Species Management Report and Plan ADF&G/DWC/SMR&P–2025–65

Wolf Management Report and Plan, Game Management Unit 18:

Report Period 1 July 2015–30 June 2020, and

Plan Period 1 July 2020–30 June 2025

Patrick Jones

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Alaska Department of Fish and Game Division of Wildlife Conservation

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Species management reports and plans provide information about species that are hunted or trapped and management actions, goals, recommendations for those species, and plans for data collection. Detailed information is prepared for each species every 5 years by the area management biologist for game management units in their areas, who also develops a plan for data collection and species management for the next 5 years. This type of report is not produced for species that are not managed for hunting or trapping or for areas where there is no current or anticipated activity. Unit reports are reviewed and approved for publication by regional management coordinators and are available to the public via the Alaska Department of Fish and Game's public website.

This species management report and plan was reviewed and approved for publication by Phillip L. Perry, Management Coordinator for Region V for the Division of Wildlife Conservation.

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Cover Photo: Wolf in Unit 18. ©2022 ADF&G. Photo by Patrick Jones.

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Purpose of this Report

This report provides a record of survey and inventory management activities for wolves (*Canis lupus*) in Unit 18 for the 5 regulatory years 2015–2019 and plans for survey and inventory management activities for the next 5 regulatory years, 2020–2024. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY20 = 1 July 2020–30 June 2021). This report is produced primarily to provide agency staff with data and analysis to help guide and record its own efforts but is also provided to the public to inform it of wildlife management activities. In 2016 the Alaska Department of Fish and Game's Division of Wildlife Conservation launched this 5-year report to more efficiently report on trends and describe planned changes in data collection activities. It replaces the wolf management report of survey and inventory activities that was previously produced every 3 years.

I. RY15–RY19 Management Report

Management Area

Unit 18 is a 42,000 mi^2 roadless area that encompasses the mouth of the Yukon and Kuskokwim rivers. These major rivers roughly divide the unit into thirds. The middle third between the rivers is largely flat, wet, and dotted with many lakes. The portion north of the Yukon River and the portion south and east of the Kuskokwim River are mostly upland to mountainous, and some extensive areas with trees exist near the rivers and smaller tributaries that drain into the 2 river systems.

The habitat in Unit 18 is largely intact but is inhabited by more than 25,000 people in more than 40 rural communities, making Unit 18 Alaska's most densely populated rural unit. The boundaries of the Yukon Delta National Wildlife Refuge and the Togiak National Wildlife Refuge approximate the Unit 18 boundary.

Summary of Status, Trend, Management Activities, and History of Wolves in Unit 18

Wolf numbers were low throughout Unit 18 from the departure of reindeer herding in the 1930s through 1960s[1] until the late 1980s, when moose populations became established. Observations from trappers, hunters, fur buyers, and agency biologists indicated that wolf numbers have increased in Unit 18, particularly along the main stem of the Yukon River and in the Kilbuck Mountains east of Bethel. More recently, there have been increased populations along the Kuskokwim River and its tributaries from Kalskag to Eek and along the coast south. The distribution and abundance of wolves in Unit 18 reflect the expanding distribution and increased abundance of moose, as well as the seasonal movements of the Mulchatna caribou herd (MCH).

[1] (Calista Professional Services and Orutsararmiut Native Council 1984)

In the 1920s and 1930s, privately owned and government-funded reindeer[2] were common on the Yukon-Kuskokwim Delta. The reindeer industry on the Yukon-Kuskokwim Delta dwindled and almost disappeared in the 1960s. Anecdotal evidence from this time suggests wolf numbers and harvest diminished when the reindeer industry collapsed. Historically and currently, many wolves caught in Unit 18 are neither sold nor sealed. Wolf fur continues to be a highly valued fur and is commonly traded or given as a gift by local subsistence users.

Current harvest data are derived from sealing certificates and represent a minimum estimate of wolf harvest. Sealing records truly began in the 1980s when the average annual harvest was 7 wolves, and the highest harvest was 17 wolves in RY88. In the 1970s and 1980s, moose and the Kilbuck caribou herd (KCH) were at very low abundances in Unit 18. In the 1990s, the Mulchatna caribou herd expanded its range from Unit 17 to include the southern third of Unit 18 and absorbed the KCH.

