Alaska Canada Rail Link Project

Alaskan Bio-Physical Assessment Report
Delta Junction to the International Boundary

June 2006

Macleod institute

HDR

ALASKAN BIO-PHYSICAL ASSESSMENT
FOR THE ALASKA CANADA RAIL LINK PROJECT
DELTA JUNCTION TO THE INTERNATIONAL BOUNDARY

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For MacLeod Institute

June 2006

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LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABREVIATIONS

Acronym	*Definition*
A	
AAC	Alaska Administrative Code
ACOE	(U.S.) Army Corps of Engineers
ACRL	Alaska Canada Rail Link Study
ADEC	Alaska Department of Environmental Conservation
ADFG	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOT&PF	Alaska Department of Transportation & Public Facilities
ARRC	Alaska Railroad Corporation
B	
BLM	(U.S.) Bureau of Land Management
C	
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CIS	(Alaska) Community Database Community Information Systems
CO	Carbon monoxide
CWA	Clean Water Act
D	
dB(A)	Decibels, A-weighted scale
DFAIT	(Canadian) Department of Foreign Affairs & International Trade
DOI	(U.S.) Department of Interior
E	
E.O.	Executive Order Number
EPA	(U.S.) Environmental Protection Agency
F	
FAA	Federal Aviation Administration
FAO	Food and Agriculture Organization
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FRA	Federal Railroad Administration
G	
GIS	Geographic Information Systems
GMU	Game Management Unit
H	
HDDVs	Heavy-duty diesel vehicles
L	
Lower 48	Continental U.S. including 48 states and the federal capital of the U.S., the District of Columbia (it excludes Alaska and Hawaii)
LUST	leaking underground storage tank
M	
M.P.	Mile post or marker

N

NAAQS	National Ambient Air Quality Standards
NAMS	National Air Monitoring Stations
NEC	National Economic Council
NEPA	National Environmental Policy Act
NO_x	Nitrogen oxides
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NWI	National Wetlands Inventory

P

PM_x	Particulate matter up to x microns in size

R

RCRA	Resource Conservation & Recovery Act
ROD	Record of Decision

S

SLAMS	State and Local Air Monitoring Stations
SO_2	Sulfur dioxide
SSMs	Supplemental Safety Measures

T

T&E	Threatened and endangered
TMDL	Total Maximum Daily Load Plan

U

U.S.	United States
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground storage tank

V

VOCs	Volatile organic compounds

1. Introduction

The Alaska Canada Rail Link Study (ACRL) is being conducted to review the feasibility of providing a rail link between Alaska and the North American rail network through Yukon and northern British Columbia. The timeliness of this project has been spurred by the signing of the Rails to Resources Bill into law in 2002 by United States (U.S.) President George W. Bush, authorizing U.S. involvement in a joint Canada-U.S. Feasibility Study to address the rail link. Ultimately, this proposed project would allow an alternative mode of access from Fairbanks, Yukon and northern British Columbia to tidewater and the Lower 48. This link would enable the transport of a variety of minerals, refined petroleum products and petrochemicals, agricultural products, commodities and heavy equipment, thus enhancing economic development opportunities for the region, while meeting the demands of changing world markets and supply chains. Currently the only means of transporting goods between Alaska and the Lower 48 is by truck or water. In addition, construction of the proposed rail line would complement development of the natural gas pipeline, as well as fiber optic communications lines through the same corridor. The rail link would also provide tourism opportunities through potential passenger rail service in the corridor.

The current stage of the ACRL Project (Stage 2) is a year-long study being conducted by the State of Alaska and Yukon Territory. Following the Stage 1 Marketing and Engineering Assessments phase, Stage 2 consists of a Financial and Public Interest Analysis which will address the long-term social and economic impacts of the rail line. The goal of the study is to produce an end product which will provide decision makers with a tool for making informed decisions on future implementation of the ACRL.

The portion of the Stage 2 analysis included herein addresses specifically the bio-physical aspects of constructing the rail link from the end of the proposed extension of the Alaska Railroad Corporation (ARRC) from Eielson Air Force Base (just southeast of Fairbanks) to Delta Junction, Alaska to the Alaska-Canada International Boundary. This bio-physical assessment will identify project risks and opportunities from an environmental standpoint in order to determine the viability of the project. More precisely, this assessment will serve as a precursor to the future environmental clearance process, which for the Alaska portion of the project must be completed in accordance with (U.S.) Federal regulations, namely the National Environmental Policy Act (NEPA) of 1969. Based on the magnitude of the proposed project, an Environmental Impact Statement will most likely be the required level of environmental documentation, followed by the issuance of a Record of Decision (ROD).

2. Study Process

The study process for the ACRL Bio-physical Assessment included identifying the study area, defining the study segments within the study area, and developing and using methodology to identify and assess bio-physical risks and benefits associated with the development of a rail line. The results of the evaluation are documented in this report and will be used to determine the feasibility of the project.

2.1 Study Area Location

The Study Area is primarily located in the South Central portion of the State of Alaska. This region is known as the Alaska Interior Region. The Alaska Interior Region makes up most of the state that is largely unpopulated and undeveloped. Within this Region, the study area lies within the Southeast Fairbanks Census Area. Southeast Fairbanks is located within what is called the Unorganized Borough, which encompasses over half of Alaska's land. Southeast Fairbanks has a total land area of 25,100 square miles (64,300 square kilometers) and a total water coverage of 250 square miles (640 square kilometers). The eastern boundary of the study area coincides with the eastern boundary of Southeast Fairbanks, which is also the International Boundary with Yukon Territory, Canada.

The existing ARRC terminates approximately 20 miles (32 kilometers) southeast of Fairbanks at Eielson Air Force Base. The proposed ACRL study area would tie into the proposed extension of the ARRC from Eielson to Delta Junction (Fort Greeley). Delta Junction is located a short distance south of the confluence of the Delta River with the Tanana River, both of which serve as major waterbodies within the project study area.

Beginning at Delta Junction, the study corridor extends southeastward, following the Alaska Highway (Route 2) approximately 98 miles (157 kilometers) to Tanacross. Two alternative routes then continue from Tanacross to the Alaska – Canada International Boundary. The southernmost alternative (referred to as the Highway Route) continues in a southeasterly direction approximately 100 miles (160 kilometers) along the Alaska Highway, while the northernmost alternative (referred to as the Ladue Route) continues in an easterly direction approximately 92 miles (147 kilometers) along the Ladue River. The study area vicinity is shown in Figure 1. Beyond the Canadian border, these two alternatives split into a complex network of segments which would carry the proposed line through Yukon and northern British Columbia to various tie in points with existing rail lines.

2.1.1 Skagway Option

This study also includes analysis of the existing Whitepass and Yukon Railroad from Skagway, Alaska to Whitehorse in Yukon, Canada. Within Alaska, the alignment extends approximately 25 miles (40 kilometers) from the Taiya Inlet in Skagway, Alaska to the International Boundary with Canada. The Alaska portion of the alignment is situated in the Upper Lynn Canal of southeastern Alaska. Skagway, Alaska is a historic town as it was the first incorporated city in Alaska and is considered the gateway to the 1898 Gold Rush. The study area for the Skagway Option is not as large as the study area

defined in Alaska's Interior Region because a narrow gauge rail alignment already exists and improvements would likely be minor. Since the Skagway Option proposed improvements would cause minimal disruption to the surrounding environment, the option is not analyzed to the same level of detail as the remaining study area in Interior Alaska. Potential bio-physical effects of the improvements are summarized in Section 3.14.

2.2 Definition of Study Segments

The study corridor for the bio-physical assessment which is addressed herein has been defined as a 25-mile (40-kilometer) wide band which is centered on the previously identified conceptual track alignment options. (As future phases of the project proceed, the study corridor will be narrowed, until ultimately a locally preferred alignment and associated project footprint will be identified.)

For analysis purposes, the 25-mile (40-kilometer) wide study corridor has been divided into the following three segments:

- Segment 1 - Delta Junction to Tanacross (approximately 98 miles [158 kilometers])
- Segment 2L - Tanacross to Canadian Boundary via Ladue River route (approximately 92 miles [148 kilometers])
- Segment 2H - Tanacross to Canadian Boundary via Alaska Highway route (approximately 100 miles [161 kilometers])

These corridor segments are delineated in Figure 2. As shown in the figure, the 25-mile (40-kilometer) wide corridors for segments 2H and 2L overlap in certain portions of the study area. In the analyses which follow, it should be noted that each of these segments was evaluated independently, in order to identify all impacts within each of the corridor options. Specifically, the features within the area shown in Figure 2 which is common to Segments 2H and 2L have been identified in the Environmental Bio-Physical Assessment Matrices for both.

2.3 Methodology for Assessing Bio-Physical Effects

Potential environmental resources were evaluated in order to identify and assess bio-physical risks and benefits associated with the development of a rail line within the study corridor. The evaluation was based on established methodology and available data for the following resources as described in subsequent sections of this report.

- Air Quality
- Noise and Vibration
- Wetlands
- Floodplains
- Waterways/Water Quality
- Farmland
- Vegetation
- Geological/Seismic Features and Permafrost

- Wildlife/Waterfowl Refuges/Fisheries
- Threatened and Endangered Species
- Parklands/Special Management Areas
- Special Waste

2.3.1 Air Quality

The following process was used to evaluate air quality effects of the ACRL within the study area.

1. Collect data on estimated annual gross tonnage to be transported on the ACRL. Determine number of trucks required to transport equivalent tonnage along highway routes.
2. Run Air Quality model for ACRL and truck options to determine emissions estimates to be used for comparison purposes.
3. Identify data gaps or shortcomings in the currently available data that will require further research in subsequent phases of the project.
4. Identify Agencies with responsibility. The following agencies have jurisdictional responsibility for air quality within the study area: U.S. Environmental Protection Agency (EPA) and the Alaska Department of Environmental Conservation (ADEC).

2.3.2 Noise and Vibration

The following process was used to evaluate noise and vibration within the study area.

1. Determine noise and vibration sensitive areas within the study corridors. Sensitive areas were identified through a review of maps and atlases in addition to internet research.
2. Identify data gaps or shortcomings in the currently available data that will require further research in subsequent phases of the project.
3. Identify potential avoidance and minimization measures which would reduce the impacts to sensitive receptors by the proposed improvements.

2.3.3 Wetlands

The following process was used to evaluate wetlands within the study area.

1. Determine the presence and extent of wetland resources within the study area. To evaluate the existing wetland conditions and potential impacts of the corridor alternatives on wetlands, available U.S. Fish and Wildlife Service (USFWS)--National Wetlands Inventory (NWI) data were downloaded and reviewed. These data show graphic representations of the type, size and location of the wetlands and deepwater habitats.
2. Identify data gaps in the currently available data that will require further research in subsequent phases of the project.
3. Assess potential effects by comparing the study corridor with available wetlands data.

4. Identify potential avoidance and minimization measures which would reduce the impacts to wetlands by the proposed improvements.
5. Identify Agencies with responsibility. The following agencies have jurisdictional responsibility for wetlands within the study area: U.S. Army Corps of Engineers (ACOE) and USFWS.

2.3.4 Floodplains

The following process was used to evaluate floodplains within the study area.

1. Determine the presence and extent of floodplains within the study corridors through the analysis of available Federal Emergency Management Agency (FEMA) documents, U.S. Geological Survey (USGS) Topographic Maps, and the Alaska Geographic Information Systems (GIS) database.
2. Identify data gaps that will require further research in subsequent phases of the project.
3. Assess potential effects by comparing the study corridor with the locations of mapped floodplains.
4. Identify potential avoidance and minimization measures that would reduce the impacts to floodplains by the proposed improvements.
5. Identify agencies with responsibility. The ACOE has jurisdictional responsibility for floodplains within the study area.

2.3.5 Waterways/Water Quality

The following process was used to evaluate waterways and water quality within the study area.

1. Determine the presence and function of waterways within the study area, including streams, rivers, creeks, lakes, sloughs, rapids and flats, through a review of maps and atlases in addition to internet research.
2. Determine if identified waterways are navigable or classified as Wild and Scenic Rivers. The list of waterways was compared to the National Park Service's (NPS) list of Wild and Scenic Rivers and the ACOE list of navigable waterways.
3. Determine the water quality status of the waterways located within the study area. The State's Water Quality Report was reviewed to obtain water quality information on waterways within the study area.
4. Identify data gaps in the currently available data that will require further research in subsequent phases of the project.
5. Assess potential effects by comparing the study corridor with the locations of the known hydraulic features. In order to identify which water bodies included aquatic farming, the Alaska Department of Natural Resources' (ADNR) Interactive Map tool was utilized. By comparing the aquatic farming water bodies with the study area's

water bodies, the total number of aquatic farming areas within the study area was determined.

6. Identify potential avoidance and minimization measures which would reduce the impacts to waterways and/or water quality by the proposed improvements.
7. Identify agencies with responsibility. The ACOE and EPA have jurisdictional responsibility for waterways and water quality within the study area. The Aquatic Farming Program is managed by the ADNR - Division of Mining, Land and Water - Division of Agriculture.

2.3.6 Farmland

The following process was used to evaluate farmlands within the study area.

1. Determine presence and extent of farmland within the study area through coordination with the local Natural Resource Conservation Service (NRCS) in Delta Junction, the review of aerial maps, and internet research of the U.S. Department of Agriculture's (USDA) National Agriculture Statistics website and Alaska Statutes.
2. Identify data gaps or shortcomings in the currently available data that will require further research in subsequent phases of the project.
3. Assess potential effects by comparing the study corridor with the boundaries of area farmlands.
4. Identify potential avoidance and minimization measures which would reduce the impacts to farmland by the proposed improvements.
5. Identify Agencies with responsibility. Agricultural land is managed by the ADNR - Division of Mining, Land and Water - Division of Agriculture. The USDA is the federal authority for farmland.

2.3.7 Vegetation

The following process was used to evaluate vegetation within the study area.

1. Determine types and extent of vegetation types within the study area through analysis of available GIS information and internet research.
2. Identify the beneficial uses of the vegetation in the study area through internet research and review of other studies.
3. Identify data gaps in the currently available data that will require further research in subsequent phases of the project.
4. Assess potential effects by comparing the study corridor with vegetation type maps of the study area.
5. Identify potential avoidance and minimization measures that would reduce the impacts to vegetation by the proposed improvements.
6. Identify Agencies with responsibility. Study area vegetation is under jurisdiction of the various property owners that covers a number of different agencies.

2.3.8 Geological/Seismic Features and Permafrost

The following process was used to evaluate geological/seismic features and permafrost within the study area.

1. Identify the physiographic provinces that are located within the study area.
2. Determine the presence and extent of geologic/seismic features and permafrost within the study area through a review of maps and atlases in addition to internet research.
3. Identify data gaps or shortcomings in the currently available data that will require further research in subsequent phases of the project.
4. Assess potential effects by comparing the study corridor with the locations of the features.
5. Identify potential avoidance and minimization measures that would reduce the impacts to geologic/seismic features and permafrost by the proposed improvements.
6. Identify agencies with responsibility. U.S. Department of Interior (DOI), U.S. Bureau of Land Management (BLM), USGS, and the ADEC have jurisdiction over geologic/seismic features and permafrost in the study area.

2.3.9 Wildlife/Waterfowl Refuges/Fisheries

The following process was used to evaluate wildlife, waterfowl refuges, and fisheries within the study area.

1. Determine the presence and extent of wildlife habitat, waterfowl refuges, migration patterns and fisheries within the study area through a review of maps and atlases in addition to internet research.
2. Identify data gaps or shortcomings in the currently available data that will require further research in subsequent phases of the project.
3. Assess potential effects by comparing the study corridor with resource maps of the study area.
4. Identify potential avoidance and minimization measures which would reduce the impacts to wildlife habitat, waterfowl refuges and fisheries by the proposed improvements.
5. Identify agencies with responsibility. In general, the following agencies have responsibilities associated with wildlife, waterfowl refuges, and fisheries: USFWS, Alaska Department of Fish and Game (ADFG), ADEC, BLM, and NPS.

2.3.10 Threatened and Endangered (T&E) Species

The following process was used to evaluate T&E species within the study area.

1. Determine presence of T&E resources within the study area through a review of federal and state T&E listings and listings of species proposed for the federal and state T&E lists.
2. Identify data gaps or shortcomings in the currently available data that will require further research in subsequent phases of the project.
3. Assess potential effects, by listing activities that would impact T&E species.
4. Identify potential avoidance and minimization measures that would reduce the impacts to T&E species by the proposed improvements.
5. Identify agencies with responsibility. USFWS and National Marine Fisheries Service manage federally listed species. State listed species are managed by the ADFG.

2.3.11 Parks and Special Management Areas

The following process was used to evaluate parks and special management areas within the study area.

1. Determine the presence and extent of parks and special management areas located within the study area. For this project special management areas include recreational areas owned and managed by state and/or federal agencies, including: refuges, sanctuaries, critical habitat areas, ranges, special management areas, forests, parks, preserves, public use areas, recreational rivers, and recreational mining areas. The regulations and plans that govern the use within the area's boundaries have been considered. For the purpose of this study, a "park" is defined as a recreational area that is locally managed. These areas were identified through a review of maps, atlases, and ADNR research. No parks at this time have been identified through our cursory review of maps and atlases.

   The following Special Management Areas have been investigated to determine whether they exist within the study area.

