

Assessment of the 1988-89 Kaktovik
Subsistence Fishery

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I always enjoy working in Kaktovik and hope this work will in some small but meaningful way become useful for the community in its struggle to blend their unique subsistence way of life with the press of industrial development.

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the data analysis and edited this report. His assistance and support is gratefully acknowledged.

STATEMENT OF THE RESEARCH PROBLEM

Introduction

This study is the second of two projects conducted in state fiscal year 1989 by Arctic Region staff of the Division of Subsistence, Alaska Department of Fish and Game (DFG), in cooperation with the U.S. Fish and Wildlife Service (FWS). The first project was an assessment of the 1987-88 subsistence caribou harvest in Kaktovik, a predominantly Inupiat community located on Barter Island in northeast Alaska (see Fig. 1). This was the latest in a series of harvest monitoring studies conducted there by the Division of Subsistence beginning in the late 1970s (Pedersen 1979 and 1981; Pedersen and Coffing 1984; Coffing and Pedersen 1985; Pedersen 1989a). The 1987-88 caribou harvest has been analyzed and a report drafted (Pedersen 1989a).

This report examines selected dimensions of the subsistence fishery in Kaktovik. The study was designed to develop information required by the FWS to evaluate the potential effects of oil and gas development on subsistence uses in the ANILCA Section 1002 Area of the Arctic National Wildlife Refuge (ANWR), if the Congress authorizes a leasing program there. The Division of Subsistence is applying the findings of this study to its North Slope land use assessments and views this research, and the proposed annual follow-up assessments, as an ideal opportunity to better understand the contribution of local fishing to the Kaktovik

economy. This initial cooperative project is intended to serve as the foundation for a proposed five-year collaborative longitudinal investigation of the Kaktovik subsistence fishery by the DFG and FWS. Funding for study years 2-5 has not yet been secured.

Background

Subsistence fishing is an important seasonal activity in Kaktovik, with most effort occurring during the summer months. Although the fishery has been described by several authors (e.g., Craig 1987, Pedersen, Coffing, and Thompson 1985; Jacobson and Wentworth 1982), harvest data are less well-documented (Craig 1987). Pedersen (1989b) has summarized Kaktovik subsistence fishery information collected by the Division of Subsistence and points to the need for more detailed data if the potential effects of industrial development on this resource are to be better understood.

Purpose of Study

This study had four primary purposes:

1. To review and update the existing Kaktovik subsistence fishing area maps, and identify the areas considered most productive over time for fish;
2. to assemble and summarize existing subsistence fishery information for the community, including harvest data, species harvested, and areas used;
3. to identify the primary modes of access from Kaktovik to subsistence fishing areas; and

4. to record harvest estimates of fish taken during the 12-month period immediately preceding the study.

Research Objectives

Five research objectives were identified for this study:

1. Reviewing and updating, as necessary, the existing subsistence fishing area maps, and documentation of areas considered most productive over time;
2. mapping of subsistence fishing areas used during 1988-89;
3. describing transportation methods used to access fishing areas from Kaktovik in 1988-89;
4. estimating community fish harvest levels, by species, for the 12-month period immediately preceding the study; and
5. identifying the most active fishing households in the community.

Research Questions

Refer to the survey form in Appendix A for a complete listing of the research questions. A similar questionnaire has been used in previous Kaktovik harvest monitoring surveys.

Rationale and Literature Review

At least 14 species of freshwater and marine fish are utilized by Kaktovik residents as food resources (Table 1) (Jacobsen and Wentworth 1982; Pedersen, Coffing and Thompson 1985; Craig 1987). Fish constitute as much as 19 percent of locally harvested resources (Pedersen 1989a) in some years

and may at times play an even greater economic role in the community (Stoker 1984).

METHODOLOGY

General Research Design

This descriptive quantitative community-based study was conducted by the Division of Subsistence, with field assistance provided by a local bilingual resident of Kaktovik. Quantitative data were gathered through a community survey designed to answer specific research questions pertaining to fishing, and the sharing of harvested fish, by Kaktovik households during the period July 1, 1988, through June 30, 1989. Existing maps of subsistence fishing areas were reviewed for accuracy with key informants from the community.

Sample

The goal of the quantitative portion of this study was to survey all Kaktovik households resident in the community during the study period (July 1, 1988, to June 30, 1989). There were an estimated 220 persons in 62 households in the community during fieldwork for the 1987-88 caribou survey; based on a close review of this information only minor household changes were noted between the two surveys.

Five households associated with the Kaktovik school were not included in the survey. School teachers generally are not integrated in the community, are not year-round

residents and do not appear to either hunt or fish as members of the Kaktovik community.

Procedures

The study concept and plan were first reviewed by the FWS and the North Slope Fish and Game Management Committee before being presented for approval to members of the Kaktovik City Council. Local officials supported the proposed project and did not recommend any changes to the draft plan. Participation in the study was voluntary and all household identifier information was coded in order to facilitate confidentiality.

Methods-Instrumentation

The primary methods of data collection were consultation with active resource harvesting households, especially those which utilize the ANWR 1002 Area, (Objective 1), and structured interviews using a standard survey instrument (Appendix A) with Kaktovik households that participated in the 1988-89 subsistence fishery (Objectives 2-4). Inquiries focused on reviewing and updating existing subsistence fishing area maps (on 1:250,000 USGS quads and field maps); identifying modes of transportation to and from fishing areas; recording estimated fish harvest levels, by species, for the preceding 12 months; and documenting the months during which fishing activities were conducted.

Fieldwork was scheduled during the period May-June 1989, at a time when Kaktovik residents were not actively engaged in resource harvesting. Interviews were conducted in the respondents' homes at times convenient to them. Inquiries focused specifically on subsistence fishing. Collection of household demographic and socioeconomic information was not planned, as these data could be derived from the caribou harvest monitoring survey conducted in the fall of 1988 (except for households known to have changed substantially during the interim). Kaktovik schoolteachers were contacted informally in order to verify the nature and extent of their participation in the local subsistence fishery.

All survey responses were entered by the interviewer on the questionnaire and accompanying map. Mapped information was recorded on field maps and on USGS 1:250,000 quads. Additional contextual information was recorded in field notebooks.

Data Analysis

Household survey data were coded by the author and entered on microcomputer by a data entry clerk. Tabulation of the 1988-89 community fish harvest and socioeconomic data was performed by the Division's Data Management staff utilizing SPSS PC+ software.

This report focuses on assessing the known and estimated community fish harvest for regulatory year 1988-89. Known and estimated community harvests were computed and compared to the totals from previous years. The community data were also categorized on the basis of species harvested.

Information on community harvest locations was collected from five households known to be high fish harvesters over time and compared to the community "general" fishing area maps developed previously (Pedersen, Coffing and Thompson 1985). Areas considered most productive for fishing in the Kaktovik area were also outlined by the same five households. In addition, fishing locations which consistently appeared in earlier surveys were included in this derivation. This facilitated comparisons of current

harvest locations with areas previously designated as having special status to Kaktovik fishers.

Methods used in accessing harvest areas were compiled on a community basis and categorized as to season of use. The estimated number and pounds of fish, by species, harvested by households were computed. An estimated household fish harvest level was computed and compared to previous estimates.

Conversion factors used in changing number of fish caught to estimated total pounds harvested by species were derived from several sources (Appendix B). Because local live weight and utilized weight data on the species harvested by Kaktovik fishers are not available, the conversion from "numbers harvested" to "amount harvested in pounds" estimate may be subject to some error. In general however, based on personal observation and participation, live and utilized weights are nearly identical. This is because the majority of fish caught are frozen in the round, and consumed as "quaq" (un-cooked; frozen) without further processing. Thus, for the purposes of this report, the entire weight of the fish (live weight) is the utilized weight.

