

STATE OF ALASKA

Jay S. Hammond, Governor



Annual Performance Report for

INVENTORY AND CATALOGING OF SPORT
FISH AND SPORT FISH WATERS OF
WESTERN ALASKA

by

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RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations
of Alaska

Project No.: F-9-10

Study No.: G-I Study Title: INVENTORY AND CATALOGING

Job No.: G-I-P Job Title: Inventory and Cataloging of
Sport Fish and Sport Fish
Waters of Western Alaska

Period Covered: July 1, 1977 to June 30, 1978

ABSTRACT

Angler counts conducted in the Nome River between June 14 and September 4 gave an estimated count of 1,836 fishermen. Arctic char, Salvelinus alpinus (Linnaeus); chum salmon, Oncorhynchus keta (Walbaum); and pink salmon, O. gorbuscha (Walbaum), are the main species taken. In other important sport fishing streams such as the Pilgrim, Sinuk, Snake, and Niukluk-Fish rivers, Arctic char; grayling, Thymallus arcticus (Pallas); and silver salmon, Oncorhynchus kisutch (Walbaum), are target species.

Grayling surveys on the Seward Peninsula streams indicated generally low populations but large size fish. Seward Peninsula grayling grow slower than grayling from Interior Alaska streams but, because of their longer life span (up to age XI), attain larger sizes.

Arctic char are important sport fish in Seward Peninsula streams and are taken immediately after breakup and during the fall. Anadromous char ranged from 120 to 620 mm and up to 2.26 kg. Ages ranged from I to XI. Spawning and nonspawning char were found together in early September, generally in areas of chum salmon spawning.

Thirteen lakes and portions of the Noatak River and its tributaries were surveyed during July. Lake trout, Salvelinus namaycush (Walbaum); round whitefish, Prosopium cylindraceum (Pallas); pike, Esox lucius Linnaeus; least cisco, Coregonus sardinella Valenciennes; and grayling were the most common fish taken in lakes. Prespawning anadromous Arctic char were observed or captured in the Noatak River at the mouth of the Nimiuktuk, Kugururok and Kelly rivers and also up the Kelly and Kugururok rivers and their tributaries.

Basic life history information of the important species captured during the survey is presented.

RECOMMENDATIONS

1. The Nome area angler utilization study should be continued with emphasis on the Nome, Pilgrim, and Niukluk-Fish rivers.
2. A complete physical biological study should be continued on the Nome River.
3. Complete surveys should be made of lakes at the head of the Stony River in the Kuskokwim drainage under this study.

OBJECTIVES

1. To determine angler utilization in the Nome area.

BACKGROUND

The Seward Peninsula area of Western Alaska has a large number of rivers and streams draining into the Bering Sea (Fig. 1). These waters contain anadromous populations of salmon, Arctic char, and whitefish as well as fluvial populations of Arctic char, grayling and whitefish. These fish are utilized by commercial, subsistence and sport fishermen.

The Nome area, with a population of over 3,000 people, has an extensive road system (over 260 miles), making many of the streams in the area accessible to sport fishermen. Recent years have seen an increase in the commercial fishing effort in the Seward Peninsula area and especially in the Nome area.

Although it is known that streams along the road system in the Nome area receive heavy sport fishing pressure, especially for salmon and char, little information is available on the magnitude of use. In order to collect basic information on angler utilization and life history of fishes of the Nome area, a two-year study was undertaken in the summer of 1977. The 1977 study centered mainly on the Nome River, the most heavily used of the local rivers, but information on utilization was also collected from other waters in the area as time permitted. Life history information on grayling, Arctic char, and whitefish was collected. The 1978 study will include creel census activity in the Nome area as well as expanded coverage of the Niukluk-Fish River systems and the Pilgrim and Kuzitrin rivers. A physical-biological study of the Nome River will be completed in 1978. These studies will provide basic information on angling pressure and life history of the more important sport fish and assist in the apportioning of the resource among the three user groups.

