rarely do they spread significantly.

4.1.10.4 Fire Return Interval

In spite of the difficulties in determining fire return intervals in Alaska, several researchers have estimated the length of the fire cycle in interior Alaska. In forests dominated by black spruce, fires typically occur every 50 to 100 years (Heinselman 1983, Rowe et al.1974, Viereck 1983). In wetter lowland bog areas and muskeg, conditions must be dryer and more extreme for large sustained fires. Typically these areas burn every 100–150 years (Heinselman 1981). The frequency of wildfire in white spruce or mixed white spruce/hardwood forest varies considerably (50–300 years) depending upon local climate and topography, but fires generally occur less frequently than in black spruce forests (Duchesne and Hawkes 2000, Rowe et al. 1974).

4.2 Biological Environment

4.2.1 The Boreal Forest Ecosystem

The presence of people predates the modern-day boreal forest in Alaska, which has evolved over approximately the past 6,000–9,000 years. Chapin (2004) provides the following overview of the boreal forest. It is the second most extensive terrestrial biome on earth (Whittaker 1975) and has many characteristics that set it apart from other ecosystems. It has a cold, dry climate, making it potentially sensitive to climate change. It has few dominant tree species, so changes in these tree species have large ecosystem impacts. It is relatively undisturbed by current human activities. Productivity and diversity is low relative to other forests (Grower et al. 1997, Waide et al. 1999), but boreal forests contain undecomposed carbon in quantities roughly equal to that found in the atmosphere (Chapin et al. 2006).

A defining characteristic of the boreal forest ecosystem is the cycle of wildfire and its influence on the distribution, abundance, and connectivity of various plant community types and habitats. Because of this significant relationship, the boreal forest is often referred to as a "fire dependent" ecosystem—meaning if fire were entirely removed, there would be a dramatic and permanent change in the vegetation, fish, wildlife, and habitats which now exist.

4.2.2 Vegetation

Vegetation communities found on the Refuge range from closed black spruce forests to alpine tundra and shrublands. Most of the communities are interspersed with wetlands. The southern half of Tetlin Refuge is primarily forested uplands, while the northern half consists of a low floodplain, including large areas of muskeg. Within Tetlin Refuge, forest cover types dominate at

elevations below tree line (3,200 feet). Open (25–60 percent tree cover) stands of black spruce are particularly common in low-relief, wet terrain. White spruce, sometimes growing with paper birch and aspen, can be found in better drained and warmer sites. Paper birch, willow, and aspen may dominate following fire, especially on southern exposures.

Willow, arctic dwarf birch, lowbush cranberry, cottongrass, and Labrador tea are common on most sites. Feathermoss covers the ground in well-drained sites and forests. Poorly-drained wetlands consist primarily of tussocks of cottongrass and sedges. Above tree line, arctic dwarf birch, willow, lowbush cranberry, crowberry, and white mountain avens dominate.

The vegetation of Tetlin Refuge and the surrounding area was mapped at the 1:250,000 scale, using Landsat satellite imagery. The Landsat photo, taken in September 1977, was interpreted at the U.S. Geological Survey EROS field office in Anchorage by interactive digital manipulation (Talbot et al. 1984, USFWS 1987a). Five major vegetation cover classes were distinguished during this process (Talbot et al. 1984, USFWS 1987a).

1. Forest (65 percent of refuge landcover): These forested areas are characterized by trees 16 feet tall or taller, or in the intermediate successional stage less than 16 feet tall but growing. Depending upon soils and topography, climax forest communities are dominated by an overstory of either black or white spruce.

The majority of forest on the Refuge is dominated by black spruce, which is found in cooler wet lowland sites and north-facing slopes. A carpet of feather mosses and lichens is very common as a primary component of the understory. Graminoid tussocks, various shrub willow species and ericaceous shrubs such as blueberry, crowberry, leatherleaf, and labrador tea may also be present. Sphagnum moss may be present on moister sites.

White spruce forests are more commonly found on warmer well-drained sites such as alluvial deposits. On lowland sites, paper birch and balsam poplar may be components of the overstory, with quaking aspen as a component on upland sites. The understory may include tall shrub willow, alder, prickly rose, and a shallow carpet of feather mosses.

Mid-successional stage forest communities are dominated by broadleaf hardwood species (quaking aspen, balsam poplar, and paper birch) or mixed stands of spruce and hardwood species. Aspen species are well adapted to regeneration following fires and will quickly recolonize an area from suckers on their extensive root system, which is well insulated from the heat of most fires by the surface layer of organic matter and soil. Both aspen and paper birch can also regenerate from their root collars where the roots spread out from the base of the stem (Duchesne and Hawkes 2000). The ability of the tree to regenerate depends upon fire intensity and severity.

2. Deciduous Scrub (5 percent of refuge landcover): Sites of this vegetation class are composed predominantly of deciduous shrubs ranging from 1.5 to 16 feet in height. On the Refuge, scrub occurs primarily along water courses, in poorly drained sites, in alpine and subalpine zones, and as early successional stage plant communities in disturbed or burned areas. Scrub stands on well-drained sites are typically dominated by willow and alder, which are important forage species for animals such as moose and snowshoe hare. Shrubs quickly revegetate burned areas and provide important forage and habitat for wildlife, and nutrients, such as nitrogen, which all plants need to grow. Browsing by moose and snowshoe hares, combined with nitrogen added by symbiotic bacteria, help the forest progress to the next stage of succession (Chapin 2000).

3. Dwarf Scrub (21 percent of refuge landcover): Sites in this vegetation class contain slow-growing dwarf shrubs less than 1.5 feet tall, chiefly in the heath and crowberry families. An abundance of mosses and lichens grow among the dwarf shrubs. Dwarf shrub-graminoid tussock peatland covers much of Tetlin Refuge.

4. Herbaceous Vegetation (3 percent of refuge landcover): This includes graminoid marshes, which are wetlands periodically inundated with standing or slowly moving water, found along lake shores and in alluvial sites. There is also the aquatic forb subclass, which consists of freshwater communities of rooted aquatic plants structurally supported by water.

5. Sparsely Vegetated Areas (3 percent of refuge landcover): In this class, plants are scattered or absent, and bare mineral soil or rock dominates the landscape.

Several inventories have documented a variety of plants occurring on Tetlin Refuge, including surveys of lichens and bryophytes (Schofield and Talbot 2001, Talbot et al. 2007). The Refuge also maintains a herbarium and associated database.

4.2.2.1 Invasive Non-native Plant Species

Invasive non-native plant species pose a significant risk to ecological stability and integrity. Species observed along the highway corridor include: common yarrow, common plantain, smooth brome, narrowleaf hawksbeard, alsike clover, white sweetclover, and yellow sweetclover. White sweetclover is the most widespread and is often found along the highway in contiguous stands 75 to 150 feet long. There is concern that sweetclover could invade riparian corridors on the Refuge. The establishment of more noxious weeds is also a concern; Russian and spotted knapweed have already been reported in the Yukon and other parts of Alaska.

4.2.3 Boreal Forest Succession and Habitat Mosaics

As shown in Figure 4-6 (Chapin 2004), the relationship of soil moisture and soil temperature greatly influence forest succession and are significant factors influencing climax boreal forest communities. On the wettest and coolest soils, climax forests are characterized by black spruce with an herb seral stage in secondary succession. At the opposite end of the spectrum, in the driest and warmest soils, climax forests are characterized by aspen, also with an herb seral stage. In between these extremes are more complex secondary succession processes with climax overstories of white or black spruce, and seral stages of herb communities followed by aspen or birch, depending upon soil moisture and temperature. These succession cycles tend to remain relatively constant. However, changes in environment, disturbance regime, or post-disturbance seed availability can shift a stand to a new successional trajectory (Chapin et al. 2006).

Foote (1983) identifies six seral stages of secondary succession in white and black spruce forests following fire disturbance: newly burned, moss-herb, tall shrub-sapling, dense tree, hardwood or mixed hardwood-spruce, and spruce. Essentially, if forest succession on both white and black spruce sites is broken into these six seral stages, there is a potential for 12 different forest communities to occur across the landscape at any given time. When combined with other landcover types, such as tundra, wetlands, and lakes, the potential for a diverse mosaic becomes readily apparent.

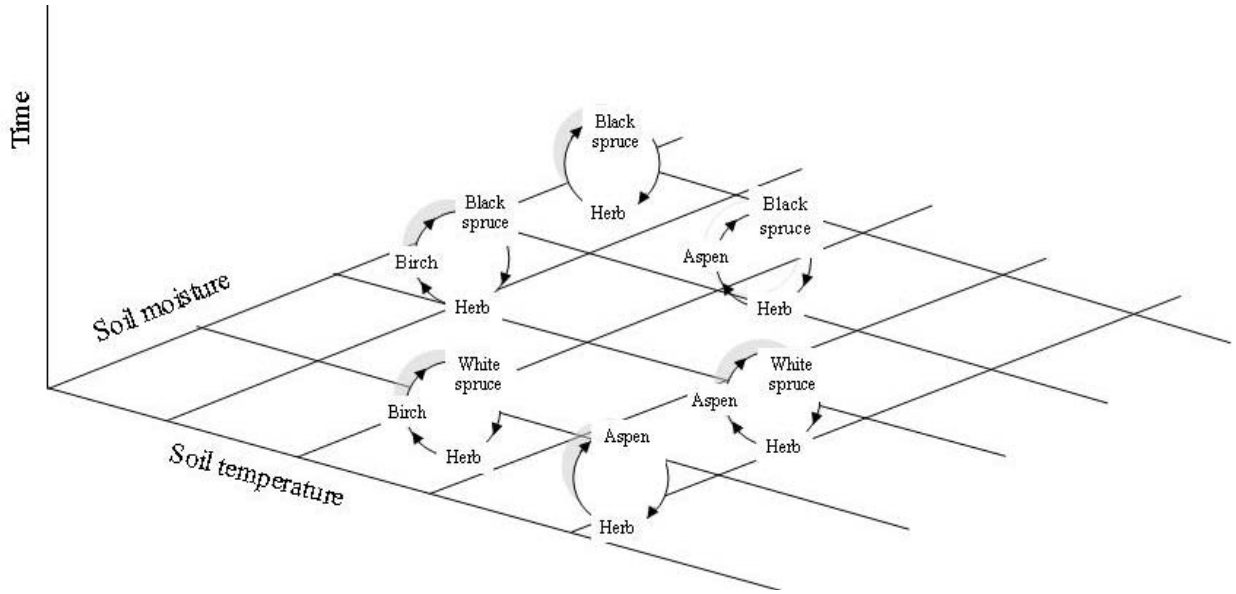


Figure 4-6. Successional trajectories in interior Alaska along soil temperature and moisture gradients (Chapin 2004)

4.2.4 Fire Severity

4.2.4.1 Fire Severity–Black and White Spruce Forests

Fires in the boreal black spruce and white spruce ecosystems are large and frequent due to the dry continental climate, the flammable nature of the forest, and the continuity of fuels extending from ground level to the forest crown (Heinselman 1981, Viereck 1983). Feathermoss understories typical of the type also form large, horizontally continuous, and well-aerated fuelbeds. Most fires in black spruce forests are either severe ground fires or crown fires of sufficient intensity to damage or kill both the overstory of spruce and the entire understory vegetation (Duchesne and Hawkes 2000). However, these fires do not burn with consistent intensity or severity over these large areas, and often a patchwork of unburned, lightly burned, and moderately burned areas is created with a very irregular line of burned and unburned vegetation along the fire perimeter (TNWR 2001). Spruce fires can smolder deep in the duff and hold over through long periods of high relative humidities and moderate rainfall.

4.2.4.2 Fire Severity–Hardwood and Mixed Spruce/Hardwood Forests

While not as significant in terms of acreage, this forest type plays an important role in terms of wildlife habitat and wildfire behavior.

The shading overstory and deciduous leaf litter of hardwood and mixed forests create moist, cool conditions and compact litter layers with less available fuel than is found in spruce forests. Fire fuels in these hardwood and mixed hardwood forests typically do not form a continuous ladder from the ground to the tree crowns, usually resulting in surface fires. Because of these forest characteristics, hardwood stands often serve as natural fuel breaks where fires typically smolder in the forest understory and spread slowly.

4.2.4.3 Fire Severity–Shrublands and Sedge Tussock-mixed Shrub Tundra

Next to spruce forest, this is the most common vegetation type found on the Tetlin Refuge. It is characterized by light flashy fuels whose moisture content responds quickly to modest changes in relative humidity. These fires tend to burn quickly and intensely, skipping over and around standing water between the tussocks and pockets of sphagnum moss. Wind contributes to high rates of spread and short- to medium-range spotting. With a little moisture, these fires go out quickly; they do not hold over for long. Moderately intense fires may kill the above-ground plant parts, but seldom burn the below-ground parts or kill the plant (Bliss and Wein 1972, Van Wagner 1983, Viereck and Schandelmeier 1980). In dryer conditions, fires in these shrublands and tussocks may have high rates of spread and intensity (TNWR 2001), which can easily carry the fire into adjacent spruce forests.

4.2.5 Amphibians

Of the six species of amphibians known to occur in Alaska, only the wood frog occurs on Tetlin Refuge. Increased sightings of malformed frogs throughout North America raised concerns about possible exposure to environmental contaminants. The U.S. Fish and Wildlife Service began investigating the prevalence of abnormal amphibians in 2000 on refuges across the United States (Trust and Tangermann 2002); work within Tetlin Refuge began in 2003. Preliminary results found most sites at Tetlin have had more than three percent abnormal frogs (Reeves and Trust 2006). Abnormalities include malformations, such as shrunken limbs and abnormal eyes. Except for one site sampled in 2005, only developed sites have been assessed at Tetlin. The abnormalities at Tetlin are similar in nature and number to abnormalities at Kenai, and the prevalences are as high as or higher than documented in most published studies of North American wild frogs.

4.2.6 Fish

Fourteen species of fish occur on the Tetlin Refuge (appendix C). Although salmon occur in the Tanana River drainage, they are not abundant in the Refuge and are not targeted in the local fishery. Local subsistence users report that chum salmon were once caught in large numbers in refuge waters, but they are only occasionally harvested now. Only incidental catches of chinook salmon are reported from the Chisana River (USFWS 1990).

Three species of whitefish are known to occur in the Refuge: humpback whitefish, round whitefish, and least cisco. An historic and traditional whitefish subsistence fishery is located in the Northway and Fish Lake area, and another is located at the mouth of Scottie Creek. Whitefish continue to be an important food of the local communities, and humpback whitefish is the primary subsistence fishery within the Refuge. However, local residents have expressed concerns about possible population declines and decreased size of whitefish.

A telemetry study of adult humpback whitefish was initiated in 2000 (Brown 2006) to confirm species identification and obtain some baseline information needed to guide future research and management of the subsistence whitefish fishery. This study found that humpback whitefish in the Upper Tanana River basin exhibit distinct migratory movements and consistently return to the same areas year after year during their migrations. In spring and early summer, adult fish can be found feeding in various lakes throughout the valley. By late summer, they have dispersed downstream from these lakes into the Tanana River and its major tributaries. As fall approaches, these same fish move upstream to congregate in discreet sections of the Nabesna and Chisana rivers to spawn. Once spawning is complete, they return downstream to overwinter, primarily in

the Tanana and Chisana rivers. During the study, adult humpback whitefish were captured in four different locations spanning approximately 70 miles of the Tanana River but were shown to spawn in only two small spawning areas (10 to 12 miles long) within the Refuge on the Nabesna and Chisana rivers (Brown 2003).

Burbot are also an important fish resource within the Tetlin Refuge to subsistence and sport harvests. A 1983 telemetry study demonstrated that most of the 21 burbot captured remained within the Tanana, Nabesna, and Chisana rivers throughout the year, including upstream movements between November and March. The proximity of individual fish during winter suggested a potential spawning area (Bresser et al. 1988). Burbot have also been found in both Jatahmund and American Wellesley lakes.

Northern pike are widely distributed in lakes and streams throughout the Refuge and are an important component of both subsistence and sport harvests. Many local people ice fish for burbot and pike during late winter. Pike are a major predator of fish, frogs, and ducklings, and may even take small mammals (Morrow 1980).

Arctic grayling are widely distributed in clear streams within the Refuge and are important to subsistence and recreational harvests. The longnose sucker is also found in most streams on the Refuge and is an important forage species for other fish. Longnose suckers spawn in refuge streams in early spring, and large concentrations of fry commonly occur during the summer. Lake chub and slimy sculpin are also important forage species found within Tetlin Refuge, but little is known about these widely distributed populations.

Other species found on the Refuge that are important to the recreational harvest are lake and rainbow trout. Lake trout inhabit Jatahmund and Wellesley lakes and may occur elsewhere. Rainbow trout are not indigenous to the Tetlin Refuge waters; the species was introduced by the Alaska Department of Fish and Game (ADF&G) to Hidden Lake near the Alaska Highway in 1982. ADF&G continues to periodically stock Hidden Lake under a "put, grow, and take" management concept. There has been no documentation of rainbow trout escaping from Hidden Lake into other refuge waters.

Local people have reported that Dolly Varden char occur within the Refuge, but these reports have not been confirmed.

A more detailed description of fishery resources, issues, and management strategies can be found in the Tetlin Refuge Fisheries Management Plan (USFWS 1990) and the Alaska Statewide Stocking Plan (ADF&G 2007).

4.2.7 Birds

There are 186 species of birds known to occur in the Upper Tanana Valley and the Tetlin Refuge (appendix C). The Tanana Valley is a major migration corridor; a number of species reach their northern range limit here. Several species found locally are rare elsewhere in interior Alaska (e.g., Sharp-tailed Grouse, Blue-winged Teal, American Coot, and Common Yellowthroat).

The majority of landbirds arrive in the Upper Tanana Valley in late April and early May (Cooper et al. 1991). The pattern of migration is similar to other parts of interior Alaska with three major peaks: swans, geese, and dabbling ducks pass through in mid- to late-April; Sandhill Cranes in early- to mid-May; and most passerines, diving ducks, and shorebirds in mid- to late-May. One

hundred and sixteen species of birds are known to breed on the Refuge, including 75 species of landbirds and 41 species of other birds (appendix C).

A detailed discussion of bird monitoring efforts can be found in the 2004 Tetlin Refuge Biological Program Review (Johnson et al. 2004).

4.2.7.1 Passerines

Tetlin Refuge has a comprehensive landbird monitoring program that follows established protocols recommended for population inventory and monitoring in Alaska (Doyle and Andres 1998). The most common breeding species include Alder Flycatcher, Tree and Violet-green Swallow, Black-capped and Boreal Chickadee, Gray Jay, Ruby-crowned Kinglet, Swainson's Thrush, American Robin, Varied Thrush, Bohemian Waxwing, Yellow-rumped Warbler, Lincoln's and White-crowned Sparrow, Slate-colored Junco, and Rusty Blackbird. Some uncommon breeders are Red-winged Blackbird (which is near the northern limit of its range), Mountain Bluebird, and Brewer's "Timberline" Sparrow. Habitats that support the greatest songbird diversity within the Refuge are mixed forest and tall scrub in wetlands (Spindler and Kessel 1980).

4.2.7.2 Waterfowl

Common nesting waterfowl species on Tetlin Refuge are Lesser Scaup, Ring-necked Duck, American Green-winged Teal, Bufflehead, American Wigeon, Common and Barrow's Goldeneye, Mallard, Northern Pintail, and Canvasback. Less common nesters include Surf Scoter, White-winged Scoter, Northern Shoveler, Blue-winged Teal, and Canada geese. Canada geese breed on Tetlin Refuge in small numbers with an estimated 30 to 50 nesting pairs. Gadwall, Redhead, Greater Scaup, Long-tailed Duck, Harlequin Duck, Ruddy Duck, Common Merganser, and Red-breasted Merganser occasionally occur on the Refuge but rarely breed. Spindler and Kessel (1977) reported a high of 362.4 birds per square mile and an average density of 256.9 birds per square mile in the southeast corner of the Refuge within and adjacent to the Scottie Creek drainage.

Ducks. Areas with the highest densities of ducks and highest production of young per pair are found primarily in the northern part of the Refuge, including selected and conveyed lands. Ponds with shrub grass complexes provide the best habitat for waterfowl. Nearby vegetation may be grassland, scrub, or forest. Productive ponds are often joined to sloughs or creeks and flood briefly in spring or during late summer rains (Murphy et al. 1984). Productive ponds in the northwestern part of the Refuge may also be fed by groundwater. Ponds and lakes south and east of Tsolmund Lake and near Scottie Creek are moderately productive but still yield many ducks. An estimate of the total number of young produced on the Refuge is obtained using actual brood sizes and expanding the stratified sample by area of open water on the Refuge. Average production over the last decade is approximately 45,000 ducklings per year.

Swans. The Upper Tanana Valley has a rapidly expanding breeding population of Trumpeter Swans, with the Refuge providing important habitat during spring and fall migrations. Breeding was first documented in the Upper Tanana Valley in 1982 when 75 swans were counted. From 1980 through 2000, the population has shown dramatic growth; 1,906 swans were counted during the last census. The proportion of young in the population declined between 1994 and 2000. This may indicate that available breeding habitat is becoming saturated.

The Upper Tanana Valley is an important staging area on the primary migration route of Tundra (Whistling) Swans entering and leaving Alaska. Several thousand birds sometimes stop on Tenmile Lake and other lakes. No tundra swans are known to breed on the Refuge.

4.2.7.3 Marsh and Waterbirds

Eight species of marsh and waterbirds occur on the Refuge. Horned Grebe, Pacific Loon, and Red-necked Grebe are the most common breeders. Common Loons are rare breeders on Tetlin Refuge, and Red-throated Loons are considered casual (do not occur annually). The Refuge is also one of the few places in Alaska where Sora and American Coot are regularly found.

A small number of Sandhill Cranes nest on muskeg flats near the north end of the Refuge. However, during spring and fall migration, up to one-half of the mid-continent population of Sandhill Cranes (approximately 200,000 birds) passes through the Tanana River Valley (Kessel 1984, Cooper et al. 1991). The numbers can vary annually depending on weather conditions affecting flight paths. In the fall, thousands of birds stop at Tenmile Lake, on the Tanana River flats in the northwest corner of the Refuge, or on the Chisana River flats near lower Gardiner Creek (Kessel 1979). In other years, the route passes across the Tanana Uplands north of the Refuge (Kessel 1984). Other major regional stopovers are on the lower Delta River and the upper Fortymile River (Kessel 1979), neither of which are managed primarily for wildlife. It is possible that disturbance on these staging areas could increase the importance of Tetlin Refuge as a staging area for migrating Sandhill Cranes.

4.2.7.4 Shorebirds, Gulls, Terns, and Allied Species

While some 26 species of shorebirds occur on Tetlin Refuge, most are migrants passing between wintering and breeding grounds. The most abundant breeding shorebirds are Lesser Yellowlegs, Wilson's Snipe, and Spotted Sandpipers. The American Golden Plover, Upland Sandpiper, and Whimbrel breed in alpine areas. Red-necked Phalaropes are commonly seen during fall migration. Mew and Bonaparte's Gulls are common breeders on the Refuge.

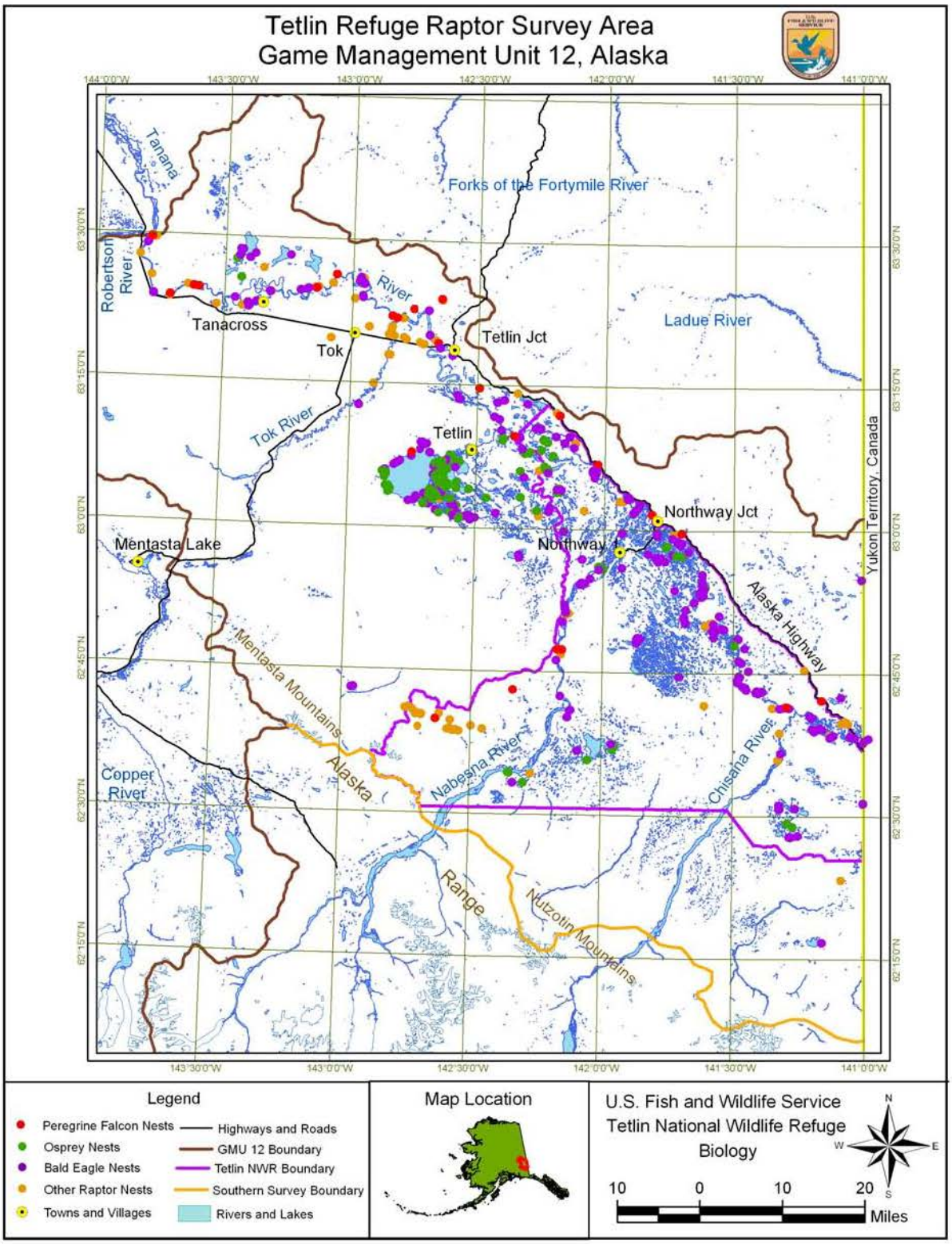
4.2.7.5 Raptors

Predators at the top of the ecological web are indicators of environmental health because their existence and welfare depend on the levels below them (Cade 1988). Raptor monitoring efforts have emphasized such indicator species whose nesting sites are relatively easy to locate. These include American Peregrine Falcon, Bald Eagle, and Osprey.

Bald Eagle, Osprey, Northern Harrier, Sharp-shinned Hawk, Red-tailed Hawk, Peregrine Falcon, and American Kestrel are uncommon breeders. Northern Goshawk, Golden Eagle, Merlin, and Gyrfalcon are rare breeders on the Refuge. Rough-legged Hawks are uncommon migrants. Turkey Vultures and Swainson's Hawks are casual visitors.

As of 2004, 479 nests in 253 nesting territories for 11 raptor species have been identified in Game Management Unit (GMU) 12. Since 1961, Bald Eagles, Osprey and Peregrine Falcon nests have accounted for 81 percent of known raptor nests in GMU 12. These raptor nesting areas are concentrated along major streams and lakes (see Figure 4-7). Nest observations of other raptor species have been recorded during surveys, including Golden Eagle, Northern Goshawk, Red-tailed and Harlan's Hawks, American Kestrel, Great Horned Owl, Great Gray Owl, Northern Hawk-Owl, and Common Raven.

Figure 4-7. Raptor Nesting Areas



Tetlin Refuge currently monitors occupancy and productivity on 17 peregrine falcon nesting territories in the Upper Tanana Valley with a mean (1991–2003) productivity of 2.20 young per occupied nest (Timm and Johnson 2003). They nest on bare ledges of cliffs, bluffs, and occasionally man-made road cuts and quarries. Peregrine Falcons were removed from the Endangered Species List in 1999, and the continent-wide population continues to recover. The local breeding population has expanded exponentially over the last decade with the number of known nesting territories increasing between 1993 (n = 4) and 2004 (n = 19), including new nests (n = 6) discovered on road cuts and rock quarries along the Alaska Highway between 1995 and 2004 (Timm and Johnson 2003).

Up to 65 Bald Eagle nesting territories have been monitored for occupancy and productivity by the refuge staff in GMU 12 with a mean (1991–2003) productivity of 0.66 young per occupied nest (Timm and Johnson 2003). Bald Eagles often nest in poplar or spruce trees near streams or lakes. They feed on a variety of fish, waterfowl, mammals, and carrion.

Tetlin Flats supports the largest concentration of nesting osprey in Alaska (USFWS 2001b). Of the estimated 200 Osprey nesting pairs in the State, roughly 25 to 33 osprey pairs breed on or near the Refuge with a mean (1991–2003) productivity of 1.01 young per occupied nest (Timm and Johnson 2003, USFWS 2001b). Ospreys are highly dependent on wetlands, as they feed almost entirely on fish. They prefer to nest in the tops of spruce trees next to lakes and ponds.

Five species of owls breed on Tetlin Refuge, the most common being the Great Horned Owl. Northern Hawk Owls, Great Gray Owls, and Boreal Owls can be common some years. The Short-eared Owl is a migrant and casual summer breeder. Additionally, the Snowy Owl is a casual visitor in fall and winter but is not known to breed on the Refuge.

4.2.7.6 Upland Game Birds

Spruce Grouse, Ruffed Grouse, Sharp-tailed Grouse, and Ptarmigan are found on the Refuge. Spruce Grouse occupy closed needleleaf or mixed forest; Ruffed and Sharp-tailed Grouse live in tall scrub in lowlands and along rivers. Sharp-tailed Grouse also use clearings in deciduous forests and burned areas in early- to mid-succession, and Ptarmigan breed in subalpine scrub and tundra at the southern edge of the Refuge and descend to lower elevations in winter.

4.2.8 Mammals

Thirty-nine species of mammals are known or suspected to occur on Tetlin Refuge (appendix C). A detailed discussion of inventory and monitoring efforts related to mammals within Tetlin Refuge can be found in the 2004 Tetlin Refuge Biological Program Review (Johnson et al. 2004).

4.2.8.1 Carnivores

Tetlin Refuge hosts a variety of large mammals; however, as in much of Alaska, the inter-relationship between moose, caribou, wolves, and bears receive much of the public interest. Besides wolves, both brown (grizzly) and black bears occur on the Refuge. Lynx, wolverine, coyote, and red fox are also present.

Wolf. Wolf density on Tetlin Refuge has been estimated between 2.8 wolves per 1,000 square miles (TNWR 1987) and 3.5 wolves per 1,000 square miles (Gasaway et al. 1992). Refuge studies of winter and summer wolf predation conducted during the 1980s found moose were a major component of wolf diets. Summer diets consisted of more moose calves, while wolves consumed

more adult moose than calves during winter months (TNWR 1987, Doyle et al. 1988). However, the proportion of moose mortality attributable to wolf predation and its effect on moose populations on the Refuge are unknown.

Lynx. The abundance and distribution of lynx populations are affected primarily by natural cycles of their primary food source—snowshoe hares (see the snowshoe hare discussion later in this chapter). Based on track surveys, harvest data, and comments from area trappers, Gardner (2001a) identified peaks in the lynx population cycle in 1990–1992 and 1997–1999, with a low in the population cycle occurring in 1993. It was suggested the increase in both snowshoe hare and lynx numbers in the late 1990s was earlier than expected based on historical 10-year cycle (Gardner 2001a).

A lynx study conducted on Tetlin Refuge by Perham (1995) provided information relating to home ranges, habitat selection, and daily snow track deposition rates. Lynx preferred broadleaf and mixed forests and avoided dwarf shrub/tundra habitats.

Bear. Tetlin Refuge provides a mix of important habitats for both brown (grizzly) and black bear. Very little is known about the size or distribution of populations within the Refuge, but both species are considered common. In general, brown bears spend most of the fall season in alpine and subalpine areas and will also seek berries on dwarf shrub peatlands. Black bears are often found in a mix of semi-open forest, tall scrub, wetlands with emergent food plants, and dwarf scrub peatland.

Other Carnivores. Wolverines were once considered a common species throughout Tetlin Refuge, but they are currently found primarily in the foothills and inaccessible mountainous areas (TNWR 1997); historical populations are believed to have been much larger (USFWS 1987a). Coyotes have increased from being scarce to common in several areas based on staff observations; red fox populations are described as moderate (USFWS 1987a).

4.2.8.2 Ungulates

Tetlin Refuge provides habitat for three species of ungulates: caribou, moose, and Dall's sheep. Occasional observations of woodland bison and mule deer have also been recorded.

Caribou. Historical information and numerous studies since 1965 in Alaska and Canada document wide fluctuations in caribou population size and distribution (see summary by Hinkes et al. 2005). Studies in Alaska and Canada have also shown caribou herds to: (1) change their range and migration patterns on an annual or long-term basis; (2) make extensive lateral shifts away from traditional migration routes; and (3) sometimes join with other herds or split apart with unpredictable frequency (Hinkes et al. 2005). There are also indications that Alaskan and Canadian caribou herds peak every 60 to 90 years, or even longer, with each herd remaining at a relatively stable size during the intervening time periods (Haber and Walters 1980, Couturier et al. 1990, Hinkes et al. 2005).

Dramatic fluctuations of caribou populations are not unique, as animal populations in northern latitudes undergo drastic fluctuations. Currently, portions of four different barren-ground caribou herds (Nelchina, Fortymile, Mentasta, and Macomb herds) winter on or near Tetlin Refuge. The Nelchina Herd (greater than 30,000 animals) is most commonly found near or on the Refuge. The Fortymile Herd (greater than 40,000 animals) is generally found north of the Refuge during the winter but does occasionally move onto refuge lands. The remaining two herds are much smaller (less than 600 animals each). The Mentasta Herd calves on the slopes of Mt. Sanford in the Wrangell Mountains with a few individuals lingering some years in the southwest

portion of the Refuge. The Macomb Herd calves northwest of the Refuge on the Macomb Plateau and rarely moves onto refuge lands. Surveys have been limited to cooperative monitoring of caribou radio-collars.

The Chisana caribou herd is the only woodland caribou herd that occurs in Alaska. The herd summers almost entirely in the Wrangell-St. Elias National Park and Preserve and winters in the Yukon within the Kluane Wildlife Sanctuary. Although the Chisana herd is specifically mentioned in the purposes for Tetlin Refuge, our management involvement has been limited; the herd rarely, if ever, occurs on refuge lands. The herd began declining in the late 1980s, and density estimates were the lowest recorded in the Yukon in 2001 (Farnell and Gardner 2002). Subsequently, the governments of the State of Alaska and the Yukon agreed it was essential to develop a recovery plan for this herd; the herd was designated as a *species at risk* in the Yukon in 2002. As part of the recovery plan, a captive rearing program was initiated in 2002 and proved to be successful in releasing calves back into the wild. However, density estimates conducted in late 2003 documented a substantial increase in the population, leading to questions regarding the true nature of the population decline and the accuracy of monitoring techniques.

Moose. Tetlin Refuge provides a variety of spring, summer, and late winter habitat for a low density moose population (0.43 moose per square mile) (Collins et al. 2004a, Collins et al. 2005). Moose generally feed heavily on aquatic vegetation from spring thaw to late summer. During the fall as moose form rutting or breeding groups, they move to higher elevation habitats adjacent to the Refuge that provide late fall and early winter habitat.

Winter habitat includes deciduous scrub of various types, particularly tall alluvial and riparian scrub. In winter, moose particularly favor species such as felt-leaf willow growing on frozen pond margins. In 2004, Tetlin Refuge completed winter moose browse surveys to compare with earlier estimates (1982–1990) (TNWR 1986, Kelleyhouse et al. 1987). The Cheslina River drainage, a known concentration area for wintering moose, showed overall browse use over 50 percent; this may be representative of winter moose habitat quality where moose are concentrated (Collins et al. 2004b). Winter moose habitat on the Refuge may have been impaired by fire suppression from the early 1950s through the early 1980s, potentially resulting in browse that grew beyond the reach of moose or had been replaced by unpalatable species such as spruce. Future survey efforts will continue to refine methodologies and techniques.

Evidence shows that both migratory and non-migratory populations of moose occupy Tetlin Refuge. Annual trend and composition surveys have been conducted on Tetlin Refuge and adjacent areas since 1982. Given our recent estimates of density, percentage of adult bulls (32 percent), calf production (47.8 calves per 100 cows), and yearling recruitment (16.2 yearling bulls per 100 cows), the moose population appears to be healthy and stable (Collins et al. 2005).

Dall's Sheep. Dall's sheep are found in the Mentasta Mountains within Wrangell-St. Elias National Park and Preserve and in the extreme southwestern portion of Tetlin Refuge. In 1987, refuge staff estimated that 125 individuals of the larger population were within refuge boundaries (TNWR 1988); no surveys have been completed since.

4.2.8.3 Furbearers

A variety of furbearer species occurs on Tetlin Refuge. Wolves, lynx, wolverine, and red fox were discussed previously; beaver, muskrat, river otter, marten, mink, and weasel also occur. Population estimates are not available for furbearers.

Beaver. The highest concentration of beaver in the Upper Tanana Valley occurs along Scottie-Desper creeks (TNWR 1997); however, this area has been described as a poor beaver producing region, possibly due to scarcity of favorable lakes and streams with solid banks, stable water levels, and sufficient depth (Murray 1961).

Muskrat. Muskrat populations were noted as high during the mid 1970s and mid 1980s (Gardner 2001a). Then in the late 1990s, the muskrat populations appeared to be low but stable (TNWR 1997), following a decline during the winter of 1987–1988 (TNWR 1988). Another decline was observed in 1998 throughout the Upper Tanana Valley (TNWR 1998). It has been suggested that extreme cold temperatures, a lack of snow in 1995, and several years of drought were contributing factors (Gardner 2001a).

Other Furbearers. River otters are not considered common, but sign has been observed along open water during the winter. Marten are present in scattered locations and are trapped on the Refuge. Numbers fluctuate naturally, due in part to variations in the vole population, the marten's most important prey species. Marten prefer spruce forest alternated with small open areas of scrub, sedges, and grass that provide for optimal hunting (Koehler and Hornocker 1977, Buskirk 1983) but will also use burned areas in early post-fire succession (Paragi et al. 1996). Mink are present along ponds, marshes, lakes, and streams on the Refuge. Mink prey on muskrats, hares, and rodents, and their population fluctuates generally with prey numbers (USFWS 1987a).

4.2.8.4 Small Mammals

Small mammals are important prey for many furbearers and raptors. Little is known about the distribution and abundance of most small mammal species that occur on Tetlin Refuge. However, many species of voles, shrews, and mice are known or suspected to occur (appendix C). Porcupine, little brown bat, red squirrel, and northern flying squirrels are also residents. Initial efforts to inventory small mammals across habitat types started in 2000, following procedures outlined in the 1998 Tetlin Refuge Wildlife Inventory and Monitoring Plan.

Snowshoe Hare. Snowshoe hare are an integral part of the boreal ecosystem. Hare population densities are cyclical across boreal North America over an 8 to11 year period (Keith 1963, Krebs et al. 1986, Keith 1990), with amplitudes of 5- to 25-fold (Hodges 2000). Hares are an important food item for a wide variety of terrestrial and avian predators (Keith 1990, Hodges 2000); hare densities can greatly influence production and recruitment of a variety of species. Hare densities are also positively correlated with other species such as Spruce Grouse, Willow Ptarmigan, and arctic ground squirrel (Boutin et al. 1995). Great Horned Owl and Northern Goshawk production and densities are also strongly influenced by hare density (McInnaville and Keith 1974, Keith et al. 1977, Boutin et al. 1995, McIntyre 1995). Other species such as wolves, red fox, marten, and Red-tailed Hawks may be less dependent on hares, but use likely increases during cyclic highs (Wolff 1980, Todd et al. 1981, Carbyn 1987).

The close correlation between population densities of hares and other boreal forest fauna, and the predictable hare cycle, suggest monitoring hare populations can provide predictive information for other species, especially lynx (Nellis et al. 1972, Poole 1994, Mowat et al. 1996, Slough and Mowat 1996) and coyotes (Prugh 2004). Lynx rely heavily on snowshoe hares for food, and lynx populations cycle along with those of its cyclic prey (Keith 1963, Brand and Keith 1979).

From 1960 through 2000, the snowshoe hare cycle has been largely synchronous across Canada and into Alaska (see summary by Hodges 2000). Cyclic peaks occurred roughly at the turn of each decade (1960–1961, 1970–1971, 1980–1981, 1990–1991) with lowest densities typically occurring three years later (1963–1964, 1973–1974, 1983–1984, 1993–1994) (Hodges 2000).

Annual pellet counts have been conducted within the Refuge to monitor snowshoe hare population trends (1990 to 1994 and 2000 to present) (Collins et al. 2004c). Snowshoe hare populations on Tetlin Refuge apparently reached their cyclic low in 1993 and peaked in 1997–1999; the next cyclic high can be expected 8–11 years following the previous peak (Hodges 2000, Collins et al. 2004c).

4.2.9 Threatened, Endangered, and Sensitive Wildlife and Plants

As discussed previously, the Chisana Caribou Herd is a small, biologically distinct, woodland caribou herd that ranges across the Alaska-Yukon border. The herd was designated as a *species at risk* by the Yukon Government in 2002 under the authority of the Yukon Wildlife Act (Farnell and Gardner 2002).

Peregrine Falcons were removed from the Endangered Species List in 1999, and it was recommended that the Tanana River peregrine population be monitored for at least five years after removal (Wright and Bente 1998). Refer to the discussion earlier in this chapter for more information about Peregrine Falcons within the Refuge.

Birds of Conservation Concern (USFWS 2002) identifies species, subspecies, and populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act. Eight species were identified for the Northwestern Interior Forest region, and three (Peregrine Falcon, American Golden-Plover, and Whimbrel) are known to breed on the Refuge.

Boreal Partners in Flight developed a list of priority landbird species breeding in each biogeographic region in Alaska (Boreal Partners in Flight Working Group 1999). The rankings are based on species abundance in North America, the degree to which breeding and wintering distributions are restricted and threatened, the proportion of the species' range occupied by the bioregion, and population trends. Nineteen priority species occur in the Central Alaska Region, of which 15 breed on Tetlin Refuge. These include Sharp-tailed Grouse, Great Gray owl, Boreal Owl, Black-backed Woodpecker, Olive-sided Flycatcher, Hammond's Flycatcher, Gray-cheeked Thrush, Varied Thrush, Bohemian Waxwing, Townsend's Warbler, Blackpoll Warbler, Golden-crowned Sparrow, Rusty Blackbird, and White-winged Crossbill.

The State of Alaska has also identified species and subspecies of fish and wildlife native to Alaska that have entered a long-term decline in abundance or are vulnerable to a significant decline. Vulnerability to decline includes low numbers, restricted distribution, dependence on limited habitat resources, or sensitivity to environmental disturbance. On Tetlin Refuge, Species of Special Concern include Peregrine Falcon, Olive-sided Flycatcher, Gray-cheeked Thrush, and Blackpoll Warbler.

No threatened or endangered plants have been identified on Tetlin Refuge. However, one species (*Cryptantha shackletteana*), which has been documented near the village of Eagle and at Calico Bluff approximately 100 miles north of the Refuge, is ranked by the Alaska Natural Heritage Program as critically imperiled in the State. One sensitive species (vulnerable to climate change but not currently threatened), *Montia bostockii,* has been documented in the easternmost Wrangell Mountains and the Yukon-Tanana Uplands of Alaska (Murry and Lipkin 1987).

4.3 Human Environment

4.3.1 Cultural Resources

4.3.1.1 Prehistory of the Upper Tanana Valley

The Upper Tanana Valley contains one of the most concentrated areas of prehistoric settlement in interior Alaska and has been the region with the most intensive archaeological research. Large scale excavations have been conducted at Healy Lake, Dihthaad, the Terrace Site, Broken Mammoth, Gerstle River, and other locations within the region. Despite this work, the prehistory of interior Alaska is known only in the barest outline.

Dated material from Yukon Territory, Canada, may indicate the presence of people in the area 14,000 years before present (B.P.), although the relationship between the articles found at this site and human activity is tenuous and has not been confirmed. The indigenous people believe that they have always been here. The earliest securely dated sites with clear human associations belong to the Paleoarctic tradition present in interior Alaska between 12,500 and 6,000 years B.P. (Clark 1981, Clark 2001, Holmes 2005, Odess 2005). The earliest known sites from this tradition near Tetlin Refuge are the 11,000-year-old village site at Healy Lake, about 100 miles to the northwest; and at least one site near Beaver Creek, Yukon Territory, approximately 30 miles southeast of the Refuge. Artifacts from these sites date to 10,200 years B.P. (Clark 2001).

A separate and distinct Northern Archaic tradition began about 6,000 years ago. In addition to microblades and side-notched points used by people of the Paleo-Arctic Tradition, the Northern Archaic people used leaf-shaped spear points, large bifaces, a variety of endscrapers, choppers and hidescrapers, and notched stone net sinkers. This stage is thought to be an adaptation to the boreal forest that was becoming the dominant vegetation type in the interior. This tradition continued with minor variations until about 2,000 years B.P. Sites from this tradition have been found at Healy Lake and at other locations near the Refuge.

This period is followed by a distinct hiatus, perhaps caused by drastic environmental changes following eruptions of Mount Churchill that occurred between 1,887 and 1,147 years B.P. that deposited up to two feet of ash in parts of the Upper Tanana Valley. The remaining layer of ash in the soil (known as the White Ash Layer) is important for dating artifacts, charcoal, and other remains throughout the region. As people returned to the area about a thousand years ago, they brought with them a tool kit that included the small, tapered-stem Kavik-type projectile point, thought to be one of the earliest indicators of Athabascan culture in Alaska (Reynolds and Jordan l982). This period (1,000 years B.P. until European contact about 160 years B.P.) is characterized by these points and by groundstone hide and woodworking tools, bone implements, and limited use of native copper. Archaeological sites dated to this period are larger than those of previous periods and contain semi-subterranean houses and cache pits. This period continues with little change until the increasing presence of trade goods make it difficult to tell the camp of a Native trapper from that of his non-native counterpart (Clark 1981).

4.3.1.2 Prehistoric and Cultural Use of Fire

The boreal forest in the region not only evolved with natural lightning-caused fire, but also with anthropogenic fire. Human habitation in the Upper Tanana Valley predates the development of the boreal forest ecosystem, which began approximately 6,000 years B.P. Athabascan people were

nomadic hunters, and the use of campfires, signal fires, and fires for rejuvenating browse for moose and snowshoe hare was common (Pyne 1982).

Broadcast fire was used intentionally to remove underbrush and improve mobility and visibility; to create clearings especially suitable for moose hunting; for use in hunting or trapping muskrats; and to kill large stands of spruce and birch, which could then be uprooted from the shallow soil and aligned into fences (Pyne 1982). As migrating herds of caribou followed these fences, they would be channeled toward waiting hunters, snares, and deadfalls.