RESULTS

Systematic survey of community households and collection of key informant information were undertaken in June and July 1989. Fishing typically does not take place during this period and other harvesting activities occur near the community at this time. Thus, households are relatively easy to contact and are minimally inconvenienced during this period. Spring came late in 1989 and fortuitously (for this project) delayed the onset of active fishing by Kaktovik households an extra two weeks. This helped considerably in carrying out the survey efficiently, and also minimized the chance of fishers unintentionally misreporting their seasonal harvest figures due to overlapping fishing activity from one year to the next.

Only households which had resided in the community for more than six months and were locally considered "full-time residents" were included in the survey. A total of 61 households conforming to this standard were identified in the community. Five households consisting of school teachers were not included, as informal visits with them determined that they had not fished during the study period. One other household had only been in the community for a short period, and did not meet the residency requirement. Thus, although there were 67 households resident in the community in 1988-89, only 61 qualified for inclusion in the survey.

The goal of this project was to interview all 61 eligible Kaktovik households. However, due to some of these households being away during the survey period and some not making themselves available to the interviewers, a total of 52 Kaktovik households were interviewed. Participation rate in the survey was 85 percent, based on total number of full-time, year-round households in the community.

Sociocultural information collected immediately preceding this survey (Pedersen 1989a) indicated that the community sex ratio was balanced in favor of males (41 percent females to 59 percent males), and the average household size was 3.7 persons. Based on this average household size figure, the estimated year-round population in Kaktovik was 226 persons in 61 households. The total maximum community population for the study period, was an estimated 247 persons in 67 households.

Other relevant information from the preceding survey included the findings that over 70 percent of surveyed heads of household were born and raised in the Kaktovik area; the community is predominantly Inupiat (91 percent) and fully 80 percent are fluent in Inupiaq; 90 percent of Kaktovik households surveyed had a relative living in the area before they settled there; 98 percent of households had used locally harvested resources in the last 12 months and 92 percent reported having harvested local resources during the study period.

Survey findings relating to objectives of this report are presented in Tables 2 through 7 and Figures 2 through 4. General use and harvest information are summarized first, followed by resource specific harvest data and relevant community socioeconomic information.

Mapped subsistence fishing area information for Kaktovik (Figure 2) conformed closely with earlier documentation. Areas tentatively considered most productive over time are shown in Figure 3. Subsistence fishing areas used by surveyed Kaktovik households during 1988-89 appear in Figure 4.

Transportation methods used to access Kaktovik fishing areas in 1988-89 are shown in Table 2. General sample information on use, harvest, and sharing of species taken by Kaktovik fishers is summarized in Table 3.

Community subsistence fish harvest estimates by species and in total for the community during the study period are shown in Tables 4 and 5. Results indicating subsistence fish harvest in numbers and pounds caught by species, by household, for the study period are shown in Tables 6 and 7.

DISCUSSION

Kaktovik Subsistence Fishing Areas

Fishing activity in Kaktovik occurs over a large area (Fig.2) (Pedersen, Coffing and Thompson 1985; Jacobson and Wentworth 1982). During this study fishers ranged from the Alaska-Canada border in the east to the Canning River delta in the west, a distance of over 125 miles along the coast. They travelled inland 60 miles or more to reach traditional fishing areas on the Hulahula River and at Schrader Lake. At both Kongakut River in the east and the Canning River in the west, fishers also travelled over 25 miles upriver in search of good fishing places.

Coastal fishing is primarily a summer (ice-free season) activity and fishers typically access their sites in small open outboard powered aluminum boats (Lund-type with 60-80 horsepower motors). The majority of summer fishing is done with gill nets set out from shore, usually on the inside (shore side) of protected bays or barrier islands.

Winter (when the ocean is ice covered and snow is present) fishing is ordinarily done through river or lake ice, typically by jigging through a hole chipped in the ice at a known productive location. However, there are several areas on local rivers that are spring fed and where ice does not usually form during winter. At these locations fishers either employ small nets in the river or fish by hook-and-

line. Winter fishing sites currently are accessed by snowmachine.

Fishing areas considered most productive over time (Fig.3) lie scattered to the east, south and west of the community, some over 60 miles away. All areas fall within the previously designated community fishing area (Pedersen, Coffing and Thompson 1985).

At least sixteen distinct fishing areas were used by Kaktovik subsistence fishers during 1988-89 (Fig.4). The most commonly used areas were those near the community on the coast and those located on the Hulahula River to the south and inland from the community.

Coastal fishing areas were used most extensively during the summer season and produced Arctic char, Arctic cisco, and some salmon (pink and chum). Net and hook-and-line fishing constituted the only gear types noted in the survey period. In early fall, during whaling and immediately after, some fishers caught modest numbers of small Arctic cod on jigging gear fished through the ocean ice near the community. Some of these fish were caught by fishers on floating ice some distance offshore (while whaling) before the ice became shorefast.

Inland fishing areas were used exclusively during winter when snow on the ground made it possible to reach these areas (rivers are too shallow to permit boating in this part of the North Slope) by snowmachine.

Transportation Methods Used to Access Fishing Areas

Seasonal and environmental conditions dictate equipment used in accessing Kaktovik fishing areas. Because rivers are too shallow to navigate much beyond their deltas, upriver fishing takes place when overland transportation is easiest. Currently this is when the ground is snow covered and snowmachine travel is possible. Access to fishing areas during the snow season is almost exclusively by snowmachine (Table 2); however, some jigging for Arctic cod through the ocean ice near the community in October is supported by three-wheel motorcycles (although our survey did not record this occurring in 1988-89).

Winter fishing is less intensive than summer fishing, as evidenced in our findings. Twenty-three percent of Kaktovik fishing households used snowmachines to support their winter fishing activities, whereas 56 percent used a boat and 35 percent relied on 3-wheelers to access summer fishing areas. Other summer transportation used by less than 4 percent of the households included pickup truck and foot travel.

Field observations suggest that boat supported fishing generally involves net-fishing, whereas 3-wheeler fishing for the most part is hook-and-line (particularly in locations near the community). Some summer net-fishing areas, such as those at the east end of Barter Island, are accessed by 3-wheelers using established travel routes, but boats typically are used to check nets. Fishing sites at the

west end of Barter Island are also reached by 3-wheelers at times, but again with few exceptions, boats are employed in setting and checking the net(s).

Use and Sharing of Kaktovik Subsistence Fish Harvest

In 1988-89, 96 percent of Kaktovik households used Arctic char and 92 percent used Arctic cisco for food (Table 3), clearly indicating the value placed on these two species as subsistence foods in the community. Together they form the mainstay of the local subsistence fishery. Arctic cod was ranked third in terms of household use in 1988-89, followed by grayling and lake trout.

At the time of this study, two community residents owned sled-dogs teams (one numbering 4-5 dogs, and the other 12-15 dogs). Both dog-teams were fed relatively small amounts of, primarily Arctic cisco.

Sharing of the 1988-89 fish harvest remained high. More than half of the households gave away Arctic char and Arctic cisco and nearly three-quarters of community households received a share of these resources (Table 3). Although quantities given or received were not specified, field observations indicate that successful households were liberal in sharing with others, whether the catch was large or small.

