National Park Service
U.S. Department of the Interior

Wrangell-Saint Elias National Park and Preserve
Alaska

Established and Maintainable Access to Inholdings Programmatic Plan and Environmental Assessment

November 2007

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Prepared by:
United States Department of the Interior
National Park Service
Wrangell-Saint Elias National Park and Preserve & Alaska Regional Office

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Glossary and Acronyms

DEFINITIONS

Acceptable:
An access facility with a durable, functional tread surface that minimizes environmental impacts and creates no new impacts outside the disturbance footprint.

Alluvium:
Unconsolidated material clay, silt, sand and/or gravel deposited by a running water.

Anadromous:
Fish that hatch or rear in fresh water, migrate to the ocean (salt water) to grow and mature, and migrate back to fresh water to spawn and reproduce.

Benthic:
Living in or on the bottom of a body of water.

Calcareous:
Said of a substance that contains calcium carbonate or lime.

Colluvium:
Rock detritus and soil accumulated at the foot of a slope.

Established:
An existing settled or fixed access facility with a stable footprint and recognized methods and means of use.

Lacustrine:
Pertaining to, produced by, or formed in a lake.

Loess:
Wind blown and deposited clay, silt, and/or sand.

Maintainable:
A facility that may not meet "design-sustainable" criteria, but with appropriate and cost effective maintenance can support a managed level of use without unacceptable environmental degradation or a decrease in travel surface utility.

Macroinvertebrates:
Animals without backbones that are big enough to see with the naked eye. Examples include most aquatic insects, snails, and crayfish.

Nephelometric turbidity unit:
A measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Permafrost:
Permanently frozen ground (subsoil), which may be continuous in more northern areas or discontinuous in more southerly areas.

Piedmont:
Formed at the base of mountains

Solifluction:
The slow movement of soil down slope, downward flow of waterlogged soil and other material.

Spate:
A sudden flood, rush, or outpouring.

Taxa:
A grouping of organisms given a formal taxonomic name such as species, genus, family, etc.

Till:
Unsorted and unstratified (not layered) glacial deposits

Thermokarst:
Settling or caving of the ground due to melting of ground ice or permafrost.

Unsustainable/Un-maintainable:
A facility that does not meet "design-sustainable" criteria and cannot be maintained or its impacts mitigated without a significant unacceptable investment in resources, be they fiscal, physical, biological, cultural, or human.

µS/cm:
Conductivity in milliseconds per centimeter.

ABBREVIATIONS

AAC	Alaska Administrative Code
ARC	Alaska Railroad Commission
ANCSA	Alaska Native Claims Settlement Act of 1971
ADEC	Alaska Department of Environmental Conservation
ADOT	Alaska Department of Transportation
ADOT&PF	Alaska Department of Transportation & Public Facilities

APHA	American Public Health Administration
AKEPIC	Alaska Exotic Plant Information Clearinghouse
AKNHP	Alaska Natural History Program
ANILCA	Alaska National Interest Lands Conservation Act of 1980
ATV	all terrain vehicle
BLM	Bureau of Land Management
CFR	code of federal regulations
CR&NW	Copper River & Northwestern Railway
DOC	dissolved organic carbon
EA	environmental assessment
EIS	environmental impact statement
EPA	Environmental Protection Agency
EPMT	exotic plant management team
FONSI	finding of no significant impacts
GMP	general management plan
LWD	large woody debris
NEPA	National Environmental Policy Act of 1969
NHL	National Historic Landmark
NPS	National Park Service
NP/P	National Park and Preserve
NWI	National Wetlands Inventory
OHV	off-highway vehicle
ORV	off-road vehicle

PEPC	planning environment – public comment
P.L.	public law
ROW	rights-of-way
RWCA	ANILCA 1110(b) right of way certificate of access
SHPO	State Historic Preservation Office
TAH	total aromatic hydrocarbons
TAqH	total aqueous hydrocarbons
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WRST	Wrangell-Saint Elias National Park and Preserve
4WD	four-wheel drive

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CHAPTER 1: PURPOSE & NEED

1.1 Purpose

The National Park Service (NPS) is considering issuing right of way certificates of access (RWCA) to persons with established and maintainable access to land holdings within or effectively surrounded by Wrangell-St. Elias National Park and Preserve (WRST). Access to State or privately-owned land in Alaska national parks is governed by the Alaska National Interest Lands Conservation Act (ANILCA) Section 1110(b), which provides: "Notwithstanding any other provisions of this Act or other law, ... the State or private owner or occupier shall be given by the Secretary such rights as may be necessary to assure adequate and feasible access for economic or other purposes." The proposed RWCAs assure the inholders access rights, not property rights. Procedures to provide access to inholdings within conservation system units (WRST in this case), are set forth in 43 CFR 36.10. The regulation at 43 CFR 36.10(b) states:

> It is the purpose of this section to ensure adequate and feasible access across areas for any person who has a valid inholding. A right-of-way permit for access to an inholding pursuant to this section is required only when this part does not provide for adequate and feasible access without a right-of-way permit.

The purpose of this program is to authorize access to inholdings under Section 1110(b) of ANILCA for established and maintainable routes and methods of access. This programmatic environmental assessment (EA) evaluates the environmental effects on the resources and values of WRST of issuing rights of way certificates of access for the subject access facilities. Established and maintainable routes and methods of access considered in this programmatic plan and EA are those that currently exist, have not resulted in unacceptable impacts to park resources and values, and can be maintained in their present condition and character and essentially within their existing footprints. Established access facilities include roads, off-road vehicle (ORV) trails, airstrips, and waterlines. These access facilities have been grouped into five classes (described in chapter 2), including well-constructed gravel surfaces, bladed surfaces, brushed and evident tracks or trails, barren routes, and waterlines with associated paths. The program establishes criteria by which to determine whether the existing access facilities, in their current conditions and methods of use, have acceptable impacts on park resources and values.

The NPS developed the scope of this plan over the past several years. During this time the NPS inventoried many of the existing access facilities on park lands, including gathering information such as centerline coordinates, measurements of widths, lengths, photographs, characterizing surface materials, and a broad brush assessment of environmental conditions, including wetlands, stream crossings, braiding, presence of cultural resources, vegetation, and other conditions. Concurrently, the NPS initiated development of an Access Users' Guide (Interim User's Guide to Accessing Inholdings in National Park System Units in Alaska [USNPS 2007]) to assist the public with

securing access across park public lands under Title XI of ANILCA. This project resulted in numerous public meetings across the State of Alaska, especially in communities around WRST. The NPS inventory has documented several established and maintainable facilities that provide adequate and feasible access to private lands. The NPS proposes to issue RWCAs for these facilities pursuant to ANILCA access regulations for access to inholdings and the Access Users Guide.

Examples of access *not* requiring a RWCAs include special access allowed under ANILCA 1110(a) for traditional activities and for travel to and from villages and homesites. Special access methods are regulated by 43 CFR 36.11, which allows for the use of snowmachines (during periods of adequate snow cover and frozen river conditions), motorboats, nonmotorized surface transportation (such as dog teams), fixed-wing aircraft and off-road vehicle use (on designated routes and areas). Some State or privately owned properties in WRST have access immediately from a State of Alaska Highway or other ROWs, and no access across park lands is used or needed.

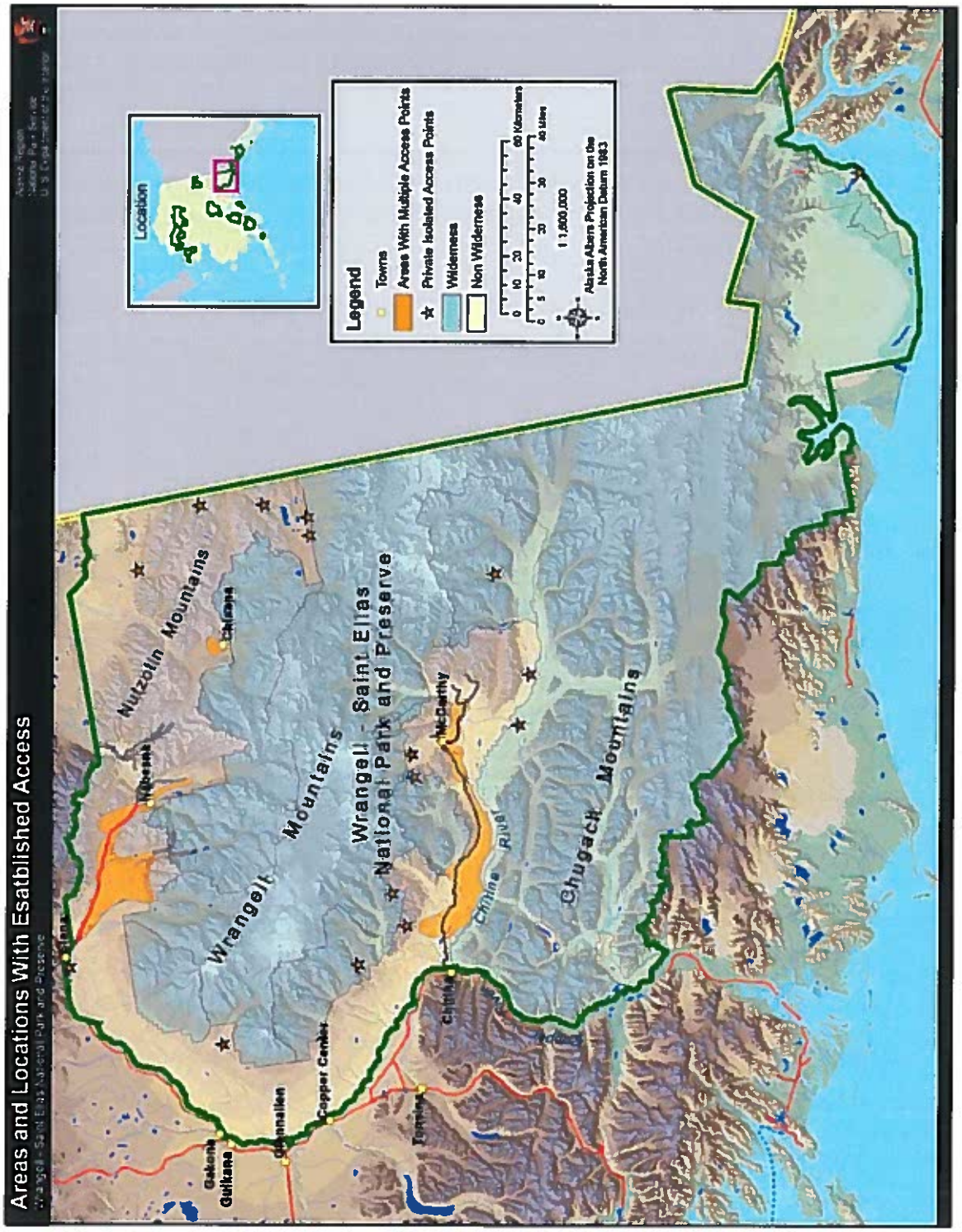
This environmental assessment (EA) analyzes the potential environmental impacts which could result from the alternatives considered, including the No-Action alternative. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, regulations of the Council of Environmental Quality (CEQ) (40 Code of Federal Regulations 1508.9), and the NPS NEPA compliance guidance handbook (Director's Order (DO)-12, *Conservation Planning, Environmental Impact Analysis, and Decision Making*)(NPS, 2001a).

1.2 Need

Numerous nonfederal lands exist within or are effectively surrounded by WRST. Some of the landowners or valid occupiers have well-established driveways, roads, or other facilities to these properties (Figure 1.1). The NPS inventory to date indicates that about 90 landowners currently use NPS lands to reach their inholdings. An estimated additional 40 landowners previously used or may need to use NPS lands in the future for access to their inholdings. Very few of these access facilities, however, have ROWs or other current authorization (e.g. special use permit) to cross public park lands.

RWCAs are needed to describe and document the access methods and means to provide access for the landowners or valid occupiers. Issuing RWCAs would also protect park resources and values by avoiding unacceptable impacts. In addition to determining what existing facilities meet technical criteria for acceptable impacts, there is a need to monitor approved facilities to ensure they are maintained in a condition that protects park resources and values and to ensure that impairment will not occur. This programmatic plan and EA articulate the approach WRST managers would follow to document maintainable facilities with acceptable environmental effects and authorize access to non-federal lands within or effectively surrounded by park lands, and to provide adequate and feasible access for economic and other purposes. By identifying the classes

Figure 1.1. Overview locations of existing access facilities in WRST addressed in the EA



of established and maintainable access facilities and conducting the requisite environmental compliance, qualifying applicants should be able to receive their ANILCA 1110(b) RWCAs more quickly. NEPA encourages consideration of similar actions in one document (40 CFR 1508.25 (a)(3)), and grouping established and maintainable access facilities in one EA is also more efficient for the NPS than preparing separate EAs for each application.

In addition to complying with ANILCA 1110(b), this plan and EA identifies for park managers those access facilities potentially qualifying as established and maintainable access facilities. Table 1.1 provides a summary of State and private access facilities across public park lands.

Table 1.1 Summary of Inholding Access Facilities in Wrangell-St. Elias NP&P.

		ESTIMATED[1]	ESTIMATED	
Established Access Activity	**Description & Comment**	**Number of Access Facilities[2]**	**Extent of NPS lands**	**Considered in this EA**
Active	**Potentially Maintainable.** Includes driveways, roads, ORV trails, airstrips, 4WD tracks, routes, parking areas, and waterlines.	60	35-50 acres	Yes[3]
Active	**Maintainability not Determined** NPS Administrative uses, fording of fish bearing streams, potential for park road designation	28	35-50 acres	No
Inactive	**Maintainability not Determined** May include driveways, roads, ORV trails, airstrips, 4WD tracks, routes, parking areas, and waterlines	39	Unknown	No
Inactive	Overland winter trails and routes	7	183 miles	No
Active & Inactive	No known established use of parklands. Access is generally over existing State or Federal easements.	92	Unknown	No
Unknown	Existing inholdings with unknown method of access.	25	Unknown	No

[1] Values in columns labeled "Estimated" are approximate.
[2] Some facilities may provide access for multiple inholdings and may require multiple RWCA's.
[3] This is the only group of inholdings addressed in this EA.

1.3 Background

1.3.1 Laws, Regulations, and Policies

1.3.1.1 ANILCA

Alaska National Interest Lands Conservation Act of 1980 (ANILCA) Section 201(9) established Wrangell-Saint Elias National Park and Preserve to:

> maintain unimpaired the scenic beauty and quality of mountain peaks, foothills, glacial systems, lakes, streams, valleys, and coastal landscapes in their natural state; to protect the habitat and populations of fish and wildlife including but not limited to caribou, brown/grizzly bears, Dall sheep, moose, wolves, trumpeter swans and other waterfowl, and marine mammals; and to provide continued opportunities, including reasonable access for mountain climbing, mountaineering, other wilderness activities. Subsistence uses by local rural residents shall be permitted in the park, where such uses are traditional.

ANILCA Section 701(8) established the Wrangell-Saint Elias Wilderness of approximately eight million seven hundred thousand acres.

ANILCA Section 1110(b) provides for special access and access to inholdings:

> Notwithstanding any other provisions of this Act or other law, in any case in which State owned or privately owned land, including subsurface rights of such owners underlying public lands, or valid mining claim or other valid occupancy is within or effectively surrounded by one or more conservation system units, national recreation areas, or those public lands designated as wilderness study, the State or private owner or occupier shall be given by the Secretary such rights as may be necessary to assure adequate and feasible access for economic and other purposes to the concerned land by such State or private owner, or occupier and their successors in interest. Such rights shall be subject to reasonable regulations issued by the Secretary to protect the natural and other values of such lands.

The Department of the Interior promulgated regulations for Title XI of ANILCA in 1986 at 43 CFR 36.10 "Access to Inholdings". The regulation defines inholdings and other pertinent terms for access to inholdings; identifies those needing a ROW, describes how to apply for a ROW, and describes how the agency makes decisions to issue ROWs. The pertinent regulation at Title 43 CFR 36.10(e)(1) states: "... the federal agency shall specify in a ROW permit the route(s) and method(s) across the area(s) desired by the applicant, unless it is determined that:

(i) The route or method of access would cause significant adverse impacts on natural or other values of the area and adequate and feasible access otherwise exists; or

(ii) The route or method of access would jeopardize public health and safety and adequate and feasible access otherwise exists; or

(iii) The route or method of access is inconsistent with the management plans for the area or purposes for which the area was established and adequate and feasible access otherwise exists; or

(iv) The method is unnecessary to accomplish the applicants land use objective."

1.3.1.2 NPS Authorities and Policies

The NPS Organic Act of 1916 and the General Authorities Act of 1970 prohibit impairment of park resources and values pursuant to the purposes for which each unit was established. The 2006 NPS Management Policies uses the terms "resources and values" to mean the full spectrum of tangible and intangible attributes for which the park is established and managed, including the Organic Act's fundamental purpose and any additional purposes as stated in the park's establishing legislation. The impairment of park resources and values may not be allowed unless directly and specifically provided by statute. The primary responsibility of the NPS is to ensure that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

The evaluation of whether impacts of a proposed action would lead to an impairment of park resources and values is included in this environmental assessment. Impairment is more likely when there are potential impacts to a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

NPS Management Policies 2006 (NPS 2006) call for park managers to avoid impacts that they determine are unacceptable. "These are impacts that fall short of impairment, but are still not acceptable within a particular park's environment (NPS 2006, 1.4.7.1). The NPS Management Policies 2006 (NPS 2006) also address rights of way for access to private property in section 8.6.5, through wilderness areas in section 6.4.8, and non-NPS roads in section 9.2.1.2. Furthermore, use of borrow material (e.g. sand and gravel) are addressed in section 9.1.3.3, which states, "Materials from borrow pits, quarries, and other clay, stone, gravel or sand sources on NPS lands, including submerged lands, will be extracted and used only 1) by the Park Service or its agents or contractors; 2) for in-park administrative uses; 3) after compliance with NEPA and the National Historic Preservation Act; 4) after compliance with other applicable federal, state, and local requirements."

1.3.2 Relationship of Proposal to Other Planning Projects

1.3.2.1 WRST GMP

The 1986 Wrangell-Saint Elias General Management Plan (GMP) addresses access to inholdings (pp. 16 and 18):

> Access is guaranteed to nonfederal land, subsurface rights, and valid mining claims, but any such access is subject to reasonable regulation to protect the values of the public lands that are crossed (ANILCA Sections 1110 and 1111). Existing regulations (43 CFR 36.10) govern access to inholdings. The use of ORVs for access to inholdings may be allowed under 43 CFR 36.10 by the superintendent on a case-by-case basis on designated routes. In determining what routes and restrictions should apply to the use of ORVs for access to inholdings, the superintendent will consider the potential for resource damage and user conflicts and the availability of alternate routes and methods of transportation. The use of ORVs for access to inholdings will only be allowed upon a finding that other traditional methods of access will not provide adequate and feasible access.
>
> The use of ORVs for subsistence purposes and access to inholdings within designated wilderness is permitted pursuant to sections 811 and 1110(b) of ANILCA.

1.3.2.2 Past and Future NEPA and Planning Efforts for Access within WRST

Twelve other NEPA documents have or are addressing access facilities in WRST. In most cases these analyses have resulted in the issuance of either short-term Special Use Permits or ANILCA 1110(b) access authorizations. These access authorizations generally address winter access trails, roads, mining plans of operation, and airstrips. A list of previous and ongoing access planning documents and decisions is provided in appendix A.

1.4 Issues

To focus the environmental assessment, the NPS selected specific issues for further analysis and eliminated others from evaluation.

The NPS conducted internal scoping sessions in 2006 to identify issues described below. The NPS has also engaged in lengthy consultation over the past two years with the State of Alaska, landowners, and the general public on access across NPS lands during development of an NPS Alaska Access User Guide (USNPS 2007). Access to inholdings in WRST has been a central part of this effort. Maintenance tools and methods for various access facility classes are briefly described in the alternatives chapter, and more detail is given in appendix B for each access class.

1.4.1 Issues Selected for Detailed Analysis

1.4.1.1 Aquatic Resources and Fish

The use and maintenance of established access routes and means near water bodies could disturb or attract aquatic organisms and fish, thereby altering their use of habitat and migration patterns.

1.4.1.2 Cultural Resources

The use and maintenance of established access routes and means could affect archeological or historical resources, particularly where ground disturbing activities might take place.

1.4.1.3 Inholder Property

The documentation of established inholder access routes and means could remove uncertainty regarding access to private lands, affect private property value, and enable landowners to achieve the intended uses of their lands.

1.4.1.4 Public Access and Recreational Use

The use and maintenance of established inholder access routes and means could result in increased public access to areas near or on private lands thereby leading to potential user conflicts or trespass issues. The use and maintenance of established access routes and means could affect natural sounds and visual quality enjoyed by park visitors in the affected areas of the park.

1.4.1.5 Soils

The use and maintenance of established inholder access routes and means could result in the operation of motorized equipment that affect adjacent soils and substrates.

1.4.1.6 Vegetation and Wetlands

The use and maintenance of established inholder access routes and means could result in the operation of motorized equipment that could affect adjacent vegetation, including the introduction of exotic plant species and effects on rare and candidate threatened species. The use and maintenance of established access routes and means could inhibit the natural flow of water through wetlands and small drainages, thereby altering wetlands values and functions.

1.4.1.7 Wilderness

The use and maintenance of established access routes and means could detract from wilderness character and the potential to designate future Wilderness in areas eligible for such designation.

1.4.2 Issues Dismissed From Detailed Analysis

1.4.2.1 Effects on Minority and Low-Income Populations

Executive Order 12898 requires federal agencies to incorporate environmental justice into their missions by identifying and addressing high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed access would not result in disproportionately high direct or indirect adverse effects on any minority or low-income population or community.

1.4.2.2 Subsistence

The use and maintenance of established inholder access routes and means would not result in a significant restriction of subsistence uses on federal public lands. Under the provisions of ANILCA (section 201(9) and title 8), local rural residents are authorized to engage in subsistence activities including hunting, fishing, and trapping in Wrangell-St. Elias National Park and Preserve. Most subsistence hunting within Wrangell-St. Elias occurs off the Nabesna and McCarthy roads and the trails that originate from them. This overlaps with the areas with multiple access points illustrated in Figure 1, however, neither of the alternatives addressed in this EA would significantly restrict subsistence uses. For additional information, see the ANILCA Section 810 Subsistence Evaluation in appendix C. See also 1.4.2.4 regarding wildlife populations and habitat.

1.4.2.3 Threatened and Endangered Species

No known threatened or endangered species are known to inhabit the established access routes and means in the park and preserve. The candidate species Kittlitz's murrelet may use habitat in the Malaspina Forelands area for breeding, but it is not expected continued use and maintenance of the established inholder access routes and means would have any effect on this species. NPS consultation with the U.S. Fish and Wildlife Service is contained in appendix D.

1.4.2.4 Wildlife and Habitat

The use and maintenance of established inholder access routes and means would result in negligible temporary disturbances to wildlife and its habitat. New effects to wildlife and its habitat are unlikely to be measurable or detectable.

1.5 Permits and Approvals Needed to Implement Project

1.5.1 Rights-of-Way

The NPS would issue ANILCA 1110(b) RWCAs to landowners whose access fits within the scope of the proposed program to authorize established and maintainable access. Each RWCA would include a map of the ROW use area and specific terms and conditions to protect park resources and values. See sections 2.3.1 and 2.3.3 for procedures to obtain ANILCA 1110(b) RWCAs and appendix E for an example RWCA with the necessary elements.

1.5.2 Clean Water Act Section 404 Permit

The inholder is responsible for obtaining any required permits from the U.S. Army Corps of Engineers (USACE). The use of nationwide permits (NWP) #3 for maintenance, # 12 for utility line activities, #14 for linear transportation corridors, or # 18 for minor discharges may be permitted by the USACE for actions that include minor filling of wetlands (see appendix F). Should any access facility result in 0.5 acres or more of fill into waters of the USA, including wetlands ultimately connecting to navigable waterways, a USACE Clean Water Act Section 404 Individual Permit would be required. For more information see USACE web page:
http://www.usace.army.mil/cw/cecwo/reg/nationwide_permits.htm

1.5.3 Clean Water Act Section 401 Certificate

The Alaska Department of Environmental Conservation (ADEC) would need to issue a Certificate of Reasonable Assurance pursuant to the Clean Water Act Section 401 for any access facility crossing a water body, which also triggers the USACE Section 404 review. See appendix G for ADEC water quality regulations.

1.5.4 Water Rights

Authorized access would be consistent with Alaska Department of Environmental Conservation 18 AAC 70 Water Quality Standards, amended as of December 28, 2006. For ADEC water quality standards, see appendix G. A RWCA for a waterline does not include the right to actually use the water. The inholder is responsible for securing applicable water rights from the Alaska Department of Natural Resources.