During his 1885 expedition as the first Euro-American to travel through the Upper Tanana Valley, Lieutenant Henry Allen (1900) wrote:

> "Heavy smoke, caused by extensive timber fires, obscured the sun the entire day, so that an observation was impossible. The smoke had originated from signal fires which were intended to give warning of our presence in the country…for nearly two days we barely caught a glimpse of the sun except through the heavy spruce smoke."

Another common use of anthropogenic fire was to keep mosquitoes at bay. Describing a military reconnaissance to interior Alaska in 1884, Frederick Schwatka (Lutz 1959) wrote, "Evidences of conflagration in the dense coniferous forests were everywhere frequent," and that the cause was incendiary fires set by the Indians "with the idea of clearing the district of mosquitoes."

4.3.1.3 Modern History of the Upper Tanana Valley

The indigenous people of the Upper Tanana Valley (including what is now Tetlin Refuge), at the time of European contact, called themselves *"Dindee" or "Dindee iin"* (The People). Early explorers and researchers called them the Upper Tanana Indians or Nabesna Indians or Nabesnatana (from Nabesna, the Native term for the upper Tanana River). By the time the first anthropological studies were begun in the 1920s, the Upper Tanana Athabascan population was estimated to be 152 people, divided into five local bands and occupying an area of about 17,500 square miles. These bands used distinct portions of the Upper Tanana Valley but interacted and exchanged food and other goods with one another on a regular basis.

Until the 1900s, the Upper Tanana Athabascans were nomadic hunters and gatherers, concentrating on moose, sheep, berries, and most importantly, caribou. As the upper Tanana River contained few salmon, fishing activities focused on freshwater fish such as whitefish, pike, grayling, burbot, and suckers. Other food sources included hare, muskrat, ducks, geese, swans, and cranes, primarily harvested in spring or summer.

The Upper Tanana Athabascans lived in semi-permanent houses in winter and in permanent summer houses. Most summer houses were located near reliable fishing spots. Lean-to, brush, or bark-covered shelters were used for hunting and traveling.

Beginning in the early 1900s, Athabascan people moved away from their traditional semi-nomadic lifestyle toward a more stationary lifestyle centered on a mixed cash-subsistence economy made possible through commercial trapping, mining, logging, and new technologies such as motor boats, snowmachines, and chainsaws. This change altered Upper Tanana Athabascan culture, the pattern of anthropogenic fire, and the way in which people viewed the role and value of wildfire.

The Upper Tanana Athabascans were involved in Alaska-wide trade networks with ties to the Ahtna to the south and the Han and Tutchone to the north and east (McKennan 1959). They may

have had access to European trade goods along the Yukon River via the British near Fort Yukon and the Russians at Nulato as early as the 1840s (Simeone 1995). Trade between the Upper Tanana Athabascans and the Chilkat Tlingit Indians in southeast Alaska was also accomplished through the Kluane Lake Tutchone as intermediaries (McClellan 2001).

The first trappers and explorers from the Yukon River and northwest United States arrived between the late 1870s and 1885. Most subsequent activities by explorers, miners, and missionaries took place near the present location of Tanacross, but some traders did maintain posts within or near what is now Tetlin Refuge at the mouth of the Kalutna River, Moose Creek, Nabesna River, and at Gardiner Creek. A brief gold rush in the early 1900s brought hundreds of people to the area by steamer, most of whom returned home empty-handed within a few years. In the 1930s, with the establishment of schools, the Upper Tanana Athabascans abandoned their seasonal movements and settled in permanent villages.

The Upper Tanana Valley remained one of the most isolated areas of the United States until the Alaska Highway was constructed during World War II (Simeone 1982, Ducker 1982). A large work camp was established west of the Tok River, at the present day location of the community of Tok, to assist with construction of the road. Soon after construction, the first gas station along the highway in Alaska was constructed at a place now called Seaton's Roadhouse. There are no longer any buildings at this site, but an abandoned section of the Alaska Highway, a few small clearings, and scattered barrels, cans, bottles, and other articles remain as evidence of its existence. Remains of a World War II construction camp (used during construction of the highway) are also found near the site of Seaton's Roadhouse.

4.3.1.4 Modern Use and Management of Fire

Anthropogenic fire may have reached its apex between the time of the Alaskan gold rush and 1940. During this period, the population of the State was at its peak, and the use of open fire and machinery led to a rapid increase in the number of wildfires across the State. During this time, it is estimated that nearly 80 percent of all land in Alaska burned at least once (Pyne 1982). However, the infrastructure and technology to move people and resources needed to find and extinguish fires throughout the vast remote wilderness of Alaska were simply not available. Suppression was confined to those fires which began near settlements, mining camps, and rail lines, much as it was during the early European settlement of the lower 48 states.

During the early 1940s, fire suppression in Alaska increased exponentially with technological improvement in aviation, the construction of military airstrips and highways, the Bureau of Land Management's (BLM) mandate to attack all wildfires throughout the State, and the funding necessary to do so.

By the late 1950s, the BLM was operating the largest civilian paracargo operation in the world and a smokejumper base in Fairbanks in its attempt to suppress every fire in the State (Pyne 1982). Enormous amounts of money were spent to protect vast inaccessible and uninhabited areas of boreal forest where wilderness and wildlife values far outweighed commercial timber values. However, these efforts led to the hiring of many firefighters throughout the State who became both an important source of income and pride for remote communities throughout Alaska.

By the 1970s, it became apparent that by attacking every fire, the BLM's fire suppression costs were far exceeding the value of resources being protected. Through the 1970s, the number and complexity of fire effects and fire behavior studies increased, and so did the understanding of the

role fire plays in the northern boreal forest (Pyne 1982). Ecologists, wildlife managers, and other professionals began to more fully recognize the importance of natural fire in conserving healthy functioning ecosystems, and they began to question the wisdom of total fire suppression. By 1974, the BLM required a team evaluation for all fires that escaped initial attack. This new approach led to classifications of lands in Alaska's interior based on resource value and a new dispatch system that took these values into account (Pyne 1982). Building upon this new approach to classifying lands and prioritizing suppression efforts based upon resource values, fire management plans were written for 13 geographic regions of Alaska. Further refinement led to the 1984 Alaska Interagency Wildland Fire Management Plan (AIWFMP), which allowed each land manager or owner to apply a combination of four fire suppression options to their lands based upon legal mandates, policies, regulations, resource management objectives, and local conditions. With some amendments by the Alaska Wildland Fire Coordinating Group in 1998, the AIWFMP continues to provide a fire suppression framework for virtually the entire State of Alaska (AWFCG 1998).

A detailed description of the three fire suppression options applied to Tetlin Refuge can be found in section 3.2.8.2 of chapter 3.

4.3.1.5 Historic and Cultural Sites

Currently, hundreds of sites and trails associated with prehistoric inhabitants, subsistence hunting and fishing, trapping, mining, and military construction within or adjacent to the Refuge have been cataloged. Many sites are located near the Alaska Highway, large rivers, lakes, and streams, making them susceptible to both intentional and unintentional damage, future development activities, flooding, and wildfire.

In addition to several historically and culturally important areas located on private lands within the Refuge, six areas managed by the Refuge may have particular historic and/or cultural value. These include the Deadman Lake area, the western Black Hills and lower Cheslina River areas, the Moose Creek/Chindagiekne Creek area, the southern portion of the Refuge in the vicinity of the Nabesna River, and the Scottie/Desper creek area. There have been only sporadic and scattered archaeological investigations conducted in these areas.

From these investigations and oral history interviews, we are learning more about sites such as Big Scottie Creek, which has historically been a place rich with natural resources, especially fish. Local residents attest that its richness continues today. It was a place where long ago, food was traditionally stored against lean times. People are said to have traveled from as far away as Chistochina (approximately 150 miles overland) to save themselves from starvation during calamities such as the White River ash fall. Additionally, there exist in this area burial grounds, caches, trails, cabin remains, and at least one documented stone fishing weir.

Many recent historic sites associated with the fur trade, the brief mining rush in the early 1900s, construction of the Alaska Highway, and various roadhouses are located adjacent to the Refuge. However, a few documented sites and artifacts of this nature are located within Tetlin Refuge, including the site of Seaton Roadhouse and Gasoline City.

4.3.2 Population Trends and Composition

The communities of Northway, Northway Junction, Northway Village, Tetlin, Tok, Tanacross, Delta Junction, Big Delta, Deltana, Fort Greely, Mentasta Lake, Chistochina, Tazlina, Copper

Center, Gakona, Gulkana, Chitna, and Cantwell were selected for discussion because their residents either regularly use Tetlin Refuge for subsistence and recreation activities, or the communities have been designated by the Federal Subsistence Board or the Alaska Migratory Bird Co-Management Council as communities with customary and traditional use in GMU 12.

The community of Tok, the largest community in the Upper Tanana Valley, is located 30 miles from the Refuge. Tok serves as the subregional supply center for the upper Tanana and Fortymile areas. It is also considered a rural community having noncommercial production and exchange. The population of Tok includes, among others, former residents of Tanacross, Tetlin, Northway, Eagle, and Mentasta. These people retain strong ties to their former communities and continue to harvest resources with friends and families from these villages.

Construction efforts associated with the National Ballistic Missile Defense Shield continue at Fort Greely. Once completed, the military base will provide full-time employment for approximately 270 people (DCED 2003). Current efforts are underway to begin gold ore production at the Pogo Mine near Delta Junction. The mine is expected to employ 300 people annually during the 11-year life span of the mine (DCED 2003). Efforts are underway to finalize agreements and permits associated with the potential construction of the Alaska Natural Gas Pipeline along the Alaska Highway to Canada. Other planning efforts are evaluating an extension of the Alaska Railroad to Fort Greely. The combination of these activities, if undertaken, will result in growth in the local economy and population in the Upper Tanana Valley over the next 15 to 20 years.

Table 4-2. Population characteristics of communities with customary and traditional use of Tetlin Refuge: 1960–2000

Community	1960 Census	1970 Census	1980 Census	1990 Cenus	2000 Census	Forecast 2018[4]	Percentage Change '90-00
Alcan Border	0	0	0	27	21	27	-22
Dot Lake	56	42	67	70	57	24	-19
Dry Creek	0	0	0	106	128	164	21
Tok	129	214	589	935	1,393	1,783	49
Northway communities[1]	196	40	185	324	274	351	-15
Tetlin	122	114	107	87	117	150	34
Tanacross	102	84	117	106	140	179	32
Delta area communities[2]	0	2,523	2,898	2,398	3,657	4,681	53
Copper River area communities[3]	419	670	649	1,176	1,394	1,361	19
Total All Areas	1,024	3,687	4,612	5,229	7,143	8,720	37

[1] Northway communities include: Northway, Northway Junction, and Northway Village.
[2] Delta area communities include: Delta Junction, Deltana, Big Delta, Healy Lake, and Fort Greely military base.
[3] Copper River area communities include: Mentasta Lake, Chistochina, Gakona, Gulkana, Copper Center, Tazlina, Chitna, and Cantwell.
[4] Forecast of 28% increase in population for the Southeast Fairbanks Census Area and 2.4% decline for the Codova-Valdez Census Area populations (Alaska Department of Labor 2004).
Source: DCED 2008

Population projections for communities with customary and traditional use of subsistence resources in Tetlin Refuge are from the Alaska Department of Labor (2004). The Alaska Department of Labor estimates the population of the entire Southeast Fairbanks Census Area will increase 28 percent by the year 2018. There are several variables which affect population changes, and it is possible the regional population could actually decrease by 5 percent or increase by as much as 67 percent. Figures presented in Table 4-2 depict a 28 percent increase in population for Tanana Valley communities and a 2.4 percent decrease in the population of Copper River Valley communities. However, changes affecting communities in the Delta areas will likely account for a greater proportion of the population growth, and other communities may actually remain stable or slightly decline. As shown in Table 4-2, the population of the Tanana Valley increased approximately 43 percent from 1980 to 2000, with Delta area communities and Tok representing most of the overall increase.

In 2000, the composition of the population of Tanacross, Tetlin, and Northway was approximately 82 percent Native Alaskan. The larger community of Tok was 13 percent Native Alaskan.

4.3.3 Sociocultural Systems

Since the early part of the 20th century, the nomadic way of life of the Upper Tanana Athabascans has been replaced by a more sedentary existence revolving around stable settlements, although some families still follow the tradition of setting up seasonal fish camps in the summer (Vitt 1971).

4.3.3.1 Subsistence Way of Life

For generations, rural residents of Alaska have lived a lifestyle based on a strong dependence upon fish, wildlife, plants, and other natural resources available to them. Until the late 1800s, the indigenous people of the Upper Tanana Valley lived a nomadic lifestyle, traveling through the taiga and boreal forest in small bands, following the movement of the harvestable resources surrounding them. They followed the seasonal migrations of caribou, waterfowl, and fish, gathering berries, hunting, and trapping large and small mammals and game birds, totally dependent upon the resources available to them. The entire culture and social organization revolved around a reciprocal agreement with the natural resources and neighboring tribes. The people were to harvest only what they needed and not waste, share with others, and be respectful of the resources. Cultural ceremonies, morals, and values reinforced this view daily.

A subsistence lifestyle includes much more than simply the harvest and use of natural resources. Subsistence was and is deeply embedded in the culture and traditions of the indigenous people, which form the basis for social organization within and between communities. Today, the residents of Native villages in the Upper Tanana have adopted modern Western means of hunting to fit their basically traditional lifestyles, and other adaptations imposed by a cash economy. But to many, subsistence remains a way of life that provides food for the body, mind, and spirit. Subsistence lifestyles are not limited to indigenous people. Many non-Native residents of rural areas in the Upper Tanana Valley also carry on subsistence type lifestyles, with varying degrees of reliance on the natural resources. ANILCA and federal subsistence regulations allow all residents of rural communities or areas to participate in subsistence harvest of fish and wildlife resources, if such use was determined to be customary and traditional. Residents of all villages and communities in the Upper Tanana Valley now make use of the cultural and natural resources found on and around refuge lands.

4.3.3.2 Kinship and Social Organization

The Upper Tanana Athabascan society has traditionally been divided into exogamous matrilineal kin groups with emphasis placed on the nuclear family (i.e., marriage to an opposite clan and kinship based on the mother's side of the family). Families within a local band were fairly autonomous, moving as subsistence needs required. Local bands were flexible, changing size and composition over time while larger regional bands were more stable. Each band had a recognized leader or *hałke*. This position was based on leadership ability, concern for the whole, hunting skill and luck, and the ability to command allegiance (McKennan 1959).

People in local communities retain a strong sense of pride in their cultural heritage. Kinship, social bonds, and strong ties to the land cause many people to stay in smaller communities despite limited employment opportunities and community services. Traditional ceremonies such as potlatches, which reaffirm kinship and village ties, are frequently held in Northway, Tetlin, and Tanacross. The use of the Athabascan language in the home, particularly among the elderly, preserves social and kinship affiliations.

Kinship is an important influence in social interaction and exchange of subsistence resources. Subsistence harvests are shared with local family and clan members and with family members who have moved to other communities. Hunting, fishing, trapping, child care, and many social activities are often conducted along kinship lines. The importance of this exchange is magnified by the shortage of social services in isolated communities.

4.3.3.3 Intraregional Interactions

Fairbanks is the center of economic and social exchange in the Tanana Basin and serves as the regional transportation center for interior Alaska.

The subregional center of commerce and development for the upper Tanana and Fortymile area is Tok. Tok is strategically located at the junction of the Alaska and Glenn highways 90 miles northwest of the Canadian border. Because of this location, it is an important service area for travelers and tourists. As the largest community in the subregion, Tok has a relatively full complement of schools, shops, service stations, lodging, restaurants, and other basic infrastructure upon which smaller surrounding communities depend.

4.3.3.4 Community Infrastructure

The underlying framework or support system for a community is known as its infrastructure. Included in this infrastructure is local government, housing, schools, health services, local transportation, water, waste and utility systems, communication systems, and police and fire protection. Northway, Tetlin, Tok, and Tanacross possess the basic components of infrastructure to some degree. The components of these communities include a community hall, grade school, church, health clinic, post office, airstrip or airport, electrical power generation, and local groups that administer Federal assistance and other services (Darbyshire and Associates 1980). Of the four communities, Tok—having bolstered its commercial and tourist industries with motels, restaurants, service stations, and related businesses—has the broadest range of support facilities. Government spending also supports a large portion of the economic infrastructure and employment in Tok.

Tok, Tetlin, Northway, and Tanacross are all unincorporated and thus without taxing authority. Tetlin, Northway, and Tanacross are governed by tribal councils.

4.3.4 Economic Conditions

Subsistence plays a key part in the local economy. Because subsistence activities overlap with commercial activities, and because there are no market values established for commodities and services received, it is difficult to estimate the size or impact of any given subsistence economy (Berman 1983).

The subsistence sector—composed of fishermen, hunters, and trappers—engages in a cash economy for a portion of the year and in a subsistence economy for the remainder of the year. The economies of Northway, Tetlin, and Tanacross are in a transitional phase with mixed cash and traditional activities. Tok, however, has more of a cash economy, supplemented by traditional activities to offset the high cost of living.

Rural residents in Alaska's interior harvest an estimated 613 pounds of resources per person each year (Wolfe 2000). An estimated $1.15 per pound is spent on equipment, fuel, and other supplies for subsistence activities (Colt 2001). Using these estimates, the 2,500 residents in the Upper Tanana Valley spend as much as $1.7 million annually on subsistence activities. The total value of these subsistence resources is much greater when the cost of replacing them with food bought from stores or farms is considered. At $4.00 per pound, subsistence harvest by Upper Tanana Valley residents would be worth more than $6 million annually. Tetlin Refuge plays an important role in providing healthy habitats and continued opportunities for subsistence uses in the Upper Tanana Valley.

The tourism industry in Alaska is the only private sector industry that has grown continuously since statehood and continues to grow (Colt 2001). In 1993, the average summer tourist driving the Alaska Highway spent about $596 in Alaska (McDowell Group 1998). Based on Colt's (2001) estimates, one job in the State is either directly or indirectly attributed to every 45 Alaska visitors.

Tok serves as a "Gateway Community" to Alaska for people traveling the Alaska Highway, and tourism is a mainstay industry. Facilities such as gasoline stations, restaurants, a laundromat, recreational vehicle parks, retail businesses, air-taxi/charters, and a visitor information facility make a significant contribution to the local economy. Tourism and government account for most of the stable employment in Tok.

The local economy is highly dependent on outside money due to the absence of local taxes. State, Federal, and tribal governments support the basic community infrastructure such as roads, schools, clinics, police, magistrate, fire department, and social programs.

4.3.4.1 Employment

Employment opportunities are more plentiful in Tok than in other communities in the Upper Tanana Valley. Wage employment opportunities in the small communities are generally limited to teaching, working for the regional or village corporations, summer construction, firefighting, and other Federal, tribal, or State jobs that sporadically become available. Nearly 32 percent of local jobs in the Upper Tanana Valley are supplied by State and Federal governments.

The high cost of living encourages people to supplement their incomes by harvesting natural resources, particularly because employment is seasonally dependent on tourism and other summer activities. Some residents take seasonal construction jobs outside the area for several months at a time, and then return home to a subsistence lifestyle. In winter, the unemployment rate in all communities is very high. Table 4-3 depicts the employment levels of local communities.

Many residents of the villages outside Tok make handicrafts to sell in gift shops in Fairbanks, Anchorage, Tok, and Northway Junction. Traditional Native handicrafts include a wide variety of hats, mittens, moccasins, beadwork, and birch bark baskets.

Tetlin Refuge contributes 20 permanent jobs and just over one million dollars annually in payroll and local spending to the local economy.

4.3.4.2 Income

Per capita incomes range from just over $7,000 in smaller, more isolated communities such as Tetlin and Dry Creek to more than $18,000 in larger communities such as Deltana, Delta Junction, and Tok, which have more infrastructure and services (see Table 4-3) (DCED 2004). These figures do not include income derived from commercial fishing, trapping, firefighting, firewood cutting, craft sales, or the value of resources gathered for other subsistence uses, which usually represent a significant portion of the annual family income. Alaska Permanent Fund dividend checks, Social Security payments, unemployment compensation, and welfare payments presumably are a portion of the total personal income, but those data are not readily available.

Table 4-3. Employment and income for local communities: 2000 (Sources: DCED 2004)

Community	Total potential workforce	Unemployed & seeking work	Government jobs (includes military)	Private sector jobs	Per capita income
Dot Lake	16	2	0	3	$18,521
Dry Creek	88	0	2	8	$7,779
Tannacross	115	32	9	15	$9,429
Tok	995	111	165	353	$18,521
Tetlin	70	15	8	9	$7,371
Northway communities[1]	209	22	52	40	$14,038
Delta area communities[2]	2,584	198	662	679	$17,811
Copper River area communities[3]	1,038	135	193	278	$16,683

[1] Northway communities include: Northway, Northway Junction, and Northway Village

[2] Delta area communities include: Delta Junction, Deltana, Big Delta, Healy Lake, and Fort Greely military base.

[3] Copper River area communities include: Mentasta Lake, Chistochina, Gakona, Gulkana, Copper Center, Tazlina, Chitna, and Cantwell.

4.3.5 Public Use

Wildlife observation, picnicking, photography, and camping are the most popular uses of Tetlin Refuge. Fishing and hunting (particularly waterfowl hunting) are enjoyed by many local and nonlocal users. Levels of nonconsumptive use such as wildlife viewing, camping, and wildlife photography are high because the Alaska Highway runs 65 miles along the northeastern boundary of the Refuge. Each year from 1999 through 2003, an average of 117,000 summer travelers (bus passengers or in personal vehicles) crossed the Alaska-Yukon border and passed by Tetlin Refuge (U.S. Department of Transportation 2007).

4.3.5.1 Facilities

Currently Tetlin Refuge administers the Tetlin Refuge Visitor Center, five interpretive sites along the Alaska Highway, eight information kiosks, Deadman Lake and Lakeview campgrounds, the Chisana River boat launch, Hidden Lake trail and Airs Hill trail. These facilities provide opportunities for the public to observe and photograph wildlife and enjoy scenic vistas of the Refuge, and serve as centralized locations for refuge educational and interpretive programs. Each of these facilities is located entirely or partly on State lands or on private lands through ANCSA 17(b) easements or lease agreements (see Figure 4-8).

The Tetlin Refuge Visitor Center was completed in 1988 and is located on State lands eight miles from the Alaska-Yukon border. The visitor center includes a large exhibit area with interpretive displays, an Alaska Geographic Association sales outlet, a large viewing deck providing views of Scottie and Desper creeks and Alaska Range, eight restrooms and two washrooms (the only such facilities available 24 hours a day along the 113-mile section of the Alaska Highway between Tok and Beaver Creek, Yukon). The visitor center is open daily from mid-May through mid-September. Average annual visitation from 1999 through 2003 was 16,600 people, a little more than eight percent of all summer travelers estimated to have crossed the Alaska-Yukon border on the Alaska Highway.

Tetlin Refuge is currently working with the Alaska Department of Transportation and Public Facilities and the Alaska Department Economic and Community Development to design and construct an 8,000-square-foot multi-agency visitor center in Tok. This facility will provide visitors and local communities a wide range of information and educational opportunities. In 2008, 8.3 acres was purchased by the Service 1.3 miles east of the Alaska Highway/ Glenn junction (Toc Cut-off). A detailed discussion of this facility is found in section 2.4.2.2 under *Visitor Centers and Kiosks.*

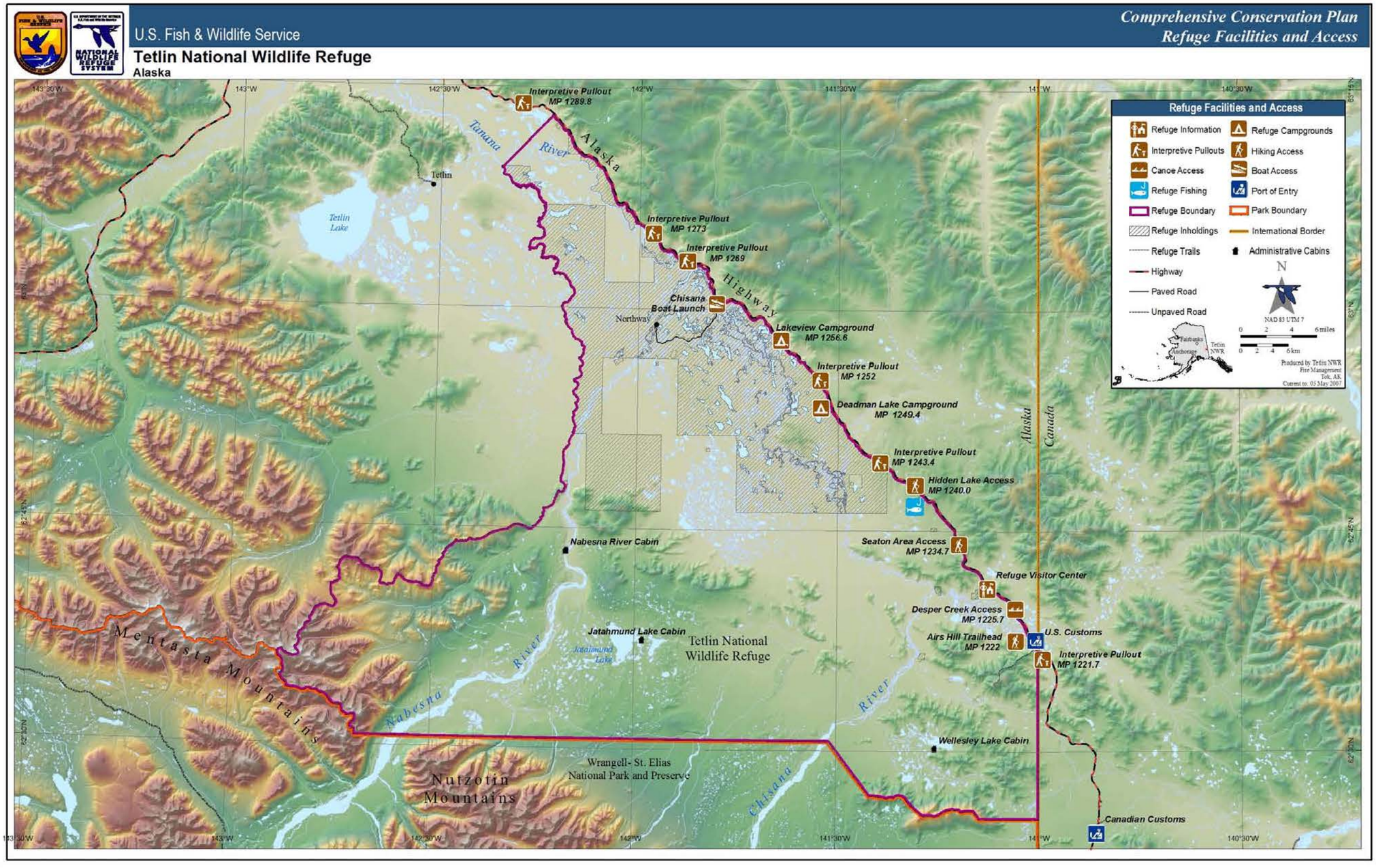
Facilities at Deadman Lake and Lakeview campgrounds include restrooms, boat launches, docks, picnic tables, fire pits, interpretive boardwalks and kiosks, and wildlife viewing platforms and photography blinds. Combined, these two campgrounds provide 23 sites (six sites are suitable for larger recreational vehicles up to 33 feet in length) and are used at or near capacity during the busiest summer months. They are managed and maintained by the Refuge under a 55-year lease from the State (expires in 2044). The Service will investigate possible purchase from the State.

Three administrative cabins located in remote parts of the Refuge are also available to the public when not needed for refuge field operations. Two cabins are accessible by floatplane and the third by boat. Each provides opportunities for wildlife viewing, wildlife photography, fishing, hunting, and trapping. The use of these cabins by the public is infrequent and sporadic, occurring primarily in the spring and fall in conjunction with waterfowl hunting, big-game hunting, and ice fishing, with some winter use occurring during trapping seasons. Table 4-4 lists the total number of groups and people known to have used these cabins from 1997 through 2004 (based upon refuge permit registration and visitor log books). Not all visitors using these cabins register with the Refuge prior to using the cabins. Log books at the cabins often include groups that refuge records indicate had made no reservations for their use.

4.3.6 Access and Transportation

Boat, canoe, snowmachine, and light aircraft are the most common modes of transportation on Tetlin Refuge. By regulation, the use of off-road vehicles (including ATVs, air boats, and air-cushion vehicles) is not allowed in locations other than established roads and parking areas or on designated routes (43 CFR 36.11(g)). There are no established roads, parking areas, or

Figure 4-8. Facilities and Access



designated routes for off-road vehicles on Tetlin Refuge. Areas suitable for landing wheeled planes are very limited, so most aircraft access on the Refuge is confined to airplanes equipped with floats and skis. It is estimated that more than 30 lakes within the Refuge are accessible by float and ski plane.

Boats and canoes gain access to the Refuge via Desper and Scottie creeks, and the Tanana, Nabesna, Chisana, and Kalutna rivers. Rafters and canoeists occasionally reach the Refuge by floating from Chisana, Nabesna, Jack Creek, or Orange Hill in the Wrangell–St. Elias National Park and Preserve. Public boat launches and access are maintained by the Refuge at Deadman Lake and at the Chisana River Bridge near Northway Junction.

Muskeg bogs, large wetland areas, the Chisana and Tanana rivers, and private lands between the Alaska Highway and refuge lands significantly limit the number of places the Refuge can be accessed from the Alaska Highway. Two primary areas for access include the Airs Hill area at the Canadian border, a few hills northwest of the Refuge Visitor Center, and the Seaton Roadhouse area. A short hiking trail provides access from the Alaska Highway to Hidden Lake (see Figure 4-8).

Table 4-4. Number of groups (people) using Tetlin Refuge administrative cabins

Year	Wellesley Lake groups (people)	Jatahmund Lake groups (people)	Nabesna River groups (people)
1997	4 (12)	4 (14)	6 (12)
1998	7 (27)	7 (19)	4 (6)
1999	1 (1)	1 (4)	4 (13)
2000	13 (36)	0	6 (17)
2001	11 (29)	3 (6)	10 (20)
2002	3 (9)	2 (5)	3 (8)
2003	9 (31)	1 (4)	1 (5)
2004	7 (21)	2 (6)	5 (10)

Note: Based upon refuge permit registration records and visitor log books.

During periods of adequate snow cover, the entire Refuge is open to snowmachine use. Snowmachines are used for subsistence and recreation. A network of unmarked snowmachine routes cross the Refuge; the Refuge does not maintain or groom these trails.

In past years, permitted guides have used pack stock in southern portions of the Refuge, but distance, terrain, and the cost of feed often make their use impractical.

No major changes in transportation have occurred in the Upper Tanana Valley for 60 years, but three construction projects are currently underway, which could significantly affect the number of summer travelers along the Alaska Highway. A road-widening and asphalt-surfacing project will upgrade and improve the existing gravel portion of the Taylor Highway between Chicken and the Poker Creek border crossing. Plans are currently underway to extend a rail line from Fairbanks to Fort Greely to support the national missile defense program (construction could be completed as early as 2011) (Alaska Railroad Commission 2004). In 2004, the Alaska State legislature passed a bill authorizing the State to delineate a rail transportation corridor between the existing corridor and the Alaska-Yukon border.

4.3.7 Subsistence

Subsistence is defined as "the customary and traditional use by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of inedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade" (ANILCA title VIII, 1980).

The primary subsistence users of the Refuge live in the areas of Northway and Tetlin, and near the Alaska-Yukon border. Residents of Tok also use the Refuge for subsistence activities but to a lesser degree. Residents of Tanacross have a long history of infrequent or occasional use of Tetlin Refuge for subsistence purposes. Information regarding the amount of subsistence resources gathered within the Refuge is limited.

Moose, caribou, whitefish, pike, burbot, waterfowl, grouse, lynx, wolves, marten, red fox, hare, muskrat, berries, and firewood are the most important resources harvested on Tetlin Refuge for subsistence use. The majority of animals are harvested near the major rivers, streams, lakes, and ponds within the Refuge, and near the Alaska Highway. Different resources are harvested at different times of the year. The availability of resources, cash income, and legal hunting seasons are the primary factors determining when harvests occur.

4.3.7.1 Large Mammals

Most hunting for large game within Tetlin Refuge is by local residents in and around Northway, Tetlin, and Tok. Moose and caribou hunting occur during the fall and winter Federal permit seasons. Moose are also harvested at other times during the year for consumption at ceremonial potlatches. Dall's sheep are occasionally sought by some local subsistence hunters in the fall.

Moose are hunted primarily in the northwestern part of the Refuge or by boat along the Nabesna, Tanana, and Chisana rivers, and on tributaries, including Moose, Desper, Scottie, and Mirror creeks. Other less accessible areas, such as Tlocgon, Nuziamundcho, and Big John lakes, and the lakes directly west of Riverside, are used less frequently. Other moose are taken within walking distance of the Alaska Highway. Each year, 20 to 30 Federal subsistence moose permits are issued for hunting within Tetlin Refuge in late November, but no harvest has been reported to date. Alaska Department of Fish and Game (ADF&G) estimates 170 to 200 moose are harvested annually in GMU 12 (an area of approximately 6.4 million acres that encompasses Tetlin Refuge). These estimates include moose harvested for both recreation and subsistence uses (Gardner 2002). The majority of harvest in GMU 12 is by local residents and occurs along the Alaska Highway and Tanana River (Gardner 2002).

Caribou hunting occurs primarily along major rivers and streams and within walking distance of the Alaska Highway. During periods of adequate snow cover, hunting areas throughout Tetlin Refuge are reached by snowmachine. Currently, only federally qualified subsistence users are permitted to hunt for caribou on the Refuge. Seasons typically occur during the winter and may be extended, shortened, or canceled based upon a number of factors, including the presence or absence of caribou on the Refuge, snow depth and conditions, and the presence of caribou from smaller herds such as the Mentasta Herd. The number of caribou hunting permits issued has been variable, ranging from 34 to 208 per year; the majority of permit holders are residents of Tok. Reported harvest has also widely varied from a low of 7 animals (2002–2003) to a peak of 43 animals (2000–2001). These harvest reports should be considered slightly below the total harvest of caribou within the Refuge. ADF&G estimates unreported harvest in adjacent GMU 20E to be less than 10 percent of the reported harvest (Gardner 2001b).

A relatively small number of brown and black bear are taken for subsistence on an opportunistic basis, but they were not historically sought out as a source of food.

4.3.7.2 Waterfowl and Other Migratory Birds

Waterfowl are taken primarily during spring and fall migrations. Waterfowl are harvested on a few bodies of water in the vicinity of Northway and along the Alaska Highway, on the Chisana River, Moose Creek, and in the Desper-Scottie Creek area.

Both subsistence and recreational hunting for waterfowl occur on Tetlin Refuge. A preliminary survey of subsistence users conducted by Tetlin Refuge staff in 1983 showed that ducks were used by over 70 percent of the households in Northway and Tetlin Village, as well as by Tok, Dot Lake, and Tanacross residents. Trappers are known to use the inedible parts of ducks for baiting traps and snares. Based upon observations by refuge staff, the number of younger waterfowl hunters has declined. These observations are reflected in Table 4-5.

Currently, residents in the Upper Tanana and Copper River valleys may harvest birds or eggs of 92 species, including waterfowl, waterbirds, seabirds, cranes, owls, and shorebirds. The bird harvest season is open from April 2 through August 31 with a closure from June 15 through July 15. Egg gathering is open from May 1 through June 14. There are no bag limits, and hunting may take place 24 hours per day.

With the inclusion of all residents in highway communities within the Upper Tanana and Copper River valleys, approximately 7,1200 people are now eligible to participate in the subsistence waterfowl hunting season (Table 4-2).

Table 4-5. Comparison of migratory bird harvest in Upper Tanana Valley communities, Alaska: 1987 and 2000 (Andersen and Jennings 2001)

Community	Dot Lake		Northway		Tanacross		Tetlin		Tok	
Year	1987	2000	1987	2000	1987	2000	1987	2000	1987	2000
Percentage of households using birds	46.7	26.7	71.1	35.7	55.6	34.6	79.3	36.7	22.5	15.5
Percentge of households harvesting birds	26.7	6.7	62.2	26.2	44.4	23.1	49.7	26.7	22.0	10.0
Ducks harvested	51	42	2652	432	207	126	810	420	2129	1131
Geese harvested	0	0	174	0	24	0	1	0	29	51
Birds per household	2.6	2.6	31.4	10.3	6.8	4.8	30.0	14.0	5.9	3.4

Note: The 2000 survey used different methodologies in Tok than in the villages. Only a subset (22 percent) of households in Tok were surveyed, most of which were subjectively identified. The village surveys attempted to contact all households.

4.3.7.3 Fish

Fish resources within the Refuge continue to be an important part of modern subsistence lifestyles in the Upper Tanana Valley. Historically, these resources were a key element for survival in the harsh environment of interior Alaska. Table 4-6 reports estimated pounds of non-salmon fish harvested by Upper Tanana communities from a recent study (Friend et al. In Press).

A historic and traditional whitefish subsistence fishery is located near Northway and Fish Lake; humpback whitefish is the primary species harvested. Humpback whitefish are an important component of local culture and continue to be a primary subsistence fishery species within the Refuge. Presently, most of the whitefish harvest is by residents of Tetlin and Northway. Surveys completed in the 1980s estimated the average household harvest of whitefish to be 375 pounds per year in Northway (Case 1986) and 569 pounds per year in Tetlin (Halpin 1987). In 1988, whitefish made up 42 percent of all subsistence resources used by residents of Northway and Tetlin (Marcotte 1991). A more recent survey estimated 16,156 pounds per year harvested by Northway residents in 2004–2005 and 10,756.52 pounds per year harvested by Tetlin (Friend et al. In Pess).

Interviews with residents illustrate whitefish are not only an important food resource, but also an important part of their culture (Robinson 2005).

Table 4-6. Estimated pounds of non-salmon fish harvested in Upper Tanana River communities: 2004 and 2005 (Friend et al. In Press).

Resource	Dot Lake	Northway	Tanacross	Tetlin	Tok	Grand Total
Non-Salmon Fish	**1580.09**	**19484.40**	**5110.61**	**10756.52**	**17936.92**	**69242.33**
Herring	0.00	0.00	0.00	0.00	0.00	0.00
Blackfish	0.00	0.00	0.00	0.00	0.00	0.00
Burbot	133.24	893.07	505.59	583.48	2642.53	5145.38
Char*	99.75	732.00	294.00	0.00	2835.58	4399.33
Dolly Varden	0.00	0.00	45.41	0.00	413.68	413.68
Lake Trout	99.75	732.00	248.59	0.00	2421.90	3985.65
Grayling	140.60	837.33	191.61	203.35	1085.09	3103.71
Pike	64.13	456.00	822.41	1399.35	1884.12	4259.60
Sheefish	0.00	0.00	0.00	0.00	30.09	30.09
Sucker	0.00	210.00	85.14	0.00	112.82	532.82
Trout	99.75	0.00	0.00	0.00	0.00	99.75
Rainbow Trout	99.75	0.00	0.00	0.00	0.00	99.75
Whitefish	**1042.63**	**16356.00**	**3211.86**	**8570.32**	**9344.12**	**51669.07**
Broad Whitefish	95.00	0.00	567.57	0.00	1158.30	1253.30
Cisco	0.00	0.00	0.00	0.00	0.00	0.00
Bering Cisco	0.00	0.00	0.00	0.00	0.00	0.00
Least Cisco	0.00	0.00	0.00	0.00	0.00	0.00
Humpback Whitefish	748.13	16156.00	2499.57	8570.32	7935.11	49565.55
Round Whitefish	0.00	200.00	144.73000	0.00	0.00	400.00
Unknown Whitefish	**199.50**	**0.00**	**0.00**	**0.00**	**250.71**	**450.21**
Unknown Non-Salmon Fish	**0.00**	**0.00**	**0.00**	**0.00**	**2.58**	**2.58**

*According to Morrow, p.61, there are no char in Eastern Interior Alaska, however the nomenclature for dolly varden is confused with char and further this study is a household survey that does not ask where the fish were harvested.

The majority of households surveyed in Northway fish within a five-mile radius of the community, primarily along Moose Creek, the Nabesna River, the Chisana River downstream from the Chisana River Bridge, and on Fish Lake. In addition, several traditional sites on the Refuge are used for fishing and fish camps. The Chisana River is used to gain access to Moose Creek, which is fished heavily for burbot and pike. Other fishing areas include Tenmile Lake, Deadman Lake, the confluence of Stuver Creek and the Chisana River, and the Desper-Scottie Creek area. Fish Camp Lake (Tlechegn Lake) is used extensively for whitefish and burbot.

The Tanana River is fished for burbot. The Kalutna River is fished for pike and Arctic grayling. Gardiner Creek, accessible by foot from the highway, is also a popular place to fish for Arctic grayling.

A moderate amount of ice fishing for burbot takes place on Moose Creek and Jatahmund Lake and at Hidden Lake for rainbow trout.

Household surveys of residents in the Upper Tanana Valley were conducted in 1988. Estimates from these surveys show Northway and Tetlin residents harvested about 21,000 whitefish, 3,300 pike, 2,700 Arctic grayling, and 1,000 burbot between June 1987 and May 1988 (Marcotte 1991).

4.3.7.4 Upland birds

Spruce, ruffed, and sharp-tailed grouse, and willow ptarmigan are the most commonly harvested upland birds. Most harvest is incidental to other activities such as big-game hunting or fishing. Research and interviews indicate residents of Tok, Tanacross, and Dot Lake harvest upland birds primarily outside the Refuge (Marcotte 1991). Northway and Tetlin residents harvested just over 2,000 grouse and ptarmigan in 1988, with the majority of harvest occurring outside Tetlin Refuge or on private lands within the Refuge (Marcotte 1991, Halpin 1987, Case 1986).

4.3.7.5 Plant Resources

Common plant resources gathered for subsistence use include various berries, Indian potato (Hydysarum spp), wild rhubarb, mushrooms, muskrat cache (roots of Myriophyllum spicatum cleaned and stored by muskrats), birch bark, and firewood (Halpin 1987, Case 1986). Plants are primarily gathered along the Tanana River near Riverside and Fish Camp Lake, along the Alaska Highway, along Moose Creek, and between the village of Northway and the Alaska Highway.

4.3.7.6 Furbearers

A number of furbearer species are trapped by local rural residents. Some of these animals are used for food (e.g., muskrat and beaver), but the primary purpose for trapping is to sell, trade, or use the furs of these animals for making handicrafts or clothing. A more detailed discussion of furbearer trapping is provided in the Economic Use section of this chapter.

Subsistence trapping cabins and traplines. Creating and maintaining a trapline through the dense spruce forests within the Refuge takes considerable time and effort. Trappers tend to rotate use to different established lines over time, and some lines are passed down from parents to children (Halpin 1987). Although all areas of Tetlin Refuge are open to the public, trappers generally feel their efforts grant them exclusive rights to use these traplines. Others generally respect this unwritten code, but user conflicts do arise.

A few residents in the Northway area utilize large areas along established traplines in the central and northern portions of the Refuge or target a few highly productive areas. Tetlin residents trap

primarily along the lower Kalutna River and around Big John Lake. Tok residents trap primarily in the northwestern panhandle, the Black Hills area, and the southern half of the Refuge, gaining access via ski plane or snowmachine. Most people no longer stay out overnight while trapping, but instead use shorter lines that can be covered within one day (Halpin 1987). This shift from multi-day trapping expeditions to single day trips has virtually eliminated the use or need for strategically located cabins along each trapline. Currently, there are five cabins administered by the Refuge which are used under special use permit for trapping and other subsistence activities. Several other cabins are located throughout the Refuge on private lands.

4.3.8 Recreation

Recreational use of the Tetlin Refuge is relatively low, partly due to its distance from major population centers and the lack of access into the interior of the Refuge. Thus, most recreational users are either residents of the area or people driving by the Refuge, stopping at campgrounds or at State-administered waysides and pullouts. Hunting, fishing, trapping, camping, wildlife observation, and photography are the primary recreational activities pursued within the Refuge.

4.3.8.1 Hunting

Waterfowl, bear, moose, and sheep are the major species hunted on Tetlin Refuge for recreation. Only federally qualified subsistence users are currently permitted to hunt caribou on the Refuge; currently, the general State season is closed. Local use of these species is discussed in the section on subsistence (section 4.3.7).

The number of people participating in recreational hunting trips is thought to currently be low and stable, but estimates for the number of recreational hunters using the Refuge are not available. Hunters generally charter or fly a personal float plane to Wellesley, Jatahmund or one of the other larger lakes, boat the Nabesna, Chisana, and/or Tanana rivers, or hire one of two commercial big-game guides permitted to operate within Tetlin Refuge.

With the exception of guided client harvest, numbers of moose harvested by recreational hunters within the Refuge is unknown because the Refuge does not constitute a unique management area for record keeping purposes as tracked by ADF&G. Average big-game harvest from the Refuge by commercially guided hunters is approximately one moose and one Dall's sheep each year, with black or brown bears harvested occasionally (TNWR 2005b).

Many waterfowl hunters come to the Refuge, particularly from Fairbanks and Anchorage, but as with other recreational hunters, no estimates of participation within the Refuge are available.

4.3.8.2 Fishing

Fishing for rainbow trout, lake trout, northern pike, Arctic grayling, and burbot draws some recreational anglers to the area. Ice fishing occurs in late winter for rainbow trout, lake trout, burbot, and pike. Refuge visitors fish predominantly in the road-accessible lakes and streams or larger, more remote fly-in lakes (Figure 4-8); hunters on the Refuge often fish when the opportunity presents itself. Fishing guide services are available, but demand for these services is currently low. In 1983, approximately 15 people paid for guided fishing trips within the Refuge. However, there are currently no commercial recreation fishing guides operating within the Refuge, and there have been no permit requests in recent years. The number of fish harvested by

recreational anglers is unknown, but based upon observations and knowledge of refuge staff, it is presumed to be minimal.

Facilities and trails throughout the Refuge provide recreational fishing opportunities. However, relatively low densities of lake trout, grayling, and rainbow trout, and limited road access to waters within the Refuge are factors limiting participation.

ADF&G continues to stock Hidden Lake with up to 4,000 rainbow trout biannually (ADF&G 2007). The purpose of this stocking effort is to improve recreational opportunities. Preliminary estimates from refuge use data indicate that Hidden Lake received approximately 80 angler use-days during 2006.

4.3.8.3 Non-consumptive Recreational Use

Most of the 200,000 people who drive the Alaska Highway past Tetlin Refuge each year are visitors from the lower 48 states, Canada, and several other countries (primarily Germany, Switzerland, Great Britain, France, and Australia). Trends in the numbers of Alaska Highway travelers and people stopping at the Tetlin Refuge Visitor Center since 1995 have shown similar patterns, with changes in visitor center use more pronounced. However, more recently the number of summer travelers on the Alaska Highway declined 19 percent from 124,535 visitors in 2000 to 100,913 visitors in 2004 (U.S. Department of Transportation 2007), while use of the Tetlin Refuge Visitor Center increased by 50 percent (5,800 visitors) during the same time period (Figure 4-9). The vast majority of recreational use on the Refuge involves wildlife viewing, wildlife photography, camping, picnicking, and other non-consumptive uses. These uses are concentrated at the Tetlin Refuge Visitor Center (16,600 visitors annually), interpretive highway pullouts and overlooks, kiosks, trails, and two refuge administered campgrounds.