Past fisheries research in the Seward Peninsula area has dealt mainly with salmon and has been conducted by the Division of Commercial Fisheries (see annual reports, Division of Commercial Fish, Nome District for various years). Sport Fish Division research in the Seward Peninsula included a brief report of angler utilization by Spetz (1969), life

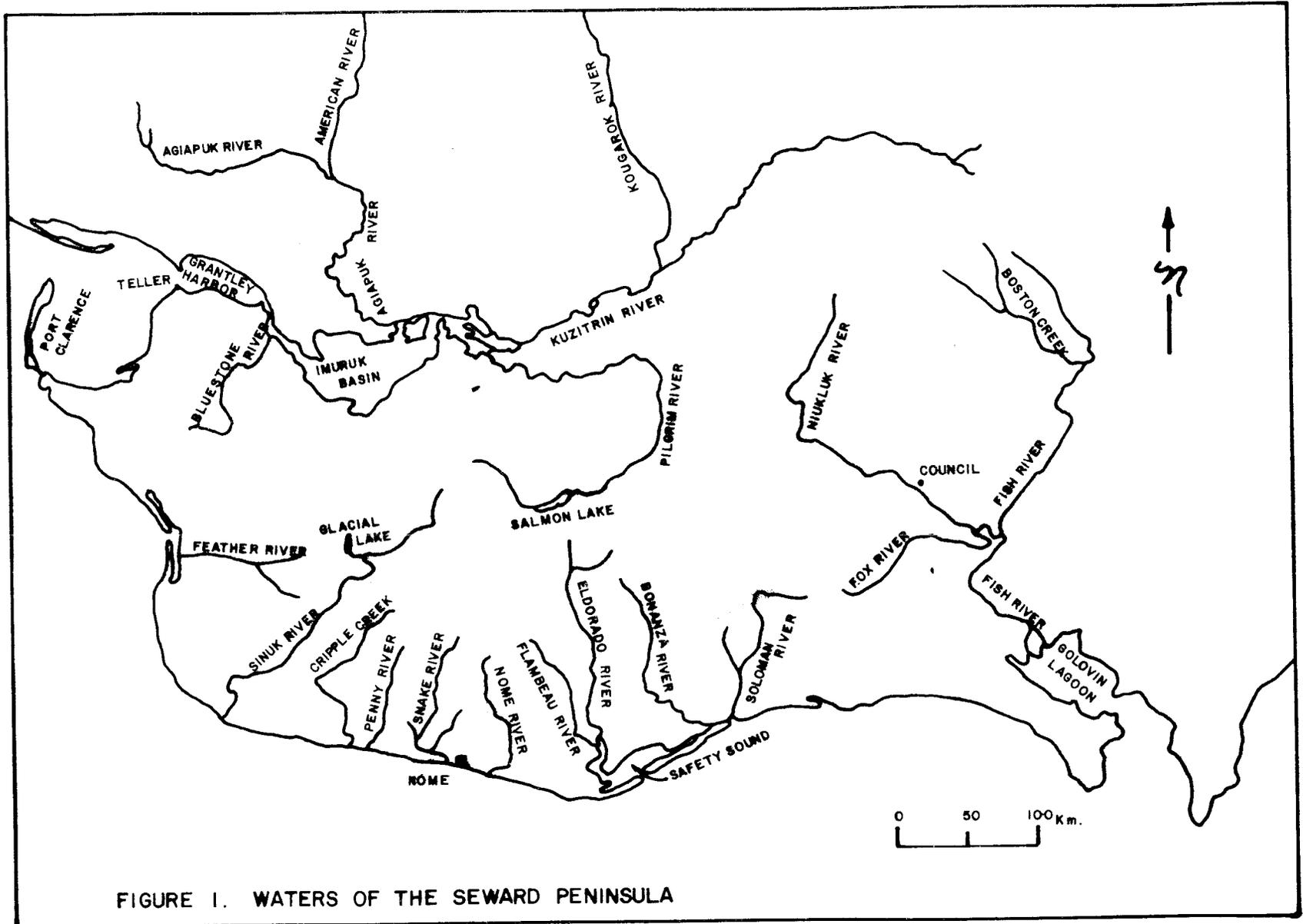


FIGURE 1. WATERS OF THE SEWARD PENINSULA

history studies on various species of whitefish (Alt, 1973; 1974) and limnological studies of the Imuruk Basin area (Alt, 1971; 1972).