1.5.5 Alaska SHPO Approval

The State Historic Preservation Office (SHPO) must be given an opportunity to comment on the issuance of any RWCA that could adversely affect historic or archeological resources.

CHAPTER 2: DESCRIPTION of the ALTERNATIVES

This chapter includes a description of the no-action alternative (status-quo) and the NPS preferred alternative to issue 1110(b) right-of-way certificates of access (RWCAs) to inholders with established and maintainable access in the park, and with terms and conditions to maintain those facilities. It also includes mitigating measures, a summary comparison of the alternatives, and a summary of environmental consequences.

2.1 Elements Common to Both Alternatives

As a result of an NPS inventory of many of the existing inholder access facilities, these facilities were classified according to size, general method of use and vehicle class, and commonly used means to maintain them. These access classes, methods and means are common to both the no-action and action alternatives. Table 2.1 describes the estimated number of established and maintainable inholder access facilities, the total mileage, and areas by access class considered in this EA.

Access methods and means not considered in these alternatives include:

- requests for development of new access facilities;
- facilities requiring additional development beyond the existing character;
- facilities requiring rerouting or relocation;
- facilities where the surface cannot be maintained given available resources and technology;
- facilities that divert or manipulate active stream channels;
- those that would cause any new direct or indirect adverse impacts on wetlands outside the established footprint of the access facility;
- routes fording fish-bearing streams;
- facilities where operations could reduce current or future large woody debris for fish habitat;
- waterlines where withdrawal is in fish habitat;
- facilities to be designated as park roads;
- overland winter routes;
- access proposals in conjunction with mining plans of operations and oil and gas rights (addressed in 36 CFR Part 9, Subparts A & B).

2.1.1 Access Classes, Methods and Means

Inholders access their properties with a variety of vehicle types for economic and other purposes such as to their primary residence, for business, or for recreation. Established access facilities include driveways, roads, parking areas, off-road vehicle (ORV) trails, 4WD tracks, overland routes, airstrips and approaches, and waterlines. Currently only a few inholders have an NPS special use permit or other authorization to traverse parklands for access to their property (see section 1.3.2.2).

The access features range from well-constructed gravel facilities to unimproved ORV trails resulting from overland travel through a variety of terrains and waterlines with associated foot paths. In addition, there are bladed routes, 4WD tracks and trails, and airstrips. Some of these facilities do not appear to have any recent use, are overgrown, and/or are partially reclaimed by natural process. Some access to private and State lands involve a combination of the access classes described in chapter 3. For more detailed description of anticipated maintenance for the access classes see appendix B.

2.1.1.1 Class 1 - Gravel Driveways and Roads

Vehicle Class: Highway vehicles
Facilities widths are typically are 10 to 15 feet, but range from 8 to 30 feet. These facilities tend to be short and generally less than one mile. Heavy equipment was and is used to construct and maintain these access facilities. Common past construction and maintenance undertakings include grading and leveling, placing gravel and borrow, installing and replacing culverts, using corduroy, ditching, brushing, and snowplowing.

2.1.1.2. Class 2 - Constructed Roads, Airstrips, 4WD Tracks, Parking Areas, and Trails with Limited Amounts of Added Gravel

Vehicle Class: Trucks, tracked vehicles, and ORVs.
Facility widths typically are 10 to 12 feet, but from 8 to 20 feet[1]. These facilities were commonly built with equipment such as a bulldozer to scrape or blade the ground surface, but no/or minor amounts of fill were transported to the site. Common past construction and maintenance undertakings include grading and leveling, ditching, with limited fill, brushing, corduroy, snowplowing and culverts.

Figure 2.1 Class 1 Road

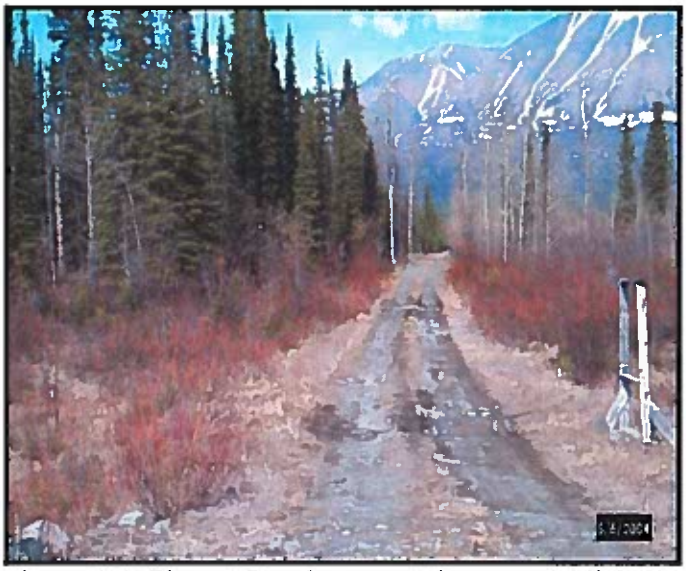


Figure 2.2 Class 1 Road – vegetation re-established in development area

[1] Airstrips may be wider than 20 feet to accommodate airplane landings and wing spans.

Figure 2.3 Class 2 – Bladed Gravel Road

Figure 2.4 Class 2 –Bladed Road on mineral soil with vegetation re-established in development area

2.1.1.3. Class 3 - Motorized Track or Trail with Limited Improvements and Minor Maintenance

These include airstrips, 4WD tracks, ORV trails and some parking areas.
Vehicle class: 4WD vehicles, ORVs and some tracked vehicles.
Facility widths typically are 8 to 10 feet, but range from 6 to 15 feet[2]. Facility lengths range from less than 100 feet to more than 5 miles. Common past maintenance undertakings include placing fill, ditching, limited culverts, and corduroy.

Figure 2.5 Class 2 - Airstrip

Figure 2.6 Class 2 - Landing Strip

[2] Airstrips may be wider to accommodate airplane landings and wing spans.

Figure 2.7 Class 3 - 4WD Track

Figure 2.8 Class 3 - ORV Track

2.1.2.4. Class 4 - Unimproved Routes and Corridors with an intermittent discernable motorized track

These facilities include routes across barren floodplains and uplands generally free of vegetation.
Vehicle class: ORV and tracked vehicles.
Facility widths are 6 to 10 feet. Lengths range from less than 0.25 mile to 5 miles. No past construction. Past maintenance and operations limited to hand tools and rerouting.

Figure 2.9 Class 4 - 4WD/ORV Route

Figure 2.10 Class 4 - ORV Route

Figure 2.11 Class 5 – Waterline Utility

Figure 2.12 Class 5 – Waterline Utility

2.1.1.5. Class 5 – Waterlines and Associated Paths

Utility Class: These are alignments over which waterlines were installed and maintained. They consist of gravity-fed and/or ram pump water systems. Facilities may include plastic or metal waterlines, holding tanks, small pumps, and a foot trail adjacent to the waterline. Facility widths are 2 to five feet and range from less than 100 feet in length to about 0.4 miles. Past construction and common maintenance include installation of pump systems and waterline, holding tanks, and brushing.

2.2 Alternative 1 – No Action

2.2.1 Introduction

This alternative provides a baseline for comparison with the action alternative. This alternative represents a continuation of the existing uses of access facilities to inholdings in the park and preserve (Table 2.1), and it provides a baseline for evaluating the changes and impacts of the proposed action alternative.

Table 2.1 Access by Class, Distance, and Area

Access Class	Category	Estimated [3] Number of Facilities	Estimated Number of Landowners or Tracts [4]	Estimated Maintainable Miles	Estimated Maintainable Acres
Class 1	Gravel Driveway or Road	11	15	2	4
Class 1/2 & 1/2/3	Gravel Road, Bladed	1	6	< 0.5	<0.5
Class 2	Bladed Airstrips	5	12		6.5
Class 2	Bladed Gravel Road	12	16	7 to 10	5 to 6
Class 2/3	Airstrips	3	3		2
Class 2/3	Road/Track Gravel	1 to 2	1	2	2.5
Class 2/3	Track ORV	5	3	1.5	4.1
Class 3	Track 4WD	2 to 3	5	2	2 to 3
Class 3	Track ORV	5 to 7	18	5.5	5.7
Class 4	Routes	1 to 2	1 to 2	6	4.5
Class 5	Utility Waterline	7 to 9	7 to 9	1.1	0.4
Total		**60**	**88**	**27-30**	**35-50**

2.2.2 NPS Management of Access Over Public Park Lands

Under the no-action alternative, NPS would continue to consider requests for access under ANILCA section 1110(b) on a case-by-case basis. In response to an application for an ANILCA 1110(b) RWCA, NPS would conduct an environmental analysis of the proposal and determine if the individual route, method and means is adequate and feasible. Processing applications would be based on procedures and timeframes specified in the ANILCA regulations at 43 CFR 36.10 and the policies and approach outlined in the 2007 NPS Alaska Region Access to Inholdings User Guide.

The NPS would not develop a comprehensive program to issue RWCAs and actively analyze and manage established and maintainable access facilities. Landowners would continue to use established access facilities to their property unless unacceptable impacts to park resources occur from unauthorized uses of NPS lands or the property owner contacts the NPS and requests a RWCA. Otherwise, NPS management of access to

[3] Values in columns labeled "Estimated" are approximate.
[4] Some facilities may provide access for multiple inholdings and may require multiple RWCA's.

inholdings would consist of maintaining inventories of access facilities and discussions with landowners regarding access to their property across park lands.

2.2.3 Documentation of Access to Inholdings

To date, compliance reviews have led to issuance of ten short-term Special Use Permits or rights of ways for access across WRST lands to inholdings. Additional future access requests would result in an unspecified number of additional RWCAs with individual terms and conditions to maintain those facilities. The NPS would continue to maintain a database of known and/or inventoried access facilities in the park.

2.3 Alternative 2 - Implement a Program to Authorize RWCAs for Established and Maintainable Access to Inholdings *(NPS Preferred)*

2.3.1 Introduction

Under this alternative, NPS would develop and implement a program for authorizing established and maintainable access to inholdings. Access facilities that would qualify are those that would meet the assessment criteria for both administrative requirements and technical management objectives (Table 2.2).The NPS would actively manage and monitor landowner or other valid occupier operations of motorized vehicles across federal public lands on established and maintainable facilities for access to state and private inholdings as provided by ANILCA Section 1110(b) and its implementing regulations. The NPS would accomplish this by working with landowners that submit applications for ANILCA 1110(b) Right of Way Certificates of Access (RWCAs), which describe the routes and methods of access, facility geometry and location, vehicle class, maintenance operations, and other appropriate terms and conditions. ANILCA 1110(b) RWCAs issued by the NPS would include appropriate terms and conditions with maintenance options to enable landowners to maintain their established access facilities in their existing footprint and consistent with their current level of development.

The RWCAs would include resource protection measures necessary to ensure consistency with Title 43 CFR 36.10 (e) (1) and 36.9(b) criteria. Specific protection measures would be attached to individual RWCAs to address unique resource protection needs. Protection measures may change over time for a specific authorized access facility to reflect changing resource conditions or access needs. Many of these measures are described in the subsequent section on mitigating measures.

The flowchart in figure 2.13 describes the process to obtain and keep a RWCA, beginning with the owner submitting an application. Applications would be reviewed to determine if they meet the basic administrative filter (Table 2.2, step1) for consideration under this program. Those access facilities that meet the administrative criteria would be further assessed as to whether the existing access facility meets the technical criteria for minimizing tread degradation and minimizing and avoiding environmental effects (Table 2.2, step2). Once a RWCA is granted, NPS would conduct monitoring of the tread utility to assure that the tread is maintained to provide the applicants a safe and serviceable

Figure 2.13 Process for RWCA for Established & Maintainable Access to Inholdings

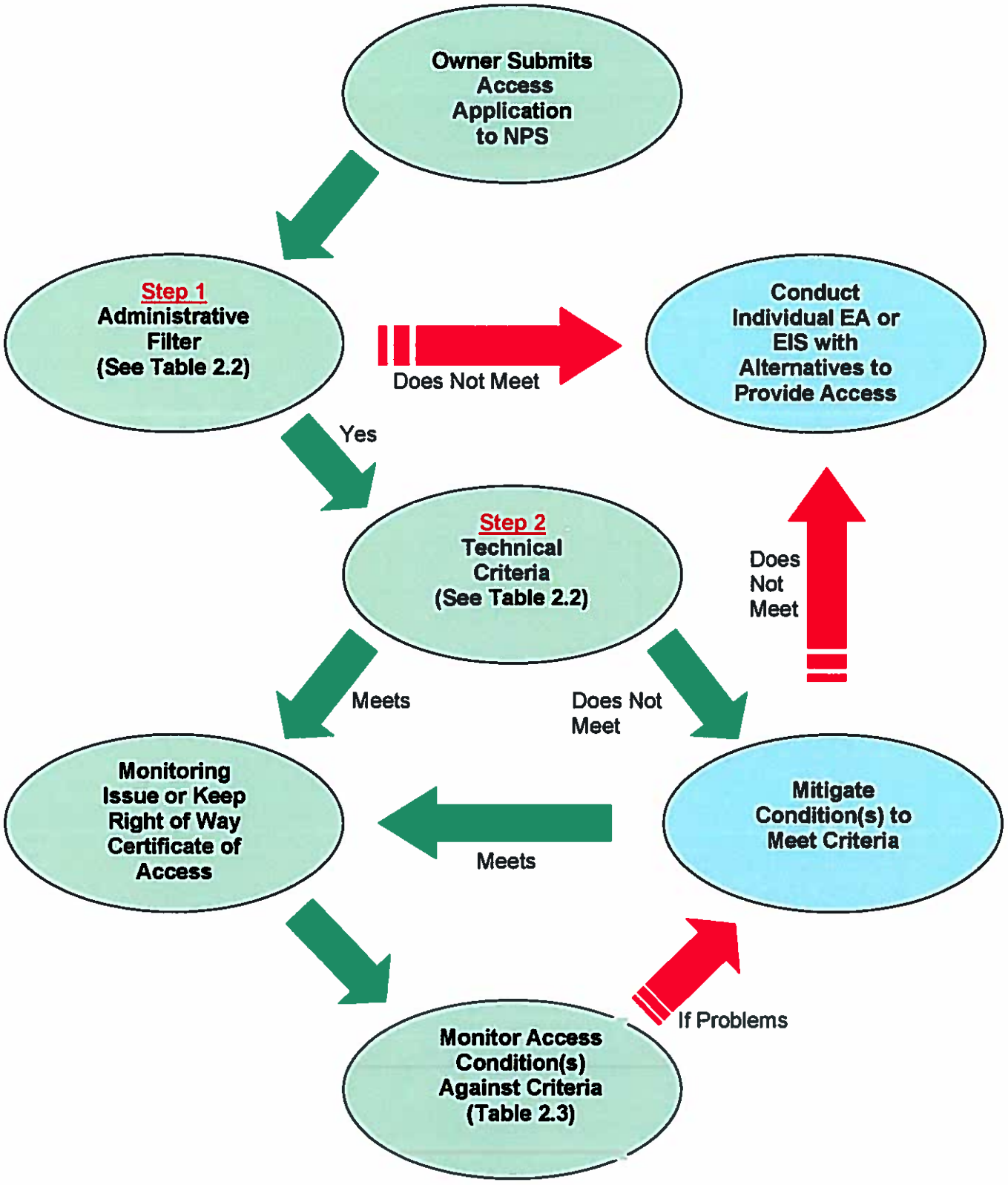


Table 2.2 Access Facility Assessment Criteria

Step 1 –Administrative Filter

An access facility must meet the following administrative requirements to be considered within this EA.

Assessment Criteria	Assessment Results
1. Access facility provides access to one or more inholdings in WRST. 2. A recognizable established facility footprint is presently used or was recently used. 3. Projected future use would be similar in character to established use (e.g. access class vehicle types, and level of use.) 4. No vehicles ford fish-bearing streams. Existing culverts provide for fish passage at fish streams. 5. Active travel surface is confined to a single access alignment. If more than one route exists, applicant selects a single alignment in consultation with NPS. 6. The facility has: a) no grades exceeding 40%; b) no grades between 20% and 40% longer than 50 feet in length; and c) grades between 20-40% are less than 10% of the total facility length.	Acceptable: Meets Requirement Unacceptable: Does not meet criteria Access may need individual EA or EIS

Step 2 – Technical Assessment

An access facility meeting administrative requirements is subject to management objectives and review of existing conditions against assessment criteria before an ANILCA Right of Way Certificate of Access would be issued with applicable terms and conditions (including maintenance, minor modifications, and mitigation).

Management Objective	Assessment Criteria	Assessment Results
Tread Utility	TREAD DEGRADATION SCREENING CRITERIA: -has a durable tread surface (gravel or mineral surface) -no ruts exceed 8" (inches) depth over 10' (feet) of length -no persistent ponded water exceed 4" depth and 10' of length -has a mud free surface under normal conditions -no depressions or muck holes exceed 8" depth and 2' of length -no persistent areas with running surface water exceed 50' long -all tread structures are in a safe and serviceable condition (e.g. drainage structures, bridges, retaining walls)	Acceptable: Meets Requirement Unacceptable: Does not meet criteria Requires maintenance or mitigation See Appendix B for maintenance options and EA section 2.3.4 for mitigation measures
Minimize/Avoid Environmental Impacts	FACILITY CORRIDOR DESIGN SCREENING CRITERIA: -travel surface width does not exceed 1.5 times the tread width of vehicles in use or 2.5 times of vehicle width at passing locations (excludes airstrips) -water is directed off tread surface in a manner to prevent tread surface erosion and sedimentation -vegetation clearing along corridor is restricted to a defined zone from the tread outside edge (See Appendix B – Brushing) -alteration of the natural ground surface to support tread utility (e.g. lead-off ditches, berms, infiltration sumps) is limited to an area not to exceed two times the minimum tread width	Acceptable: Meets Requirement Unacceptable: Requires maintenance or mitigating actions such as: • Narrowing of tread width • Modifying drainage type and/or spacing • Vegetation mitigation • Surface mitigation or site plan

Table 2.3. Monitoring for Permitted Access Facilities

Management Objective	Assessment Criteria	Assessment Results
Tread Utility	LONG-TERM TREAD DEGRADATION MONITORING: - tread surface remains durable - no ruts exceed 8 " (inches) depth over 10' (feet) of length - no persistent areas of ponded water exceed 4" depth and 10' of length - has a mud free surface under normal conditions - no depressions or muck holes exceed 8" depth and 2' of length - no persistent areas with running surface water exceed 50' long - All tread structures maintained in a safe and serviceable condition (e.g. drainage structures, bridges, retaining walls)	Acceptable: Meets Criteria. Unacceptable: Does not meet criteria. Requires maintenance or mitigation. See Appendix B for maintenance options. And EA Section 2.3.4 for mitigation measures.
No New Environmental Impacts	LONG-TERM ENVIRONMENTAL IMPACT MONITORING: - new trail braids or parallel routes developed along route - width expanded beyond 1.5 times the tread width of vehicles in use; or, 2.5 times in passing locations - water is directly discharged from tread surface into adjacent watercourses - tread surface has "captured" adjacent natural watercourses - off-site erosion evident from water running off tread - off-site sedimentation evident from water running off tread - Detrimental impacts to adjacent wetlands evident from tread use or tread surface (i.e., changes in water table or vegetation) - Detrimental impacts to adjacent fish habitat evident from tread use or tread surface - Evidence of brushing/clearing beyond defined zone - Alteration of the natural ground surface to support tread utility (e.g., lead-off ditches, berms, infiltration sumps) is limited to an area not to exceed 2.0 times the minimum tread width. - Maintenance is not confined to existing footprint	Acceptable: NOT Observed. Unacceptable: Observed. Does not meet criteria. Requires maintenance or mitigation. See Appendix B for maintenance options. And EA Section 2.3.4 for mitigation measures.

structure with no new environmental impacts. Additional maintenance or mitigation could be required to maintain the access facility or address environmental concerns.

For all of the access classes, no new impacts outside the facility footprints would be expected. If these facilities cross fish-bearing streams, they would need well-designed culverts or bridges. Use and maintenance of these facilities would not result in any new direct or indirect adverse effects to wetlands. Acceptable facilities do not contain any significant sections of standing, ponded, or running water that cannot be addressed through routine maintenance within the established footprint

The terms and conditions in a RWCA depend in part on the facility character and surface conditions. Facilities with a constructed gravel surface or that were bladed to a gravel substrate or mineral soil are generally in good to very good condition and pose little challenge for maintenance operations within the established footprint. Facilities with well drained or mineral substrate surfaces generally avoid conditions posing concerns for acceptability, and the number of passes over the surfaces does not substantially change facility footprints or character.

For tracks and routes that have not been constructed (class 3 and 4), acceptability and maintenance is tied to the terms and conditions of a RWCA and the inholder's ability to confine operations to a single track without development and use of braided alignments or segments wider than the approximate vehicle class width. Track surface conditions that may individually or collectively preclude a facility as acceptable include, braiding, excessive track width, grade, side slope, surface character, drainage, presence of mud/muck, and degree of impact to vegetation. Acceptable and manageable tracks have trail segment grades that overall are well less than 20% (many in the 0 to 10% range and only very short segments in the 20 to 40 % range), and they have a durable surface character consisting of mineral soil or coarse particles such as gravel.

Vegetation and soil impacts are manageable within an established minimum footprint necessary to accommodate passage of appropriate vehicles without braiding, diversion of surface water flows, or expansion or creation of new impacts outside the established footprint. Surface vegetation loss and root exposure in the tracks are common. Rutting is limited, generally less than 8 inches deep, and can be mitigated through maintenance and RWCA terms and conditions.

2.3.2 NPS Management of Access Over Public Park Lands

Under this alternative each access RWCA would provide for motorized access and maintenance undertaken by the inholder pursuant to ANILCA 1110(b) and its implementing regulations at 43 CFR 36.10. The terms and conditions in each RWCA would allow for appropriate maintenance activities for each access facility. Minor changes of a facility, which are consistent with the current level of development and within the established footprint, would be allowed provided no significant impacts to park resources and values outside the access facility would result.

2.3.3 Procedures to Document an ANILCA Section 1110(b) RWCA

The owner or valid occupier (owner) and NPS would have a pre-application meeting to discuss and document what constitutes the existing access in terms of (1) access class, (2) location, (3) dimensions, (length, width and development footprint) (4) vehicle use, (5) maintenance operations, and (6) anticipated specific resource protection concerns. A joint landowner and NPS onsite visit may be warranted to fully and accurately describe what constitutes the existing access. If there is agreement that the existing access is adequate and feasible, and operation and maintenance as described is compatible with the criteria outlined in this EA the owner would complete a right of way application and submit it to the NPS.

Upon receipt of a complete application, the NPS would follow the procedures outlined in Figure 2.13 and tables 2.2-2.3 in order to determine if the access facility meets the administrative and technical criteria for issuance of an RWCA. If the access facility meets the requirements, the NPS would prepare a letter to the NEPA project file and prepare an ANILCA 1110(b) RWCA. The RWCA would include terms and conditions allowing the owner to use and maintain their access facility while protecting park resources.

Each access RWCA would specify facility geometry and location, vehicle class, allowable maintenance operation (tools), and terms and conditions to protect park resources and values, consistent with criteria at Title 43 CFR 36.10 (e)(1) and Title 43 36.9(b).

An ANILCA 1110(b) RWCA may include but not be limited to the following terms and conditions pursuant to 43 CFR 36.9(b):

(1) Requirements to ensure to the maximum extent feasible the right of way is used in a manner compatible with the purposes for which the affected area was established or managed;
(2) Requirements for restoration, revegetation, and curtailment of erosion of the surface of the land;
(3) Requirements to ensure activities in connection with the right of way will not violate applicable air and water quality standards and related facility standards established pursuant to law;
(4) Requirements, including the minimum necessary width, designed to control or prevent:
    i. Damage to the environment including damage to fish and wildlife habitat,
    ii. Damage to public or private property, and
    iii. Hazards to public health and safety;
(5) Requirements to protect the interests of individuals living in the general area of the RWCA who rely on the fish, wildlife and biotic resources of the area for subsistence; and

(6) Requirements to employ measures to avoid or minimize adverse environmental, social, or economic impacts.

The RWCA becomes valid after it is signed by the owner and the NPS Regional Director. The RWCA remains valid as long as it is needed. NPS would assign the RWCA to a new owner if the new owner agrees to abide by the terms and conditions. See sample RWCA in Appendix E.

2.3.4 Mitigating Measures

Each RWCA would specify general and individual terms and conditions to mitigate and avoid adverse effects on park resources. Mitigating measures below address detailed effects and response actions not already addressed in the assessment criteria and monitoring actions identified above in section 2.3.1 and tables 2.2 and 2.3.

2.3.4.1 Wetlands

Established access in wetland areas would be reduced in width within the access alignment, where practical and feasible, to allow for restoration of wetlands functions within and/or mitigation of wetlands impacts outside the authorized footprint.