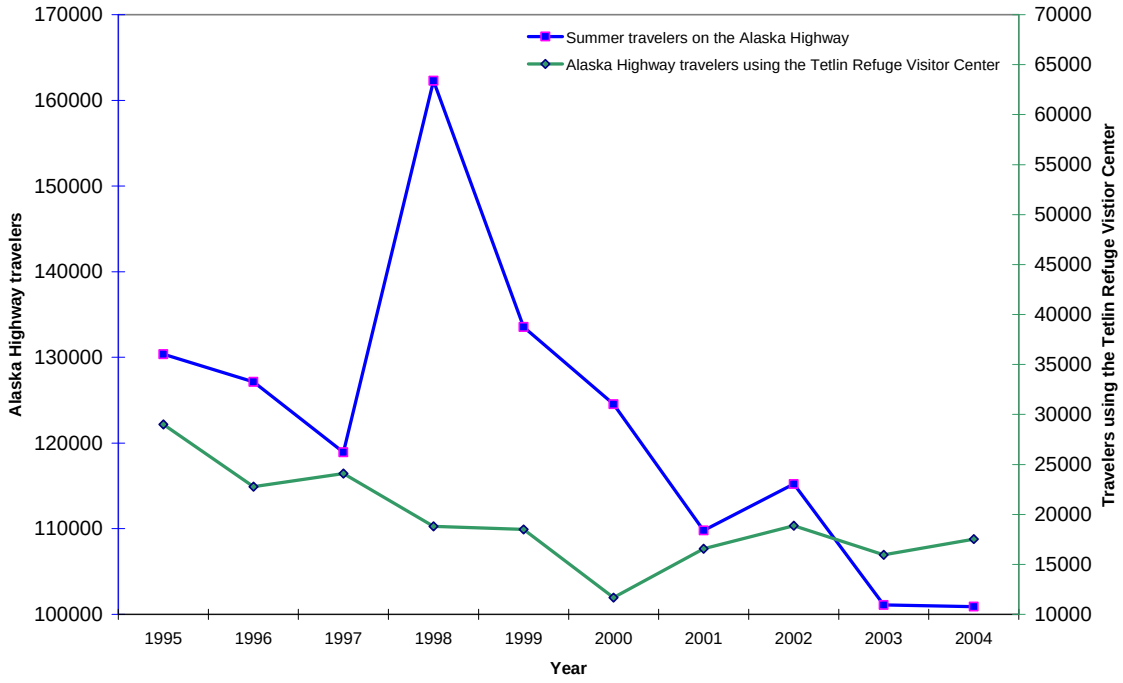
A small but increasing number of boaters and canoeists use Scottie and Desper creeks, and the Nabesna, Chisana, and Tanana rivers. While fishing and hunting are the primary reasons most people use these waters, these areas also provide visitors the opportunity to observe and photograph wildlife. People occasionally fly to Wellesley or Jatahmund lakes for similar activities.

Guide services for these non-consumptive activities are available, but demand is low and sporadic, with only one or two groups using the Refuge from 2001 through 2004. Currently, one operator offers guided canoe and raft trips of varying lengths through Tetlin Refuge.

4.3.8.4 Environmental Education and Interpretation

Environmental education and interpretation is a primary purpose for Tetlin Refuge. Due to the number and diversity of programs and products produced by the Refuge, only an overview is provided here. A detailed description of the Refuge's interpretive program can be found in the Tetlin Refuge Public Use Management Plan (USFWS 1997a). Most activities take place at the Tetlin Refuge Visitor Center, Deadman and Lakeview campgrounds, or at off-site locations in local communities. Interpretive programs cover a broad range of topics, including identification of local flora and fauna, local geology, natural history, ecology, wildlife management, traditional lifestyles, and local history.

Figure 4-9. Alaska Highway and Tetlin Refuge Visitor Center summer visitation 1995–2004



Source: U.S. Department of Transportation 2007

Each year, various refuge employees conduct hundreds of presentations in cooperation with Alaska Gateway School District, local Native councils, Alaska Department of Natural Resources, ADF&G, Alaska Natural History Association, Tok Chamber of Commerce, Tok Lions Club, and a variety of other local community organizations.

Programs are delivered through interpretive talks and nature walks, audio cassette or compact disk driving tours, traditional arts and crafts demonstrations, literature classes, school visits, youth camps, Native culture camps, and a number of interpretive displays at the Tetlin Refuge Visitor Center, Deadman Lake Campground, and highway pullouts.

In addition to answering visitor questions, giving directions, providing items through the Alaska Geographic Association, and distributing Service and State brochures and pamphlets—a wide variety of educational materials are produced for the public. These materials include environmental curricula for elementary and secondary schools, the Tetlin Refuge Web Site, Tetlin Refuge brochure, and Tetlin Refuge Visitor Guide, which is updated periodically to provide detailed information about the Refuge. Refuge employees are also active participants in developing local school curricula on a variety of topics ranging from fire to wildlife.

4.3.9 Economic Use

4.3.9.1 Trapping

Trapping is an important activity on Tetlin Refuge and throughout the Upper Tanana Valley. Because most animals are trapped for their pelts (which most often are sold or used to make items which are then sold), it is discussed here as an economic use of the Refuge.

Muskrat, lynx, hare, marten, red fox, wolf, and wolverine are the principal species trapped within Tetlin Refuge. In the early 1900s, and even into the 1960s and 1970s, trapping played an important role in the local economy. In 1983, between $70,000 and $100,000 worth of raw fur (mostly muskrat, lynx, marten, and fox) was taken on the Refuge by an estimated 25 trappers. These estimates do not include fur that was used locally for handicrafts. Wolves, wolverine, coyote, mink, river otter, and beaver were also harvested.

More recently, the value of furs and the number of animals harvested have both declined. Based on past interviews with local fur buyers (TNWR 1988) and the harvest estimates included in this discussion, the current value of furs taken from the Refuge is most likely in the range of $30,000 to $50,000 annually.

The Northway-Tetlin Flats area, which includes the northern portion of Tetlin Refuge, has been one of the most productive muskrat trapping areas in Alaska (Gardner 2001a). Muskrat, at one time, were probably the most harvested furbearer in the region (USFWS 1987a). Historically, tens of thousands of muskrat pelts were sold annually in the Northway and Tetlin areas. Household surveys estimate that nearly 4,000 muskrat were harvested by residents of Tetlin and Northway in 1988 (Marcotte 1991).

Lynx harvest tends to fluctuate according to their natural population cycles (see section 4.2.8 of this document). Based upon a review of ADF&G sealing records for GMU 12 from 1978–1998, it is estimated 70 to 100 lynx were harvested from the Refuge during the peak of the cycles, with 30 to 40 harvested during the bottom of the cycles (TNWR 1998).

A similar review of ADF&G sealing records for wolverine indicates reported harvest within the Refuge remained less than six animals per year (TNWR 1998). More recent harvests were above average due to higher pelt prices, with trapping effort concentrated along the western and southern boundaries of the unit, outside Tetlin Refuge (Gardner 2001a).

Review of ADF&G sealing records for wolves indicates an average of four animals trapped per year within the Refuge from 1978 through 1990. However, these same reports indicate harvest increased to an annual average of 19 animals from 1991 through 1998 (TNWR 1998).

Household surveys estimate 4,600 snowshoe hare and 700 marten were harvested by residents of Tetlin and Northway in 1988 (Marcotte 1991); there is no harvest reporting requirement for these species under current regulations, and a more recent estimate of harvest is not available.

4.3.9.2 Guiding and Transporter Services

All commercial guiding and air-taxi/transporter services within Tetlin Refuge are regulated by special use permits. Currently, two big-game guides, one air-taxi/transporter, and one river float trip guide service are permitted to operate within the Refuge. The number of big-game guides is limited at this time by a competitive application process, which allows only two guide use areas on the Refuge.

Relatively low densities of big-game populations and Federal hunting regulations currently make areas outside the Refuge more attractive to commercial big game guides. Guides permitted to operate on the Refuge typically take one or two clients into the Refuge each year and account for a harvest of one sheep and one moose. Occasionally, a guided hunter harvests a black bear or grizzly bear. Hunts may last as long as 10 days, but clients typically hunt 4 or 5 days within the

Refuge. The average cost for a one-week hunt is $6,500 to $7,500 depending on the number and type of game hunted.

Despite recreational fishing opportunities in the Refuge for Arctic grayling, northern pike, and lake trout, there is currently no demand for guided fishing services; no permits are currently active, and none have been requested.

The permitted air-taxi/transporter operator provides the majority of air service for hunters, anglers, backpackers, photographers, and other recreational users on the Refuge. On average, 18 people are flown into the Refuge annually. Group size is generally two to four people; the average stay is eight days.

One permitted ecotourism operator provides canoe and raft trips within the Refuge, primarily on the Chisana and Tanana rivers.

4.4 Wilderness Values

Section 304(g) of ANILCA requires the Service to identify and describe the special values of the Refuge, including wilderness values. The term "values" is often viewed synonymously with a range of similar terms, from subjective beliefs and preferences (e.g., family values) to more objective functions, services, and benefits (e.g., ecological values). Of interest here are the objective kinds of values, specifically those that are related to the condition and character of the natural environment.

The 1964 Wilderness Act recognized wilderness as a resource in and of itself and also established a mechanism for preserving that resource in a national system of lands. The definition of wilderness found in the act provides a framework for identifying and describing wilderness values. According to the act, the fundamental qualities of wilderness are: undeveloped, untrammeled, natural, and outstanding opportunities for solitude, or a primitive and unconfined type of recreation. In addition, the act states that wilderness "may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

Undeveloped. This is the most immediately observable and easily measured wilderness quality. Undeveloped simply means free from roads, structures, and other evidence of modern human presence or occupation. The undeveloped quality strongly influences other core wilderness values, in particular, experiential opportunities for solitude and primitive recreation. A lone structure may have only minimal impacts on natural processes while still serving as a constant reminder of human influence for recreational visitors. Certain kinds of structures or improvements may be considered desirable in a given wilderness setting (e.g., trails) or acceptable according to specific legislation, but that does not diminish their negative impact on the undeveloped quality.

Untrammeled. The Wilderness Act states that wilderness is "an area where the earth and its community of life are untrammeled by man." In other words, wilderness is essentially uncontrolled or unrestricted by purposeful human actions. Synonyms for untrammeled include unhindered, unencumbered, free-willed, and wild (Landres et al. 2005). The untrammeled quality of the wilderness resource is diminished when ecological events or processes are constrained or redirected to suit modern human ends (e.g., by suppressing naturally ignited fires or introducing non-native plants or animals).

Natural. Naturalness is a measure of the overall composition, structure, and function of native species and ecological processes in an area. In contrast to untrammeledness, the natural condition of an area may sometimes be enhanced through purposeful human action (e.g., to restore an eroded stream bank or eradicate an invasive weed).

Outstanding Opportunities for Solitude. Solitude in the wilderness context is generally understood to mean freedom from sights, sounds, and other evidence of modern man (Landres et al. 2005). While the relative amount of freedom from these things necessary to experience solitude is highly personal and variable, the Wilderness Act states only that outstanding opportunities for solitude be provided. Accordingly, encountering other people, hearing mechanized sounds (from aircraft overflights, for example), or seeing the lights of a distant population center are all examples of things that may negatively affect solitude opportunities; while remoteness, low visitor density, and vegetative or topographic screening are things that may enhance solitude opportunities.

Outstanding Opportunities for a Primitive and Unconfined Type of Recreation. Primitive and unconfined recreation occurs in an undeveloped setting and is relatively free from social or managerial controls. Primitive recreation in wilderness has largely been interpreted as travel by non-motorized and non-mechanical means. Primitive recreation is also characterized by experiential dimensions such as challenge, risk, and self-reliance. Dispersed use patterns, which frequently occur where there are no facilities to concentrate use, enhance opportunities for self-reliance, and also enhance opportunities for solitude. Conversely, some actions aimed at maintaining opportunities for solitude, such as limited permit management systems, may negatively affect opportunities for unconfined experiences.

Other Special Features. Lands that exhibit the core wilderness qualities described may also contain additional special features with scientific, educational, scenic, or historic value. While the Wilderness Act makes it clear that these features are not wilderness qualities in and of themselves, their presence may distinguish one area with wilderness values from another. In the context of Alaska refuges, special features might include such things as active volcanoes, unique abundance or concentrations of a given species, fossil deposits, or evidence of prehistoric cultures.

As directed by sections 304(g) and 1317 of ANILCA, all Tetlin Refuge lands were reviewed during the first refuge planning process in the 1980s "as to their suitability or nonsuitability for preservation as wilderness." Four wilderness review units were identified for the 1980s review, and with minor adjustment, those boundaries are used once again for the following identification and description of refuge wilderness values (see Figure 4-10). No lands on Tetlin Refuge were recommended for designation as Wilderness in the 1987 Conservation Plan (USFWS 1987a).

4.4.1 Characteristics Common to All Units

Most of the Federal lands within the four wilderness review units in Tetlin Refuge meet the definitions of wilderness as defined by the Wilderness Act. They are largely undeveloped, untrammeled, and highly natural, and support abundant opportunities for solitude and primitive recreation. All of these units support the full suite of fish and wildlife species and plant communities that represent the northern boreal forest of Tetlin Refuge. Although much of the Federal land within the units is contiguous, some small parcels of private property, or inholdings, exist. The Alaska Highway borders portions of some units, and there are scattered cabins and remnants of other structures as well. However, within the interior of each of the units, few visible signs of human manipulation or a permanent human presence can be seen. The Refuge is large

and offers outstanding opportunities for solitude. Opportunities for primitive recreation—use that is dispersed and does not require on-site facilities—are also abundant in all units.

4.4.2 Tetlin Flats Unit

This area consists of two parcels approximately 11,500 acres and 8,500 acres in size. These parcels are isolated from other Federal lands within the Refuge and share only one common point. This broad wetland and river valley area located in the northern portion of the Refuge is dotted with innumerable lakes, ponds, and meander scars that provide some of the most productive wetlands within the refuge boundaries. The predominant vegetation type is open black spruce forest with deciduous scrub of alder, willow, blueberry, and dwarf scrub.

This unit remains largely undeveloped, appearing natural and undisturbed, with some improvements on private inholdings and parcels adjacent to refuge lands along the Alaska Highway. However, due to the overall the size of the unit, the unconnected position of the parcels that comprise it, and uncertainty relative to surrounding development and activities, it does not lend itself to long-term conservation of naturalness at a scale sufficient for wide-ranging species such as caribou or wolves.

Compared to the rest of the Refuge, this unit experiences substantial traffic noise and boat travel along the Tanana River, which decrease opportunities for solitude. Recreational opportunities are largely confined to the river corridor and to winter snowmachine trails.

4.4.3 South Central Area

This unit includes approximately 419,000 acres of refuge-administered lands between the Alaska Highway (including the Nabesna and Chisana rivers) and the Refuge's southern boundary with Wrangell-St.Elias National Park and Preserve. Habitats are diverse—ranging from low wetland areas, to the rolling Black Hills, to the foothills of the Nutzotin Mountains. Numerous small ponds, large lakes, and various streams are found throughout the area.

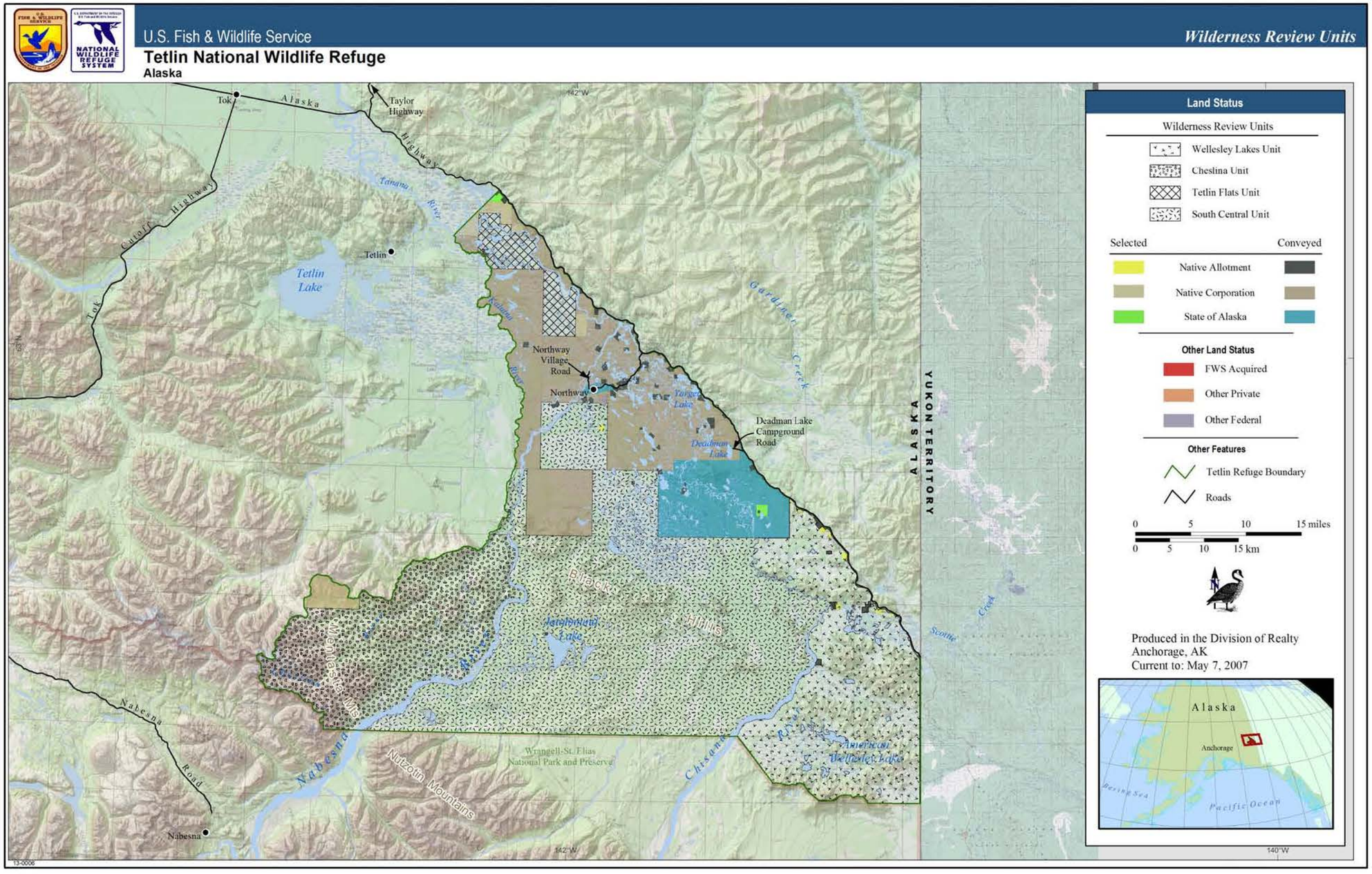
The unit remains essentially in a natural, unaltered condition. Evidence of current and past trapping activities, hunting camps, various subsistence activities, and early travel south into the gold mining areas of the upper Chisana and Nabesna rivers is present but widely scattered. Extended travel into the area requires a boat, airplane, snowmachine, or dog team. Few people visit the area, with the limited use focused at a few key destinations such as Jatahmund Lake. As a result, opportunities for solitude and a variety of recreation activities are outstanding throughout most of the area.

4.4.4 Cheslina Area

This unit is located in the southwest corner of the Refuge and encompasses approximately 140,000 acres, including much of the Cheslina watershed and refuge-administered lands east to the Nabesna River. The unit is dominated by high hills and steep, rugged mountains up to 8,000 feet in elevation. Vegetation is predominantly scrub and alpine or subalpine tundra. The area provides important habitat for moose, wolf, wolverine, and marten, and is the only habitat for Dall's sheep found within the Refuge.

Access to the area is by boating the Nabesna River, by small plane, or by a steep overland trail from the Nabesna Road located south of the Refuge in Wrangell-St. Elias National Park and

Figure 4-10. Wilderness Review Units (from USFWS 1987a)



Preserve. Due to its remote and rugged terrain, the area is only visited occasionally by hunters and provides outstanding opportunities for solitude and a variety of recreation activities.

4.4.5 Wellesley Lake/Scottie Creek Area

This unit encompasses approximately 120,000 acres bounded by the Chisana River, the Alaska Highway, the Canadian border, and Wrangell-St. Elias National Park and Preserve. Much of this area is characterized by the meandering channels of Mirror, Scottie, and Desper creeks and the numerous small ponds and lakes in these low wetland valleys. However, several areas of forested hills and uplands add to the diversity.

The unit remains essentially unaltered from its natural condition except for development along the Alaska Highway. Much of this area is easily accessible from the Alaska Highway but is not frequently used by visitors. Access is also possible from the Chisana River. While opportunities for solitude are limited near the Alaska Highway, portions of this area away from the highway provide outstanding opportunities for solitude in settings found few other places within Tetlin Refuge. Recreational opportunities in this area are more diverse and more easily accessible than in other portions of the Refuge due to boat access to Scottie and Desper creeks and overland access to Airs Hill and the Chisana River from the Alaska Highway.

Use of this area dates to prehistoric times, and the number and variety of cultural resources documented make it the most valuable cultural and historic area managed by the Refuge.

4.5 River Values

4.5.1 Scottie-Desper Creeks

Scottie Creek is the Chisana River's largest tributary. It begins in the Yukon and flows southwest for approximately 50 miles, crossing the Alaska-Canada border to join with the Chisana River about 28 miles southeast of Northway Junction. Scottie Creek crosses the Alaska Highway at milepost 1223.4. The lower 12 miles of the stream meanders through a lowland area consisting of numerous lakes, ponds, and other wetlands. A prehistoric rock fishing weir was established in the lower segment of the stream (Yarber and Madison 1987, Tyone 1996). The stream substrate is mud with excellent water quality during the open water period. Scottie Creek is known to support northern pike, longnose suckers, humpback whitefish, arctic grayling, and burbot. Chum salmon have been reported in Scottie Creek, and this stream also contains freshwater clams. The lower Scottie Creek watershed is considered by refuge personnel to be vital wildlife habitat.

Desper Creek originates in the foothills north of the Refuge in the Yukon-Tanana Uplands. It flows south and west 20 miles before joining with Scottie Creek about 31 miles southeast of Northway Junction. Desper Creek crosses the Alaska Highway at milepost 1225.7 near Border City Trading Post. From the highway, the stream meanders approximately 11 miles to Scottie Creek. The lower Desper Creek watershed is considered by refuge personnel to be important wildlife habitat. The stream has an abundance of aquatic vegetation. It freezes to the bottom during some winters or has shallow and anoxic water conditions under the ice. Desper Creek is known to support northern pike, humpback whitefish, burbot, and longnose suckers; grayling are also likely to occur in the drainage.

Although both Scottie and Desper creeks are easily accessible from the Alaska Highway, neither receives a noticeable amount of public use. A number of log jams and beaver dams make boat

travel difficult, but portages are possible. As a result, these two creeks provide outstanding opportunities for fishing, hunting, wildlife viewing, and wildlife photography characterized by high degrees of solitude in a primitive setting.

4.5.2 Chisana River

The Chisana River rises from the Chisana Glacier in the Wrangell Mountains south of the Refuge. It flows northeast then northwest approximately 110 miles, joining the Nabesna River to form the Tanana River about 3 miles northwest of Northway Junction. The Chisana watershed is approximately 3,300 square miles. About half of the river's length is within the Refuge, with the remaining upper half in Wrangell-St. Elias National Park and Preserve. The upper river segment is braided and has wide bank-to-bank widths, relatively shallow water depths, and a steep gradient with high water velocities. This is typical of rivers that flow through glacier moraines. The river substrate within the Refuge is variable with sand, gravel, and cobble in riffle areas, and sand and silt in pool areas. The Chisana is highly turbid during the open water season, but water quality improves considerably during the winter. Primary tributaries to the Chisana River include Stuver, Wellesley, and Mirror creeks, which drain the southern plateau; Scottie and Desper creeks run through important wetlands; and Gardiner Creek flows south onto the Refuge from the Yukon-Tanana Uplands.

Access to the Refuge along the Chisana River is not easy. Visitors must either boat down Desper or Scottie creeks to the confluence or boat upriver from the Chisana Bridge boat ramp more than 40 miles. However, during ice-free periods, the shallow, braided nature of the river upstream from its confluence with Scottie Creek makes boat travel difficult or impossible. Large gravel bars in this upper braided section make access by small wheeled planes possible.

Due to these access difficulties, the portion of Chisana River within the Refuge remains remote and infrequently traveled, providing outstanding opportunities for solitude in a primitive setting. The numerous wetlands, streams, ponds and lakes along this river corridor provide numerous opportunities for fishing, hunting, wildlife viewing, and wildlife photography.

4.5.3 Nabesna River

The Nabesna River rises from the Nabesna Glacier in the Wrangell Mountains south of the Refuge. It flows northeast 73 miles, joining the Chisana River to form the Tanana River about 3 miles northwest of Northway Junction. The Nabesna River watershed is about 2,100 square miles. The upper third of the river is within Wrangell-St. Elias National Preserve. The river has a 0.8 percent gradient from its glacial origin for a distance of about 21 miles to the southern boundary of the Refuge, and a 0.16 percent gradient from the refuge boundary to it confluence with the Chisana near Northway. Water is turbid in the spring, summer, and fall but clears in the winter.

Portions of the Refuge are accessible by traveling a few miles up the Nabesna River beyond the village of Northway. The few cabins scattered along its banks and the occasional boat are the only noticeable signs of people. Near the confluence with the Cheslina River, the Nabesna enters an area of remarkable scenery characterized by high rolling hills dotted with ponds and lakes and the Nutzotin Mountains beyond. The diversity of terrain and habitats found along the Nabesna River provide opportunities for fishing, hunting, and wildlife viewing and photography not found anywhere else within the Refuge.

4.5.4 Kalutna River

The Kalutna River begins adjacent to and west of the Nabesna River, about 9.5 miles southwest of Northway. It flows north 26 miles to the Tanana River, approximately 23 miles southeast of Tok, Alaska. The refuge boundary follows the east bank of the Kalutna River, and the river proper is outside of the Refuge. The Kalutna River drains a large area in the northwest portion of the Refuge.

The Kalutna is only accessible from its confluence with the Tanana River. Its narrow, meandering channel is blocked by numerous deadfall, log jams, and beaver dams, making travel by small boat or canoe difficult. Due to access difficulties, the Kalutna provides outstanding opportunities for fishing, hunting, wildlife viewing, and photography in a primitive setting with outstanding opportunities for solitude.

4.6 Refuge Infrastructure and Administration

4.6.1 Administrative Facilities

Administrative facilities include offices, visitor center/contact stations, residences (quarters), bunkhouses, maintenance shops, warehouse space, vehicle storage, hangar/airport leases/tie-down space/float ponds or docks, fuel and other hazardous materials storage sites, remote administrative cabins and/or sites, etc.

Tetlin Refuge administrative facilities are headquartered in Tok. Table 4-7 is a comprehensive list of all current administrative facilities used and maintained by the Refuge, including pertinent information on the adequacy of the facilities to meet current and projected refuge needs.

Additional administrative facilities and infrastructure necessary for implementation of the Refuge's current program of work are identified in Table 4-8. If additional facilities are required to implement the Revise Conservation Plan as described in Chapter 2, those facilities and associated costs are identified in the discussion of the Revised Plan.

4.6.2 Refuge Staffing

The refuge staff presently consists of 20 permanent positions, and 6 to 8 seasonal positions.

- Refuge Manager
- Deputy Refuge Manager/Refuge Officer
- Supervisory Biologist (Land Management Research Demonstration Area program)
- General Biologist (seasonal)
- Wildlife Biologist (subsistence)
- Wildlife Biologist
- Fire Management Officer
- Forestry Technicians (2 seasonals)
- Refuge Administrator/Computer Specialist
- Refuge Clerk (seasonal)
- Refuge Information Technician
- Supervisory Park Ranger
- Education Specialist (seasonal)
- Park Rangers (4 seasonals)
- Airplane Pilot
- Carpenter (maintenance)

Table 4-7. Existing administrative facilities for Tetlin Refuge

Facility	Size (sq. ft.) or Length (mi.)	Est. Replacement Cost (2005 dollars in thousands)	Description
Visitor Center	N/A	2,701	Consists of a 1,730 sq. ft. main log building, parking lot, wildlife viewing platform, interpretive trail, information signs, drinking water and storage, and restroom facilities. Constructed in 1988. Roof is failing; must be replaced.
Headquarters Office	4,736	1,477	Consists of main log office building, bunkhouse, and framed outbuildings. Constructed in 2003.
Storage Building/ Garage	4,000	134	Frame constructed vehicle and equipment storage building. Constructed in 2003.
Northway Bunkhouse	2,024	684	Frame constructed bunkhouse; has well water and driveway. Constructed in 1958. This aging structure has a failing roof and utility systems that are costly to maintain. It is scheduled to be replaced.
Northway Warehouse	1,000	217	Facility is inadequate; must be replaced to meet current needs.
Residences (four owned)	1,355 per residence	571 per residence	Consists of frame constructed houses with driveways, well water, septic systems, outbuildings, and fuel storage. Constructed in 1985. Outbuildings have deteriorated beyond repair; must be replaced.
Borealis Duplex	7,238	1,086	Consists of 2 quarters units, general use area (conference room), attached 3- and 1-car garages, fuel storage, well and septic systems. Constructed in 1976, transferred from BLM in 2005.
Hangar (leased)	Approx. 3,500	1,200	Newer metal building with capacity for multiple aircraft and maintenance shop.
Fuel Storage	N/A	31	1,000-gallon aviation fuel storage tank at Yarger Lake. Constructed in 1996.
Administrative Cabins (2)	320	80	Remote log cabins. Constructed in 1987. Both cabins need maintenance and repairs.
Administrative Cabin	192	48	Remote log cabin. Constructed in 1975. Needs major structural repairs to meet public health and safety requirements.
2 - Radio Repeaters	N/A	211	Used for refuge communication needs.
3 - Remote Automated Weather Stations	N/A	180	Constructed at various times. Two located within the Refuge, one adjacent to the Refuge. Condition is good.

Facility	Size (sq. ft.) or Length (mi.)	Est. Replacement Cost (2005 dollars in thousands)	Description
Deadman Lake Campground	N/A	4,068	Established in early 1950s. Consists of gated two-mile access road, 16 campsites, boat launch, outhouses, interpretive kiosk, wildlife viewing platform, and wooden boardwalk. Campsites are in need of rehabilitation. Boat ramp needs repairs.
Lakeview Campground	N/A	785	Consists of gated access road, 8 campsites, outhouses, interpretive kiosk, and wildlife viewing/photography blind. Campsites need additional rehabilitation and maintenance.
Taiga Trail	0.25 mi.	42	Interpretive accessible trail consisting of 48 in. wide wooden boardwalk, interpretive signs, lakeside wildlife viewing platform. Constructed in 1990.
Visitor Center Trail	0.25 mi.	35	Interpretive accessible trails consisting of 36 in. wide trail of native material. Original trail established 1974 or earlier. Reconstructed in 2007. Design and materials for interpretive displays require additional funding.
Hidden Lake Trail	1.2 mi.	311	Consists of a parking area, interpretive kiosk, and 6,400 ft. walking trail with sections of wooden boardwalk.
Island Lake-American Wellesley Lake Trail	17 mi.	1,235	Winter trail. Established in 1965 or earlier.
Northway-Jatahmund Lake Trail	30 mi.	2,180	Winter trail. Established in 1980 or earlier.
Tetlin Flats Trail	1.5 mi.	210	Access trail. Established 1980 or earlier.
Airs Hill Trail	11 mi.	1,940	Unmaintained foot and stock trail. Established in 1965 or earlier.
Alaska Highway Interpretive Panels	N/A	49	Replaced in 2006.
Seaton Roadhouse Site	1 mi.	2,703	Consists of an abandoned section of the Alaska Highway. Condition currently unusable. Constructed in 1941.
Chisana River Boat Launch	15,365	227	Consists of a gravel parking area and ramp. Constructed in 1999.
Desper Creek Boat Launch	5,000	66	Area is currently undeveloped. Constructed in 1986.

Table 4-8. Additional facilities needed to support current refuge programs

Facility	Size (sq. ft.)	Projected Cost (2005 dollars in thousands)	Description
Interagency Visitor Center	3,600 (of the total 10,000)	5,331	Currently in the final stages of Phase I planning. Land purchase pending final agreement. Construction pending Service funding.
Refuge Headquarters Office Annex	1,000	375	Existing facilities at capacity. An annex to this existing facility is required prior to any staffing increases.
Fire Cache	192	53	Existing 150 sq. ft. building inadequate. Fire equipment currently located in multiple buildings not designed for use as fire caches.
Hangar	3,600	1,455	Current leased facility is very expensive.
Northway Warehouse	1,600	360	Current facility does not meet existing needs. Upgrades would exceed new construction costs.
Maintenance Shop	4,000	1,508	Current facilities inadequate and located within the existing leased hangar facility scheduled to be replaced.

To effectively manage the Refuge's current program of work, 10 additional staff positions (permanent full-time and/or part-time) are needed:

- Law Enforcement Officer (LE; 1-2 FTEs)
- Maintenance Worker/Mechanic (0.75 FTE)
- Interpretive Park Ranger (1 FTE/GS-09)
- Interpretive Park Rangers- Interagency Visitor Center (2-0.5 FTE/GS-05)
- Park Ranger (outdoor recreation) (0.75 FTE/GS-07)
- Education Assistant (0.5 FTE/GS-07)
- Refuge Information Technicians (2-0.5 FTEs)
- Biologist (Land Management Research Demonstration assistant) (0.75 FTE/GS-07)
- Biologist (Fisheries specialist) (1 FTE/GS-9)
- Biological Technicians (4-0.5 FTEs)
- Refuge Operation Specialist (1 FTE/GS-07/09/11)

In fiscal year 2005, Tetlin Refuge had a staff of 15 permanent full-time, 4 permanent part-time, and 6 seasonal employees, and 8 volunteers (with two positions vacant). Salaries for these employees totaled $1,117,769. In addition, $807,975 funded refuge maintenance and operations, inventory and monitoring work, trail reconstruction, and other refuge projects.

5. Implementation and Monitoring

Implementation of the Tetlin National Wildlife Refuge Comprehensive Conservation Plan (Conservation Plan) will be accomplished, in part, by means of various step-down plans (section 5.1). Each step-down plan has its own program focus, identifying and directing the implementation of strategies (actions, techniques, and tools) designed to achieve programmatic objectives outlined in the Conservation Plan (chapter 2, section 2.3). Part of the implementation process also includes identifying partnership opportunities that result in implementing strategies and that accomplish refuge objectives. Monitoring the progress of the Conservation Plan implementation is currently accomplished by a variety of methods, including surveys, inventories, radio telemetry, and genetic sampling. Evaluation of monitoring results may lead to amendment or revision of the Conservation Plan (section 5.4).

5.1 Step-Down Plans

Step-down management plans address specific management subjects or programs. They describe management strategies and implementation schedules and provide details necessary to implement management objectives identified in the Comprehensive Conservation Plan (Service Manual 602 FW 1.5). Step-down plans for the Refuge include the following.

5.1.1 Wildlife Inventory and Monitoring Plan (1986)

The Tetlin Refuge Wildlife Inventory and Monitoring Plan (TNWR 1986) outlines strategies and methods to be used in gathering consistent baseline and management data for species of local, regional, and national significance. In the selection of species to be intensively surveyed, many factors were considered, including short- and long-range goals, future conflicts, habitat loss or degradation, ability to serve as indicators of habitat quality, degree of management possible, and available resources. The majority of inventory and monitoring outlined in this plan are directed toward birds.

The goals and objectives in the Wildlife Inventory and Monitoring Plan have been revised as part of this Conservation Plan (chapter 2, section 2.3.). Further revision of the Inventory and Monitoring Plan is scheduled to begin two years after the Conservation Plan's approval.

5.1.2 Cultural Resource Guide (1997)

The Tetlin Refuge Cultural Resource Guide (Corbett and Arend 1997) assists the refuge staff in meeting legal requirements to protect and manage the cultural resources of the refuge. The guide summarizes the cultural resource guidance provided by law and regulation, the Service Manual, and the Cultural Resource Management Handbook (USFWS 1992). It outlines roles and responsibilities, summarizes legislation governing management of cultural resources, and contains information of potential use to the refuge manager. It describes the current state of knowledge of the prehistory and history of the region. It includes a list of projects that would fill in gaps in knowledge or complete existing work. A more complete and detailed Cultural Resource Management Plan is scheduled to be completed in cooperation with Native groups and other local entities by 2011 (15 years after completion of the initial guide).

5.1.3 Fire Management Plan (2001)

The Tetlin Refuge Fire Management Plan (TNWR 2001) provides the planning framework for all refuge fire management decision making and specifies the uses of fire that are consistent with and can enhance refuge habitat and wildlife management objectives. The Fire Management Plan identifies action to be taken to preserve, protect, and enhance natural and cultural resources with specific regard to both wildland fire and prescribed fire. This plan also provides the foundation of objectives, guidelines, and planning information upon which the refuge-prescribed fire program is based. Upon final approval, the Tetlin Refuge Conservation Plan will make important adjustments to fire management within the Refuge. These changes will be reflected in a revision of the Fire Management Plan scheduled to begin within two years of the Conservation Plan's approval.

5.1.4 Fisheries Management Plan (1990)

The Fishery Management Plan (USFWS 1990) describes the fishery resources on Tetlin Refuge and provides management direction the Service will take to support the conservation of fishery resources and habitat. The plan is designed to remain consistent with the Service's Master Memorandum of Understanding with the Alaska Department of Fish and Game (see appendix B) and provides for continued use of fishery resources for subsistence, commercial, and recreation purposes. The plan identifies concerns and describes objectives and tasks to address these concerns. Eleven priority tasks were identified in the plan: six of the tasks are ongoing, three have been completed and two were dropped because of funding limits or changes in priorities. Revision is scheduled to begin two years after the Conservation Plan's approval.

5.1.5 Land Protection Plan (2001)

The Tetlin Refuge Land Protection Plan (USFWS 2001a) used the Alaska Priority System model to identify key resources that require protection from potential negative effects of private land development and public use. The plan also evaluated possible threats to important refuge resources, and special management values such as environmental education and public access. This resulted in 19 non-refuge parcels within the administrative boundary of the Refuge being identified as high priority for resource protection. Measures to mitigate threats include easements and purchase of non-refuge lands from willing sellers. The highest priority sites are near the refuge visitor center and in the vicinity of Scottie Creek and the Alaska Highway. This plan is scheduled to be reviewed in 2015.

5.1.6 Public Use Management Plan (Visitor Services Plan) (1997)

The Tetlin Refuge Public Use Management Plan (USFWS 1997a) sets forth specific direction for the recreation, interpretation, and education programs of the Refuge. The primary goal of the public use program at Tetlin Refuge is to provide high quality fish and wildlife-oriented recreation, interpretive, and educational opportunities consistent with the Refuge's resource oriented purposes. This plan (now called a Visitor Services Plan) is scheduled to be revised within two years of the Conservation Plan's approval.

5.1.7 Station Safety Plan (2005)

This plan focuses on providing a safe and healthful environment for employees and visitors by minimizing the potential for injury to employees and the public and by preventing property damage. The safety plan describes programs needed to train personnel in how to deal with the

environment, materials, and machines that may pose hazards, and it has the goal of making safety and environmental health integral parts of every task. This plan is revised annually.

5.2 Partnership Opportunities

Partnerships with other organizations are among the ways in which the Service fulfills its mission: "Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people." Partnership opportunities would be consistent throughout all alternatives. The Refuge exists within a dynamic ecosystem. Many of the resources within the Refuge are of national and international importance. The Service recognizes that the public, organizations, and other governmental agencies have interests in the Refuge. Implementation of many refuge programs requires community involvement, support, and assistance. The refuge staff looks for opportunities to coordinate activities with the following (among others):

- Local village councils
- Various State agencies, primarily: Alaska Department of Fish and Game; Alaska Department of Transportation and Public Facilities;, Alaska Department of Natural Resources; and Alaska Department of Commerce, Community, and Economic Development
- Alaska Geographic Association
- Alaska Gateway School District
- Alaska Bird Observatory
- Tok Bird Rehabilitation
- Tok Lions Club
- Ducks Unlimited
- Duct Tape Radio and Humanities Forum
- Tok Choral Society
- Tok Chamber of Commerce
- Upper Tanana Development Corporation
- Local businesses, Native corporations, and Native associations
- Other Federal agencies, primarily: the National Park Service, Bureau of Land Management, U.S. Geological Survey, and the Bureau of Indian Affairs
- Yukon government, primarily Environment Yukon (formerly the Division of Wildlife and Parks and Department of Natural Resources)
- Universities, including the University of Alaska Fairbanks and Yukon College
- Tanana Chiefs Conference
- Museums
- Friends of Alaska Refuges
- Eastern Interior Federal Subsistence Regional Advisory Council and the Upper Tanana-Fortymile Advisory Committee

These partnerships have been fostered for many years and have resulted in a number of successful collaborative projects of mutual benefit far greater than the Refuge would have achieved independently. In some cases, the Refuge has worked with as many as four other partners who

contributed time, money, and other support to make a single project successful. Without these partnerships we could not fully succeed in fulfilling the purposes for Tetlin Refuge.

5.3 Monitoring and Evaluation

Monitoring helps refuge staff track the progress of Plan implementation. Results of monitoring show how objectives are being achieved, and they measure progress towards accomplishing goals. Monitoring is currently conducted under direction of the Wildlife Inventory and Monitoring Plan (TNWR 1986). Additional monitoring strategies will be developed as data analyses are completed, biological and visitor service reviews are conducted, and the Public Use Management Plan (USFWS 1997a) and other step-down plans are revised.

5.4 Plan Amendment and Revision

Periodic review and change of this Comprehensive Conservation Plan will be necessary. As knowledge of refuge resources, users, and uses improves, changes in management may be identified. Fish and wildlife populations, user groups, adjacent land users, and other management considerations change with time, often in unforeseen ways. Challenges also may be encountered in trying to implement the Conservation Plan. Revisions are a necessary part of the adaptive management approach used by the Service. This means objectives and strategies to reach goals can be adjusted. Most of the resulting changes will fine-tune the plan. These changes will not require modification of this document because minor changes will be addressed in the more detailed refuge step-down and annual work plans. Only if a major change is required in management of the Refuge will it be necessary to revise this Conservation Plan with a new environmental analysis. To enable refuge users; adjacent landowners; local, State, and Federal agencies; and other interested parties to express their views on how the Refuge is being managed, the Refuge will periodically hold meetings or use other techniques, such as comment cards and surveys, to solicit comments for evaluation purposes. By encouraging continuing public input, the Refuge will be better able to serve the public, to determine potential problems before they occur, and to take immediate action to resolve existing problems. Every three to five years, refuge staff will review public comments, local and State government recommendations, staff recommendations, research studies, and other sources to determine if revisions to the Plan are necessary. If major changes are proposed, public meetings may be held, and new environmental assessments and environmental impact statements may be necessary. Full review and updating of the Conservation Plan will occur every 15 years.

5.5 ORV Closure Regulations

The promulgation of regulations to implement the subsistence access closure will begin following completion of the Conservation Plan. The regulation will close the Refuge to off-road vehicles (ORVs) for subsistence purposes consistent with ANILCA section 811(b) and 50 CFR 36.12. The closure is justified to protect the Refuge from the potential for resource damage. Since the Refuge determined that ORVs were not traditionally used for subsistence purposes at the time Refuge was established, such a closure will not affect ongoing subsistence activities.

Appendix A

Legal Guidance and Planning Coordination

A. Legal Guidance and Planning Coordination

Management of the Refuge is dictated, in large part, by the legislation that created the unit and the purposes and goals described in chapter 1. However, other laws, regulations and policies, and agreements with the State of Alaska also guide the management of the Tetlin National Wildlife Refuge (Tetlin Refuge, Refuge). This appendix identifies the international treaties and Federal laws and policies that are integral to the development of this Comprehensive Conservation Plan (Conservation Plan, Plan). It also describes the national and regional plans that were reviewed and considered during the revision of the Tetlin Refuge Conservation Plan to ensure that the revised management direction for Tetlin Refuge is consistent with these national and regional conservation plans.

A.1 Legal Guidance

The U.S. Fish and Wildlife Service (Service) manages national wildlife refuges pursuant to various legal and administrative requirements. Management of Tetlin National Wildlife Refuge is dictated, in large part, by the Alaska National Interest Lands Conservation Act of 1980 (ANILCA), which designated the Refuge and identified the purposes for which it was established. However, operation and management of Tetlin Refuge is also influenced by a wide array of other laws, treaties, and executive orders, and the regulations and policies developed to implement them. Among the most important are the National Wildlife Refuge System Administration Act as amended by the National Wildlife Refuge System Improvement Act; the Refuge Recreation Act; the Alaska Native Claims Settlement Act (ANCSA); and the Endangered Species Act. A brief description of these and other pertinent documents that influence management of Tetlin Refuge is found in the following subsections.

A.1.1 International Treaties

Several treaties affect how the Service manages Tetlin Refuge. Among these are migratory bird treaties with Canada, Mexico, Japan, and Russia, and the Convention on Nature Protection and Wildlife Conservation in the Western Hemisphere. These treaties differ in emphasis and species of primary concern, but collectively provide clear mandates for identifying and protecting important habitats and ecosystems and for protecting and managing individual species.

Treaties for migratory bird protection include management provisions such as (1) prohibiting disturbance of nesting colonies; (2) allowing the Secretary of the Interior to establish seasons for the taking of birds and the collection of their eggs by "indigenous inhabitants" of Alaska for their own nutritional and other essential needs; (3) directing each nation to undertake, to the maximum extent possible, measures necessary to protect and enhance migratory bird environments and to prevent and abate pollution or detrimental alteration of their habitats; and (4) providing that protective measures under the treaty may be applied to species and subspecies not listed in the specific convention but which belong to one of the families containing listed species. Of the migratory bird species of concern in the treaties, those that use Tetlin Refuge include loons, swans, geese, ducks, hawks, eagles, harriers, ospreys, falcons, cranes, plovers, sandpipers, jaegers, gulls, terns, owls, and passerines.

A.1.2 National Guidance

A.1.2.1 Alaska National Interest Lands Conservation Act of 1980 as amended, 16 U.S.C. 140hh-3233, 43 U.S.C. 1602-1784

In addition to amending the Alaska Native Claims Settlement Act (ANCSA), the Alaska Statehood Act, and the Wild and Scenic Rivers Act and modifying portions of the Wilderness Act as it applies to Alaska lands, ANILCA expanded the Federal conservation system throughout the State (including refuges, parks, forests, Wilderness areas, and Wild and Scenic Rivers). ANILCA sets forth the purposes of the refuges, defines provisions for planning and management, and authorizes studies and programs related to wildlife and wildland resources, subsistence opportunities, and recreational and economic uses (such as oil and gas exploration and development, access, and transportation and utility systems).

Title VIII of ANILCA authorizes the State of Alaska to regulate subsistence uses on Federal public lands if several requirements are met. The State of Alaska managed statewide subsistence harvests until late 1989, at which time the Alaska Supreme Court ruled that the rural residency preference required by Federal law violated the Alaska Constitution. Despite repeated efforts, the State has not amended its constitution to bring its regulatory framework back into compliance with ANILCA.