Estimated 1988-89 Kaktovik Subsistence Fish Harvest Level

Numerically, Arctic cisco dominated the 1988-89 catch with a harvest of 7,020 reported by the households surveyed (Table 4) and an estimated community catch of 8,235 fish (sample figure expanded to 61 households). Kaktovik fishers caught an estimated 2,343 Arctic char and 1,368 Arctic cod year. A small number of grayling, lake trout, and Arctic flounder also were harvested (Table 4).

The subsistence fish harvest by (live) weight for the 1988-89 household sample was 11,000 pounds, or 212 pounds per household (Table 5). Expanded to the total community estimate (from 52 to 61 households), the harvest was about 12,900 pounds. Arctic char and Arctic cisco made up over 96 percent of the catch, with Arctic cod a distant third at 3 percent.

The estimated fish harvest for 1988-89 is slightly higher than the 1985-86 figure of (12,049 pounds) (Pedersen 1986), but substantially higher than the estimate of 6,949 pounds from 1986-87 (Pedersen 1987). Stoker (1984) estimated that the annual Kaktovik subsistence fish harvest averaged 7,045 pounds over the period 1962-82. This average is considerably lower than the three-year databased average of 10,633 pounds we have computed for the 1980s.

Household Level Fishing Activity

Forty (77 percent) and thirty-seven (71 percent) of the households in the sample harvested Arctic char and Arctic

cisco, respectively, during the study period (Table 6). The highest individual household harvest of Arctic char, by weight, was 409 pounds, whereas for Arctic cisco it was 727 pounds (Table 7). This is a result of Arctic char tending to be more numerous at the beginning of the summer net-fishing season, and Arctic cisco, the preferred species, being more abundant later in the summer, when more fishing activity takes place. Four households each harvested more than 400 pounds of cisco, whereas only one household took over 400 pounds of char during the study period.

Five of thirty-seven households (14 percent) produced over half of the Arctic cisco harvest, with the highest producing household accounting for over 10 percent of the harvest. With respect to Arctic char, eleven of forty (28 percent) households harvested over half of the annual known harvest. Thus, as has been found with respect to other resources in Kaktovik and other rural communities, a few households produce much of the community harvest of selected resources. Taken together with the strongly rooted tradition of sharing harvested resources in Kaktovik, it becomes clear that resource harvesting and distribution is a complex local economic system, in which fishery resources play a significant role.

Contribution of the Fishery to the Local Subsistence Economy

Fish typically comprise about 20 percent of all resources harvested by Kaktovik for local use, ranking

second and sometimes third (after marine mammals and/or caribou) in overall contribution to the local resource-based economy. For this reason and because fish are taken at times when other resources are not readily available, fish are an important contributor to the local subsistence economy (Stoker 1984; Pedersen 1986, 1987, 1988).

Quantitative information on the harvest of other resources is not available for the study period. Based on field observations and discussions with selected community harvesters during this study, however, community harvests for the year appeared typical with the exception of a particularly low caribou harvest. In terms of rank order, based on pounds harvested, fish probably were second in importance only to marine mammals during 1988-89.

SUMMARY

A systematic survey of Kaktovik households in 1989 revealed that over 90 percent of the households had used locally harvested fish for food during the study period (July 1988 through June 1989). An estimated 12,900 pounds of fish were taken by local fishers. Over 90 percent of the catch was composed of Arctic char and Arctic cisco (roughly equal contributions) mainly harvested during the summer using beach-set gill nets. Fishing sites as far east as the Alaska-Canada border, and as far west as the Canning River were visited. Active fishing was concentrated on or in the immediate vicinity of Barter Island. The main summer transportation mode to fishing areas was by boat, but 3-wheelers also were used. Winter transportation to fishing areas was exclusively by snowmachine.

Fish were shared widely in the community, and probably constituted the second largest contribution to the community's local resource based economy in 1988-89. The importance of the fishery resource to the community's well being must not be underestimated.

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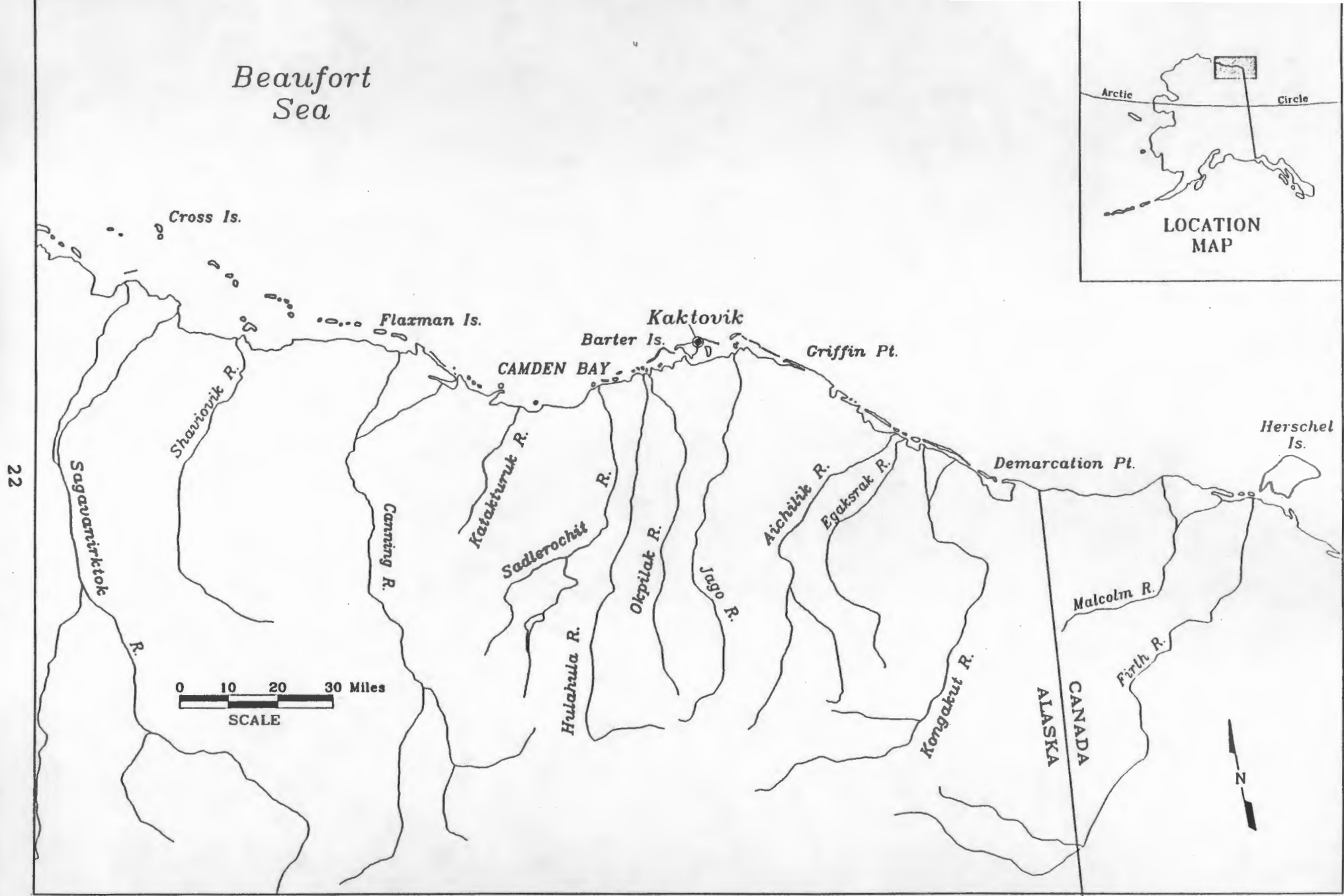


Figure 1. Map of Study Area in NE Alaska.

