

CHAPTER 2: PROPOSED ACTION AND ALTERNATIVES



2 Proposed Action and Alternatives

2.1 Summary of Major Changes between the Draft and Final EIS

Several major changes were made to the Draft Environmental Impact Statement (EIS) and incorporated into this chapter of the Final EIS based on public comments on the Draft EIS. These are (and Section where change was made):

1. Included a discussion of how oil prices and recent assessments of potential oil and gas resources in the Yukon Flats Basin have been incorporated into the Final EIS (Section 2.3.2).
2. Updated the status of the equal value land exchange appraisal process and its use in the Final EIS (Section 2.3.4).
3. Included a discussion of why the No Land Exchange Alternative was selected by the U.S. Fish and Wildlife Service as the Preferred Alternative for the Final EIS (Section 2.4.4).
4. Included a discussion of other alternatives considered but excluded from further analysis in the Final EIS based on public comments on the Draft EIS (Section 2.5).
5. Included a discussion of incomplete information concerning Doyon and village management of Alaska Native Claims Settlement Act (ANCSA) 12(b) lands within or outside of the Yukon Flats National Wildlife Refuge (Refuge; Section 2.7.2).

2.2 Introduction

This chapter discusses the Proposed Action and alternative actions that have been developed to assess different land exchange and use options to facilitate the Refuge management while providing Doyon, Limited (Doyon) with the opportunity to develop oil and gas resources on their lands. The proposed and alternative actions are those that could be taken to feasibly attain or approximate the Service goals, as expressed in its programs, policies, and management plans.

Alternatives were developed to respond to the various significant issues and alternative proposals raised during scoping and public hearings on the Draft EIS, yet still meet the project's purpose and need as described in Chapter 1. Alternatives also were developed to ensure Refuge compliance with Federal, Tribal, State, and local regulations. This chapter also identifies special features of the Proposed Action and other action alternatives that would be taken by Doyon to offset the effects to natural and social resources from potential development of oil and gas resources within the Refuge.

The following information is included in this chapter:

- A discussion of how alternatives were developed for the land exchange.
- A detailed description of the Proposed Action – a land exchange in accordance with the Agreement in Principle.
- Descriptions of alternatives to the Proposed Action that were considered in detail.
- Descriptions of alternatives considered but excluded from further detailed analysis.
- Identification of the Preferred Alternative for the Final EIS.

- A discussion of special features of the land exchange under the Proposed Action and other action alternatives.
- Identification of incomplete and unavailable information.
- A comparative assessment of the responsiveness of alternatives to project goals.
- A summary comparison of the effects of the alternatives; a detailed assessment of effects is given in Chapter 4, Environmental Consequences.

2.3 Development of Alternatives

The Service and Doyon negotiated the details of the Proposed Action as described below. The Service shared these details with the public and other interested parties in the pre-scoping effort, which yielded the issues and concerns listed in Section 1.7. The Service subsequently developed two action alternatives to the Proposed Action and a No Land Exchange Alternative in response to the issues raised during the pre-scoping and scoping efforts, the Service and Doyon goals identified in Section 1.3.2, and the stated purpose and need for the land exchange. These alternatives were described in the Service's Notice of Intent to prepare the EIS, which was published in the Federal Register on October 19, 2005 (Volume 70, Number 201, Pages 60845-60846), and were presented to the public and other interested parties in public scoping meetings, newsletters, consultations, and other scoping documents.

The Interdisciplinary Team responsible for preparing this EIS reviewed the alternatives and determined that they represented a reasonable range of alternatives. No new alternatives were developed as a result of scoping; however, we modified the Proposed Action slightly based on comments received during scoping meetings. Tribal representatives in Circle identified land to the east of, and adjacent to, the Yukon River near Circle as the site of a historical settlement known as 22-Mile Village. These Tribal representatives stated that 22-Mile Village has important cultural significance to local residents and should remain in Native ownership. The land was originally included in the Proposed Action as some of the exchange lands that could be transferred from Doyon ownership to Federal ownership. This parcel of land was subsequently removed from the lists of lands available for exchange under any alternative.

Except for excluding 22-Mile Village, the alternatives presented below are the same as those presented during the scoping process. The following range of alternatives was considered in detail in the Draft EIS: the Proposed Action, two action alternatives, and a No Land Exchange Alternative. Several additional alternatives were suggested during scoping and the Draft EIS public comment period. Information about these alternatives and the reasons they were excluded from detailed analysis are given in Section 2.5.

2.3.1 Negotiation History

In November 1993, Doyon and the Refuge staff began discussions about an exchange in land interests. Doyon contacted the Service and suggested exchanging a noncompetitive oil and gas lease on Refuge lands for conservation easements or restrictive covenants that would prohibit development on other Doyon lands. In December 1993, the Service responded and acknowledged that a large percentage of important fish and wildlife habitat within the Refuge boundary is under Native ownership. The Service identified the legal, regulatory, and policy issues that would need to be addressed before reaching an agreement. The Service was concerned about the long-term practicality of acquiring conservation easements. The Service response stated that prior Service

experience had shown conservation easements to be expensive and difficult to administer. The Service did express interest in acquiring fee title lands containing important wetland habitats. However, the Service was uncertain on how it would benefit from this proposed exchange in land interests.

In April 1995, Doyon submitted a formal “management partnership” proposal to the Service (Doyon, Limited 1995). This proposal, while based on discussions held in 1993, further refined how a land exchange would benefit both parties. The proposal stated that: “...in return for the conservation easements and other habitat protection tools by Doyon, the USFWS [Service] would grant noncompetitive oil and gas leases on Refuge lands adjacent to and in the vicinity of other Doyon lands. The leases would be similar to those for Federal uplands for which Doyon would pay a production royalty and would be of limited duration.”

The Service asked the Department of the Interior (DOI) Solicitor’s Office to review the proposal. The review was completed in May 1997, and in January 1998 the Service responded to Doyon’s proposal. The response stated that: (1) oil and gas leasing and development were not consistent with the selected management alternative in the *Yukon Flats National Wildlife Refuge Comprehensive Conservation Plan, Environmental Impact Statement and Wilderness Review* (CCP; Service 1987a), and (2) noncompetitive oil and gas leases could not be issued under the authority of the Minerals Leasing Act of 1920; however, the Service could exchange interests in land. The response also stated that to justify such an exchange, the Service must: (1) acquire lands (or interests therein) that were consistent with the purposes for which the Refuge was established, and (2) the exchanged land interests must be of equal value. The Service’s response concluded, “We would certainly be interested in considering any such proposal that is both in the public interest and consistent with the purposes for which the Yukon Flats Refuge was established.” In December 1999, Doyon asked the DOI to consider a competitive oil and gas lease sale within the Refuge, under the Mineral Leasing Act of 1920. In January 2000, the Service responded and stated that the Refuge CCP does not allow for oil and gas leasing on the Refuge. Before leasing Refuge lands, the Service would have to revise the CCP and make a determination that oil and gas leasing and development is an appropriate use and compatible with the purposes for which the Refuge was established. The Service response also stated it was unlikely that any large-scale development activities on Refuge lands would be determined to be an appropriate use and compatible as they would negatively impact wildlife habitats.

In November 2002, the Service and Doyon began discussions that led to the Agreement in Principle for the proposed land exchange. A number of key differences exist between these negotiations and the earlier proposals from Doyon:

1. Doyon offered the U.S. Government fee title ownership of priority wildlife habitats.
2. Doyon was willing to exchange fee title ownership (both surface and subsurface estates), ensuring development activities would occur on Doyon’s lands, not on Refuge lands. Therefore, a determination that oil and gas development is an appropriate use and compatible with the purposes of the Refuge would not be required.
3. Doyon was willing to reallocate 56,500 acres of remaining ANCSA 12(b) entitlements to areas outside the Refuge.
4. The Service and Doyon would consolidate land ownerships by pursuing additional land exchanges. This exchange would include up to 132,000 acres by each party.

5. Doyon was willing to mitigate oil and gas development impacts by: (a) selling up to 120,000 acres of additional land to the United States; (b) increasing perpetual production payments from 1.25% to 1.5% if access to oil and gas development areas is through the Refuge; and (c) transferring to the United States one section (640 acres) of Doyon land for every linear mile of access corridor across the Refuge.

A facilitator from the Conservation Fund was invited to attend negotiation meetings and suggested alternative approaches when the negotiators were unable to reach an agreement. In October 2004, the Service and Doyon issued a press release announcing that the Service and Doyon had reached an agreement, termed the Agreement in Principle (see **Appendix A**, Agreement in Principle). On December 8, 2004, the Omnibus Appropriations Act passed into law. This Act provided \$750,000 to the Service for the proposed exchange and established a special account in the U.S. Treasury in which to deposit any production payments received from Doyon. In February 2005, the Service publicly disclosed the details of the exchange proposal in a report entitled “Evaluation and Review of a Proposed Land Exchange and Acquisition” (U.S. Fish and Wildlife Service 2005) and invited public comment.

During public meetings held in early 2005, a number of concerns were raised that had not been considered in detail in the Evaluation and Review document. At the request of the public and Doyon, the Service agreed to prepare an EIS. On October 19, 2005, the Service published in the Federal Register a Notice of Intent to prepare an EIS (Federal Register, Volume 70, Number 201, Pages 60845-60846).

2.3.2 Oil and Gas Development Potential on Refuge and Doyon Lands

The U.S. Geological Survey (USGS) conducted an assessment of potential oil and gas resources in the Yukon Flats Basin in 2004 (Stanley et al. 2004). Doyon’s consultants also prepared an independent assessment (Doyon, Limited 2006a) of the basin in the same general time frame. Both of these assessments were based on existing USGS mapping of contours within the Yukon Flats Basin. This mapping indicated that the areas of the basin that were likely deep enough to hold oil were located within a single deep area of the basin encompassing the core lands involved in the exchange and lands to the northeast toward the village of Birch Creek. Doyon’s interest in obtaining the core lands, the Service’s selection of the lands that would be exchanged, and the Agreement in Principle were based on this mapping. The price of oil in 2004-2005 and the location of the single area of deep basin at distances of 70 to 90 miles from market infrastructure (Trans-Alaska Pipeline System or TAPS) also led both Doyon and the Service to believe that only a rather large single discovery of oil would be economically recoverable and would therefore be developed in this area. This was the Service’s belief at the time scoping was carried out in February and March 2006.

Subsequently, the USGS re-mapped the Yukon Flats Basin through re-analysis of existing data and interpretation of new geophysical surveys (Till et al. 2006) and conducted a burial and thermal history modeling of the Basin to determine if geological conditions in the Basin were favorable for the occurrence of oil and gas (Rowan and Stanley 2007). This new mapping revealed four large areas in the basin that are considered to be deep enough to potentially hold oil resources. These areas extended westward to Stevens Village and north of Fort Yukon, encompassing additional Native and Federal lands. Modeling of the Basin also suggested that geological conditions are favorable for the occurrence of oil and gas at depths greater than 6,000 feet. The price of oil also has increased since negotiations began. In 1993, the price of oil was less than \$20/barrel; in July 2008, prices exceeded \$140/barrel, and in January 2010 prices

exceeded \$80/barrel. The new mapping and the increases in the price of oil have resulted in the following, which have been incorporated in the analyses in this EIS: (1) a smaller field would be more economically recoverable than was previously thought, (2) Doyon has indicated that they would explore for oil and gas resources on other Native lands within the Refuge thought to hold potential whether or not a land exchange takes place, (3) some of the lands selected by the Service for the exchange are now thought to hold potential for oil and gas, and (4) oil and gas exploration and development could take place on lands adjacent to some of the lands the Service would receive in the proposed exchange.

2.3.3 Exchange Land Prioritization

About 2.5 million acres within the Refuge boundaries have been selected by, or conveyed to, Doyon or village corporations. The Yukon Flats Land Protection Plan (U.S. Fish and Wildlife Service 1997) identified high, medium, and low land protection priorities on these private lands within the Refuge; however, other information was available to develop a more detailed ranking system. Prior to negotiations, the Service prioritized all 123 townships based on their wildlife habitat value. The following sections describe the biological and physical measures used and the ranking process in detail.

2.3.3.1 Biological Measures

Two biological data sets were available for all 123 townships and included intensive waterfowl breeding pair surveys conducted during 1990 to 1992, and trumpeter swan¹ surveys conducted every 5 years between 1975 and 2005. The Service used these two data sets to evaluate the biological resource values of each township as the Refuge was established primarily to conserve significant waterfowl habitats. The densities (birds per acre) of dabbling ducks, diving ducks, swans, and other waterbirds (primarily grebes, loons, and shorebirds) surveyed in each township were calculated for each of the 123 townships and summed to establish a biological rank. All 123 townships were then prioritized based on these biological ranks.

2.3.3.2 Physical Measures

Wetland habitats are some of the most productive wildlife habitats in the Refuge, and digital surface water data were available for all 123 townships. Surface water features on land parcels were measured and prioritized using aerial photography collected between 1978 and 1981. The Service used the following four physical measures to rank acquisition priorities: (1) number of lakes within the township, (2) number of acres of lakes within the township, (3) number of miles of streams within the township, and (4) number of acres of the Yukon River within the township. Quantifying these abiotic factors gave a relative measure of riparian habitat, an important biotic factor. Each of the physical measures was given equal weight, and the total scores were summed for each township. All 123 townships were prioritized based on their physical rank.

¹ Common and scientific names of plants and animals given in this EIS are provided in **Appendix B**.

2.3.3.3 Final Acquisition Priorities

The biological and physical rankings were combined, and an overall rank was established for each of the 123 townships. However, the Service used other important considerations to influence selection of the highest priority townships. Questions that were used to help make these decisions included:

- Was the township owned by Doyon and was Doyon willing to make this township available for exchange or purchase?
- Would acquiring the township provide the Refuge with a large contiguous block of habitat?
- Was the township adjacent to other Refuge lands?
- Were other special values present within the township, such as important fish spawning areas, recreation values, or key watersheds such as Beaver Creek or the Hodzana River?

At the onset of negotiations, Doyon removed from Service consideration all village corporation and certain Doyon-conveyed lands. Of the 57 townships conveyed to Doyon, Doyon was willing to exchange or sell a total of 48 townships. From these lands, the Service identified 16 priority parcels to be included in the exchange. These parcels were rated from 1 to 16, with 1 being the highest priority. **Table 2-1** includes the priority ranking of all 123 townships and the positioning of all private lands in relation to this ranking. Parcels 1 to 8 were included in the top 19 of the 123 privately owned townships (top 10 of the 57 Doyon townships). Parcels 9 to 15 were included in the top 64 of the 123 privately owned townships (top 28 of the 57 Doyon townships). Parcel 16 ranked 103 of the 123 privately owned townships (top 47 out of the 57 Doyon townships), but was included because it contained key Yukon River fish spawning habitat. Doyon has also agreed to reallocate certain land selections to villages outside the Refuge if the exchange proceeds; otherwise these lands would be conveyed to villages inside the Refuge and would no longer be part of the conservation estate. Totaling 56,500 acres, these lands are in four townships near the villages of Beaver and Chalkyitsik, and ranked in the top 22 of the 123 privately owned townships.

The final priorities reflected both the biological/physical ranking process and best professional judgment of Service staff of lands that would contribute most significantly to Refuge purposes based on parcels that Doyon made available for selection. **Figure 1-2** shows the exchange lands marked with their priority rankings.

Doyon has examined recent geological data (Till et al. 2006; Rowan and Stanley 2007) and identified that 7 of the 16 parcels offered for exchange by Doyon have oil and gas potential. This is information that was not available during the negotiation process and likely would have influenced which lands Doyon offered for exchange.

2.3.4 Equal Value Land Exchange

Sections 1302(h) of the Alaska National Interest Lands Conservation Act (ANILCA) and 22(f) of ANCSA authorize the Secretary of the DOI to exchange lands or interests in lands with village and regional corporations, individuals, or the State of Alaska to consolidate land ownerships, or to facilitate management or development of the land. The exchanged lands must be equal in value unless the Secretary determines it is in the public interest, in which case the exchange may be made for other than equal value. The provisions permit the addition of cash to the exchange by

Table 2-1 Comparison of priority ranking of privately owned townships and selected lands within the Refuge based on wildlife habitat values and ranking for Service land acquisitions in the proposed land exchange

Township Ranking Based on Wildlife Habitat Values	Service Priority Ranking for Proposed Land Exchange Parcels	Current Land Status	Land Grid Location (Meridian, Township, and Range)
1	Parcel 1	Conveyed to Doyon	F016N008W
2	Parcel 5	Conveyed to Doyon	F016N007W
3	Parcel 4	Conveyed to Doyon	F017N001E
4	Parcel 3	Conveyed to Doyon	F015N009W
5		Conveyed to Village Corporation	F016N010E
6		Conveyed to Village Corporation	F017N003E
7		Selected Native Lands	F015N008W
8	Parcel 2	Conveyed to Doyon	F016N003E
9	12(b) selected land to Refuge	Selected Native Lands	F020N009E
10		Conveyed to Doyon	F022N020E
11		Conveyed to Village Corporation	F017N007E
12		Selected Native Lands	F016N011E
13		Conveyed to Village Corporation	F017N008E
14		Conveyed to Doyon	F016N004E
15		Selected Native Lands	F021N009E
16	Parcel 8	Conveyed to Doyon	F023N019E
17	Parcel 6	Conveyed to Doyon	F016N006W
18	12(b) selected land to Refuge	Selected Native Lands	F016N005W
19	Parcel 7	Conveyed to Doyon	F019N003E
20		Conveyed to Village Corporation	F022N019E
21	12(b) selected land to Refuge	Selected Native Lands	F017N002E
22	12(b) selected land to Refuge	Part Conveyed to Village Corporation/Part Selected Native Lands	F016N009E
23		Conveyed to Doyon	F020N010E
24		Selected Native Lands	F016N001W
25		Conveyed to Doyon	F021N019E
26		Conveyed to Village Corporation	F020N019E
27		Conveyed to Village Corporation	F018N013E
28		Conveyed to Village Corporation	F021N013E
29		Selected Native Lands	F018N001E
30		Conveyed to Doyon	F017N009E
31		Conveyed to Village Corporation	F018N003E
32		Conveyed to Village Corporation	F015N011E
33		Conveyed to Village Corporation	F019N013E
34		Conveyed to Doyon	F013N017E
35		Conveyed to Doyon	F022N010E
36		Conveyed to Village Corporation	F014N008W
37	Parcel 10	Conveyed to Doyon	F017N010E
38	Parcel 12	Conveyed to Doyon	F016N009W
39		Conveyed to Village Corporation	F015N007W
40		Conveyed to Doyon	F022N016E

Table 2-1 Comparison of priority ranking of privately owned townships and selected lands within the Refuge based on wildlife habitat values and ranking for Service land acquisitions in the proposed land exchange (continued)

Township Ranking Based on Wildlife Habitat Values	Service Priority Ranking for Proposed Land Exchange Parcels	Current Land Status	Land Grid Location (Meridian, Township, and Range)
41	Parcel 13	Conveyed to Doyon	F019N004E
42		Selected Native Lands	F023N017E
43		Conveyed to Village Corporation	F017N001W
44	Parcel 14	Conveyed to Village Corporation	F013N008W
45	Parcel 11	Conveyed to Doyon	F019N010E
46		Conveyed to Doyon	F015N009E
47		Conveyed to Village Corporation	F014N006W
48	Parcel 9	Conveyed to Doyon	F016N001E
49		Selected Native Lands	F023N018E
50		Conveyed to Village Corporation	F017N004E
51		Conveyed to Doyon	F013N016E
52		Conveyed to Doyon	F019N002E
53		Selected Native Lands	F019N018E
54		Conveyed to Doyon	F016N002E
55		Conveyed to Village Corporation	F019N001W
56		Conveyed to Doyon	F021N017E
57		Selected Native Lands	F013N009W
58		Conveyed to Village Corporation	F020N011E
59		Conveyed to Doyon	F014N007W
60		Conveyed to Village Corporation	F018N004E
61		Selected Native Lands	F018N002E
62		Selected Native Lands	F014N016E
63		Conveyed to Village Corporation	F015N005W
64	Parcel 15	Conveyed to Doyon	F021N010E
65		Conveyed to Doyon	F015N006W
66		Conveyed to Doyon	F020N014E
67		Conveyed to Doyon	F016N008E
68		Conveyed to Village Corporation	F020N021E
69		Conveyed to Village Corporation	F019N012E
70		Conveyed to Doyon	F022N012E
71		Conveyed to Doyon	F020N018E
72		Conveyed to Village Corporation	F014N009W
73		Selected Native Lands	F021N018E
74		Conveyed to Doyon	F014N005W
75		Conveyed to Village Corporation	F022N017E
76		Conveyed to Village Corporation	F020N012E
77		Conveyed to Village Corporation	F018N007E
78		Conveyed to Doyon	F018N010E
79		Conveyed to Doyon	F015N010E
80		Conveyed to Village Corporation	F023N020E
81		Conveyed to Village Corporation	F022N018E
82		Conveyed to Doyon	F019N008E
83		Conveyed to Doyon	F019N007E

Table 2-1 Comparison of priority ranking of privately owned townships and selected lands within the Refuge based on wildlife habitat values and ranking for Service land acquisitions in the proposed land exchange (continued)

Township Ranking Based on Wildlife Habitat Values	Service Priority Ranking for Proposed Land Exchange Parcels	Current Land Status	Land Grid Location (Meridian, Township, and Range)
84		Conveyed to Doyon	F019N009E
85		Conveyed to Village Corporation	F018N014E
86		Conveyed to Village Corporation	F014N017E
87		Conveyed to Village Corporation	F022N011E
88		Conveyed to Village Corporation	F013N007W
89		Selected Native Lands	F018N001W
90		Conveyed to Doyon	F019N020E
91		Conveyed to Doyon	F023N016E
92		Selected Native Lands	F019N019E
93		Conveyed to Village Corporation	F020N013E
94		Conveyed to Village Corporation	F018N009E
95		Conveyed to Doyon	F021N012E
96		Conveyed to Doyon	F012N008W
97		Conveyed to Doyon	F020N003E
98		Selected Native Lands	F021N020E
99		Selected Native Lands	F021N011E
100		Conveyed to Doyon	F019N001E
101		Conveyed to Village Corporation	F018N008E
102		Conveyed to Doyon	F021N016E
103	Parcel 16	Conveyed to Doyon	F019N014E
104		Selected Native Lands	F019N017E
105		Conveyed to Village Corporation	F015N008E
106		Conveyed to Doyon	F022N013E
107		Conveyed to Doyon	F018N011E
108		Conveyed to Village Corporation	F019N011E
109		Selected Native Lands	F012N006W
110		Conveyed to Doyon	F020N001W
111		Conveyed to Village Corporation	F021N021E
112		Conveyed to Village Corporation	F019N021E
113		Conveyed to Doyon	F020N017E
114		Conveyed to Doyon	F020N020E
115		Selected Native Lands	F020N004E
116		Selected Native Lands	F023N021E
117		Conveyed to Doyon	F018N012E
118		Conveyed to Doyon	F013N005W
119		Selected Native Lands	F017N011E
120		Conveyed to Doyon	F022N021E
121		Conveyed to Village Corporation	F020N001E
122		Conveyed to Doyon	F012N009W
123		Conveyed to Doyon	F020N002E

either party in order to equalize values. The proposed land exchange between Doyon and the Service would be an equal value exchange, with the following exception: to facilitate comparison of the alternatives for this EIS before obtaining the appraised land values, Doyon has agreed to convey a specified minimum amount of land under each alternative. Under the Proposed Action, for example, Doyon would trade no less than 150,000 acres (surface and subsurface) to the Service in exchange for 110,000 acres of fee title lands (core lands) and 97,000 acres of oil and gas interests (halo lands).