The Federal government began managing subsistence hunting, trapping, and fishing on Alaska's Federal public lands in July 1990. For the purposes of Federal subsistence management, public lands are defined to include lands managed by the U.S. Fish and Wildlife Service (Service), National Park Service, Bureau of Land Management, Bureau of Indian Affairs, and the U.S.D.A. Forest Service; public lands also include non-navigable waters on these lands and some navigable and marine waters. On October 1, 1999, management authority of the Federal Subsistence Board was extended to include navigable water within and adjacent to exterior boundaries of Federal conservation units in which the United States has an interest by virtue of the reserved water rights doctrine.

The Federal Subsistence Board (FSB) establishes regulations for the harvest of fish and wildlife on Federal public lands in Alaska by qualified rural residents for subsistence purposes. The Federal process involves substantial public input. Individuals and organizations submit proposals for regulations to the FSB that are reviewed by the Federal Subsistence Regional Advisory Councils (RACs) (e.g., the Eastern Interior Federal Subsistence RAC). The RACs, which are composed of local citizens, make recommendations on the proposals to the FSB. The Federal subsistence staff also advises the FSB on regulation proposals, providing data and analysis from local Federal managers as well as from the Alaska Department of Fish and Game (ADF&G).

The State's recreational, commercial, personal use, and subsistence regulations continue to apply on all Federal lands unless superseded by Federal subsistence regulations. However, the FSB may establish Federal regulations to provide for use only by eligible rural residents in order to protect the ANILCA title VIII preference for local rural users or to protect a wildlife population or fishery.

A.1.2.2 Alaska Native Claims Settlement Act of 1971 as amended, 43 U.S.C. 1601-1624

The purpose of this act was to provide for ". . . settlement of all claims by Natives and Native groups of Alaska, based on aboriginal land claims." It provided for grants of land and money and the establishment of Native corporations to maintain the economic affairs of Native organizations.

In exchange, all aboriginal titles and claims, including any fishing and hunting rights, were extinguished. Section 12(a) allowed village corporations to select lands, with several stipulations, in national wildlife refuges. Section 22(g), however, stated that these lands were to ". . . remain subject to the laws and regulations governing use and development of such refuge." Other refuge lands were selected under section 14(h)(1), which allowed regional corporations to select cemetery sites and historical places. Section 17(b) provided for public easement across Native lands for access to Federal lands. Section 17(d)(2)(A) provided the basis for the enactment of ANILCA.

A.1.2.3 National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C 668dd-668ee

This act serves as the "organic act" for the National Wildlife Refuge System (System). Where this act provides direction that conflicts with direction described in ANILCA, the ANILCA direction is followed. The act establishes a unifying mission for the System, direction for determining compatible uses of refuges, and a requirement for preparing comprehensive conservation plans. This Act states, first and foremost, that the mission of the National Wildlife Refuge System be focused singularly on wildlife conservation.

It identifies six priority wildlife-dependent recreation uses and reinforces and expands the "compatibility standard" of the Refuge Recreation Act, which requires that, before they can be allowed, public uses must be determined to be compatible with refuge and agency missions and purposes.

A.1.2.4 The Refuge Recreation Act of 1962 as amended, 16 U.S.C. 460k-460k-4

This act requires that any recreational use on areas of the National Wildlife Refuge System be compatible with the primary purpose(s) for which the area was acquired or established. It also requires that sufficient funding be available for the development, operation, and maintenance of recreation uses that are not directly related to the area's primary purpose(s).

A.1.2.5 National Environmental Policy Act of 1969 as amended, 42 U.S.C.4321-4347 (NEPA)

This act and the implementing regulations developed by the Council on Environmental Quality (40 CFR 1500-1508) require Federal agencies to integrate the National Environmental Policy Act (NEPA) process with other planning at the earliest possible time to provide a systematic interdisciplinary approach to decision making; to identify and analyze the environmental effects of their actions; to describe appropriate alternatives to the proposed actions; and to involve the affected State and Federal agencies, tribal governments, and public in the planning and decision making process.

A.1.2.6 The Endangered Species Act of 1973 as amended, 16 U.S.C. 1231-1544

The Endangered Species Act provides for the conservation of threatened and endangered species of fish, wildlife, plants, and their critical habitats by Federal action and by encouraging the establishment of State programs. Although not specifically addressing the System, it does directly affect management activities on national wildlife refuges. It directs Federal agencies to take actions that would further the purposes of the act and to ensure that actions they carry out, authorize, or fund do not jeopardize endangered species or their critical habitat (section 7).

A.1.2.7 National Historic Preserveation Act of 1966, as amended ((Public Law 89-665; 16 U.S.C. 470 et seq.) (NHPA)

This act established a program for the preservation of historic properties throughout the United States. It established a Federal policy of cooperation with other nations, tribes, States, and local governments to protect historic sites and values.

Together with its implementing regulations, NHPA authorized the National Register of Historic Places, created the Advisory Council on Historic Preservation, provided further considerations for National Historic Landmarks, and created procedures for approved State and local government programs. The National Register of Historic Places criteria for evaluation of properties to be nominated are found at 36 CFR Part 60.4. Consideration is given to "districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association" and that are (a) related to events that have made a significant contribution to the broad patterns of our history; or that are (b) associated with the lives of persons significant in our past; or that (c) bear a pattern of distinctive characteristics of historic, architectural, archeological, engineering or cultural significance; or that (d) have yielded or may, in the future, yield important information as to our history or prehistory.

Regulatory provisions of NHPA require that State Historic Preservation Officers (SHPOs) prepare and implement State historic preservation plans. Protection of identified historic sites is facilitated through implementation of NHPA section 106 review, a five-step process designed to ensure that historic properties are considered during the planning and execution of Federal projects.

Amendments passed in 1980 provided support for archeological resources protection by codifying portions of Executive Order 11593, which requires Federal agencies to develop programs to inventory and evaluate historic resources.

A.1.2.8 The Archaeological Resources Protection Act of 1979 (16 U.S.C. s/s 470 et seq.)

This act established detailed guidelines for issuing permits for excavation or removal of archaeological remains from Federal lands.

A.1.2.9 The Clean Air Act of 1977 (42 U.S.C. s/s 7401 et seq.)

This act regulates the discharge of air pollutants and establishes air quality standards to protect and enhance the quality of the nation's air resources. In particular, the act regulates the amount of particulate matter Federal land managers can allow as a result of their actions (e.g., prescribed fires).

A.1.2.10 The Federal Water Pollution Control Act of 1972, as amended by The Clean Water Act of 1977, (33 USC s/s 1251 et seq.)

This act regulates the discharge of pollutants into waters of the United States. The act protects fish and wildlife, establishes operation permits for all major sources of water pollution, limits the discharge of pollutants or toxins into water, and makes it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a permit is obtained under the Clean Water Act.

A.1.2.11 Executive Order 13112 Invasive Species, signed February 3, 1999.

The purpose of this executive order is to prevent the introduction of invasive species and provide for their control, as well as to minimize the economic, ecological, and human health impacts that invasive species cause.

A.1.2.12 Americans with Disabilities Act of 1990 (Public Law 101-336, 28 CFR 35 and 36)

This act (among other actions) requires that public transportation services be accessible to individuals with disabilities. With respect to national wildlife refuges, regulations pertain to boating facilities, fishing piers or platforms, public restrooms, and facilities associated with public transportation.

A.1.2.13 Architectural Barriers Act of 1969 (42 U.S.C. 4151)

This act ensures that certain buildings financed or leased by Federal agencies are constructed (or renovated) so that they will be accessible to the physically handicapped. It requires the General Services Administration, in consultation with the Secretary of Health and Human Services, to prescribe standards for non-military Federal buildings.

A.1.2.14 Alaska Natural Gas Transportation Act of 1976 (15 U.S.C. 719 et seq.)

This act authorized the Alaska Natural Gas Transportation System and associated right-of-ways across Federal lands, including what is now Tetlin National Wildlife Refuge, consistent with other acts and regulations.

A.1.2.15 Other Laws

Laws that affect mineral leasing, recreation use, commercial fishing, preservation and protection of cultural and historic resources, and other activities on Federal lands are also considered in the comprehensive conservation planning process.

A.2 Planning Coordination

Nature is not constrained by government boundaries that are used to determine ownership or management of specific areas of land. Without physical barriers, and with available habitat, fish and wildlife will freely roam through lands and waters regardless of ownership or management. To ensure the conservation of the many species that migrate across legal and political boundaries, a number of efforts—at scales ranging from local community and regional plans to national and international conservation programs—have been designed to monitor and protect these species. These plans were reviewed during the revision of the Tetlin Refuge Conservation Plan to ensure that the revised management direction is consistent with these national conservation plans. The following list is not intended to be comprehensive but demonstrates the range of documents reviewed. When applicable, specific information from these plans has been incorporated into this document.

A.2.1 National Management Plans

A.2.1.1 North American Waterfowl Management Plan

This conservation plan seeks to restore waterfowl populations in Canada, the United States, and Mexico to the levels recorded in the 1970s. The international partnership has worked to identify

priority habitats for waterfowl and has established goals and objectives for the waterfowl populations and habitats (USFWS 1998). Estuaries, lagoons, bays, and nearshore waters on and adjacent to the Refuge provide wintering habitat for an estimated 12,000 dabbling ducks and 150,000 sea ducks. Breeding waterfowl use of the Refuge is comparatively low because the area supports limited wetland breeding habitat.

A.2.1.2 Partners in Flight—Bird Conservation Plans

Partners in Flight is a cooperative effort among Federal, State, and local government agencies; philanthropic foundations; professional organizations; conservation groups; industry; universities; and private individuals. Partners in Flight was created in 1990 in response to growing concerns about declines in the populations of many landbird species and to emphasize the conservation of birds not covered by existing conservation initiatives. Bird conservation plans are developed in each region to identify species and habitats most in need of conservation, to establish objectives and strategies to meet those needs, and to implement plans and monitor progress on them.

A.2.1.3 U.S. Shorebird Conservation Plan (Brown et al. 2000)

This conservation plan seeks to stabilize populations of all shorebirds that are in decline because of factors affecting habitat in the United States. At a regional level, the plan's goal is to ensure that shorebird habitat is available in adequate quantity and quality to support shorebird populations in each region. Ultimately, the goal of the U.S. Shorebird Conservation Plan is to restore and maintain shorebird populations throughout the western hemisphere through an international partnership.

A.2.2 Regional Management Plans

In addition to considering the national conservation plans, this Comprehensive Conservation Pan must consider the conservation plans and management goals of neighboring lands of the region. Regional plans, as well as goals and objectives from other programs, were reviewed to understand how the Tetlin Refuge can contribute to the goals for conservation within the State or local region. This list is not intended to be comprehensive but demonstrates some of the major regional plans that were reviewed during the development of this draft. When applicable, specific information from these plans has been incorporated into the plan.

A.2.2.1 A Conservation Plan for Alaska Shorebirds (Alaska Shorebird Working Group 2000)

This plan identifies shorebird species of concern in Alaska and provides goals and objectives for shorebird conservation throughout the State. Although nine shorebird species are known to nest on Tetlin Refuge, and at least 20 others have been found on the Refuge, habitat is limited and numbers are minimal.

A.2.2.2 Landbird Conservation Plan for Alaska Biogeographic Regions (Boreal Partners in Flight Working Group 1999)

This bird conservation plan, developed through the Partners in Flight national initiative, identifies by region those species and habitats most in need of conservation, and establishes objectives and strategies to provide needed conservation activities and for monitoring progress in implementing the plan. Tetlin Refuge contributes to this plan through a variety of monitoring and inventory studies of landbirds on the Refuge.

A.2.2.3 Alaska Interagency Wildland Fire Management Plan (1998)

This plan is a statewide effort to provide an opportunity, through cooperative planning for land managers/owners, to accomplish individual fire-related land use objectives in the most cost-effective manner. It established a statewide framework for land managers/owners to classify wildfire suppression options on their lands based on values to be protected and resource management objectives. The management options of this framework apply to all Refuge lands and nearly all lands within Alaska.

A.2.2.4 Mentasta Caribou Herd Management Plan (1995)

The Mentasta Caribou Herd (MCH) Management Plan was a cooperative effort by the Alaska Department of Fish and game, the U.S. National Park Service, and the U.S. Fish and Wildlife Service to adopt management guidelines that reflected the varied Federal and State policies and laws concerning management of the MCH (Wrangell-St. Elias National Park and Preserve 1995). This plan developed fall harvest quotas and bag limits for the MCH that would allow for priority subsistence uses and a strategy to minimize incidental harvest of Mentasta caribou during winter hunts targeted primarily for the Nelchina and Fortymile caribou herds.

A.2.2.5 Tanana Basin (1991) and Upper Yukon (2003) Area Plans

The Alaska Department of Natural Resources is responsible for development of plans for management of State lands, including the Tanana Basin Area Plan (ADNR 1991), which is currently under revision, and the Upper Yukon Area Plan (ADNR 2003). These plans determine land use designations, management intent, and management guidelines that apply to all State lands in the two planning areas.

A.2.2.6 Wrangell- St. Elias National Park and Preserve General Park Management Plan (1986)

This plan outlines the overall management direction for the Park, including natural resource preservation and protection, public use facilities and access, visitor services, subsistence uses, and commercial activities.

A.2.2.7 Alaska Department of Fish and Game (ADF&G)

The Service shares management responsibility for fish and wildlife on refuge lands with the ADF&G as identified in the Master Memorandum of Understanding (appendix B). In accordance with this policy directive, ADF&G has primary responsibility for managing fish and resident wildlife populations. Part of this management includes setting objectives for populations and harvest within management areas called game management units (GMUs). Tetlin Refuge is within GMU 12. During the development of this Conservation Plan, the State's management objectives for fish and wildlife were important considerations for establishing and evaluating management direction on the Refuge. Information on key management objectives that address fish and wildlife populations found on the Refuge can be found in chapter 4 .

A.2.2.8 Statewide Stocking Plan for Recreational Fisheries (2005)

This plan, developed by ADF&G, outlines the numbers of and schedule for stocking lakes throughout Alaska. With respect to Tetlin Refuge, this plan provided direction for the stocking of Hidden Lake.

A.2.2.9 Alaska's Comprehensive Wildlife Conservation Strategy (Alaska Department of Fish and Game 2006a)

The goal of this plan is to "conserve the diversity of Alaska's wildlife resources, focusing on those species with the greatest conservation need…" and is "intended to be a blueprint for an overall conservation approach." The strategy largely intends to "coordinate and integrate conservation actions and strategies with Alaska's existing wildlife management and research programs…"

Appendix B

Coordination with the State of Alaska

B. Coordination with the State of Alaska, Including the Master Memorandum of Understanding with the Alaska Department of Fish and Game

Consistent with the principles of ecosystem management and the laws and policies described in appendix A, effective management of the Tetlin National Wildlife Refuge (Refuge) must be done in close coordination with the State of Alaska. This appendix is not intended to be a comprehensive list of State agencies, but rather describes the primary State agencies that share concern and responsibilities for fish, wildlife, and other natural resources.

B.1 Alaska Department of Fish and Game

The Alaska Department of Fish and Game (ADF&G) has the primary responsibility for managing fish and resident wildlife populations. On refuge lands, the U.S. Fish and Wildlife Service (Service) and ADF&G share a mutual concern for all fish and wildlife resources and their habitats, and both are engaged in extensive fish and wildlife conservation, management, and protection programs. In 1982, the Service and ADF&G signed a Master Memorandum of Understanding (MMOU) (dated March 13, 1982) that defines the cooperative management roles of each agency. This memorandum sets the framework for cooperation between the two agencies. On November 14, 2006, the two agencies signed a memorandum recommitting the agencies to the spirit and letter of the MMOU. Both documents are included at the end of this appendix.

Through the direction of the Boards of Fisheries and Game, the State of Alaska establishes fishing, hunting, and trapping regulations throughout the State. These regulations apply to Federal public lands unless superseded by Federal restrictions, implemented through a rulemaking, through closure or restriction processes as provided in 50 CFR 36.42, or through Federal Subsistence Board regulations in 50 CFR 100.10(d)(4). The State is divided into 26 game management units (GMUs); most are further divided into subunits. State management objectives are developed for fish and wildlife populations within GMUs. All Tetlin Refuge lands are in GMU 12.

The State process for developing regulations involves substantial public input to the Alaska Boards of Fisheries and Game (boards) concerning changes in regulations and allocations. Input may be directly to the boards through testimony and proposals or indirectly through participation in local fish and game advisory committees. For the area including the Refuge, this includes the Upper Tanana/Forty Mile Fish and Game Advisory Committee. These advisory committees assist the boards in assessing local fish and wildlife issues and proposed regulations. Biological staff from ADF&G also provides data and analysis of proposals to the boards. Regulations may be changed by the boards at regular meetings, by emergency regulation, or by emergency order.

Although many biologists within ADF&G have law enforcement authority, most enforcement of fishing and hunting regulations is carried out by refuge law enforcement officers and Bureau of Wildlife Protection State Troopers of the Alaska Department of Public Safety.

ADF&G's Division of Wildlife Conservation works to conserve and enhance Alaska's wildlife and to provide for a wide range of uses for the greatest benefit of current and future generations of the people through management of wildlife populations and habitat, research, information transfer, regulatory activities, and public service. Wildlife Conservation is responsible for overseeing development of management plans for a variety of wildlife populations throughout the State.

The Division of Commercial Fisheries manages, protects, rehabilitates, enhances, and develops fisheries and aquatic plant resources in the interest of the economy and general well-being of the State, consistent with the sustained-yield principle and subject to allocations established through public regulatory processes. It is responsible for management of the State's commercial, subsistence, and personal-use fisheries.

The Division of Sport Fish is responsible for the State's recreational fishery resource: the conservation of self-perpetuating populations of fish; management of sport fisheries in both salt and fresh water; and hatchery production and release of fish for recreational fishing. The goals of the division are to conserve naturally reproducing populations of sport fish species, provide a diverse mix of recreational fishing opportunities, and optimize the social and economic benefits of Alaska's recreational fisheries.

The Division of Subsistence is the research branch of the department responsible for providing comprehensive information on the customary and traditional use of wild resources. Information is provided to meet management goals, aid in regulation development, facilitate collaborative agreements, assess environmental impacts, and describe the unique role of wild resources in Alaska.

B.2 Alaska Department of Natural Resources

The Alaska Department of Natural Resources (ADNR) and its divisions are also key management partners, coordinating with the Service and other Federal and State agencies in managing the public lands (Federal and State) in Alaska. ADNR manages all State-owned land, water, and surface and subsurface resources except for fish and game. ADNR's Division of Mining, Land, and Water manages the State's water and land interests within national wildlife refuges. The State owns approximately 46,000 upland acres within the Tetlin Refuge boundaries, has selected an additional 750 acres, and owns an as yet undetermined quantity of submerged land acreage. The State interests will become increasingly significant in the next 10 to 15 years, especially in regard to water rights, navigable waters, ownership of submerged lands, and rights-of-way over refuge lands. The division is responsible for development of plans for management of State lands; this includes the Tanana Basin Area Plan for State Lands (adopted in 1985, updated in 1991, and currently being revised) (ADNR 1991). The ADNR Division of Forestry is an important partner with the refuge fire management program and is the primary fire suppression provider for refuge lands.

In 1989, the ADNR Division of Land and Water Management and the Service signed a 55-year lease agreement allowing the Tetlin Refuge to manage two State-owned recreation sites within refuge boundaries for public uses. The Refuge continues to manage Deadman Lake and Lakeview Campgrounds under this lease agreement.

B.3 Alaska Department of Transportation and Public Facilities

The Alaska Department of Transportation and Public Facilities (ADOTPF) is responsible for maintenance and reconstruction of the Alaska Highway and associated pullouts and rest stops. Due to Tetlin Refuge's proximity to the Alaska Highway, ADOTPF is a valued partner in developing and maintaining most facilities for public access to the Refuge and for maintaining pullouts associated with refuge informational kiosks and interpretive panels along the Alaska Highway.

A memorandum of understanding (MOU) between the Service; ADOTPF; the Alaska Department of Commerce, Community and Economic Development; and the Tok Chamber of Commerce is being finalized for the collaborative planning, development, and management of a proposed Interagency Alaska Public Lands Information Center, visitor center, and rest area in Tok. The

proposed project will be shared and jointly managed by the Refuge and partner State agencies to provide visitors and Alaskan travelers with year-round information and rest facilities at a cost savings to the State and Federal government.

Master Memorandum of Understanding
Between the Alaska Department of Fish and Game
Juneau, Alaska
and
the U.S. Fish and Wildlife Service, Department of the Interior
Anchorage, Alaska

This Master Memorandum of Understanding between the State of Alaska, Department of Fish and Game, hereinafter referred to as the Department, and the U.S. Fish and Wildlife Service, hereinafter referred to as the Service, reflects the general policy guidelines within which the two agencies agree to operate.

WHEREAS, the Department, under the Constitution, laws and regulations of the State of Alaska (Appendix I), is responsible for the management, protection, maintenance, enhancement, rehabilitation, and extension of the fish and wildlife resources of the State on the sustained yield principle, subject to preferences among beneficial uses; and

WHEREAS, the Service, by authority of the Constitution, laws of Congress and regulations of the U.S. Department of Interior [Appendix II] has a mandated management responsibility for certain species or classes of wildlife and is responsible for the management of Service lands in Alaska, and the conservation of fish and wildlife resources on these lands; and

WHEREAS, the Department and the Service share a mutual concern for fish and wildlife resources and their habitats and both are engaged in extensive fish and wildlife conservation, management, and protection programs and desire to develop and maintain a cooperative relationship which will be in the best interests of both parties, the concerned fish and wildlife resources and their habitats, and produce the greatest public benefit; and

WHEREAS, it has been recognized in the Alaska National Interest Lands Conservation Act and subsequent implementing Federal regulations that the resources and use of Service lands in Alaska are substantially different than those of other states; and

WHEREAS, the Department and the Service recognize the increasing need to coordinate resource planning and policy development;

NOW, THEREFORE, the parties hereto do hereby agree as follows:

THE DEPARTMENT OF FISH AND GAME AGREES:

1. To recognize the Service as the agency with the responsibility to manage migratory birds, endangered species, and other species mandated by Federal law, and on Service lands in Alaska to conserve fish and wildlife and their habitats and regulate human use.
2. To manage fish and resident wildlife populations in their natural species diversity on Service lands.
3. To consult with the Regional Director in a timely manner and comply with applicable Federal laws and regulations before embarking on enhancement or construction activities on Service lands.

THE FISH AND WILDLIFE SERVICE AGREES:

1. To recognize the Department as the agency with the primary responsibility to manage fish and resident wildlife within the State of Alaska.
2. To recognize the right of the Department to enter onto Service lands at any time to conduct routine management activities which do not involve construction, disturbance to the land, or alterations of ecosystems.
3. To cooperate with the Department in planning for enhancement or development activities on Service lands which require permits, environmental assessments, compatibility assessments, or similar regulatory documents by responding to the Department in a timely manner with requirements, time tables, and any other necessary input.
4. To manage the fish and wildlife habitat on Service lands so as to insure conservation of fish and wildlife, populations and their habitats in their natural diversity.
5. To consider carefully the impact of any proposed treaties or international agreements relating to fish and wildlife resources on the State of Alaska which could diminish the jurisdictional authority of' the State and to consult freely with the State when these treaties or agreements have a primary impact on the State.
6. To review present U.S. Fish and Wildlife Service policies and any future proposed changes in those policies in consultation with the Department to determine if modified or special policies are needed for Alaska.
7. To adopt refuge management plans whose provisions—including provision for animal damage control—are in substantial agreement with the Department's fish and wildlife management plans, unless such plans are determined formally to be incompatible with the purposes for which the respective refuges were established.
8. To utilize the State's regulatory process to maximum in extent allowed by Federal law in developing new or modifying existing Federal regulations or proposing changes in existing State regulations governing or affecting the taking of fish and wildlife on Service lands in Alaska.

THE DEPARTMENT OF FISH AND GAME AND THE FISH AND WILDLIFE SERVICE MUTUALLY AGREE:

1. To coordinate planning for management of fish and wildlife resources on Service lands so that conflicts arising from differing legal mandates, objectives, and policies either do not arise or are minimized.
2. To consult with each other when developing policy and legislation which affects the attainment of wildlife resource management goals and objectives, or management plans.
3. To recognize that the taking of fish and wildlife by hunting, trapping, or fishing on Service lands in Alaska is authorized in accordance with applicable State and Federal law unless State regulations are found to be incompatible with documented Refuge goals, objectives, or management plans.
4. To develop such supplemental memoranda of understanding between the Commissioner and the Regional Director as may be required to implement the policies contained herein.
5. That this Master Memorandum of Understanding shall become effective when signed by the Commissioner of the Alaska Department of Fish and Game and the Alaska Regional

Director of the U.S. Fish and Wildlife Service and shall continue in force until terminated by either party by providing notice in writing 120 days in advance of the intended date of termination.

6. That amendments to this Master Memorandum of Understanding may he proposed by either party and shall become effective upon approval by both parties.

STATE OF ALASKA	**U.S. DEPARTMENT OF THE INTERIOR**
Department of Fish and Game	Fish and Wildlife Service
/signed/ Ronald 0. Skoog	/signed/ Keith M. Schreiner
Commissioner	Regional Director, Alaska
March 13, 1982	March 13, 1982
Date	Date

NOV 14 2006

In Reply Refer To:
FWS/AEA

Memorandum

To: All Employees of Region 7 U.S. Fish and Wildlife Service and
The Alaska Department of Fish and Game

From: Regional Director – Region 7
Commissioner – Alaska Department of Fish and Game

Subject: Recommitment to the Master Memorandum of Understanding

The Master Memorandum of Understanding (MMOU) between the U.S. Fish and Wildlife Service (Service) and the Alaska Department of Fish and Game (Department) has been in place since first signed by Commissioner Skoog for the Department and Regional Director Schreiner for the Service in 1982. The necessity and benefits of working together in recognition of our respective authorities is no less relevant today than it was during the crafting of the original document. In fact, the book commemorating 100 years of the International Association of Fish and Wildlife Agencies illustrates many truly great accomplishments due to cooperation among the Service and various state game and fish agencies.

In that spirit of cooperation and in order to solidify our business and management practice, we are recommitting to the spirit and letter of the MMOU between the Department and the Service. The MMOU was built on solid foundation principles that, when adhered to, will contribute to many more great accomplishments.

In order to achieve this mutually-desired success, we are asking each of you to:

- work together with respect and in the spirit of cooperation
- minimize your disagreements
- go more than half way to reach a compromise
- support and encourage each other's efforts to the highest degree possible, and
- offer each other assistance when the opportunity arises.

We emphasize that positive interagency communications be pursued before airing differences in public forums in order to serve our mutual objectives to the fullest.

Please read and become familiar with the MMOU and practice its cooperative principles to the greatest extent possible.

Thomas O. Melius
Regional Director
Fish and Wildlife Service

McKie Campbell
Commissioner
Alaska Department of Fish and Game

Attachment

Appendix C

Species Lists

C. Species Lists

This appendix contains lists of bird, mammal, fish, butterfly, and vascular plant species for Tetlin National Wildlife Refuge.

Tetlin National Wildlife Refuge bird species list

Family	Subfamily	*Genus species*	Common Name * -known to breed on TNWR
Gaviidae		*Gavia sellata*	Red-throated Loon
		Gavia pacifica	*Pacific Loon
		Gavia immer	*Common Loon
Podicipedidae		*Podiceps auritus*	*Horned Grebe
		Podiceps grisegena	*Red-necked Grebe
Phalacrocoracidae		*Phalacrocorax carbo*	Double-crested Cormorant
Cathartidae		*Cathares aura*	Turkey Vulture
Anatidae	Anserinae	*Anser albifrons*	Greater White-fronted Goose
		Chen caerulescens	Lesser Snow Goose
		Branta Canadensis	*Canada Goose
		Branta bernicla	Black Brant
		Cygnus buccinators	*Trumpeter Swan
		Cygnus columbianus	Tundra Swan
		Anas strepera	*Gadwall
		Anas Americana	*American Widgeon
		Anas platyrhynchos	*Mallard
		Anas discors	*Blue-winged Teal
		Anas cyanoptera	Cinnamon Teal
		Anas clypeata	*Northern Shoveler
		Anas acuta	*Northern Pintail
		Anas crecca	*American Green-winged Teal
		Aythya valisneria	*Canvasback
		Aythya americana	*Redhead
		Aythya collaris	*Ring-necked Duck
		Aythya marila	*Greater Scaup
		Aythya affinis	*Lesser Scaup
		Histrionicus histrionicus	*Harlequin Duck
		Melanitta perspicillata	*Surf Scoter
		Melanitta fusca	*White-winged Scoter
		Changula hyemalis	Oldsquaw
		Bucephala albeola	*Bufflehead
		Bucephala clangula	*Common Goldeneye
		Bucephala islandica	*Barrow's Goldeneye
		Mergus merganser	Common Merganser
		Mergus serrator	Red-breasted Merganser
		Oxyura jamaicensis	Ruddy Duck
Accipitridae	Pandioninae	*Pandion haliaetus*	*Osprey
	Accipitrinae	*Haliaeetus leucocephalus*	*Bald Eagle
		Circus cyaneus	*Northern Harrier
		Accipiter striatus	*Sharp-shinned Hawk
		Accipiter gentilis	*Northern Goshawk
		Buteo swainsoni	Swainson's Hawk

Family	Subfamily	*Genus species*	Common Name * -known to breed on TNWR
		Buteo jamaicensis	*Red-tailed Hawk
		Buteo lagopus	Rough-legged Hawk
		Aquila chrysaetos	*Golden Eagle
Falconidae	Falconinae	*Falco sparverius*	*American Kestrel
		Falco columbarius	*Merlin
		Falco rusticolus	*Gyrfalcon
		Falco peregrinus	*Peregrine Falcon
Phasianidae	Tetraoninae	*Bonasa umbellus*	*Ruffed Grouse
		Falcipennis canadensis	*Spruce Grouse
		Lagopus lagopus	*Willow Ptarmigan
		Lagopus mutus	*Rock Ptarmigan
		Lagopus leucurus	White-tailed Ptarmigan
		Tympanuchus phasianellus	*Sharp-tailed Grouse
Rallidae		*Porzana carolina*	*Sora
		Fulica americana	*American Coot
Gruidae	Gruinae	*Grus canadensis*	*Sandhill Crane
Charadriidae	Charadriinae	*Pluvialis squatarola*	Black-bellied Plover
		Pluvialis dominica	*American Golden-Plover
		Charadrius semipalmatus	*Semipalmated Plover
		Charadrius vociferus	*Killdeer
Scolopacidae	Scolopacinae	*Tringa melanoleuca*	Greater Yellowlegs
		Tringa flavipes	*Lesser Yellowlegs
		Tringa solitaria	*Solitary Sandpiper
		Heteroscelus incanus	*Wandering Tattler
		Actitis macularia	*Spotted Sandpiper
		Bartramia longicauda	*Upland Sandpiper
		Numenius phaeopus	*Whimbrel
		Limosa haemastica	Hudsonian Godwit
		Arenaria interpres	Ruddy Turnstone
		Arenaria melanocephala	Black Turnstone
		Aphriza virgata	Surfbird
		Calidris pusilla	Semipalmated Sandpiper
		Calidris mauri	Western Sandpiper
		Calidris minutilla	*Least Sandpiper
		Calidris bairdii	Baird's Sandpiper
		Calidris melanotos	Pectoral Sandpiper
		Tryngites subruficollis	Buff-breasted Sandpiper
		Limnodromus griseus	Short-billed Dowitcher
		Limnodromus scolopaceus	Long-billed Dowitcher
		Gallinago gallinago	*Wilson's Snipe
	Phalaropodinae	*Phalaropus lobatus*	*Red-necked Phalarope
Laridae	Stercorariinae	*Stercorarius perasiticus*	Parasitic Jaeger
	Larinae	*Larus ridibundus*	Black-headed Gull
		Larus philadelphia	*Bonaparte's Gull
		Larus canus	*Mew Gull
		Larus argentatus	Herring Gull
		Larus glaucescens	Glaucous-winged Gull
		Larus hyperboreus	Glaucous Gull

Family	Subfamily	*Genus species*	Common Name * -known to breed on TNWR
		Xema sabini	Sabine's Gull
	Sterninae	*Sterna paradisaea*	*Arctic Tern
		Chlidonias niger	Black Tern
Columbidae		*Columba livia*	Rock Dove
Strigidae		*Bubo virginianus*	*Great Horned Owl
		Nyctea scandiaca	Snowy Owl
		Surnia ulula	*Northern Hawk Owl
		Strix nebulosa	*Great Gray Owl
		Asio flammeus	*Short-eared Owl
		Aegolius funereus	*Boreal Owl
Caprimulgidae	Chorodeilinae	*Chordeiles minor*	Common Nighthawk
Trochilidae	Trochilinae	*Calypte anna*	Anna's Hummingbird
Alcedinidae	Cerylinae	*Ceryle alcyon*	*Belted Kingfisher
Picidae	Picinae	*Sphyrapicus varius*	*Yellow-bellied Sapsucker
		Sphyrapicus ruber	Red-breasted Sapsucker
		Picoides pubescens	Downy Woodpecker
		Picoides villosus	*Hairy Woodpecker
		Picoides tridactylus	*Three-toed Woodpecker
		Picoides arcticus	*Black-backed Woodpecker
		Colaptes auratus auratus	*Northern 'Yellow-shafted' Flicker
Tyrannidae	Fluvicolinae	*Contopus cooperi*	*Olive-sided Flycatcher
		Contopus sordidulus	*Western Wood-Peewee
		Empidonax flaviventris	Yellow-bellied Flycatcher
		Empidonax alnorum	*Alder Flycatcher
		Empidonax minimus	Least Flycatcher
		Empidonax hammondii	Hammond's Flycatcher
		Sayornis saya	*Say's Phoebe
Laniidae		*Lanius excubitor*	*Northern Shrike
Vireonidae		*Vireo gilvus*	Warbling Vireo
Corvidae		*Perisoreus canadensis*	*Gray Jay
		Pica pica	*Black-billed Magpie
		Corvus corax	*Common Raven
Alaudidae		*Eremophila alpestris*	*Horned Lark
Hirundinidae	Hirundininae	*Tachycineta bicolor*	*Tree Swallow
		Tachycineta thalassina	*Violet-green Swallow
		Riparia riparia	*Bank Swallow
		Petrochelidon pyrrhonota	*Cliff Swallow
		Hirundo rustica	*Barn Swallow
Paridae		*Poecile atricapillus*	*Black-capped Chickadee
		Poecile hudsonicus	*Boreal Chickadee
		Poecile cinctus	Gray-headed Chickadee
Sittidae	Sittinae	*Sitta canadensis*	Red-breasted Nuthatch
Certhiidae	Certhiinae	*Certhia americana*	Brown Creeper
Cinclidae		*Cinclus mexicanus*	American Dipper
Regulidae		*Regulus satrapa*	Golden-crowned Kinglet
		Regulus jocosus	*Ruby-crowned Kinglet
Sylviidae	Sylviinae	*Phylloscopus borealis*	Arctic Warbler
Turdidae		*Oenanthe oenanthe*	Northern Wheatear

Family	Subfamily	*Genus species*	Common Name * -known to breed on TNWR
		Sialia sialis	*Mountain Bluebird
		Myadestes townsendi	*Townsend's Solitaire
		Catharus minimus	*Gray-cheeked Thrush
		Catharus ustulatus	*Swainson's Thrush
		Catharus guttatus	*Hermit Thrush
		Turdus migratorius	*American Robin
		Ixoreus naevius	*Varied Thrush
Sturnidae		*Sturnus vulgaris*	*European Starling
Motacillidae		*Motacilla lugens*	Black-backed Wagtail
		Anthus rubescens	*American Pipit
Bombycillidae		*Bombycilla garrulus*	*Bohemian Waxwing
Parulidae		*Vermivora peregrina*	Tennessee Warbler
		Vermivora celata celata	*Orange-crowned Warbler
		Dendroica petechia	*Yellow Warbler
		Dendroica coronata	*Yellow-rumped "Myrtle" Warbler
		Dendroica townsendi	*Townsend's Warbler
		Dendroica striata	Blackpoll Warbler
		Seiurus noveboracensis	*Northern Waterthrush
		Geothlypis trichas	Common Yellowthroat
		Wilsonia pusilla	*Wilson's Warbler
Emberizidae		*Spizella arborea*	*American Tree Sparrow
		Spizella passerina	*Chipping Sparrow
		Spizella pallida	Clay-Colored Sparrow
		Spizella breweri	*Brewer's "Timberline" Sparrow
		Chondestes grammacus	Lark Sparrow
		Passerculus sandwichensis	*Savannah Sparrow
		Passerella iliaca	*Fox Sparrow
		Melospiza melodia	Song Sparrow
		Melospiza lincolnii	*Lincoln's Sparrow
		Zonotrichia albicollis	White-throated Sparrow
		Zonotrichia leucophrys gambelii	*Gambel's White-crowned Sparrow
		Zonotrichia atricapilla	Golden-crowned Sparrow
		Junco hyemalis hyemalis	*Slate-colored Junco
		Calcarius lapponicus	Lapland Longspur
		Calcarius pictus	*Smith's Longspur
		Plectrophenax nivalis	Snow Bunting
		Plectrophenax hyperboreus	McKay's Bunting
Icteridae		*Agelaius phoeniceus*	*Red-winged Blackbird
		Sturnella neglecta	Western Meadowlark
		Euphagus carolinus	*Rusty Blackbird
		Molothrus ater	Brown-headed Cowbird
Fringillidae	Carduelinae	*Leucosticte tephrocotis*	Gray-crowned Rosy-Finch
		Pinicola enucleator	*Pine Grosbeak
		Carpodacus purpureus	Purple Finch
		Loxia leucoptera	*White-winged Crossbill
		Carduelis flammea	*Common Redpoll
		Carduelis hornemanni	Hoary Redpoll
		Carduelis pinus	Pine Siskin

Tetlin National Wildlife Refuge mammal species list

Family	*Genus species*[1]	Common Name	Status[2]
Soricidae	*Sorex cinereus*	Common shrew	Resident
	Sorex hoyi	Pygmy shrew	Resident
	Sorex monticous	Dusky shrew	Resident
	Sorex palustris	Water shrew	Probable
	Sorex tundrensis	Tundra shrew	Probable
	Sorex yukonicus	Tiny Shrew	Probable
Phyllostomidae	*Myotis lucifugus*	Little brown bat	Resident
Canidae	*Canis latrans*	Coyote	Resident
	Canis lupus	Wolf	Resident
	Vulpes fulva	Red fox	Resident
Felidae	*Lynx canadensis*	Lynx	Resident
Mustelidae	*Lontra canadensis*	River otter	Resident
	Gulo gulo	Wolverine	Resident
	Martes americana	Marten	Resident
	Mustela erminea	Ermine	Resident
	Mustela nivalis	Least weasel	Resident
	Mustela vison	Mink	Resident
Ursidae	*Ursus americanus*	Black bear	Resident
	Ursus horribilis	Grizzly bear	Resident
Cervidae	*Alces alces*	Moose	Resident
	Rangifer tarandus	Caribou	Resident
Bovidae	*Bison bison*	Wood bison	Incidental
	Ovis dalli	Dall's sheep	Resident
Sciuridae	*Citellus parryi*	Arctic ground squirrel	Possible
	Tamiasciurus hudsonicus	Red squirrel	Resident
	Glaucomys sabrinus	Northern flying squirrel	Resident
Castoridae	*Castor canadensis*	Beaver	Resident
Dipodidae	*Zapus hudsonicus*	Meadow jumping mouse	Probable
Muridae	*Clethrionomys rutilus*	Northern red-backed vole	Resident
	Lemmus trimucronatus	Brown lemming	Probable
	Microtus longicaudus	Long-tailed vole	Possible
	Microtus miurus	Singing vole	Possible
	Microtus oeconomus	Tundra vole	Probable
	Microtus pennsylvanicus	Meadow vole	Resident
	Microtus xanthognathus	Yellow-cheeked vole	Resident
	Ondatra zibethica	Muskrat	Resident
	Synaptomys borealis	Northern bog lemming	Resident
Erethizontidae	*Erethizon dorsatum*	Porcupine	Resident
Ochotonidae	*Ochotona collaris*	Collared pika	Possible
Leporidae	*Lepus americanus*	Snowshoe hare	Resident

[1] Genus species from Jarrell et al. Checklist to the Mammals of Alaska

[2] Residents— species known to occur from regular observations and/or from specimens collected on or near the Refuge. Probable—species documented near the Refuge; Refuge is within known range of species; and habitat is available. Possible—species not documented in, or adjacent to, the Refuge but Refuge is within known range and habitat is available. Revised February 24, 2003.