The Noatak River study was designed to collect baseline information on a variety of lakes and streams and basic life history information on the fishes of the Noatak Basin. The Noatak River is receiving increased use by fishermen and recreationists and is being considered for inclusion into the National Park System. Virtually nothing is known about the sport fish resources of the Noatak Basin, although lake trout are known to inhabit lakes in the upper part of the basin and Arctic char were taken on hook and line near the Kelly River. There is a large run of chum salmon spawning in the lower Noatak River which supports an important commercial and subsistence fishery. Information on the magnitude of the run is contained in management and research reports by the Division of Commercial Fisheries, Nome District. Limited information on fish of the Noatak Basin is presented in Young, 1974 (Biological Survey of the Noatak River Valley).

TECHNIQUES USED

The creel census was not statistically designed. During each trip the biologist counted anglers and at the end of the day estimated the percentage of anglers counted. These figures were then expanded to give total estimated angler days during the season from June 14 to September 4 on the Nome River. On days when the biologist was on other duty the average number of anglers the previous day and the day following were used to estimate the number of fishermen. Fishing pressure on other streams in the study area was never as heavy as on the Nome River so only instantaneous spot counts were made. After determining that the Nome River was receiving the major amount of pressure much of the creel census effort was expended there.

Fish for life history studies were collected by hook and line, gill net and seine. Otoliths were used to age Arctic char, while scales were used for grayling and whitefish. Sex and stage of maturity were determined through gross examination of the gonads. An effort was made to differentiate between consecutive and nonconsecutive spawners by noting presence of retained eggs.

The Noatak River study was conducted between July 10 and 18 using a float equipped Cessna 185 aircraft. Twelve lakes were sampled by gill nets and hook and line, and limited angling was done in tributaries of the Noatak River and in Desperation Lake. Lakes were overflowed to assess inlets and outlets, shoal area and possible camping areas. Rivers were flown to observe bottom configuration, presence of aufeis areas, and presence of anadromous Arctic char.

In each lake one or two nets each 41 x 1.9 m with five panels ranging in mesh size from 12 to 62 mm were set for one to two nights. Nets were constructed of both monofilament and multifilament material. Only limited limnological data were collected.

Lakes were selected for sampling by the following criteria: (1) Potential for sport fishing--including scenic beauty and access to Noatak River

for float trips. (2) Type of lake. Lakes were categorized as (a) low floodplain shallow lakes generally close to the Noatak River; (b) intermediate lakes of slightly higher elevation or located along Noatak tributaries, of generally greater depths and of glacial origin; and (c) mountain lakes of still higher elevation; generally quite large, deep and of glacial origin. (3) Time and physical limitations due to fuel and airplane logistical problems.

Nets were usually set from shore except that in Feniak Lake an additional net was set in 15 m of water in the center of the lake.

Because of extremely warm water and air temperatures fish were autopsied in the field immediately. In two lakes fish were so decomposed that they could not be removed intact from the gill nets. Data collected from fish included scales and otoliths for aging, weight, fork length, stomach contents, sex and state of maturity.

Standard Fish and Game lake survey and stream survey forms were completed and placed in the files of the Fairbanks office.

FINDINGS

Fish Species Encountered

Sixteen species of fish were captured or observed during this study (Table 1).

Nome Area Angler Utilization Study

The 1977 Nome River angler count program conducted between June 14 and September 4 gave a total angler count of 1,214 fishermen. It was estimated that 66% of the anglers were contacted, thus the expanded angler count is 1,836 anglers. In 1977 there was heavy fishing pressure for Arctic char on the Nome River both before June 14 and after September 4, thus the total man-days of fishing on the Nome River would probably exceed 2,000 man-days. The average length of a fishing trip was slightly less than 3 hours.

Heaviest sport fishing use was during the period June 14-21 when the char were outmigrating and during the first two weeks of July when chum and pink salmon were available. There was a lesser peak in early September when char and silver salmon were available.

Most fishing occurs from the Nome River bridge downstream to the mouth, a distance of 0.8 km (1/2 mile). Later in the fall most fishing for grayling, char and silver salmon occurs in the vicinity of Mile 8-13 on the Kougarok Road.