2.3.4.2 Hydrology

The NPS would conduct inspections of all existing culverts and bridges to assure they can accommodate a major flood with associated bed load and debris. The NPS and inholder would conduct inspections during or after flood events.
Mitigation measures may include:

- The inholder maintains water control features to accommodate flood events and to avoid damage to the facility or environment.
- Installation of surface water control features such as culverts, small bridges, French drains, ditches, grade dips, crowning, out-sloping[5], or depressions with permeable gravels, cobble, or rock would be authorized as necessary to preserve natural hydrological functions within and adjacent to access facilities.
- If an existing bridge, culvert, or other water control feature fails, the NPS would work with the inholder to ensure their replacement structure is able to accommodate a major flood and associated bed load and debris. New or replacement structures would be designed to avoid future impacts to fish or fish habitat.

2.3.4.3 Aquatic Habitat and Fish

- NPS would conduct inspections of all access facility stream crossings within fish habitat to ensure they provide fish passage for all potential species and life stages at all potential stream flows. New or replacement structures would be required to provide fish passage.

[5] See glossary for definition.

- Access facility drainages would be routed away from potentially unstable stream channels, fills, and hill slopes. Side-casting of materials from an access facility would be prohibited on segments within or abutting areas essential for riparian and aquatic protection.
- Inholder would not be allowed to cut or remove large woody debris from areas within 300 feet of fish bearing streams, 150 feet from non-fish bearing streams, or landslide prone areas which are considered essential for the protection of aquatic and riparian habitat.

2.3.4.4 Soils and Substrates

- To prevent compaction, shearing, erosion, or deposition of soils and substrates under or adjacent to access facilities, the RWCA may authorize the use of synthetics such as geotextiles, geoblock, and small amounts of sand, gravel and rock within the access facility footprint to prevent the loss of, and damages to, soils and substrates.
- Seasonal use restrictions of access facilities, such as during spring break-up or fall storms, may be required to minimize compaction, shearing, erosion, and deposition of soil and sediments.

2.3.4.5 Native Plants

- Source fill material used on the access facility must be approved by NPS as free of exotic invasive species. This approval must occur prior to importing fill onto park lands.
- When transporting livestock forage and bedding materials with non-native species and their seed across park lands, the inholder would be required to prevent the loss of these materials onto park lands. These materials should be covered with tarps or enclosed in containers to prevent the introduction of invasive exotic species on NPS lands.

2.2.4.6. Cultural Resources

WRST's Cultural Resource staff would survey all existing access corridors prior to authorizing vehicle travel and permitting any further repairs or maintenance. Any cultural feature encountered would be formally evaluated in order to determine its eligibility for the National Register of Historic Places. Features eligible for the National Register are deemed historic properties. No adverse effects to historic properties would be authorized.

2.3.4.7 Migratory Birds

Spring and summer vegetation clearing, grubbing, and other site preparation and construction activities during bird nesting season (May 1 to July 15) may not result in the destruction of active bird nests, eggs, or nestlings. If an active nest is encountered at any time, it must be protected from destruction. (MBTA 16 U.S.C. 703, see web page at http://alaska.fws.gov/fisheries/fieldoffice/anchorage/pdf/vegetation_clearing.pdf)

2.2.4.8 Wilderness

Park staff would complete a minimum requirements analysis on each existing facility before issuing a right of way certificate of access. Any RWCA issued under this NEPA compliance would not allow new impacts to wilderness resources. Any new construction or expansion inconsistent with the existing current level of development would require a new application and additional NEPA review.

2.4 Environmentally Preferred Alternative

The Environmentally Preferred Alternative is the alternative that would promote the national environmental policy expressed in the NEPA section 101(b) of the NPS DO-12 Handbook and Director's Order (NPS, 2005a). The Environmentally Preferred Alternative is the action which results in the least damage to the biological resources and environment while protecting, preserving, and enhancing the historic, cultural, and natural resources.

Alternative 2 would be environmentally preferable over the no-action alternative because it would result in RWCAs for established and maintainable access to inholdings that specify vehicle use and maintenance methods and means to protect park natural and cultural resources while providing for adequate and feasible access.

2.5 Actions Considered But Eliminated from Further Consideration

The following describe actions or alternatives raised during internal scoping or with the public during development of the Access User Guide, which were considered but eliminated from detailed evaluation in this EA.

2.5.1 Designate Access Facilities as Park Roads, Airstrips, and Trails

This action would include the possible designation of park roads, airstrips, and trails, which facilities the NPS would take responsibility to maintain in a manner to protect park purposes and values. It is the responsibility of the landowner to construct and maintain their access unless it also has a joint NPS administrative use. This action would occur in the future to address administrative uses for park management and monitoring, public recreation, and subsistence activities on public park lands. A small subset of these facilities may eventually be designated as park roads and trails with completion of appropriate project-specific NEPA, however, not all established and maintainable access to inholdings would be addressed. This action exceeds the responsibility, maintenance, and staffing capabilities at the park, and adequate and feasible access for all valid inholders or occupiers with established and maintainable access would not be addressed. For these reasons this alternative was dismissed from further consideration at this time.

2.5.2 Address Access to Inholdings over RS 2477 Routes Listed by the State of Alaska

The State of Alaska has asserted many RS 2477 rights of way within WRST. The NPS acknowledges these assertions; however, the U.S. Court of Appeals declared that only a federal court has the authority to determine the validity of an asserted RS 2477. The Secretary of the Interior has stated that Department of Interior agencies will be guided by that Tenth Circuit opinion. There have been no court determinations of RS 2477 rights of way in NPS units in Alaska. Until an asserted RS 2477 is determined to be valid by a federal court, the NPS will work with landowners to issue an ANILCA 1110(b) RWCA for access. Potential RS 2477 access routes are identified in the WRST GMP (pp 13-14) and are shown in Appendix M of the GMP. This alternative exceeds the scope and timeframe for this EA.

Table 2.4 Summary Impacts of the Alternatives

Impact Topic	Alternative 1: No –Action	Alternative 2: Issue RWCAs (*NPS Preferred*)
Aquatic Resources and Fish	Minor effects from small reroutes or multiple routes near streams and cutting of live or dead trees reducing woody vegetation for fish habitat	Negligible effects because no new disturbance near fish-bearing streams would be allowed on access routes cleared for RWCAs
Cultural Resources	Minor new negative impacts to the historic fabric due to erosion and the gradual enlargement of the inholder access facility footprints	Minor new effects would slightly benefit cultural resources over the long-term due to terms and conditions to survey and protect cultural resources along RWCAs
Inholder Property	Negligible effects: uses and values would remain as they are, but uncertainty about access uses would remain.	Moderate beneficial impacts to property values (up to +30%) and assured access to properties into the foreseeable future.
Public Access & Recreational Use	Minor adverse effects to public access and recreational uses of public lands near existing access to inholdings from noise, visual intrusions and conflicts between visitors and landowners	Minor adverse effects on public access from posted motorized access restrictions, but documentation of access RWCAs and public information decrease potential for trespass incidents and conflicts between visitors and landowners
Soils	Minor adverse impacts from continuing operation of motorized vehicles and maintenance within existing access footprints with small incremental changes in the nature of the facility width,	Negligible adverse impacts and possibly minor beneficial effects from terms and conditions in RWCAs to prevent additional loss of soil and improve soil hydrology, surface water hydrology, and

Impact Topic	Alternative 1: No –Action	Alternative 2: Issue RWCAs *(NPS Preferred)*
	access class, and soil conditions. Impacts potentially greatest in locations with well developed soil horizons and wetlands where an operator does not select an acceptable location or fails to adequately design or maintain a facility.	permafrost conditions.
Vegetation & Wetlands	Overall, moderate adverse impacts from: (1) long term localized direct effects to vegetation and wetlands within facility footprints, (2) short term low to moderate intensity indirect effects to vegetation and wetlands adjacent to facilities, (3) long term and localized effects to vegetation and wetlands with new facility development and expansions or upgrades to established facilities without appropriate design and mitigation, (4) localized long term indirect effects to native plant communities by the spread of exotic plants, and (5) possible localized but long term to permanent effects to rare plants.	Overall, minor adverse impacts and some beneficial effects due to documenting resources and the development of stipulations to reduce or avoid impacts outside access facility footprints: (1) long term localized and low intensity direct impacts to vegetation and wetlands, (2) short term low intensity indirect impacts to vegetation and wetlands, (3) no new effects outside the footprint of established facilities from facility maintenance and corrections within the footprint, (4) low intensity long term impacts to native plant communities due to the spread of exotic plants, and (5) no new impacts to rare plants.
Wilderness	Minor impact due to low level of management oversight in this alternative leading to new or expanded access facilities and roads that would have long-term impacts to wilderness resources.	Authorizing and managing access facilities would result in no new impacts to wilderness resources and may have a minor beneficial effect, but road RWCAs would have localized, long-term effects on wilderness resources.

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3.0 AFFECTED ENVIRONMENT

This chapter describes resources and values that could be affected by the no-action alternative or alternative to issue RWCAs with terms and conditions to protect the resources and maintain the access facilities.

3.1 Aquatic Resources and Fish

While generally healthy, aquatic resources within Wrangell-St. Elias National Park and Preserve are affected by a variety of natural and human influences that appear to have reduced the quality and quantity of aquatic resources in recent decades. These influences, among others, include widespread spruce bark beetle infestations, climate change, roads, trails, mining, firewood harvest (Figure 3.1), and over harvest of some fish populations. Typically streams can be considered as properly functioning if they have healthy fish populations, high levels of large woody debris, levels of fine sediment within the natural range of variation for the specific system, stable banks (non-glacial systems) and habitat not fragmented by human-caused barriers. Pool frequency ranges from low to high and is typically positively correlated with large woody debris and negatively correlated with high levels of fine sediment.

Figure 3.1 Riparian impacts from firewood harvest to a stream near the Nabesna Road.

The affected area for the analysis of potential effects to aquatic resources was divided into four areas based on watershed drainages because aquatic resources in each of these large areas are substantially different. The four areas are the Nabesna Road corridor within the Nabesna River drainage, the Nabesna Road corridor within the Copper River drainage, the McCarthy Road corridor within the Chitina River drainage, and the Chisana area within the Chisana River drainage.

3.1.1 Nabesna Road Corridor

The Nabesna Road corridor transects 2 major watersheds, the Copper River and the Nabesna River.

3.1.1.1 Nabesna River Watershed

Major streams within the Nabesna River portion of the Nabesna Road corridor include Jack Creek, Little Jack Creek and several tributaries to Jack Creek. Nearly all of these streams are low gradient (<5%) which allows them to be easily colonized by fish and to provide, in many cases, highly productive aquatic habitat. Most of the stream ecosystems are connected to lakes or ponds. Many of these aquatic systems appear to have fine sediment levels approaching the maximum level that sustains optimal spawning conditions for salmonids and other native species. Whether this condition is due to natural or human causes is unknown. Large woody debris levels appear to be substantially below natural levels in some streams due to a variety of human influences. Nabesna Road stream crossings often limit the transport of large woody debris in the stream channel even if they allow for fish passage. Fish passage is limited by inadequate stream crossing structures in some streams. Dissolved oxygen is a limiting factor in many area lakes during winter months.

Water Chemistry:

In 2006, water chemistry was sampled in streams along the Nabesna Road (table 3.1). Conductivities were fairly high at all sites, ranging from 183 µS/cm at Skookum Creek to 813 µS/cm at Little Jack Creek. This is consistent with the generally calcareous geology drained by these streams. Skookum Creek had noticeably different water chemistry than the other 4 streams in that it had relatively high dissolved phosphorous (P) and relatively low alkalinity and conductivity. Similarly, Nitrogen: Phosphorous (N:P) ratios suggest that while 4 of the 5 streams are P-limited, Skookum Creek may be N-limited. Dissolved organic carbon (DOC) concentrations were generally low at all sites. Consistent with its generally low level of solutes, Skookum Creek had the lowest DOC, although Little Jack Creek, which had the next lowest DOC concentration, also had the highest conductivity.

Table 1. Water chemistry data from Nabesna Road streams. Conductivity and pH were determined in the field.

Stream	Conductivity (uS/cm)	Alkalinity (mg/L)	pH	soluble P (mg/L)	soluble N (mg/L)	DOC (mg/L)
Chalk Creek - June	383	139	8.2	ND	ND	ND
Rock Creek - July	ND	155	ND	0.002	0.11	5.8
Chalk Creek - Sept.	477	147	7.7	0.007	0.222	2
Rock Creek - Sept.	475	170	7.3	<0.001	0.091	3.7
Jack Creek	448	146	7.6	0.004	0.148	2.2
Little Jack Creek	845	155	7.7	<0.001	0.386	1.8
Skookum Creek	182	56	7.4	0.027	0.186	1.6

Macroinvertebrates:

In 2006, macroinvertebrates were sampled in streams along the Nabesna road (table 3.2). A total of 43 macroinvertebrate taxa were collected from these 5 streams, including 3 caddisfly, 6 stonefly and 6 mayfly taxa. The majority (23) of taxa collected were Diptera (true flies), accounting for 53% of the total. Of these, 14 were chironomid midges (Chironomidae). Richness varied among the individual streams and sampling dates, ranging from 11 to 20 unique taxa (Table 2). Jack Creek had the highest richness, and furthermore had remarkably high EPT (Ephemeroptera-Plecoptera-Trichoptera) richness for an Alaskan stream. The true EPT taxa richness for Jack Creek is actually 13, because the two Isoperla species were collapsed to the generic level to increase comparability across all sites. Nemourid stoneflies were collected at all sites, though they were at low density in Jack and Skookum Creeks. *Baetis bicaudatus*, a common mayfly, was found at high densities in Rock and Chalk Creeks during the summer, but was at very low density at all 5 sites in September. The only other insect collected at all 5 sites was the chironomid midge *Diamesia*, emphasizing the biological variability found among even nearby stream ecosystems. Richness appeared to decline substantially from summer to fall at both Chalk Creek (16 to 11) and Rock Creek (18 to 12). However, the results of the replicate sampling at Chalk Creek suggest that this interpretation should be made cautiously, as richness among the 5 replicates collected on the same day in June varied from 14 to 18. In addition, the community composition changed almost completely at these sites from summer to fall, with few taxa being collected in both seasons.

Table 2. Macroinvertebrate community metrics

Stream	Taxa Richness	Non-midge Taxa Richness	EPT Taxa Richness
Chalk Creek - June	16*	11*	4.8*
Rock Creek - July	18	10	4
Chalk Creek - Sept	11	8	6
Rock Creek - Sept.	12	8	4
Jack Creek	20	17	12
Skookum Creek	17	12	8
Little Jack Creek	18	16	9

* Mean value for 5 replicate samples

Benthic diatoms:

Benthic diatoms were sampled in conjunction with the water chemistry and macro-invertebrate sampling in 2006 (table 3.3). Benthic diatom richness was substantially higher than macroinvertebrate richness. A total of 145 diatom taxa were collected from these five streams, mostly identified to the species level. Diatom richness varied from a low of 24 taxa (Little Jack Creek) to a high of 55 (Rock Creek in September), with a mean of 35.5. Diatom densities were much higher in September than in the summer. At both Chalk Creek and Rock Creek densities increased by nearly 2 orders of magnitude (40 fold at Chalk Creek, 50 fold at Rock Creek). Such an increase is probably a combination of two factors – the increase in direct sunlight available after leaf fall, and a

general increase in biomass throughout the summer in streams that are not regularly scoured by spates.

Table 3. Diatom community metrics

Stream	Taxa Richness	Density (cells/cm^2)	Dominant Taxon
Chalk Creek - June	39.6*	$8.02 \times 10^{7*}$	*Cocconeis placentula var. lineata*
Rock Creek - July	55	2.41×10^{8}	*Rhoicosphenia curvata*
Chalk Creek - Sept.	32	3.3×10^{9}	*Rhoicosphenia curvata*
Rock Creek - Sept.	45	1.2×10^{10}	*Achnanthes minutissima*
Jack Creek at Bridge	27	8.1×10^{10}	*Achnanthes minutissima*
Skookum Creek	26	3.3×10^{10}	*Meridion circulare*
Little Jack Creek	24	4.6×10^{10}	*Achnanthes minutissima*

*Mean of 5 replicates

Fish species present include Arctic grayling, slimy sculpin, burbot, longnose suckers, round whitefish and lake trout. Burbot populations in Jack Lake are reported to be well below historic levels due to over harvest. Steelhead/rainbow trout have not been documented in tributaries to the Yukon River. Yukon River tributaries within the Nabesna Road corridor do not provide habitat for salmon within the Wrangell-St. Elias National Park/Preserve boundary because stream gradient and distance from the ocean limits the ability of adult salmon to migrate into these areas.

3.1.1.2 Copper River Watershed

Major streams within the Copper River watershed portion of the Nabesna Road corridor include Caribou Creek, the Copper River, Rufus Creek, the Slana River and Tanada Creek (see Figure 3.2).

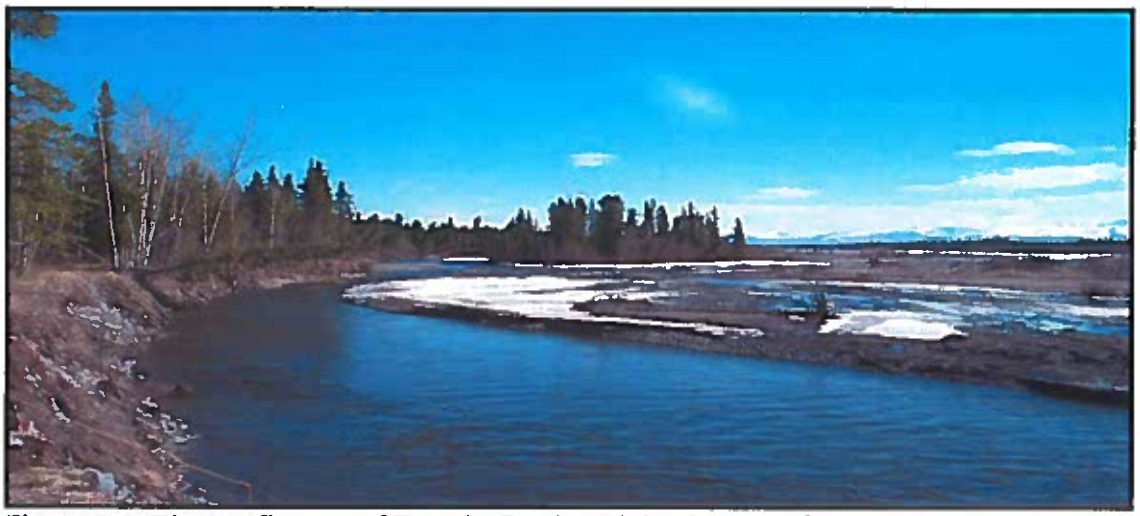


Figure 3.2 The confluence of Tanada Creek and the Copper River.

Aquatic habitat in these streams ranges from crystal clear small streams to large glacial rivers. Many of these streams are low gradient (<5%) which allows them to be easily colonized by fish and to provide, in many cases, highly productive aquatic habitat. Most of the stream ecosystems are connected to lakes or ponds. Many of these aquatic systems appear to have fine sediment levels approaching the maximum level that sustains optimal spawning conditions for salmonids and other native species. Large woody debris levels appear to be within their natural range of variation. Fish passage is not limited by inadequate stream crossing structures.

Fish populations include round and humpback whitefish, sockeye salmon, chinook salmon, slimy sculpin, arctic grayling, lake trout, burbot, longnose sucker, steelhead/rainbow trout and dolly varden. An ongoing radio telemetry study of whitefish in the Copper River may indicate that some whitefish stocks in the Copper River are anadromous. The northernmost population of steelhead in the world occurs in the Gulkana River, although anecdotal reports suggest steelhead occasionally stray upstream as far as Tanada Creek. Salmon are harvested in Tanada Creek for subsistence use and the management of this population is occasionally controversial. Copper River salmon are harvested commercially in marine waters and are internationally recognized for their superior quality.

3.1.2 McCarthy Road Corridor

The McCarthy Road corridor is contained within the Chitina River watershed. The Chitina River is the largest tributary to the Copper River. Streams in the McCarthy Road corridor range from low to high gradient, some of which are too steep to support fish populations. McCarthy Road stream crossings often limit the transport of large woody debris in the stream channel even if they allow for fish passage. Fish passage is limited by several poorly designed culverts along the McCarthy Road. Most fish bearing streams in the McCarthy Road corridor provide at least some habitat for anadromous fish as well as resident fish species. Fish populations include round whitefish, sockeye salmon, chinook salmon, coho salmon, slimy sculpin, arctic grayling, lake trout, burbot, longnose sucker, steelhead/rainbow trout and dolly varden. Long Lake along the McCarthy Road provides substantial fish habitat for unique fish populations including kokanee and a sockeye salmon stock that spawns from September through March (see figure 3.3). This spawning period is the longest of any known sockeye salmon stock.

3.1.3 Chisana Area

The analysis area for properties located in and around the community of Chisana is contained within the Chisana River watershed. Streams in the Chisana area are low gradient and display a high level of glacial influence. Relatively little is known regarding fish populations in this area. Arctic grayling, round whitefish, slimy sculpin, northern pike and burbot occupy these streams but relatively little is known regarding their life history in this especially harsh environment. The condition of spawning areas and rearing habitat is unknown.

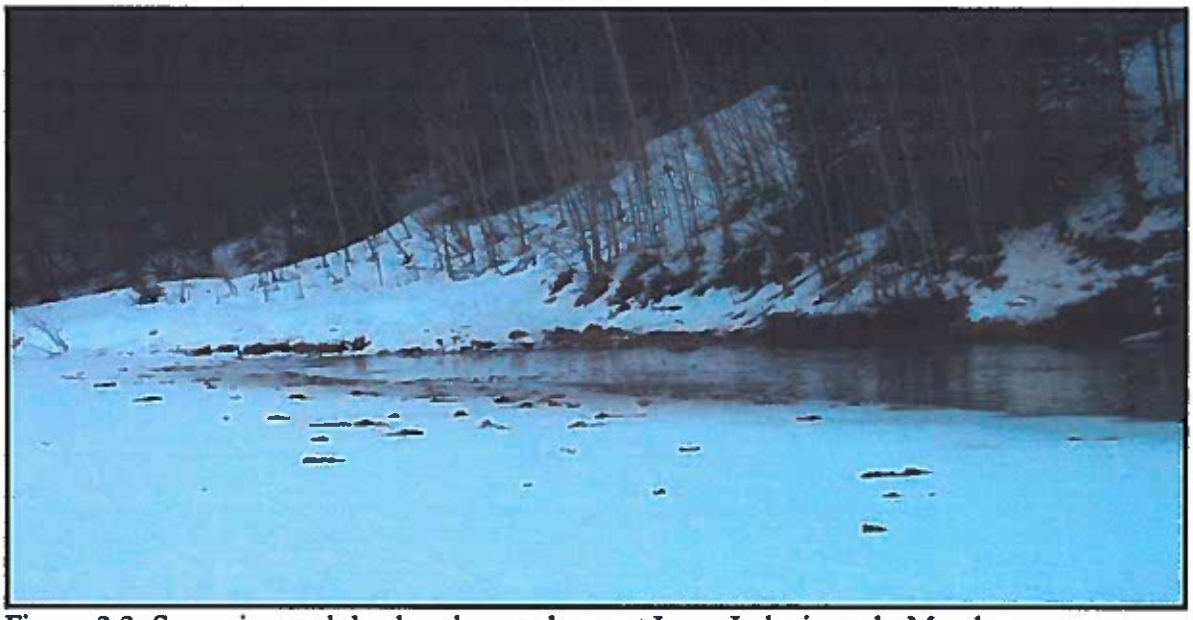


Figure 3.3 Spawning and dead sockeye salmon at Long Lake in early March

3.2 Cultural Resources

Cultural features are scattered throughout Wrangell-St. Elias National Park and Preserve (WRST), but most are concentrated in those areas which received the most extensive and sustained use, such as along its major rivers, lakes, roads, and trails, and within its larger and more significant historic mining districts. The Copper, Chitina, Nizina, Sanford, Nabesna, Chisana, and White River corridors; Tanada, Copper, Jack, Twin, Ptarmigan, Beaver, Dadina, Tebay, Hanagita, and Long Lakes; the McCarthy, Nabesna, Kotsina, and May Creek Roads; the Batzulnetas, Suslota Lake, Trail Creek, Lost Creek, Caribou Creek, Platinum Creek, Jack Creek, Cooper Pass, Orange Hill, Beaver Creek, Bryan Creek, Horsfeld, and Bremner Trails; the Kennecott, Nabesna, Chisana, Nizina, and Kuskulana Mining Districts; and the Malaspina Forelands all hold potential for significant cultural resources (Hunt 1991). Many inholder access corridors traverse areas with such features.

