Ambler Mining District Access

Environmental Overview Memorandum

September 2011

AMBLER MINING DISTRICT ACCESS

ENVIRONMENTAL OVERVIEW MEMORANDUM

AKSAS 63812

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APPENDICES

LIST OF ACRONYMS

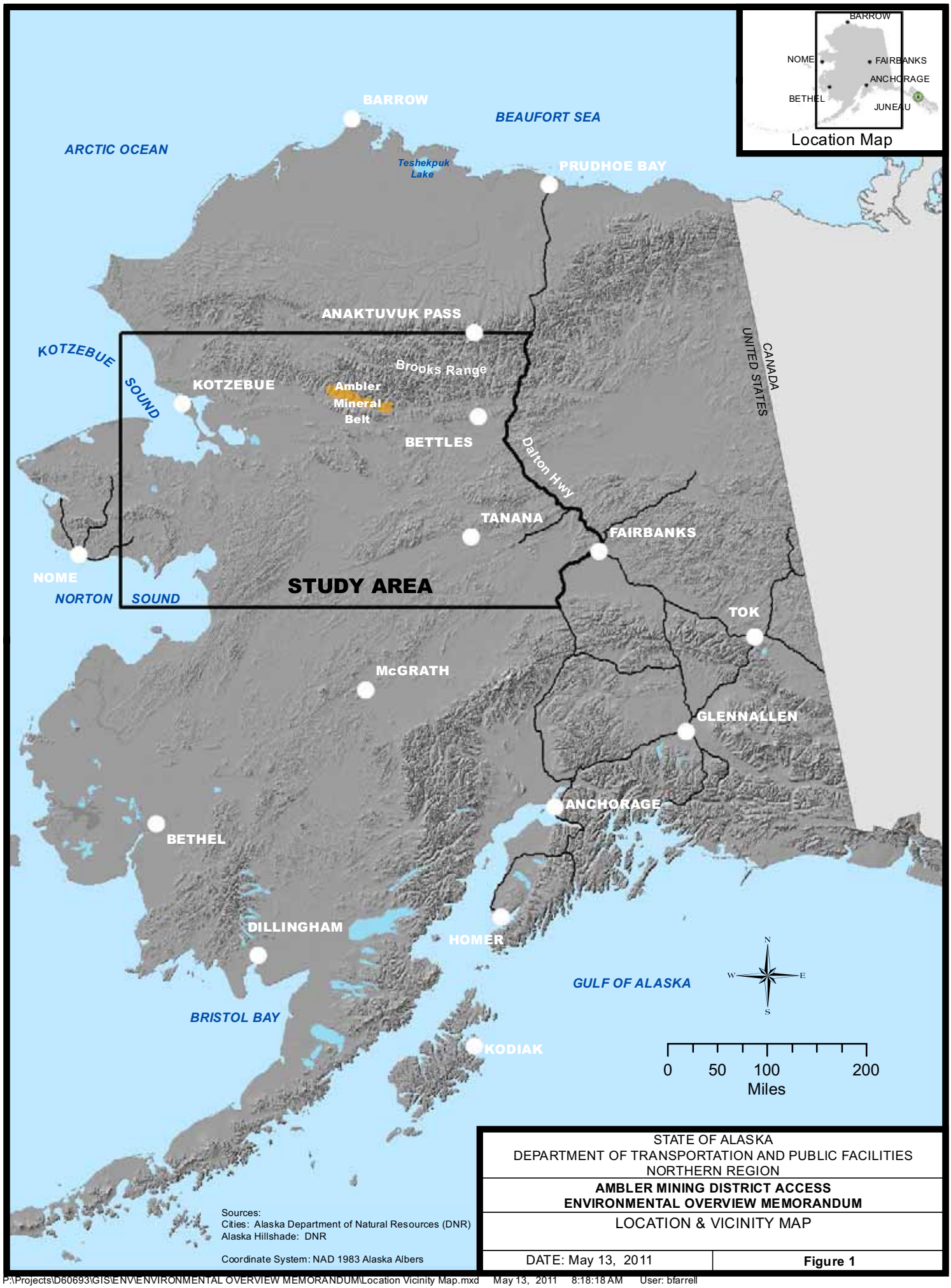
AAC ..... Alaska Administrative Code
ACEC ..... Area of Critical Environmental Concern
ADF&G ..... Alaska Department of Fish and Game
AHRS ..... Alaska Heritage Resources Survey
ANCSA ..... Alaska Native Claims Settlement Act
ANHP ..... Alaska Natural Heritage Program
ANILCA ..... Alaska National Interest Lands Conservation Act
APDES ..... Alaska Pollutant Discharge Elimination System
AS ..... Alaska Statute
AWC ..... Anadromous Water Catalog
BCR ..... Bird Conservation Region
BIA ..... Bureau of Indian Affairs
BLM ..... Bureau of Land Management
CFR ..... Code of Federal Regulations
CSU ..... conservation system unit
CWA ..... Clean Water Act
DEC ..... State of Alaska Department of Environmental Conservation
DMTS ..... Delong Mountain Transportation System
DNR ..... State of Alaska Department of Natural Resources
DOT&PF ..... State of Alaska Department of Transportation and Public Facilities
EIS ..... Environmental Impact Statement
FHWA ..... Federal Highway Administration
GMU ..... Game Management Unit
NANA ..... Northwest Arctic Native Association
NEPA ..... National Environmental Policy Act
NMFS ..... National Marine Fisheries Service
NPS ..... National Park Service
NRHP ..... National Register of Historic Places
NWAB ..... Northwest Arctic Borough
NWR ..... National Wildlife Refuge
RMP ..... Resource Management Plan
RNA ..... Research Natural Areas
ROW ..... rights-of-way
RS ..... Revised Statute
SHPO ..... State Historic Preservation Office(r)
U.S. ..... United States
U.S.C. ..... United States Code
USACE ..... United States Army Corps of Engineers
USCG ..... United States Coast Guard
USDOI ..... United States Department of the Interior
USEPA ..... United States Environmental Protection Agency
USFWS ..... United States Fish and Wildlife Service
USGS ..... United States Geological Survey
WACH ..... Western Arctic Caribou Herd
WSR ..... Wild and Scenic River

1.0 INTRODUCTION

The Ambler Mining District Access project proposes to identify, design, and construct a transportation corridor from the Ambler mineral belt to either a port location on the west coast of Alaska or the surface transportation system in the Alaska Interior (Figures 1 and 2). The corridor is intended to provide surface transportation access to state lands and facilitate exploration and development of mineral resources along the Ambler mineral belt (Figure 3).

The South Flank of the Brooks Range contains extensive mineral resources. Limited exploration efforts since the 1950s have identified significant resources of copper and other base metals (Hawley and Vant, 2009). Exploration and development of these deposits has been economically and logistically curtailed by the lack of transportation infrastructure.

This Environmental Overview Memorandum reviews existing environmental information for the project study area and proposed corridors, documents environmental data gaps and potential field studies that may be needed, and identifies the likely agency permits and authorizations that would be needed for construction. Table 3-1 provides an overview of environmental resources by corridor. Table 4-1 summarizes agency permits and authorizations that may be needed for the project. Resource agency interviews will be conducted in the near future to further define the data gaps and field study plans for summer 2011.



Sources:
Cities: Alaska Department of Natural Resources (DNR)
Alaska Hillshade: DNR

Coordinate System: NAD 1983 Alaska Albers

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LOCATION & VICINITY MAP

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Figure 1

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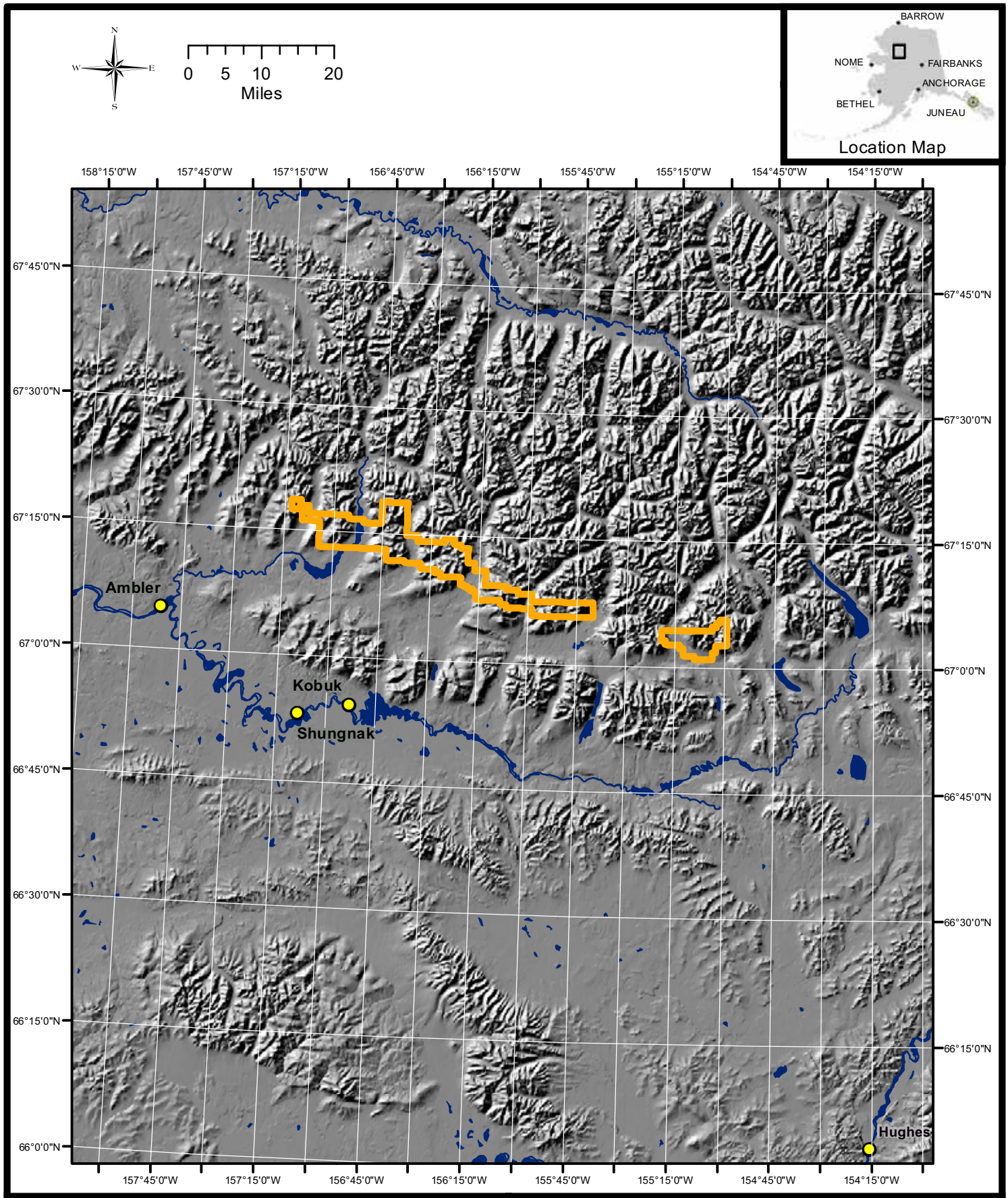

Communities and Place Names

Water

Ambler Mineral Belt

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AMBLER MINERAL BELT

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Figure 2

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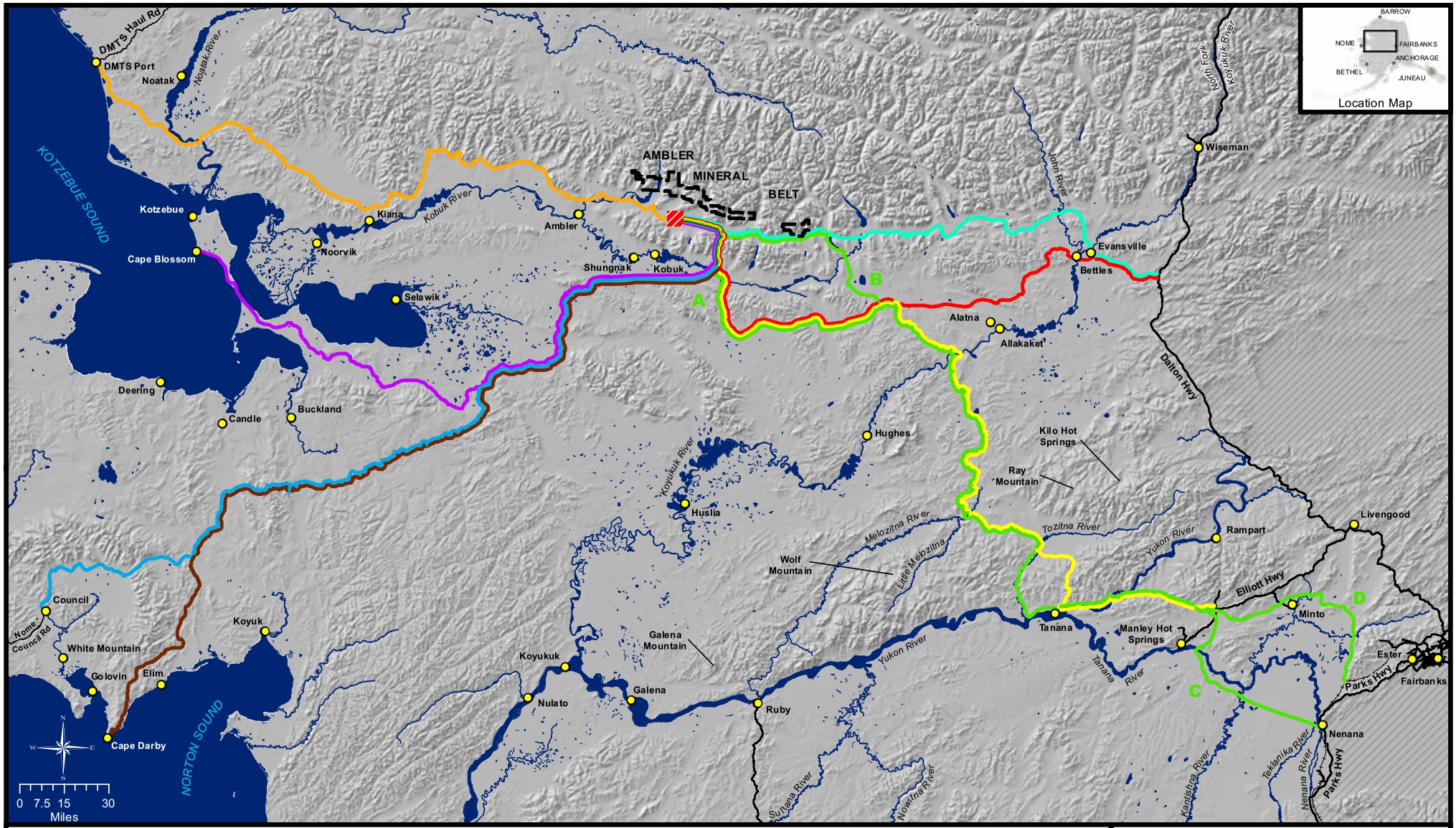
DMTS Haul Rd
DMTS Port
Noatak
Noatak River
KOTZEBUE SOUND
Kotzebue
Cape Blossom
Kiana
Kobuk River
Noorvik
Selawik
Deering
Candle
Buckland
AMBLER
MINERAL
BELT
Ambler
Shungnak
Kobuk
A
B
Koyukuk River
Huslia
Hughes
Kilo Hot Springs
Ray Mountain
Melozitna River
Little Melozitna
Wolf Mountain
Tozitna River
Yukon River
Rampart
Livengood
Dalton Hwy
Alatna
Allakaket
Wiseman
John River
North Fork Koyukuk River
Evansville
Bettles
Elliott Hwy
Minto
D
Tanana
Manley Hot Springs
Tanana River
Ester
Fairbanks
Parks Hwy
C
Nenana
Nenana River
Teklanika River
Parks Hwy
Kantishna River
Council
Nome-Council Rd
Koyuk
White Mountain
Golovin
Elim
Cape Darby
NORTON SOUND
Galena Mountain
Koyukuk
Nulato
Galena
Ruby
Yukon River
Sulatna River
Nowitna River
0 7.5 15 30
Miles
BARROW
NOME
FAIRBANKS
ANCHORAGE
BETHEL
JUNEAU
Location Map
Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Proposed Staging Area
1-Brooks East Corridor 216 Miles (Road Only)
2-Kanuti Flats Corridor 241 Miles (Road Only)
5-DMTS Port Corridor 257 Miles (Road & Rail)
3-Elliott Hwy Corridor 365 Miles (Road Only)
4-Parks Hwy RR Corridor 420-450 Miles (Rail Only)
6-Cape Blossom Corridor 245 Miles (Road & Rail)
7-Selawik Flats Corridor 331 Miles (Road & Rail)
8-Cape Darby Corridor 340 Miles (Road & Rail)
Commmunities and Place Names: DNR, DOT&PF
Existing Roads: DOT&PF
DMTS Haul Road: NANA
Railroad: DNR
Coordinate System: NAD 1983 Alaska Albers
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PRELIMINARY CORRIDORS
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Figure 3
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2.0 ENVIRONMENTAL RESOURCE BASELINE DATA

2.1 Land Use and Ownership

Alaska's system of land ownership and management is complex as a result of various land laws that resolved land ownership claims in Alaska. These laws include the Native Allotment Act, the Alaska Statehood Act, the Alaska Native Claims Settlement Act (ANCSA), the Alaska National Interest Lands Conservation Act (ANILCA), and the state's Municipal Entitlement Act. Most of these laws govern the transfer of federal lands to individuals, the state, and ANCSA Native corporations. Other provisions set aside federal lands as national interest conservation lands, as described further below. Finally, the Municipal Entitlement Act provided for the transfer of state lands to municipalities. This multitude of land laws results in the current situation in which millions of acres have been selected by the state, ANCSA Native corporations, and local municipalities and are in various stages of the conveyance process. Access to and acquisition of these lands may require coordination with various federal, state, and local entities depending on the status of the conveyance.

Alaska Native Allotment Act

The 1906 Alaska Native Allotment Act allowed for Native Alaskans to apply for up to 160 acres of unrestricted land (land not withdrawn by the federal government for specific purposes). The Bureau of Land Management (BLM) has resolved most Native allotment applications, but over 500 remain in process (BLM, 2011a). BLM must resolve these allotment applications prior to completing the transfer of lands to ANCSA Native corporations and the state under the entitlement programs discussed below.

Native allotments are generally transferred as restricted-title properties. The Bureau of Indian Affairs (BIA) has a fiduciary responsibility for Native lands and the lands can only be acquired with the approval of the Secretary of the Interior.

Alaska Statehood Act

The 1958 Alaska Statehood Act provided for the selection of over 104 million acres of unreserved lands by the state. It also provided title to lands underlying most navigable waters to the state. Determination of the navigability of waters is made by various federal agencies and by the state. State and federal determinations do not always agree and are often resolved in court.

While there have been navigability determinations on more than 65 water bodies to date, the navigability of most water bodies in Northwest Alaska has not been determined (Alaska Minerals Commission, 2009).

In 2006, Congress passed the Alaska Land Transfer Acceleration Act to speed the transfer of lands from the federal government to the state and Native corporations. The goal of the act was to complete the land transfers by 2009. Although this goal was not met, the law has increased the pace of land conveyance, and as of December 2010, the state had received 98.9 million acres in tentative approval or patent, or 95% of its entitlement under the Alaska Statehood Act (State of Alaska Department of Natural Resources [DNR], 2011b). Until selected lands are conveyed to the state by patent or tentative approval, BLM continues to have management authority over them.

Alaska Native Claims Settlement Act

The passage of ANCSA in 1971 settled the land claims for Native Alaskans by providing them nearly 45 million acres and $1 billion. The 45 million acres was distributed to the village and regional corporations established under the act. Village corporations received the surface estate to about 22 million acres. Regional corporations received the subsurface estate to those 22 million acres and received surface and subsurface estates on another 18 million acres.

As of December 2010, approximately 43 million acres (96% of the ANCSA entitlements) have been transferred to Native corporations either in patent or as interim conveyances (DNR, 2011b).

In addition to resolving Alaska Native land claims, ANCSA provided for the federal government to withdraw additional public lands to be studied for possible addition to National Parks, Forests, Wildlife Refuges and Wild and Scenic River (WSR) Systems and to withdraw other public lands to protect the public interest in them. ANILCA addressed the disposition of the lands withdrawn for study under ANCSA.

Alaska National Interest Lands Conservation Act

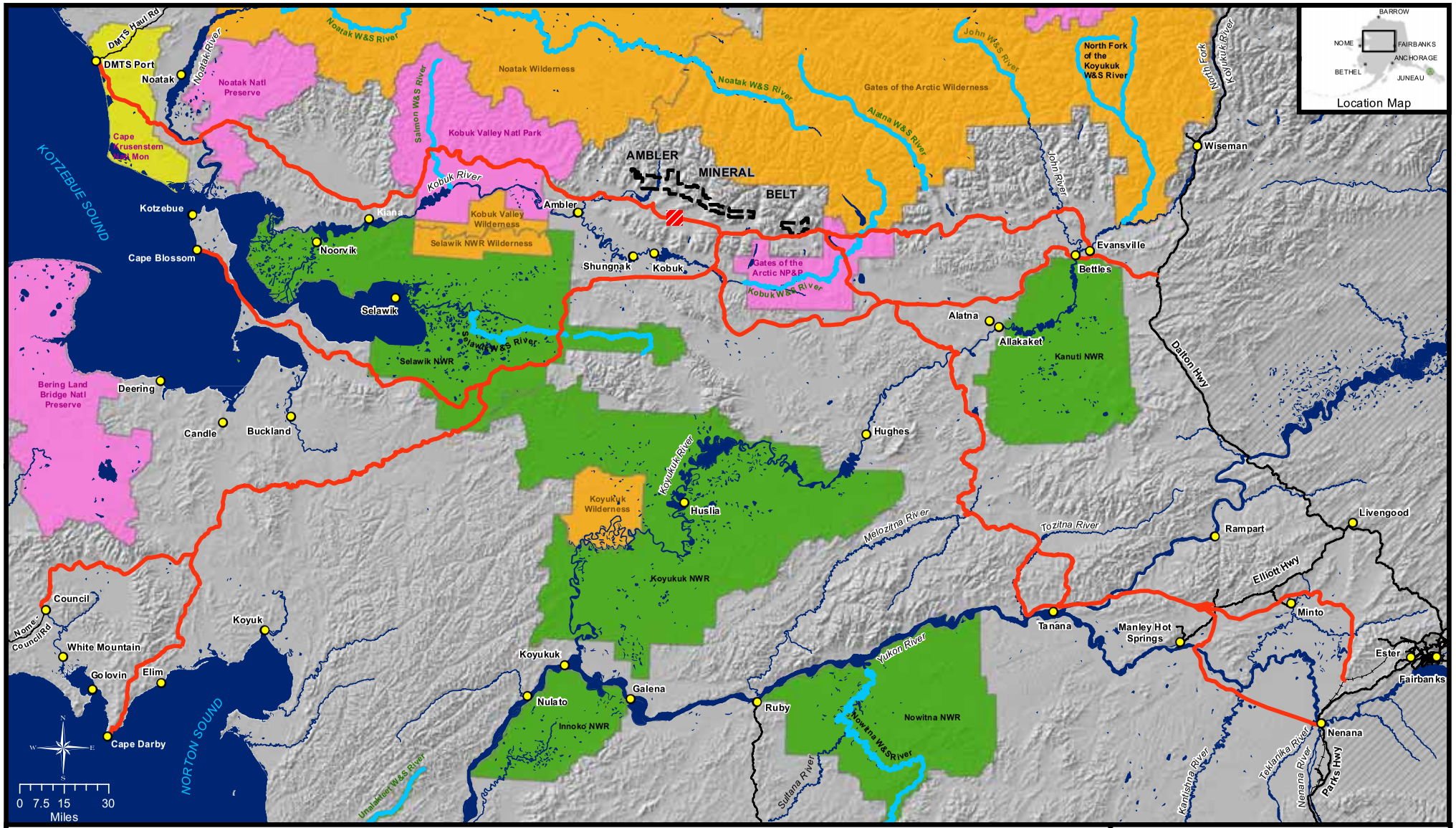
ANILCA was enacted to preserve nationally significant natural resources for the benefit of future generations. The passage of ANILCA in 1980 added 104 million acres to Conservation System Units (CSU) in Alaska. CSUs were defined in ANILCA as any portion of the National Park

System, National Wildlife Refuge (NWR) System, National WSR Systems, National Trails System, National Wilderness Preservation System, or a National Forest Monument in Alaska. In the project study area, over 28 million acres were placed into CSUs, including almost 15 million acres designated Wilderness (Table 2-1) (Figures 4 through 8). Almost 16 million acres were placed in four units managed by the National Park Service (NPS), including seven WSRs and 13 million acres designated Wilderness. Another 12.5 million acres was placed in five NWRs, including two WSRs and almost 1.9 million acres designated Wilderness. Wilderness is the most protective designation for federal lands. Wilderness areas retain their primitive nature and provide opportunities to experience areas that have not been modified by humans. The Wilderness Act of 1964 calls for these areas to be maintained to protect their wilderness values, strictly limiting activities and uses in these areas.

Table 2-1: Alaska National Interest Lands Conservation Act Conservation System Units within the Project Study Area

National Parks and Preserves	
Gates of the Arctic National Park and Preserve	7,052,000 acres (Park/Wilderness) 900,000 acres (Preserve)
Kobuk Valley National Park	1,710,000 acres (Park) (190,000 acres Wilderness within Park)
Noatak National Preserve	6,460,000 acres (Preserve) (5,800,000 acres Wilderness within Preserve)
Cape Krusenstern National Monument	560,000 acres (Monument)
National Wildlife Refuges	
Innoko National Wildlife Refuge	3,850,000 acres (Refuge) (1,240,000 acres Wilderness within Refuge)
Kanuti National Wildlife Refuge	1,430,000 acres (Refuge)
Koyukuk National Wildlife Refuge	3,550,000 acres (Refuge) (400,000 acres Wilderness within Refuge)
Nowitna National Wildlife Refuge	1,560,000 acres (Refuge)
Selawik National Wildlife Refuge	2,150,000 acres (Refuge) (240,000 acres Wilderness within Refuge)
Wild and Scenic Rivers	
Gates of the Arctic National Park and Preserve	Alatna River Kobuk River John River Noatak River North Fork of the Koyukuk River Tinayguk River
Noatak National Preserve	Noatak River
Kobuk Valley National Park	Salmon River
Nowitna National Wildlife Refuge	Nowitna River
Selawik National Wildlife Refuge	Selawik River

Table Note: ANILCA notes that these are approximate acreages, subject to refinement. Actual acreages in these CSUs are typically larger than those identified in ANILCA.



Sources:
Land Ownership: DNR
Native Corporation Boundary: DNR
Kobuk-Seward Peninsula RMP;BLM KSPRMP EIS
Central Yukon RMP: Central Yukon RMP

Coordinate System: NAD 1983 Alaska Albers

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FEDERAL CONSERVATION SYSTEM UNITS

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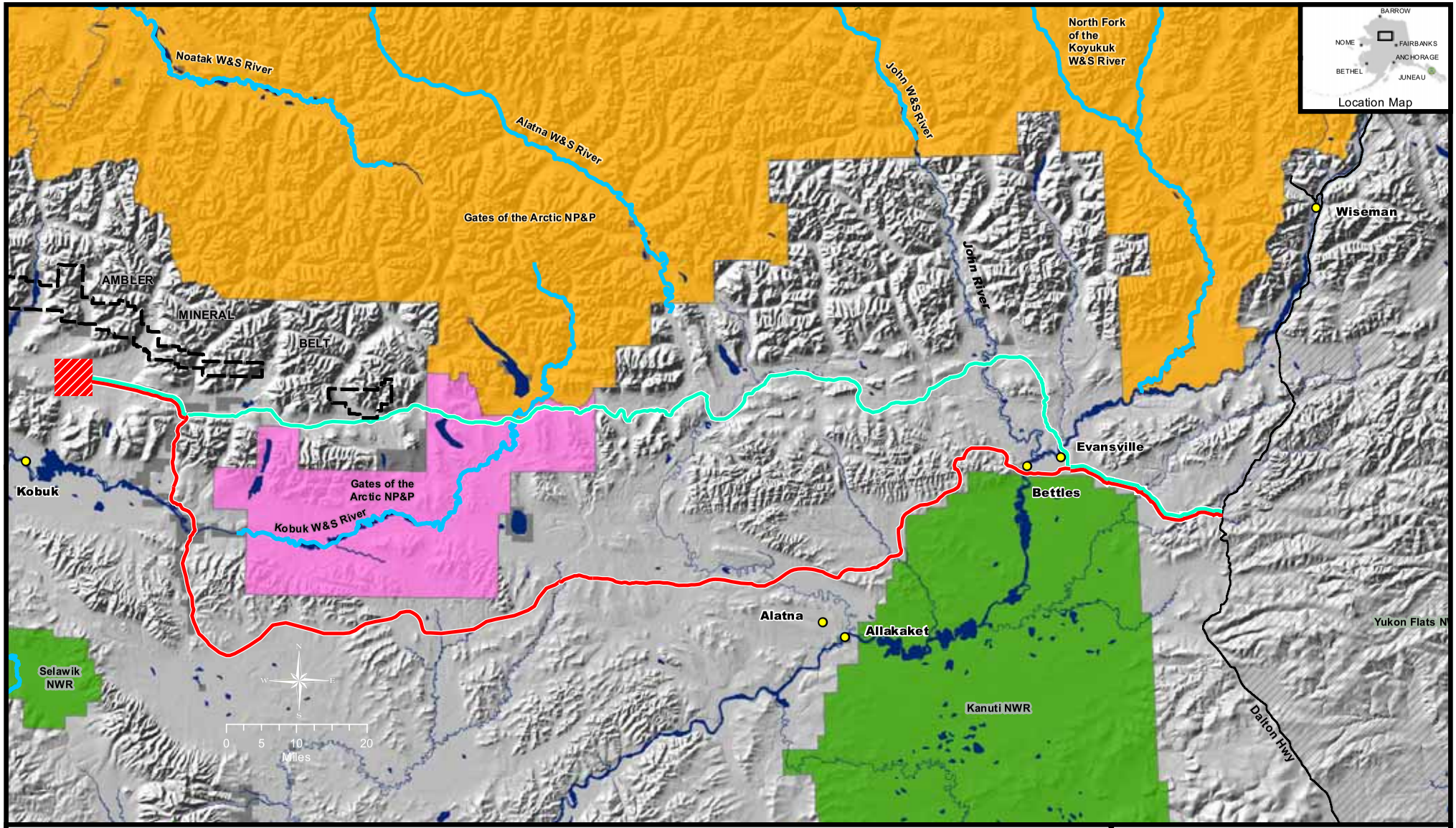

Sources:
Regional Lands: BLM
Village Lands: BLM
State Lands: BLM
Native Allotments: BLM
Private or Municipal Lands: DNR

Coordinate System: NAD 1983 Alaska Albers

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FEDERAL CONSERVATION SYSTEM UNITS
EAST CORRIDORS

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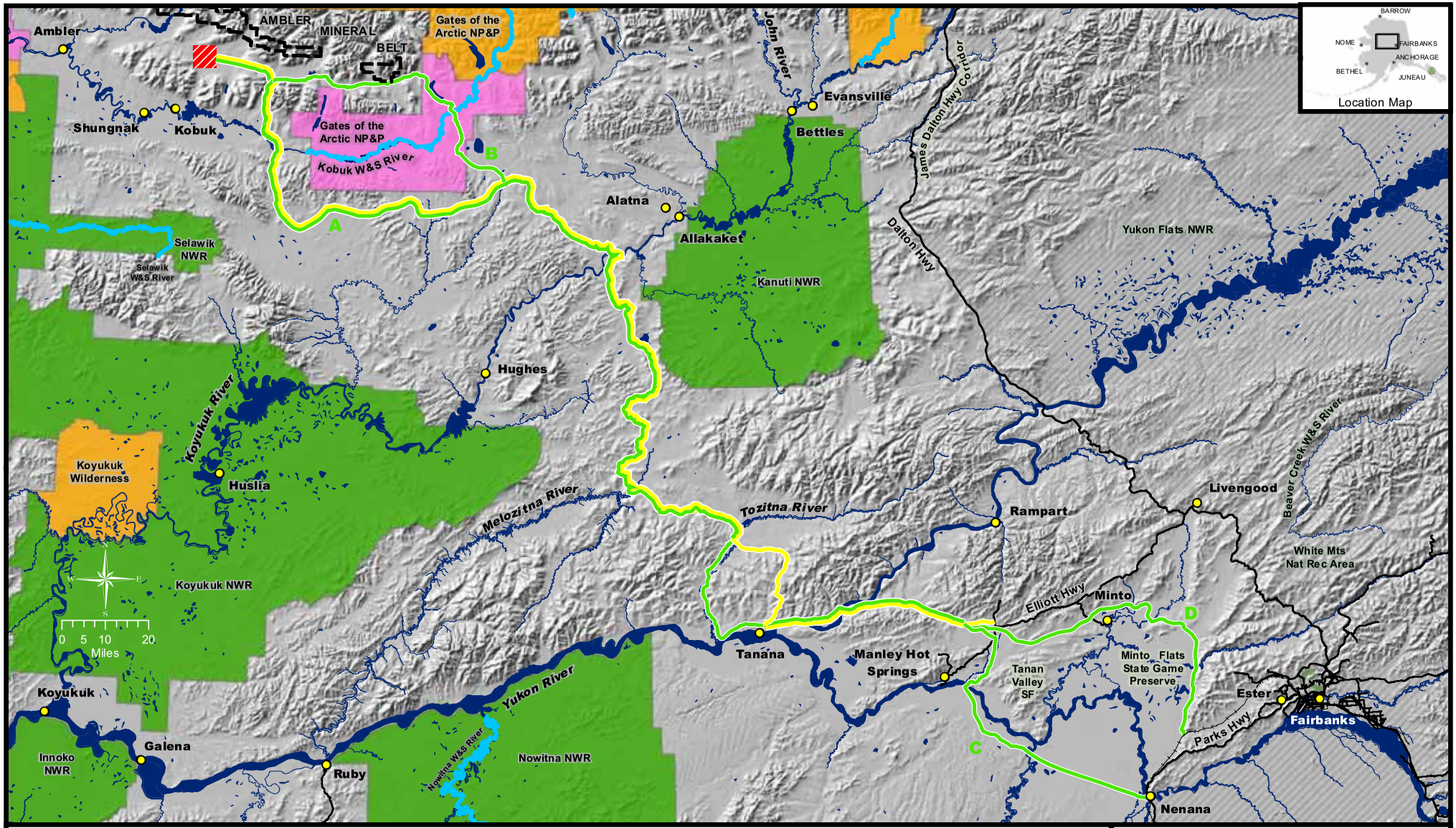

Sources:
Regional Lands: BLM
Village Lands: BLM
State Lands: BLM
Native Allotments: BLM
Private or Municipal Lands: DNR

Coordinate System: NAD 1983 Alaska Albers

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FEDERAL CONSERVATION SYSTEM UNITS
SOUTHEAST CORRIDORS

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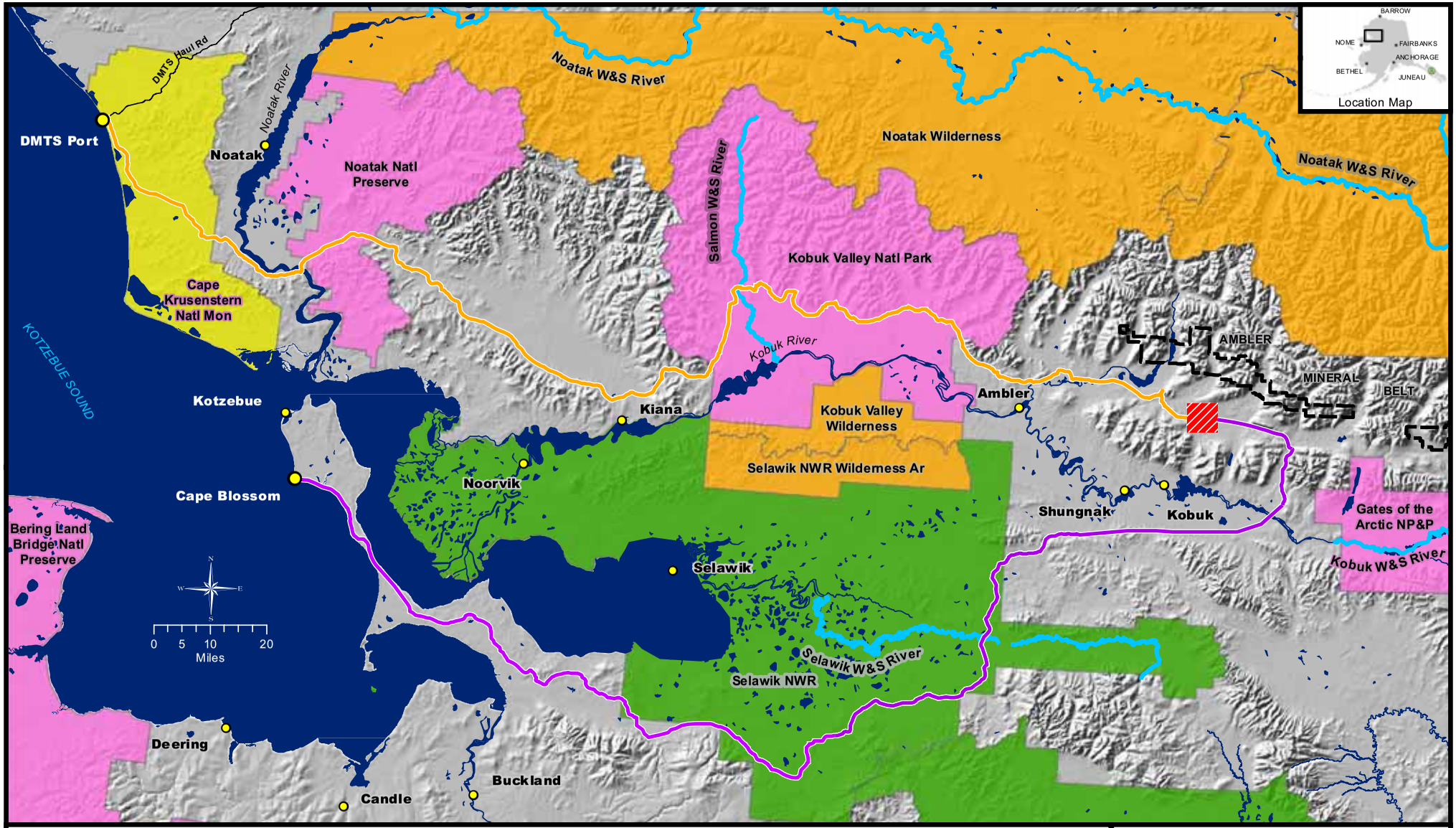