   - National/State Forests
   - State Management Areas
   - Game Management Units (GMU)
   - Controlled Use Areas
   - Alaska Native Management Areas/Villages
   - State Preserves
   - State Refuges
   - State/National Refuges
   - State Critical Habitat Areas
   - State Sanctuaries
   - State Range Areas
   - State Parks (Recreational Areas)
   - State Resource Management Areas
   - State Scenic Byways
   - National Trails
   - Recreational Mining Areas
   - Military Management Areas

2. Identify impact restrictions for each of the special management area categories, through a review of Alaska statutes and other Alaska State Reports, including Interior Alaska Subarea Contingency Plan (June 2000) and the ADNR, Fact Sheet: State of Alaska Legislatively Designated Areas (August 1997).
3. Identify data gaps or shortcomings in the currently available data that will require further research in subsequent phases of the project.
4. Assess potential effects by comparing the study corridor with the boundaries of each special management area. The State of Alaska has developed criteria for measuring levels of concern when special management areas are impacted. According to the Interior Alaska Subarea Contingency Plan (June 2000), State Refuges and High Recreational Use Areas are considered Areas of Major Concern, whereas National Parks, National Wildlife Refuges, and other Recreational Use Areas are considered Areas of Moderate Concern.
5. Identify potential avoidance and minimization measures which would limit the infringement on any park and/or special management area by the proposed rail alignment.
6. Identify agencies with responsibility. The following agencies manage these special management areas.
    - The ADFG manages the State Sanctuaries, State Range Areas, Critical Habitat Areas, State Refuges, and State/National Refuges.
    - The ADNR, Division of Parks and Outdoor Recreation manages the State Park Areas, Marine Parks, State Recreational Areas, and State Preserves.
    - The ADNR, Division of Forestry manages the State Forest and the Resource Management Areas.
    - The ADNR and ADFG manage Recreational Mining Areas.

2.3.12 Special Waste

The following process was used to evaluate special waste within the study area.

1. Identify special waste sites that are known to exist or have the potential to exist within the study area. Two methods were used to identify potential special waste sites within the study area: 1) review special waste databases and 2) identify other potential sources of waste products, such as service stations, auto repair facilities, bulk fuel facilities, agricultural chemical warehouses and distribution facilities.

    The databases reviewed for this study are maintained by the Resources Management and State Programs Unit of the EPA. The databases from which data was obtained for this analysis include Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS), Underground Storage Tank (UST), Resource Conservation & Recovery Act (RCRA), Leaking Underground Storage Tank (LUST), and Contaminated Sites.

2. Identify special waste risks associated with the implementation of a new rail line through the study area. Risks associated with the construction of a new rail line were identified through web research and discussions with rail authorities.
3. Identify data gaps or shortcomings in the currently available data that will require further research in subsequent phases of the project.
4. Assess potential effects by comparing the study corridor with the listing of special waste sites. Review potential areas at high risk for being impacted by potential hazardous waste incidences associated with the new rail line.
5. Identify potential avoidance and minimization measures that would reduce the impacts to known special waste sites and sensitive resources by the proposed improvements.
6. Identify agencies with responsibility. In general, the Resources Management & State Programs Unit of the EPA has responsibilities associated with special waste and special waste sites.

3. Summary of Findings by Resource

A summary of findings from the bio-physical assessment which addresses each of the resource areas described above (by Study Corridor Segment) is provided in Tables 2 through 13 on the following pages. These tables are preceded by the Matrix Key in Table 1 which describes the organization of data within the matrices. Following the matrices is a discussion/interpretation of the findings, broken down into resource areas.

Table 1. Matrix Key

Potential Environmental Effects	
Potential environmental effects of the proposed rail alignment on the study area are provided for each of the study segments (Segment 1, 2L, and 2H). The following resources were included in the analysis: • Air Quality • Noise/Vibration • Wetlands • Floodplains • Waterways/Water Quality • Farmland • Vegetation • Geological/Seismic Features and Permafrost • Wildlife/Waterfowl/Fisheries • T&E Species • Parks and Special Management Areas • Special Waste	
Railroad Corridor Segment ID: **Segment 1**	**Segment Description:** Approximately 98-mile (158-kilometer) segment that follows the alignment of the Alaska Highway Route 2 from Delta Junction to Tanacross. **Segment Terminus Points:** Approximately mile post (M.P.) 0 (Delta Junction) to M.P. 98 (Tanacross).
Railroad Corridor Segment ID: **Segment 2L**	**Segment Description:** Approximately 92-mile (148-kilometer) segment along the Ladue River from Tanacross to the Alaska - Canada International Boundary. **Segment Terminus Points:** Approximately M.P. 98 (Tanacross) to M.P. 190 (Alaska – Canada International Boundary)
Railroad Corridor Segment ID: **Segment 2H**	**Segment Description:** Approximately 100-mile (161-kilometer) segment along Alaska Highway Route 2 from Tanacross to the Alaska - Canada International Boundary. **Segment Terminus Points:** Approximately M.P. 98 (Tanacross) to M.P. 198 (Alaska – Canada International Boundary)
Data Gaps	
Data that is not available for the current phase of study and will be required for subsequent phases.	
Data Source(s)	
Listing of sources used for the study.	

Table 2. Air Quality

Potential Environmental Effects

All Segments (1, 2L, & 2H):

Based upon estimated gross ton-miles of freight to be carried during the first full year of operation, a comparison of the rail alternative with the truck alternative was performed, in terms of emission factors in tons per year for Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Particulate Matter (PM), Volatile Organic Compounds (VOCs), and Sulfur Dioxide (SO_2). These air pollutant emissions comparisons are shown below.

Pollutant	Rail Alternative (tons/year)	Truck Alternative (tons/year)
NO_x	38.00	288.00
CO	83.00	39.00
PM*	2.10	7.00
VOCs	31.00	13.00
SO_2	0.30	0.86

Note: * Includes both $PM_{2.5}$ and PM_{10}, however, all are expected to be in the PM_{10} size range

Data Gaps

- Agency coordination
- More detailed air quality modeling
- Existing and future air quality reports

Data Source(s)

- Mobile6.2 (air quality model)
- ADEC– Division of Air Quality
- Alaska's State and Local Air Monitoring Stations (SLAMS)/National Air Monitoring Stations (NAMS) Monitoring Network Assessment 2001 Annual Report, ADEC

Table 3. Noise and Vibration

Potential Environmental Effects

All Segments (1, 2L, & 2H)

With respect to freight rail projects, vibration-sensitive receptors typically include buildings where medical procedures are performed, high-tech printing operations, and other vibration-sensitive industrial facilities. Residences and other facilities where overnight sleep occurs can also be both noise and vibration sensitive. At this time, the most likely noise and vibration-sensitive locations have been identified in the study area. These locations include the census-designated areas and villages that are located within Segments 1, 2L, and 2H, as shown below.

Segment 1

Census-designated Areas:

- Delta Junction
- Deltana
- Fort Greely
- Dry Creek
- Dot Lake
- Dot Lake Village
- Tanacross

The potential presence of smaller and unidentified or unincorporated developed areas in this segment exist.

Segment 2L

Census-designated Areas:

- Tanacross
- Tok
- Tetlin

The potential presence of smaller and unidentified or unincorporated developed areas in this segment exists.

Segment 2H

Census-designated Areas:

- Tanacross
- Tok
- Tetlin
- Northway Junction
- Northway Village
- High Cache
- Northway
- Nabesna Village
- Kathakne
- Charlieskin Village

The potential presence of smaller and unidentified or unincorporated developed areas t in this segment exists.

Data Gaps

- Agency Coordination
- Individual Receptors

Data Source(s)

- Google Earth Pro (Aerial Program)
- Encyclopedias
- State of Alaska Atlas

Table 4. Wetlands

Potential Environmental Effects:

All Segments (1, 2L, & 2H)

Alaska Wetlands:

- Make up 63% of the nation's wetland ecosystems
- Interior Region wetlands are classified as Flats (majority).
- Alaska wetland use require approval/permit from ACOE
- Regulated under federal and state law, and local ordinances.
- Follow water quality standards, no specific standards for wetlands.
- Mitigation measures include preservation, restoration, enhancement, or creation of wetlands or funding of studies to improve wetland management

Segment 1

NWI data indicated approximately 58% of the segment consists of wetlands. Types of wetlands:

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Lake
- Riverine

Segment 2L

NWI data is insufficient for evaluating entire segment. Types of wetlands:

- Freshwater Forested/Shrub Wetland
- Riverine

Segment 2H

NWI data indicated that 80% of the segment consists of wetlands. Types of wetlands:

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Wetland and Freshwater Pond
- Lake
- Riverine

Data Gaps

- Agency Coordination
- Wetland Delineations including jurisdictional determinations
- Wetland quality assessments
- NWI wetland maps along Ladue River Route
- NWI wetland maps along Alaska Highway Route
- NRCS Farmed Wetland Maps
- Field verification of available NWI wetland information

Data Source(s)

- EPA – Alaska State Water Quality Report
- USFWS, NWI, Alaska Wetland Polygons 2004 GIS Data
- Cowardin, Lewis. Classification of Wetlands and Deepwater Habitats of the United States. USFWS, December 1979.
- ACOE Release No. PA-00-14, Sept. 8, 2000
- Alaska Geospatial Data Clearinghouse: USGS Forest Health Monitoring Clearinghouse: Land Use/Land Cover GIS Data. 1991

Table 5. Floodplains

Potential Environmental Effects

All Segments (1, 2L, & 2H)

Digital data verified that floodplain formations exist throughout the study area. Refer to Figure 6 and Section 3.4. The largest percentage of floodplain in the study area is associated with the Tanana River. The Tanana River with its associated floodplain crosses all three segments.

If impacts to the floodway and 100-year floodplains cannot be avoided then mitigation measures should be developed. In accordance with the Clean Water Act (CWA), mitigation is required at a 1:1 ratio for areas within the FEMA floodway and 100-year floodplain that will be impacted.

Segment 1

Floodplains are associated with water bodies in this segment according to available digital data. Refer to Section 3.4.2.1.

FEMA delineated floodplains:

According to the FEMA Flood Insurance Rate Map (FIRM) for the City of Delta Junction within the Southeast Fairbanks Division, 100-year floodplain is located within Segment 1. It is associated with the Delta River and Jarvis Creek. Refer to Figure 4. FEMA floodplain information was not available for the remainder of the study area.

Segment 2L and Segment 2H

Floodplains are associated with water bodies within these segments according to available digital data. Refer to Section 3.4.2.2 and Section 3.4.2.3. FEMA floodplain information was not available within these two segments.

Data Gaps

- Agency Coordination
- FEMA FIRMs indicating floodplain delineations for study area east of Delta Junction
- Limits of the floodway and 100-year floodplains
- Field investigations needed to complete analysis

Data Source(s)

- FEMA
- NPS, Alaska Support USGS Office

Table 6. Waterways/Water Quality

Potential Environmental Effects			
All Segments (1, 2L, & 2H)			
RIVERS:	• Robertson River[1]	• Tanana River[1] (Navigable water of the U.S.)	
There are no Wild and Scenic Rivers within the study area.			
LAKES:	• Grass Lake[1]	• Midway Lake[1]	• Silchin Lake[1]
Segment 1			
RIVERS:			
• Delta River[1] • Gerstle River[1]	• Healy River • Johnson River[1]	• South Fork Goodpaster River	• Little Gerstle River • Volkmar River
CREEKS: • Arrow Creek • Berry Creek • Billy Creek • Bradford Creek • Chief Creek • Clearwater Creek[2] • Cockscomb Creek • Dry Creek • Dougherty Creek	• Elting Creek • Fish Creek • George Creek • Granite Creek • Jarvis Creek[2] • July Creek • Hajdukovich Creek • Little Fish Creek • Mansfield Creek • McCumber Creek	• MJ Creek • Natohona Creek • Ober Creek • Panoramic Creek • Pegmatite Creek[1] • Prospect Creek • Rhoads Creek • Rumble Creek • Sam Creek • Sand Creek[1]	• Sawmill Creek • Sears Creek • Sheep Creek • Shelf Creek • Shindata Creek • Stibnite Creek • White Creek • Yerrick Creek
LAKES: • Big Lake • Black Lake[1] • Bolio Lake[2] • Butch Lake • Clearwater Lake[2]	• Craig Lake[1] • Dot Lake • Fish Lake[1] • Glaman Lake • Healy Lake[1] • Jan Lake	• Lake George[1] • Lake Mansfield[1] • Lisa Lake • Monte Lake • Moon Lake • Moose Lake[1]	• Moosehead Lake[1] • Plateau Lake • Round Lake • Sand Lake • T Lake • Twelve Mile Lake[1]
SLOUGHS:	• Liscum Slough	• Little Tanana Slough	• Johnson Slough
RAPIDS:	• Cathedral Rapids No.1	• Cathedral Rapids No. 2	• Tower Bluff Rapids
FLATS:	• Goodpaster Flats		
Segment 2L			
RIVERS:	• Kalutna River • Ladue River	• Tetlin River • Tok River	
LAKES: • Big Lake[2] • Fish Lake[1] • Fish Camp Lake	• Leaf Lake • Long Lake • Porcupine Grass Lake • Round Lake	• Swan Lake • Tetlin Lake[1] • Tlechegn Lake • Tlocogn Lake	• Willow Lake • Wolf Lake
CREEKS: • Big Creek • Bitters Creek	• Chicken Creek • Clearwater Creek[2] • Deep Creek[2]	• Dennison Creek • East Fork • McArthur Creek	• Porcupine Creek • Yellow Water Creek

Table 6. Waterways/Water Quality

Segment 2H:

RIVERS:

- Chisana River
- Kalukna River
- Kalutna River
- Little Tok River
- Nabesna River
- Tetlin River
- Tok River

CREEKS:

- Beaver Creek[2]
- Bitters Creek
- Charlieskin Creek
- Chindaglekne Creek
- Clearwater Creek[2]
- Desper Creek
- Gardiner Creek
- Little Scottie Creek
- Mark Creek
- Moose Creek[2]
- Mirror Creek
- Open Creek
- Porcupine Creek
- Scottie Creek
- Stuver Creek
- Silver Creek
- Tenmile Creek
- Yellow Water Creek

LAKES :

- Andrew Lake
- Big John Lake
- Big Lake[2]
- Birch Lake[2]
- Cemetery Lake
- Chidek Lake
- Chindagmund Lake
- Clearwater Lake[2]
- Close Lake
- Damundtali Lake
- Dathlalmund Lake
- Deadman Lake
- Deep Lake
- Dog Lake
- Eliza Lake
- Fish Camp Lake
- Fish Lake
- Gasoline Lake
- Halthmund Lake
- Hillside Lake
- Hudeuc Lake
- Island Lake
- Joe Lake
- Leaf Lake
- Long Fred Lake
- Long Lake
- Logging Lake
- Louie Lake
- Mundcho Lake
- Nuziamundcho Lake
- Old Albert Lake
- Pauline Lakes
- Porcupine Grass Lake
- Pullin Lake
- Round Lake
- Sand Lake[1]
- Shashamund Lake
- Skate Lake
- Steve Lake
- Sun Lake
- Swan Lake
- Tenmile Lake
- Tetlin Lake[1]
- Thadthamund Lake
- Titus Lakes
- Tlechegn Lake
- Tlocogen Lake
- Tontethaimund Lake
- Tsolmund Lake
- Tushaday Lake
- Tutkaimund Lake
- Tsilchin Lake
- Willow Lake
- Wolf Lake
- Yarger Lake

SLOUGHS:

- Nabesna Slough

Data Gaps

- Agency Coordination
- Verification of waterways
- Hydraulic/hydrologic surveys
- Hydraulic reports and drainage or watershed studies
- Jurisdictional determinations
- Information from previous studies
- Modeling effort
- Water quality determinations

Data Source (s)

- EPA – Alaska State Water Quality Report
- NPS
- ACOE – Alaska District
- BLM

NOTE: 1) A function of the waterbody is aquatic farming
2) Designated Category 3 waterbody: See Section 3.5 for Category descriptions.

Table 7. Farmland

Potential Environmental Effects

All Segments (1, 2L, & 2H):

The USDA, National Agriculture Statistics Service states that the Upper Tanana Valley from Fairbanks to Delta Junction produces much of the state's barley and oats, as well as hay, potatoes, milk, greenhouse plants and vegetables. However, according to the USDA – Farm Service Agency, Delta Junction Service Center, the study area does not encompass prime farmland, unique farmland, or farmland of statewide significance.

Data Gaps

- Agency Coordination
- Field investigations
- Soil analyses
- Farmland evaluations (if found to be present)

Data Source(s)

- USDA, Farm Service Agency, Delta Junction Service Center
- USDA – National Agriculture Statistics Service
- ADNR – Division of Mining, Land and Water

Table 8. Vegetation

Potential Environmental Effects

All Segments (1, 2L, & 2H):

VEGETATION TYPE COVER:

Vegetation cover types in the study area include the following as shown in Figure 5, sheets 1 through 5:

- Alpine Tundra - Alpine Tundra are the treeless region above the treeline of high mountains, characterized by cold winters and short, cool summers and having permafrost below a surface layer that may melt in summer. Vegetation consists of perennial forbs, grasses, sedges, and short woody shrubs.
- Forests - Forests (boreal forests) are floristically simple with only nine tree species dominating. These species are composed of black spruce or white spruce and several early and mid-succession deciduous broadleaf forests, including alder, paper birch, aspen, and balsalm poplar. The forests are structurally simple, typically composed of a single-layer closed-canopy or an open-canopy stand.
- Shrub - Shrubs include woody vegetation less than 20 feet tall.
- Dwarf Shrub Tundra - Dwarf Shrub Tundra are locations where soils tend to be thin, well drained and stony but may be more poorly drained peat.
- TussockSegde/Dwarf Shrub Tundra - Tussock Sedge/Dwarf Shrub Tundra is a combination of Tussock Sedge and Dwarf Shrub Tundra. The Tussock Sedge is one of many grass-like plants called sedges. Sedges are often hard to tell apart, because they all have long, green, triangular (shaped like a triangle) stems with rough edges.Moist Herbaceous/Shrub Tundra - Moist Herbaceous/Shrub Tundra describes a Shrub Tundra region that includes plants with stems that are non-woody and die back to the ground every year. Some hebaceous plants include marigold, zinnias, grass, tomatoes, green beans and geraniums.
- Glacier/Snow - A glacier is a large, long-lasting river of ice that is formed on land and moves in response to gravity. A glacier is formed by multi-year ice accretion in mountainous or sloping terrain. The glacier fringe is the area where the glacier has recently melted. There are two main types of glaciers: alpine glaciers, which are found in mountain terrains, and continental glaciers, which are associated with ice ages and can cover large areas of continents
- 1990 Fires & Gravel Bars and 1991 Fires – This cover type has been affected by the 1990 and 1991 fires. Gravel bars are natural and manmade features in the water that change the elevation.