A few areas within Wrangell-St. Elias National Park and Preserve have received exhaustive archeological surveys. These include the Kennecott and Bremner Mining Districts, Gold Hill, Wiki Peak, Skolai Pass, the Chisana townsite, the McCarthy Creek Road, and selected portions of the McCarthy and Nabesna Road corridors. All other archeology has been site specific.

Alaska Native people first entered this region about 8,000 years ago. Because game was not very plentiful, human numbers were low and groups remained widely dispersed and highly mobile. These early peoples typically situated their winter villages where a large tributary entered one of the major rivers, and established temporary camps whenever and wherever critical resources were available. Several villages, including Taral (on the east bank of the Copper River just south of the Chitina River), Strelna (on the McCarthy Road), and Batzulnetas (near the mouth of Tanada Creek just south of the Nabesna

Road), were particularly significant and are now especially vulnerable. Other features associated with the region's early Native inhabitants can be encountered practically anywhere and range from camp and cache sites to graves, game fences, and stone tools (Reckord 1983; USNPS 1998).

The first large influx of American immigrants arrived during the gold excitement of 1898. While this region was no Klondike, prospectors eventually made some important local discoveries. These included gold placers on tributaries of the Nizina and Chisana Rivers; gold lodes near the Nabesna and Bremner Rivers; and copper lodes near the Kennicott, Chitistone, Kuskulana, and Kotsina Rivers.

Local mining features fall into two main groups, placer and lode, and most are associated with either extraction, circulation, or processing. Those categorized as extractive include prospect and drift pits; adits and shafts; hand, hydraulic, and bulldozer cuts; hand-stacked cobble; tailings; and spoil piles. Structures related to circulation include ore car runways, aerial tramways, boardwalks, bridges, paths, and roads. Many operations also possessed dams, ponds, pipelines, ditches, and flumes to contain, divert, regulate, or supply water. Structures associated with processing include mills, power plants, crushers, and concentrators (Bleakley 2000a).

Successful prospectors established mining districts. In this region, a district typically includes a variety of utilitarian buildings and structures, locally manufactured tools, and landscape revisions consistent with mining operations. Three such districts, the Nabesna Gold Mine Historic District (Stanley 1978), the Chisana Historic Mining Landscape (Bleakley 1998; Feldman N.D.), and the Bremner Historic Mining District (Bleakley 2000b; White 2000), are presently listed on the National Register of Historic Places. A fourth, the Kennecott Mine, is a National Historic Landmark. In addition, WRST contains more than 65 additional mining-related sites which have been determined eligible for National Register listing.

Abercrombie began building the Trans-Alaska Military Road (popularly called the Valdez Trail) from Valdez to Eagle in 1899. This route was responsible for the location or expansion of many local settlements. Early entrepreneurs built roadhouses along it, often at or near existing Ahtna villages or fish camps. Many such sites, such as Copper Center, Gulkana, Gakona, Chistochina, and Slana, became substantial communities. Trail and road corridors contain the remains of sites, structures, and buildings once devoted to their construction, use, and maintenance. These include bridges, culverts, abandoned road sections, camp sites, trash scatters, and the ruins of homes, roadhouses, and support facilities. About 10 miles of the Valdez Trail situated just west of Slana parallels the northwestern boundary of Wrangell-St. Elias National Preserve (Bleakley 1997).

The Kennecott Copper Company and its successors mined on Bonanza Ridge from 1907-1938, and the Alaska Syndicate built the Copper River and Northwestern Railway to transport its ore from Kennecott to Cordova. The current McCarthy Road follows that railway's right-of-way from Chitina to McCarthy. This route retains an extensive

assemblage of associated features, including the remains of maintenance facilities, watering stations, bridges, trestles, culverts, and track, many of which have been determined eligible for National Register listing (Buzzell 2005). In addition, the community of McCarthy contains two properties, the General Store and the Mother Lode Powerhouse, which are already listed.

The Nabesna Road enjoys a similar history. Incorporating a number of prehistoric Native trail segments, it was constructed by the Alaska Road Commission in the early 1930s to facilitate development of the Nabesna Gold Mine. Like other roads and trails, its corridor contains prehistoric camp sites and stone tool scatters as well as the remains of historic cabins, shelters, camp sites, culverts, and refuse scatters (YCC 1979).

3.3 Inholder Property

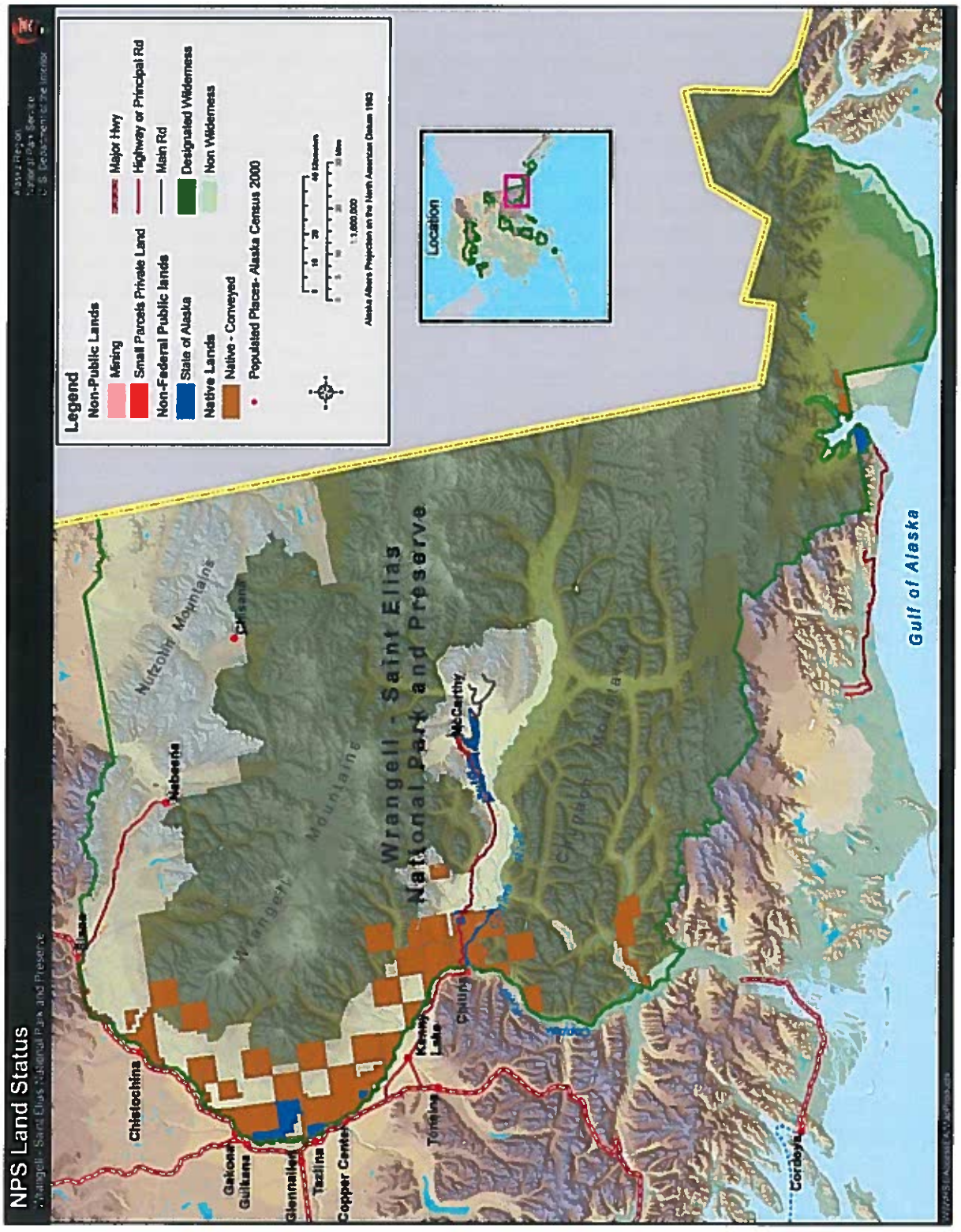
Wrangell-St. Elias National Park and Preserve encompasses approximately 13.2 million acres (Figure 3.4). There are approximately 784,000 acres of non-Federal lands within WRST. Native corporations, pursuant to the Alaska Native Claims Settlement Act, own a majority of these non-Federal lands. Ahtna, Incorporated owns 620,478 acres; Chitina Village Corporation owns 62,688 acres; and Chugach Alaska Corporation owns 51,809 acres. There are thirty-six Native allotments containing 3,650 acres and 7 pending Native allotments with 560 acres.

The State of Alaska owns 34,430 acres of uplands, some managed by the Department of Natural Resources, the rest by the University of Alaska. There are 286 patented mining claims containing 5,625 acres and 27 unpatented mining claims containing 491 acres. The remaining non-Federal lands consist of 64 parcels transferred from the Federal public domain to private owners under the Federal land disposal statutes (4,874 acres) and 73 lots subdivided from the surface estate of patented mining claims in Kennecott (186 acres).

The number of landowners with inholdings has increased as non-Native private lands and university lands have been subdivided. Subdivision and sale of non-federal lands within WRST are not reported to the National Park Service. There are inholdings throughout WRST, but the majority of established access routes to inholdings are along the Nabesna and McCarthy Roads and in the Chisana area. NPS's inventory show that approximately 120 landowners have access to their inholdings across non-federal lands while approximately 90 landowners cross NPS lands to reach their inholding. An estimated additional 40 landowners previously crossed NPS lands or may need to cross NPS lands in the future for access to their inholdings. The NPS has previously authorized temporary and/or short-term access to multiple private landowners since 1980.

These non-Federal lands are used by inholders as residences, second homes or recreational sites, for trade and manufacturing, business ventures (including guiding and outfitting into the park and preserve), mining, recreation, and subsistence. Some Native Corporation lands have been logged.

Figure 3.4 Land Status in WRST



3.4 Public Access and Recreational Use

While existing access facilities to inholdings are scattered throughout the park and preserve, the majority of the properties are situated along the Nabesna and McCarthy Roads and other more developed front country locations such as Kennecott and McCarthy. The Kennecott National Historic Landmark (NHL) is the most popular visitor destination in the park. The average visitation to the Kennecott area ranges between 8 and 12 thousand people per year. (Littlejohn 1995 & USNPS 1990 - WRST Mining EIS). The ADOT&PF has periodically placed traffic counters on both the McCarthy and Nabesna Roads. The most recent results counted 10,000 trips per year on the McCarthy Road and 3,500 trips per year for the Nabesna Road. These trips would include both residents and visitors. As of yet there is not a methodology to differentiate between the two groups.

For recreational purposes, park management would classify such areas as "Front country", meaning that amenities for visitor use, such as constructed and maintained trails would be appropriate. This term should not be construed to mean that the area is highly developed. While trails have been maintained and trailheads have been improved to include vault toilets and orientation information, these facilities would be classified as fairly simple and Spartan. In the Recreation Opportunity Spectrum system they would meet the primitive classification.

Because these areas have easier access connected to the road system or a well-maintained airstrip, they serve as portal to areas where a variety of recreational activities occur. From these front country areas visitors enter the larger wilderness and backcountry areas. The primary recreational activities for these areas include hiking, sightseeing, backpacking, camping, horseback riding, sport hunting, touring historic districts, fishing, boating, snowmobiling, ORV riding, and flight seeing. While overnight activities are popular, most uses are a day long or less.

In the Nabesna District there are a number of multi-use trails that are used by hikers, hunters, subsistence users, commercial operators, and landowners gaining access to inholdings. Some use the trails via foot and others with an ORV. Those who use an ORV for recreational purposes do so under an NPS permit. Trails include the Copper Lake, Suslota Lake, Tanada Lake, Caribou Creek, Trail Creek, Reeves Field, and Skookum Volcano (foot trail only). There are a number of camping areas, two principal areas at Jack Creek and Twin Lakes. Along the Nabesna Road, both adjacent to and within the park boundary, are a number of commercial operators who provide a variety of services from food and lodging to flight seeing, backcountry drop-offs, and guided hunting and fishing. The NPS provides visitor orientation and interpretive programs at the Slana Ranger Station and a public use cabin.

Chisana is a historic mining town in the northeast corner of the Preserve. During the apex of the mining era it was the largest log constructed town in the State. Today it is a mixture of public and private lands that is accessed via airplane. Recreational opportunities in this area include many of the same activities mentioned for the Nabesna

area- hiking, sightseeing, backpacking, camping, sport hunting, touring historic districts, fishing, boating, and flight seeing. There are also hunting guide outfitters in this location. A number of visitors explore the historic structures in Chisana and in the Gold Hill area where the placer gold was mined. The NPS has exhibits and historic photographs at the Commissioner's Court in Chisana and a public use cabin.

The McCarthy Road corridor has a few trails that provide visitors with recreational opportunities. They include the Nugget Creek Trail, Dixie Pass and Crystalline Hills. Nugget Creek is a multiple use trail with a public use cabin at its terminus. Dixie Pass is a popular backpacking route and Crystalline Hills is a day hiking trail. A number of small lakes are adjacent to the road where there is fishing. There are a number of historic structures for visitors to enjoy since the road follows the Copper River and Northwestern railroad route. The Kuskulana Bridge and Gilihina Trestle are two of the more significant structures. As on the Nabesna Road, there are a number of commercial operators that provide services along the route. The NPS provided visitor orientation at the Chitina Ranger Station at the beginning of the McCarthy Road. There is a public use cabin at the terminus of the Nugget Creek Trail.

The towns of McCarthy and Kennecott are a visitor destinations and portals to enter the larger backcountry and wilderness areas. Visitors have opportunities to tour the historic towns of McCarthy and Kennecott. A history museum is in McCarthy. Day hiking is available to the Copper Mines above Kennecott Mill Town and out the Root Glacier Trail. Commercial operators provide air taxi service to back country and wilderness destinations. There are mountaineering, hiking, and rafting guide services, including glacier hiking and ice climbing and a concessioner who provides guided tours of the Kennecott Mill Building. A full spectrum of lodging and restaurant opportunities are available at McCarthy and Kennecott. The NPS provides visitor information and interpretive programs at the McCarthy Road Information Station and the Kennecott Visitor Center.

Overall, visitors to these areas typically expect the following recreational settings:

Area feels accessible and frequently visited, but the landscape is still primarily natural with few visible reminders of permanent human presence once you leave the road corridor or town. In the portal access areas visitors will find trails, campsites, airstrips, and primitive toilet facilities. Visitors experience solitude most of the time, but they may encounter up to 10 parties a day and opportunities for solitude are limited during popular use times. Visiting the area requires a moderate degree of self reliance, advance planning, and time commitment.

Minor resource impacts may be common at access points, but resources impacts are infrequent elsewhere. Social trails may be common in some places, such as popular access points. Infrequent transient evidence of human activity occurs elsewhere.

Natural sounds are undisturbed the greater part of the time over the area. Depending on the season, weather, and proximity to travel corridors, there may be frequent intrusions of

human noise from snowmobiles, aircraft, ORVs, and highway vehicles, some of which may be loud.

3.5 Soils

The areas affected by the proposed action are located in the Copper River Plateau, South Central Alaska Mountains, and Alaska Range Land Resource Areas as described by the Exploratory Soil Survey of Alaska (Rieger, 1979). The discussion below and Soils Appendix H describes the Land Resource Areas and the soil associations within the Nabesna, McCarthy Road, and Chisana areas separately.

3.5.1 Copper River Plateau Land Resource Area and Soil Map Components

The Exploratory Soil Survey describes the Copper River Plateau as a broad basin of rolling to hilly moraines and glacial lacustrine sediment, interspersed with many lakes. Within Wrangell-St. Elias Park and Preserve the plateau is bordered by Wrangell Mountains to the east, the Chugach Mountains to the south and the Alaska Range - Mentasta/Nutzotin subunit to the north. Arms of the plateau unit extend up into the headwaters of the upper Copper River in the Nabesna area, and the middle Copper River valley roughly from Copper Center down river below McCarthy.

Elevations range between 1,500 and 3,000 feet for this unit in the study area. Within this elevation range the unit is generally covered with a forest of black spruce and willow. Along the Copper and Chitna Rivers are second-growth forests of white spruce, paper birch and quaking aspen. Similar forests occur in a few places at higher elevations on steep south-facing slopes. The climate is strongly continental with long and cold winters and short relatively warm summers. Mean annual temperatures are below freezing and precipitation is light to moderate. Summer frosts are common in this area.

3.5.1.1 Nabesna Area

There are four soil mapping units within the Copper River Plateau Land Resource Area in the Nabesna Area.

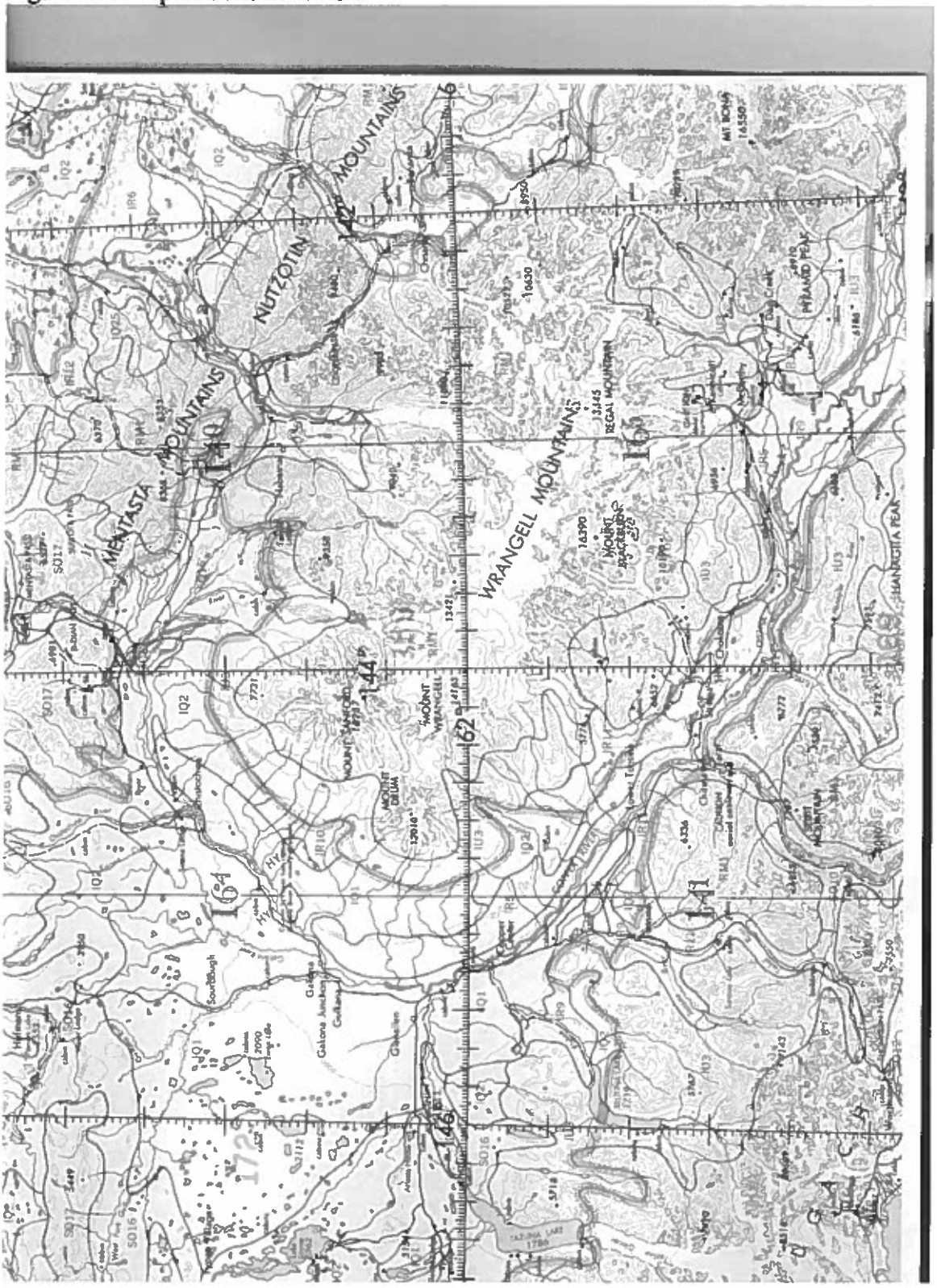
IQ-15

The most extensive of the four soil mapping units is IQ-15. It occupies the broad relatively flat outwash plain north of Tanada and Copper Lakes and the lower piedmont slopes east of Slana. The majority of soils within this unit are poorly drained and shallow to permafrost. They formed in very gravelly glacial drift or outwash. Some associated soils are well drained and occur on higher terraces. Small ponds and lakes are common within this unit.

IQ-6

The IQ-6 mapping unit occupies the area immediately surrounding Slana. It occupies a landform shaped by the Copper River. Meandering sloughs, small rivers and undrained

Figure 3.5. Map of Soils in WRST



depressions are common in this unit. Most of the poorly drained loamy soils formed in nonacid or calcareous alluvium.

IQ-2
The IQ-2 mapping unit occupies the area immediately west and south of Slana. It is characterized by nearly level to rolling ground moraines, outwash plains, and long mountain slopes. Some moraine hills, small floodplains, and a few stream terraces are included. The dominant soils in this association formed in silty material of variable thickness over very gravelly drift. Most of the soils have a shallow permafrost table, but in some of the very gravelly well drained soils permafrost is deep or absent.

SO-17
The SO-17 is found on the southwest facing steeper slopes of the Mentasta Mountains southeast of Slana. It occupies alpine areas adjoining mountains of the Alaska Range. High sharp ridges and peaks of bare rock or rubble, steep mountain sides, and deep glacial valleys dominant the landscape. Most of the soils formed in very gravelly and stony colluvium or glacial drift under a cover of alpine tundra. Although the mean annual soil temperature is below freezing, most soils do not retain enough moisture for the formation of ice-rich permafrost.

3.5.1.2 McCarthy Road Area

There are three soil association mapping units within the Copper River Plateau in the McCarthy Road area of the study unit.

IR-11
In the area down river from Copper Center to just west of McCarthy the dominant soils unit is IR-11. This soil unit occupies moraines and mountain foothills within the Copper River valley. The landscape is made up of hills and ridges formed in thick deposits of very gravelly till and colluvium, but a few soils on steep ridges and peaks are shallow over bedrock. Most of the soils in this association formed in deposits of very gravelly till and colluvium, but a few soils on steep ridges and peaks are shallow over bedrock. The dominant soils are well drained without. They occur on nearly all slopes below tree line except those facing directly north. Poorly drained soils with permafrost occur in valleys and on steep north-facing slopes.

IR-5
The IR-5 soil unit occupies the north side of the Copper River valley from Lower Tonsina to just west of McCarthy. This soil association occupies low moraines, former lake basins and terraces in areas close to the Copper River. Though much of the area is nearly level to rolling a few steep narrow valleys of deeply incised streams are included. The principle soils formed in a silty loess mantle of variable thickness over very gravelly drift on moraines and clayey lacustrine sediment in former lake basins and terraces. A thin layer of volcanic ash may occur on some surfaces. Soils under forests of white spruce, quaking aspen and paper birch are well drained and free of permafrost. They are

commonly interspersed with scattered areas of poorly drained soils with a shallow permafrost table.

IR-9
In the area downstream from McCarthy within the greater Copper River valley is the IR-9 soil association. This group of soils occupies broad plains bordering the tributaries to the Copper River. Nearly level forested terraces interrupted by low floodplains along the rivers dominant the landscape. Short steep escarpments on terrace edges and a few rolling moraines are included. The dominant soils are formed in well drained silty loess over thick deposits of very gravely outwash. Poorly drained soils with permafrost support forests in valley bottoms and in broad swales in terraces. Also included are poorly drained deep fibrous peat soils in scattered depressions.

3.5.2 Alaska Range Land Resource Area and Soil Map Components

The Exploratory Soil Survey describes the Alaska Range Land Resource Area as a long, relatively narrow mountain chain that arcs around south central Alaska and separates it from the hills and lowlands of the State's interior. Within the study area, it forms the northern edge of the Nabesna subunit, and the area surrounding Chisana and the upper White River. The Mentasta and Nutzotin Ranges located in these areas are named subunits of this Land Resource Area. Overall the unit is very rugged with extensive high mountains and a number of low passes that permit relatively easy passage through the range. Almost all of the landforms are of glacier origin. The transition to adjoining lowlands is generally sharp. Most of the high slopes are bare. Shrubby alpine vegetation covers most of the lower slopes and passes. Black spruce forests occupy some lower slopes, and natural grasslands occur in a few places. Mean annual temperatures are well below freezing even in low passes. Precipitation is fairly heavy on southern and southeastern slopes.

3.5.2.1 Chisana and White River Area

There are two soil associations within the Alaska Range Land Resource Area in the Chisana and White River Area: IQ-25 and RM-1.