Communities and Place Names
Existing Roads
Water
Wild and Scenic Rivers
Ambler Mineral Belt
Proposed Staging Area
5-DMTS Port Corridor
257 Miles (Road & Rail)
6-Cape Blossom Corridor
245 Miles (Road & Rail)
Wildlife Refuge
Wilderness
National Park
National Monuments

Sources:
Regional Lands: BLM
Village Lands: BLM
State Lands: BLM
Native Allotments: BLM
Private or Municipal Lands: DNR

Coordinate System: NAD 1983 Alaska Albers

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FEDERAL CONSERVATION SYSTEM UNITS
WEST CORRIDORS

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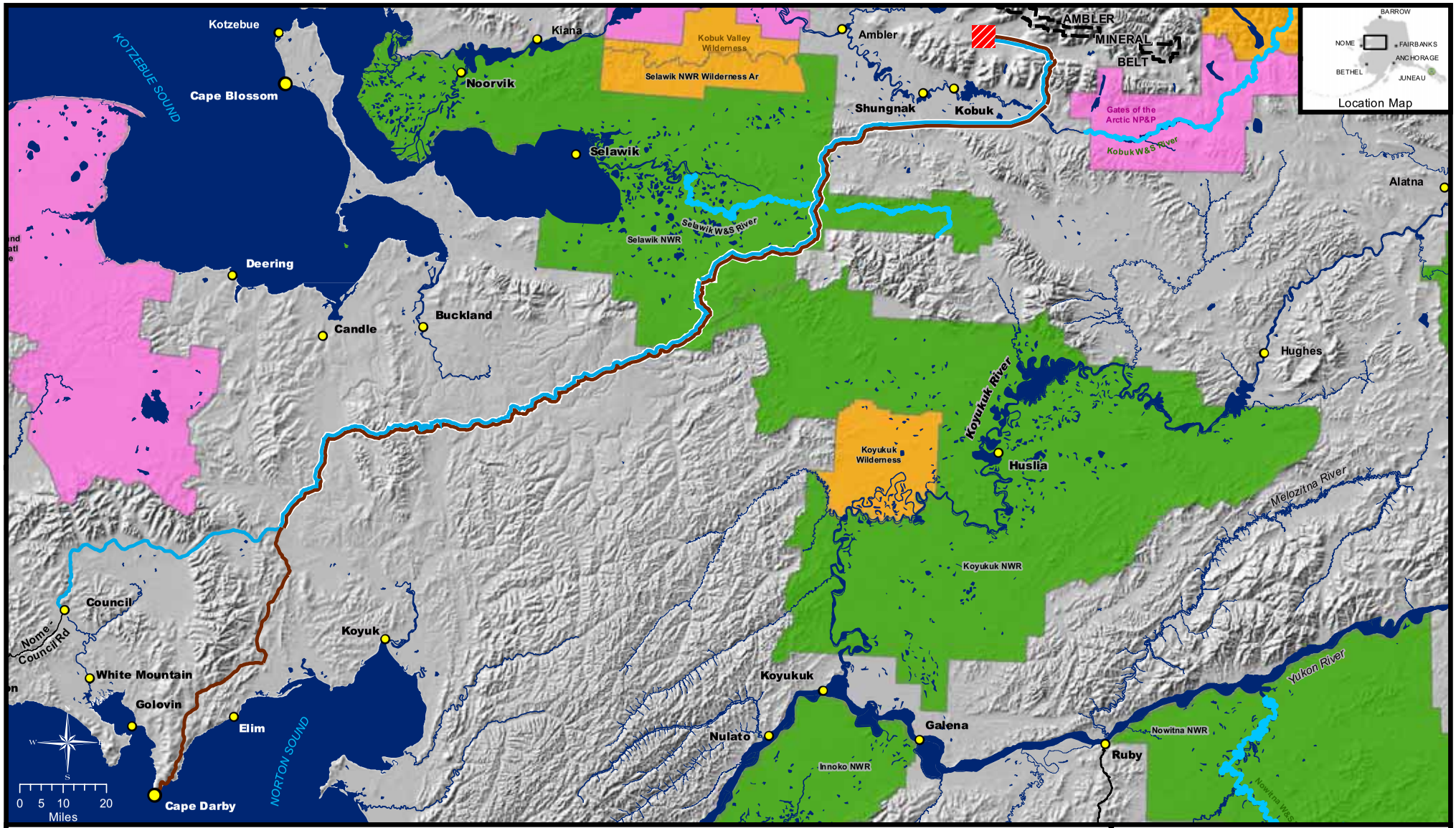

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FEDERAL CONSERVATION SYSTEM UNITS
SOUTHWEST CORRIDORS

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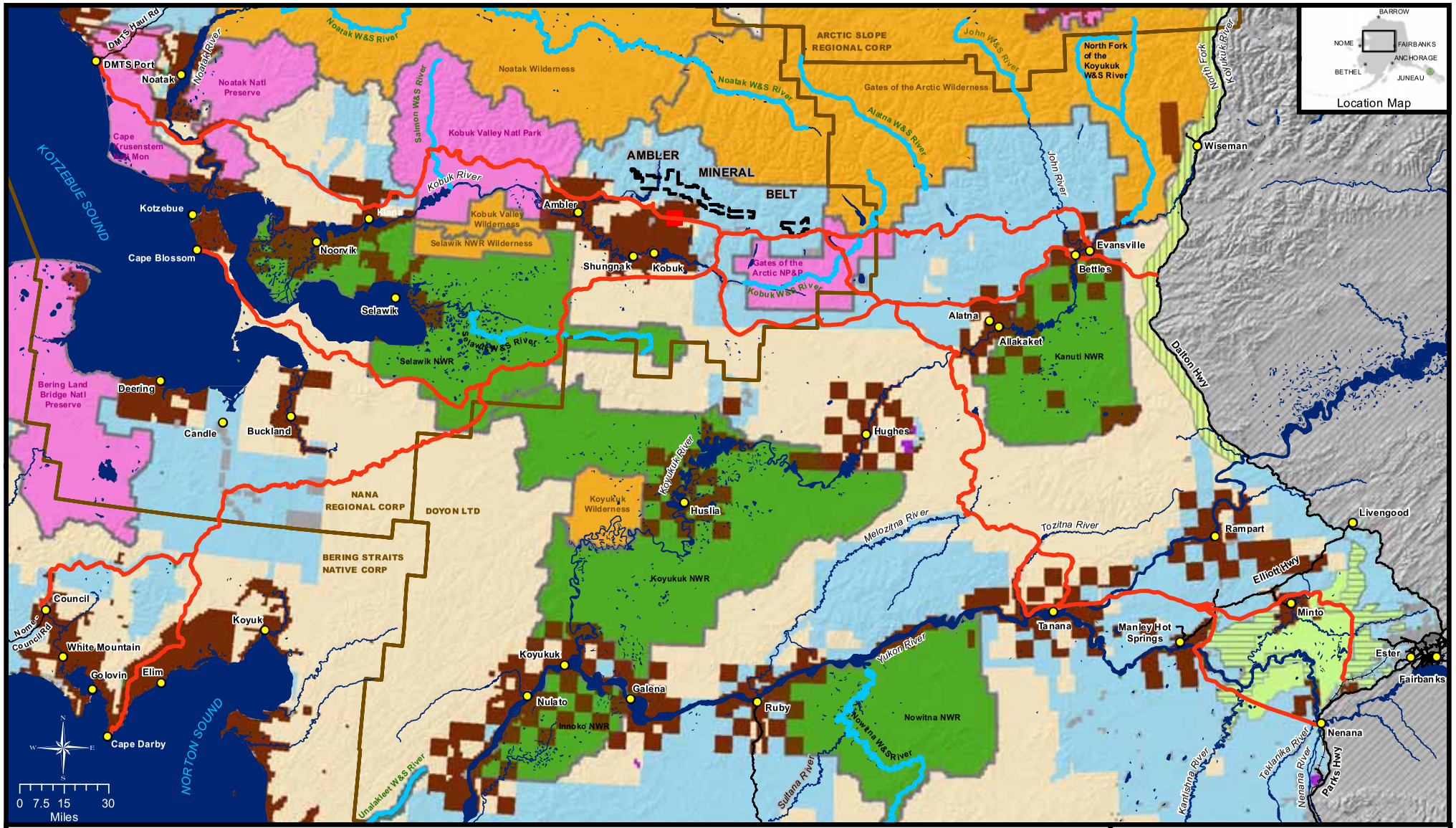
Although ANILCA placed millions of acres of land in CSUs with various levels of protection, it also recognized existing uses of these areas and Alaska's potential need to expand transportation systems through these areas. Title XI of ANILCA addresses transportation and utility access into and across the CSUs established by the Act. It acknowledges the largely undeveloped status of Alaska's transportation system, the likely need for future access, and a process for reviewing applications for access. More specifically, ANILCA Title II, Section 201(4) addressed the need for access from the Ambler mineral belt to the Dalton Highway through the Gates of the Arctic National Preserve, and provides for the Secretaries of the Interior and Transportation to grant this access.

Municipal Entitlement Act

The Municipal Entitlement Act of 1978 provided for the transfer of state lands to organized boroughs and cities to support their growth and economic development. The Northwest Arctic Borough (NWAB) is designated to receive 285,438 acres of state land within its boundaries under the Municipal Entitlement Act. Through 2005, the borough had only received 4 acres of this entitlement (DNR, 2005). The state has approved almost 70,000 acres of additional selections and granted the borough management rights on these, but actual conveyance will not occur until the areas have been surveyed (DNR, 2011b).

2.1.1 Current Land Status in Northwest Alaska

The majority of Alaskan lands remain in federal ownership, and land ownership in the study area is consistent with this (Figure 9). The federal government owns approximately 60% of the lands in the study area, including parks, preserves, refuges, military lands, and undesignated federal lands (Table 2-2). The BLM manages undesignated lands, which make up 35% of the lands in the study area. The NPS manages those lands designated as parks, preserves, or monuments. The United States Department of the Interior (USDOI) Fish and Wildlife Service (USFWS) manages the lands designated as wildlife refuges.



Sources:
Land Ownership: DNR
Native Corporation Boundary: DNR

Coordinate System: NAD 1983 Alaska Albers

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LAND OWNERSHIP / MANAGEMENT

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Table 2-2: Generalized Land Status in the Project Study Area

Ownership	Acres (% of Project Study Area)
Federal	40,718,826 (62%)
National Park Service[3]	7,162,747 (11%)
USFWS[4]	10,463,778 (16%)
Department of Defense	362,055 (<1%)
BLM	22,730,246 (35%)
State[1]	16,320,584 (25%)
Native[1]	7,756,025 (12%)
State/Native Management[2]	43,821 (<1%)
Municipal and Private	837,791 (1%)
Project Study Area	65,677,047 (100%)

Table Notes: Ownership data obtained from DNR land status dataset at section level.
1 Includes interim conveyances and tentative approvals.
2 Includes areas selected by state or Native corporations, but still managed by federal government.
3 Project study area does not include all of Gates of the Arctic National Park and Preserve, Noatak National Park, or Bering Land Bridge National Park.
4 Does not include Native in-holdings in NWRs.

Native Alaskans, Native regional and village corporations, boroughs, cities, and the state have all selected lands in the study area under the laws cited previously. Many of these lands have yet to be conveyed for reasons discussed previously. In addition, multiple entities have often selected the same lands; in many instances, these conflicting selections have not yet been resolved.

These unresolved land ownership issues complicate efforts to acquire property rights for construction of transportation infrastructure. Acquisition of lands that have been selected but not yet conveyed may require coordination with multiple entities, including BLM, DNR, and Native corporations. Native corporation lands may require coordination with both village and regional corporations, as surface rights were conveyed to village corporations and subsurface rights were conveyed to the regional corporations. Acquisition of Native allotments may require approval of the Secretary of the Interior.

2.1.2 Federal Lands

As described above, land ownership in the study area is predominantly federal. Federal lands in this area are managed by BLM, NPS, or USFWS depending on the designation of the land (Figures 4 through 8). When Congress passed ANILCA in 1980, it established more than 100 million acres of federal land in Alaska as new or expanded CSUs. The CSUs in the study area include national parks, preserves, a monument, wildlife refuges and WSRs. The NPS manages the parks, preserves and monuments, and WSRs within these areas. The USFWS

manages the NWRs and the WSRs within them. BLM manages the federal lands outside these CSUs. In general, acquisition of rights-of-way (ROW) and permitting for development of a transportation facility are likely to be more difficult on federal lands than on state lands, and more so in CSUs. Although ANILCA provides a process for acquiring access rights through these CSUs (see Section 2.1.1.4), the process requires approval from the Secretaries of the Interior and Transportation.

The CSUs in the study area are listed and discussed further below.

These protected federal lands include:

- Bering Land Bridge National Preserve
- Gates of the Arctic National Park and Preserve and Wilderness Area
- Kobuk Valley National Park and Wilderness Area
- Noatak National Preserve
- Cape Krusenstern National Monument
- Nine Wild and Scenic Rivers (see Section 2.3.1.1)
- Nowitna National Wildlife Refuge
- Innoko National Wildlife Refuge and Wilderness Area
- Kanuti National Wildlife Refuge
- Koyukuk National Wildlife Refuge and Wilderness Area
- Selawik National Wildlife Refuge and Wilderness Area

BLM manages federal lands not included in these CSUs, including the Dalton Highway Utility Corridor and the Dalton Highway Recreation Management Area. These are discussed further in Section 2.3.1.5.

2.1.2.1 Conservation System Units

ANILCA identified specific purposes for each area withdrawn as national interest lands. It also recognized that federal lands in Alaska needed to be managed to allow the rural and Native lifestyles to continue in and around the CSUs, including subsistence and other traditional uses. The following sections which discuss relevant parks, preserves, monuments, refuges, and wilderness areas established under ANILCA, and Section 2.3.1.1 discusses the WSRs in the project study area.

2.1.2.1.1 Gates of the Arctic National Park and Preserve and Wilderness Area

Gates of the Arctic National Park and Preserve was created in 1980 under ANILCA and encompasses approximately 8.4 million acres (Figure 6). It is the northern most National Park in the United States (U.S.) and is located north of the Arctic Circle. The Park consists primarily of portions of the Brooks Range. Approximately 7.4 million acres are designated as Park and just less than 1 million acres in two separate areas are designated as Preserves. Typically, more activities are allowed in preserves than in parks.

Over 7 million acres in the Park are designated Wilderness. This Wilderness area is adjacent to Wilderness areas in the Noatak National Preserve, resulting in the largest contiguous Wilderness area in the U.S. The NPS General Management Plan for Gates of the Arctic National Park and Preserve identified almost the entire 1 million acres of Preserve as potentially eligible for Wilderness designation (NPS, 1986). The Wilderness eligibility determination specifically notes an exception for certain subsurface rights and the potential transportation ROW between the Ambler mineral belt and the Dalton Highway identified in ANILCA Section 201(4)(b). The General Management Plan also documents NPS concern about potential impacts on the Park from any future transportation or utility system ROW granted.

Two areas in the Park were designated as National Natural Landmarks: the Arrigetch Peaks and Walker Lake. Another 16 sites have been identified as potential National Natural Landmarks. In addition, the Noatak River drainage is designated as a biosphere reserve by the United Nations.

The 1986 General Management Plan is currently being updated and will include a recommendation on whether eligible lands should be proposed for Wilderness designation.

2.1.2.1.2 Kobuk Valley National Park and Wilderness Area

Kobuk Valley was established as a National Monument by presidential proclamation in 1978 and re-designated as a 1.7-million acre National Park by ANILCA. The Park, located in northwest Alaska, encompasses the Baird Mountains in the north, the Kobuk Sand Dunes in the south, and the broad Kobuk River Valley in between (Figure 5). The southern boundary of the Park is 35 miles above the Arctic Circle. The Kobuk Valley National Park is home to Great Kobuk, Little Kobuk, and Hunt River Sand Dunes, which are the only active sand dunes within the Arctic Circle. ANILCA also designated 190,000 acres of the Park as Wilderness in the Central

Brooks Range, which contains the Onion Portage Archaeological District that contains documented evidence of our human habitation spanning more than 12,500 years.

The 1986 General Management Plan for Kobuk Valley National Park discusses proposed access studies that were conducted for mineral resource development proposals and states that requests for transportation ROW would be handled through the process outlined in ANILCA (discussed further in Section 2.1.1.4). The General Management Plan also noted that another 1.5 million acres of the Park were suitable for Wilderness and would be managed to protect the wilderness characteristics. No National Natural Landmarks have been designated in the Kobuk Valley National Park; however, three dunes are identified as potential National Natural Landmarks: the Great Kobuk Sand Dunes, Hunt River Dunes, and Little Kobuk Sand Dunes. These three clusters of dunes cover 25 square miles and constitute the largest active sand dunes within arctic latitudes.

2.1.2.1.3 Noatak National Preserve

The Noatak National Preserve consists of 6,569,904 acres, and is located just north of the Arctic Circle in the Western Brooks Range (Figure 7). This Preserve was established to protect the Noatak River Basin, which is a biosphere reserve, designated in 1976. Under this United Nations scientific program, the area's ecological and genetic components provide baseline data for measuring changes in ecosystems worldwide. The Preserve is the largest mountain-ringed river basin in the U.S. that is still virtually unaffected by human activities. ANILCA designated 5.8 million acres of the Preserve as Wilderness. The 1986 General Management Plan states that all of the remaining federal lands in the Preserve are eligible for Wilderness designation. No National Natural Landmarks have been designated in the Noatak National Preserve; however, 11 sites are identified as potential National Natural Landmarks.

2.1.2.1.4 Cape Krusenstern National Monument

Cape Krusenstern National Monument is an undeveloped Wilderness area along the coast of the Chukchi Sea (Figure 7). The Monument includes 659,807 acres of coastal plains, sizable lagoons, and limestone hills. The Monument was established to protect evidence of prehistoric populations to allow for study of early human migrations to the continent. The Monument lies within the boundaries of the Cape Krusenstern National Historic Landmark, established as an

archaeological district in 1973. ANILCA calls for management of the area to protect wildlife habitat as well as these cultural resources.

The 1986 General Management Plan for Cape Krusenstern National Monument identified 513,926 acres that were eligible for Wilderness designation. A 100-year road easement through the Monument was established by Congress in 1985 to allow for access to the Delong Mountain Transportation System (DMTS) port. The General Management Plan acknowledges the potential for mining development in Ambler and the possible need for a new transportation corridor through the Monument. No National Natural Landmarks have been designated in this National Monument; however, Cape Krusenstern and Igichuk Hills are identified as potential National Natural Landmarks.

2.1.2.1.5 Koyukuk National Wildlife Refuge and Wilderness Area

The Koyukuk NWR consists of 4.25 million acres along the Koyukuk River, with approximately 400,000 acres designated Wilderness (Figure 8). This refuge was established to protect waterfowl nesting and breeding habitat. About 80% of the NWR provides valuable wetlands nesting habitat for at least 250,000 waterfowl annually. The Koyukuk NWR lies within the Koyukuk River floodplain, in a basin that extends from the Yukon River to the Purcell Mountains and the foothills of the Brooks Range, and provides highly diverse habitat resulting from riverine erosion, deposition, flooding, wildfire, and topographical variation.

2.1.2.1.6 Selawik National Wildlife Refuge and Wilderness Area

The Selawik NWR was established to conserve the Western Arctic Caribou Herd (WACH), waterfowl, shorebirds, other migratory birds, salmon, and sheefish; to fulfill treaty obligations; to provide for continued subsistence uses; and to ensure necessary water quality and quantity to protect these species.

The 2.15-million acre Selawik NWR is situated on the Arctic Circle to the east of Kotzebue Sound, and occupies a unique variety of landforms in northwest Alaska (Figure 7). The refuge is bounded on the north by the Waring Mountains and Kobuk Valley National Park and to the south by the Selawik Hills and Purcell Mountains. Refuge lands extend eastward to the headwaters of the Selawik River and the continental divide. Approximately 240,000 acres of the Selawik NWR

are designated Wilderness Area. This Wilderness Area is located at the northern portion of the Wildlife Refuge and borders the Kobuk Valley Wilderness Area.

In 2006, the Selawik NWR was accepted as an observation site within a worldwide monitoring network, which was established to study the effects of climate change on high mountain environments. The network is known as the Global Observation Research Initiative in Alpine Environments. The purpose of the initiative is to establish and maintain a long-term observation network for the comparative study of the effects of climate change on mountain environments. The site was selected because of its diverse and highly specialized plant species.

2.1.2.1.7 Bering Land Bridge National Preserve

The Bering Land Bridge National Preserve is located on the Seward Peninsula in Northwest Alaska. The Preserve is a remnant of the land bridge that connected Alaska with North America more than 13,000 years ago (NPS, 2011a). The Bering Land Bridge National Preserve was established to preserve and protect arctic plant communities, volcanic lava flows, ash explosions, coastal formations, and other geologic processes (Figure 8). The Preserve protects habitat for fish and wildlife populations including significant populations of migratory birds, marine mammals, brown/grizzly bears, moose, and wolves. It also provides for archeological and paleontological study, as well as outdoor recreation and environmental education activities at Serpentine Hot Springs.

2.1.2.1.8 Nowitna National Wildlife Refuge

The Nowitna NWR is located approximately 200 miles west of Fairbanks in the central Yukon River Valley. The NWR encompasses forested lowlands, hills, lakes, marshes, ponds, and streams and was established to conserve trumpeter swans, other waterfowl and migratory birds, moose, caribou, martens, other furbearers, salmon, sheefish, and northern pike; to fulfill treaty obligations; to provide for continued subsistence uses; and to ensure necessary water quality and quantity (Figure 6).

2.1.2.1.9 Innoko National Wildlife Refuge and Wilderness Area

The Innoko NWR, located south and east of the Innoko River, encompasses approximately 3.85 million acres and has a designated Wilderness Area covering approximately 1.24 million

acres. Roughly 752,000 acres of the Innoko NWR are located within the project study area. This congressionally-mandated area includes much of the lower Iditarod River and many lakes and ponds. The Wilderness Area is located to the southeast of the Innoko River and is outside of the project study area (Figure 6). The Innoko NWR and Wilderness Area are managed primarily for its wilderness values.

2.1.2.1.10 Kanuti National Wildlife Refuge

The Kanuti NWR was established to conserve white-fronted geese, other waterfowl and migratory birds, moose, caribou, and furbearers; to fulfill treaty obligations; to provide for continued subsistence uses; and to ensure necessary water quality and quantity to protect these species (Figure 5).

2.1.2.2 Other Federal Lands

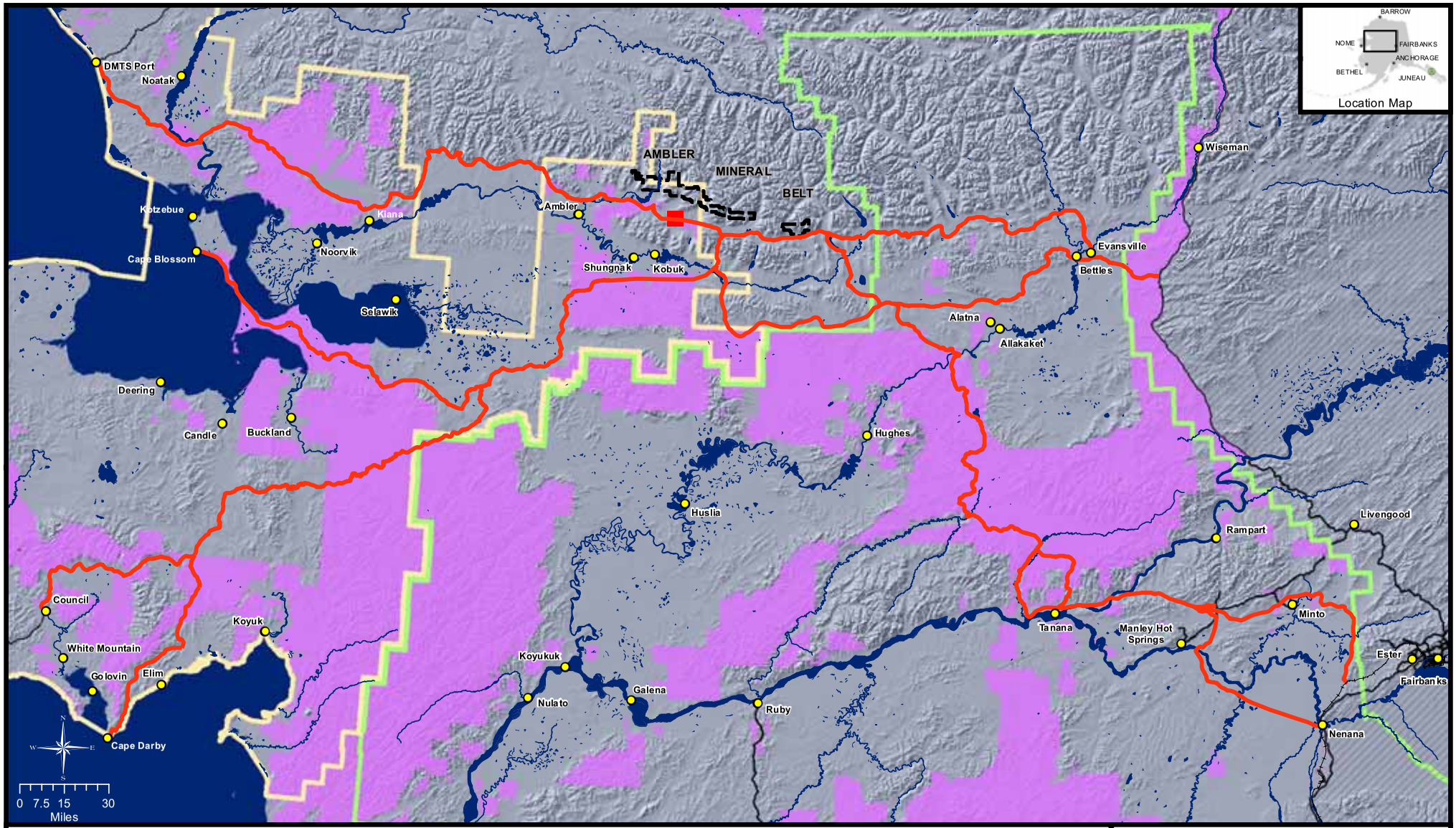
BLM manages other federal lands that have not been designated as parks, preserves, monuments, or refuges. BLM-managed areas account for 35% of the project study area. The Federal Land Policy and Management Act requires BLM to allow for multiple use while protecting the long-term productivity of the land and its renewable resources.

2.1.2.2.1 Kobuk-Seward Peninsula

Federal lands managed by BLM on the Seward Peninsula and in the Kobuk area are addressed under a Resource Management Plan (RMP) completed in 2006 (Figure 10). The RMP provides guidance for the management of land use on 12 million acres of land managed by the BLM, including lands that have been selected by Native corporations and the state. The 2006 RMP calls for balancing the use and protection of resources. It opens much of the planning area to mineral entry and location, but also implements constraints to protect resources. Six Areas of Critical Environmental Concern (ACEC) were established as well as two Special Recreation Management Areas. The ACECs were designated to protect specific natural, cultural, and/or scenic resources and are described in more detail in Section 2.3.1.4.

2.1.2.2.2 Central Yukon

BLM-managed lands east of the Kobuk-Seward Peninsula planning area are covered in the Central Yukon RMP (Figure 10). This RMP opened mineral development on 93-96% of lands



Sources:
Land Ownership: DNR
Native Corporation Boundary: DNR
Kobuk-Seward Peninsula RMP:BLM KSPRMP EIS
Central Yukon RMP: Central Yukon RMP

Coordinate System: NAD 1983 Alaska Albers

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BLM RMP AREAS

DATE: May 13, 2011 | **Figure 10**

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covered by the plan, limiting mining on areas with sensitive resource values or where impacts could not be mitigated (BLM, 1986). It designated critical habitats and established ACECs to protect natural resource values of sensitive areas. The RMP allows for appropriate access as needed to accomplish the management goals and for stipulating mitigation measures for such access. Access by vehicles of more than 1-500-pounds gross vehicle weight are required to get authorization and are limited to winter access unless in feasible, specialized equipment such as low-ground-pressure vehicles are used, or existing trails can be used without damage.

2.1.2.3 Key Federal Transportation Laws

Two key transportation laws may affect development of access within the project study area: Revised Statute (RS) 2477 and Title XI of ANILCA.

Title XI of ANILCA addresses transportation and utility access into and across the CSUs established by the Act. ANILCA Title XI acknowledged the largely undeveloped status of Alaska's transportation system and the need for future access. It established a single comprehensive statutory authority for the approval or disapproval of access applications.

More specifically, while establishing the Gates of the Arctic National Park and Preserve, ANILCA Title II, Section 201(4) addressed the need for access across the Western Unit of the Preserve from the Ambler mineral belt to the Dalton Highway. In lieu of an Environmental Impact Statement (EIS) on the proposed access, ANILCA calls for the Secretaries of Interior and Transportation to jointly prepare an economic and environmental analysis to determine the most desirable route, and the terms and conditions required for issuance of the ROW. A draft analysis must be provided within 180 days of application and the final must be completed within one year. The Secretaries must agree upon a route within 60 days from analysis completion.

The Secretaries' analysis must consider economically-feasible and prudent alternative routes across the Preserve resulting in fewer or less severe impacts, and identify measures to avoid or minimize negative impacts and enhance positive impacts.

Another law that affects transportation rights is RS2477. RS2477 is contained in the Mining Law of 1866, and grants a public ROW across unreserved federal land for transportation purposes. A route must have been constructed or used when the land was unreserved federal

land to qualify as an RS2477 ROW. DNR has identified over 600 routes in Alaska that qualify as a possible RS2477 ROW. Many RS2477 ROWs are located within the study area, and the proposed corridors intersect and/or follow some RS2477 routes (Figure 11).

2.1.3 State Lands

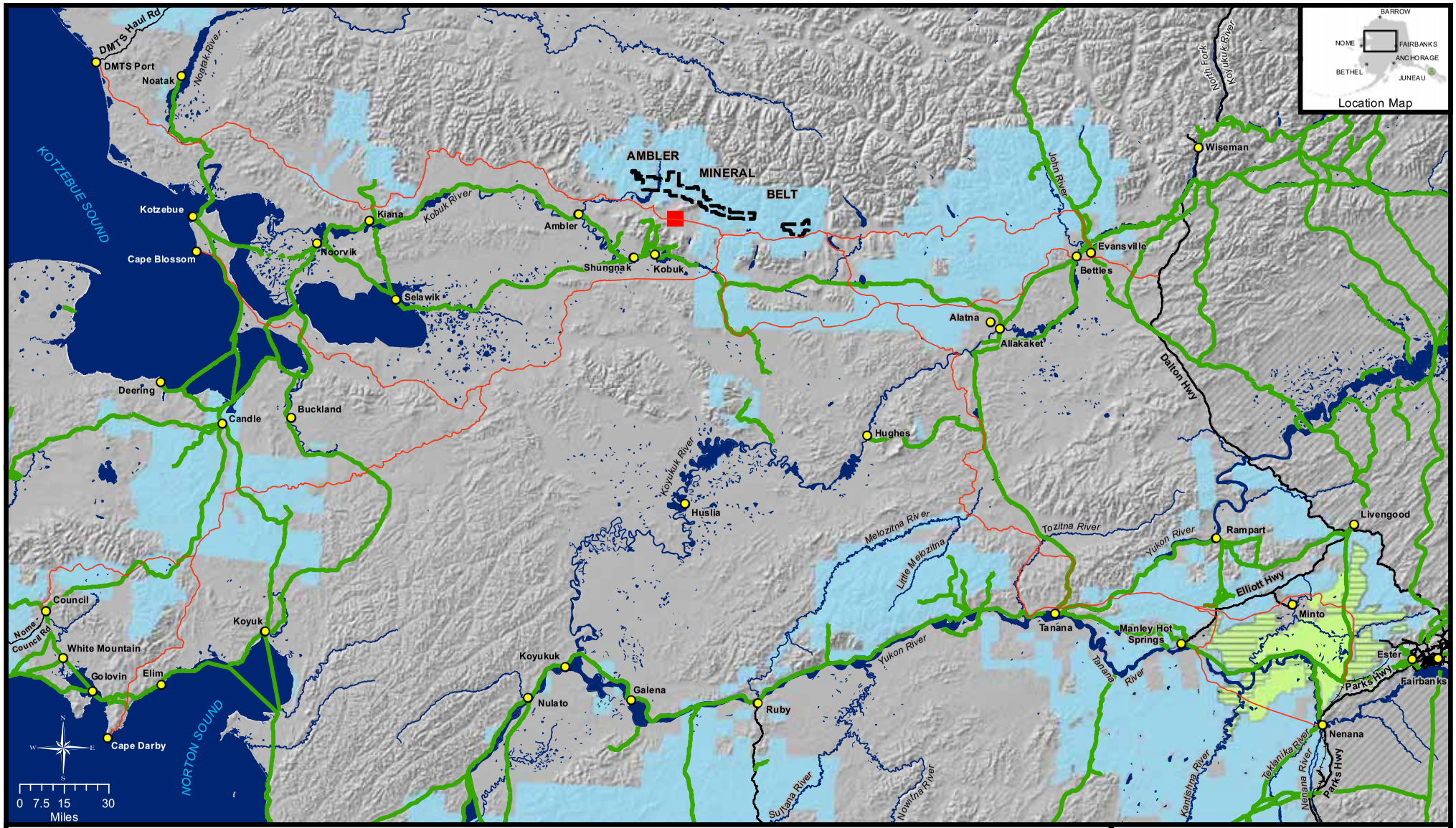
State lands in the area are primarily undesignated, expecting those associated with the Tanana Valley State Forest and the Minto Flats State Game Refuge in the southeastern portion of the project study area (Figure 11).

2.1.3.1 Area Plans

Undesignated state lands are managed for multiple uses, and area land use plans for state lands provide guidelines to allow a variety of uses to occur without causing unacceptable adverse effects. The Northwest Area Plan covers state lands in the western portion of the project study area (DNR, 1989/amended 2005) and the Tanana Basin Area Plan covers some lands in the eastern portion of the study area (DNR, 1991). The state is updating the Tanana Basin Area Plan and developing a Yukon/Tanana Area Plan that will cover additional state lands in the eastern portion of the study area (DNR, in process).

The Northwest Area Plan designates primary and secondary land uses for state lands with a goal of providing for multiple uses on the lands. The Area Plan recognizes the importance of local harvest of fish and wildlife from state lands, but also provides for mining activities except near seabird rookeries and sheefish spawning areas (DNR, 1991). A 2005 amendment to the Plan reclassified some state lands that were designated habitat to settlement and public recreation to allow the NWAB's land entitlements under the Municipal Entitlement Act to be resolved (DNR, 2005). The 1991 Plan identifies a possible western access corridor from Prospect to Kougarok Road.

Subregion 2 of the Tanana Basin Area Plan covers the area west of the Fairbanks North Star Borough and east of the city of Tanana. This area is more accessible than most state lands and contains a number of trails and mining roads. Primary surface uses identified for state lands in this area include wildlife habitat, agriculture, forestry, public recreation and settlement (DNR, 1991). The Plan specifically references a rail corridor from Nenana to Tanana as a potential future transportation improvement in the area.



Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mining District
Preliminary Corridors
Proposed Staging Area
RS2477 Routes
Tanana Valley State Forest
Minto Flats State Game Preserve
Other State Lands

Sources:
RS2477 Routes: DNR

Coordinate System: NAD 1983 Alaska Albers

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STATE LANDS AND RS2477 RIGHTS-OF-WAY

DATE: May 13, 2011 | **Figure 11**

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2.1.3.2 Tanana Valley State Forest

The Tanana Valley State Forest was established in 1983. State forests are managed for multiple uses, and to provide for the production, use, and replenishment of timber resources. The Tanana Valley State Forest Management Plan sets management goals for the forest and outlines how proposed uses and activities within the forest will be reviewed. The Plan's general management policies for access call for coordinating access needs with the State of Alaska Department of Transportation and Public Facilities (DOT&PF). The Plan allows public access on public roads in the forest where feasible, but recognizes that access may be restricted at times to allow special uses, prevent environmental impacts, or protect public safety. The Plan's policies on subsurface minerals include aiding in the development of infrastructure for mining development. Provisions for the conversion of trails into roads are addressed, and actions incompatible with construction of potential transportation routes through the forest, such as the western access railroad corridor, are to be avoided.

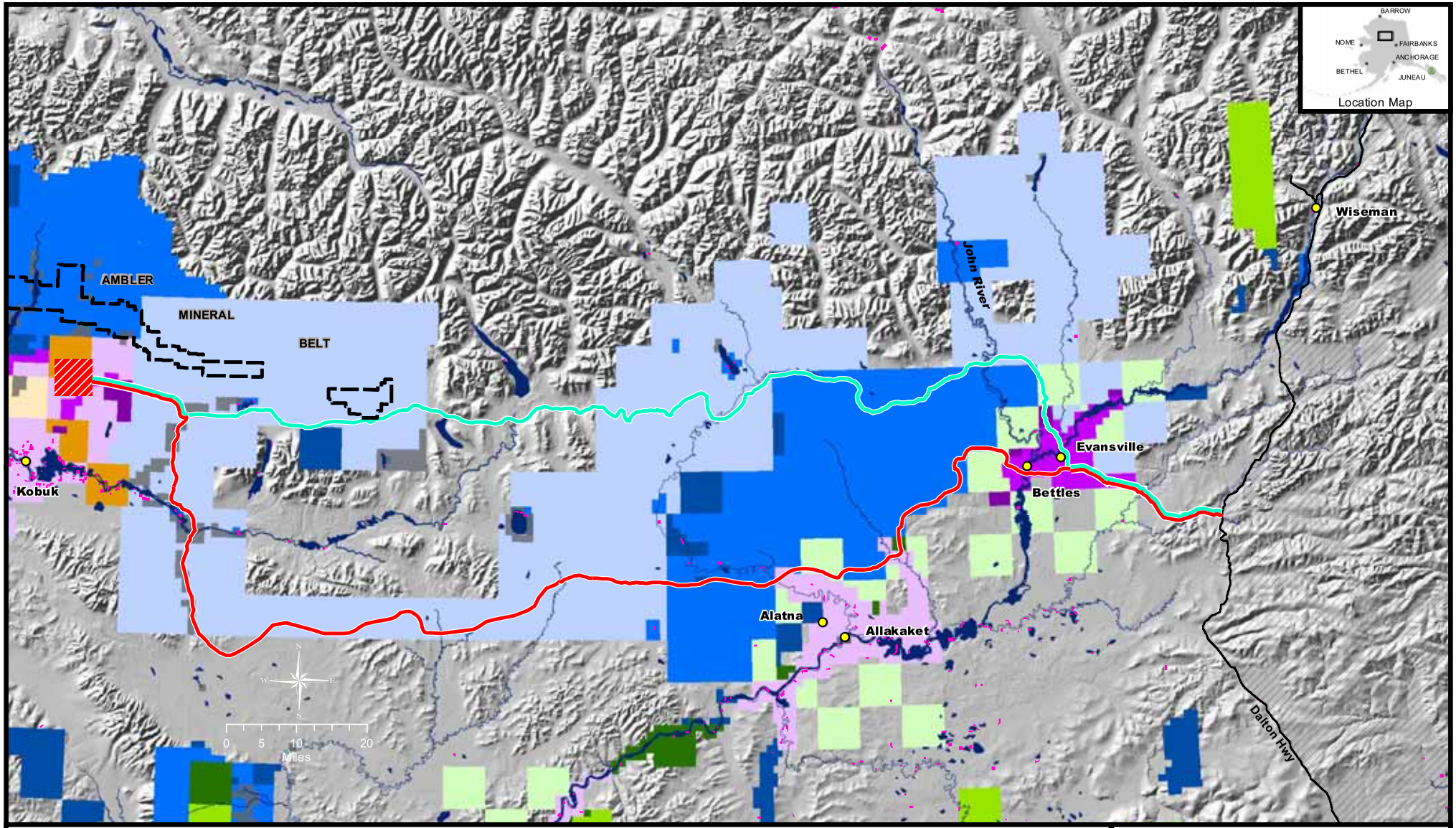
The Tanana Valley State Forest identifies two Research Natural Areas (RNA) located within its boundaries: the Oblique Lakes and Caribou Crossing RNAs. For more information on these sites see Section 2.3.3 and Table 2-3.