Little meaningful information on catch by species and catch per effort was obtained as many anglers were snagging salmon and believed that the biologist was a protection officer and would force them to surrender their fish. The total observed catch during the period from June 14 to September 4 was:

Table 1. List of common and scientific names and abbreviations used of fishes encountered during surveys of Western Alaska waters, 1977.

Common Name	Scientific Name and Author	Abbreviation
Pink salmon	<u>Oncorhynchus gorbuscha</u> (Walbaum)	PS
King salmon	<u>Oncorhynchus tshawytscha</u> (Walbaum)	KS
Chum salmon	<u>Oncorhynchus keta</u> (Walbaum)	CS
Coho salmon	<u>Oncorhynchus kisutch</u> (Walbaum)	SS
Sockeye salmon	<u>Oncorhynchus nerka</u> (Walbaum)	RS
Arctic char	<u>Salvelinus alpinus</u> (Linnaeus)	AC
Lake trout	<u>Salvelinus namaycush</u> (Walbaum)	LT
Humpback whitefish	<u>Coregonus pidschian</u> (Gmelin)	HWF
Broad whitefish	<u>Coregonus nasus</u> (Pallas)	BWF
Bering cisco	<u>Coregonus laurettae</u> Bean	BCI
Least cisco	<u>Coregonus sardinella</u> Valenciennes	LCI
Round whitefish	<u>Prosopium cylindraceum</u> (Pallas)	RWF
Grayling	<u>Thymallus arcticus</u> (Pallas)	GR
Northern pike	<u>Esox lucius</u> Linnaeus	NP
Slimy sculpin	<u>Cottus cognatus</u> Richardson	SSC
Ninespine stickleback	<u>Pungitius pungitius</u> (Linnaeus)	NSB

<u>Species</u>	<u>No. Observed Caught</u>
Arctic char	183
Chum salmon	74
Pink salmon	51
Grayling	15
Silver salmon	5
King salmon	4
Round whitefish	10

The actual catch during the period was doubtlessly considerably higher.

Based on limited observations and conversations with local fishermen and Fish and Game Department and other government employees, there are many other good sport fishing streams in the Nome area. The most important streams are the Snake, Sinuk, Penny, Cripple, Feather and Bluestone rivers on the Teller Highway; the Grand Central, Pilgrim, Kuzitrin and Kougarok rivers on the Kougarok Road; and the El Dorado, Solomon and Niukluk-Fish rivers on the Nome-Council Highway.

During most recent summers the Pilgrim and Niukluk-Fish rivers have received the heaviest fishing pressure, mainly because of excellent fishing for trophy grayling but also for chum, pink and silver salmon; Arctic char; and pike. A boat can be used successfully in these two rivers, resulting in increased access to sport fish. In 1977 the road to Council was closed most of the summer, resulting in little pressure on the Niukluk and Fish rivers. Airstrips are situated at the Pilgrim River bridge and at Council, allowing many anglers to fly from Nome then utilize boats which are kept at the river. Spot counts for anglers at various waters in the Nome area are given below.

<u>Water</u>	<u>No. Days Observed</u>	<u>Total Fishermen Observed</u>
Pilgrim R.	11	85
Snake R.	9	37
Niukluk R. - Fish R.	5	34
Sinuk R.	6	18
Kuzitrin R.	4	14
Bluestone R.	2	4
Solomon R.	4	12
Gold Rush Creek	3	5
Feather R.	2	6
Cripple R.	2	6
Salmon L.	2	6
El Dorado R.	1	4

Other waters fished by Nome area residents include the Agiapuk and American rivers, draining into Imuruk Basin.

Trips to Kwiniuk River in late June indicated good fishing for Arctic char by residents of Moses Point, and a visit to the Unalakleet River in early July indicated light sport fishing pressure with many grayling, Arctic char, chum salmon and pink salmon being caught. The king salmon fishery, mainly on the North River (Unalakleet River tributary), was fair. Eleven nonresident sport

Fishermen were fishing at the Silvertip Lodge 8 miles up the Unalakleet River at the time of survey. This lodge has a capacity of 15 to 20 fishermen. The lodge indicated that during the 1977 season from June to September they had 40 fishermen with the average fisherman staying four days. No information is available on total catch. The owner of the Unalakleet Lodge mentioned that most sportsmen fishing from their lodge do so in the fall.

