Appendix C
ANILCA Section 810 Subsistence Evaluation

Federal Highway Administration
Alaska Division
P.O. Box 21648
Juneau, AK 99802

and

Alaska Department of Transportation
and Public Facilities
P.O. Box 196900
Anchorage, AK 99519-6900

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Note to Reader:

Changes in this document since the Draft SEIS was published in March 2015 have been highlighted in grey for easy identification by the reader. Deletions and spelling corrections are not shown for clarity purposes.

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Abbreviations and Acronyms

ADF&G	Alaska Department of Fish and Game
ANILCA	Alaska National Interest Lands Conservation Act
CIRI	Cook Inlet Region, Incorporated
CNF	Chugach National Forest
DOT&PF	Alaska Department of Transportation and Public Facilities
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
Forest Service	Forest Service, U.S. Department of Agriculture
FSB	Federal Subsistence Board
GMU	Game Management Unit
KNWR	Kenai National Wildlife Refuge
KWAP	Kenai Winter Access Plan
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service

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1 Introduction

The Alaska Department of Transportation and Public Facilities (DOT&PF) has identified the need to upgrade and expand the Sterling Highway in the Cooper Landing area (Milepost [MP] 45 to 60) to meet current design standards for rural principal arterial roads. The Sterling Highway traverses through the Kenai River valley between rugged mountainous areas. The highway provides access to the Kenai River, one of the most popular recreation destinations in Alaska. Between MP 45 and 60, the road passes through portions of the Chugach National Forest (CNF) and the Kenai National Wildlife Refuge (KNWR). These are federal lands that provide subsistence opportunities to qualified rural[1] Alaska residents under the provisions of the Alaska National Interest Lands Conservation Act (ANILCA).

Section 810 of ANILCA (16 U.S. Code [USC] Section 3120) requires an evaluation of the effects on subsistence uses of federal lands. This report was prepared to comply with Title VIII, Section 810, of ANILCA. It evaluates the potential restrictions to subsistence uses and needs on federal lands that could result from implementation of the reasonable alternatives[2] for the Sterling Highway MP 45–60 Project.

Federal Highway Administration (FHWA) submitted an earlier draft of this evaluation to the U.S. Fish and Wildlife Service (USFWS) and the Forest Service, U.S. Department of Agriculture (Forest Service) for comment and review in early 2007, revised per agency comments, and resubmitted the report in December 2007. This current report refreshes the previous evaluation with updated study and community data.

[1] As defined in ANILCA, "rural" residents live in a community or area that is "substantially dependent on fish and wildlife for nutritional and other subsistence uses." State subsistence regulations do not include this restriction to rural residents.

[2] The impacts were carefully weighed and the alternatives were evaluated for "reasonableness." NEPA considers reasonable those alternatives that are practical or feasible from a technical and economic standpoint and using common sense (Council on Environmental Quality: 40 Most Asked Questions Concerning CEQ's NEPA Regulations; 46 Fed. Reg. 18026, as amended, 51 Fed. Reg. 15618). Thus, reasonable means those alternatives that, when considered relative to each of the evaluations criteria, are worthy of future evaluation for this project. Reasonable does not mean to imply that any one alternative is more preferable than any other. That determination will be made in the Supplemental Environmental Impact Statement. For a detailed description of all project alternatives, refer to the Sterling Highway Milepost 45-60 Project EIS, Chapter 2, Project Alternatives.

2 Subsistence Evaluation Factors

ANILCA (Section 803) defines subsistence uses as the "customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicrafts articles out of non-edible byproducts of fish and wildlife resources taken for family or personal consumption; for barter, or sharing for personal or family consumption; and for customary trade."

An evaluation of potential subsistence impacts under ANILCA Section 810 must be completed for the proposed Sterling Highway MP 45–60 Project because the project area encompasses federal lands managed by the USFWS and Forest Service. FHWA proposes to provide funding to use public lands for highway purposes, and the USFWS would need to transfer an interest in federal public land to the State for highway purposes.

Title VIII of ANILCA (Section 810(a)) requires that an evaluation of subsistence uses and needs be completed as part of any Federal agency determination to "withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands." Specifically, ANILCA 810(a) requires an evaluation based on three specific issues:

1. The effect of use, occupancy or disposition on subsistence uses and needs;
2. The availability of other lands for the purpose sought to be achieved; and
3. Other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes (16 USC § 3120).

The harvest of subsistence resources by Alaska Native cultures has been an essential way of life for thousands of years and has also become critical to the lives of many non-Natives, particularly rural Alaskans. According to the Alaska Department of Fish and Game (ADF&G), Alaska's rural residents harvested approximately 38 million pounds of fish and wildlife resources each year, with an average of 316 pounds per person in 2010 (ADF&G 2010). Based on ADF&G Division of Subsistence research, fish generally comprise more than 60 percent of the subsistence harvest, but account for only 2 percent of all fish caught in Alaska. Commercial fisheries in Alaska account for 97 percent and sport fishing accounts for about 1 percent of fish.

Federal law defines rural and non-rural areas for purposes of subsistence access and management. Federal subsistence regulations apply to harvests on Federally owned lands by communities designated as rural. The Federal Subsistence Board (FSB) is charged with determining rural status for communities that have customarily and traditionally harvested particular subsistence resources. The FSB has identified three non-rural areas on the Kenai Peninsula: the Homer Non-rural Area (including Homer, Anchor Point [portion], Kachemak City, and Fritz Creek [portion]); the Kenai Non-rural Area (including Clam Gulch, Kalifornsky, Kasilof, Kenai, Nikiski, Salamatof, Soldotna, and Sterling); and the Seward Non-rural Area (including Seward and Moose Pass). The FSB has granted rural designation to the communities of Cooper Landing, Hope, and Ninilchik (see Map 1).

The FSB has established season and bag limits, as well as methods and means for salmon and resident fish in the upper Kenai River for the residents of Hope and Cooper Landing and for salmon for the residents for Ninilchik. The FSB has adopted regulations that recognize the

customary and traditional use[3] of moose by residents of Cooper Landing in Game Management Units (GMUs) 7, 15A, and 15B. FSB recognition of the customary and traditional use of moose and black bear by residents of Ninilchik in GMUs 15A and 15B is first noted in subsistence management regulations in 2008; however, subsistence moose harvests by Ninilchik residents in GMU 15 predates this. The FSB has adopted regulations recognizing the customary and traditional use of moose and caribou by residents of Hope in GMU 7. Table 2-1: summarizes some of the key historical subsistence points for the Kenai Peninsula.

Table 2-1: Kenai Peninsula subsistence key points

Year	Key Subsistence Point
1952	All Kenai Peninsula lakes and streams are closed to subsistence fishing.
1960	Federal government transfers the authority to manage fish and wildlife in Alaska to the State government.
1971	Congress passes the Alaska Native Claims Settlement Act, which conveys to Alaska Natives title to land and monetary compensation but extinguishes aboriginal hunting and fishing rights.
1978	State subsistence law creates a priority for subsistence use over all other uses, but does not define subsistence users.
1980	Congress passes the ANILCA. Title VIII of ANILCA protects subsistence needs for rural Alaskans.
1990	Federal subsistence program begins management of subsistence harvest of wildlife by rural residents of Federal public lands on the Kenai Peninsula.
1999	Federal government assumes management of subsistence fishing on navigable waters.
2001	FSB defers action on proposals to change Kenai Peninsula subsistence fishery regulations pending completion of a study of local subsistence uses. Board adopts subsistence fishing regulations mirroring state sport fishing regulations as a temporary measure until new subsistence regulations are developed for the Kenai Peninsula.
January 2006	FSB makes initial Customary and Traditional Use findings for the Kasilof and Kenai Rivers.
May 2007	FSB approves changes to Federal subsistence fishing regulations for Kenai Peninsula for the rural communities of Ninilchik, Cooper Landing, and Hope.
2008	FSB recognizes the customary and traditional use of moose by residents of the rural community of Cooper Landing.
2008	FSB grants a salmon fish wheel fishery on the Kasilof River for residents of the rural community of Ninilchik.
2010	FSB recognizes the customary and traditional use of moose and caribou[a] by residents of the rural community of Hope.
2011	FSB recognizes a customary and traditional use determination for residents of Ninilchik for all fish in the Kenai Peninsula District waters north of and including the Kenai River drainage.
2014	FSB recognizes the customary and traditional use of caribou[a] by residents of the rural communities of Cooper Landing and Hope in GMU 7.

[a] Rural residents can harvest one caribou by Federal registration permit on Federal lands.

[3] As defined in ANILCA, "'customary and traditional uses' means the noncommercial, long-term, and consistent taking of, use of, or reliance upon fish and wildlife in a specific area and the patterns and practices of taking or use of that fish and wildlife that have been established over a reasonable period of time, taking into consideration the availability of the fish and wildlife."