2.1.4 Native Lands

Native lands in the area include lands owned by the regional corporations, and village corporations, as well as individual Native allotments. All Native lands are treated as private lands. Figures 12 through 15 illustrate the current status of Native lands in the project study area.

Native allotments are concentrated along river corridors and near lakes throughout the study area. As mentioned previously, Native allotments are owned by individuals, but acquisition of these parcels requires review by the BIA and Secretary of the Interior.

The study area also includes lands owned by three Alaska Native regional corporations, established under the ANCSA: Bering Straits Native Corporation, Northwest Arctic Native Association (NANA), and Doyon Limited.



Communities and Place Names
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Proposed Staging Area

1-Brooks East Corridor 216 Miles (Road Only)
2-Kanuti Flats Corridor 241 Miles (Road Only)
Native Allotments
Private or Municipal

Village Corporation Lands
Selected
Interim Conveyed
Patented

NANA Regional Corporation Lands
Selected
Interim Conveyed
Patented

Doyon Limited Lands
Selected
Interim Conveyed
Patented

State Lands
Selected
Tentative Approved
Patented

Sources:
Regional Lands: BLM
Village Lands: BLM
State Lands: BLM
Native Allotments: BLM
Private or Municipal Lands: DNR

Coordinate System: NAD 1983 Alaska Albers

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STATE & NATIVE LAND STATUS
EAST CORRIDORS

DATE: May 13, 2011 | **Figure 12**

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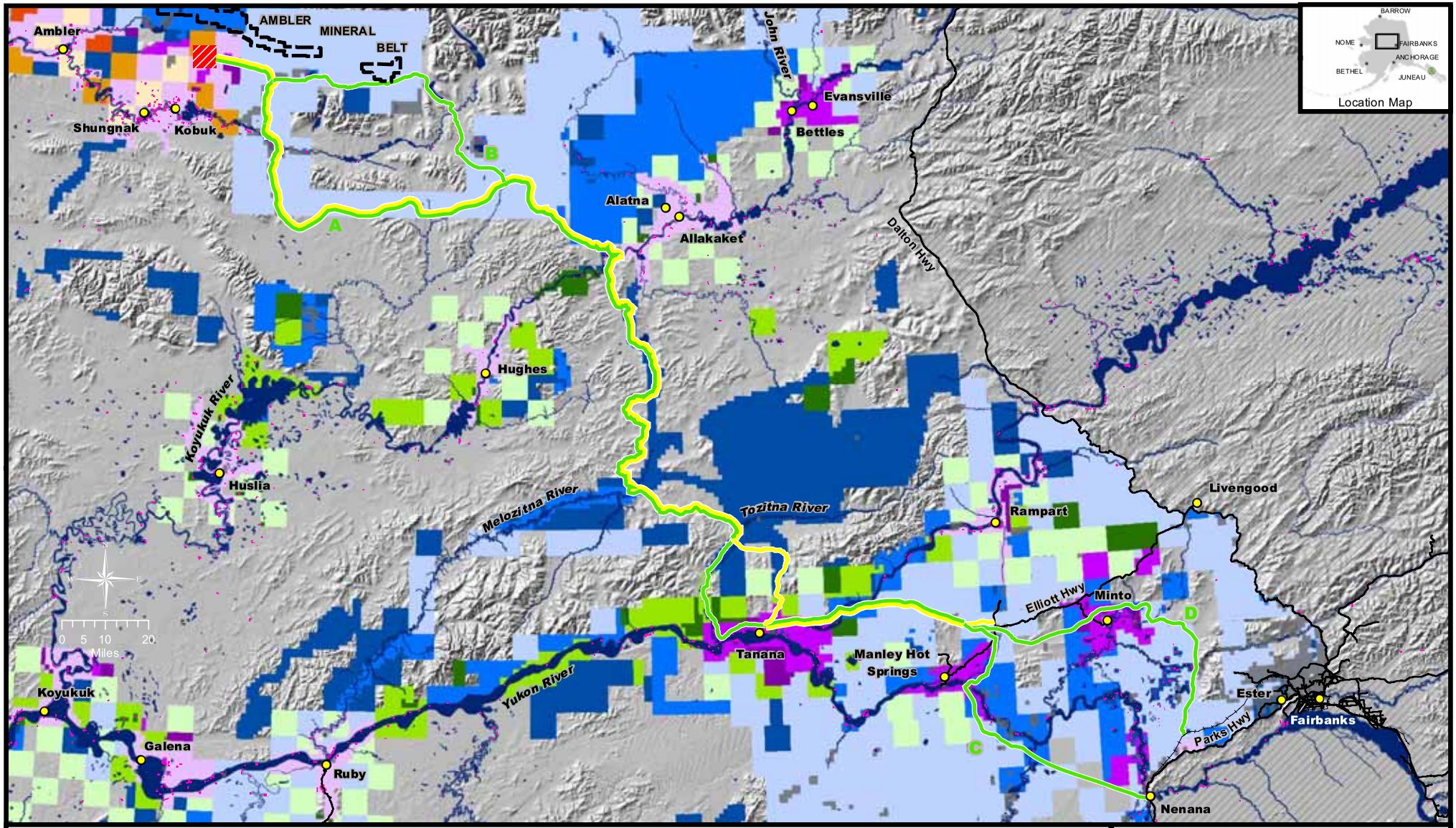

Communities and Place Names
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Proposed Staging Area

3-Elliott Hwy Corridor 365 Miles (Road Only)
4-Parks Hwy RR Corridor 420-450 Miles (Rail Only)
Native Allotments
Private or Municipal Lands

Village Corporation Lands
Selected
Interim Conveyed
Patented

NANA Regional Corporation Lands
Selected
Interim Conveyed
Patented

Doyon Limited Lands
Selected
Interim Conveyed
Patented

State Lands
Selected
Tentative Approved
Patented

Sources:
Regional Lands: BLM
Village Lands: BLM
State Lands: BLM
Native Allotments: BLM
Private or Municipal Lands: DNR

Coordinate System: NAD 1983 Alaska Albers

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STATE & NATIVE LAND STATUS
SOUTHEAST CORRIDORS

DATE: May 13, 2011 | **Figure 13**

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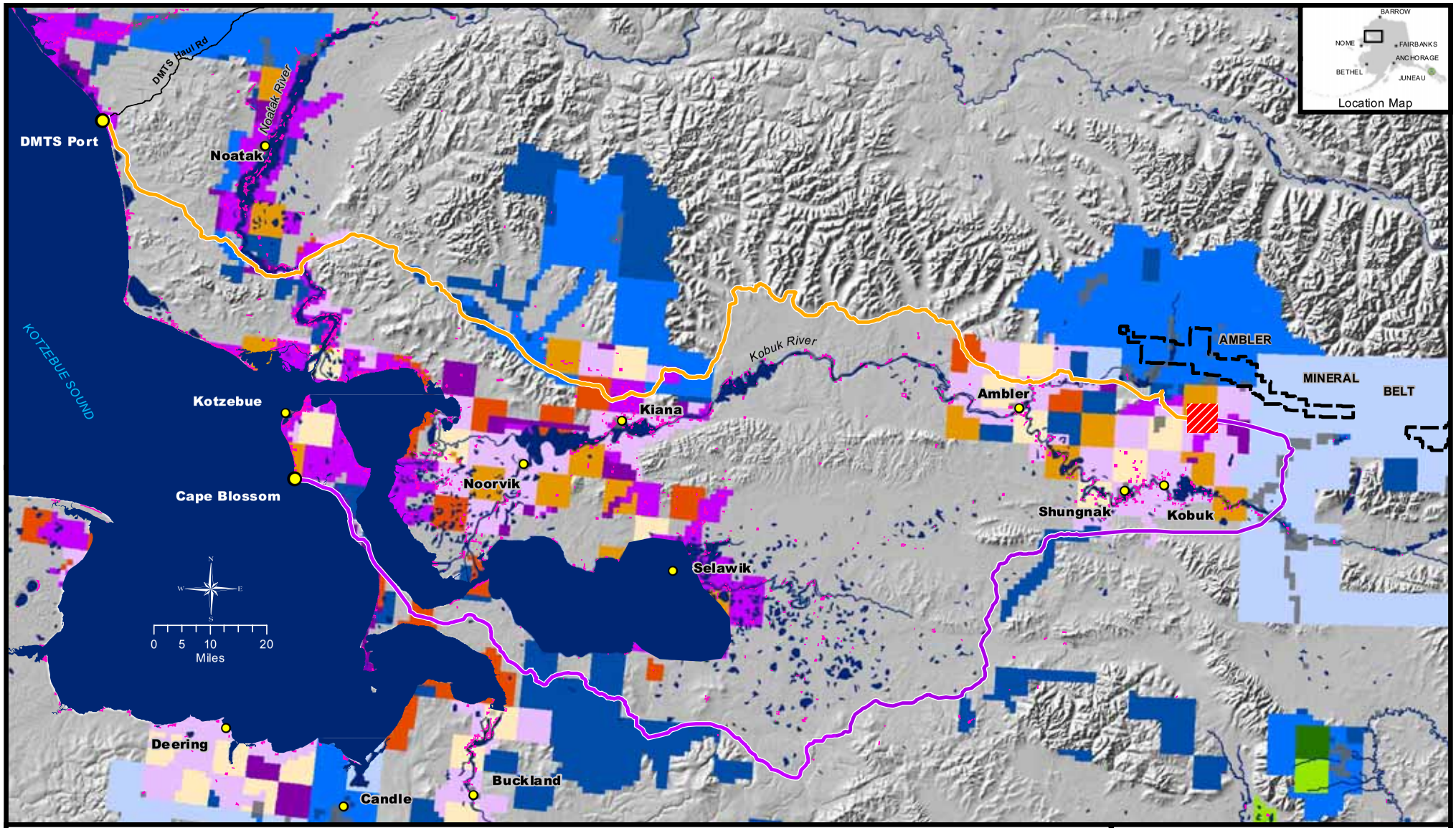

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STATE & NATIVE LAND STATUS
WEST CORRIDORS

DATE: May 13, 2011 | **Figure 14**

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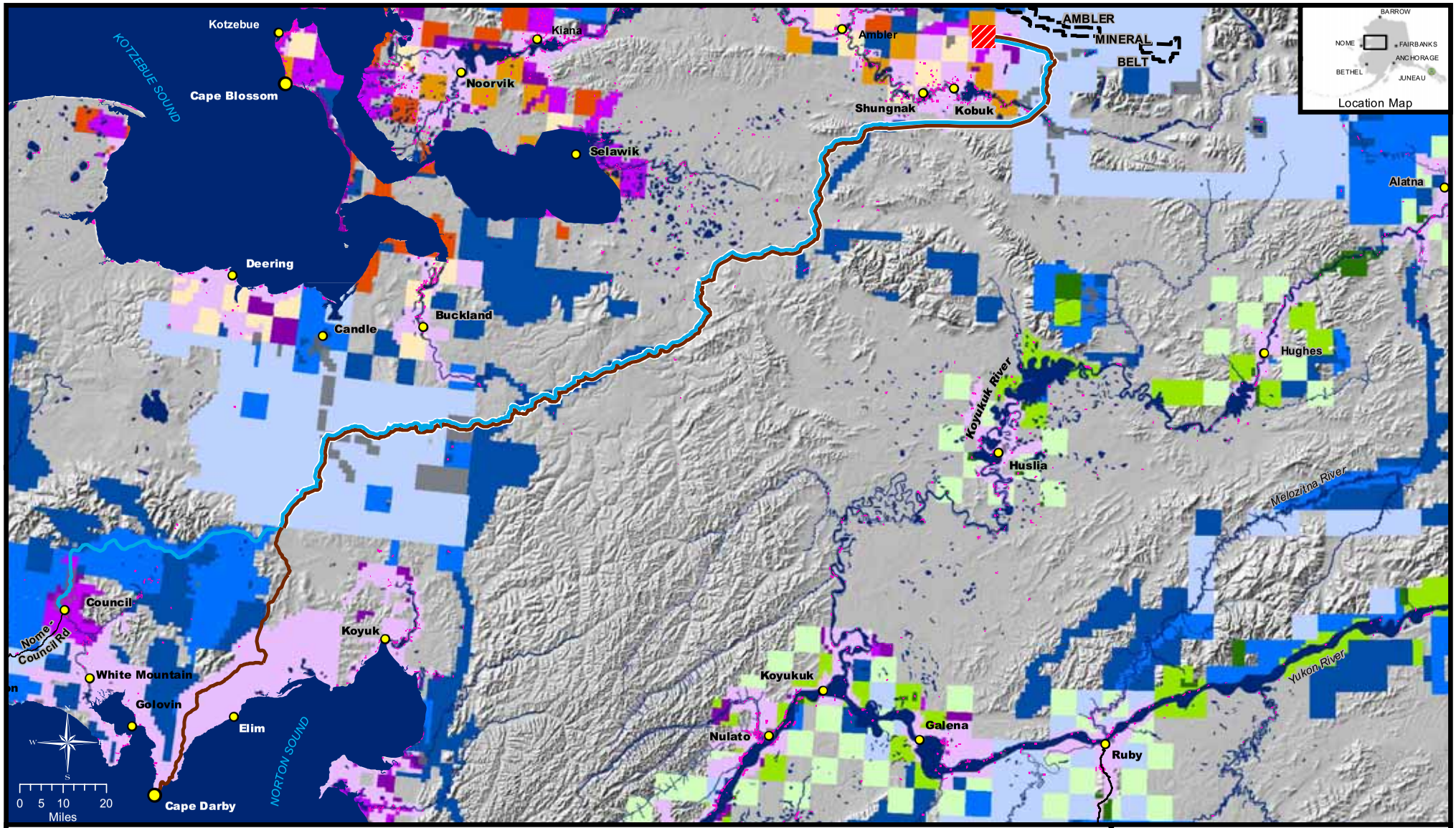

Communities and Place Names
Existing Roads
Water
Ambler Mineral Belt
Proposed Staging Area
7-Selawik Flats Corridor 331 Miles (Road & Rail)
8-Cape Darby Corridor 340 Miles (Road & Rail)
Native Allotments
Private or Municipal Lands

Village Corporation Lands: Selected; Interim Conveyed; Patented
NANA Regional Corporation Lands: Selected; Interim Conveyed; Patented
Doyon Limited Lands: Selected; Interim Conveyed; Patented
State Lands: Selected; Tentative Approved; Patented

Sources:
Regional Lands: BLM
Village Lands: BLM
State Lands: BLM
Native Allotments: BLM
Private or Municipal Lands: DNR

Coordinate System: NAD 1983 Alaska Albers

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STATE & NATIVE LAND STATUS
SOUTHWEST CORRIDORS

DATE: May 19, 2011 | **Figure 15**

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In the northwestern portion of the study area, most ANCSA village corporations have unified with NANA, the regional corporation. Although the village corporations have merged with NANA, the village land selections are tracked separately by BLM (Figure 14).

The Bering Straits Native Corporation encompasses the southwest portion of the study area, which also contains several ANCSA village corporations (Figure 15).

In the eastern portion of the study area, Doyon Limited is the regional corporation with several village corporations associated with the communities in this region (Figures 12 and 13).

2.1.5 Other Private Lands

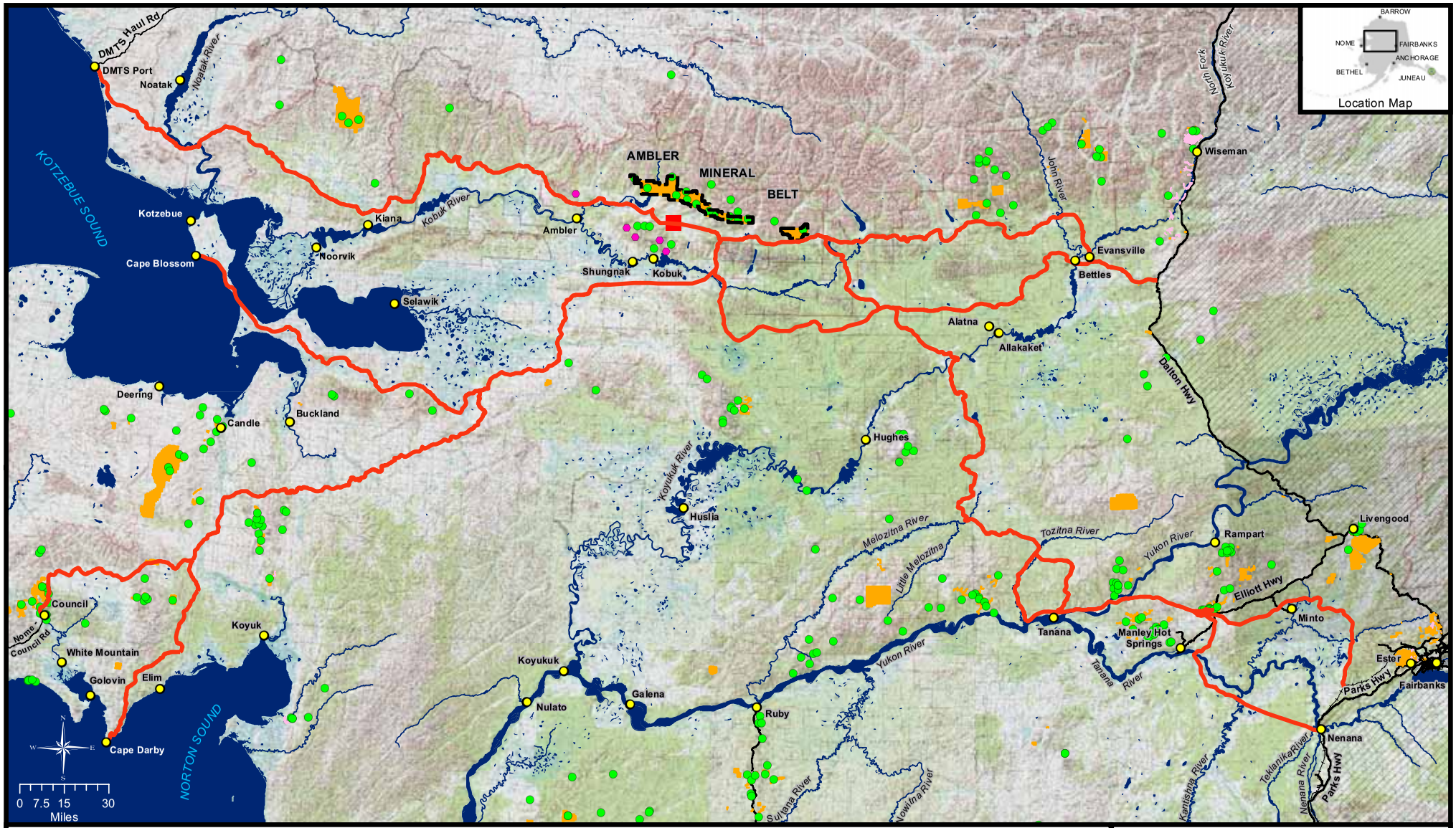
DNR land records indicate there are also other parcels of private land scattered throughout the project study area totaling almost 838,000 acres (Figures 12 through 15).

2.1.5.1 Mining Claims

The project study area has extensive mineral resources, particularly in the Ambler mineral belt (Figures 16 through 20). Major mineral resources in this area are copper, lead and zinc, but silver, gold, cobalt and germanium are also present in this area (Hawley and Vant, 2009).

The state has a mineral policy that encourages responsible development of mineral resources to support the state economy (Alaska Statute AS 44.99.110; Alaska Minerals Commission, 2004). The state mineral policy requires mineral exploration and development to be considered as part of the state's multiple use management policy for state lands and in the development of the statewide transportation system. The state-established Alaska Minerals Commission makes annual recommendations on increasing mineral production. The lack of transportation infrastructure has been cited for many years as a major impediment to development of mineral resources, and transportation to the Ambler mineral belt was cited as one of the top five recommendations in the Commission's 2010 report (Alaska Minerals Commission, 2010).

Mining claims grant the holder an exclusive right to locatable minerals (base and/or precious metals and uncommon rocks) in the claim area. Mining claims do not give rights to the sand and gravel resources that may be on the claim. Both federal and state mining claims exist in the project study area, including almost 1,700 federal mining claims mostly clustered around the



Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Preliminary Corridors
Proposed Staging Area
Mineral Occurrences
Naturally Occuring Asbestos
Federal Mining Claims
State Mining Claims

Sources:
Federal Mining Claims: BLM
State Mining Claims:DNR
Mineral Occurrences: Report on Minerals - C.C. Hawley & M.K. Vant, February 2009

Coordinate System: NAD 1983 Alaska Albers

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AMBLER MINING DISTRICT ACCESS ENVIRONMENTAL OVERVIEW MEMORANDUM

MINING CLAIMS AND MINERAL OCCURRENCES

DATE: May 13, 2011 | **Figure 16**

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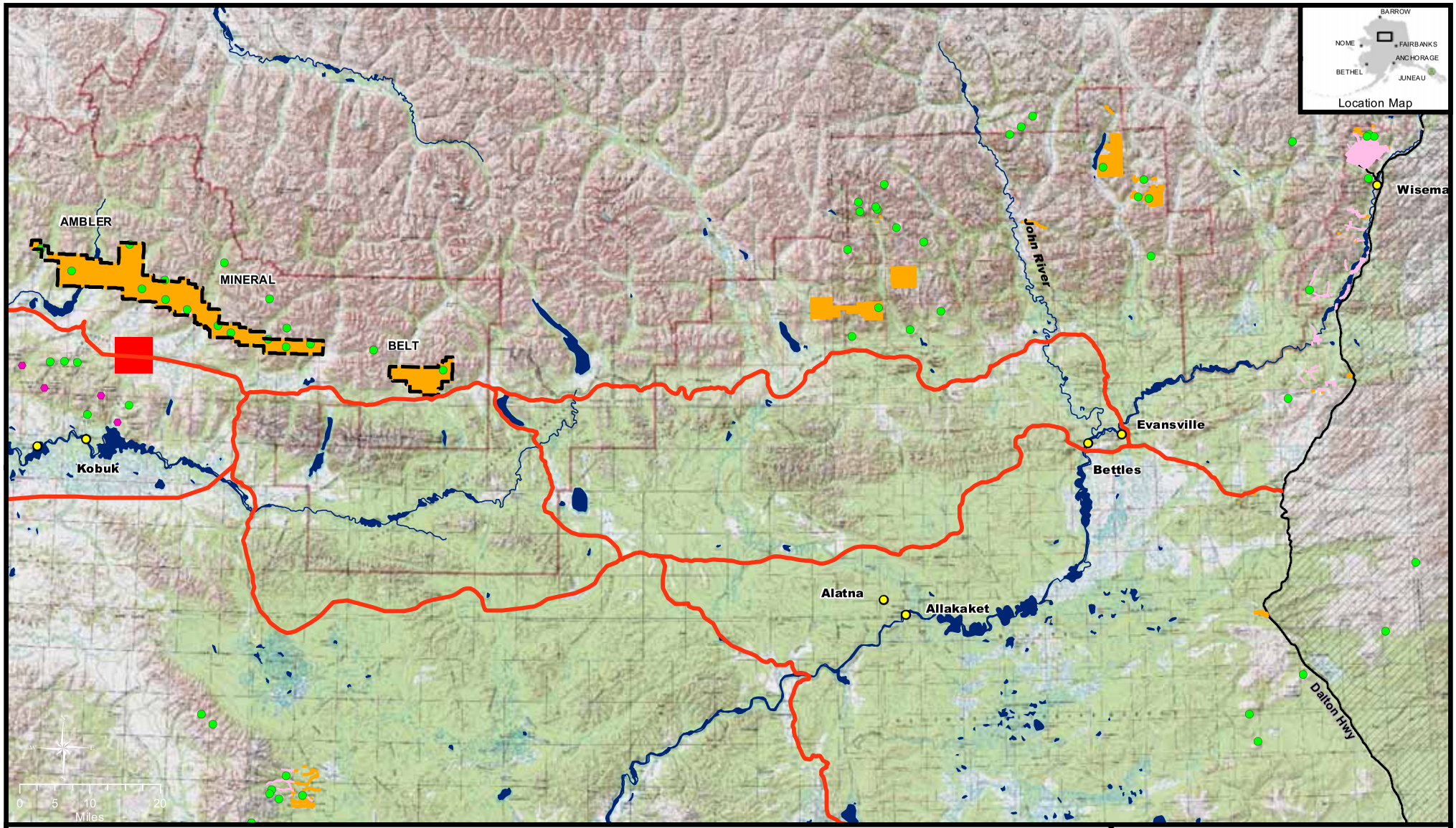

Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Preliminary Corridors
Proposed Staging Area
Mineral Occurrences
Naturally Occuring Asbestos
Federal Mining Claims
State Mining Claims

Sources:
Federal Mining Claims: BLM
State Mining Claims:DNR
Mineral Occurrences: Report on Minerals - C.C. Hawley & M.K. Vant, February 2009

Coordinate System: NAD 1983 Alaska Albers

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MINING CLAIMS AND MINERAL OCCURRENCES
EAST CORRIDORS

DATE: May 13, 2011 | **Figure 17**

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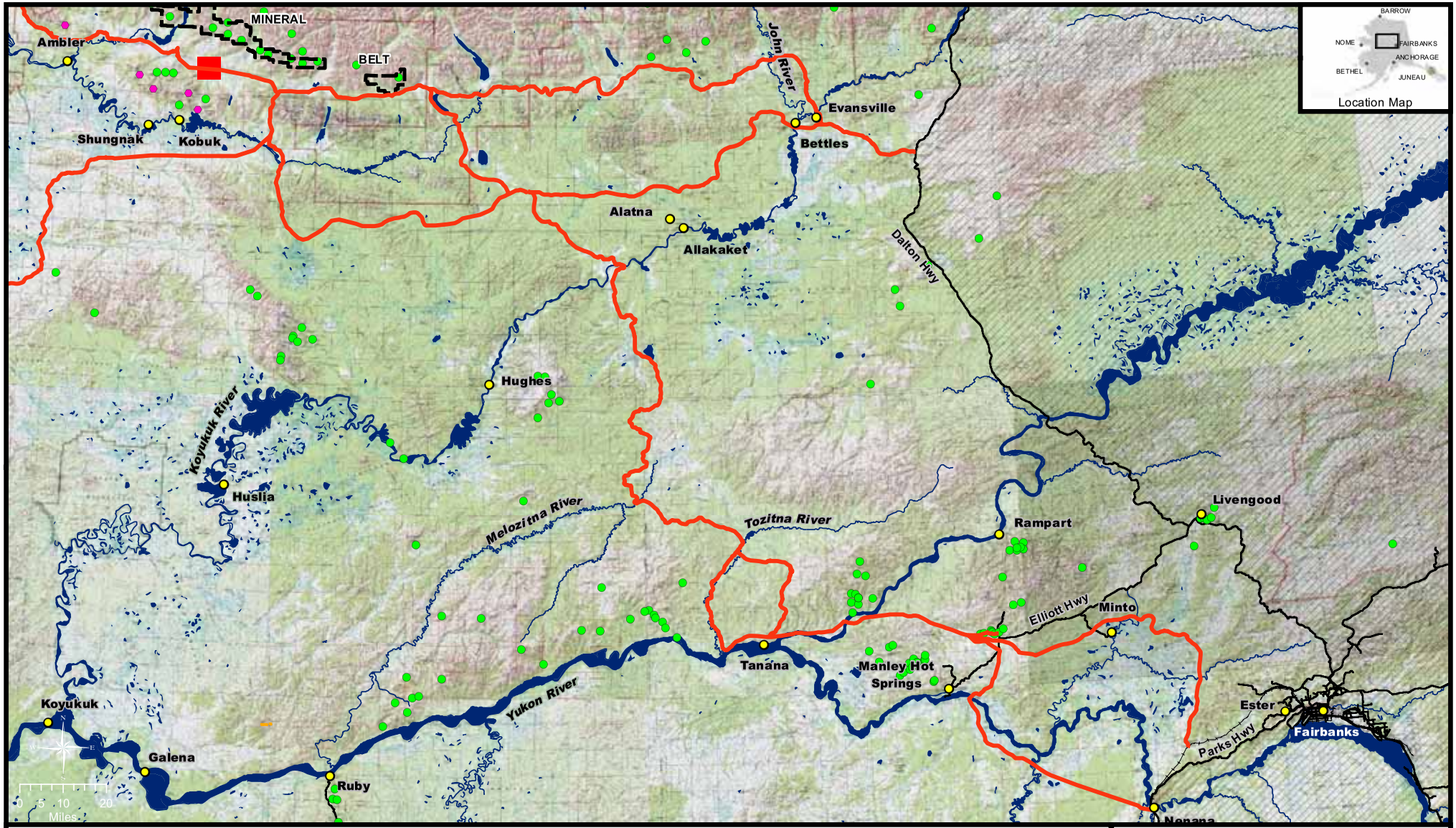

Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Preliminary Corridors
Proposed Staging Area
Mineral Occurrences
Naturally Occuring Asbestos
Federal Mining Claims
State Mining Claims

Sources:
Federal Mining Claims: BLM
State Mining Claims:DNR
Mineral Occurrence: Report on Minerals - C.C. Hawley & M.K. Vant, February 2009

Coordinate System: NAD 1983 Alaska Albers

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MINING CLAIMS AND MINERAL OCCURRENCES
SOUTHEAST CORRIDORS

DATE: May 24, 2011 | **Figure 18**

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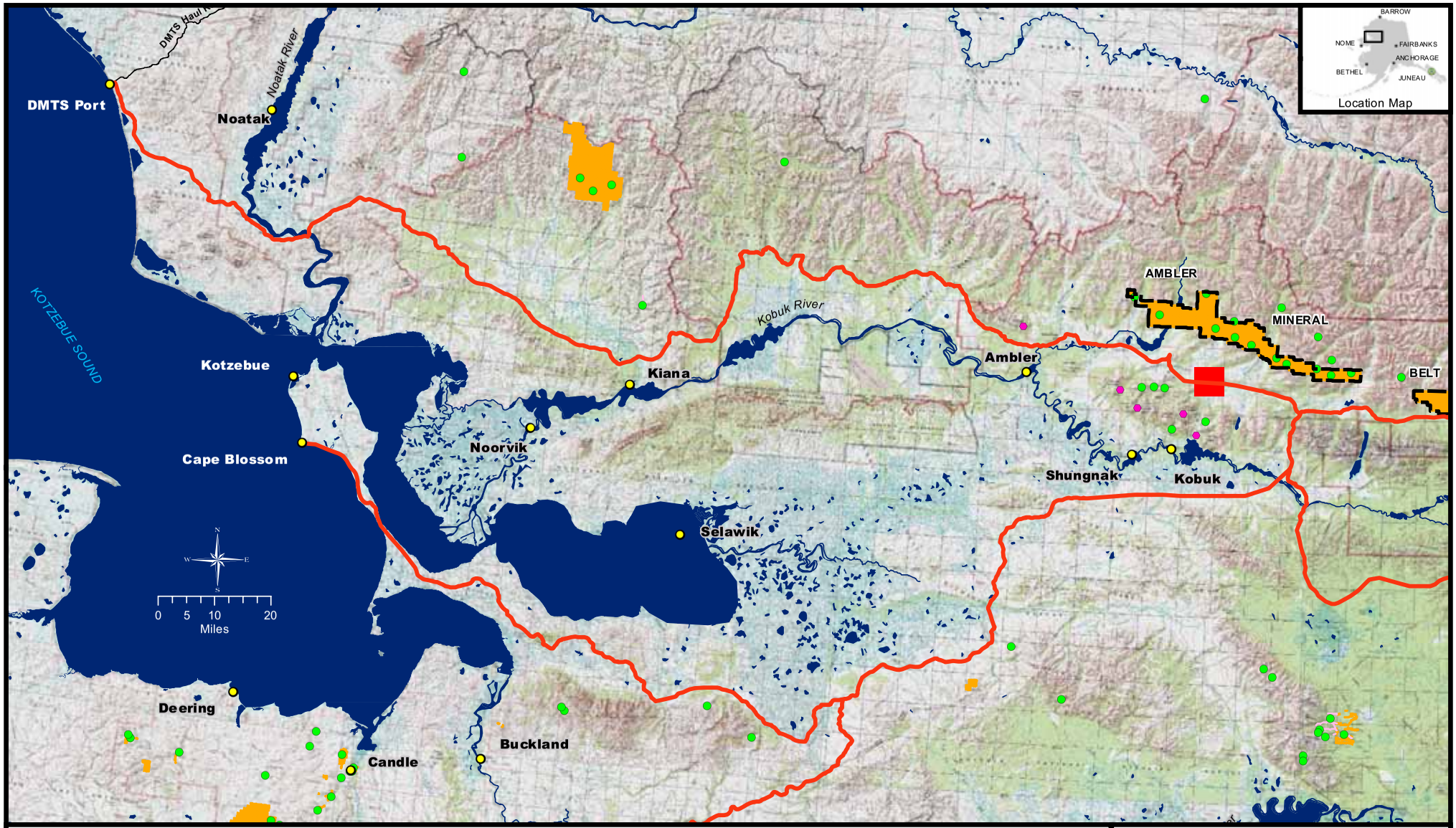

Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Preliminary Corridors
Proposed Staging Area
Mineral Occurrences
Naturally Occuring Asbestos
Federal Mining Claims
State Mining Claims

Sources:
Federal Mining Claims: BLM
State Mining Claims:DNR
Mineral Occurrences: Report on Minerals - C.C. Hawley & M.K. Vant, February 2009

Coordinate System: NAD 1983 Alaska Albers

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MINING CLAIMS AND MINERAL OCCURRENCES
WEST CORRIDORS

DATE: May 13, 2011 | **Figure 19**

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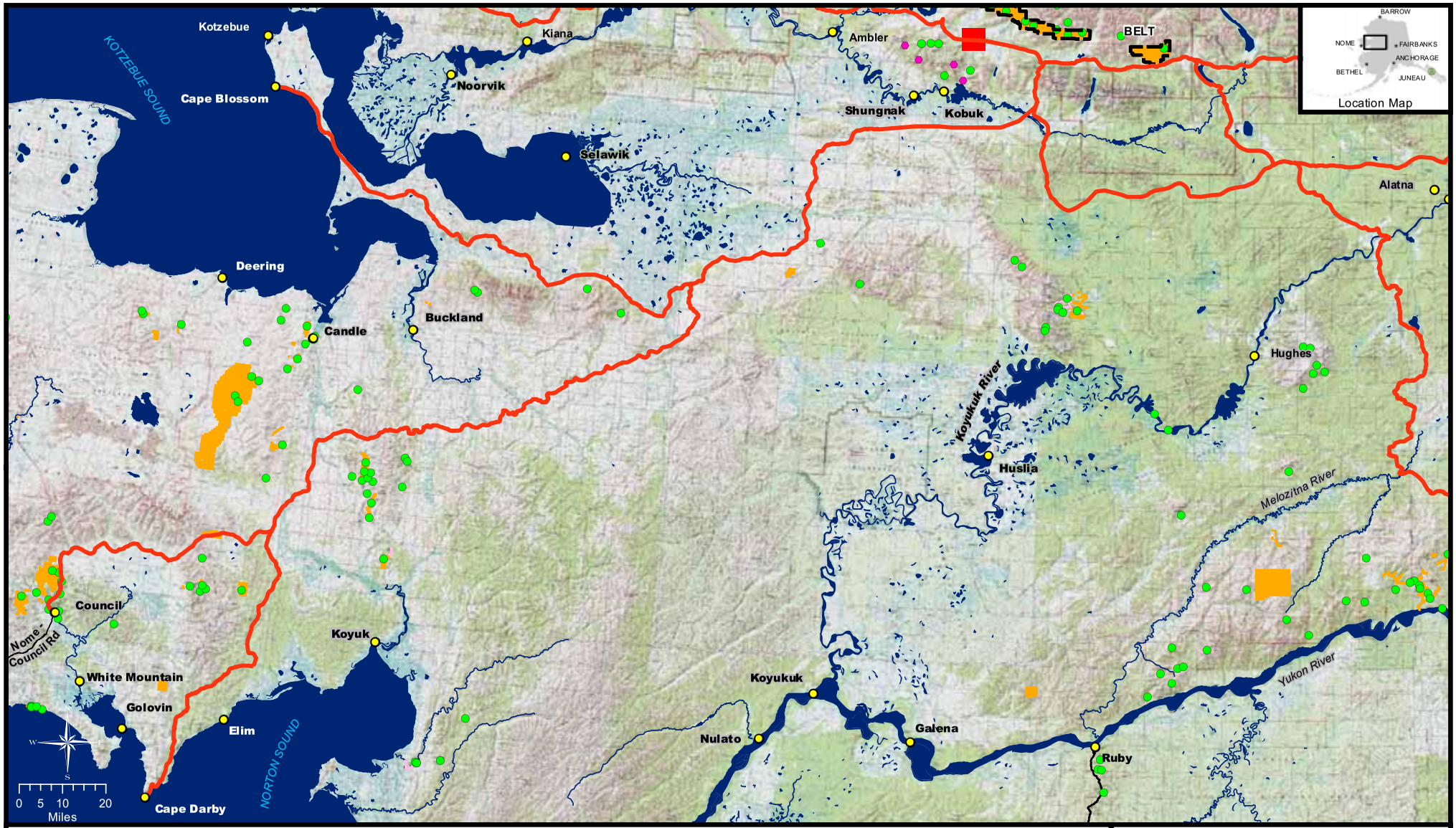

Sources:
Federal Mining Claims: BLM
State Mining Claims:DNR
Mineral Occurrences: Report on Minerals - C.C. Hawley & M.K. Vant, February 2009

Coordinate System: NAD 1983 Alaska Albers

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MINING CLAIMS AND MINERAL OCCURRENCES
SOUTHWEST CORRIDORS

DATE: May 13, 2011 | **Figure 20**

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Dalton Highway near Wiseman, and more than 6,800 state mining claims (Figure 17). Mining claims do not allow the claimant to restrict access to public lands.

