Nuyakuk River Hydroelectric Project

Subsistence Resources Workshop Follow-Up

Dillingham




Photos Source: KDLG, ADN, BBNA

13 August 2025

R&M Consultants, Inc.

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Introductions

Nushagak Electric and Telephone Cooperative (NETC)

- Board members

Subsistence Technical Leads

- McMillen
- Stephen Braund & Associates
- R&M Consultants
  - Bryant Wright & Dave Whitfield

Thank you to participants of Technical Working Groups

House Keeping

- Sign in and sign the Informed Consent Form
- Snacks & Prize Drawing
- Please identify yourselves when asking questions
  - *This workshop is being recorded for accurate reporting. Your participation is voluntary. We will not include anyone's name in the study report. Participants will remain anonymous in study reports.*

About the Nuyakuk River Hydroelectric Project

- Intended to provide distributed **electric energy** and **broadband** access to **participating*** Bristol Bay Communities
  - **Potential energy for Aleknagik, Ekwok, Koliganek, Levelock, New Stuyahok and Dillingham** (*if they choose to participate).
- Located on **Nuyakuk River** Falls, 4 miles downstream of Tikchik Lake.
- NETC has contracted McMillen Corp to help with feasibility studies, outreach and consulting.
- **Federal Energy Regulatory Commission** (FERC) has licensing jurisdiction through their Integrated Licensing Process.

Nushagak COOPERATIVE

Nuyakuk River Hydroelectric Project (P-14873)

Watersheds

N

0 15 30 60

Miles

Legend

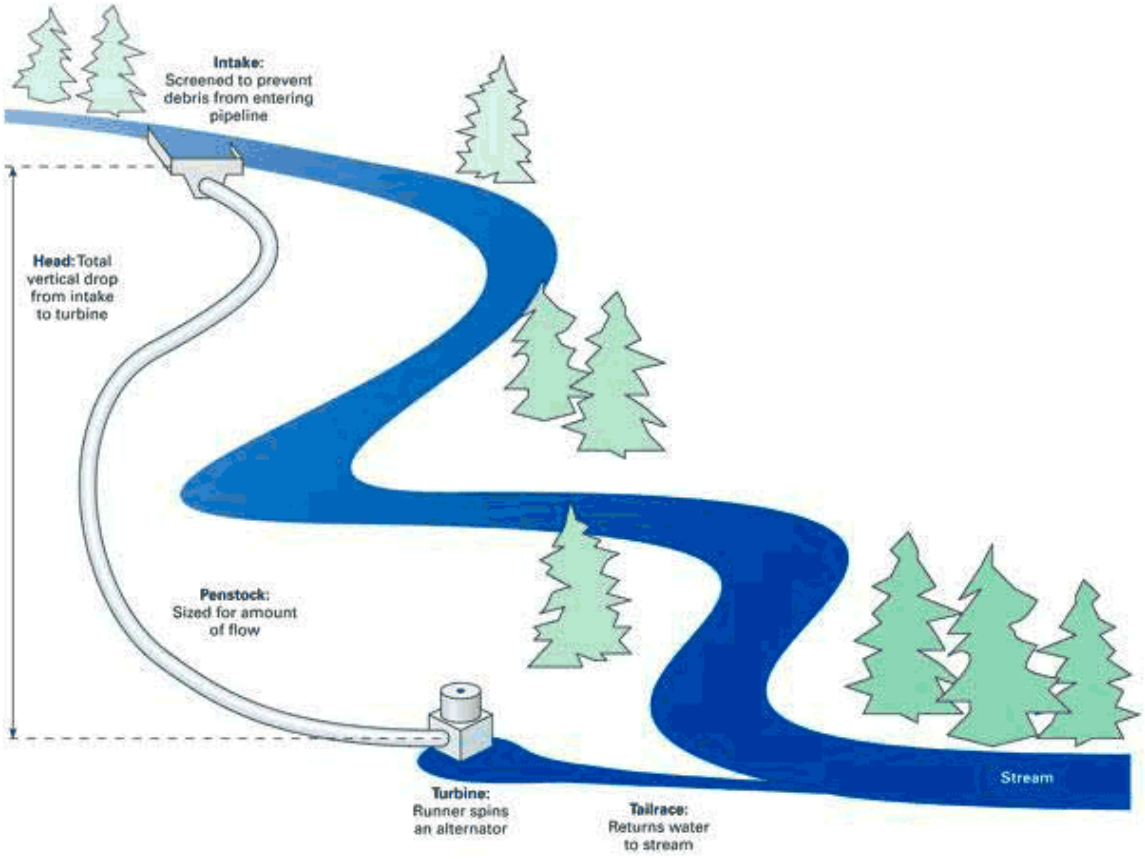
- Project Watershed (975,665 Acres)
- HUC8 Watershed Boundary
- Waterbody
- River
- City / Town

1. Data Sources: Watersheds, Rivers: USGS,
2.DISCLAIMER: ©2024. McMillen, Inc. makes no representation or warranty as to its accuracy, and in particular, its accuracy as to labeling, dimensions, contours, property boundaries, or placement or location of any map feature thereof. No warranties of any sort, including accuracy, fitness, or merchantability, accompany this product. The data sets contain generalized, limited information and cannot be used to locate or determine property boundaries or surface features.

Run-of River Hydropower

The Nuyakuk River Hydroelectric Project is a proposed **Run-of-River** hydroelectric development.

- Diverts a portion of the natural flow through a turbine to generate electricity without relying on a large reservoir.



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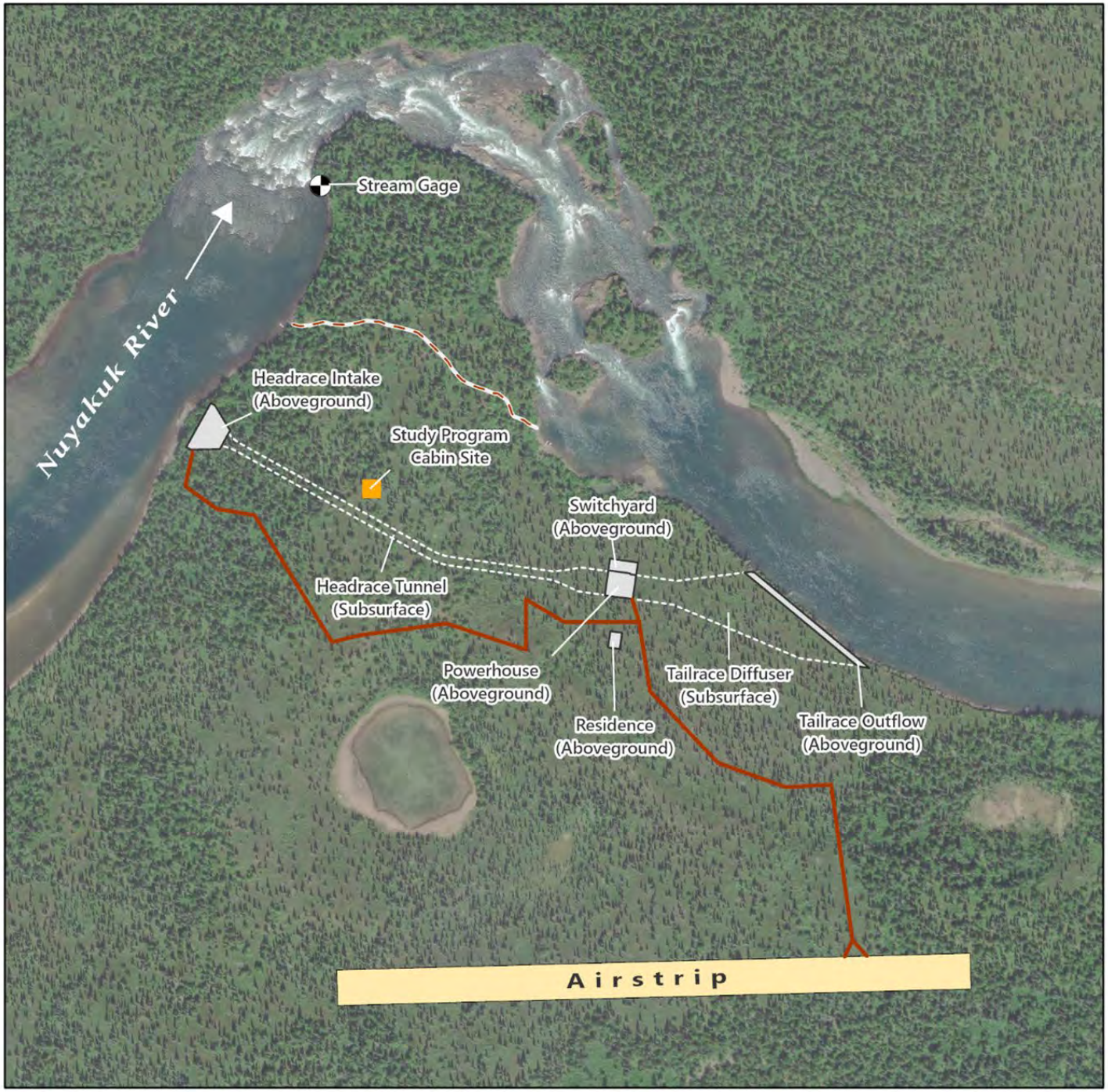