Tetlin National Wildlife Refuge fish species list

Family	*Genus species*	Common Name
Salmonidae	*Coregonus sardinella*	Least Cisco
	Prosopium cylindraceum	Round Whitefish
	Coregonus pidschian	Humpback Whitefish
	Oncorhynchus mykiss	Rainbow trout
	Salvelinus namaycush	Lake Trout
	Salvelinus malma	Dolly Varden
	Oncorhynchus tshawytscha	Chinook Salmon
	Oncorhynchus keta	Chum Salmon
	Thymallus arcticus	Arctic Grayling
Esocidae	*Esox lucius*	Northern Pike
Cyprinidae	*Couesius plumbeus*	Lake Chub
Catostomidae	*Catostomus catostomus*	Longnose Sucker
Lotidae	*Lota lota*	Burbot
Cottidae	*Cottus cognatus*	Slimy Sculpin

Tetlin National Wildlife Refuge butterfly species list

Family	*Genus species*	Common Name
Swallowtails (Family Papilionidae)		
Swallowtails (Subfamily Papilioninae)		
	Papilio machaon	Old World Swallowtail
	Papilio Canadensis (=*Pterourus canadensis*)	Canadian Tiger Swallowtail
Whites and Sulphurs (Family Pieridae)		
Whites (Subfamily Pierinae)		
	Pontia occidentalis	Western White
	Pieris napi	Mustard White
	Euchloe creusa	Northern Marble
Sulphurs (Subfamily Coliadinae)		
	Colias philodice	Clouded Sulphur
	Colias krauthii kluanensis	Kluane Sulphur
	Colias palaeno	Palaeno Sulphur
	Colias Canadensis	Canadian Sulphur
	Colias gigantean	Giant Sulphur
	Colias nastes	Labrador Sulphur
Gossamer-wing Butterflies (Family Lycaenidae)		
Coppers (Subfamily Lycaeninae)		
	Lycaena phlaeas arethusa	American Copper
	Epidemia dorcas	Dorcas Copper
Hairstreaks (Subfamily Theclinae)		
	Incisalia polia	Hoary Elfin
Blues (Subfamily Polyommatinae)		
	Everes amyntula	Western Tailed Blue
	Celastrina ladon	Spring Azure
	Glaucopsyche lygdamus	Silvery Blue
	Lycaeides idas	Northern Blue
	Plebejus saepiolus	Greenish Blue
	Vacciniina optilete	Cranberry Blue
Brush-footed Butterflies (Family Nymphalidae)		
Heliconians and Fritillaries (Subfamily Heliconiinae)		
	Speyeria atlantis	Atlantis Fritillary
	Boloria eunomia (=*Clossiana eunomia*)	Bog Fritillary
	Boloria selene (=*Clossiana selene*)	Silver-bordered Fritillary
	Boloria polaris (=*Clossiana polaris*)	Polaris Fritillary
	Boloria frigga (=*Clossiana frigga*)	Frigga Fritillary
	Boloria freija (=*Clossiana freija*)	Freija Fritillary
	Boloria titania (*Clossiana titania*)	Titania Fritillary
	Boloria chariclea (=*Clossiana chariclea*)	Arctic Fritillary
	Phyciodes pratensis	Field Crescent
True Brush-foots (Subfamily Nymphalinae)		
	Polygonia faunus	Green Comma
	Polygonia gracilis	Hoary Comma
	Nymphalis antiopa	Mourning Cloak
	Aglais milberti	Milbert's Tortoiseshell
Admirals and Relatives (Subfamily Limenitidinae)		
	Basilarchia arthemis	White Admiral

Family	*Genus species*	Common Name
Satyrs (Subfamily Satyrinae)		
	Coenonympha kodiak	Kodiak Ringlet
	Erebia mancinus	Taiga Alpine
	Erebia discoidalis	Red-disked Alpine
	Erebia epipsodea	Common Alpine
	Oeneis chryxus	Chryxus Arctic
	Oeneis bore	Bore Artic
	Oeneis jutta	Jutta Arctic
	Oeneis rosovi	Rosovi Arctic
Skippers (Family Hesperiidae)		
Spread-wing Skippers (Subfamily Pyrginae)		
	Erynnis persius	Persius Duskywing
Grass Skippers (Subfamily Hesperiinae)		
	Carterocephalus palaemon	Arctic Skipper
	Hesperia comma manitoba	Common Branded Skipper

Tetlin National Wildlife Refuge vascular plant species list

Family	*Genus species*	Common Name
Araceae	*Calla palustris*	Calla, Wild
Betulaceae	*Betula glandulosa*	Birch, Shrub
	Betula papyrifera	Birch, Paper
	Alnus crispa	Alder, Mountain
Boraginaceae	*Lappula occidentalis*	Stickseed
	Lappula myosotis Moench	Stickseed
	Mertensia paniculata	Bluebell
Campanulaceae	*Campanula lasiocarpa*	Bellflower
Caprifoliaceae	*Viburnum edule*	Cranberry, High Bush
Caprifoliaceae	*Linnaea borealis*	Twinflower
Caryophyllaceae	*Stellaria crassifolia*	Chickweed
	Melandrium affine J.Vahl	
	Moehringia lateriflora (L.) Fenzl.	Grove Sandwort
	Melandrium taimyrense	
	Silene acaulis L. subacaulescens (F.N. Williams) Hult.	Moss Campion
	Stellaria longifolia	Chickweed
	Stellaria edwardsii	Chickweed
	Stellaria longipes	Chickweed
	Ceratophyllum demersum	Hornwort
Chenopodiaceae	*Chenopodium capitatum*	Blite, Strawberry
Compositae	*Arnica alpina*	Arnica, Alpine
	Arnica frigida	Arnica, Frigid
	Erigeron elatus	Fleabane
	Petasites hyperboreus	Coltsfoot
	Aster sibericus	Aster, Siberian
	Achillea millefolium	Yarrow, Common
	Achillea lanulosa	Yarrow
	Aster junciformis	
	Achillea sibirica	Yarrow
	Taraxacum ceratophorum	Dandelion
	Achillea borealis	Yarrow
	Saussurea angustifolia	Saussurea
	Senecio ogotorokensis	Ragwort
	Petasites sagittatus	Coltsfoot, Sweet
	Matricaria matricariodes	Pineapple Weed
	Erigeron acris	Fleabane
	Solidago decumbens	Goldenrod
	Artemisia borealis	Northern Wormwood
	Petasites frigidus	Coltsfoot, Frigid
	Crepis elegans	Elegant Hawk's-beard
	Crepis nana	Hawk's-beard
	Solidago multiradiata	Mountain Goldenrod
	Antennaria pulcherrima	Showy Everlasting
	Senecio congestus	Mastadon Flower
	Senecio conterminus	Ragwort
	Senecio lugens Richards.	
	Senecio atropurpureus (Ledeb.) Fedtsch.	
	Senecio pauciflorus Pursh	Alpine Butterweed,Rayless

Family	*Genus species*	Common Name
Compositae	*Bidens cernua L.*	
Cornaceae	*Cornus canadensis*	Bunchberry
Cruciferae	*Draba nivalis Liljebl.*	
	Barbarea orthoceras	Cress, Winter
	Rorippa islandica	
	Cardamine pratensis	Cuckoo Flower
	Braya humilis (C.A.Mey.) Robins	
	Erysimum cheiranthoides	
	Parrya nudicaulis	Parrya
	Arabis holboellii	Cress, Rock
	Lepidium densiflorum	
	Rorippa hispida	
Cupressaceae	*Juniperus communis nana*	Juniper, Mountain
Cyperaceae	*Carex capitata*	Sedge
	Carex disperma	Sedge
	Carex praticola	Sedge
	Carex rostrata	Sedge, Beaked
	Carex vaginata	Sedge
	Trichophorum alpinum	
	Eriophorum brachyantherum	Cotton Grass
	Carex tenuiflora Wahlenb.	
	Scirpus validus	Bulrush
	Eleocharis palustris	Spike, Rush
	Carex aurea Nutt.	
	Eriophorum scheuchzeri	Cotton Grass
	Carex membranacea	
	Carex media R.Br.	
	Carex physocarpa	
	Trichophorum caespitosum (L.) Hartm.	
	Carex scirpoidea Michx.	
	Eriophorum angustifolium	
	Eriophorum vaginatum vaginatum	
	Eriophorum vaginatum spissum	Hare's Tail Grass
	Carex bigelowii	
	Carex aquatilis Wahlemb.	Sedge, Water
Droseraceae	*Drosera anglica*	Sundew, Long-leaf
Droseraceae	*Drosera rotundifolia*	Sundew, Round-leaf
Elaeagnaceae	*Shepherdia Canadensis*	Soapberry
	Elaeagnus commutata	Silverberry
Empetraceae	*Empetrum nigrum hermaphroditum*	Crowberry
	Equisetum scirpoides	Horsetail
	Equisetum arvense	Horsetail
	Equisetum silvaticum	Horsetail
	Equisetum fluviatile	Horsetail
Ericaceae	*Ledum palustre groenlandicum*	Labrador Tea
	Cassiope tetragona tetragona	Lapland Cassiope
	Ledum palustre decumbens	Labrador Tea, Narrow leaf
	Arctostaphylos uva-ursi	Kinnikinnick
	Andromeda polifolia	

Family	*Genus species*	Common Name
	Rhododendron lapponicum	Rosebay, Lapland
	Loiseluria procumbens (L.) Desv.	Alpine Azalea
	Oxycoccus microcarpus	Bog Cranberry
	Vaccinium uliginosum	Blueberry, Alpine
	Vaccinium vitis-idaea	Lingonberry
	Arctostaphylos rubra	Bearberry, Red Fruit
	Chamaedaphne calyculata	Leatherleaf
Furmariaceae	*Corydalis sempervirens*	Corydalis, Pale
Gentianaceae	*Gentiana barbata*	Bearded Gentian
	Lomatogonium rotatum	Star Gentian
	Gentiana propinqua	
	Menyanthes trifoliata	Buckbean
Gramineae	*Calamagrostis purpurascens*	Grass, Reed Bent
	Calamagrostis neglecta	Grass, Reed Bent
	Poa alpigena	
	Phleum commutatum	Mountain Timothy
	Calamagrostis canadensis	Grass, Reed Bent
	Agropyron pauciflorum pauciflorum	Grass, Wheat
	Agrostis scabra	Grass, Bent
	Arctagrostis latifolia	Grass, Polar
	Poa glauca	
	Alopecurus pratensis	Foxtail
	Beckmannia erucaeformis baicalensis	Grass, Slough
	Hordeum jubatum	Grass, Squirreltail
	Festuca saximontana	Grass, Fescue
	Elymus innovatus	Grass, Lyme
	Festuca altaica	Grass, Fescue
	Bromus pumpellianus	Grass, Bent
	Festuca rubra	
	Deschampsia caespitosa	
	Poa arctica	
	Trisetum spicatum	
Haloragaceae	*Myriophyllum spicatum*	Water Milfoil
Haloragaceae	*Hippuris vulgaris*	Mare's Tail, Common
Iridaceae	*Iris setosa interior*	Wild Flag
Juncaceae	*Juncus arcticus alaskanus*	Rush
	Juncus alpinus	Rush
	Juncus castaneus	Rush
Juncaginaceae	*Triglochin maritimum L.*	Arrow Grass
Juncaginaceae	*Triglochin palustris*	Arrow Grass
Labiatae	*Scutellaria galericulata*	Skullcap
Leguminosae	*Hedysarum alpinum americanum*	Liquorice-root
	Lupinus arcticus	Lupine
	Melilotus albus	Clover, Yellow Sweet
	Oxytropis deflexa (Pall.) DC. var. foliosa (Hook.) Barneby	Crazy Weed, Pendant-pod
	Oxytropis campestris gracilis	Oxytrope, Northerm Yellow
	Melilotus officinalis	Clover, Yellow Sweet
Lemnaceae	*Lemna trisulca*	Duckweed
Lemnaceae	*Lemna minor*	Duckweed, Lesser

Family	*Genus species*	Common Name
Lentibulariaceae	*Pinguicula villosa*	Hairy Butterwort
	Utricularia vulgaris macrorhiza	Bladderwort
Liliaceae	*Tofieldia glutinosa (Michx.) Pers. ss. brevistyla Hitchc.*	
	Zygadensus elegans	Camass, Death
	Tofieldia pusilla	Asphodel, False
Lycopodiaceae	*Lycopodium annotinum annotinum*	Stiff Club Moss
	Lycopodium selago selago	Fir Club Moss
	Lycopodium annotinum pungens	Stiff Club Moss
Marchantiaceae	*Marchantia polymorpha*	
Myricaceae	*Myrica gale tomentosa*	Sweet Gale
Nymphacaceae	*Nuphar polysepalum*	Pond Lily, Yellow
Onagraceae	*Epilobium palustre*	
	Epilobium hornemannii	
	Epilobium angustifolium	Fireweed
	Epilobium latifolium	River Beauty
Orchidaceae	*Plantanthera obtusata*	One-leaved Rein Orchid
	Calypso bulbosa	Lady's Slipper
	Amerorchis rotundifolia	Orchis, Fly-specked
	Platanthera hyperborea	Bog Orchis
	Corallorrhiza trifida	Northern Coral Root
	Spiranthes romanzoffiana	Ladies' Tresses
	Cypripedium passerinum	Northern Lady's Slipper
	Goodyera repens	Rattlesnake Plantain
Orobanchaceae	*Boschniakia rossica*	Broomrape
Papaveraceae	*Papaver macounii Greene*	Macoun's Poppy
Pinaceae	*Picea glauca*	Spruce, White
Plantaginaceae	*Plantago major major*	Plantain, Common
Polemoniaceae	*Polemonium acutiflorum*	Jacob's Ladder
	Polemonium pulcherrimum	Jacob's Ladder, Tall
Polygonaceae	*Polygonum viviparum*	
	Polygonum amphibium laevimarginatum	Water Smartweed
	Rumex arcticus	Dock, Arctic
	Polygonum alaskanum	Rhubarb, Wild
	Polytrichum juniperinum	Haircap Moss
Potamogetonaceae	*Potamogeton vaginatus*	Pondweed
Primulaceae	*Lysimachia thrysiflora*	Loosestrife, Tufted
	Dodecatheon pulchellum pauciflorum	Shooting Star
	Androsace septentrionalis	
	Primula sibirica	Siberian Primrose
Pyrolaceae	*Pyrola asarifolia*	Pyrola, Pink
	Moneses uniflora	Single Delight
	Pyrola chlorantha Sw.	Pyrola, Green
	Pyrola secunda secunda	One-sided Wintergreen
Ranunculaceae	*Delphinium glaucum*	Larkspur
	Ranunculus lapponicus	
	Ranunculus gmelini	
	Anemone multifida	Anemone, Cutleaf
	Anemone parviflora	Anemone, Northern
	Anemone richardsonii	Anemone, Yellow

Family	*Genus species*	Common Name
	Anemone narcissiflora L.	Anemone,Narcissus-flowere
	Pulsatilla patens	Pasque Flower
Rosaceae	*Dryas drummondii*	Dryas, Yellow
	Spiraea beauverdiana	Spiraea, Alaska
	Potentilla hookeriana	
	Dryas integrifolia integrifolia	Dryas
	Potentilla fruticosa	Cinquefoil, Shrubby
	Potentilla multifida	
	Rosa acicularis	Rose, Prickly Wild
	Potentilla norvegica	
	Potentilla palustris	Marsh Fivefinger
	Rubus arcticus arcticus	Nagoonberry
	Geum macrophyllum perincisum	
	Rubus chamaemorus	Cloudberry
Rubiaceae	*Galium boreale*	Bedstraw
Salicaceae	*Populus balsamifera*	Poplar, Balsam
	Salix arctica	Willow, Arctic
	Salix arbusculoides	Willow, Littletree
	Salix glauca	Willow, Greyleaf
	Salix candida	Willow, Silver
	Salix brachycarpa	Willow, Barren Ground
	Populus tremuloides	Aspen, Quaking
	Salix barclayi	Willow, Barclay
	Salix myrtillifolia	Willow, Low Blueberry
	Salix phlebophylla	Willow, Skeletonleaf
	Salix bebbiana	Willow, Bebb's
	Salix alaxensis	Willow, Feltleaf
	Salix scouleriana	Willow, Scouler's
	Salix lanata richardsonii	Willow, Richardson's
	Salix polaris pseudopolaris	Willow, Polar
	Salix novae-angliae Anderss.	Willow, Tall Blueberry
	Salix monticola Bebb	Willow, Park
	Salix planifolia pulchra	Willow, Diamondleaf
	Salix reticulata	Willow, Net Leaf
Santalaceae	*Geocaulon lividum*	Toadflax
Saxifragaceae	*Ribes hudsonianum*	Currant,Northern Black
	Ribes triste	Northern Red Currant
	Saxifraga tricuspidata	Saxifrage, Prickly
	Saxifraga hieracifolia	Saxifrage, Stiff-Stemmed
	Parnassia palustris meogaea	Grass-of-Parnassus
	Chrysosplenium tetrandrum	Water Carpet, Northern
	Saxifraga reflexa	
Scrophulariaceae	*Euphrasia disjuncta*	Eyebright
	Pedicularis kanei Durand ss. kanei	Lousewort, Wooly
	Pedicularis sudetica Willd. Hult. ss. interior	
	Pentstemon gormani	Yukon Beardtongue
	Pedicularis oederi	Lousewort, Oeder's
	Pedicularis labridorica	Lousewort, Labrador
	Castilleja caudeta	Indian Paintbrush

Family	*Genus species*	Common Name
Selaginellaceae	*Selaginella sibirica*	
Sparganiaceae	*Sparganium minimum (Hartm.) E. Fries E. Fries*	Bur Reed
Umbelliferae	*Cicuta mackenzieana*	Hemlock, Water or Poison
	Cnidium cnidiifolium	
	Sium suave	Parsnip, Water
	Bupleurum triradiatum arcticum	Thoroughwax
Valerianaceae	*Valeriana capitata*	Mountain Heliotrope

Appendix D

Easements and Rights-of-Way within Tetlin National Wildlife Refuge

D. Easements and Rights-of-Way within Tetlin National Wildlife Refuge

Easements Reserved Pursuant to Section 17(b) of the Alaska Native Claims Settlement Act

When the Federal government conveyed lands to Native corporations, they reserved specific easements to ensure access to public lands and waters. Section 17(b) of the Alaska Native Claims Settlement Act (ANCSA) authorizes the Secretary of the Interior to reserve public easements on lands conveyed to Native corporations to guarantee access to public lands or waters. These easements include linear easements across Native lands and site easements. Easement are listed by easement identification number (EIN). Figure D-1 displays these easements.

NORTHWAY NATIVES, INC.

Sites

EIN 19	C5 M	1-acre site on the right bank of the Chisana River and immediately east of the bridge over the Chisana River in Sec. 9, T14N R19E, Copper River Meridian. USGS map Tanacross A-2. IC 664.
EIN 55a	C5 D1	1-acre site on the right bank of the Tanana River in Sec. 24, T16N R17E, Copper River Meridian. USGS map Tanacross A-3. IC 1044.
EIN 103	I	VORTAC site in T14N R18E, Sec. 36, T14N, R18E, Copper River Meridian. USGS map Nabesna D-2. IC 1044.

Roads

EIN 39	C3 C5 D1	60-foot-wide road from the Alaska Highway to Deadman Lake Campground in Section 24, T13N R20E, Copper River Meridian. USGS map Nabesna D-2. IC 364.
EIN 46	I	60-foot-wide road from the Northway Village road southerly to FAA navigational facilities in Section 36, T14N R18E, Copper River Meridian. USGS map Nabesna D-2. IC 964. *This easement is reserved for government use only.*
EIN 55	C5 D1	50-foot-wide road from Alaska Highway southerly to Site 55a C5 D1 on the right bank of the Tanana River. Sections 13, 14, and 24, T16N R17E, Copper River Meridian. USGS map Tanacross A-3. IC 489 and IC 1044.
EIN 104	C4	60-foot-wide road from the Northway village road northeasterly to FAA facilities in Section 26, T14N R18E, Copper River Meridian. USGS map Nabesna D-2. IC 1227.

Trail

EIN 2	C5	A 25-foot-wide trail easement for a proposed trail in the NE ¼ of Section 1, T. 15 N., R. 17 E., Copper River Meridian. USGS map Tanacross A-3. Patent 50-91-0365.

EIN 27 C3 C5 D9 A 50-foot-wide trail from the south boundary of USS 2630, Lot 1 southerly to public land in Section 2, T13N R18E, Copper River Meridian. USGS map Nabesna D-2. IC 964 and IC 1377.

EIN 52 C4 C5 E A 50-foot-wide trail from the north boundary of Section 5, T12N R18E, Copper River Meridian westerly to the east boundary of Section 1, T12N R17E, Copper River Meridian. USGS map Nabesna D-3. IC 714.

EIN 105 C6 D1 D9 An easement 25 feet in width for an existing and proposed access trail from the Alaska Highway in Section 32, T17N R17E, Copper River Meridian, southwesterly to public lands. USGS map TanacrossA-3.

RS-2477 Rights-of-Way

The State of Alaska identifies numerous claims to roads, trails, and paths across federal lands under Revised Statute 2477 (RS 2477), a section in the Mining Act of 1866 that states, "The right-of-way for the construction of highways over public land, not reserved for public uses, is hereby granted." RS 2477 was repealed by the Federal Land Policy and Management Act of 1976, subject to valid existing claims.

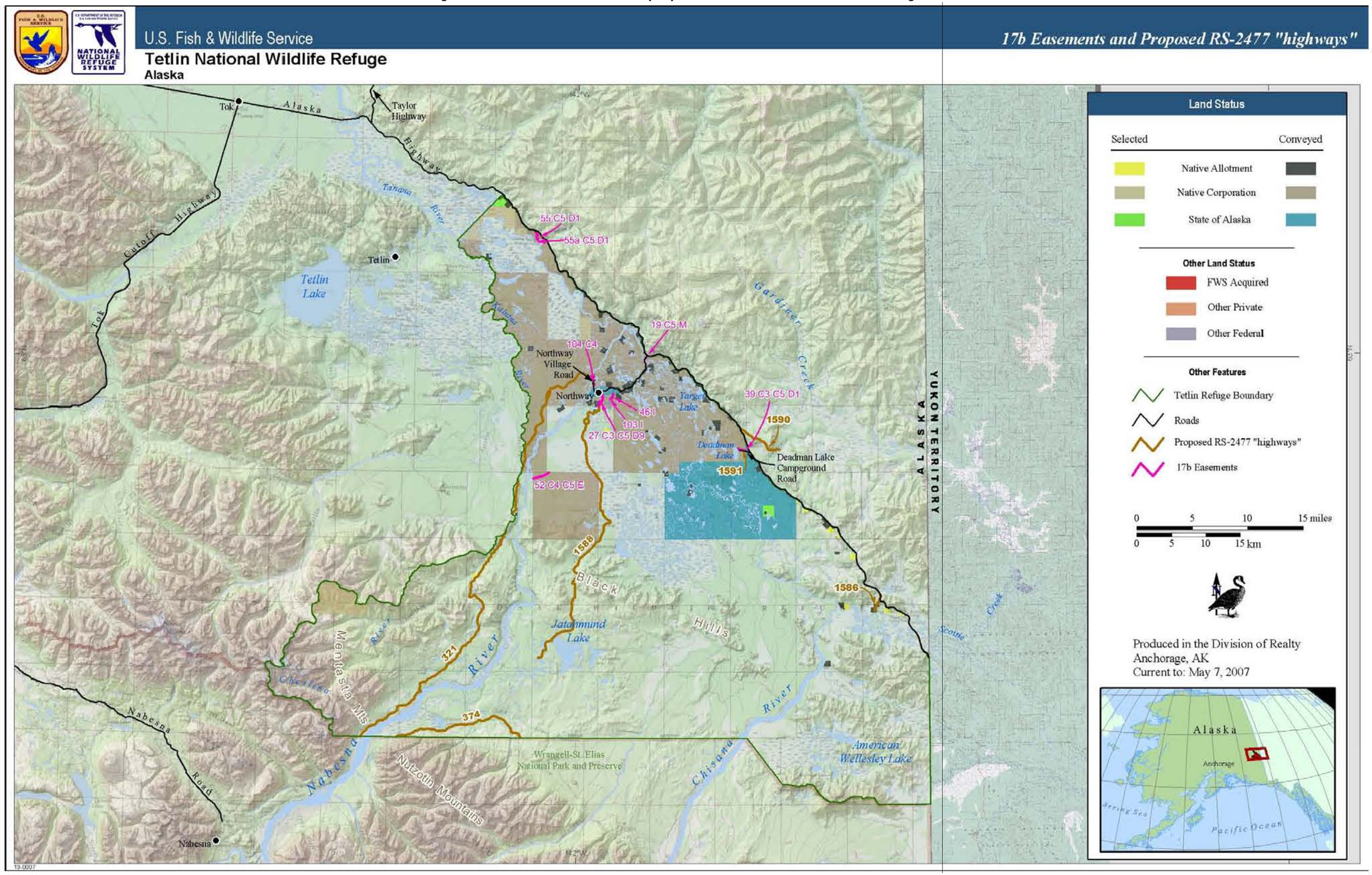
Assertion and identification of potential rights-of-way does not establish the validity of these claims nor the public's right to use them. The validity of all RS 2477 rights-of-way will be determined on a case-by-case basis, either through the courts or by other legally-binding document. The State of Alaska has identified in Alaska Statute 19.30.400 seven routes on Tetlin Refuge it claims may be asserted as rights-of-way under RS 2447 (see Table D-1 and Figure D-1).

Table D-1. Estimated mileage of State-claimed RS 2477 routes within the boundaries of Tetlin Refuge

No.	Route Name	Native Conveyed	Native Selected	State Conveyed	Refuge Lands	Estimated Total Miles
321	Nabesna-Northway	13.51	0.00	0.00	30.33	43.84
374	Nabesna River-Canadian Border	0.00	0.54	0.00	12.95	13.49
1586	Scottie Creek Lodge-High Cache	0.96	0.00	0.00	0.69	1.65
1588	Northway Airport-Jatahmund Lk.	1.63	0.00	0.25	30.16	32.04
1589	Paradise Hill-Cabin	0.00	0.00	0.00	0.01	0.01
1590	Gardiner Creek Trail	0.01	0.00	0.00	0.00	0.01
1591	Deadman Lake Campground Trail	0.71	0.00	0.45	0.00	1.16
	Total	**16.82**	**0.54**	**0.70**	**74.14**	**92.20**

Source: USFWS. 2001a.

Figure D-1. 17(b) easements and proposed RS-2477 routes on Tetlin Refuge



Appendix E

Compatibility Determinations

Commercial Air Transporter Services	E-01
Commercial Hunting Services (Guiding and Outfitting)	E-07
Recreational Fishing (Wildlife-Dependent Recreation)	E-17
Recreational Hunting (Wildlife-Dependent Recreation)	E-23
Scientific Research	E-29
State of Alaska Management Activities	E-36
Subsistence Activities	E-40
Trapping	E-47
Wildlife Observation, Wildlife Photography, Environmental Education, and Interpretation (Wildlife-Dependent Recreation)	E-52

COMPATIBILITY DETERMINATION

Use: Commercial Air Transporter Services

Supporting and Incidental Uses: Hunting, fishing, hiking and backpacking, boating and rafting (motorized and non-motorized), camping, berry picking, picnicking, firewood gathering, swimming, wildlife photography, and wildlife observation.

Refuge Name: Tetlin National Wildlife Refuge

Establishing and Acquisition Authority

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established the Tetlin National Wildlife Refuge as part of the National Wildlife Refuge System.

Refuge Purposes

ANILCA sets out the purposes for which each refuge in Alaska was established and must be managed. The purposes and management priorities of the Tetlin National Wildlife Refuge are described in Section 302(8)(B) of ANILCA as follows:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use

This compatibility determination addresses a commercial use of the Refuge involving the transportation of persons and/or materials in and out of the Refuge by means of airplane. The commercial transport of persons to and from the Refuge primarily to hunt, fish, and participate in

other outdoor recreational activities on the Refuge has occurred prior to and since its establishment in 1980. Occasionally, transporter services may be chartered for non-recreational activities on the Refuge or for access to private lands within the Refuge. Commercial transporter operations are required to obtain a permit to operate on the Refuge. Permit conditions require they annually report number of clients and trips, the primary activity of the clients, location of trips, dates and length of stay, group size, and other related information. Commercial transporter operators who utilize state lands within the Refuge, including shorelands and waters, are also required to register with the Alaska Department of Natural Resources.

As of 2005, three commercial transporters were permitted to use the Refuge. Most reported use occurs from May through October. A relatively small number of refuge visitors use commercial transporter services to access the Refuge. The number of commercial transporter trips made to the Refuge averaged six per year during most of the 1990s. One air transporter/air-taxi operator accounts for more than 90 percent of all use (primarily using float equipped airplanes). The annual number of visitor use days on the Refuge associated with these trips ranged from 16 to 34.

This use (commercial transporter services) occurs throughout the Refuge and supports wildlife-dependent recreational activities, primarily hunting and fishing. Thus timing of transporter activities is primarily in response to state fishing and hunting seasons.

Availability of Resources

Adequate refuge personnel and base operational funds are available to manage commercial transporter activities at current and projected levels. Approximately $400- $500 in visitor use fees are collected annually, which are returned to the Refuge for use in management of commercial transporter activities over and above base operational funds. Administrative time (5 to 10 staff days) primarily involves annually issuing permits, ensuring that licenses and certifications are current, and collecting client use-day fees. Field work associated with administering the program primarily involves monitoring the permittee's compliance with the terms of the permits.

Anticipated Impacts of the Use

Because of the Refuge's administrative oversight of the activity, comprehensive state and federal regulations (which continually evolve to respond to fisheries and wildlife management needs) and because of combined law-enforcement efforts of state and Service personnel, direct impacts from commercial transporter services at existing and projected levels should have minimal or negligible impacts to fish and wildlife resources, other refuge resources, and other refuge users. Refuge special use permits that are required for transporter activities include special conditions to minimize potential impacts on refuge resources and other users. Commercial transporter services are provided in support of other uses and activities that occur on the Refuge. Impacts of the uses supported by transporters are addressed in the respective compatibility determination specific for that use.

Permit conditions prohibit operation of airplanes at altitudes or in flight paths resulting in disturbance or harassment of wildlife. However, temporary displacement and/or disturbance to wildlife can occur during take-offs and landings. There are no known long-term impacts to refuge wildlife populations from this disturbance.

The vast majority of transporter activities in the Refuge involve access in and out of lakes and rivers with float-equipped airplanes, which minimizes potential impacts to refuge habitats. Wheel-

plane landings are far less common, and occur opportunistically on gravel bars or other sites that are conducive to wheel landings. Although it is not known to have occurred on the Refuge to date, one potential impact or threat associated with airplane use is the introduction of invasive species carried in on the airplane. Most such sites are unvegetated or lightly vegetated. The size of the Refuge and distance from fixed base operations outside the Refuge negate need for refueling in the field and thus avoid concerns for potential spills during refueling activities.

Public Review and Comment

This and other compatibility determinations were prepared concurrently with the Draft Revised Comprehensive Conservation Plan and Environmental Assessment (USFWS 2007) for the Tetlin National Wildlife Refuge. The public was invited to comment on the draft compatibility determinations during the public review period established for the Draft Revised Comprehensive Conservation Plan. We published public notice of the availability of the draft conservation plan and draft determinations in the Federal Register on October 3, 2007, and invited public comments until January 18, 2008, which provided a comment period of 106 days. We mailed summaries of the Draft CCP to approximately 800 individuals, agencies, and organizations, and the full Draft CCP document (including the draft determinations) to approximately 80 other individuals, agencies and organizations. We also published ads or articles in four newspapers, and purchased a public service announcement on public radio to invite comments on the Draft CCP and compatibility determinations, and held public meetings in Tanacross, Tetlin, Tok, Northway and Fairbanks. The draft determinations were also posted on the Region 7 Refuge Conservation Planning and Policy Web pages.

The only comments we received regarding this compatibility determination were from the State of Alaska. In response to their comments, we added a statement to the determination acknowledging that commercial operators who utilize State lands and waters within the Refuge must register with the State Department of Natural Resources. The State recommended the special use permit condition prohibiting the use of helicopters be changed to state, "Helicopter landings are not authorized by this permit." We made no changes to the permit conditions because the Service's regional permit conditions are being reviewed in a separate process, but we forwarded their comments to those working on that task. The special use permit conditions are displayed in compatibility determinations for activities that require permits as examples only.

Determination

_____Use is Not Compatible

__X__Use is Compatible

Stipulations Necessary to Ensure Compatibility

Based on management direction provided in the Tetlin Refuge Revised Comprehensive Conservation Plan (USFWS 2008) and the 1986 Tetlin Refuge Wildlife Inventory and Monitoring Plan, will continue monitoring of commercial transporter activities and other associated public-use activities. Findings from monitoring efforts will be used to determine what additional management actions, if any, are needed to ensure that commercial transporter activities remain compatible with refuge purposes.

To minimize impacts on refuge lands and resources, law-enforcement and administrative monitoring of permittees will be continued to ensure compliance with conditions incorporated into all permits for commercial transporters.

The conditions listed below are generally included on refuge permits issued for transporter services, mostly to minimize impacts and ensure compatibility of these uses with refuge purposes. Conditions included on each permit may vary somewhat as needed or appropriate for the specific operations being proposed, and if changing situations warrant revisions.

1. Failure to abide by any part of this special use permit; violation of any refuge related provision in Titles 43 (Part 36) or 50 (sub-chapters B and C) Code of Federal Regulations; or violation of any pertinent state regulation (e.g., fish or game violation) will, with due process, be considered grounds for immediate revocation of this permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit (e.g., assistants). Appeals of decisions relative to permits are handled in accordance with Title 50 Code of Federal Regulations Part 36.41.

2. The permittee is responsible for ensuring that all employees, party members, aircraft pilots, and any other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

3. Any problem with wildlife and/or animals taken in defense of life or property must be reported immediately to the refuge manager and/or Alaska Department of Fish and Game, and be salvaged in accordance with State regulations.

4. This permit may be canceled or revised at any time by the refuge manager in case of emergency (e.g., high fire danger, flooding, unusual resource problems etc.).

5. Prior to beginning any activities allowed by this permit, the permittee shall provide the refuge manager with: (1) proof of appropriate aviation passenger liability ($150,000 per seat plus $100,000 property damage), marine liability, and/or comprehensive general liability insurance covering all aspects of operations throughout the annual use period; (2) aircraft and other vehicle types to be used, with identification information, if different from the original permit or previous year; (3) changes in names of pilots; and (4) any other changes in information provided in the original permit application.

6. The permittee shall provide the refuge manager with a comprehensive summary report of activities and services provided on refuge lands under authorization of this permit within 30 days of permit expiration unless stated otherwise in the permit. The report shall include the number of trips provided to and from the Refuge, and for each trip the date, location, number of clients in the party, and number and species of all animals taken by the party. For law enforcement purposes, the permittee may be required to provide names and addresses of clients.

7. In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the removal or disturbance of archaeological or historic artifacts is prohibited. The excavation, disturbance, collection, or purchase of historical or archaeological specimens or artifacts on refuge lands is prohibited.

8. The construction or clearing of landing strips or pads is prohibited. Incidental hand removal of rocks and other minor obstructions may be permitted.

9. The operation of aircraft at altitudes and in flight paths resulting in the herding, harassment, hazing, or driving of wildlife is prohibited. It is recommended that all aircraft, except for take off and landing, maintain a minimum altitude of 2,000 feet above ground level (AGL).

10. Construction of cabins, tent platforms, fuel caches, or other permanent structures is prohibited.

11. Any action by the permittee or the permittee's employees which unduly interferes with or harasses other refuge visitors or impedes access to any site is strictly prohibited. Examples of prohibited acts include, but are not limited to, low flights over camps or persons at less than 500 feet (unless landing) and parking aircraft or placing other objects (rocks, tents, etc.) on any landable area so as to restrict use by other aircraft or persons.

12. The permittee's operations plan, as amended and accepted by the U.S. Fish and Wildlife Service, is hereby incorporated in its entirety as a special condition. All deviations from the operations plan must receive prior written approval by the refuge manager or his designee.

13. All non-combustible waste materials must be removed from the Refuge (not buried) upon the permittee's and/or clients' departure. The permittee is responsible for removal of clients' garbage.

14. The use of helicopters is prohibited.

15. The use of Native or State lands that have been conveyed (patented) is not authorized by this permit.

Justification

Commercial guiding and outfitting services are traditional uses that Congress intended to preserve with the enactment of ANILCA. These services are provided in direct support of hunting, fishing, wildlife observation and photography, and environmental education, which the National Wildlife Refuge System Improvement Act of 1997 identified as a priority public uses of the National Wildlife Refuge System. Commercial transporter services are necessary to a segment of the public that does not have other means of access to the extremely remote environment of the Refuge.

As described previously in the "Anticipated Impacts" section of this compatibility determination, the overall impacts of commercial transporter activities on resources, and on subsistence use opportunities is minor. After fully considering the direct and indirect impacts of these uses, it is my determination that commercial transporting activities on the Refuge do not materially interfere with or detract from the purposes of the Refuge or the mission of the National Wildlife Refuge System.

Supporting Documents

Tetlin National Wildlife Refuge. 1986. Wildlife inventory and monitoring plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska, USA.

USFWS. 1987. Tetlin National Wildlife Refuge final comprehensive conservation plan, environmental impact statement and wilderness review. U.S. Fish and Wildlife Service, Anchorage, AK.

USFWS. 1992. Finding of No Significant Impact, Environmental Assessment for the policy on commercial big-game guide-outfitters and transporters on national wildlife refuges in Alaska, June 9, 1992. Anchorage, Alaska.

USFWS. 1994. Compatibility determination for commercial transporter uses within Tetlin National Wildlife Refuge. August 12, 1994. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 1997. Tetlin National Wildlife Refuge public use management plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 2007. Draft Revised Comprehensive Conservation Plan and Environmental Assessment: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

USFWS. 2008. Final Comprehensive Conservation Plan: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

Refuge Determination

Refuge Manager / Project Leader Approval:	/signed/ Tony Booth	8/8/2008
	(Signature)	(Date)

Concurrence

Regional Chief, National Wildlife Refuge System:	/signed/ Mike Boylan (Acting)	8/8/2008
	(Signature)	(Date)

Mandatory 10-Year Re-Evaluation Date: 2018

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum

_____ Categorical Exclusions and Environmental Action Memorandum

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

COMPATIBILITY DETERMINATION

Use: Commercial Hunting Services (Guiding and Outfitting)

Supporting and Incidental Uses: Hiking and backpacking, boating and rafting (motorized and non-motorized), fishing, fixed-wing aircraft landings, snowmachining, dog sledding, snowshoeing, cross-country skiing, pack horses and mules, camping, cabins, tent frames, weatherports, picnicking, firewood gathering, berry picking, wildlife photography, and wildlife observation.

Refuge Name: Tetlin National Wildlife Refuge

Establishing and Acquisition Authority

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established the Tetlin National Wildlife Refuge as part of the National Wildlife Refuge System.

Refuge Purposes

ANILCA sets out the purposes for which each refuge in Alaska was established and must be managed. The purposes and management priorities of the Tetlin National Wildlife Refuge are described in Section 302(8)(B) of ANILCA as follows:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use

This compatibility determination addresses commercial guiding and outfitting services provided to hunters in the field. Alaska regulations define the term "guide" …*to provide, for compensation or*

with the intent or with an agreement to receive compensation, services, equipment, or facilities to a big game hunter in the field by a person who accompanies or is present with the big game hunter in the field either personally or through an assistant. The regulations identify guiding "services" provided to big game hunters to include such things as 1) contracting to guide or outfit hunts; 2) stalking, pursuing, tracking, killing, or attempting to kill game; 3) packing, preparing, salvaging, and caring for meat; 4) field preparation of trophies, including skinning and caping; 5) selling, leasing, or renting goods when the transaction occurs in the field; 6) using guiding or outfitting equipment, including spotting scopes and firearms for the benefit of the hunter; and 7) providing camping or hunting equipment or supplies that are already located in the field. The term "outfit" also applies to services, supplies, or facilities that are provided for compensation to hunters in the field. However, State regulations distinguish outfitting from guiding in that outfitters do not accompany or remain present with the hunter in the field, whereas guides or their assistants must be in the field with clients through the duration of a guided hunts. Outfitting services are often referred to as "drop-off hunts." Big game guides and outfitters are required to obtain a guide license from the State of Alaska. Although the State's regulatory definitions for guiding and outfitting apply to big game hunting, this compatibility determination includes commercial hunting services for all other wildlife species that may be hunted under Alaska hunting regulations as well (i.e., waterfowl, sandhill cranes, small game, upland game birds, etc.).

Commercial big game guiding and outfitting services have operated on the Refuge prior to, and since its establishment in 1980. Most guiding and outfitting within the Refuge is incidental to operations which focus their efforts in the adjacent Wrangell-St. Elias National Park and Preserve. All known or currently permitted guiding or outfitting activities on the Refuge involve hunts for the big game species, including moose, black bear, brown bear and Dall sheep. Commercial hunting services for other wildlife that may be hunted, such as waterfowl, upland birds, fur animals, or small game animals, could be allowed by special use permit, but the Refuge has not received any requests for such activities.

The Alaska Big Game Commercial Services Board licenses and regulates commercial big game guide and outfitter services in Alaska. In addition to applicable State statutes and regulations, these uses are intensively managed by the U.S. Fish and Wildlife Service (Service) on refuge lands. Big game guide/outfitter uses require special use permits on national wildlife refuges, and the number of such permits allowed on Alaska refuges is limited. The Service has established a competitively selection process to manage commercial guiding/outfitting activities at a level compatible with refuge purposes and to ensure that high-quality guiding services are available to the public. The selection process requires the applicant to submit an operations plan to be evaluated, and the criteria established by the Service to award the permits include impacts to refuge resources, and impacts to subsistence and other users. There are two established big game guide use areas on the Tetlin Refuge, and only one big game guide permit is allowed in each of the guide areas. Thus, there are only two big game guides allowed to operate on refuge lands. Commercial operators, such as guides or outfitters, who utilize state lands within the Refuge, including shorelands and waters, are required to register with the Alaska Department of Natural Resources.

Big game guide/outfitters must be qualified and licensed by the State in order to apply for permits to use refuge lands and are required to follow written operations plans submitted with their applications, which are evaluated by Service personnel during the competitive-selection process. These operations plans include the following: 1) dates of field operations; 2) species to be hunted; 3) maximum and expected number of clients for each species hunted; 4) number and type of

existing or new camps (i.e., tent, tent platform or frame, cabin, boat) including other needed facilities such as caches and weatherports; 5) access points and mode(s) of transportation (e.g., airplanes, boats, snowmachines, pack animals, and other nonmotorized means); 6) fuel storage needs; and 7) services provided by others (e.g., contracts for transportation, food services).

Commercial guiding or outfitting for wildlife other than big game species is subject to far less regulation by the State and the Service. However, such uses still require a special use permit from the Refuge. Although allowed, there has been no history or interest in permits for guided or outfitted hunts for wildlife other than big game.

This compatibility determination considers the full spectrum of uses and activities associated with commercially guided or outfitted hunting of wildlife, including all means of access, field lodging and camping facilities, and other elements identified in the guides' operations plans. Authorized modes of access for refuge lands may include fixed-wing aircraft, motor boats, snowmachines, nonpowered boats, pack stock, dogsled, foot, snowshoe, and cross-country ski. Lodging or camp facilities on refuge lands include tents, tent frames, tent platforms, weatherports, existing cabins, and caches. There are currently two cabins on the Refuge authorized for use in conjunction with big-game guiding operations. These cabins existed when the Refuge was first established and are allowed to remain in accordance with Section 1303(b) of ANILCA.

Commercial hunting service activities could occur throughout the Refuge depending on State regulated hunting seasons. However, all activities conducted under current big game guide permits have been limited to remote areas of the Refuge.

Availability of Resources

Adequate refuge personnel and base operational funds are available to manage commercial hunting services at existing and projected levels. The level of such uses on the Refuge has been extremely low during the past several years. The Refuge typically collects less than $1,000 in annual fees from the guide permit holders which are returned to the Refuge for use in managing commercially guided hunting activities. Administrative time (15–20 staff days) devoted to managing these uses primarily involves issuing permits, ensuring that licenses and certifications are current, collecting fees, and collecting hunting activity and harvest data. Field work associated with administering the program primarily involves monitoring the permitted operations for compliance with the terms of the permits and applicable hunting regulations.

Anticipated Impacts of the Use(s)

We anticipate that existing and projected levels of commercial guiding and outfitting activities on the Refuge should have minor or minimal overall impacts on fish and wildlife resources, other refuge resources, and opportunities for continued subsistence uses. Big game guiding/outfitting activities are subject to significant administrative oversight and regulation by the State, and the competitive process used by the Service to permit and manage these activities on refuge lands is designed to minimize impacts. In addition, all hunting activities associated with commercial guiding or outfitting are subject to State and Federal hunting regulations that continually evolve to respond wildlife management needs.

The competitive process used to select or award big game guide permit applications on refuge lands includes evaluation criteria for evaluating the potential impacts on wildlife resources, on other refuge resources such as water quality, soil, and vegetation; and on other refuge users,

especially subsistence users. The criteria address such factors as target species, number of clients, transportation modes, number of airplanes and amount of airplane use, fuel storage, garbage and human waste management, type and location of lodging, and access points. The ranking criteria provide a strong incentive for applicants to maintain a low-impact guiding service. In addition, permit conditions (noted in a following section) contribute to minimizing potential impacts.

Harvest levels for all hunters are effectively managed by State and Federal hunting regulations and the permitting process, to avoid overharvest of resources. Temporary displacement and/or disturbance to wildlife can occur while stalking and taking game animals, during motorized boat use, airplane take-offs and approaches to landings, and at or other areas of concentrated human activities. There are no known or expected long-term impacts to refuge wildlife populations from this disturbance. Overall, the direct impacts from hunting and harvesting wildlife resources by guided and outfitted hunters are expected to remain minor.

Some localized vegetation damage generally occurs in the vicinity of campsites and cabins due to more intense human activity, and at commonly used points of access, such as landing strips. The use of pack horses and mules can have localized impacts on refuge habitat, but their use has been essentially discontinued due to logistic and cost considerations. Most access to the Refuge currently used by commercial hunting services involves landing on lakes and rivers with float-equipped airplanes or on gravel bars with wheel-equipped airplanes, which renders minimal impacts on refuge habitat or vegetation. Some landings are made on vegetated lowland tundra or ridge tops, usually with small, light airplanes equipped with tundra tires. Disturbance to vegetation is minimal and short-term unless numerous landings are made repeatedly it the same location. Surface damage from heavily used landing strips has not been observed to date on the Refuge.

A potential impact or threat associated with access by commercial guiding and outfitting operations is the introduction of invasive species carried in on airplanes, boats and boat trailers, pack stock, pack stock feed, pets, or clothing. This is not known to have occurred within the Refuge to date.

Commercial big-game guiding operations may, in some cases, result in some competition for limited numbers of resident game animals or for preferred campsites or interfere with subsistence users and/or other unguided recreational hunters. However, both the Federal Subsistence Board and Alaska Board of Game regularly adopt regulations in response to big-game population levels and management needs to reduce impacts to big-game populations and to ensure opportunity for continued subsistence uses of wildlife resources by local residents. The current big game guiding/outfitting operations on the Refuge occur at remote areas where there is minimal potential for interference with local subsistence uses.

Compliance with regulations and permit conditions by guides is excellent because of potential consequences of a citation. Although a guide/outfitter could lose his permit immediately due to a citation for a severe infraction, any citation would be a negative factor during the next competitive selection process.

There two pre-ANILCA cabins in the Refuge that are used in support of permitted guiding activities. The areas around these cabin sites are subject to localized damage to vegetation and wildlife disturbances associated with more intensive human activities. The cabins are managed

under separate Refuge special-use permits, in accordance with established regional policy and regulations to ensure impacts are minimized. Refuge policy and regulations state that, "In general new cabin permits will be given only to local residents to pursue a legitimate subsistence activity." Thus the Refuge will generally not authorize new cabins for commercial purposes such as big game guiding and outfitting.

Public Review and Comment

This and other compatibility determinations were prepared concurrently with the Draft Revised Comprehensive Conservation Plan and Environmental Assessment for the Tetlin National Wildlife Refuge (USFWS 2007). The public was invited to comment on the draft compatibility determinations during the public review period established for the Draft Revised Comprehensive Conservation Plan. We published public notice of the availability of the draft conservation plan and draft determinations in the Federal Register on October 3, 2007, and invited public comments until January 18, 2008, which provided a comment period of 106 days. We mailed summaries of the Draft CCP to approximately 800 individuals, agencies, and organizations, and the full Draft CCP document (including the draft determinations) to approximately 80 other individuals, agencies and organizations. We also published ads or articles in four newspapers, and purchased a public service announcement on public radio to invite comments on the Draft CCP and compatibility determinations, and held public meetings in Tanacross, Tetlin, Tok, Northway and Fairbanks. The draft determinations were also posted on the Region 7 Refuge Conservation Planning and Policy Web pages.

The only comments we received on this draft determination were from the State of Alaska and we made some revisions to this determination in response to their comments. The State did not disagree with our determination, but recommended the special use permit condition prohibiting the use of helicopters be changed to state, "Helicopter landings are not authorized by this permit." We made no changes to the permit conditions because the Service's regional permit conditions are being reviewed in a separate process, but we forwarded their comments to those working on that task. The special use permit conditions are displayed in compatibility determinations for activities that require permits as examples only. The State also commented that refuge regulations allow commercial cabins by special use permit. We revised the compatibility determination to more closely reflect regulatory and policy language that, in general, limits new cabins to local residents to pursue subsistence activities.

Determination

_____Use is Not Compatible

__X__Use is Compatible

Stipulations Necessary to Ensure Compatibility

As directed in the Refuge's revised Comprehensive Conservation Plan and the 1986 Wildlife Inventory and Monitoring Plan, the Refuge will continue to monitor the existing and any future commercial hunting activities permitted on the Refuge (and other public-use activities). Findings from these monitoring efforts will be used to determine what additional management actions, if any, are needed to ensure all commercial guided and outfitted hunting activities remain compatible with refuge purposes.

Commercial guiding and outfitting uses of Refuge lands require a special use permit and are subject to permit conditions. The Refuge completed the selection process for the two big game guides authorized to operate on the Refuge for the period of January 1, 2004, through December 31, 2008. During this selection process, all elements of the proposed operations plans, (e.g., access, use of cabins and other facilities, fuel storage) were carefully considered by the selection panel to ensure that future commercial guiding operations remain compatible with refuge purposes. Refuge permits to provide commercial hunting services for wildlife resources other than big game animals are not subject to the competitive selection process. Such permits are issued on an annual basis to qualified individuals.

The conditions listed below are generally included on refuge permits issued for commercial guiding and outfitting services, mostly to minimize impacts and ensure compatibility of these uses with refuge purposes. Conditions included on each permit may vary somewhat as needed or appropriate for the specific operations being proposed, and if changing situations warrant revisions.

1. Failure to abide by any part of this special use permit; violation of any refuge related provision in Titles 43 (Part 36) or 50 (sub-chapters B and C) Code of Federal Regulations; or violation of any pertinent state regulation (e.g., fish or game violation) will, with due process, be considered grounds for immediate revocation of this permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit (e.g., assistants). Appeals of decisions relative to permits are handled in accordance with Title 50 Code of Federal Regulations Part 36.41.

2. The permittee is responsible for ensuring that all employees, party members, aircraft pilots, and any other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

3. The permittee may not sublet any part of the authorized use area and is prohibited from subcontracting clients with any other guide.

4. Any problem with wildlife and/or animals taken in defense of life or property must be reported immediately to the refuge manager and/or Alaska Department of Fish and Game, and be salvaged in accordance with State regulations.

5. The permittee and permittee's clients do not have the exclusive use of the site(s) or lands covered by this permit, except for authorized camp facilities.

6. This permit may be canceled or revised at any time by the refuge manager in case of emergency (e.g., high fire danger, flooding, unusual resource problems etc.).

7. The permittee shall notify the refuge manager during refuge working hours in person or by telephone before beginning and upon completion of annual activities allowed by this permit.

8. Prior to beginning any activities allowed by this permit, the permittee shall provide the refuge manager with: (1) proof of appropriate comprehensive general liability ($300,000 each occurrence, $500,000 aggregate), marine liability, and/or aviation passenger liability

insurance covering all aspects of operations throughout the annual use period; (2) aircraft and other vehicle types to be used, with identification information, if different from the original permit or previous year; (3) changes in names of assistant guides and other employees; and (4) any other changes in information provided in the original permit/proposed operations plan.

9. The permittee is responsible for accurate record keeping and will provide the refuge manager with a comprehensive summary report of the number of clients, and number of client days per activity type by December 31 for all uses during that calendar year unless stated otherwise in the permit. A legible copy of the State's "Hunt Record" for each client will be required in addition to the summary report.

10. Failure to report the actual number of client use days per type of authorized activity by December 31 of each calendar year and annually pay the Service's established fees (client use day and reserved land site) within 30 days after receiving a bill for collection will be grounds for revocation of this permit.

11. The permittee will not be required to provide a letter of concurrence from the State of Alaska before the use of State selected lands can be authorized. However, if any of these selected lands are conveyed to the State during the term of the permit, the permittee will be required to obtain permission from the State's Dept. of Natural Resources to continue operating on State Land.

12. In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the removal or disturbance of archaeological or historic artifacts is prohibited. The excavation, disturbance, collection, or purchase of historical or archaeological specimens or artifacts on refuge lands are prohibited.

13. Permittees shall maintain their use areas in a neat and sanitary condition. Per Alaska Dept. of Environmental Conservation Code 18 AAC 72.021(e),(h), latrines, seepage pit, etc., must be located at least 100 feet, measured horizontally to the nearest edge of the mean annual high water level of lakes, rivers, streams, springs, sloughs, or mean higher high water level of coastal waters. No privies are to be installed in areas subject (no less than 4 feet to maximum water table elevation) to flooding. All property of the permittee (except authorized cabins and/or tent frames) must be removed from refuge lands upon completion of permitted activities.

14. The construction or clearing of landing strips or pads are prohibited. Incidental hand removal of rocks and other minor obstructions may be permitted.

15. The use of off-road vehicles (except snow machines) is prohibited unless specifically authorized in writing in this permit.