If an exchange occurs, all lands potentially involved in the exchange, including submerged lands, would be independently appraised according to the Uniform Appraisal Standards for Federal Land Acquisitions (Interagency Land Acquisition Conference 2000). The appraisal would determine the market value of the properties, including the mineral estate (oil and gas resources). Acreages involved in the land exchange would be adjusted as needed based on the appraisal. If more than 150,000 acres of Doyon land were needed to equal the value of the Service land, more Doyon land would be added in priority order (starting with Priority 9).

2.4 Alternatives Considered in Detail

The following section details the Proposed Action, two other action alternatives, and the No Land Exchange Alternative. The alternatives were developed by the EIS Interdisciplinary Team, which consisted of management, planning, and technical staff with the Service, Bureau of Land Management (BLM), EIS contractor, and Doyon. Descriptions of each alternative are found in Sections 2.4.1 through 2.4.4, and are followed by a summary and comparison table in Section 2.4.5.

For all alternatives considered in detail, it is assumed that oil and gas exploration and development could occur on lands currently owned by Doyon under all alternatives and also on exchange lands under the action alternatives. Assumptions about future oil and gas exploration and development are discussed in Section 4.4.

If oil and/or gas were to be produced on the core lands, a pipeline and support road would be needed to transport product to market. Because of the location of the core lands, the pipeline and road would cross either the Refuge or the White Mountains National Recreation Area (WMNRA). The affected agency would be required to provide “adequate and feasible access” (ANILCA section 1110[b]) for a right-of-way (ROW) across Federal lands if warranted by oil and gas production (see Section 1.4.2). Under the action alternatives, the Service would receive compensation for the effects of a pipeline and support road on Refuge lands, as described below; no compensation would be provided for a ROW across Refuge lands under the No Land Exchange Alternative.

Under Title XI of ANILCA, an additional National Environmental Policy Act (NEPA) analysis would be required before constructing a ROW across Federal lands. The analysis would assess the site-specific impacts from the transportation corridor, and would include mitigation to minimize adverse impacts to public resources from the transportation corridor and oil and gas field development.

2.4.1 Proposed Action – Agreement in Principle

The Agreement in Principle between Doyon and the Service would provide Doyon title to lands within the Refuge that may hold developable oil and gas resources. In exchange, the Service

would receive lands characterized as priority habitat for fish and wildlife. Under the terms of the Agreement in Principle, the proposed exchange would proceed in two phases. Key features of each Phase of the Agreement in Principle are listed below:

2.4.1.1 Phase I of the Proposed Action

- Doyon would receive from the Service 110,000 acres (surface and subsurface), referred to in this document as “core lands” (**Figure 2-1**).
- Doyon would receive from the Service 97,000 acres of subsurface oil and gas interests, referred to in this document as “halo lands” that surround the core lands (**Figure 2-1**). No surface occupancy for oil and gas development would be allowed on these lands, except for a road/pipeline ROW as authorized under Title XI of ANILCA. Seismic surveys could be authorized by permit (at the Refuge Manager’s discretion), but would be limited to methods that do not require clearing of vegetation, such as helicopter-supported surveys.
- The Service would receive from Doyon a minimum of 150,000 acres of land (referred to in this document as “exchange lands”) with priority fish and wildlife habitat. At a minimum, the Service would receive priority parcels 1 through 8 (150,000 acres; **Figure 1-2** and **Table 2-1**). This acreage would equal or exceed the appraised value of the core and halo lands identified above that would be transferred to Doyon, and could be adjusted upwards based on appraised land values. Any additional Doyon lands required to make the exchange equal in value will be based on the priorities established by the Service and shown in **Figure 1-2** and **Table 2-1**.
- Doyon would reallocate most of its remaining ANCSA 12(b) entitlement (approximately 56,500 acres) to areas outside the Refuge.
- Both parties would exchange additional lands to consolidate ownerships and facilitate land management. For the purposes of analysis, these lands are assumed to be of equal value. Up to 132,000 acres would be exchanged by each party. The locations of these lands (referred to as “consolidation lands” in this document) are indicated in **Figure 2-2**. The status of lands within the Refuge after completion of Phase I is shown in **Figure 2-3**.
- Doyon would reserve a subsistence easement on all lands conveyed to the Service. The easement would mirror Federal subsistence provisions under Title VIII of ANILCA by ensuring a subsistence priority to local rural residents.
- To protect public access, the Service would reserve an approximately 1-mile-wide public use easement (totaling 13,000 acres) along the segment of Beaver Creek flowing through the core lands conveyed to Doyon. The easement would extend approximately 0.5 mile on each side of the ordinary high water line of Beaver Creek, measured from each bank. Allowable public uses include wildlife observation and photography, hunting, fishing, boating, trapping, camping, hiking, environmental education and interpretation, and other similar activities. Under the terms of the easement, Doyon could request that the Service close or restrict public access to up to 1,000 acres within the easement, but only if it does not obstruct travel along the entire length of Beaver Creek. The restrictions or closures could only be for purposes directly related to oil or gas exploration, development, and production. The Refuge would reserve two ANCSA 17(b) public access easements across Doyon lands to ensure legal access to Refuge lands. These easements would enable Refuge visitors to access public lands from either side of the conveyed Doyon lands or from Beaver Creek.



Proposed Land Exchange EIS

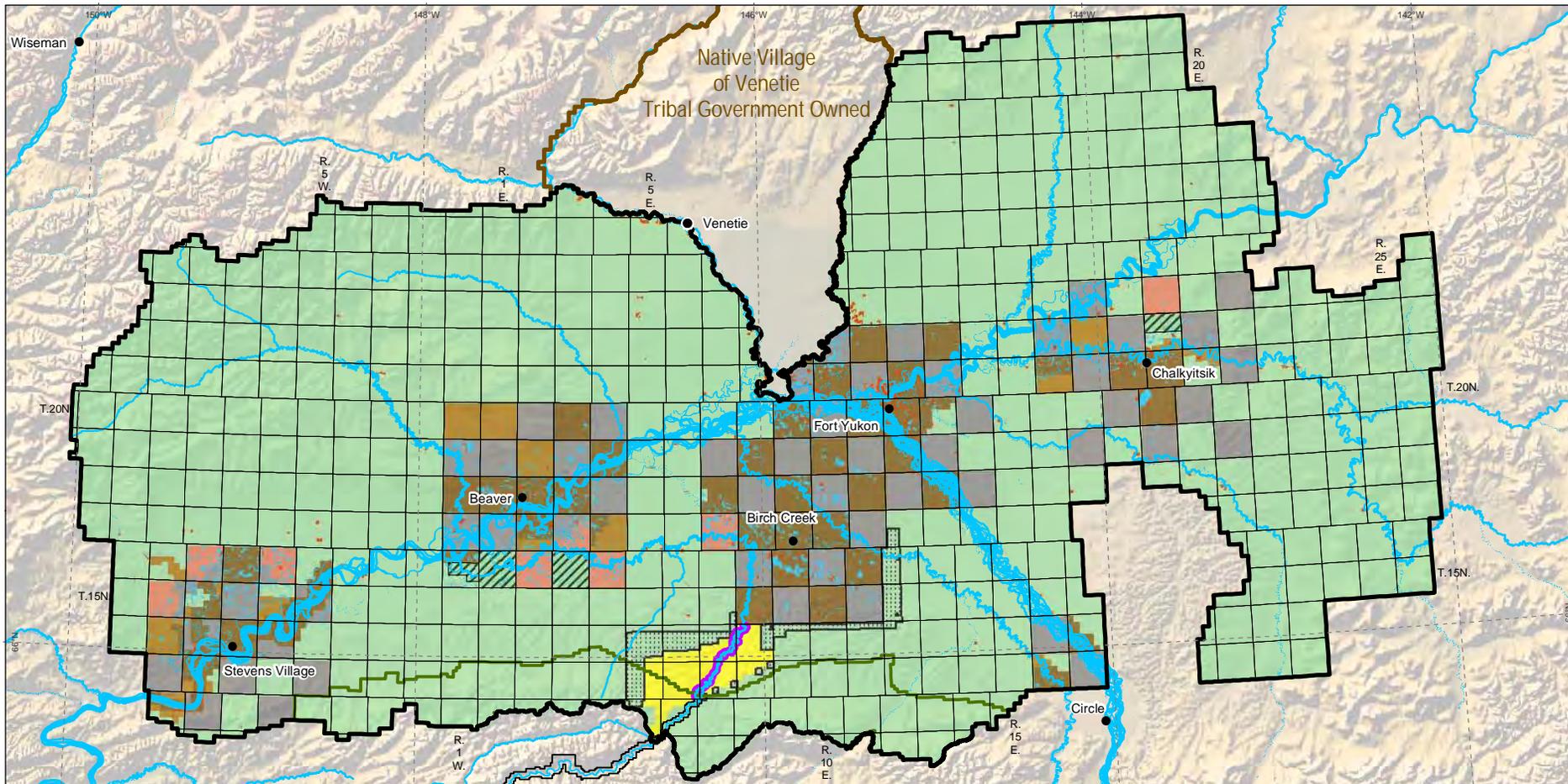
U.S. Fish & Wildlife Service

Yukon Flats National Wildlife Refuge, Alaska

Proposed Action Phase I :

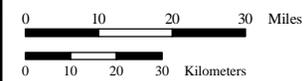
Lands to be Exchanged and ANCSA 12(b) Selections to be Reallocated

Figure 2-1



Land Status

- Yukon Flats Refuge
- Refuge Lands (Service)
- Conveyed Doyon Lands
- Conveyed Village Lands
- Selected Village Lands
- Other Private Lands
- Venetie Reservation
- Service Lands to Doyon (Core Lands)
- Service Oil & Gas Interests to Doyon (Halo Lands)
- Doyon Lands to Service (Exchange Lands)
At a minimum, the U.S. would receive these 150,000 acres.
- ANCSA 12(b) Selections to be Reallocated outside the Refuge
- Service Recommended Wilderness Area
- Beaver Creek Wild River Corridor
- Beaver Creek Public Use Easement
- Rivers, Streams, Lakes, and Ponds



Produced by Allied GIS
Anchorage, Alaska
Map Prepared: December 22, 2009



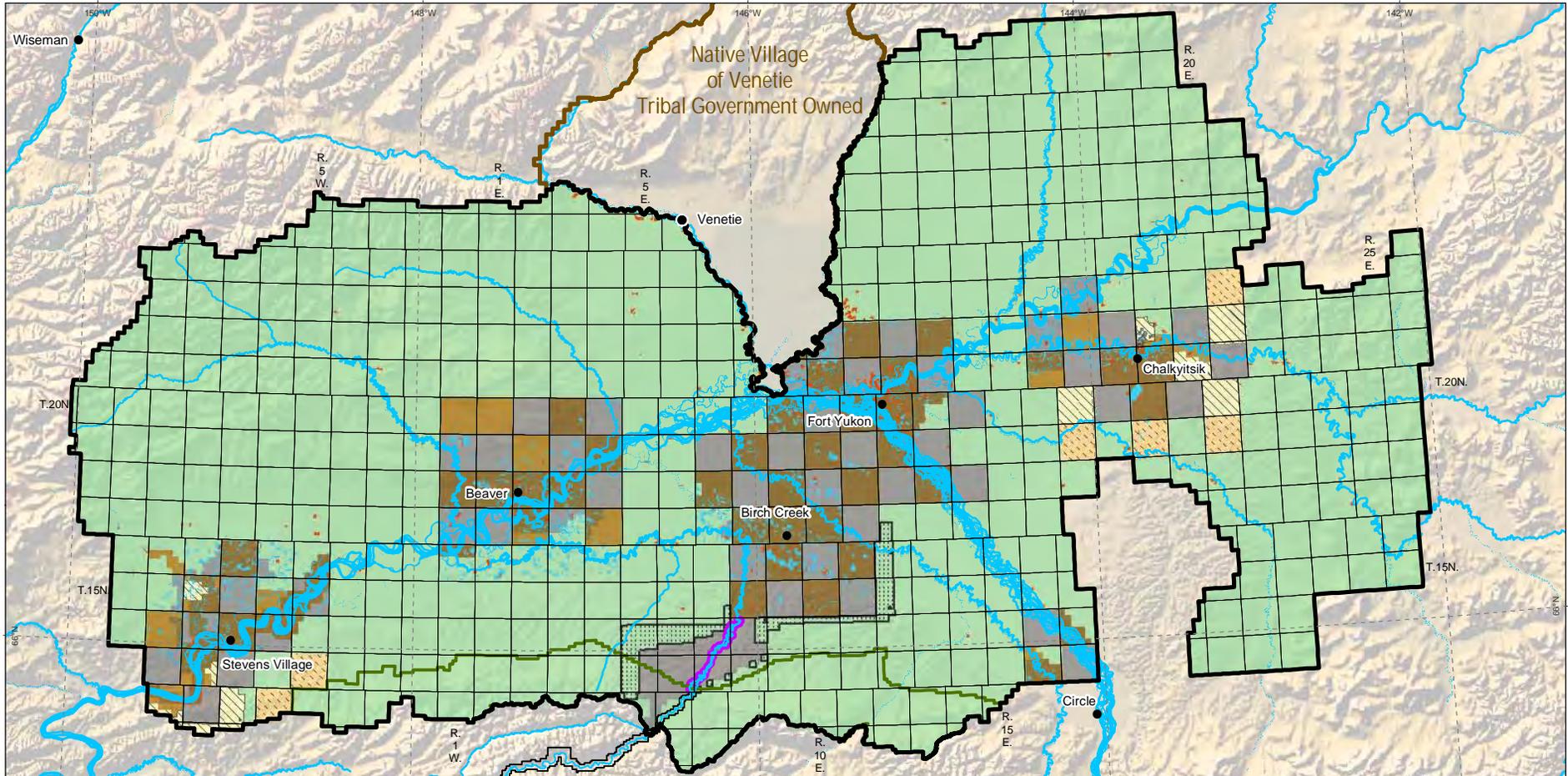
Proposed Land Exchange EIS

U.S. Fish & Wildlife Service

Yukon Flats National Wildlife Refuge, Alaska

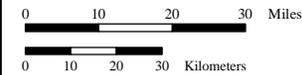
Figure 2-2

Proposed Action Phase I : Consolidation Exchanges



Land Status

- Yukon Flats Refuge
- Refuge Lands (Service)
- Conveyed Doyon Lands
- Conveyed Village Lands
- Selected Village Lands
- Other Private Lands
- Venetie Reservation
- Service Lands to Doyon (Consolidation Lands)
- Service Oil & Gas Interests to Doyon (Halo Lands)
- Doyon Lands to Service (Consolidation Lands)
- Service Recommended Wilderness Area
- Beaver Creek Wild River Corridor
- Beaver Creek Public Use Easement
- Rivers, Streams, Lakes and Ponds



Prepared by the Alaska GIS/Realty
 Anthropology Alaska
 Cultural Resources Division, 2009

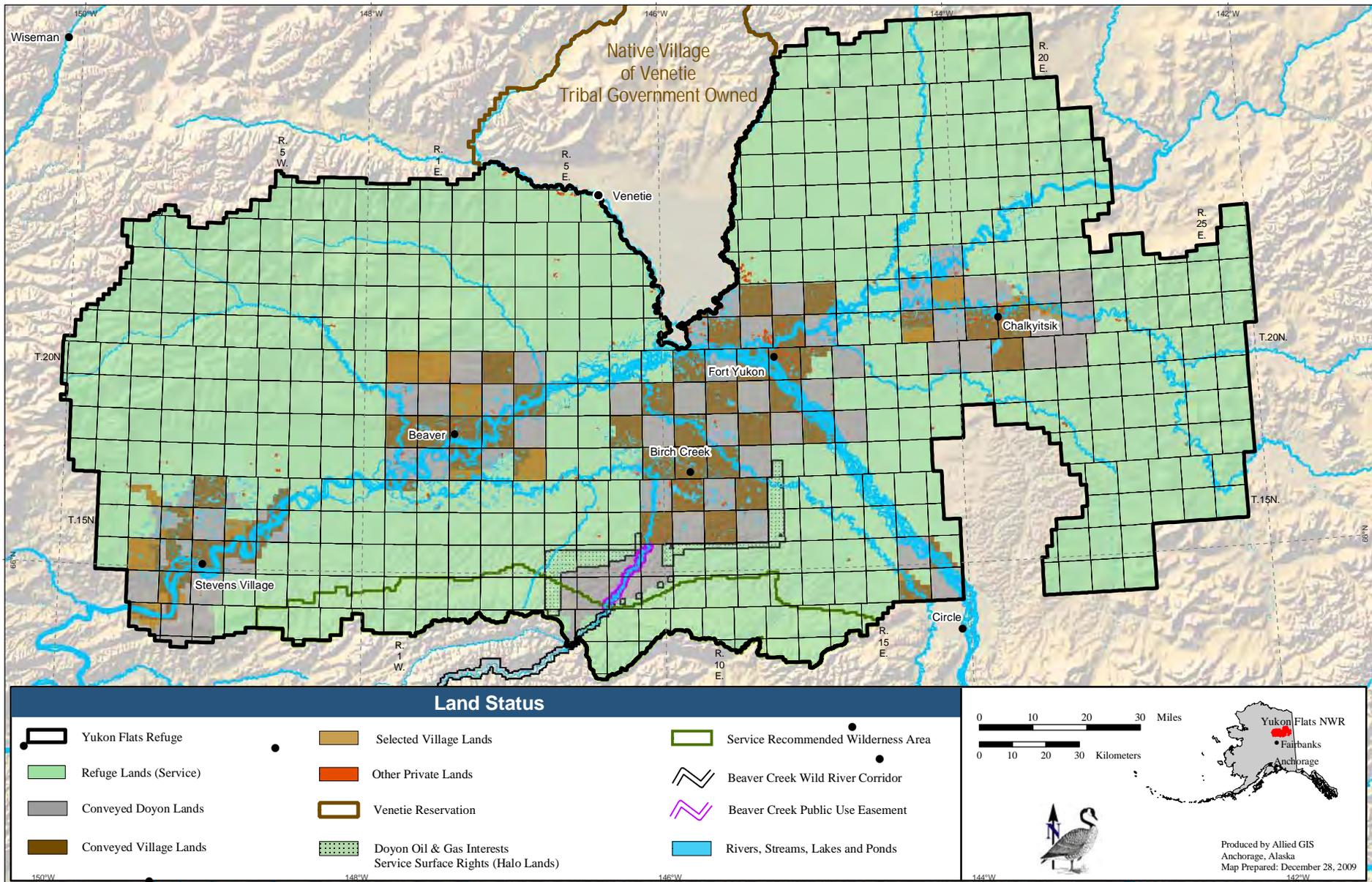


Proposed Land Exchange EIS

U.S. Fish & Wildlife Service

Yukon Flats National Wildlife Refuge, Alaska

Figure 2-3 Proposed Action Phase I : Land Status after Completion of Phase I



2.4.1.2 Phase II of the Proposed Action

If Doyon locates and produces oil and/or gas resources on the lands acquired in Phase I, then additional actions would occur:

- The Service would receive a perpetual production payment of 1.25% of the value at the wellhead from any oil and gas produced on any of the lands Doyon received in the exchange. These funds would be deposited into a U.S. Treasury account authorized by the 2005 Omnibus Spending Bill. The Service could only use these funds to buy additional land from willing sellers in the Refuge or other national wildlife refuges in Alaska or to construct Alaska refuge facilities.
- Doyon would sell (at fair market value) up to 120,000 acres more of its land holdings in the Refuge to the Service. The lands selected would be based on the priorities established by the Service (see Section 2.3.3) and shown in **Figures 1-2** and **2-4** (parcels 9 through 16). The status of lands within the Refuge after completion of Phase II is indicated in **Figure 2-5**.
- Produced oil or gas would have to be transported to market by pipeline. Two probable pipeline routes to the TAPS have been identified. Depending on the route selected, Doyon would file an application (under the provisions of ANILCA Title XI) with the BLM, the Service, or both agencies for a ROW to construct a pipeline and associated road. If a ROW were granted across Refuge land, Doyon would convey to the Service 640 acres of land for every linear mile of ROW crossing the Refuge and increase the Service's perpetual production payment to 1.5%.
- Doyon would reserve a subsistence easement on all lands conveyed to the Service. The easement would mirror Federal subsistence provisions under Title VIII of ANILCA by ensuring a subsistence priority to local rural residents.