The greatest percentages of land cover within the study area are Alpine tundra, forests, and shrubs. The remaining surface area is covered by the remaining vegetation cover types. The geology around and south of the Tanana River contrasts sharply, as the floodplain was formed by Pleistocene glaciers that left broad outwash plains and gravel moraines. The meandering Tanana River floodplain consists of erosional cut banks and deposition silt bars that create a mosaic of successional forests. Permafrost is discontinuous within these stands. In the lowlands, both white and black spruce occupy the same topographic zone, as do alder, balsam poplar, and paper birch.

The construction of a rail alignment could potentially affect the five primary functions of vegetation through fragmentation and land conversion for the rail (which may not serve the same functions). The largest impacts will be to wildlife and on subsistence and developments that depend on subsistence.

Data Gaps

- Agency Coordination
- Field investigations
- Additional studies and information about the cover types, soils, and cover types functions/species supported therein

Table 8. Vegetation

Data Source(s)

- USDA, Forest Service, Pacific Northwest Research - Publication: The Alaska Vegetation Classification, by Viereck, 1992
- USGS: EROS Alaska Field Office
- TAPS Environmental Impact Study (Viereck et. al 1992)
- ADNR – Division of Mining, Land and Water

Table 9. Geological/Seismic Features and Permafrost

Potential Environmental Effects

All Segments (1, 2L, & 2H):

BEDROCK GEOLOGY: *(from greatest area coverage to least area coverage in study area)*

- Paleozoic/Precambrian metamorphic
- Quaternary sedimentary
- Paleozoic metamorphic
- Mesozoic plutonic
- Paleozoic sedimentary
- Tertiary/Mesozoic sedimentary
- Tertiary volcanic
- Tertiary/Mesozoic plutonic
- Tertiary sedimentary

GLACIERS: In the Alaskan Interior– 5,367 square miles (8,637 square kilometers) of Alaska Range Glaciers.

MINING: There are no large active mining facilities within the study area.

Segment 1:

CONSERVATION DISTRICT:

District 1 – Alaska

District 10 – Salcha-Big Delta

SURFICIAL GEOLOGY: The proposed segment corridor generally follows the Tanana River floodplain.

Lower elevations in the project area are underlain by various glacial outwash, alluvial deposits and floodplain formations.

Higher elevations in the project area consist of mountainous bedrock and coarse and fine rubble.

PERMAFROST: The entire study area is underlain by permafrost. Permafrost is found in isolated masses in both lowland and upland areas. Permafrost depth varies from moderately thick to thin.

SEISMIC ACTIVITY: (# and approximate location of fault lines present within study corridor)

- 1 fault line (Donnelly Dome Fault), South of Delta Junction, at Richardson Highway
- 2 fault lines, South of Alaska Highway, east of Richardson Highway
- 3 fault lines, North of Alaska Highway, at Sheep Creek

VOLCANOES: Segment 1 is located approximately 62 miles (100 kilometers) southwest of the dormant Prindle volcano and 62 miles (100 kilometes) north of the volcanoes in the Wrangell range. The Wrangell range contains nine volcanoes, some of which are considered active.

Segment 2L:

CONSERVATION DISTRICT:

District 1 – Alaska

SURFICIAL GEOLOGY: The western portion of this segment generally follows the Tanana River floodplain. Lower elevations in this area are underlain by various glacial outwash, alluvial deposits and floodplain formations. At higher elevations, the project area contains mountainous bedrock and coarse and fine rubble.

The eastern portion of this segment follows the Ladue River to the Canadian Border. This area contains mountain alluvium and coluvium, coarse and fine rubble.

SEISMIC ACTIVITY: (# and approximate location of fault lines present within study corridor)

- 1 fault line, South of Alaska Highway, south of Tok, along Tok Creek Cut-Off
- 1 fault line, North of Alaska Highway, at Tetlin Junction

PERMAFROST: The entire study area is underlain by permafrost. In lower elevation areas, permafrost is found in isolated masses in both lowland and upland areas. Permafrost is discontinuous in mountainous, higher elevation areas.

VOLCANOES: Prindle Volcano is located approximately 17 miles (28 km) north of segment 2L. This volcano is considered dormant.

Table 9. Geological/Seismic Features and Permafrost

Segment 2H:

CONSERVATION DISTRICT:

District 1 – Alaska

SURFICIAL GEOLOGY: The western portion of the segment generally follows the Tanana River floodplain. At lower elevations, this area is underlain by various glacial outwash, alluvial deposits and floodplain formations. At higher elevations, the project area contains mountainous bedrock and coarse and fine rubble.

The eastern portion of this segment (east of Northway Junction) encounters floodplain deposits and an eloian sand dune formation at lower elevations. Mountain alluvium and coluvium, coarse and fine rubble and the floodplain formation of the Chisana River are found near the Canadian border.

PERMAFROST: The entire study area is underlain by permafrost. Permafrost is found in isolated masses in both lowland and upland areas. Permafrost depth varies from moderately thick to thin.

SEISMIC ACTIVITY: (#and approximate location of fault lines present within study corridor)

- 1 fault line, South of Alaska Highway, south of Tok, along Tok Creek Cut-Off
- 1 fault line, North of Alaska Highway, at Tetlin Junction

VOLCANOES: Segment 2 is located approximately 75 miles (120 kilometers) northeast of the volcanoes in the Wrangell range. The Wrangell range contains nine volcanoes, two of which are considered active.

Data Gaps

- Agency Coordination
- Field investigations
- Additional studies

Data Source(s)

- ADNR - Division of Mining, Land & Water and Division of Geologic & Geophysical Surveys
- Alaska Soil & Water Conservation Districts
- ADFG - Division of Wildlife Conservation and Division of Commercial Fisheries
- USFWS
- USGS Permafrost Map of Alaska
- University of Alaska – Fairbanks GIS Data
- NPS, Alaska Support Office GIS Team
- Alaska Volcano Observatory
- Northern Alaska Environmental Center
- TAPS Environmental Impact Statement – TAPS Owners 2001a
- National Marine Fisheries Service – Alaska Regional Office
- Carrara, P. 2004. "Surficial Geologic Map of the Tanacross B-6 Quadrangle, East-Central Alaska." Scientific Investigations Map 2850. DOI.
- Siefert, R. 1994. "Permafrost: A Building Problems in Alaska." University of Alaska Fairbanks – College of Rural Alaska. Cooperative Extension Service. HCM-00754.

Table 10.Wildlife/Waterfowl/Fisheries

Potential Environmental Effects

All Segments (1, 2L, & 2H):

WILDLIFE SPECIES:
- Caribou
- Moose
- Bison
- Dall Sheep
- Duck/Goose

WATERFOWL:
- Region: Tanana/Kuskokwim Lowlands (Stratum 3)
- Major species: Pintails, mallards, wigeon, and scaup
- Highest concentration: Tetlin wetlands (containing 23 species of waterbirds)
- Total species: 32

ANADROMOUS FISH STREAMS: Tanana River

MIGRATORY PATTERNS: A total of 186 bird species are known to inhabit the Game Management Unit (GMU) 12, which is located in Tok. *(See PARKS & SPECIAL MANAGEMENT AREAS Section for further reference GMU 12)*

Four seasons: Based on bird movements and activities during that time.
1. Spring: Birds arrive, only 3 species in early March
2. Summer: Nesting and brood rearing, majority still nest in June and most young have hatched by July.
3. Fall: Birds depart. By end of October, only resident species remain.
4. Winter: Only the hardiest species remain until the first migrants return in March.

FISHERIES: Upper Yukon Salmon District – Yukon Northern Area (District 6); Along Tanana River, from Fairbanks to the Alaska-Canada International Boundary.

Fishing Schedule (2006): Two 42-hour periods/week, Monday 6pm to Wednesday Noon & Friday 6pm to Sunday Noon

Aquatic farms also existing within all three segments.

Segment 1:

CARIBOU HERD LOCATIONS:
- Macomb Caribou Herd: Dot Lake, Dry Creek, Dot Lake Village (part)
- Mentasta Caribou Herd: Tanacross, Dot Lake Village (part)
- Forty Mile Caribou Herd: Healy Lake

Segment 2L:

CARIBOU HERD LOCATIONS: Mentasta Caribou Herd: Tanacross, Tok, Tetlin

NATIONAL WILDLIFE REFUGES: Tetlin National Wildlife Refuge
- Located at M.P. 1314 Alaska Highway in Tok
- 730,000 acres (295,420 hectares) of the Upper Tanana River Basin, west of the Alaska-Canada border, between Alaska Highway and Wrangell-St. Elias National Park and Preserve.
- Main purpose for designation: to preserve fish and wildlife populations and habitats in their natural diversity.
- Quiet hours in campgrounds: 10:00 pm to 6:30 am
- Managed by: USFWS

Table 10.Wildlife/Waterfowl/Fisheries

Segment 2H:

CARIBOU HERD LOCATIONS: Mentasta Caribou Herd: Tanacross, Tok, Tetlin

NATIONAL WILDLIFE REFUGES: Tetlin National Wildlife Refuge

- Located at M.P. 1314 Alaska Highway in Tok
- 730,000 acres (295,420 hectares) of the Upper Tanana River Basin, west of the Alaska-Canada border, between Alaska Highway and Wrangell-St. Elias National Park and Preserve.
- Main purpose for designation: to preserve fish and wildlife populations and habitats in their natural diversity.
- Quiet hours in campgrounds: 10pm to 6:30am
- Managed by: USFWS

Data Gaps

- Agency Coordination
- Field investigations
- Additional studies

Data Source(s)

- TAPS Environmental Assessment Report (Viereck et. al 1992)
- ADFG – Division of Wildlife Conservation
- USFWS
- USGS: Northern Prairie Wildlife Research Center
- ADFG – Division of Commercial Fisheries
- National Marine Fisheries Service – Alaska Regional Office

Table 11. Threatened and Endangered Species

Potential Environmental Effects

All Segments (1, 2L, & 2H):

According to the USFWS, there are 13 federally-listed T&E species that occur in the State of Alaska. There is also one listed Candidate for the Threatened and Endangered Species list. According to the ADFG, there are 5 state-listed endangered species and 17 species of special concern. A total of eight species are potentially located in the study area. One of the species is a federally-listed threatened species and the remaining are on the state's species of special concern list.

- Lynx, Canada lower 48 States DPS (*Lynx Canadensis*), Federally-threatened species
- Northern Goshawk (*Accipiter gentiles laingi*), Species of special concern
- American peregrine falcon (*Falco peregrinus anatum*), Species of special concern, USFWS de-listed
- Arctic peregrine falcon (*Falco peregrinus tundrius*), Species of special concern, USFWS de-listed
- Olive-sided flycatcher (*Contopus cooperi*), Species of special concern
- Gray-cheeked thrush (*Catharus minimus*), Species of special concern
- Townsend's warbler (*Dendroica townsendi*), Species of special concern
- Blackpoll warbler (*Dendroica striata*), Species of special concern

Data Gaps

- Agency Coordination
- Recorded T&E species locations
- Field investigations
- Federal Register listed T&E species
- Additional studies on T&E species' habitat

Data Source(s)

- USFWS
- ADFG – Division of Wildlife

Table 12. Parks and Special Management Areas

Potential Environmental Effects

All Segments (1, 2L, & 2H):

NATIVE CULTURES: The study area falls within the Doyon, Limited National Regional Corporation.

NATIVE CULTURE AREAS: Native Village of Tanacross:

- Culture: Athabascan (semi-nomadic)
- Location: bank of the Tanana River, approx. 12 miles (19 kilometers) from Tok and 90 miles (145 kilometers) from the Alaska-Canada Border.

NATIONAL FORESTS: There are no National Forests within the study area.

STATE REFUGES: None within study area

STATE CRITICAL HABITAT AREAS: None within study area

STATE SANCTUARIES: None within study area

STATE FORESTS: Tanana Valley State Forest

- 1.81 million acres (0.73 million hectares) (almost all within Tanana River Basin, stretches from Manley to Tok)
- Located along north side of Alaska Highway from Delta River to east of Tok
- Open to mining, although very little is done
- Controlling Agency: ADNR
- Primary Purpose of Management: Timber Management

Segment 1:

NATIVE CULTURE AREAS: American Native Claims Settlement Act land exists west, south, and north (and within) Tanacross, Healy Lake and surroundings, southeast of Dry Creek, and west of Lake George.

Native Village of Dot Lake:

- Culture: Athabascan (semi-nomadic)
- Location: Just off the Alaska Highway, 50 miles (80 kilometers) northwest of Tok, 155 miles (249 kilometers) southeast of Fairbanks, south of Tanana River
- Communities: Two – Native Village of Dot Lake and a highway community (name unknown)

Healy Lake Village (Healy Lake Village Council):

- Culture: Mixed Athabascan
- Location: Just northwest of Dry Creek, lies along course of the Healy River, 29 miles (47 kilometers) east of Delta Junction.

GAME MANAGEMENT UNITS (GMU):

GMU 12:

- Along Yukon, Canada border in eastern Interior Alaska
- Northern and westerly boundaries-Tanana River, southern boundary-crest of Wrangell-St.Elias Mountain Range
- State Management Area (Tok Management Area) south of Alaska Highway to Tok, National Wildlife Refuge south of Alaska Highway from Tetlin east to border
- Controlling Agency: ADFG
- Land ownership: 80% of the land is NPS (Wrangell – St. Elias National Park and Preserve), USFWS (Tetlin National Wildlife Refuge), or privately owned by several native corporations and villages
- No controlled use within
- 2,000 people live within Unit

Table 12. Parks and Special Management Areas

GMU 20E:

- North of GMU 12 along Yukon Canada border.
- Northern boundary is Yukon River; Westerly boundary is the Forty Mile and Charley River drainages
- State Management Area (Ladue River and Glacier Mountain Controlled Use Areas).
- Controlling Agency: 50% State, 30% Native Corporation
- Controlled use within State Management Areas (Ladue River and Glacier Mountain)
- 220 people live within Unit

Delta Junction GMU (Unit 20D):

- Western boundary is Delta River, Eastern boundary is the confluence of Clearwater Creek and Tanana River, southern boundary is M.P. 238 Richardson Highway, easterly boundary M.P. 1348 Alaska Highway
- Restrictions: open to moose hunting by permit only.
- Controlling Agency: ADFG

Bison Range Youth Hunt Management Area (Unit 20D):

- Panoramic Field hunting area- located 0.75 miles (1.2 kilometers) south of the Alaska Highway between M.P. 1404 and M.P. 1407
- Gerstle Field hunting area – located 0.75 miles (1.2 kilometers) south of the Alaska Highway between M.P. 1394 and M.P. 1396
- Restrictions: Open to moose hunting by permit only.
- Controlling Agency: ADFG

CONTROLLED USE AREAS:

Delta Controlled Use Area (Unit 20D):

- Northern boundary is Delta Junction, Eastern boundary is west edge of Johnson River, Western boundary is the Delta River, Southern boundary is past project study area
- Restrictions: Closed to any motorized vehicle for big game hunting from 8/5 to 8/25.
- Controlling Agency: ADFG

Clearwater Creek Controlled Use Area (Unit 13B):

- Northern boundary is M.P. 227 Richardson Highway, Southern Boundary is just south of Pump Station 10 of Fort Greely
- Restrictions: Closed to any motorized vehicle for hunting from 3/15 to 4/30, No Pack animals for hunting.
- Controlling Agency: ADFG

Macomb Plateau Controlled Use Area (Unit 20D):

- Portion of Unit 20D south of the Alaska Highway, between the east bank of the Johnson River upstream to Prospect Creek, and the east bank of Bear Creek at Alaska Highway M.P. 1357.3
- Size: 304 square miles (787 square kilometers) in area
- Restrictions: Closed to any motorized vehicle for hunting from 8/10 to 9/30
- Controlling Agency: ADFG
- Protects habitats and provides hunting opportunities to the Macomb Caribou Herd.

Table 12. Parks and Special Management Areas

TRAILS: There are no State operated trails within the study area.

According to the ADNR Recreational Trails Plan, October 2000, there are no trails within the study area on the NPS Register of National Recreational Trails.

Recreational trails in Segment 1:

1. Tanana Crossing Trail (runs parallel to Alaska Highway – north side).
2. Eagle Trail (runs from Mansfield Village, crossing Alaska Highway, to Tetlin Lake).
3. Clearwater Creek Trail (south of Alaska Highway at Tanacross to Clearwater Camp along Tok Cut Off).

STATE PARKS (RECREATIONAL AREAS):

Clearwater State Recreation Site

- Located on M.P. 1415 Alaska Highway
- Controlling Agency: ADNR

Moon Lake Recreation Site

- Located on M.P. 1332 Alaska Highway
- Controlling Agency: ADNR

Delta River Recreation Site

- Controlling Agency: ADNR

Tok River Recreation Site

- Located on M.P. 1309 Alaska Highway
- Controlling Agency: ADNR

SCENIC BYWAYS: *Steese Highway Scenic Byway*; Delta Junction south along Richardson Highway

STATE RANGES: Delta Junction Bison Range

- 12 miles (19 kilometers) south of Delta Junction along Richardson Highway north to Alaska Highway
- Controlling Agency: ADFG

MILITARY: Fort Greely is a military reservation located within Segment 1 at the western study area boundary, operated by the U.S. Army.

Segment 2L:

NATIVE CULTURE AREAS:

Athabascan Native Villages Trading Center: Tok, Alaska

American Native Claims Settlement Act land exists:

- West, South, and North of Tanacross (and within)
- South of Tok
- Northeast of Tok through Tetlin Junction

Tetlin Native Indian Village:

- Culture: Athabascan (semi-nomadic)
- Location: north of Tetlin River, west of Kalutna River and is bordered to the north, south, and west by Foot Trail Road (Sec. 29, T018N, R015E, Copper River Meridian.)