16. The operation of aircraft at altitudes and in flight paths resulting in the herding, harassment, hazing, or driving of wildlife is prohibited. It is recommended that all aircraft, except for take off and landing, maintain a minimum altitude of 2,000 feet above ground level (AGL).

17. All aircraft being used in a commercial guiding operation must have 12" identification numbers in contrasting colors which are readily visible.

18. Motorboat operators must possess a U.S. Coast Guard (USCG) license for all passenger carrying operations, if required by USCG regulations.

19. Construction of cabins or other permanent structures is prohibited.

20. Any action by a permittee or the permittee's employees which unduly interferes with or harasses other refuge visitors or impedes access to any site is strictly prohibited. Examples of prohibited acts include, but are not limited to, low flights over camps or persons at less than 500 feet (unless landing) and parking aircraft or placing other objects (rocks, tents, etc.) on any landable area so as to restrict use by other aircraft or persons.

21. Subject to available suppression resources, all permitted cabins will be protected from wildfire to the extent possible. Human safety will receive the highest priority consideration by land managers and fire suppression personnel.

22. The permittee's operations plan, as amended and accepted by the U.S. Fish and Wildlife Service, is hereby incorporated in its entirety as a special condition. **All deviations from the operations plan must receive prior written approval by the refuge manager or his designee.**

23. A copy of this permit must be in the permittee's possession at all times while exercising the privileges of this permit.

24. All non-combustible waste materials must be removed from the Refuge (not buried) upon the permittee's and/or clients' departure. The permittee is responsible for removal of clients' garbage.

25. Tent platforms are prohibited unless specifically requested in permittee's operations plan (see No. 22).

26. The use of helicopters is prohibited.

27. Fuel caches are allowed only in areas designated in permittee's operations plan (see No. 22). Containers shall be properly stored and marked with the owner's name, address and type of fuel.

Justification

Commercial guiding and outfitting services are traditional uses that Congress intended to preserve with the enactment of ANILCA. These services are provided in direct support of hunting, which the National Wildlife Refuge System Improvement Act of 1997 identified as a priority public use of the National Wildlife Refuge System. These services also provide indirect support for other wildlife-dependent activities that occur incidental to hunting, including fishing, wildlife observation, and photography. Guided and outfitted hunting services provide the public with opportunities enjoy a quality and safe recreational hunting experience and, in many cases, are necessary for non-residents to hunt on the Refuge. Alaska hunting regulations require that nonresidents who hunt brown bear and Dall sheep must be accompanied in the field by an Alaska-

licensed big game guide, or an Alaskan resident who is within second degree of kindred. Commercial guiding services provide valuable benefits to those people who are required by State regulation or who simply choose to employ a big game hunting guide. People choose to hire a guide for many reasons: they may lack the physical ability and/or knowledge, or are not comfortable with embarking on unguided hunting in the extremely remote and harsh wilderness environment of the Refuge.

As described previously in the "Anticipated Impacts" section of this compatibility determination, the overall impacts of commercial guiding and outfitting activities on refuge wildlife and other resources, and on subsistence use opportunities is minor. After fully considering the direct and indirect impacts of these uses, it is my determination that commercial guiding and outfitting activities on the Refuge do not materially interfere with or detract from the purposes of the Refuge or the mission of the National Wildlife Refuge System. These uses, in fact contribute to the mission of the National Wildlife Refuge System by supporting priority public uses. They enable hunters to utilize and enjoy refuge resources and generally provide a safe and rewarding experience for many hunters who might not be able to utilize the Refuge on their own.

Supporting Documents

Tetlin National Wildlife Refuge. 1986. Wildlife inventory and monitoring plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska, USA.

USFWS. 1987. Tetlin National Wildlife Refuge final comprehensive conservation plan, environmental impact statement and wilderness review. U.S. Fish and Wildlife Service, Anchorage, AK.

USFWS. 1992. Finding of No Significant Impact, Environmental Assessment for the policy on commercial big-game guide/outfitters and transporters on national wildlife refuges in Alaska. June 9, 1992.

USFWS. 1994. Compatibility determination for commercial guiding operations uses within Tetlin National Wildlife Refuge. August 12, 1994. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska

USFWS. 1997. Tetlin National Wildlife Refuge public use management plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 2007. Draft Revised Comprehensive Conservation Plan and Environmental Assessment: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

USFWS. 2008. Final Comprehensive Conservation Plan: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

Refuge Determination

Refuge Manager / Project Leader Approval:	/signed/ Tony Booth (Signature)	8/8/2008 (Date)

Concurrence

Regional Chief, National Wildlife Refuge System:	/signed/ Mike Boylan (Acting) (Signature)	8/8/2008 (Date)

Mandatory 10-Year Re-Evaluation Date: 2018

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum

_____ Categorical Exclusions and Environmental Action Memorandum

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

COMPATIBILITY DETERMINATION

Use: Recreational Fishing (Wildlife-Dependent Recreation)

Supporting and Incidental Uses: Hiking and backpacking, boating and rafting (motorized and non-motorized), commercial and private fixed-wing aircraft landings, snowmachining, dog sledding, snowshoeing, cross-country skiing, pack horses and mules, fish stocking (Hidden Lake only), camping, picnicking, firewood gathering, swimming, wildlife photography, and wildlife observation.

Refuge Name: Tetlin National Wildlife Refuge

Establishing and Acquisition Authority

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established the Tetlin National Wildlife Refuge as part of the National Wildlife Refuge System.

Refuge Purposes

ANILCA sets out the purposes for which each refuge in Alaska was established and must be managed. The purposes and management priorities of the Tetlin National Wildlife Refuge are described in Section 302(8)(B) of ANILCA as follows:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use

The Tetlin Refuge provides opportunities to catch a number of fish species common to the Alaska interior. Angling opportunities within the Refuge include fishing for Arctic grayling, northern pike, humpback whitefish, lake trout, rainbow trout, and burbot. Recreational fishing on the Refuge has occurred prior to, and since its establishment in 1980. Most fishing within the Refuge involves natural populations of native species. The only exception is at Hidden Lake, near the Alaska Highway, which is periodically stocked by the Alaska Department of Fish & Game (ADFG) with rainbow trout to enhance fish recreational fishing opportunities. While native to other parts of Alaska, rainbow trout do not occur naturally in the Upper Tanana drainage. Recreational fishing is a wildlife-dependent priority public use (National Wildlife Refuge System Administration Act, as amended). Activities associated with recreational fishing activities such as camping, backpacking, hiking, various means of access, and other incidental uses are considered part of wildlife-dependent fishing activities.

Traditional forms of access on the Refuge include fixed-wing aircraft, motorboats, snowmachines, nonpowered watercraft, dog sled, foot, snowshoe, cross-country skis, pack horses and mules, and other nonmotorized means. Only the northern portion of the Refuge is road accessible. The relatively small number of visitors who participate in recreational fishing access the Refuge from the road (Alaska Highway), or by boat, commercial air taxi, private airplanes, or snowmachine. Little cross-country skiing or snowshoeing occurs. A number of local residents own sled dogs for competitive racing, but dog sled access for recreational activities within the Refuge is not common. Use of helicopters, jet-powered personal watercraft, and airboats is specifically excluded from this evaluation.

Based upon direct observations by refuge staff and from annual reports provided by commercial transporters, recreational fishing primarily occurs from late May through September with very limited winter use. Overall participation in this activity within the Refuge is estimated to be low with use concentrated at major rivers, their tributaries, and fewer than six lakes within the Refuge. More detailed discussions of recreational fishing, fish populations, and fisheries management within the Refuge can be found in the Tetlin Refuge Revised Comprehensive Conservation Plan (USFWS 2008), the 1997 Public Use Management Plan, 1990 Fisheries Management Plan, and the 2005 Alaska Department of Fish and Game Statewide Stocking Plan.

Availability of Resources

Adequate refuge personnel and base operational funds are available to manage recreational fishing activities at existing and projected levels. Administrative staff time (6-14 staff days) primarily involves phone conversations, written correspondence, personal interaction with visitors at the visitor center, review of proposed changes to Alaska sport fishing regulations, and entering activity data into a database. Field work associated with administering the program primarily involves maintenance of boat launches and designated trails (as many as six staff days), and conducting law-enforcement patrols (as many as 52 staff days) via vehicle, airplane, and boat to increase compliance with state and federal regulations and foster respect for the activities and property of local residents.

Anticipated Impacts of the Use

State and federal regulations continually evolve to respond to fishery management needs. Regulations, combined with law-enforcement efforts of State and refuge personnel, minimize impacts from recreational fishing to fisheries resources, other refuge resources and other users.

Although potential impacts on refuge resources and/or other refuge users are more likely at popular use areas such as Wellesley and Jatahmund lakes, they are believed to be below levels that would cause population, genetic, or natural diversity changes.

Because of the relatively low levels of use and limited access, the anticipated and observed impacts to refuge habitats are minimal. Recreational fishing does pose a potential impact or threat of the introduction of invasive species carried in or on airplane floats, boat trailers, pack stock, pack stock feed, pets, or clothing. However, this is not known to have occurred within the Refuge to date. Temporary displacement and/or disturbance to wildlife can occur during fishing activities and associated activities such as boat use and airplane take-offs and approaches to landings. Some of the other activities commonly associated with fishing, such as camping, hiking, backpacking, floating, and other incidental uses may result in adverse impacts to vegetation and wildlife. However, these impacts are anticipated to remain relatively minor or negligible, and localized to specific areas of use such as individual lakes, campsites, campgrounds, trails, and other facilities. A more detailed discussion of these impacts can be found in the Draft Tetlin Refuge Revised Comprehensive Conservation Plan (USFWS 2007).

ADF&G has periodically stocked Hidden Lake, which is on the Refuge, with rainbow trout since 1982 to enhance recreational fishing opportunities. The Statewide Stocking Plan for Recreational Fisheries details future stocking plans for this and other waterbodies throughout Alaska (ADF&G 2007). Rainbow trout do not occur naturally within the Upper Tanana Region. However, because this lake has no inlet or outlet, impacts to other refuge resources and their habitats are confined to the lake itself. Past illegal ORV use to access this lake has caused trail degradation, erosion, and vegetation impacts in the past, but the illegal use has been eliminated and impacts mitigated. Trail reconstruction and other mitigation measures are expected to maintain future impacts associated with recreational angler access to Hidden Lake at acceptable levels.

A more detailed discussion of the impacts associated with recreational fishing within the Refuge can be found in the Draft Revised Tetlin Refuge Comprehensive Conservation Plan and Environmental Assessment (USFWS 2007) and Public Use Management Plan (USFWS 1997).

Public Review and Comment

This and other compatibility determinations were prepared concurrently with the Draft Revised Comprehensive Conservation Plan and Environmental Assessment for the Tetlin National Wildlife Refuge (USFWS 2007). The public was invited to comment on the draft compatibility determinations during the public review period established for the Draft Revised Comprehensive Conservation Plan. We published public notice of the availability of the draft conservation plan and draft determinations in the Federal Register on October 3, 2007, and invited public comments until January 18, 2008, which provided a comment period of 106 days. We mailed summaries of the Draft CCP to approximately 800 individuals, agencies, and organizations, and the full Draft CCP document (including the draft determinations) to approximately 80 other individuals, agencies and organizations. We also published ads or articles in four newspapers, and purchased a public service announcement on public radio to invite comments on the Draft CCP and compatibility determinations, and held public meetings in Tanacross, Tetlin, Tok, Northway and Fairbanks. The draft determinations were also posted on the Region 7 Refuge Conservation Planning and Policy Web pages.

The only comments we received on the draft determination were from the State of Alaska. The State did not disagree with our determination but offered a comment that they expect any

decision regarding the Hidden Lake fish stocking to be made in cooperation with the Alaska Department of Fish and Game. Their comment did not warrant any revisions, and we would coordinate any decisions about fishery enhancement projects with the State

Determination

_____Use is Not Compatible

__X__Use is Compatible

Stipulations Necessary to Ensure Compatibility

Management direction is provided in the revised Comprehensive Conservation Plan for the Refuge. This directs implementation of the Refuge's fishery management plan and monitoring of wildlife-dependent recreational fishing activities. Findings from these monitoring efforts will be used to determine what additional management actions, if any, are needed to ensure all fishing activities remain compatible with refuge purposes.

State of Alaska sport fishing regulations apply to recreational fishing on the Refuge. The refuge staff will work cooperatively with the State's regulatory process to maintain harvest regulations necessary and appropriate to minimize adverse impacts to native fisheries resources. To minimize impacts on refuge lands and resources, law enforcement patrols will routinely be conducted in an effort to maximize compliance with applicable policies, rules, and/or regulations.

Refuge staff will reevaluate the State's stocking of Hidden Lake annually to monitor biological impacts and user demand. If impacts to natural populations of fish and wildlife, or their habitat is documented, the stocking program will be terminated.

Justification

The National Wildlife Refuge System Improvement Act of 1997, identifies recreational fishing as one of six priority public uses on national wildlife refuges. The law states that, when managed in accordance with principles of sound fish and wildlife management and administration, fishing and the other priority wildlife dependent recreational uses "…have been and are expected to continue to be generally compatible uses." The Act further states that these priority public uses should receive enhanced consideration over other general public uses in refuge planning and management, and directs the U.S. Fish and Wildlife Service (Service) to provide increased opportunities for the public to safety engage in traditional outdoor activities such as fishing and hunting.

Recreational fishing is a traditional activity that Congress intended to preserve when the Refuge was established by ANILCA. As previously stated, recreational fishing on the Refuge provides the public with safe and enjoyable recreational opportunities. To reduce impacts to fishery resources and to provide the continued opportunity for subsistence uses of these species by local rural residents, both the Federal Subsistence Board and Alaska Board of Fisheries regularly adopt regulations in response to fish population levels and management needs. These regulations currently provide adequate protection for the Refuge's fishery resources, continued subsistence opportunities, and other refuge purposes.

There are some potential impacts from the modes of access used for fishing on the Refuge. Section 1110(a) of ANILCA allows for use of snowmachines (subject to adequate snow cover or

frozen river conditions), motorboats, airplanes, and nonmotorized surface transportation methods on Alaska refuges for traditional activities, subject to reasonable regulations to protect the natural and other values. Over the past 26 years, such means of access used in conjunction with fishing on the Refuge, as currently regulated by the Service, have not materially interfered with or detracted from refuge purposes. Should use of motorized transportation grow to levels where it interferes with or detracts from refuge purposes, appropriate management steps would be taken to maintain compatibility.

After fully considering the impacts of this activity, as described previously in the "Anticipated Impacts" section of this Compatibility Determination, it is my determination that recreational fishing activities on the Refuge do not materially interfere with or detract from the purposes of the Refuge or the mission of the National Wildlife Refuge System.

Supporting Documents

ADF&G 2007. Statewide Stocking Plan for Recreational Fisheries. http://www.sf.adfg.state.ak.us/statewide/hatchery/stockingplan.cfm. Accessed on February 28, 2007.

USFWS. 1987. Tetlin National Wildlife Refuge final comprehensive conservation plan, environmental impact statement and wilderness review. U.S. Fish and Wildlife Service, Anchorage, AK.

USFWS. 1990. Tetlin National Wildlife Refuge fishery management plan. Fairbanks Fishery Assistance Office, Fairbanks, Alaska, USA.

USFWS. 1994. Compatibility determination for recreational and subsistence uses within Tetlin National Wildlife Refuge. August 12, 1994. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 1997. Tetlin National Wildlife Refuge public use management plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 2007. Draft Revised Comprehensive Conservation Plan and Environmental Assessment: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

USFWS. 2008. Final Comprehensive Conservation Plan: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

Refuge Determination

Refuge Manager / Project Leader Approval:	/signed/ Tony Booth (Signature)	8/8/2008 (Date)

Concurrence

Regional Chief, National Wildlife Refuge System:	/signed/ Mike Boylan (Acting) (Signature)	8/8/2008 (Date)

Mandatory 15-Year Re-Evaluation Date: _2023

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum

_____ Categorical Exclusions and Environmental Action Memorandum

__X___Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

COMPATIBILITY DETERMINATION

Use: Recreational Hunting (Wildlife Dependent Recreation)

Supporting and Incidental Uses: Hiking and backpacking, boating and rafting (motorized and non-motorized), commercial and private fixed-wing aircraft landings, snowmachining, dog sledding, snowshoeing, cross-country skiing, pack horses and mules, dog retrieving, camping, picnicking, firewood gathering, berry picking, fishing, wildlife photography, and wildlife observation.

Refuge Name: Tetlin National Wildlife Refuge

Establishing and Acquisition Authority

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established the Tetlin National Wildlife Refuge as part of the National Wildlife Refuge System.

Refuge Purposes

ANILCA sets out the purposes for which each refuge in Alaska was established and must be managed. The purposes and management priorities of the Tetlin National Wildlife Refuge are described in Section 302(8)(B) of ANILCA as follows:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use

Recreational hunting is a wildlife-dependent priority public use (National Wildlife Refuge System Administration Act, as amended). The use includes all activities typically associated with hunting,

such as searching, stalking, pursuing, harvesting and retrieving wildlife that can be legally hunted. Other activities associated with recreational hunting such as camping, backpacking, hiking, various means of access, and other incidental uses are considered part of wildlife-dependent hunting uses.

The Tetlin Refuge provides recreational hunting opportunities for a number of wildlife species common in the eastern interior of Alaska. Recreational hunting on the Refuge has occurred prior to and since its establishment in 1980. For the most part, these recreational hunting opportunities are regulated by the State of Alaska. However, in some cases, Federal subsistence hunting regulations passed by the Federal Subsistence Board may affect recreational hunting opportunities on refuge lands. The Alaska hunting regulations currently provide hunting seasons for moose, brown/grizzly bear, black bear, Dall sheep, wolf, wolverine, beaver, coyote, fox, lynx, squirrels, snowshoe hares, various species of waterfowl, sandhill cranes, upland birds, and other species on the Tetlin Refuge. Although the State hunting regulations provide no recreational caribou hunting seasons on the Refuge at this time, they may provide such hunting opportunities again if the Alaska Board of Game determines such seasons are warranted and passes regulations to allow such harvest.

Recreational hunting use patterns are estimated primarily from direct observation by refuge staff and from information in annual reports provided by air-taxi operators and big game guides permitted to operate on the Refuge. Recreational hunting generally occurs from August through May, predominantly in conjunction with the big game hunting seasons in August and September, and general (i.e., non-subsistence) waterfowl hunting seasons that open September 1. Participation and harvests are thought to be low, but accurate estimates are not available. A more detailed description of recreational hunting within the Refuge can be found in the revised Tetlin Refuge Comprehensive Conservation Plan and 1997 Public Use Management Plan.

Traditional forms of access on the Refuge include fixed-wing aircraft, motorboats, snowmachines, nonmotorized watercraft, dog sled, foot, snowshoe, cross-country skis, pack horses and mules, and other nonmotorized means. Only the northern portion of the Refuge is road accessible. The modes of access most commonly used for recreational hunting on the Refuge include foot access from the Alaska Highway, boats, airplanes (both commercial air taxis and private airplanes), and snowmachines. Little cross-country skiing or snowshoeing occurs. A number of local residents own sled dogs for competitive racing, but dog sled access for recreational activities within the Refuge is not common. Use of helicopters, jet-powered personal watercraft, and airboats is specifically excluded from this evaluation.

Availability of Resources

Adequate refuge personnel and base operational funds are available to manage wildlife-dependent recreational hunting activities at existing and projected levels. Administrative staff time (10 to 20 staff days) primarily involves maintenance of boat launches and designated trails, phone conversations, written correspondence, personal interaction with visitors at the visitor center, review and commenting on proposed changes to State hunting regulations through the State regulatory process, and entering activity data into a database. Field work associated with administering the program primarily involves surveys and studies to monitor game animal populations, and law-enforcement patrols (as many as 52 staff days) via vehicle, airplane, and boat to increase compliance by recreational users with state and federal regulations and to foster respect for the activities and property of local residents.

Anticipated Impacts of the Use

Harvest levels are managed by State and Federal regulations, which continually evolve in response to wildlife population changes and management needs. Refuge and State law enforcement officers routinely patrol the Refuge to increase compliance with State and Federal regulations and permit conditions. Regulations, combined with the law-enforcement efforts minimize impacts of recreational hunting to refuge resources and other users.

Recreational hunting activities may, in some cases, result in competition for limited resources such as preferred campsites or use areas, or interfere with subsistence users and/or other refuge users. Both the Federal Subsistence Board and the Alaska Board of Game regularly adopt regulations to maintain sustainable harvest levels and reduce impacts to resources and to support opportunities for continued subsistence uses by local residents. Numerous regulation changes have been made by these boards in recent years to address the Refuge's wildlife resource management needs. The magnitude of use is effectively regulated through hunting regulations.

Because of relatively low overall levels of use and difficult access, impacts to refuge habitat are anticipated to remain minor. Temporary displacement and/or disturbance to wildlife can occur while stalking and taking game animals, during motorized boat use, airplane take-offs and approaches to landings, use of snowmachines, and at campsites or other areas of concentrated human activities. There are no known long-term impacts to refuge wildlife populations from this disturbance. In addition some localized vegetation damage will generally occur in the immediate vicinity of campsites and commonly used points of access. An additional potential impact or threat associated with access in conjunction with hunting is the introduction of invasive species carried in on airplane floats, boat trailers, pack stock, pack stock feed, pets, or clothing. This is not known to have occurred within the Refuge to date.

Substantial impacts would likely result from use of all-terrain-vehicles (ATVs). However, ATVs are not traditional modes of access and generally not allowed on the Refuge.

A more detailed discussion of the impacts associated with recreational hunting within the Refuge can be found in the Draft Revised Tetlin Refuge Comprehensive Conservation Plan and Environmental Assessment (USFWS 2007) and Public Use Management Plan (USFWS 1997).

Public Review and Comment

This and other compatibility determinations were prepared concurrently with the Draft Revised Comprehensive Conservation Plan and Environmental Assessment for the Tetlin National Wildlife Refuge (USFWS 2007). The public was invited to comment on the draft compatibility determinations during the public review period established for the Draft Revised Comprehensive Conservation Plan. We published public notice of the availability of the draft conservation plan and draft determinations in the Federal Register on October 3, 2007, and invited public comments until January 18, 2008, which provided a comment period of 106 days. We mailed summaries of the Draft CCP to approximately 800 individuals, agencies, and organizations, and the full Draft CCP document (including the draft determinations) to approximately 80 other individuals, agencies and organizations. We also published ads or articles in four newspapers, and purchased a public service announcement on public radio to invite comments on the Draft CCP and compatibility determinations, and held public meetings in Tanacross, Tetlin, Tok, Northway and Fairbanks. The draft determinations were also posted on the Region 7 Refuge Conservation Planning and Policy Web pages.

The only comments we received on the draft determination were from the State of Alaska and we made some minor revisions to this determination in response to their comments.

Determination

_____Use is Not Compatible

__X__Use is Compatible

Stipulations Necessary to Ensure Compatibility

General recreational hunting activities on refuge lands do not require a special use permit. State of Alaska hunting regulations apply to recreational hunting on the Refuge. The refuge staff will work cooperatively with the State's regulatory process to maintain harvest regulations necessary and appropriate to minimize adverse impacts to native wildlife resources and subsistence activities. To minimize impacts on refuge lands and resources, law enforcement patrols will routinely be conducted in an effort to maximize compliance with applicable policies, rules, and/or regulations.

The Refuge will continue to monitor frequently used campsites and access points for impacts on refuge habitat and potential introduction of invasive species. Monitoring of wildlife populations as described in the 1986 Tetlin Refuge Wildlife Inventory and Monitoring Plan, or future revisions of that plan, and additional management actions will be taken when necessary to insure that impacts from recreational hunting and associated uses remain at minor levels that are compatible with refuge purposes.

Justification

The National Wildlife Refuge System Improvement Act of 1997, identifies recreational hunting as one of six priority public uses on national wildlife refuges. The law states that, when managed in accordance with principles of sound fish and wildlife management and administration, hunting and the other priority wildlife dependent recreational uses "…have been and are expected to continue to be generally compatible uses." The Act further states that these priority public uses should receive enhanced consideration over other general public uses in refuge planning and management, and directs the U.S. Fish and Wildlife Service (Service) to provide increased opportunities for the public to safety engage in traditional outdoor activities such as fishing and hunting.

Recreational hunting is a traditional activity that Congress intended to preserve when the Refuge was established by ANILCA. As previously stated, recreational hunting on the Refuge provides the public with safe and enjoyable recreational opportunities. To reduce impacts to wildlife resources and to provide the continued opportunity for subsistence uses of refuge resources by local rural residents, both the Federal Subsistence Board and Alaska Board of Game regularly adopt regulations in response to game population levels and management needs. These regulations currently provide adequate protection for the Refuge's wildlife resources, continued subsistence opportunities, and other refuge purposes.

There are potential impacts from the modes of access used for hunting on the Refuge. Section 1110(a) of ANILCA allows for use of snowmachines (subject to adequate snow cover or frozen river conditions), motorboats, airplanes, and nonmotorized surface transportation methods on

Alaska refuges for traditional activities such as hunting, subject to reasonable regulations to protect the natural and other values. Since establishment of the Refuge, such means of access as currently regulated by the Service, have not materially interfered with or detracted from refuge purposes. Should use of currently used modes of motorized transportation grow to levels where it interferes with or detracts from refuge purposes, appropriate management steps would be taken to maintain compatibility.

After fully considering the impacts of this activity, as described previously in the "Anticipated Impacts" section of this compatibility determination, it is my determination that recreational hunting activities on the Refuge do not materially interfere with or detract from the purposes of the Refuge or the mission of the National Wildlife Refuge System.

Supporting Documents

Tetlin National Wildlife Refuge. 1986. Wildlife inventory and monitoring plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska, USA.

USFWS. 1987. Tetlin National Wildlife Refuge final comprehensive conservation plan, environmental impact statement and wilderness review. U.S. Fish and Wildlife Service, Anchorage, AK.

USFWS. 1990. Tetlin National Wildlife Refuge fishery management plan. Fairbanks Fishery Assistance Office, Fairbanks, Alaska, USA.

USFWS. 1994. Compatibility determination for recreational and subsistence uses within Tetlin National Wildlife Refuge. August 12, 1994. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 1997. Tetlin National Wildlife Refuge public use management plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 2007. Draft Revised Comprehensive Conservation Plan and Environmental Assessment: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

USFWS. 2008. Final Comprehensive Conservation Plan: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

Refuge Determination

Refuge Manager / Project Leader Approval:	/signed/ Tony Booth (Signature)	8/8/2008 (Date)

Concurrence

Regional Chief, National Wildlife Refuge System:	/signed/ Mike Boylan (Acting) (Signature)	8/8/2008 (Date)

Mandatory 15-Year Re-Evaluation Date: 2023

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum

_____ Categorical Exclusions and Environmental Action Memorandum

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

COMPATIBILITY DETERMINATION

Use: Scientific Research

Supporting and Incidental Uses: Hiking and backpacking, boating and rafting (motorized and non-motorized), fixed-wing aircraft and helicopter access, snowmachining, dog sledding, snowshoeing, cross-country skiing, pack horses and mules, camping, firewood gathering, tents, tent frames, tent platforms, weatherports, and existing cabins, field caches, wildlife photography, and wildlife observation.

Refuge Name: Tetlin National Wildlife Refuge

Establishing and Acquisition Authority

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established the Tetlin National Wildlife Refuge as part of the National Wildlife Refuge System.

Refuge Purposes

ANILCA sets out the purposes for which each refuge in Alaska was established and must be managed. The purposes and management priorities of the Tetlin National Wildlife Refuge are described in Section 302(8)(B) of ANILCA as follows:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use

This compatibility determination addresses the full spectrum of uses associated with the scientific research of biological, geological, aquatic, paleontological, archaeological, cultural, social and other resources that occur on the Tetlin Refuge. The term research in this document is intended to include scientific studies, surveys and monitoring activities. The scope of this determination includes research activities that are not conducted in support of refuge management needs or by the Alaska Department of Fish and Game (ADFG). Routine refuge management activities, including research and surveys, that are conducted by the U.S. Fish and Wildlife Service (Service) or by other agencies or entities for, or in cooperation with refuge programs, do not require compatibility determinations. The Alaska Department of Fish and Game (ADF&G) in particular conducts many research or resource monitoring activities in cooperation with the Refuge. Other ADFG management activities on the Refuge that are outside the realm of refuge management needs are addressed in a separate compatibility determination.

This compatibility determination includes all means of investigations and sampling efforts, access, camping/lodging facilities and activities, and other uses typically associated with research projects. Specific authorized means and locations of access for activities on the Refuge will be specifically authorized for any research that is permitted. Potential means of access include airplanes, helicopters, motorboats, snowmachines, nonpowered watercraft, dog sleds, foot, snowshoes, and cross-country skis. Potential lodging and camp facilities includes tents, tent frames, weatherports, existing cabins, temporary fuel storage and caches.

A wide range of various research activities have been conducted on the Refuge since its creation. Future activities would likely be dispersed and of low magnitude.

Availability of Resources

Adequate refuge personnel and base operational funds are available to manage research activities at existing (generally no more than two requests per year) and projected levels. Administrative staff time (not more than 10 days) primarily involves phone conversations, written correspondence, administration of special use permits, proposal review, and personal interaction with researchers. Field work associated with administering the use primarily involves monitoring researchers' compliance with the terms of the permit.

Anticipated Impacts of the Use

Many factors will affect the extent of impacts from individual research projects. These factors include target resources, number of researchers, methods, duration and frequency of sampling activities , modes of transportation, type of aircraft and amount of aircraft use, type and location of field lodging (camps), fuel storage, garbage and human waste management, and location of access points. Research activities require a special use permit from the Refuge, which will contain provisions to minimize or avoid impacts on the Refuge's fish, wildlife and plant resources, and on other refuge users. However, some minor impacts are unavoidable.

Some research projects may require or result in some fish or wildlife mortality. Temporary displacement and/or disturbance to fish and wildlife can occur during sampling efforts, and motorized boat use, airplane take-offs and approaches to landings, use of snowmachines, helicopters, and at campsites or other areas of concentrated human activities. There are no known long-term impacts to refuge fish and wildlife populations from such disturbance, and such impacts

can be minimized by permit conditions. In addition some localized vegetation damage will generally occur in the immediate vicinity of campsites, sampling locations, and commonly used points of access. Some research activities entail excavation and/or collection of soils and plant materials, which result in localized disturbances. An additional potential impact or threat associated with access in conjunction with these uses is the introduction of invasive species carried in on airplanes, boats or boat trailers, pack stock, pack stock feed, pets, or clothing. This is not known to have occurred within the Refuge to date.

Overall, scientific research and associated activities should have only minor impacts on the fish, wildlife and other refuge resources (e.g., water quality, soil, and vegetation), and on other refuge users, including subsistence users, because of the limited scope of such activities and the administrative scrutiny that the Refuge maintains over such uses.

Public Review and Comment

This and other compatibility determinations were prepared concurrently with the Draft Revised Comprehensive Conservation Plan and Environmental Assessment for the Tetlin National Wildlife Refuge (USFWS 2007). The public was invited to comment on the draft compatibility determinations during the public review period established for the Draft Revised Comprehensive Conservation Plan. We published public notice of the availability of the draft conservation plan and draft determinations in the Federal Register on October 3, 2007, and invited public comments until January 18, 2008, which provided a comment period of 106 days. We mailed summaries of the Draft CCP to approximately 800 individuals, agencies, and organizations, and the full Draft CCP document (including the draft determinations) to approximately 80 other individuals, agencies and organizations. We also published ads or articles in four newspapers, and purchased a public service announcement on public radio to invite comments on the Draft CCP and compatibility determinations, and held public meetings in Tanacross, Tetlin, Tok, Northway and Fairbanks. The draft determinations were also posted on the Region 7 Refuge Conservation Planning and Policy Web pages.

The only comments we received on this draft determination were from the State of Alaska and we made some revisions to this determination in response to their comments. The State did not disagree with our determination, but recommended revision of one the special use permit conditions. We made no changes to the permit conditions because the Service's regional permit conditions are being reviewed in a separate process, but we forwarded their comments to those working on that task. The compatibility determinations display special use permit conditions that have been typically used for permitted research activities.

Determination

_____Use is Not Compatible

__X__Use is Compatible

Stipulations Necessary to Ensure Compatibility

Research activities not conducted by or in cooperation with the Service must be authorized by a special use permit from the Refuge. Refuge staff will monitor all research being conducted on the Refuge. Findings from these monitoring efforts will be used to determine what additional

management actions, if any, are needed to ensure research activities remain compatible with refuge purposes. Monitoring of all authorized research activities will be continued to ensure compliance with specific terms and conditions tailored for each research project's permit as well as conditions incorporated into all research permits. Research activities authorized on refuge lands will require the following conditions and others as necessary to minimize impacts and maintain compatibility with the purposes for Tetlin Refuge:

The conditions listed below are generally included on refuge permits issued for research activities, mostly to minimize impacts and ensure compatibility of these uses with refuge purposes. Conditions included on each permit may vary somewhat as needed or appropriate for the specific operations being proposed, and if changing situations warrant revisions.

1. Failure to abide by any part of this special use permit; violation of any refuge related provision in Titles 43 (Part 36) or 50 (sub-chapters B and C) Code of Federal Regulations; or violation of any pertinent state regulation (e.g., fish or game violation) will, with due process, be considered grounds for immediate revocation of this permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit (e.g., assistants). Appeals of decisions relative to permits are handled in accordance with Title 50 Code of Federal Regulations Part 36.41.

2. The permittee is responsible for ensuring that all employees, party members, aircraft pilots, and any other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

3. Any problem with wildlife and/or animals taken in defense of life or property must be reported immediately to the refuge manager and/or Alaska Department of Fish and Game, and be salvaged in accordance with State regulations.

4. The permittee and permittee's clients do not have the exclusive use of the site(s) or lands covered by this permit, except for authorized camp facilities.

5. This permit may be canceled or revised at any time by the refuge manager in case of emergency (e.g., high fire danger, flooding, unusual resource problems etc.).

6. Prior to beginning any activities allowed by this permit, the permittee shall provide the refuge manager with: (1) proof of appropriate comprehensive general liability ($300,000 each occurrence, $500,000 aggregate), marine liability, and/or aviation passenger liability insurance covering all aspects of operations throughout the annual use period; (2) aircraft and other vehicle types to be used, with identification information, if different from the original permit or previous year; (3) changes in names of assistant guides and other employees; and (4) any other changes in information provided in the original permit/proposed operations plan.

7. In accordance with the Archeological Resources Protection Act (16 U.S.C. 470aa), the removal or disturbance of archaeological or historic artifacts is prohibited. The excavation, disturbance, collection, or purchase of historical or archaeological specimens or artifacts on refuge lands are prohibited.

8. Permittees shall maintain their use areas in a neat and sanitary condition. Per Alaska Dept. of Environmental Conservation Code 18 AAC 72.021(e),(h), latrines, seepage pit, etc., must be located at least 100 feet, measured horizontally to the nearest edge of the mean annual high water level of lakes, rivers, streams, springs, sloughs, or mean higher high water level of coastal waters. No privies are to be installed in areas subject (no less than 4 feet to maximum water table elevation) to flooding. All property of the permittee (except authorized cabins and/or tent frames) must be removed from refuge lands upon completion of permitted activities.

9. The construction or clearing of landing strips or pads are prohibited. Incidental hand removal of rocks and other minor obstructions may be permitted.

10. The use of off-road vehicles (except snow machines) is prohibited unless specifically authorized in writing in this permit.

11. The operation of aircraft at altitudes and in flight paths resulting in the herding, harassment, hazing, or driving of wildlife is prohibited. It is recommended that all aircraft, except for take off and landing, maintain a minimum altitude of 2,000 feet above ground level (AGL).

12. Construction of cabins or other permanent structures is prohibited.

13. Any action by a permittee or the permittee's employees which unduly interferes with or harasses other refuge visitors or impedes access to any site is strictly prohibited. Examples of prohibited acts include, but are not limited to, low flights over camps or persons at less than 500 feet (unless landing) and parking aircraft or placing other objects (rocks, tents, etc.) on any landable area so as to restrict use by other aircraft or persons.

14. The permittee's research plan, as amended and accepted by the U.S. Fish and Wildlife Service, is hereby incorporated in its entirety as a special condition. **All deviations from the operations plan must receive prior written approval by the refuge manager or his designee.**

15. A copy of this permit must be in the permittee's possession at all times while exercising the privileges of this permit.

16. All non-combustible waste materials must be removed from the Refuge (not buried) upon the permittee's and/or clients' departure. The permittee is responsible for removal of clients' garbage.

17. Tent platforms are prohibited unless specifically requested in permittee's operations plan.

18. The use of helicopters is prohibited (unless specifically approved by the refuge manager).

19. Research concerning fish, wildlife, and other refuge resources is expected to contribute to refuge purposes of conserving fish and wildlife populations and protection resources of the Refuge.

20. When applicable and prior to initiating field work, the permittee must provide documentation that recognized Institutional Animal Care and Use Committee (IACUC) personnel have reviewed and approved (as required by the Animal Welfare Act) activities and proposed procedures involving invasive procedures or procedures that could harm or materially alter the behavior of an animal under study.

21. When applicable and prior to initiating field work, the permittee must obtain State and Federal collecting permits in compliance with the Service's Regional Collecting Policy and Permit Requirements.

22. The refuge manager, upon request, shall be afforded the opportunity and logistical support to accompany the permittee from the nearest commercial transportation site for the purpose of inspection and monitoring permittee activities. A final inspection trip provided by the permittee of the areas of use may be required by the refuge manager to determine compliance with the terms of this permit.

23. Temporary storage of fuel will only be allowed on a case-by-case basis and will be conducted in accordance with federal regulations and Service policy.

24. The permittee shall provide the refuge manager with a report of activities under this permit within 30 days of permit expiration.

25. Upon completion, the permittee will provide the refuge manager a complete copy of all research results. This will include a discussion and description of the methodology used, the analyses conducted, the results of those analyses, and any conclusions or findings related to the research conducted. At the request of the refuge manager a summary of the research results can be substituted.

Justification

Natural and social science information is necessary for the proper management of units within the National Wildlife Refuge System. It is the policy of the Service (4 RM 6.1) to encourage and support research and management studies in order to provide scientific data upon which to base decisions regarding management of units of the refuge system.

The Service will also permit use of a refuge for other investigatory scientific purposes when such use is compatible with the objectives for which the Refuge is managed. Priority will be given to studies that contribute to the enhancement, protection, use, preservation, and management of native wildlife populations and their habitats in their natural diversity. All proposed research not associated with refuge management will be thoroughly evaluated prior to authorization and then monitored closely to ensure that the activities do not materially interfere with or detract from the refuge purposes or the mission of the National Wildlife Refuge System.

After fully considering the impacts as described previously in the "Anticipated Impacts" section of this compatibility determination, it is my determination that scientific research activities on the Refuge do not materially interfere with or detract from the purposes of the Refuge or the mission of the National Wildlife Refuge System.

Supporting Documents

USFWS. 1987. Tetlin National Wildlife Refuge final comprehensive conservation plan, environmental impact statement and wilderness review. U.S. Fish and Wildlife Service, Anchorage, AK.

USFWS. 1994. Compatibility determination for research projects conducted on refuge lands by non-Service personnel. August 12, 1994. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska

USFWS. 2007. Draft Revised Comprehensive Conservation Plan and Environmental Assessment: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

USFWS. 2008. Final Comprehensive Conservation Plan: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

Refuge Determination

Refuge Manager / Project Leader Approval:	/signed/ Tony Booth (Signature)	8/8/2008 (Date)

Concurrence

Regional Chief, National Wildlife Refuge System:	/signed/ Mike Boylan (Acting) (Signature)	8/8/2008 (Date)

Mandatory 10-Year Re-Evaluation Date: 2018

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum

_____ Categorical Exclusions and Environmental Action Memorandum

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

COMPATIBILITY DETERMINATION

Use: State of Alaska Management Activities

Supporting and Incidental Uses: Hiking and backpacking, boating and rafting (motorized and non-motorized), fixed-wing aircraft and helicopter access, snowmachining, dog sledding, snowshoeing, cross-country skiing, pack horses and mules, camping, firewood gathering, tents, tent frames, tent platforms, weatherports, and existing cabins, field caches, wildlife photography, and wildlife observation.

Refuge Name: Tetlin National Wildlife Refuge

Establishing and Acquisition Authority

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established the Tetlin National Wildlife Refuge as part of the National Wildlife Refuge System.

Refuge Purposes

ANILCA sets out the purposes for which each refuge in Alaska was established and must be managed. The purposes and management priorities of the Tetlin National Wildlife Refuge are described in Section 302(8)(B) of ANILCA as follows:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use

This compatibility determination addresses management activities conducted on the Tetlin Refuge by the Alaska Department of Fish and Game (ADF&G) that may not be encompassed by the Master Memorandum of Understanding between the ADF&G and the U.S. Fish and Wildlife Service, signed March 13, 1982, and law enforcement activities conducted by Alaska Department of Public Safety. State management activities included in this compatibility determination include: fish, wildlife, vegetation or habitat surveys, and collection of fish, wildlife or plant specimens or their parts, and law-enforcement activities. This determination does not address predator management, fish and wildlife control (with the exception of emergency removal of individual rogue animals), reintroduction of species, nonindigenous species management, pest management, disease prevention and control, fishery restoration, fishery enhancement, indigenous fish introductions, nonindigenous species introductions, construction of facilities, or any other nonpermitted activity that could alter the Refuge's ecosystems. Separate compatibility determinations addressing specific proposals will be required for those activities. All management and research activities conducted by ADF&G under a specific cooperative agreement with the U.S. Fish and Wildlife Service to fulfill one or more purposes of the Refuge or the National Wildlife Refuge System mission do not require a compatibility determination.

This compatibility determination takes into consideration other uses associated with State management uses, such as access and field lodging/camping activities and facilities. Potential means of access include airplanes, helicopters, motorboats, snowmachines, nonmotorized watercraft, dogsleds, foot, snowshoes, and cross-country skis. Potential lodging and facilities include tents, tent frames, tent platforms, weatherports, existing permitted cabins, and caches.

Availability of Resources

Adequate refuge personnel and base operational funds are available to manage activities at existing and projected levels. Administrative staff time (as many as 10 staff days annually) primarily involves phone conversations, written correspondence, administering special use permits and personal interaction with State personnel regarding ongoing activities. Field work associated with administering the program primarily involves monitoring (when applicable) the state's activities to ensure all activities are consistent with the Master Memorandum of Understanding, or in compliance with any applicable special use permits.

Anticipated Impacts of the Use

Temporary displacement and/or disturbance to fish and wildlife can occur during field activities, motorized boat use, airplane take-offs and approaches to landings, use of snowmachines, helicopters, and at campsites or other areas of concentrated human activities. There are no known long-term impacts to refuge fish and wildlife populations anticipated from such disturbance. In addition some localized vegetation damage will generally occur in the immediate vicinity of campsites or other areas of concentrated activities. Such uses may occasionally require mortality of some animals that are collected or captured. Because ADF&G managers and Public Safety law enforcement personnel are trained professionals, we anticipate that the negative impacts from routine State management and law-enforcement activities will be minor, and more than compensated by the long-term benefits these activities will have on fish, wildlife, and plant resources and to persons who use those resources. Law enforcement activities will significantly benefit refuge resources and other users by reducing illegal harvests and other illegal activities. These positive impacts will support refuge purposes and goals and the Service mission.

Public Review and Comment

This and other compatibility determinations were prepared concurrently with the Draft Revised Comprehensive Conservation Plan and Environmental Assessment for the Tetlin National Wildlife Refuge (USFWS 2007). The public was invited to comment on the draft compatibility determinations during the public review period established for the draft revised Comprehensive Conservation Plan. We published public notice of the availability of the draft conservation plan and draft determinations in the Federal Register on October 3, 2007, and invited public comments until January 18, 2008, which provided a comment period of 106 days. We mailed summaries of the Draft CCP to approximately 800 individuals, agencies, and organizations, and the full Draft CCP document (including the draft determinations) to approximately 80 other individuals, agencies and organizations. We also published ads or articles in four newspapers, and purchased a public service announcement on public radio to invite comments on the Draft CCP and compatibility determinations, and held public meetings in Tanacross, Tetlin, Tok, Northway and Fairbanks. The draft determinations were also posted on the Region 7 Refuge Conservation Planning and Policy Web pages.

The only comments we received on the draft determination were from the State of Alaska and we made some minor revisions to this determination in response to their comments.

Determination

_____Use is Not Compatible

__X__Use is Compatible

Stipulations Necessary to Ensure Compatibility

Refuge staff will monitor State management activities on the Refuge and to determine what additional management actions, if any, are needed to ensure these uses remain compatible with refuge purposes, and in compliance with established agreements with the State agencies.

Justification

Section 1314 of ANILCA states Congressional intent to maintain significant State responsibility and authority for management of fish and wildlife on Federal public lands in Alaska, except for the subsistence management provisions in Title VIII of the Act. In addition, Service policy supports and encourages cooperation with State management of fish and wildlife resources on refuge lands. I also recognize that State law enforcement activities are critical to the protection of refuge resources. After fully considering the minor potential impacts and long-term benefits described in the "Anticipated Impacts" section of this compatibility determination, it is my determination that State management and law enforcement activities on the Refuge do not materially interfere with or detract from the purposes of the Refuge or the mission of the National Wildlife Refuge System. Overall, these uses support the refuge purposes and goals and the System mission.

Supporting Documents

USFWS. 2007. Draft Revised Comprehensive Conservation Plan and Environmental Assessment: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

USFWS. 2008. Final Comprehensive Conservation Plan: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

Refuge Determination

Refuge Manager / Project Leader Approval:	/signed/ Tony Booth (Signature)	8/8/2008 (Date)

Concurrence

Regional Chief, National Wildlife Refuge System:	/signed/ Mike Boylan (Acting) (Signature)	8/8/2008 (Date)

Mandatory 10-Year Re-Evaluation Date: _2018

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum

_____ Categorical Exclusions and Environmental Action Memorandum

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

COMPATIBILITY DETERMINATION

Use: Subsistence Activities

Supporting and Incidental Uses: Hiking and backpacking, boating and rafting (motorized and non-motorized), hunting, fishing, trapping, fixed-wing aircraft landings, snowmachining, dog sledding, snowshoeing, cross-country skiing, pack horses and mules, camping, picnicking, cabins, tent frames and weatherports, berry picking, gathering of firewood, house logs and harvesting of other natural resources, wildlife photography, and wildlife observation.

Refuge Name: Tetlin National Wildlife Refuge

Establishing and Acquisition Authority

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established the Tetlin National Wildlife Refuge as part of the National Wildlife Refuge System.

Refuge Purposes

ANILCA sets out the purposes for which each refuge in Alaska was established and must be managed. The purposes and management priorities of the Tetlin National Wildlife Refuge are described in Section 302(8)(B) of ANILCA as follows:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use

This compatibility determination addresses activities associated with the harvesting and gathering of fish, wildlife and plant resources on the Tetlin Refuge by local rural Alaska residents for subsistence purposes. Subsistence activities and lifestyles occurred in the area now occupied by the Tetlin Refuge since the prehistoric existence of man in the area, approximately 12,000 ago. Subsistence uses continue on the Refuge today, although the nature and manner that these uses occur have been significantly influenced by evolution of contemporary society. This document addresses "subsistence uses" as defined in ANILCA and U.S Fish and Wildlife regulations to mean: *the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation: for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.*

Subsistence activities addressed in this document include hunting, fishing, berry picking, and gathering firewood, house logs and other plant materials (e.g., Labrador tea, muskrat cache, birch bark), camping, and the use of three cabins permitted in support of subsistence activities. This compatibility determination also considers means of access that has or may be used for subsistence activities within the Refuge, including snowmachines, motorboats, airplanes, non-motorized watercraft, dog sleds, pack horses and mules, foot access or hiking, cross-country skis, and snowshoes. Trapping by local residents can also be considered a subsistence activity, but is considered under a separate compatibility determination. New subsistence and trapping cabin permits would require a separate compatibility determination.