2.4.2 Land Exchange with Non-Development Easements Alternative

This alternative was developed in response to concerns that lands would leave Alaska Native (Doyon) ownership and be added to the Refuge under Service management. Under this alternative, the Service would provide Doyon title to lands within the Refuge that may hold developable oil and gas resources. In exchange, the Service would receive lands characterized as priority habitat for fish and wildlife. In addition, Doyon would grant Non-development easements on 120,000 acres but would not sell land to the Service. Non-development easements are permanent, legal agreements that become part of the title to the property and function to specifically allow or preclude certain uses of the land.

2.4.2.1 Phase I – Land Exchange with Non-Development Easements

Phase I of the land exchange under the Land Exchange with Non-Development Easements Alternative would occur as described above for the Proposed Action with the addition of the following:



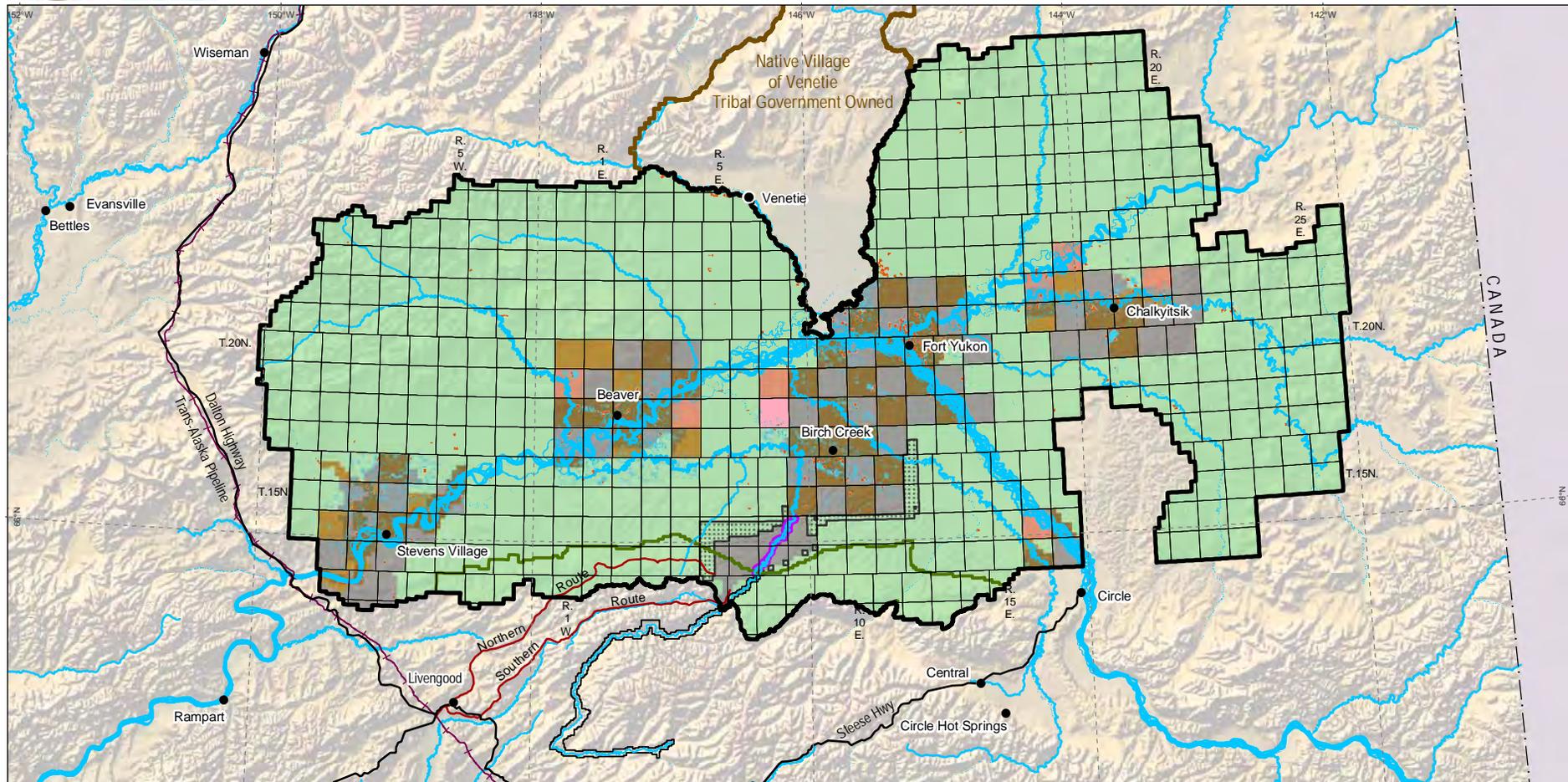
Proposed Land Exchange EIS

U.S. Fish & Wildlife Service

Yukon Flats National Wildlife Refuge, Alaska

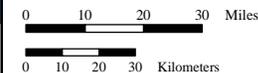
Proposed Action Phase II : Additional Service Acquisitions and ROWs

Figure 2-4



Land Status

- | | | | |
|------------------------|---|---|-----------------------------------|
| Yukon Flats Refuge | Selected Village Lands | Doyon Lands to Service (Purchase) | Beaver Creek Wild River Corridor |
| Refuge Lands (Service) | Other Private Lands | Land to Service Subject to Acquisition by Doyon | Beaver Creek Public Use Easement |
| Conveyed Doyon Lands | Venetie Reservation | Potential ROWs | Rivers, Streams, Lakes, and Ponds |
| Conveyed Village Lands | Doyon Oil & Gas Interests Service Surface Rights (Halo Lands) | Service Recommended Wilderness Area | |



Produced by Allied GIS
Anchorage, Alaska
Map Prepared: February 6, 2010



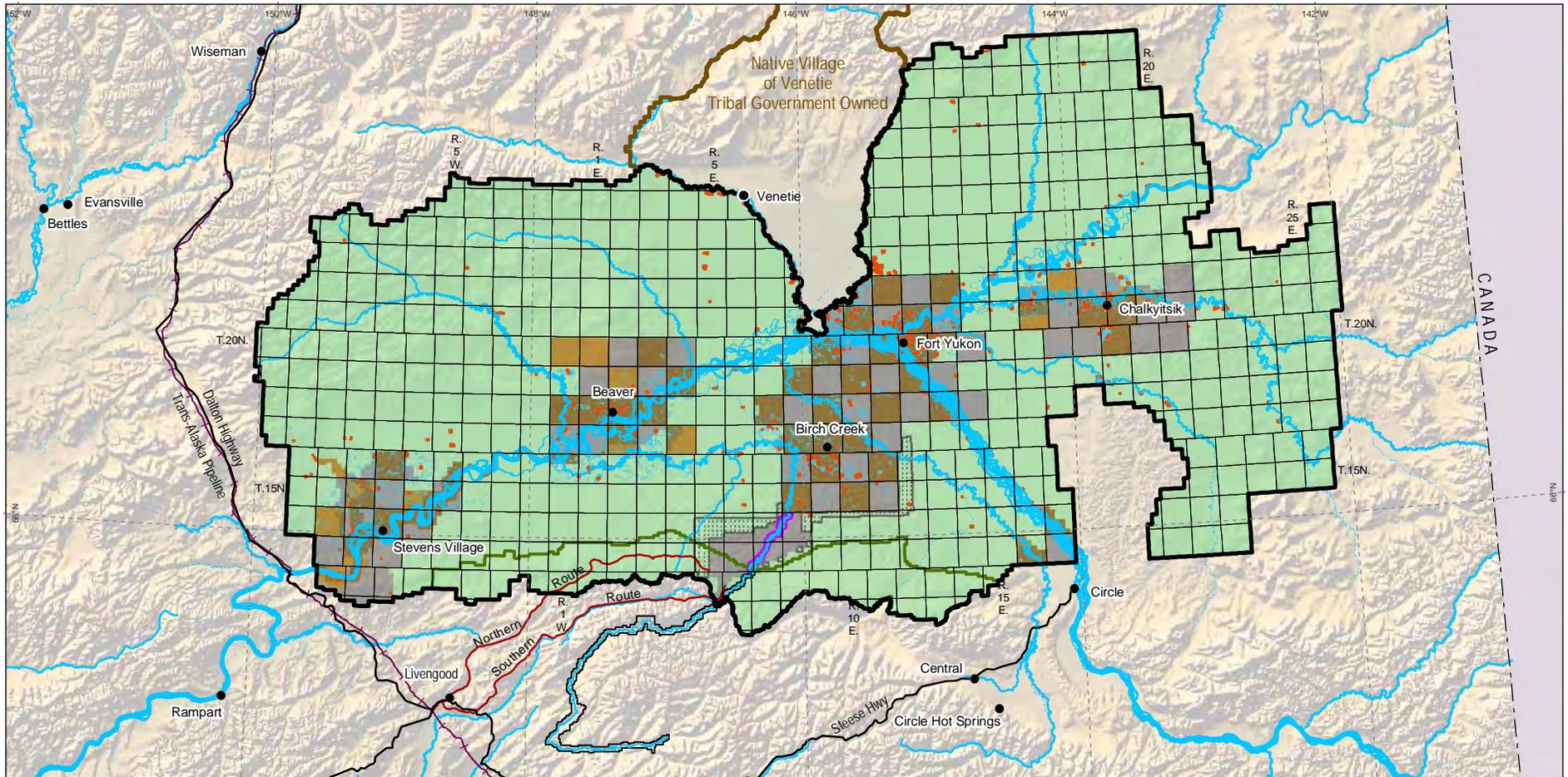
Proposed Land Exchange EIS

U.S. Fish & Wildlife Service

Yukon Flats National Wildlife Refuge, Alaska

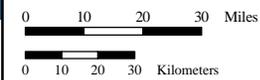
Proposed Action Phase II : Land Status after Completion of Phase II

Figure 2-5



Land Status

- Yukon Flats Refuge
- Refuge Lands (Service)
- Conveyed Doyon Lands
- Conveyed Village Lands
- Selected Village Lands
- Other Private Lands
- Venetie Reservation
- Doyon Oil & Gas Interests Service Surface Rights (Halo Lands)
- Potential ROWs
- Service Recommended Wilderness Area
- Beaver Creek Wild River Corridor
- Beaver Creek Public Use Easement
- Rivers, Streams, Lakes, and Ponds



Produced by Allied GIS
Anchorage, Alaska
Map Prepared: December 23, 2009

- Doyon would donate non-development easements that would preclude commercial development on 120,000 acres of Doyon's lands within the Refuge boundaries. These lands would be donated to the Service regardless of whether Doyon produced oil and gas on any of the lands Doyon received from the Service (**Figure 2-6**). These lands would be in addition to the 150,000 acres that the Service would receive from Doyon. The easements would be on the same lands that would be available for purchase by the Service in Phase II of the Proposed Action (parcels 9 through 16). These easements would provide habitat protection by preventing oil and gas exploration and/or development and other commercial activities, including gravel mining, commercial timber harvest, road construction, and water withdrawals. Activities that could occur on easement lands would differ from those on Refuge lands in the following ways: (a) no general public access or use would be allowed on the easements, (b) Refuge regulations governing public entry and use regulations would not apply, (c) subsistence activities (other than fishing) would be under State rather than Federal jurisdiction, and (d) no permanent structures would be allowed except for camps and cabins for traditional activities. Allowable surface activities and uses like timber and firewood harvest, subsistence cabin construction and use, access to inholdings, etc., would be permitted and controlled by Doyon, not the Service.

Under the terms of the non-development easements, Doyon would not allow commercial or industrial development of any of the lands subject to the non-development easement, including professional guiding, hotels or commercial lodges, mining, and oil or gas development.

Except as limited by the foregoing, Doyon would be allowed to use the land, and to authorize the use of the land by Doyon shareholders and the descendants and family members of Doyon shareholders, in all respects as other Doyon lands, including as follows:

- Hunting and fishing, as long as pertinent game hunting and fishing laws, including the subsistence laws, are followed and responsible temporary camp maintenance is practiced. Responsible camping practices include removing all trash from the area, securing food away from wildlife, extinguishing campfires, burying human wastes 6 to 8 inches deep and at least 200 feet from water, and restoring the area as much as possible to its original condition.
- The gathering of berries, wild fruits, roots, fungi, mushrooms, and other edible natural foods.
- The cutting of live trees on Doyon fee land by Doyon shareholders for the construction, addition, or reconstruction of personal and immediate family primary residence on personal property, including the right to cut enough house logs to build one residential structure and other related outbuildings at a site, and up to 10 cords of firewood annually for personal non-commercial use. No cutting would occur within the immediate vicinity of any cultural resources.
- Traplines and trapping cabins and trapline camps with necessary associated facilities as long as pertinent game laws, including the subsistence laws, are followed, and that responsible temporary camp maintenance is practiced.
- Personal, group, or community gardens on suitable lands so long as the garden is for personal or community benefit and is noncommercial in nature.
- Fish camps for personal use.
- Establish cabins for traditional activities, such as, but not limited to, hunting, fishing, and trapping, including shareholder homesites.



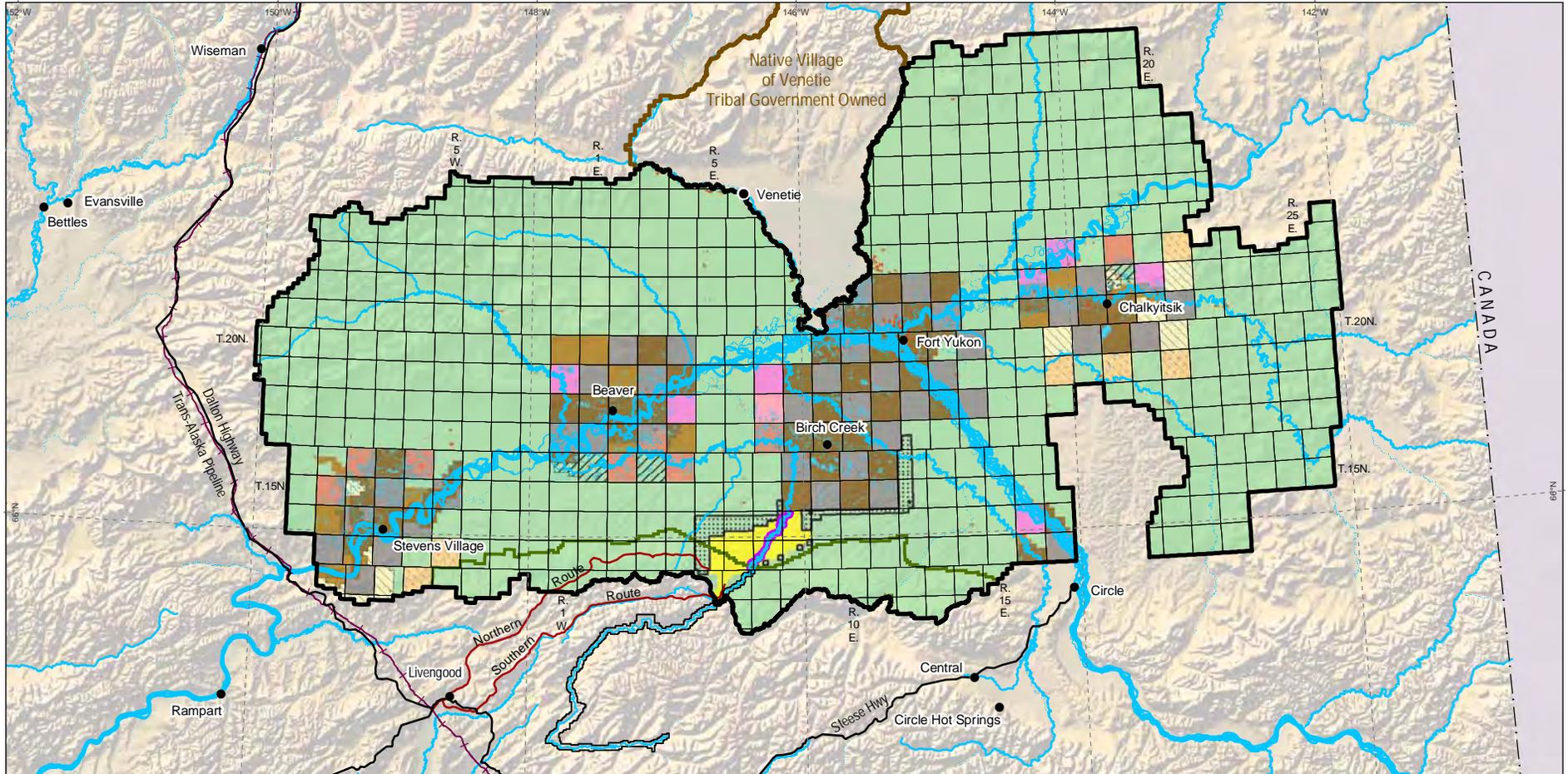
Proposed Land Exchange EIS

U.S. Fish & Wildlife Service

Yukon Flats National Wildlife Refuge, Alaska

Figure 2-6

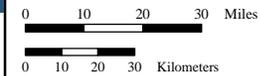
Land Exchange with Non-Development Easement Alternative



Land Status

- | | | | |
|------------------------|---|--|-------------------------------------|
| Yukon Flats Refuge | Venetie Reservation | Doyon Lands to Service (Exchange Lands) | Potential ROWs |
| Refuge Lands (Service) | Service Lands to Doyon (Core Lands) | Doyon-Donated Non-Development Easement | Service Recommended Wilderness Area |
| Conveyed Doyon Lands | Service Oil & Gas Interests to Doyon (Halo Lands) | Doyon-Donated Non-Development Easement Subject to Acquisition by Doyon | Beaver Creek Wild River Corridor |
| Conveyed Village Lands | Service Lands to Doyon (Consolidation Lands) | ANCSA 12(b) Selections to be Reallocated outside the Refuge | Beaver Creek Public Use Easement |
| Selected Village Lands | Doyon Lands to Service (Consolidation Lands) | | Rivers, Streams, Lakes and Ponds |
| Other Private Lands | | | |

*At a minimum, the US would receive these 150,000 acres.



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Anchorage, Alaska
Map Prepared: February 6, 2010

- The use of Doyon lands for the location of a dog lot where the owner of the animals is the holder of the permit.

2.4.2.2 Phase II – Land Exchange with Non-Development Easements

Under this alternative, Doyon would not sell the Service any additional lands under Phase II. However, the Service would receive perpetual production payments for oil and gas on core and halo lands Doyon received in the exchange, and Doyon would provide compensation to the Service for a ROW crossing Service lands.

- The Service would receive a perpetual production payment of 0.25% of the value at the wellhead from any oil and gas produced on the core or halo lands Doyon received in the exchange. The intent of the perpetual production payment is to enable the Service to buy additional land for conservation purposes to offset the impacts of oil and gas development. The perpetual production payment is lower under this alternative than under the Proposed Action because Doyon would already have donated protective easements on up to 120,000 acres of land during Phase I, regardless of whether oil or gas is ever produced. Any production payment funds would be deposited into a U.S. Treasury account authorized by the 2005 Omnibus Spending Bill. The Service could only use these funds to buy additional land from willing sellers in the Refuge or other national wildlife refuges in Alaska or to construct Alaska refuge facilities.
- If a ROW were granted across Refuge land, Doyon would convey to the Service 640 acres of land for every linear mile of ROW crossing the Refuge and increase the Service's perpetual production payment to 0.5%.

2.4.3 Land Exchange Excluding the White-Crazy Mountains Alternative

This alternative was developed in response to specific concerns that land previously recommended by the Service for Wilderness designation under the Wilderness Act of 1964 should be excluded from any exchange proposals. Lands recommended by the Service for Wilderness designation would leave Federal ownership under both the Proposed Action and the Land Exchange with Non-Development Easements Alternative. This alternative would partially protect the recommended-Wilderness area by excluding these surface lands from the exchange. Doyon would receive oil and gas interests in some of these, but there would be no surface oil and gas development on any lands in the recommended-Wilderness area. However, if oil and gas development were to occur on lands Doyon received in the exchange, an access ROW would likely traverse the recommended-Wilderness area. Although this alternative would allow Congress the future option to designate much of this area as Wilderness, the transportation corridor would not qualify as Wilderness and would be excluded from the designation.

2.4.3.1 Phase I – Land Exchange Excluding the White-Crazy Mountains

Approximately 26,500 acres of the core lands and 12,000 acres of halo lands transferred to Doyon ownership under Phase I of the Proposed Action were previously recommended by the Service for Wilderness designation. Core lands transferred into Doyon ownership, however, would no longer be eligible for Wilderness designation under the Wilderness Act of 1964. Under the Land Exchange Excluding the White-Crazy Mountains Alternative, these lands would be excluded from the exchange, although Doyon would receive some subsurface oil and gas rights (but no surface occupancy) within and along the northern edge of the recommended-Wilderness area. Drilling would only be allowed outside of the recommended-Wilderness area. Subsurface oil and gas resources within the recommended-Wilderness area to which Doyon would have rights would

have to be accessed using directional drilling from locations outside of the Wilderness-designation area. These lands would continue to qualify for future Wilderness designation because the surface estate would be protected from development activities. The acreage of halo lands would increase by approximately 8,000 acres under this alternative compared to the Proposed Action.