Table 1. Fish Species Harvested by Kaktovik Residents
in the 1980's.

Category	Inupiaq ¹	Scientific ²
<u>FISH</u>		
Arctic char	Igalukpak	<u>Salvelinus alpinus</u>
Whitefish		
Arctic cisco	Qaaktaq	<u>Coregonus autumnalis</u>
Least cisco	Igalusaag	<u>Coregonus sardinella</u>
Broad whitefish	Aanaaktiq	<u>Coregonus nasus</u>
Round whitefish	Savigunaq	<u>Prosopium cylindraceum</u>
Ling cod	Tittaaliq	<u>Lota lota</u>
Grayling	Sulukpaugaq	<u>Thymallus arcticus</u>
Chum salmon	Igalugruaq	<u>Oncorhynchus keta</u>
Pink salmon	Amactuiq	<u>Oncorhynchus gorbuscha</u>
Arctic flounder	Nataagnaq	<u>Lisopsetta glacialis</u>
Fourhorned sculpin	Kanayuiq	<u>Myoxocephalus quadricornis</u>
Lake trout	Igalukpak or Paganilik	<u>Salvelinus namaycush</u>
Arctic cod ("tomcod")	Dugaq	<u>Boreogadus saida</u>
Rainbow smelt	Ithuaqniq	<u>Osmerus mordax</u>

This is a listing of all locally harvested fish species used by Kaktovik residents in the 1970s and 1980s (Jacobson and Wentworth 1982; North Slope Borough 1979). Use of additional fish species is known to occur from time to time. Consult with the community for definitive information.

¹ Inupiaq names are from NSB (1978), Pedersen (1979), Jacobson and Wentworth (1982) and local residents in Kaktovik. The orthography used is that of the University of Alaska Native Language Center.

² The scientific names listed here are from Morrow (1980) and U.S. Fish and Wildlife Service (1982).

Table 2. Transportation Methods Used to Access Kaktovik Subsistence Fishing Areas in 1988-89.

Usual Transportation to Get to Fishing Area	Season of Fishcamp					
	Summer		Winter		Missing	
	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households
Missing	4	7.7%	1	1.9%	1	1.9%
Boat	29	55.8%			1	1.9%
Snowmachine			12	23.1%		
3-Wheeler	18	34.6%				
Other	2	3.8%				

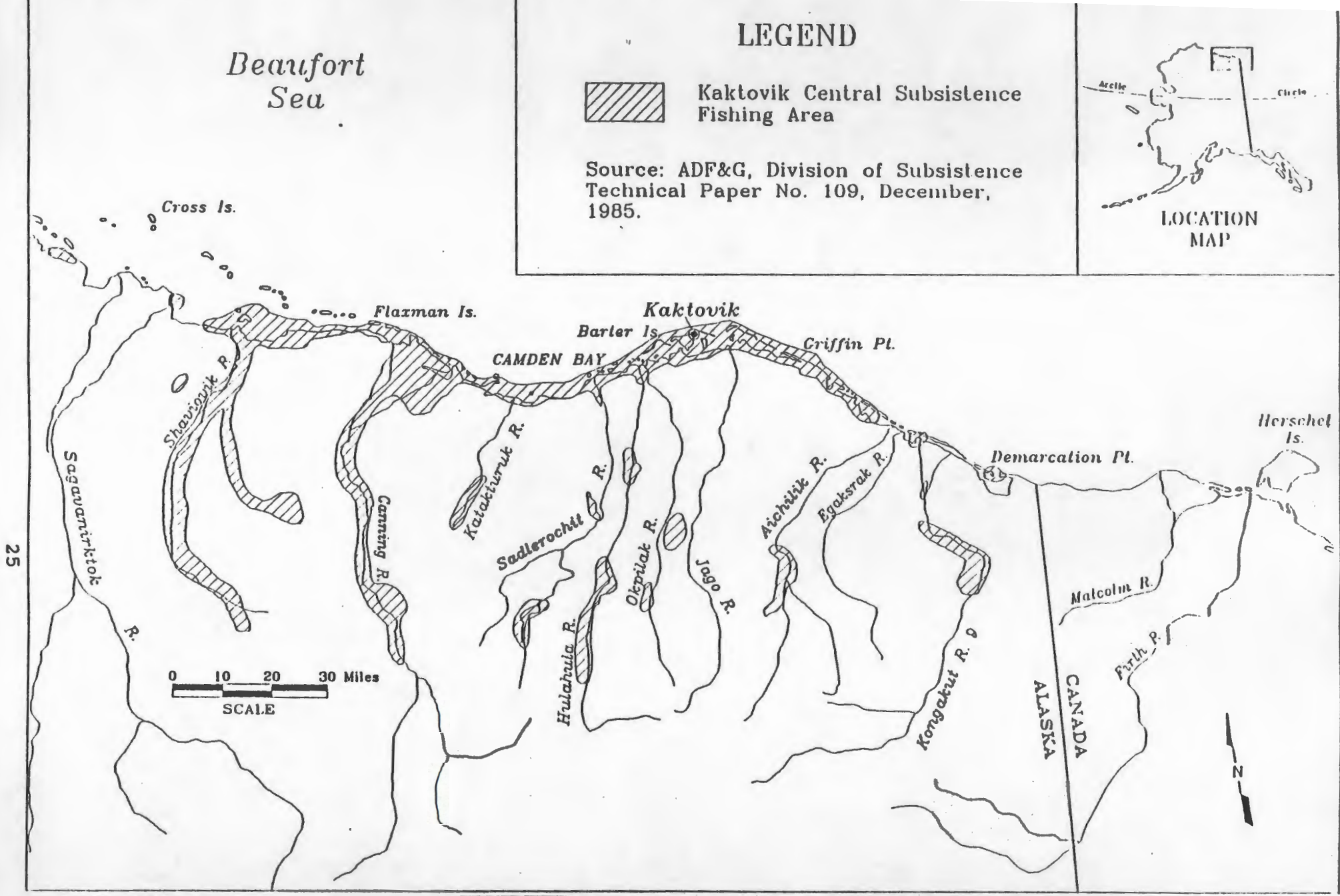


Figure 2. Map of Kaktovik Central Subsistence Fishing Area.