Most subsistence uses on refuge lands are associated with the harvest of fish, wildlife and plant resources. Subsistence hunting and fishing activities are managed by state and federal regulations. State regulations apply on refuge lands unless superseded by federal regulations. The federal regulations generally offer qualified subsistence users longer and more liberal seasons, bag limits and methods and means of harvesting resources than those allowed in the state hunting and fishing regulations. Eligibility to harvest resources on the Refuge for subsistence uses under the federal regulations is determined by the Federal Subsistence Board and Alaska Migratory Bird Co-management Council on a geographical or community basis, rather than individual basis. All residents of rural communities or areas that have been determined to have a history of customary and traditional use of fish and wildlife resources in the Refuge are eligible to participate in subsistence uses of those resources on the Refuge. Under federal regulations, all residents of broad areas in the Upper Tanana Region and other surrounding areas are eligible to participate in the subsistence uses of fish and wildlife resources on refuge lands. In some cases, residents of distant communities or areas are eligible to subsistence hunt and fish on the Refuge. The rural and customary and traditional use determinations affect the level of subsistence uses on the Refuge and thus will affect the impacts of such uses.

Most subsistence activities on the Tetlin Refuge involve residents from nearby communities, particularly Northway, Tetlin, Tok, and Tanacross, Dot Lake, Healy Lake, and persons who live in outlying areas near these communities. Many of these residents of the local area have lifestyles and economies that largely depend on subsistence resources. To many, subsistence activities are not just a way of obtaining food, shelter, clothing, etc., but are an important mechanism for maintaining cultural values such as connectivity to the land, kinship, community, respect for elders, hospitality, sharing resources, and the passing of values to younger generations. In

addition, many residents in the area prefer traditional wild foods over commercially available foods. The pool of qualified subsistence users of the Refuge is growing, as the population of qualified rural communities grow.

Whitefish is one of the mainstay subsistence foods harvested on the Refuge by nearby communities. Other fish, including northern pike, burbot, Arctic grayling, and lake trout, are also used but to a lesser extent.

Many wildlife resources are harvested on the Refuge for subsistence purposes, including caribou, moose, black bears, Dall sheep, grizzly bears, wolf, wolverine, beaver, marten, mink, muskrats, coyote, fox, lynx, squirrels, spruce, ruffed and sharp-tailed grouse, ptarmigan, many species of waterfowl, and sandhill cranes. Wildlife harvested on the Refuge are used primarily for food, clothing, tools, handicraft articles and occasions for special spiritual and traditional ceremonies such as funeral or memorial potlatches.

Caribou and moose are important traditional subsistence resources that are widely used by residents of the local villages. Caribou herds (primarily the Nelchina and Fortymile Herds) are hunted on the Refuge during a Federal subsistence season which is open when caribou are present during seasonal migrations, mostly during late fall through spring. Since 2000, harvest reports indicate 7-43 caribou have been taken from within the Refuge by subsistence hunters each year. Federal subsistence moose hunting seasons on the Refuge are currently open August 24-28, September 8-17, and November 20-30. Nearly all moose harvest on the Refuge occurs during the fall season when the general State season is also open.

Waterfowl also provide important subsistence foods for local residents of villages near the Refuge. Much subsistence waterfowl hunting on the Refuge occurs during the general fall/winter waterfowl hunting season that is open to all persons. Recent regulations passed by the Migratory Bird Co-management Council allow subsistence harvest of most species of waterfowl, cranes, waterbirds, and shorebirds that occur on the Tetlin Refuge during most of the spring and summer as well. The regulations also allow for egg gathering during May 1 – June 14. It is currently unknown what level of bird and egg harvests are occurring or is likely to occur in the near future.

Many other refuge resources are subject to subsistence uses, but levels of harvest are not known. The distribution and timing of subsistence uses vary according to seasonal availability of resources, accessibility and proximity from villages, and regulatory seasons.

A more detailed discussion of subsistence uses and harvest can be found in the Draft Revised Tetlin Refuge Comprehensive Conservation Plan and Environmental Assessment (USFWS 2007) and the Tetlin Refuge Public Use Management Plan (USFWS 1997).

Availability of Resources

Available refuge personnel and base operational funds have been marginally adequate to monitor and manage subsistence uses at existing levels, but the adequacy of current resources to manage uses at projected levels depend on future regulatory actions or other changes that may affect the level of subsistence use demands on the Refuge. Current refuge base funding and personnel allows for only limited amount of survey or monitoring of subsistence activities and harvest levels. While the Refuge continues to monitor populations of large and small mammals and various waterfowl species that are harvested for subsistence purposes, available funding needed to

monitor the abundance and distribution of subsistence resources and their harvest levels has been declining while the demand on resources increases.

Approximately 800 - 1000 staff days and $250,000-$300,000 are typically spent managing various activities associated with subsistence uses on an annual basis. Much of the Refuge's funding and personnel resources expended for subsistence management overlap with other refuge uses, particularly recreational hunting and fishing. Subsistence related tasks are primarily conducted by the refuge subsistence biologist, general biologists, refuge information technician, pilot, refuge manager, deputy manager/law enforcement officer, and two to three seasonal technicians. Management activities primarily include wildlife studies and surveys for the management of subsistence species, administering Federal subsistence permit hunts, harvest monitoring and reporting, law enforcement, administering permits for subsistence cabins on the Refuge, and participation in the regulatory development process with the Federal Subsistence Board, Alaska Boards of Fisheries and Game, the Regional Advisory Council, and local Advisory Committees.

Anticipated Impacts of the Use(s)

The Federal Subsistence Board, in cooperation with local advisory committees, regional advisory councils, and the State of Alaska, regularly adopts subsistence hunting and fishing regulations, except for subsistence migratory bird hunting, in response to subsistence needs, changes in fish and wildlife populations and other management needs. Federal subsistence regulations adopted by the Board must be found to be consistent with the "conservation of healthy populations of wildlife." Subsistence harvest of migratory birds in Alaska is managed by the Alaska Migratory Bird Co-management Council, which attempts to maintain regulations that provide continued opportunities for traditional subsistence uses and conserve migratory bird populations.

The Refuge monitors the distribution and abundance of moose, caribou, and some selected species of migratory birds (primarily swans and ducks) occurring on the Refuge. Subsistence uses of these resources do not appear to have significant adverse effects on these resources at this time. Relatively low numbers of caribou, primarily from the Nelchina Caribou Herd, are harvested on the Refuge by local subsistence hunters during seasonal migrations across the Refuge. The reported harvest levels are a small portion of the overall harvest of the Nelchina Caribou Herd. Impacts of subsistence hunting of moose are not known because of incomplete harvest reporting, and other factors affecting moose populations. Moose densities on the Refuge have remained stable at relatively low levels for many years. Based on limited data, the current level of subsistence hunting of waterfowl and other migratory birds on the Refuge does not appear to have a significant adverse effect on the bird populations. There is no documented or known significant adverse impacts from subsistence uses of other resident fish and wildlife populations on the Refuge, but the Refuge does not have funding to monitor the populations of many subsistence resources or harvest levels.

Anticipated impacts from berry picking and other plant-harvesting activities are insignificant based upon the knowledge of refuge staff. Cutting of trees for firewood and cabin logs is minimal on the Refuge and subject to regulations to ensure minimal impacts.

The most common modes of access to the Refuge for subsistence purposes include snowmachines, motor boats, and foot. Airplane use for subsistence activities is minor. Impacts to habitat caused by access are generally minor and localized. Much of the access by subsistence users is by boat, thereby causing very little impact to refuge habitat. Snowmachine use occurs during the winter when there is generally snow cover to prevent impacts to vegetation and soils. However, some

snowmachine trails are easily visible during the summer. Airplane use on the Refuge by subsistence users is minor and landings occur primarily on existing unmaintained landing strips on gravel bars or other sparsely vegetated sites, or by float equipped aircraft on lakes and ponds.

Temporary displacement and/or disturbance to wildlife can occur while stalking and taking game animals, during motorized boat use, airplane take-offs and approaches to landings, use of snowmachines, and at campsites or other areas of concentrated human activities. There are no known long-term impacts to refuge wildlife populations from this disturbance. In addition some localized vegetation damage generally occurs in the immediate vicinity of subsistence cabins, campsites, and commonly used points of access. Use of permanent structures such as cabin sites renders longer-term localized impacts on refuge plants. However, there are only 3 cabins currently permitted on refuge lands for subsistence activities. This level of use does not result in significant overall impacts to the Refuge. An additional potential impact or threat associated with access is the introduction of invasive species carried on airplanes, boats, pack stock, pack stock feed, pets, or clothing. However, this is not known to have occurred within the Refuge to date.

Overall, the level of impacts from current levels of subsistence uses of the Refuge does not appear to have significant long-term impacts on refuge resources, although the impacts of subsistence hunting and fishing needs to be monitored more thoroughly. A more detailed discussion of the impacts associated with subsistence uses within the Refuge can be found in the Draft Tetlin Refuge Revised Comprehensive Conservation Plan (USFWS 2007) and Public Use Management Plan (USFWS 1997).

Public Review and Comment

This and other compatibility determinations were prepared concurrently with the Draft Revised Comprehensive Conservation Plan and Environmental Assessment for the Tetlin National Wildlife Refuge (USFWS 2007). The public was invited to comment on the draft compatibility determinations during the public review period established for the Draft Revised Comprehensive Conservation Plan. We published public notice of the availability of the draft conservation plan and draft determinations in the Federal Register on October 3, 2007, and invited public comments until January 18, 2008, which provided a comment period of 106 days. We mailed summaries of the Draft CCP to approximately 800 individuals, agencies, and organizations, and the full Draft CCP document (including the draft determinations) to approximately 80 other individuals, agencies and organizations. We also published ads or articles in four newspapers, and purchased a public service announcement on public radio to invite comments on the Draft CCP and compatibility determinations, and held public meetings in Tanacross, Tetlin, Tok, Northway and Fairbanks. The draft determinations were also posted on the Region 7 Refuge Conservation Planning and Policy Web pages.

The only comments we received on the draft determination were from the State of Alaska and we made some revisions to this determination in response to their comments.

Determination

_____Use is Not Compatible

__X__Use is Compatible

Stipulations Necessary to Ensure Compatibility

Although specific stipulations for subsistence activities are not necessary, management direction is provided in the Tetlin Refuge Revised Comprehensive Conservation Plan (USFWS 2008) and the 1986 Tetlin Refuge Wildlife Inventory and Monitoring Plan. This direction includes implementation of applicable sections of the Refuge's wildlife inventory plan, and adequate monitoring of public-use activities. Findings from these wildlife, public-use, and habitat-monitoring efforts will be used to determine what additional management actions, if any, are needed to ensure that subsistence activities remain compatible with refuge purposes.

The Federal subsistence management program provides for review and design of subsistence hunting and fishing regulations that ensure protection of fish and wildlife resources on refuge lands, except for migratory birds. The Alaska Migratory Bird Co-management Council regulates subsistence harvest of migratory birds to ensure their conservation. Service regulations address access, harvests of plants, and use of cabins for subsistence purposes on Alaska refuges to ensure compatibility of these uses. Use or construction of subsistence cabins also require a special use permit from the Refuge that will include provisions designed to ensure compatibility. Should use of currently used modes of motorized transportation, new cabin construction or any other subsistence activity grow to levels where it interferes with or detracts from refuge purposes, appropriate management steps would be taken to maintain compatibility. All-terrain-vehicles are not traditional modes of access for subsistence uses and generally not allowed on the Refuge.

Justification

One of the purposes of the Refuge is to provide for continued opportunities for subsistence uses by local rural residents. However, subsistence uses must be consistent with the other refuge purposes of conserving fish and wildlife populations and habitats and fulfilling international treaty obligations with respect to fish and wildlife. ANILCA recognized that the continued opportunity for subsistence uses of public lands is critical to physical, economic, traditional, social, and cultural existence of rural Native and non-Native residents of Alaska. ANILCA established a preference for subsistence users, stating that the taking of fish and wildlife on public lands for nonwasteful subsistence use is given priority over other consumptive uses; in times of scarcity, recreational use is limited first. Section 811 of ANILCA requires that we ensure rural residents have reasonable access to subsistence resources on the Refuge, and that we allow them use of snowmachines, motorboats, and other traditionally used means of surface transportation, subject to reasonable regulation.

To reduce impacts to fish, wildlife and plant resources the Federal Subsistence Board and Alaska Migratory Bird Co-Management Council regularly adopt regulations in response to fish and wildlife resource population levels and management needs. These regulations currently provide adequate protection for the Refuge's wildlife resources, continued subsistence opportunities, and other refuge purposes.

Subsistence activities occurring on the Refuge contribute to one of the purposes of the Refuge while not materially interfering with or detracting from the other purposes of the Refuge or the mission of the National Wildlife Refuge System. While complete information about subsistence harvest and resource use is not available, current monitoring efforts are focused on those species most likely to be harvested and indicate that populations are generally healthy.

Supporting Documents

Tetlin National Wildlife Refuge. 1986. Wildlife inventory and monitoring plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska, USA.

USFWS. 1987. Tetlin National Wildlife Refuge final comprehensive conservation plan, environmental impact statement and wilderness review. U.S. Fish and Wildlife Service, Anchorage, AK.

USFWS. 1994. Compatibility determination for recreational and subsistence uses within Tetlin National Wildlife Refuge. August 12, 1994. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 1997. Tetlin National Wildlife Refuge public use management plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 2007. Draft Revised Comprehensive Conservation Plan and Environmental Assessment: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

USFWS. 2008. Final Comprehensive Conservation Plan: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

Refuge Determination

Refuge Manager / Project Leader Approval:	/signed/ Tony Booth (Signature)	8/8/2008 (Date)

Concurrence

Regional Chief, National Wildlife Refuge System:	/signed/ Mike Boylan (Acting) (Signature)	8/8/2008 (Date)

Mandatory 10-Year Re-Evaluation Date: 2018

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum

_____ Categorical Exclusions and Environmental Action Memorandum

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

COMPATIBILITY DETERMINATION

Use: Trapping

Supporting and Incidental Uses: Hiking and backpacking, boating and rafting (motorized and non-motorized), commercial and private fixed-wing aircraft landings, snowmachining, dog sledding, snowshoeing, cross-country skiing, pack horses and mules, cabins, tent frames and weatherports, camping, picnicking, firewood gathering, berry picking, hunting, fishing, wildlife photography, and wildlife observation.

Refuge Name: Tetlin National Wildlife Refuge

Establishing and Acquisition Authority

In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) established the Tetlin National Wildlife Refuge as part of the National Wildlife Refuge System.

Refuge Purposes

ANILCA sets out the purposes for which each refuge in Alaska was established and must be managed. The purposes and management priorities of the Tetlin National Wildlife Refuge are described in Section 302(8)(B) of ANILCA as follows:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use

Trapping is a consumptive use involving the taking of furbearers within seasons established in the Federal subsistence harvest regulations and Alaska trapping regulations, and with a required Alaska trapping license. Trapping primarily involves the use of various types of leg hold traps or snares to catch furbearers, with some provisions to allow licensed trappers to take of furbearers with firearms. Firearms are also sometimes used to dispatch animals caught in traps. Trapping predominantly occurs during the late fall, winter and spring.

State and Federal trapping regulations provide trapping opportunities for a number of furbearers species on the Tetlin Refuge, including beaver, muskrat, coyote, red fox, lynx, martin, mink, weasel, river otter, wolf, and wolverine. Certain other species of wildlife, such as snowshoe hares, squirrels and marmots, may also be taken by traps or snares. Trapping on the Refuge has occurred prior to, and since its establishment in 1980. Although furs of animals trapped may be sold, trapping on Tetlin Refuge is not a major commercial venture at this time. The few local trappers who use the Tetlin Refuge target primarily muskrat, marten, wolves, wolverine, and lynx. The sale of these furs provides supplemental income to some trappers. This scope of this compatibility determination also includes incidental uses associated with trapping, such as access, camping, trapping cabins, backpacking, hiking, and other incidental activities.

The most common modes of access to and on refuge lands for trapping uses include snowmachines, foot, and airplanes. Motorboats or other nonmotorized watercraft are generally not used because of frozen conditions during most of the trapping seasons. Much of the northern portion of the Refuge is relatively accessible from the Alaska Highway by snowmachines and by foot. Airplanes and snowmachines are more commonly used for with more remote areas of the Refuge. Cross-country skiing and snowshoeing occur infrequently. A number of local residents own sled dogs for competitive racing, but dog sled use as a means of access for trapping activities within the Refuge is not common.

The annual number of trapper-related visits and harvest of furbearers occurring on the Refuge is unknown, but past harvest surveys and state sealing records indicate the total number of furbearers taken annually likely ranges from several thousand for muskrat and snowshoe hare to less than 200 for wolf, wolverine, and lynx. A more detailed description of trapping within the Refuge can be found in the Tetlin Refuge Revised Comprehensive Conservation Plan (USFWS 2008) and 1997 Public Use Management Plan.

Availability of Resources

Adequate refuge personnel and base operational funds are available to manage trapping on Tetlin Refuge. The Alaska Department of Fish and Game administers most management activities associated with trapping. The refuge staff devotes only a minor amount of time to management of trapping activities, except for annual monitoring and survey of some furbearer populations. A very minor amount of staff time is spent by refuge staff for answering questions and providing information to the public, and review and commenting on proposed changes to State and Federal trapping regulations. Field work associated with managing this use primarily involves surveys and studies to monitor game animal populations, and occasional law-enforcement patrols.

Anticipated Impacts of the Use

At current and expected levels of use, the anticipated impacts of trapping on refuge wildlife resources and other users are minor. State and federal trapping regulations are established to

maintain harvest levels at sustainable levels, and the number of trappers who use the Refuge is very low. Incidental take of non-target wildlife inevitably occurs but not at a significant level. Most trapping occurs during the winter when snow cover and frozen conditions protect ground surface and vegetation, and there is very limited amount of other uses occurring on the Refuge. There is some minor localized destruction of vegetation associated with clearing trapline trails and collection of firewood and logs for trapping shelters or cabins.

Public Review and Comment

This and other compatibility determinations were prepared concurrently with the Draft Revised Comprehensive Conservation Plan and Environmental Assessment for the Tetlin National Wildlife Refuge (USFWS 2007). The public was invited to comment on the draft compatibility determinations during the public review period established for the Draft Revised Comprehensive Conservation Plan. We published public notice of the availability of the draft conservation plan and draft determinations in the Federal Register on October 3, 2007, and invited public comments until January 18, 2008, which provided a comment period of 106 days. We mailed summaries of the Draft CCP to approximately 800 individuals, agencies, and organizations, and the full Draft CCP document (including the draft determinations) to approximately 80 other individuals, agencies and organizations. We also published ads or articles in four newspapers, and purchased a public service announcement on public radio to invite comments on the Draft CCP and compatibility determinations, and held public meetings in Tanacross, Tetlin, Tok, Northway and Fairbanks. The draft determinations were also posted on the Region 7 Refuge Conservation Planning and Policy Web pages.

The only comments we received on the draft determination were from the State of Alaska. Although the state did not disagree with our determination of compatibility, they commented that trapping is a public use that is not classified under federal or state law as commercial, subsistence, or recreational. We did not make changes to this compatibility determination in response to the state comments. Federal legal requirements for subsistence use priorities necessitate that we distinguish subsistence trapping from other trapping. In addition, ANILCA provisions and Service regulations and policy regarding construction and use of cabins on refuges require that we determine whether trapping activities associated with a cabin is for subsistence, commercial or recreational purposes.

Determination

_____Use is Not Compatible

__X__Use is Compatible

Stipulations Necessary to Ensure Compatibility

This use does not require a special use permit. refuge staff will work cooperatively with the State and Federal regulatory processes to maintain trapping regulations necessary and appropriate to minimize adverse impacts to native wildlife resources. Law enforcement patrols will be conducted in an effort to maximize compliance with applicable policies, rules, and/or regulations.

The Refuge will continue to monitor furbearer populations as described in the 1986 Tetlin Refuge Wildlife Inventory and Monitoring Plan, or future revisions of that plan, and additional management actions will be taken when necessary to insure that impacts from trapping activities remain at minor levels that are compatible with refuge purposes.

Justification

Trapping is a long-established traditional use on the Refuge that Congress intended to preserve when the Refuge was established by ANILCA. Both the State of Alaska and Federal Subsistence Board manage harvest of furbearing animals to ensure sustainable population levels are maintained.

There are potential impacts from access used for trapping on the Refuge. Section 1110(a) of ANILCA allows for use of snowmachines (subject to adequate snow cover or frozen river conditions), motorboats, airplanes, and nonmotorized surface transportation methods on Alaska refuges for traditional activities such as trapping, subject to reasonable regulations to protect the natural and other values. Since establishment of the Refuge, such means of access as currently regulated by the Service, have not materially interfered with or detracted from refuge purposes. Should currently used modes of motorized transportation grow to levels where it interferes with or detracts from refuge purposes, appropriate management steps would be taken to maintain compatibility.

After fully considering the impacts of this activity as described previously in the "Anticipated Impacts" section of this compatibility determination, it is my determination that trapping activities on the Refuge do not materially interfere with or detract from the purposes of the Refuge or the mission of the National Wildlife Refuge System.

Supporting Documents

USFWS. 1987. Tetlin National Wildlife Refuge final comprehensive conservation plan, environmental impact statement and wilderness review. U.S. Fish and Wildlife Service, Anchorage, AK.

USFWS. 1994. Compatibility determination for recreational and subsistence uses within Tetlin National Wildlife Refuge. August 12, 1994. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 1997. Tetlin National Wildlife Refuge public use management plan. U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Tok, Alaska.

USFWS. 2007. Draft Revised Comprehensive Conservation Plan and Environmental Assessment: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

USFWS. 2008. Final Comprehensive Conservation Plan: Tetlin National Wildlife Refuge. Anchorage, Alaska: U.S. Fish & Wildlife Service, Region 7, Division of Refuge Planning and Policy.

Refuge Determination

Refuge Manager / Project Leader Approval:	/signed/ Tony Booth (Signature)	8/8/2008 (Date)

Concurrence

Regional Chief, National Wildlife Refuge System:	/signed/ Mike Boylan (Acting) (Signature)	8/8/2008 (Date)

Mandatory 10-Year Re-Evaluation Date: 2018

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum

_____ Categorical Exclusions and Environmental Action Memorandum

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

COMPATIBILITY DETERMINATION

Use: Wildlife Observation, Wildlife Photography, Environmental Education, and EnvironmentalInterpretation

Supporting and Incidental Uses: Hiking and backpacking, boating and rafting (motorized and non-motorized), commercial and private fixed-wing aircraft landings, snowmachining, dog sledding, snowshoeing, cross-country skiing, camping, picnicking, firewood gathering, berry picking, and swimming.

Refuge Name: Tetlin National Wildlife Refuge

Establishing and Acquisition Authority

The Alaska National Interest Lands Conservation Act (ANILCA) established the Tetlin National Wildlife Refuge as part of the National Wildlife Refuge System in 1980 (Public Law 96-487 Stat. 2371).

Refuge Purposes

ANILCA sets out the purposes for which each refuge in Alaska was established and must be managed. The purposes and management priorities of the Tetlin National Wildlife Refuge are described in Section 302(8)(B) of ANILCA as follows:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, raptors and other migratory birds, furbearers, moose, caribou (including participation in coordinated ecological studies and management of the Chisana caribou herd), salmon and Dolly Varden;
>
> (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
>
> (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents;
>
> (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge; and
>
> (v) to provide, in a manner consistent with subparagraphs (i) and (ii), opportunities for interpretation and environmental education, particularly in conjunction with any adjacent State visitor facilities.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "To administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Uses

The Refuge provides excellent opportunities for wildlife observation, wildlife photography, and environmental education and interpretation throughout the year. This compatibility determination includes refuge visitor uses and activities associated with viewing and/or photographing fish and wildlife resources, and environmental education and interpretation activities. These wildlife-dependent recreational uses, along with hunting and fishing, were established by Congress as priority public uses that are to be facilitated on national wildlife refuges when they can be found compatible with the Refuge's established purposes. Associated activities such as camping, backpacking, hiking, and other incidental uses are considered part of these wildlife-dependent activities.

This compatibility determination includes means of access for these uses. Traditional forms of access on the Refuge include fixed-wing aircraft, motorboats, snowmachines, nonmotorized boats (e.g., rafts and canoes), dog sleds, foot, snowshoe, cross-country skis, pack horses and mules, and other nonmotorized means. Most wildlife viewing, wildlife photography, environmental education and interpretation and associated activities occur along or very near the Alaska Highway, particularly at the refuge visitor center, campgrounds, kiosks, pullouts, and trails or as part of refuge programs in the local communities. Many visitors participate in these activities incidental to other uses such as fishing or hunting.

Only the northern portion of the Refuge is accessible by road. A relatively small number of visitors who participate in wildlife observation and wildlife photography in more remote parts of the Refuge rely primarily on boats, commercial air taxi, private airplanes, or snowmachines for access. Little cross-country skiing or snowshoeing occurs. A number of local residents own sled dogs for competitive racing, but dog sleds as a means of access for recreational activities within the Refuge is not common. Use of helicopters, jet-powered personal watercraft, and airboats is specifically excluded from this evaluation.

Refuge facilities contain a number of interpretive displays, exhibits and demonstrations of local natural and cultural history. Various refuge programs also promote understanding and appreciation of the Service Mission, refuge purposes, the boreal forest ecosystem and associated local Native cultures and customs through interpretive talks, presentations, field trips, school courses, and youth camps. A more detailed description of the wildlife viewing, wildlife photography, environmental education and interpretation opportunities provided by the Refuge can be found in the Tetlin Refuge Revised Comprehensive Conservation Plan (USFWS 2008) and 1997 Public Use Management Plan.

Availability of Resources

Wildlife observation and photography uses do not require high levels of refuge resources, in terms of staff time and expenses, to manage, since these uses generally entail minimal impacts and often occur incidental to other uses. Adequate refuge personnel and base operational funds are available to manage these uses on the Refuge at the existing and projected levels. However, a significant commitment of refuge staff time and funding is required to administer environmental education and interpretation programs and uses on the Refuge. Adequate refuge personnel and base operational funds are not available to manage environmental education and interpretation activities at existing or projected levels. Recent reductions in part-time and full-time staffing and funding have limited the number of education and interpretive programs which can be provided, reduced the level of public use monitoring, and have increased refuge maintenance and construction backlogs. Administrative staff time (30-50 staff days) primarily involves phone

conversations, written correspondence, and interaction with visitors at the Refuge Headquarters. Field work (1,000- 1,500 staff days) associated with administering programs related to environmental education, interpretation, wildlife viewing and wildlife photography primarily involves maintaining facilities, constructing new facilities, providing interpretive presentations, developing and implementing classroom curriculum, participating in local nature camps and culture camps, organizing refuge events, and monitoring compliance by recreational users with state and federal regulations.

Anticipated Impacts of the Uses

Wildlife observation, photography, environmental education and interpretation involve nonconsumptive activities that generally result in minimal impacts on fish and wildlife populations and their habitats, other refuge resources, and subsistence users or other refuge users. Regulations, combined with law-enforcement efforts of State and refuge personnel further minimize potential impacts of these wildlife-dependent uses.

As stated previously, most recreational users utilize facilities along the Alaska Highway or attend various refuge programs in local area communities. Only a relatively small number of visitors venture into the more remote areas of the Refuge to observe and/or photograph wildlife. Temporary displacement and/or disturbance to wildlife can occur while approaching wildlife, during motorized boat use, airplane take-offs and approaches to landings, use of snowmachines, and at campsites or other areas of concentrated human activities. There are no known long-term impacts to refuge wildlife populations from this disturbance. In addition some localized vegetation damage will generally occur in the immediate vicinity of campsites and commonly used points of access. An additional potential impact or threat associated with access in conjunction with these uses is the introduction of invasive species carried in on airplane floats, boat trailers, pack stock, pack stock feed, pets, or clothing. This is not known to have occurred within the Refuge to date.

In summary, uses related to wildlife observation and photography, environmental education and interpretation is likely to increase in the near future, but due to the low impact nature of these nonconsumptive uses, and the concentration of use along the Alaska Highway there will continue to be negligible direct or indirect effects on refuge fish and wildlife populations and habitats, or on local subsistence users. Unless staffing and funding are increased to keep pace with these and other changes, the level and quality of visitor service programs and facilities will continue to decline.

A more detailed discussion of these and associated uses can be found in the Draft revised Tetlin Refuge Comprehensive Conservation Plan and Environmental Assessment (USFWS 2007) and the Tetlin Refuge Public Use Management Plan (USFWS 1997).

Public Review and Comment

This and other compatibility determinations were prepared concurrently with the Draft Revised Comprehensive Conservation Plan and Environmental Assessment for the Tetlin National Wildlife Refuge (USFWS 2007). The public was invited to comment on the draft compatibility determinations during the public review period established for the Draft Revised Comprehensive Conservation Plan. We published public notice of the availability of the draft conservation plan and draft determinations in the Federal Register on October 3, 2007, and invited public comments until January 18, 2008, which provided a comment period of 106 days. We mailed summaries of the Draft CCP to approximately 800 individuals, agencies, and organizations, and the full Draft CCP document (including the draft determinations) to approximately 80 other individuals,

agencies and organizations. We also published ads or articles in four newspapers, and purchased a public service announcement on public radio to invite comments on the Draft CCP and compatibility determinations, and held public meetings in Tanacross, Tetlin, Tok, Northway and Fairbanks. The draft determinations were also posted on the Region 7 Refuge Conservation Planning and Policy Web pages.

We received no comments on the draft compatibility determination.

Determination

_____Use is Not Compatible

__X__Use is Compatible

Stipulations Necessary to Ensure Compatibility

Establishment of impact thresholds and associated monitoring to be included in the revised Tetlin Refuge Public Use Management Plan/Visitor Services Plan and Habitat Management Plan in conjunction with continued monitoring of wildlife populations included in the 1986 Tetlin Refuge Wildlife Inventory and Monitoring Plan will indicate what additional management actions, if any, are necessary to insure wildlife viewing, photography, environmental education, and environmental interpretation remain compatible with other refuge purposes.

These uses will be limited to levels that can be supported by available refuge personnel and funding.

Justification

The National Wildlife Refuge System Improvement Act of 1997, identifies compatible wildlife observation and photography, environmental education, and environmental interpretation as four of six priority public uses of national wildlife refuges. The law states that, when managed in accordance with principles of sound fish and wildlife management and administration, these and the other priority wildlife dependent recreational uses "…have been and are expected to continue to be generally compatible uses." The Act further states that the priority public uses should receive enhanced consideration over other general public uses in refuge planning and management. Providing opportunities for environmental education and interpretation is also a purpose of Tetlin Refuge defined by ANILCA.

There are potential impacts from the modes of access used for remote areas of the Refuge. Section 1110(a) of ANILCA allows for use of snowmachines (subject to adequate snow cover or frozen river conditions), motorboats, airplanes, and nonmotorized surface transportation methods on Alaska refuges for traditional activities, subject to reasonable regulations to protect the natural and other values. Over the past 26 years, such means of access used in conjunction with hunting on the Refuge, as currently regulated by the Service, have not materially interfered with or detracted from refuge purposes. Should use of motorized transportation grow to levels where it interferes with or detracts from refuge purposes, appropriate management steps would be taken to maintain compatibility.

The conservation and management of fish, wildlife and plant resources and their habitats for the benefit of the American people is fundamental to the National Wildlife Refuge System's mission. It is important to provide the opportunity, when possible, for the public to visit the Refuge, allowing them to observe (and photograph) fish and wildlife resources in the simplest and most basic form. The Refuge provides an incredible opportunity to function as an outdoor classroom,

promoting an awareness of ecological functions and the interrelationship between human activities and the natural system, and to educate and motivate future generations of people so that they effectively support wildlife conservation. For many, the only opportunity to gain that experience will be on a national wildlife refuge.

After fully considering the impacts described previously in the "Anticipated Impacts" section of this compatibility determination, it is my determination that wildlife viewing and photography, environmental education, and environmental interpretation activities on the Refuge do not materially interfere with or detract from the other purposes of the Refuge or the mission of the National Wildlife Refuge System. They in fact contribute to one of the purposes of the Refuge and to the mission of the National Wildlife Refuge System.

Supporting Documents

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Refuge Determination

Refuge Manager / Project Leader Approval:	/signed/ Tony Booth (Signature)	8/8/2008 (Date)

Concurrence

Regional Chief, National Wildlife Refuge System:	/signed/ Mike Boylan (Acting) (Signature)	8/8/2008 (Date)

Mandatory 15-Year Re-Evaluation Date: 2023

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum

_____ Categorical Exclusions and Environmental Action Memorandum

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Appendix F

Section 810 Evaluation

F. Section 810 Evaluation

The Alaska National Interest Lands Conservation Act (ANILCA) section 810 requires an evaluation of the effects on subsistence uses for any action to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands. The evaluation consists of three parts:

- A finding of whether or not a proposed action would have a significant restriction on subsistence uses
- A notice and hearing if an action is found to have a significant restriction on subsistence uses
- A three-part determination prior to authorization of any action, if there is a significant restriction on subsistence uses

Section 3.2.10 in chapter 3 of this document presents an overview of the guidelines and policies for management of subsistence use on Tetlin Refuge. This management direction is compiled from the laws governing the National Wildlife Refuge System and the regulations, policies, and other guidance, both national and regional, developed to implement these laws. Section 4.3.7 (in chapter 4) describes current subsistence use on the Refuge, including harvest of large mammals; harvest of waterfowl, other migratory birds, and upland birds; harvest of whitefish, pike, Arctic grayling, burbot, and other fish; gathering of a variety of plant resources; and trapping of local furbearer species. This is a long-range programmatic plan that includes some changes in management direction for Tetlin Refuge, does not propose any site-specific development, or allow any new types of uses or development that would pose risks to subsistence uses of the Refuge.

The Final Revised Conservation Plan will not contain actions that would reduce subsistence uses because of direct effects on wildlife or habitat resources, though a minor increase in competition for resources could result. (See discussion of access in subsequent text.)

Similarly, the Final Revised Conservation Plan will not change the availability of resources by altering their distribution or location. The general goal is to maintain habitat and wildlife populations naturally occurring on the Refuge.

The expansion of and improvements to refuge access included in the Final Revised Conservation Plan will benefit subsistence users by enhancing access to resources they use. Such development also poses some risk for increased competition or user conflicts by encouraging more recreational users. Any anticipated negative effects will be minor. The overall effects of improved access included in the Revised Conservation Plan will be positive and not result in any significant restriction of subsistence uses.

Finally, the Final Revised Conservation Plan will not reduce subsistence uses because of limitations on access, by either physical or legal barriers, to harvestable resources. This evaluation concludes that the action would not result in a significant restriction of subsistence uses.

Appendix G

Preparers

G. Preparers of the Tetlin Refuge Draft Revised Comprehensive Conservation Plan

Name	Expertise/Function	Degree(s)	Experience (years)
Refuge Staff			
Booth, Tony	Refuge Manager	BS—Wildlife Biology MS—Wildlife Biology	11 Fish and Wildlife Biology 21 Refuge Management
Butteri, Peter	Fire Management/Ecology	BA—English Certificate—Technical Fire Management	24 Fire Management 21Fire Ecology/Botany
Cebrian, Merben	Biology/Botany	MS—Wildlife Biology	9 Wildlife Biology
Collins, Aaron	Natural Resource Management/Public Use	BS—Natural Resource Management	7 Natural Resource Planning 3 Public Use/Recreation Management 1 Botany/Plant Ecology
Collins, Gail	Wildlife/Subsistence Biology (mammals)	MS—Wildlife Biology	13 Large Mammal Research 5 Subsistence Management
Dippel, Cris	Deputy Refuge Manager/Law Enforcement/Biology	MS—Wildlife Biology	20 Refuge Management/Law Enforcement
Friend, Connie	Refuge Liaison/Subsistence Management	AA—Counseling/Psychology	9 Natural Resource/Subsistence Coordination/Social Science Research
Johnson, Buddy	Wildlife Biology/Fire Ecology	BS—Forestry and Wildlife MS—Wildlife Management	25 Wildlife Management
Johnson, Heather N.	Public Use/Visitor Services	BS—Wildlife Biology	26 Public Use/Environmental Education
Timm, Hank	Biology (avian, small mammals)	BS—Forestry	16 Wildlife Biology
Region 7 Planning Staff			
Clough, Helen	NEPA, Policy, and ANILCA Compliance	BA—Anthropology	23 Natural Resource Planning 12 Resource Management
Glaspell, Brian	Social Science	PhD—Forestry/Wilderness and Recreation Management	11 Social Science Research
Haase, Mikel	Planning Team Leader	BA—Environmental Design MS—Forest Resources	29 Natural Resource Planning
Rice, Kenneth W.	NEPA, Policy and ANILCA Compliance	MS—Wildlife Management	31 Resources Management

State of Alaska			
Palach, Brad	Liaison with State of Alaska-ADF&G	BA—Justice	24 Fish and Wildlife Management
Taylor, Sara	Liaison with State of Alaska-DNR	BS—Environmental Studies	7 Wildlife Biology and Biometric 4 Environmental Education 5 Natural Resource Planning

Appendix H

Glossary

H. Glossary

Specialized Words and Terms:

Appropriate use — All uses over which the Service has jurisdiction must be determined to be appropriate following direction in Service Manual 630 FW 1. Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are considered appropriate by national policy with no further analysis required. See section 3.2.4.1 for a description of the criteria used to determine if other uses are appropriate.

Cache — (Alaska and Northern Canada) A small shed elevated on poles above the reach of animals and used for storing food, equipment, etc.

Compatibility — All activities, uses, and facilities allowed on the Refuge, except management actions undertaken by or for the Service, must be compatible with the purposes of the Refuge and the mission of the Refuge System. The analysis that occurs results in a refuge compatibility determination. Management activities undertaken by the Service or by volunteer, cooperators, or contractors working for the Service, with limited exception, are exempt from compatibility review (Part 603 of the Service Manual).

Engine module — A fire suppression unit consisting of a fire engine, an engine boss, and one engine module member. Engine module capabilities vary depending upon vehicle tank and pump capacities.

Fire use — Any fire occurring without human ignition which is allowed to burn so as to achieve specific resource management objectives.

Initial Attack — The period of time from the first response of fire units until a functioning fire team has developed. On large fires, the first twelve hours is called initial attack. On small fires, initial attack may end within a few minutes after a fire unit arrives on the fire scene.

Loess — An unstratified deposit of loam that ranges to clay at one extreme and to fine sand at the other, is usually of a buff or yellowish brown color, and is chiefly deposited by the wind.

Moraine — An accumulation of earth and stones carried and finally deposited by a glacier.

Muskeg — Any area of boreal spruce forest characterized by wet boggy surface underlain by permafrost.

Native Species	A species, subspecies, or distinct population that occurs within its natural range or natural zone of potential dispersal (i.e., the geographic area the species occupies naturally or would occupy in the absences of direct or indirect human activity or an environmental catastrophe). This definition recognizes that ecosystems and natural ranges are not static; they can and do evolve over time. Thus a species may naturally extend its range onto (or within) a refuge and still be considered native.
Non-native Species	A species, subspecies, or distinct population that has been introduced by humans (intentionally or unintentionally) outside its natural range or natural zone of potential dispersal.
NEPA analysis	All activities, uses, and facilities proposed for a refuge that have the potential to result in significant effects on the environment require an analysis of potential environmental impacts under the National Environmental Policy Act. This analysis may be documented as a categorical exclusion, an environmental assessment, or an environmental impact statement, depending on the nature of the proposed project.
Rare birds	Present annually in very small numbers or locally distributed. Not frequently encountered.
Regulations	All activities, uses, and facilities on a refuge must comply with any applicable regulations, as published in the Code of Federal Regulations. Regulations are developed by the Service through a public process to implement the legal authorities under which the Service manages the Refuge System. For more information on these regulations, see the appropriate topic in the Management Policies and Guidelines (section 3.2) of this document. For some activities, other Federal agency and/or State regulations may also apply.
Riverine	Of, relating to, formed by, or resembling a river; living or situated on the banks of a river.
Rouge Animal	Any animal which—by its actions or behavior—presents a likely and imminent threat to public health or safety.
Social Trails	Unofficial trails established between two or more facilities such as campsites, outhouses, and boat docks.
Sora	A small short-billed North American rail (shore bird) commonly found in marshes (particularly along the Atlantic coast).

Tradition	Archaeological term used to describe distinct periods in human prehistory separated by changes in the technology of tool construction and use.
Tussock	A small hummock of more solid ground in marsh or bog, often underlain by permafrost in Alaska, usually covered with and bound together by the roots of low vegetation such as grasses and sedges.
Upper Tanana Valley	The portion of the Tanana River watershed upstream from, and including, the Healy River.

Appendix I

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Appendix J

Responses to Comments

Responses to Comments

The Draft Revised Comprehensive Conservation Plan (Conservation Plan, Plan) and Environmental Assessment for Tetlin National Wildlife Refuge (Tetlin Refuge, Refuge) was released for public review on October 3, 2007 (Notice of Availability published in the *Federal Register*). The comment period closed on January 18, 2008. Public meetings were held by Tetlin Refuge staff in Tanacross (November 19, 2007), Tok (November 27, 2007), Fairbanks (November 28, 2007), Northway (January 7, 2008), and Tetlin (January 8, 2008). Approximately 40 people attended these meetings. Written comments were received from eight individuals and the State of Alaska. Five of the individuals who commented on the Plan were from Alaska. In addition, the Service's Office of Subsistence Management provided additional background information, related primarily to the moose population on Tetlin Refuge and adjacent lands, for potential inclusion in the final Plan.

Comments from the individual letters and the public meetings are summarized below, with responses as necessary. Copies of the original letters and emails and notes taken during the meetings are available at the Refuge Headquarters in Tok, Alaska, and at the Alaska Regional Office in Anchorage.

Several issues were raised by those commenting on the Draft Revised Tetlin Conservation Plan. These topics included the following:

Access to and Recreational Use of the Refuge.

Comment: "I would like to see a canoe portage system perhaps in the Scotty Creek/Desper Creek area, with marked portages and a few camp sites. I would also like to see a winter trail to Jatahmund Lake with public access." Another commenter stated, "It would be nice to maintain trails running out from the highway and I think it would be good to have a little more access."

Response: No changes were necessary. The Revised Conservation Plan proposes the establishment of canoe routes, and also the marking, maintenance and improvement of existing trails. Designation of specific locations for canoe trails and access improvements will be determined in the revised Refuge Visitor Services Plan (Public Use Management Plan) to be developed after completion of the Conservation Plan.

Comment: "Re: Construction of airstrips, boat launches, visitor facilities, etc., it is important to restrict this man-made infrastructure to areas of intensive use only."

Response: No changes were necessary. Section 3.1 of the Revised Conservation Plan explains the level of developments or uses that will be allowed in each management category. In general, major facility developments and management actions that are very apparent and/or modify natural processes or habitats will be limited to the small area designated for Intensive Management, which occurs along the Alaska Highway corridor where man-made infrastructure already exists. Most of the Refuge will be designated as Minimal Management, where new public use facilities are not generally provided, and uses or access improvements are limited to those that cause minimal or no disturbance to habitats, resources, or natural processes.

Comment: Among comments from several public meeting participants were recommendations for more and improved access opportunities in general and support for increased access into

refuge backcountry via construction and maintenance of more airstrips, and new trails (or extensions of existing trails).

Response: No revisions were necessary. The Revised Conservation Plan includes improved access opportunities into the Refuge.

Comment: ATV Use on the Refuge. "ATV's should be allowed only in areas of intensive use by humans," and "I'd like to see more restrictive use of all-terrain vehicles."

Response: No revisions were necessary. ORV (or ATV) use may be allowed only on designated routes or areas within areas of Intensive and Moderate Management, or by special use permit. We have no plans or proposals to designate any ORV trails or routes on the Refuge. If proposed, they would be subject to specific compatibility determinations, the NEPA process, and ANILCA 810 evaluations.

Fire Management.

Comment: "Maintain as natural a fire regime as possible. No prescribed fire unless necessary to protect communities."

Response: Several revisions in language were made in response to State of Alaska and public comments regarding fire management. Among those revisions, our Fire Management Goal (Goal E) was modified to more clearly state the refuge intent to maintain a fire management program that reflects the natural role of wildfires in maintaining natural diversity and productivity of northern boreal forests, while providing an appropriate level of protection for human life, property, and cultural and natural resources. The Revised Conservation Plan shifts management focus away from use of prescribed fires to management of wildland fires ignited by natural causes.

Comments: "Wildland fires should be aggressively fought only in or near intensive use areas or where the long-term ecological integrity of refuge lands is threatened. If there are cabins in inholdings in the refuge, these should also be protected. Fire, I believe, should not be used to enhance or maintain wildlife habitat."

Response: See the preceding response. No revisions were made specifically in response to this comment. The Revised Conservation Plan provides an appropriate level of fire protection of intensive use areas and allows for protection of cabins within the Refuge. Wildfires are a natural process, and essential to maintaining the natural diversity and biological productivity of the northern boreal forests habitats found on the Refuge. Our proposed increase in reliance on wildland fire management to achieve habitat management goals and objectives is an appropriate management strategy and consistent with refuge purposes.

Comment: "Proscribed fire should enhance or maintain habitat only when identified as a specific project proposal."

Response: No changes were necessary. The Revised Conservation Plan redirects emphasis to reliance on use of naturally ignited wildfires to achieve habitat management goals and objectives.

Fish and Wildlife Population Management.

Comment: Introduced and Invasive Species. "There should be no introduction of species not naturally occurring with(in) the refuge. If starlings begin to invade the area, shoot them." ". . . there should be no additional stocking of non-native fish." Public meeting participants asked questions regarding use of aerial spraying for eradication of invasive plants and potential introductions (via migration from Canada) of wood bison and elk.

Response: No changes were made. The Revised Conservation Plan does not allow the introduction of species that do not occur naturally on the Refuge, with one exception. The Alaska Department of Fish and Game will be allowed to continue periodically restocking rainbow trout at one small lake on the Refuge. The Plan explains the reasons for this single exception. Although we concur that the range expansions of starlings and other invasive species are undesirable, the Revised Conservation Plan provides only broad management direction and does not go into detailed management actions to prevent or respond to such range expansions onto refuge lands if they occur. Any plans for aerial spraying to eradicate invasive plants would be subject to considerable internal scrutiny, and would require specific environmental analysis, including NEPA evaluation and a compatibility determination.

Comment: "Do not allow predator control, or any manipulation of wildlife populations."

Response: No changes were required. Although we expect that the control or manipulation of predators or other native fish and wildlife populations would be rarely—if ever—used, such management should be maintained as a potential conservation tool for extreme circumstances when other management alternatives are not practical. Such management actions would be subject to intense scrutiny and must be found to be ecologically sound and biologically justified (e.g., necessary to restore the biological integrity, diversity, and health of refuge wildlife populations), require appropriate NEPA compliance, an ANILCA section 810 determination, and a compatibility determination (if conducted by anyone other than the Service).