- Doyon would receive from the Service 83,500 acres (surface and subsurface), referred to as core lands (**Figure 2-7**).
- Doyon would receive from the Service 105,000 acres of subsurface oil and gas interests, referred to as halo lands, which lie adjacent to the core lands (**Figure 2-7**). Only off-site (directional) drilling would be allowed. A no surface occupancy restriction would be in effect for these lands, which would preclude the following: drilling (both exploratory and production), field gathering pipelines, roads, and electric transmission lines. All drilling locations and oil field infrastructure would be located on Doyon core lands. The no surface occupancy restriction would provide for the following exceptions: (1) a temporary surface occupancy could be allowed for geophysical exploration, but would be authorized through a permit issued by the Refuge that would address concerns such as timing and method of exploration; clearing of vegetation and other long-term impacts would be prohibited; and (2) transportation pipeline facilities would be allowed, but would be addressed through an EIS. The Service cannot refuse access to inholdings, including subsurface ownerships, but can require a permit pursuant to ANILCA Title XI to allow reasonable access to those inholdings.
- The Service would receive from Doyon a minimum of 115,000 acres of land (**Figure 2-7**) with priority fish and wildlife habitat (priority parcels 1 through 7 in **Figure 1-2**). This acreage would equal or exceed the appraised value of the core and halo lands identified above that would be transferred to Doyon and could be adjusted upwards based on appraised land values. Any additional Doyon lands required to make the exchange equal in value would be based on the priorities established by the Service and shown in **Figure 1-2** and **Table 2-1**.
- Doyon would reallocate most of its remaining ANCSA 12(b) entitlement (approximately 56,500 acres; **Figure 2-7**) to areas outside the Refuge. These are the same lands proposed for reallocation under the Proposed Action (**Figure 2-1**) and the Land Exchange with Non-Development Easements Alternative (**Figure 2-6**).
- Doyon would retain a subsistence easement on lands conveyed to the Service. The easement would mirror Federal subsistence provisions under Title VIII of ANILCA by ensuring a subsistence priority to local rural residents.
- To protect public access, the Service would reserve a 1-mile-wide public use easement (totaling 13,000 acres) along the segment of Beaver Creek flowing through the core lands conveyed to Doyon. The easement would extend approximately 0.5 mile on each side of the ordinary high water line of Beaver Creek, measured from each bank. Allowable public uses include wildlife observation and photography, hunting, fishing, boating, trapping, camping, hiking, environmental education and interpretation, and other similar activities. Under the terms of the easement, Doyon could request that the Service close or restrict public access on up to 1,000 acres within the easement, but only if it does not obstruct travel along the entire length of Beaver Creek. The restrictions or closures could only be for purposes directly related to oil or gas exploration, development, and production. The Refuge would reserve one ANCSA 17(b) public access easement across Doyon lands to ensure legal access to Refuge lands. This easement would enable Refuge visitors to access public lands from either side of the conveyed Doyon lands or from Beaver Creek.



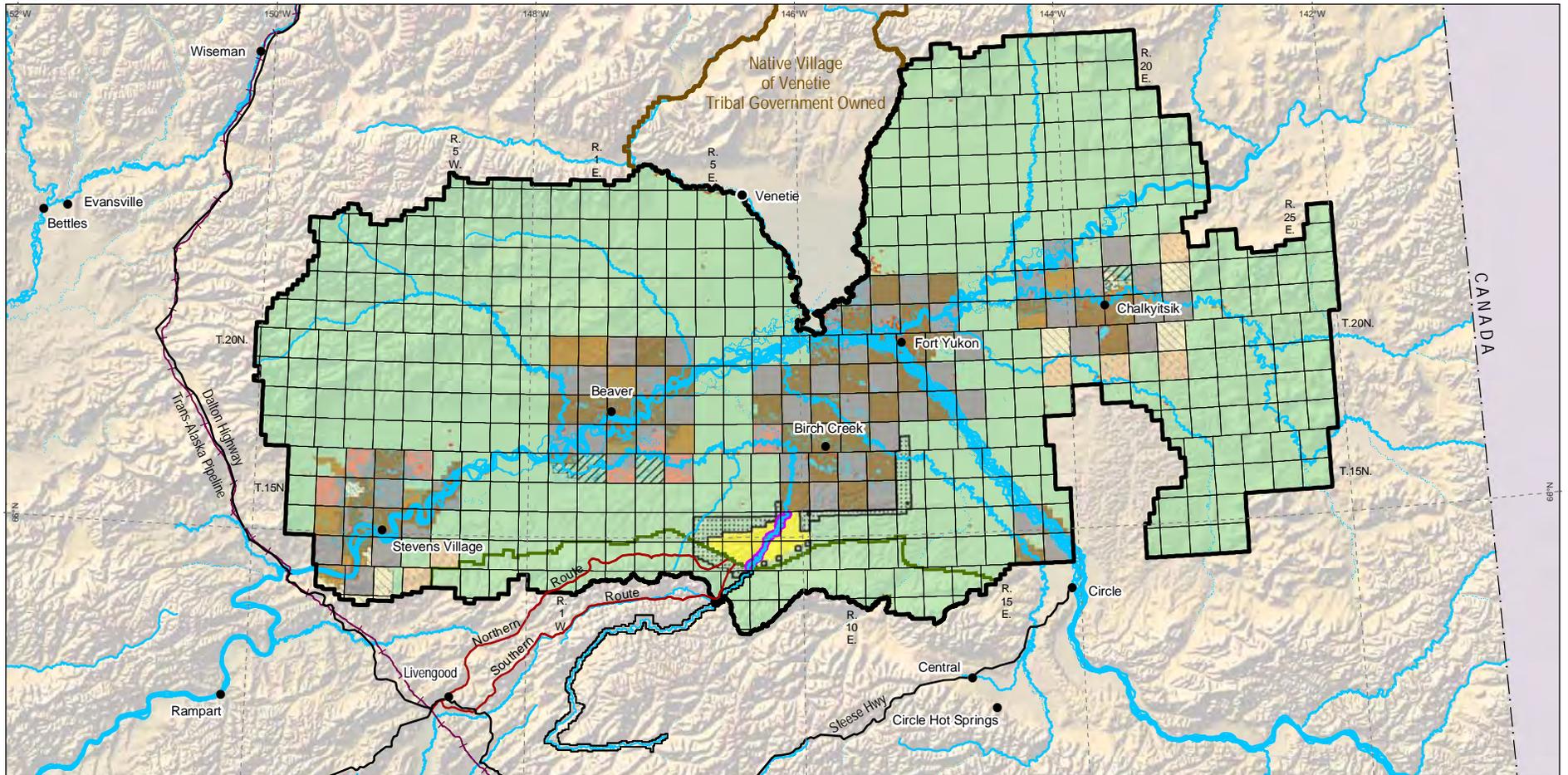
Proposed Land Exchange EIS

U.S. Fish & Wildlife Service

Yukon Flats National Wildlife Refuge, Alaska

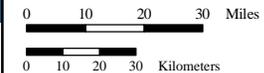
Land Exchange Excluding White-Crazy Mountains Alternative : Phase I

Figure 2-7



Land Status

- Yukon Flats Refuge
- Refuge Lands (Service)
- Conveyed Doyon Lands
- Conveyed Village Lands
- Selected Village Lands
- Other Private Lands
- Venetie Reservation
- Doyon Oil & Gas Interests
- Service Surface Rights (Halo Lands)
- Service Lands to Doyon (Consolidation Exchange)
- ANCSA 12(b) Selections to be Reallocated outside the Refuge
- Doyon Lands to Service (Consolidation Exchange)
- Doyon Lands to Service (At a minimum, the U.S. would receive these 115,000 acres)
- Service Lands to Doyon
- Potential ROWs
- Service Recommended Wilderness Area
- Beaver Creek Wild River Corridor
- Beaver Creek Public Use Easement
- Rivers, Streams, Lakes, and Ponds



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Anchorage, Alaska
Map Prepared: January 10, 2010

- Both parties would exchange additional lands to consolidate ownerships and facilitate land management. For the purposes of analysis, these lands, referred to in this document as consolidation lands, are assumed to be of equal value. Up to 132,000 acres would be exchanged by each party. The locations of these lands are indicated in **Figure 2-7**.

2.4.3.2 Phase II – Land Exchange Excluding the White-Crazy Mountains

If Doyon locates and produces oil and/or gas resources on the lands acquired in Phase I, then the following additional actions would occur:

- The Service would receive a perpetual production payment of 1.25% of the value at the wellhead from any oil and gas produced on any of the lands Doyon received in the exchange. These funds would be deposited into a U.S. Treasury account authorized by the 2005 Omnibus Spending Bill. The Service could only use these funds to buy additional land from willing sellers in the Refuge or other national wildlife refuges in Alaska or to construct Alaska refuge facilities.
- Doyon would sell (at fair market value) up to 81,000 acres of its land holdings in the Refuge to the Service. The lands selected would be based on the priorities established by the Service (see Section 2.3.3) and shown in **Figure 2-8**. The number of acres sold to the Service would be reduced by 39,000 acres as compared to the Proposed Action because Doyon would receive fewer acres of core lands under this alternative. Doyon would reserve a subsistence easement on all lands sold to the Service. The easement would mirror Federal subsistence provisions under Title VIII of ANILCA by ensuring a subsistence priority to local rural residents.
- Produced oil and/or gas would have to be transported to market by pipeline. Two probable pipeline routes to the TAPS have been identified. Under this alternative, both routes would cross Refuge land, including the Service-recommended Wilderness area (**Figure 2-8**). Depending on the route selected, Doyon would file an application with the Service, or both the Service and BLM, for a ROW to construct a pipeline and associated road. If a ROW were granted for the northern route across Refuge land, Doyon would convey to the Service 640 acres of land for every linear mile of ROW crossing the Refuge and increase the Service's perpetual production payment to 1.5%. Under this alternative, the southern route ROW would cross about 7 miles of Refuge lands before entering BLM lands. If the ROW were granted for the southern route, there would be no additional compensation to the Service.

2.4.4 Preferred Alternative - No Land Exchange Alternative (No Action Alternative)

Under this alternative, the Service would not enter into a land exchange with Doyon. Consolidation exchanges could take place; however, none are planned under this alternative. There would be no oil or gas development on Refuge lands proposed for exchange to Doyon.

During scoping, commenters suggested that the No Land Exchange Alternative should assume that there would be no oil and gas development anywhere within the Refuge boundaries. However, Doyon has stated their intention to pursue oil and gas exploration on other Doyon lands inside the Refuge, regardless of whether the exchange proceeds or not. Of course, oil and gas development would occur only if technically and economically recoverable oil and gas resources are discovered on Doyon lands. If production does occur on Doyon-owned lands inside the Refuge, the Service would be required to provide access across Refuge lands (subject to reasonable regulations to protect Refuge resources), but would not be entitled to receive perpetual production payments or other forms of compensation. This EIS acknowledges the possibility that Doyon may develop its current land holdings with or without the exchange. We address the

potential impacts of oil and gas development on other Doyon lands in the Cumulative Effects analysis in Chapter 4.

The No Land Exchange Alternative has been identified as the Service's Preferred Alternative for the Final EIS for several reasons. First, the Service has a limited understanding of the effects that oil and gas development would have on the hydrology of lands exchanged to Doyon and lands that would be retained by the Service. As discussed in Section 3.3.6, limited data are available to understand hydrologic functions in the parcels included in the proposed exchange. We do not understand the connectivity of subsurface and surface waters within and between habitats, including wetland and riverine systems. Thus, impacts from gravel and water (ponds and rivers) withdrawals are expected to have unknown direct and indirect consequences to water resources. The concern regarding the limited baseline information on hydrologic function is confounded by the limited information on where and how oil and gas development would occur on lands Doyon would obtain in the exchange and on lands currently owned by Doyon. The Service is especially concerned about where and how development would occur in the Beaver Creek watershed, including the 16 mile length of wild and scenic river corridor, and in proposed wilderness areas. Impacts to fisheries, riverine habitats, and wilderness character would be expected, but the level of impact is not known because of a lack of specific development scenario information.

Second, the exchange would create a private lands corridor that would bisect the Refuge north to south and cause habitat fragmentation on the Refuge. Although the exchange of lands is not expected to significantly impact resources, it would facilitate infrastructure development and increase access, which are expected to affect resources, especially wildlife with large home ranges (e.g., bear, moose, wolverine, wolf). In addition, lands surrounding the 110,000-acre core lands would likely require more restrictive fire management and fire suppression to protect oil and gas field infrastructure, which would increase fire suppression costs from current levels and affect the natural fire regime. Species that benefit from early succession habitats, such as moose and furbearers, would likely be affected.

Third, the Service is concerned that the proposed land exchange could magnify projected changes to Refuge resources from climate change. Climate change projections for the Yukon Flats include a long-term drying trend, change in seasonal moisture distribution, change in wetland structure and function, loss of permafrost, later freeze up and earlier breakup on rivers, and an increase in fire severity and frequency. Water withdrawals, increased access, and infrastructure associated with oil and gas field development on exchange lands could exacerbate climate change effects on Refuge resources. These effects could include: (a) loss of fish habitat, a decrease in fish productivity, and an increase in rate of fish disease; (b) a decrease in the amount of surface water available for breeding birds; and (c) an increase in winter snow that acts as a stressor to moose movement.

Fourth, infrastructure associated with access corridors from the proposed exchange (corridors to remove oil and gas product, transport equipment for exploration, and connect developed sites between villages) would increase human use of the Refuge. Competition between local subsistence users and non-local users (sport hunters and fishers, other recreation users) could increase and create conflicts between user groups. Increased human access and use would have direct impacts to refuge resources and could facilitate movement of invasive species into the Refuge.

Fifth, there is concern that the final Agreement could differ substantially from the draft Agreement. During the early negotiations, it was the Service's understanding that development

opportunities would be restricted to the core lands in the south-central portion of the Refuge. Thus, the Service negotiated to receive parcels in lowlands in areas distant to the 110,000-acre parcel. Revised USGS oil and gas basin data (Till et al. 2006; Rowan and Stanley 2007) now indicate a much larger area of the Yukon Flats Basin and Refuge as sufficiently deep to have potential oil and gas generation than was the case when parcels were originally selected for the proposed land exchange and the Agreement in Principal was negotiated. These new findings make it more likely that parcels proposed for acquisition by the Service (parcels near Stevens Village and Beaver Village) would be adjacent to prospective areas of development and ultimately less desirable to the Service. This change, along with Doyon's decision to not include high quality native conveyed lands in the initial negotiations, could hinder the Service's ability to acquire high quality habitats. The likelihood of the Service achieving an equal exchange of lands in future negotiations has substantially decreased.

Finally, the majority (>90%) of the general public and local residents oppose the proposed exchange. Most villages downriver of the Refuge also oppose the proposed exchange. The public and local residents are opposed to land trades that increase the net amount of Federal lands near villages and are opposed to any conveyed lands being transferred out of Native ownership. They are also concerned about contamination of the Yukon River salmon fishery from potential oil spills associated with exploration and development on the Refuge, impacts to the Beaver Creek watershed, degradation of wilderness character, adverse impacts to air and water quality and animal populations, and conflicts with the mission of the Service and purposes of the Refuge, which include protection of Refuge resources and conservation of oil and gas resources on Refuge lands.

2.4.5 Summary of Lands Involved in Proposed Action and Alternatives

Lands and perpetual production payments involved in the proposed land exchange under the Proposed Action, other action alternatives, and the Preferred Alternative (No Land Exchange Alternative) are summarized in **Table 2-2**. Under each of the action alternatives (Proposed Action, Land Exchange with Non-Development Easements Alternative, and Land Exchange Excluding the White-Crazy Mountains Alternative), the Service would receive more acres of surface lands than would Doyon. The net gains in surface lands by the Service under these alternatives are compared in **Table 2-3**. These gains do not include lands that would be transferred to the Service in Phase II if a ROW was required across Service lands.

2.5 Alternatives Considered but Excluded from Further Analysis

The Service is required to develop a reasonable range of alternatives and may exclude alternatives if they are not considered to be reasonable. An additional alternative was raised during the scoping process and was considered for inclusion in the Draft EIS by the Interdisciplinary Team. Six new alternatives were identified by the public during the Draft EIS review process. A description of the alternatives and the reasons for excluding the alternatives from further analysis are given in the following subsections.

2.5.1 Leasing of Service Lands for Oil and Gas Development Alternative

A scoping comment suggested that the Service should consider leasing lands for oil and gas exploration and development instead of exchanging lands. This alternative was considered but was rejected as unreasonable and excluded from detailed analysis by the Service. Leasing could



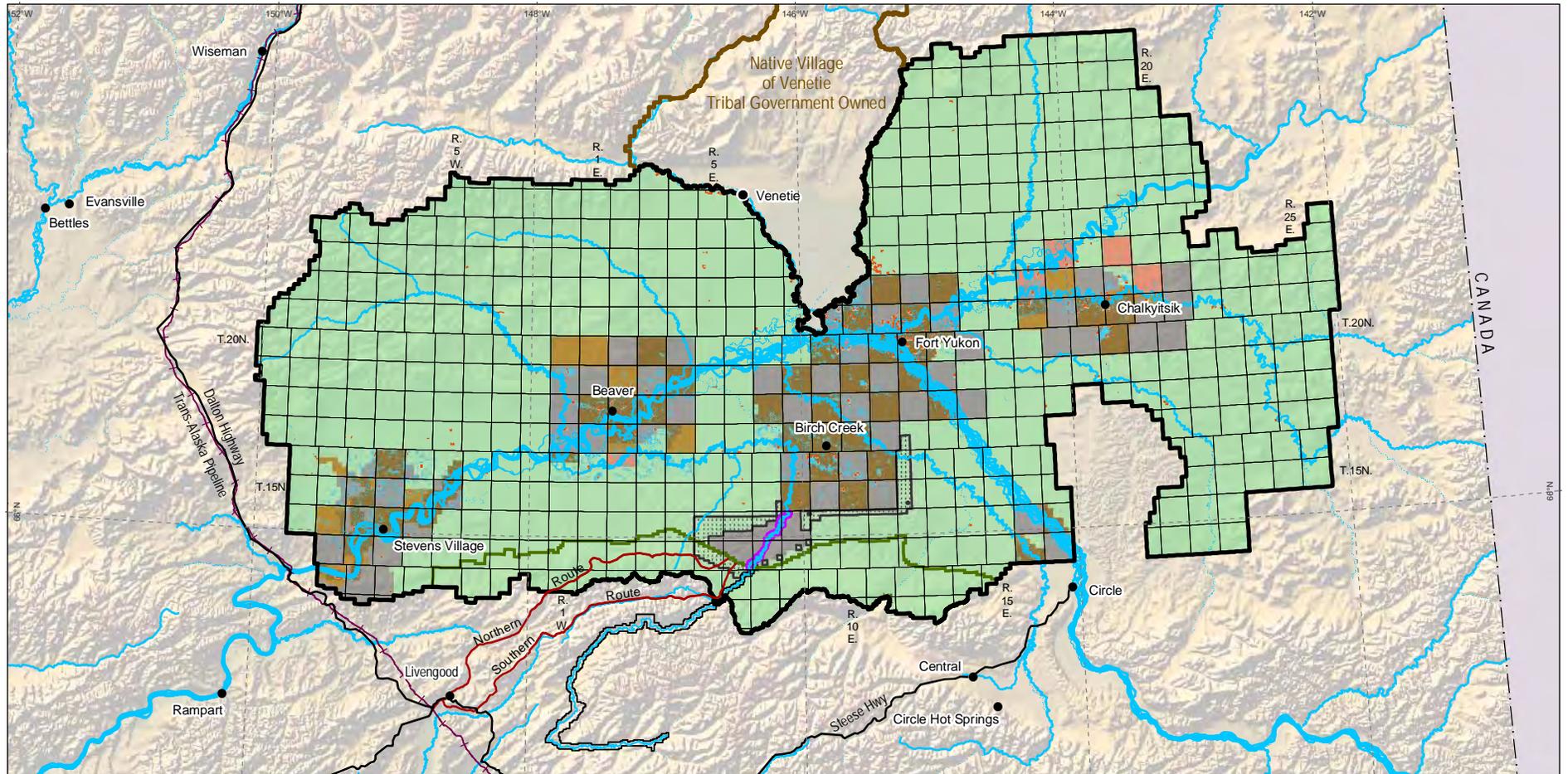
Proposed Land Exchange EIS

U.S. Fish & Wildlife Service

Land Exchange Excluding White-Crazy Mountains Alternative : Phase II

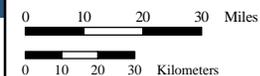
Yukon Flats National Wildlife Refuge, Alaska

Figure 2-8



Land Status

- Yukon Flats Refuge
- Refuge Lands (Service)
- Conveyed Doyon Lands
- Conveyed Village Lands
- Selected Village Lands
- Other Private Lands
- Venetie Reservation
- Doyon Oil & Gas Interests Service Surface Rights (Halo Lands)
- Doyon Lands to Service (Purchase)
- Potential ROWs
- Service Recommended Wilderness Area
- Beaver Creek Wild River Corridor
- Beaver Creek Public Use Easement
- Rivers, Streams, Lakes, and Ponds



Produced by Allied GIS
Anchorage, Alaska
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be allowed only if the following conditions were met: (1) the Secretary of the DOI decides that leasing would be in the national interest (National Interest Determination), (2) the Refuge Manager determines that leasing would be an appropriate use of the Refuge (Service policy 603 FW 1) and would be compatible with the purposes for which the Refuge was established (ANILCA Section 1008) and (3) the Service amends the CCP. Management policies in the CCP (U.S. Fish and Wildlife Service 1987a:166) prohibit the leasing of any Yukon Flats Refuge lands for oil and gas exploration or development.

2.5.2 Consolidation of Lands without Oil and Gas Development Alternative

A Draft EIS commenter suggested that the Service should retain management of its current land base, but continue to pursue land consolidation on the 132,000 acres as identified under the action alternatives. No land exchange for the purpose of oil and gas development would be considered within the Refuge. This alternative was considered but was rejected as not reasonable and excluded from detailed analysis by the Service. This alternative would not meet the purpose and need of both the Service and Doyon. Although consolidation of ownership is one of the purposes of the exchange (for both the Service and Doyon), Doyon's primary reason for pursuing an exchange is to acquire lands on which to pursue oil and gas development as a means of increasing economic opportunities. The consolidation lands are outside the area with high potential for having oil and gas, and therefore have little potential for providing the corporation with additional economic opportunities.