Under State of Alaska law, all Alaska residents are eligible to participate in personal use activities in State-defined non-subsistence use areas on state-owned lands. The State Joint Boards of Fish and Game classify all of the Kenai Peninsula, except areas around Seldovia, Nanwalek, and Port Graham, as a "non-subsistence area" (ADF&G 2014a). As a result, there are no fisheries or hunts considered "subsistence" in the project area on State lands or waters. Noncommercial net fisheries (dip net in the lower Kenai river, set net in portions of Cook Inlet) are classified as "personal use" (ADF&G 2014a).

The data presented within this document are focused on the harvests associated with the rural communities of Cooper Landing, Hope and Ninilchik in GMUs 7, 15A and 15 B (see Map 1). The FSB has designated these communities as rural, and the project crosses these GMUs. The data used in this analysis are taken from available ADF&G publications and ADF&G's Community Subsistence Information System for these communities.

A survey of subsistence harvests for all resources in the upper Kenai Peninsula was conducted by ADF&G in 1990. This survey, which documented fish and wildlife resources use and harvest patterns for the communities of Cooper Landing, Hope, and Whittier, found that the three communities had very similar harvest quantities and range of resources used, shared, and harvested (Seitz et al. 1992). A survey published in 2000 by ADF&G documented fish and wildlife resource uses by residents of selected areas of the Kenai Peninsula, including Ninilchik (Fall et al. 2000). In 2002, the FSB funded the ADF&G Division of Subsistence to conduct a subsistence-use household survey to document subsistence uses of fish in Kenai Peninsula communities including Cooper Landing, Hope, and Ninilchik. Patterns of subsistence use documented during this survey were found to be consistent with earlier studies (Fall et al. 2004). Further discussion of the results of these surveys is included in Section 4.

3 Proposed Action on Federal Lands

The reasonable alternatives being evaluated for the Sterling Highway MP 45–60 Project are described in detail in Chapter 2, Project Alternatives, in the Sterling Highway MP 45–60 Environmental Impact Statement (EIS). The following is a brief summary of each alternative (see Map 2 for reasonable alternatives).

No Build Alternative. The No Build Alternative would not change the existing highway in the project area. The existing highway has one lane in each direction, limited shoulder space, tight curves, limited sight distance, and a posted speed limit of 35 miles per hour (mph) in areas. Some major highway maintenance would occur, including replacement of pavement (twice), replacement of three project area bridges due to age, and improvement of a curve at MP 45 as part of a programmed project.

Features Common to All Build Alternatives. Each of the build alternatives would be engineered based on highway design standards for rural principal arterials. The build alternatives are identical from MP 45 to MP 46.3, at the eastern end of the project, and from MP 55.8 to MP 60, at the western end of the project. Each alternative would consist of a two-lane highway with paved shoulders, passing lanes, and turning lanes. Travel lanes would be 12 feet wide, paved shoulders would be 8 feet wide (adequate for safe bicycle and pedestrian use), passing lanes would be 12 feet wide, and all major intersections would have right- and left-turn lanes. No new interchanges would be constructed, and T-intersections would be used where the "old" highway intersects new segments within each alternative.

See Chapter 2 (Alternatives) of the EIS for more detail about the following build alternatives.

Cooper Creek Alternative. The Cooper Creek Alternative follows the existing Sterling Highway from the beginning of the project to the south side of the Cooper Landing Bridge. Approximately 10 miles of the existing highway would be rebuilt to meet current rural principal arterial standards and incorporate passing and turning lanes. Approximately 4 miles of the alternative would include a new alignment skirting Cooper Landing to the south. Two bridges, Cooper Landing Bridge and Schooner Bend Bridge, would be replaced under the Cooper Creek Alternative, and a new bridge would be constructed over Cooper Creek. The new bridge would be approximately 62 feet wide and 840 feet long and would accommodate two lanes, a passing lane, shoulders, and a future pathway on one side (no pathway is proposed at this time).

Several construction staging areas and sites for disposal of woody debris and soils would be required, the largest being a 44-acre area east of Cooper Creek.

G South Alternative. The G South Alternative would straighten and widen approximately 8 miles of the existing highway corridor along both ends of the project area, and construct 5.5 miles of new alignment skirting north of Cooper Landing and the Kenai River between existing MP 46.3 and MP 51.6. In areas where the G South Alternative uses the existing highway, the road would be widened to meet rural principal arterial standards, and would include west- and east-bound passing lanes. This alternative would include replacement of one bridge over the Kenai River and construction of two new bridges, one over lower Juneau Creek and one over the Kenai River. It would also include construction of an underpass for the existing Slaughter Ridge Road, a logging road near a crossing of Bean Creek.

The G South Alternative avoids the Resurrection Pass National Recreation Trail and KNWR area while still providing a route north of the Kenai River.

Several construction staging areas and sites for disposal of woody debris and soils would be required, the largest being a 35-acre area west of Juneau Creek. A 27-acre disposal area is proposed east of Juneau Creek, as well as relatively small staging areas adjacent to each new or replacement bridge.

Juneau Creek Alternative. The Juneau Creek Alternative would straighten and widen approximately 4 miles of the existing highway at both ends of the project area, with approximately 9.5 miles of new alignment skirting north of Cooper Landing and the Kenai River. This alternative diverges at MP 46.3, climbs the hillside and crosses Juneau Creek Canyon with a new bridge south of the falls. The alignment would then descend the hillside, cross the Mystery Creek Wilderness in the KNWR, and rejoin the existing highway with a T-intersection at MP 55.8. The Juneau Creek Alternative then follows the existing highway for the remaining 3 miles to the end of the project.

The Juneau Creek Alternative crosses the Juneau Falls Recreation Area[4], an area withdrawn from mining to preserve its use for recreation around the Juneau Creek Falls, crosses the Resurrection Pass Trail, and locates the new roadway in an area relatively undisturbed by settlement.

Several construction staging areas and sites for disposal of woody debris and soils would be required, the largest being a 27-acre area east of Juneau Creek and 4-acre access road. A 20-acre disposal area is proposed well west of Juneau Creek, as well as relatively small staging areas adjacent to the new Juneau Creek Bridge.

Juneau Creek Variant Alternative. The major difference between the Juneau Creek and Juneau Creek Variant alternatives is that the Juneau Creek Alternative was created on the best alignment for engineering and traffic purposes, but crosses the Mystery Creek Wilderness in the KNWR. The Juneau Creek Variant Alternative would be identical to the Juneau Creek Alternative, with the primary difference being its avoidance of KNWR Wilderness. Beginning at a point approximately 1.5 miles west of the Juneau Creek Bridge, the variant would diverge from the Juneau Creek Alternative and then rejoin the existing alignment at MP 55 of the existing highway using a T-intersection. Access to Sportsman's Landing would occur off the "old" highway and would be slightly reconfigured as part of the re-routing of the western end of the "old" highway. The Juneau Creek Variant Alternative would be within the existing highway right-of-way at the KNWR boundary, and this alternative would avoid any impact to the KNWR designated Wilderness.

Construction staging areas would be the same as those described above for the Juneau Creek Alternative.

[4] The Juneau Falls Recreation Area is a 320-acre area of National Forest land withdrawn from mining for recreation purposes by 43 CFR Public Land Order 6888.

4 Affected Environment

In accordance with Title VIII of ANILCA, subsistence uses are allowed on federal public lands within the KNWR and the CNF. Federal regulations allow qualified rural residents to harvest fish, wildlife, plants, or other subsistence resources. Subsistence activities include hunting, fishing, trapping, picking, and gathering. In the vicinity of the Kenai River, subsistence resources harvested could include bear, moose, fish, small mammals, birds, berries, edible plants, and wood. Table 4-1 summarizes Federal subsistence wildlife regulations for GMUs 7, 15A and 15B, and Table 4-2 summarizes Federal subsistence fish regulations for the Cook Inlet area and the affected waters within the project area. GMU 15C is not discussed in this analysis, as the unit lies far south of the project area.

This analysis of subsistence uses and needs includes the three primary rural communities associated with subsistence use in the project area: Cooper Landing, Hope, and Ninilchik. These rural communities have Federal recognition of customary and traditional or subsistence uses for key subsistence species, such as fish and moose, in GMUs 7, 15A, and 15B. GMU 7 encompasses the eastern Kenai Peninsula; GMUs 15A and 15B lie within the eastern portion of the KNWR and abut GMU 7 (see Map 1).

The residents of Cooper Landing, Hope, and Ninilchik have recognized customary and traditional use of fish in the project area in the waters north of and including the Kenai River drainage within the KNWR and the CNF. Residents of Cooper Landing, Hope, and Ninilchik have subsistence rights for all fish in these waters. Residents of Ninilchik also have subsistence rights for all fish in waters of the Kasilof River drainage within the KNWR. Federal subsistence fishing permits are required for salmon, trout, and Dolly Varden/char in the Kenai and Kasilof River drainages. Seasons, harvest and possession limits, and methods and means of harvest for these harvests in the Kenai and Kasilof rivers are the same as the Alaska sport fishing regulations. Regulations provide for three dip net fisheries in the Kenai basin, one on the Russian River[5] and two downstream of Skilak Lake, and a dip net fishery in the Kasilof River basin.