Life History Studies of Grayling and Arctic Char in Waters of the Nome Area

Arctic Char:

Arctic char are the most important sport species in Seward Peninsula waters. They are found in nearly every stream on the peninsula. Most populations are anadromous but some dwarf resident populations exist.

Movements: Arctic char overwinter in fresh water, probably in deeper holes in the lower reaches of the rivers. At breakup, usually in May, there is a noticeable outmigration. This movement is usually short in duration and fish are only available to anglers for approximately two weeks. However, in 1977 a large pack ice formation off Nome resulted in char remaining in the lower reaches of rivers for up to six weeks. Char spend the summer feeding in the rich estuarine environment off Nome and begin entering the fresh water streams in late summer. A test net was set overnight near the mouth of the Nome River from July 27 to August 28. Five immigrating char were captured on July 27 and six fish were caught on the last day of the set, August 28. Peak catches (9-13 fish per net night) were made between August 5 and 21. Conversations with local residents also indicated a prolonged fall immigration. Fish move upstream slowly. Foot surveys in a 1.6 km (1 mile) area of the Nome River near 10 Mile during late June and early July failed to reveal any char. Only a few char were sighted the last week of July, 16 on August 9, 30 on August 14 and 80-100 on August 17. After that the heavy fishing pressure dispersed the char.

Stream distribution of char during summer and fall generally was related to salmon distribution, as char were feeding on salmon eggs.

Char observed in the various streams of the Nome area in early fall included both spawning and nonspawning fish. While no spawning observations were made it seems probable that they would spawn in the vicinity of the chum and pink salmon spawning grounds.

Age and Growth: One hundred sixty-two char were aged (Table 2). The majority of char were age V-IX and only one age I and one age XI fish were taken. The largest samples were from the Nome and Penny rivers as a special effort was made to capture as many age classes of char as possible from these two streams. The largest fish captured was 620 mm from the Sinuk River and evidently 550-600 mm is the average maximum size attained by char from the Seward Peninsula.

Seward Peninsula char ranged in weight from 17 to 2,270 g (Table 2). Most of the char were captured in late summer, and weight per length was probably higher than had the fish been captured while outmigrating. It is likely that char larger than the 2,270 g (5 lb) fish exist in waters

Table 2. Mean fork length (mm) and mean weight (g) in parentheses for Arctic char from Seward Peninsula streams, 1977.

Stream	Age at Capture										
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Nome R. n=88			211 (68)	274 (164)	307 (282)	381 (560)	446 (876)	476 (995)	489 (1,178)	527 (1,519)	548 (1,588)
Fox R. n=8					273 (120)	387 (520)	441 (897)	529 (1,103)	456 (690)		
Sinuk R. n=2							434 (640)			620 (2,270)	
Bluestone R. n=2			261 (140)			415 (720)					
Boston Cr. n=4						490 (1,160)	440 (905)	505 (1,150)		550 (1,785)	
Solomon R. n=10		104 (25)			332 (290)	408 (640)	443 (750)	500 (990)			
Penny R. n=38	49 (17)	124 (28)	152 (50)			440 (756)	432 (768)	456 (1,000)	495 (1,190)	530 (1,377)	

of the Seward Peninsula, and local fishermen tell of catching char weighing 8 lbs from the Pilgrim, Sinuk and Fish rivers.

Two Penny River male char were mature at age III and fork length of 161 and 171 mm. It is suspected that these small char (43 and 30 g) are stream residents. No females of this size were mature. No age IV and V char were taken in the Penny River but all char age VI and over were mature. Only one of 13 mature female char in the Penny River was judged to be a nonconsecutive spawner. Char examined as late as August 28 had not begun spawning and it is believed spawning occurs during September. One of five (20%) age IV Nome River char was mature; also 10 of 28 (36%) of age V, 7 of 17 (41%) of age VI, 18 of 19 (95%) of age VII, and all char over age VII were mature. Eight of 24 mature Arctic char (33%) contained eggs from the previous year's spawning but would not spawn in the current year and were judged nonconsecutive spawners.