Nushagak Cooperative

Nuyakuk River Hydroelectric Project (P-14873)

Site Plan

N

1 inch = 500 feet

0 375 750

Feet

Legend

- Proposed Project Facilities
- Proposed Tailrace and Tunnel
- Proposed Airstrip
- Proposed Access Road
- Existing Portage Trail

1. Data Sources: Facilities: McMillen, Inc.

2.DISCLAIMER: ©2024. McMillen, Inc. makes no representation or warranty as to its accuracy, and in particular, its accuracy as to labeling, dimensions, contours, property boundaries, or placement or location of any map feature thereof. No warranties of any sort, including accuracy, fitness, or merchantability, accompany this product. The data sets contain generalized, limited information and cannot be used to locate or determine property boundaries or surface features.

FERC Licensing Process & Project Schedule

- FERC's Integrated Licensing Process
- Project Schedule
  - Comprehensive Study Seasons – 2023 and 2024
  - Study Reporting – 2023 and 2024
  - **Study Reporting Meetings – 2023 and early 2025**
  - Ongoing Infrastructural and Site Analysis and Design – 2023-2024
  - Further Geotechnical Analysis –2024
  - Preliminary Licensing Proposal –2025
  - PLP Comment Period –2025
  - Final License Application – 2025

Natural Resource Study Program

- Fisheries/Aquatics
  - Fish Community and Behavior Near the Project Area
  - Falls Fish Passage Study
  - Entrainment and Impingement Study
  - Tailrace False Attraction Evaluation
  - Chinook and Sockeye Life Cycle Modeling
  - Integrated Risk Assessment of Fish Populations
- Water Resources
  - Dissolved Oxygen and Water Temperature Focus
  - Flow Duration Curve/Stationarity Assessment*
  - Future Flows Study*
  - Ice Processes Assessment
- Terrestrial
  - Botanical Impact Assessment
  - Wetlands Impact Assessment
  - Caribou Population Evaluation
- Cultural
  - **Subsistence Study**
  - Section 106 Evaluation
- Recreation and Aesthetics
  - Noise Study
  - Recreation Inventory

**Voluntary study, not required by FERC*

2025 Project Status (www.nuyakukhydro.com)

- Public Review/Comments of Study report – December 2024-February 2025
- Study Report Meetings – January 15 & 16, 2025
- *Updated Study Report Addendum filed – February 18, 2025*
  - *Chinook and Sockeye Lifecycle Modeling*
  - *Integrated Risk Assessment of Fish Populations*
  - *Subsistence Study*
  - *Aesthetic Study*
- Public Comments continue on the Study Report – February 19, 2025
- Cooperative Responses to Comments – March 21, 2025
- FERC Determination – April 20, 2025
  - ***Recommended following up with potentially affected communities to share Subsistence Study findings and gather any additional information.***

Purpose of **Subsistence** Workshops

01

Verify and document subsistence knowledge in potentially affected communities near the Nuyakuk River Hydroelectric Project.

What do we know about Subsistence in the area?

02

Document knowledge that helps identify concerns and potential impacts and mitigation associated with the Nuyakuk River Hydroelectric Project.

What are we worried about, and what can be done?

03

Record information in the Nuyakuk River Hydroelectric Environmental Studies.

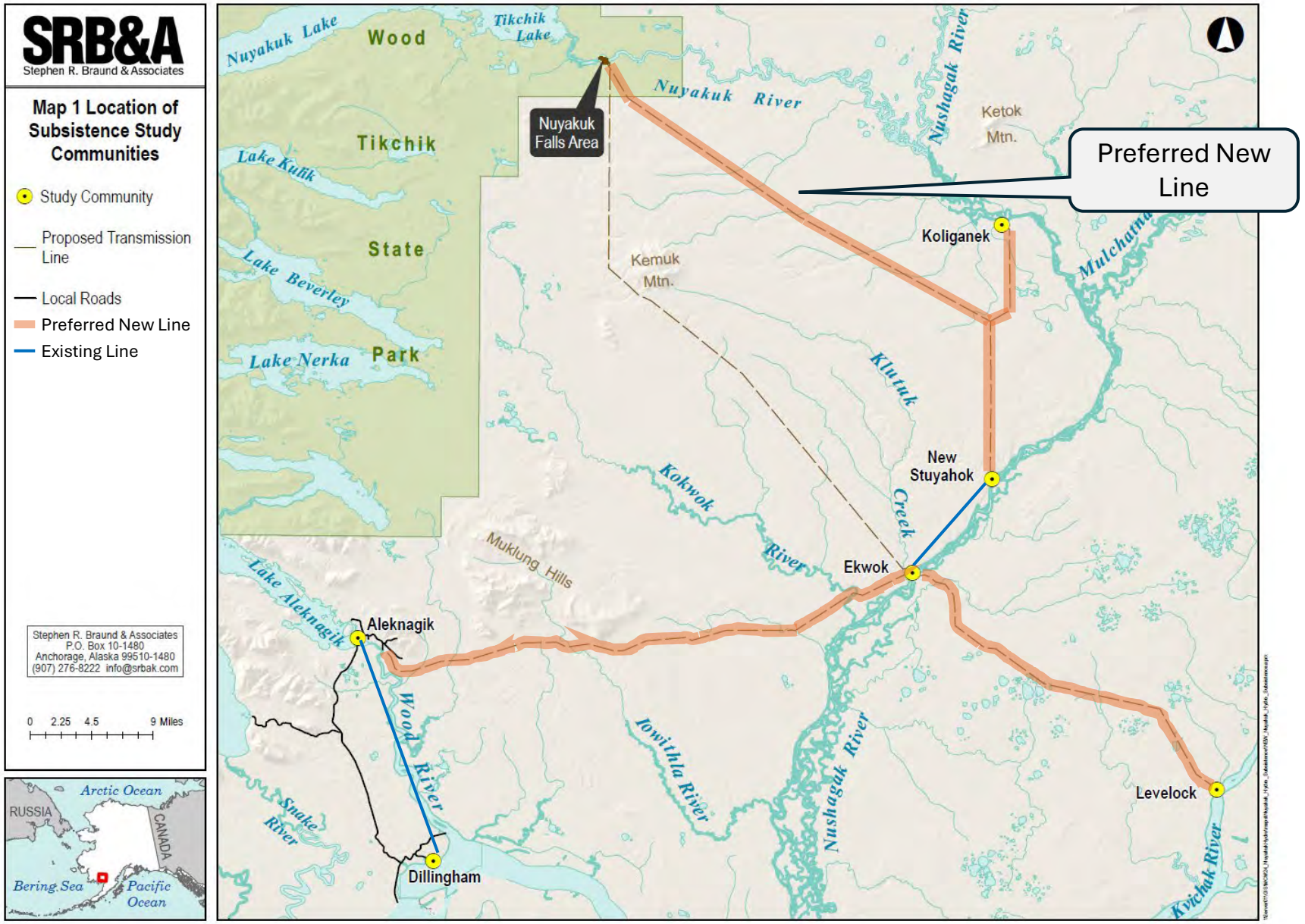
- Workshop participant names will NOT be used or released.