2.1.6 Municipal Governance

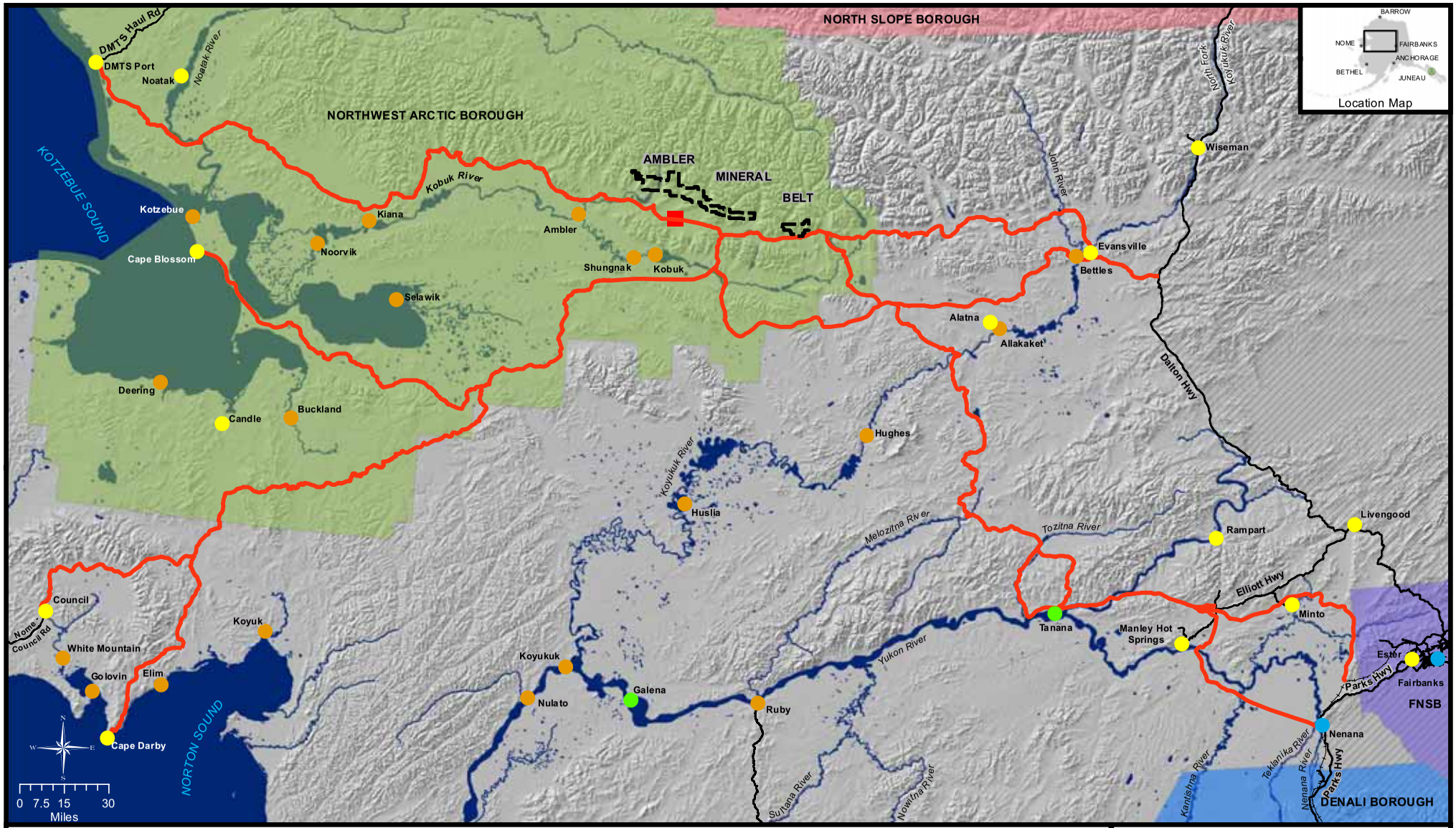
The western portion of the study area is located in the NWAB, a first-class borough under AS 29 (Figure 21). The North Slope Borough lies to the north of the study area, and the Fairbanks North Star Borough and the Denali Borough lie to the southeast and south of the study area, respectively. Most of the study area is located outside of organized boroughs. Several second-class cities are located within the project study area, as well as two first-class cities (Galena and Tanana) and one home rule city (Nenana). Tribal governments have also been established in most of the study area communities.

As a first-class borough, the NWAB provides planning, platting and land use regulation for all borough areas (including within cities). The borough is currently setting up planning committees in each of its communities to provide input to the borough Planning Commission on land use issues. First-class cities and home rule cities outside an organized borough are required to regulate land use within their boundaries. Second-class cities located outside an organized borough have the ability to control planning, platting, and land use regulation within their boundaries, but are not required to do so.

2.2 Subsistence Use Areas

State and federal law define subsistence as the "customary and traditional uses" of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade. Subsistence hunting and fishing are important sources of employment and nutrition in almost all rural communities, and the opportunity for a subsistence lifestyle is guaranteed for all rural residents by ANILCA. However, subsistence also defines important cultural values in terms of the harvest, processing, distribution, and consumption in a traditional way that cannot be separated from other aspects of the Alaska Native culture.

Subsistence use occurs throughout the project study area, and is considered one of the highest land use and economic priorities by most boroughs and residents in northern and northwest Alaska. DOT&PF intends to conduct a separate, more detailed research and data gap analysis



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COMMUNITIES AND BOROUGHS

DATE: May 13, 2011 | **Figure 21**

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for subsistence use within the project study area. The following provides a broad overview of subsistence use areas, as outlined in several state and federal documents that cover the project study area.

The NWAB has designated expansive subsistence use areas within the western portion of the project study area under the Alaska Coastal Management Program (Alaska Administrative Code 11 AAC 114.250(g)). Subsistence use areas are designated for bowhead whale, polar bear, other marine mammals (seals, walrus, and beluga whale), large game (sheep, moose, caribou, and bear), small game, furbearers, salmon, other fish and marine invertebrates, and waterfowl and egg gathering. In addition, the NWAB designated 17 specific geographic areas as especially critical for subsistence. The NWAB subsistence use designation includes only nonfederal lands and waters.

The areas are:

1. Sisoalik Spit Subsistence Use Area
2. Kobuk-Selawik Lakes Subsistence Use Area
3. Cape Espenberg/Goodhope River Subsistence Use Area
4. Kobuk River Delta Subsistence Use Area
5. Selawik River Delta Subsistence Use Area
6. Maniilaq River/Ambler Lowlands Subsistence Use Area
7. Inmachuk River Subsistence Use Area
8. Lower Buckland River Subsistence Use Area
9. North Fork Squirrel River/Omar River Subsistence Use Area
10. North Kivalina Coast Subsistence Use Area
11. Onion Portage Subsistence Use Area
12. Eschscholtz Bay Subsistence Use Area
13. Elephant Point/Choris Peninsula Subsistence Use Area
14. Kobuk River Sheefish/Chum Salmon/Whitefish Subsistence Use Area
15. Wulik River Subsistence Use Area
16. Noatak River Subsistence Use Area
17. Upper Kivalina River Subsistence Use Area

The two BLM RMPs that cover the project study area (the Kobuk-Seward Peninsula RMP and the Central Yukon RMP) also include subsistence use maps that indicate areas considered to be important to local villages. The BLM Kobuk-Seward RMP notes that during their EIS scoping process, they received many comments identifying locally important subsistence use areas such as the headwaters of the Koyuk, Ungalik, and Inglutalik rivers; Nulato Hills; and Norton Bay (BLM, 2006). Norton Bay was also identified as an important subsistence area on a statewide level, because it supports fish and wildlife resources that migrate to other areas of the state. In general, the highest subsistence use areas were selected by Native corporations to protect those lands; however, all federal lands outside of Native corporation boundaries in the Nulato Hills are also important for subsistence use (BLM, 2006).

2.3 Special Management and Habitat Protection Areas

The state and federal government have established a number of special management designations for their lands. Special management areas have regulations in place to protect wildlife, wildlife habitat, and wilderness areas. The Alaska Department of Fish and Game (ADF&G), NPS, and BLM all manage game species and important habitats within the project study area. Special management and habitat protection areas in the project study area are designated in the Kobuk-Seward Peninsula RMP, the Utility Corridor Proposed RMP, the Minto Flats State Game Refuge Management Plan, Tanana Valley State Forest Management Plan, and Dalton Highway Corridor Management Area. These Plans emphasize habitat and management that is necessary to maintain viable populations of fish, wildlife, or plants.

Section 1317(b) of ANILCA required federal agencies to conduct studies of all lands not designated Wilderness by the Act for possible additions. Those studies were completed in the late 1980s. As noted earlier in this report, the project study area also has an extensive network of National Parks and wildlife refuges. Each National Park has designated Wilderness Area units that are mandated under ANILCA, and described further below.

2.3.1 Special Management Areas within Federally Managed Lands

2.3.1.1 Wild and Scenic Rivers

The National WSRs System was created by Congress in 1968 (Public Law 90-542; United States Code 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and

recreational values in a free-flowing condition for the enjoyment of present and future generations. WSRs may be designated by Congress or, if certain requirements are met, the Secretary of the Interior. Each river is administered by either a federal or state agency. Designated segments need not include the entire river and may include tributaries. For federally administered rivers, the designated boundaries generally average one-quarter mile width from either bank in the lower 48 states, and one-half mile in width from either bank on rivers outside National Parks in Alaska in order to protect river-related values.

The WSR Act prohibits federal support for actions such as the construction of dams or other instream activities that would harm the river's free-flowing condition, water quality, or outstanding resource values.

Designated WSRs within the project study area include the following (Figure 4):

- North Fork of the Koyukuk Wild and Scenic River
- Kobuk Wild and Scenic River
- Selawik Wild and Scenic River
- Noatak Wild and Scenic River
- Salmon Wild and Scenic River
- Nowitna Wild and Scenic River
- Unalakleet Wild and Scenic River
- John Wild and Scenic River
- Alatna Wild and Scenic River

2.3.1.2 Onion Portage

Onion Portage is located within the Kobuk Valley National Park and Wilderness Area in the Central Brooks Range. The area is considered important habitat for the WACH because it has been part of their migration route for thousands of years. According to the National Park Service, hunters (both ancient and modern) have stationed themselves at Onion Portage for the vantage point the site offers. Due to its historic use, Onion Portage is also considered an archaeological district, and has provided archeologists the opportunity to excavate up to nine cultural complexes, which have aided in establishing a cultural chronology for the region (NPS, 2011b).

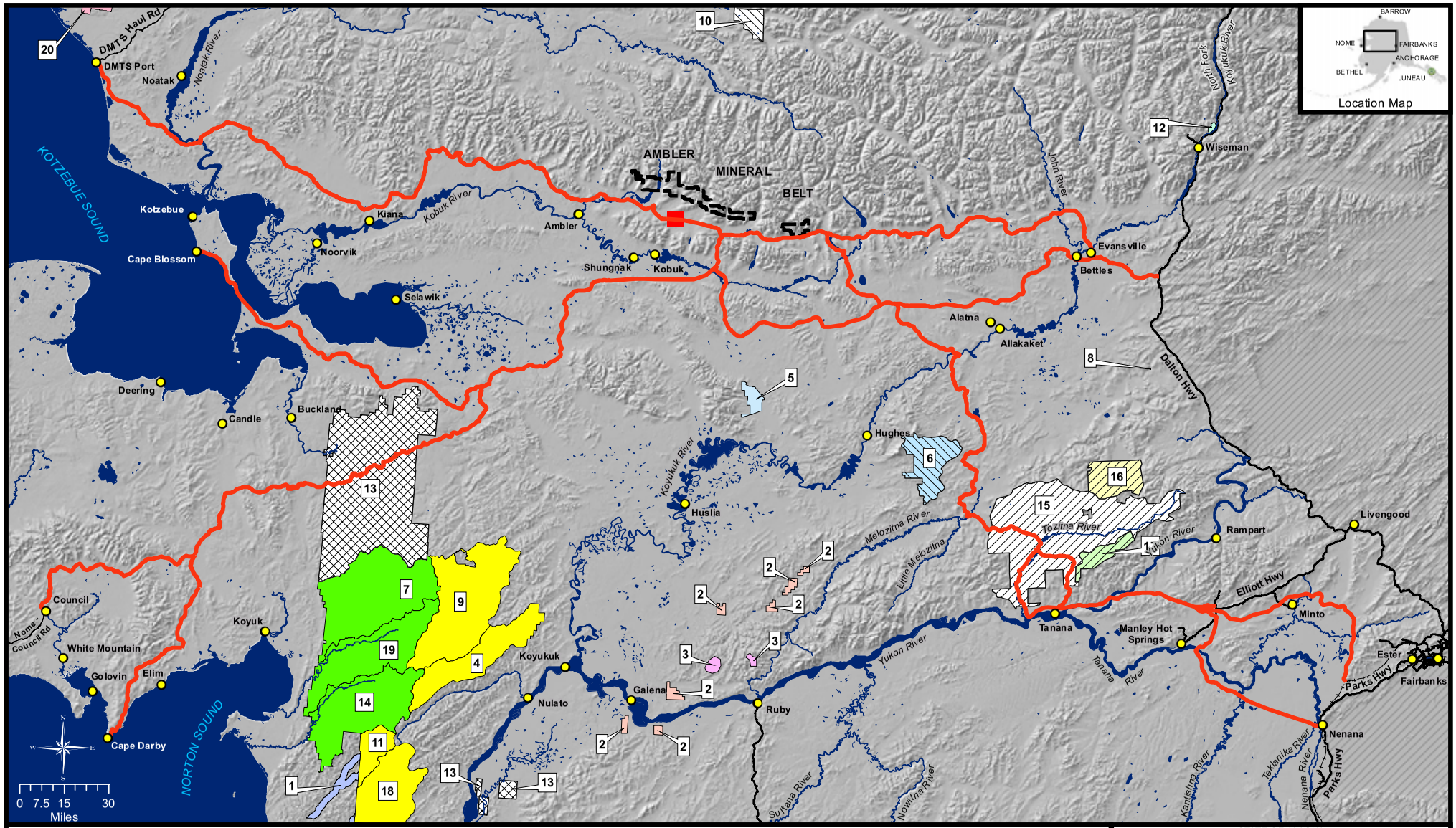
2.3.1.3 Selawik National Wildlife Refuge Special Management Areas

The 1987 Selawik NWR Special Management Area Plan describes the wilderness values and special features of four areas:

- Selawik Wilderness Area in the Waring Mountainsaba
  - Unique plant communities that are associated with underlying sedimentary rock
  - Unique group of rolling, vegetated sand dunes
  - Watershed areas for the Selawik lowlands
  - WACH migration corridor during the spring and fall
- Headwaters of the Selawik River
  - Wild River corridor
  - Riparian and aquatic habitats
  - Supporting major fisheries and wildlife resources
  - Extensive opportunities for backcountry recreation such as float trips, hunting, and fishing
- Selawik River delta and lowlands
  - Extensive wetlands, rivers, lakes, and streams, supporting large numbers of migratory waterfowl and fisheries resources
- Selawik Hills
  - Provides backcountry hunting of large mammals such as moose and caribou

2.3.1.4 Bureau of Land Management Designated Areas of Critical Environmental Concern

Twelve ACECs are mapped throughout the project study area (Figure 22). ACECs are areas within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes or to protect life and safety from natural hazards (BLM, 2006). Table 2-3 provides a brief description of each ACEC within the project study area.


AMBLER
MINERAL
BELT
DMTS Haul Rd
DMTS Port
Noatak
Noatak River
KOTZEBUE SOUND
Kotzebue
Cape Blossom
Kiana
Kobuk River
Noorvik
Selawik
Ambler
Shungnak
Kobuk
Deering
Candle
Buckland
Council
Nome-Council Rd
White Mountain
Golovin
Elim
Cape Darby
Koyuk
NORTON SOUND
Koyukuk
Nulato
Galena
Huslia
Hughes
Koyukuk River
Melozitna River
Little Melozitna
Ruby
Yukon River
Tozitna River
Alatna
Allakaket
Wiseman
John River
North Fork Koyukuk River
Evansville
Bettles
Dalton Hwy
Rampart
Livengood
Tanana
Manley Hot Springs
Tanana River
Elliott Hwy
Minto
Ester
Fairbanks
Parks Hwy
Nenana
Nenana River
Teklanika River
Kantishna River
Sulatna River
Nowitna River
0 7.5 15 30
Miles
BARROW
NOME
FAIRBANKS
ANCHORAGE
BETHEL
JUNEAU
Location Map
Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Preliminary Corridors
Proposed Staging Area
1 Anvik River
2 Dulbi-Kaiyuh Mountains Subunit
3 Galena Mountain
4 Gisasa River
5 Hogatza River Tributaries
6 Indian River
7 Inglutalik River
8 Kanuti Hot Springs
9 Kateel River
10 Nigu-Iteriak
11 North River
12 Nugget Creek
13 Nulato Hills
14 Shaktoolik River
15 Tozitna River
16 Tozitna Subunit North
17 Tozitna Subunit South
18 Unalakleet River
19 Ungalik River
20 Western Arctic Caribou Insect Relief
Sources:
Areas of Critical Environmental Concern: BLM
Coordinate System: NAD 1983 Alaska Albers
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BLM - DESIGNATED
AREAS OF CRITICAL ENVIRONMENTAL CONCERN
DATE: May 13, 2011
Figure 22
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Table 2-3: Bureau of Land Management-Designated Areas of Critical Environmental Concern

Name	Location	Description	BLM Resource Management Plan
Nulato Hills	Central to southwest section of the study area, approximately 1,079,920	Considered to be essential wintering grounds for the WACH. Five BLM designated rare plant species grow in the area.	Kobuk-Seward Peninsula/Central Yukon
Ingluatlik, Ungalik, Shatoolik Rivers	South section of the study area, together they are approximately 964,000 acres	Supports populations of fish that are essential subsistence resources including: • Dolly Varden • Arctic grayling • Sheefish • Salmon (chum, coho, pink, and to some degree, king) • Whitefish	Kobuk-Seward Peninsula
Unalakleet, North River, Kateel and Gisasa Watersheds	South section of the study area, together they are approximately 1,184,192 acres	Important salmon and sheefish spawning habitat	Central Yukon
Anvik River	Southwest section of the project study area, approximately 51,347 acres	Important spawning habitat for the largest population of chum salmon in the Yukon River System	Southwest Management Framework Plan
Dulbi-Kaiyuh Mountains	Southcentral section of the project study area, approximately 54,252 acres	Crucial habitat for the caribou, peregrine falcon, and moose	Central Yukon
Nig-Iteriak	North Central section of the project study area, approximately 46,665	Important location for geology and cultural resources	Dalton Highway Utility Corridor
Indian River Watershed	East Central section of the project study area, approximately 161,195 acres	Salmon and sheefish spawning habitat	Central Yukon
Hogatza River Tributaries	Central section of the project study area, approximately 30,507 acres	Salmon and sheefish spawning habitat	Central Yukon
Hughes Subunit	Northern Central section of the project study area	Crucial salmon-feeding habitat for brown bears	Central Yukon
Nugget Creek	Along Dalton Highway, approximately 3,300 acres, Middle Fork of Koyukuk	Crucial lambing areas and mineral licks for Dall sheep	Utility Corridor Proposed RMP
Kanuti Hot Springs	Central section, approximately 43 acres, near Caribou Mountain	Meadow habitat	Utility Corridor Proposed RMP
Western Arctic Caribou Insect Relief	Northwest section of the project, approximately 11,478 acres	Caribou insect relief area	Kobuk-Seward Peninsula

2.3.1.5 Dalton Highway Corridor - Federal Management

In 1971, Public Land Order 5150 established a utility and transportation corridor from Washington Creek (28 miles north of Fairbanks) to 60 miles south of Prudhoe Bay. Both an inner and an outer corridor were designated. The outer corridor is over 300 miles long and ranges in width from 12 to 24 miles (BLM, 1989). The corridor was set aside to support North Slope oil development by providing a ROW for transportation of oil and gas.

BLM's 1989 RMP for the Utility Corridor recognized the primary energy transportation purpose of the corridor, but also proposed a balance of resource uses with an emphasis on recreational opportunities (BLM, 1989). The Plan designated the 40-acre Kanuti Hot Springs ACEC within the project study area. This ACEC was designated to protect the hot spring and associated meadow habitat. The Plan recognized the need for access to adjacent lands and specifically addressed the access to the Ambler mineral belt identified in ANILCA. The Plan recommended designation of a transportation corridor near Prospect/Pump Station 5 to provide this access, but the Plan's proposed management actions discussion noted that no specific ROW exclusion or avoidance areas were identified. The RMP indicates that appropriate locations for ROWs from the Dalton Highway should be determined through cooperative planning.

The RMP established four recreation management areas. Two of these areas are located within the project study area: the 1.1-million-acre Dalton Highway Recreation Management Area (corresponding to the Public Land Order PLO 5150 inner corridor) and the 2.3-million-acre Dalton Corridor Recreation Management Area (corresponding to the outer Utility Corridor and some adjacent lands). The most recent BLM management plan for the Utility Corridor was a 1991 Plan for the Dalton Highway Recreation Management Area. This Plan calls for protecting the corridor's underlying energy transportation use while providing for recreation uses and development in specific areas. The lands within the recreation area are divided into four management zones with varying levels of development allowed. The rural zone allows for development and is limited to Wiseman and four development nodes at Yukon Crossing, Coldfoot, Chandalar Shelf, and Happy Valley. This Plan limits commercial road-related development to areas designated rural.

2.3.2 State Special Management Areas

2.3.2.1 Alaska Department of Fish and Game Designated Wildlife Areas

ADF&G's State Game Refuges, State Game Sanctuaries, and Critical Habitat Areas are designated by the Alaska Legislature. Each has a different general purpose although all provide habitat protection.

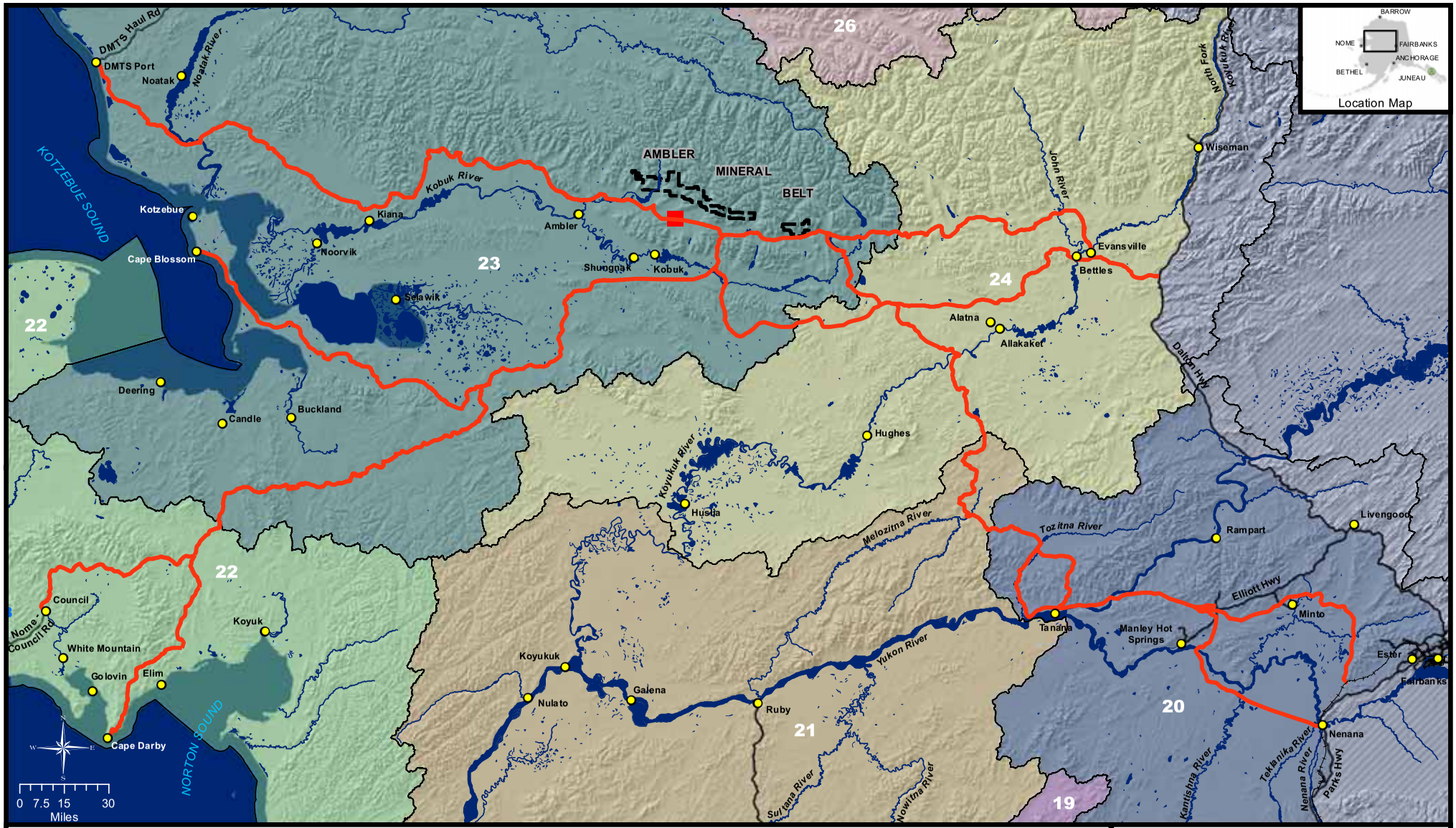
2.3.2.2 Minto Flats State Game Refuge

The Minto Flats State Game Refuge encompasses approximately 500,000 acres and is located about 35 miles west of Fairbanks between the communities of Minto and Nenana (Figure 11). Minto Flats is a large wetland complex lying along a northerly loop of the middle Tanana River. The area is fed by waters from the Tatalina, Chatanika, and Tolovonan Rivers, and Goldstream and Washington Creeks. The area is made up of a mosaic of ponds, oxbows, stream channels and various wetlands and upland vegetation types, which provide excellent habitat for waterfowl, large game, and furbearers, as well as fish habitat (ADF&G, 1992).

The refuge was established by the Alaska Legislature in 1988 to ensure the protection and enhancement of habitat, the conservation of fish and wildlife, and to guarantee the continuation of hunting, fishing, trapping, and other compatible public uses. Minto Flats State Game Refuge has one of the highest quality waterfowl nesting and staging habitats in Alaska, especially along its eastern edge around Big Minto Lakes, and supports some of the highest densities of waterfowl on the continent (ADF&G, 2011a). Waterfowl nests are distributed throughout the refuge, with birds nesting in a wide range of habitats. Densities of 3,885 nests per square mile in some of the most productive habitats have been recorded (ADF&G, 2011a).

2.3.2.3 Game Management Units

Alaska Game Management Units (GMU) were created to allow residents and visitors to Alaska to have fair and equal hunting rights in all regions of the state. The ADF&G established 26 GMUs to effectively manage and control hunting in Alaska. There are seven GMUs within the project study area, including sections of GMU 19, 20, 21, 22, 23, 24, and 26 (Figure 23).



Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Preliminary Corridors
Proposed Staging Area

Game Management Units
19 21 23 26
20 22 24

Sources:
Game Management Units: ADF&G

Coordinate System: NAD 1983 Alaska Albers

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GAME MANAGEMENT UNITS

DATE: May 13, 2011 | **Figure 23**

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The State of Alaska has legal regulations that govern each GMU to provide hunters with an optimal experience while managing game populations from year to year. Regulations describe when hunting is allowed and how many animals may be taken each season.

2.3.2.4 High User Conflict Game Management Unit 23

GMU 23 comprises the Kotzebue Sound, Chukchi Sea, and Arctic Ocean drainage from and including the Goodhope River drainage to Cape Lisburne. The majority of land (56%) is under federal ownership and the remaining land is owned by the NWAB or the state. Federal land includes Kobuk Valley National Park and Preserve, Noatak National Park and Preserve, Cape Krusenstern National Monument and southwestern section of Gates of the Arctic National Park and Preserve, the Selawik NWR, portions of Alaska Maritime Refuge, and BLM property.

Subsistence, recreation, and commercial hunting are central activities for GMU 23. User conflicts occur primarily during the fall hunting season, between local residents, non-local, and commercial operators. Local residents are concerned about increased numbers of hunters and lack of respect by some hunters for traditional values and practices; non-resident hunters want access to public land and to have quality hunting experiences (ADF&G, 2008).

2.3.2.5 Dalton Highway Corridor - State Management

State Plans

In addition to the BLM's management plans, there are two state plans on the Dalton Highway, as well as ADF&G regulations. The state published a Dalton Highway Master Plan in 1989 to support economic development, public safety, and prudent natural resource management in the area. In 1998, the Dalton Highway was designated a State Scenic Byway, and in 2010, the DOT&PF issued a Corridor Partnership Plan for the Dalton Highway Scenic Byway (DOT&PF, 2010). This Plan identified the scenic, cultural and natural resources along the highway corridor and identified a number of land and resource use conflicts that limit the highway's potential for recreational use. The Corridor Partnership Plan calls for land managers and residents to work together to resolve conflicts and promote the recreational values of the area. These Plans do not include any restrictions or recommendations for a potential future roadway corridor accessing the Ambler mineral belt.

State Restrictions

ADF&G Dalton Highway Regulations

ADF&G does not allow hunting within five miles from each side of the Dalton Highway, from the Yukon River to the Arctic Ocean; however, big game, small game, and fur animals may be taken in the area by bow and arrow only.

Aircraft and boats may be used to transport hunters, their gear, or parts of game within the Dalton Highway Corridor Management Area. A snowmachine may be used to transport hunters, their hunting gear, or parts of game across the management area from land outside the management area to access land on the other side of the management area. No motorized land vehicle may be used to transport hunters, their hunting gear, or parts of game within the Dalton Highway Corridor Management Area, except licensed highway vehicles may be used on certain designated roads. Any hunter traveling on the Dalton Highway must stop at any check station operated by the ADF&G within the Dalton Highway Corridor Management Area.

Alaska Statute Section 19.40.210 - No Off-Road Vehicles

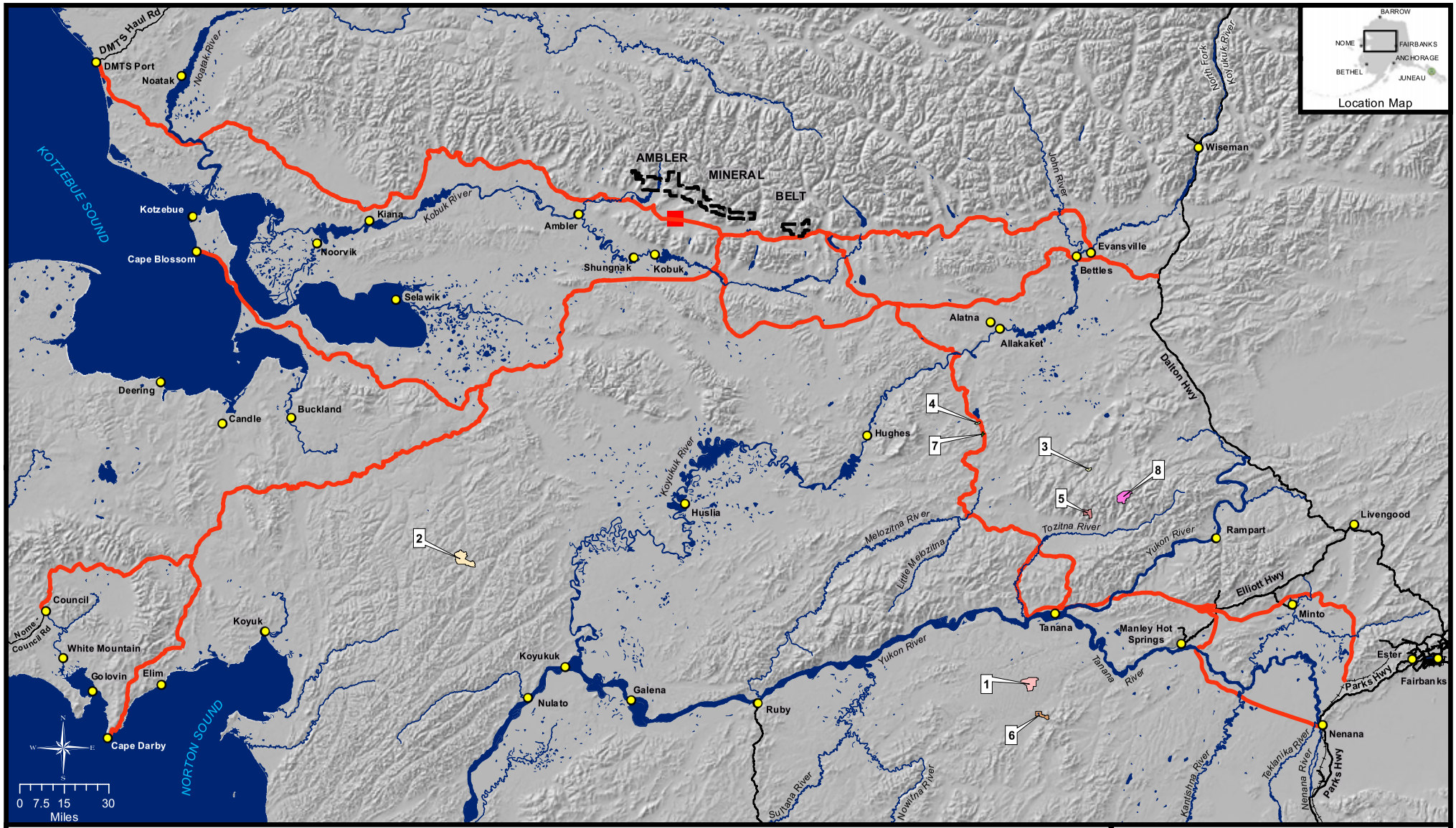
Alaska Statute Section 19.40.210 prohibits the use of off-road vehicles on land within five miles of the ROW of the Dalton Highway north of the Yukon River, except for persons who hold a mining claim in the vicinity of the highway and who must use land within five miles of the ROW to gain access to the mining claim. This means that the only legal use of off-road vehicles is by miners. However, miners using these vehicles may not carry game, hunters, or their gear.

2.3.3 Designated Research Natural Areas

Twelve RNAs are mapped throughout the project study area (see Table 2-4 and Figure 24). RNAs are areas within state or federal public lands that have been established for research and education. RNAs are intended to provide sites within which baseline ecological research and education can be conducted. It is intended that these areas be maintained in their natural state as much as possible. RNA designated lands have at least one of the following characteristics: typical representation of a common plant or animal, an unusual plant or animal, threatened or endangered species, representation of common geological, soil or water features, or unusual geologic oil or water features of sufficient number and size to adequately provide for scientific study, research, and demonstration purposes (BLM, 2006). Activities that result in significant

Table 2-4: Research Natural Areas

Name	Area (acres)	Location	Characteristics of the Area for Research and Education	Resource Management Plan
Arms Lake	10,900	North Kuskokwim Subunit	• Vegetation diversity associated with sand dunes	Central Yukon RMP (BLM)
Redlands Lake	3,700	North Kuskokwim Subunit	• Several large lakes associated with sand dunes • Floral and faunal communities	Central Yukon RMP (BLM)
Ishtalitna Creek Hot Springs	1,100	Tozitna Subunit	• Small low grade hot springs and adjacent watershed • Wildlife mineral licks and unique vegetation communities	Central Yukon RMP (BLM)
Spooky Valley	10,800	Tozitna Subunit	• Isolated alpine tundra • Geologic, physiographic and vegetation • Birdlife - habitat	Central Yukon RMP (BLM)
Lake Todatonten Pingos	640	Hughes Subunit	• Lake Todatonten pingo • Open-system pingo • Uphill watershed	Central Yukon RMP (BLM)
SouthTodatonten Summit	680	Hughes Subunit	• South Todatonten summit alpine vegetation • Open-system pingo • Uphill watershed	Central Yukon RMP (BLM)
Box River Treeline	11,200	Nulato Hills Subunit	• Western treeline • Box River watershed • Upland habitat used by WACH	Central Yukon RMP (BLM)
McQuesten Creek	3,990	Tozitna Subunit	• Mid-Elevation slope and valley ecosystems in the Ray Mountains • Small side valley watershed	Central Yukon RMP (BLM)
Mount Osborn	Not given	Kigluaik Mountain ACEC	• Outcrops provide alpine habitat for rare plants	Kobuk Seward Peninsula RMP (BLM)
Windy Cove	Not given	Kigluaik Mountain ACEC	• Habitat for two sensitive species plants, Arctic sage and Arctic wormwood • Glaciated mountains, the summit of Mount Osborne, and the glaciated Grand Central Valley • Lakes that support Kigluaik char and additional geologic features of interest	Kobuk Seward Peninsula RMP (BLM)
Oblique Lake	4,241	Subunit 2B	• Two contrasting lake types: an upland dune lake lying oblique to the dune-building wind direction, and a bottom oxbow lake near Kantishna River	Tanana Valley State Forest Management Plan (DNR)
Caribou Crossing	2,990	Subunit 2C	• Undisturbed, mature white spruce forest, a hill prairie, a bottomland of permafrost, and a wetland marsh • Optimum habitat for late-succession, snag cavity-dependent birds and small mammals. Hill prairie is scientifically interesting sagebrush grassland	Tanana Valley State Forest Management Plan (DNR)



Communities and Place Names
Railroad
Existing Roads
Ambler Mineral Belt
Proposed Staging Area

1 Arms Lake
2 Box River Treeline
3 Ishtalitna Creek Hot Springs
4 Lake Todatonten Pingos

5 McQuesten Creek
6 Redlands Lake
7 South Todatonten Summit
8 Spooky Valley

Sources:
Designated Research Natural Areas: BLM

Coordinate System: NAD 1983 Alaska Albers

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BLM - DESIGNATED RESEARCH NATURAL AREAS

DATE: May 13, 2011

Figure 24

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disturbance that is unnatural will typically not be authorized unless they are found to be consistent with the management intent for the area. These activities include timber harvest, material extraction, and developed recreation.

2.3.4 Northwest Arctic Borough Coastal District

The western portion of the project study area falls within the NWAB's Coastal District boundaries. The proposed project would trigger a review under the Alaska Coastal Management Program, and must be found consistent with the statewide standards and the enforceable policies of the NWAB. The overall purpose of the Alaska Coastal Management Program is to manage competing demands for coastal resources and uses. Coastal resources include habitats, fish, wildlife, plants, and clean air and water. Uses of coastal resources include subsistence, recreation, and development projects. The Alaska Coastal Management Program provides the NWAB a method to participate in state and federal decision making that could affect coastal uses and resources, including subsistence. The NWAB's Coastal Management Plan includes all of the borough's communities: Kotzebue, Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Noatak, Noorvik, Selawik, and Shungnak.