The FSB adopted regulations that recognized the customary and traditional use of moose by residents of Cooper Landing, allowing harvests GMUs Units 7, 15A, and 15B under Federal subsistence regulations. As detailed in Table 4-1, other subsistence harvests have recognized customary and traditional use including black and brown bear, caribou (Hope and Cooper Landing only), small mammals, and upland birds.

The CNF has prepared an EIS revising its *Kenai Winter Access Plan* (KWAP). Revisions to the KWAP will affect winter motorized access onto national forest lands for recreation as well as for subsistence uses. As it pertains to the project area, current management of Resurrection Pass National Recreation Trail allows a split season of motorized and non-motorized uses. Between May 1 and November 30, the trail is closed to motorized vehicles. No management units would have restricted motorized access for subsistence uses; motorized use for subsistence uses is allowed in all management units. To prohibit the use of snow machines for traditional activities

[5] Household limits under Federal Regulations for the Russian River Federal Subsistence dip net fishery are 25 for head of household and 5 for each additional household member. Only sockeye salmon are permitted to be harvested. https://www.doi.gov/sites/doi.gov/files/migrated/subsistence/regulation/fish_shell/upload/Cook.pdf

or travel to and from villages and home sites, such use must be found to be detrimental to the resource values of the unit or area.

Table 4-1. Federal subsistence wildlife regulations for GMUs 7, 15A, and 15B, 2014/2016

Species	Customary & Traditional Use Determination	Game Management Unit 7	Game Management Unit 15A and 15B
Black Bear	• All rural residents (GMU 7) • Ninilchik (GMUs 15A/15B)	Harvest limit: 3 (July 1-June 30)	Harvest limit: 2 (July 1-June 30)
Brown Bear	Ninilchik (GMUs 15A/15B)	No Federal subsistence priority/open season	Harvest limit: 1 bear every 4 regulatory years (Oct. 1-Nov. 30)
Caribou	Cooper Landing, Hope (GMU 7)	• Harvest limit: 1 (Aug. 10-Dec. 31) • In area north of Sterling Highway and west of Seward Highway	No Federal open season
Moose	• Cooper Landing, Hope (GMU 7)[a] • Cooper Landing, Nanwalek, Ninilchik, Port Graham, Seldovia (GMUs 15A/15B)	• Harvest limit: 1 (Aug. 10-Sept. 20) • No Federal open season in portion draining into King's Bay	• 15A (Skilak Loop Wildlife Management Area): no Federal open season • Harvest limit for 15A (remainder), 15B: 1 antlered bull (Aug. 10-Sept. 20) • Harvest limit for 15B: 1 antlered bull (Oct. 20-Nov. 10)
Goat		• Brown Mountain hunt area (Nanwalek and Port Graham) • No Federal open season	No Federal open season
Sheep		No Federal subsistence priority/open season	No Federal subsistence priority/open season
Small mammals	All rural residents	• Beaver: 1 (May 1-Oct. 10) • Coyote: no limit (Sept. 1-April 30) • Hare: no limit (July 1-June 30) • Lynx: 2 (Nov. 10-Jan. 31) • Wolf (KNWR): 2 (Aug. 10-Apr. 30) • Wolf (remainder): 5 (Aug. 10-Apr. 30)	• Coyote: no limit (Sept. 1-April 30) • Hare: no limit (July 1-June 30) • Lynx: 2 (Nov. 10-Jan. 31) • Wolf (KNWR): 2 (Aug. 10-Apr. 30) • Wolf (remainder): 5 (Aug. 10-Apr. 30) • Wolverine: 1 (Sept. 1-Mar. 31)
Game birds	All rural residents	• Grouse (spruce): 10/day (Aug. 10-Mar. 31) • Ptarmigan: 20/day (Aug. 10-Mar. 31)	• Grouse (spruce): 15/day (Aug. 10-Mar. 31) • Ptarmigan: 20/day (Aug. 10-Mar. 31)

[a] In the portion of GMU 7 draining into King's Bay, rural residents of Chenega Bay, Cooper Landing, Hope, and Tatitlek have a customary and traditional use determination for moose. However, Federal public lands in the King's Bay area are closed to the harvest of moose, and there is no Federal open season.
Source: Federal Subsistence Management Program 2014a and 2014b

Table 4-2. Federal subsistence fish regulations for the Cook Inlet area, 2013/2015

Species	Customary & Traditional Use Determination	Location	Harvest Limits/Season
Smelt	All rural residents	Cook Inlet area	• No limit (Apr. 1-June 15) • Dipnets in freshwater
Fish other than salmon, trout, Dolly Varden/ char, smelt, grayling, and burbot	All rural residents	Cook Inlet area	No limit (year round)
Salmon, trout, Dolly Varden/char, smelt, grayling, and burbot	All rural residents	Remainder of the Cook Inlet area	No limit (year round)
All fish (Federal subsistence permit required for salmon, trout, and Dolly Varden/char)	Cooper Landing, Hope, and Ninilchik	Kenai Peninsula District, waters north of and including the Kenai River drainage within the KNWR and CNF	Seasons, harvest and possession limits, and methods and means are the same as for the taking of those species under Alaska sport fishing regulations
All fish (Federal subsistence permit required for salmon, trout, and Dolly Varden/char)	Ninilchik	Waters within the Kasilof River drainage within the KNWR	Seasons, harvest and possession limits, and methods and means are the same as for the taking of those species under Alaska sport fishing regulations

Source: Federal Subsistence Management Program 2014c

4.1 Fish and Wildlife Resource Harvests for Cooper Landing, Hope, and Ninilchik

The harvests of fish and wildlife were documented in the 1990, 1998, and 2002 ADF&G studies in Cooper Landing, Hope, and Ninilchik (Seitz et al. 1992; Fall et al. 2000; Fall et al. 2004). These studies quantify resource harvests taken under both Federal subsistence regulations and State regulations. The patterns of harvest in these communities generally followed seasonal availability and harvest regulations. Table 4-3 and Table 4-4 present the estimated harvests of fish and wildlife, and are referenced and discussed in the following subsections.

4.1.1 Cooper Landing

The 1990 ADF&G survey found that the harvest of fish and wildlife resources in the Cooper Landing area totaled 91.5 pounds per person, and the average household harvest totaled 238 pounds with 94 percent of households harvesting fish and wildlife resources (Seitz et al. 1992). Quantities of specific resources harvested and the percentages of households harvesting particular resources are detailed in Table 4-3 and Table 4-4.

Table 4-3. Estimated harvest of fish and wildlife resources

	Harvested Pounds per Household (per Person)		
Resource	**Cooper Landing, 1990**	**Hope, 1990**	**Ninilchik, 1998**
All resources	238 (91.5)	262.2 (110.7)	439.5 (163.8)
Fish	140.2 (53.9)	155.9 (65.8)	216.7 (80.8)
Salmon	102.6 (39.5)	118.5 (50.1)	113.9 (42.5)
Non-salmon fish	37.6 (14.5)	37.4 (15.8)	102.8 (38.3)
Land mammals	75 (28.8)	77.7 (32.8)	177.7 (66.2)
Large land mammals	74.5 (28.6)	73.8 (31.1)	176.2 (65.7)
Small land mammals	0.5 (0.2)	3.9 (1.7)	1.5 (0.6)
Marine mammals	0 (0)	0 (0)	0 (0)
Birds and eggs	6.4 (2.5)	5.6 (2.4)	3.8 (1.4)
Migratory birds	1.2 (0.5)	0.9 (0.4)	1.2 (0.5)
Other birds	5.2 (2.0)	4.8 (2.0)	2.6 (1.0)
Marine invertebrates	5.9 (2.3)	9.5 (4.0)	29.6 (11)
Vegetation	10.6 (4.1)	13.5 (5.7)	11.7 (4.4)

Source: ADF&G (2014b)

Table 4-4. Estimated harvest of select fish and wildlife resources

	Percent of Households Harvesting		
Resource	**Cooper Landing, 1990**	**Hope, 1990**	**Ninilchik, 1998**
All resources	94%	94%	96%
Berries	64%	75%	59%
Sockeye salmon	56%	33%	45%
Coho salmon	44%	33%	38%
Dolly Varden	44%	53%	14%
Plants/Greens/Mushrooms	35%	39%	20%
Grouse	25%	17%	29%
Halibut	25%	25%	60%
Lake trout	18%	10%	2%
Chinook salmon	15%	19%	47%
Moose	10%	9%	21%

Source: ADF&G (2014b)

The 2002 study surveyed residents regarding the harvest and use of fish in 103 Copper Landing households. The study found that 90 percent of Cooper Landing households used fish, about 73 percent of households harvested fish, and 62 pounds of fish were harvested per person (Fall et al. 2004). This is similar to the 1990 survey, which reported that 91 percent of households used fish, almost 72 percent of households harvested fish, and 54 pounds of fish were harvested per person (ADF&G 2014b). Table 4-5 summarizes the most common types of fish harvested within the Cooper Landing area as reported during the 2002 survey.