2.5.3 Consolidation of Lands and Leasing of Service Lands for Oil and Gas Development Alternative

A Draft EIS commenter suggested that the Service should retain management of its current land base, but continue to pursue land consolidation on the 132,000 acres as identified under the action alternatives. In addition, the Service should conduct further exploration of oil and gas resources within the core lands to refine what is known about the location, extent, and value of oil and gas resources within this area. Under this alternative, leasing of oil and gas resources could be considered following exploration. In addition, royalties commensurate with customarily charged royalties for oil and gas leasing would be applied and the money would be made available for acquiring land within Alaska and the lower contiguous states to further support the National Wildlife Refuge System purposes (e.g., conserving winter habitat and migration corridors for migratory birds). Under this alternative, if leasing were allowed, the Refuge would retain more control over development activities and would be able to prescribe mitigation to lessen the impacts of development on Refuge resources. In comparison, under the Proposed Action, once land is exchanged with Doyon, the Refuge would lose its ability to prescribe mitigation on lands no longer under its administration. No land exchange for the purpose of oil and gas development would be considered within the Refuge. This alternative was considered but was rejected as not reasonable and excluded from detailed analysis by the Service for reasons given in Sections 2.5.1 and 2.5.2.

2.5.4 No Increase in Production Payments for Right-of-way and Lake Easements Alternative

A Draft EIS commenter suggested that the Service should have an alternative that is the same as the Proposed Action, but does not include conveyance to the Service of 640 acres of land for every linear mile of ROW crossing the Refuge. The commenter felt that this requirement placed a

Chapter 2: Proposed Action and Alternatives

Table 2-2 Comparison of land transfers, perpetual production payments, and exploration sites for the alternatives

Description	Proposed Action – Agreement in Principle	Exchange with Non-Development Easements Alternative	Exchange Excluding the White-Crazy Mountains Alternative	Preferred Alternative - No Land Exchange Alternative
Service lands (subsurface and surface; core lands) transferred to Doyon (acres)	110,000	110,000	83,500	0
Service oil and gas interests (halo lands) transferred to Doyon (acres)	97,000	97,000	105,000	0
Doyon lands (subsurface and surface) transferred to the Service (acres)	≥ 150,000	≥ 150,000	≥ 115,000	0
Selected lands (ANCSA 12[b]) reallocated outside of Refuge (acres)	56,500	56,500	56,500	0
Beaver Creek Public Use Easement (width in miles)	1	1	1	NA ¹
Development by Doyon allowed in Beaver Creek Public Use Easement (≤ 1,000 acres)	Yes	Yes	Yes	NA ¹
ANCSA 17(b) public access easements across Doyon lands (number of easements)	Yes (2)	Yes (2)	Yes (1)	NA ¹
Subsistence easements on lands from Doyon	Yes	Yes	Yes	NA
Non-development easements on other Doyon lands (acres)	0	≤ 120,000	0	0
Consolidation lands to Doyon (acres)	132,000	132,000	132,000	0
Consolidation lands to the Service (acres)	132,000	132,000	132,000	0
White-Crazy Mountains recommended-Wilderness area excluded	No	No	Yes ²	Yes
Perpetual production payment (percent)	1.25	0.25	1.25	0 ³
Perpetual production payment with ROW along northern route (percent)	1.5	0.5	1.5	0 ³
Additional Doyon lands available for purchase by the Service in Phase II (acres)	≤ 120,000	0	≤ 81,000	0 ³
Acres conveyed by Doyon to Service for each linear mile of ROW (northern route) across Service lands that connect to Doyon lands	640	640	640	0 ³
Exploration may occur on Doyon-owned lands that are not part of the exchange	Yes	Yes	Yes	Yes
Exploration occurs on Refuge lands	No	No	No	No

Notes:

¹ Not applicable; under this alternative the land is retained by the Service.

² Refers to surface lands only; approximately 20,800 acres of oil and gas interests (halo lands) in the recommended-Wilderness area would be exchanged to Doyon under this alternative, but no surface lands. In addition, a Title XI ROW may cross this land.

³ Production takes place on Doyon or other Native lands not received in the exchange, so no perpetual production payment to Service is required.

Key:

ANCSA = Alaska Native Claims Settlement Act.

NA = Not applicable.

ROW = Right-of-way.

Table 2-3 Change in surface/subsurface fee ownership of Refuge lands under the action alternatives¹

Phase	Ownership	Lands	Proposed Action - Agreement in Principle (acres)	Exchange with Non-Development Easements Alternative (acres)	Exchange Excluding the White-Crazy Mountains Alternative (acres)
Phase I	To Service	Exchange lands	≥ 150,000	≥ 150,000	≥ 115,000
		ANCSA 12(b) lands ²	56,500	56,500	56,500
		Consolidation	132,000	132,000	132,000
		Total	≥ 338,500	≥ 338,500	≥ 303,500
	To Doyon	Core lands ³	110,000	110,000	83,500
		Halo lands ³	97,000	97,000	105,500
		Consolidation	132,000	132,000	132,000
		Total ⁴	242,000	242,000	215,500
	Service Net Gain	Surface lands ⁴	≥ 96,500	≥ 96,500	≥ 88,000
	Phase II	To Service	Purchase ⁵	≤ 120,000	0
To Doyon		Purchase	0	0	0
Service Net Gain		Surface lands	≤ 120,000	0	≤ 81,000
Total	To Service	Surface Lands ⁵	458,500 ⁶	338,500 ⁶	384,500 ⁶
	To Doyon	Surface Lands ⁴	242,000 ⁶	242,000 ⁶	215,500 ⁶
	Service Net Gain	Surface lands ^{4,5}	216,500 ⁶	96,500 ⁶	169,000 ⁶

Notes:

¹ Does not include donation by Doyon of 120,000 acres for non-development easements under the Land Exchange with Non-Development Easement Alternative or the Beaver Creek Public Use Easement that the Service would retain under all action alternatives.

² These ANCSA 12(b) selected lands are currently managed by the Service but would be conveyed to village corporations if there is no land exchange.

³ Core lands – Doyon would receive surface and subsurface oil and gas interests; Halo lands – Doyon would receive subsurface oil and gas interests only.

⁴ Totals do not include oil and gas interests (halo lands) that Doyon would receive from the Service.

⁵ Totals do not include other Doyon lands that Service would receive as mitigation for a pipeline ROW (640 acres per ROW mile) across Service lands.

⁶ Totals could be more or less, depending on land appraisal and discovery of oil and gas.

Key:

ANCSA = Alaska Native Claims Settlement Act.

ROW = Right-of-way.

financial and land disincentive on Doyon to locate a ROW on the Refuge, and would require Doyon to construct a ROW on BLM-administered lands along the southern ROW route. In addition, the commenter suggested that public use easements be established around the 14,035 acres of submerged lands on the exchange parcel determined by the BLM determined to belong to the State of Alaska (see Section 3.5.1.2). Easements should be sized to allow for a variety of public uses including camping, fishing, wildlife viewing, and hunting.

This alternative differs from the Proposed Action by eliminating the financial and land compensation terms negotiated between the Service and Doyon for the northern ROW. This alternative was considered but was rejected as not reasonable and excluded from detailed analysis by the Service. We did not analyze this alternative in detail for several reasons. First, its effects can be extracted from the existing analysis of the Proposed Action. For instance, according to **Table 4-37** the annual average production payment to the Service would be \$1.6 to \$2.2 million instead of \$1.9 to \$2.6 million if there were no increased payment for the northern ROW route. In addition, Doyon would be relieved of its obligation to donate an estimated 23,680 acres (640 acres for every linear mile; 37 miles; see **Table 4-5**) to the Service as compensation for the ROW.

Secondly, this is a discretionary land exchange. We are not required to exchange lands with Doyon and would chose to do so only if we considered the terms of the exchange to be beneficial to the Refuge and the mission of the Service. The financial and land disincentives are important compensatory mitigation measures that would offset some of the environmental impacts of a ROW across Refuge lands. Without these measures, the alternative would not meet the minimum environmental standards listed in Section 1.4.3.2.

Lastly, we fundamentally disagree with the underlying assumption that the financial and land compensation terms would force the ROW route across BLM land. These terms were negotiated with Doyon to compensate the Service in the likely event the ROW would cross Refuge land. If Doyon requests a ROW through the WMNRA, the BLM would be the lead agency in the EIS required under Title XI of ANILCA. The Service would serve either as a co-lead or cooperating agency at the BLM's request. The agencies would work together to identify an environmentally responsible route. It is important to emphasize that the Title XI regulations do not obligate the agencies to issue a permit for the applicant's preferred route, nor for the most cost-effective route. It is extremely unlikely that the modest increase in the production payment for the northern route would tip the scales in favor of the southern route. Environmental considerations would carry much more weight. The permit would be subject to whatever stipulations and mitigation may be necessary to protect resource values.

2.5.5 Increased Production Payments for all Right-of-way Routes and Lake Easements Alternative

A Draft EIS commenter suggested an alternative that is the same as the Proposed Action except that the financial and land compensation terms associated with a ROW on Refuge lands would also apply if the ROW was off the Refuge and on BLM-administered lands. In the absence of special legislation authorizing the BLM to accept financial compensation for a ROW, any accrued funds for the southern route would be deposited into the general treasury. In addition, public use easements would be established around the 14,035 acres of submerged lands on the exchange parcel determined by the BLM to belong to the State of Alaska (see Section 3.5.1.2). Easements

should be sized to allow for a variety of public uses including camping, fishing, wildlife viewing, and hunting.

This alternative was considered but was rejected as not reasonable and excluded from detailed analysis by the Service for two reasons. First, its general effects can be extrapolated from the existing analysis of the Proposed Action. For instance, according to **Table 4-37** the annual average production payment to the Service would be \$1.9 to \$2.6 million for the northern route; the same amount would be deposited in the general treasury for the southern route. In addition, Doyon would be obligated to donate about 23,680 acres (640 acres for every linear mile) to the Service (see **Table 4-5**) in compensation for the northern ROW and 20,480 acres for the southern ROW route. Second, we fundamentally disagree with the underlying assumption that the financial and land compensation terms negotiated for the Proposed Action would force the ROW route across BLM land, as discussed in Section 2.5.4.

2.5.6 Service Retains Beaver Creek Corridor, No Increase in Production Payments for Right-of-way, and Lake Easements Alternative

A Draft EIS commenter suggested an alternative that is the same as the No Increase in Production Payments for Right-of-way and Lake Easements Alternative (Section 2.5.4), except that the Service would retain ownership of Beaver Creek within the 100-year floodplain. This alternative would give the Service the authority to permit proposed land-use activities and prescribe mitigation so as to ensure the continued protection of fish species of concern (e.g., Chinook salmon), riparian-wetland habitats, water quality, and other resources. This alternative would ensure public access to lands along this section of Beaver Creek and would offset impacts to the visual and wilderness character of the river. In addition, public use easements would be established around the 14,035 acres of submerged lands on the exchange parcel determined by the BLM to belong to the State of Alaska (see Section 3.5.1.2). Easements should be sized to allow for a variety of public uses including camping, fishing, wildlife viewing, and hunting. This alternative was considered but was rejected as not reasonable and excluded from detailed analysis by the Service.

We did not analyze this alternative in detail because we believe the underlying concerns will be addressed in the ROD. This alternative presumably grew out of a concern that the proposed Beaver Creek public use easement would not adequately protect the resources and the quality recreational experience provided by the river. Our intent for the easement was to limit development within the river corridor and preserve the aesthetic experience for visitors to Beaver Creek. However, after reexamining the easement language we agree that it fails to provide the level of protection we intended. If the exchange proceeds, the ROD would document the Regional Director's rationale for selecting a particular method to protect both the river's resources and the visitor's experience. The method could range from retaining a public-use easement to outright ownership of the land adjacent to the river. However, if the former is chosen, the Service would renegotiate the terms of the easement to better protect the resources, visual qualities, and the overall visitor experience along Beaver Creek before exchanging lands.

2.5.7 Phased Development Alternative

The U.S. Environmental Protection Agency proposed an alternative that is similar to the Proposed Action, except that development could only occur in phases. Such a phased approach would allow

for evaluation and monitoring of impacts at a smaller scale, and subsequent adjustments for future phases.

This alternative was considered but was rejected as not reasonable and excluded from detailed analysis by the Service. We did not analyze this alternative in detail because a phased approach to exchanging core lands is highly unlikely to achieve the desired outcome (i.e., enabling the Service to evaluate and monitor any impacts at a smaller scale and make subsequent adjustments for future phases). For development to be economically feasible, Doyon would need to acquire a “critical mass”—that is, enough of the area they are interested in to make development economically feasible. Parcels smaller than those analyzed in the EIS would be below this threshold. As parcel size decreases, the likelihood of successful geophysical explorations decreases and development becomes increasingly unlikely. Therefore, a phased approach would likely result in no development and little to evaluate and monitor. Doyon is unlikely to develop “in a small way” just because they receive less land in the initial phase. Rather they would be unable to develop at all until receiving additional lands.

2.6 Special Features of the Land Exchange

The following features of the land exchange are identified in the Agreement in Principle, and incorporated in the action alternatives, as actions that would be taken by Doyon to offset the effects to natural and social resources from potential development of oil and gas resources within the Refuge. A general discussion of features associated with the alternatives was given in Section 2.4; more detailed information is provided below. Site-specific mitigation measures to avoid or reduce impacts to resources could be identified during the ANILCA Title XI ROW application and during permitting of oil and gas construction and development projects on Doyon lands.

2.6.1 Reallocation of ANCSA 12(b) Entitlement Lands

Doyon would reallocate most (approximately 56,500 acres) of their remaining 12(b) entitlement under ANCSA to areas outside the Refuge. Without this agreement, Doyon would likely allocate their remaining 12(b) entitlement to villages within the Refuge, reducing the total acreage administered by the Refuge. The reallocation would occur under all the action alternatives; lands to be reallocated are shown in **Figure 1-2**. Although these lands are currently managed as Refuge lands, they are selected by village corporations under 12(b) of ANCSA. If the exchange doesn't happen, they will become village conveyances. If the exchange proceeds, Doyon has agreed to reallocate the entitlement to other villages outside of the Refuge (so the selected lands within the Refuge would remain Refuge-administered lands). Because they would only remain Refuge lands if there is an exchange, the Service has viewed them as a “gain” in lands if there is an exchange. These lands are located entirely within the lowlands.

2.6.2 Consolidation of Lands

The Service and Doyon would consolidate land ownerships by pursuing additional land exchanges. This would be an equal value exchange. For the purpose of this analysis, the lands are assumed to be of equal value so they are treated as an acre-for-acre exchange. Up to 132,000 acres of these consolidation lands would be exchanged by each party. The consolidation exchange would be the same under all the action alternatives. These consolidation lands involve all or part of 18 townships near the villages of Stevens Village and Chalkyitsik (**Figure 1-2**) and

would help to reduce the “checkerboard” ownership within the Refuge (U.S. Fish and Wildlife Service 2005).

2.6.3 Non-Development Easement

Under the Land Exchange with Non-Development Easements Alternative, Doyon would donate non-development easements that would preclude commercial development on up to 120,000 acres of Doyon’s lands within the Refuge boundaries (see **Figure 2-6**). The easements (parcels 9 through 16 in **Figure 1-2**) would be on the same lands that would be available for purchase by the Service in Phase II of the Proposed Action (**Figure 2-4**). These easements would provide habitat protection by preventing oil and gas exploration and/or development and other commercial activities, including gravel mining, commercial timber harvest, road construction, and water withdrawals on easement lands. Activities that could occur on easements would differ from those on Refuge lands in the following ways: (a) no general public access or use would be allowed on the easements; (b) Refuge regulations governing public entry and use would not apply; and (c) surface activities and uses like timber and firewood harvest, cabin construction and use, access to inholdings, seismic exploration, etc., would be permitted and controlled by Doyon, not the Service. Terms of the draft easement are provided in **Appendix E**.

2.6.4 Subsistence Easements on Exchanged Lands

Provision of opportunities for continued subsistence uses by local rural residents is one of the purposes for which the Refuge was established. Section 804 of ANILCA gives subsistence use priority over all other consumptive uses of wildlife, such as recreational and commercial fishing or hunting on all inland waters within the external boundary. If fish or game populations cannot support all types of harvest, recreational and commercial harvests are precluded. For example, there are areas on the Refuge where non-local hunting for moose is not allowed but subsistence hunting is allowed. Subsistence activities on Federal lands are generally controlled by Federal subsistence regulations, while subsistence activities on Native corporation lands are controlled by the State of Alaska’s regulations for hunting and Federal regulations for fishing. Under the action alternatives, Doyon would retain a subsistence easement on all surface lands that transfer from Doyon to Service ownership. This subsistence easement would mirror Federal subsistence provisions under Title VIII of ANILCA by providing a subsistence priority for local rural residents on exchange lands. Doyon would continue to control access and use of Doyon land. Terms of the easement are provided in **Appendix E**.

2.6.5 Beaver Creek Public Use Easement

Under all of the action alternatives, the Service would reserve an approximately 1-mile-wide public use easement (totaling 13,000 acres) along that portion of Beaver Creek that flows through core lands that would be received by Doyon. The easement would extend approximately 0.5 mile on each side of the ordinary high water line of Beaver Creek, measured from each bank. Allowable public uses include wildlife observation and photography, hunting, fishing, boating, trapping, camping, hiking, environmental education and interpretation, and other similar activities. The terms of the easement would allow the Service to restrict public access (at Doyon’s request) on up to 1,000 acres at any one time within the easement, as long as unobstructed travel along Beaver Creek remains. These lands may not be contiguous. Lands would be restricted or closed only for purposes directly related to oil or gas exploration, development, or production. Except for two existing permitted cabins, however, public use would not include the construction

of cabins, tent platforms, or similar established camps for commercial operators or the general public. Overnight camping or other uses of the lands by commercial operators in common with the general public would be allowed. The Service would have the authority to restrict or prohibit such public use in accordance with and subject to the same restrictions and regulations as are applicable to the general public on the Refuge. Terms of the easement are provided in **Appendix E**.

Doyon would have the right to explore and develop oil and gas resources on up to 1,000 acres within this easement. These acres could be comprised of one or more parcels. Doyon also could request that the Service temporarily or permanently restrict or prohibit use by the general public on up to 1,000 acres of land within the easement. The restrictions would have to be related to oil or gas exploration, development, and production, and would have to be necessary to protect the public health or safety or to provide for oil or gas field security. Doyon could not prevent the general public from traveling along Beaver Creek at any time of the year. The Service would have the right to restrict or prohibit the use of fixed-wing aircraft, helicopters, and off-road vehicles within the easement, but these restrictions would not apply to the use of such equipment by Doyon that is directly related to oil or gas exploration, development, or production.

The Refuge would reserve one (Exchange Excluding the White-Crazy Mountain Alternative) or two (Proposed Action and Exchange with Non-Development Easements Alternative) ANCSA 17(b) public access easements across Doyon lands to ensure legal access to Refuge lands. These easements would enable Refuge visitors to access public lands from either side of the conveyed Doyon lands or from Beaver Creek.

2.6.6 Perpetual Production Payments

If Doyon produces oil and/or gas on lands acquired from the Service, Doyon will pay the Service a perpetual production payment of 1.25% of the resource value at the wellhead under the Proposed Action and Land Exchange Excluding the White-Crazy Mountains Alternative and a payment of 0.25% under the Land Exchange with Non-Development Easements Alternative. If a transportation corridor were developed across Refuge lands, these payments would increase to 1.5% under the Proposed Action and Land Exchange Excluding the White-Crazy Mountains Alternative and 0.5% for the Land Exchange with Non-Development Easements Alternative. The 1.5% payment would only apply to the northern ROW under the Land Exchange Excluding the White-Crazy Mountains Alternative; no increase in payment would occur for the southern route. These funds would be deposited into a U.S. Treasury account authorized by the 2005 Omnibus Spending Bill. The Service could only use these funds to buy additional land from willing sellers in the Refuge or other national wildlife refuges in Alaska or to construct Alaska refuge facilities.

2.6.7 Agreement to Sell Additional Lands if Development Occurs

Under the Proposed Action and Land Exchange Excluding the White-Crazy Mountains Alternative, Doyon has agreed to make additional lands available for purchase by the Service as compensation for oil and gas development impacts (if development occurs). The lands would be purchased with funds paid to the Service by Doyon as perpetual production payments. Up to 120,000 acres of lands could be purchased by the Service under the Proposed Action, and up to 81,000 additional acres could be purchased under the Land Exchange Excluding the White-Crazy Mountains Alternative. The actual amount of land that would change hands would depend on how much oil or gas is produced (value of perpetual production payment) and whether or not the

Service decides to use the perpetual production payment funds on land purchases in the Refuge. The funds also could be used for land purchases in other Alaska refuges or to construct Refuge facilities for Alaska refuges. Selection of any lands to be purchased on the Refuge would be based on the priorities established by the Service (see Section 2.3.3) and shown in **Figures 1-2, 2-4, and 2-8.**

2.6.8 Compensation for Pipeline Right-of-Way

Any oil or gas produced in the Refuge would have to be transported to market by a pipeline. If the selected pipeline route were to traverse Federal lands, Doyon would have to file an application with the appropriate land management agency (BLM, Service, or both) for a ROW.

Under the Proposed Action and Land Exchange with Non-Development Easements Alternative, Doyon would be required to convey 640 acres of land to the Service for every linear mile of ROW crossing the Refuge. Under the Land Exchange Excluding the White-Crazy Mountains Alternative, both proposed ROW routes would cross the Refuge. However, the length of ROW across the Refuge would be much greater for the northern route (approximately 42 miles) than for the southern route (approximately 8 miles). Doyon would be required to convey 640 acres of land to the Service for every linear mile of ROW only if the northern route is constructed across the Refuge.

In addition, Doyon perpetual production payments to the Service for oil and gas produced on exchanged land would be increased as indicated previously in Section 2.6.6.