Table 12. Parks and Special Management Areas

GMUs:

GMU 20E:

- North of GMU 12 along Alaska-Canada International Boundary
- Northern boundary is Yukon River; Westerly boundary is the Forty Mile and Charley River drainages
- State Management Area (Ladue River and Glacier Mountain Controlled Use Areas)
- Controlling Agencies: 50% State, 30% Native Corporation
- Controlled use within State Management Areas (Ladue River and Glacier Mountain)
- 220 people live within Unit

STATE MANAGEMENT AREAS:

Ladue River Controlled Use Area (Unit 20E):

- Northern Boundary is the Taylor Highway, Western Boundary is the Dennison Fork Forty Mile River, Southern Boundary is the Ladue River, Eastern Boundary is the Alaska-Canada border
- Restrictions: Closed to any motorized vehicle for hunting from 9/1 to 9/3

TRAILS:

There are no State operated trails within the study area. According to the ADNR Recreational Trails Plan, October 2000, there are no trails within the study area that are on the NPS Register of National Recreational Trails.

Recreational trails within Segment 2L:

1. Foot Trail (located south of Tetlin Junction, west of Alaska Highway)
2. Hidden Lake Trail (approximately 20 miles (32 kilometers) northwest of the Alaska-Canada border, north of the Alaska Highway)
3. Tanana Crossing Trail (runs parallel to Alaska Highway – north side)
4. Eagle Trail (runs from Mansfield Village, crossing Alaska Highway, to Tetlin Lake)
5. Clearwater Creek Trail (south of Alaska Highway at Tanacross to Clearwater Camp along Tok Cut Off)
6. Dennison Fork Trail (along Dennison Fork of Forty Mile River)
7. Winter Trail (starting at Nabesna Village and extending south)

STATE PARKS (RECREATIONAL AREAS):

Tok River Recreation Site

- Located on M.P. 1309 Alaska Highway
- Controlling Agency: ADNR

STATE RANGES: There are no State Ranges within Segment 2L.

MILITARY: The Loran Coast Guard Station is located between Tok and Tetlin.

Table 12. Parks and Special Management Areas

Segment 2H:

NATIVE CULTURE AREAS:

Athabascan Native Villages Trading Center: Tok, Alaska

American Native Claims Settlement Act land exists:

- West, South, and North of Tanacross (and within)
- South of Tok
- Northeast of Tok through Tetlin Junction
- West of Lake George
- Extending South past Tetlin Lake
- Surrounding Tetlin Junction (majority of native land), continuing to follow the Alaska Highway, past Northway Junction.

Northway Indian Village:

- Culture: Athabascan
- Location: North of Skate Lake, East of Nabesna River, West of Cemetery Lake

Native Village of Tanacross:

- Culture: Athabascan
- Location: bank of the Tanana River, approx. 12 miles (19 kilometers) from Tok and 90 miles (145 kilometers) from the Alaska-Canada International Boundary.

Tetlin Native Indian Village:

- Culture: Athabascan (semi-nomadic)
- Location: north of Tetlin River, west of Kalutna River and is bordered to the north, south, and west by Foot Trail Road (Sec. 29, T018N, R015E, Copper River Meridian.)

GMUs:

- GMU 12: Along Alaska-Canada International Boundary in eastern Interior Alaska
- Northern and westerly boundaries-Tanana River, southern boundary-crest of Wrangell-St.Elias Mountain Range
- State Management Area (Tok Management Area) south of Alaska Highway to Tok, National Wildlife Refuge south of Alaska Highway from Tetlin east to the Alaska-Canada International Boundary
- Controlling Agencies: FWS and USFWS
- No controlled use within
- 2,000 people live within Unit

TRAILS: There are no national trails within the study area. According to the ADNR Recreational Trails Plan, October 2000, there are no trails within the study area that are on the NPS Register of National Recreational Trails.

Recreational trails within Segment 2H:

1. Foot Trail (located south of Tetlin Junction, west of Alaska Highway)
2. Hidden Lake Trail (approximately 20 miles (32 kilometers) northwest of the Alaska-Canada International Boundary, north of the Alaska Highway)
3. Tanana Crossing Trail (runs parallel to Alaska Highway – north side)
4. Eagle Trail (runs from Mansfield Village, crossing Alaska Highway, to Tetlin Lake).
5. Clearwater Creek Trail (south of Alaska Highway at Tanacross to Clearwater Camp along Tok Cut Off).
6. Dennison Fork Trail (along Dennison Fork of Forty Mile River)
7. Winter Trail (starting at Nabesna Village and extending south)

Table 12. Parks and Special Management Areas

STATE PARKS (RECREATIONAL AREAS):

Tok River State Recreation Site

- Located on M.P. 1309 Alaska Highway
- Controlling Agency: ADNR

STATE RANGES: There are no State Ranges within Segment 2H.

MILITARY: The Loran Coast Guard Station is located between Tok and Tetlin.

Data Gaps

- Agency Coordination
- Number of visitors to these areas per year
- Field investigations
- Survey and additional studies
- Information on designated uses and ownership for permit approval
- Documentation requirement determinations (including Section 4(f) and Section 6(f))

Data Source(s)

- ADFG – Division of Wildlife Conservation
- ADNR – Division of Parks and Outdoor Recreation and Division of Forestry
- Alaska Department of Transportation & Public Facilities (ADOT&PF)
- Alaska Community Database Community Information Systems (CIS)
- Native Village of Tanacross (website)
- NPS
- Alaska Department of Commerce, Community, and Economic Development – Division of Community Advocacy
- U.S. Bureau of the Census 2001
- Alaska Army National Guard
- Arctic Circle Forum

Table 13. Special Waste

Potential Environmental Effects

All Segments (1, 2L, & 2H):

CERCLA Sites *(Site Name, City, County, NPL Status, EPAID#)*

US DOI BLM Tanacross Airfield, Tanacross, Southeast Fairbanks, No, AK7141190085

Tanacross Air Field, Tanacross, Southeast Fairbanks, No AKSFN102144

LUSTs and Contaminated Sites

Tanacross: There are 0 LUST sites and 4 contaminated sites.

Segment 1:

CERCLA Sites *(Site Name, City, County, NPL Status, EPAID#)*

Delta Junction ACS, Delta Junction, Southeast Fairbanks, No, AKN001002285

US Army Fort Greely, Fort Greely, Southeast Fairbanks, No, AK8214522155

UST Sites *(Facility Name, Facility Type, Facility Owner, Facility Address, City, Zip, FacID)*

Fort Greely, Federal Military, US Army Greely Garrison, PO Box 31310, Fort Greely, 99731, 2

Delta Motors, Commercial, Neda Holbert, M.P. 266 Richardson Highway, Delta Junction, 99737, 192

Delta Junction Fire Station, Commercial, City of Delta Junction, M.P. 265 Richardson Highway, Delta Junction, 99737, 212

J-L Ventures, Contractor, Nistler Entrerprises, M.P. 1420.5 Alaska Highway, Delta Junction, 99737, 594

Craig Taylor Equipment Company, Commercial, Craig Taylor Equipment Company, M.P. 1413.5 Alaska Highway, Delta Junction, 99737, 844

Alaska Farmers Cooperative, Inc., Gas Station, Alaska Farmers Cooperative Inc., M.P. 265.5 Richardson Highway, Delta Junction, 99737, 1076

Pump Station #9, Commercial, Alyeska Pipeline Service Co., Trans-Alaska Pipeline System, Delta Junction, 99737, 1282

Pump Station #10, Commercial, Alyeska Pipeline Service Co., Trans-Alaska Pipeline System, Delta Junction, 99737, 1285

Delta Fuel Inc., Petroleum Distributor, Delta Fuel Inc,. M.P. 267.5 Richardson Highway, Delta Junction, 99737, 1527

ADOT&PF – Delta Junction Maintenance Station, State Government, State of Alaska – ADOT&PF Maintenance & Operations, M.P. 266 Richardson Highway, Delta Junction, 99737, 1557

OK Fuel Company, Gas Station, Albert W. Gartz, M.P. 266 Richardson Highway, Delta Junction, 99737,1594

Buffalo Service Station, Gas Station, George & Angeline Norton Trust, M.P. 266 Richardson Highway, Delta Junction, 99737, 1599

Glacier State Telco, Commercial, PTI Communications, 2361 Tanana, Delta Junction, 99737, 1629

Black Rapids Microwave Repeater, Commercial, Robert N. Hall, M.P. 225 Richardson Highway, Delta Junction, 99737,1693

Donnelly Dome Microwave Repeater, Utilities, AT&T Alascom Inc., M.P. 245 Richardson Highway, Delta Junction, 99737, 1695

Gerstle River Microwave Repeater, Utilities, AT&T Alascom Inc., Delta Junction, 99737, 1699

Delta Junction, Utilities, AT&T Alascom Inc., M.P. 1422 Alaska Highway, Delta Junction, 99737, 1712

Paxson Annex, Utilities, AT&T Alascom Inc., M.P. 185 Richardson Highway, Delta Junction, 99737, 1716

George Lake Lodge Site, State Government, ADFG, M.P. 1385 Alaska Highway, Delta Junction, 99737, 1917

Silver Fox Roadhouse, Commercial, Daniel Splain, M.P. 1404 Alaska Highway HC 62 Box 5740, Delta Junction, 99737, 2295

Agricultural/forestry Experiment, Farm, University of Alaska – Fairbanks, Research Facility – Farm 1408 Alaska Highway, Delta Junction, 99737, 2897

Table 13. Special Waste

RCRA sites *(Handler Name, Street, City, Zip)*

ADOT&PF Delta M & O Facility, Junction of Alaska Highway and Richard Highway, Delta Junction, 99737

ADOT&PF Johnson River Bridge, M.P. 1380.4 Alaska Highway SE, Delta Junction, 99737

ADNR Gerstle River Expansion Area, 20 miles (32 kilometers) east of Delta Junction, Delta Junction, 99737

Alyeska Pipeline SE Taps Pump Station #9, M.P. 258 Richardson Highway, Delta Junction, 99737

Arctic Fox Safety & Supply, 1591 Quartz Avenue, Delta Junction, 99737

Services Inc., 1229 Richardson Highway, Delta Junction, 99737

U.S. Army Fort Greely, Richardson Highway, Delta Junction, 99737

U.S. DOT Federal Aviation Administration (FAA) Big Delta, Center of Town, Delta Junction, 99737

U.S. DOT FAA Delta Junction, Fort Greely Air Force Naval Aids, Delta Junction, 99737

LUSTs and Contaminated Sites

Delta Junction: There are 0 LUST sites and 23 contaminated sites within Delta Junction.

Dot Lake: There are no LUST sites or contaminated sites within Dot Lake.

Fort Greely: There are 0 LUST sites and 67 contaminated sites within Fort Greely.

Segment 2L:

CERCLA Sites *(Site Name, City, County, NPL Status, EPAID#)*

U.S. Army Alaska Tok Fuel Terminal, Tok, Southeast Fairbanks, No, AKN001002302

UST Sites *(Facility Name, Facility Type, Facility Owner, Facility Address, City, Zip, FacID)*

40-Mile Road House, Gas Station, Howard Williams, M.P. 1302 Alaska Highway, Tetlin, 99779, 1972

USFWS – Tetlin NWF Visitor Center, Federal Non-Military, USFWS, M.P. 1229 Alaska Highway, Tetlin, 99779, 2968

Knob Ridge Microwave Repeater, Utilities, AT&T Alascom Inc., M.P. 1264 Alaska Highway, Tok, 99780,193

Cathedral Microwave Repeater, Utilities, AT&T Alascom Inc., M.P. 1239 Alaska Highway, Tok, 99780, 198

Beaver Creek Microwave Repeater, Utilities, AT&T Alascom Inc.,M.P. 1275 Alaska Highway, Tok, 99780, 200

40-Mile Air Ltd., Commercial, 40-Mile Air Ltd., 1-mile (1.6 kilometer) E of Junction, Tok, 99780, 242

Northern Energy Corporation, Gas Station, Northern Energy Corporation, M.P. 1314.5 Alaska Highway, Tok, 99780, 284

Former Veteran's Air Service Inc., Air Taxi (Airline), Tetlin native Corporation, Tok Airport, Tok, 99780, 346

USCG – Loran Station Tok, Federal Military, Commanding Office USCG Civil Engineering Unit, M.P. 1313.5 Alaska Highway, Tok, 99780, 441

ADFG, State Government, ADFG, M.P. 1314, Tok, 99780, 495

Young's Chevron, Gas Station, Young's Partnership, M.P. 1314 Alaska Highway, Tok, 99780, 599

Westmark Inn (Tundra Lodge), Commercial, Mr. and Mrs. Don Abbott, M.P. 1315 Alaska Highway, Tok, 99780, 687

Tok Power Plant, Utilities, Alaska Power & Telephone Co., M.P. 1314.8 Alaska Highway, Tok, 99780, 749

U.S. Coast Guard (USCG) – Loran Station Tok, Federal Military, Commanding Officer USCG Civil Engineering Unit, M.P. 1308.5 Alaska Highway, Tok, 99780, 820

Carson Turbo Helicopters, Air Taxi (Airline), Ron Warbelow, Tanacross Airport, P.O. Box 401, Tok, 99780, 1022

U.S. Border Station Tok, Federal Non-Military, GSA General Services Administration, M.P. 1221 Alaska Highway, Tok, 99780, 1128

ADOT&PF – South Fork Maintenance, State Government, State of Alaska – ADOT&PF Maintenance & Operations, M.P. 1235 Alaska Highway, Tok, 99780, 1783

Williard's Auto, Elec. & Gas, Gas Station, Willard F. Grammont, M.P. 1313.2 Alaska Highway, Tok, 99780, 2484

Camper City Super Service, Gas Station, Norma A. Wadsworth, M.P. 1313.5 Alaska Highway, Tok, 99780, 2530

Northstar – PCA Truckstop & Café, Gas Station, Alaska Yukon Investments, M.P. 1313.3 Alaska Highway, Tok, 99780, 2564

Crozier Investments, Truck/Transporter, Crozier Investments, Tok Transportation-School Buses M.P. 1311 Alaskan Highway, Tok, 99780, 2574

Former Tok TESORO, Gas Station, Alaska Department of Commerce and Economic Development, M.P. 1313.5 Alaska Highway, Tok, 99780, 2830

Tanacross Administrative Site, Federal Non-Military, BLM, M.P. 1322 Alaska Highway, Tok, 99780, 3100

Tanacross Airfield, Federal Non-Military, BLM, M.P. 1322 Alaska Highway, Tok, 99780, 3101

Table 13. Special Waste

RCRA sites *(Handler Name, Street, City, Zip)*

ADOT&PF Alaska Highway EQ Perm Repairs, M.P. 1303.3 Alaska Highway, Tok, 99780

U.S. Army Alaska Tok Fuel Terminal, 7 miles (11 kilometers) west of Tok, Alaska Highway 2, Tok, 99780

USCG Loran Station, M.P. 1308 Alaska Highway, Tok, 99780

LUSTs and Contaminated Sites

Tetlin: There are 0 LUST sites and 2 contaminated sites.

Tok: There are 20 LUST sites and 13 contaminated sites.

Open LUSTs in Tok:

Chevron-Youngs Service, Young's Partnership, M.P. 1314 Alaska Highway, Tok, Remediation Initiated: 9/1996

ADFG – Center Street, ADFG, Center Street, Tok, Remediation Initiated: 10/1997

BLM Tanacross Airport, BLM, M.P. 1322 Alaska Highway, Tok, Remediation Initiated: 9/1997

BLM Tanacross Administrative Buildings, BLM, M.P. 1322 Alaska Highway, Tok, Remediation Initiated: 5/1997

Northern Energy Tesoro, Northern Energy Corporation, M.P. 1314.5 Alaska Highway, Tok, Remediation Initiated: 12/1999

ADOT&PF-TOK Maintenance and Operation Station, State of Alaska – ADOTPF Maintenance and Operations, M.P. 122 Tok Cut Off, Tok, Remediation Initiated: 5/2006

Tok Tesoro, Alaska Department of Commerce and Economic Development, M.P. 1313.5 Alaska Highway, Tok, Remediation Initiated: 2/2005

Segment 2H:

CERCLA Sites *(Site Name, City, County, NPL Status, EPAID#)*

U.S. Army Alaska Tok Fuel Terminal, Tok, Southeast Fairbanks, No, AKN001002302

Northway Village Staging Area, Northway Village, Southeast Fairbanks, No, AKD983076530

UST Sites *(Facility Name, Facility Type, Facility Owner, Facility Address, City, Zip, FacID)*

40-Mile Road House, Gas Station, Howard Williams, M.P. 1302 Alaska Highway, Tetlin, 99779, 1972

USFWS – Tetlin NWF Visitor Center, Federal Non-Military, USFWS, M.P. 1229 Alaska Highway, Tetlin, 99779, 2968

Knob Ridge Microwave Repeater, Utilities, AT&T Alascom Inc., M.P. 1264 Alaska Highway, Tok, 99780,193

Cathedral Microwave Repeater, Utilities, AT&T Alascom Inc., M.P. 1239 Alaska Highway, Tok, 99780, 198

Beaver Creek Microwave Repeater, Utilities, AT&T Alascom Inc., M.P. 1275 Alaska Highway, Tok, 99780, 200

40-Mile Air Ltd., Commercial, 40-Mile Air Ltd., 1 mile (1.6 kilometer) E of Junction, Tok, 99780, 242

Northern Energy Corporation, Gas Station, Northern Energy Corporation, M.P. 1314.5 Alaska Highway, Tok, 99780, 284

Former Veteran's Air Service Inc., Air Taxi (Airline), Tetlin native Corporation, Tok Airport, Tok, 99780, 346

USCG – Loran Station Tok, Federal Military, Commanding Office USCG Civil Engineering Unit, M.P. 1313.5 Alaska Highway, Tok, 99780, 441

ADFG, State Government, ADFG, M.P. 1314 Alaska Highway, Tok, 99780, 495

Carson Turbo Helicopters, Air Taxi (Airline), Ron Warbelow, Tanacross Airport, P.O. Box 401, Tok, 99780, 1022

U.S. Border Station Tok, Federal Non-Military, GSA General Services Administration, M.P. 1221 Alaska Highway, Tok, 99780, 1128

ADOT&PF – South Fork Maintenance, State Government, State of Alaska – ADOTPF Maintenance & Operations, M.P. 1235 Alaska Highway, Tok, 99780, 1783