Table 4-5. Estimated harvest of select fish resources, 2002-2003

	Cooper Landing		Hope		Ninilchik	
Resource	Pounds per Person	Percent Households Harvesting	Pounds per Person	Percent Households Harvesting	Pounds per Person	Percent Households Harvesting
All Fish	61.7	73%	62.4	67%	81.8	73%
Sockeye Salmon	28.0	62%	14.8	30%	20.7	54%
Coho Salmon	12.2	45%	17.8	45%	11.1	41%
Halibut	10.5	29%	10.5	18%	28.8	53%
Chinook Salmon	4.2	18%	4.2	12%	8.4	38%
Lake Trout	2.2	16%	0.1	3%	0.8	6%
Dolly Varden	1.4	26%	1.6	28%	0.6	12%
Rainbow Trout	1.2	20%	0.9	10%	1.8	6%
Black Rockfish	0.7	3%	0.6	7%	0.8	7%
Eulachon	0.6	2%	1.4	8%	1.3	5%

Source: Fall et al. (2004)

4.1.2 Hope

For the community of Hope, the 1990 ADF&G survey reported the per person harvest of fish and wildlife resources totaled 110.7 pounds, and the average household harvest totaled 262 pounds with 94 percent of households harvesting fish and wildlife resources (Seitz et al. 1992). Quantities of specific resources harvested and the percentages of households harvesting particular resources are detailed in Table 4-3 and Table 4-4.

For the 60 households surveyed in Hope during the 2002 study, it was found that 83 percent of households used fish, almost 67 percent of households harvested fish, and 62 pounds of fish were harvested per person (Fall et al. 2004). This is similar to the 1990 survey, which reported that 92 percent of households used fish, 70 percent of households harvested fish, and 66 pounds of fish were harvested per person (ADF&G 2014b). Table 4-5 summarizes the types and amount of each fish type harvested per person by residents of Hope.

4.1.3 Ninilchik

A survey of selected Kenai Peninsula communities, including Ninilchik, documented non-commercial uses of fish, wildlife, and plant resources in 1982 (Reed 1985). However, ADF&G does not consider these data to be representative of harvests for the community, and it will not be reported in this document. A 1998 survey conducted on fish and wildlife resource uses of selected communities within the Kenai Peninsula Borough included data on wildlife harvests for the community of Ninilchik (Fall et al. 2000). This ADF&G survey reported the per person harvest of fish and wildlife resources totaled 163.8 pounds, and the average household harvest totaled 439.5 pounds with 96 percent of households harvesting fish and wildlife resources (Fall et al. 2000). Quantities of specific resources harvested and the percentages of households harvesting particular resources for Ninilchik are detailed in Table 4-3 and Table 4-4.

The 2002 survey interviewed 100 Ninilchik households and found that 96 percent of households used fish, 73 percent of households harvested fish, and almost 82 pounds of fish were harvested per person (Fall et al. 2004). This is similar to the 1998 survey, which reported that 97 percent of households used fish, 73 percent of households harvested fish, and 81 pounds of fish were harvested per person (ADF&G 2014b). Table 4-5 summarizes the top fish resources harvested in Ninilchik.

4.1.4 Summary

For Cooper Landing, Hope, and Ninilchik residents, moose is the most harvested wildlife resource (9-20 percent of households harvesting; Table 4-4). In 1990, the estimated total community harvest of moose for Cooper Landing was 10 animals or 18.7 pounds per person (Seitz et al. 1992). During the same year, the estimated total community harvest for moose for Hope was 6 animals or 19.0 pounds per person, the highest of any single resource harvested (Seitz et al. 1992). Historically, moose have been an important source of food for both Cooper Landing and Hope. Between 1975 and 1990, Hope residents reported harvesting an average of 3.3 moose per year for the entire community and Cooper Landing residents reported harvesting an average of 5.4 moose per year for the entire community (Seitz et al. 1992). In 1998, moose represented the highest percent of Ninilchik residents' total harvest for the community (95 animals or 0.1 moose per person) (Fall et al. 2000).

Fish are harvested by more than two-thirds of the residents (67-73 percent; Table 4-5) and represent more than half of the total harvest of the three communities. Coho salmon, sockeye salmon, and halibut represent the majority of the total fish harvest in the three communities based on pounds per person (69-82 percent; Table 4-5). As documented during the 1990 survey, salmon harvests by the residents of Cooper Landing and Hope were taken largely under State sport fishing regulations and not under Federal subsistence regulations (Seitz et al. 1992). The 2002 household survey noted that less than 12 percent of all salmon harvested by both Cooper Landing and Hope residents were taken under subsistence regulations (Fall et al. 2004). In 2002, 30 percent of the total salmon harvested by Ninilchik residents was through subsistence methods (Fall et al. 2004).

The majority of Cooper Landing, Hope and Ninilchik households (59-75 percent; Table 4-4) harvested berries. Other commonly harvested resources include other plants, such as greens and mushrooms, and grouse.

4.2 Harvest Locations for Cooper Landing, Hope, and Ninilchik

The majority of the project area is located within GMU 7 and a smaller portion is located in both GMU 15A and 15B. The locations used to harvest fish were documented in the 1990, 1998, and 2002 ADF&G studies in Cooper Landing, Hope, and Ninilchik.

Residents of Cooper Landing primarily used Federal public lands and adjacent waters for access to fishing areas. In particular, the upper Kenai and Russian rivers were most frequently fished for sockeye salmon (Table 4-6). Kenai Lake and its tributary streams, also federally managed for subsistence purposes, were a primary fishing location for Dolly Varden and lake trout. The lower Kenai River, which is State-managed, was an important source of Chinook salmon, sockeye salmon, and coho salmon (Fall et al. 2004).

Table 4-6. Federal public waters used to harvest fish, Cooper Landing 2002/2003

	Percentage of Cooper Landing Households								
Area Fished	**Chinook**	**Sockeye**	**Coho**	**Chum**	**Pink**	**Dolly Varden**	**Rainbow Trout**	**Lake Trout**	**Hooligan**
Kenai Lake and Kenai Lake Streams	0	0	1	0	1	16	8	15	0
Kenai Mountain Streams	0	0	0	0	0	5	10	4	0
Russian River	0	40	14	0	1	3	4	1	0
Swanson River	0	0	0	0	0	1	3	0	0
Upper Kenai River, Skilak Canyon	2	29	16	0	0	7	2	1	0

Source: Fall et al. 2004

Hope residents (including the town of Sunrise) primarily used Kenai mountain streams in the CNF and the KNWR to harvest salmon and non-salmon fish resources (Table 4-7). Other important non-Federal waters fished for salmon were the lower Kenai River, Kasilof River, Crooked Creek, and Resurrection Bay. The northern portion of the Cook Inlet was also an important area fished for hooligan (Fall et al. 2004).

Table 4-7. Federal public waters used to harvest fish, Hope 2002/2003

Area Fished	Percentage of Cooper Landing Households								
	Chinook	**Sockeye**	**Coho**	**Chum**	**Pink**	**Dolly Varden**	**Rainbow Trout**	**Lake Trout**	**Hooligan**
Kenai Lake and Kenai Lake streams	0	2	0	0	0	3	2	0	0
Kenai mountain streams	3	0	35	12	20	17	3	2	2
Russian River	0	12	2	0	0	0	2	0	0
Swanson River	0	0	0	0	0	2	2	0	0
Upper Kenai River, Skilak Canyon	0	7	5	0	0	3	0	2	0

Source: Fall et al. 2004

Fish harvests by Ninilchik residents on Federal public lands within the project area were substantially lower when compared to Cooper Landing and Hope. For the community of Ninilchik, 4 percent of households harvested sockeye from the Russian River, and 1 percent of households harvested trout from Kenai Lake, Kenai Lake tributary streams, and Kenai mountain streams (Fall et al. 2004; Table 4-8). Other important non-federal waters fished for salmon were the lower Kenai River, Deep Creek, Ninilchik River and the Cook Inlet (Fall et al. 2004).

Table 4-8. Federal public waters used to harvest fish, Ninilchik 2002/2003

Area Fished	Percentage of Cooper Landing Households								
	Chinook	Sockeye	Coho	Chum	Pink	Dolly Varden	Rainbow Trout	Lake Trout	Hooligan
Kenai Lake and Kenai Lake streams	0	0	0	0	0	0	1	1	0
Kenai mountain streams	0	0	0	0	0	0	1	0	0
Russian River	0	4	2	0	0	0	2	0	0

Source: Fall et al. 2004

Mapped data were collected from some of the surveyed households during the 1990 ADF&G survey, providing general locations within Southcentral Alaska of fish and wildlife resource use areas for Cooper Landing and Hope (ADF&G 1994). Generally speaking, the project area was used by residents of Hope and Cooper landing for harvesting salmon, non-salmon fish, black bear, moose, and furbearers. Cooper Landing residents also reported harvesting vegetation, birds, goats, sheep, and firewood in the approximate project area. These maps do not detail whether fish and wildlife resource use areas occurred on Federal or State lands or any information on access points to these areas. Data on moose harvests, where harvest locality is also general, exist only at the GMU level, and does not help to determine where subsistence moose hunting is occurring within the project area. ADF&G data does not indicate whether moose harvests within GMU 7 were made by residents of Cooper Landing or Hope, or by residents from another community within this GMU.