IQ-25
The IQ-25 soils association occupies the area surrounding Chisana and upper White River. This association occupies foothills and high mountain valleys such as those surrounding Chisana and the White River. Most of the association is above tree line. The soils have developed predominantly in glacial till, with a thin mantle of volcanic ash or loess in places. Bedrock outcrops on peaks and ridges and loose rubble occurs in many high areas. Most soils are poorly drained, but well drained soils have developed in very gravelly material at the foot of high ridges and on some south-facing slopes and hilly moraines at lower elevations.

RM-1

The RM-1 unit is made up of steep rocky slopes, ice fields, and glaciers. Some slopes in the mountains support a sparse shrubby vegetation cover, but most are barren. Thin soils occur in the vegetated areas on lower slopes and in valleys, but almost all are stony and shallow over bedrock or boulder deposits.

3.5.3 South Central Alaska Mountains Land Resource Area and Soil Map Components

The Exploratory Soil Survey delineates this land resource area to include the Wrangell Mountains. Both the southern fringe of the Nabesna area and the northern fringe of the McCarthy area –including McCarthy and Kennicott town sites, and the headwaters of the Kotsina, Kuskulana, Chokosna, and Gilahina Rivers fall within this area. Within this resource area, a large ice field caps the Wrangell Mountains and numerous glaciers descend its flanks to form moraines, outwash plains, and other glacial features. These are clearly visible on lower slopes and in areas adjacent to the mountain. This area has relatively low precipitation and marked seasonal temperature differences with interior Alaska. At higher elevations precipitation is mostly snow which is incorporated into the glacial ice even in summer time.

3.5.3.1 Nabesna Area

Within the Nabesna area two soil mapping units are found: IU-25, and IU-3.

IU-25
This soil association is located in the uplands east of Tanada Lake and the area surrounding Nabesna. Most of the association is above tree line. The soils are dominantly formed in glacial till with a thin mantle of volcanic ash or loess in places. Bedrock outcrops on peaks and ridges and loose rubble occurs in many high places. Most soils are poorly drained. Well drained soils have developed in very gravelly material at the foot of high ridges and on some south-facing slopes and hilly moraines at lower elevations.

IU-3
This soil association occupies hilly alpine plateaus, rocky peaks, sharp ridges, steep mountain valleys and foot slopes. It includes the area south of Tanada and Copper Lakes and the head waters of Copper River and Drop Creek. The dominant soils in most areas formed in very stony and gravelly colluvial material of variable thickness over bedrock, but some of the soils in valleys and on foot slopes in glaciated areas formed in deposits of till.

3.5.3.2 McCarthy Road Area

Three soil association units within this Land Resource Area are found within the McCarthy Road area.

IU-3
The IU-3 map unit is located in the highlands both north and south of the McCarthy

Road. The description for the unit in this area is identical for the IU-3 unit described for the Nabesna area presented above.

IR-11
The IR-11 soil association is located in the area surrounding and immediately south of May Creek, the steep slopes north of the McCarthy Road, and the mountain foot slopes south of the Copper River. This soil unit occupies moraines and mountain foothills within the Copper River valley. The landscape is made up of hills and ridges formed in thick deposits of very gravelly till and colluvium, but a few soils on steep ridges and peaks are shallow over bedrock.

RM-1
The RM-1 unit is made up of steep rocky slopes, ice fields, and glaciers. Some slopes in the mountains support a sparse shrubby vegetation cover, but most are barren. Thin soils occur in the vegetated areas on lower slopes and in valleys, but almost all are stony and shallow over bedrock or boulder deposits.

3.5.4 Soils in Established Access Facilities:

The degree to which soils are impacted is a function of the established level of development (covered, bladed, or trammeled), use of motorized vehicles (frequency, vehicle class, period of use) ongoing maintenance (grading, ditching, and placing fill) as well as natural processes responding to these disturbances. Direct soil impacts are primarily confined to the established access disturbance footprint. Within established facilities soils have degraded through compaction, erosion and thermokarsting. Many sections of the established facilities are impacted and have lost soil and/or exposed underlying unconsolidated surficial mineral deposits. Impacts are worst on those portions of facilities which pass through wetlands or traverse steep slopes.

Impacts to soils adjacent to a facility principally result from indirect consequence to the surface hydrology and changes to the underlying permafrost. These include the disruption of surface water flow, reductions in infiltration and percolation, surface ponding, and the loss of water-holding capacity. Other indirect impacts include wind and water erosion and deposition of transported material.

For constructed facilities where gravel has been placed to support the passage of motorized vehicles, the principle affect on soils is that the in situ soils are covered. Soils in established facilities that were bladed with motorized equipment such as a bulldozer commonly have had all or most of the organic soil horizon removed from the facility footprint and some of the underlying mineral soils. Soils underlying unimproved ORV trails and 4-wheeled drive tracks are impacted from wheel contact by abrasion, shearing, compression, and displacement within the established footprint. For established facilities located in barren floodplains and relatively young upland terraces containing a gravel and/or sand substrate which are generally well drained, the impacts are negligible principally because of the lack of any well developed soils.

3.6 Vegetation and Wetlands

The spatial extent evaluated in this environmental assessment is that portion of the park north of the Chitina River, south of the Mentasta and Nutzotin Mountains, east of the Copper River and west of the Alaska-Yukon border. It also includes the Malaspina Forelands in Yakutat Bay on the coast of the park. Facilities are located within the Nutzotin, Mentasta, and southern Wrangell Mountain foothills and mountains and within the Upper Copper, Chitina, Nabesna, Chisana and White River basins. The study area traverses three climate divisions (coastal, interior basin and Copper River (Milkovich 1989)) and eight ecological regions (Nowacki et. al. 2001). This area is in the subarctic vegetation region and is dominated by boreal forest vegetation below tree line (approximately 3000 ft), mixed shrub and herbaceous types near tree line and alpine tundra communities above tree line.

Four components of vegetation are addressed in this description and the analysis in Chapter 4. These are: (1) vegetation in general - which includes structure, distribution, abundance and composition of plant species; (2) wetlands, (3) exotic plants, and (4) rare plants. Wetlands, exotic and rare plants are sub-components of vegetation but are discussed separately. The term 'vegetation' refers to plant community structure, distribution and composition. The term 'wetland' refers to jurisdictional wetlands as defined by the National Park Service Director's Order #77-1 and Cowardin et al. 1979. Landform, landcover and vegetation descriptions that follow for the regions adjacent to the Nabesna and McCarthy Road are from 2006 field surveys conducted by Mike Loso (Loso 2006). Vegetation and landcover data for other regions were derived from digital landcover data as referenced below. Wetland descriptions and estimates were derived from National Wetland Inventory (NWI) maps that cover the Nabesna Road, the Western Wrangells and Malaspina Forelands, digital landcover maps and field surveys conducted by Mike Loso in 2006 and the park botanist in previous years. Information on exotic plants is from the park's voucher data (NPSpecies), the Alaska Exotic Plant Information Clearinghouse (AKEPIC) Database, and surveys conducted from 2004-2006 by the National Park Service Alaska Exotic Plant Management Team from (EPMT). Data on rare plant distribution in the park is from NPSpecies, surveys conducted in the park from 1994-1997 and 2003, historical collections and voucher collections at the University of Alaska Fairbanks. Vegetation types are generally to level four of the Alaska vegetation classification (Viereck et. al. 1992), wetland classes are those used by the USFWS National Wetland Inventory program (Cowardin et al 1979), and plant nomenclature follows Hultén (1968) and Cody (1996).

3.6.1 Vegetation

Vegetation types that occur on and near facilities are listed in Table 3.1 and described by region below.

Table 3.4 Vegetation Types in Facilities.

Region	Vegetation Types within Facilities
Nabesna Road	Open white spruce forest White spruce woodland Black spruce woodland Open mixed white spruce-poplar forest Open low willow-graminoid shrub bog Open tall willow scrub Herbaceous seral
McCarthy Road	Closed white spruce forest Open white spruce forest White spruce woodland Closed mixed aspen-white spruce forest Closed mixed forest Open mixed forest Open black spruce forest Open low willow-graminoid shrub bog Open low mixed shrub-sedge tussock bog Willow-birch shrub Alpine forb herbaceous Open dwarf scrub
Chisana River (Cathenda Creek)	Woodland needleleaf forest Open needleleaf forest Disturbed graminoid-forb herbaceous Dwarf shrub sedge bog Dwarf shrub-scrub
Gold Hill	Dwarf shrub scrub Dwarf shrub-sedge bog
White River	Seral forb herbaceous Woodland needleleaf forest Closed dwarf shrub Open dwarf shrub-scrub Willow-birch shrub-scrub
Horsfeld & Beaver Creek	Open dwarf shrub sedge bog Woodland needleleaf forest
Francis & Ptarmigan Creeks	Disturbed graminoid-forb herbaceous Needleleaf woodland Open dwarf shrub-scrub
Western Wrangell Mountains	Seral dry forb herbaceous Closed tall shrub scrub Open tall shrub scrub
Chitina River	Woodland needleleaf forest Closed needleleaf forest Open needleleaf forest Willow-alder shrub-scrub Closed dwarf shrub-scrub Willow-birch shrub-scrub
Malaspina Forelands	Non-vegetated coastal strand Sparsely vegetated graminoid-forb herbaceous

3.6.1.1 Nabesna Road

Vegetation communities in the vicinity of the Nabesna Road are primarily distributed in relation to depositional features created by glacial Lake Ahtna, ground moraines left behind after the Wisconsin Glaciation in the Alaska Range, recent alluvial deposits from drainages flowing from the Mentasta Mountains, older alluvial deposits on these river terraces and inactive fluvial terraces. The dominate vegetation types along the Nabesna Road associated with facilities evaluated in this document are: open white spruce forest, white spruce woodland, black spruce woodland, open mixed white spruce-poplar forest, open low willow-graminoid shrub bog, open tall willow scrub and herbaceous seral communities (Loso 2006).

3.6.1.2 McCarthy Road, McCarthy, & Kennicott

Facilities accessible from the McCarthy Road are on river terraces and moraines in the Kuskulana and Kotsina River drainages, alluvial fans emanating from the southern Wrangell Mountains in the Chokosna River drainage and terraces in the Crystalline Hills formed by the retreat of glacial Lake Ahtna. Facilities in the Kennicott and McCarthy Creek drainages are in inactive river channels, on ground and terminal moraines and on outwash floodplains. Outwash areas on the Kennicott River floodplain have primary succession vegetation. Most of the forested area directly adjacent to the McCarthy Road has been logged for the Kennicott railroad construction or was burned in historical fires. This area has been heavily infested by the spruce bark beetle. The following vegetation types are found within facilities accessed from the McCarthy Road: closed white spruce forest, open white spruce forest, white spruce woodland, closed mixed aspen-white spruce forest, open mixed white spruce-poplar forest, closed mixed poplar-white spruce forest, open black spruce forest, open low willow-graminoid shrub bog and open low mixed shrub-sedge tussock bog (Loso 2006). The vegetation types in the upper Kotsina River drainage in the vicinity of facilities are: willow-birch shrub (90%), woodland needle leaf forest, open mixed forest and closed mixed forest (Alaska Department of Natural Resources 1985). Vegetation types near facilities in the Upper Kuskulana River drainage are alpine forb herbaceous (90%), open dwarf scrub and willow-birch shrub.

3.6.1.3 Western Wrangell Mountains

Facilities in the western Wrangell Mountains are located on floodplains, river terraces and lateral moraines of the Sanford and Cheshnina River drainages flowing from Mounts Drum and Sanford between 2,500 and 3,500 foot elevation. Floodplains are barren with seral dry forb herbaceous vegetation; whereas lateral moraines and river terraces have closed tall shrub and open tall shrub landcover types (Pacific Meridian Resources 1995).

3.6.1.4 Upper Chitina River Valley

Facilities in the Chitina River Valley are located on river terraces, floodplains and lateral moraines from 1,250 to 3,300 foot elevation. River terraces are predominately vegetated with woodland needleleaf forest with areas of closed forest, open needleleaf forest, and

willow-alder shrub (Alaska Department of Natural Resources 1985). Lateral moraine vegetation is also predominately woodland needleleaf forest with areas of closed dwarf shrub and willow-birch shrub.

3.6.1.5 Chisana River, White River, and Nutzotin Mountains

Facilities accessed from Chisana are on river terraces and floodplains of the Chisana River and White River drainages (including Cathenda Creek, Beaver Creek, Horsfeld Creek, Francis Creek and Ptarmigan Creek) from 3,200 to 3,550 foot elevation. There are also facilities in upland areas of the eastern Nutzotin Mountains in the Gold Hill area (between Big Eldorado and Bonanza Creeks) and on a northwest facing slope above Snag Creek. Elevations in the upland areas range from 4,500 to 5,000 feet.

Vegetation at Chisana (on the river terraces and floodplains of the Chisana River and Cathenda Creek) is predominately disturbed graminoid-forb herbaceous surrounded by woodland needle leaf forest (80%), dwarf shrub sedge bog (5%), open needle leaf forest (10%) and dwarf shrubs (5%) (Alaska Department of Natural Resources 1985). Facilities in the upper White River are located on active and inactive floodplains (90%) with seral herbs, and on river terraces (10%) with woodland need leaf forest, closed dwarf shrub, open dwarf shrub, and willow-birch shrub vegetation types. The facilities in the floodplains and river terraces of Beaver and Horsfeld Creek are located in open dwarf shrub (50%); dwarf shrub sedge bog (25%) and woodland needle leaf forest (25%). Vegetation of facilities in the Francis and Ptarmigan Creek drainages is primarily disturbed graminoid-forb herbaceous surrounded by need leaf woodland (95%) and open dwarf shrub (5%).

Seral herbs, open tall scrub and need leaf forest occur in and adjacent to creeks in the Gold Hill area. The remaining uplands at Gold Hill are predominately subalpine to alpine dwarf shrub and dwarf shrub-sedge bog plant communities. The upland slopes above Snag Creek range from barren alpine scree at the highest elevation to woodland need leaf forest on the moraine above the creek.

3.6.1.6 Malaspina Forelands

Facilities in Yakutat Bay on the Malaspina Forelands near Point Manby are in non-vegetated coastal strand and sparsely vegetated graminoid-forb herbaceous plant communities (USGS 1987).

3.6.2 Wetlands

National Wetland Inventory (NWI) maps have been completed for only 15 of the 68 USGS 1:63360 quadrangles covering the study area, so a summary of the wetland types in the study area is limited. Although the extent of wetlands has not been mapped for the park (there is no park-wide vegetation map), 50.7% of the surface area of Alaska is classified as wetlands (Hall, Frayer and Willen 1994) and we estimate a similar ratio for the vegetated landscape of this park. One NWI map covers a portion of the Nabesna

Road, one covers a small portion of the McCarthy Road (but there are no facilities on this map) and there is coverage of a portion of the Malaspina Forelands where there are facilities. There are no NWI maps in the Chisana area. A landcover map for a portion of the study area (Pacific Meridian 1977) indicates that the forested and scrub-shrub wetland types are common throughout the park. Riverine and lacustrine wetland types are also common throughout the park as are estuarine and marine communities on the coast.

The ice-free acreage for the park is approximately 8.4 million acres. Summarizing wetland landcover types for a portion of the park indicates that 52% of the mapped area has wetland landcover types. Application of this ratio to the ice-free area of the park results in an estimated 4.4 million acres of wetland in the park. Established facilities cover a maximum of 50 acres, a portion of which are classified as wetlands - an estimated 15.5 miles (Table 3.5). Regional descriptions of wetlands and known facilities follow.

3.6.2.1 Nabesna Road

The vegetation map for the Nabesna Quad (Alaska Department of Natural Resources 1985) indicates that woodland forest was 41% of the quadrat and other wetland types (wet sedge meadow, wet herbaceous meadow, dwarf shrub-sedge bog, floating and emergent aquatic and deep water) were 11% of the mapped area. Three facilities accessed from the Nabesna Road that are within the area mapped by the National Wetland Inventory program cover approximately 3.05 miles of palustrine needle-leaf forest, palustrine scrub-shrub and palustrine emergent wetlands. Field surveys during 2006 along the Nabesna Road indicated that an additional 0.07 miles of two facilities are within white spruce woodland forested wetlands (Loso 2006).

3.6.2.2 McCarthy Road, McCarthy, and Kennicott

Portions of four facilities accessed from the McCarthy Road are within forested or scrub-shrub wetlands (Loso 2007). Approximately 825 ft are adjacent to open low willow graminoid shrub bog or mixed shrub sedge tussock bog communities and approximately 3,656 feet are adjacent to an open black spruce forested wetland community.

3.6.2.3 Chisana River, White River and Nutzotin Mountains

A maximum of 2,800 feet along an access route in the Cathenda Creek floodplain may be within riverine wetlands. The White River facilities most likely occur in riverine and shrub-scrub wetlands. Palustrine scrub-shrub, forested, emergent and moss-lichen wetlands occur in the Horsfeld and Beaver Creek drainages. Ptarmigan and Francis Creek drainages are predominately palustrine forested and scrub shrub wetlands. Facilities at Snag Creek are not adjacent to or in wetlands.

Table 3.5 Estimated miles of established access to facilities that may pass through or be adjacent to wetlands.

Region	Miles	Wetlands Types
Nabesna Road	3.12	Palustrine forested Palustrine scrub-shrub Palustrine emergent
McCarthy Road	0.85	Palustrine forested Palustrine scrub-shrub Palustrine emergent
Chisana River (Cathenda Creek)	0.53	Palustrine unconsolidated shore Riverine unconsolidated shore Riverine unconsolidated bottom Riverine emergent
Gold Hill	8.44	Palustrine scrub-shrub Palustrine moss-lichen
White River	0.90	Riverine unconsolidated shore Riverine unconsolidated bottom Riverine emergent Palustrine scrub-shrub Palustrine unconsolidated shore
Horsfeld & Beaver Creek	0.81	Palustrine scrub-shrub Palustrine moss-lichen Palustrine emergent Palustrine forested
Western Wrangell Mountains	0.20	Palustrine unconsolidated shore Riverine unconsolidated shore Riverine unconsolidated bottom
Upper Chitina River	0.22	Riverine unconsolidated shore Riverine unconsolidated bottom Riverine emergent Palustrine unconsolidated shore
Malaspina Forelands	0.43	Estuarine subtidal unconsolidated bottom Estuarine intertidal unconsolidated shore
Total:	15.50	

3.6.2.4 Western Wrangell Mountains

Facilities on the upper Sanford River are just outside a NWI map which covers the adjacent portions of the Sanford River. Wetland types found here are: riverine unconsolidated shore, riverine unconsolidated bottom and palustrine unconsolidated shore. Facilities in the upper Cheshnina River drainage are most likely in upland, non-wetland communities.

3.6.2.5 Upper Chitina River Valley

Riverine unconsolidated shore, riverine unconsolidated bottom, riverine emergent and palustrine unconsolidated shore wetlands are found adjacent to facilities in the Chitina River drainage.

3.6.2.6 Malaspina Forelands

According to the NWI map for the Yakutat Quadrat, access to facilities on the Malaspina Forelands is through estuarine wetland plant communities.

3.6.2.7 Unique/Special Wetland Communities

The dominate wetland types on facilities are palustrine forested, palustrine scrub-shrub, and palustrine emergent, common wetland types in the park. It is not known if special or unique wetland communities occur on facilities since wetland inventories of all facilities have not been conducted and most of the park's wetlands have never been surveyed. However, 25% of the rare plant species that occur in the park are restricted to wetlands. Rare species and their communities are unique components of our ecosystems and are sensitive indicators to change as indicated by the fact that 45% of the nation's Threatened and Endangered Species depend on wetlands (Hall 1998). The following rare plants have been documented in wetlands in the vicinity of facilities and these communities should be considered sensitive:

Nabesna Road: *Carex atratiformis* and *Montia bostockii* - Lost Creek drainage (palustrine scrub shrub wetland).

McCarthy Road: *Carex lapponica* (Kuskulana River drainage -palustrine scrub shrub wetland), *Cypripedium parviflorum* (Gilihina River drainage - palustrine emergent wetland), *Myriophyllum verticillatum, Najas flexilus* and *Potamogeton subsibiricus* (Chokosna River drainage - palustrine scrub-shrub wetland and palustrine emergent wetland).

Upper Chitina River Valley: *Carex atherodes, C. parryi, C. eburnea* and *Tricophorum pumilum* var. *rollandii* (Barnard Glacier terminus, Clear Stream, Short River Pond, palustrine scrub shrub wetland and palustrine emergent wetland).

Chisana Vicinity: *Carex holostoma* (Horsfeld Creek - palustrine scrub shrub wetland).

3.6.3 Exotic Plants

Exotics plants are spreading along the road systems of Alaska and pose a threat to the native plant communities within the park (Lapina & Carlson 2004, AKEPIC 2005). There are 26 non-native plants known to occur on NPS land within this park, 14 of these are considered invasive by the Alaska Exotic Plant Information Clearinghouse (AKEPIC) and are referred to in this document as exotic species. An additional twelve exotic species

occur along state roads into the park, on private lands within the park or on the highways in the Copper River basin. (See appendix I.) No exotic plants have been documented for the Western Wrangell Mountains and Malaspina Forelands. Exotic plant concerns in the remaining regions are described below.

3.6.3.1 Nabesna Road

There are 11 exotic species occurring in the vicinity of the Nabesna Road. The most problematic is an extensive population of *Melilotus alba* (white sweet clover) at the junction of the Tok Cutoff and the Nabesna Road. This species is highly invasive and has been documented colonizing natural riverine habitats in southeast Alaska. It has the potential to spread down the Nabesna Road and into the Slana, Copper and Nabesna rivers. Along the road system, it successfully out competes all other herbaceous species due to its rapid growth of a deep taproot and extremely high seed output. Control efforts for the past five years at this location have had positive results, however, populations of white sweet clover on the rest of the road system in the Copper River Basin have continued to spread.

Compared to the McCarthy Road, the Nabesna Road is relatively weed free. There are a few small populations of *Crepis tectorum* (narrowleaf hawksbeard) and *Lappula squarrosa* (European stickseed) that have been controlled as well as scattered populations of *Taraxacum officinale* (common dandelion) that are being monitored and controlled. A population of *Lappula squarrosa* was also documented at Reeves Field at the end of the Nabesna Road in 1996. The other exotic species on the Nabesna Road are species commonly found near habitation, have occurred along the road for at least 20 years and are less likely to be a threat to native plant communities.

3.6.3.2 McCarthy Road, McCarthy, & Kennicott

Exotic plant species have been rapidly spreading from both ends of the McCarthy Road such that in the summer of 2006, there were very few areas along the McCarthy Road that were free of exotic species. One relatively weed free area is the west end of the Crystalline Hills. A growing population of *Melilotus alba* near the Chitina Airport on the Edgerton Highway has the potential to spread into the Copper and Chitina River drainages and down the McCarthy Road.

There are 15 exotic species documented along the McCarthy Road and 17 exotic species known to occur in the communities of McCarthy and Kennicott. Factors contributing to the spread of exotic plants in these areas include: extensive road work along the McCarthy Road in the past few years with the moving of infested fill one area to another; the increase in the number of vehicles using the road to access McCarthy and Kennicott, many of these traveling from the Anchorage area where weed seed is prevalent; increased development of private lands adjacent to the road and in Kennicott and McCarthy; and, increased visitor use of Kennicott and McCarthy with the spread by foot and clothing of exotic weed seed and material.

Fortunately, exotics have not yet been documented on park lands adjacent to the McCarthy Road except a population of *Bromus inermis* (smooth brome) which has spread from road fill to an adjacent drainage near Long Lake. However, without some control, there are many other species that may soon invade native plant communities adjacent to the road, particularly along creeks and drainages. *Vicia americana* (American vetch), considered a native to southeast Alaska, is spreading along the road at Long Lake into the adjacent forest. An undetermined *Vicia* has also been reported from park land adjacent to a facility at Crystal Creek. *V. americana* is as invasive in its life history as the problematic *Vicia cracca* (tufted bird vetch) which is spreading along the road system from Anchorage.

Exotics in McCarthy and Kennicott are primarily associated with private land. The two species that are spreading most rapidly (and which the NPS has been trying to control) are *Taraxacum officinale* (which has been spreading steadily out the Root Glacier trail and up the Bonanza Ridge trail), and *Leucanthemum vulgare* (oxeye daisy) which has been spreading downslope from the Kennicott Lodge where it is planted as an ornamental. *Taraxacum officinale* is likely to out compete the native dandelions that were known from the Bonanza Ridge trail as well as other native species, particularly some rare sub-alpine species documented by Nordell and Schmitt (1974). *Leucanthemum vulgare* has invaded the roadsides south of Anchorage and has displaced the native seral communities throughout much of the Kenai Peninsula. It has been spreading rapidly down the moraines from the Kennicott Lodge and could invade the Kennicott floodplain and adjacent drainages and out compete the native floodplain seral communities.