The NWAB's Enforceable Policies are divided into the following nine subject areas:

1. Subsistence
2. Coastal Habitats and Resources
3. Historic, Prehistoric, and Archeological Resources
4. Natural Hazards
5. Coastal Development
6. Transportation
7. Energy Facilities
8. Special Subsistence and Important Habitat areas

In addition, the NWAB's Coastal Management Plan designates certain areas under the authority of 11 AAC 114.250 that have been determined important, and may include additional restrictions to protect special resources and uses. These designated areas include specific areas, as well as general areas (i.e., broad areas used for subsistence, cultural resources, important habitats, and natural hazards).

2.4 Wildlife Use of the Project Study Area

Alaska's diversity of wildlife habitats and landscapes makes it home to a rich and diverse fauna. Wildlife within the project study area are used for subsistence harvesting for traditional uses, sport fishing, sport hunting, guided hunting and fishing, and wildlife viewing. More detail regarding subsistence of wildlife will be forthcoming in a separate subsistence analysis specific to the communities within the project study area.

2.4.1 Mammals

The project study area provides habitat for many different mammal species, which are an essential part of the ecosystem and everyday lives of the residents within the project study area (Table 2-5). The following discussion groups species into four categories: ungulates (large, hoofed mammals including muskoxen, moose, Dall sheep, reindeer, and caribou), omnivores (brown and black bear), carnivores (wolves and coyotes), furbearers (beaver, arctic fox, red fox, marten, mink, river otter, wolverine, and lynx), and marine mammals (ringed seal, spotted seal, Pacific walrus, bowhead whales, and polar bear). Harvest data reported in the following sections was gathered largely from ADF&G's Survey and Inventory reports, which are not always accurate due to lack of hunter provided information. Consultation with resource agencies and communities on subsistence use in the project study area is underway. Therefore, subsistence use is not reported unless it was called out in ADF&G's Survey and Inventory reports.

Table 2-5: Mammal Species Documented within the Project Study Area

Common Name	*Scientific Name*	Seasonal Use
Alaska marmot	*Marmota broweri*	Year Round
Arctic fox	*Alopex lagopus*	Year Round
Arctic ground squirrel	*Spermophilus parryii*	Year Round
Barren ground shrew	*Sorex ugyunak*	Year Round
Beaver	*Castor canadensis*	Year Round
Beluga whales	*Delphinapterus leucas*	Year Round
Black bear	*Ursus americanus*	Year Round
Bowhead whales	*Balaena mysticetus*	Year Round
Brown bear	*Ursus arctos*	Year Round
Brown lemming	*Lemmus trimucronatus*	Year Round
Caribou	*Rangifer tarandus*	Partial Migrant
Common shrew	*Sorex cinereus*	Year Round
Coyote	*Canis latrans*	Year Round

Common Name	*Scientific Name*	Seasonal Use
Dall sheep	*Ovis dalli*	Year Round
Dusky shrew	*Sorex monticolus*	Year Round
Gray wolf	*Canis lupus*	Occasional Migrant
Hoary marmot	*Marmota caligata*	Year Round
House mouse	*Mus musculus*	Year Round
Least weasel	*Mustela nivalis*	Year Round
Little brown bat	*Myotis lucifugus*	Seasonal Migrant
Lynx	*Lynx canadensis*	Year Round
Marten	*Martes americana*	Year Round
Meadow vole	*Microtus pennsylvanicus*	Year Round
Mink	*Mustela vison*	Year Round
Moose	*Alces alces*	Year Round
Mountain goat	*Oreamnos americanus*	Year Round
Muskoxen	*Ovibos moschatus*	Year Round
Muskrat	*Ondatra zibethicus*	Year Round
North American river otter	*Lontra canadensis*	Occasional Migrant
Northern bog lemming	*Synaptomys borealis*	Year Round
Northern collared lemming	*Dicrostonyx groenlandicus*	Year Round
Northern flying squirrel	*Glaucomys sabrinus*	Year Round
Northern red-backed vole	*Myodes rutilus*	Year Round
Pacific walrus	*Odobenus rosmarus divergens*	Year Round
Polar bears	*Ursus maritimus*	Year Round
Porcupine	*Erethizon dorsatum*	Year Round
Pygmy shrew	*Sorex hoyi*	Year Round
Red fox	*Vulpes vulpes*	Year Round
Red squirrel	*Tamiasciurus hudsonicus*	Year Round
Reindeer	*Rangifer tarandus tarandus*	Year Round
Ringed seals	*Phoca hispida*	Year Round
Short-tailed weasel	*Mustela ermine*	Year Round
Singing vole	*Microtus miurus*	Year Round
Snowshoe hare	*Lepus americanus*	Year Round
Spotted seals	*Phoca largha*	Year Round
Tiny shrew	*Sorex yukonicus*	Year Round
Tundra hare	*Lepus othus*	Year Round
Tundra shrew	*Sorex tundrensis*	Year Round
Tundra vole	*Microtus oeconomus*	Year Round
Wolverine	*Gulo gulo*	Year Round
Wolves	*Canis Lupus*	Year Round
Yellow-cheeked vole	*Microtus xanthognathus*	Year Round

Sources: International Union for Conservation of Nature and Natural Resources, 2011; Smithsonian Institution, 2011

It should be noted that the GMU harvest data provided in the following sections may be larger than what is actually located within the project study area (Table 2-6):

Table 2-6: Percentage of Game Management Unit Located within the Project Study Area

Game Management Unit	Percent Located Within the Project Study Area
19D	0.30
20A	0.11
20B	2.65
20C	4.29
20F	4.22
21A	0.22
21B	5.04
21C	2.97
21D	8.43
22A	2.78
22B	6.08
22C	0.01
22D	0.80
22E	1.59
23Z	29.79
24A	1.35
24B	10.88
24C	2.47
24D	4.34
25D	0.02
26A	1.33
26B	0.05

Species that are considered important for economic or subsistence purposes, require specific management practices, or have special habitat designations are listed below.

2.4.1.1 Ungulates

Muskoxen

Muskoxen were originally indigenous to the study area and disappeared around the nineteenth century. They were reintroduced in the 1970s both on the Seward Peninsula and near Cape Thompson. Today those herds occur in the project study area (BLM, 2006). Muskoxen favor windblown ridges during the winter months, and riparian areas during the summer.

The Seward Peninsula population has established itself as far east as the Buckland River and has been spotted in the Nulato Hills and the Selawik and Yukon River Drainages. A few reports

have noted muskoxen as far south as Elim and Granite Mountain, with the rare occurrences near Koyuk. The Seward Peninsula herd's range makes up less than 1% of the project study area. The Cape Thompson Herd ranges from the mouth of the Noatak River to Cape Lisburne, within 15 to 20 miles of the Chukchi Sea. The Cape Thompson herd's range makes up less than 1% of the project study area.

The Seward Peninsula herd population was estimated to be 2,387 in 2005, with its density being the highest on the western Seward Peninsula (Harper, 2007a). In February 2011, 32 musk oxen from the Seward Peninsula herd, located in the Bering Land Bridge National Preserve, perished during a storm surge (Anchorage Daily News, 2011). There are also known smaller groups consisting of one to four individuals scattered throughout the Noatak and Kobuk River drainages almost to Walker Lake and in the Selawik River Drainage (BLM, 2006). In 2000, the Cape Thompson herd had a population estimated to be 424 animals (BLM, 2006).

According to ADF&G's harvest data for GMU 22, approximately 145 muskoxen were harvested by drawing hunt permit and 49 were harvested during subsistence hunts during the 2004 and 2005 hunting season (Harper, 2007a). The Cape Thompson herd, located in GMU 23, is only hunted for subsistence use. From 2005 to 2007, three bulls were harvested from the herd (Harper, 2007a).

Muskoxen are highly sought after for their soft wool-like under-hair called qiviut, which is considered to be the rarest fiber in the world (ADF&G, 2011b).

The project study area does not contain any special or designated critical habitat areas for muskoxen (ADF&G, 2011b).

Moose

Moose are an important subsistence resource, and are widely distributed throughout Alaska with the population ranging from approximately 175,000 to 200,000 individuals (ADF&G, 2011c). Their distribution is determined by requirements for food and cover, as well as seasonal snow depths (ADF&G, 2011q).

The project study area does not contain any special or designated critical habitat areas for moose. Hot springs are important habitats for moose, and they may travel out of their way to visit a

mineral lick while moving between winter and summer ranges to get additional sodium supplement to their early summer diet (BLM, 1986). Information regarding locations of mineral licks within the project study area was not available; however, ADF&G and USFWS will be contacted to find out whether they know of any important mineral licks that should be avoided by this project.

Moose harvest data within the project study area is available through ADF&G's *2007 Moose Management Report of Survey and Inventory Activities*, which indicates moose harvests tend to be low during years when caribou are abundant, increasing in years when caribou are not available for taking (Harper, 2007b). Below is a brief summary of the most recent moose harvest data available for the GMUs within the project study area (Harper, 2007b):

- The moose population in GMU 21 has been estimated between 8,500 to 9,500 individuals. During the 2007 and 2008 season, estimated harvest in GMU 21 Sections B, C, and D was between 100 to 400 animals per year.
- Multiple sections of GMU 22 were surveyed during 2007 and a population of approximately 3,144 moose was documented. Approximately 340 moose per year were harvested between 2005 and 2007.
- Approximately 530 moose per year were harvested in GMU 23 during the 2005 to 2007 survey season.
- The moose population in GMU 24 is estimated at over 3,000 individuals. Approximately 394 moose per year were harvested in GMU 24 between 1997 and 2006.

Dall Sheep

Dall sheep are found in relatively dry country and frequent a special combination of open alpine ridges, meadows, and steep slopes with "escape terrain" in the immediate vicinity. Escape terrain consists of extremely steep, rough areas that Dall sheep use to avoid predators. They also use ridges, meadows, and steep slopes for feeding and resting (ADF&G, 2011d).

Dall sheep habitat within the project study area is common within the Noatak National Preserve, Gates of the Arctic National Park and Preserve, and the Kobuk Valley National Park. In 2009, four observation teams flew surveys across potential Dall sheep habitat within the Gates of the

Arctic National Park and Preserve, and estimated population of 8,654 individuals within the National Park and Preserve (NPS, 2010). In 2001, the Dall sheep population of Kobuk Valley National Park (concentrated in the Baird Mountains) was estimated to be 616 animals (BLM, 2006). Dall sheep lambing habitat and mineral licks are located within the Nugget Creek ACEC (see Table 2-3) (BLM, 1989). Harvest data is available through ADF&G's *2004 to 2007 Dall Sheep Management Report of Survey-Inventory Activities*.

Dall sheep harvest data for the western Brooks Range (GMU 23) indicate that approximately 15 sheep were taken during the 2006 to 2007 hunting season. Harvest data for the central Brooks Range (west of the Dalton Highway encompassing the Gates of the Arctic National Park and Preserve) indicate that approximately 10 sheep were taken per year between 2002 and 2006. Harvest information in the central Brooks Range for the years 2004 to 2006 are not documented (Harper, 2008).

Reindeer

In 1891, reindeer were introduced to Alaska by Sheldon Jackson. The reindeer where brought from Siberia for use in developing an economic base and were also a reliable food source in years when caribou populations were low (BLM, 2006). A large portion of reindeer in Alaska are located on the Seward and Baldwin Peninsulas, which have been divided into 15 different grazing allotments. Grazing allotments are comprised of federal, state, and private lands. Only Alaska Natives can apply for reindeer grazing permits (BLM, 2011b).

The reindeer population on the Seward Peninsula in 2004 was estimated at approximately 9,000 animals (BLM, 2006). In the same year, approximately 7,500 reindeer were corralled by herders. However, the University of Alaska Fairbanks Reindeer Research Program and the Kawerak Reindeer Headers Association believe that only 80% of the actual population was corralled. ADF&G and the Alaska Fairbanks Reindeer Research Program have documented that reindeer intermingle with the WACH during spring the spring migration (BLM, 2006).

Caribou

Caribou are one of the most studied mammals within the project study area because they are heavily depended upon as a subsistence resource. There are many published documents that map caribou ranges within the project study area. However, sources depicting this information are

dated and are not presented in this memorandum. More recent data has been compiled by resource agencies, but has not been made available to the public. A more detailed analysis of caribou use within the project study area will be conducted with the help of the resource agencies and local knowledge, once DOT&PF has selected a proposed corridor.

Five herds of caribou have been known to utilize some portions of the project study area:

- Galena Mountain Herd
- Wolf Mountain Herd
- Ray Mountain Herd
- Western Arctic Caribou Herd
- Teshekpuk Lake Caribou Herd

According to ADF&G's *2004 through 2006 Caribou Management Report of Survey and Inventory Activities*, the Galena Mountain, Wolf Mountain, and Ray Mountains caribou herds occur north of the Yukon River in the Kokrines Hills and Ray Mountains. The Galena Mountain herd typically calves on the east side of Galena Mountain and move to the west side of the mountain during winter. The herds' population was estimated at approximately 125 animals in 2006. The Wolf Mountain herd calves and winters to the north and east of Wolf Mountain in the Melozitna and Little Melozitna River drainages. The population of the Wolf Mountain herd was estimated between 300 and 500 animals in 2006. The Ray Mountains herd calves in the Ray Mountains around Kilo Hot Springs and winters to the north in the Kanuti Kiloitna River area. The population of the Ray Mountains herd was estimated at 1,850 animals in 2006.

These caribou herds are rarely hunted because they are relatively inaccessible during the hunting season, and few people outside the local area are aware of them. The combined average of reported and known unreported harvest from all three herds combined over the last 10 years was less than 10 animals per year. Aerial surveys of the Galena and Wolf Mountain herds are difficult during fall and winter due to small group size and poor sightability in the dense black spruce forests where they occur. Similarly, fall aerial surveys of the Ray Mountains herd are difficult due to frequent fog, clouds, and high winds (Harper, 2007c).

The WACH is the largest herd in Alaska, consisting of approximately 400,000 caribou (Nedwick, 2010). The herd uses a portion of the project study area for their wintering grounds, and migrating to and from their wintering grounds to their summer grounds. The WACH is mostly hunted for subsistence use. However, other hunters also obtain permits to hunt this herd.

The ADF&G, Division of Subsistence, has been documenting caribou takes through subsistence harvest surveys carried out in Ambler, Buckland, Kiana, Kobuk, Shaktoolik, and Shishmaref since 1998. Estimated caribou harvested from the WACH by each community during 2009 and 2010 is described below (ADF&G, 2010):

- In Ambler, an estimated 456 caribou were harvested with most animals taken from the area immediately down river, between Ambler and Kiana. Other animals were harvested within the Ambler River drainage, and upriver on the Kobuk River, between Ambler and Kobuk.

- The community of Buckland harvested 662 caribou. Most of the animals harvested came from the areas surrounding the community, which is bound on the west by the Duck River. Other areas hunted include the Kiwalik River drainage, Baldwin Peninsula, Kauk River drainage, and Selawik Lake.

- The community of Kiana harvested approximately 440 caribou, mostly from the area along the Kobuk River that extends to Ambler. Other areas hunted include the Salmon River drainage and Hunt River area.

- Kobuk residents harvested an estimated 210 caribou. Most of the animals were taken from the area immediately down river between Kobuk and Ambler. Other areas hunted include the area upstream of Kobuk, in the area that extends from the village to the confluence of the Kobuk and Pah Rivers, and the Pick River drainage.

- The community of Shaktoolik harvested approximately 136 caribou from two areas near the village, the Ungalik and Shaktoolik River drainages.

- Residents of Shishmaref harvested an estimated 342 caribou from the Serpentine River drainage and the coastal area each of the village. Other areas hunted include the

Nugnugaluktuk River drainage, and the Goodhope and Cripple Rivers. These areas are located adjacent to the western edge of the project study area.

The Teshekpuk Lake Caribou Herd occasionally occurs within the northwestern section of the project study area. In winter months, portions of this herd may be found as far south as Nulato Hills. However, the majority of their range lies to the north of the project study area (BLM, 2006). In 2002, the population of the Teshekpuk Lake Caribou Herd was estimated to be approximately 45,166 animals. Approximately 4,463 caribou were harvested from this herd during the 2002 to 2003 hunting season (Harper, 2007c).

2.4.1.2 Omnivores

Black and Brown Bears

Bears are inhabitants of the entire project study area, and are known to be seasonally abundant around salmon streams and spawning areas.

Black Bears

Black bears exploit a variety of habitats that provide good denning habitat and produce seasonal foods (berries, wildlife, fish). They are also drawn to disturbed habitats such as recently burned areas and areas of high wild berry production. The range of the black bear tends to be more expansive in areas or periods of low food abundance and smaller in areas and periods when foraging resources are abundant. Black bear den locations include cavities in trees or rocks, brush piles, root excavations, underground burrows, or open-ground beds. Den entrances tend to be partially or fully filled in during use, and are likely to be reused each season, either by the same bear or other individuals (Larivie`re, 2001). Information on den sites within the project study area is not readily available. Resource agency consultation is needed to determine if bear den location data and field surveys for bear den sites are needed for analyses, once proposed corridor study areas are identified.

Brown Bears

Brown bears range from tundra to forested habitats, and utilize riparian areas along anadromous streams during salmon spawning season. The brown bear diet is highly variable, and individuals may travel long distances in search of food resources. Home range size is generally determined

by prey quality and availability. Population density is affected by topography, cover, and nutritional resources. Bears in the project study area have some of the largest home ranges in the state of Alaska.

Brown bears in the project study area den within rock caves in mountainous areas or sandy soils that have thawed more than four feet deep. Much of the project study area is underlain by permanently frozen ground. Soils can collapse easily unless the top four inches of soil is frozen. Therefore, bears generally wait until mid-October for a hard freeze before they begin excavating their dens (USFWS, 2011a).

Information on specific brown bear den locations within the project study area is not readily available. Consultation with resource agencies is needed to determine if brown bear den location data is available for the project study area. Field surveys for bear den sites may be needed once a preferred corridor is identified.

Brown bears occur throughout GMU 20 (A, B, C, and F), located within the central and lower Tanana valley and middle Yukon River drainages. According to ADF&G's *2004 through 2006 Brown Bear Management Report of Survey and Inventory Activities* the highest densities occur in the mountainous portions of GMUs 20A and 20C, with the highest harvest units in GMU 20A (ADF&G, 2011p).

An estimated 350 to 400 brown bears inhabit GMU 21. Harvest data shows that approximately 18 bears are harvested annually. During the 2004 to 2005 hunting season, approximately 180 brown bears were harvested in GMU 22. In GMU 23 approximately 25 to 30 brown bears are estimated to be harvested annually. Approximately 1,250 brown bears inhabit GMU 24. Seventeen brown bears are estimated to be harvested annually in GMU 24 (Harper, 2007d).

2.4.1.3 Carnivores

Wolves

Wolves occur throughout Alaska with their range covering approximately 85% of the state. Wolves have adapted to exist within a variety of habitats including rainforests and arctic tundra along the Beaufort Sea. Moose and caribou make up their primary food source, with Dall sheep,

squirrels, snowshoe hare, beaver and occasionally birds and fish as supplements (ADF&G, 2011o).

The wolf population in GMU 20 was estimated at approximately 650 to 900 animals from fall 2002 to 2004 with an average harvest of 187 wolves annually. During 2002 to 2004, the population of wolves within GMU 21 was estimated to range between 427 and 771 individuals, making up between 52 and 80 packs. During the same timeframe, approximately 190 wolves were harvested. Wolves are scarce throughout Unit 22 because the population was actively suppressed by predator control programs intended to protect reindeer. Population data for wolves within GMU 22 is not currently available; however numbers are thought to be increasing, and harvest reports have documented approximately 22 to 45 wolves harvested yearly between 2002 and 2004. The estimated population of wolves in GMU 23 is 869 animals, though limited harvest information is available for GMU 23. Data reported by communities within GMU 23 indicate that roughly 3 wolves were taken per community from 2004 to 2005. From 2001 to 2002, approximately 74 wolves were harvested in GMU 24 (Harper, 2009).

2.4.1.4 Furbearers

Furbearers are one of the most diverse and widely used groups of wildlife within the project study area, with species including, but not limited to; beaver, Arctic fox, red fox, coyote, wolverine, American marten, American mink, Canada lynx, and snowshoe hare. Furbearers are defined as mammal species that are routinely sought after by licensed trappers. Most furbearers in the project study area are harvested for subsistence or recreation (BLM, 2006).

Beaver

Beaver are ecologically important because they cut down small trees and clear away brush, creating early successional habitats that are ideal food patches for other wildlife. Ponds created by beavers often serve as fish habitat (ADF&G, 2011e). Waterfowl use these areas as feeding and nesting grounds. Beaver population data is not available for the project study area; however, harvest information is as follows:

- GMU 21 data has no report of beavers being harvested after the 2002 to 2003 season. Pre-2002, the annual harvest numbers were around 250, with some years approaching 500 animals.

- Harvest information for GMU 22 and GMU 23 is not available.
- During the 2005 to 2006 season, 22 beaver were harvested from GMU 24. This number has fluctuated over the last 15 years. For example, in the mid-1990s, when the price for beaver pelts was high, harvest reports show as many as 650 beavers harvested per year (Harper, 2007e).

Arctic Fox

Arctic fox are found in treeless coastal areas of Alaska, and den on earthen mounds along river banks and the seacoast. Arctic fox are omnivores dependent on cyclic resources, and concentrations can depend on prey populations and locations (ADF&G, 2011e). Arctic fox commonly are harvested throughout the project study area; however, harvest information has not been reported for this species.

Red Fox

Red fox prefer a variety of terrain, and seem to prefer broken country, tundra, lowland marshes, and low hills. They share tundra habitats with the Arctic fox, and den on knolls in lowlands (ADF&G, 2011e). Red fox occur within the project study area and are commonly harvested by residents. Harvest reports from GMU 21 indicate only one red fox harvested for the 2005 to 2006 season (Harper, 2007e).

Coyote

Coyotes occur within the project area, though there are few records of them north of the Yukon River. Main food sources for the coyote include snowshoe hare, rodents, and carrion. They are also known to feed on marmots, ground squirrels, muskrats, fish, insects, and Dall sheep. Coyotes den in a variety of protected areas and frequently take over dens of other animals (ADF&G, 2011l).

According to ADF&G's *2003 to 2006 Furbearer Management Report of Survey and Inventory Activities,* coyotes are harvested throughout the project study area; however, because there are no sealing requirements for coyote populations, trends were monitored with the use of trapper questionnaire reports, biologist observations, and personal conversations with trappers. This

information revealed that coyotes maintain a moderate population in localized areas along the Tanana River (ADF&G, 2011m).

Marten

Marten are voracious omnivores and are highly mobile, living and moving through a variety of habitats (ADF&G, 2011e). Marten depend on cyclic prey species such as voles and mice, and can have large home ranges when prey population numbers crash. The marten is Alaska's most widely trapped animal, and at current prices brings an estimated $1 to 2 million into the state each year (ADF&G, 2011e). Below is a brief summary of available harvest information for marten in the project study area:

- During the 2005 to 2006 hunting season, approximately 409 marten were harvested from GMU 21.
- Marten are known to be abundant throughout GMU 22 and 23; however, there is no harvest information for these areas at this time.
- Approximately 222 marten were harvested during the 2005 to 2006 season in GMU 24 (Harper, 2007e).

Mink

Mink den in a burrow or hollow log near a pond or a stream, frequently using dens deserted by other animals. Mink are voracious omnivores and will occupy habitats that contain prey. They prefer streams, ponds, beaches, and wetlands, and will eat or scavenge almost anything (ADF&G, 2011e). Mink are trapped throughout the project study area; however little harvest information is available. In GMU 24 during the 2005 to 2006 hunting season, only one mink harvest was reported (Harper, 2007e).

River Otter

River otter are often found living in freshwater rivers and can be found several miles inland between bodies of water (ADF&G, 2011e). River otter develop well maintained pathways from years of use though do not appear to have exclusive territories. Although river otters may be harvested specifically for their pelts, they are commonly taken incidentally when they become

entangled in fishing nets or traps meant for other species. Below is a brief summary of available harvest information for the river otters (Harper, 2007e):

- Approximately 13 river otters were harvested in GMU 21 during the 2005 to 2006 hunting season.
- Approximately three animals were harvested in GMU 22 in 2005 to 2006.
- During 2005 to 2006, two animals were reported harvested in GMU 23 and 12 animals were reported in GMU 24.

Wolverine

Wolverines are a wide-ranging species that occur naturally at low densities and require large expanses of suitable habitat such as that found in the project study area (ADF&G, 2011e). They travel extensively in search of prey, demonstrating an ability to quickly capitalize on food resources. Wolverines are potentially subject to overharvest and other human impacts due to limited reproductive capacity. Harvest reports show (Harper, 2007e):

- During the 2005 and 2006 hunting season in GMU 21, 37 wolverine were harvested.
- In GMU 22, 44 wolverine harvests were reported in 2005 to 2006.
- Three wolverines were harvested in GMU 23 while approximately 20 animals were harvested in GMU 24 during 2005 and 2006.

Canada Lynx

Canada lynx are the only species of cat native to Alaska, inhabiting much of Alaska's forested terrain (ADF&G, 2011e). They have large home territories to search for prey, and will greatly expand their movements when food resources are scarce. Below is a brief summary of available harvest information for lynx in the project study area (Harper, 2007e):

- During the 2005 and 2006 hunting season, 291 lynx were harvested in GMU 20, 25 lynx were harvested in GMU 21, and 144 harvested in GMU 22.
- In GMU 23, harvest numbers for lynx were low during the 2005 to 2006 hunting season with only two lynx reported as harvested.

- Numbers were also low in GMU 24 in 2005 to 2006 with only 10 lynx reported harvested.

2.4.1.5 Marine Mammals

The study area for the western corridors encompasses Threatened and Endangered Species habitat for marine mammals. Construction in marine waters would be limited to that required for a port facility, for the western corridors. Ringed seals, spotted seals, Pacific walrus, bowhead whales, beluga whales, and polar bears may occur along the western shoreline of the project study area. Polar bear critical habitat and no disturbance zones may be of more concern for this project, as polar bears use terrestrial habitat that may have a higher potential for impacts from this project. More information on polar bears is included in Section 2.5.4.3, Threatened and Endangered Species.

2.4.2 Birds

Approximately 471 bird species have been positively identified by ADF&G to occur in Alaska (USFWS, 2011b). Because of the unique geographic position of Alaska, many of the state's landbirds are found nowhere else in the U.S.:

- The North American breeding populations of gray-headed chickadee, arctic warbler, bluethroat, yellow and white wagtail, and red-throated pipit nest almost entirely within Alaska.
- Alaska supports the entire U.S. breeding population of gyrfalcon, willow and rock ptarmigan, snowy and northern hawk owl, northern shrike, northern wheatear, gray-cheeked thrush, Bohemian waxwing, American tree and golden-crowned sparrows, Smith's and Lapland longspur, snow bunting, and common and hoary redpoll.
- More than 75% of the U.S. breeding populations of bald eagle, alder flycatcher, northwestern crow, boreal chickadee, blackpoll warbler, and rusty blackbird occur in Alaska.

Birds make up a large percentage of species diversity within the project study area and are known to occupy every habitat type within the project study area. Bird species identified within the project study area are included in Appendix A (Audubon Society Alaska, 2011; Cornell Lab

of Ornithology, 2011). The highest densities occur in areas dominated by tundra and riparian habitat (adjacent to freshwater streams, rivers, and lakes) consisting of tall willow and alder shrubs. The following discussion has been divided into two groups: (1) non-migratory birds, which remain resident year round, and (2) migratory birds, which travel seasonally to and from Alaska.

2.4.2.1 Non-Migratory Birds

Non-migratory birds are those that are considered resident species and stay in one place year round. Over 25 bird species endure the harsh winters of Interior and western Alaska and are considered "resident" species (ADF&G, 2011f).

2.4.2.2 Migratory Birds

Migratory birds include both neotropical (long-distance) and temperate (short-distant) migrants. Migratory bird species commit to an annual migration traversing certain parts of the globe to return to breeding and nesting grounds. Migratory birds are divided into five subgroups: (1) landbirds, (2) raptors, (3) shorebirds, (4) seabirds, and (5) waterfowl.

The USFWS has mapped migratory bird locations and densities for most species within the Tanana/Kuskwim Lowlands, Koyukuk and Kanuti NWR, and the Selawik NWR, which are located within the project study area. The USFWS reports the highest concentrations of waterfowl occur on the Noatak and Kobuk River deltas as well as in the habitats east of Selawik Lake along the Selawik and Tagagawik Rivers. Densities were generally lower during surveys for the Noatak Lowlands and the area north of the Waring Mountains. Scaups were the most widely distributed species occurring over most of the survey area.

Under the Migratory Bird Treaty Act (16 U.S.C. 703), it is illegal for anyone (unless permitted by regulations) to "take" (hunt, pursue, wound, kill, posses or transport) migratory birds, their eggs, feathers or nests. Take and possession under the Migratory Bird Treaty Act can be authorized through regulations, such as hunting regulations, or permits for purposes of salvage, research, depredation, or falconry. The Migratory Bird Treaty Act does not distinguish between intentional and unintentional take. In Alaska, all native birds except grouse, ptarmigan, and ravens (protected by the State of Alaska) are protected under the Migratory Bird Treaty Act (USFWS, 2011c).

Destruction of active bird nests, eggs, or nestlings can result from spring and summer vegetation clearing and grubbing, which would violate the Migratory Bird Treaty Act. To comply with the Migratory Bird Treaty Act, the USFWS lists the following recommended time periods for avoiding vegetation clearing within the project study area (USFWS, 2011d):

- Seward Peninsula
  - May 20 through July 20 (for habitat types that include shrub cover or marsh, pond, tundra, gravel, or other treeless/shrubless ground habitat)
    - Black scoter habitat has an extended window through August 10
  - May 20 through September 15 (for cliff and burrow seabird colonies)
  - April 15 through August 15 (for raptor and raven cliffs)
- Interior (north of Talkeetna to the south slope of the Brooks Range; west to treeline)
  - May 1 through July 15 (for habitat types that include shrub cover or marsh, pond, tundra, gravel, or other treeless/shrubless ground habitat)
  - Canada geese and swan habitat begin April 20
  - May 1 through July 20 (for cliff and burrow seabird colonies)
  - Note: Seabirds in Interior refer to terns and gulls
  - April 15 through August 1 (for raptor and raven cliffs)
- Yukon-Kuskokwim Delta (east to treeline)
  - May 5 through July 25 (for habitat types that include shrub cover or marsh, pond, tundra, gravel, or other treeless/shrubless ground habitat)
  - Black scoter habitat has an extended window through August 10
  - Canada geese and swan habitat begin April 20
  - May 20 through September 15 (for cliff and burrow seabird colonies)
  - April 15 through August 15 (for raptor and raven cliffs)

Some species and their nests have additional protections under other federal laws, including those listed under the Threatened and Endangered Species Act, and bald and golden eagles, protected under the Bald and Golden Eagle Protection Act (USFWS, 2011e).

2.4.2.3 Landbirds

Landbirds comprise the largest and most ecologically diverse subgroup of migratory birds within the project study area (Appendix A). They include raptors, grouse, woodpeckers, flycatchers, jays, chickadees, thrushes, warblers, and sparrows, among others (Boreal Partners in Flight, 1999; Alaska Raptor Management Program, 2001). Collectively, landbirds occupy all terrestrial habitats within the project study area and play a vital role in ecosystems by feeding on insect pests, pollinating plants, dispersing seeds, serving as prey, and acting as top predators.

The Partners in Flight Program was launched in 1990 in response to growing concerns about declines in populations of many land bird species, and in order to emphasize the conservation of birds not covered by existing conservation initiatives (Partners in Flight, 2011). The Boreal Partners in Flight (a coalition of individuals working to conserve bird populations throughout boreal regions of North America) uses a systematic process to identify species of conservation priority within Alaska by applying four global criteria to rank them including relative abundance, size of breeding range, size of non-breeding range, and threats to the species in non-breeding areas. The Boreal Partners in Flight coalition identified the following as priority species for western and northern Alaska:

- Gyrfalcon
- Snowy owl
- Gray-cheeked thrush
- Varied thrush
- Blackpoll warbler
- Golden-crowned sparrow
- Smith's longspur
- Rusty blackbird
- Hoary redpoll

Many of these species depend upon habitat that is dominated by shrubs, which is likely the most important landbird habitat in western and northern Alaska (Boreal Partners in Flight, 1999). Breeding distribution and abundance for the priority species is not well known. Generally, nest sites are along the foothills of the Brooks Range, but further information on breeding abundance and distribution is needed (Boreal Partners in Flight, 1999).

2.4.2.4 Raptors

Raptors are defined as birds that primarily hunt vertebrates, including other birds (BLM, 2006). They are found throughout Alaska and regularly nest along lakes, rivers, and coastlines south of the Brooks Range. There are numerous species of raptors that inhabit the project study area, including many falcon species. Accipiters (hawks that inhabit deeply wooded areas) prefer to

spend most of their time in wooded habitats, and usually nest in mixed stands of conifers and deciduous trees.

Strigiformes, such as snowy owls and short-eared owls nest on the open tundra.

2.4.2.4.1 Bald and Golden Eagles

Bald and golden eagles summer ranges extend into the western and central sections of the project study area. USFWS's Alaska Bald Eagle Nest Atlas provides a record of survey data (from surveys conducted beginning in the 1960s through 2002) for bald eagle nests throughout the state (USFWS, 2011f). According to the Atlas, survey data extends as far north as Talkeetna and no bald eagle nests have been reported within the project study area. Several parks throughout the project study area have identified bald and golden eagles as regular inhabitants and bald eagles nest on cliffs in the foothills of the Brooks Range (BLM, 1989 - Utility Corridor Plan). Since the bald and golden eagles summer ranges are known to extend into the project study area, a field survey to document nest sites will likely be required by USFWS.

Bald and golden eagles are protected under the bald eagle Protection Act of 1940, as amended (16 U.S.C. 668-668d), which prohibits anyone, without a permit issued by the Secretary of the Interior, USFWS, from "taking" bald eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." For purposes of these guidelines, "disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (USFWS, 2010). The USFWS also published National bald eagle Management Guidelines in 2007, which includes general recommendations on how to avoid disturbing bald eagles and on land management practices that could benefit bald eagles (USFWS, 2007).

In addition to immediate impacts, "taking" also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes

with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

2.4.2.5 Shorebirds, Seabirds, and Waterfowl

Numerous lakes, streams, tidal flats, wet tundra, and sedge flats support abundant populations of shorebirds, seabirds, and waterfowl such as ducks, geese, swans, and loons (Boreal Partners in Flight, 2011).

2.4.2.5.1 Shorebirds

The Alaska Shorebird Plan is one of 11 regional plans associated with the United States Shorebird Conservation Plan. The Plan presents an overview of the Shorebird Conservation Plan of Alaskan shorebirds, descriptions of priority species, and threats to shorebirds throughout Alaska (Alaska Shorebird Group, 2008). The Plan also describes a conservation strategy specific for each Bird Conservation Region (BCR) in Alaska. In addition, the Plan also identifies shorebird species of concern, or priority species, in collaboration with Partners in Flight, by weighing various risk factors that affect the conservation status of a species. There are three BCRs within the project study area, which include Western Alaska, Arctic Plains and Mountains, and Northwestern Interior Forest.

The Western Alaska BCR consists of the coastal plain and mountains of western and southwestern Alaska and is characterized by expansive intertidal habitat associated with numerous river deltas. Over half of the Western Alaska BCR is located within federal CSUs, including National Parks, Preserves, Monuments, and Wildlife Refuges. The Western Alaska BCR is suspected to host over 30 species of shorebirds. Table 2-7 lists priority species identified within the Western Alaska BCR.

Table 2-7: Priority Shorebird Species in the Western Alaska Bird Conservation Unit

Breeding	Migration	Winter
American golden-plover	Whimbrel	Black oystercatcher
Black oystercatcher	Bristle-thighed curlew	
Solitary sandpiper	Bar-tailed godwit	
Bristle-thighed curlew	Marbled godwit	
Hudsonian godwit	Black turnstone	
Bar-tailed godwit	Red knot	
Marbled godwit	Western sandpiper	
Black turnstone	Rock sandpiper	
Surfbird	Dunlin	
Western sandpiper		
Dunlin		

Source: Alaska Shorebird Group, 2008

The Arctic Plains and Mountains BCR includes low-lying coastal tundra, drier uplands of the Arctic Foothills of the Brooks Range, and montane areas of the Brooks Range. The BCR is characterized by a coastal plain landscape underlain by permafrost and dominated by surface water during the arctic summer. The Arctic Plains and Mountains BCR stretches from the shoreline of the Beaufort Sea and into the northern portion of the project study area. Table 2-8 lists priority shorebird species identified within the Arctic Plains and Mountains BCR.

Table 2-8: Priority Shorebird Species in the Arctic Plains and Mountains Bird Conservation Region

Breeding	Migration
American golden-plover	American golden-plover
Upland sandpiper	Red knot
Whimbrel	Sanderling
Bar-tailed godwit	Dunlin
Sanderling	
Dunlin	
Buff-breasted sandpiper	

Source: Alaska Shorebird Group, 2008

The Northwestern Interior Forest BCR is the largest in the state and extends from eastern Norton Sound to the Alaska-Yukon Territory border in the east, and from the southern terminus of the Kenai Peninsula in the south to the southern foothills of the Brooks Range in the north. The area is characterized by cold winters and warm summers and a mosaic of vegetation communities. The southern extent of Nulato Hills is noted as an important bird area, which supports an estimated 60% of the world's breeding population of bristle-thighed curlews. Table 2-9 lists priority shorebird species identified within the Northwestern Interior Forest BCR.

Table 2-9: Priority Shorebird Species in the Northwestern Interior Forest Bird Conservation Region

Breeding	Migration	Winter
American golden-plover	Lesser yellowlegs	Rock sandpiper
Solitary sandpiper	Whimbrel	
Lesser yellowlegs	Hudsonian godwit	
Upland sandpiper	Sanderling	
Whimbrel	Western sandpiper	
Bristle-thighed curlew	Dunlin	
Hudsonian godwit	Short-billed dowitcher	
Surfbird		
Short-billed dowitcher		

Source: Alaska Shorebird Group, 2008

2.4.2.5.2 Seabirds

Seabirds (also known as marine birds) are birds that have adapted to life within the marine environment. They almost always have webbed feet to aid movement on the surface as well as in the water. Most seabirds breed in colonies along coastlines and inland waters. Numerous seabird colony areas exist within the western portion of the project study area, which are important breeding areas for species such as the thick-billed murres, tufted puffins, and black-legged kittiwakes (ADF&G, 2011g).

The Steller's and spectacled eiders have been listed by the USFWS as threatened species. Both are diving ducks that spend most of the year in marine waters and inhabit coastal areas within the project study area. Coastal areas within the project study area have been identified by the USFWS as historic breeding grounds for the Steller's eiders. In addition, the southwest coast of Norton Sound, within the project study area, has been designated by USFWS as Critical Habitat for the spectacled eider. For more information on the Steller's and spectacled eiders, their status as a Threatened species and Critical Habitat areas, see Sections 2.5.4.1 and 2.5.4.2.