2.7 Incomplete and Unavailable Information

According to the Council on Environmental Quality Regulations for implementing the procedural provisions of NEPA (Title 40 of the Code of Federal Regulations [CFR], Section 1502.22), if the information is essential to a reasoned choice among alternatives and the cost of gathering it is not excessive, it must be included or addressed in the EIS. The Council on Environmental Quality Regulations provide direction on how to proceed with the preparation of an EIS when information is incomplete or unavailable:

“If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement: (1) a statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence, which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and (4) the agency’s evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, “reasonably foreseeable” includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason” (40 CFR 1502.22 b).

Knowledge is, and always will be, incomplete regarding many aspects of terrestrial and aquatic species, forestland, rangelands, the economy, oil and gas development, and society. However, central ecological, economic, and social relationships are well established, and a substantial amount of credible information about ecosystems in the project area is known. The alternatives were evaluated using the best available information.

The following summarizes where information may be lacking and efforts to obtain information needed to analyze the effects of the alternatives on natural and social resources. While additional information may add precision to estimates or better specify relationships, new or additional information is unlikely to significantly change the understanding of the relationships that form the basis of the effects analysis presented in Chapter 4.

2.7.1 Incomplete Information Concerning Future Oil and Gas Exploration and Development

Information is unavailable or incomplete on the types, amounts, and location of oil and gas exploration and development activities that could occur on Doyon and proposed exchange lands. Given the price of, and need for, fossil fuels at this time and projected into the future (Energy Information Administration 2007), and the potential for oil and gas to occur within the Yukon Flats, it is likely that exploration would take place in the Yukon Flats. Seismic work contracted by oil and gas exploration and development companies in the past has laid the foundation for interest in oil and gas exploration activities in the Yukon Flats, most notably in the south-central part of the Refuge, including the 110,000-acre parcel and adjacent 97,000 acres of halo lands Doyon wants to acquire in the southern Yukon Flats Basin. Although the deepest part of the basin lies within these 110,000 acres, a recent report by the USGS indicates that oil and gas could be found at depths of 6,000 feet or greater and that there are actually four large, deep areas rather than just one within this region (Till et. Al 2006; Rowan and Stanley 2007). An estimated 2.9 million or more acres with oil and gas potential are found within the Refuge. Currently, approximately 1,055,000 or more acres of the 2.9 million or more acres of lands with potential for oil and gas are Native-owned and therefore open to exploration. The fact that there are multiple deep areas in the basin was not considered by Doyon or the Service when the proposed land exchange and Agreement in Principle were negotiated. There are only limited seismic data available for the proposed exchange lands, and no seismic data are available for the other recently identified deep areas.

For the purpose of analyzing the effects of the land exchange, we assume that all exploration and development would occur on the core lands that are within broad areas in the southern part of the Refuge identified as having potential for oil and gas resources, but the exact locations of oil and gas exploration and development cannot be predicted. Doyon intends to explore for oil and gas on lands they currently own that have been identified as having oil and gas potential regardless of the land exchange. The effects of exploration and development on these non-exchange lands are considered in Chapter 4 in the cumulative effects analysis (Section 4.24).

Exploration also can take many forms and occur in different sequences depending on the company's exploration strategy. Development depends on the discovery of economically and technically recoverable quantities of oil and gas. The probability of development is lower than for exploration, but it is still reasonably foreseeable.

Doyon would not be responsible for conducting oil and gas exploration and development, but would solicit interest and proposals from exploration and development companies (operator). If

an agreement were reached between the two parties, Doyon would lease their lands, including lands obtained in the land exchange, to the operator. The operator or their contractors would then conduct the actual exploration or development.

Thus, we have made general assumptions about where and what types of exploration might occur and what the resulting development might look like. These assumptions, which are based on exploration and development in other basins in Alaska, were the basis for our evaluation of potential effects of future oil and gas exploration or production in the Yukon Flats. These assumptions are given in Section 4.4.

2.7.2 Incomplete Information Concerning Doyon and Village Management of ANCSA 12(b) Lands within or Outside the Refuge

Doyon would reallocate most (approximately 56,500 acres) of their remaining 12(b) entitlement under ANCSA to areas outside the Refuge. Without this agreement, Doyon would likely allocate their remaining 12(b) entitlement to villages within the Refuge, reducing the total acreage administered by the Refuge. If the exchange doesn't happen, they will become village conveyances. If the exchange proceeds, Doyon has agreed to reallocate the entitlement to other villages outside of the Refuge (so the selected lands within the Refuge would remain Refuge-administered lands). We do not know how Doyon would manage those lands outside of the Refuge and the impacts from management of lands within, or outside, of the Refuge.

2.8 Responsiveness of Alternatives to Service and Doyon Goals

The Service's and Doyon's goals for this project are identified in Chapter 1. The responsiveness of alternatives with regard to meeting the goals identified as part of the project purpose and need are summarized and compared in **Table 2-4**.

2.9 Responsiveness of Alternatives to Significant Issues

Significant environmental issues of concern were identified by interested parties during pre-scoping and scoping. These issues are listed in Chapter 1. The effects of the Proposed Action and other alternatives are assessed and discussed in detail with regard to these issues, by resource, in Chapter 4, Sections 4.6 through 4.25. The direct and indirect effects of the proposed land exchange on these resources are addressed in Sections 4.6 through 4.23. Cumulative effects, including the effects of oil exploration and development on non-exchange lands within the Refuge are addressed in Section 4.24. **Table 2-5** briefly summarizes the findings of the detailed analysis provided in the Chapter 4 sections and presents a comparison of the alternatives with regard to their relative efficacy in addressing concerns over the listed issues/resources. The effects on resources are summarized by alternative and by resource in **Table 2-5** in the same order as they are presented in Chapter 4. Within each resource, the effects also are summarized by phase of the exchange. Phase I includes the initial land exchange as described for each of the alternatives in Section 2.4. The effects of exploration, including seismic surveys and exploratory drilling, are included in Phase I. The effects of Phase II (as presented in **Table 2-5** and in Chapter 4) include those associated with additional land purchases as described by alternative in Section 2.4 and those associated with oil and gas field development and production. In **Table 2-5**, summaries and comparisons of the cumulative effects of each alternative follow the effects of Phase II within each resource.

Table 2-4 Responsiveness of alternatives to Service and Doyon objectives

Goal	Proposed Action - Agreement in Principle	Exchange with Non-Development Easements	Exchange Excluding White/Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
<i>Service Project-Specific Goals</i>				
Increase the total amount of public lands managed in accordance with the Refuge purposes. ¹	Gain of ≥ 97,000 acres under Phase I, and 216,500 acres if oil and gas developed under Phase II, of public lands managed in accordance with Refuge purposes. ²	Gain of ≥ 97,000 acres of public lands managed in accordance with Refuge purposes under Phase I. Non-development easements on 120,000 acres of other Doyon lands that would be managed more closely to Refuge purposes, although the general public would not have access to these lands. ²	Gain of ≥ 88,000 acres under Phase I, and 169,000 acres if oil and gas developed under Phase II, of public lands managed in accordance with Refuge purposes. ²	No change in number of acres of public lands managed in accordance with Refuge purposes.
Add priority wildlife habitats to the Yukon Flats Refuge.	Gain of ≥ 97,000 acres under Phase I, and 216,500 acres if oil and gas developed under Phase II, of priority wildlife habitat (priority parcels 1 through 16). ²	Gain of ≥ 97,000 acres under Phase I of priority wildlife habitat (priority parcels 1 through 8). Non-development easements on 120,000 acres of other Doyon lands that would be managed more closely to Refuge purposes, including maintenance and production of priority wildlife habitat. ²	Gain of ≥ 88,000 acres under Phase I, and 169,000 acres if oil and gas developed under Phase II, of priority wildlife habitat (priority parcels 1 through 13). ²	No change in number of acres of priority wildlife habitat managed by Refuge.
Consolidate landownership patterns in the Refuge. (Note: a reduction in length of Refuge boundaries indicates an increase in land consolidation).	Refuge boundaries reduced by 137 miles (16%) in Phase I and by 158 miles (18%) if all Phase II lands purchased.	Refuge boundaries reduced by 137 miles (16%) in Phase I. No additional boundary reductions in Phase II.	Refuge boundaries reduced by 125 miles (15%) in Phase I and by 163 miles (19%) if all Phase II lands purchased.	No change in length of Refuge boundary. Retain current checkerboard landownership pattern within exterior Refuge boundaries.

Table 2-4 Responsiveness of alternatives to Service and Doyon objectives (continued)

Goal	Proposed Action - Agreement in Principle	Exchange with Non-Development Easements	Exchange Excluding White/Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
<i>Doyon Goals</i>				
Fulfill the Alaska Native Claims Settlement Act requirement to provide economic opportunities for Doyon and its shareholders.	Doyon would acquire 110,000 acres with oil/gas potential and an adjacent 97,000 acres of oil/gas interests. Exploration would create about 99 local jobs that would last 2 to 6 years. Development would create about 106 to 176 local jobs that would last a few years and about 14 to 74 local jobs that could last 30 to 50 years.	Same as Proposed Action.	Doyon would acquire 83,500 acres with oil/gas potential and an adjacent 97,000 acres of oil/gas interests. Economic opportunities would be the same as Proposed Action.	No jobs are created as a result of actions associated with the land exchange. Jobs would be created by oil and gas exploration and development on Doyon lands (see cumulative effects in Chapter 4) and by other local employers.
Create a rural economy that would enable more people to live and work in their traditional villages.	Given that 84% of the local residents are Alaska Native, and Doyon contractors are encouraged to hire local Alaska Natives, Natives in local villages would have opportunities to fill many of the new jobs. Some residents gaining employment may move away from villages.	Same as Proposed Action.	Same as Proposed Action.	No jobs are created as a result of actions associated with the land exchange. Jobs would be created by oil and gas exploration and development on Doyon lands (see cumulative effects in Chapter 4), and by other local employers, that could employ local Natives.
Consolidate land ownerships in the Yukon Flats basin.	Both parties would exchange additional lands to consolidate ownerships and facilitate land management. This exchange would include up to 132,000 acres by each party.	Both parties would exchange additional lands to consolidate ownerships and facilitate land management. This exchange would include up to 132,000 acres by each party.	Both parties would exchange additional lands to consolidate ownerships and facilitate land management. This exchange would include up to 132,000 acres by each party.	Retain current checkerboard landownership pattern within exterior Refuge boundaries.

Notes:

¹ All acreages are for the surface state, unless otherwise noted.

² If a pipeline and access road were constructed across Refuge land, Doyon would donate an additional 640 acres for every linear mile of right-of-way.

Table 2-5 Comparison of alternatives with respect to significant environmental issues