Williard's Auto, Elec., & Gas, Gas Station, Willard F. Grammont, M.P. 1313.2 Alaska Highway, Tok, 99780, 2484

Camper City Super Service, Gas Station, Norma A. Wadsworth, M.P. 1313.5 Alaska Highway, Tok, 99780, 2530

Northstar – PCA Truckstop & Café, Gas Station, Alaska Yukon Investments, M.P. 1313.3 Alaska Highway, Tok, 99780, 2564

Crozier Investments, Truck/Transporter, Crozier Investments, Tok Transportation-School Buses, M.P. 1311 Alaska Highway, Tok, 99780, 2574

Former Tok TESORO, Gas Station, Alaska Department of Commerce and Economic Development, M.P. 1313.5 Alaska Highway, Tok, 99780, 2830

Tanacross Administrative Site, Federal Non-Military, BLM, M.P. 1322 Alaska Highway, Tok, 99780, 3100

Table 13. Special Waste

Young's Chevron, Gas Station, Young's Partnership, M.P. 1314 Alaska Highway, Tok, 99780, 599 *Westmark Inn (Tundra Lodge),* Commercial, Mr. and Mrs. Don Abbott, M.P. 1315 Alaska Highway, Tok, 99780, 687 *Tok Power Plant, Utilities*, Alaska Power & Telephone Co., M.P. 1314.8 Alaska Highway, Tok, 99780, 749 *USCG – Loran Station Tok*, Federal Military, Commanding Officer USCG Civil Engineering Unit, M.P. 1308.5 Alaska Highway, Tok, 99780, 820	*Tanacross Airfield*, Federal Non-Military, BLM, M.P. 1322 Alaska Highway, Tok, 99780, 3101 *Airport Store*, Gas Station, Clarence L. Larson, Box 410 – Northway Airport, Northway, 99764, 693 *FAA Northway*, Federal Non-Military, FAA, Northway Airport, Northway, 99764, 1133 *Northway Alaska Command System*, Federal Military, Northway ACS, Alaska Highway, Northway, 99764, 3418
RCRA sites *(Handler Name, Street, City, Zip)* *ADOT&PF Alaska Highway EQ Perm Repairs*, M.P. 1303.3 Alaska Highway, Tok, 99780 *U.S. Army Alaska Tok Fuel Terminal*, 7 miles (11 kilometers) west of Tok, Alaska Highway 2, Tok, 99780 *U.S. DOT CG Loran Station*, M.P. 1308 Alaska Highway, Tok, 99780	*U.S. Army ACOE FAA Northway Staging Field*, 7 miles (11 kilometers) West of Alaska Highway and 2 miles (3 kilometers) North of Northway, Northway, 99764 *U.S. Army ACOE Northway ACS RRS*, Northway Junction 9 miles (14 kilometers) east, Northway, 99764 *U.S. DOT FAA Northway STA*, Northway Airfield Naval Aids, Northway, 99764
LUSTs and Contaminated Sites *Tetlin*: There are 0 LUST sites and 2 contaminated sites.	*Tok:* There are 20 LUST sites and 13 contaminated sites. *Northway*: There are 6 LUST sites and 0 contaminated sites.
Open LUSTs in Tok: *Chevron-Youngs Service*, Young's Partnership, M.P. 1314 Alaska Highway, Tok, Remediation Initiated: 9/1996 *ADFG – Center Street*, ADFG, Center Street, Tok, Remediation Initiated: 10/1997 *BLM Tanacross Airport*, BLM, M.P. 1322 Alaska Highway, Tok, Remediation Initiated: 9/1997 *BLM Tanacross Administrative Buildings*, BLM, M.P. 1322 Alaska Highway, Tok, Remediation Initiated: 5/1997	*Northern Energy Tesoro*, Northern Energy Corporation, M.P. 1314.5 Alaska Highway, Tok, Remediation Initiated: 12/1999 *ADOT&PF-TOK Maintenance and Operation Station*, State of Alaska – ADOT&PF Maintenance and Operations, M.P. 122 Tok Cut Off, Tok, Remediation Initiated: 5/2006 T*ok Tesoro*, Alaska Department of Commerce and Economic Development, M.P. 1313.5 Alaska Highway, Tok, Remediation Initiated: 2/2005
Open LUSTs in Northway: *Beaver Creek Microwave Repeater*, AT & T Alascom, Inc., M.P. 1267 Alaska Highway, Northway, 99764 *FAA – Northway (B) 52-A-16 Service Station,* FAA, No data, Northway, 99764 *FAA – Northway (B) 52-A-17 Basketball Court*, FAA, No data, Northway, 99764	*FAA – Northway (B) 52-A-2-5 Tank Farm*, FAA, No data, Northway, 99764 *FAA – Northway Vortec Building UST# 5281*, FAA, Alaska Highway, Northway, 99764 *ADOT&PF – Northway Maintenance Station*, FAA, M.P. 1256.5 Alaska Highway, Northway, 99764

Data Gaps:

- Agency Coordination
- Street addresses for CERCLA sites
- Field investigations and records of known sites
- Additional studies including formal Phase I and potentially Phase II Environmental Site Assessments (ESAs)

Data Source(s):

- EPA - Resources Management & State Programs Unit
- ADEC – Division of Spill Prevention and Response, Contaminated Sites Program

3.1 Air Quality

The EPA has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants to protect the public from health hazards associated with air pollution. These six criteria pollutants include: CO, ozone, nitrogen dioxide, sulfur dioxide, PM (including coarse - PM_{10} and fine particulate - $PM_{2.5}$), and lead.

The Federal Clean Air Act and Alaska state law in Title 44, Chapter 46, and Title 46, Chapter 3 and Chapter 14 establish the duties of the Division of Air Quality for controlling and mitigating air pollution (for the six criteria pollutants) and for conserving the clean air within most locations of Alaska.

Alaskans periodically experience threatening air pollution from natural events including forest fires, volcanic eruptions, and high wind glacial dust storms. While no one can control these types of pollution, the Division of Air Quality provides health advisories and suggested protective actions to be taken during these events.

3.1.1 Affected Environment

The Division of Air Quality focuses on monitoring larger communities (populations greater than 10,000) to cover the largest possible population exposure. Air quality is not currently monitored since the populations of the communities within the study area are less than the criteria. The nearest location to the study area that is monitored is Fairbanks, Alaska. Fairbanks' air quality is monitored for CO levels and $PM_{2.5}$. In addition to CO and $PM_{2.5}$, Alaska also monitors for PM_{10}. Air quality information for the state is reported annually.

3.1.2 Potential Affects

In order to assess the potential impacts on air quality of the proposed ACRL, a preliminary evaluation was performed to estimate the amounts of air pollutant emissions that would be generated by locomotive traffic along either of the alternative rail routes from Delta Junction to the Alaska-Canada International Boundary. Because the trip distance for either alignment is approximately the same, it was assumed that locomotive emissions would be roughly the same with either alignment. To compare the locomotive emissions with those of a "no-action" alternative, emission estimates were also made for a scenario where no rail line is constructed, and freight would be transported by trucks. For all alternatives, emissions estimates were made for the first full year of operation, assumed to be 2015.

For the locomotive emissions analysis, the calculation methodology is based on the following:

- Sulfur dioxide emissions are based on mass-balance for diesel fuel containing 15 ppm of sulfur by weight (maximum allowed starting before 2015).
- CO and VOC emissions are based on current EPA Tier II emission standards, as listed in EPA Publication EPA420-F-97-051, December 1997 since the Tier III standards are not yet available.

- NOx and PM emissions factors are assumed to be 10 percent of the Tier II factors, based on EPA's stated intentions to reduce locomotive NOx and PM emissions for new (Tier III) locomotive emissions by 90 percent.

Locomotive emission factors in grams/gallon were multiplied by total estimated annual fuel use in gallons (5,661,115 gallons (21,429,651 liters) in 2015, based on an ongoing energy analysis) to calculate annual pollutant emissions from locomotives traveling along the proposed rail segment.

For the truck emissions analysis, the calculation methodology is based on the following:

- Emissions of the above listed pollutants were obtained using the EPA's MOBILE6.2 emissions model, for heavy-duty diesel vehicles (HDDVs) assumed to be traveling at 55 miles/hour (88 kilometers/hour).
- Highway length was assumed to be the same as rail segment length (195.5 miles (314.6 kilometers)).
- The national default vehicle registration (age) distribution was used for MOBILE6.2 projections.
- Trucks were assumed to haul 45 tons (41 metric tons) per load, with 100 percent of the trucks full in one direction, and a 60 percent/40 percent full/empty split assumed in the other direction.
- Estimated rail freight movement of 14.48 million gross tons (13.14 million gross metric tons), and 75 percent freight proportion (10.86 million net tons (9.85 million net metric tons)), were converted, based on the above truck loading, to 301,686 truck trips per year.

Based on the above, the estimated 2015 emissions for the rail vs. truck (build vs. no-build) alternatives are provided in Table 2.

For either of the proposed rail corridor routes, the ACRL would in general help to reduce emissions of NOx, PM_{10} and SO2, in comparison to transporting freight along the corridor by trucks. While somewhat higher emissions of CO and VOCs are shown for the rail alternative, the rail emissions estimates do not account for expected reductions in these pollutants due to anticipated Tier III emissions standards, which are not yet quantified by EPA.

3.1.3 Mitigation Statement

Avoidance and minimization measures will be implemented where prudent and feasible. An Erosion Control Plan is recommended that outlines procedures for minimization of pollutants discharged during construction activities.

3.2 Noise and Vibration

The sources of railroad noise include the locomotive noise emissions (engine casing, air intake and exhaust areas), the wheel/rail interaction, and the rattling noise from empty cars. New locomotives must meet EPA noise emission performance standards; EPA does not inspect aged locomotives. There is no other regulatory mechanism for reducing noise emissions from locomotives.

Federal Railroad Administration (FRA) safety regulations address wheel and rail maintenance. Railroad operators are required to maintain tracks and wheels in accordance with these safety standards. Maintenance on tracks and wheels also reduces noise emissions, and improves fuel economy. As with locomotive noise emissions, there is no other regulatory mechanism for reducing noise emissions from wheel/rail interaction. Some work has been done evaluating the application of a lubricant to the rail, to reduce noise emissions. However use of this approach has been largely limited to sections of curved track where flange squeal is an issue. Safety concerns limit the use of this practice.

Empty freight cars tend to rattle when rolling down the track because the dampening effects of their cargo are absent. For obvious economic reasons, railroad operators like to minimize the number of empty cars they transport. However on occasion it is a necessity.

3.2.1 Affected Environment

As explained in Table 3, noise and vibration-sensitive receptors are generally associated with residential areas and some types of industries that are sensitive to vibration. Potentially sensitive areas of this nature within the study corridors have been identified in the Table. While the Table indicates the Census-designated Areas within each of the segments, specific numbers of residential areas and vibration-sensitive industries will not be identified until subsequent more detailed studies are performed.

3.2.2 Potential Affects

Noise from freight train passbys can be in the range of 90 and 100 decibels, A-weighted scale (dBA) at 100 feet (30 meters) from the tracks. When the locomotive horn is used at grade crossings, horn noise can reach 110 dBA at 100 feet (30 meters). These loud sounds can be audible far from the rail line if background noise levels are low. In urban areas, where background noise levels are higher, train noise does not stand out quite as much because the background noises mask train noise at distances far from the track. It is reasonable to assume that freight train passby noise will be audible for several hundred feet (meters) from the rail line in areas where background noise is low, which will be the case through the majority of the potential ACRL corridors.

Similarly, ground-borne vibration from freight train passbys may also be perceivable for a few hundred feet (meters) from the rail line. Certain soil conditions and shallow bedrock are two factors that affect how well ground-borne train-induced vibrations travel through the ground and; therefore, how ground-borne vibrations attenuate (weaken) with increasing distance from the rail line.

For purposes of this bio-physical assessment, U.S. Census-designated Areas that could be potentially sensitive to noise and vibration from implementation of a new rail line have been identified for each of the study segments. As shown in Table 3, there are seven such areas in Segment 1, three in Segment 2L and nine in Segment 2H. During subsequent phases of the project (NEPA documentation), specific noise and vibration sensitive receptors would be identified, as well as the impacts on these receptors and potential mitigation.

3.2.3 Mitigation Statement

Avoidance and minimization measures will be evaluated at locations where impacts occur. As part of the avoidance strategies, attempts may be made to locate the rail alignment away from sensitive receptors. Potential noise attenuation strategies are listed below:

3.2.3.1 Path Treatments

Placing a physical obstacle between the source and the noise sensitive area is a typical noise attenuation strategy for outdoor noise control. Earthen berms are often used, especially when construction projects have dirt leftover from excavation activities. However, they require wide footprints (due to their sloped sides) and often there is not adequate room for them.

The most common and practical method of outdoor noise control is through the construction of noise walls between the source and the noise sensitive area. Noise walls require less space to erect, due to their narrower footprint (compared with berms). Noise walls are also available in prefabricated sizes and lengths.

3.2.3.2 Receiver Treatments

It is possible to reduce noise levels by treating the noise sensitive area. This approach is a common mitigation strategy for airport noise, but not common for highway or railroad noise abatement. Common treatments include retrofitting homes with new acoustical windows, insulation in walls and attics, central air conditioning, or when possible, treating roof vents to reduce noise propagation inside the structure. Average costs are approximately $40,000 per home to mitigate using receiver treatment strategies. For economic reasons, this approach is often not considered reasonable or feasible for mitigating highway and rail noise problems.

3.2.3.3 Other Options

Another potential treatment is a quiet zone. The FRA outlined the requirements for quiet zones, in which locomotive horns and whistles are not routinely sounded. To compensate for the absence of the horns, Supplemental Safety Measures (SSMs) must be implemented to warn on-coming pedestrians, cyclists, and motorists that a train is approaching the grade crossing. Potential SSMs include four- quadrant gate systems, gates with median barriers, conversion to one-way street, and temporary or permanent closure of the crossing.

3.3 Wetlands

Wetlands are areas that are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. Wetlands include swamps, marshes, bogs and similar areas. As a significant natural resource, wetlands serve important functions relating to fish and wildlife. Such functions include food chain production, habitat, nesting, spawning, rearing and resting sites for aquatic and land species. They also provide protection of other areas from wave action and erosion; storage areas for storm and flood waters; natural recharge areas where ground and surface water are interconnected; and natural water filtration and purification functions. Wetland determinations are made using three parameters - types of plants, soil conditions, and hydrology of the affected land. The Clean Water Act (CWA) Section 404 program requires approval, or permitting, of wetlands use from the ACOE. Wetlands are regulated under federal and state law and local ordinances.

3.3.1 Affected Environment

The State of Alaska includes 63 percent of the nation's wetland ecosystems (Hall et al. 1994). Estimates place the total acreage (hectares) at approximately 130 million acres (53 million hectares) or about one-third of the State. These wetlands help maintain water quality by slowly filtering excess nutrients, sediments, and pollutants before water seeps into rivers, streams and underground aquifers. They also offer a breeding ground and/or habitat for fish, wildlife, and plants. A majority of Alaskan wetlands within the Interior Region are classified as Flats.

The USFWS- NWI maps were used to identify locations of potential wetlands within the study area. NWI maps are based on satellite photograph interpretation and have varying levels of accuracy. USFWS uses the Cowardin et al. (1979) definition of wetland. This definition is the standard for the agency, and is the national standard for wetland mapping, monitoring, and data reporting as determined by the Federal Geographic Data Committee on December 17, 1996. According to the NWI data, there is a significant amount of wetlands in the region and study corridors.

The list below provides general descriptions of the types of wetlands found in the study areas for all three segments:

- Freshwater Emergent Wetland- Freshwater, non-tidal wetlands dominated by persistent emergent plants or emergent mosses and lichens
- Freshwater Forested/Shrub Wetland- Freshwater, non-tidal wetlands dominated by shrub vegetation or by trees greater than 20 feet (6 meters) high
- Lake- Deepwater habitats greater than 6.6 feet (2 meters) deep associated with a lake or reservoir and lake fringe wetlands that are less than 6.6 feet (2 meters) deep and vegetated with aquatic plants or lake fringe wetlands that are less than 6.6 feet (2 meters) deep and vegetated with emergent plants
- Riverine- Wetlands of unknown hydrology
- Freshwater Pond- Freshwater wetland dominated by aquatic plants, permanently-flooded
- Estuarine and Marine Wetland- Generally associated with salt water.

USDA-NRCS farmed wetlands maps were not available for the study area. NWI and NRCS mapped areas should be reviewed in the field to verify locations and wetland characteristics. Wetland Delineations will be required for the preferred rail alignment.

3.3.2 Potential Affects

Wetlands that were identified from the NWI maps available for the study area are shown in Figure 3, sheets 1 through 5. As can be seen from the maps, wetlands make up approximately 58 percent of the Segment 1 corridor and 80 percent of the Segment 2H corridor. Because only a small portion of the NWI data was available for the Segment 2L corridor, an assessment of the wetland coverage was not made.

3.3.3 Mitigation Statement

The goal of the project is to avoid net loss of wetlands. State and Federal policies require avoidance and the minimization of loss of wetlands. The objective of the ADEC wetlands program is to maintain and minimize impacts to water quality associated with construction projects through the CWA Section 401 water quality certification process. The 401 certification provides "reasonable assurance" that a project will meet State Water Quality Standards, and may require Best Management Practices to be followed during construction concerning fill materials, erosion control, drainage control, and habitat protection. Any unavoidable wetland impacts will be compensated through an approved wetland bank, preservation, restoration, enhancement, or creation of wetlands, or funding of studies to improve future wetland management planning. In addition agency coordination will be required to confirm the quality and jurisdiction of wetlands and mitigation requirements. No standard ratio has been established for wetland acreage preserved or restored versus acreage lost. Each project is individually negotiated.

The CWA Section 404 program requires approval, or permitting, of wetlands use from the ACOE. Wetlands use applications are evaluated according to highly technical standards of the CWA.

3.4 Floodplains

A floodplain is an area of relatively level land that is inundated from time to time. A floodplain may border a stream, lake or river, or may be a watercourse in its own right.