2.4.2.5.3 Waterfowl

Common waterfowl species within the project study area include the American wigeon, mallard, green-winged teal, northern shoveler, northern pintail, greater scaups, long-tailed duck (previously known as oldsquaw), black scoter, tundra swan, red-necked grebe, arctic loon, common loon, yellow-billed loon, Pacific loon, greater white-fronted goose, Canada goose, and sandhill crane (Jandt and Morkill, 1994).

McCarthy's Marsh and the upper Kuzitrin River, located on the Seward Peninsula, provide important wetlands and marsh habitat for waterfowl (Jandt and Morkill, 1994). The Koyukuk and Yukon Delta NWRs, Selawik National Wilderness Area, and Cape Krusenstern National Monument all provide important waterfowl brood areas and, in some cases, were designated as Federal Wilderness area due to their significance as important waterfowl habitat.

Trumpeter swan nesting sites have been surveyed and are documented within the project study area (BLM, 2007). Trumpeter swans in Alaska represent about 80% (13,000) of the trumpeter swans in North America, and breeding swans in Alaska are therefore a critical component of the

continental population (USFWS, 1995). Seasonally, nesting swans and swan families are widely distributed throughout the project study area.

2.4.3 Fish

Fish that inhabit the rivers, streams, and lakes throughout the project study area are an important subsistence resource for the residents of the region. Not only are fish essential for human populations, they are also important to the diet of wildlife species that inhabit the project study area. The following species have been documented throughout the project study area. Additional information on anadromous fish streams within the project study area is located in Section 2.6.1. For more information on subsistence use areas, see Section 2.2.

Alaska Blackfish

Alaska blackfish (*Dallia pectoralis*) are found only in Alaska and eastern Siberia, and are an important winter subsistence resource for both human and dog consumption (ADF&G, 2011h). This species typically lives in the densely vegetated areas of lowland swamps, ponds, rivers, and lakes. Alaska blackfish are known to occur in the project study area; however, little information is available on their exact locations.

Alaska blackfish are rather sluggish, bottom-dwelling fish that use their large pectoral fins to paddle slowly about the vegetation in search of food. Spawning occurs from May to August, and individual fish may spawn several times (ADF&G, 2011h).

Arctic Char

Arctic char (*Salvelinus alpinus Linnaeus*) are present throughout Alaska. Within the project study area, they are found in lakes in the Brooks Range, the Kigluaik Mountains, and the Kuskokwim Mountains. Arctic char are sought throughout the project study area by both sport and subsistence fisherman. Arctic char are thought to spawn only every other year. Spawning usually occurs from August through October, probably over steep, broken substrates or gravel shoals at sufficient depth to be protected from winter ice (ADF&G, 2011h).

Arctic Grayling

Arctic grayling (*Thymallus arcticus*) are an important resource for both subsistence and sport fishing, and are found in most streams, rivers, and lakes throughout the project study area.

Grayling can be highly migratory, using different streams for spawning, rearing, summer feeding, and overwintering. However, in some areas, they can complete their entire life without leaving a short section of stream or lake. Older, larger adults tend to be more prevalent in the upper reaches of rivers and stream systems. Sub-adults inhabit the middle sections of the waterways. Juvenile grayling are found in the lower ends. After spawning, grayling tend to occupy quieter waters close to where they were spawned. In the early fall, grayling begin to slowly migrate, between several to one hundred miles, to overwintering areas, which are typically downstream of feeding areas (ADF&G, 2011h).

Arctic Lamprey

Arctic lamprey (*Lampetra camtschatica*) are the most common lamprey found in Alaska and are an important subsistence resource. Arctic lamprey are commonly observed in the Yukon River during their fall migration up stream. Lamprey are found at sea at depths up to 50 meters. During spawning, lamprey migrate to clear streams of moderate flow, and stay out of main river currents. Possible threats to lampreys include pollution of spawning streams and potential for overharvest by subsistence and commercial fisheries. Once lamprey pass the larval stage they migrate out to sea to feed by attaching parasitically to various species of fish (ADF&G, 2001k). Arctic lamprey appear to have similar habitat needs and life histories to anadromous salmon (ADF&G, 2011h).

Bering Cisco

Bering cisco (*Coregonus laurettae*) are a subsistence fish found in streams throughout the west and southwest sections of the project study area. Bering cisco are primarily found in freshwater and coastal marine waters, but some populations are anadromous and undertake extreme spawning migrations into freshwater systems. Some populations spend winters in freshwater, far from sea. Upstream migrations occur in late summer. Bering cisco are believed to spawn in the fall, but little is known about spawning behavior or the location of spawning grounds (ADF&G, 2011h).

Dolly Varden

Dolly Varden (*Salvelinus mama Walbaum*) occupy most of the coastal waters of Alaska, and are thought to occur in every anadromous stream or river within the project study area. Dolly

Varden are a highly sought after sport fish and an important subsistence resource (ADF&G, 2011h). Dolly Varden migration patterns are highly variable. Most southern-form Dolly Varden spend winters in lakes, while the northern form usually overwinter in rivers or springs. While at sea, Dolly Varden generally stay near shore, but may travel long distances along the coast, frequently ascending rivers to feed or find a suitable place (lake or river) to spend the winter.

Spawning occurs in the fall between the months of September and November in small headwater streams. Upon reaching maturity (2-4 years), Dolly Varden migrate to sea, usually in May or June. Dolly Varden return to spawn in their stream of origin or "natal stream" upon reaching sexual maturity (ADF&G, 2011h).

Northern Pike

Northern pike (*Esox lucius*) range from the interior of the state to the Arctic coast, are a common subsistence fish for area residents, and are a popular sport fish as well (ADF&G, 2011h). Northern pike are found in most major streams and rivers throughout the project study area. Most Northern pike overwinter in the deep slow waters of large rivers, and migrate to shallow spawning areas, and then on to warm shallow areas for summer (ADF&G, 2011h).

Lake Trout

Lake trout *(Salvelinus namaycush)* are Alaska's largest freshwater fish, and they occur in lakes throughout the Brooks Range (ADF&G, 2011h). Lake trout are mostly sought after by sport fisherman, but are also a subsistence resource. Lake trout prefer large, deep, cold lakes in which they spend their entire lives. Spawning takes place over clean, rocky lake bottoms in September or October, with eggs hatching early the next spring.

Sheefish

Sheefish *(Stendous leucichthys)* are recognized as an important subsistence species in the project study area, and are also sought for sport fishing, and live throughout Alaska's major Arctic rivers and tributaries. Sheefish prefer slow water velocity, and will not ascend streams or rapids (Alt, 1973). Five populations have been identified in the project study area, including the Minto flats, upper Yukon River, lower Yukon River, Kuskokwim River, and Selawik-Kobuk populations. Sheefish move upstream to spawn and prefer large rivers and deep water (ADF&G, 1978).

Spawning survey work has included reconnaissance on the Selawik River (Underwood, 1998), the Kobuk River (between Reed River and Kalla) (Savereide, 2009) and tributaries to the Yukon (USFWS, 2011g) and Kuskokwim (Stuby, 2010).

Salmon

Five different Pacific salmon species inhabit the waters within the project study area. All five species are important for subsistence and sport fishing: king salmon (*Oncorhynchus tshawytscha*), chum salmon (*Oncorhynchus keta*), Coho salmon (*Oncorhynchus kisutch*), pink salmon (*Oncorhyncus gorbuscha*), and sockeye salmon (*Oncorhynchus nerka*) (ADF&G, 2011h). Pacific salmons' life histories includes incubation and hatching of embryos; emergence and initial rearing of juveniles in freshwater; migration to oceanic habitats for extended periods of feeding and growth; and return to natal waters for completion of maturation, spawning, and death. Pacific salmon spawning runs occurs from May thru August (National Marine Fisheries Service [NMFS], 2011a). Pacific salmon species are found in most waterways throughout the project study area.

2.4.4 Federally Listed Threatened and Endangered and Candidate Species

The Endangered Species Act of 1973 was designated to protect critically compromised species from extinction; these include fish, wildlife, and plants that are listed by the federal government as Endangered or Threatened. A species is listed either as Threatened or Endangered depending on its status and the degree of threat it faces. A "Threatened species" is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. An "endangered species" is in danger of extinction throughout all, or a significant portion of its range.

The USFWS and the NMFS are the primary federal agencies monitoring and documenting Threatened and Endangered species and their habitats. Four USFWS-listed threatened species occur within the project study area: the Steller's eider (*Polysticta stelleri*), spectacled eider (*Somateria fischeri*), polar bear (*Ursus maritimus*) (USFWS, 2011h), and the bowhead whale (*Balena Mysticetus*) (NMFS, 2011b). Each of these species is discussed in detail below.

According to the Endangered Species Act, "Critical Habitat" specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the provisions

of Section 4 of the Endangered Species Act, and on which are found those physical or biological features (1) essential to the conservation of the species and, (2), which may require special management considerations or protection.

2.4.4.1 Steller's Eider

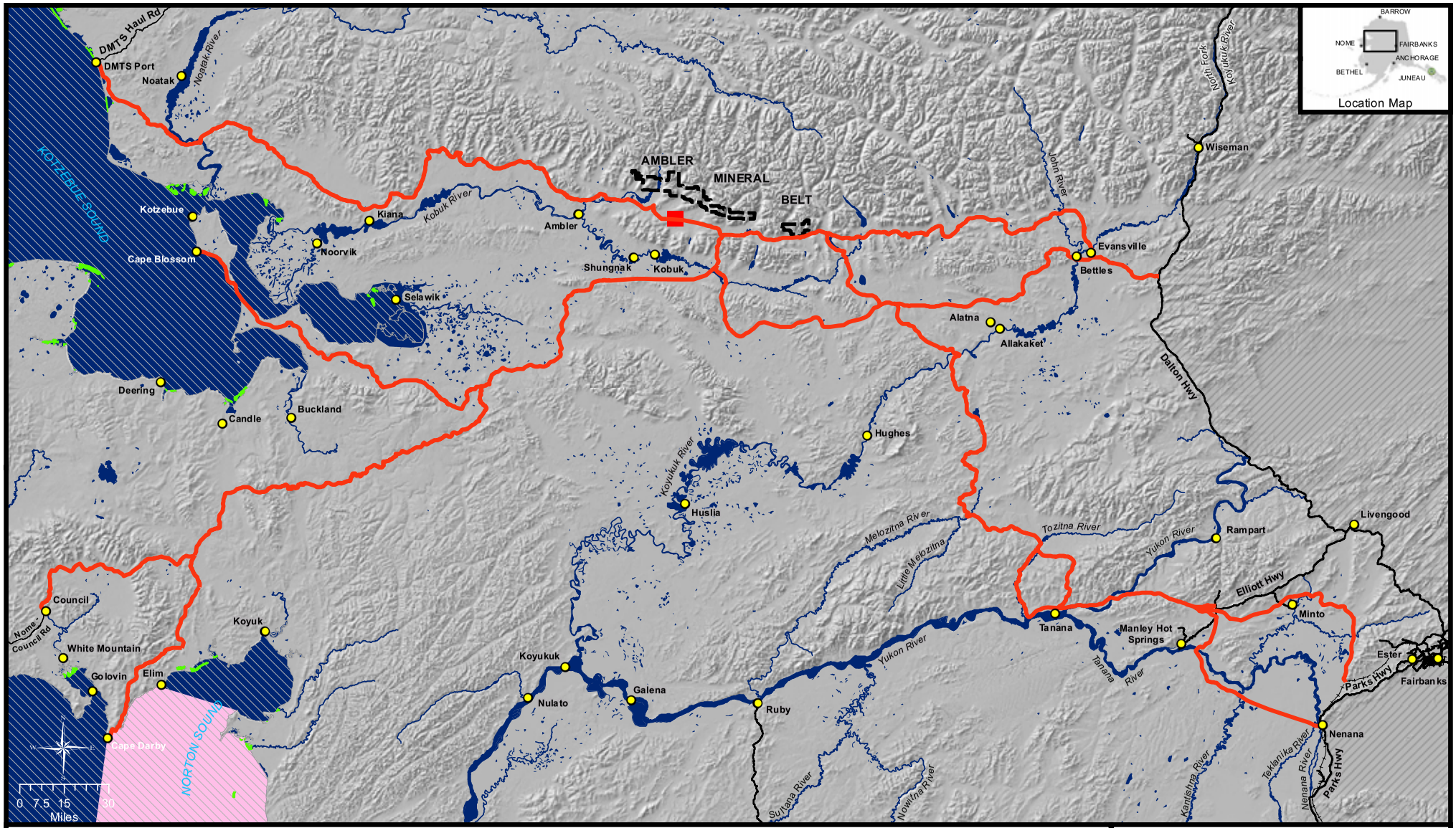
Steller's eiders are diving ducks that spend most of the year in marine waters and migrate through coastal areas to reach historic breeding grounds located along the northern coast of Alaska (USFWS, 2011h). According to ADF&G's Steller's eider range map, the species occurs in the project study area along the coastline, near the DMTS Port Corridor (ADF&G, 2011r).

The Alaska-breeding population of Steller's eider nests in two general areas: on the North Slope and on the Yukon Kuskokwim Delta (USFWS, 2011k). Around the time of spring break‐up, breeding pairs move to nesting areas on wet, coastal tundra. While this species may migrate through the western coastal areas of the project study area, no designated Critical Habitat exists within the project study area.

2.4.4.2 Spectacled Eider

Spectacled eiders are diving ducks that spend most of the year in marine waters. During spring break-up, breeding pairs move to nesting areas on wet coastal tundra north of the project study area. When moving between nesting and molting areas, spectacled eiders travel along the coast, up to 31 miles (50 kilometers) offshore. Offshore molting areas are located in Norton Sound, along the western coast of the project study area (Figure 25). Historically, spectacled eiders nested along much of the coast of Alaska. Today, only two nesting grounds remain in Alaska and are located outside the project study area (USFWS, 2011i). According to the USFWS, the spectacled eider's current breeding range is located outside of the project area and occurs along the North Slope and Yukon-Kuskokwim Delta (USFWS, 2011i).

The USFWS has designated Critical Habitat for the spectacled eider within the waters of Norton Sound in the southwest section of the project study area (Figure 25) (USFWS, 2011i). None of the proposed corridors would be constructed within coastal waters; therefore, designated Critical Habitat would not be impacted by the road or rail construction. However, construction of port facilities in this area would trigger Section 7 Consultation under the Endangered Species Act.



Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Preliminary Corridors
Proposed Staging Area
Spectacled Eider Critical Habitat
Polar Bear
Barrier Islands Critical Habitat
Feeding Critical Habitat

Sources:
Spectacled Eider: USFWS
Polar Bear: USFWS

Coordinate System: NAD 1983 Alaska Albers

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NORTHERN REGION

AMBLER MINING DISTRICT ACCESS
ENVIRONMENTAL OVERVIEW MEMORANDUM

DESIGNATED CRITICAL HABITATS

DATE: May 13, 2011

Figure 25

P:\Projects\D60693\GIS\ENV\ENVIRONMENTAL OVERVIEW MEMORANDUM\Threatened Endangered Candidate Species.mxd May 13, 2011 8:09:48 AM User: blarrel

2.4.4.3 Polar Bear

Polar bears associated with the coastline of the project study areas generally concentrate along the shore when the sea ice has thawed ("open water period"), or when mating or rearing cubs. Most dens in the circumpolar Arctic are located on land in areas where snow accumulates, such as along coastal bluffs or riverbanks. Pregnant females enter maternity dens in October/November.

On November 24, 2010, USFWS announced the final designation of polar bear Critical Habitat (published in the Federal Register on Tuesday, December 7, 2010) (Figure 25). Multiple shorelines throughout the western sections of the project study area are within designated critical habitat/or no disturbance zones for polar bears.

2.4.4.4 Bowhead Whale

Bowhead whales are circumpolar, ranging throughout high latitudes in the Northern Hemisphere. They spend the winter associated with the southern limit of the pack ice, and migrate north as the sea ice breaks up and recedes during spring. Five distinct stocks of bowhead whales are recognized worldwide. The Bering-Chukchi-Beaufort Sea stock is associated with the coast of the project study area, inhabiting the Bering, Chukchi, and Beaufort Seas.

2.4.4.5 Threatened and Endangered Candidate Species

USFWS and NMFS maintain Candidate lists of species for which there is sufficient information to indicate that their listing as Threatened or Endangered is warranted, but preparation of a formal listing proposal is precluded by other, higher priority activities (USFWS, 2011h). Candidate species receive no statutory protections under the Endangered Species Act; however, candidate status informs people these are species of conservation concern. Four species within the project study area are listed as Candidate Species under the Candidate Conservation program: yellow-billed loon (*Gavia adamsii*), Pacific walrus (*Odobenus rosmarus divergens)*, ringed (*Phoca hispida*) and bearded seal (*Erignathus barbatus*). Each of these species is discussed in detail below.

Yellow-billed Loon

The yellow-billed loon is currently designated by USFWS as a candidate species. In 2009, the USFWS determined listing the yellow-billed loon as a Threatened or Endangered species is warranted, but their listing is precluded by other higher priority species. The reasons for listing include the small population size, restricted breeding grounds, and their vulnerability to human impact (USFWS, 2011j).

Yellow-billed loons are found throughout northwestern Alaska. During summer months, yellow-billed loons can be found in northern and western Alaskan tundra on freshwater lakes (ADF&G, 2011n). According to ADF&G, the range of the yellow-billed loon covers the western portion of the project study area to the extent that each western route under consideration crosses areas where the species could occur. In 2005 and 2007, the USFWS conducted yellow-billed loon surveys of western Alaska (USFWS, 2005 and 2007). The aerial surveys were conducted entirely within the project study area, specifically in and around Bering Land Bridge National Preserve and Cape Krusenstern National Monument. The survey (conducted in June 2005) documented an estimated 128 nests and 121 yellow-billed loons with most concentrated in the northern portion of the Seward Peninsula. The 2007 survey documented an estimated 136 yellow-billed loons and 18 nests in the same area surveyed in 2005.

Bearded Seal, Ringed Seal, and Pacific Walrus

Distribution of these species varies seasonally, and is limited by water depth and sea ice conditions. The bearded seal, ringed seal, and Pacific walrus are considered ice-dependent species because they use floating sea ice for calving, nursing, resting, isolation from predators, and passive transport to new feeding areas. Most of these species' populations spend the summer months in the pack-ice of the Chukchi Sea. There are no designated Critical Habitats for these species.

2.4.5 Designated Species of Special Concern and Sensitive Species

2.4.5.1 Alaska Department of Fish and Game Designated Species of Special Concern

A number of state-designated Species of Special Concern occur within the project study area. Species of Special Concern are described by the ADF&G 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

due to low numbers, restricted distribution, dependence on limited habitat resources, or sensitivity to environmental disturbances." (ADF&G, 2011i). Table 2-10 lists designated Species of Special Concern that may be found within the project study area.

2.4.5.2 Bureau of Land Management Designated Sensitive Species

A number of BLM-designated Sensitive Species also occur within the project study area. BLM Sensitive Species are defined as species listed, or proposed for listing, under the Endangered Species Act; or requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the Endangered Species Act. All federal candidate species, proposed species, and delisted species in the 5 years following delisting are BLM-designated sensitive species.

Table 2-10 lists designated sensitive species that may be found within the project study area.

Table 2-10: Alaska Department of Fish and Game Designated Species of Special Concern and Bureau of Land Management Designated Sensitive Species

Species	ADF&G-Listed Species of Special Concern	BLM-Designated Sensitive Species
American peregrine falcon (*Falco peregrines anatum*)	X	
Arctic peregrine falcon (*Falco peregrines tundrius*)	X	
Olive-sided flycatcher (*Contopus cooperi*)	X	
Blackpoll warbler (*Dendroica striata*)	X	
Red-throated loon (*Gavia stellata*)		X
Harlequin duck (*Histrionicus histrionicus*)		X
Bristle-thighed curlew (*Numenius tahitiensis*)*		X
Red knot (*Calidris canutus*)		X
Trumpeter swan (*Cygnus buccinators*)		X
Black brant (*Branta bernicla*)*		X

* Species located within project study area but habitat is not traversed by any corridor.

2.5 Rivers, Streams, and Lakes

2.5.1 Cataloged Anadromous Streams and Lakes

Anadromous waters are of particular importance because they sustain fish populations crucial to subsistence based communities. Anadromous fish identified in the project study area include king salmon, chum salmon, Coho salmon, pink salmon, sockeye salmon, Dolly Varden, whitefish (various species), and sheefish. Salmon habitat is considered Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act. Any work within

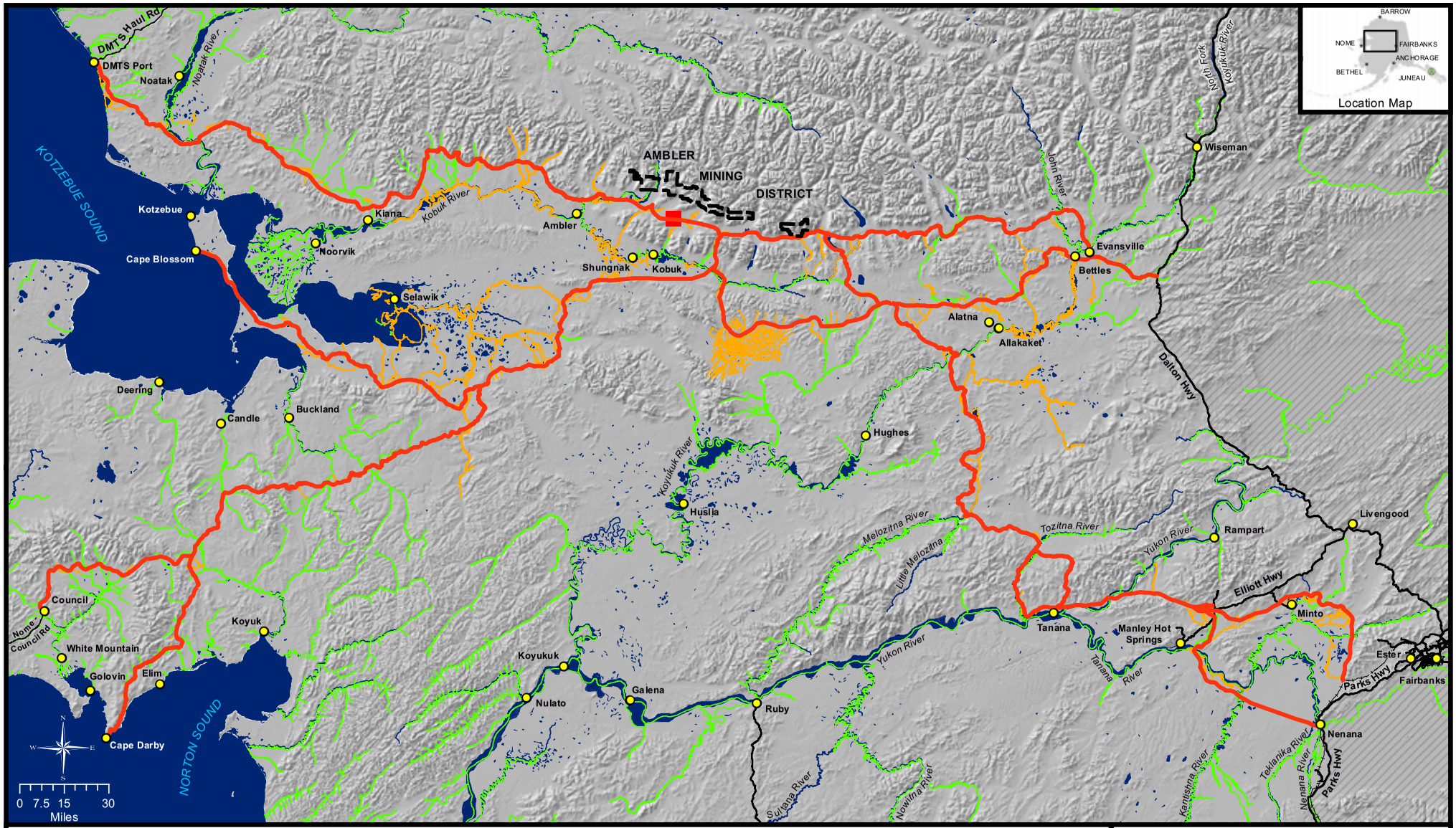
Essential Fish Habitat requires an Essential Fish Habitat Assessment and consultation with NMFS.

The ADF&G Anadromous Water Catalog (AWC) was consulted to identify anadromous waters in the project study area (Figure 26). ADF&G estimates that current AWC mapping contains less than 50% of anadromous streams in the state, and that more than 20,000 additional anadromous waters across the state have not been identified or included in the AWC (ADF&G, 2010j). Only limited mapping of anadromous waters has occurred in the project study area.

Anadromous waters mapped in the ADF&G AWC are typically large main-stem rivers in the project study area. Little mapping data is available for anadromous fish in tributary streams or smaller watershed systems. Smaller tributary streams in upper watersheds often provide the most productive spawning and rearing habitats for a diverse range of fish populations (Bates et al., 2008). Ephemeral (seasonal) streams may also act as migration corridors allowing fish to access upstream water bodies.

The likelihood of anadromous fish presence in unmapped streams can be estimated by comparing the gradients of mapped streams to interconnected unmapped streams. For fish to move upstream, the swimming velocity of the fish (and power required to obtain this swimming velocity) must be great enough to overcome the velocity and energy of the water flowing downstream (Behlke, 1991). The velocity of water is dependent on gradient, channel shape and roughness, and flow of the stream.

Stream gradients can be predicted using the available topographic data to a much greater extent than other factors affecting fish habitat, such as water quality (temperature, dissolved oxygen, salinity, etc.), substrate type, and cover requirements. Stream gradient is directly tied to stream bed load and grain size, which in turn affects spawning habitat and is a defining force in the development of different stream morphologies (Rosgen, 1996; Bates et al., 2008). Geographic Information System analysis was used to estimate general stream gradients of AWC-mapped anadromous streams in the project study area. The upper portions of the AWC-mapped streams typically had a maximum gradient of approximately 8%. The digital elevation model used for this analysis has a pixel resolution of 60 meters by 60 meters, so there is inherently error in determining stream gradients, especially for smaller streams. Gradients were determined for



Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Preliminary Corridors
Proposed Staging Area
Cataloged Anadromous Streams
Assumed Anadromous Streams

Sources:
Cataloged Anadromous Streams: ADF&G

Coordinate System: NAD 1983 Alaska Albers

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ANADROMOUS STREAMS

DATE: May 13, 2011

Figure 26

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unmapped streams using the same digital elevation model data, and an analysis was completed to identify all unmapped streams with gradients of 8% or less that are connected to mapped anadromous waters. Any streams identified through this analysis are believed to have a high likelihood of supporting anadromous fish populations and are assumed to be anadromous streams for the purpose of this study (Figure 26). The Geographic Information System analysis of stream gradients was completed to assist in narrowing down the proposed corridor alternatives based on anadromous fish presence. It should be noted that individual stream obstructions are unknown, and may significantly affect the probability of this analysis regardless of gradients. Ultimately, the analysis will need to be validated against empirical data.

2.5.2 Resident Streams and Lakes

Many streams in the project study area also support resident (non-anadromous) fish populations. These include ephemeral (seasonal) channels that may temporarily provide access to upstream water bodies or seasonal spawning and rearing habitat. Resident fish species are important subsistence resources for area residents, and essential to maintaining healthy ecologically-diverse watersheds. Resident fish identified in the project study area include Arctic grayling, Dolly Varden, Arctic char, burbot, northern pike, whitefish (various species), sheefish, and slimy sculpins. The ADF&G Alaska's Fisheries Atlas Volume II maps resident fish populations; however, this mapping is dated and may not be comprehensive (ADF&G, 1978). Resident fish populations are widespread across waters of the Brooks Range and Interior Alaska, and may occupy the majority of the streams in the project study area.

2.5.3 River Navigability

Various federal and state agencies define and determine navigability of water in the project study area. State and federal determinations may differ, and sometimes conflict. Navigable waters of the U.S., as defined in Code of Federal Regulations 33 CFR 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 while the waterway is in its ordinary condition. Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), approved March 3, 1899, prohibits the unauthorized obstruction of a navigable water of the U.S.

The Clean Water Act (CWA) also uses the terms "navigable waters," "waters of the U.S.," and "navigability" to define its applicability. "Waters of the U.S." include not only navigable waters, but also waters with "a significant connection to navigable waters."

2.5.3.1 United States Coast Guard

The United States Coast Guard (USCG) has permit authority for navigable waters of the U.S., as defined in 33 CFR 329. Under Section 9 of the Rivers and Harbors Act of 1899, a USCG Bridge Permit would be required to construct any bridge or causeway over any navigable river or navigable water of the U.S. The USCG maintains a list of waters they consider navigable, which was last updated in 2000. The USCG is currently in the process of updating their list of navigable waters, which should be made available in September 2011 (Webber, 2011). Once a preferred corridor study area is selected, DOT&PF may need to request additional navigability determinations from the USCG. See Table 2-11 for waters determined to be navigable by USCG (USCG, 2000).

Table 2-11: Designated Navigable Waters within the Study Area

Water Body	USACE	DNR	USCG	BLM
John River	x			
Kobuk River	x	x	x	x
Koyukuk River	x	x		x
Noatak River	x	x	x	x
Selawik Lake	x			x
Yukon River	x		x	x
Selawik River		x		
Olikatuk Channel		x		
Lewis Rich Channel		x		
Riley Channel		x		
Melvin Channel		x		
Buckland River		x		
Little Noatak		x		
Shiliak Creek		x		
Tanana River			x	
Ambler River				x

2.5.3.2 Bureau of Land Management

The BLM has prepared administrative navigability determinations, through the recordable disclaimers of interest process, in support of land transfer actions under the Alaska Statehood Act, ANCSA, and the Native Allotment Act. The Submerged Lands Act of 1953 confirmed that states own the unreserved beds of navigable waters. The State of Alaska is using the recordable

disclaimers of interest process to confirm the state's ownership of navigable rivers and lakes (BLM, 2011c).

2.5.3.3 United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE) has regulatory and permitting authority for navigable waters of the U.S. under Section 9 of the Rivers and Harbors Act of 1899. Navigable Waters of the U.S. under this Act include oceans and navigable coastal and inland waters, lakes, rivers, and streams. The USACE jurisdiction extends shoreward to the mean high water line. The USACE general definition of navigable waters of the U.S. are: "Those waters subject to the ebb and flow of the tide shoreward to the mean high water mark 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 water body, and is not extinguished by later actions or events which impede or destroy navigable capacity." This statute also requires a permit from the USACE for any construction in or over any navigable water, or the excavation or discharge of material into such water, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters.

2.5.3.4 State of Alaska

The DNR Division of Navigability defines navigability as those water bodies that are used, or are susceptible of being used, in their ordinary condition, as highways of commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water (DNR, 2011c). The water body must be usable as a highway for the transportation of people or goods.

The use of water bodies for transportation in connection with natural resources exploration or development, government land management, management of fish and game resources, or scientific research is also evidence of navigability. Travel by local residents or visitors for the purpose of hunting, fishing, and trapping, or as a means of access to an area can be used to establish navigability. The same holds for recreational transportation, including personal travel and professionally guided trips.

The DNR Division of Navigability Project enables the state to assert ownership of lands beneath navigable waters. The mission of the DNR Navigability Project to protect the public's rights associated with navigable and public waters and to ensure that the state's title to lands beneath navigable waters is protected (DNR, 2011c). This is important for two reasons--first, the public will be ensured access to these state lands; and second, these lands are not counted against Alaska's statehood land entitlement and cannot be conveyed by the federal government to non-state ownership (DNR, 2011c).

Due to the limited overland transportation system in the project study area, barge traffic is the primary means for delivering seasonal supplies of dry cargo and bulk fuel to nearly all the communities located along navigable rivers. Where rivers cannot be navigated due to shallow waters, supplies must typically be delivered by air cargo at substantially elevated costs (CH2M Hill, 2004). The extent of navigability on each river varies throughout the year and as river levels fluctuate. Typically, navigability is highest when water levels rise during the spring breakup and during periods of high precipitation in the fall (R&M Consultants, Incorporated, 2005). River navigability is generally available during the summer months from approximately mid-June to mid-September.

2.5.3.5 Navigable Waters within the Study Area

Based on the information obtained from the DNR, BLM, USACE, and the USCG the following navigable waters, as defined by the respective agency, occur within the study area (DNR, 2011a; USACE, 2011; USCG, 2000; BLM, 2011c).

2.5.4 Aquatic Resource of National Importance

As defined by the CWA Section 404(q), an Aquatic Resource of National Importance is a resource-based threshold used to determine whether a dispute between the U.S. Environmental Protection Agency (USEPA) and the USACE regarding individual permit cases are eligible for elevation under the 1992 Memorandum of Understanding. Factors used to identify Aquatic Resources of National Importance include the following: economic importance of the aquatic resource, rarity or uniqueness, and/or importance of the aquatic resource to the protection, maintenance, or enhancement of the quality of the Nation's waters (USEPA, 2011a). The

potential presence of Aquatic Resources of National Importance in the project study area will need to be verified with the USEPA.

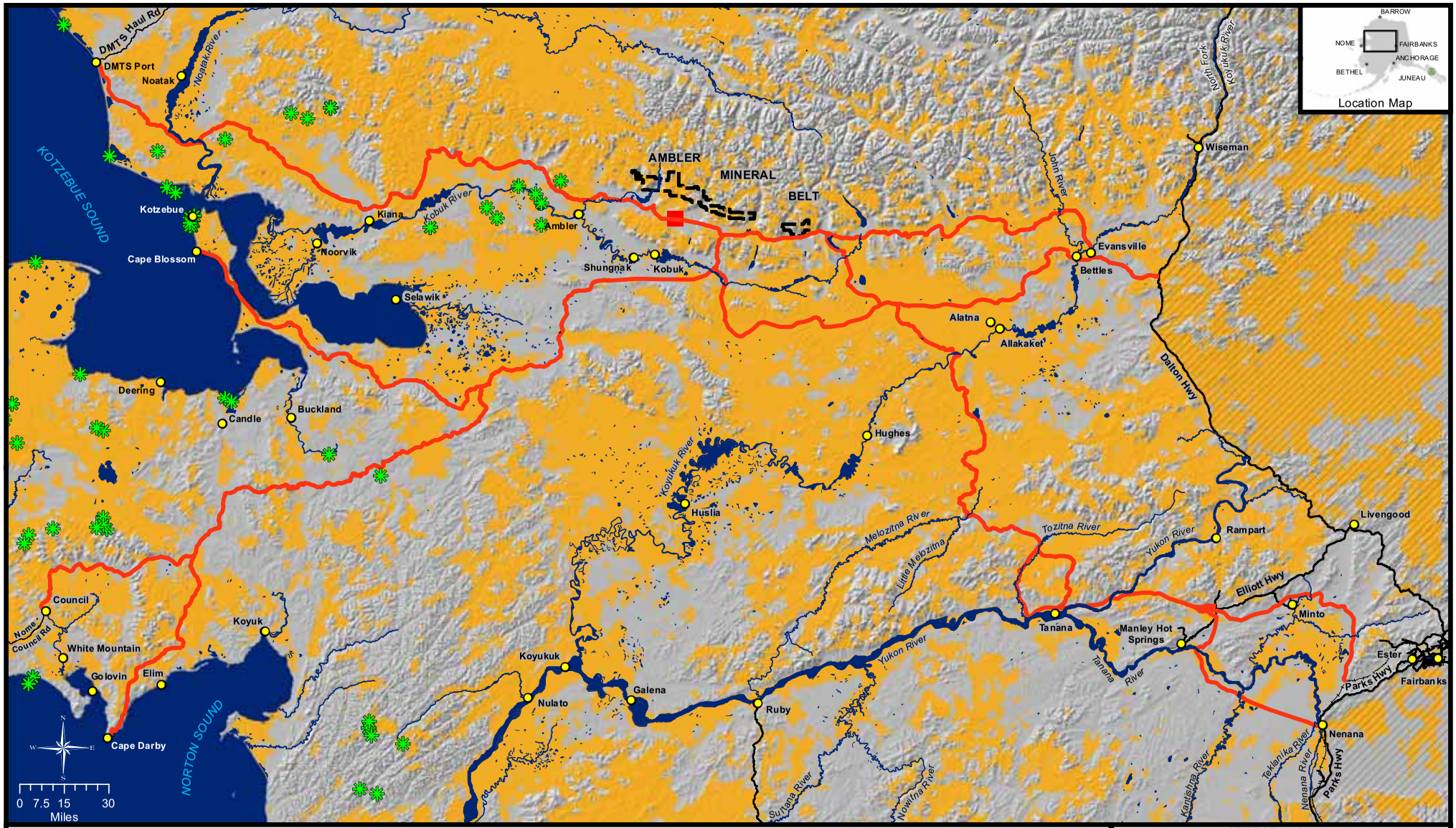
2.6 Wetlands and Vegetation

2.6.1 Wetlands

Most of the project study area can be assumed to contain wetlands of varying extent and value. Wetlands serve as valuable habitat to wildlife and fish, including a number of listed and Candidate, Endangered, and Threatened species. Coastal and riparian wetlands are important to salmon habitat. Wetlands are not only vital to anadromous and estuarine dependent fish such as salmon, but also to migratory waterfowl and shorebirds, raptors, other migratory birds, marine mammals, moose, otters, and many other mammals. In addition, wetlands support subsistence fisheries for Native and rural non-Native Alaskans, as well as hunting and bird watching activities.

Wetlands are defined by the USACE as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (USACE, 1987). Wetlands serve a number of essential functions including flood control, water storage, filtration of runoff, and habitat. Because of the recognized values inherent in wetland functions, these areas are protected and regulated by federal law, under the CWA. The USACE provides regulatory oversight of wetlands through the Section 404 permitting process and the 404(b)(1) guidelines of the CWA, which require avoidance, minimization, and mitigation of impacts to wetlands (USEPA, 2011b).

The National Wetlands Inventory mapping covers less than 20% of the study area and is based primarily on analysis of aerial photography and topographic information (Figure 27). Groundtruthing has not been performed to verify wetland boundaries. Therefore, vegetation data, available in the Statewide Vegetation/Land Cover Raster Data Set (Fleming, 1996), was used to identify areas likely to contain wetlands. Based on this evaluation, the majority of the project study area includes areas likely to contain wetlands, except areas located in uplands and mountain bluff areas (Figure 27). A field survey will be needed as part of a future phase for this project to more accurately determine wetland boundaries as well as functions and values.