Successful moose hunting moratoriums along the Yukon (1988–1994) and Kuskokwim (2003–2008) rivers have resulted in a larger, well-established moose population. These changes in the prey base seem to have led to an increase in wolves on the landscape and higher harvests than those documented in previous decades. During RY15–RY19, the MCH slowly declined from 30,000 to 13,500 animals as of RY19. Moose populations throughout the unit continue to expand their range and grow. In RY19, ADF&G staff counted 4,693 moose in the southern third of Unit 18, and in RY20, we counted 23,668 moose in the northern third of the unit. In RY91, we estimated there were 1,000 to 1,200 moose in all of Unit 18, and most of those were on the Yukon River upstream of Russian Mission. Moose population growth and range expansion have ostensibly allowed wolves to become more firmly established throughout the unit.

Regulated wolf hunting and trapping in Unit 18 started with a state season in 1959 of "no limit" and "no closed season" and remained that way through the 1968 regulatory year. The first restricted season for wolves was established during RY69 (1 October–30 April), and the bag limit remained "no limit." The bag limit slowly changed from 2 wolves to 5 wolves from RY74 through RY11. The current hunting season start date of 10 August was established in RY74, and the season is currently 10 August–30 April. In RY12 the current hunting bag limit of 10 wolves was established, and that has remained unchanged. Trapping season is 10 November–30 March with no bag limit for residents or nonresidents.

Over 95% of reported wolf harvest happens in the winter in Unit 18. Hunting and trapping success is greatly dependent on snow accumulation and people's ability to travel across the landscape. The amount of time caribou spend in open terrain and in accessible areas throughout the winter also influences wolf hunter success. Trapping and hunting have likely had little to no effect on the wolf population in Unit 18.

[2] In Alaska and Canada, the semi-domesticated form of caribou is called reindeer; in Europe, all caribou are called reindeer. All caribou and reindeer throughout the world are the same species (*Rangifer tarandus*); note that there are 7 subspecies (ADF&G 2008).

Management Direction

Existing Wildlife Management Plans

There are no existing management plans specific to wolves in Unit 18.

Goals

- Maintain viable wolf populations in Unit 18.
- Minimize adverse interactions between wolves and the public.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

The Unit 18 wolf population has a positive customary and traditional use determination finding. The Alaska Board of Game established the amount reasonably necessary for subsistence uses (ANS) in 2011 and set the value at 5–20 wolves for Unit 18.

Intensive Management

There were no intensive management activities in Unit 18 during RY15–RY19.

Management Objectives

- Monitor wolf population status through contacts with the public, annual trapper questionnaires, and field observations.
- Monitor harvest through the sealing program and public contacts.
- Explain regulations to local hunters and trappers and promote compliance.
- Provide general wolf information and education to the public.

Management Activities

1. Population Status and Trend

Wolf population trends are monitored through harvest trends in Unit 18. Refer to Activity 2.1 for wolf harvest information.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor mortality and harvest in Unit 18 annually.

Data Needs

Annual summaries of harvest are needed to establish if harvest is within sustained yield. Monitoring harvest data and improving harvest reporting through public education, increasing fur sealer support, conducting community-based harvest assessment surveys in select communities, and improving the distribution of trapper questionnaires are critical to a better understanding of actual harvest levels and public interaction with wolves, both positive and negative.

Methods

Harvest data are derived from sealing certificates, where these data are recorded and represent a minimum estimate of wolf harvest. However, many wolves caught in Unit 18 are neither sold nor sealed. Wolf ruffs are highly prized as parka trim, and the local domestic demand for wolf pelts is very high. Local residents generally prefer stiffer home-tanned wolf pelts for parka ruffs. Harvest assessment surveys are done periodically in communities to determine the reporting rate of harvested wolves. A comparison of reported harvest and community harvest surveys conducted during 2008–2013 showed that reported harvest was between 0% and 67% of the actual harvest (Table 1). The average reporting rate of all 16 communities surveyed was 28%.