3.6.3.3 Chisana River, White River & Nutzotin Mountains

No exotic plant inventories have been conducted in the Nutzotin Mountains except for the Chisana airstrip where three exotic plant species were documented: *Lappula squarrosa* (European stickseed), *Bromus inermis* and *Descurania sophia* (flixweed) (McKee 2003). Vouchers of other exotic plants have been made from Stuver Creek (*Taraxacum officinale*), Horsfeld Creek (*Poa pratensis* ssp. *pratensis* - Kentucky bluegrass) and the White River (*Achillea millefolium* - common yarrow). It is likely that exotics occur at other airstrips and within grazing areas in the park.

3.6.3.4 Upper Chitina River Valley

Lappula squarosa was collected in 1984 from a grazing lease in the Chitina River and from two localities at the head of the Chitina River in 1995 and 2003 (Blondie Ridge and Baldwin Glacier). *Polygonum aviculare* (prostrate knotweed) was collected on Mt. Chitina at the head of the Chitina River in 1995.

3.6.4 Rare Plants

Botrychium lineare (slender moonwort - Ophioglossaceae), a USFWS candidate for the Threatened and Endangered List is known from two localities in the park: an off-road

vehicle trail connecting to the Chisana airstrip, and a remote bluff above the Chisana River. It could occur in facilities at Chisana.

The state of Alaska does not have a rare plant list. However, federal agencies in Alaska use the Alaska Natural Heritage Program (AKNHP) rare vascular plant tracking list to guide their protection of rare plants and their habitat. Species with a state rank of three or less (known from less than 100 occurrences in the state) are on this list and it is National Park Service policy to avoid actions that would have negative effects on these species and their habitat. There are 89 species in the park that are on the 2007 AKNHP rare vascular plant tracking list for the park (appendix J). Twenty-five of these rare species have been documented adjacent to facilities. These are:

Nabesna Road

Carex atratiformis
Montia bostockii
Phacelia mollis

McCarthy Road, Kennicott & /McCarthy

Carex lapponica
Cypripedium parviflorum
Juniperus horizontalis
Myriophyllum verticillatum
Najas flexilus
Papaver alboroseum
Potamogeton subsibiricus
Viola selkirkii

Upper Chitina River Valley

Arenaria longipedunculata
Carex atherodes
Carex parryi
Carex eburnea
Douglasii gormanii
Juniperus horizontalis
Montia bostockii
Poa secunda subsp. *secunda*
Stellaria alaskana
Tricophorum pumilum var. *rollandii*

Malaspina Forelands

Salix hookeriana

Chisana River, White River & Nutzotin Mountains

Botrychium lineare
Botrychium tunux
Botrychium yaaxudakeit
Carex holostoma
Cryptogramma stelleri
Draba stenopetala

Based on their known spatial and ecological distribution in the park, an additional 15 species have the potential to occur in or near facilities. These are:

Astragalus harringtonii
Carex adelostoma
Carex laxa
Carex phaeocephala
Ceratophyllum demersum
Chamaerhodos erecta
subsp. *nuttallii*
Elymus calderi
Eriophorum viridicarinatum
Limosella aquatica
Lupinus kuschei
Pedicularis macrodonta
Poa leptocoma
Potamogeton obtusifolius
Salix setchelliana
Trisetum sibiricum
subsp. *Litorale*

3.7 Wilderness

The Wilderness Act of 1964 (P.L. 88-577) describes wilderness as an area "untrammeled by man…retaining its primeval character and influence, without permanent improvements of human habitation… [with] outstanding opportunities for solitude or a primitive and unconfined type of recreation." Wrangell-St. Elias National Park and Preserve is the largest unit of the national park system and includes the largest unit of the national wilderness preservation system. The wilderness was designated by ANILCA in 1980 and its size and scope give this wilderness national and international recognition. WRST contains approximately 9,677,000 acres of designated wilderness (NPS Wilderness FEIS 1988), or about 8.5% of the national wilderness preservation system. This encompasses approximately 200,000 acres of private lands.

ANILCA Section 707 directs that wilderness be managed in accordance with the Wilderness Act of 1964, except as otherwise expressly provided for in ANILCA. ANILCA Title XI offers specific exceptions to the Wilderness Act for the purposes of access. This provision extends special provisions for access to lands within WRST using motorized or mechanical means on permanent trails, roads or airstrips that would otherwise be prohibited.

3.7.1 NPS Management Policies

By policy the term "wilderness" includes the categories of eligible, study, proposed, recommended and potential, as well as designated. In policy, "the NPS will take no action that would diminish the wilderness eligibility of an area possessing wilderness characteristics until the legislative process of wilderness designation has been

completed." (NPS Mgt. Policies, Ch. 6.3.1, 2006). This includes use of the minimum requirements concept regardless of wilderness category.

Wilderness character is the fundamental concept in the Wilderness Act of 1964 and is broadly defined in Section 2(c) but is not further defined in NPS policies. Wilderness character is the overarching and supplemental park management goal for areas so delineated. The NPS manages wilderness areas to be protected and remain unimpaired for future enjoyment as wilderness. Any proposal having the potential to impact wilderness resources will be evaluated in accordance with NPS policy or implementing NEPA. In evaluating environmental impacts, the NPS will consider: 1) wilderness characteristics and values, including the primeval character and influence of the wilderness; 2) the preservation of natural conditions, and 3) assurance that there will be outstanding opportunities for solitude, that the public will be provided with a primitive and unconfined type of recreational experience, and that wilderness will be preserved and used in an unimpaired condition. (NPS Mgt. Policies, Ch. 6.3.4.3, 2006)

The management of rights-of-way in Alaska national park wilderness areas are directed by policies at 6.4.8, which indicate access procedures affecting these areas are governed by ANILCA and its regulations in 43 CFR Part 36 and 36 CFR Part 13. See section 1.3.1.2 for more in depth discussion of these policies.

3.7.2 WRST Wilderness

The Wrangell-St. Elias Wilderness encompasses a wide variety of terrain, including mountains, ice fields, beaches, boreal forest and alpine tundra. Wilderness resources (including undeveloped, untrammeled, naturalness and opportunity for solitude) are in excellent condition throughout most of the park and preserve. Wilderness areas are affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable, keeping them largely untrammeled and natural. Human use and occupancy has occurred for a long period in this conservation system unit, however, and some facilities and historic features are compatible with the wilderness character. The WRST designated and eligible wilderness areas already contain many anthropogenic features, which detract from its undeveloped character. These include roads, trails, airstrips, mines, communities, remote cabins and camps, seismic and climate monitoring stations, and radio repeaters. Nevertheless, the WRST's wilderness retains outstanding opportunities for solitude or a primitive and unconfined type of recreation. Visitors to WRST's remote backcountry areas rarely encounter other people or signs of human presence except at their access portal or in areas near developed roads or communities.

ANILCA Section 1317(a) directs the Secretary of the Interior to review the wilderness suitability of all National Park Service lands in Alaska not already designated as wilderness for future designation. Wilderness review criteria specific to WRST were developed to accomplish that task. The park completed its review in the mid-1980s and included its findings in its General Management Plan, the FONSI for which was signed on November 26, 1986. WRST identified seven general areas which do not meet wilderness criteria: 1) a narrow strip of land paralleling the shore of the Malaspina

Forelands is unsuitable because of commercial fishing activities; 2) the area around Chisana is unsuitable because of extensive mineral development and nonfederal interests; 3) several scattered parcels of federal land between the Copper River and Mt. Drum are unsuitable because they are surrounded by nonfederal lands; 4) the Kuskulana Valley is unsuitable because of mineral development and well-defined routes to several nonfederal interests; 5) an area east of McCarthy is unsuitable because of its extensive mining claims, active mining operations, human habitation, and numerous buildings; 6) an area between the Nabesna Road and Tanada Lake, and the Suslota Lake Trail north of the Nabesna Road that provides access to BLM lands north of the preserve, are unsuitable because of the impacts from regularly used access routes for subsistence, recreation, and nonfederal interests; and 7) the main road corridors, including the McCarthy Road, the Nabesna Road, the Dan Creek Road, and McCarthy-Kennecott Road. The are approximately 3,498,000 acres not designated as wilderness, of which 2,243,800 acres are considered suitable for future wilderness designation (NPS 1986 - WRST GMP pp 34-36).

The Wilderness Suitability Map presented in the WRST's General Management Plan (NPS 1986) reflects the finding described in the GMP/EA. Even small nonfederal parcels are excluded, as well as a half-mile-wide buffer on every side. This also applies to roads and trails, where a half-mile-wide buffer is excluded on each side of the corridor. Under these criteria, we anticipate that five of WRST's existing access corridors possess potential to affect either eligible or designated wilderness.

The full wilderness review process required under ANILCA section 1317(b) has not yet been completed. An EIS was drafted for WRST Wilderness Review (NPS 1988), but no final action was taken in the Secretary of the Interior's office and no record of decision was published in the Federal Register. This leaves all eligible wilderness acreage managed under NPS policies that protect wilderness character until Congress chooses to act.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Impact Criteria and Assessment

For each issue selected for detailed analysis (see section 1.4) and for which the subject resources are described in chapter 3, the direct, indirect, and cumulative effects are analyzed. The effects to the subject resources are analyzed on the basis of the duration, extent, and intensity of the impacts. Summary impact levels (characterized as negligible, minor, moderate, or major) are given for each issue topic in the analyses. Definitions of impact terms are provided below. Table 4-1 presents a summary of impact level thresholds.

Duration:

Temporary: Impacts would last no more than a season, or for the duration of the discreet activity, such as maintenance of a road or trail segment.

Long-Term: Impacts would extend for several years up to the life of the project.

Permanent: Impacts are a permanent change to the resource that would last beyond the life of the project even if the actions causing the impacts were to cease.

Context:

Common: The affected resource is widespread, and is not identified in enabling legislation as important to the park, nor is it rare within or outside the park. The portion of the affected resource impacted by the action does not fill a unique role within the park or its region of the park.

Important: The affected resource is identified by enabling legislation, or is rare either within or outside the park. The portion of the affected resource does not fill a unique role within the park or its region of the park.

Unique: The affected resource is identified by enabling legislation, and the portion of the affected resource uniquely fills a role within the park and its region of the park.

Intensity

Low: A change in resource condition is perceptible, but does not measurably alter the resource function in the park ecosystem, cultural context, or visitor opportunity.

Medium: A change in a resource condition is measurable or observable, and an alteration is detectable to the resource function in the park ecosystem, cultural context, or visitor opportunity.

High: A change in a resource condition is measurable or observable, and an alteration to the resource function in the park ecosystem, cultural context, or visitor opportunity is clearly and consistently observable.

Table 4.1 Summary Impact Levels

Negligible	Minor	Moderate	Major
Effects would tend to be low intensity, temporary, and would not affect unique resources.	Effects would tend to be low intensity and short duration, but common resources may sustain medium intensity and long-term effects.	Effects on common resources would tend to be medium to high intensity and long-term, while important and unique resources would tend to be affected by medium to low intensity and short-term to temporary impacts, respectively.	Effects would tend to be medium to high intensity, long-term to permanent, and affect important to unique resources.
Impairment occurs when a resource no longer fulfills the specific purposes in the enabling legislation or its role in maintaining the park's natural integrity.			

4.2 Cumulative Effects

As defined in 40 CFR 1508.7, cumulative impacts are the incremental impacts on the environment resulting from adding the impacts of an alternative to the impacts resulting from other past, present, and reasonably foreseeable future actions, including those taken by both federal and nonfederal agencies, as well as actions undertaken by individuals. Cumulative impacts may result from singularly minor but collectively significant actions taking place over a period of time. A simple way to view cumulative impacts is with an equation a + b = c, where "a" is the effects of past, present, and future impacts of human activities not addressed by the alternative, "b" is the effects of the alternative, and "c" is the total combined effects to the resource of all these activities. Cumulative impacts have been prepared for each impact topic for each alternative. These analyses are based on the following assumptions and list of relevant past, present, and foreseeable future actions.

The reader should bear in mind that most impacts on federal parklands and resources were inherited when the park was established by ANILCA, and the U.S. Congress and the President recognized these impacts prior to establishment of this park for its national significance. The park was not entirely pristine at the time of its creation, but the park still protects large relatively unspoiled, superlative, exceptional quality areas. The inherited level of disturbance presents the point of departure for the analyses of impacts to the various resources, including wilderness.

4.2.1 Assumptions for the Cumulative Effects Analyses

There are approximately 784,000 acres of nonfederal lands within Wrangell St. Elias NP/P. Past development includes, settlement of the towns of McCarthy and Chisana, mineral exploration and mining circa 1900 until the present (USNPS 1990, Mining EIS),

oil and gas seismic exploration circa 1960, commercial logging 1990's, homestead settlement 1900 until 1970, facilities supporting commercial guiding and hunting operations, and land subdivisions and sales with settlements for residential and recreational use proximal to the Nabesna and McCarthy road systems and Chisana.

Most of the past development within WRST occurred on private lands within the 488 patented (5,681 acres) and 2) unpatented mining claims (292 acres), small private tracts (8,700 acres) and the University of Alaska lands [(1)]. The State of Alaska and University of Alaska currently control 34,430 acres. The University of Alaska subdivided lands near McCarthy in the mid-1990's. Numerous lots have been sold and are currently being developed. In general, lands conveyed to native corporations from the Alaska Native Claims Settlement Act (ANCSA) have little past development except for logging in the Chitina area and oil and gas seismic lines put in before ANCSA. These Native Corporations currently own approximately 735,000 acres within WRST.

There is a limited amount of past mineral development on parklands associated with lapsed unpatented mining claims and acquired properties that reverted to federal ownership. In addition, there are two ROWs granted to the State of Alaska at the time of statehood under the Omnibus Act. These include the Nabesna and McCarthy Roads.

4.2.2 Motorized Access Facilities on Parklands

Existing access facilities include ORV trails and routes and fixed-wing aircraft landing strips. These contribute to the cumulative effects in Wrangell-St. Elias NP/P and are likely to affect several or all resources evaluated in this EA.

4.2.2.1 ORV Trails:
We estimate that there may have been 600 miles or more of trails or routes within the area that became WRST when it was established in 1980 (USNPS 1990, Mining EIS). These were used for a variety of purposes including, hunting, recreation, mining, oil and gas exploration, subsistence and access to private lands. Many facilities have shared use. Some of these are historic trails originally utilized by native Alaskans, others were developed using bulldozers. The history and use pattern of each trail is unique; many have evolved over time due to changes in technology and level of use.

Within WRST there are generally three user types that currently operate ORVs on parklands over portions of the trail system that existed under BLM management prior to 1980. These include (1) individuals accessing their private lands, (2) recreational users on the established trails for which a Special Use Permit is required prior to operating an ORV, and (3) local rural residents using an ORV in support of recognized subsistence activities.

4.2.2.2 Airstrips:
Currently there are more than 100 fixed-wing aircraft landing strips of which more than 50 are on federal land within Wrangell-St. Elias NP/P. These facilities range in size from barely discernable short airstrips less than 900 feet in length on barren floodplains to

extensively developed areas where motorized equipment was used to clear vegetation and soils and/or blade a gravel surface. The Chisana Airstrip is an example of a large airstrip, which is approximately 5,000 feet long and 50 feet wide. Fixed-wing landing strips are used for access to the backcountry for recreation and access to inholdings. The greatest level of use is for recreation on most, but some also serve as an essential component of access to an inholding. The NPS currently undertakes some maintenance operations on 24 established airstrips.

4.2.2.3 Alaska State Road Rights-of-Way (ROW):
The two Alaska State ROWs within WRST, Nabesna Road and McCarthy Road, were granted at the time of statehood under the Omnibus Act. These include the Nabesna Road, a 42-mile long and 200-foot wide ROW, and the Chitina - McCarthy – May Creek Road, which is a 100-foot wide ROW with spurs to Chititu and Dan Creek traversing approximately 80 miles.

Table 4.2 Summary of Facilities & Actions.

Facilities, Condition, or Actions within Park	Number	Estimated Total
Trails, Tracks, Roads		600 miles
ADOT&PF Roads	2	125 miles
Airstrips	100 within park boundary	
Recorded mining claims areas circa 1990[1]	1,389	19,952 acres

Foot note [(1)] Circa 1990 recorded mining claims indicate there were then approximately 19,950 acres of patented (10,629 acres) and unpatented (9,323acres) mining claims with had various levels of past development (USNPS 1990, Mining EIS).

4.3 Effects to Aquatic Resources and Fish

Motorized vehicles can alter or affect drainages and wetlands in ways that can significantly change runoff patterns and amounts (see figure 4.1). Off-road vehicle activity nearly always results in greatly increased erosion (Hinckley et al.1984). ORVs compact and disrupt the soil reducing infiltration capacity resulting in increased frequency and duration of runoff. ORV activity also destroys or disperses surface stabilizers creating relatively smooth trails that entrain surface flow and enhance runoff effectiveness (Meyer 2002). Off road vehicles can contribute large suspended sediment loads to receiving waters especially during storm events (Ayala et al.2005). Although extremely difficult to measure, some estimates of ORV-induced erosion rates have ranged as high as 5 to 50 times greater than natural rates (Hinckley et al.1984).

The physical impact of ORVs on the landscape strips surface vegetation and compacts soils leading to surface subsidence or entrenched trails. Entrenched trails can intercept and drain water from surrounding landforms (Meyer 2002). These effects can ditch and drain wetlands or at least impact wetland structure and function. ORV tracks oriented

perpendicular to natural drainage patterns are more likely to intercept and potentially reroute surface flow than parallel oriented tracks. Tracks that run parallel to hill slopes promote soil erosion and development of rills and gullies (Brooks and Lair 2005). Braiding of trails compounds these effects.

Figure 4.1. A braided access route that has intercepted and rerouted surface flow.

Motorized vehicle passage can directly affect water quality in two main ways. These include the suspension (turbidity) and deposition of fine sediment and/or leakage and combustion of petroleum products and other fluids at stream crossings. Fine sediments suspended in water create turbidity which is a quantifiable water quality characteristic affecting aquatic biota (Lloyd et al.1987). Hydrocarbon or other fluid contaminants are often washed directly from ORVs and can be precipitated from the atmosphere following combustion of fossil fuels.

Disturbed or resuspended sediments are typically transported downstream as bedload or suspended sediment for a short distance (meters or tens of meters) where they are deposited in pools or along channel margins where current velocities decline. Accumulated sediment downstream of motorized stream crossings can subsequently be scoured, resuspended, and transported on a much wider spatial scale as a result of extreme precipitation and flooding events. Flood events capable of resuspending and transporting deposited sediments occur primarily during the wet season at annual or less frequent intervals. Flooding events in the Wrangell-St. Elias National Park/Preserve typically occur during spring snow melt in April and May and during the wet season from June through October. The extent of sediment movement and transport is dependant on sediment particle size and composition, gradient or channel slope, stream velocity, and magnitude of precipitation and discharge events.

Finer sediment such as silt and fine sand is typically more easily disturbed and transported (critical velocity = 20 cm/s) than course gravel (critical velocity = 1 m/s), for example (Allan 1995). Larger particles are typically transported as bed load along or near the streambed rather than suspended in the water column. Under average and low flow conditions, silt and sand are transported over relatively short (meters or tens of meters)

distances. However, flooding events and associated increased current velocities typically transport finer materials over much greater distances (hundreds of meters to kilometers).

Turbidity is a fluid optical property describing the amount of light scattered by suspended solids (MacDonald et al.1991). More simply, it is a visual property of water that implies a reduction in or lack of water clarity. Suspended silt and clay are typically the primary causes of turbidity but other contributors to turbidity include finely divided organic and inorganic matter, some soluble colored organic compounds, plankton, and microscopic organisms (APHA 1998). Suspended particles < 0.1 mm in diameter are typical for Alaska (MacDonald et al.1991). But particles as large as 1 mm can become suspended during high flow discharge events. Because so many different particles can affect turbidity, the relationship between turbidity and suspended sediments is nonlinear. However, about 80% of suspended sediment variability can be explained by turbidity measurement (MacDonald et al.1991). Turbidity, measured as nepholometric turbidity units (NTU), is typically quantified using a photoelectric turbidimeter. Alaska Administrative Code (18 AAC 70) specifies that turbidity standards for fish, aquatic life and wildlife:

> *"May not exceed 25 NTU above natural conditions."*

Vegetation cover, type of substrate, steepness of approach/topography, and water conditions can influence the level of the effect. For example, Rinella and Bogan (2003) noted that only one of three stream fords they monitored in the Kenai Peninsula actually contributed measurable sedimentation effects. This was attributed to the fact that this site consisted of ample, unconsolidated, fine sediment and a sloped approach topography which entrained sediment during rain events. Ayala *et al.*'s (2005) work confirmed the effect of precipitation events and higher magnitude, low-frequency floods in transporting greater sediment loads.

High turbidity can decrease light penetration and significantly reduce primary (aquatic plants), secondary (invertebrates) and even tertiary (fishes) biological productivity. Extremely high turbidity and subsequent sedimentation can have both sublethal and lethal effects on aquatic biota. Suspended sediment can also facilitate the transport of heavy metals, nutrients and other sediment-associated pollutants (LaPerrier et al.1985).

Vegetation loss as a result of ORV disturbance to soil and roots can also result in increased water temperatures. The mechanism is typically through vegetative loss and reduced shading effects. Oxygen concentration in water is inversely related to temperature, thus increased water temperatures are typically known to decrease oxygen levels. However, ORV effects on vegetation would likely need to occur along a significant portion of riparian habitat throughout the watershed in order to affect water temperature to the extent that oxygen concentration and/or temperature would exceed aquatic biota tolerances.

Right of way use and maintenance in areas adjacent to streams has the potential to reduce large woody debris levels. Maintenance prevents the growth of trees within the right of

way and trees that naturally fall across the right of way are typically cut and removed rather than entering the aquatic system. Stream crossings that are undersized often trap large woody debris as it is transported by high flows, where it is later removed as part of a standard maintenance activity. In some cases, hazard trees are removed to protect the right-of-way. Channel manipulation to protect right of ways often includes the removal of large woody debris from stream channels to reduce flooding.

Few studies have taken place on large rivers, on glacial rivers, or in interior Alaska. In smaller or clearer water bodies, large woody debris (LWD) plays a direct role in salmonid habitat, particularly for juvenile fish. This is largely related to the spawning and cover- use characteristics of this group of fishes (e.g., Lister and Genoe 1970, Lee 1985, Murphy et al. 1989, Hicks et al. 1991, Inoue and Nakano 1998). In large streams, the role for LWD may be more indirect, because water velocities in mainstem channels are often high, and much of the LWD is on bars or jams above the free- flowing water during winter months. In large glacial streams, the chief role of LWD may well be in shaping stream morphology, adding hydraulic roughness to glacial streams, providing bank armoring, contributing to the formation of river bars and islands, and blocking side channels (Fetherston et al. 1995, Abbe and Montgomery 1996, Montgomery et al. 1996, Dudley et al. 1998). Because of its size, LWD in large rivers can be more stable than the relatively mobile bed load sediments, and can function as substrate for aquatic invertebrates used by fishes as food. Hypotheses indicate LWD could play an important, but short-term, role during migration by providing eddies where upstream movement is easier and where fish can rest.

Petroleum product or hydrocarbon contamination of water can result directly from the leakage of fuel (primarily gasoline) or other fluids (i.e., lubricating oils, brake fluid or antifreeze) from ORVs. Alaska Administrative Code (18 AAC 70) specifies petroleum, hydrocarbons, oils and grease standards in waters for fish, aquatic life and wildlife.

"Total aqueous hydrocarbons (TAqH) in the water column may not exceed 15 µg/l (see note 7[1]). Total aromatic hydrocarbons (TAH) in the water column may not exceed 10 µg/l (see note 7). There may be no concentrations of petroleum hydrocarbons, animal fats, or vegetable oils in shoreline or bottom sediments that cause deleterious effects to aquatic life. Surface waters and adjoining shorelines must be virtually free from floating oil, film, sheen, or discoloration."

Because volumes of these materials are typically thought to be small (a few gallons or less) for most ORVs and because of the of the dilution factor associated with significantly

[1] Note 7 (from 18 AAC 70). *Samples to determine concentrations of total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH) must be collected in marine and fresh waters below the surface and away from any observable sheen; concentrations of TAqH must be determined and summed using a combination of: (A) EPA Method 602 (plus xylenes) or EPA Method 624 to quantify monoaromatic hydrocarbons and to measure TAH; and (B) EPA Method 610 or EPA Method 625 to quantify polynuclear aromatic hydrocarbons listed in EPA Method 610; use of an alternative method requires department approval; the EPA methods referred to in this note may be found in Appendix A of 40 C.F.R. 136, Appendix A, as revised as of July 1, 2003 and adopted by reference.*

larger relative volumes of water at stream crossings where these materials are most likely to be discharged or accumulate, the effect is likely to be negligible, localized and short term.