Issue		Proposed Action - Agreement in Principle	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Air Quality	Phase I	Drill rigs would increase air pollutant concentrations, but air quality would be expected to meet NAAQS/Alaska AAQS at the drill pad edge. Effects would last as long as drilling (4 months/year for 4 years). Exploratory drilling would have a minimal short-term and long-term effect on local and a negligible effect on regional air quality.	Effects on air quality would be similar to those for the Proposed Action.	Effects on air quality would be similar to those for the Proposed Action.	No effects on air quality.
	Phase II	Emissions from development facilities would have a minor effect beyond immediate localized area for 30-50 years. Air quality would be expected to meet NAAQS and Alaska AAQS within 100 yards of facility. An oil spill could result in the release of volatile organic compounds within the area of the spill.	Effects on air quality would be similar to those for the Proposed Action.	Effects on air quality would be similar to those for the Proposed Action.	No effects on air quality.
	Cumulative	Oil and gas exploration and development on other Doyon lands would have similar air quality effects as above, but they would not accumulate due to distance and dispersion.	Effects on air quality would be similar to those for the Proposed Action.	Effects on air quality would be similar to those for the Proposed Action.	A small or large field may be developed on non-exchange lands, which would have similar effects on air quality as described for Phase II of the Proposed Action.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Climate	Phase I	Greenhouse gas emissions would be negligible.	Effects on climate would be similar to those for the Proposed Action.	Effects on climate would be similar to those for the Proposed Action.	No effects on climate.
	Phase II	Greenhouse gas emissions from field operation would equal about 0.008% of U.S. emissions.	Effects on climate would be similar to those for the Proposed Action.	Effects on climate would be similar to those for the Proposed Action.	No effects on climate.
	Cumulative	Greenhouse gas emissions from operation of large fields on core and non-exchange lands could total 1.14 tons annually or about 0.017% of U.S. emissions. Decreasing production in other Alaska fields may result in no accumulation from oil and gas industry. Combustion of oil produced by a large field could represent as much as 216 tons of CO ₂ e or approximately 0.1% of total U.S. annual emissions (approximately 7,200 million tons) from the burning of fossil fuels over the life of the project. Emissions from oil produced by a small field would be one quarter of that or less. Development of an additional large field on non-exchange lands could double the greenhouse gas emissions.	Cumulative effects would be similar to those for the Proposed Action.	Cumulative effects would be similar to those for the Proposed Action.	A small or large field may be developed on non-exchange lands, which would have similar effects on climate as development of a single small or large field under Phase II of the Proposed Action. There would also be greenhouse gas emissions associated with construction and operation of a natural gas pipeline from the North Slope, and new development associated with villages in or near the Refuge.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Climate (continued)	Cumulative (continued)	There would also be greenhouse gas emissions associated with construction and operation of a natural gas pipeline from the North Slope, and new development associated with villages in or near the Refuge.			
Geology, Geologic Hazards, and Soil	Phase I	There would be no impacts to geology or geologic hazards from the Proposed Action. Clearing of seismic survey lines, access trails, and ice pads could cause minor subsidence and deepening of permafrost active layer over portions of 490-660 acres.	Effects on soils would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential, affording some protection to soil on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	Effects on soils would be similar to those for the Proposed Action.	No effects on geology, geologic hazards, and soil.
	Phase II	Loss of 735-1,200 acres of soil due to gravel pads/roads, and 145-240 acres of direct impact from gravel mining if an oil field is developed. Indirect effects would include thermokarst, erosion, subsidence, and flooding, which could affect as much as 7,200 acres. Soil could be impacted by spills onto land and through cleanup efforts. If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of	Effects on geology, geologic hazards, and soil would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact soil. Geology and	Effects on geology, geologic hazards, and soil would be similar to those for the Proposed Action.	No effects on geology, geologic hazards, and soil.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Geology, Geologic Hazards, and Soil (continued)	Phase II (continued)	Doyon lands; about 45,000 acres of these lands have oil and gas potential. Geology and soil on these lands would be protected from future development. Geology and soil would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands would also be protected.	soil would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands would also be protected.		
	Cumulative	Exploration and development on Doyon-owned lands would have a similar effect as activities on core lands, and the effects would be additive resulting in double the area of soil on the Refuge lost due to exploration and development. Climate change could increase the effects of line clearing.	Cumulative effects to geology, geologic hazards, and soil would similar to those for the Proposed Action.	Cumulative effects to geology, geologic hazards, and soil would similar to those for the Proposed Action.	Exploration and development on Doyon-owned lands would have similar effects on geology, geologic hazards, and soil as those described for exploration and development in Phase I and II of the Proposed Action.
Paleontological Resources	Phase I	Potential for minor effects to paleontological resources from exploration.	Effects to paleontological resources would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential, affording some protection to paleontological resources on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	Effects to paleontological resources would be similar to those for the Proposed Action.	No effects to paleontological resources.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Paleontological Resources (Continued)	Phase II	The primary impact to paleontological resources would result from the excavation of material for construction of the permanent facilities. Extraction of the terrestrial materials could impact paleontological resources. Up to 1,200 acres of soil could be impacted due to gravel pads/roads, and up to 240 acres of direct impacts could occur from gravel mining if an oil field is developed. Paleontological resources could be adversely impacted by an oil spill. If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. Paleontological resources on these lands would be protected from future development. Paleontological resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands.	Effects to paleontological resources would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact paleontological resources. Paleontological resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands.	Effects to paleontological resources would be similar to those for the Proposed Action.	No effects to paleontological resources.
	Cumulative	Exploration and development on Doyon-owned lands would have a similar effect as activities on core lands, and the effects would be additive resulting in double the area of ground disturbance on the Refuge lost due to exploration and development.	Effects to paleontological resources would be similar to those for the Proposed Action.	Effects to paleontological resources would be similar to those for the Proposed Action.	Exploration and development on Doyon-owned lands would have similar effects on paleontological resources as those described for exploration and development in Phase I and II of the Proposed Action.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Oil and other Mineral Resources	Phase I	The Service would experience a net loss of 76,200 acres with oil and gas potential, while Doyon gains same.	The Service would experience a net loss of 76,200 acres with oil and gas potential, while Doyon gains same. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including about 45,000 acres with oil and gas potential, affording some protection to oil and other mineral resources on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	The Service would experience net loss of 59,400 acres with oil and gas potential, while Doyon would gain 59,400 acres.	No effect on oil and other mineral resources.
	Phase II	Service would have a net gain of 44,500 acres with oil and gas potential, while Doyon loses same. Potential for removal of 125-500 MMbbls of oil if oil is discovered. Up to about 12,000,000 cubic yards of gravel could be removed if an oil field is developed, with up to half of the gravel coming from Federal lands for a ROW. If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. Oil and other mineral resources on these lands would be protected from future development.	There could be removal of 125-500 MMbbls of oil under this alternative if oil is discovered. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact gravel resources. Oil and other mineral resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands.	The Service would have a net gain of 9,300 acres with oil and gas potential. There could be removal of 125-500 MMbbls of oil if oil is discovered. Up to about 12,000,000 cubic yards of gravel could be removed if an oil field is developed, up to half could be from Federal lands for a ROW.	No effects on oil and other mineral resources.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Oil and other Mineral Resources (continued)	Phase II (continued)	Oil and other mineral resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands; portions of the proposed ROW routes would be within areas with high oil and gas potential.			
	Cumulative	Oil and gas development on other Doyon lands without halo lands could result in drainage of resources under Federal lands. Potential development on non-exchange private lands in Refuge could double use of gravel (24,000,000 cubic yards) and oil production from lands within outer Refuge boundary.	Effects to oil and other mineral resources (oil, gas, gravel) would be similar to those for the Proposed Action.	Effects on mineral resources (oil, gas, gravel) would be similar to those for the Proposed Action.	Development on other Doyon lands would have similar effects on oil and other mineral resources as described for exploration and development in Phase I and II of the Proposed Action.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Water Resources	Phase I	<p>There would be a net gain of 1,430 lakes (24,100 acres) and 118 river miles on Refuge lands.</p> <p>Exploration activities could result in erosion of streambanks and sedimentation of streams.</p> <p>Exploratory drilling would consume up to 20 ac-ft of surface water per winter drilling season, for 4 seasons.</p>	<p>Effects to water resources would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential and about 42,600 acres of lakes and 232 river miles, affording some protection to water resources on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.</p>	<p>There would be a net gain of 1,250 lakes (22,000 acres) and 116 river miles on Refuge lands. Effects to water resources from exploration and exploratory drilling would be similar to those for the Proposed Action.</p>	<p>No effects to water resources.</p>
	Phase II	<p>Consumption of up to 830 ac-ft of surface water over field life. Removal of water for development could adversely impact the hydrology of lowland habitats below development areas and impact lowland vegetation.</p> <p>If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. Water resources would be protected from future development. Water resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands.</p>	<p>Effects to water resources would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact water resources. Water resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands.</p>	<p>Consumption of up to 830 ac-ft of surface water over field life. Removal of water could adversely impact the hydrology of lowland habitats below development areas and impact lowland vegetation.</p> <p>If oil resources were discovered and developed on exchange lands, the Service would use production payments to purchase up to 81,000 acres of Doyon lands that have about 1,770 lakes (36,300 acres) and 165 river miles that would benefit water resources on the Refuge.</p>	<p>No effects on water resources,</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Water Resources (continued)	Cumulative	<p>Exploration and development on other Doyon lands could result in consumption of up to another 910 ac-ft of surface water over field life if a large field is developed on other Doyon lands. The effects could be additive if water sources are in the same drainage.</p> <p>Climate change could result in less available surface water and increase the effects of withdrawals.</p>	<p>Cumulative effects on water resources would be similar to those for the Proposed Action.</p>	<p>Cumulative effects on water resources would be similar to those for the Proposed Action.</p>	<p>Water resource effects would be similar to those under Phase I and II of the Proposed Action. Climate change could result in less available surface water and increase the effects of withdrawals.</p>
Water Quality	Phase I	<p>Minor effects on water quality due to erosion and sedimentation from the clearing and use of seismic survey lines and accessing drill sites. Drilling fluids, wastewater, and solid wastes, and spills could impact surface water or groundwater.</p>	<p>Effects on water quality would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential and about 42,600 acres of lakes and 232 miles of river, affording some protection to water quality on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.</p>	<p>Effects on water quality would be similar to those for the Proposed Action.</p>	<p>No effect on water quality.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Water Quality (continued)	Phase II	<p>Potential effects due to erosion and sedimentation from equipment access, gravel mining, and pipeline, road, and facility construction. Excessive withdrawals of surface waters could affect water quality, water quantity, and habitat value. Small oil spills likely to occur but would have negligible effect on water quality. Large and very large spills could affect water quality but have a low probability of occurrence.</p> <p>If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. Water resources and water quality on these lands would be protected from future development. Water resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands.</p>	<p>Effects on water quality would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact water quality. Water resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands.</p>	<p>Effects on water quality would be similar to those for the Proposed Action.</p>	<p>No effect on water quality.</p>
	Cumulative	<p>Additional oil and gas exploration and development on other Doyon lands would have similar effects to above and could have potential to accumulate if situated in the same drainage.</p>	<p>Effects on water quality would be similar to those for the Proposed Action.</p>	<p>Effects on water quality would be similar to those for the Proposed Action.</p>	<p>Effects on water quality would be similar to those under Phase I and II of the Proposed Action.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Hydrology	Phase I	Minimal effect on surface hydrology due to overland moves of equipment.	Effects on hydrology would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential and with 42,000 acres of lakes and 232 river miles, affording some protection to hydrology on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	Effect on hydrology would be similar to those for the Proposed Action.	No effect on hydrology.
	Phase II	Potential effects on drainage patterns due to wetland and stream crossing associated with culverting, and pipeline, road, and facility construction. Potential for excessive drawdown of surface water resources during winter during low flow periods with unknown impacts to lowland hydrology. If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. The hydrology on these lands would be protected from future development. Water resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands.	Effects on hydrology would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact hydrology. Water resources would also be protected on lands obtained by the Service if a ROW was constructed across Refuge lands.	Effect on hydrology would be similar to those for the Proposed Action.	No effect on hydrology.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Hydrology (continued)	Cumulative	Additional oil and gas exploration and development on other Doyon lands would have similar effects to above and could have potential to accumulate if situated in the same drainage.	Effects on hydrology would be similar to those for the Proposed Action.	Effects on hydrology would be similar to those for the Proposed Action.	Effects on hydrology would be similar to those under Phase I and II of the Proposed Action.
Biodiversity, Biological Integrity, and Environmental Health	Phase I	<p>The Service would receive at least 150,000 acres in the lowlands with priority fish and wildlife habitat value and Doyon would receive 110,000 acres in the uplands. This would result in a habitat increase under Service management for plant and animal species that favor lowland habitats. Effects would be minor; however, as lowland habitat under Service management would increase by only about 2% and upland habitat would decrease by about 2% from current levels. Refuge lands are currently about 48% lowland and 52% upland. There would be a net gain of 96,500 acres of Refuge lands.</p> <p>Refuge lands would be consolidated. The size of habitat blocks would increase, which would facilitate management. The exchange would result in a block of private lands extending from the southern to northern Refuge boundaries.</p>	Effects on biodiversity and biological integrity would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including about 45,000 acres with oil and gas potential, affording some protection to biodiversity, biological integrity, and environmental health on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	Refuge lands would increase by 88,000 acres, and Refuge lands would be consolidated. The habitat types of exchanged lands and the potential effects on the biological integrity, diversity, and environmental health of the Refuge would be similar to those described for the Proposed Action. Under this alternative, private lands would not extend from the southern to northern Refuge boundaries due to the exclusion of the recommended-Wilderness area, which is approximately 7 miles wide.	Under the No Land Exchange Alternative, there would be no land exchange. There would be no increase or consolidation of Federal lands in the Refuge. This alternative would not affect the Refuge's biological integrity, diversity, and environmental health.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Biodiversity, Biological Integrity, and Environmental Health (continued)	Phase I (continued)	Seismic surveys would not be conducted on Refuge lands. Thus, direct impacts to biological integrity, diversity, or environmental health of the Refuge would not occur from seismic exploration. However, the activities and movements of wildlife on Refuge lands adjacent to the core lands could be impacted by seismic activities.			
	Phase II	The Service could acquire up to 120,000 acres of Doyon lands within the Refuge. These lands contain priority wildlife habitats. This would increase the size of habitat blocks that would better facilitate management of Refuge lands. The purchase of lands would have a positive effect on the Service’s ability to maintain the biological integrity, diversity, and environmental health of the Refuge.	Effects on biodiversity, biological integrity, and environmental health due to development would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact biodiversity, biological integrity, and environmental health.	The Service could acquire up to 81,000 acres of Doyon lands within the Refuge. These lands contain priority fish and wildlife habitats. This would increase the size of habitat blocks, which would better facilitate management of Refuge lands. The transfer of lands would have a positive effect on the Service’s ability to maintain the biological integrity, diversity, and environmental health of the Refuge.	Under the No Land Exchange Alternative, there would be no oil exploration or development on Refuge lands. There would be no increase or consolidation of Federal lands in the Refuge. This alternative would not affect the Refuge’s biological integrity, diversity, and environmental health.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Biodiversity, Biological Integrity, and Environmental Health (continued)	Phase II (continued)	Infrastructure and activities associated with oil development on core lands and pipeline/road ROWs could have adverse effects on the biological integrity, diversity, and environmental health of the Refuge. Development activities could alter wildlife migration patterns on the Refuge. Oil infrastructure would require protection from wildland fire, potentially altering fire regimes in forest stands affecting forest stand age and composition.		Other effects on biodiversity, biological integrity, and environmental health would be similar to those for the Proposed Action.	
	Cumulative	Cumulative effects would primarily be associated with the Proposed Action and exploration and development on Doyon-owned lands. Water withdrawals for oil field development could exacerbate the drying effects of climate change and degrade the biological integrity, diversity, and environmental health of the Refuge. Construction of oil field pads, roads, and pipeline, and a natural gas pipeline, and climate change could degrade the biological integrity, diversity, and environmental health of the Refuge.	Cumulative effects would be similar to those for the Proposed Action.	Cumulative effect would be similar to those under the Proposed Action.	Cumulative effect would be similar to those under Phase I and Phase II of the Proposed Action.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Refuge Purposes	Phase I	<p>The transfer of lands from Doyon to the Service does not conflict with Refuge purposes.</p> <p>There would be a net increase of 96,500 acres of Refuge lands containing priority fish and wildlife habitats, increasing opportunities for conservation. Refuge lands would be consolidated, increasing the size of habitat blocks under Federal ownership and facilitating management of Refuge lands.</p> <p>Exploration would occur on private lands, which would have little effect on Refuge purposes except for cleared snow trails on about 28 miles (100 acres) of Refuge lands.</p>	<p>Effects on Refuge purposes would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including about 45,000 acres with oil and gas potential, affording some protection to Refuge purposes on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.</p>	<p>There would be a net increase of 88,000 acres of Refuge lands containing priority wildlife habitats, increasing opportunities for conservation. Refuge lands would be consolidated, increasing the size of habitat blocks under Federal ownership and facilitating management of Refuge lands.</p> <p>Exploration would occur on private lands, which would have little effect on Refuge purpose, except for cleared snow trails on about 28 miles (100 acres) of Refuge lands.</p>	<p>Lands administered by the Refuge would continue to remain in relatively pristine condition and serve to meet the Refuge purposes identified under Section 302(9)(B) of ANILCA. Most Doyon land would also continue to remain in pristine condition and support the Refuge purposes at a regional scale.</p>
	Phase II	<p>If development occurs, the Service could purchase up to 120,000 acres of Doyon lands in the Refuge, which would increase acreage under Service management and further consolidates Refuge lands, facilitating management and conservation.</p>	<p>Effects on Refuge purposes would be similar to those under the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact Refuge purposes.</p>	<p>If development occurs the Service could purchase up to 81,000 acres of Doyon lands in the Refuge, which increases acreage under Service management and further consolidates Refuge lands, facilitating management and conservation.</p>	<p>Lands administered by the Refuge would continue to remain in relatively pristine condition and serve to meet the Refuge purposes identified under Section 302(9)(B) of ANILCA. Most Doyon land would also continue to remain in pristine condition and support the Refuge purposes at a regional scale.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Refuge Purposes (continued)	Phase II (continued)	Development would only occur on private lands and therefore affect Refuge purposes only indirectly except along a road/pipeline ROW that might be constructed on Refuge lands if the northern route is selected. The 1,090 acres of Refuge lands that could be directly affected would no longer fully support Refuge purposes. The ROW could disturb animals or their movements and increase access by the public, which could affect ability to meet Refuge purposes. Increased public use and harvest would require increased active and responsive management.		Development would only occur on private lands and therefore affect Refuge purposes only indirectly except along a road/pipeline ROW that might be constructed on Refuge lands if the northern route was selected. The 1,090 acres of Refuge lands that could be directly affected would no longer fully support Refuge purposes. The ROW could disturb animals or their movements, and increase access by the public, which could affect the ability to meet Refuge purposes.	
	Cumulative	Development of core and other non-exchange lands would be on private lands, and not directly affect the Refuge or its purposes. As much as 37-247 miles of ROWs (450-2,790 acres) could be developed on Refuge lands. These lands would not fully support Refuge purposes. Indirect effects associated with these ROWs (e.g., vehicle disturbance, habitat effects, increased hunting) would also affect the Refuge's ability to meet established conservation purposes.	Cumulative effects on Refuge purposes would be similar to those for the Proposed Action.	Cumulative effect on Refuge purposes would be similar to those under the Proposed Action.	Cumulative effect would be similar to those under Phase I and Phase II of the Proposed Action.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Vegetation	Phase I	Vegetation would be cleared from 490-660 acres for seismic survey lines, camps, access trails, and drilling pads. Regeneration of vegetation could take 30-230 years depending on vegetation type. Vegetation could also be impacted by spills of drilling fluids and waste.	Effects on vegetation would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential, affording some protection to vegetation on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	Effects on vegetation would be similar to those for the Proposed Action.	No effects on vegetation.
	Phase II	If development occurs, 882–1,440 acres of vegetation would be lost or harmed for facility construction and mining, and an additional 415 acres could be cleared of woody vegetation for a ROW. Vegetation could be impacted by spills onto land and through cleanup efforts. If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. Vegetation on these lands would be protected from future development. Vegetation would also be protected on lands obtained by the Service if a ROW was constructed across Refuge.	Effects on vegetation would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact vegetation. Vegetation would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.	Effects on vegetation would be similar to those for the Proposed Action.	No effects on vegetation.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Vegetation (continued)	Cumulative	<p>Seismic surveys and exploratory drilling on Doyon-owned lands would be additive to those on core lands and past seismic surveys; 1,200-1,500 acres within the Refuge.</p> <p>Effects of development on Doyon-owned and core lands would be additive; 1,400-3,400 acres could be lost to gravel mining and gravel pads/roads and 600-1,100 acres could be affected by a cleared ROW. Total direct effects could be 1,800-2,600 acres. Indirect effects could impact an additional 2,800-6,800 acres.</p>	Cumulative effects on vegetation would be similar to those for the Proposed Action.	Cumulative effects on vegetation would be similar to those for the Proposed Action.	Effect on vegetation would be similar to those under Phase I and Phase II of the Proposed Action. Past seismic surveys would be additive to seismic and other exploration on non-exchange lands. Direct effects could include a total of 670-840 acres plus additional acres for access. Development on Doyon-owned lands would directly affect 540-1,920 acres, and an additional 175-650 acres would be cleared and maintained for a ROW. Total direct effects could be 1,210-2,760 acres. Indirect effects could impact an additional 600-3,600 acres.
Wetlands and Floodplains	Phase I	The Proposed Action could have an effect on wetlands or floodplains. Exploration activities would result in clearing of vegetation from 150-180 acres of wetlands and cause minor erosion and sedimentation. A spill of drilling fluids or other harmful fluids used during exploration could adversely impact wetlands.	Effects on wetlands and floodplains would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential and with about 40,000 acres of wetland habitat, affording some protection to wetlands that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	Effects on wetlands and floodplains would be similar to those for the Proposed Action.	No effects on wetlands or floodplains.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Wetlands and Floodplains (continued)	Phase II	<p>Approximately 265-432 acres of wetland would be lost due to gravel pads and mining, and 126 acres would be cleared of woody vegetation. However, the extent of wetlands is highly variable, and effects will depend on specific locations of activities. If the southern route is selected for the ROW, the Victoria Creek floodplain would be crossed twice with a road/pipeline.</p> <p>Wetlands and floodplains could be adversely impacted by spills onto land and water and through cleanup efforts. If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. Wetlands and floodplains on these lands would be protected from future development. Wetlands and floodplains would also be protected on lands obtained by the Service if a ROW was constructed across Refuge.</p>	<p>Effects on wetlands and floodplains would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact wetlands and floodplains. Wetlands and floodplains would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p>	<p>Effects on wetlands and floodplains would be similar to those for the Proposed Action.</p>	<p>No effects on wetlands and floodplains.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Wetlands and Floodplains (continued)	Cumulative	Few past effects. Future effects include oil exploration and development on Doyon owned lands and core lands. Direct effects would be loss of 960-1,800 acres of wetlands. Effects would be additive but dependant on siting of facilities/ activities in wetlands. Climate change could result in additional loss of wetlands.	Cumulative effects on wetlands and floodplains would be similar to those for the Proposed Action.	Cumulative effects on wetlands and floodplains would be similar to those for the Proposed Action.	Effects of oil and gas exploration and development on other Doyon-owned lands on wetlands and floodplains could be similar to those for Phase I and Phase II of the Proposed Action. Climate change could result in additional loss of wetlands.
Fish and Essential Fish Habitat	Phase I	Amount of fish habitat on Federal lands in the Refuge would increase by about 1,430 lakes (24,100 acres) and 118 river miles. Ice bridge crossings of streams and seismic surveys over streams could impact fish and fish overwintering habitat. A spill of drilling fluids or other harmful materials used during exploration could harm fish.	Fish habitat on Federal lands would increase by 1,430 lakes (24,100 acres) and 118 river miles – same as under the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential and about 42,000 acres of lakes and 232 river miles that could have fish habitat, affording some protection to fish on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative. Adverse impacts to fish from exploration would be similar to those for the Proposed Action.	Net gain of water bodies on Refuge lands would be 1,250 lakes (22,000 acres) and 116 river miles. Adverse impacts to fish from exploration would be similar to those for the Proposed Action.	No effects on fish or their habitats.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Fish and Essential Fish Habitat (continued)	Phase II	<p>If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. Fish and fish habitat on these lands would be protected from future development. Net gain of water bodies on Refuge lands of about 2,290 lakes (42,600 acres) and 232 river miles if an oil field was developed and all available Phase II lands were purchased. Fish and fish habitat would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p> <p>Fish could be impacted by excessive water withdrawals during winter, but should be protected by regulations and flow reservations. Fish could be impacted by changes in water quality or flow due to road/facility construction.</p> <p>Fish could be impacted by spills onto land and through cleanup efforts.</p>	<p>Effects to fish would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact fish and fish habitat. Fish and fish habitat would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p>	<p>If oil development occurs, 81,000 acres of lowlands with priority wildlife habitat would be made available for purchase by the Service. Purchase of all these lands would increase total net gain of fish habitat on Refuge lands to 169,000 acres. Net gain of 1,770 lakes (36,300 acres) and 165 river miles if an oil field was developed and all available Phase II lands were purchased. Fish and their habitats would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p> <p>Effects on fish from development would be similar to those under Proposed Action.</p>	<p>No effects on fish or their habitats.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Fish and Essential Fish Habitat (continued)	Cumulative	Past effects to fish have occurred from placer mining, but fish resources have recovered. Future oil and gas exploration and development on non-exchange Native lands in the Refuge would have effects on fish as described above for the Proposed Action. Effects would be additive on migratory fish populations but not on resident fish. Climate change could reduce fish habitat, increase disease, lower productivity, and shift species ranges to the north. These effects could be additive.	Cumulative effects on fish would be similar to those for the Proposed Action.	Cumulative effects on fish would be similar to those for the Proposed Action.	Exploration and development on non-exchange lands would have similar effects on fish as for Phase I and Phase II of the Proposed Action. Climate change could reduce fish habitat, increase disease, and lower productivity, and these effects could be additive.
Birds	Phase I	In exchange for 110,000 acres of mostly upland habitat, the Service would obtain at least 150,000 acres of lowlands that are priority wildlife habitats. These lowlands have relatively high densities of nesting swans and waterfowl/waterbirds. The exchange would result in a net gain of 96,500 acres of available bird habitat under Service management (Refuge lands). Refuge lands in the midland lake zone habitat would be reduced by 79,600 acres (4%).	Effect on birds would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential and about 40,000 acres of wetland habitat, affording some protection to aquatic and upland bird habitat on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	In exchange for 83,500 acres of mostly upland habitat, the Service would obtain 115,000 acres of lowlands that are priority wildlife habitats. These lowlands have relatively high densities of nesting swans and waterfowl/waterbirds. The exchange would result in a net gain of 88,000 acres of bird nesting habitat under Service management (Refuge lands).	No effects on birds or their habitats.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Birds (continued)	Phase I (continued)	Exploration would disturb resident birds and result in the alteration (clearing of woody vegetation) of about 490-660 acres of bird habitat, which would require 30-230 years for regrowth. Nesting owls could be disturbed. Spills of drilling fluids and other harmful materials could harm birds and their habitat.		Exploration would disturb resident birds and result in the alteration (clearing of woody vegetation) of about 490-660 acres of bird habitat, which would require 30-230 years for regrowth. Nesting owls could be disturbed. Spills of drilling fluids and other harmful materials could harm birds and their habitat.	
	Phase II	If oil development occurs, 120,000 acres of lowlands with priority wildlife habitat would be made available for purchase by the Service. Purchase of all these lands would increase total net gain of bird habitat on Refuge lands to 216,500 acres. Birds and their habitats would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.	Effects to birds would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact birds and their habitats. Birds and their habitats would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.	If oil development occurs, 81,000 acres of lowlands with priority wildlife habitat would be made available for purchase by the Service. Purchase of all these lands would increase total net gain of bird habitat on Refuge lands to 169,000 acres. Birds and their habitats would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.	No effects on birds or their habitats.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Birds (continued)	Phase II (continued)	<p>Development would result in the direct loss of 882-1,440 acres of bird habitat due to gravel pads/roads and mining, and alteration of 415 acres (cleared ROW). These effects would be on private lands and last for at least 30-50 years.</p> <p>Birds could be impacted by spills onto land or water and through cleanup efforts. Birds would also be impacted by disturbances from oil development.</p>		<p>Development would result in the direct loss of 882-1,440 acres of bird habitat due to gravel pads/roads and mining, and alteration of 415 acres (cleared ROW). These effects would be on private lands and last for at least 30-50 years.</p> <p>Birds could be impacted by spills onto land or water and through cleanup efforts. Birds would also be impacted by disturbances from oil development.</p>	
	Cumulative	<p>Few past effects, seismic surveys have altered some habitat. Some bird species are in regional or national declines, others such as swans are increasing. Future effects would be primarily habitat loss due to exploration and development on non-exchange and core lands. Past and future effects on habitat would be additive. Past and future exploration and development would result in the alteration (clearing) of 1,800-2,600 acres and loss (gravel mining/pads/roads) of 1,400-3,400 acres of bird habitat; total area affected represents 0.03-0.05% of lands within exterior Refuge boundaries.</p> <p>Climate change could result in less surface water for waterbirds.</p>	Cumulative effects on birds would be similar to those for the Proposed Action.	Cumulative effects on birds would be similar to those for the Proposed Action.	<p>Cumulative effects on birds would be similar to those under Phase I and II of the Proposed Action. Past and future effects on habitat would be additive. Past and future exploration and development would result in the alteration (clearing) of 850-1,490 acres and loss (gravel mining/pads/roads) of 540-1,920 acres of bird habitat. Total represents 0.01-0.03% of lands within exterior Refuge boundaries.</p> <p>Climate change could result in less surface water for waterbirds.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Mammals	Phase I	<p>In exchange for 110,000 acres of mostly upland habitat, the Service would obtain at least 150,000 acres of lowlands that are priority wildlife habitats. The exchange would result in a net gain of 96,500 acres of available habitat under Service management (Refuge lands). Exchange will result in a 2% decrease in acres of upland habitat and 2% increase in acres of lowland habitat managed by the Service, which would be expected to favor more aquatic species (e.g., muskrat, beaver, otter, mink, moose) than upland species (e.g., wolves, marten, lynx).</p> <p>Exploration would disturb mammals and result in the temporary loss/alteration (clearing of vegetation) of about 490-660 acres of mammal habitat, which would require 30-230 years for regrowth. Cleared survey lines could potentially increase wolf predation of moose or caribou. Surveys could directly disturb burrowing small mammals and denning bears; however, past studies indicates effects such as den abandonment or loss of cubs is unlikely.</p> <p>A spill of drilling fluids or other harmful materials during exploration could harm mammals and their habitats.</p>	<p>Effects on mammals would be the similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including lands with oil and gas potential, affording some protection to mammal habitat on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.</p>	<p>In exchange for 83,500 acres of mostly upland habitat, the Service would obtain at least 115,000 acres of lowlands that are priority wildlife habitats. The exchange would result in a net gain of 88,000 acres of available habitat under Service management. The exchange would result in a decrease in acres of upland and increase in acres of lowland habitat managed by Service, which would be expected to favor more aquatic species (e.g., muskrat, beaver, otter, mink, moose) than upland species (e.g., wolves, marten, lynx). Effects from exploration would be similar to those for the Proposed Action.</p>	<p>No effects on mammals or their habitats.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Mammals (continued)	Phase II	<p>If oil development should occur, up to 120,000 acres of lowland habitat would be made available for purchase by the Service, thus increasing the total net gain of habitat on Federal lands on the Refuge by 216,500 acres. The increase in lowland habitat managed by the Service could benefit aquatic species (e.g., muskrat, beaver, otter, mink, and moose). Mammals and their habitats would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p> <p>Development would result in the direct loss of 882-1,440 acres of mammal habitat due to gravel pads/roads and mining, and alteration of 415 acres (cleared ROW). Mammals would be disturbed and avoid a larger area. Development of an access road could increase hunting pressure on mammals. These effects would be on private lands and last for at least 30-50 years. Mammals could also be impacted by spills onto land and through cleanup efforts.</p>	Effects on mammals would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact mammals and their habitats. Mammals and their habitats would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.	<p>If oil development should occur, up to 81,000 acres of lowland habitat would be made available for purchase by the Service, thus increasing the total net gain of habitat on Federal lands on the Refuge by 169,000 acres. The increase in lowland habitat managed by the Service could benefit aquatic species (e.g., muskrat, beaver, otter, mink, and moose). Mammals and their habitats would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p> <p>Lands in the White-Crazy Mountains area would be excluded; some of these lands may be used by Dall sheep and caribou. Effects to mammals due to development would be similar to those under the Proposed Action.</p>	No effects on mammals or their habitats.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Mammals (continued)	Cumulative	Few past effects, but seismic surveys have altered some habitat. Most populations are healthy, although the moose density is depressed on the Refuge. Future effects would be primarily habitat loss due to exploration and development on Doyon-owned and core lands. Past and future effects on habitat would be additive. Past and future exploration and development would result in the alteration (clearing) of 1,800-2,600 acres and loss (gravel mining/pads/roads) of 1,400-3,400 acres of mammal habitat. Total area affected represents 0.03-0.05% of lands within exterior Refuge boundaries. Access roads could increase hunting and interrupt or affect mammal movement. This could impact moose populations.	Cumulative effects on mammals would be similar to those for the Proposed Action.	Cumulative effects on mammals would be similar to those for the Proposed Action.	Cumulative effects would be similar to those under Phase I and II of the Proposed Action. Past and future effects on habitat would be additive. Past and future exploration and development would result in the alteration (clearing) of 850-1,490 acres and loss (gravel mining/pads/roads) of 540-1,920 acres of mammal habitat. Total area represents 0.01-0.03% of lands within exterior Refuge boundaries. Access roads could increase hunting and interrupt or affect mammal movement. This could impact moose populations.
Threatened and Endangered Species	Phases I and II	No effects on threatened and endangered species.	No effects on threatened and endangered species.	No effects on threatened and endangered species.	No effects on threatened and endangered species.
	Cumulative	No effects on threatened and endangered species.	No effects on threatened and endangered species.	No effects on threatened and endangered species.	No effects on threatened and endangered species.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Land Use/ Recreation	Phase I	<p>Opportunities for recreation by the public would increase as lands open to the public would increase by 96,500 acres. Most adverse effects on public use of Beaver Creek would be avoided with the establishment of the 13,000-acre Beaver Creek public use easement. Trapping that currently takes place along Beaver Creek would be restricted to the easement area. Recreation opportunities would increase due to a net gain in lakes and rivers within Federal lands in the Refuge as most recreation is associated with water. This would include a net gain of 47 miles along Beaver Creek.</p> <p>There would be some loss of recreational opportunities in the vicinity of exploration equipment and drill rigs.</p>	<p>Effects on recreation would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including about 45,000 acres with oil and gas potential, affording some protection to recreation and other minimal impact land uses on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.</p>	<p>Opportunities for recreation by the public would increase as lands open to public would increase by 88,000 acres. Most adverse effects on public use of Beaver Creek would be avoided with establishment of the 13,000-acre Beaver Creek public use easement. Trapping that currently takes place along Beaver Creek would be restricted to the easement area. Recreation opportunities would increase due to net gain in lakes and rivers within Federal lands in the Refuge as most recreation is associated with water. This would include a net gain of 47 miles along Beaver Creek.</p>	<p>No increase or change in opportunities for public recreation.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Land Use/ Recreation (continued)	Phase II	Opportunities for recreation would increase through Service purchase of up to 120,000 acres if Phase II lands are purchased. Recreational values would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge. Public use could be prohibited on up to 1,000 acres at unknown locations along Beaver Creek. Recreational values could be degraded by noise, visual, and aesthetic impacts from development.	Effects to land use and recreation would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact land use and recreation. Recreational values would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.	Opportunities for recreation would increase through Service purchase of up to 81,000 acres, to 169,000 acres if all Phase II lands are purchased. Public use could be prohibited for up to 1,000 acres along Beaver Creek. Recreational values would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.	No effects on land use and recreation.
	Cumulative	Seismic lines, trails, and ROWs could affect land use/recreation by providing access. The effects associated with past and future exploration and development on non-exchange and core lands would be additive. As much as 37-247 miles of ROWs (450-2,790 acres) could be developed on Refuge lands. The magnitude of the effect would depend on the amount of public access.	Cumulative effects on land use and recreation would be similar to those for the Proposed Action.	Cumulative effects on land use and recreation would be similar to those for the Proposed Action.	Cumulative effects to land use and recreation would be similar to those that would occur under Phases I and II of the Proposed Action.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Wilderness	Phase I	There would be no effects on designated Wilderness. Approximately 26,370 acres of the 658,000 acres of Refuge lands that have been recommended for Wilderness designation would be transferred to Doyon, effectively dividing the remaining area into two parcels. All Refuge lands meet Wilderness suitability criteria and therefore have high wilderness value. These lands would be increased by 96,500 acres.	Effects on wilderness would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including about 45,000 acres with oil and gas potential, affording some protection to wilderness values on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	There would be no effects on designated Wilderness. The 658,000-acre recommended-Wilderness area on the Refuge would remain intact and in Federal ownership. All Refuge lands meet the Wilderness suitability criteria and therefore have high wilderness value. These lands would be increased by 88,000 acres.	No effects on designated Wilderness or wilderness values.
	Phase II	Up to 120,000 acres of lands with high wilderness value would come under Federal ownership if all Phase II lands are acquired. Lands with wilderness values would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge. Development would be restricted to private lands except for a pipeline/road ROW. If the northern route was selected, approximately 42 miles (510 acres) would be within the recommended-Wilderness area.	Effects on wilderness would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact wilderness values. Wilderness values would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.	Up to 81,000 acres of lands with high wilderness value would come under Federal ownership if all Phase II lands are acquired. Wilderness values would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge. Development would be restricted to private lands except for a pipeline/road ROW. If the northern route was selected, approximately 42 miles (510 acres) would be within the recommended-Wilderness area; if the southern route were selected, 8 miles (95 acres) would be on the recommended-Wilderness area.	No effects on designated Wilderness or wilderness values.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Wilderness (continued)	Cumulative	Development on non-exchange lands would result in a ROW across Federal lands in the Refuge. Development would occur on lands with wilderness values and the effects would be additive. As much as 37-247 miles of ROWs (450-2,790 acres) could be developed on Refuge lands.	Cumulative effects on wilderness values would be similar to those for the Proposed Action.	Cumulative effects would be similar to those for the Proposed Action. With regard to lands with wilderness values, however, the Service-recommended wilderness area would not be directly affected. Development on other Doyon lands near Birch Creek could require a ROW through the area.	Development on non-exchange lands would result in effects on lands with high wilderness value similar to that described for Phase I and II of the Proposed Action. The recommended-Wilderness area would not be affected except that a ROW could be required if field is developed in Birch Creek area.
Wild and Scenic Rivers	Phase I	No lands within Beaver Creek Wild River corridor would be exchanged. Federal ownership along other segments of Beaver Creek would increase (see Land Use above). Refuge lands to the west of the wild river corridor would be transferred to Doyon and thus would be open to exploratory drilling.	Effects on wild and scenic rivers would be the similar to those for the Proposed Action.	Effects on wild and scenic rivers would be similar to those for the Proposed Action except that lands to the west of the wild river corridor would not be transferred to Doyon. Neither drilling nor development could take place in this area.	No effects on wild and scenic rivers.
	Phase II	Development could take place on lands to the west of and within the view shed of the Beaver Creek Wild River corridor.	Effects on wild and scenic rivers would be similar to those for the Proposed Action.	Neither drilling nor development could occur on lands near the Beaver Creek Wild River corridor, but a pipeline (particularly southern route) ROW could be constructed in the area.	No effects on wild and scenic rivers.
	Cumulative	No additional cumulative effects on Beaver Creek Wild River corridor.	Cumulative effects on wild and scenic rivers would be similar to those for the Proposed Action.	Cumulative effects would be similar to those for the Proposed Action.	No effects on wild and scenic rivers.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Special Areas	Phase I	Phase I would have no direct effects on the WMNRA or Steese National Conservation Area. Exploratory drilling operations could occur within the viewshed of the WMNRA.	Effect on special areas would be the similar to those for the Proposed Action.	There would be no effects on special areas.	No effects on special areas.
	Phase II	Development on core lands would result in an approximately 32-mile (390 acres) pipeline/road ROW across the WMNRA if southern route was selected and 37-mile (450 acres) ROW across Refuge lands if northern route was selected. Oil field could be within view shed of WMNRA.	Effects on special areas would be similar to those under the Proposed Action.	Development on core lands would result in 32 miles (390 acres) of ROW on WMNRA, and 7 miles (85 acres) if the southern route selected, and 42 miles (510 acres) of ROW if the northern route is selected, on Refuge lands.	No effects on special areas.
	Cumulative	Development of oil on non-exchange lands could possibly result in additional ROWs across Refuge, WMNRA, or Steese National Conservation Area.	Cumulative effects on Special Areas would be similar to those for the Proposed Action.	Cumulative effect on Special Areas would be similar to those under the Proposed Action.	Cumulative effects on Special Areas would be similar to those under Phase I and Phase II of the Proposed Action.
Visual Resources	Phase I	Loss of Federal ownership of 26,500 acres of some of the more scenic areas (White Mountains) on the Refuge in exchange for additional lowland areas. One of the Refuge's special values is the White Mountains and their scenic nature. Clearing of 100-200 miles of seismic survey lines (170-340 acres) and 70 miles (250 acres) of access trail would affect visual resources on private lands and could affect visual resources on nearby Federal lands for up to 230 years.	Effects on visual resources would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including about 45,000 acres with oil and gas potential, affording some protection to visual resources on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	No effects on visual resources in the White Mountains from land exchange. Effects of seismic surveys would be similar to those under the Proposed Action.	No effects on visual resources.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Visual Resources (continued)	Phase II	<p>Development of an oil field on core lands and an access road could affect visual resources over 52,500-95,500 acres in the foreground, 505,500-863,000 acres in the middle ground, and 1,233,500-1,955,500 acres in the background. Some impacts would be within the Class II area in the WMNRA.</p> <p>Visual resources could be impacted by spills onto land or water and through cleanup efforts. If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. Visual resources on these lands would be protected from future development. Visual resources would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p>	<p>Effect on visual resources would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact visual resources. Visual resources would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p>	<p>Effects on visual resources would be similar to those under the Proposed Action.</p>	<p>No effects on visual resources.</p>
	Cumulative	<p>Development on non-exchange lands could be as much as double the effects on visual resources but would probably be less due to level terrain.</p>	<p>Cumulative effects on visual resources would be similar to those for the Proposed Action.</p>	<p>Cumulative effects on visual resources would be similar to those for the Proposed Action.</p>	<p>Cumulative effect on visual resources would be similar to those for Phase I and Phase II of the Proposed Action.</p>
Socioeconomics	Phase I	<p>No effects from land exchange on socioeconomics. Exploration could increase personal income and create jobs. Seismic surveys could generate 110-134 (direct, indirect, induced) jobs State-wide; drilling could create 95-320 jobs State-wide.</p>	<p>Effects on socioeconomics would be similar to those for the Proposed Action.</p>	<p>Effects on socioeconomics would be similar to those for the Proposed Action.</p>	<p>No effects on socioeconomics.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Socioeconomics (continued)	Phase II	<p>Oil field development would create 950-6,700 (direct, indirect, induced) jobs during field construction/development for 3 years and 100-360 jobs during production for 30-50 years.</p> <p>A large field would produce approximately \$96,400,000-\$131,200,000 in average annual tax revenues, and a small field would produce \$23,600,000-\$35,900,000 in average annual tax revenues, to the State. If the northern route was selected for a ROW, a large field would produce \$6,500,000-\$9,000,000 in average annual perpetual production payments to the Service, and a small field would generate \$1,900,000-\$2,600,000 in perpetual production payments for 30-50 years. If the southern route were selected, Service annual production payments would be reduced to \$5,400,000-\$7,500,000 for a large field and \$1,200,000-\$1,600,000 for a small field.</p>	<p>A similar number of jobs and State tax revenues would be created as under the Proposed Action.</p> <p>If the northern route was selected for a ROW, a large field would produce \$2,200,000-\$3,000,000 in average annual perpetual production payments to the Service, and a small field would generate \$600,000-\$900,000 in average annual perpetual production payments for 30-50 years. If the southern route were selected, Service annual production payments would be reduced to \$1,100,000-\$1,500,000 for a large field and \$300,000-\$400,000 for a small field.</p>	Effects on socioeconomics would be similar to those for the Proposed Action.	No effects on socioeconomics.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Socioeconomics (continued)	Cumulative	<p>Collapse of fur prices, harvest restrictions on commercial salmon fisheries, and isolation and lack of opportunity have resulted in a depressed area economy. Exploration and development on non-exchange lands would create similar numbers of jobs to those indicated for development on core lands. These may or may not be additive depending on whether the programs are concurrent or consecutive. Production on non-exchange lands create similar (to core land development) revenues to the State and Doyon and increased revenue to village corporations (ranging from \$1,000,000-\$5,000,000 annual average), and these positive effects would be additive. There would be positive effects on jobs and income for villages and the State. The Alaska gas pipeline could result in gas development and additional jobs. Formation of a borough could result in additional jobs and increased or improved services.</p>	<p>Cumulative effects on socioeconomics would be similar to those for the Proposed Action.</p>	<p>Cumulative effects on socioeconomics would be similar to those for the Proposed Action.</p>	<p>This alternative would likely have less cumulative positive effect on socioeconomics. Oil development could proceed on non-exchange lands without an exchange. Effects on socioeconomics would be similar to Phase I and Phase II of the Proposed Action except there would be no production payments to Service, which would increase revenue to Doyon.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Cultural Resources	Phase I	<p>Seven place name sites would leave Federal ownership, and 3 AHRS sites and 11 place name sites would enter Federal ownership.</p> <p>Exploration could directly and indirectly impact undocumented cultural resources.</p>	<p>Effects on cultural resources would be similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including about 45,000 acres with oil and gas potential, affording some protection to cultural resources including one AHRS and four place names on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.</p>	<p>No AHRS sites and 7 place name sites would leave Federal ownership, and 3 AHRS sites and 9 place name sites would enter Federal ownership.</p> <p>Exploration could directly and indirectly impact undocumented cultural resources.</p>	<p>No effects on cultural resources.</p>
	Phase II	<p>One AHRS site and 4 place name sites would enter Federal ownership.</p> <p>Development and production could directly and indirectly impact undocumented cultural resources.</p> <p>If oil resources were discovered and developed, the Service would purchase up to 120,000 acres of Doyon lands; about 45,000 acres of these lands have oil and gas potential. Cultural resources on these lands would be protected from future development. Cultural resources would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p>	<p>Effects on cultural resources would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact cultural resources.</p>	<p>No AHRS sites and 6 place name sites would enter Federal ownership. Cultural resources would also be protected on lands obtained by the Service if a ROW was constructed across the Refuge.</p> <p>Development and production could directly and indirectly impact undocumented cultural resources.</p>	<p>No effects on cultural resources.</p>