Report back to FERC and Public.

Subsistence Workshop Topics

1. Overview of Previously Documented Subsistence Information For Your Community
2. Use of Nuyakuk Falls Area
3. Use of Nuyakuk Transmission Corridor
4. Comments and Concerns regarding Subsistence
5. Potential Subsistence Recommendations

Location of **Subsistence Study** Communities



Overview of Previously Documented **Subsistence** Information For Your Community

Where do you do Subsistence Activities?

When do you do Subsistence Activities?

What do you harvest?

Subsistence Study Methods

What information went into the Study Report?

Subsistence Literature Review

- Existing info from previous studies by ADF&G and others
- Sometimes the only source of data
- Helps describe general use patterns and baseline conditions
- Allow for documentation of changes, trend and patterns

Subsistence Workshops, October 2024

- Dillingham, Koliganek, New Stuyahok
- Present findings from literature review
- Ask participants to share knowledge about subsistence

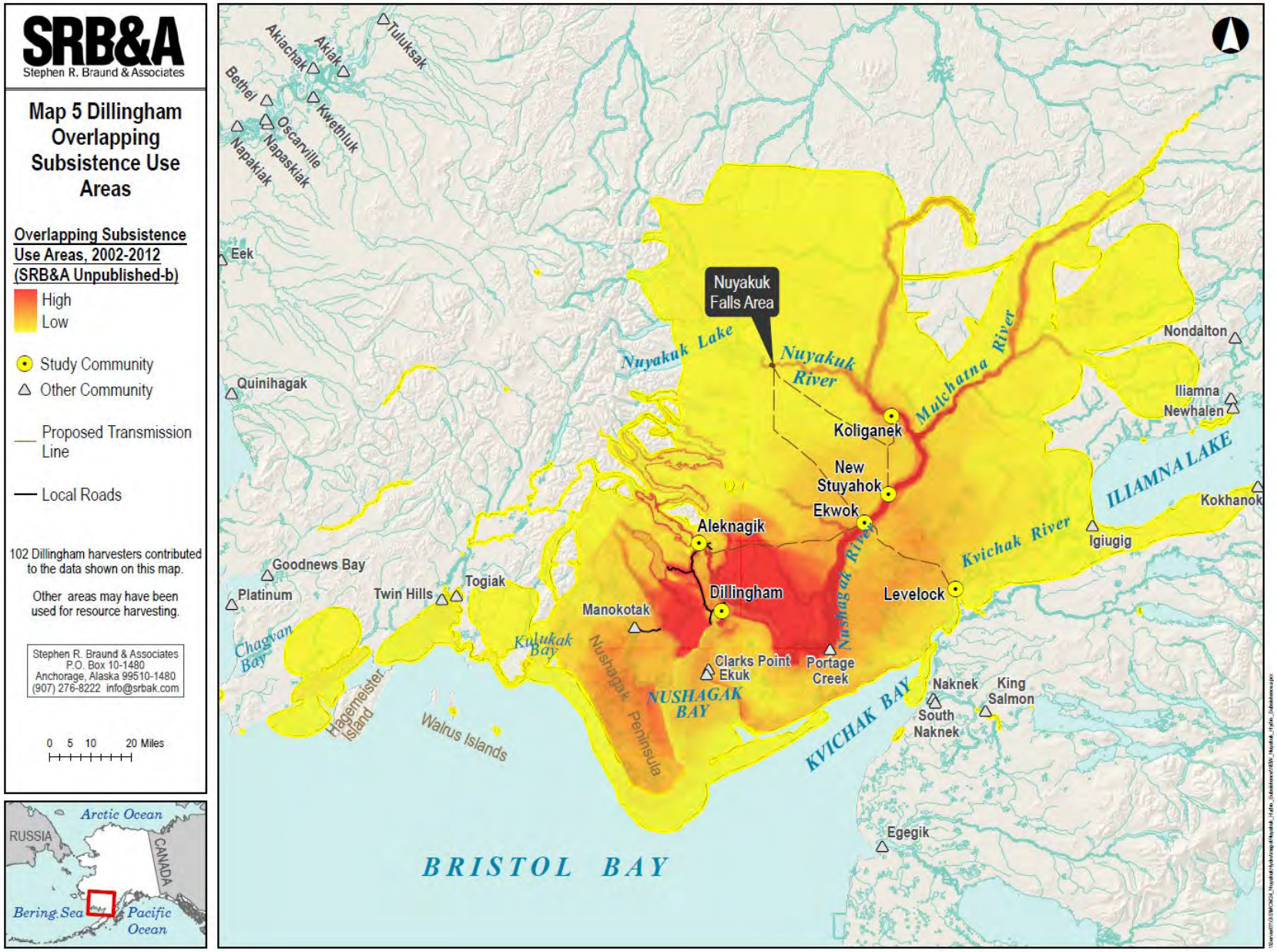
Subsistence Study Methods

Literature Review Sources

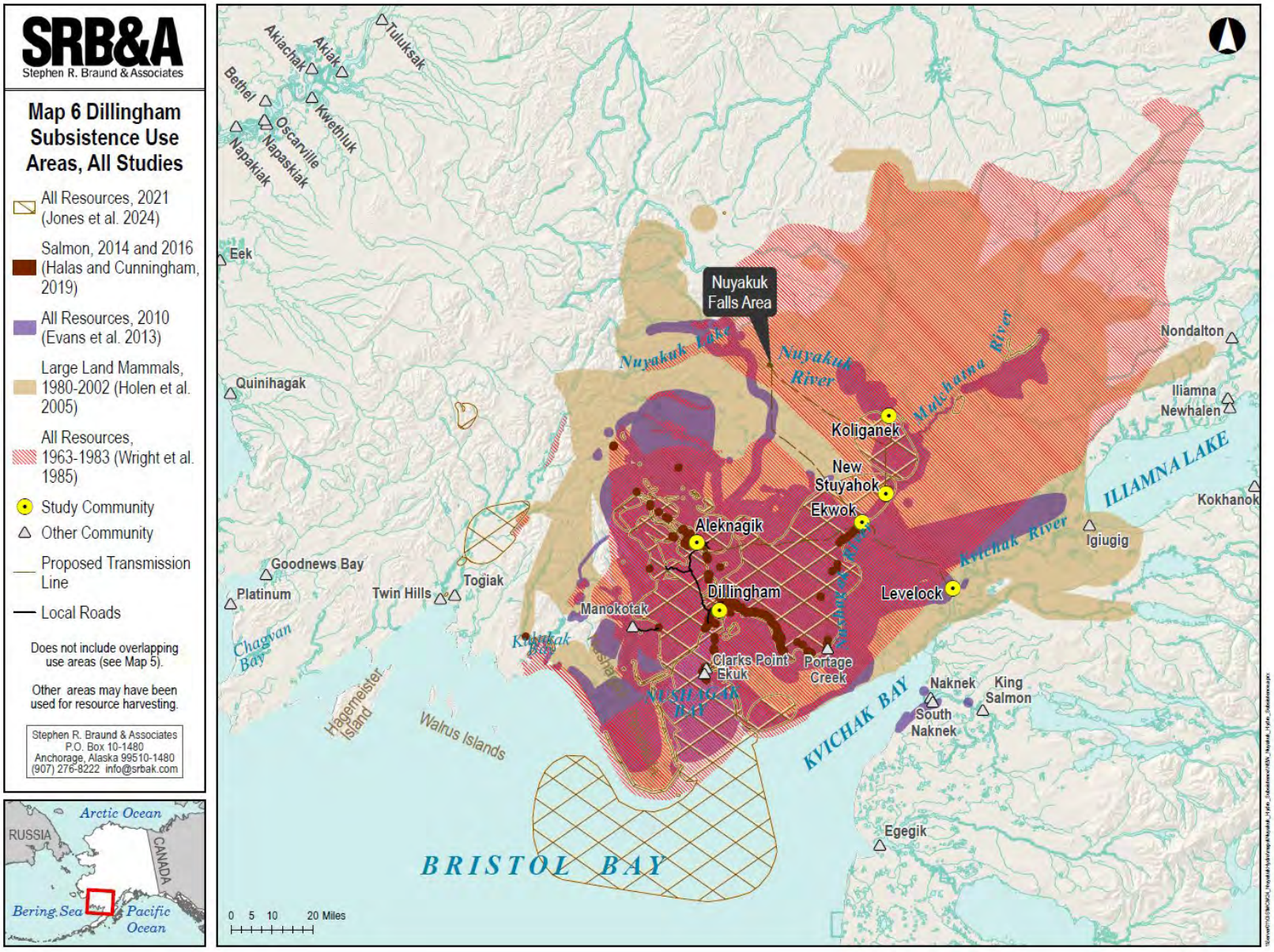
Table 1: Subsistence Data Inventory by Study Community

Community	Citation	Harvest Data		Timing of Subsistence		Use Areas	
		Resource	Time Period	Resource	Time Period	Resource	Time Period
Dillingham	(Evans, Kukkonen, Holen, and Koster 2013)	ALL	2010	LLM	2010	ALL	2010
	(Fall, Schichnes, Chythlook, and Walker 1986)	ALL	1984	N/D	N/D	N/D	N/D
	(Halas and Cunningham 2019)	Salmon	2014, 2016	N/D	N/D	Salmon	2014, 2016
	(Holen et al. 2005)	LLM	2001-02	LLM	2001-02	LLM	1980-2002
	(Jones et al. 2024)	ALL	2021	LLM, SLM, MM, Birds	2021	ALL	2021
	(SRB&A Unpublished-b)	N/D	N/D	ALL	2001-2010	ALL	2001-2010
	(Wolfe et al. 2009b)[1]	MM	1995-1998; 2000-2008	MM	1995-1998; 2000-2008	N/D	N/D
	(Wright et al. 1985)	N/D	N/D	ALL	1980s	ALL	1963-83

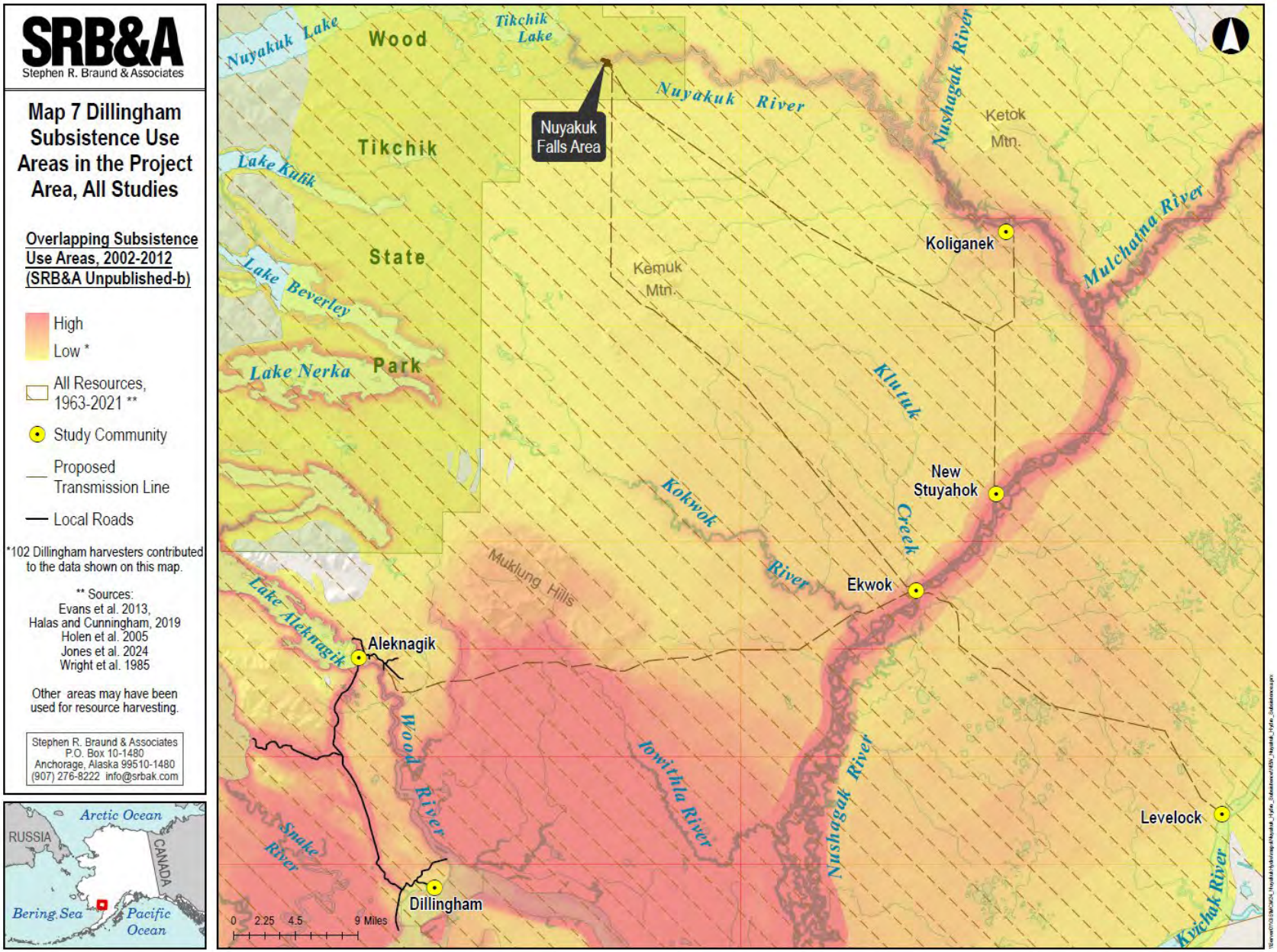
Where do you do Subsistence Activities?