LEGEND

● Kaktovik Subsistence Fishing Areas Considered Most Productive Over Time

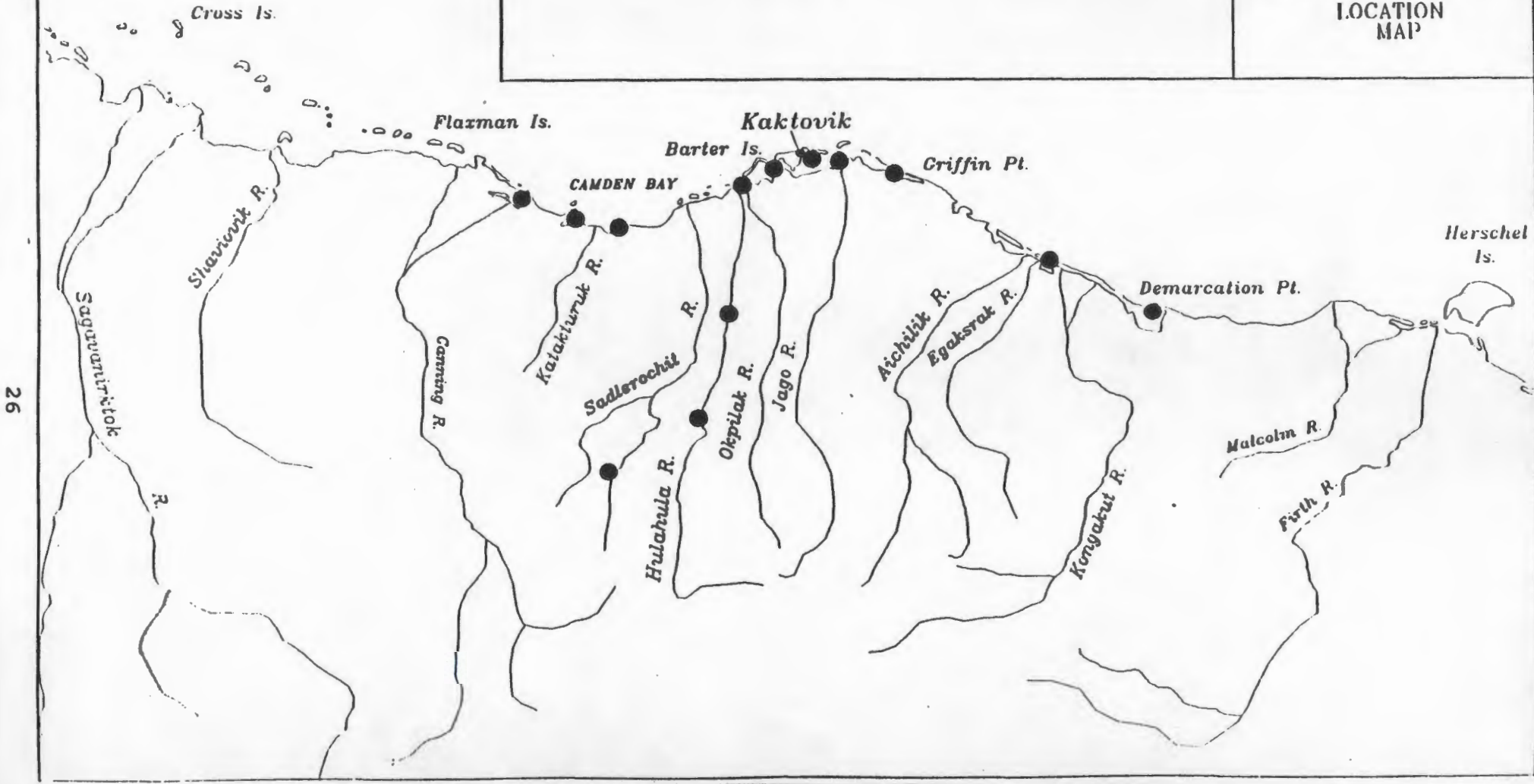


Figure 3. Map of Kaktovik Subsistence Fishing Areas Considered Most Productive Over Time.

LEGEND

● Kaktovik Subsistence Fishing Areas Used In The Study Period 1988-1989.

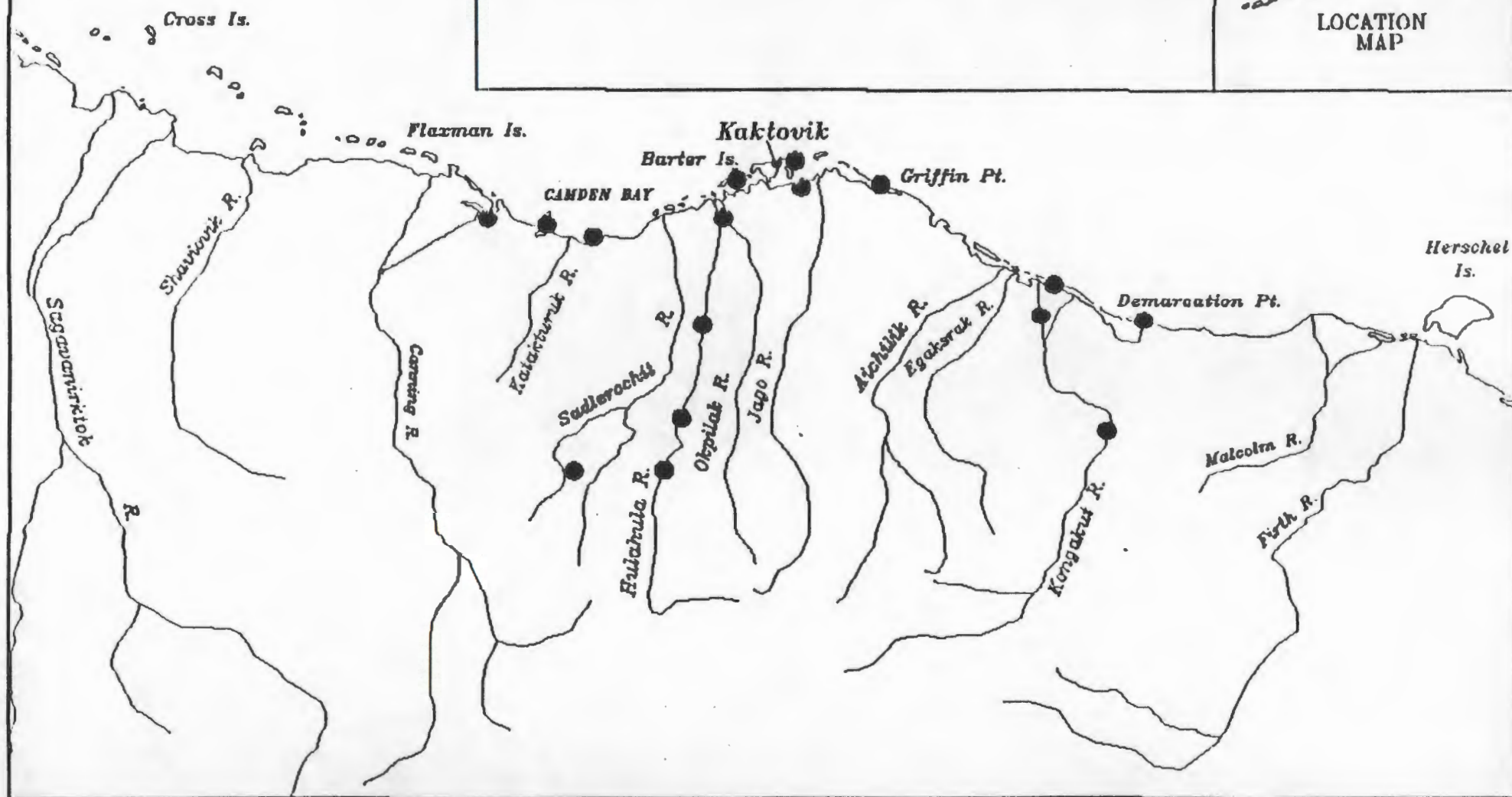


Figure 4. Map of Kaktovik Subsistence Fishing Areas Used in the Study Period 1988-89.

Table 3. Survey Sample Information on Use, Harvest, and Sharing of 1988-89 Kaktovik Subsistence Fish Harvest.