Season and Bag Limit

Regulatory years	Bag limit (resident and nonresident)	Resident open season (subsistence and general hunts)	Nonresident open season
2015–2019	Hunting: 10 wolves	10 Aug–30 Apr	10 Aug–30 Apr
2015–2019	Trapping: No limit	10 Nov–31 Mar	10 Nov–31 Mar

Results and Discussion

Harvest by Hunters-Trappers

Reported and sealed harvest exceeded the minimum ANS every year of the RY15–RY19 reporting period (Table 2, Fig. 1). The average annual number of wolves sealed during RY15–RY19 was 46 compared to 33 during RY10–RY14 (Tables 2 and 3). However, as previously noted, the number of wolves sealed is not an accurate reflection of the number of wolves harvested and should only be viewed as a minimum number.

Table 1. ADF&G Division of Subsistence household harvest survey compared with reported and sealed wolf harvest, 2008–2013, Unit 18 communities, southwest Alaska.

Community	Study year	Estimated amount harvested	Reported harvest	Percent reported
Emmonak	2008	0	0	0
Marshall	2010	17	4	24
Mountain Village	2010	2	1	64
Tuluksak	2010	3	2	67
Kwethluk	2010	0	0	–
Akiak	2010	0	0	–
Oscarville	2010	0	0	–
Russian Mission	2011	5	0	0
Napaskiak	2011	0	0	–
Napakiak	2011	0	0	–
Bethel	2012	35	12	34
Tuntutuliak	2013	0	0	–
Eek	2013	0	0	–
Quinhagak	2013	5	0	0
Scammon Bay	2013	0	0	–
Pilot Station	2013	1	0	0
Total	–	68	19	28

Note: Study year and estimated amount of harvest are from surveys conducted by ADF&G Division of Subsistence (Brown et al. 2015, Fall et al. 2013, Ikuta et al. 2014, Ikuta et al. 2016, and Runfola et al. 2017). Reported harvest is the actual number of animals reported to ADF&G's Division of Wildlife Conservation. En dash indicates not applicable.

Understanding true harvest is essential not only for identifying patterns and levels of use, but also for determining cultural needs in subsistence activities. Subsistence uses of furbearers are the primary drivers of harvest in this unit. Lack of harvest reporting and failure to comply with the state and federal requirement of CITES[3] tags are a result of hunter confusion or not having access to a fur vendor. Strong cultural values for home-tanned wolf hides and a common custom of giving away untanned wolf hides also complicates matters when trying to assign years and location of harvest to a fur.

The reported harvest during RY15–RY19 follows the trend of the valuable harvests of the last 2.5 decades (Fig. 1). Regulatory years with lower harvests are more likely to reflect poor winter travel conditions and high fuel prices than a low abundance of wolves. Good winter conditions benefit both trappers and hunters; however, trappers tend to harvest more wolves than hunters when travel conditions are marginal or worse (Table 3).

[3]CITES stands for the Convention on International Trade in Endangered Species of Wild Fauna and Flora. This is a federal program that requires the pelts of certain species legally harvested be tagged.

Table 2. Reported wolf harvest by location from the Yukon and Kuskokwim river drainages, regulatory years 2005–2019, Unit 18, southwest Alaska.

Regulatory year	Yukon	Kuskokwim	Unknown	Total
2005	5	57	28	90
2006	1	29	1	31
2007	25	51	–	76
2008	25	5	–	30
2009	12	9	2	23
2010	21	54	–	75
2011	9	17	–	26
2012	6	20	–	26
2013	3	4	–	7
2014	16	14	2	32
2015	13	19	2	34
2016	33	49	–	82
2017	24	33	–	57
2018	5	16	–	21
2019	32	7	–	39

Note: An en dash indicates no data.