Where do you do Subsistence Activities?

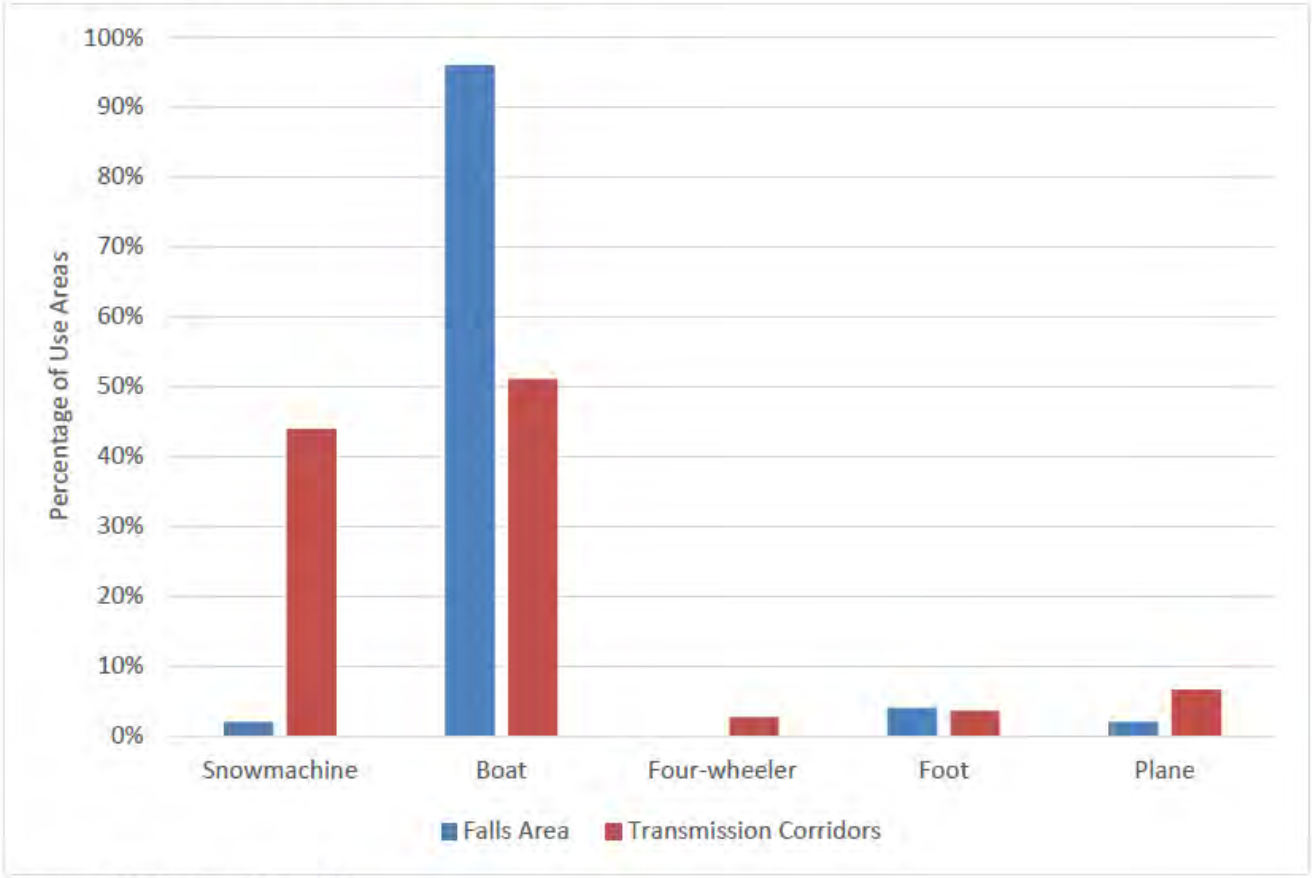


Where do you do Subsistence Activities?



Where do you do Subsistence Activities and **how** do you get there?

Figure 6: Dillingham Travel Methods in Project Area



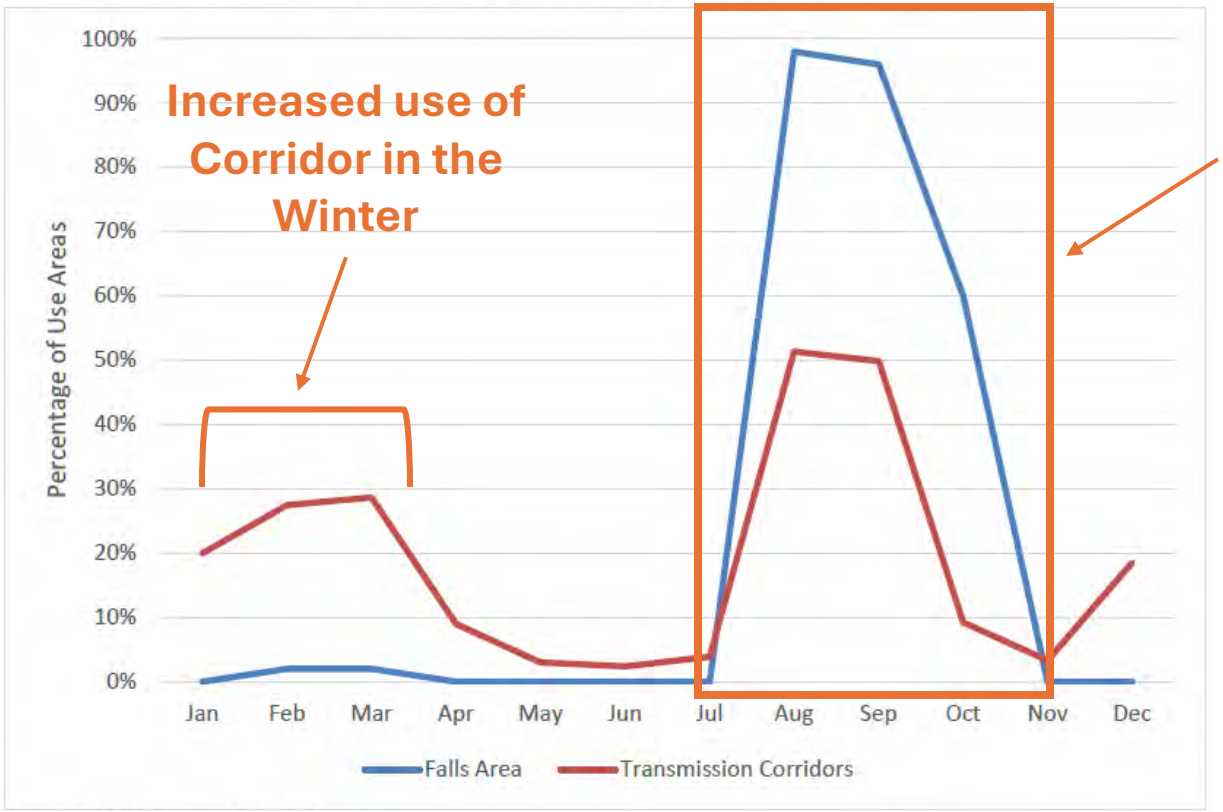
Source: (SRB&A Unpublished-b)

Most use areas around the **Falls** are accessed by boat.

Transmission corridors are accessed primarily by boat and snowmachine.

When do you do Subsistence Activities?