	RESOURCE							
	Arctic Cisco		Arctic Cod		Grayling		Flounder	
	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households
Household Used Resource								
No	4	7.7%	36	69.2%	40	76.9%	51	98.1%
Yes	48	92.3%	16	30.8%	12	23.1%	1	1.9%
Household Attempted to Harvest Resource								
No	14	26.9%	38	73.1%	44	84.6%	51	98.1%
Yes	38	73.1%	14	26.9%	8	15.4%	1	1.9%
Household Harvested Resource								
No	15	28.8%	38	73.1%	44	84.6%	51	98.1%
Yes	37	71.2%	14	26.9%	8	15.4%	1	1.9%
Household Gave Away Resource								
No	22	42.3%	46	88.5%	49	94.2%	52	100.0%
Yes	30	57.7%	6	11.5%	3	5.8%		
Household Received Resource								
No	15	28.8%	47	90.4%	44	84.6%	52	100.0%
Yes	37	71.2%	5	9.6%	8	15.4%		

	RESOURCE					
	Arctic Char		Lake Trout			
	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households
Household Used Resource						
No	2	3.8%	44	84.6%		
Yes	50	96.2%	8	15.4%		
Household Attempted to Harvest Resource						
No	11	21.2%	49	94.2%		
Yes	41	78.8%	3	5.8%		
Household Harvested Resource						
No	12	23.1%	49	94.2%		
Yes	40	76.9%	3	5.8%		
Household Gave Away Resource						
No	19	36.5%	51	98.1%		
Yes	33	63.5%	1	1.9%		
Household Received Resource						
No	15	28.8%	46	88.5%		
Yes	37	71.2%	6	11.5%		

Table 4. Survey and Estimated 1988-89 Kaktovik Subsistence Fish Harvest in Number by Species.

<u>Resource</u>	<u>No. of Households</u>	<u>Number Harvested</u>		
		<u>Sum</u>	<u>Mean</u>	<u>S.D.</u>
Arctic Cisco	52	7020.00	135.00	216.73
Arctic Cod	52	1166.00	22.42	55.00
Grayling	52	157.00	3.02	11.76
Arctic Flounder	52	2.00	0.04	0.28
Arctic Char	52	1997.00	38.4	37.13
Lake Trout	52	16.00	0.31	1.39

<u>Resource</u>	<u>No. of Households</u>	<u>Number Harvested</u>		
		<u>Sum</u>	<u>Mean</u>	<u>S.D.</u>
Arctic Cisco	61	8235.00	135.00	216.73
Arctic Cod	61	1367.81	22.42	55.00
Grayling	61	184.22	3.02	11.76
Arctic Flounder	61	2.44	0.04	0.28
Arctic Char	61	2342.40	38.4	37.13
Lake Trout	61	18.91	0.31	1.39

Table 5. Survey and Estimated 1988-89 Kaktovik Subsistence Fish Harvest in Pounds by Species.

Survey

<u>Resource</u>	<u>No. of Households</u>	<u>Pounds Harvested</u>		
		<u>Sum</u>	<u>Mean</u>	<u>S.D.</u>
Arctic Cisco	52	4914.00	94.50	151.71
Arctic Cod	52	291.50	5.61	13.75
Grayling	52	141.30	2.72	10.59
Arctic Flounder	52	1.00	0.02	0.14
Arctic Char	52	5591.60	107.53	103.98
Lake Trout	52	64.00	1.23	5.58

Total		11003.40	211.61	

Community Estimate

<u>Resource</u>	<u>No. of Households</u>	<u>Pounds Harvested</u>		
		<u>Sum</u>	<u>Mean</u>	<u>S.D.</u>
Arctic Cisco	61	5764.50	94.50	151.71
Arctic Cod	61	342.21	5.61	13.75
Grayling	61	165.92	2.72	10.59
Arctic Flounder	61	1.22	0.02	0.14
Arctic Char	61	6559.33	107.53	103.98
Lake Trout	61	75.03	1.23	5.58

Totals		12908.21	211.61	

Table 6. Survey Sample Information on 1988-89 Kaktovik Household Subsistence Fish Harvest in Number Harvested by Species.

	RESOURCE					
	Arctic Char		Lake Trout			
	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households
Number Harvested						
.00	12	23.1%	49	96.2%		
1.00	1	1.9%				
2.00	1	1.9%	1	1.9%		
4.00	1	1.9%				
5.00						
6.00			1	1.9%		
8.00			1	1.9%		
10.00	1	1.9%				
12.00						
15.00						
18.00	1	1.9%				
20.00	4	7.7%				
21.00						
24.00						
25.00	5	9.6%				
30.00	2	3.8%				
32.00	1	1.9%				
35.00	1	1.9%				
40.00	2	3.8%				
50.00	6	11.5%				
55.00	1	1.9%				
60.00	1	1.9%				
70.00						
75.00	5	9.6%				
80.00	1	1.9%				
95.00	1	1.9%				
100.00						
110.00	4	7.7%				
140.00						
145.00	1	1.9%				
200.00						
216.00						
280.00						
300.00						
520.00						
600.00						
700.00						
1039.00						

Table 6 cont.

	RESOURCE							
	Arctic Cisco		Arctic Cod		Grayling		Flounder	
	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households
Number Harvested								
.00	15	28.8%	38	73.1%	44	84.6%	51	98.1%
1.00	2	3.8%						
2.00					1	1.9%	1	1.9%
4.00								
5.00					1	1.9%		
6.00			1	1.9%				
8.00								
10.00					3	5.8%		
12.00	1	1.9%						
15.00			2	3.8%				
18.00								
20.00	3	5.8%			2	3.8%		
21.00	2	3.8%						
24.00	1	1.9%						
25.00	2	3.8%	1	1.9%				
30.00	1	1.9%	1	1.9%				
32.00								
35.00			1	1.9%				
40.00	1	1.9%						
50.00								
55.00								
60.00								
70.00	1	1.9%	4	7.7%				
75.00	1	1.9%						
80.00					1	1.9%		
95.00								
100.00	6	11.5%						
110.00								
140.00	1	1.9%	2	3.8%				
145.00								
200.00	6	11.5%	1	1.9%				
216.00	1	1.9%						
280.00			1	1.9%				
300.00	3	5.8%						
520.00	1	1.9%						
600.00	1	1.9%						
700.00	2	3.8%						
1039.00	1	1.9%						

Table 7. Survey Sample Information on 1988-89 Kaktovik Household Subsistence Fish Harvest in Pounds Harvested by Species.

Pounds	RESOURCE							
	Arctic Cisco		Arctic Cod		Grayling			
	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households
1.50			1	1.9%				
1.80					1	1.9%		
2.80								
3.75			2	3.8%				
4.50					1	1.9%		
5.60								
6.25			1	1.9%				
7.50			1	1.9%				
8.00								
8.40	1	1.9%						
8.75			1	1.9%				
9.00					3	5.8%		
11.20								
14.00	3	5.8%						
14.70	2	3.8%						
16.80	1	1.9%						
17.50	2	3.8%	4	7.7%				
18.00					2	3.8%		
21.00	1	1.9%						
24.00								
28.00	1	1.9%						
32.00								
35.00			2	3.8%				
49.00	1	1.9%						
50.00			1	1.9%				
50.40								
52.50	1	1.9%						
56.00								
70.00	6	11.5%	1	1.9%				
72.00					1	1.9%		
84.00								
89.60								
98.00								
112.00	1	1.9%						
140.00	6	11.5%						
151.20	1	1.9%						
154.00								
168.00								
210.00	3	5.8%						
224.00								
266.00								
308.00								
364.00	1	1.9%						
406.00								
420.00	1	1.9%						
490.00	2	3.8%						
727.30	1	1.9%						

Table 7 cont.