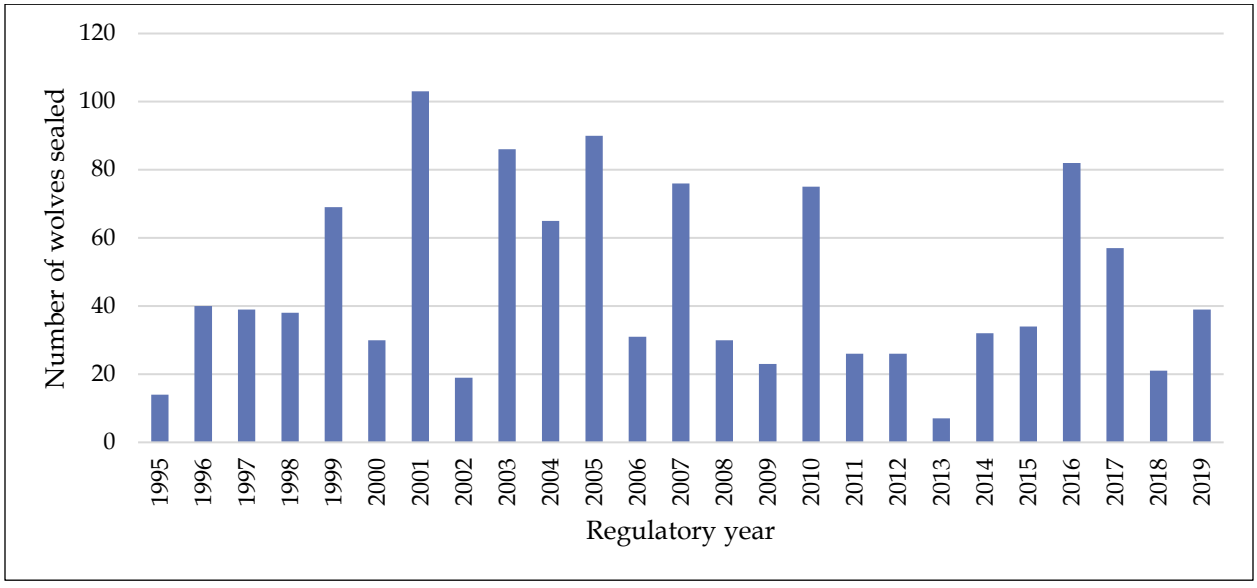

Figure 1. Number of wolves sealed, regulatory years 1995–2019, Unit 18, southwest Alaska.

Table 3. Wolf harvest by method of take, regulatory years 2005–2019, Unit 18, southwest Alaska.

Regulatory year	Reported harvest			Method of take			
	Male	Female	Unknown	Trap or Snare	Shot	Unknown	Total harvest
2005	27	31	32	37	23	30	90
2006	13	14	4	18	13	0	31
2007	43	27	6	25	46	5	76
2008	9	6	15	19	9	2	30
2009	13	10	0	5	18	0	23
2010	19	21	35	34	36	5	75
2011	10	5	11	1	25	0	26
2012	12	10	4	11	15	0	26
2013	1	4	2	5	2	0	7
2014	10	8	14	19	11	2	32
2015	14	10	10	20	14	0	34
2016	51	26	5	45	37	0	82
2017	34	19	5	19	38	1	57
2018	12	7	2	11	10	0	21
2019	19	19	1	9	30	0	39
Total	287	217	146	278	327	45	649

Hunter Residency and Success

Most harvest in Unit 18 is done by residents of Alaska. During RY15–RY19, 8 wolves were harvested by nonresidents out of the 233 reported. No measure of hunter and trapper success is available.

Harvest Chronology

The highest reported harvests have historically occurred in February and March (Table 4). This pattern is explained by the timing of snow accumulation, improving travel conditions for hunters and trappers, the onset of the wolf breeding season, and the increasing day length. The frequencies and severity of winter storms in addition to freeze and thaw events make trapping on the Yukon-Kuskokwim Delta difficult at times. The intensity of caribou hunting, and the subsequent incidental harvest of wolves are also dependent on travel conditions. During RY10, the high harvests in both January and March reflect the quality of winter and the amount of snowfall the area received (Table 4).

Table 4. Wolf harvest chronology, regulatory years 2005–2019, Unit 18, southwest Alaska.