Regulated FEMA floodplains are identified by a FEMA investigation. A conceptual-level floodplain investigation and evaluation was performed for the proposed ACRL alternative corridors, since a floodplain encroachment and mitigation plan is required for any federally-funded/regulated project that is within the limits of a FEMA base floodplain.

In order to determine if FEMA base floodplains are present within the study corridors, the presence and extent of the floodplains are determined according to the National Flood Insurance Program. As part of this Program, FIRMs are provided. Unfortunately, only one FIRM was provided within the Southeast Fairbanks FEMA designation Division

within the State of Alaska. This single FIRM map covers the City of Delta Junction. This map is shown in Figure 4.

Due to a lack of FEMA FIRM data, further research was performed in order to confirm the existence of any other floodplains within the study area. As part of the geologic survey completed for the project, verification was made that floodplain formations are located within the study corridors. These are not actual FEMA delineated floodplains, but more so designated as a floodplain deposit type of earth according to the NPS.

3.4.1 Affected Environment

According to information obtained from the ADNR's Geologic Mapping, floodplains are located within all three study area segments (Segment 1, Segment 2L, and Segment 2H). The estimated floodplain boundaries are shown on the Surface Geology maps in Figure 6, sheets 1 through 5. Coordination and additional field studies should be conducted to accurately define the floodplain boundaries.

3.4.2 Potential Affects

Affects to the FEMA 100-year floodplain can occur in two forms: direct affects and indirect affects. Direct affects include changes to the volumetric capacity of the floodplain (e.g., filling, bridge piers). Indirect affects include increases in the total volume of water arriving at and being conveyed by the floodplain (e.g. increase of impervious surface area).

Direct affects to floodplains are typically estimated by calculating the amount of fill required for the area within the floodplain boundary. Indirect affects are typically estimated by calculating the increased impervious surface area.

3.4.2.1 Segment 1

Of the waterways located within Segment 1, floodplains are associated with the Delta River, Tanana River, Gerstle Creek, Johnson River, Dry Creek, Berry Creek, Tower Bluff Rapids, Robertson River, and Cathedral Rapids.

3.4.2.2 Segment 2L

Of the waterways located within Segment 2L, floodplains are likely associated with the Tanana River, Tok River, and Fork Forty Mile River. Small sections of the Ladue River may be located within a floodplain; however, available mapping did not show floodplain boundaries in this area.

3.4.2.3 Segment 2H

Of the waterways located within Segment 2H, floodplains are likely associated with the Tanana River, Tok River, Chisana River, and Nabesna River.

3.4.3 Mitigation Statement

As the alignments are developed within the corridors, affects to floodplains should be avoided where feasible. If avoidance is not feasible, minimization measures should be implemented. Measures may include: adjusting the back slope, ensuring that areas

temporarily disturbed by construction are restored to their original condition, use of detention basins and water quality basins, incorporation of native vegetation, a Sediment and Erosion Control Plan, and coordination during design and construction with the agencies that have jurisdiction over the resources. Best management practices should be used during the design and construction phases.

If impacts to the FEMA floodplains cannot be avoided, then mitigation measures must be developed. In accordance with the CWA, mitigation will be required at a 1:1 ratio for the area in the FEMA floodway and 100-year floodplain that will be impacted.

3.5 Waterways/Water Quality

Water resources which were addressed for the bio-physical assessment include rivers (including Wild and Scenic Rivers), lakes, creeks, sloughs, rapids, and flats. Discussions of wetlands and floodplains are included in Section 3.3 and Section 3.4, respectively.

3.5.1 Affected Environment

Waterways located within each of the three study corridor segments are identified in Table 6.

Of the 25 designated Wild and Scenic Rivers in Alaska managed by ACOE, BLM, NPS, and USFWS, none are located within the study area. A main feature within the study area is the Tanana River. It is associated with the Tanana Watershed, the largest populated watershed in interior Alaska, and is a tributary of the Yukon River. It flows primarily along the Alaska Highway and is located within all three segments. The Tanana River is defined as navigable by the ACOE and also anadromous by Alaska Statute 41.17.950.

Navigable waters of the United States, as defined in 33 CFR Part 329, are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity.

According to Alaska Statute 41.17.950, an "anadromous water body" refers to the portion of a fresh water body or estuarine area that is cataloged as important for anadromous fish or is not cataloged as important for anadromous fish but has been determined by the deputy commissioner to contain or exhibit evidence of anadromous fish in which event the anadromous portion of the stream or waterway extends up to the first point of physical blockage.

3.5.1.1 Water Quality

Alaska's Water Quality standards specify the degree of degradation that may not be exceeded in a waterbody as a result of human actions. The Alaska Integrated Water Quality Monitoring and Assessment Report (Integrated Report), addresses waterbodies and their current condition. The Integrated Report includes a list and narrative of Alaska's

impaired waterbodies. The information included in the Integrated Report satisfies EPA's 303(d) and 305(b) reporting requirements for the CWA.

Water quality conditions are assessed in terms of the degree to which waters attain "beneficial uses," also called "designated uses". There are 7 designated uses for fresh waters (drinking water, agriculture, aquaculture, industrial, contact recreation, no-contact recreation, growth, and propagation of fish, shellfish, other aquatic life and wildlife), and seven designated uses for marine waters (aquaculture, seafood processing, industrial, contact recreation, non-contact recreation, growth, and propagation of fish, shellfish, other aquatic life, and wildlife). All waterbodies in Alaska are protected for all designated uses. The assessment concludes for each waterbody one of five possible categories based on available information and the degree to which a waterbody attains water quality goals.

- Category 1: Waters that are attaining standards for all designated uses. There are no Category 1 waterbodies identified within the study area.
- Category 2: Waters that are attaining some designated uses or standards. There are no Category 2 waterbodies within the study area.
- Category 3: Waters where there is insufficient or no data or information to determine if any designated use is attained. There are eight listed water bodies under Category 3 within the study area including: Beaver Creek, Bear Creek, Birch Lake, Bolio Lake, Clearwater Creek, Clearwater Lake, Deep Creek, and Moose Creek.
- Category 4: Impaired for one or more designated uses but not needing a Total Maximum Daily Load (TMDL) Plan. There are no listed water bodies under Category 4 within the study area.
- Category 5: Impaired by pollutant(s) for one or more designated uses and requiring a TMDL Plan. These waters are also on the EPA's Federal CWA Section 303 (d) list of impaired waters. There are 48 Category 5 waterbodies within the state of Alaska, none of which are located within the study area.

Since water quality information is not available on a majority of the waterways within the study area and the State of Alaska, field studies and coordination with the ACOE, EPA, and ADEC is recommended in subsequent phases of the ACRL project to assess water quality and make designated use determinations of affected waterways.

3.5.1.2 Aquatic Farming

Aquatic farming, according to the Oceanic Institute, includes farming of aquatic organisms including fish, mollusks, crustaceans, and aquatic plants. According to Food and Agriculture Organization (FAO) of the United Nations' Code of Conduct for Responsible Fisheries, aquatic farming implies intervention in the rearing process to enhance production, such as regular stocking, feeding, or protection from predators.

According to the ADNR – Division of Mining, Land & Water's Aquatic Farming Program, there is aquatic farming within the Southcentral Region of their Program which includes all three segments of the study area.

3.5.2 Potential Affects

Affects to surface water quality are of primary concern within and adjacent to the study area. Potential affects to surface water resources and water quality may result from proposed construction activities, storm water run-off during construction and operation, increased impervious surface area, and other non-point source pollution, stream channel erosion, and human access.

If the potential affects are not identified and properly addressed, the results of the affects can include degradation of surface and groundwater, more rapid and higher discharge run-off patterns, an over draught of groundwater, impaired groundwater recharge rates, a disturbance of hydrology, diminished flood control capacity, sediment delivery and pollutant loading, deterioration of recreational water bodies, and litter and refuse deposits.

Potential affects to surface water resources and water quality may result from proposed construction activities and increased impervious surface area adjacent to a stream. Construction of drainage features adjacent to a stream will likely result in sediment discharges (i.e. concrete wash or saw water) and increased suspended solids and turbidity downstream from the construction sites.

3.5.3 Mitigation Statement

As the alignments are developed within the corridors, affects to waterways should be avoided where feasible. If avoidance is not feasible, minimization measures should be implemented. Measures may include: adjusting the back slope, ensuring that areas temporarily disturbed by construction are restored to their original condition, detention basins, water quality basins, incorporation of native vegetation, a Sediment and Erosion Control Plan, and coordination of the design and construction with EPA, ADEC, and ACOE. Best management practices should be used during the design and construction phases. Permits and approvals will be required prior to construction of the rail corridor.

If a water body containing aquatic farming is located within the proposed rail alignment, coordination between the permit holder for the aquatic farming site and the ADFG, ADEC, and ADNR must take place, in order to replace and restore the environment of the farm.

3.6 Farmland

3.6.1 Affected Environment

The USDA, National Agriculture Statistics Service states that the Upper Tanana Valley from Fairbanks to Delta Junction produces much of the state's barley and oats, as well as hay, potatoes, milk, greenhouse plants and vegetables. However, according to the USDA - NRCS, Delta Junction Service Center, the study area does not encompass prime farmland, unique farmland, or farmland of statewide significance.

3.6.2 Potential Affects

Potential affects to prime and unique farmland are not anticipated since protected farmland is not located within the study area. If future investigations or surveys identify protected farmland, additional analysis will be required.

3.7 Vegetation

Vegetation is a general term for the plant life of a region. Vegetation serves several critical functions in the biosphere. First, vegetation regulates the flow of numerous cycles, most critically those of water, carbon, and nitrogen; it is also of great importance in local and global energy balances. Second, vegetation strongly affects soil characteristics, including soil volume, chemistry and texture, which feed back to affect various vegetational characteristics, including productivity and structure. Third, vegetation serves as wildlife habitat and the energy source for the vast array of animal species on the planet. Vegetation is also critically important to the world economy, particularly in the use of fossil fuels as an energy source, as well as in the global production of food, wood, fuel and other materials. Perhaps most importantly, and often overlooked, global vegetation has been the primary source of oxygen in the atmosphere. Lastly, vegetation is psychologically important to humans, who evolved in direct contact with, and dependence on, vegetation, for food, shelter, and medicines.

3.7.1 Affected Environment

Vegetation cover types in the study area include the following as shown on the vegetation figure:

- Alpine Tundra - Alpine Tundra encompass the treeless region above the treeline of high mountains, characterized by cold winters and short, cool summers and having permafrost below a surface layer that may melt in summer. Vegetation consists of perennial forbs, grasses, sedges, and short woody shrubs.
- Forests - Forests (boreal forests) are floristically simple with only nine tree species dominating. These species are composed of black spruce or white spruce and several early and mid-succession deciduous broadleaf forests, including alder, paper birch, aspen, and balsam poplar. The forests are structurally simple, typically composed of a single-layer closed-canopy or an open-canopy stand.
- Shrub - Shrubs include woody vegetation less than 20 feet (6 meters) tall.
- Dwarf Shrub Tundra - Dwarf Shrub Tundra is found in locations where soils tend to be thin, well drained and stony but may be more poorly drained peat.

- Tussock Sedge/Dwarf Shrub Tundra - Tussock Sedge/Dwarf Shrub Tundra is a combination of Tussock Sedge and Dwarf Shrub Tundra. The Tussock Sedge is one of many grass-like plants called sedges. Sedges are often hard to tell apart, because they all have long, green, triangular (shaped like a triangle) stems with rough edges.
- Moist Herbaceous/Shrub Tundra - Moist Herbaceous/Shrub Tundra describes a Shrub Tundra region that includes plants with stems that are non-woody and die back to the ground every year. Some hebaceous plants include marigold, zinnias, grass, tomatoes, green beans and geraniums.
- Glacier/Snow - A glacier is a large, long-lasting river of ice that is formed on land and moves in response to gravity. A glacier is formed by multi-year ice accretion in mountainous or sloping terrain. The glacier fringe is the area where the glacier has recently melted. There are two main types of glaciers: alpine glaciers, which are found in mountain terrains, and continental glaciers, which are associated with ice ages and can cover large areas of continents
- 1990 Fires & Gravel Bars and 1991 Fires – This cover type has been affected by the 1990 and 1991 fires. Gravel bars are natural and manmade features in the water that change the elevation.

Forest, Alpine Tundra, and Shrub occur most frequently in the study area for all of the segments. Table 8 summarizes additional information from the USDA and the USGS on the forests in the study area.

3.7.2 Potential Affects

The construction of a rail alignment could potentially affect the five primary functions of vegetation. The loss of habitat would also result in adverse impacts to wildlife due to habitat fragmentation. Indirect effects associated with habitat fragmentation are also discussed in the Wildlife Potential Affects section.

There is also the possibility for the project, through landscaping and construction activities to introduce noxious weeds. Title 11 Chapter 34 of the Alaska Administrative Code (AAC) defines noxious weeds as "…any species of plants, annual, biennial, or perennial, reproduced by seed, root, underground stem, or bulb, which, when established, is or may become destructive and difficult to control by ordinary means of cultivation or other farm practices". Regulations regarding quarantines and inspections and the list of noxious weed species are all coded in AAC. Regulation and control of plant pests by the Division of Agriculture is authorized under Title 3 of the Alaska Statutes. The Division of Agriculture is charged with the protection of the agricultural industry and the public interest through preventing the importation and spread of these pests.

3.7.3 Mitigation Statement

Avoidance and minimization measures will be implemented where prudent and feasible. To minimize impacts to sensitive vegetation located adjacent to construction areas, "No-Intrusion" fencing and appropriate sediment and erosion control methods should be used.

The project should minimize impacts on vegetation by defining narrow clearing limits and using disturbed areas for staging where feasible. To protect the integrity of the natural plant communities, plant species indigenous to the area should be used for vegetating slopes where feasible. It may be possible to maximize avoidance and minimization measures using the highway alignment where some vegetation has been cleared. Indirect impacts to vegetation may also be minimized with an alignment closer to the highway since vegetation would then be cleared in one corridor rather than two as highway improvements are made and some growth occurs along that corridor.

3.8 Geological/Seismic Features and Permafrost

The geologic features that were identified for the study area segments include bedrock geology and surficial geology. In addition, glaciers, mining, seismic activity, volcanoes and permafrost areas were addressed, and Conservation Districts identified.

3.8.1 Affected Environment

The project area is located at the convergence of three physiographic provinces: the Alaska Range to the south, the Yukon-Tanana upland to the north, and the Northway-Tanana lowland in the middle. The proposed segments generally follow the Tanana River and the Ladue River to the Canadian Border. Geologic features are displayed in Figure 6, sheets 1 through 5, while permafrost conditions are shown in Figure 7, sheets 1 through 5.

3.8.1.1 Segment 1

The Segment 1 corridor is located in the Northway-Tanana lowland, which contains the northeasterly flowing Tanana River. The corridor generally follows the Tanana River floodplain. At lower elevations near the Tanana River, the project area is underlain by various glacial outwash, alluvial deposits and floodplain formations. At higher elevations, the project area contains mountainous bedrock and coarse and fine rubble. The entire area is also underlain by permafrost. At lower elevations, both lowland and upland areas contain permafrost. Permafrost in these areas varies in thickness. Higher elevations contain mountainous areas underlain by discontinuous permafrost. The occurrence of permafrost should be investigated in detail during the design process.

Segment 1 is also in the general vicinity of several active and dormant volcanoes. The dormant Prindle volcano is located approximately 62 miles (100 kilometers) to the northeast and the Wrangell range volcanoes are located approximately 62 miles (100 kilometers) to the south. The Wrangell range contains nine volcanoes, two of which are considered active. A number of earthquakes have occurred approximately 46 miles (75 kilometers) south of the project corridor area.

There are no large mining facilities in the project area; however, mineral deposits are located throughout the study area. Refer to Figure 11. It is unknown how many of those deposits will be extracted through mining operations if the rail alignment is constructed or is not constructed.

No active glaciers are located in the proposed corridor. However, glaciers are located at higher elevations that are the source of several tributaries to the Tanana River.

3.8.1.2 Segment 2L

The western portion of this segment generally follows the Tanana River floodplain. Lower elevations in this area are underlain by various glacial outwash, alluvial deposits and floodplain formations. At higher elevations, the project area contains mountainous bedrock and coarse and fine rubble. The eastern portion of this segment follows the Ladue River to the International Boundary. This area contains mountain alluvium and coluvium, coarse and fine rubble. The entire area contains permafrost. At lower elevations, both lowland and upland areas contain permafrost. Permafrost in these areas varies in thickness. Higher elevations contain mountainous areas underlain by discontinuous permafrost. The occurrence of permafrost should be investigated in detail during the design process.

Segment 2L is also in the vicinity of several active and dormant volcanoes. Prindle Volcano is located approximately 17 miles (28 kilometers) north of the potential alignment. A number of earthquakes have occurred approximately 37 to 74 miles (60 to120 kilometers) south of the project corridor area.

There are no large mining facilities in the project area; however, mineral deposits are located throughout the study area. Refer to Figure 11. It is unknown how many of those deposits will be extracted through mining operations if the rail alignment is constructed or is not constructed.

No active glaciers are located in the proposed corridor. However, glaciers are located at higher elevations that are the source of several tributaries to the Tanana River.

3.8.1.3 Segment 2H

The western portion of Segment 2H generally follows the Tanana River floodplain. At lower elevations, the proposed alignment is underlain by various glacial outwash, alluvial deposits and floodplain formations. The eastern portion of Segment 2H (east of Northway Junction) encounters floodplain deposits and an eloian sand dune formation. The last 14 miles (22 kilometers) of the corridor follow Chisana River to the Canadian border. Geology in this area ranges from mountain alluvium and coluvium to coarse and fine rubble in the floodplain formation of the Chisana River. At higher elevations, the project area contains mountainous bedrock and coarse and fine rubble. The entire area contains permafrost. At lower elevations, both lowland and upland areas contain permafrost of varying thickness. Higher elevations contain mountainous areas underlain by discontinuous permafrost. The occurrence of permafrost should be investigated in detail during the design process.