For the community of Ninilchik, the 1998 ADF&G survey provides general locations of fish and wildlife resource harvests also at the GMU level (Fall et al. 2000). The data presented in Table 4-9 illustrate the relatively low level of usage of the project area by Ninilchik residents for harvesting fish and wildlife resources.

Table 4-9. Percentage of Ninilchik households harvesting select fish and wildlife resources within specific GMUs, 1998

Resource Type		Location of Reported Harvest		
		GMU 15A: Kenai National Wildlife Refuge (KNWR)	GMU 15B: KNWR	GMU 7: KNWR and Chugach National Forest
Salmon		2%	3%	2%
Non-salmon		0%	1%	1%
Moose	Hunt	0%	1%	0%
	Harvest	0%	1%	0%
Dall sheep	Hunt	0%	2%	0%
	Harvest	0%	2%	0%
Brown bear	Hunt	0%	1%	0%
	Harvest	0%	0%	0%
Black bear	Hunt	0%	1%	0%
	Harvest	0%	0%	0%

Source: Fall et al. 2000.

5 ANILCA 810 (a) Evaluations and Findings for All Alternatives

ANILCA 810 requires an evaluation of potential impacts to subsistence uses on Federal public lands and waters. As discussed in Section 2, ANILCA 810(a) requires that this evaluation include findings on three specific issues:

- The effect of such use, occupancy, or disposition on subsistence uses and needs (Section 5.1);
- The availability of other lands for the purpose sought to be achieved (Section 5.2); and
- Other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes (Section 5.3) (16 USC § 3120)

Each alternative, including the No Build and four build alternatives as well as the cumulative case, is discussed and evaluated below by issue to avoid and reduce repetition. This evaluation is based on information provided above in Section 4 regarding areas and resources important for subsistence use. In addition, this evaluation relies on information provided in Chapter 3 of the EIS regarding fish (Section 3.21) and wildlife (Section 3.22) populations and habitats as well as cumulative impacts to these resources (Section 3.27).

5.1 The Effect of Such Use, Occupancy, or Disposition on Subsistence Uses and Needs

To address this issue, the reasonable alternatives were analyzed using three further evaluation criteria related to existing subsistence resources that could be impacted that include:

- Potential to reduce subsistence uses caused by changes in resources, resource habitat, or competition for resources; (Section 5.1.1);
- Potential to reduce subsistence uses due to changes to resource availability due to alteration in resource migration patterns or distribution (Section 5.1.2); and
- Potential to reduce subsistence uses due to physical or legal barriers to accessing resources (Section 5.1.3).

The proposed project could have direct and indirect effects on subsistence activities and uses. Direct effects on subsistence uses could be caused by changes in resource availability, access, or competition. Indirect effects to subsistence uses could be caused by subsistence users' responses to direct effects, contamination concerns, and changes in culturally significant activities associated with subsistence practices (e.g., harvesting, processing, transferring knowledge, adhering to a traditional diet, and maintaining integrity of culturally significant places). Indirect effects on subsistence users could also be caused by resource responses to potential habitat fragmentation, resource disturbance, or changes in resource movement patterns.

5.1.1 Changes in Resources, Habitat, or Competition for Resources

5.1.1.1 No Build Alternative

Under the No Build Alternative, there would be no new construction. However, ongoing operations, and maintenance activities, including projected replacement of the existing bridges

over the Kenai River, could have an impact on subsistence resources and habitat. Under the No Build Alternative, there would be negligible new direct effects to subsistence uses, subsistence access, or competition for subsistence resources. However, as traffic levels, human population, and recreation increases, resources may increasingly avoid or reduce use of habitats along the highway, habitat quality may decrease, and injury or mortality of resources may occur from increased collisions or hazardous materials spills.

A majority of the existing highway is within 500 feet of the Kenai River and its tributaries, presenting an increased risk that vehicle crashes could spill pollutants with little buffer or opportunity for cleanup before they would reach the river (see Section 3.17 for discussion of hazardous material spill risks). Projected increased traffic on the existing highway could result in greater runoff of roadway debris and pollutants, which could adversely affect fish habitat immediately adjacent to the highway (see Sections 3.13 and 3.21 for additional discussion of impacts to water quality and fish, respectively).

In addition, competition for resources may increase as human population and use of the area increases. Larger numbers of both subsistence and recreational users could be competing for the same resources. However, resources such as fish and moose harvested under a Federal subsistence permit are restricted to residents of the local, rural-designated communities on Federal lands. It should be noted that these resources can be harvested by all hunter/fishers on Federal lands under State fish and game permits and associated regulations (sport/commercial) unless the FSB has closed that area to non-subsistence uses.[6] Concentrated fishing pressure and associated stream bank erosion could also increase as human population and recreational use of the area increase (see Section 3.21 for additional discussion of impacts to fish).

5.1.1.2 All Build Alternatives

All of the build alternatives share general impacts to subsistence resources, habitat or competition. The build alternatives could result in slight differences in impact levels due to differences in the amount and quality of subsistence resource habitat impacted and differences in the number and types of bridges and culverts that could affect fish and their habitat. Impacts specific to alternatives are discussed in the following sections.

Impacts to fish and wildlife resources may occur as a result of construction and operation of the build alternatives. Changes to the landscape can influence wildlife populations through habitat loss, changes in habitat suitability, changes in habitat use, or reduced survival (see Section 3.22, Wildlife, of the EIS for further discussion of these impacts). Impacts to subsistence uses in the project area may include resources avoiding or reducing use of habitat along the highway, actual loss of habitat within the new alignment, decreased habitat quality, fragmentation of habitat, and injury or mortality of resources from collisions or hazardous materials spills.

Some habitat for wildlife would be altered or destroyed by construction of new highway segments. In addition, direct mortality from vehicle collisions could increase where new alignments cross high-quality habitat and from increased traffic volume coupled with higher

[6] ANILCA grants subsistence priority to rural Alaska residents. This subsistence priority gives subsistence uses by rural residents priority over non-subsistence uses (commercial and sport) on Federal lands. During times of resource shortages, the Federal Subsistence Board can close an area to non-subsistence uses. However, when fish/game stock is sufficient, all State uses are generally accommodated on Federal lands and waters.

traffic speeds. However, new and reconstructed highway segments would be wider with substantially better sight distance throughout their lengths, allowing for increased visibility and maneuvering room for both drivers and wildlife.

Similar to the No Build Alternative, the projected growth in traffic levels and recreation in the project area under all build alternatives could create additional pressures on subsistence resources located along the existing highway and increase competition for those resources. If poorly managed, additional and concentrated fishing pressure could reduce habitat and habitat quality, primarily though trampling of river banks and riparian vegetation. A possible increase in competition for subsistence resources could occur because of larger numbers of both subsistence and recreational users vying for the same resources.

The new areas of habitat impact would contribute to fish and wildlife displacement and habitat fragmentation; however, as can be seen in the case of moose, the loss of habitat includes a negligible portion of their total habitat. Table 5-1 provides general details on potential impacts to subsistence resource habitats. Further discussion of habitat loss by alternative is included in the following sections.

Table 5-1. Potential impacts to select fish and wildlife resource habitat by alternative

	Build Alternative			
	Cooper Creek	**G South**	**Juneau Creek**	**Juneau Creek Variant**
Miles of new roadway [a]	4	6	10.0	9.0
Miles of roadway on Federal lands	1.4	1.9	4.0	3.4
Number of new culvert crossings or stream rerouting of anadromous fish streams	5	5	1[b]	1
Number of new or replacement bridges	3[b]	3[c]	1[c]	1[c]
Acres of wetlands impacted	11.0	26.6	38.7	37.5
Total moose habitat acres impacted (% of habitat type in project area)[d]	204 (1%)	216 (1%)	277 (2%)	266 (2%)
Total upland game bird habitat acres impacted [e]	83	107	106	109
Total Essential Fish Habitat (EFH) impact (acres)[f]	1.2	1.0	0.8	0.8

[a] "New roadway" is defined as the length of constructed highway that diverges from the existing highway alignment.

[b] The Cooper Creek Bridge crossing is a clear-span design and would not result in any in-stream construction.

[c] The Juneau Creek Bridge crossing is a clear span design and would not result in any in-stream construction.

[d] See Section 3.22.4 and Table 3.22-11 in the Wildlife section of the EIS for further information on possible impacts to moose. The impacts to other mammals such as black bear, wolf, and lynx would be similar to those for moose.

[e] See Section 3.22 (Wildlife) and Table 3.22-13 in the Wildlife section of the EIS for further information.

[f] See Section 3.21 (Fish and Essential Fish Habitat) and Tables 3.21-4, 3.21-5, and 3.21-6 in the Fish and Essential Fish Habitat section of the EIS for further information.

In addition to improving upon the capacity and safety standards for the Sterling Highway, all build alternatives would decrease the risk of a containment spill into the Kenai River by moving

the alignment away from the river (see Section 3.17, Hazardous Waste Sites and Spills, of the EIS. Design upgrades, such as widening and straightening the roadway, would also serve to decrease the possibility of collisions of vehicles carrying hazardous substances. According to the ADF&G Division of Subsistence, by routing the Sterling Highway away from the Kenai River, which would reduce the risk of a hazardous substance spill into the river, any of the build alternatives may serve to safeguard aquatic resources and habitat within the project area (Fall 2005). Fuel spills may directly affect resource populations and habitat as well as users' perceptions regarding contamination of the resource, reducing their use of the resource.