Anadromous char from Seward Peninsula streams exhibited growth similar to char from the Sagavanirktok River (North Slope of Alaska) but slightly slower growth than char from the Goodnews River in southwest Alaska (Alt, 1977).

Food Habits: All Penny River char under Age IV had been feeding on salmon eggs, insect larvae or both. Stomachs of six of the 20 mature Penny River char contained salmon eggs; the remainder were empty. Only 7 of the 88 char from the Nome River were taken during their outmigration in late June but all had gorged on pink and chum salmon fry. The remainder of fish captured on salmon spawning grounds had been feeding almost exclusively on salmon eggs. Almost all char captured at the Ft. Davis (Nome River mouth) test fishing site had empty stomachs.

Utilization: The major use of Arctic char in the Seward Peninsula area is by sport fishermen although a few are taken by gill net and seine subsistence fishermen in the Nome, Snake, Niukluk-Fish, Agiapuk, Kuzitrin rivers and Imuruk Basin areas. Sport fishing usually occurs during the outmigration in late May and early June and the immigration in August and September. Little ice fishing is done except for subsistence fishing by residents of Mary's Igloo in the lower Kuzitrin River.

Grayling:

After Arctic char and chum and pink salmon, grayling are the most important sport fish in the Nome area. Some of the rivers in the Nome-Seward Peninsula areas are the only major rivers in the state other than the Ugashik system where trophy size grayling (3 lbs) are present. Some of these rivers are the Sinuk, Grand Central, Pilgrim, American and Niukluk-Fish.

Movements: When the study began in late June grayling were distributed throughout sections of rivers having gravel bottoms. Heaviest concentrations were in locations with abundant pool-riffle areas. As salmon begin reaching spawning grounds in mid to late July, grayling become more concentrated in these areas and feed on salmon eggs. Grayling remain during the entire year in the main river or its estuarine areas as most streams discharge directly into the ocean and grayling cannot

tolerate the high salinities of the ocean. No information on overwintering areas of grayling is available but they are probably located in deep holes in the lower reaches of the rivers. In the Pilgrim-Kuzitritin and Agiapuk-American systems the fish could overwinter in the extensive delta areas of these rivers, as in Imuruk Basin. Other rivers e.g., the Sinuk, Cripple, Penny, Snake and Nome have less of this type of potential overwintering habitat.

There is some grayling movement into tidal areas of the Nome river, as a test gill net set at the mouth of the Nome River on a two days a week basis from July 27 to August 28 took eight grayling during the first three weeks of the set but none thereafter.

It was observed during foot and boat surveys of streams in the Nome area, that grayling populations were small in lower reaches of some streams. This was especially true in some of the streams containing large grayling. Most of the streams are very clear during summer months and most fish are visible to the observer. The Grand Central River, for example, in the 4 mile section from the bridge to its entrance into Salmon Lake had only approximately 20 grayling visible, all of which were very large. The Sinuk, Snake and Nome rivers apparently have low populations. Younger age classes of grayling have not been located in many of the streams but all streams containing grayling must have spawning populations. These fish could be in small tributary waters. Streams with seemingly large grayling populations are the Pilgrim, and Niukluk-Fish systems.

Age and Growth: One hundred thirty-nine grayling from nine Seward Peninsula streams were aged and specimens from age I through XI were found (Table 3). Grayling captured ranged from 112 to 504 mm fork length. The Fox (Niukluk-Fish system) and Nome rivers were the only two streams where any number of small grayling were captured. Because of the small samples from many of the streams it is difficult to compare growth. It appears that the Pilgrim River grayling grow faster than the other populations.

Grayling from the Seward Peninsula streams grow faster than grayling from streams in the lower Kuskokwim River, slightly slower than grayling in Kuskokwim Bay streams (Alt, 1977) and considerably slower than grayling in Interior Alaska (Tack, 1974). Fish from the Seward Peninsula streams attain such a large size mainly because of their long life span (up to age XI). Very few grayling south of the Brooks Range exceed nine years of age.