Hydrocarbons and other contaminants can also be leaked into aquatic systems when combusted and uncombusted fuels pass out the exhaust pipe of internal combustion engines. The mechanism for water pollution by these sources would occur either through exhausting combusted gasoline underwater (which sometimes happens at water crossings during high water periods) or through dry or wet deposition of combusted particulates (Stoker and Seager 1976). Heavy metals and nitrogen oxides, accumulate along ORV trails and may be mobilized into freshwater systems during precipitation events (Trombulak and Frissell 2000).

Repeated exposure to high concentrations of gasoline or gasoline combustion by-products can have carcinogenic effects, cause damage to internal organs (particularly kidneys and liver) and/or cause birth defects and chromosomal damage in humans. Carbon dioxide, carbon monoxide and various hydrocarbon contaminants including benzene, N-hexane, N-heptane, cyclohexane, methyl-t-butyl ether, and toluene are components of or combustion products from gasoline. However, again because of the dilution factor, these contaminants are likely to have negligible or minor localized effects of extremely short term duration on exposed downstream fishes and aquatic life.

4.3.1 Impacts of the No-Action Alternative

4.3.1.1 Direct and Indirect Impacts of the No-Action Alternative

If the no-action alternative is selected, some landowners may choose to reroute their access or utilize multiple access routes to their property. In addition, landowners may widen their existing access routes by cutting live or dead trees that would potentially provide large woody debris to fish habitat in the future. Unrestricted, multiple access routes, or access management methods that fail to protect aquatic and riparian areas, are likely to negatively affect aquatic resources by increasing fine sediment levels, turbidity, and contaminants. Negative effects are also likely to occur from reducing large woody debris levels.

4.3.1.2 Cumulative Effects of the No-Action Alternative

Cumulative effects to aquatic resources within the affected areas from past, present and ongoing activities are resulting in increased sedimentation of aquatic habitat, reduced large woody debris levels, fragmentation of fish habitat, reduced complexity of fish habitat, and downward trends in fish populations. Ongoing access use threatens aquatic habitat and populations. Vehicles, ranging in size from small ORVs to highway vehicles or large tracked equipment, ford fish bearing streams and disturb stream channel substrate and cause increases in turbidity as well as hydrocarbons and other contaminants. Disturbed areas generating sediment that is transported or resuspended would continue to generate sediment. Access use and maintenance reduces the amount of

large woody debris in stream channels. Undersized stream crossings trap large woody debris. Many fish populations occurring within the Park/Preserve are at the northern edge of their natural range. Relatively small impacts can threaten their viability.

Wrangell-St. Elias National Park and Preserve lacks any formal aquatic conservation strategy that establishes site specific management goals or protection for aquatic habitat. Other agency regulations related to fish habitat are poorly understood and due to staffing constraints, typically there is little field monitoring for compliance. The effects to aquatic resources from hundreds of miles of road and trails, over 100 airstrips, and existing ADOT&PF Roads are moderate overall. The additive effects to aquatic resources of selecting the no-action alternative are expected to be minor in the context of the sum of the cumulative effects.

4.3.1.3 Conclusions

The no-action alternative could result in minor effects to aquatic resources and fish, which would not lead to the impairment of park natural resources that are key to the purposes and values for which the park unit was established.

4.3.2 Impacts of the Preferred Alternative

4.3.2.1 Direct and Indirect Impacts of the Preferred Alternative

The preferred alternative does not address access facilities to inholdings with fords over fish bearing streams. The established gravel road to the Four Mile settlement near Slana has a properly designed culvert over Rufus Creek. Access routes within areas contributing large woody debris to fish bearing streams would not be issued RWCAs where operation and maintenance of the established facilities would result in measurable adverse affects to the contribution of large woody debris for fish habitat. The preferred alternative would not create any new disturbance or result in any impacts to fish-bearing streams. Restricting use to one access alignment is expected to reduce the amount of fine sediment input and would allow areas producing and supplying large woody debris to streams to recover. Hydrocarbon and other contaminant input is expected to remain the same. Other direct or indirect effects to aquatic resources would be negligible.

4.3.2.2 Cumulative Effects of the Preferred Alternative

The cumulative effects to aquatic resources and fish from all other human-caused effects in the study areas would be the same as described above for the no-action alternative in section 4.3.1.1, moderate. The effects to aquatic resources from the preferred alternative are expected to be negligible in the context of the sum of the cumulative effects.

4.3.2.3 Conclusions

The preferred alternative would result in negligible effects to aquatic resources and fish, which would not lead to the impairment of park natural resources that are key to the purposes and values for which the park unit was established.

4.4 Effects to Cultural Resources

4.4.1 Impacts from Alternative 1: No Action

4.4.1.1 Direct and Indirect Impacts

Under this No-Action Alternative, established and acceptable airplane, highway vehicle, off-highway vehicle (ORV), and waterline access to inholdings would continue. While the NPS has authorized a few corridors in the past, no additional ROWs would be issued under this alternative unless the landowner specifically requests one. The use of these access routes and methods under their current conditions would result in minor new negative impacts to the historic fabric due to erosion and the gradual widening of the existing, acceptable corridor footprints.

4.4.1.2 Cumulative Impacts
Human activities and natural events have caused major impacts to cultural resources throughout this undertaking's area of potential effect, including these particularly significant loci:

McCarthy Corridor: The construction and maintenance of the McCarthy Road permanently destroyed the integrity of about 60 miles of the historic Copper River and Northwestern Railway (CR&NW), many elements of which have been determined eligible for the National Register of Historic Places. Modifications to the Kuskulana Trestle greatly diminished its integrity of design. The construction of local airstrips, platted access corridors, and logging trails adversely affected other cultural features.

Nabesna Corridor: The construction of the Nabesna Road destroyed portions of the original pack trails leading from Slana to the Nabesna Mine and traversed unsurveyed, but potentially site-rich, prehistoric and early historic areas near Long and Twin Lakes and along Jack Creek. Maintenance activities have caused additional damage. Trails branching off this corridor have increased the potential for vandalism and looting.

May Creek Corridor: Flooding destroyed large portions of the May Creek Road, including both approaches to the Young Creek Bridge. Parts of the Nizina River Bridge were damaged by flooding in the 1950s and 1960s. Features along the corridor's Chititu branch have also been affected. Flooding has destroyed at least one building in Chititu Camp (XMC-053) and the Nizina Post Office (XMC-012) has collapsed.

McCarthy Creek Corridor: The McCarthy Creek valley contains twelve known historic sites. Four, the Green Butte Mining District (XMC-096), the McCarthy Creek Road (XMC-439), and two nearby cabins (XMC-044 and XMC-102), have been determined

eligible for listing on the National Register of Historic Places. The total impact to cultural resources along this corridor has been major, including the complete destruction of the lower Nikolai Creek cabin (XMC-051), the Meadow construction camp (XMC-042), and the Hero mill site (XMC-064).

Kennecott Mines National Historic Landmark (NHL): Many historic buildings within the Kennecott mill town were demolished in the 1950s, and several others were severely damaged. Even buildings at Kennecott's individual mines have been affected. Construction and maintenance activities within the McCarthy-Kennecott ROW have damaged or displaced other features.

Chisana-Gold Hill Historic Mining Landscape: Recent mining activity on Bonanza and Big Eldorado Creeks has adversely affected some cultural features. The expansion of the Chisana Airfield in the 1950s and the construction of the Chicken Creek Airstrip around 1960 produced similar effects.

Extensive vandalism, looting, damage, and destruction of cultural resources occurred under past conditions. Within a regional context, these actions have had a major effect on WRST's cultural landscape. Although the incremental effect of the No-Action Alternative is minor, the overall cumulative effects would remain major.

4.4.1.3 Conclusion

Implementing this No-Action Alternative would result in minor new impacts to cultural resources, but would not materially degrade their present condition. These effects would not result in the impairment of cultural resources fulfilling the specific purposes identified in the park's enabling legislation or that are key to its cultural identity.

4.4.2 Alternative 2 – NPS Proposed Action to Issue RWCAs

4.4.2.1 Direct and Indirect Impacts

This alternative specifically excludes any action possessing the potential to affect historic properties adversely. All access corridors would be surveyed by WRST personnel before a RWCA is issued. If those surveys identify any cultural features, those features would be formally evaluated for integrity and significance. Any access corridor containing features deemed eligible for the National Register of Historic Places would require additional analysis and be addressed in future NEPA compliance. Because the access facility footprint would be documented and maintained with approved terms and conditions in the RWCA to avoid effects outside that footprint and possibly reduce the area of effect, the potential for any future impacts to cultural resources would be avoided.

4.4.2.2 Cumulative Impacts

Extensive vandalism, looting, and destruction of historic features has occurred under past conditions, resulting in a major impact to the park's cultural landscape (see section above

at 4.4.1.2). The increased inventory and monitoring efforts associated with this authorization process would eliminate most future damage to cultural resources and help mitigate some past impacts. Within a regional context and given the more rigorous analysis this alternative requires, its contribution to cumulative impacts on cultural resources would be minor beneficial, leaving the total cumulative effects as major.

4.4.2.3 Conclusion

Implementing this NPS Preferred Alternative to issue RWCAs with terms and conditions to protect cultural resources, among others, would result in minor beneficial effects to cultural resources. These effects would not result in the impairment of cultural resources fulfilling the specific purposes identified in the park's enabling legislation or that are key to its cultural identity.

4.5 Effects on Inholder Property

4.5.1 Impacts from Alternative 1: No Action

4.5.1.1 Direct and Indirect Impacts:
There would be no new impacts to private land uses and property values from the no-action alternative as the current situation would not change. Property owners would use their present modes of access to their inholdings. There would be limited documentation of established access, and it would remain unclear whether the access needs of the landowner would be met.

Those inholders wishing to document their established access and obtain a RWCA would have to submit a complete SF-299 application form. Environmental compliance would be undertaken before the NPS could issue a RWCA. Any request would be processed separately and be addressed at some future time. For those not obtaining a RWCA or other authorized access to their inholdings, there would be uncertainty and a continued potential for misunderstanding and conflict between the landowners and the NPS regarding what constituted their ANILCA 1110(b) access facility and appropriate maintenance. Land values would likely increase only for those landowners that secured a RWCA. Property owners with established and maintainable access would have to wait for an individual EA to be completed before the NPS would issue them a RWCA. Without a RWCA the landowner is not authorized to sign or control use on the facility on parklands. Unintended trespass on private lands is more likely as the general public may not understand that the facility leads to private lands.

4.5.1.2 Cumulative Impacts

Approximately 600 miles of roads and trails and over 100 landing strips in the park, including State roads and park maintained airstrips, provide access to many inholder properties. This alternative addresses a subset of about 30 miles of roads and trails and 15 landing strips. The long-term effects to current private land ownership, uses, and property values from all of these access facilities would not materially change. Access would only

be assured for those who obtain individual access authorizations, where the NPS establishes public roads, or where the State of Alaska secures a ROW. Uncertainties about the validity of unauthorized access routes and means would remain the same through the foreseeable future. The additive effect of the no-action alternative to inholder property would be negligible in view of the overall access to nonfederal lands throughout the park.

4.5.1.3 Conclusions

The no-action alternative would not measurably impact the ownership, access to, or value of inholdings, but uncertainty about access uses and validity would remain.

4.5.2 Impacts from Alternative 2, NPS Proposed Action

4.5.2.1 Direct and Indirect Impacts:

Property owners with established and maintainable access who apply for a RWCA within the scope of this EA would not have to wait for an individual EA to be completed before the NPS would issue them a RWCA. For those obtaining a RWCA to their inholdings, there would be certainty and a reduced potential for misunderstanding and conflict between the landowner and the NPS regarding what constituted their ANILCA 1110(b) access facility and appropriate maintenance.

Access rights-of-way increase the appraised value of property. Property without clearly documented access is problematic; the uncertainty elevates the risk to the current owner or potential buyer. Properties with authorized rights-of-way have sold for 30%, and more, than similar properties without ROWs. This is because the real-estate market measures risk and adjusts for it. Having a RWCA would reduce or eliminate uncertainty regarding undocumented access. The risks include time, money, and uncertainty. Even though adequate and feasible access is provided for in law; a prospective purchaser must consider how much it would cost and how long it would take, to obtain a documented access right-of-way. Return on money invested in property may be lost while access rights are processed for full enjoyment of the land. These uncertainties do not apply when access is secured by a right-of-way certificate of access.

The owner or occupier of an inholding can post their property to prevent trespass. Under the proposed action, the NPS may allow the landowner to post the access route on federal lands with signs limiting vehicular use of the access route to authorized users. This would decrease the likelihood of trespass and unintended impacts to the tread surface, which would require more maintenance. These options can reduce trespass incidents and improve the owner's enjoyment of their lands.

4.5.2.2 Cumulative Impacts

Many access facilities originate from the State of Alaska Nabesna Road and McCarthy Road ROWs or landing strips maintained by the NPS. For those inholdings adjacent to

these public access routes that do not need a RWCA, the uses and values of these lands would not change as a result of the proposed action.

The proposed action is expected to decrease the uncertainty and potentially increase the value of some inholdings; especially for those within the McCarthy and Nabesna road corridors, the Chisana area, or remote areas where RWCAs could be authorized. The no action alternative would also reduce potential trespass and therefore the enjoyment and property values of those properties obtaining a RWCA. The number of inholdings with authorized access within WRST is expected to increase. The overall effect to inholder property within the park would be a moderate increase in property values (up to 30%) and certainty of access for a subset of inholder lands.

4.5.2.3 Conclusions
The proposed action would have a moderately positive impact on the uses and values of inholdings for those landowners who obtain a RWCA.

4.6 Effects on Public Access and Recreational Use

4.6.1 Impacts from Alternative 1: No Action

4.6.1.1 Direct and Indirect Impacts:

Public access and recreational use based on continued unauthorized use of existing access to inholdings would change very little. The primary impact to public access and recreational use under this alternative would be the potential confusion about the location and appropriate access facilities for public lands in the vicinity of inholdings. Some incidents of unintentional trespass may occur due to lack of signs or confusion about current land status and appropriate access routes. Some visitor frustration would most likely result from this confusion. Trespass incidents could also result in conflicts between inholders other park visitors.

4.6.1.2 Cumulative Impacts

The cumulative impacts to public access and recreational use result from adding the past impacts to the foreseeable future impacts identified under this alternative.

There are approximately 784,000 acres of nonfederal lands within WRST. Past development includes, settlement of the towns of McCarthy and Chisana, mineral exploration and mining circa 1900 until the present (USNPS 1990), oil and gas seismic exploration circa 1960, commercial logging in the 1990's, homestead settlement 1900 until 1970, facilities supporting commercial guiding and hunting operations, and land subdivisions and sales with settlements for residential and recreational use proximal to the Nabesna and McCarthy road systems. Existing access facilities include ORV trails and routes, fixed-wing aircraft landing strips, and two Alaska State Roads - McCarthy and Nabesna.

Development of inholdings and improvements to access facilities in future years could result in increased volume of users and more substantial use of access facilities. Such increases could impact public access and recreational use by shifting the character of these areas from generally primitive to more developed. Overall, such a change would have minor impacts for those visitors that expect a more undeveloped and self-reliant experience. The NPS would use the NEPA process to evaluate these potential future changes and would minimize and mitigate impacts as warranted.

The effects on scenic quality and increased noise resulting from about 600 miles of roads and trails and over 100 airstrips for access to nonfederal lands in WRST have a moderate negative effect on primitive recreational opportunities. These facilities also provide necessary access for both inholders and recreational users to remote parts of WRST. The effects of the no-action alternative from continued unauthorized use of about 30 miles of road and trails, 15 landing strips, and 4 waterlines and associated foot paths would contribute minor negative impacts to visitor use and recreation. There would also be minor positive impacts to public access and recreational use due to the continued availability of access facilities under the current conditions. This results in no change in the overall moderate cumulative impacts of these access facilities to public access and recreational use.

4.6.1.3 Conclusions

Implementation of the no-alternative would have minor negative effects on public access and recreational use.

4.6.2 Impacts from Alternative 2, NPS Proposed Action

4.6.2.1 Direct and Indirect Impacts:

The NPS proposed action would result in NPS authorization and management of existing access facilities for inholdings that are maintainable in their current footprint and use patterns. Minor benefits to visitor experience would occur due to the implementation of this alternative. The process of issuing RWCAs to inholders for their access facilities would provide documentation of these routes. This information could be made available to visitors so they would know what activities were appropriate on any individual route; thus decreasing the potential for trespass incidents and conflicts between visitors and landowners. Minor negative effects to public access and recreational use would occur due to the implementation of this alternative if access routes issued RWCAs are gated or otherwise restricted.

Private property may be posted with "no trespass" signs at any time at the discretion of the landowner. Under this proposed action, the access facility route on public lands may be posted with signs limiting vehicular traffic to authorized users. These options would restrict public access and recreational use (minor negative impact), but there would be a minor improvement in visitor experience by clarification of appropriate access routes and public use areas.

Issuance of RWCAs for inholder access facilities would provide landowners with clear standards and maintenance tools for their access facilities. The use of these tools would ensure that resource impacts would not be occurring on adjacent park and preserve lands. Accordingly, visitors would see minor improvements to the visual quality on and adjacent to these routes due to effective management and maintenance. Noise impacts would remain essentially as in the no action alternative.

4.6.2.2 Cumulative Impacts

Cumulative impacts of access facilities in WRST to recreation and visitor use would continue to be moderate as described above in section 4.6.1.2 despite the minor benefits to visitor use and recreation from the proposed action to issue RWCAs and actively manage inholder access facilities.

4.6.2.3 Conclusions

Implementation of this alternative would have minor adverse and beneficial impacts on public access and recreation.

4.7 Effects on Soils

4.7.1 Impacts of Alternative 1 (No Action)

4.7.1.1 Direct and Indirect Impacts:

Soil impacts are a function of the established level of development (covered, bladed, or trammeled), use of motorized vehicles (frequency, vehicle class, period of use) ongoing maintenance (grading, ditching, and placing fill) as well as natural processes responding to these disturbances. Direct soil impacts are primarily confined to the established access disturbance footprint. Along these routes soils would continue to degrade through compaction, erosion, and thermokarst. Many sections of the established facilities are already impacted and have lost soil and/or exposed underlying unconsolidated surficial mineral deposits. Impacts are expected to be worst on those portions of facilities that pass through wetlands or traverse steep slopes. Repeated passes during breakup or over partially thawed soils underlain by ice during periods of excessive wetness and on slopes would lead to deterioration of soils conditions. These would result in erosion and the loss of some soil function.

Impacts to soils adjacent to a facility principally result from indirect consequence to the surface hydrology and changes to the underlying permafrost. These include the disruption of surface water flow, reductions in infiltration and percolation, surface ponding, and the loss of water-holding capacity. Other potential indirect impacts include wind and water erosion and deposition of transported material.

Under this alternative, a number of factors would likely contribute to an expected increase in soil impacts outside the minimum footprint necessary for acceptable access along established facilities. There would be an increased footprint of damage to the soil resources because there would be limited control of: a) access construction, rerouting, and facility maintenance; b) where ORVs travel; and c) no controls related to soils protection. The amount of damage cannot be accurately predicted, but over the long term it could result in degradation of soils from continued travel through wetlands and along braided trails.

We anticipate that there would be small incremental changes in the nature of the established access facility footprint width, access class, and soil conditions. For access facilities that are generally acceptable and maintained, these changes would be negligible. For those that are not acceptable or adequately maintained there would be additional minor and moderate impacts to soils.

Soils would be lost and degrade along access routes that are not protected by a gravel cap or in areas without any substantial natural soil development such as barren gravel floodplain. Changes in soil conditions would be most noticeable within unimproved ORV tracks/facilities from continued use. Locally there would be low to medium intensity, long-term new impacts to common soils within the footprint of unimproved tracks. Braiding most commonly occurs along unimproved ORV tracks/facilities which have not had a gravel pad constructed or been bladed. Expansion of the existing disturbance corridor would likely occur locally from continued ORV use. Expansion destroys the permafrost and vegetation cover, which protect soils, unless maintenance operations such as surface water control or facility hardening are undertaken.

Construction of new access facilities, expansion or upgrades would directly and indirectly impact pristine soils or substantially affect functional soil systems. These impacts are potentially greatest in locations with well developed soil horizons and wetlands. Where an operator does not select an acceptable location or fails to adequately design or maintain a facility, the impacts to soils can be of medium to high intensity, long-term and affect important or unique resources.

The use of motorized equipment across frozen ground with ice or snow cover has a negligible affect on soil hydrology, stratigraphy, and function. Local soils contamination could occur from fuel spills.

Effects of Gravel Roads (Access Class 1)
For constructed facilities where gravel has been placed to support the passage of motorized vehicles, the principal affect on soils is that the in situ soils are covered. For facilities that were originally constructed over undeveloped routes the soil stratigraphy is essentially intact. Gravel roads in many situations were developed after overland travel had commenced and the underlying soils may have lost some or most of their functional value. Soils underlying gravel roads are compacted and local soil hydrology within the footprint is modified. These impacts reduce or eliminate the soil's ability to support native plant life and alter the existing plant community. Although fill locally provides a

barrier that protects the root systems of trees adjacent to the facility, the water content, temperature and density of soils is altered. Placing fill in areas may reduce the potential of a degraded facility to capture and divert surface flow and alter local soil hydrology adjacent to the alignment and may enhance insulation of the under laying permafrost. Hence placing fill in degraded areas often provides a net benefit to adjacent soils. Long-term, high intensity impacts to common soils within constructed facility footprints would result from covering natural surfaces with gravel or fill material.

Effects of Bladed Facilities (Access Class 2)
The soils in established facilities that were bladed with motorized equipment such as a bulldozer commonly have had all or most of the organic soil horizon removed from the facility footprint along with some of the underlying mineral soils. These soils are either cast aside forming berms of mixed organic and mineral deposits or placed as fill in lower topographic features within the facility alignment. Soils in established facilities, where blading did not remove all of the organic or underlying mineral material, result in a "disturbed" soil regime, which provides for a reduced level of soil function. The removal of the organic horizon destroys the protective layer making the area susceptible to erosion. Removal of soils also creates a topographic "low" and changes the thermal regime. Topographic lows tend to capture surface water and alter local soil hydrology. Vehicle travel and maintenance grading prevents natural soils from reestablishing and functioning naturally.

Blading impacts soils. It involves disturbance that changes or degrades the natural conditions of the area affecting plant growth, water regime, or the natural soil stratigraphy. In poorly drained areas melting of seasonal frost and permafrost zones occurs more rapidly and to greater depths. Adverse soil effects occur where a bladed and traveled surface disturbs an area to the degree the soils no longer support plant life or the disturbance alters the existing plant community. These impacts are usually of a mechanical nature including stripping, shearing, abrasion, compaction, and mixing. Changes to soil are greatly amplified by a change in water regime that affects hydrology.

Medium intensity, long-term impacts to common soils would result within facility footprints from blading and grading of natural surfaces. Blading can lead to subsequent problems of rutting, erosion, muddy sections or ponding where the underlying substrate lack sufficient coarse material to support vehicle passage or where the permafrost is more directly affected by melting due to removal of the organic horizon. Surface water control features (SWCF) such as ditches and culverts impact soils when constructed and maintained but these disturbances subsequently allow for reestablished soil function. In some cases SWCFs may greatly enhance the ongoing hydrologic functions of soils adjacent to the established footprint.

Effects of Unimproved Tracks and ORV Trails (Access Class 3)
Soils underlying unimproved ORV trails and 4-wheeled drive tracks are impacted from wheel contact by abrasion, shearing, compression, and displacement within the established footprint. Abrasion strips surface vegetation and roots. Compaction causes surface subsidence. Displacement results in the mechanical movement of soil particles.

These disturbances change or degrade the natural soil conditions of the area affecting plant growth, water regime, or the natural stratigraphy. Often these soils no longer support plant life, or the disturbance alters the existing plant community. Vehicle travel can lead to subsequent problems of rutting, erosion, muddy sections or ponding where the underlying substrate lacks sufficient coarse material to support vehicle passage or where the permafrost is more directly affected by melting due to removal of the organic horizon. Changes to soil are greatly amplified by a change in water regime that affects hydrology. Melting of seasonal frost and permafrost zones occurs more rapidly once vegetation and soils are disturbed; it is greatest in poorly drained areas.

Long-term, medium intensity impacts within facility footprints to common soils would result from overland travel on unimproved facilities across natural surfaces. Soils impacts are expected both on-and off facility, intensifying in previously low-impacted areas and expanding to adjacent non-impacted areas. Continuation of past use levels would further strain the soils, reduce their functional value, and result in the continuation of the same or similar impacts.

Construction of new access facilities and expansion or upgrades of established facilities pose threats to soils and can cause loss of soils and/or reduces the soil function in manners outlined above. These impacts are potentially greatest in areas with well developed soil horizons and wetland areas. Where an operator does not select an acceptable location and/or fails to adequately design or maintain a facility, the impacts to soils can be of medium to high intensity, long-term, and affect important or unique resources.