Figure 5: Dillingham Timing of Subsistence Activities in Project Area

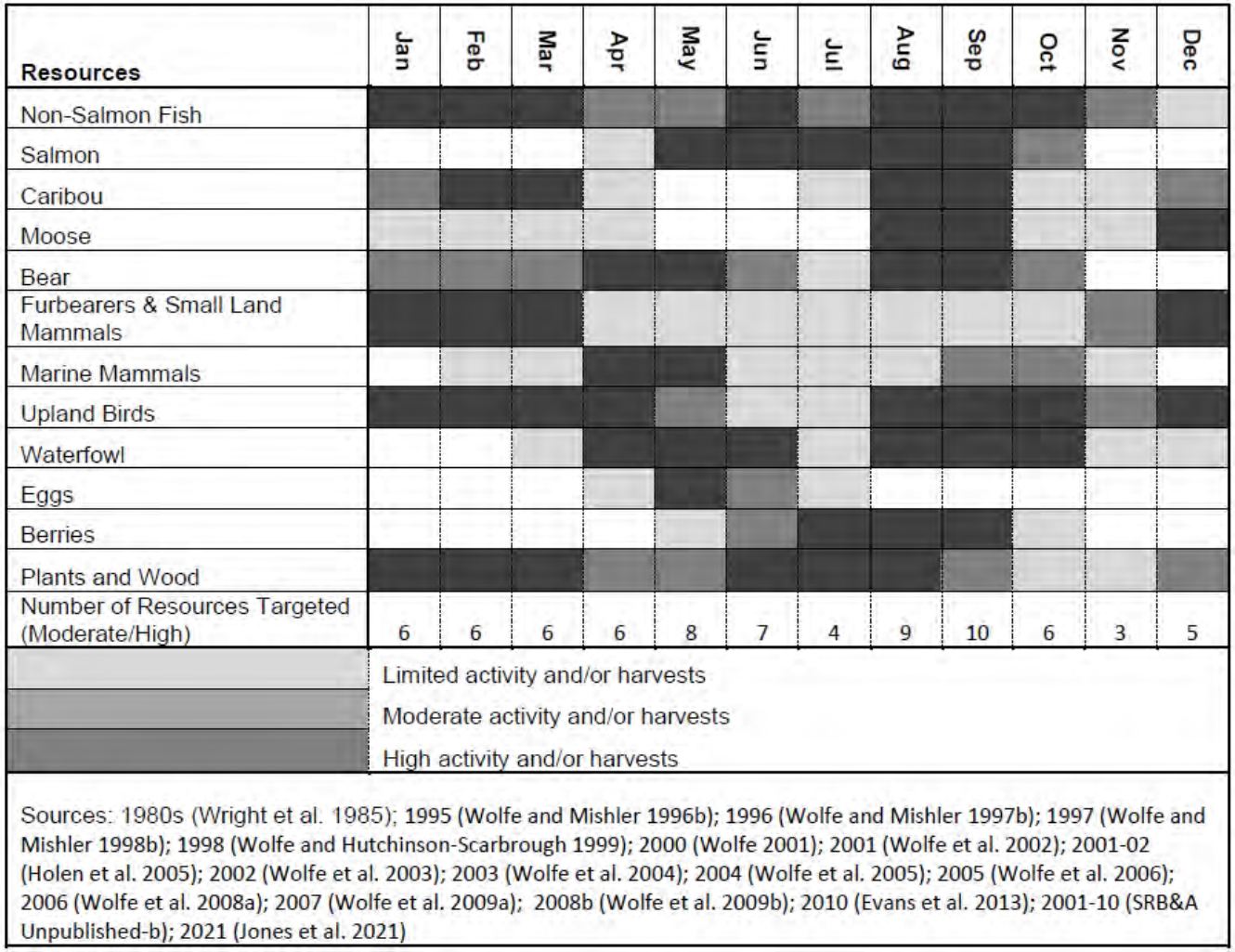


Source: (SRB&A Unpublished-b)

Transmission corridor used year-round, with peak activities in the winter (December through March) and fall (August and September). **Falls** primarily used in the fall.

When do you do Subsistence Activities? *All Areas*

Figure 7: Dillingham Timing of Subsistence Activities



Resources	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Non-Salmon Fish												
Salmon												
Caribou												
Moose												
Bear												
Furbearers & Small Land Mammals												
Marine Mammals												
Upland Birds												
Waterfowl												
Eggs												
Berries												
Plants and Wood												
Number of Resources Targeted (Moderate/High)	6	6	6	6	8	7	4	9	10	6	3	5

Limited activity and/or harvests

Moderate activity and/or harvests

High activity and/or harvests

Sources: 1980s (Wright et al. 1985); 1995 (Wolfe and Mishler 1996b); 1996 (Wolfe and Mishler 1997b); 1997 (Wolfe and Mishler 1998b); 1998 (Wolfe and Hutchinson-Scarbrough 1999); 2000 (Wolfe 2001); 2001 (Wolfe et al. 2002); 2001-02 (Holen et al. 2005); 2002 (Wolfe et al. 2003); 2003 (Wolfe et al. 2004); 2004 (Wolfe et al. 2005); 2005 (Wolfe et al. 2006); 2006 (Wolfe et al. 2008a); 2007 (Wolfe et al. 2009a); 2008b (Wolfe et al. 2009b); 2010 (Evans et al. 2013); 2001-10 (SRB&A Unpublished-b); 2021 (Jones et al. 2021)

When do you do Subsistence Activities? *All Areasa*

Spring:

- Hunt and trap furbearers, ice fish, hunt ptarmigan, and harvest firewood
- spring migratory bird hunting season occurs from April through June
- Bird eggs are harvested in May.
- Seals and belugas are hunted in the spring months of April and May.

Summer:

- Peak harvests of sockeye salmon (June and July)
- Chum and Coho Salmon are harvested (late summer into fall)
- Gathering of wild plants also occurs during the summer months

Fall

- Hunting moose and caribou
- Berry picking

Winter:

- Hunting and trapping is common for trapping furbearers and small land mammals
- Ice fishing

Dillingham subsistence activities peak in the fall months of August and September.

What do you harvest? *Falls vs Transmission Corridor*

Dillingham Subsistence Use Area Overlaps with Project Components, by Resource

Resource Category	Falls Area	Transmission Corridors
Moose	X	X
Caribou	X	X
Other LLM	X	X
Furbearers & SLM		X
Salmon	X	X
Non-Salmon Fish	X	X
Marine Mammals		
Migratory Birds		X
Upland Game Birds		X
Bird Eggs		
Marine Invertebrates		
Vegetation	X	X

What do you harvest? *Falls vs Transmission Corridor*

Dillingham Harvester Overlaps with Project Components, by Resource

	Percentage of Harvesters Using Project Components by Resource	
	Falls Area	Transmission Corridors
Caribou (n=75)	11%	79%
Moose (n=89)	8%	66%
Other LLM (n=21)	14%	29%
Furbearers & SLM (n=57)		37%
Marine Mammals (n=15)		
Salmon (n=30)	3%	8%
Non-Salmon Fish (n=31)	3%	13%
Migratory Birds (n=23)		25%
Upland Birds (n=25)		35%
Eggs (n=19)		
Berries (n=30)		16%
Plants (n=26)		9%
Marine Invertebrates (n=9)		
All Resources (n=31)	11%	73%

Note: Percentages are based on the number of harvesters for each individual resource (e.g., 80 percent of caribou harvesters reported using the transmission corridors, not 80 percent of all subsistence harvesters). The number of harvesters for each resource is provided next to the resource name (n=x). The percentages for all resources are based on the total number of harvester respondents for the study.
Blank cells= no harvesters reporting uses.
Source: (SRB&A Unpublished-b)