Communities and Place Names
Railroad
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Preliminary Corridors
Proposed Staging Area
High Probability Wetland Areas
Documented Rare Plant Sites

Sources:
National Wetlands Inventory: NWI
Documented Rare Plant Sites: BLM

Coordinate System: NAD 1983 Alaska Albers

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AREAS LIKELY TO CONTAIN WETLANDS
AND RARE PLANT SPECIES

DATE: May 13, 2011 | **Figure 27**

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2.6.2 Vegetation

A mosaic of vegetation communities exist within the project study area. The most dominant vegetation community is boreal forest, which has arisen from the interplay of elevation, aspect, permafrost, surface water, and fire. Needle leaf, deciduous, and mixed forests are also represented within the project study area. Tall shrub communities occur along rivers and within drainages. Bogs, consisting of low shrubs and shrub-graminoid communities, are common in the lowlands. Alpine dwarf shrub communities are common throughout mountainous regions, while the highest elevations are generally devoid of vegetation (Stowe et al., 2003). Vegetation is important as browse, forage, and shelter habitat for wildlife, and also plays a key role in sustaining the natural biological and ecological processes. State and federal resource agencies focus on preservation and minimization of impacts to natural vegetation as a means of sustaining and promoting natural processes and environmental resources under their jurisdiction.

Detailed descriptions of vascular plant species found in the National Parks, Preserves, and Monuments that are located within the project study area can be found in the *Vascular Plants Inventory of Alaska's Arctic National Parklands.*

2.6.2.1 Rare Plant Species

The Endangered Species Act in 1973 spurred interest in the conservation of rare plants and led to the adoption of policies and regulations designed to ensure their survival. Rare plants are important not only for their own value, but as indicators of unusual or rare communities and natural habitats. Areas with rare plants may be centers of high biodiversity, or refuge areas where species survived the last ice age. Knowing about the presence of rare species ahead of time allows development projects to be planned so as to minimize disturbance to those populations and reduces delays during the regulatory and environmental review process (Alaska Natural Heritage Program [ANHP], 2011).

The ANHP partners with many federal and state agencies (U.S. Forest Service, BLM, ADF&G, and USEPA) to maintain a comprehensive list of rare plant species in Alaska (ANHP, 2011). Rare plant species within the BLM's Kobuk-Seward Planning Area are listed in Table 2-12, and their locations are shown on Figure 27 (BLM, 2006). The BLM's Central Yukon RMP, which

covers the rest of the project study area, has not been updated since 1986, and does not have specific information on rare plant species.

2.6.2.2 Invasive Plant Species

An "invasive species" is defined as a species that is: (1) non-native to the ecosystem under consideration, and (2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112). There is little known information about invasive plant species in the project study area; however, it is likely that this will be an issue of concern with the resource agencies that have jurisdiction over the CSUs in the study area. New transportation corridors act as avenues for expansion of invasive plant species, as seeds are often unintentionally introduced during construction activities, and post-construction, as vehicles travel along the corridor. There is growing concern by the BLM and other resource agencies that the Dalton Highway has enabled the northward expansion of invasive plants. Twenty-eight non-native invasive plant species have already been identified on lands along or near the highway, and serious economic and ecological harm is predicted if these species are left to expand their range (BLM, 2009).

Table 2-12: Alaska Natural Heritage Program Rare Plant Species List

Location	Rare Plant Species
Kobuk-Seward Peninsula	Small-leaf bittercress *(Cardamine microphylla* ssp.*blaisdellii*)
	Hudson Bay sedge (*Carex heleonastes)*
	Windmill fringed gentian (*Gentianopsis detonsa* ssp. *detonsa*)
	Strawberry cinquefoil (*Potentilla fragiformis*)
	Chukchi primrose (*Primula tschuktschorum*)
	Greenland buttercup (*Ranunculus auricomus*)
	Glacier buttercup (*Ranunculus glacialis* ssp. *chamissonis*)
	Krause's sorrel (*Rumex krausei*)
	Waring mountain saw-wort (*Saussurea triangulata*)
	Johnson's false candytuft (*Smelowskia johnsonii*)
	Siberian oatgrass (*Trisetum sibiricum* ssp. *litorale*)
	Purple wormwood (*Artemisia globularia* var. *lutea*)
	Bering Sea wormwood (*Artemisia senjavinensis*)
	Alaskan Glacier Buttercup (*Beckwithia glacialis* ssp.*alaskensis*)
Nulato Hills ACEC	Alaskan douglasia (*Douglasia alaskana*)*
	Bering Sea doulasia (*Douglasia beringensis*)*
	Barneby's locoweed (*Oxytropis arctica* var. *bamebyana*)
	Kobuk locoweed (*Oxytropis kobukensis*)
	Hairy lousewort (*Pedicularis hirsuta*)
	Stipulated cinquefoil (*Potentilla stipularis*)*

* ANHP, 2011

To help address the problem, the BLM is proposing to implement an Integrated Invasive Plant Strategic Plan for the BLM Dalton Highway Management Area. The purpose of this Plan is to provide a strategy for the control, monitoring, prevention, and management of invasive plants in cooperation with state and federal agencies, private industry, landowners, and the public.

It is likely that resource agencies will require development of a similar strategic plan for control, monitoring, prevention, and management of invasive plants, for this project. Once a preferred corridor study area is selected, it may be appropriate to conduct invasive plant species surveys, along with the wetland delineation field survey, to create baseline data for use in development of a strategic management plan for invasive species.

2.7 Historic and Cultural Resources

DOT&PF conducted research to identify, described, and analyze known cultural resources along the potential transportation corridors considered in this report (Figure 28).

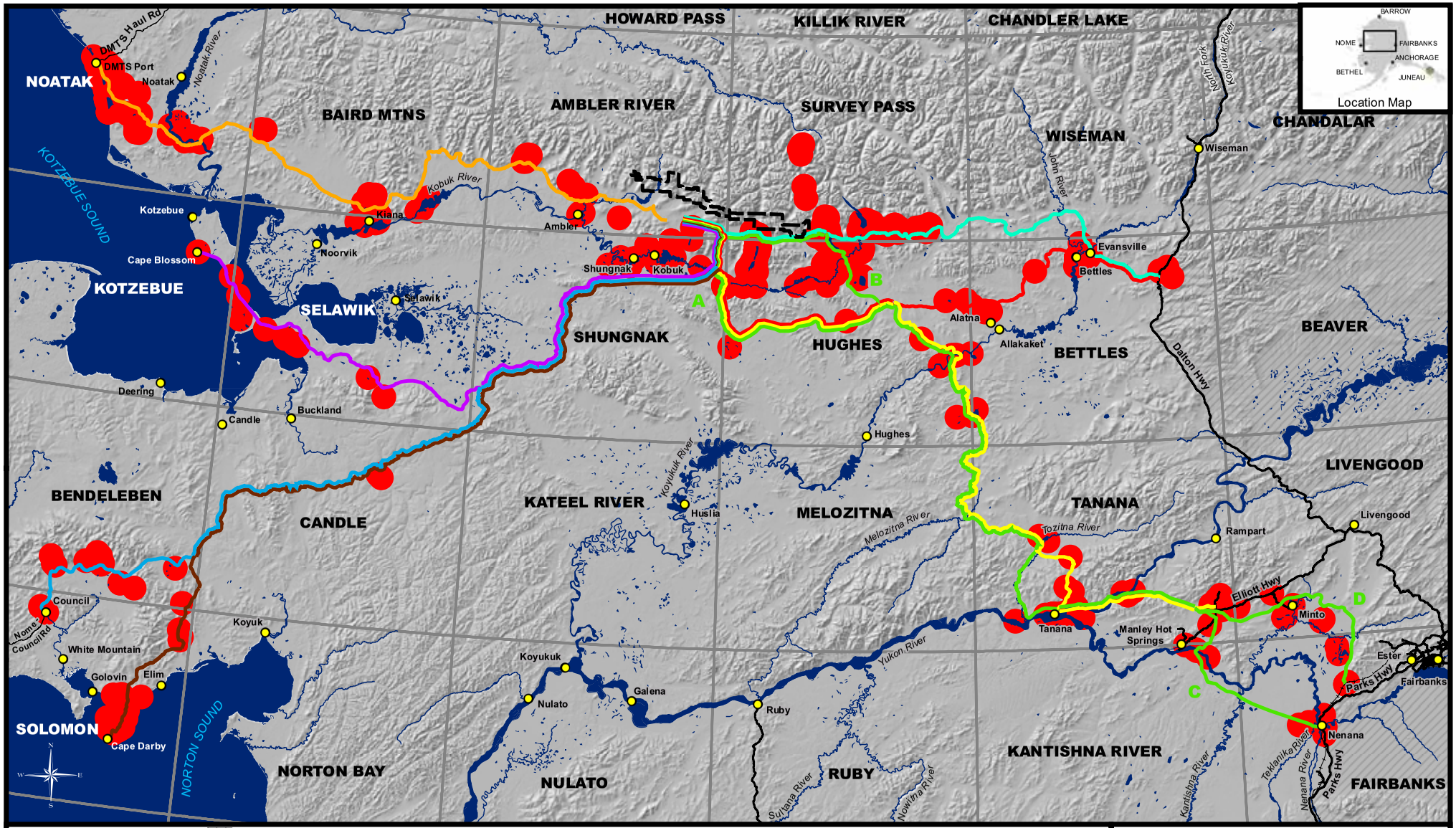
The National Historic Preservation Act of 1966, as amended (16 U.S.C. 470) is the primary law governing the preservation of cultural resources in the U.S. (NTHP, 2011). The Act requires that all federal agencies proposing actions complete the Section 106 consultation process to take into consideration actions that could adversely affect historic properties listed, or eligible for listing, on the National Register of Historic Places (NRHP).

2.7.1 Regional Cultural Prehistory and History

The project study area prehistory is divided into the following eight archaeological culture traditions:

- Paleoindian
- American Paleoarctic
- Northern Archaic
- Arctic Small Tool
- Birnirk
- Western Thule
- Late Prehistoric Eskimo
- Athabascan

These traditions are general designations for what are believed to be Alaskan prehistoric cultures represented by recognizable differences in technologies and time of occurrence.



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KNOWN AHRS SITES

DATE: May 12, 2011 | **Figure 28**

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The historic period of Northwestern Alaska begins with recorded contact between Alaska Natives and Euro-Americans along the coast. From 1800 to 1848, coastal exploration of the project study area ensued with Euro-Americans intermittently investigating the Kotzebue Sound Region and the coastal areas north towards Point Barrow. Farther inland, Euro-American contact with Interior Alaska Athabascans occurred later than on the coast of Alaska, beginning around 1837 when traders entered the area via the Yukon River (McKennan, 1959, 1981). In addition to the recorded history of published explorers, government officials, and missionaries our understanding of the recent past is enhanced by the oral histories of the people who inhabited the project study area, and those who live there today.

2.7.1.1 Paleoindian Tradition (11,700 to 8,500 years ago)

The oldest, well-documented sites in Northern Alaska belong to the Paleoindian Tradition, dating to between 11,700 years ago and as recent as 8,500 years ago. The oldest site in the Brooks Range, the Mesa Site, was discovered as a result of oil and gas exploration activities in 1978 (Kunz and Reanier, 1994, 1995; Kunz et al., 2003). Information from this site, along with others such as the fluted point sites at Putu, Lisburne, Tuluaq Hill (DEL-360), and the Raven Bluff site (DEL-402) in the Kivalina River drainage (Alexander, 1987; Bowers, 1982; Rasic, 2000; Hedman, 2010), implies temporal and cultural connections with early sites in more temperate latitudes such as the Great Plains and the American Southwest. Remarkable similarities exist in artifact forms, especially large projectile points, scrapers and spurred gravers, site settings, and subsistence patterns. Organic remains are not well preserved at these sites, forcing archaeologists to make comparisons and interpretations entirely from the lithic artifacts. On the Seward Peninsula, investigations around Serpentine Hot Springs uncovered fluted point bases. Fluted points are a hallmark of Paleoindian occupations throughout North America, including Alaska, which date to 12,000 calendar years before present (Largent, 2009; Young and Gilbert-Young, 2007). The three fluted point bases at Serpentine Hot Springs were from the surface, and thus not datable by radiocarbon methods. Test excavations in 2009 identified a buried fluted point assemblage, in situ, with artifacts associated with charcoal.

2.7.1.2 American Paleoarctic Traditions (10,000 to 7,000 years ago)

The American Paleoarctic Tradition, as proposed by Anderson (1970), relates stone tool technologies observed from Alaskan sites to stone technologies from Northeast Eurasia (Rainey,

1939). The Paleoarctic Tradition identified type artifacts that include microblades, bifacial points, large bifacial cores and tools, burins made on flakes, endscrapers, and other expedient tools made on macroblades. Certain stone tool types, especially distinctive cores, blades, and burins found in American Paleoarctic sites are remarkably similar to stone technologies from Northeast Eurasia, suggesting cultural connections across the Bering Land Bridge. American Paleoarctic tool kits are generally thought to have been oriented toward the production of composite antler and stone projectiles, used to dispatch late Pleistocene to early Holocene fauna. West (1981) later attributed what he originally defined (West, 1967) as the Denali Complex (10,500 to 8,000 years ago) as a regional variant of the Paleoarctic Tradition based on artifacts from four Tanana region sites.

American Paleoarctic sites in the Interior include Healy Lake Village, Broken Mammoth, Swan Point, Chugwater, and Gerstle River (Cook, 1969; Holmes, 1996a; Holmes et al., 1996b; Lively, 1988; Potter, 2005). Paleoarctic sites from the Brooks Range include Onion Portage, the Akmak and Kobuk complexes (Anderson, 1988), Gallagher Flint Station (Dixon, 1975; Bowers, 1983), Lisburne Site (Bowers, 1982), and sites DEL-166 and DEL-168 from the Red Dog Mine area (Gerlach and Hall, 1996).

2.7.1.3 Northern Archaic Tradition (6,000 to 2,000 years ago)

At some time after 6,000 years ago, side-notched and lanceolate projectile points of various forms begin to appear in interior, northern, and western Alaska archaeological assemblages. These are a hallmark of the cultures termed the Northern Archaic Tradition (D. Anderson, 1968). The broad occurrence of this point type throughout interior and northern Alaska and the Yukon Territory, along with distinctive scraping implements and other lithic tools, may represent the spread of a new boreal forest-oriented cultural tradition (D. Anderson, 1988). The Onion Portage site has a Northern Archaic Tradition component dated between 5,800 and 4,100 years Before Present.

Interior sites associated with the Northern Archaic Tradition include Swan Point CZ 1 and 2, the Tok Terrace Site (Sheppard et al., 1991), Healy Lake Village, Dixthada (Shinkwin, 1979), and several sites near Livengood (Derry, 1976). The Northern Archaic Tradition is also represented along the northwest coast of Kotzebue Sound and the Chukchi Sea at the Palisades, Cape

Krusenstern (Giddings and Anderson, 1986), DEL-342 in the Red Dog Mine area (Bowers et al., 1998), and at 10 sites in the Kobuk River drainage, including well-dated contexts at Onion Portage on the Kobuk River (D. Anderson, 1988; Esdale, 2008). The Northern Archaic has also been identified in the Noatak River drainage and central Brooks Range, as well as on the coast of the North Slope at sites such as Kuparuk Pingo (Lobdell, 1986) and the Putuligayuk River Delta Overlook Site (Lobdell, 1985).

2.7.1.4 Arctic Small Tool Tradition (4,500 years ago to A.D. 900)

Beginning around 4,500 years ago, a new tool technology, the Arctic Small Tool tradition, was in use in Alaska. The Arctic Small Tool tradition was named for its tiny, finely flaked stone tools (Giddings, 1952; Irving, 1964). The original Arctic Small Tool tradition definition by Irving (1964) was based in part on Giddings' investigation of the Denbigh type-site from Cape Denbigh (Giddings, 1952). The Arctic Small Tool tradition definition has been expanded to include later cultures such as Choris, Norton, and Ipiutak, extending the Arctic Small Tool tradition time period to about A.D. 900 (D. Anderson, 1978, 1984; Giddings, 1957; Larsen and Rainey, 1948). This dramatic change in stone tool technology from the earlier Northern Archaic may mark the introduction of the bow and arrow. Many archeologists interpret this time period as representing the arrival of the ancestral Iñupiat (Eskimo) people in Northwest Alaska and the Brooks Range. However, the nature of the continuity and cultural relationship between late Arctic Small Tool tradition Ipiutak and ancestral Iñupiat people has not been clearly established (cf. Gerlach and Hall, 1988).

Arctic Small Tool tradition sites are well documented at Cape Krusenstern (Giddings and Anderson, 1986), Onion Portage (D. Anderson, 1988), the Arctic foothills Mosquito Lake Site, (Kunz, 1977), and Gallagher Flint Station (Dixon, 1975; Bowers, 1983). Choris/Norton bifaces were recovered from DEL-337, a site in the Red Dog area (Gerlach et al., 1997). In other areas of the Arctic Foothills and Brooks Range, Arctic Small Tool tradition sites are relatively common, such as Franklin Bluffs along Trans-Alaska Pipeline System, identified by Solecki et al. (1973). An Arctic Small Tool tradition site is known from the vicinity of Kuzitrin Lake on the Seward Peninsula (Harritt, 1998).

2.7.1.5 Birnirk, Western Thule, and Late Prehistoric Eskimo (A.D. 600 to 1838)

In the first millennium of the Christian era, prehistoric inhabitants of Northwest Alaska and the Arctic Coast increased their reliance on hunting marine resources. Based on excavations at the Cape Krusenstern Archaeological District and the Birnirk and Walakpa sites near Barrow (Giddings and Anderson, 1986; Ford, 1959; Stanford, 1976), it appears that sea mammal hunting for small marine mammals may have become the preferred subsistence strategy. Birnirk may have co-existed temporally with Ipiutak, but does not appear to have been derived from it. At the same time, however, land mammal hunting, especially for caribou, remained important, especially in the Arctic Foothills (Gerlach and Hall, 1988) and the major interior river valleys such as the Noatak (Hall, 1967, 1974, 1975), Kobuk (Giddings, 1952), and Selawik (D. Anderson, 1971, 1975).

Around the beginning of the second millennium A.D., the Birnirk culture around Bering Strait developed into the Western Thule culture, which is clearly ancestral to the present-day Iñupiat people of Alaska (Ford, 1959; Stanford, 1976), Canada, and Greenland. In the Western Thule culture, subsistence was broad-based, with both interior and coastal resource exploitation. Along the coastal areas, bowhead whaling became especially important to subsistence, an activity that continues to this day. Late prehistoric coastal material culture shows, among other traits, a well-developed and complex technology based on harpooning whales from skin boats. Sites with similarities to the Interior are also found in the Western Brooks Range, including DEL-340, which contains an Ambler Island type projectile point, probably dating to 200 years ago (Bowers et al., 1998; see Giddings, 1952).

2.7.1.6 Athabascan Tradition (2,000 B.P. to A.D. 1880)

The Athabascan tradition is a prehistoric culture complex attributed to ancestors of the northern Athabascan Indians of Alaska, whose archaeological history precedes Euro-American contact. At present, sites in interior Alaska (south of the Brooks Range) dating to at least 2,000 years ago and up to A.D. 1880 are generally attributed to the Athabascan Tradition. Subsurface housepit and cache features associated with a variety of flaked and ground stone, bone, and antler artifacts characterize early prehistoric Athabascan sites. In the Koyukuk River region, a complex called the Lake 324 Complex is identified by A. Clark and D. Clark (1976) at various sites, including the Batza Tena obsidian source area. The Lake 324 Complex shows a distinct change in style

and technology indicative of Athabascan cultural characteristics, though later influenced by contact with Eskimos in the boundary zone between upper Kobuk and upper Selawik and the Koyukuk River drainages. In addition, there is evidence that Athabascans prehistorically had established trade routes throughout the area.

2.7.2 History of Exploration and Mining

In 1778, Captain James Cook was the first Euro-American explorer to travel as far north as Kotzebue Sound. From 1800 to 1848, coastal exploration ensued as various Euro-Americans intermittently investigated the Kotzbue Sound Region and the coastal areas north towards Point Barrow. Names along the coast record the Euro-American legacy of exploration with Cape Blossom, Chamisso Island, Kotzebue Sound, and Cape Krusenstern overlying traditional Iñupiat placenames. After 1848, Yankee whalers ventured further north of Bering Strait into the Chukchi Sea pursuing bowhead whales.

The earliest known Euro-American exploration and documentation of the central Kobuk River region was done by Naval Lieutenant George M. Stoney in 1883 (Sherwood, 1992). The presence of placer gold on the Kobuk River was documented as early as 1894 (Haskell 1898:545). In the summer of 1898, the Kobuk experienced a small gold rush and at least 800 miners wintered along the Kobuk that year (Grinnell, 1901:31, 59). Many of these miners had little or no experience in either the arctic or mining. This, combined with isolation, harsh weather, low gold yield and news of a strike at Nome, led most of those who wintered over to abandon the Kobuk in the spring of 1899 (Grinnell, 1901:73, 74 ,86; Roberts, 1978:182-193). However, an unknown number of miners remained in the area and found paying placer gold deposits in the mountains between the Kobuk and Shungnak River drainages, within the modern Ambler mineral belt.

The earliest known mines to be developed in this area were along Dahl Creek, the Shungnak River, and Riley Creek (Smith, 1913:125-26). Placer deposits may have been discovered on both Dahl Creek and the Shungnak River as early as 1898 (Reed, 1931:31-33; 20-23). Several cabins were built near the diggings on Dahl Creek and were still in use in 1913 (Smith, 1913:129).

In 1931, hydraulic operations were set up at Dahl Creek and Shungnak River, though less mechanically intensive methods were still in use. In addition to hydraulic equipment, in 1931, the Kobuk-Alaska Mines Company operated a Crescent scraper and a 46 horsepower boiler and hoist combination on the Shungnak. They also used a turbo steam generator to power an electric flood light system that allowed mining at night (Reed 1931:24-26). Mines on the Shungnak River remained in intermittent production until 1940 (Reed, 1931:15; Fritts, 1970:54-55).

In 1908, placer gold was discovered on the head of Riley Creek. To process the ore, water was collected in ditches dug along the north-facing slope of the Dahl-Riley creek divide and gathered behind a small dam. It was then fed by a ditch and hose to the sluice boxes. This did not provide enough water to mine effectively. Operations were further hampered by the presence of large boulders in the creek. Despite these problems, one to three men mined Riley Creek until at least 1910 (Smith, 1913:129-130).

Woodchopper Creek was prospected prior to 1931, but no details are known (Reed, 1931:28). Ryan Creek was prospected "in the early days" but, by 1931, was not considered to hold paying amounts of gold (Reed, 1931:41). Gold was discovered on California Creek by F.R. Ferguson in 1918 and was mined by him until at least 1932. In 1931, a 2.5-mile long ditch and 3,000 feet of pipe fed water to three No. 1 Giant nozzles and sluice box. Between 1912 and 1932, one or two man placer mining operations were conducted on Lynx Creek. Both Radio and Trinity Creeks were prospected for gold in the early 1930s, but no details are known (Reed, 1931:41, 50).

Several shafts were sunk on the head of Cosmos Creek in the early 1930s but the area showed evidence of earlier mining activity including an old ditch (Reed, 1931:28-29). Ruby Creek was a small gold producer during the early period of placer mining (exact dates unknown) and the United States Geological Survey (USGS) tested it for copper in 1910 (Reed, 1931:30; 52). Jay Creek yielded a small amount of gold in 1931 and employed five men at the diggings (Reed, 1931:31). Several shafts were dug on Canyon Creek in the early 1930s (Reed, 1931:49) and another was excavated on Glacier Creek prior to 1931 (Reed, 1931:42), though no details of production at either location are known. Small-scale placer mining of low-grade gold deposits was underway on Pearl Creek in 1933 (Smith, 1934) and Wesley Creek was prospected prior to 1910 but it was not being mined by 1931 (Reed, 1931:30).

Although early mining efforts in the hills between the Shungnak and Kobuk Rivers focused primarily on placer gold, lode gold was identified on the divide between Riley and Dahl Creeks and "in many other places" in the area by 1913 (Smith, 1913:145). However, these lode gold resources were never developed. Copper, coal, lead, iron, asbestos, and jade were also identified early in the twentieth century (Smith, 1913:147, 151, 153, 154), but also went undeveloped.

Gold production was shut down during WWII. However, during this period, the U.S. Bureau of Mines excavated several trenches on asbestos deposits on Bismark Mountain and Cosmos Creek. A small shipment of material was processed from these tests but no subsequent production was undertaken (E. Anderson, 1945:19-20; E. Anderson, 1947:15; Heide et al., 1949:21-22). The Bureau of Mines also conducted tests on Asbestos Mountain, near Dahl Creek, digging several trenches and a 229-foot adit. Thirty-three tons of tremolite (a form of asbestos) and .09 tons of serpentine were shipped from these excavations, but the site was not placed into production (Heide et al., 1949:11-13).

The federal government lifted the ban on gold mining in 1946 and limited mining activity resumed on Dahl Creek. Beginning in 1950, nephrite boulders were recovered during placer operations and intermittent gold and nephrite mining continued on Dahl Creek into the 1970s. Total gold production on Dahl Creek is estimated to be 15,000 to 17,000 ounces (Degenhart et al., 1978). Mining also resumed on California Creek after the War until about 1960, when the deposit was considered to be mined out (Mindat.org, accessed February 2011).

Beginning in the 1960s and continuing to this day, surface, geochemical, and drill testing of the ore deposits has been undertaken within the Ambler mineral belt. Some of this testing has taken place near earlier mining operations. For example, sometime after 1960, a shaft and drifts on two levels were excavated by the Kennecott Exploration Company at Bornite, adjacent to Ruby Creek (Mindat.org, accessed February 2011). The effect of these testing efforts on historic mining sites is unclear.

2.8 Contaminated Sites

The State of Alaska Department of Environmental Conservation (DEC) contaminated sites database was reviewed to identify known contaminated sites within the study area. The database lists release locations reported, and subsequent investigations that may have been performed.

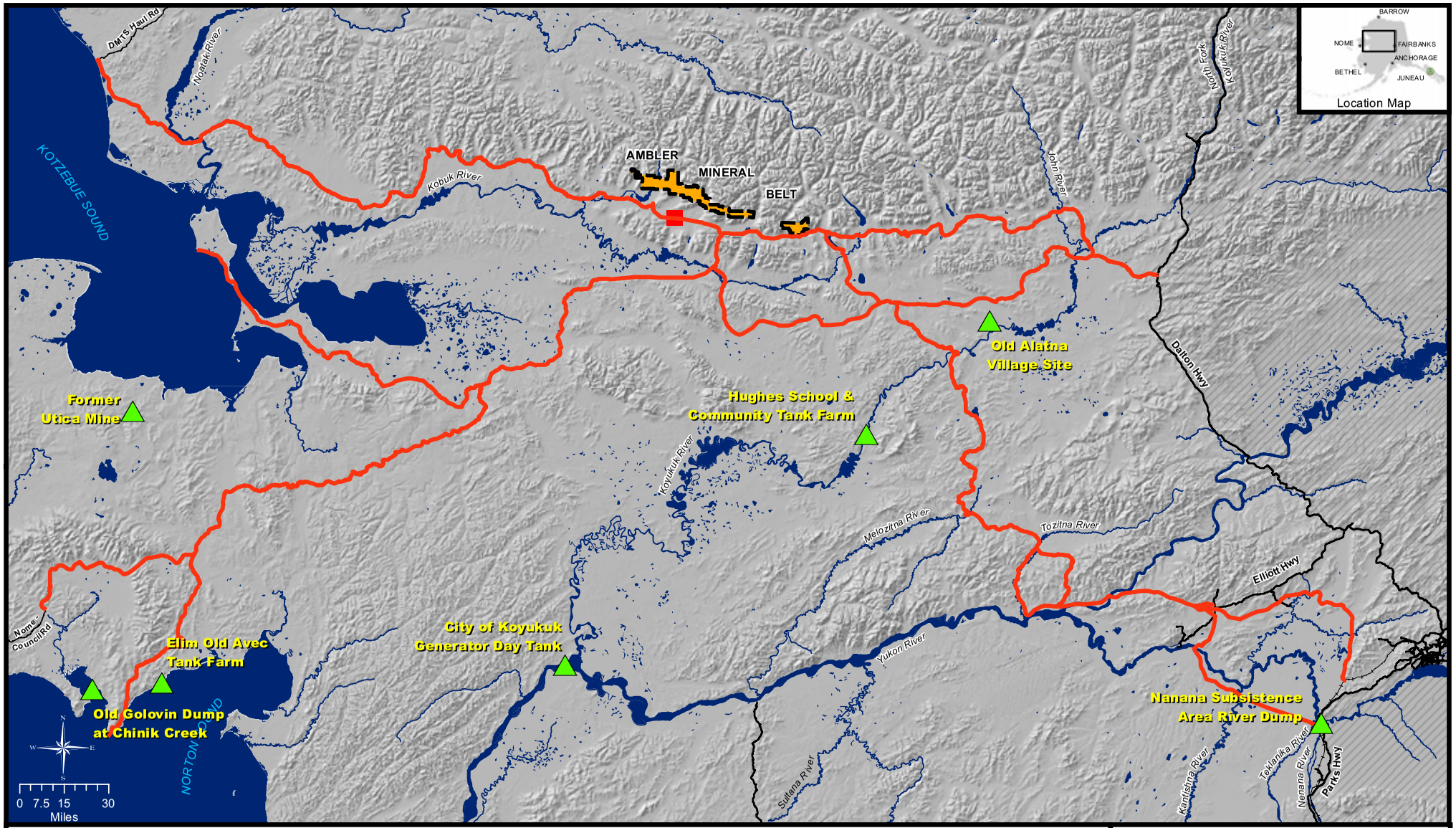
Based on the information obtained from the DEC database, most of the villages, towns, and cities within the project study area have reported spills. Consultation with the DEC will be important to ensure that contaminated sites are identified within any preferred corridors carried forward for more detailed study.

There are seven federally listed Brownfield sites within the project study area (Table 2-13 and Figure 29). The federal government defines Brownfield sites as abandoned, idled, or underused industrial and commercial properties where expansion or redevelopment is complicated by real or perceived environmental contamination (Brownfields Center, 2011). General information regarding specific sites and the type and extent of contamination will be obtained, once a preferred corridor study area is chosen.

Table 2-13: Brownfield Sites within the Project Study Area

Brownfield Property	Address/Location	Contaminant Type	Community	Approximate Size	Site Status
Former Utica Mine	18 miles south of Deering, Alaska	Petroleum products, asbestos, lead, other heavy metals	Deering	10 acres	Property has been assessed/contamination found
Old Golovin Dump at Chinik Creek	Aukon Street at the mouth of Chinik Creek	Unknown	Golovin	1.25 acres	Property has been assessed/undetermined contamination
Elim Old Avec Tank Farm	Center of Town	Unknown	Elim	0.32 acres	Property has been assessed/undetermined contamination
City of Koyukuk Generator Day Tank	Grouse Road, 30 miles west of Galena	Petroleum products	Koyukuk	0.2 acres	Property has been assessed/contamination found
Hughes School and Community Tank Farm	110 Front Street	Petroleum products	Hughes	0.69 acres	Property has been assessed/contamination found
Old Alatna Village Site	North Banks of the Koyukuk River	Unknown	Alatna	5.5 acres	Property is ready for reuse/no contamination found
Nanana Subsistence Area River Dump	Unknown	Unknown	Nenana	30 acres	Property has been assessed/undetermined contamination

Source: http://iaspub.epa.gov/apex/cimc/f?p=255:63:1455017617232886



Communities and Place Names
Railroad
Preliminary Corridors
Existing Roads
Water
Outside of Project Study Area
Ambler Mineral Belt
Proposed Staging Area
Brownfield Sites

Sources:

Coordinate System: NAD 1983 Alaska Albers

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NORTHERN REGION

AMBLER MINING DISTRICT ACCESS
ENVIRONMENTAL OVERVIEW MEMORANDUM

BROWNFIELD SITES

DATE: May 13, 2011 | **Figure 29**

P:\Projects\D60693\GIS\ENV\ENVIRONMENTAL OVERVIEW MEMORANDUM\Brownfield Properties.mxd May 13, 2011 8:11:54 AM User: bfarrell

3.0 OVERVIEW OF EACH CORRIDOR'S ENVIRONMENTAL RESOURCES

The following table summarizes the environmental resources, indentified through preliminary research and data gathering efforts that are associated with each corridor. It is important to note that while subsistence is considered one of the most critical environmental issues for this project, it is not included in this preliminary overview due to the lack of data. The DOT&PF will be completing a subsistence analysis for this project at a later date.

Table 3-1: Overview of Environmental Resources by Corridor

	Brooks East Corridor (Road Only)	Kanuti Flats Corridor (Road Only)	Elliott Highway Corridor (Road Only)	Parks Highway Railroad Corridor (Railroad Only)	DMTS Port Corridor (Road and Railroad)	Cape Blossom Corridor (Road and Railroad)	Selawik Flats Corridor (Road and Railroad)	Cape Darby Corridor (Road and Railroad)
Total Miles (approximate)	**217**	**232**	**365**	**450-420**	**257**	**245**	**331**	**340**
National Parks, Preserves and, Monuments	Gates of the Arctic National Park and Preserve			Gates of the Arctic National Park and Preserve	• Gates of the Arctic National Park and Preserve • Cape Krusenstern National Monument • Noatak National Preserve • Kobuk Valley National Park			
Wildlife Refuges						Selawik Wildlife Refuge	Selawik Wildlife Refuge	Selawik Wildlife Refuge
Wild and Scenic Rivers	Kobuk River	Kobuk River			Salmon River	Selawik River	Selawik River	Selawik River
Number of RS2477 Trails	**3**	**3**	**5**	**7**	**2**	**3**	**4**	**4**
Wildlife (key species)	**Mammals** • Caribou (WACH) - peripheral range, migratory area, and potentially a portion of the winter range • Moose • Brown and black bears **ADF&G-Designated Species of Special Concern** • Peregrine falcon • American falcon • Blackpoll warbler **BLM-Designated Sensitive Species** • Harlequin duck • Trumpeter swan	**Mammals** • Caribou (WACH) - peripheral range, migratory area, and winter range • Moose • Brown and black bears **ADF&G-Designated Species of Special Concern** • Peregrine falcon • American falcon • Blackpoll warbler **BLM-Designated Sensitive Species** • Harlequin duck • Trumpeter swan	**Mammals** • Caribou (WACH) - peripheral range, migratory area, and winter range • Moose • Brown and black bears **ADF&G-Designated Species of Special Concern** • Peregrine falcon • American falcon • Blackpoll warbler • Olive-sided flycatcher **BLM-Designated Sensitive Species** • Harlequin duck • Trumpeter swan	**Mammals** • Caribou (WACH) - peripheral range, migratory area, and winter range • Moose • Brown and black bears **ADF&G-Designated Species of Special Concern** • Peregrine falcon • American falcon • Blackpoll warbler • Olive- sided flycatcher **BLM-Designated Sensitive Species** • Harlequin duck • Trumpeter swan	**Mammals** • Caribou (WACH) - migratory area and potentially a portion of the winter range • Moose • Brown, black, and polar bears **ADF&G-Designated Species of Special Concern** • Peregrine falcon • American falcon • Blackpoll warbler • Steller's eider • Yellow-billed loon **BLM-Designated Sensitive Species** • Red-throated loon • Harlequin duck • Red knot	**Mammals** • Caribou (WACH) - migratory area and winter range • Moose • Brown, black, and polar bears **ADF&G-Designated Species of Special Concern** • Peregrine falcon • American falcon • Blackpoll warbler • Yellow-billed loon **BLM-Designated Sensitive Species** • Harlequin duck • Red-throated loon • Adjacent to Trumpeter swan habitat	**Mammals** • Caribou (WACH) - migratory area and winter range • Moose • Brown, black, and polar bears **ADF&G-Designated Species of Special Concern** • Peregrine falcon • American falcon • Blackpoll warbler • Yellow-billed loon **BLM-Designated Sensitive Species** • Harlequin duck • Red-throated loon • Red knot • Adjacent to Trumpeter swan habitat	**Mammals** • Caribou (WACH) - migratory area and winter range • Moose • Brown, black, and polar bears **ADF&G-Designated Species of Special Concern** • Peregrine falcon • American falcon • Blackpoll warbler • Spectacled eider • Yellow-billed loon **BLM-Designated Sensitive Species** • Harlequin duck • Red-throated loon • Adjacent to red knot habitat • Adjacent to Trumpeter swan habitat
ACEC and RNAs			• Tozitna River ACEC • Lake Todatonten RNA • South Todatonten RNA	• Tozitna River ACEC • Lake Todatonten RNA • South Todatonten RNA			• Nulato Hills ACEC	• Nulato Hills ACEC
Threatened, Endangered and Candidate Species (Section 7 Consultation may be required)					• Polar bear • Steller's eider (beginning of the corridor is located within non-breeding range) • Yellow-billed loon	• Polar bear • Yellow-billed loon (beginning of the corridor is located within breeding range)	• Yellow-billed loon (beginning of the corridor is located within breeding range)	• Polar bear • Spectacled eider Yellow-billed loon (beginning of the corridor is located within breeding range)

	Brooks East Corridor (Road Only)	Kanuti Flats Corridor (Road Only)	Elliott Highway Corridor (Road Only)	Parks Highway Railroad Corridor (Railroad Only)	DMTS Port Corridor (Road and Railroad)	Cape Blossom Corridor (Road and Railroad)	Selawik Flats Corridor (Road and Railroad)	Cape Darby Corridor (Road and Railroad)
Critical Habitat					• Adjacent Critical Habitat/no disturbance zone-polar bear	• Adjacent feeding Critical Habitat polar bear		• Adjacent Critical Habitat spectacled eider • Adjacent feeding Critical Habitat - polar bear
Potential Wetlands* (miles/%)	127/58%	• 155/67%	• 268/73%	• 242/56% (Option A) • 271/60% (Option B) • 236/62% (Option C) • 291/66% (Option D)	• 175/68%	• 125/55%	• 109/33%	• 139/41%
Rivers and Streams	• 5 Cataloged Anadromous • 21 Assumed Anadromous • 135 Non- Anadromous	• 14 Cataloged Anadromous • 411 Assumed Anadromous • 157 Non- Anadromous	• 8 Cataloged Anadromous • 48 Assumed Anadromous • 195 Non- Anadromous	• 8 - 13 Cataloged Anadromous • 53-72 Assumed Anadromous • 166-225 Non- Anadromous	• 13 Cataloged Anadromous • 63 Assumed Anadromous • 137 Non- Anadromous	• 2 Cataloged Anadromous • 83 Assumed Anadromous • 136 Non-Anadromous	• 23 Cataloged Anadromous • 48 Assumed Anadromous • 114 Non-Anadromous	• 26 Cataloged Anadromous • 51 Assumed Anadromous • 116 Non-Anadromous
Navigable Waters	John River • USACE Koyukuk River • USACE • BLM	Koyukuk river • USACE • BLM	Koyukuk River • USACE • BLM Yukon River • USACE • Coast Guard • BLM	Koyukuk River • USACE • BLM Yukon River • USACE • Coast Guard • BLM Tanana River • USCG	Noatak River • USACE • DNR • Coast Guard • BLM	Kobuk River • USCG • USACE	Kobuk River • USCG • USACE	Kobuk River • USCG • USACE
Cultural Sites	• 13 Historic • 2 Historic/Prehistoric • 161 Prehistoric	• 22 Historic • 5 Historic/Prehistoric • 9 Prehistoric • 2 Sites listed on the NRHP	• 52 Historic • 3 Historic/Prehistoric • 9 Prehistoric • 2 Sites listed on the NRHP	• 65 Historic • 6 Historic/Prehistoric • 122 Prehistoric	• 37 Historic • 14 Historic/Prehistoric • 85 Prehistoric • 5 Paleontological	• 5 Historic • 5 Historic/ Prehistoric • 7 Prehistoric	• 14 Historic • 8 Historic/ Prehistoric • 5 Prehistoric • 2 Paleontological	• 10 Historic • 6 Historic/ Prehistoric • 10 Prehistoric
Contaminated Sites		Contaminated Sites are known to be located within the following areas: Bettles - 8 Sites	Contaminated Sites are known to be located within the following areas: Tanana - 15 Sites	Contaminated Sites are known to be located within the following areas: Tanana - 15 Sites Minto - 4 Sites Nenana - 4 Sites	Contaminated Sites are known to be located within the following areas: DMTS Haul Road - Entire Road			

*Potential wetland areas determined based on vegetation mapping. Wetlands will need to be ground-truthed.