Pounds	RESOURCE					
	Arctic Char		Lake Trout			
	No. of Households	% of Households	No. of Households	% of Households	No. of Households	% of Households
1.50						
1.80						
2.80	1	1.9%				
3.75						
4.50						
5.60	1	1.9%				
6.25						
7.50						
8.00			1	1.9%		
8.40						
8.75						
9.00						
11.20	1	1.9%				
14.00						
14.70						
16.80						
17.50						
18.00						
21.00						
24.00			1	1.9%		
28.00	1	1.9%				
32.00			1	1.9%		
35.00						
49.00						
50.00						
50.40	1	1.9%				
52.50						
56.00	4	7.7%				
70.00	5	9.6%				
72.00						
84.00	2	3.8%				
89.60	1	1.9%				
98.00	1	1.9%				
112.00	2	3.8%				
140.00	6	11.5%				
151.20						
154.00	1	1.9%				
168.00	1	1.9%				
210.00	5	9.6%				
224.00	1	1.9%				
266.00	1	1.9%				
308.00	4	7.7%				
364.00						
406.00	1	1.9%				
420.00						
490.00						
727.30						

APPENDIX A: SURVEY INSTRUMENT

KAKTOVIK HOUSEHOLD FISH HARVEST QUESTIONNAIRE
JULY 1988 THROUGH JUNE 1989

HOUSEHOLD # _____ DATE _____ INTERVIEWER _____

1. Can you tell us if the attached map of the most common fishing areas for community residents is correct:

Use attached map

2. What species of fish are caught in these areas?
(A= Arctic Cisco; C= Arctic Char; G= Grayling; L= Lake Trout)- mark on map as well

3. When is each area/place used (what time of year do people go to these places/areas)?

4. Does this household have a fish camp-- a place you go back to year after year to fish. Please locate each one on the map

Yes ___ location _____

No ___

5. At what times of the year is the fish camp generally used?

6. What species of fish are usually caught at the fish camp(s)?

7. How do you usually get to your fishing area in summer (S), fall (F), winter (W) and spring (P)?

8. Does this household usually fish with members of this household only, or with members from other households (if so which households, and what is the relationship to this household)?

9. What sorts of gear do you use to catch each type of fish (and does the gear type vary by season for each species)

10. Individual household harvest, by species (past 12 months)

Species	! Did Your Household Use? (Yes/No)	! Tried to Harvest? (Yes/No)	! Amount Harvested by Household by gear and loc.	! Months Harvested by gear and loc.	! Did you Give to and/or Recieve from another HH? (Yes/No)
Arctic char	!	!	!	!	!
Iqalukpik!	!	!	!	!	!
Arctic Cisco	!	!	!	!	!
Quaaktaq	!	!	!	!	!
Grayling	!	!	!	!	!
Sulukpaugaq	!	!	!	!	!
Ling cod	!	!	!	!	!
Tittaaliq!	!	!	!	!	!
Arctic Cod-Uugaq!	!	!	!	!	!
Lake Trout	!	!	!	!	!
Paganiluk!	!	!	!	!	!
Other	!	!	!	!	!

11. How would you rate your fishing success for the past year (poor, good, excellent)?

12. Please explain your response in #9 above.

13. Compared with five years ago, would you say that fishing in your household has

increased alot _____ decreased alot _____

increased _____ decreased _____

stayed the same _____

14. How would you rate the importance of locally caught fish in your household diet?

of little importance _____ of some importance _____

important _____ very important _____

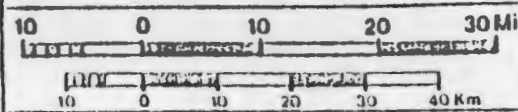
THANK YOU VERY MUCH, WE REALLY APPRECIATE YOUR TAKING THE TIME TO TELL U ABOUT YOUR HARVEST OF FISH IN THE KAKTOVIK AREA. THIS INFORMATION WILL GO A LONG WAY TOWARDS MAKING PEOPLE IN GOVERNMENT, AND ELSEWHERE MORE AWARE OF THE IMPORTANCE OF THE FISHERY RESOURCE TO KAKTOVIK RESIDENTS.

QUYANAQPUK!

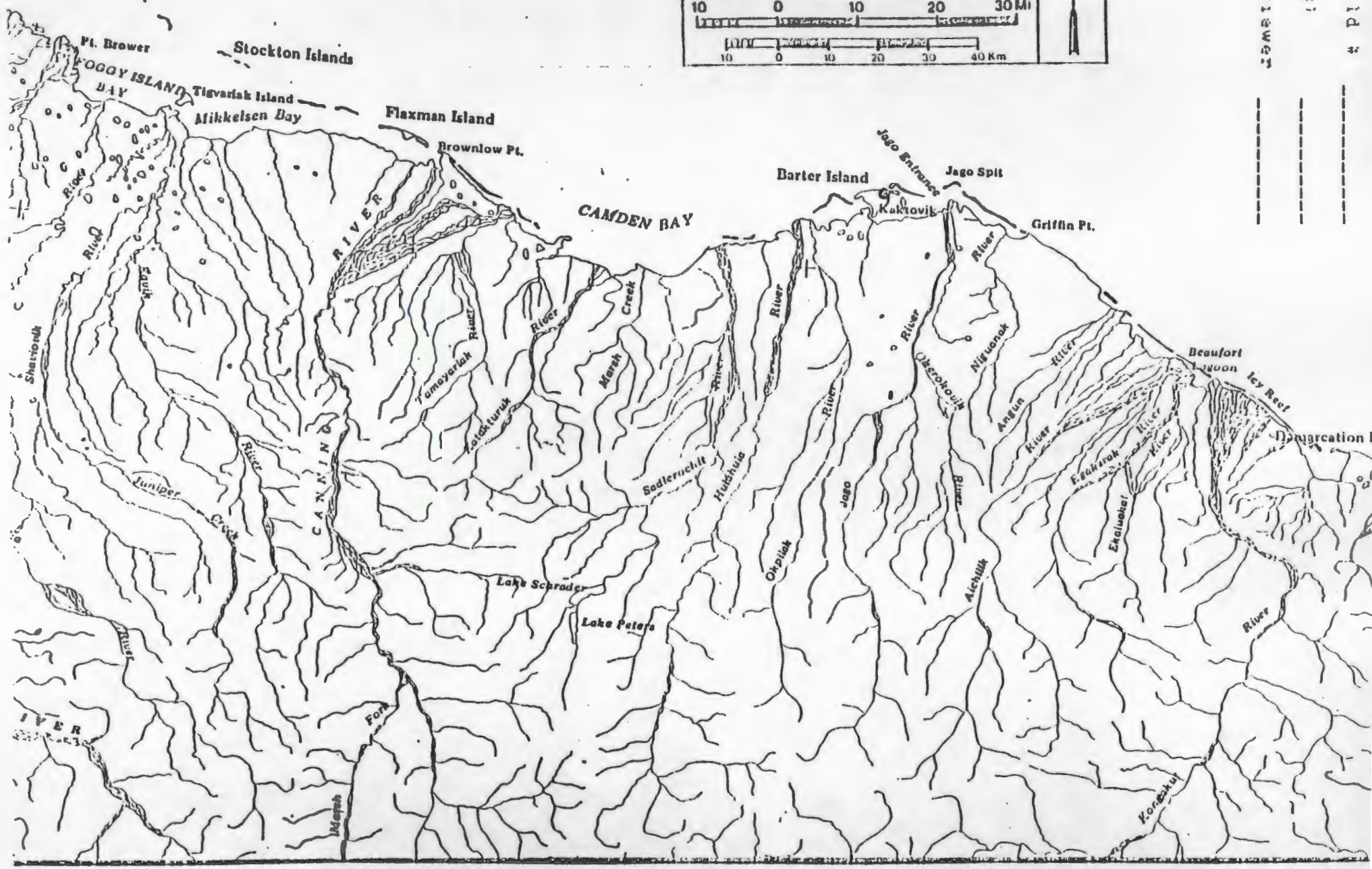
(last ed 2-27-89)

Cross Island

SOURCE
Alaska Department of Fish & Game
Division of Subsistence



Interp...
J...
household...