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Cultural Resources (continued)	Cumulative	Exploration and development on Doyon-owned lands would increase the opportunity for direct and indirect impact on unidentified cultural resources.	Effects on cultural resources would be similar to those under the Proposed Action.	Effects on cultural resources would be similar to those under the Proposed Action.	Effects on cultural resources would be similar to those under Phase I and Phase II of the Proposed Action.
Subsistence	Phase I	Service would have a net gain of 96,500 acres. Generally more townships with subsistence use go to Service than Doyon. Service lands are open to the public, so competition for subsistence resources could increase, but there is very little public use on Refuge lands now and a subsistence easement and priority is maintained.	Effects on subsistence would be the similar to those for the Proposed Action. However, Doyon would also grant non-development easements on 120,000 acres of Doyon lands in Phase I, including about 45, 000 acres with oil and gas potential, affording some protection to subsistence resources on this acreage that would not occur under Phase I of the Proposed Action and Exchange Excluding White-Crazy Mountains Alternative.	Service would have a net gain of 88,000 acres. Effects on subsistence on transfer of lands would be similar to those under the Proposed Action.	No effects on subsistence resources.
	Phase II	Service could purchase up to 120,000 acres if oil is developed on exchange lands; effects on these lands would be similar to Phase I. Plant and animal subsistence resources would also become available to the public on lands obtained by the Service if a ROW was constructed across the Refuge. Development on core lands would have minimal effects on subsistence for Beaver, Birch Creek, and Fort Yukon as there is little overlap of subsistence use areas.	Effects on subsistence from development on core lands would be similar to those for the Proposed Action. The Service would not purchase up to 120,000 acres of Doyon lands under this Phase; these lands would be afforded similar, but lesser, protection under Phase I and some land uses would be allowed on non-development easements that could impact subsistence.	Service could purchase up to 81,000 acres if oil is developed on exchange lands; effects on these lands would be similar to Phase I. Plant and animal subsistence resources would also become available to the public on lands obtained by the Service if a ROW was constructed across the Refuge. Effects on subsistence from development on core lands would be similar to those under the Proposed Action.	No effects on subsistence resources.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Subsistence (continued)	Cumulative	Oil development on non-exchange lands would result in additional impacts to subsistence (changes in access to resources, resource availability, and increased concern about contamination of subsistence foods). The effects could be additive as subsistence use takes place across broad areas.	Cumulative effects on subsistence would be similar to those for the Proposed Action.	Cumulative effects on subsistence would be similar to those for the Proposed Action.	Cumulative effects on subsistence would be similar to those for Phase I and Phase II of the Proposed Action. However, oil development could occur in high-use subsistence areas adjacent to villages.
Environmental Justice	Phase I	Alaska Native ownership in the Refuge would be reduced by 96,500 acres. Remaining Native land ownership would be consolidated. Seismic surveys would create about 33 local jobs and drilling would create 66 local jobs that could be filled by local residents. These jobs would last 2-5 years.	Effects on Environmental Justice populations would be similar to those for the Proposed Action.	Alaska Native ownership in the Refuge would be reduced by 88,000 acres. Remaining Native land ownership would be consolidated. Seismic surveys would create about 33 local jobs and drilling would create 66 local jobs that could be filled by local residents. These jobs would last 2-5 years.	No effects on Environmental Justice populations.
	Phase II	Native land ownership would be reduced by up to 120,000 acres if development occurred on exchange lands. Native land ownership would also be lost on Doyon-owned lands obtained by the Service if a ROW was constructed across the Refuge.	Effects on Environmental Justice would be similar to those under the Proposed Action except that Native ownership would be up to 120,000 acres greater than under Proposed Action. Native land ownership would be lost on Doyon-owned lands obtained by the Service if a ROW was constructed across the Refuge.	Effects on Environmental Justice would be similar to those under the Proposed Action except that 81,000 acres would leave Native ownership under this alternative and Doyon royalties would be similar to those under the Proposed Action.	No effects on Environmental Justice populations.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Environmental Justice (continued)	Phase II (continued)	<p>Development would create about 106-176 local jobs during field construction that would last a few years and about 14-74 local jobs that could last 30-50 years during field production.</p> <p>Fifty percent of any increases in Doyon profits would go to Native shareholders. Seventy percent of royalty payments to Doyon (estimated at \$182.4-\$896.8 million) would be shared with other Alaska Native regional corporations.</p> <p>Adverse social effects could include increased alcohol and drug use, loss of language and subsistence skills, and declines in cultural values. Effects on health and subsistence activities of environmental justice populations are addressed in this table under those headings.</p> <p>To the extent exploration, development, or a Title XI right-of-way involves land under local Native ownership, it would require access permits (i.e., surface use agreements) from the Village corporation. The access permits would likely include land use requirements and restrictions, thus allowing the local community to have input on any potential exploration or development.</p>	<p>Creation of jobs due to development would be similar to those Proposed Action.</p> <p>Doyon royalties (and thus the sharing with other Regional Corporations) would be greater (estimated at \$199.0-\$976.5 million) under this alternative than the Proposed Action.</p>		

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Environmental Justice (continued)	Cumulative	<p>There would be additional positive (economic) and adverse (social) effects on environmental justice populations from development on non-exchange land and with the Alaska natural gas pipeline. The gas pipeline may result in borough formation, with consequent improvements in services, which could mitigate some adverse social effects of development. The gas pipeline could open up opportunities for development of gas fields with additional economic effects.</p> <p>To the extent exploration, development, or a Title XI right-of-way involves land under local Native ownership, it would require access permits (i.e., surface use agreements) from the Village corporation. The access permits would likely include land use requirements and restrictions, thus allowing the local community to have input on any potential exploration or development.</p>	Cumulative effects on environmental justice populations would be similar to those for the Proposed Action.	Cumulative effect on environmental justice populations would be similar to those for the Proposed Action.	Cumulative effects would be the similar to those for Phase I and Phase II of the Proposed Action depending on discovery and development of oil on other Doyon lands.
Health	Phase I	No effects on human health.	No effects on human health.	No effects on human health.	No effects on human health.
	Phase II	Employment resulting from the exploration or development could alter social structure and have sociological effects on health such as increased drug abuse, alcoholism, and domestic violence.	Effects on human health would be similar to those under the Proposed Action.	Effects on human health would be similar to those under the Proposed Action.	No effects on human health.

Table 2-5 Comparison of alternatives with respect to significant environmental issues (continued)

Issue		Proposed Action	Exchange with Non-Development Easements	Exchange Excluding White-Crazy Mountains	Preferred Alternative – No Land Exchange Alternative (No Action Alternative)
Health (continued)	Cumulative	Employment from the construction of Alaska gas pipeline and additional oil and gas development on other Doyon lands would also be expected to result in employment and would be additive to the effects of the Proposed Action. Potential for increase in wildland fires and smoke due to climate change. Incorporation as a borough may result in services that mitigate for adverse health effects associated with oil development and wildland fires.	Cumulative effects on human health would be similar to those for the Proposed Action.	Cumulative effects on human health would be similar to those for the Proposed Action.	Oil development on other Doyon lands would have a similar effect on health as under Phase I and Phase II of the Proposed Action. Employment from construction of Alaska gas pipeline would also be expected to result in employment and would be additive to the effects of the Proposed Action. Incorporation as a borough may result in services that mitigate for adverse health effects associated with oil development and wildland fires.

Key:

AAQS = Ambient Air Quality Standards.

ac-ft = acre-feet.

ANILCA = Alaska National Interest Lands Conservation Act.

AHRS = Alaska Heritage Resource Survey

CO₂e = carbon dioxide equivalent.

MMbbls = Million barrels.

NAAQS = National Ambient Air Quality Standards.

ROW = Right-of-way.

WMNRA = White Mountains National Recreation Area.