Salmon represents one of the most heavily used subsistence resources for the rural communities of Cooper Landing, Hope, and Ninilchik. Several anadromous fish streams within the project area could potentially be affected during the replacement of old bridges and construction of new bridges. All build alternatives would require new and/or replacement bridges that would span anadromous fish streams. Of primary concern would be suspended silt in runoff which could adversely affect adult or juvenile fish in the stream or, if deposited, could suffocate eggs in the streambed. However, not all bridges would require in-stream construction such as the Cooper Creek and Juneau Creek bridges. In those cases, impacts to fish habitat and populations would be minimized (see EIS Section 3.21.2).

All build alternatives also include culverts in anadromous fish streams. The primary impacts of culverts on fish resources would be changes in stream flow that could affect fish passage under the highway, elimination of habitat, and reduction of habitat quality where culverts would replace natural habitat. Where old culverts under the existing highway would be replaced with new culverts built to modern standards and often at larger diameter, it is possible that fish passage would be established where it had previously been cut off. Permanent direct impacts to fish and fish habitat from culvert installation and bridge construction and/or replacement from the build alternatives would be minor. Because of required culvert design features to preserve fish passage for all build alternatives, there would be minimal permanent loss of fish populations or habitat (EIS Section 3.21.2.2). See EIS Section 3.21.2 (in Fish and Essential Fish Habitat) for a detailed analysis of direct and construction impacts to resident and anadromous fish populations and habitat.

Moose inhabit the entire project area, and all build alternatives would impact moose habitat through alteration and destruction resulting from new highway construction and vegetation clearing. However, the total habitat impacts under the build alternatives would be only 1 to 2 percent of total moose habitat in the project area. In addition, the construction of new roadway has the potential to impact the availability of moose as a subsistence resource due to wildlife displacement and habitat degradation and fragmentation. The ADF&G believes that in some areas of the Kenai Peninsula, the moose population is in a slow but steady decline because of declining habitat quality, predation, mortality caused by vehicle collisions, and weather, especially in GMU 7. Section 3.22.1 (in Wildlife) of the EIS includes detailed information about moose populations and habitat. Impacts to moose populations and numbers are included in EIS Section 3.22.4.

The build alternatives could also impact the other wildlife species and their habitat, including Dall sheep, mountain goat, lynx, wolves, and black and brown bears due to wildlife displacement and habitat degradation and fragmentation as well as mortalities caused by vehicle collisions and human-wildlife conflicts (i.e., Defense of Life and Property for bears). These species, however,

do not constitute a significant proportion of wildlife resources harvested by Cooper Landing, Hope, and Ninilchik residents. Section 3.22 (Wildlife) of the EIS provides a detailed analysis on project impacts to other wildlife species and their habitats.

An increase in competition for resources could occur as a result of constructing new roads in previously unaffected areas and opening new access. In addition, changes to trails and trailheads might increase access and shift subsistence uses to new areas. The build alternatives would intersect several trails in the project area and would affect access to CNF lands used for subsistence activities and connectivity of trails in the project area. Depending on the build alternative selected, some trails would be rerouted and replacement trailheads would be added because existing trailheads would no longer be functional with the new alignments (see Section 3.8, Park and Recreation Resources, and Chapter 4, Section 4(f) Evaluation). Some of the replacement trailheads may be closer to backcountry areas, making access to these areas easier for users. The Forest Service, in its Draft SEIS comments, stated that it does not anticipate that overall subsistence use will increase based on these replacement facilities.

If the replacement constitutes an improvement over existing use (e.g., improved access, more parking capacity, improved accommodations such as bathroom or camping facilities), it could indirectly affect the intensity of subsistence harvests by subsistence users. Improved access could also impact availability of resources from recreational hunting and fishing. Increased access to previously inaccessible or difficult-to-access areas could also introduce an increase in competition for unregulated subsistence resources such as berries, eggs, or wood. The potential changes to subsistence opportunities and increased access could be viewed as beneficial to some, while others may view the increased competition as an adverse impact.

As reported during consultation for this project, the ADF&G Division of Subsistence stated that they did not believe any of the project's build alternatives would negatively impact subsistence resources or reduce subsistence use opportunities (Fall 2005).

5.1.1.3 Cooper Creek Alternative

The Cooper Creek Alternative would rebuild approximately 10 miles of the existing highway and construct approximately 4 miles of new alignment skirting Cooper Landing to the south. Where construction is outside the existing highway right-of-way, resource habitat loss will occur.

The Cooper Creek Alternative would result in the loss of approximately 204 acres of moose habitat, or 1 percent of the total moose habitat in the project area (Table 5-1). A small portion (2 acres) of this loss is considered high-quality moose habitat. An additional 92 acres of moose habitat could be directly impacted during construction from staging areas and disposal sites; however, these impacts would be temporary and could result in improved moose forage in these areas. Given the negligible impact to moose habitat, the impact to subsistence uses in regard to moose habitat would also be negligible. A detailed discussion of impacts to moose populations and habitat from the Cooper Creek Alternative is included in Section 3.22.4.3 (in Wildlife) of the EIS.

The Cooper Creek Alternative would require replacement of two bridges, Cooper Landing Bridge and Schooner Bend Bridge, and construction of a new bridge over Cooper Creek. However, the Cooper Creek Bridge would be a clear-span design and would not involve an in-stream construction. For replacement bridges, no permanent impacts would be expected because construction would be in almost the same locations and similar sizes as the existing bridges and

highway. Potential impacts to fish habitat would be negligible and temporary, and would have negligible impact on subsistence uses. A detailed discussion of impacts to fish populations and habitat from the Cooper Creek Alternative is included in Section 3.21.2.3 (in Fish and Essential Fish Habitat) of the EIS. As impacts to fish habitat and populations from the Cooper Creek Alternative are anticipated to be negligible, the impact on subsistence uses in regard to fish habitat and population would also likely be negligible.

5.1.1.4 G South Alternative

The G South Alternative would straighten and widen approximately 8 miles of the existing highway corridor along both ends of the project area, and construct approximately 6 miles for a new alignment skirting north of Cooper Landing and the Kenai River between existing MP 46.3 and MP 51.6. As stated above, where construction is outside the existing highway right-of-way, resource habitat loss would occur.

The alternative crosses currently unaffected wildlife habitat areas, including the lower Juneau Creek delta area. As discussed in Section 4.1, moose is a key wildlife resource. The G South Alternative would result in the loss of approximately 216 acres of moose habitat, or 1 percent of the total moose habitat in the project area (Table 5-1). A portion of this loss is considered high-quality moose habitat, including a large logged area east of Juneau Creek and an area near Bean Creek where the Forest Service conducted a hazardous fuels reduction project. Both new and existing highway segments cross areas of predicted use for wildlife such as moose. An additional 114 acres of moose habitat could be directly impacted during construction from staging areas and disposal sites; however, these impacts would be temporary and could result in improved moose forage in these areas. A detailed discussion of impacts to moose populations and habitat from the G South Alternative is included in Section 3.22.4.4 (in Wildlife) of the EIS. Given the negligible impact to wildlife habitat, the impact to subsistence uses in regard to wildlife populations and habitat would also be negligible.

The G South Alternative would require replacement of one bridge over the Kenai River and construction of two new bridges, one over lower Juneau Creek and one over the Kenai River. The Juneau Creek Bridge would be a clear-span design and would not involve in-stream construction, so no impacts to fish populations or habitat are anticipated. Construction of a new bridge across the Kenai River would permanently change fish habitat as a result of in-stream construction, altering flows around bridge piers, and shadowing from bridge structures. However, this impact is expected to be minimal to resident fish species. The existing Schooner Bend Bridge would be replaced, but no permanent impact to fish populations and habitat would be expected, because the new bridge would be in nearly the same location and would be of similar size and configuration. Potential impacts to fish habitat during reconstruction of the bridges under the G South Alternative would be negligible and temporary, and would have negligible impact on subsistence uses. A detailed discussion of impacts to fish populations and habitat from the G South Alternative is included in Section 3.21.2.4 (in Fish and Essential Fish Habitat) of the EIS. As impacts to fish habitat and populations from the G South Alternative are anticipated to be negligible, the impacts on subsistence uses in regards to fish habitat and population would also be negligible.

The G South Alternative would also include constructing an underpass for the existing Slaughter Ridge Road, a logging road near a crossing of Bean Creek. This could facilitate access by subsistence and other users, and increase competition for resources in the area.

5.1.1.5 Juneau Creek and Juneau Creek Variant Alternatives

The Juneau Creek Alternative would straighten and widen approximately 4 miles of the existing highway at both ends of the project area, with approximately 10 miles of new alignment north of the existing roadway between existing MP 46.3 and 55 skirting north of Cooper Landing. The Juneau Creek Variant Alternative would straighten and widen approximately 5 miles of the existing highway at both ends of the project area, with approximately 9 miles of new alignment skirting north of Cooper Landing. An overpass or underpass would be provided to accommodate logging trucks on two Forest Service roads located west of Juneau Creek; however, no connections between the highway and these roads would be provided.