APPENDIX B: ESTIMATED USEABLE WEIGHTS OF SUBSISTENCE CAUGHT
FISH, KAKTOVIK, ALASKA

<u>Species</u>	<u>Estimated Useable Weight (lbs)</u>	<u>Source</u>
Arctic Char	2.8	Kaktovik Survey*
Arctic Cisco	0.7	Kaktovik Survey*
Grayling	0.9	Kaktovik Survey*
Arctic Cod	0.07	P.C. Craig 1987
Lake Trout	4.0	Kaktovik Survey*
Arctic Flounder	0.5	Kaktovik Survey*

* Researcher's Estimate (based on local sampling and numerous sources, including Craig 1987)

APPENDIX C: SUMMARY OF EXISTING KAKTOVIK
FISHERY INFORMATION

APPENDIX D: 5-YEAR KAKTOVIK SUBSISTENCE
FISHERY RESEARCH PROPOSAL TO FWS

Draft 2, 3/31/89

PROPOSED 5-YEAR COOPERATIVE STUDY:
ARCTIC NATIONAL WILDLIFE REFUGE SUBSISTENCE FISHERIES

Terry L. Haynes
Division of Subsistence
Alaska Department of Fish and Game
Fairbanks

March 1989

INTRODUCTION

The Division of Subsistence, Alaska Department of Fish and Game (DFG) and the U.S. Fish and Wildlife Service (FWS) entered into a cooperative agreement in state fiscal year 1989 to conduct subsistence research in the community of Kaktovik (Fig. 1). Under terms of the agreement, subsistence harvest data and related information are being recorded for fish and caribou taken by Kaktovik residents during the 12 months preceding the survey. Data previously collected by DFG on the subsistence fishery also are being catalogued for future reference. Fieldwork is scheduled to be completed no later than June 30, 1989, and a final report is scheduled for completion by December 31, 1989.

The prospects of continued oil and gas exploration and development on the North Slope in the 1990s, and the potential for expansion of such activities into the Arctic National Wildlife Refuge (ANWR) 1002 Area have prompted the cooperating agencies to recommend continuation of their collaborative effort for five additional years and to focus attention on the Kaktovik subsistence fishery. The FWS and DFG agree that existing biological and human use data for this fishery are inadequate to address potential management and regulatory issues arising in the context of continued industrial activities in or near ANWR. The proposed five-

year plan will link biological and subsistence fishery research efforts, and establish a cooperative working relationship with Kaktovik residents.

GOALS

The primary goals of the proposed five-year cooperative project are as follows:

(1) To develop a collaborative working relationship on subsistence fishery research between the DFG, FWS, and the community of Kaktovik;

(2) to refine current subsistence fishery harvest data collection measures used in Kaktovik, by employing strategies involving and acceptable to the community;

(3) to coordinate biological and subsistence fishery research efforts, so that a data base is developed which accurately assesses the potential effects of industrial development on ANWR fishery stocks; and

(4) to ensure that the goals and objectives of this cooperative effort are compatible with and integrated into the ANWR Fishery Management Plan when it is developed.

OBJECTIVES

Objectives for each year of the proposed five-year project will be developed as more specific information becomes available about FWS biological fishery studies planned in the ANWR area. This will ensure that appropriate linkages are made. The subsistence fishery research to be conducted in May and June 1989 also is expected to identify possible directions for consideration in future efforts. Consequently, the objectives below reflect the general areas to be pursued.

(1) First, the DFG and FWS will expand their information and education (I&E) efforts in Kaktovik concerning subsistence fishing and biological fishery research. Strategies will include describing proposed research tasks with active harvesting households and community leaders, identifying local concerns about the proposed research, and seeking ways to involve Kaktovik residents in research and monitoring efforts. Specific procedures may include meeting informally with active fishing families (instead of relying only on community meetings to disseminate information), making presentations in the Kaktovik school, hiring one or more local residents as members of the field research team, and routinely briefing community residents on research progress and findings.

(2) Harvest monitoring is a second major component of the study plan. Efforts will be made to collect data either during or soon after the two primary fish harvest periods each year. Attention may focus on specific species or specific fishing areas. Data may be collected in conjunction with DFG caribou harvest monitoring if and when feasible.

(3) Mapping of fish camps and fishing areas will be considered for inclusion in each annual plan. Geographic and locational information, in addition to distribution and use of these locations, may provide data applicable to mitigation of site-specific impacts associated with industrial development.

(4) Documentation of DFG conversion factors used for converting harvested fish into utilizeable pounds will be considered for arctic char and arctic cisco. These data will complement efforts to improve community fish harvest estimates. Successful attainment of this objective will necessitate close collaboration between the DFG, FWS, local residents and local hires from Kaktovik.

SCHEDULING

Limited data collection and an emphasis on information and education (I&E) are proposed as the focus of Year 1. Because community support is essential to the success of this project, I&E efforts will center on discussing the goals of and procedures employed in fishery research, as well as the fishery research efforts occurring in adjoining areas (e.g., Mackenzie Bay). This phase of the project is designed to identify local concerns about fishery research techniques and to heighten community awareness of the long-term value of ANWR fishery studies. Harvest data collection may proceed during the first study year but is not a primary objective.

During Years 2 - 5 harvest data collection will be emphasized, but I&E efforts will continue. Appropriate linkages will be made with biological research programs underway in ANWR. For example, if the FWS is conducting stock identification studies in particular drainages, collection of harvest data should complement this work. In-season data collection may be most extensive in Year 2, in order to provide a baseline data set to measure against existing data and to use as a basis for identifying priority information needs in future years. Involvement of local residents in data collection will be a major consideration.

The emphases during Years 3 - 5 will be determined at a later date, in consultation with the FWS and community residents.

PRODUCTS

Annual progress reports summarizing the activities of the study year will be prepared. Major accomplishments will be discussed and pertinent issues identified. The proposed activities for the next study year will be listed. Annual reports will be drafted by DFG in consultation with the FWS, and reviewed by the FWS and Kaktovik residents before being considered final documents.

If survey data are collected, they will be corrected, tabulated, and summarized, and made available to the FWS. Steps will be taken to ensure respondent confidentiality.

BUDGET

Annual operating costs to be requested from the FWS are estimated at \$20,000 - \$30,000. This will provide 2-3 months of salary support for DFG staff assigned to the project; DFG travel to Kaktovik; expenses incurred during

fieldwork; field supplies and communications; and related expenses.

Actual expenses incurred each year will depend upon the scope of project activities and whether or not the salary and support costs for local hires are to be factored into the budget. The FWS may have a more efficient process than does DFG for hiring local residents. Travel expenditures for DFG staff can be reduced if trips to Kaktovik can be scheduled when space is available on FWS aircraft.

DFG in-kind contributions will principally take the form of administrative oversight, project coordination, and continued annual caribou subsistence harvest monitoring in Kaktovik. Additionally, DFG will cover the costs of attending meetings of the North Slope Borough Fish and Game Management Committee.

Itemized annual budget requests will be prepared as needed and in consultation with the FWS.

noslope/5yrplan