Comment: "Has anyone studied the failure of the Northern pike population to recover after the failed poisoning project of years ago? " (Deadman Lake)"

Response: No changes were necessary. We have not been involved with and are unaware of any studies regarding the poisoning of Deadman Lake. Although within the external boundaries of Tetlin Refuge, there are no federally owned lands adjacent to Deadman Lake. The Refuge manages Deadman Lake Campground through a long-term lease with the State of Alaska, but we do not have management authority over the adjacent lake.

Comment: "I think the management intent for larger fish to provide trophy fishing opportunities should be dropped…"

Response: No changes are necessary. The Revised Conservation Plan eliminates current management intent for trophy fishing opportunities and redirects management emphasis toward maintaining native species in their natural diversity and abundance.

Comment: A public meeting participant also expressed concerns regarding the decreasing quality of fisheries resources (since the earthquake in November 2002) and suggested that agencies investigate the fish problem.

Response: The Revised Conservation Plan provides broad, general management direction for the Refuge. Following completion of the Revised Conservation Plan, the Refuge will revise the Refuge Fisheries Management Plan, which will provide more detailed management direction, including addressing specific fisheries issues and study needs.

The State of Alaska comment letter is included in its entirety. Responses to State comments are incorporated directly into their letter.

STATE OF ALASKA

ANILCA IMPLEMENTATION PROGRAM
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January 18, 2008

Tony Booth, Refuge Manager
Tetlin National Wildlife Refuge
P.O. Box 779
Tok, AK 99780-0779

Dear Mr. Booth:

The State reviewed the Draft Revised Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) for the Tetlin National Wildlife Refuge. These comments represent the consolidated views of the State's resource agencies.

We appreciate the overall level of coordination that occurred during this planning process. As a result, we have fewer substantive comments. However, we remain particularly concerned about the CCP's assertion, based on a decision in the Refuge's 1997 Public Use Management Plan (PUMP), that the refuge is closed to subsistence use of off-road vehicles (ORV). As noted in more detail below, we question both the basis for that earlier decision and the lack of refuge-specific regulations needed to implement such a closure under Section 811 of the Alaska National Interest Lands Conservation Act (ANILCA). We understand treatment of ORVs is also a regional issue that variously affects all refuges in Alaska. We request an opportunity to work with both the Refuge and the Region in an effort to resolve our long-standing concern over the right of rural residents to continue traditional use of ORVs for subsistence purposes, subject to reasonable regulation to protect refuge resources.

Our remaining comments on the Draft Revised CCP are primarily informative in nature and often request inclusion of additional information or clarification in the final plan or decision notice. They are organized into the following categories:

- Subsistence Access and Management
- Fisheries
- Fire Management
- State Lands and Waters within the Refuge
- Compatibility Determinations
- Additional Page-Specific

Subsistence Access and Management

Subsistence Use of Off-Road Vehicles
The Revised CCP indicates that a traditional use determination made as part of the 1997 Tetlin Refuge PUMP found that ORVs were not traditionally used for subsistence purposes on the Refuge (See 3-23, 3.2.10.1, Access for Subsistence Purposes). It appears the discussion of ORVs was based on reports written by the Alaska Department of Fish and Game (ADF&G) Division of Subsistence for Northway (1986) and Tetlin (1987), and on unidentified subsistence studies conducted prior to 1980. We acknowledge that riverboats, highway vehicles, and snowmachines are used most frequently, in part because of limitations imposed by the terrain. However, we continue to question the definitive assertion that ORVs have not been used at all for subsistence purposes and maintain our long held view that the Refuge must compile a larger-scope study of all pre-ANILCA activities and access to establish a strong foundation for any access regulations that may be needed. While we do not condone inappropriate or illegal use of ORVs, additional steps, including refuge-specific regulations, are needed to prohibit access allowed under ANILCA Section 811.

Response: During development of the Tetlin Refuge's Public Use Management Plan in 1997, the Refuge determined that ORVs were not traditionally used for subsistence purposes at the time the Refuge was established. That determination, along with the development of the Plan, was subject to public review. We believe that determination was adequate and accurate. After completion of the Conservation Plan, we will promulgate regulations to implement the closure to ORVs.

Page 2-58, Table, Off-road Vehicles, Action Alternative Column: ORVs are allowed for subsistence activities under ANILCA Section 811 (subject to reasonable regulation) or by special use permit in Minimal management areas. We suggest the language be changed to *"No routes or areas will be designated in Minimal management"* which is consistent with Chapter 3 and existing laws and regulations.

Response: Table 2-5 does not appear in the final plan. Section 811 of ANILCA does not require the Refuge to allow use of ORVs on refuge lands for subsistence purposes unless they were traditionally used for such purposes prior to establishment of the Refuge. Even then, the ORV use must be found compatible with the refuge purposes and the mission of the National Wildlife Refuge System. As previously indicated, the Refuge determined that ORVs were not traditionally used for subsistence purposes.

Page 4-36, 4.3.6, second sentence: Describing off-road vehicles as "not allowed" is inconsistent with both ANILCA and Service regulations. Off-road vehicles are allowed in designated routes and areas, and by special use permit per 43 CFR 36.11(g), or when used for subsistence purposes per 50 CFR 36.12 (see also Chapter 3, Sections 3.2.11.2 and 3.2.10.1). Until regulations are promulgated closing the Refuge to ORVs, it is inaccurate to simply indicate they are "not allowed" on the Refuge.

Response: The sentence was revised. Regulations at 50 CFR 36.12 echo ANILCA language that, as indicated previously, allows continued ORV use for subsistence purposes only if they were determined to have been traditionally employed for subsistence purposes. Regulations at 43 CFR

36.11(g) prohibit ORV use except in designated routes or areas. There are no designated routes or areas on the Refuge.

General Subsistence Management

Page 2-3, A.10 Objective: We would like to commend the Refuge for inclusion of this objective as well as the previous work concerning whitefish. Monitoring of whitefish stocks in the Refuge and in downstream waters provides information that will assist in the maintenance of this important subsistence resource for local area residents, particularly those in Tetlin and Northway. We also concur with the importance of Objective A.11; however, we request that "critical" be replaced with "important."

Response: This change has been made throughout the final Plan.

Pages 2-16 to 2-17, Management Alternatives, Goal G, Objectives: Six objectives are presented to meet Goal G: "*Provide subsistence opportunities for rural residents, compatible with other refuge purposes.*" These are reasonable objectives that, in combination with objectives associated with fish and wildlife populations, are essential for accomplishing Goal G. We appreciate plans by the Refuge to work with ADF&G to address Objective G.4. However, potentially waiting up to 10 years to achieve Objectives G.4 and G.6 may be problematic, especially if construction begins within the next few years on a natural gas pipeline following the Alaska Highway corridor. The Refuge will have an important opportunity to document subsistence activities before, during, and after this proposed construction project to evaluate the impacts of construction and operation. We therefore suggest moving up the timelines for addressing Objectives G.4 and G.6.

Response: We concur that construction of the proposed gas pipeline may increase the urgency of some of the stated management objectives. The timelines stated for Objectives G.4 and G.6 are "within 10 years", which allow flexibility to move them up if or as the situation warrants, and funding is available.

Page 3-22, 3.2.10, Subsistence Use Management: The first paragraph properly notes the role of the Federal Subsistence Board in regulating subsistence activities on the Refuge, but does not acknowledge that regulations implemented by the state regulatory boards continue to apply on the Refuge unless superseded by federal subsistence regulations. We request recognition of the State's continuing regulatory authorities (as stated on page B-1 in Appendix B) in the final paragraph in Section 5.1.1.2 on page 5-4.

Response: The Service recognizes the State's regulatory authorities for managing its resident fish and wildlife resources. We modified language where appropriate to reflect their authority.

Page 4-17, Section 4.2.6.1, Humpback Whitefish: The first paragraph references a 2007 report by Friend et al. If this is a draft report not yet available for examination, it should be listed as such on page I-7 in the References Cited Appendix. The first paragraph also presents whitefish harvest data from studies conducted in the 1980s with the addition of 2005-06 data. For comparison purposes, the 2005-06 data would be more useful if presented as average pounds per household. It is unclear why harvest data for whitefish are presented in this section but not for any other fish and wildlife species. Presentation of subsistence harvest data would be more appropriate in Section 4.3.7.

Response: We corrected the citation to reflect the appropriate status of the report (i.e., "in press"). Section 4.2.6 was also revised to focus on the fish resources occurring on the Refuge; the subsistence harvest information was moved to section 4.3.7.3, which discusses subsistence uses of the Refuge resources. The Plan presents subsistence fish harvest data in the same units used in the source documents. Unfortunately, the source of the more recent harvest data did not report the data in average pounds per household.

The second paragraph mentions local concerns about "*possible declines in humpback whitefish populations*" and a study that was instigated to address the matter. Many study outcomes are discussed *except* for results regarding real or perceived population declines. If this information is retained in the final plan, we suggest incorporating resolutions for these concerns or related conclusions found in the study.

Response: The whitefish study objectives were directed at confirming species identification and obtaining baseline information needed for guiding future research and management activities in the area. Prior to that study, there was virtually no baseline information about the local whitefish populations on which to make any conclusions about populations trends. The language of the Plan was modified to alleviate confusion about the objectives and results of the study.

Page 4-32, Table 4-2: As previously noted to the Planning Team, the 2000 population statistics for Dot Lake appear to exclude data for Dot Lake Village. The Alaska Community Database Community Information Summaries contain census data for both Dot Lake and Dot Lake Village. This database is available on line and contains 2006 community population estimates that could be presented in this table. At a minimum, the Dot Lake population data should be corrected.

Response: We corrected the data.

Page 4-38, 4.3.7, Affected Environment, Subsistence: The ADF&G Division of Subsistence recently conducted harvest surveys in refuge-area communities covering the period April 2004 – March 2005. Our previous communications with the Planning Team noted that more current harvest data for refuge area communities is available in a Division of Subsistence report prepared for the Department of Natural Resources (DNR); however, it appears the Refuge either did not obtain a copy of this report or chose not to present these more current data. The data from this study are now being summarized in more detail in a report now in preparation. For more information about this study, contact the Division of Subsistence Regional Program Manager, Jim Simon, in Fairbanks at 459-7317.

Response: The more recent subsistence harvest data from the State Division of Subsistence was not included because the data was still being analyzed, and the report was under preparation at the time the draft revised Plan was being developed. The subsistence harvest report, when completed, is not expected to affect the integrity of the general subsistence information presented in this Plan nor warrant changes to our proposed management actions. If it does, adaptive management strategies can be applied to respond to unexpected changes or outcomes.

Page 5-3, 5.1.1.2, Subsistence: We request the discussion include recognition of state management authorities for fish and wildlife, including that harvest of fish and wildlife within the Refuge is

regulated by the State unless superseded by federal subsistence regulations. See also comment for page 3-22.

Response: We agree with your comment, but this section does not appear in this document. Text has been modified in other sections of this document where appropriate.

Page 5-17, Section 5.2.3.3, Impacts to the Human Environment: Subsistence Opportunity: The second paragraph states that,

> *Access and opportunities for public use will continue to expand under all alternatives. The resulting increase in use will create some competition between local rural subsistence users and non-local recreational users under all alternatives… most impacts will occur during brief periods in spring and fall when subsistence activities and recreational uses overlap.*

We appreciate acknowledgement of the Refuge's responsibility to mitigate potential impacts of increasing non-subsistence uses on subsistence users. We are concerned, however, that more restrictive hunting regulations would be one potential mitigation measure to address increased harvest levels that might result from improved access (see Section 5.5.2.3, pages 5-38 to 5-39). In essence, the Refuge might first improve access that attracts more recreational users and then be compelled to seek more restrictive regulations to reduce hunting opportunity by non-federally qualified subsistence users. An alternative approach would be to focus on access improvements that are less likely to generate user group conflicts. We strongly encourage addressing this concern in consultation with local residents and other management agencies such as ADF&G or DNR.

Response: This statement does not appear in this document. We considered potential user conflicts and impacts on subsistence uses were considered when proposing access improvements. As stated in the draft document, we do not anticipate proposed actions in any of the alternatives evaluated to significantly restrict subsistence use within the Refuge, including any actions in the final Conservation Plan. The section 810 evaluation, now found in appendix F was modified to more clearly reflect the anticipated effects.

Page 5-44 to 5-45, Section 5.9, Section 810 Evaluation: The possible conflicts noted in the discussion of the Preferred Alternative and their potential effects on subsistence users seem to contradict conclusions made in the Section 810 evaluation. For example, the table on page 5-47 suggests that increased boat, trail, and highway site access will have a moderate, long-term local "*positive*" effect on subsistence opportunity, while in Section 5.2.3.3 expanded access is projected to "*create some competition between local rural subsistence users and non-local recreational users under all alternatives.*" Discussion of the Preferred Alternative in Section 5.4.2.3 appropriately indicates plans by the Refuge to conduct public education and outreach activities to mitigate such impacts.

Response: Access expansion or improvements will benefit subsistence users by enhancing access to the resources they use on the Refuge but also pose some risk for increased competition or user conflicts by encouraging more use by other users. We anticipate the negative effects, if any, to be minor, and the overall effects of the access improvements proposed in the preferred alternative to be positive, and not resulting in a significant restriction of subsistence uses. The section 810

evaluation, now found in appendix F was modified to more clearly reflect the anticipated effects. Other referenced sections do not appear in this document.

Fisheries

We understand the position of the Service concerning the stocking of rainbow trout into Hidden Lake in the Preferred Alternative. We would appreciate future opportunities to work with the Service on the potential for fisheries enhancement projects on appropriate waters within the Refuge. We are particularly interested in working with the Service in providing priority public uses of the Refuge, including opportunities for fishing. Enhancement projects such as the one at Hidden Lake provide increased opportunities for the public and have the additional benefit of reducing pressure on wild stocks of fish within the region, which could become greater if use on the road system increases. The ability of the State to enter into additional stocking programs will increase as the new hatchery in Fairbanks becomes operative in 2009 or 2010. It may be appropriate to utilize the revision of the Refuge Fishery Management Plan, following the completion of the CCP, to develop long range goals for potential fisheries enhancement projects. We look forward to working with the Refuge on the revision of that plan.

Response: We also look forward to working with the State on revision of the Refuge Fishery Management Plan. Any new fisheries enhancement projects must be compatible with Refuge purposes and consistent with the Service's Biological Integrity, Diversity, and Environmental Health Policy (601 FW 3.16 of the Service Manual).

Fire Management

Our overarching comment regarding the management of fire within the Refuge relates to how it is addressed within the context of the CCP process. We understand that wildland fire management planning and CCPs are two separate processes. While it is entirely appropriate to outline general wildland fire management direction in the CCP, as is done in Goal E, the CCP should clarify that detailed specifics are actually left to annual reviews of fire management conducted by the Refuge and sent to the Alaska Wildland Fire Coordinating Group (AWFCG) for implementation. We appreciate the Refuge's intent to provide the most detailed information concerning wildland fire management for reviewers, particularly in the areas adjacent to human habitation. At the same time, the CCP should clarify that policies and techniques concerning fire may change over time and may eventually amend the direction of the CCP. The details and implementation of fire management are best described and implemented through the Refuge Fire Management Plan. As an adjacent land manager with inholdings in the Refuge and with management responsibilities for fish and wildlife that overlay the Refuge, the State appreciates opportunities to work with the Refuge on the details concerning wildland fire management. Additional page-specific comments related to fire management follow.

Response: In general, we agree with these comments. We feel that the identification of specific strategies and target treatment acreages in the original 1987 Refuge Plan was overly prescriptive and would be better left to a step-down Fire Management Plan or to individual treatment plans. Alternative A included these specific fire management strategies because it was the "Current Management (No-Action) Alternative." The other alternatives provided more generalized strategies better suited to the Conservation Plan level of planning. Where specific fire management strategies were described in the draft Plan, the intent was to clarify how broad

strategic differences between alternatives might affect day-to-day management decisions. Only Alternative B, the final Conservation Plan, is described in this document.

Page 2-12, Goal E: We recommend that Goal E more clearly state the intent of the Refuge concerning fire management: that the boreal forest is fire dependent/fire adapted and that fires will be allowed to burn on the landscape to the extent practicable. Our recommended rewording is:

> *Given that productivity and diversity of the flora and fauna in the boreal forest depends in large part on recurring wildland fire, allow fire on the landscape to the extent possible while protecting human life, property and cultural resources.*

Response: Goal E was modified as follows to more clearly state the refuge intent and recognize the natural role of wildland fires on the boreal forests.

Goal E: *Maintain a fire management program for Tetlin Refuge that reflects the natural role of wildland fires in maintaining diversity and productivity in the boreal forest and supports refuge purposes and habitat management goals, while providing an appropriate level of protection for human life, property and identified cultural and natural resources.*

Page 2-13, E.6, Objective: Regarding: "*...and submit necessary change recommendations to the AWFCG.*" We recommend rephrasing this sentence consistent with the following information derived from the Alaska Interagency Wildland Fire Management Plan (AIWFMP): "*The land manager/owner(s) determines the fire management option for the lands under their jurisdiction or ownership*" (AIWFMP, pg. 38). The fire management options that the Refuge selects for its lands are not recommendations nor are they sent to the AWFCG. The Refuge is expected to inform and involve its neighbors during the annual review but the final decision rests with the Refuge. Once approved the changes are submitted to the Alaska Incident Coordination Center for inclusion in the statewide map atlas (ref.: AIWFMP 2005 Revision to Management Option Boundary or Management Level Change Procedures. 2005 Alaska Wildland Fire Coordinating Group).

Response: We concur with the comment and revised the objective as follows to more clearly reflect the Service's authority to determine the fire management option for refuge lands:

In collaboration with local partners, annually assess the Alaska Interagency Wildland Fire Management Plan (AWFCG 1998) Management Option boundaries within the Refuge, and submit any needed changes to the Alaska Incident Coordination Center (AICC) for inclusion in the statewide map atlas.

Page 2-37, 2.5.2.4, Habitat Management: For clarification we request that this sentence be revised as follows so that the use of quotation marks around *"improve"* are not necessary:

> *Prescribed fire would be applied to approximately 400 acres annually to improve habitat for wildlife needing earlier seral vegetation, such as waterfowl and moose.*

Response: The statement referred only to Alternative A (Current Management/No Action) and is not included in this document.

Page 2-39, 2.6.1, second bullet and page 2-41, 2.6.2.3 Fire Management: We agree that shifting to a Fire Use strategy will be an improvement over the current situation, especially since federal policy now allows active management of a wildland fire instead of just allowing it to spread naturally. Aerial ignition can now be used to extend a fire to burn out hazardous fuels to enhance future protection of human values and increase future opportunities to manage wildland fire on areas adjacent to human values needing protection.

Response: No changes were necessary.

Page 2-43, Figure 2-3: The fire management discussion for Alternative B (Page 2-41, 2.6.2.3) indicates the emphasis will shift away from suppression and landscape-scale prescribed burning to wildland fire use and fuels reduction treatments. However, the map for Alternative B appears to instead increase the area designated for the Full Fire Management Option, notably in the eastern portion of the Refuge south of the Alaska Highway (the current plan has the lands designated as Modified). Please address the apparent discrepancy in the final plan.

Response: It is our intent in Alternative B to increase emphasis on wildland fire use as a management tool to the extent practical, while providing appropriate protection for human safety and property. However, it was necessary to add the Full Management buffer to protect increased human residency and developments that have occurred along that stretch of the highway. Language was added in the final Plan to explain why additional lands along the Alaska Highway were included in the Full Management Option.

Page 2-48, 2.7.2.3, General Fire: Although referenced in Table 2-8, the narrative description of Alternative B does not specifically mention the fire dispatch system. It is unclear why the descriptions for the two alternatives are so different when Alternative C's narrative begins with "*As under Alternative B…*" implying they are the same. If there is in fact a difference between the two Alternatives, we request that be clarified in the final plan. Otherwise, we recommend the two sections read the same.

Response: We agree with your comment. However, Alternative C is not in this document.

Additionally, the fire terminology used in this section is incorrect. "Full Suppression Option", "Modified Suppression Option", and "Limited Suppression Option" should be changed to "Full Management Option", "Modified Management Option", and Limited Suppression Option" respectively, per the AIWFMP. These may need to be changed elsewhere in the document and we recommend conducting a word search.

Response: We agree with your comment. However, Alternative C is not in this document.

Page 2-51, 2.7.2.3 (cont.), first full paragraph on the page: Alternatives A and B are feasible under current Division of Forestry staffing levels; however, the State would need to increase its staffing and available funding for the area to accommodate Alternative C. This would constitute a change between Alternatives B and C, which should be clarified in this paragraph. Regarding cooperation, we look forward to working with the Service on increasing suppression capabilities and response times in the context of the Fire Management Plan revision.

Response: The draft Plan indicates that Alternative C would require an increase in fire suppression resources to accommodate the increased application of the Full Management Option. We agree that maintenance of fire suppression capabilities commensurate with these changes would require increased funding and staffing for the State Division of Forestry as well. However, Alternative C is not in this document.

State Lands and Waters within the Refuge

Page 4-2, Table 4-1: We understand that estimating acreage for submerged lands is complex, and appreciate their inclusion in the table. If this figure is retained in the final plan, or used in subsequent step-down plans, we request the following language be added to the footnote:

> *The State of Alaska received title to the beds of navigable waters at statehood, which may affect some or all of the submerged lands acreage. Any lake smaller than 50 acres which is part of a navigable system, may have transferred to the State of Alaska under the Equal Footing Doctrine.*

Response: The following statement has been added as a footnote to Table 4-1: "Navigability, for purposes of establishing land title ownership (as defined by Federal case law criteria), determines who owns the submerged lands beneath waterbodies of Tetlin Refuge. If navigable, the State owns the submerged lands. If non-navigable, the adjacent upland owner (e.g., the United States, an individual, or a village corporation) owns the submerged lands."

Page 4-2, 4.1.1, first full paragraph on page: The Submerged Lands Act of 1953 is another fundamental piece of legislation affecting land ownership within the Refuge. Please include this reference in the final plan.

Response: The Submerged Lands Act of 1953 has been added as requested.

Page 4-2, 4.1.1, last paragraph on page and Figure 4-1: The State of Alaska received title to the submerged lands under navigable waters at statehood. Within the Tetlin Refuge these have not been specifically identified and may include some, or all of the acreage listed under the Submerged Lands category of Table 4-1, and may also include some of the acreage of water bodies smaller than 50 acres if any are an integral part of a navigable system. We recognize that the plan identifies title as a time-specific estimate (September 2005 for Table 4-1 and May 2007 for Figure 4-1); however, the section does not include language that identifies these essential land status considerations. We request that the final plan clarify these points.

Response: The following language has been added to the paragraph: Ownership of the majority of submerged lands within the external boundaries of Tetlin Refuge is unresolved. Disputed ownership of submerged lands is resolved through Federal administrative actions of the Bureau of Land Management, or through judicial rulings of Federal courts. Two current examples of disputed submerged land ownership and navigability regard upper reaches of the Chisana and Nabesna rivers within the Refuge.

Page B-2, 1.2, first paragraph, fourth sentence: If retained in the final plan, we request the following revision to this sentence: "*The State owns approximately 46,000* ***upland*** *acres within the Tetlin Refuge boundaries,* ***has*** *selected an additional 750 acres,* ***and owns an as yet undetermined quantity of the submerged land acreage***." These revisions are significant in light of the remainder of the paragraph that also addresses navigable waters and state-ownership of submerged lands.

Response: We have revised the text as requested.

Appendix D: We request the following changes to the first sentence in the second paragraph under RS2477 Rights-of-Way:

> *The State of Alaska has* ***currently*** *identified seven specific routes (see Table D-1) that it believes may be claimed on Tetlin Refuge under Revised Statute 2477* ***(AS 19.30.400)***.

We also recommend including a clarification about the technical term "*highway*" since it is at least as likely that any given RS 2477 route would be developed by the State as a trail instead of a road. Specifically, we request inclusion of the following sentence that BLM uses in its plans when discussing RS 2477 rights-of-way: "'*Highways' under state law include roads, trails, paths and other common routes open to the public.*" We recently recommended an approach to address RS 2477 rights-of-way for all CCPs.

Response: Not all of these requested changes have been made. However, the discussion of RS 2477 rights-of-way was revised consistent with Regional Office direction following consultation with the State.

Page D-2, Table D-1 and Figure D-1: Our records indicate the mileage totals for the routes listed in the table are as follows:

RST 321: ~59 miles

RST 374: ~45 miles (The initial portion of this route duplicates RST #439)

RST 1586: ~5 miles

RST 1588: ~32.04 miles (same)

RST 1589: ~9 miles

RST 1590: ~4.5 miles

RST 1591: ~1.5 miles

RS 2477 route lengths are estimates since very few throughout the State have been surveyed. Unless a route has been surveyed and adjudicated, we request these figures be listed as approximations.

Response: The Service does not dispute the route lengths identified by the State of Alaska and recognizes that these lengths are estimates. However, the estimated lengths presented by the Service in Table D-1 represent only that portion of each route that is within the external boundaries of Tetlin Refuge. These figures were taken from Figure 2: Proposed RS-2477 "highways" as presented in the *Land Protection Plan for Tetlin National Wildlife Refuge* (USFWS 2001a). The title of Table D-1 has been changed to reflect this fact (Table D-1. Estimated mileage of State-claimed RS 2477 routes within the boundaries of Tetlin Refuge).

We also request Figure D-1 include RST 1589, "Paradise Hill-Cabin." Our files indicate this route is located in the Nabesna D-1 Quadrangle; originating off the Alaska Highway 1 mile south of Paradise Hill, running east 1.5 miles, and then northeast 7.5 miles before terminating at a cabin on an unnamed lake. A map of all area routes is available and can be provided upon request.

Response: RST 1589 has been added to Figure D-1 as requested.

Page D-3, Figure D-1: EIN 105 is not on the map. Our files show that the easement is scheduled to be included when the land goes to patent. USGS Quad maps (Tanacross A-3) also show an easement 2 C5, in Section 36, Township 16N, Range 17E, and Section 6, Township 15N, Range 16E. We understand this easement may no longer be on Native selected land, which would explain why it is not included. However, if that is not the case, we request it be added to the map.

Response: Both EIN 105 C6 D1 D9 and EIN 2 C5 have been added to Figure D-1. A description of EIN 2 C5 has been added to the list of 17(b) easements in appendix D.

Compatibility Determinations

Page E-4 Commercial Air Transporters, Stipulations Necessary to Ensure Compatibility, #14; and Page E-13 Commercial Hunting (Guiding and Outfitting), Stipulations Necessary to Ensure Compatibility, #26:

Stipulations that "prohibit" an activity are typically supported by statute or Service regulations. However, in this instance there are exceptions built into 43 CFR 36.11(f)(4) that would make it possible to authorize helicopters on a case-by-case basis, as appropriate. We recommend this stipulation be changed as follows: "*Helicopter landings are not authorized by this permit.*"

Response: The Service's regional special use permit conditions are being reviewed in a separate process. Your comments have been forwarded to those working on this task. Comments on regional special use permit conditions are not addressed here. The special use permit conditions are displayed in compatibility determinations for activities that require permits as examples only. Special conditions appear on the permit when it is issued.

Page E-8, third full paragraph on page, first sentence: Commercial operators, such as air taxis, hunting and fishing guides, who utilize state lands within the Refuge, including shorelands and waters, are also required to register with the Department of Natural Resources (11AAC 96.018 and 96.250). We understand that this is not a necessary component from a refuge management perspective, but request that it be included when other state requirements are described.

Response: We added the language as requested.

E-10, Commercial Hunting Services CD, fourth full paragraph, last sentence: Contrary to this statement, according to 50 CFR 36.33(e), commercial cabins are allowed by special use permit, except in designated Wilderness.

Response: While commercial uses of existing cabins may be permitted, refuge regulations at 50 CFR 36.33(d) state that, "In general, **new** cabin permits will be given only to local residents to pursue a legitimate subsistence activity." We revised the statement of concern to the State to more closely reflect the regulatory language.

Page E-17, Stipulations Necessary to Ensure Compatibility, third paragraph, second sentence: As a result of overlapping jurisdictional authorities, we expect this decision will be made in cooperation with ADF&G.

Response: No changes are necessary. We would coordinate with the ADF&G before any final decision to terminate the Hidden Lake fish stocking program is made.

Page E-22, Description of Use, second paragraph, second sentence;
Page E-23, Stipulations Necessary to Ensure Compatibility, first paragraph, second sentence;
Page E-38, Description of Use, second full paragraph on page, second sentence;
Page E-39, Description of Use, first paragraph on page, last sentence:
We request that "*sport*" not be used to describe general hunting. This term is no longer used in ADF&G regulations and has developed a negative connotation over time. (Use of the term sport fishing, however, is not problematic.)

Response: We revised the language to eliminate all references to "sport hunting."

Page E-23, Description of Use, second paragraph on page, first sentence: We recommend the Refuge avoid using the term "*significant*," particularly in this instance. The term has legal implications in the context of this document that have not been thoroughly analyzed. We suggest the final determination include the following change, or similar: "*Impacts to resources would…*"

Response: We substituted "*substantial*" for "*significant.*" Regardless of terminology used, substantial impacts from ORV use are well documented and apparent in many areas where they are commonly used.

Page E-29, Stipulations Necessary to Ensure Compatibility, #7: Considering that this determination encompasses research performed on archaeological and cultural resources, we question the definitive nature of this stipulation. We suggest the Refuge consider adding "*…unless specifically authorized in this permit.*"

Response: The Service's regional special use permit conditions are being reviewed in a separate process. Your comments have been forwarded to those working on this task. Comments on regional special use permit conditions are not addressed here. The compatibility determinations display special use permit conditions that have typically been included for activities that require permits. Special conditions appear on the permit when it is issued. Permit conditions may need to be modified for applicability to the specific activity being permitted.

E-37 to E-42, Compatibility Determination for Subsistence Uses: The second full paragraph on page E-38 contains an incomplete and not entirely accurate description of how subsistence hunting and fishing are regulated on the Refuge. We recommend replacing the second, third, and fourth sentences with the following:

> *Subsistence hunting and fishing activities are managed by state and federal regulations. State regulations apply on refuge lands unless superseded by federal subsistence regulations. The federal regulations generally offer qualified subsistence users longer and more liberal seasons, bag limits, and methods and means of harvesting resources than those allowed in the state regulations. Eligibility to harvest resources on the Refuge for subsistence uses under the federal regulations is determined by the Federal Subsistence Board and the Alaska Migratory Bird Co-management Council on a geographical or community basis, rather than an individual basis. All residents of rural communities or areas that have been determined to have a history of customary and traditional use of fish and wildlife resources in the Refuge are eligible to participate in subsistence uses of those resources on the Refuge under the federal regulations….*

Response: We revised the compatibility determination to incorporate the recommended language.

Page E-44, Description of Use, third paragraph on page: Trapping is a public use that is not classified under federal or state law as commercial, subsistence, or recreational. It is simply "trapping."

Response: No changes were made. In deference to the State's position, we have tried to avoid the classification or distinction of trapping as a commercial, subsistence, or recreational activity and recognize the inherent difficulties in doing so. However, ANILCA and applicable Federal regulations and policies regarding subsistence use priorities and cabins sometimes require that we distinguish or classify trapping into one of the use categories. For example, we can not permit use of private cabins for recreational trapping.

General - Stipulations Necessary to Ensure Compatibility

We request the Refuge consider using the phrases "*not allowed*" or "*not authorized*" in place of "*prohibited*", where appropriate. Stating that a prohibition exists may imply that there are regulations in place that make all forms of these activities or facilities illegal, which is not always the case.

Regional Stipulations Necessary to Ensure Compatibility

We understand the following two compatibility stipulations (bullets) are also regional permit conditions. We have brought them and others to the attention of the Region to address in a region-wide review of permit stipulations. We provide our comments concerning these stipulations here for your information within the context of this review.

Page E-11, Stipulations Necessary to Ensure Compatibility, #7:

- *"The permittee shall notify the refuge manager during refuge working hours in person or by telephone before beginning and upon completion of annual activities allowed by this permit."*

It may be useful to incorporate a more specific timeframe in which notifications must occur.

Page E-12, Stipulations Necessary to Ensure Compatibility, #15, and
Page E-30, Stipulations Necessary to Ensure Compatibility, #10:

- "*Use of off road vehicles (except snowmachines) is prohibited except in designated areas.*"

50 CFR 36.2 specifically excludes snowmachines from the definition of ORVs. Including "*except snowmachines*" in this stipulation inaccurately implies snowmachines are ORVs. We request the phrase in parentheses be removed and if necessary, snowmachine use be addressed by separate stipulation(s).

Response: The Service's regional special use permit conditions are being reviewed in a separate process. Your comments have been forwarded to those working on this task. Comments on regional special use permit conditions are not addressed here. The special use permit conditions are displayed in compatibility determinations for activities that require permits as examples only. Special conditions appear on the permit when it is issued.

Additional Page-Specific Comments

Page1-6, 1.3.3, second paragraph, second sentence: We request this sentence include reference to the Boards of Fisheries and Game as additional bodies that govern regulations related to harvest in the Refuge.

Response: This text no longer appears in this document. Reference to the State Boards of Fisheries and Game was already included in appendix B, though some additional text has been added.

Page 1-6, 1.3.3, second paragraph, last sentence: Because management objectives encompass more than just "big game" we request that "wildlife" be used in place of "big game."

Response: This text no longer appears in this document. A similar statement in appendix B was revised as recommended.

Page 1-10, 1.6.3, entire paragraph: The word "rare" is sometimes confused with endangered or threatened species. Since the species referenced in this paragraph are not listed as such, we recommend replacing "rare" with "uncommon." This comment is also applicable to 4.2.7, first paragraph, second sentence.

Response: No changes were made. "Rare" is a commonly used term in bird checklists throughout the world to describe local abundance of species and is not the same as "uncommon" (or endangered). Both "uncommon" and "rare" are used (and explicitly defined) in the Tetlin Refuge Bird Checklist. See section 1.5.3 in this document.

Page 2-1, 2.1, Vision, Goals and Objectives: We request the following paragraph from the Kanuti NWR Draft Revised CCP, page 2-27, 2.9 Refuge Goals and Objectives also be inserted here.

> *"Cooperation with State and Federal agencies and other organizations is a critical component to successfully meeting most of the objectives listed below. This cooperation can take a variety of forms, ranging from reviewing and revising study plans and reports to cooperating on data collection and report completion."*

Response: We added the language recommended by the State.

Page 2-2, A.4, Objective: We recommend using "important" rather than "critical" to describe moose habitat.

Response: We substituted language as recommended.

Page 2-3, A.7, Rationale: Since bears roam in and out of the Refuge we recommend replacing the first sentence as follows: *"Additional information is needed concerning area bear populations that utilize the Refuge."* This comment is also applicable to Objective A.8 concerning furbearers. Objective A.17, which addresses Dall sheep populations, provides a good description of a wildlife population that resides within several different land management units and is managed under differing authorities.

Response: We made minor edits to the rationale in Objectives A.7 and A.8 to more clearly reflect general recognition that the bear and furbearer populations roam in and out of the Refuge.

Page 2-8, B.9 Rationale: We encourage the Refuge to update relevant literature prior to any planning and implementation of the proposed study. The references used to describe this objective are significantly dated. Major changes in both study methodology and vehicle technology separate snowmachine use in the 1970s from that which occurs today. We also request this section note that current snowmachine use is not believed to be substantial enough to cause significant impacts. In addition, the rationale refers to "critical" habitat. Unless critical habitat has been identified pursuant to the Endangered Species Act, we request replacing the term "critical" with "important."

Response: Our literature review did not find any studies more current than what was cited in this section. It is premature and unnecessary to speculate that current snowmachine use is not substantial enough to cause significant damage. However, we changed the word "critical" was changed to other appropriate terms (e.g., crucial, important, sensitive) throughout the Plan to avoid any misconceptions that may result from its association with the Endangered Species Act.

Page 2-15, F.4, Rationale: In recognition of differing management authorities over habitat and wildlife, we request *"and others responsible for management of habitat and wildlife"* be added following *"the Refuge"* in the last sentence.

Response: Revisions to the last sentence were made as recommended.

Page 2-17, G.4, Objective: We suggest clarifying that this objective concerns a valid household survey.

Response: No changes were made. Although a household survey may be the most likely approach, the existing language leaves open the potential to consider other approaches.

Page 2-18, H.4, Rationale: The fifth sentence refers to *"non-renewable resource extraction."* The objective needs to clarify whether any extraction is occurring on the Refuge at the present time. If not, we request the sentence be modified with *"could include"* to clarify that the sources noted are examples.

Response: We modified the statement as recommended.

Page 2-27, 2.3.2: Consistent with the Record of Decision for the 1987 Tetlin CCP, as well as the approach taken in other CCPs currently under revision, we request this section clarify that no lands were recommended for designation during the previous wilderness review.

Response: This section does not appear in this final Plan. We added to section 4.4: Other Special Features clarify that no refuge lands were recommended for Wilderness designation during development of the original Plan in 1987.

Page 2-41, 2.6.2.2: We concur with and encourage Plan direction to modify the Chisana River boat launch in order to assure reliable access for boaters.
Page 3-30, Sand, Gravel, and Other Common Variety (Saleable) Minerals, last sentence: Contrary to Regional Management Policies and Guidelines, this use is not allowed in Moderate management, however, no explanation has been provided in this chapter or elsewhere in the plan. Please include rationale for this refuge-specific variation in the final plan.

Response: Tetlin Refuge limits these activities to lands within the Intensive Management category because the Refuge has lands within this category. Many other Alaskan refuges do not. Activities requiring these materials are likely associated with roads; roads are within or adjacent to the Intensive Management areas.

Page 3-41, Off-Road Vehicles (All-Terrain Vehicles): While taking into account the relevant justification provided in the narrative (3.2.11.2), stating that airboats and air cushion vehicles are *"not allowed"* is not entirely consistent with 43 CFR 36.11(g), which allows ORVs on designated routes and areas or by special use permit. We understand that the Refuge has chosen not to designate areas on the Tetlin Refuge for these vehicles, however, that is still consistent with standard direction in the Regional Management Policies and Guidelines Table, which states: *"may be allowed, consistent with section 3.2.11.2*." We request the standard language be reinstated or, alternatively, replaced with the following: *"May be allowed; no routes will be designated for airboats or air cushion vehicles"* or *"May be allowed; consistent with section 3.2.11.2."*

Response: No changes were made. The definition of ORVs includes airboats and air cushion vehicles. Regulations at 43 CFR 36.11 do not obligate the Refuge to allow ORV use. They prohibit the use of ORVs on refuge lands for recreational purposes, except on established roads, parking areas, and routes designated by the agency, or by special use permit.

Page 4-43, 4.3.8.1, first paragraph, first sentence: We recommend the final plan recognize that the Tetlin Refuge opted to use the term *"recreational"* when describing users who are not federally qualified subsistence users, even though their activities may not be what is commonly accepted as "recreation." Since the State considers all Alaska residents may potentially qualify for specific subsistence hunts, the term becomes particularly problematic when the discussion continues on page 4-44 and describes hunters from *"Fairbanks and Anchorage"* as recreational hunters. If possible, please revise this discussion to avoid confusion. If it becomes too difficult to address this comment in this context, at a minimum we request a clarification that not all non-federally qualified subsistence hunters are in fact engaged solely in "recreation." This comment also applies to 4.3.8.2 on page 4-44 and all other such references throughout the plan.

Response: No changes were made. The term "recreational hunting" was applied to all hunting other than that done by federally qualified subsistence hunters to be consistent with Federal laws and policies that establish hunting as one of the priority wildlife-dependent recreational uses of the National Wildlife Refuge System. The State's view that all Alaska residents may potentially qualify for subsistence hunts is not consistent with Federal laws and regulations that restrict subsistence hunting to rural residents of communities that have a customary and traditional use of the resource. We feel it would be confusing and unnecessary to attempt to explain or redefine recreational hunting.

Page 4-43, 4.3.8.1, third paragraph, first sentence: To clarify the calculation of the harvest of moose in the area, we request that the sentence be extended to note, *"…is unknown because the Refuge does not constitute a unique management area for record keeping purposes as tracked by ADF&G."*

Response: We revised the text as recommended.

Page 4-46, 4.3.9.1, second sentence: Please add the following to the beginning of the second sentence: *"Trapping is a public use that is not classified as commercial, subsistence or recreation, however..."*

Response: No changes were made. We recognize some inherent difficulties in determining whether trapping in Alaska should be classified as a commercial, subsistence, or recreational activity. However, Federal requirements for subsistence use priorities and ANILCA provisions and Service regulations regarding cabins may require that we classify trapping into one of the categories. We addressed it in this section as an economic use.

Page 4-48, Outstanding Opportunities for a Primitive and Unconfined Type of Recreation: The first sentence implies that motorized activity is, or should be, prohibited in designated wilderness. We recognize this is not the Service's intent. Since similar language appears in most CCPs, we are working with the regional planning staff to refine this section and suggest the following revision:

> *Primitive and unconfined recreation occurs in an undeveloped setting and is relatively free from social or managerial controls. Primitive recreation is characterized by experiential dimensions such as challenge, risk, and self-reliance, and includes*

opportunities for non-motorized, non-mechanized travel. Dispersed use patterns, which frequently occur where there are no facilities to concentrate use, enhance opportunities for self-reliance and also enhance opportunities for solitude….

Response: ANILCA clearly states that "The terms 'wilderness' and 'National Wilderness Preservation System' have the same meaning as when used in the Wilderness Act" (section 102). The meaning of "primitive recreation" is clear in the history and purposes of the Wilderness Act, and in the Act's explicit general prohibition on the use of motor vehicles and motorized equipment. ANILCA allows for continued use of specific types of motor vehicles for traditional activities and motorized surface transportation traditionally used for subsistence. The Wilderness Act allows continued use of aircraft and motorboats in Wilderness areas where those uses had previously become established. However, these provisions do not change the meaning of primitive recreation provided in the Wilderness Act for the purposes of describing wilderness values.

Page 4-48, Other Special Features, second paragraph, last sentence, and 4.4.1, first sentence: Consistent with the Record of Decision for the 1987 Tetlin CCP, we request language be included or referenced that clarifies that these units were not recommended for designation in the previous wilderness review for not meeting the criteria for "outstanding wilderness values." Although these statements are correct, the reader may not have access to the existing management plan and may be confused as to why these units are not designated or proposed for designation.

Response: Language has been included in Other Special Features as requested that states that no lands on the Refuge were recommended for designation as Wilderness in the 1987 Conservation Plan.

Page 5-2, third bulleted list and page 5-17, 5.2.3.3, second paragraph, third sentence: See above comments for page 4-43, 4.3.8.1 regarding the qualifier "recreational."

Response: Neither section 5.2.3.3 nor the referenced bulleted list appear in the final Plan.

Page 5-27, 5.4.1.7, Mammal Populations, first paragraph: We request that the paragraph also note that in high snowfall years compacted snowmachine trails can facilitate the ability of moose to move into additional browse areas.

Response: Section 5.4.1.7 does not appear in the final Plan.

Page 5-34, 5.4.2.7, Cumulative Effects: first paragraph, third sentence: We request that the adverse impacts be changed from *"substantial"* to *"moderate to major"* site specific long term impacts but regionally *"minor."* "Substantial" is not defined and impacts will be greater at the local level but minor refuge-wide.

Response: Section 5.4.2.7 does not appear in the final Plan.

Thank you for the opportunity to comment. Please contact me if you have any questions.

Sincerely,

/ss/
Susan E. Magee
ANILCA Project Coordinator

cc: Sally Gibert, ANILCA Program Coordinator

Appendix K

Finding of No Significant Impact
for the Revised Comprehensive Conservation Plan
for Tetlin National Wildlife Refuge

U. S. Department of the Interior
Fish and Wildlife Service
Region 7, Alaska

FINDING OF NO SIGNIFICANT IMPACT

Revised Comprehensive Conservation Plan
Tetlin National Wildlife Refuge, Alaska

The U.S. Fish and Wildlife Service (Service) has completed the Revised Comprehensive Conservation Plan (Plan) for the Tetlin National Wildlife Refuge. The draft revised plan and Environmental Assessment (EA) (herein incorporated by reference) describe the three alternatives for managing the Refuge and associated effects on the human environment. No changes in the preferred alternative, Alternative B, were made in response to public comments. Alternative B was selected for implementation.

Alternatives Considered

The Alaska National Interest Lands Conservation Act requires the Service to designate areas according to their respective resources and values and to specify programs and uses within the areas designated. To meet this requirement, the Alaska Region established management categories for the refuges including Wilderness; Minimal, Moderate, Intensive, and Wild River management. Appropriate activities, public uses, commercial uses, and facilities are identified for each management category. Only Minimal, Moderate, and Intensive management are applied to Tetlin Refuge.

Three alternatives were considered in the environmental assessment. Alternative A, the no-action alternative, would continue current management. Alternative B (preferred alternative) would include additional opportunities to enhance access to and public use of Tetlin Refuge while placing more emphasis on use of natural processes (e.g. wildfire) to protect refuge resources and maintain long-term ecological health. Fisheries would be managed to maintain natural diversity in the region; any additional reintroductions would be based on historic distribution of fish. Alternative C would further expand and upgrade access and public use opportunities on the Refuge, would rely on fire management (suppression) as the primary tool to protect resources and property throughout the Refuge. Fisheries management would be the same as under Alternative B. Under both alternatives B and C, management of the refuge would generally continue to follow the current course of action, but would include the vision statement, goals, and objectives developed for the refuge and would incorporate new regional management policies and guidelines. The distribution and amount of land in the Minimal, Moderate, and Intensive management is the same under all three alternatives.

Public Review

Public comments on the draft plan and EA were solicited from October 3, 2007 through January 18, 2008. During the public comment period meetings were held in Fairbanks, Northway, Tanacross, Tetlin, and Tok. We received a number of comments which supported

plans for additional recreational opportunities and facilities, additional access to the Refuge, and that all terrain vehicle use be restricted. Support was expressed for use of natural fire management regimes, restricted use of prescribed fire, and use of aggressive fire control only in or near intensive use areas and around private inholdings. Several comments were made regarding management of fish and wildlife populations–related specifically to invasive species, non-native species, predator control, and trophy fisheries.

Revisions from Draft Plan

No revisions to Alternative B, the preferred alternative, were made as a result of the public comments on the Draft Revised Tetlin Plan.

Alternative B, the preferred alternative, provides a realistic balance between public use of the Refuge and the conservation needs of the Refuge. Alternative B best accomplishes refuge purposes, best helps achieve the missions of the National Wildlife Refuge System and the Service, and best meets the vision and goals identified in the plan. It provides long-term protection of fish and wildlife populations and their habitats while allowing for appropriate levels of fish and wildlife-dependent recreation, interpretation and environmental education, subsistence, and other public uses.

Analysis of Impacts

The EA analyzed direct, indirect, and cumulative impacts on refuge resources of fish and wildlife and on subsistence and wildlife dependent recreation, refuge facilities, cultural resources, the refuge environment, and the refuge communities. No significant effects were identified in the analysis.

Conclusions

Based on review and evaluation of the information contained in the EA and revised plan, I have determined that there will be no significant individual or cumulative impacts to the human environment, within the meaning of section 102(2)(c) of the National Environmental Policy Act of 1969, as amended. I have determined that the activities prescribed in this plan are not major Federal actions. Accordingly, the Service is not required to prepare an environmental impact statement.

Thomas O. Melius
Regional Director

July 24, 2008
Date