The Juneau Creek alternatives would not replace any existing bridges, but would construct a new bridge over Juneau Creek. The Juneau Creek Bridge crossing is a clear span design and would not result in any in-stream construction, so no impacts to fish populations or habitat are anticipated. As impacts to fish habitat and populations from the Juneau Creek alternatives are anticipated to be negligible, the impacts on subsistence uses in regards to fish habitat and population would also be negligible.

The Juneau Creek and Juneau Creek Variant alternatives would affect approximately 277 and 266 acres of moose habitat, respectively, representing approximately 2 percent of the total moose habitat in the project area (Table 5-1). A portion of this loss is considered high-quality moose habitat, including several logged areas east and west of Juneau Creek as well as an area near Bean Creek where the Forest Service conducted a hazardous fuels reduction project. A 106-acre wildlife habitat improvement area is north of the proposed Juneau Creek and Juneau Creek Variant alternatives' alignments and would not be affected by these alternatives. Both new and existing highway segments cross areas of predicted use for wildlife such as moose. Construction activities for the Juneau Creek and Juneau Creek Variant alternatives would result in temporary impacts to approximately 119 and 118 acres, respectively, of moose habitat. A detailed discussion of impacts to moose populations and habitat from the Juneau Creek alternatives is included in Section 3.22.4.5 (in Wildlife) of the EIS. Given the negligible impact to wildlife habitat under these alternatives, the impact to subsistence uses would also be negligible.

Under the Juneau Creek alternatives, two replacement trailheads will be built where the new alignment would intersect the Resurrection Pass Trail and Bean Creek Trail. The construction of these trailheads would provide new access points for both the Resurrection Pass Trail and the Bean Creek Trail, which potentially could increase the number of trail users and therefore increase competition for subsistence resources on adjacent federal public lands (see Section 3.8, Park and Recreation Resources). However, the Forest Service, in its Draft SEIS comments, stated that it does not anticipate that overall subsistence use will increase based on these replacement facilities.

5.1.1.6 Cumulative Case

Section 3.27 of the EIS includes a cumulative impacts analysis for the proposed project. This analysis considered all past, present, and reasonably foreseeable future projects and actions that could result in impacts on human and environmental resources in the project area. Past actions included construction of roads/highways, establishment of the National Moose Range (now KNWR) and the Kenai River Special Management Area, and development of the Cooper Lake Hydroelectric Facility. A present action includes the Forest Service's CNF Bean North

Management project under the Healthy Forest Restoration Act. Reasonably foreseeable future actions include the Sterling Highway Maintenance and Bridge Replacement program (see Section 3, No Build Alternative); the Sterling Highway Rehabilitation and Passing Lanes (MP 58–79) project; the Cooper Landing Senior Citizen Housing Development; Cooper Lake Hydroelectric Facility development; Cook Inlet Region, Incorporated (CIRI) land development; Skilak Wildlife Recreation Area improvements; Cooper Landing residential land development; State Land Management Unit 394B or 395 rural residential development; and Cooper Landing Walkability Improvements.

Subsistence was determined to have inconsequential impacts in association with the No Build and four build alternatives and was not identified as a national, regional, or local issue of importance (see Section 3.27.3, in Cumulative Impacts, of the EIS). The EIS has found that the alternatives would not alter the availability of or competition for subsistence resources. While the No Build Alternative would not result in any new construction in the project area, ongoing operations and maintenance activities would occur. The actions associated with the Sterling Highway Maintenance and Bridge Program could potentially include short-term construction-related impacts to subsistence resources, resource habitat, and competition for resources. The limits of construction for the replacement of bridges and curve realignment for these actions have not yet been determined; therefore, specific impacts to subsistence resources and harvests during construction have not been determined. However, these impacts are expected to result in negligible to minor impacts on subsistence uses.

5.1.2 Changes in Resource Availability due to Alteration in Migration Pattern or Distribution of Resources

5.1.2.1 No Build Alternative

Under the No Build Alternative, there would be no new construction. Ongoing operations, and maintenance activities, including projected replacement of the existing bridges over the Kenai River could have minor impacts on fish and wildlife migration patterns and distribution (see Section 3.21, Fish and Essential Fish Habitat, and Section 3.22, Wildlife). However, these activities would likely have negligible new direct effects on subsistence resource availability from changes in resource migration patterns or distribution.

5.1.2.2 All Build Alternatives

All of the build alternatives share common impacts to subsistence resources availability due to potential changes in migration patterns or distribution of resources. Changes to the landscape caused by project construction can influence wildlife population migration patterns and distribution through habitat loss, changes in habitat suitability, changes in habitat use, or reduced survival. In addition, the highway itself can become a barrier to resource migration patterns through design, such as steep embankments or retaining walls, or through resource injuries or mortality due to collisions. As stated above, the ADF&G Division of Subsistence does not believe any of the project's build alternatives would negatively impact subsistence resource availability (Fall 2005).

The proposed build alternatives will not adversely affect the distribution or migration patterns of fish resources, so there will be no impact to subsistence uses. No structures would be placed that would block or impede fish passage.

Wildlife resource availability may be adversely affected as a result of potential changes to migration patterns resulting from each of the proposed reasonable alternatives. The Cooper Landing area has been identified as a brown bear movement area, with areas just west of Cooper Landing near Juneau Creek identified as primary brown bear habitat. However, brown bear is not a key subsistence species. Other movement areas have been identified in the project area for moose as well as other mammals, although impacts to movement of these resources are likely to be minor.

The new highway segments may fragment habitat by impeding access to sections of habitat, which would change migration movements. Physical features of the highway, such as steep embankments and retaining walls, may create barriers to wildlife movement and result in less use of the existing range. Increased noise levels in areas adjacent to new highway alignment segments could also impact normal wildlife distribution through the avoidance or reduced use of existing habitat within the project area. Changes in the use of existing habitat may alter the population distribution and may result in less habitat availability and reduced population size. Impacts to wildlife movement patterns and distribution are discussed in detail in Section 3.22 (Wildlife) of the EIS. Negligible to minor impacts on wildlife resource distribution or movement from the build alternatives would not likely result in any impacts on subsistence uses.

It should be noted that DOT&PF is sponsoring a wildlife movement study steered by wildlife management agencies that is expected to aid in the design of underpasses and other measures to accommodate wildlife movement for brown bears and moose, as well as for other mammals. In addition, DOT&PF has committed to building underpasses on Forest Service roads that could function, in part, as wildlife crossings. While these underpasses are not intended specifically for wildlife crossings, DOT&PF is committed to building these structures to wildlife crossing standards so that moose and bears would be able to cross under the new highway at these locations.

5.1.2.3 Cumulative Case

As discussed in Section 5.1.1.6, subsistence was determined to have inconsequential impacts in association with the No Build and four build alternatives and was not identified as a national, regional, or local issue of importance (see Section 3.27.3, in Cumulative Impacts, of the EIS). The EIS has found that the alternatives would not alter the availability of subsistence resources due to changes in distribution or migration patterns. While the No Build Alternative would not result in any new construction in the project area, ongoing operations and maintenance activities associated with the Sterling Highway Maintenance and Bridge Program would occur, potentially resulting in short-term construction-related impacts to fish and wildlife distribution and migration patterns. The limits of construction for the replacement of bridges and curve realignment for these actions have not yet been determined; therefore, specific impacts to subsistence resources and harvests during construction have not been determined. However, these impacts are expected to result in negligible to minor impacts on subsistence uses.

5.1.3 Physical or Legal Barriers to Accessing Resources

It should be noted that customary and traditional subsistence uses on federal lands would continue as authorized by Federal law under all reasonable alternatives. However, agencies would continue to monitor resource habitat and populations and alter hunting and fishing regulations to maintain resources at sustainable levels.

5.1.3.1 No Build Alternative

The No Build Alternative would not cause new direct effects to accessing subsistence resources due to physical or legal barriers. However, as traffic levels, human population, and recreation increases, increased impacts to resources and habitats, as well as increased competition for resources between subsistence users and sport or personal use harvesters, may result in changes to harvest regulations or closures.

5.1.3.2 All Build Alternatives

No boat launches would be permanently affected, and access to the Kenai River would remain unchanged from existing conditions, under the build alternatives.

Several access areas (trailheads) to federal lands would be affected as a result of the proposed build alternatives. Adding replacement trailheads or improving existing trailheads could improve access to subsistence resource areas. In addition, for each of the build alternatives, DOT&PF has committed to building underpasses on Forest Service roads that would preserve access rights for subsistence users.

Improved access to previously inaccessible or difficult-to-access areas could introduce an increase in competition for unregulated subsistence resources. Unregulated wild resources (e.g., berries, eggs, or wood) could potentially be over-harvested in areas receiving higher levels of usage and could result in land managers needing to introduce regulations to better manage those wild resources and/or trailheads or areas used for collecting subsistence resources.