Segment 2H is also in the vicinity of several active and dormant volcanoes. Segment 2H is located approximately 75 miles (120 kilometers) northeast of the Wrangell range volcanoes. The Wrangell range contains nine volcanoes, two of which are considered

active. A number of earthquakes have also occurred approximately 37 to 43 miles (60 to 70 kilometers) south of the project corridor area.

There are no large mining facilities in the project area; however, mineral deposits are located throughout the study area. Refer to Figure 11. It is unknown how many of those deposits will be extracted through mining operations if the rail alignment is constructed or is not constructed.

No active glaciers are located in the proposed corridor. However, glaciers are located at higher elevations that are the source of several tributaries to the Tanana River.

3.8.2 Potential Affects

Construction of the proposed ACRL would impact the existing topography and soils. The impacts will vary according to the placement of the proposed right-of-way. If the right-of-way is placed in the river valleys, the topography is relatively level and less earthwork would be necessary. If the proposed right-of-way is placed in the adjacent mountainous uplands, extensive cut and fill would be required.

Right-of-way adjacent to rivers may need extra stability if located in alluvial, permafrost soils. Extra stability may also be required if the right-of-way is located near fault lines. If the right-of-way is located in upland bedrock mountainous areas, blasting may be required.

A cumulative affect of the proposed ACRL is gradual warming or thawing of the permafrost layers. Frozen permafrost makes a good foundation as long as it remains frozen. When thawed, these soils can change into soft slurry with very little strength for supporting a structure and foundation failure can result (Siefert, 1994). As the soils become unstable from the thawing the ground sinks and there is potential for deep pits, sinkholes, and hummocks to form. Different soil types also react differently to permafrost. Solid rock, gravel and sand normally contain very little ice. Fine grain soils such as silt, clay or peat typically have high ice content. These soils are susceptible to settling when permafrost melts and heaving when moisture moves to a frozen layer. The rate at which permafrost thaws is dependent on several factors (soil types, global warming, other developments that lie on permafrost, etc.). Since several factors including global warming cannot be controlled, it needs to be considered in the project design.

3.8.3 Mitigation Statement

3.8.3.1 Permafrost

Permafrost occurs in discontinuous patches throughout the project area. Local variation in climate, soils, vegetation, relief, snow cover, and slope aspect appear to control the occurrence and depth of permafrost. Permafrost can also be influenced by soil type, vegetation, topography, snow cover, and slope aspect.

Construction in these areas requires specific knowledge about permafrost and specialized building techniques (Siefert, 1994). The occurrence and depth of permafrost should be investigated in detail in the proposed corridors. The proposed design should take into account the depth and locations of permafrost. Engineers who are experienced with Arctic building issues should characterize and design the proposed corridor and account for permafrost areas in the design of the proposed railroad.

When frozen, permafrost is virtually impermeable (Siefert 1994). This can result in drainage difficulties because the amount of runoff is increased and the amount of water infiltrating into the ground is decreased. This phenomenon should be taken into account when designing site drainage for the proposed railroad.

3.8.3.2 Seismic Risk

Earthquake and volcano hazards should be identified in more detail during the design process. The rail line should be designed in accordance with the earthquake risk of the area.

3.9 Wildlife/Waterfowl Refuges/Fisheries

The Alaska Department of Fish & Game - Division of Wildlife Conservation recognizes wildlife as a public trust belonging to all Alaskans. In understanding the importance of wildlife to the State, the proposed rail alignment must consider wildlife habitat and mitigation routes in choosing an alternative.

Vegetation within the study area includes but is not limited to forests, wetlands, sedges, shrubs, tundra, and barrens. The vegetation supplies wildlife with a wide variety of food resources, shelter, and nesting sites. These different habitats provide homes for a diversity of animals. Examples of Alaskan wildlife include beaver, bison, black bears, brown bears, caribou, coyote, deer, goat, moose, muskoxen, porcupine, red fox, river otter, dall sheep, squirrel, and wolf among other species.

According to the USFWS – Alaska Region, Alaska has more than 90 million acres (36 million hectares) of wetland habitat for use by breeding waterfowl among other wildlife. Within the study area there are designated breeding areas for waterfowl species.

According to the National Oceanic & Atmospheric Administration - National Marine Fisheries Service, Alaska Regional Office, there are many fisheries located within the State of Alaska.

3.9.1 Affected Environment

3.9.1.1 General for All Segments

According to the USFWS – Alaska Region, Migratory Bird Management Studies, the study area falls into the Tanana/Kuskokwim lowlands. The migratory bird breeding areas that lie within the study area start at Delta Junction, continue southeast parallel to the Tanana River and continue towards the International Boundary along the Alaska

Highway. Figure 8, sheets 1 through 5 illustrates the breeding areas that exist within the study area, while Figure 9, sheets 1 through 5 shows the waterfowl areas.

There is one commercial fishery district located within the study area, the Upper Yukon Salmon District (District 6). This District is along the Tanana River from Fairbanks continuing southeastward toward the International Boundary. The fishing schedule includes two 42-hour periods per week.

Two main ecosystems in Alaska and the study area include forests and tundra. The information provided for ecosystems is referenced from the ADFG website. Figure 8, sheets 1 through 5 show locations of caribou, moose, duck/goose, and dall sheep habitat. Information on other species was not available for this study.

3.9.1.1.1 Wildlife within the Forested Ecosystem

Alaska's forests support a relatively low diversity of species, and a relatively low abundance of individual organisms. The plants and animals that live in the forests are adapted for the bitter cold, short summers, and frequent fires.

Migration. Many species of birds migrate to avoid the winter: they arrive in spring to nest and feed during the brief boreal summer, then depart in fall for milder climates. Waterfowl descend on the lakes for fish, aquatic plants, and insects. Forest birds such as warblers and thrushes feed on beetles, caterpillars, flies, spiders, and berries that inhibit the trees and thickets. Hawks, owls, and falcons thrive on the forests' watching for birds and small mammals.

Caribou also migrate but on a schedule opposite of birds. In summer, most caribou live on the tundra. In the winter, caribou head for the forest where they are protected from the cold and their staple winter food, lichen, is easier to access.

Hibernation. Some forest animals including brown bears, black bears, marmots, jumping mice, wood frogs, and various insects hibernate during the winter season.

3.9.1.1.2 Wildlife within the Tundra Ecosystem

A variety of animals are supported by the artic tundra ecosystem. Some animals migrate in the winter and some animals are adapted to live in the tundra year-round.

Migration. While a few species-including ptarmigan, ravens, snowy owls, and redpolls-remain year-round in the tundra, the bulk of arctic birds are migrants. Some of the migrant birds that spend springs and summers in the tundra include swans, terns, geese, ducks, loons, shorebirds, phalaropes, and songbirds. Migrant birds come from wintering areas in nearly every state in the United States, and elsewhere: snow geese from Mexico, Pacific golden plovers from Argentina, tundra swans from Maryland, arctic terns from the waters off Antarctica.

3.9.1.2 Segment 2H and Segment 2L

In addition to the potentially affected wildlife, waterfowl areas, and fisheries listed for all three segments, there is one National Wildlife Refuge located within the study area, Tetlin National Wildlife Refuge. This area is located between the Alaska Highway and Wrangell-St.Elias National Park and Preserve. Within the study area, this Refuge begins at Alaska Highway M.P. 1314 in Tok and continues east to the International Boundary. The main purpose for designating this area as a National Wildlife Refuge is to preserve fish and wildlife populations and habitats in their natural diversity. Special restrictions set aside for this Refuge include quiet hours in the campgrounds from 10:00 p.m. to 6:30 a.m. This Refuge is managed by the USFWS – Alaska Region.

3.9.2 Potential Affects

At the scale of the individual forest patch, several factors affect its value as plant and wildlife habitat. In general, larger patches support more species. This is because larger forest patches have more different kinds of habitats and support larger populations that are less vulnerable to chance extinction. Additionally, only larger patches are likely to contain enough habitat to support species like larger mammals that require larger areas.

Forest fragmentation occurs when large, continuous forests are divided into smaller blocks by roads, clearing for agriculture, urbanization, or other human development. Fragmentation affects animal populations in a variety of ways, including decreased species diversity and lower densities of some animal species in the resulting smaller patches. Ornithologists suspect that fragmentation harms many woodland birds by increasing their susceptibility to predation and nest parasitism. Predators such as jays, crows, raccoons, and cats, as well as the parasitic brown-headed cowbird, are not typically abundant in extensive forests. But when a forest is fragmented, predators and cowbirds gain more access to the woodland. Cowbirds lay their eggs in the nests of other birds. The host birds will care for the cowbird eggs. When the eggs hatch, the larger cowbird nestlings will out-compete the host nestlings for food, and may even push the host nestlings out of the nest. Forest fragmentation also affects subsistence and developments that depend on subsistence through impacts to access and the potential reduction in wildlife populations.

3.9.3 Mitigation Statement

As the ACRL Study proceeds into the Phase I/NEPA evaluation process, the proposed improvements will be developed further and the natural resources affects will more accurately be defined. Detailed surveys will be required during this process to determine the exact boundaries of the natural resources. If affects to sensitive resources cannot be avoided then minimization measures will be implemented where prudent and feasible. Measures may include adjusting the alignment, adjusting the back slope, constructing retaining walls or wildlife crossing corridors, ensuring that areas temporarily disturbed by construction are restored to their original condition, coordinating the design and construction with the property owners and developments that depend on subsistence, and coordinating construction activities to minimize disturbance to threatened and endangered species during critical periods. The waterfowl breeding areas within the

study area are considered essential and should be avoided as much as possible in choosing a proposed rail alignment.

3.10 Threatened & Endangered Species

USFWS maintains lists of federally threatened, endangered, proposed, and candidate species that are protected under the Endangered Species Act. The list includes species that are under the jurisdiction of either the USFWS or the National Marine Fisheries Service. According to USFWS an endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future.

Alaska has one of the shortest lists of T&E species of all the states. Many species that are rare, endangered, or have been extirpated elsewhere in the United States are thriving in Alaska. The ADFG maintains lists of threatened, endangered, proposed, and candidate species for the state in addition to lists of species of concern. Species of concern are defined as any species or subspecies of fish or wildlife or population of mammal or bird native to Alaska that has entered a long-term decline in abundance or is vulnerable to a significant decline due to low numbers, restricted distribution, dependence on limited habitat resources, or sensitivity to environmental disturbance.

3.10.1 Affected Environment

There are 13 federally-listed T&E species that occur in Alaska as well as one candidate species. There are only 5 state-listed endangered species and 17 listed species of special concern. Of those species, there is one known federally-listed T&E species (Canada Lower 48 States DPS lynx (*Lynx Canadensis*)) and seven species of special concern (all animals both vertebrate and invertebrates) that are potentially located within the project study corridors. Two of the seven species of special concern have been de-listed by USFWS. The federally-listed species does not appear on the state T&E species list. These eight species are described in Table 11.

3.10.2 Potential Affects

There is potential for the proposed project to affect the federally threatened species and species of special concern as previously undisturbed lands are converted for the construction of the railroad alignment. Within each of the segments it is unknown without additional research and coordination with responsible agencies where these species have been recorded.

3.10.3 Mitigation Statement

As the ACRL Study proceeds into the Phase I/NEPA evaluation process, the proposed improvements will be developed further and the natural resources affects may more accurately be defined. Detailed surveys will be required during this process to determine the exact locations of the species of special concern. If affects to the species cannot be avoided then minimization measures will be implemented where prudent and feasible. Measures may include adjusting the alignment, adjusting the back slope, constructing retaining walls, ensuring that areas temporarily disturbed by construction are restored to their original condition, coordinating the design and construction with the property

owners, and coordinating construction activities to minimize disturbance to T&E species during critical periods.

3.11 Parks and Special Management Areas

For the purpose of this study, a "park" is defined as a recreational area that is locally managed and "special management areas" are defined as recreational areas owned and managed by state and/or federal agencies. Special management areas include refuges, sanctuaries, critical habitat areas, ranges, special management areas, forests, parks, preserves, public use areas, recreational rivers, and recreational mining areas. Parklands and Special Management Areas are shown in Figure 10, sheets 1 through 5.

3.11.1 Affected Environment

There are no State Refuge Areas, State Critical Habitat Areas, State Sanctuaries, or National Forests located within the study area.

Parks/Special Management Areas located within the study area include:

- Four Game Management Units
- One State Management Area
- Four Controlled Use Areas
- One State Forest
- Four State Parks (Recreational Areas)
- One State Range Area
- Six Alaska Native Villages/Centers
- One U.S. Military Reservation
- One Portion of a Scenic Byway

These potentially affected parks and special management areas, separated into each of the three segments, Segment 1, Segment 2L, and Segment 2H based on their location within the study area, are described in Table 12.

3.11.2 Potential Affects

Parks and special management areas are potentially affected by the potential rail alignment as their boundaries are located within the study area.

As the ACRL Study proceeds into the Phase I/NEPA evaluation process, the proposed improvements will be developed and the potential affects to parks and special management areas will be more accurately defined. Detailed surveys will be required during this process to determine the exact boundaries of the natural resources.

The parks and management areas identified in Table 12 would be adversely affected by either a property acquisition or severance. Severing an area means that the railroad alignment would cut through the park or special management area dividing it into two sections that would be located on either side of the rail alignment. Activities/natural features that could be adversely affected by the potential acquisition or severance of parks and special management areas include:

- Recreation including biking, hiking, hunting, fishing, etc.
- Business activities including timber mining, tourism
- Wildlife/T&E species habitat
- Visual aesthetics

Secondary affects to the parks and recreational area could include increased noise from the rail line and stormwater runoff. The development of a new rail corridor could also have positive affects for the affected areas. The railroad could potentially be used to transport goods to the areas. If passenger rail service is provided in the future there may be a possibility of added access to the parks and special management areas resulting in increased tourism.

3.11.3 Mitigation Statement

As the alignments are developed within the corridors, affects to parks and special management areas should be avoided where feasible. If avoidance is not feasible, minimization measures should be implemented. Measures may include: adjusting the back slope, constructing retaining walls, ensuring that areas temporarily disturbed by construction are restored to their original condition, coordinating the design and construction with the property owners, and coordinating construction activities to minimize disturbance to species during critical periods.

Coordination between agencies will need to be initiated. For example, it is recommended that the lead agency coordinate with the owners of the affected parklands and special management areas on the landscaping and ditches located adjacent to the properties. It is also recommended to establish a landscaping plan for areas adjacent to the parks and management areas to lessen the impacts caused by the proposed improvements. Permits and approvals will need to be initiated if Section 4(f) lands are affected.

Since some Alaskan residents make their home within the GMU 12 and GMU 20E and the Alaska Native Villages, their property and quality of life must not be inhibited. In case a property cannot be avoided, property mitigation would usually require replacement of Section 4(f) property or facilities. More information is needed on aboriginal villages and tribes to determine their needs and how the ACRL project will address their concerns and issues. This is a gap to be filled during the next phases of the project (public involvement components). Consultation will be required on an on-going basis to identify sensitive areas and cultural issues, obtain necessary information, and address concerns.

Since a controlled use area (Ladue River Controlled Use Area) is within the study corridor, special avoidance must be considered since, as of 1994, motorized access is limited to designated trails and strips, between September 1st and September 30th annually.

3.12 Special Waste

Potential special waste includes hazardous wastes, potentially infectious medical wastes, industrial process waste, and pollution control waste. Special waste requires special handling, trained people, and/or special disposal methods.

The special waste assessment for the ACRL study is separated into two areas, corresponding to: 1) site specific special waste issues that are known to exist or to have the potential to exist; and 2) special waste risks associated with the implementation of a new rail line through the study area.

3.12.1 Site Specific Special Waste

Special waste sites evaluated for this project include Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites, RCRA sites, LUST sites, UST sites, and contaminated sites. Special waste sites that have been identified within the study corridors are listed in Table 13.

CERCLA, commonly known as Superfund, established prohibitions and requirements concerning closed and abandoned hazardous waste sites, provided for liability of persons responsible for releases of hazardous waste at these sites, and established a trust fund to provide for cleanup when no responsible party could be identified. CERCLIS contains hazardous waste sites nominated or chosen for cleanup under CERCLA.

The RCRA of 1976 established the federal program regulating solid and hazardous waste management. The Act defines solid and hazardous waste, authorizes EPA to set standards for facilities that generate or manage hazardous waste, and establishes a permit program for hazardous waste treatment, storage, and disposal facilities. While CERCLA addresses uncontrolled releases of hazardous substances, often from facilities no longer in operation where contamination resulted from past practices, RCRA focuses on prevention and remediation for releases from currently operating facilities.

A LUST site refers to a Leaking Underground Storage Tank. The majority of USTs contain petroleum products (gasoline, diesel, heating oil, kerosene, jet fuel). Many other substances classified as hazardous by the RCRA and CERCLA are stored in USTs. Cleanups are funded by the EPA's LUST Trust Fund.

3.12.2 Hazardous Materials Risks

Under Federal Law, as common carriers, railroads are required to move hazardous materials. The hazardous materials transported by rail can include any chemicals, paints, fuel, etc.

Federal Hazardous Material Law (49 U.S.C. 5101) is the basic statute regulating hazardous materials transportation in the United States. Transportation of hazardous materials by rail requires the use of special containers, flat cars and/or tank cars. Currently, the Alaska Railroad Corporation transports hazardous materials within Alaska which includes links to routing with air cargo, ship cargo and/or highway conveyance.

Potential risks causing a hazardous materials event during rail transport are:

- Derailment
- Collision at highway/rail grade crossing
- Puncture of locomotive fuel tank
- Puncture of rail car

According to the Association of American Railroads, approximately 1.7 million carloads of hazardous materials are transported by rail annually (about 6 percent of total freight rail traffic) in the United States. Statistics indicate that 99.998 percent of hazardous material shipments by rail arrive at their destination without a release caused by an accident.

Statistics indicate that it is far more likely that there will be a hazardous materials event (spill) somewhere during the transportation cycle (by highway, or ship) to/from the rail corridor than there will be while in transit by rail. The Association of American Railroad statistics indicate that between 1994 and 2003, there were a total of six fatalities as a result of hazardous materials events during rail transport compared to 108 fatalities in highway-related hazmat accidents.