Regulatory year	Reported harvest per month										
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Unk	*n*
2005	–	1	–	7	7	11	36	22	2	4	90
2006	–	1	–	0	8	4	2	6	1	9	31
2007	–	–	–	–	6	7	18	30	2	13	76
2008	–	–	–	3	6	4	1	11	3	2	30
2009	–	–	–	1	3	2	7	8	–	2	23
2010	–	2	–	2	12	16	13	18	4	8	75
2011	–	–	–	1	6	2	8	7	–	2	26
2012	–	–	–	1	2	–	14	8	1	–	26
2013	–	–	–	–	–	2	1	3	–	1	7
2014	1	2	–	1	12	5	5	3	–	3	32
2015	–	2	–	–	3	4	13	12	–	–	34
2016	–	6	–	–	2	8	14	51	1	–	82
2017	–	1	–	1	2	16	6	31	–	–	57
2018	–	1	–	–	–	10	7	3	–	–	21
2019	–	–	–	–	6	4	18	11	–	–	39
Total	1	16	–	17	75	95	163	224	14	44	649

Note: An en dash indicates no data.

The reported RY13 harvest was 7 wolves, the lowest in the last 25 years (Fig 1). Travel conditions unitwide remained extremely poor throughout most of the season, which explains the lower harvest.

Transport Methods

Hunters and trappers typically use snowmachines to harvest wolves. Eight of the successful hunters were dropped off by airplane during RY15–RY19.

Other Mortality

No information is available on natural mortality of wolves in Unit 18.

Alaska Board of Game Actions and Emergency Orders

There were no Board of Game actions or department-issued emergency orders for wolves in Unit 18 during RY15–RY19.

Recommendations for Activity 2.1

Continue.

3. Habitat Assessment-Enhancement

There are no activities for wolf habitat assessment or enhancement in Unit 18.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

Harvest data are entered into ADF&G's Wildlife Information Network (WinfoNet), an internal database housed on a server.

Historical wolf sealing certificates (RY90–RY18) are stored in ADF&G's Bethel office. The sealing certificates should also be scanned for more secure data archival that is more secure.

Agreements

There were no agreements with other agencies pertaining to wolf no data sharing management in Unit 18 during RY15–RY19.

Permitting

No permits were needed to conduct wolf management activities in Unit 18 during RY15–RY19.

Conclusions and Management Recommendations

The wolf population is likely to continue growing and expanding its range in Unit 18 in response to greater availability of ungulate prey. Moose along the Yukon River have increased in numbers and range to the point that wolf packs are established from the Unit 18 boundary at Paimiut throughout the Yukon River delta. Wolf abundance has also increased in the Kilbuck Mountains in response to a seasonal influx of caribou and an expanding moose population. A large portion of the wolves that use the eastern portion of Unit 18 are transient. They spend their winters in the lower drainages in habitat more associated with moose, then in spring when the snow melts, these wolves often move into the mountains and spend the snow free season following caribou. It appears that there is substantial seasonal movement within Unit 18 during March and April, probably in response to mating season.

The reported harvest of 82 wolves in RY16 was the highest for the RY15–RY19 period, but below the highest recorded harvest of 109 in RY01. The RY16 harvest represented the culmination of a few factors: a growing wolf population, good snow conditions allowing easy snowmachine travel, and improved harvest reporting as a result of the efforts of a local fur buyer in the region. It also reflected the efforts of 3 particularly accomplished trappers.

Current ungulate management strategies and planning efforts in Unit 18 are designed to increase caribou, moose, and muskox populations, resulting in increased availability of prey for wolves. Wolf pelts are frequently presented for sealing after the sealing deadline has passed, and many of these are presented by someone other than the hunter or trapper. Typically, these pelts have been given as gifts to skin sewers, frequently elderly women, who discover the need to have the pelts

sealed when they are presented for tanning. The department routinely seal these furs as requested and use this as an opportunity to educate the public about the sealing regulations. We have asked the fur sealers to direct people with illegal pelts to us so we have the opportunity for education and can collect harvest data. We recommend continuing this practice.

The department will continue to monitor wolf population status through contacts with the public, annual trapper questionnaires, and field observations. Staff regularly explain regulations to local hunters and trappers which promotes compliance. Providing general wolf information and education to the public helps the department meet its wolf management goals.