More people tend to use the Transmission corridor versus the Falls area

What do you harvest? *All Areas*

Table 8: Dillingham Harvest Average by Resource Category

Resource	Percentage of Households					Estimated Harvest				
	Use	Try to Harvest	Harvest	Give	Receive	Numbers[1]	Total Pounds[2]	Average HH Pounds	Per Capita Pounds	Percent of Total Harvest
All Resources	97	90	89	84	81		453,934	652	218	100.0%
Salmon	90	65	61	57	60	122,541	250,435	339	115	57.4%
Non-Salmon Fish	73	48	47	39	43	26,389	29,611	43	15	6.7%
Large Land Mammals	64	37	21	40	44	375	119,056	159	54	22.8%
Small Land Mammals	31	22	20	17	11	1,544	7,856	11	4	1.6%
Marine Mammals	31	7	5	16	22	68	12,710	19	6	3.0%
Migratory Birds	38	23	23	17	20	3,441	5,724	8	3	1.3%
Upland Game Birds	56	44	44	27	21	6,761	5,426	8	3	1.2%
Bird Eggs	30	14	14	15	19	3,012	1,279	2	1	0.3%
Marine Invertebrates	23	15	14	9	17	1,666	2,041	3	1	0.4%
Vegetation	84	77	76	45	42	7,542	22,797	33	11	5.2%

Notes: Blank cells indicate no data.

[1]Estimated numbers typically represent individuals except in some cases such as vegetation where they may represent gallons.

[2]Estimated pounds include only edible pounds and therefore do not include estimates for resources that are not typically eaten by community residents (e.g., furbearers).

Sources: 1984 (Fall et al. 1986); 2001-02 (Holen et al. 2005); 2010 (Evans et al. 2013); 2021 (Jones et al. 2024).

Stephen R. Braund & Associates, 2024.

What do you harvest? *All Areas*

Across all areas:
Salmon is the primary subsistence resource harvested in Dillingham in terms of edible pounds at **57.4%** total harvest

- Large Land Mammals = **22.8%**
- Non-salmon fish = 6.7%
- Vegetation = 5.2%

What do you harvest? **How much?** *All Areas*

Table 9: Dillingham Harvest Average by Species

	Percentage of Households					Estimated Harvest				Percent of Total Harvest
	Use	Try to Harvest	Harvest	Give	Receive	Numbers[1]	Total Pounds[2]	Average HH Pounds	Per Capita Pounds	
Sockeye Salmon	82	54	53	42	45	21,366	87,758	120	41	22.4%
Chinook Salmon	82	56	52	43	42	9,100	99,087	132	45	19.0%
Moose	58	33	16	34	40	164	88,750	119	40	18.1%
Coho Salmon	52	37	37	25	23	7,255	34,334	47	16	9.0%
Rainbow Smelt	49	30	28	27	32	2,992	17,953	27	9	4.7%
Caribou	33	13	8	19	16	197	29,505	39	13	4.5%
Berries	82	74	73	34	32	5,088	20,351	29	9	4.2%
Unknown Salmon	3	2	2	1	1	1,889	8,982	13	4	2.9%
Chum Salmon	35	28	26	15	12	2,489	11,309	15	5	2.4%
Belukha	12	2	1	6	10	9	8,408	12	4	2.1%
Beaver	14	5	5	9	6	349	5,587	8	3	1.1%
Smelt	37	22	22	22	12	275	8,264	12	4	1.7%
Unknown Smelt	48	21	21	18	36	2,017	7,815	11	3	1.6%
Cloud Berry	62	52	51	35	29	1,419	5,675	9	3	1.5%
Pink Salmon	18	13	13	8	6	2,120	5,476	7	2	1.1%
Herring Roe	18	5	5	8	10	147	5,055	7	2	1.0%

Notes: Blank cells indicate no data.

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Stephen R. Braund & Associates, 2024.

What do you harvest? *All Areas*

Top four species harvested:

1. Sockeye 22.8%
2. Chinook 19.0%
3. Moose at 18.1%
4. Coho 9.0%

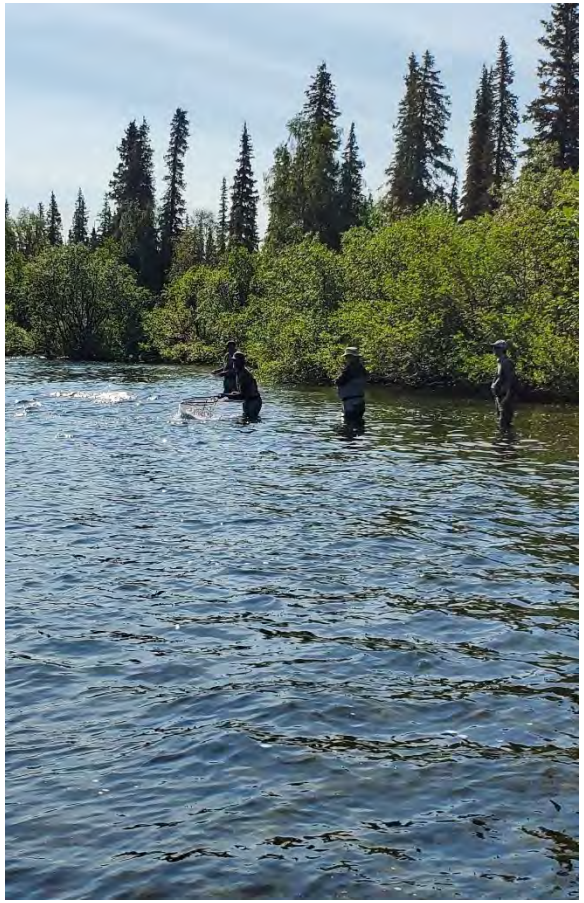
% of total harvested edible pounds

The community harvests:

- a small number of brown bear and black bear annually,
- small land mammal species include beaver, porcupine, and hare.
- Furbearers such as fox, marten, wolf, and wolverine.
- Pike, Dolly Varden, smelt, herring/herring roe, and rainbow trout.
- Beluga whales and seals.
- Migratory birds including mallards, pintails, Canada geese, and white fronted geese.
- Bird eggs are also important for subsistence (gull eggs).

2024 **Subsistence** Workshop Comments: *What we heard*

- Low returns of Chinook Salmon
- Moose and Caribou harvest declined
- Absence of the Nushagak Peninsula Caribou herd
- Decline in the Mulchatna Caribou herd
- Increase in non-Native and non-local families hunting in the region