Notes: 1) Subsistence is an important environmental factor, but is not listed in this initial corridor summary due to the lack of existing data.
2) WACH - Western Arctic Caribou Herd

4.0 NATIONAL ENVIRONMENTAL POLICY ACT PROCESS OVERVIEW AND REGULATORY FRAMEWORK

The next step in project development will include formal public and agency scoping, as well as environmental impact assessment, as required by the National Environmental Policy Act (NEPA). NEPA is a federal law that outlines policies and procedures to protect the environment. The NEPA process requires that environmental information is available to public officials and citizens before decisions are made and actions taken. An EIS would likely be required for this project, given the magnitude of construction that would occur. The EIS would document potential impacts to the natural and man-made environment, including short-term construction impacts, permanent (long-term) impacts related to the proposed project and any reasonably foreseeable future actions, and both secondary and cumulative impacts that might result from this project. The EIS would also document how issues raised during public and agency scoping were addressed, and propose mitigation measures that would avoid or minimize environmental impacts. The estimated duration for completion of the EIS could be as short as two years if all scoping, field work and preliminary design are completed in the first year.

4.1 Federal Funding

4.1.1 Road Access

If an access project is federally funded, the Federal Highway Administration (FHWA) would likely be the lead agency overseeing the NEPA process, while a number of other federal agencies such as the NPS, USACE, USFWS, or BLM could be a cooperating or co-lead agency. If the selected corridor traverses parks or preserves, the Gates of the Arctic National Park and Preserve, the NPS may be the lead federal agency. An EIS would be completed under FHWA NEPA guidelines and would also include .specific analysis to meet other cooperating or co-lead agencies' NEPA requirements.

4.1.2 Rail Access

The Federal Railroad Administration would likely be the lead agency for the EIS and Section 106 consultation, for any federally-funded rail project.

4.1.3 State Funding

A state-funded road would not necessarily trigger the NEPA process unless a federal permit is required, such as an Army Corps of Engineers Section 404 permit for impacts to wetlands. However, under the Alaska Environmental Procedures Manual, Chapter 9, Environmental Review Procedures for State-Funded Projects, a fully documented DOT&PF State Project Environmental Checklist would be required to identify a preferred corridor study area and the permits and clearances needed for construction. This checklist would require supporting documentation, which requires much of the same agency consultation and fieldwork to identify and document resource issues required for an Environmental Assessment or an EIS.

Completing the State Project Environmental Checklist evaluation and providing for public and agency coordination would not preclude another federal agency, such as the NPS or the USACE from requiring and conducting their own NEPA process activities for permitting the project. Any of the corridors would likely require a USACE Section 404 permit. Issuing a federal permit is a federal action, and therefore triggers the NEPA process. Based on the controversy of this project, and particularly if the preferred corridor crosses a federal CSU, the USACE working alone or with the NPS would likely determine that an EIS is required. The EIS would be conducted under one or both agency's NEPA guidelines. Similar to the federal funding scenario, the application for ROW within the park would trigger the Title XI process, which could be wrapped into the NEPA process.

The timeframe for completing the NEPA process for a state-funded project is likely to be similar to that for a federally funded project, as a similar level of analysis would be required to address the federal requirements of the federal agencies issuing permits.

4.2 Overview of Regulatory Framework

Title XI of ANILCA governs the procedures for permitting a Transportation Utility System across federal CSU lands. Of all the land statuses within the study area, rights-of-way across any CSU lands will be the most difficult to obtain, and the permitting process is especially difficult to navigate because of the many steps and agencies involved. Given the sheer volume of agency and public involvement necessitated by the process, it is anticipated that the entry application could become a politically charged issue and could face extensive agency, political, and public

scrutiny. In addition, the entire Transportation Utility System may be disapproved if any portion of it is disapproved by an appropriate agency. The State of Alaska has never successfully navigated the Transportation Utility System permitting process, and the probability of being granted such a permit is poor. Additionally, if the state should prove successful, the issued permit would only be valid for 20 years. After that time, the DOT&PF would need to reapply for a new permit, regardless of whether any improvements had been constructed within the permitted area.

A ROW for access to the Ambler mineral belt from the Dalton Highway through Gates of the Arctic National Preserve is specifically identified in ANILCA Section 201(4)(b). The process identified for section of a route in Section 201(4)(b) would apply only to a route through Gates of the Arctic National Preserve. ROW needed through any other CSU will need to meet the conditions of Title XI as described above.

When a proposed Transportation Utility System crosses a designated Wilderness area, the permitting procedures become even more complex and time intensive, ultimately involving the President of the U.S. and the U.S. Congress for approval.

Additional federal and state permits and approvals that could be required for the development of a transportation corridor through the project study area are listed in Table 4-1.

Table 4-1: Potential Permit and Agency Authorization Requirements

Regulated Activities (Required Permit/Approval)	Permitting Agency	Authority	Description
Federal Authority			
Wastewater discharges to waterways via stormwater, Alaska Pollutant Discharge Elimination System (APDES) Permit for Stormwater Discharges	DEC	Section 402, Federal Water Pollution Control Act of 1972 (CWA) (33 USC 1251)	The DEC must authorize any activity or wastewater system that would discharge waste from one or more points into a waterway.
State of Alaska 401 Certification	DEC	Pursuant to Section 401 of the CWA	Under the APDES program, the state of Alaska does not have permitting enforcement authority for stormwater. However, the DEC certifies the USEPA general permits by issuing a 401 Certification.
Discharge of Dredged or fill material into U.S. waters, including wetlands (review of USACE Section 404 Permit)	USEPA	Section 404, Federal Water Pollution Control Act of 1972, as amended in 1977 (CWA) (33 USC 1344)	USEPA reviews (USACE) Section 404 Permit under its Section 404(b)(1) "Guidelines for Specifications of Disposal Sites for Dredged or Fill Material."
Discharge of dredged or fill material into U.S. waters, including wetlands (USACE permit)	USACE	Section 404, Federal Water Pollution Control Act of 1972, as amended in 1977 (CWA) (33 USC 1344)	The USACE must authorize the discharge of dredged or fill material into, and excavation in U.S. waters, including wetlands. The USACE determines compliance with the Section 404(b)(1) guidelines.
Construction in or over any navigable water, or the excavation or discharge of material into such water, or the excavation or discharge of material into such water, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters	USACE	Section 9 of the Rivers and Harbors Act of 1899	The USACE has regulatory and permitting authority for navigable waters of the U.S. This statute requires a permit from the USACE for any construction in or over any navigable water, or the excavation or discharge of material into such water, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters.

Regulated Activities (Required Permit/Approval)	Permitting Agency	Authority	Description
Development of a bridge or causeway over any navigable river or navigable water of the U.S.	USCG	Section 9 of the Rivers and Harbors Act of 1899, as defined in 33 CFR 329	A USCG Bridge Permit would be required to construct any bridge or causeway over any navigable river or navigable water of the U.S.
Development possibly affecting historical or archaeological sites (Review and Comment)	Advisory Council on Historic Preservation	National Historic Preservation Act of 1966, as amended (16 USC 470)	All federal agencies must take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on the adequacy of the management/mitigation for historic or archaeological sites potentially impacted by any federally permitted or licensed project.
Destruction or modifications of wetlands (Wetlands Protection Considerations)	All Federal Agencies	Executive Order 11990 (Protection of Wetlands) May 24, 1977	All federal agencies must avoid, to the extent possible, impacts associated with destruction and modification of wetlands, including direct or indirect support of new construction in wetlands, wherever there is a practicable alternative.
Impacts to Essential Fish Habitat	All Federal Agencies	Magnuson-Stevens Fishery Conservation and Management Act of 1976	All federal agencies are required to consult with the Secretary of Commerce on any action that may impact Essential Fish Habitat.
Actions that could adversely affect Threatened and Endangered Species or their critical habitat	Department of the Interior and USFWS	Endangered Species Act of 1973 (16 USC 1531)	All federal agencies must ensure that any action is authorizes, funds, or carries out, does not “adversely impact” any listed species, or “destroy or adversely modify” any critical habitat for that species.
Development possibly affecting publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites	Department of the Interior and official(s) with jurisdiction over the Section 4(f) resource	Section 4(f) of the Department of Transportation Act of 1966 (49 USC 1653(f))	All Department of Transportation agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless there is no feasible or prudent alternative to the use of land; or the action includes all possible planning to minimize harm to the property resulting from use.

Regulated Activities (Required Permit/Approval)	Permitting Agency	Authority	Description
Actions that could cause take of migratory birds	Department of the Interior and USFWS	Migratory Bird Treaty Act (16 USC 703-711) Executive Order 13186	All federal agencies must avoid, to the extent possible, the "take" of migratory birds and bald and golden eagle, eggs, feathers, or nests.
Actions that could cause take of a bald or golden eagle	Department of the Interior and USFWS	Bald and Golden Eagle Protection Act (16 USC 668-669d)	Prohibits the taking or possession of and commerce in bald and golden eagles, with limited expectations.
Conversion of property purchased or improved with funds from the Land and Water Conservation Fund	Department of the Interior	Section 6(f), Land and Water Conservation Fund Act of 1965 (36 CFR 59)	All Department of Transportation agencies must ensure that the requirements of Section 6(f) (3) of the Land and Water Conservation Fund Act would be met should a proposed conversion be implemented. The Act prohibits the conversion of property acquired or developed with funds from the Land and Water Conservations Fund to a non-recreational purpose without the approval of the Department of the Interior's National Park Service.
Actions that cause disproportionately high and adverse human health or environmental effects on minority or low-income populations	All Federal Agencies	Executive Order 12898 (Environmental Justice)	All federal agencies must identify and address the disproportionately high and adverse human health or environmental effects of actions on minority and low-income populations to the greatest extent practicable and permitted by law.
Actions that cause occupancy and modification of floodplains	All Federal Agencies	Executive Order 11988: Floodplain Management	Requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.
Development within the Coastal Zone	All Federal Agencies	Coastal Zone Management Act of 1972 (16 USC 1452)	Requires federal agencies to preserve, protect, develop, and where possible, restore or enhance the resources of the Nation's coastal zone.
State of Alaska Authority			
Wastewater discharge into all waters of the state (Wastewater Disposal Permit)	DEC	AS 46.03.020, .100, .110, 18 AAC 15, 70, and 72.010	The DEC must authorize the discharge of wastewater into or upon all waters or land surfaces of the state. This includes review and approval of treatment plans for facility wastewater discharges.

Regulated Activities (Required Permit/Approval)	Permitting Agency	Authority	Description
Development possibly affecting historic or archaeological sites	Office of History and Archaeology/Alaska State Historic Preservation Office(r) (SHPO)	National Historic Preservation Act of 1966, as amended (16 USC 470); As 41.35.010 to .240, Alaska Historic Preservation Act	For any federally permitted, licensed, or funded project, the Alaska SHPO must concur that cultural resources would not be impacted, or that proper methods would be used to minimize or mitigate impacts that would take place. Concurrence must be received before federal permits can be granted.
State of Alaska (Material Sale)	DNR Division of Mining, Land and Water	Alaska Administration Code AS 38.05; 11 AAC 71.070 through .075	The DNR must issue a Material Site Permit prior to the removal of borrow material from a state operated quarry site.
Temporary Water Use/Water Rights	DNR - Division of Mining, Land and Water	AS 46.15; 11 AAC 93	The DNR must issue Water Rights prior to any appropriation of freshwater from a well, spring, or stream. Temporary use is typically during the construction phase of the Proposed Action.
Title 16 Fish Habitat Permit	ADF&G Division of Fish Habitat	Fishway Act: AS 16.05.841 through .861, Fish Passage; Anadromous Fish Act: AS 16.05.871 through .901, Anadromous Fishes	ADF&G must issue a Fish Habitat Permit for activities within or across a stream used by fish.
Municipal Governance			
Title 9 Land Use Permit Application for Commercial Transporters	NWAB	Title 9 of Borough Code	The NWAB implements land use regulation according to Title 9 including commercial transport (hunting, camping, rafting, etc.), resource development, community infrastructure, temporary use airstrips and archaeological exploration/assessment.

5.0 SUMMARY OF DATA GAPS AND RECOMMENDED FIELD STUDIES

DOT&PF will be contacting resource agencies to confirm data gaps identified in this report and to solicit their recommendations for needed field surveys once a preferred study corridor is selected.

5.1 Land Use and Ownership

Many of the RS2477 trail corridors within the project study area are not marked and have not been surveyed or recorded. Coordination with DNR will be required to ensure that the latest information on RS2477 trails is identified within the preferred corridor study area.

5.2 Subsistence

Subsistence use areas are considered one of the major data gaps for this project. While there is abundant information available regarding important subsistence use areas from the NWAB and BLM, some of it is outdated, and it does not cover all important areas. The DOT&PF is planning to conduct a separate research and data gap analysis for subsistence use in order to better understand where important areas exist that should be avoided. Field surveys to identify important subsistence areas will likely occur during the summer of 2011.

5.3 Wildlife

Consultation with ADF&G and USFWS may provide additional data on caribou use of the study area, and will help determine whether any caribou field surveys might be needed to better understand their movements and use of the preferred corridor study area.

Information regarding the location of mineral licks within the project study area was not available. ADF&G and USFWS will be contacted to find out whether they know of any mineral licks important for either moose, caribou, or Dall sheep that exist within the project study area.

Because brown and black bear den locations have not been previously mapped, a field survey will likely be needed for the preferred corridor study area.

While resource agencies may have additional data on wildlife use and important habitats for the project study area, migratory bird surveys may be needed to identify any nesting or brood-rearing areas, particularly for key species (i.e., eiders, yellow-billed loons, peregrine falcons,

eagles, trumpeter swans) in the preferred corridor study area. Environmental Sensitivity Index (ESI) maps have been developed for marine and coastal areas of Northwest Alaska (NOAA, 2006). These maps include nest site locations in coastal areas, and would be a very useful resource for any of the western corridors.

5.4 Rivers, Streams, and Lakes

Anadromous waters mapped in the AWC are typically large main-stem rivers. Limited data is available for anadromous fish in tributary streams within the project study area. A Geographic Information System analysis of stream gradients was used to estimate which streams may support anadromous fish populations for the purpose of comparing corridors, but these assumptions will need to be verified by state and federal area biologists or through field investigations. Year-round trapping and sampling efforts may be necessary to determine seasonal migrations and to identify spawning and rearing habitat.

ADF&G announced impending changes to the AWC in February 2011. Changes include identifying levels of importance for spawning, rearing, and migration of anadromous fish for various reaches of anadromous waters. Revisions and updates to the AWC are out for comment until March 21, 2011. The impact of proposed revisions on permitting and design costs for the proposed corridors is not known.

Resident fish populations are widespread across waters of the Brooks Range and Interior Alaska, and may occupy the majority of the streams crossed by proposed corridors. The presence of resident fish on the level of fish passage required at each crossing need to be confirmed through consultations with ADF&G biologists and field investigations. Year-round trapping and sampling efforts may be necessary to determine seasonal migrations of various fish species potentially present.

Navigability determinations have not been completed by the USCG for all rivers within the study area. The use of these river systems by local communities may need to be further defined, in order to get navigability determinations from the USCG for rivers that are traversed by the preferred corridor study area. Consultation with regulatory agencies including DNR, USACE, and USCG will ultimately determine navigable waters within the preferred corridor study area and, subsequently necessary permit requirements.

Flood histories and floodplains of major water crossings are poorly defined. Floodplain studies should be conducted for the preferred corridor study area, as part of the hydrologic and hydraulic analyses typically done during the design phase of transportation projects.

5.5 Wetlands and Vegetation

Due to the lack of available wetland data for the study area, wetland field surveys would be required to allow for sufficient analysis of wetlands within the study area. Upland and wetland vegetation mapping and invasive plant species surveys may also be done concurrently with wetland field surveys, to provide additional information regarding plants and wildlife habitat in the project area.

Delineation of wetland boundaries throughout the study area would be determined using conventional wetland delineation survey techniques in accordance with Part IV, Section D, Subsection 3, of the *Corps of Engineers Wetlands Delineation Manual* (USACE, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region* (Version 2.0) (USACE, 2007) prior to the project permitting phase.

5.6 Historic and Cultural Resources

5.6.1 Report Sources and Literature Review

This report was prepared using the Alaska Heritage Resources Survey (AHRS) database and source documents available in a private library of publications and research materials. These documents were supplemented by materials available on the internet and in public libraries in Anchorage and Fairbanks. A more comprehensive literature review needs to be completed once a preferred corridor is chosen.

5.6.2 Lack of Fieldwork-Based Corridor Specific Research

Existing cultural resource information suggests that there are undiscovered cultural resources along all potential corridors. Existing AHRS data and information gathered through comprehensive literature reviews are inadequate to support the assessment of a specific corridor, a specific alignment, or specific engineering plan within that corridor. Fieldwork involving large-scale air and surface inspection by qualified cultural resource specialists, including sub-surface testing and site evaluation (and, as required, site mitigation) will have to be performed as

part of the environmental investigations and compliance for the project. Additional contact with federal other state agencies, or knowledgeable individuals to obtain reports or to verify information, will need to be conducted.

5.6.3 Prehistoric and Historic Period Sites in the Alaska Heritage Resources Survey

The AHRS was initially populated with information drawn from the available literature in the 1960s and 1970s. Rural communities were often assigned a single AHRS number so that they would be represented in the AHRS for planning purposes. A single community AHRS number might represent several hundred houses, sheds, community structures, road features, etc., of varying "historic" ages. Again, under current AHRS policies, each of those properties would be assigned a single AHRS number and each property would be evaluated for its eligibility for listing on the NRHP.

5.6.4 Paleontological Sites

Under the State of Alaska's Historic Preservation statutes, paleontological sites are afforded the same status for protection as sites that relate to human activities. There has been little systematic effort to inventory the State's paleontology resources with the goal of placing those sites on the AHRS. Thus, the AHRS under-represents the paleontological resources present in Alaska, regardless of land status. More detailed study to identify paleontological sites needs to be conducted once a corridor is chosen for further analysis.

5.6.5 National Register of Historic Places

Of the known sites within the project study area, approximately one-quarter have been evaluated for the NRHP. All sites discovered during the field survey that are within the area of potential effect, will need to be evaluated for their eligibility for listing on the NRHP. As fieldwork plans are developed, the National Register Listed and National Register Eligible sites on the NRHP should be verified for site location and site boundary accuracy and precision.

5.6.6 Site Locations (Coordinates) in the Alaska Heritage Resources Survey

Site location information in the AHRS is presented in several formats including Public Lands Survey (section, township, range, meridian format), UTM, latitude and longitude, and Global

Positioning System-derived latitude and longitude. All AHRS site locations within a selected corridor will need to be field checked for location accuracy and site condition.

5.7 Contaminated Sites

Contaminated sites have been identified by DEC in most of the villages, towns, and cities within the project study area. Depending upon which corridors are chosen for further study, these sites can most likely be avoided. Consultation with DEC will be necessary to ensure that contaminated sites are identified and are fully characterized within any preferred corridor study area.

Naturally occurring asbestos has been documented in the project study area along the west side of the Shungnak River (below the east slope of Bismark Mountain), Cosmos Creek (found in the Cosmos Hills), and Dahl Creek (Asbestos Mountain). Small deposits have been located east of Kogoluktuk River (south of California Creek) and in Jade Mountain (in the Jade Hills - 25 miles northwest of the confluence of the Shungnak and Kobuk Rivers) (USDOI, 1949).

A Phase I Environmental Site Assessment will likely be needed once a preferred corridor study area is chosen. The Phase I Environmental Site Assessment will help determine the potential presence of hazardous waste contamination, or other related environmental concerns. Depending on the results of the Phase I Assessment, a Phase II Assessment may be needed to further characterize any contamination that could be encountered during construction of the project.

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APPENDIX A

Bird Species Documented within the Project Study Area

Bird Species Documented within the Project Study Area

Common Name	*Scientific Name*	Seasonal		Migration Status	Habitat	Parks that List Birds
		Summer	Winter			
Land Birds						
Alder Flycatcher	*Empidonax alnorum*	P	A	Seasonal	Scrub	Tanana-Kuskokwim Lowlands
American Golden-Plover	*Pluvialis dominica*	P	A	Seasonal	Grasslands	
American Kestrel	*Falco sparverius*	P	A	Seasonal	Woodland	
American Pipit	*Anthus rubescens*	P	A	Seasonal	Grasslands	
American Robin	*Turdus migratorius*	P	A	Seasonal	Forest	
American Three-toed Woodpecker	*Picoides dorsalis*	P	P	Resident	Boreal Forest	
American Tree Sparrow	*Spizella arborea*	P	A	Seasonal	Scrub	
Arctic Warbler	*Phylloscopus borealis*	P	A	Seasonal	Forest	
Bank Swallow	*Riparia riparia*	P	A	Seasonal	Grasslands	
Bar-tailed Godwit	*Limosa lapponica*	P	A	Seasonal	Tundra	
Black-backed Woodpecker	*Picoides arcticus*	P	P	Resident	Forest	
Black-billed Magpie	*Pica hudsonia*	P	P	Resident	Omnipresent	
Black-capped Chickadee	*Poecile atricapillus*	P	P	Resident	Scrub	
Blackpoll Warbler	*Dendroica striata*	P	A	Seasonal	Boreal Forest	Intermontane Boreal Kuskokwim Mountains, Ray Mountains, Tanana-Kuskokwim Lowlands
Bluethroat	*Luscinia svecica*	P	A	Seasonal	Mountains	Bering Tiaga, Seward Peninsula
Bohemian Waxwing	*Bombycilla garrulus*	P	A	Seasonal	Forest	
Bonaparte's Gull	*Chroicocephalus philadelphia*	P	A	Seasonal	Tundra	
Boreal Chickadee	*Poecile hudsonicus*	P	P	Resident	Boreal Forest	Yukon-Tanana Uplands, Yukon Ridges and Valleys
Boreal Owl	*Aegolius funereus*	P	P	Resident	Forest	Yukon-Tanana Uplands, Intermontane Boreal Kuskokwim Mountains,

Common Name	*Scientific Name*	Seasonal		Migration Status	Habitat	Parks that List Birds
		Summer	Winter			
						Yukon Ridges and Valleys, Ray Mountains, Tanana-Kuskokwim Lowlands
Brambling	*Fringilla montifringilla*	P	A	Seasonal	Tundra	
Brant	*Branta bernicla*	P	A	Seasonal	Tundra	
Common Raven	*Corvus corax*	P	P	Resident	Omnipresent	
Common Redpoll	*Acanthis flammea*	P	P	Resident	Woodland	
Dark-eyed Junco	*Junco hyemalis*	P	A	Seasonal	Forest	
Downy Woodpecker	*Picoides pubescens*	P	P	Resident	Forest	
Eastern Yellow Wagtail	*Motacilla tschutschensis*	P	A	Seasonal	Scrub	
Fox Sparrow	*Passerella iliaca*	P	S	Seasonal	Boreal Forest	
Glaucous-winged Gull	*Larus glaucescens*	P	A	Seasonal	Omnipresent	
Golden-crowned Sparrow	*Zonotrichia atricapilla*	P	A	Seasonal	Scrub	
Gray Jay	*Perisoreus canadensis*	P	P	Resident	Scrub	Yukon-Tanana Uplands, Yukon Ridges and Valleys
Gray-cheeked Thrush	*Catharus minimus*	P	A	Seasonal	Scrub	
Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*	P	A	Seasonal	Mountains	
Great Gray Owl	*Strix nebulosa*	P	P	Resident	Boreal Forest	Intermontane Boreal Kuskokwim Mountains, Yukon Ridges and Valleys, Ray Mountains, Tanana-Kuskokwim Lowlands
Great Horned Owl	*Bubo virginianus*	P	P	Resident	Forest	
Greater White-fronted Goose	*Anser albifrons*	P	A	Seasonal	Tundra	
Hairy Woodpecker	*Picoides villosus*	P	P	Resident	Forest	
Hammond's Flycatcher	*Empidonax hammondii*	P	A	Seasonal	Forest	Tanana-Kuskokwim Lowlands
Hermit Thrush	*Catharus guttatus*	P	A	Seasonal	Forest	
Herring Gull	*Larus argentatus*	P	A	Seasonal	Omnipresent	
Hoary Redpoll	*Acanthis hornemanni*	P	P	Resident	Scrub	
Horned Lark	*Eremophila alpestris*	P	A	Seasonal	Grasslands	Brooks Range, Intermontane

Common Name	*Scientific Name*	Seasonal		Migration Status	Habitat	Parks that List Birds
		Summer	Winter			
						Boreal Kuskokwim Mountains
Lapland Longspur	*Calcarius lapponicus*	P	A	Seasonal	Tundra	
Long-tailed Jaeger	*Stercorarius longicaudus*	P	A	Seasonal	Tundra	
McKay's Bunting	*Plectrophenax hyperboreus*	P	P	Resident	Tundra	
Merlin	*Falco columbarius*	P	A	Seasonal	Forest	
Mew Gull	*Larus canus*	P	A	Seasonal	Omnipresent	
Northern Flicker	*Colaptes auratus*	P	A	Seasonal	Forest	Yukon-Tanana Uplands
Northern Goshawk	*Accipiter gentilis*	P	P	Resident	Forest	
Northern Hawk Owl	*Surnia ulula*	P	P	Resident	Boreal Forest	
Northern Shrike	*Lanius excubitor*	P	P	Resident	Woodland	
Northern Waterthrush	*Parkesia noveboracensis*	P	A	Seasonal	Forest	
Northern Wheatear	*Oenanthe oenanthe*	P	A	Seasonal	Grasslands	
Olive-sided Flycatcher	*Contopus cooperi*	P	A	Seasonal	Boreal Forest	Intermontane Boreal Kuskokwim Mountains, Ray Mountains, Tanana-Kuskokwim Lowlands
Orange-crowned Warbler	*Oreothlypis celata*	P	A	Seasonal	Scrub	
Parasitic Jaeger	*Stercorarius parasiticus*	P	A	Seasonal	Tundra	
Pine Grosbeak	*Pinicola enucleator*	P	P	Resident	Woodland	
Red-throated Pipit	*Anthus cervinus*	P	A	Seasonal	Grasslands	Bering Tiaga
Rock Ptarmigan	*Lagopus muta*	P	P	Resident	Tundra	
Ruby-crowned Kinglet	*Regulus calendula*	P	A	Seasonal	Scrub	
Ruffed Grouse	*Bonasa umbellus*	P	P	Resident	Forest	Tanana-Kuskokwim Lowlands
Rusty Blackbird	*Euphagus carolinus*	P	A	Seasonal	Boreal Forest	Intermontane Boreal Kuskokwim Mountains, Ray Mountains, Tanana-Kuskokwim Lowlands
Savannah Sparrow	*Passerculus sandwichensis*	P	A	Seasonal	Scrub	
Say's Phoebe	*Sayornis saya*	P	A	Seasonal	Grasslands	

Common Name	*Scientific Name*	Seasonal		Migration Status	Habitat	Parks that List Birds
		Summer	Winter			
Sharp-tailed Grouse	*Tympanuchus phasianellus*	P	P	Resident	Grasslands	
Short-eared Owl	*Asio flammeus*	P	A	Seasonal	Grasslands	
Slaty-backed Gull	*Larus schistisagus*	P	A	Seasonal	Tundra	
Snow Bunting	*Plectrophenax nivalis*	P	P	Resident	Grasslands	
Snowy Owl	*Bubo scandiacus*	P	A	Seasonal	Tundra	Kotzebue Sound Lowlands
Spruce Grouse	*Falcipennis canadensis*	P	P	Resident	Spruce Forest	
Surfbird	*Aphriza virgata*	P	A	Seasonal	Mountains	
Swainson's Thrush	*Catharus ustulatus*	P	A	Seasonal	Forest	
Varied Thrush	*Ixoreus naevius*	P	A	Seasonal	Forest	
Violet-green Swallow	*Tachycineta thalassina*	P	A	Seasonal	Woodland	
White-crowned Sparrow	*Zonotrichia leucophrys*	P	S	Seasonal	Scrub	
White-winged Crossbill	*Loxia leucoptera*	P	P	Resident	Boreal Forest	
Willow Ptarmigan	*Lagopus lagopus*	P	P	Resident	Tundra	
Wilson's Warbler	*Wilsonia pusilla*	P	A	Seasonal	Scrub	
Yellow Warbler	*Dendroica petechia*	P	A	Seasonal	Woodland	
Yellow-rumped Warbler	*Dendroica coronata*	P	A	Seasonal	Scrub	
Raptors						
Golden Eagle	*Aquila chrysaetos*	P	A	Seasonal	Grasslands	Brooks Range, Intermontane Boreal Kuskokwim Mountains
Northern Harrier	*Circus cyaneus*	P	A	Seasonal	Grasslands	
Red-tailed Hawk	*Buteo jamaicensis*	P	A	Seasonal	Grasslands	Yukon-Tanana Uplands
Gyrfalcon	*Falco rusticolus*	P	A	Seasonal	Mountains	
Peregrine Falcon	*Falco peregrinus*	P	P	Seasonal	Mountains	Dulbi-Kaiyuh Mountains Subunit, North Kukokwim Subunit, Yukon-Tanana Uplands, Brooks Foothills
Rough-legged Hawk	*Buteo lagopus*	P	A	Seasonal	Tundra	
Sharp-shinned Hawk	*Accipiter striatus*	P	A	Seasonal	Forest	Intermontane Boreal Kuskokwim Mountains
Bald Eagle	*Haliaeetus leucocephalus*	P	P	Resident	Wetlands	

Common Name	*Scientific Name*	Seasonal		Migration Status	Habitat	Parks that List Birds
		Summer	Winter			
Shorebirds, Seabirds, and Waterfowl						
American Dipper	*Cinclus mexicanus*	P	P	Resident	Wetlands	
American Wigeon	*Anas americana*	P	A	Seasonal	Wetlands	
Arctic Tern	*Sterna paradisaea*	P	A	Seasonal	Wetlands	
Belted Kingfisher	*Megaceryle alcyon*	P	A	Seasonal	Wetlands	Tanana-Kuskokwim Lowlands
Bufflehead	*Bucephala albeola*	P	A	Seasonal	Wetlands	
Cackling Goose	*Branta hutchinsii*	P	A	Seasonal	Wetlands	
Canada Goose	*Branta canadensis*	P	A	Seasonal	Wetlands	
Cliff Swallow	*Petrochelidon pyrrhonota*	P	A	Seasonal	Wetlands	
Common Goldeneye	*Bucephala clangula*	P	A	Seasonal	Wetlands	Tanana-Kuskokwim Lowlands
Common Loon	*Gavia immer*	P	A	Seasonal	Wetlands	Tanana-Kuskokwim Lowlands
Common Merganser	*Mergus merganser*	P	A	Seasonal	Wetlands	
Common Snipe	*Gallinago gallinago*	P	A	Seasonal	Wetlands	
Greater Scaup	*Aythya marila*	P	A	Seasonal	Wetlands	
Green-winged Teal	*Anas crecca*	P	A	Seasonal	Wetlands	
Horned Grebe	*Podiceps auritus*	P	A	Seasonal	Wetlands	Tanana-Kuskokwim Lowlands
Lesser Scaup	*Aythya affinis*	P	A	Seasonal	Wetlands	
Lesser Yellowlegs	*Tringa flavipes*	P	A	Seasonal	Wetlands	
Lincoln's Sparrow	*Melospiza lincolnii*	P	A	Seasonal	Wetlands	
Long-tailed Duck	*Clangula hyemalis*	P	A	Seasonal	Wetlands	
Mallard	*Anas platyrhynchos*	P	A	Seasonal	Wetlands	
Northern Pintail	*Anas acuta*	P	A	Seasonal	Wetlands	
Northern Shoveler	*Anas clypeata*	P	A	Seasonal	Wetlands	
Osprey	*Pandion haliaetus*	P	A	Seasonal	Wetlands	
Pacific Loon	*Gavia pacifica*	P	A	Seasonal	Wetlands	
Red-breasted Merganser	*Mergus serrator*	P	A	Seasonal	Wetlands	
Red-necked Grebe	*Podiceps grisegena*	P	A	Seasonal	Wetlands	Tanana-Kuskokwim Lowlands
Red-necked Phalarope	*Phalaropus lobatus*	P	A	Seasonal	Wetlands	
Red-throated Loon	*Gavia stellata*	P	A	Seasonal	Wetlands	
Sandhill Crane	*Grus canadensis*	P	A	Seasonal	Wetlands	
Sharp-tailed Sandpiper	*Calidris acuminata*	U	U	U	Wetlands	

Common Name	*Scientific Name*	Seasonal		Migration Status	Habitat	Parks that List Birds
		Summer	Winter			
Solitary Sandpiper	*Tringa solitaria*	P	A	Seasonal	Wetlands	
Spotted Sandpiper	*Actitis macularius*	P	A	Seasonal	Wetlands	
Tree Swallow	*Tachycineta bicolor*	P	A	Seasonal	Wetlands	
Trumpeter Swan	*Cygnus buccinator*	P	A	Seasonal	Wetlands	Tanana-Kuskokwim Lowlands
Tundra Swan	*Cygnus columbianus*	P	A	Seasonal	Wetlands	
White-winged Scoter	*Melanitta fusca*	P	A	Seasonal	Wetlands	
Wilson's Snipe	*Gallinago delicata*	P	A	Seasonal	Wetlands	
Yellow-billed Loon	*Gavia adamsii*	P	A	Seasonal	Wetlands	McCarthy's Marsh
Aleutian Tern	*Onychoprion aleuticus*	P	A	Seasonal	Coastal	
Baird's Sandpiper	*Calidris bairdii*	P	A	Seasonal	Coastal	Brooks Foothills
Black Guillemot	*Cepphus grylle*	P	P	Resident	Coastal	
Black Scoter	*Melanitta americana*	P	A	Seasonal	Coastal	
Black Turnstone	*Arenaria melanocephala*	P	A	Seasonal	Coastal	Kotzebue Sound Lowlands, Seward Peninsula
Black-bellied Plover	*Pluvialis squatarola*	P	A	Seasonal	Coastal	
Black-legged Kittiwake	*Rissa tridactyla*	P	A	Seasonal	Coastal	
Bristle-thighed Curlew	*Numenius tahitiensis*	P	A	Seasonal	Coastal	Seward Peninsula
Common Eider	*Somateria mollissima*	P	A	Seasonal	Coastal	
Dunlin	*Calidris alpina*	P	A	Seasonal	Coastal	
Emperor Goose	*Chen canagica*	P	A	Seasonal	Coastal	
Glaucous Gull	*Larus hyperboreus*	P	A	Seasonal	Coastal	
Harlequin Duck	*Histrionicus histrionicus*	P	A	Seasonal	Coastal	
Horned Puffin	*Fratercula corniculata*	P	P	Resident	Coastal	
Hudsonian Godwit	*Limosa haemastica*	P	A	Seasonal	Coastal	
King Eider	*Somateria spectabilis*	P	A	Seasonal	Coastal	
Kittlitz's Murrelet	*Brachyramphus brevirostris*	P	U	U	Coastal	
Least Sandpiper	*Calidris minutilla*	P	A	Seasonal	Coastal	
Long-billed Dowitcher	*Limnodromus scolopaceus*	P	A	Seasonal	Coastal	
Mottled Petrel	*Pterodroma inexpectata*	P	A	Seasonal	Coastal	

Common Name	*Scientific Name*	Seasonal		Migration Status	Habitat	Parks that List Birds
		Summer	Winter			
Pacific Golden-Plover	*Pluvialis fulva*	P	A	Seasonal	Coastal	
Parakeet Auklet	*Aethia psittacula*	P	P	Resident	Coastal	
Pectoral Sandpiper	*Calidris melanotos*	P	A	Seasonal	Coastal	
Pelagic Cormorant	*Phalacrocorax pelagicus*	P	P	Resident	Coastal	
Pigeon Guillemot	*Cepphus columba*	P	P	Resident	Coastal	
Red Knot	*Calidris canutus*	P	A	Seasonal	Coastal	
Red-faced Cormorant	*Phalacrocorax urile*	P	A	Seasonal	Coastal	
Red-legged Kittiwake	*Rissa brevirostris*	P	A	Seasonal	Coastal	
Red-necked Stint	*Calidris ruficollis*	P	A	Seasonal	Coastal	
Rock Sandpiper	*Calidris ptilocnemis*	P	A	Seasonal	Coastal	
Ruddy Turnstone	*Arenaria interpres*	P	A	Seasonal	Coastal	Kotzebue Sound Lowlands, Seward Peninsula
Sabine's Gull	*Xema sabini*	P	A	Seasonal	Coastal	
Sanderling	*Calidris alba*	P	A	Seasonal	Coastal	
Semipalmated Plover	*Charadrius semipalmatus*	P	A	Seasonal	Coastal	
Semipalmated Sandpiper	*Calidris pusilla*	P	A	Seasonal	Coastal	
Short-tailed Shearwater	*Puffinus tenuirostris*	P	A	Seasonal	Coastal	
Sooty Shearwater	*Puffinus griseus*	P	P	Resident	Coastal	
Spectacled Eider	*Somateria fischeri*	P	A	Seasonal	Coastal	Kotzebue Sound Lowlands, Seward Peninsula
Steller's Eider	*Polysticta stelleri*	P	A	Seasonal	Coastal	
Surf Scoter	*Melanitta perspicillata*	P	A	Seasonal	Coastal	
Thick-billed Murre	*Uria lomvia*	P	P	Resident	Coastal	Seward Peninsula
Tufted Puffin	*Fratercula cirrhata*	P	P	Resident	Coastal	Seward Peninsula
Wandering Tattler	*Tringa incana*	P	A	Seasonal	Coastal	
Western Sandpiper	*Calidris mauri*	P	A	Seasonal	Coastal	
Whimbrel	*Numenius phaeopus*	P	A	Seasonal	Coastal	

P Present
A Absent
U Unknown

Ambler Mining District Access