II. Project Review and RY20–RY24 Plan

Review of Management Direction

Management Direction

There are no changes planned in management direction for RY20–RY24.

Goals

- Maintain a sustainable wolf population.
- Provide harvest opportunity consistent with sustained-yield principles.
- Provide an opportunity for nonconsumptive uses (e.g., to view and photograph wolves).

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

No changes are expected to the positive customary and traditional use determination finding or to the amount reasonably necessary for subsistence (5–20 wolves).

Intensive Management

No intensive management activities are planned for RY20–RY24.

Management Objectives

There are no changes to the management objectives for RY20–RY24.

Review of Management Activities

All activities will continue, and no new activities are planned for RY20–RY24.

1. Population Status and Trend

Continue to monitor wolf population trends through harvest, reported in Activity 2.1.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor mortality and harvest in Unit 18 annually.

Data Needs

Annual summaries of harvest are needed to establish if harvest is within sustained yield. Monitoring harvest data and improving harvest reporting through public education, increasing fur sealer support, conducting community-based harvest assessment surveys in select communities, and improving the distribution of trapper questionnaires are critical to a better understanding of actual harvest levels and public interaction with wolves, both positive and negative.

Fur sealing data stored within the WinfoNet database are needed annually to assess trends in harvest. Pack size, location of harvest, and hunter-trapper effort are critical elements needed to assess harvest trends and corroborate aerial survey observations

Methods

Wolves harvested by trappers and hunters will continue to be sealed to monitor harvest. Fur sealing data used will be archived in the WinfoNet database and queried annually to access reported wolf harvest data for the unit.

3. Habitat Assessment-Enhancement

No activities for wolf habitat assessment or enhancement are expected in Unit 18 wolf management.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

No new issues have been identified.

Data Recording and Archiving

No change from RY15–RY19.

Agreements

Currently there are no agreements with other agencies pertaining to wolf management.

Permitting

No permits are expected in RY20–RY24.

References Cited

Alaska Department of Fish and Game. 2008. Alaska wildlife notebook series. Division of Wildlife Conservation, Juneau. https://www.adfg.alaska.gov/index.cfm?adfg=educators.notebookseries (Accessed 4 November 2025).

Brown, C. L., and A. Brenner, H. Ikuta, E. H. Mikow, B. Retherford, L. J. Slayton, A. Trainor, J. Park, D. Koster, and M. L. Kostick. 2015. The harvest and uses of wild resources in Mountain Village, Marshall, Nulato, Galena, and Ruby, Alaska, 2010. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 410, Fairbanks.

Calista Professional Services and Orutsararmiut Native Council. 1984. Prospects for reviving the reindeer industry in the Yukon-Kuskokwim region. Alaska Department of Community and Regional Affairs, Municipal and Regional Assistance Division, Anchorage.

Fall, J. A., N. S. Braem, C. L. Brown, L. B. Hutchinson-Scarbrough, D. S. Koster, and T. M. Krieg, editors. 2013. Continuity and change in subsistence harvests in five Bering Sea communities: Akutan, Emmonak, Savoonga, St. Paul, and Togiak. Deep sea research part II: Topical studies in oceanography 94(October 2013):274–291. https://doi.org/10.1016/j.dsr2.2013.03.010

Ikuta, H., C. L. Brown, and D. S. Koster, editors. 2014. Subsistence harvest in 8 communities in the Kuskokwim River drainage and Lower Yukon River, 2011. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 396, Fairbanks.

Ikuta, H., D. M. Runfola, J. J. Simon, and M. L. Kostick, editors. 2016. Subsistence harvests in 6 communities on the Bearing Sea, in the Kuskokwim River drainage, and on the Yukon River, 2013. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 417, Fairbanks.

Runfola, D. M, H. Ikuta, A. R. Brenner, J. J. Simon, J. Park, D. S. Koster, and M. L. Kostick. 2017. Bethel subsistence, 2012: Wild resource harvests and uses, land use patterns, and subsistence economy in the hub community of the Yukon-Kuskokwim Delta, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 393, Fairbanks.


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