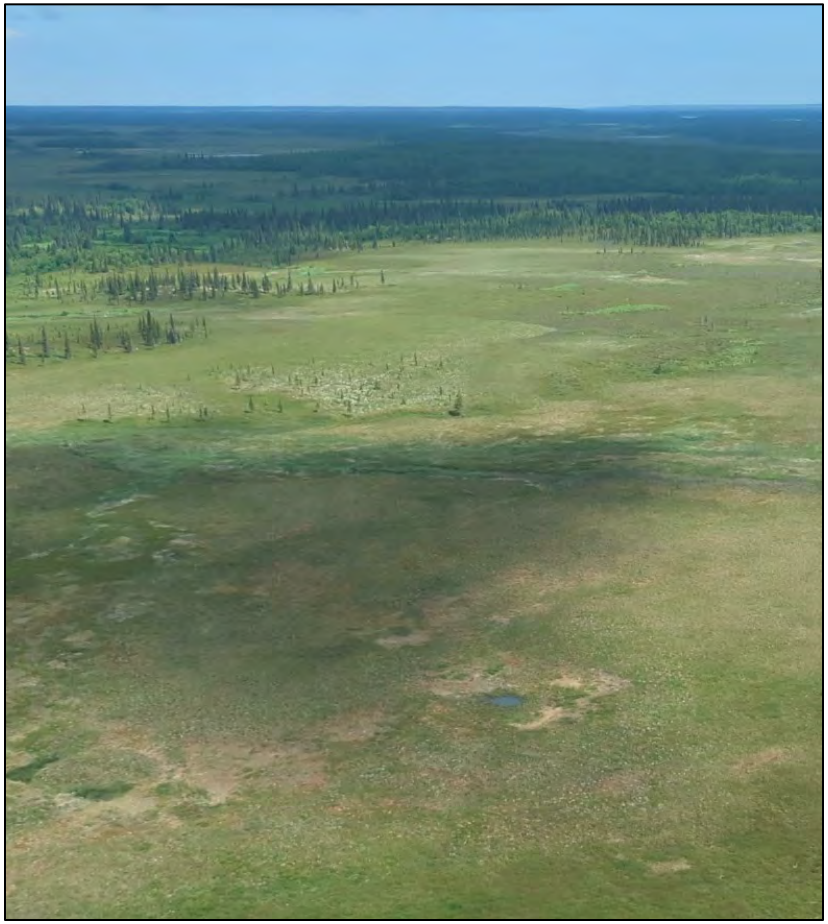


What else should we know about: **Subsistence** in the Nuyakuk Falls Area

- **Where: Falls, above, and below**
- What – are you going for?
- When – are you going?
- How – are you travelling/harvesting?

- **For each resource harvested in the project area:**
- Why do you harvest this resource in this location?
- How do you travel to this location?
- How often do you harvest this resource in this location?
- Why is this area important for this resource?

What else should we know about: **Subsistence** Use of Transmission Corridor



- **Where: Transmission Line Corridors**
- What – are you going for?
- When – are you going?
- How – are you travelling/harvesting?

- **For each resource harvested in the project area:**
- Why do you harvest this resource in this location?
- How do you travel to this location?
- How often do you harvest this resource in this location?
- Why is this area important for this resource?

Comments, Concerns, and Recommendations Regarding Subsistence




Photos Source KDLG

Potential Effects of the Project On Subsistence Use and Activities

Will the project change:

- How **ABUNDANT** are subsistence resources?
  - *Will there be more or less animals or plants to harvest?*
- How **AVAILABLE** are subsistence resources?
  - *Will animals or plants stay in expected areas at expected times? Will they be more or less healthy to harvest?*
- How you **ACCESS** subsistence resources?
  - *Will access to your subsistence use areas be easier or more difficult?*
- How you share and express your subsistence **CULTURE** and **TRADITIONS**?
  - *Will there be more or less competition for resources?*
  - *Will you be more or less likely to choose to do your subsistence activities and teach them to others?*

Potential Effects of the Project On Subsistence User Access

- *Will access to your subsistence use areas be easier or more difficult?*

Concern	Evaluation
Disrupted access along transmission corridor during construction	*Temporary, likely during early spring and winter when using snowmachines. Isolated locations could be diverted.*
Difficult to navigate river due to decreased water depth	*Design of project makes it unlikely to reduce water levels, only diverting around the ¼ mile of the Falls.*
Competition with non-local hunters & anglers	*No public access to the air strip.* *No proposed road. Air access only.*
Avoid Falls and Transmission Line area during construction	*Timing is important: Impacts depends on whether construction is at the same time as subsistence harvest in the area.*

Potential Effects of the Project On Subsistence Resource Availability

- *Will fish and animals change in behavior, migration, distribution, or health?*

Important Resources	General Concerns
• Fish (Salmon, Whitefish) • Moose & Caribou	• Water temp, quality, & movement • Noises and infrastructure changing animal and fish behavior • Non-local hunters & anglers changing wildlife behavior & distribution

Potential Effects of the Project On Subsistence Resource Availability

- *Will **FISH** change in behavior, migration, distribution, or health?*

Concerns	Evaluation
Water temperature, chemistry, quality	*Water Quality Assessment finds diversion of water unlikely to adversely impact dissolved oxygen downstream*
Fish passage at lower water depths	*Upstream passage: Fish Passage Study found 97% success rate. Low levels are easier for fish to navigate. Maximum diversion (30%) unlikely to delay or prevent passage of migrating fish. Three main passage routes maintained.* *Downstream passage: Likely adequate flows. Downstream passage timing corresponds with peak flows.*

Potential Effects of the Project On Subsistence Resource Availability

- *Will **FISH** change in behavior, migration, distribution, or health?*

Concerns	Evaluation
Whitefish/non-salmon fishing areas upstream of Falls	*Winter travel to Nuyakuk River and Tikchik Lakes to harvest Pike, Grayling, Trout. Project facility construction phase could impact access/availability.*
Construction Noise & Activity	*Temporary and localized*
Contamination & sedimentation	*Potential sources to manage are: fuel delivery by barge, leaks from construction equipment, turbidity from excavation and tailrace.*

Potential Effects of the Project On Subsistence Resource Availability

- *Will **ANIMALS** change behavior, migration, distribution, or health?*

Concerns	Evaluation
Caribou avoiding the transmission line	*Recent study in Norway found no substantial effect. No studies in Alaska on the MCH. Barrier response more likely if transmission line increase human activity.*
Construction Noise & Human Activity	*Caribou and Moose likely to avoid high activity areas. Mostly during 24-month construction period.*
Air traffic noise	*Behavioral change more likely with helicopters. Can expect changes during construction during high helicopter activity.*

Potential Effects of the Project On Subsistence Resource Abundance

- *Will there be more or less **ANIMALS** or **FISH** to harvest?*

Concerns	Evaluation
Fish passage and habitat loss	*If flows maintained at adequate levels, no expected impact to upstream/downstream passage, and habitat functions preserved.*
Fish mortality to entrainment & entrapment	*Fish-friendly turbines assume 98% survival rate of entrained fish. Population-level effects are not likely.*
Moose & Caribou habitat loss, stress, hunting pressure	*Does not intersect with Mulchatna Herd calving area. Increased human activity may cause stress response.*

Potential Effects of the Project On Subsistence Traditions & Culture

- *How might **YOU** change your subsistence activity?*

Concerns	Evaluation
More time, distance, risk, and cost required for harvest	*Cost savings may make it easier to stay in village. Job opportunities mostly limited to construction phase.* *"If construction and operation of the Project can occur without affecting the abundance and availability of subsistence resources… then the Project could have a net benefit to subsistence users by reducing the cost of living in the region, spurring economic development, encouraging residents to stay in their communities, and increasing residents' capacity to engage in subsistence activities due to an increase in disposable income."*
Less participation = less knowledge sharing	
Loss of cultural identity, tradition, and social ties	

Recommended Potential Mitigation Measures

How to Reduce Negative Impacts to Subsistence Resources?

Your ideas for mitigation are valuable. Suggesting a mitigation measure does NOT mean you support the project.

Category	Example Measure
Timing	• *Limit in-water activities during spawning & migration* • *Time disruptive activities to avoid peak subsistence harvest times*
Design & Location	• *Locate infrastructure in coordination with communities* • *Avoid key harvest areas, trails, traplines* • *Minimize project footprint*
Manage & Monitor	• *Air traffic management plan* • *Monitor water quality, wildlife health, use of airstrip, use of transmission lines, subsistence harvests, fish passage*
Communicate & Coordinate	• *Share results of monitoring studies* • *Continue to gather input for mitigation measures*
Study & Investigate	• *Research burying transmission lines*

Thank You!

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