Effects of Access Facilities on Barren Lands (Access Class 4)
For established facilities located in barren floodplains and relatively young upland terraces containing a gravel and/or sand substrate which are generally well drained, the impacts would be barely perceptible and temporary to short term principally because of the lack of any well developed soils or periodic reworking of gravels in barren floodplains.

Effects of Waterline Facilities
Soils impacts resulting from ongoing waterline maintenance and use are principally associated with footpath travel as all established waterline utilities are placed above ground. Impacts to soils would generally be low intensity and temporary for foot travel along waterline corridors.

4.7.1.2 Cumulative Impacts:

Historic and recent activities in WRST have impacted native soils and underlying substrates. These include clearing for development sites, overland travel with ORVs, construction of roads, railroads, trails, airstrips and utilities, and undertaking logging, mining and recreational operations. Past activities removed soils from production and led to loss of soil resources by burial, grading, and wind and water erosion. The loss of production ranges from temporary to long term. When temporary use and occupancy was

discontinued, soil productivity resumed at a reduced level. Disturbances principally changed the character of native soils by modifying the texture, organic content, and drainage. Motorized vehicle travel, facility construction and maintenance, and blading disrupted soil productivity and soil development, exposed areas to erosion, and affected plant communities. Impacts are greatest in wet areas and areas underlain by permafrost. In total, impact activities that occurred before establishment of the park have had a moderate impact on soil resources. Any foreseeable future action would likely be limited to those occurring along a historic or existing alignment to private properties or on private lands. These access facilities would likely be within the footprint of past disturbance and be minor or moderate. The addition of impacts from actions under this alternative would generate minor to moderate additional cumulative impacts to soils, depending upon the access class. The total cumulative impacts to soils resources within WRST from past, ongoing, and future effects would be considered moderate.

4.7.1.3 Conclusion:

Under Alternative 1, soils impacts from continuing operation of motorized vehicles and maintenance would generally be confined within the existing footprint corridor of development and associated disturbance. It would generate minor adverse impacts to soil resources. The level of effects on soils would not result in an impairment of park resources.

4.7.2 Impacts of Alternative 2:

4.7.2.1 Direct and Indirect Impacts to Soils

The effects to soils would be essentially the same as those presented in Alternative 1 for those soils in and along acceptable and maintainable access facilities for which an ANILCA 1110(b) RWCA is issued. These RWCAs would document the necessary established footprint dimensions, vehicle class, agreed upon maintenance operations and conditions, and allow for monitoring operations. RWCA terms and conditions would prevent unnecessary and reduce or eliminate adverse impacts to soils and the environment outside the established disturbance footprint. In some cases short widened or duplicative routes may be abandoned allowing for natural restoration processes to occur, which provide a net benefit to soil resources. Erosion of soils would be controlled. Some of the ongoing and potential future disruption of surface water flow, reductions in infiltration and percolation, surface ponding, and the loss of water-holding capacity would be reduced. In some cases we anticipate there would be net benefits to soil hydrology, surface water hydrology, seasonal and permafrost conditions and prevent additional loss of soil. A documented access facility provides for collaboration between the landowner and the NPS to reduce the potential for new impacts from ongoing operations while providing for the established and acceptable access and protecting park resources. Improvements outside an authorized RWCA would receive additional future environmental analysis.

NPS RWCAs, collaboration with the landowners, and monitoring would minimize some of the potential soil impacts, especially the indirect impacts.

NPS technical staff would collaborate with landowners on maintenance conditions and approach with incorporation of practical and feasible maintenance practices, as warranted, to document in the terms and conditions of an ANILCA 1110(b) RWCA. This would move inholder access operations to an acceptable design, which would potentially reduce and mitigate soils impacts in the corridor and adjacent to the established facility disturbance.

4.7.2.2 Cumulative Impacts:

Present and future conditions would be as outlined in the Alternative 1, section 4.7.1.2. The overall cumulative impact with Alternative 2 on soil resources coupled with any past, present, and future actions would likely be moderate. Alternative 2 would contribute negligible additional adverse effects within the footprint and potentially minor beneficial effects to adjacent park lands.

4.7.2.3 Conclusion:

Overall, effects on existing soil conditions for established acceptable access facilities would result in negligible adverse impacts and possibly minor beneficial effects. The level of impacts to soils anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or that are key to the integrity of the park.

4.8 Effects on Vegetation and Wetlands

4.8.1 Impacts from Alternative 1: No Action

4.8.1.1 Direct and Indirect Impacts

The following analysis recognizes impacts from two types of actions: (1) direct impacts from existing facilities and construction of new facilities, expansions and upgrades to established facilities without appropriate design and mitigation measures and (2) indirect impacts from fugitive dust, changes in water flow, and the escapement of exotic invasive plants into natural park areas. Impacts within facility footprints are considered direct, impacts outside of the facility footprints are considered indirect. All components of vegetation could have indirect and direct effects. Common vegetation types include vast expanses of white spruce forest, black spruce forest, mixed hardwood and evergreen forest, various scrub-shrub types, and alpine and sub-alpine tundra areas. Important vegetation types noted in the enabling legislation would be habitat for fish and wildlife including, but not limited to caribou, brown/grizzly bears, Dall sheep, moose, wolves, trumpeter swans, and other waterfowl. Wetlands connected to navigable waters are protected by the Clean Water Act and would be important for waterfowl and fish. Riparian areas would be important for fish, bear, and moose habitat. Rare plants are considered to be unique vegetative resources.

Impacts to Vegetation and Wetlands

Vegetation and wetlands on access to inholdings have already been altered to various degrees through removal of vegetation, erosion of topsoil, placement of fill, compaction of soil, changes in hydrology and the thermal regime and subsequent changes in species composition. It is estimated that there have been some direct impacts to vegetation on a maximum of 60 acres of established subject access facilities in the park. Approximately 24% of the established access facilities within the park are classified as wetlands. The continued use of these access routes without the implementation of mitigation measures would most likely result in additional losses of vegetation and wetlands and changes in species composition adjacent to the routes as soil erosion, soil compaction and altered hydrology progress. Vegetation disturbance is directly related to soil disturbance. As described in Section 4.7, the indirect effects to vegetation adjacent to facilities would be greatest on unimproved ORV trails (especially those in wetlands and with well developed soil horizons), bladed trails, and facilities with gravel fill. Indirect impacts to vegetation would be less to vegetation on barren floodplains and young river terraces.

The direct effects to vegetation and wetlands within and adjacent to established facilities would be long term to permanent in duration but of low intensity, localized and representing a small portion of the these important resources in the park. The indirect effects to vegetation and wetlands adjacent to facilities would range from low to medium intensity over short durations to common resources (in well-drained soils such as floodplains and early river terrace communities with little soil development), to medium intensity and longer duration effects to important resources (in wetland communities, areas with permafrost and areas with well-developed soil horizons).

Construction of new facilities, expansions and upgrades to established facilities without appropriate design and mitigation measures could occur under the No Action Alternative. These actions would directly and indirectly impact vegetation and wetlands as described above. The effects to vegetation could vary greatly depending on soils, hydrology and landscape position.

Impacts due to Exotic Plants

Native sub-arctic plant communities, with their relatively low species diversity, may be poorly suited to adapt to rapidly evolving exotic species (Levine 2000, Levine and D'Antonio 1999). A principal of natural resource management is to protect healthy functioning ecosystems (not to manage for individual species). Slowing down the rate of spread of invasive exotic species into natural communities should promote co-evolution and adaptation of native species and communities to the rapidly changing global environment (Cox 2004).

Airplanes, highway vehicles and ORV's are the primary vectors for the spread of exotic plants as is the spread of infested road fill. Therefore, we expect the use of these facilities with continued disturbance to increase the rate of spread, number, and area

covered by exotic plant species in the park. Established inholder access facilities cover a maximum of 65 miles in the park, all of which are potential vectors for the spread of exotic plants. Most of this mileage is adjacent to the McCarthy and Nabesna Roads, the main vectors in the park, but many facilities are remote and have the potential to spread exotic plants into disturbed landscapes of natural communities throughout the park.

The spread of exotic plant species could have indirect impacts to native plant communities with continued use of facilities without the implementation of mitigation measures. The effects could be wide spread with a measurable alteration to the park's native plant communities and therefore of medium intensity. Also, there could be long term to permanent alterations to the integrity of native plant communities adjacent to facilities.

Impacts to Rare Plants

Rare plant surveys have not been conducted of the subject access facilities, so the impact of this alternative is difficult to assess. There are 25 species, however, which occur in areas adjacent to facilities and 15 additional species that are likely to occur based on their distribution in the park. Four species of rare plants in the park are known from five or fewer populations in the world. Impacts to their habitat or populations could impair the survival of these species. Additionally, there are 31 rare plants in the park that are known from five or fewer localities in the state. Removing these populations or their habitat could affect the distribution of the species in Alaska and the species' ability to survive at the edge of their range.

If there are populations of rare plants directly adjacent to or in alignments, these populations would be impacted by continued access to inholdings without mitigating measures. These populations could be removed by natural widening of the alignment, by changes to the hydrology and soils which would alter the habitat, and by competition with invasive plant species (native and non-native).

If no rare plants are found within or adjacent to existing facilities there would be no adverse effects to this resource. If rare plant populations are found within or adjacent to facilities, then the impacts to rare plants under Alternative 1 would be of low to high intensity, long term to permanent to these unique park resources. Therefore, potential impacts to rare plants could vary widely depending on the global and state distributions of the species.

4.8.1.2 Cumulative Impacts

Human induced effects to vegetation in the vicinity of established access to inholdings include:

- Facility development. There are 727 miles of trails, tracks and roads in the park, 102 airstrips and 19,952 acres of mining claims. The vegetation and wetlands on these facilities have been either permanently altered or removed. Most of these facilities were present prior to the establishment of the park.

All of these facilities as well as development on private land increase the spread and dispersal of exotic plant species (Forman et. al. 2003).

- Global warming is causing an observable reduction of wetlands (particularly lacustrine types) and an expected reduction in alpine plant communities in the park. This adds stress to rare plants in these communities in the form of lowered genetic availability and reduced habitat availability.
- Fires along the McCarthy Road corridor have created a mosaic of successional forest communities, opening up the forest canopy and promoting higher species diversity.
- Clear-cut logging occurs along the McCarthy Road on private land in a buffer zone between park lands and the road. This has created disturbed ground for the introduction of exotic and invasive plant species and is likely to affect adjacent native plant communities on park land.
- Increased recreational visitation occurs near airstrips and trails in the park, especially remote areas of the park. Exotic weeds have been spread on the tires of fixed-wing aircraft and are likely to be spread on the soles and clothes of visitors.
- Development of private property in park. Private property owners may plant non-native seed or invasive horticultural species that escape cultivation. This has been observed throughout the park.
- Increased traffic along the McCarthy Road has increased the spread of exotic plant species. Road dust and vehicle pollution have detrimental affects to the buffer zone vegetation decreasing species' ability to adapt to other environmental stressors (such as competition with exotics and changing climate). Trampling of vegetation adjacent to the road by campers is also increasing.
- Road improvements and maintenance on the McCarthy and Nabesna Roads. Exotic weed seed is spread in fill. Hydrology and soils are altered, which in turn effect the composition and health of adjacent plant communities.
- Grazing. Imported feed for horses grazing on allotments throughout the park contain weed seed. Grazing alters the composition of native plant communities.

The effects of past and present impacts of human activities to the vegetation resources in the park are moderate because the effects are of low intensity but long term. The impacts from actions under Alternative 1 are also mixed but moderate overall, therefore, cumulative impacts to vegetation from Alternative 1 past, proposed and future activities remain moderate.

4.8.1.3 Conclusion

Overall, implementing this No-Action Alternative could have moderate adverse effects to the wetlands and vegetation (plant community structure, distribution and composition) of the park. This impact level incorporates the impact analysis described above for the separate components of vegetation. Continued implementation of this alternative would

not result in the impairment of park natural resources that are key to the purposes and values for which the park was established.

4.8.2 Impacts from Alternative 2, NPS Proposed Action

4.8.2.1 Direct and Indirect Impacts

The effects to vegetation under alternative 2 would be the same as those presented in Alternative 1 except for vegetation in and adjacent to established and acceptable access facilities for which an ANILCA 1110(b) right-of-way certificate of access is issued. These facilities would be surveyed for the presence of wetlands and rare and exotic plant species. This alternative specifically addresses any action possessing the potential to affect these vegetation resources through the implementation of mitigation measures and the terms and conditions of the right-of-way agreement. If the surveys identify wetlands adjacent to or in the facility footprint, stipulations would be developed in collaboration with the landowners to prevent additional loss of wetland area, function, or value. Stipulations would also be developed to help reduce the spread of exotic plant species onto park lands and to protect any rare plant populations that are documented.

Damages to resources in the existing footprints and adjacent areas that have not yet been documented would be reduced through the terms and conditions of the right-of-way agreement thereby having some potential beneficial effects for all vegetation resources. Effects to the specific components of vegetation under Alternative 2 are described below.

Impacts to Vegetation and Wetlands

Existing perceptible and measurable impacts to vegetation and wetlands within the footprint would continue due to continued authorized brushing and the edge effects of vehicle use (such as soil erosion, fugitive dust, vegetation breakage, and effects from pollutants). These effects would be low intensity and intermittent, long term to permanent, but localized in a small portion of the park. Surveys to identify wetlands under Alternative 2 and stipulations to improve wetland function and to ensure the NPS policy of no net loss of wetlands would result in small measurable beneficial effects.

Impacts due to Exotic Plants

It would not be possible to completely stop the spread of exotic plants onto park lands from access facilities, even with stipulations. Therefore, there would be small measurable effects to native plant communities due to the spread of exotic plants because the effects would be of low intensity (due to the implementation of stipulations) but long term to permanent.

Impacts to Rare Plants

Effects to the park's rare plant populations under Alternative 2 would be of very low intensity if any measurable effect at all. Surveys would document any populations that occur in the facility footprint or in adjacent areas, and stipulations would be developed to prevent impacts to these populations.

4.8.2.2 Cumulative Impacts:

Cumulative impacts from past and current activities described for Alternative 1 apply to Alternative 2 and have a potentially moderate effect on the park's vegetation resources. The contribution of minor adverse and minor beneficial effects from Alternative 2 to the cumulative impacts on vegetation resources would not change the overall cumulative effects from a moderate level.

4.8.2.3 Conclusion:

Changes to vegetation resources on established and acceptable access facilities under Alternative 2 would be minor because of the beneficial effects of documenting resources and the development of stipulations to minimize impacts within and adjacent to facility footprints. Implementation of this alternative would not result in the impairment of park natural resources that are key to the purposes and values for which the park was established.

4.9 Effects on Wilderness

4.9.1 Impacts from Alternative 1 - No Action

4.9.1.1 Direct and Indirect Impacts of Alternative 1:

Under this alternative, the use of five access facilities to inholdings in designated or eligible wilderness would continue. One is a bladed driveway off the McCarthy Road, which traverses about 1.2 miles of designated wilderness. There may be a couple of unimproved class 4 ORV trail routes to inholdings and the others are remote airstrips with limited motorized track to the inholdings. No RWCAs would be issued and there would be no documentation of routes except when requested by the landowner. The number and type of access routes could increase without active management, resulting in medium impacts to the wilderness resources (of undeveloped, untrammeled, naturalness and opportunity for solitude or unconfined recreation). There would be a low level of use expected for these access facilities to accomplish private, personal access to private properties. The value of wilderness includes the opportunity for solitude or unconfined recreation, and a wilderness experience is also partly dependent on the wilderness setting representing a natural ecosystem. The presence of access routes alters the natural condition, and there would be occasional temporal impacts to the opportunity for solitude or unconfined recreation over the long term use of these access facilities.

Additional effects to the naturalness of wilderness could result from invasive plants which are commonly brought into wilderness areas with vehicles along access routes or at access portals such as airstrips. (See section 4.8.1.1.) These invasive plants could alter the natural condition of the ecosystem potentially leading to additional management actions, which would also affect the untrammeled character of wilderness.

The issuance by landowner request of any RWCA within the Class 1 or Class 2 category for a constructed road would result in authorized long term impacts on wilderness resources where this would occur in designated or eligible wilderness. This may reduce the status of eligible lands as they would no longer meet the standard eligibility criteria for wilderness designation, however, Congress could authorize wilderness all around these access facilities and even include them as with the ANILCA 1110(b) exception.

4.9.1.2 Cumulative Effects:

The current access within designated or eligible wilderness is already taking place and many of the impacts are already occurring on airstrips and several miles of roads, tracks, and winter trails in the park and preserve designated or eligible wilderness. There is the possibility of new or expanded access routes occurring in this alternative, which would add to the cumulative presence of access routes in WRST. In designated or eligible wilderness there are numerous landing strips that are not maintained with heavy equipment, 28 miles of bladed routes or ORV trails, about 10 miles of overland track remaining from mineral development, and about 30 miles of winter access routes (see Table 4.3).

Table 4.3 Access Facilities in Wilderness

	Distance in Wilderness (miles)	
Facility	**Designated**	**Eligible**
Landing Strips	4 (~1.8 miles)	8 (~3 miles)
Bladed Road (from McCarthy Road)	1.2	
Bladed Route (e.g. Kotsina Trail)	8	
Overland Track (e.g. Orange Hill Mining trail)		10
Winter Access Routes (e.g. Beaver Lake Trail)		30
ORV Trails to Native Lands (e.g. Mt Drum Trail)		20
TOTAL	~10	~63

There have been no previously approved ROWs issued in designated wilderness, but short-term special use permits have been issued for overland ORV travel and winter trail access for the movement of large equipment and supplies. The presence of roads has a long term impact to wilderness resources. Additively the no-action alternative, considering the established and acceptable access facilities under review in this EA, would contribute minor adverse effects to wilderness resources and the overall effect to wilderness resources in the park from existing access facilities would be moderate.

4.9.1.3 Conclusion:

Implementation of this alternative would result in minor additional impacts to wilderness resources but would not materially degrade their present condition. The effects of this alternative would not result in the impairment of wilderness resources in WRST that are key to the purposes and values for which the unit was established.

4.9.2 Impacts from Alternative 2, NPS Proposed Action

4.9.2.1 Direct and Indirect Impacts of Alternative 2:

Under this alternative use of established access routes would be managed and maintained in an acceptable condition. We anticipate that approximately 5 RWCAs could be issued for access facilities partly or wholly within park wilderness. Park staff would complete a minimum requirements analysis on each existing facility before issuing a RWCA. Any RWCA issued under this alternative would result in no new adverse impacts to park wilderness resources.

Under this alternative no new construction would be allowed, but small improvements within facility footprints would be allowed to existing access. Each RWCA would include approved terms and conditions to avoid effects occurring outside the existing footprint, so new impacts to wilderness resources would be avoided. The value of wilderness includes the opportunity for solitude or unconfined recreation, and a wilderness experience is also partly dependent on the wilderness setting representing a natural ecosystem. The presence of long term access routes alters the natural condition, but the impacts to the opportunity for solitude or unconfined recreation would be low because levels of uses are anticipated to be of low intensity and short duration. There is already less of an expectation of solitude at access portals such as airstrips in the wilderness.

Additional effects to the naturalness of wilderness could result from invasive plants which are commonly brought into wilderness areas with vehicles along access routes or at access portals such as airstrips. (See section 4.8.2.1.) These invasive plants could alter the natural condition of the ecosystem potentially leading to additional management actions also affecting the untrammeled character of wilderness. Under this alternative, invasive plants would be more likely to be identified and controlled due to the surveys and other management oversight that would occur.

Overall the impacts to the wilderness resources (of undeveloped, untrammeled, naturalness and opportunity for solitude or unconfined recreation) would be long term because of the assignment of rights of way certificates of access for long term or constructed roads. The issuance of these certificates would change the status of eligible lands as they would no longer meet the standard eligibility criteria for wilderness designation. Other forms of access such as trails, routes and airstrips may not have the same impact as permanent roads on eligible areas as they may be more easily mitigated if

use patterns or needs change over time. For a more detailed analysis of wilderness impacts see appendix K.

4.9.2.2 Cumulative Effects:

Five of the established and acceptable access facilities are already located within designated or eligible wilderness and can not be rerouted to exclude their effect on wilderness. The current access within designated or eligible wilderness is already taking place and many of the impacts are already occurring on airstrips and several miles of roads, tracks, and winter trails in the park and preserve designated or eligible wilderness as summarized above in the no-action alternative section 4.9.1.2. Additively the proposed action alternative to issue RWCAs would contribute minor adverse effects to wilderness resources, with some beneficial effects due to increased management involvement in locating and maintenance of the access facilities. The overall effect to wilderness resources in the park from existing access facilities and these RWCAs would remain moderate.

4.9.2.3 Conclusion:

The assignment of RWCA in designated or eligible wilderness would result in no new impacts to wilderness resources, and, due to documenting and managing access routes, would have a minor beneficial effect. The effects of this alternative would not result in the impairment of wilderness resources in WRST that are key to the purposes and values for which the unit was established.

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CHAPTER 5: CONSULTATION AND COORDINATION

5.1 Public Involvement

The public was involved in scoping over the last 3 years in conjunction with the NPS Alaska Region process to develop an Access User Guide. Many of the access questions and concerns in the Guide deal with access to inholdings in NPS units in Alaska. In addition to this public effort, the NPS conducted stakeholder meetings in affected area communities during the week of May 14, 2007, and issued a public newsletter to the park mail list announcing the preparation of the EA to address issuing ROWs to landowners with established, sustainable access. The Interim Access Guide was released in July 2007.

The newsletter was posted on the NPS Planning, Environment, and Public Comment (PEPC) webpage (http://parkplanning.nps.gov/index.cfm) and was mailed or emailed during the week of June 4-8, 2007 to about 153 addresses, including:

3) Alaska Congressional delegation;
15) environmental groups;
8) native groups;
7) state and federal agencies;
5) local organizations;
5) resource development organizations; and
95) individuals, mostly landowners.

Other scoping activities included:

- Consulted with U.S. Army Corps of Engineers about avoiding significant wetlands impacts and use of Nationwide Permits (Victor Ross, pers. com.).

- Consulted with NPS Water Resources Division Wetlands Specialist about NPS policy and procedures for wetlands management (Joel Wagner, Pers. Comm.)

- Consulted with the State of Alaska, Department of Natural Resources, regarding the Access User Guide provisions and principles.

- Consulted with U.S. Fish and Wildlife Service, Ecological Services, Anchorage, AK, in June 2007 regarding the presence of threatened and endangered species in the subject area.

5.2 List of Preparers and Consultants

Tables 5-1 and 5-2 list personnel that participated and consulted on the development of this environmental assessment.

Table 5-1 List of EA Preparers (Interdisciplinary Team)

Name	Organization	Position
Bud Rice	NPS, Alaska Region, Environmental Planning and Compliance	Environmental Protection Spec.
Danny Rosenkrans	Wrangell Saint-Elias National Park and Preserve	Geologist/Land Manager
Eric Veach	Wrangell Saint-Elias National Park and Preserve	Chief of Resources Management
Vicki Snitzler	Wrangell Saint-Elias National Park and Preserve	Park Planner
Geoff Bleakley	Wrangell Saint-Elias National Park and Preserve	Historian/Compliance Officer
Mary Beth Cook	Wrangell Saint-Elias National Park and Preserve	Botanist
Barbara Cellarius	Wrangell Saint-Elias National Park and Preserve	Cultural Anthropologist/Subsistence Specialist
Martin Hansen	NPS, Alaska Region, Division of Lands	Realty Specialist
Judy Alderson	NPS, Alaska Region, Natural Resources	Regional Wilderness Coordinator
Staci Deming	NPS, Alaska Region, Geographic Resources	GIS Specialist
Lisa Fox	NPS, Alaska Region, Environmental Planning and Compliance	Environmental Protection Spec.

Table 5-2 List of EA Consultants

Name	Organization	Position
Joan Darnell	NPS, Alaska Region, Environmental Planning and Compliance	Team Manager
Meg Jensen	Wrangell Saint-Elias National Park and Preserve	Superintendent
Kevin Meyer	NPS, Alaska Region, Natural Resources	Environmental Specialist/Regional Trails Specialist
Mason Reid	Wrangell Saint-Elias National Park and Preserve	Wildlife Biologist
Michelle Jesperson	Wrangell Saint-Elias National Park and Preserve	Archeologist
Jane Ahern/John Quinley	NPS, Alaska Region	Public Affairs Officer
Chuck Gilbert	NPS Alaska Lands	Team Manager
Martin Wild, PhD	USFS Chugach NF Supervisor Office, Anchorage, AK	Land Appraiser
Sally Gibert	State of Alaska, Office of the Governor	ANILCA Coordinator

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