3.12.3 Affected Environment

Potential special waste sites were identified in and near the study area based on database searches of cities/villages in the study area. These sites were divided into segments based on relative location. In future phases of the project, coordination with the EPA and local agencies and municipalities is recommended to identify additional special waste sites and to verify sites identified through preliminary research. In addition a review of historic USGS maps and aerial photographs should be conducted and further review and investigation of the junkyards, spill sites, and LUSTs should be conducted including a formal Phase I investigation to qualify more specifically the impact of construction to these sites. Phase II investigations may be warranted in some instances to determine the extent of the contamination. Additional investigation is recommended for older buildings and structures that are modified or demolished since there is a risk for exposure to asbestos.

3.12.3.1 Segment 1

A total of 128 potential special waste sites are identified near the study area through preliminary investigations. These special waste sites include four CERCLA sites, nine RCRA sites, 21 UST sites, and 94 contaminated sites. No LUST sites were identified through preliminary research. These sites were not confirmed through coordination with responsible agencies.

3.12.3.2 Segment 2L

A total of 69 potential special waste sites are identified near the study area through preliminary investigations. These special waste sites include three CERCLA sites, three RCRA sites, 24 UST sites, 20 LUST sites, and 19 contaminated sites. These sites were not confirmed through coordination with responsible agencies. Of the 20 LUST sites,

remediation is initiated or still required at seven sites in Tok, Alaska. The remaining LUST sites are closed or do not require any additional actions by USEPA.

3.12.3.3 Segment 2H

A total of 82 potential special waste sites are identified near the study area through preliminary investigations. These special waste sites include four CERCLA sites, six RCRA sites, 27 UST sites, 26 LUST sites, and 19 contaminated sites. These sites were not confirmed through coordination with responsible agencies. Of the 26 LUST sites, remediation is initiated or still required at seven sites in Tok, Alaska and six sites in Northway, Alaska. The remaining LUST sites are closed or do not require any additional remedial actions by EPA.

3.12.4 Potential Affects

The construction of a rail corridor could potentially affect the study area. The study area could be affected through hazardous materials spills or through construction activities.

3.12.4.1 Hazardous Materials Spills

Segment 1 and Segment 2H generally follow the existing Alaska Highway. Like the existing highway, the proposed railroad would pass through several small communities. Some businesses in these communities either utilize hazardous materials or produce them. Hazardous materials are currently transported on the existing Alaska Highway to support these businesses. The proposed railroad would also haul hazardous materials in support of local businesses and in support of other businesses in the interior of Alaska.

The greatest risk involved with the transportation of hazardous materials is the potential for a spill. Sensitive areas within the proposed corridor include areas of human settlement, habitat areas, rivers, streams, lakes and wetlands. These sensitive areas are especially vulnerable to hazardous materials spills. While there are some settled areas within the Segment 1 and Segment 2H corridors, the study area is sparsely populated. Emergency response to a hazardous materials spill resulting from a train derailment could take several hours or longer.

Rail line construction also utilizes hazardous materials for fuel and construction equipment maintenance. Hazardous materials used during construction should be stored properly with secondary containment. Maintenance activities on construction equipment should be conducted in a designated area away from water bodies.

The proposed segment paralleling the Ladue River (Segment 2L) would introduce a rail line to an area that currently has no roads or settlement. Construction of the railroad would introduce the potential for a hazardous materials spill to this area. The Segment 2L corridor also contains water bodies that are vulnerable to hazardous materials spills. This segment is not currently populated. Emergency response to a hazardous materials spill resulting from a train derailment could take several hours or longer. If this segment was constructed, access and supporting facilities for emergency responders would be needed.

3.12.4.2 Rail Corridor Construction

During the rail corridor construction period, the main threat for a hazardous material event will be associated with the operation of construction work vehicles and equipment and work trains. The event would be related to the puncture of the fuel tanks on construction work vehicles and equipment and/or work train locomotives. During the rail operations period, the main threat would be associated with transporting hazardous materials by rail.

During construction there is also the possibility that the alignment could extend through a known (likely documented) special waste site or unknown (undocumented) special waste site.

3.12.5 Mitigation Statement

Avoidance and minimization measures will be implemented where prudent and feasible. The following mitigation measures should be considered for the ACRL project:

- If the railroad is constructed, an emergency response plan and supporting facilities would be needed.
- Hazardous materials used during construction should be stored properly with secondary containment. Maintenance activities on construction equipment should be conducted in a designated area away from water bodies.
- Access and supporting facilities for emergency responders are required for segment 2L.
- If fuel storage is required at the rail construction staging area, a secondary containment area should be provided. Federal regulations govern the fuel storage and secondary containment area requirements.

3.13 Induced Development

Induced development is development that would occur as a direct result of the proposed improvement –that would not have otherwise occurred without the proposed improvement. Induced development associated with the ACRL is unknown at this time. Induced development could affect tourism and the economic development of communities and businesses. The ACRL project could have a large impact on mining activities. Figure 11 shows mineral deposits located in the study area vicinity. Several deposits are located within all three study corridors (Segments 1, 2L, and 2H) as well as in the vicinity of the corridors. The size, ownership, and potential for mining of the mineral deposits are unknown. Additional studies should be conducted to address these issues. Depending on the size and quality of the mineral deposits, one rail alignment may be more beneficial to develop.

3.14 Skagway Option

The Skagway Option improvements include upgrading the entire White Pass and Yukon Railroad alignment to service trains on either narrow gauge or standard gauge track. The proposed improvements would extend from Skagway, Alaska to Whitehorse in Yukon, Canada. The improvements would include the installation of a single rail and potentially reinforcements to increase stability needed for heavier trains that travel on standard gauge

track. The existing gauge of the White Pass and Yukon Railroad is 36 inches (91 centimeters) (inside face of rail at top to inside face of rail at top). A standard gauge railroad measurement is 56.5 inches (144 centimeters) (inside face of rail at top to inside face of rail at top). Therefore, the difference in the placement of the 2nd and 3rd rails for the White Pass and Yukon Railroad would be 20.5 inches (52.0 centimeters).

3.14.1 Potential Affects

Potential environmental effects of constructing an additional rail 20.5 inches (52.0 centimeters) outside of one of the existing rails would likely be minimal. The improvements would likely take place within existing right-of-way. The largest risk to the further development and design of the improvements is the railroad's historic status and restrictions associated with the status.

3.14.1.1 Historic Status

The White Pass and Yukon Railroad does not appear at this time to be subject to a Section 4(f) evaluation as it is not specifically listed on the Federal Register of Historic Places. However, the railroad may be eligible for listing on the Federal Register; its surrounding areas are listed on the National Register. The Skagway Historic District and White Pass (located in the Skagway-Yakutat-Angoon Borough of Alaska) is listed in the Federal Register as a National Historic Landmark. According to the NPS, this area is historic for its transportation use, primarily the influence of the railroad (White Pass and Yukon Railroad). The White Pass and Yukon Railroad is also considered a major historic resource within the Skagway River Valley. This location is also listed on the National Register as a Historic Place. It is listed as a Historic Place for its area of significance being landscape and its historic function being commerce/trade.
The White Pass and Yukon Railroad is designated as an International Historic Civil Engineering Landmark, being recognized for the difficult and hazardous obstacles that were overcome during construction. The Historic Civil Engineering Landmark Program is organized by the American Society of Civil Engineers and recognizes historically significant local, national, and international civil engineering projects, structures, and sites.

3.14.2 Mitigation Statement

The design of the improvements should avoid impacts to environmental resources. If avoidance is not feasible, minimization measures should be implemented. Measures may include: adjusting the back slope, constructing retaining walls, ensuring that areas temporarily disturbed by construction are restored to their original condition, and coordinating construction activities to minimize disturbance to environmental features.

Although the White Pass and Yukon Railroad does not appear to be subject to a Section 4(f) evaluation, additional coordination should occur to confirm findings.

3.15 Summary of Findings on the Preliminary Data Gap Analysis

Due to the conceptual nature of the current phase of the ACRL study, data gaps are present within all resources evaluated. Additional issues and potential affects may be identified through public involvement and local, state, and federal agency coordination. Table 14 presents a summary of identified data gaps for the ACRL Project.

Table 14. Summary of Identified Data Gaps

Resource	Summary of Data Gaps
Air Quality	Agency coordination, air quality modeling, and existing air quality reports
Noise and Vibration	Existing noise and vibration characteristics/levels, detailed analysis of potential sensitive areas, field investigations, and agency coordination
Wetlands	Wetland Delineations including jurisdictional determinations, agency coordination, NRCS Farmed wetland maps, NWI wetland maps along Ladue River Route, NWI wetland maps along the Alaska Highway Route north and south of the Alaska Highway, Field verification of available NWI wetland information
Floodplains	FEMA floodplain maps were not available for the majority of the study area. Limits of the floodway and 100-year floodplains are unknown. Coordination and field investigations needed to complete analysis.
Waterways/Water Quality	More information is needed on the waterways within the study area including hydraulic/hydrologic surveys, hydraulic reports and drainage or watershed studies, jurisdictional determinations, and information from previous studies and modeling efforts. Agency coordination and water quality determinations are also required for the majority of the waterways within the study area. Aboriginal needs, issues, and concerns also need to be identified in relation to waterways and water quality.
Farmland	Field investigations, additional agency coordination, and soils analyses required to confirm findings of no farmlands in the study area.
Vegetation	Field investigations, additional studies, agency coordination, and aboriginal needs, issues, and concerns
Geological/Seismic Features and Permafrost	Field investigations, additional studies on permafrost, earthquake and volcano hazards, and sensitive geologic features, and agency coordination
Wildlife/Waterfowl Refuges/Fisheries	Field investigations, additional studies on the resources and their migratory patterns and habitat, agency coordination, and aboriginal needs, issues, and concerns
T&E Species	Recorded T&E species locations, field investigations, additional studies on T&E habitat and species in area, and agency coordination
Parks and Special Management Areas	Field investigations, survey and additional studies to determine exact locations of borders in relation to the project right-of-way and affect zones, more information on designated uses and ownership to make permit and approval and documentation requirement determinations (including Section 4(f) and Section 6(f)), aboriginal needs, issues, and concerns, and agency coordination
Special Waste	Field investigations and records of known sites, additional studies including formal Phase I and potentially Phase II, and agency coordination
Induced Development	Information on the mineral deposits (size, ownership, and potential for mining)

3.16 Other Issues

3.16.1 Permits and Approvals

Numerous permits and approvals are required from federal, state, and local agencies prior to construction for a project of the nature and magnitude of the ACRL. Since the project will cross the international boundary from the U.S. into Canada two additional permits/approvals will be required including the Presidential Permit and the International Boundary Commission Approval. Refer to Section 3.16.2 and 3.16.3 for additional information on the permits/approvals required for activity associated with the international boundary.

Until alignments are refined, impacts are assessed, and funding for the project is determined, the exact permit approvals and clearances that are required will not be certain. Table 15 contains a list of permit approvals and clearances that may be required for the project based on a preliminary analysis. The list does not account for all potential permits that are required for the project. The list will require refinement during later stages of the project.

Table 15. Summary of Permits and Approvals Potentially Required for the ACRL Project

Jurisdiction/Agency	Type of Approval or Permit	Activity Type
ACOE	Section 404 Permit	Excavating or placing fill in the waters of the U.S., including wetlands
	Section 10 Permit	Dredging, placing, or other work in or affecting navigable waters
	Section 103	Transporting dredged material for disposal in ocean waters
ADNR	Right-of-Way Permit	Placement of discharge/outfall/intake lines on state tide and submerged lands
	Land-Use Permit	Constructing projects on state-owned lands or crossing state-owned lands for access
	Temporary Water Use Permit	Appropriating freshwater from any subsurface or surface source, on a temporary basis, on all lands regardless of ownership
	Water Right Permit/Certificate	Appropriating freshwater from any subsurface or surface source, on a permanent basis, on all lands regardless of ownership
	Fish Habitat Permit (Title 41)	Construction or other activities in specified anadromous streams or that black fish passage in streams with resident fish
ADFG	Special Area Permit	Construction, continuing use, or other activity in state game refuges, critical habitat areas, or sanctuaries
EPA	National Pollution Discharge Elimination System Permit (NPDES)	Point-source discharge of wastewater or storm water into waters of the United States
ADEC, Division of Water	Wastewater Disposal Permit	Disposing wastewater into or upon waters or lands of the state
	401 Certificate of Reasonable Assurance	Activities requiring a permit under the CWA
	Design Plan Approval	Construction of sewer and drinking water facilities

Table 15. Summary of Permits and Approvals Potentially Required for the ACRL Project

Jurisdiction/Agency	Type of Approval or Permit	Activity Type
ADEC, Division of Spill Prevention and Response	Various permits are required based on special waste located in corridor	If special waste is located within the study area, refer to the following website: http://www.dec.state.ak.us/spar/approvals.htm#ipp
ADNR, State Historic Preservation Office	Section 106 Review	Activities that may affect cultural or historic resources
USFWS or National Marine Fisheries Service and ADFG	Endangered Species Act of 1973, Section 7 Consultation	Activities that may affect threatened or endangered species
USCG	Section 9 Permit for Bridges over Navigable Waters	Construction of bridges over navigable waters
	Applications for Private Aids to Navigation under title 33, Parts 62.25, 64, 66, and 67	Installation of private aids to navigation
Various – agencies with jurisdiction over affected properties	49 USC 303 - Section 4(f)	Activities that may affect historic properties and/or publicly-owned parks, recreation areas, refuges
DOI, NPS, and Local Agencies	Section 6(f) - Land and Water Conservation Fund Act	Activities that may affect Land and Water Conservation Fund Act lands
EPA and ADEC, Division of Air Quality	Clean Air Act Conformity Requirements	Activities that may affect the air quality for the study area

3.16.2 Presidential Permit

Among the permits that will be required for the ACRL project will be a Presidential Permit to be issued by the U.S. Department of State. As stipulated by Executive Order No. (E.O.) 11423, and amended by E.O. 12847, a Presidential Permit provides executive permission for constructing and maintaining facilities at U.S. borders which provide for the transportation of persons and/or things to or from a foreign country.

The Presidential Permit must be coordinated closely with the NEPA process, as well as the National Historic Preservation Act (NHPA), and E.O. 12898 regarding Environmental Justice. The application for a Presidential Permit must in fact be submitted with appropriate environmental documentation. In addition, notice of the application must be published in the Federal Register, soliciting public comment which will be a consideration in issuing the permit. Consultation with numerous resource agencies is also required, including the General Services Administration, Immigration and Naturalization Service, Customs Service, Animal and Plant Health Inspection Service of the Department of Agriculture, EPA, USFWS, as well as the Department of State and various state agencies.

3.16.3 Transboundary Effects

In addition to the Presidential Permit, International Boundary Commission Approval is also required for projects within ten feet of an international boundary (60 feet (18 meters)) if on federal land). The International Boundary Commission consists of two commissioners: on the U.S. side, the commissioner reports to the Secretary of State, while the Canadian commissioner reports to the Secretary of State for Foreign Affairs. Although the application would be submitted to the section of the commission in the applicant's own country, once permission is granted, it is valid for both countries.

3.16.4 Bilateral Coordination

As with any project of the size and complexity of the ACRL, and in particular, due to its international nature, close coordination will be required both within each of the respective federal governments and between them. The National Economic Council (NEC) has documented its recommendations in a 1994 White Paper which identify the following commitments for a project of this nature: the necessary infrastructure to support the project; consistency with state and regional plans, as well as Canadian development plans and priorities; and financing plans for the necessary border facilities (including inspection agency facilities and staffing.) In addition, ongoing coordination throughout implementation of the project is imperative between the U.S. Department of State and the Canadian Department of Foreign Affairs & International Trade (DFAIT) and the Canadian Embassy.

4. Affects of Phased Implementation

Phased implementation includes sections of the proposed railroad alignment that have independent utility and logical termini and could stand alone without support from additional sections of railroad alignment. Based on available funding, phased implementation of the ACRL alignment may be necessary. The benefit of phased implementation is that portions of the rail corridor may be constructed and satisfy the needs of the areas sooner than if the whole project is constructed at once. In addition, more alternatives (both Segment 2L and Segment 2H as opposed to just one or the other) may be identified for construction. A challenge of phased implementation is the risk of segmentation.

Unfortunately, since the majority of the study area is undeveloped, it does not appear that there are sections of the rail alignment that have independent utility, logical termini, or could stand alone within the Alaska portion of the study area. Segment 2L is so remote that constructability will be a challenge in itself. The cities/villages within the remaining segments are small enough that the construction of the railroad would not likely be supported and the need is not great enough without the remaining sections of the alignment as destinations.

5. Summary Matrix (Net Potential Environmental Effects)

Table 16 summarizes the resources that are most likely to be significantly impacted by the proposed improvements. According to NEPA, an Environmental Impact Statement is required when there are significant impacts and federal funding involved in a project. The results of this assessment conclude that this project is not likely to proceed to construction without the completion of an Environmental Impact Statement.

Table 16. Summary of Potential Environmental Effects

Resource	Significant Impacts Likely?				Additional Notes:
	Yes, Negative	Yes, Beneficial	No	Unknown	
Air Quality		x			Additional studies required to confirm attainment status and Mobile6.2 modeling results
Noise and Vibration	x				Significant impacts likely
Wetlands	x				Significant impacts likely
Floodplains	x				Significant impacts likely, dependant on location of alignment to the vicinity of the Tanana River
Waterways/ Water Quality				x	Additional information/ coordination/ studies required to make determination
Farmland			x		Farmland was not identified within the corridor.
Vegetation	x				Significant impacts likely, especially to wildlife habitat.
Geological/ Seismic Features and Permafrost				x	Additional studies required to determine magnitude of impacts.
Wildlife/ Waterfowl Refuges/ Fisheries	x				Significant impacts likely
T&E Species				x	Additional information/ coordination/ studies required to make determination
Parklands/ Special Management Areas	x	x			Significant impacts likely, Section 4(f) documentation may be required.
Special Waste				x	Additional information/ coordination/ studies required to make determination
Induced Development				x	More information is needed on the mineral deposits.