The availability of land for subsistence use also could be impacted because target species likely would not spend time near the new highway alignments except to cross them. Also, State law prohibits discharging firearms on, from, or across a road, and it is advised that hunters should discharge firearms well away from roads as a matter of safety and courtesy (ADF&G 2013). This law could deter hunting on Federal land with firearms in an approximate half-mile wide swath along each alternative, with the Juneau Creek alternatives creating the most new restriction, followed by the G South Alternative and the Cooper Creek Alternative.

5.1.3.3 Cumulative Case

As discussed in Section 5.1.1.6, subsistence was determined to have inconsequential impacts in association with the No Build and four build alternatives and was not identified as a national, regional, or local issue of importance (see Section 3.27.3, in Cumulative Impacts, of the EIS). The EIS has found that the alternatives would not alter the availability of subsistence resources due to changes in access due to physical or legal barriers. While the No Build Alternative would not result in any new construction in the project area, ongoing operations and maintenance activities associated with the Sterling Highway Maintenance and Bridge Program would occur, potentially resulting in short-term construction-related impacts to access. However, these impacts are expected to result in negligible to minor impacts on subsistence uses.

5.2 The Availability of Other Lands, and Alternatives for the Purpose Sought to be Achieved

The purpose of the proposed project is to upgrade and expand the Sterling Highway in the Cooper Landing area (MP 45 to 60) to meet current design standards for rural principal arterial

roads. The DOT&PF had originally identified 10 preliminary build alternatives to address transportation improvement needs in this area. The 10 preliminary alternatives underwent extensive evaluation including consistency with purpose and need, and other factors including physical and social environmental considerations, transportation factors, life cycle costs, and other feasibility considerations.[7] Those 10 preliminary alternatives have been reduced to five, including the No Build Alternative and four build alternatives determined to be reasonable. These reasonable alternatives best achieve the purpose and need for capacity and demand, current design standards, and system linkage. Because the purpose of the proposed project is to upgrade and expand the existing Sterling Highway, and because constructing and operating new highway outside of the project area could lead to greater adverse environmental impacts and engineering obstacles, lands outside of the proposed project area would not satisfy the purpose and need of the proposed project.

5.3 Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes

Other alternatives that would reduce or eliminate the use of Federal public lands needed for subsistence purposes are described in Chapter 2 of the EIS. DOT&PF originally identified 10 preliminary build alternatives to address transportation improvement needs in the project area. Many of these alternatives were considered but eliminated from further analysis because they did not meet the purpose and need of the proposed project to provide for capacity and demand, current design standards, and system linkage; they could lead to greater adverse impacts on the environment; or they presented construction or operational limitations. Chapter 2 of the EIS provides a description of the alternatives eliminated from the study as well as the reasons for the elimination of these alternatives. The terrain restrictions and extent of Federal public land in the project area preclude other reasonable alternatives that would avoid or further minimize use of Federal public land.

[7] For more detail on the alternatives screening evaluation process and documents, see the project website at http://www.sterlinghighway.net/documents.html#alternativestwo.

6 Summary of Findings

Based on available data on subsistence use within the project area by residents of the rural communities of Cooper Landing, Hope, and Ninilchik, the potential impacts to fish and wildlife subsistence resources are thought to be minimal for the reasonable alternatives for the Sterling Highway MP 45–60 Project. The data examined provides an understanding of how federal lands and waters in the project area have been utilized by residents of these communities. The various ADF&G subsistence surveys document the important role of these resources in the diets of rural residents in the project area.

The documents referenced in this study quantify fish and wildlife resource harvests taken under both Federal subsistence regulations and State regulations. Based on the 1990 household survey findings, salmon were the most important resource harvested by residents of Cooper Landing and Hope. However, based on the 1990 and 2002 surveys, the majority of salmon harvested by Cooper Landing and Hope residents were under State sport fishing regulations and not under Federal subsistence regulations (Seitz et al. 1992; Fall et al. 2004). While Ninilchik residents harvested a larger percentage of salmon by means of subsistence methods, residents fished primarily in areas located outside of the project area (Fall et al. 2004). Based on the 1990 and 1998 surveys, wildlife, especially moose, has played an important role in the diets of Cooper Landing, Hope, and Ninilchik residents (Seitz et al. 1992; Fall et al. 2000). However, locations of wildlife harvests have not been well documented.

In addressing the evaluation criteria listed in Section 5, it is unlikely that a significant reduction of harvestable resources in subsistence use areas would occur due to competition with other subsistence users or sport or personal use hunting and fishing. Fish and wildlife resource populations will likely not be substantially affected by the increased access to subsistence use areas as a result of any of the alternatives. Fish resource distributions will likely be unaffected by implementation of any of the alternatives.

In general, the build alternatives are unlikely to have a measureable effect on subsistence resources, habitat, or competition. Any impacts would not be significant relative to the overall availability of habitat and subsistence use areas in the project area.

A finding that the proposed action could significantly restrict subsistence uses would require that additional requirements be imposed. However, this evaluation concludes, for reasons described in this document, that the effects of the proposed project fall below the level of significantly restricting subsistence uses for the rural communities of Cooper Landing, Hope and Ninilchik. Impacts to subsistence resources (population, distribution, and migration patterns), resource habitat, competition for resources, and user access would be minimal. Because no significant restriction of subsistence uses is anticipated, specific notice and hearings related to subsistence are not required by ANILCA [per Section 810(a)(3)]. The notice, public hearing, and draft findings were coordinated as part of the project EIS [per Section 810(a) and 810(b)].

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Map 1: Subsistence Overview Map

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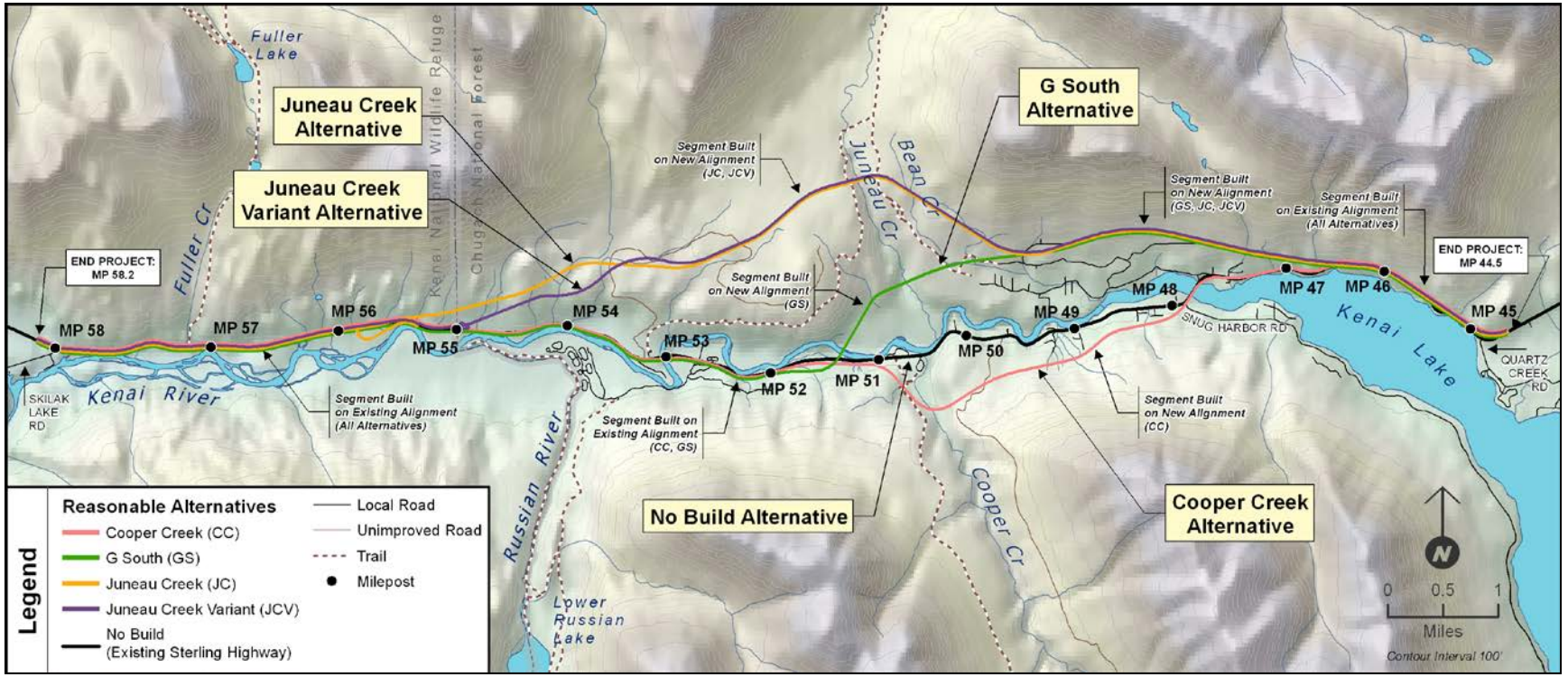

Map 2: Reasonable Alternatives

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