Weight of grayling from Seward Peninsula streams ranged from 17 to 1,474 g (0.04 to 3.2 lbs). The heavier fish were from the Pilgrim, Grand Central and Sinuk rivers. Grayling from the Seward Peninsula streams appear to be deeper bodied and broader in cross section than grayling in most other areas of the State.

Except for one age V female and one age VI male, all grayling from the Pilgrim River over age V were mature. From the Fox River (Niukluk-Fish system) 3 of 7 age V fish were mature and 20 of 23 age VI fish and all fish over age VI were mature.

Table 3 Mean fork length (mm) and mean weight (g) for 139 grayling from various streams on the Seward Peninsula.

Stream	Age Class										
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Pilgrim R. n=33			241 (132)		317 (317)	367 (466)	393 (545)	441 (850)	502 (1,304)	472 (1,250)	
Grand Central R. n=4							370 (440)	481 (1,361)	463 (1,250)		480 (1,474)
Nome R. n=17	124 (17)	186 (52)	258 (160)	347 (440)	357 (505)	426 (840)	391 (640)	459 (950)			
Fox R. n=42	110 (12)	204 (20)	228 (65)	262 (100)	323 (278)	344 (330)	366 (410)	400 (580)			
American R. n=8							340 (511)		425 (720)	460 (802)	488 (930)
El Dorado R. n=7					360 (460)	402 (606)	425 (681)				
Sinuk R. n=2					390 (630)					490 (1,205)	
Kougarok R. n=5			224 (80)	275 (200)		322 (297)					
Bluestone R. n=21	150 (31)		251 (142)		321 (284)			440 (720)			

Food Habits: Of 26 stomachs examined from July and August caught Pilgrim River grayling, 21 contained only insect remains, and the remainder contained salmon eggs and insect remains. Grayling from the Fox river taken in July and August had fed mainly on insects, but shrews, salmon eggs, and unidentified salmon fry remains were also important food items.

Utilization: In the Seward Peninsula grayling are taken almost exclusively by sport fishermen. Most of the streams are too shallow for boat travel and fishermen are restricted to a short distance in both directions from highway access points. The Pilgrim and Niukluk-Fish systems are excellent grayling streams and since they are suitable for boat travel, receive the heaviest fishing pressure. In addition to being the target species for many anglers, grayling fill the void during periods when char and salmon are not available.

Noatak River Drainage Survey

Lakes:

Thirteen Noatak River lakes were surveyed, including three floodplain lakes, seven plateau lakes and two mountain lakes (Fig. 2). Six lakes are landlocked and all lakes except Kelly River Lake are in tundra habitat.

Fish were present in all lakes surveyed, with round whitefish, lake trout and grayling being the most common species (Table 4). Least cisco, northern pike, Arctic char, slimy sculpin, salmon (chum and red) and ninespine stickleback, were also taken.

Lake Omelaktavik is located at 67°39'N, 155°32'W in the upper Noatak River Valley, 7.2 km south of the Noatak River at 229 m elevation. The lake is very shallow (maximum depth 4.2 m (14')). It is 2.4 km long by 1 km wide. The lake bottom is mud with a heavy coating of vegetation. This landlocked lake had a very abundant population of freshwater shrimp. A gill net set overnight took nine northern pike. Water temperature on July 11 was 15°C.

Isiak Lake is a glacial thaw lake situated on a bench above the Noatak River at 67°43'N, 156°09'W and 547 m elevation. This is a very scenic lake with a gravel shore and about 40% shoal area. The deepest area sounded in this 2.5 x 7.5 km lake is 10 m (31'). There is an unimproved gravel landing strip next to the lake and a Kotezbue based guide has a cabin here. Small schools of round whitefish were seen swimming along shore. A gill net set overnight took 1 northern pike, 1 lake trout, 10 round whitefish and 2 least cisco. No fish were caught during 2 hours of angling.

Matcharak Lake is only about 3 km from Isiak Lake at 67°45'N, 156°12'W at 492 m elevation. This is a very scenic lake with low hills surrounding the lake and is in close proximity to the mountains. The lake is 4 km long by 1.7 km wide with 35% shoal area and a maximum recorded depth of 18.5 m (56'). The entire northern arm of the lake is shallow with a mud bottom and emergent vegetation but the main body of the lake has a

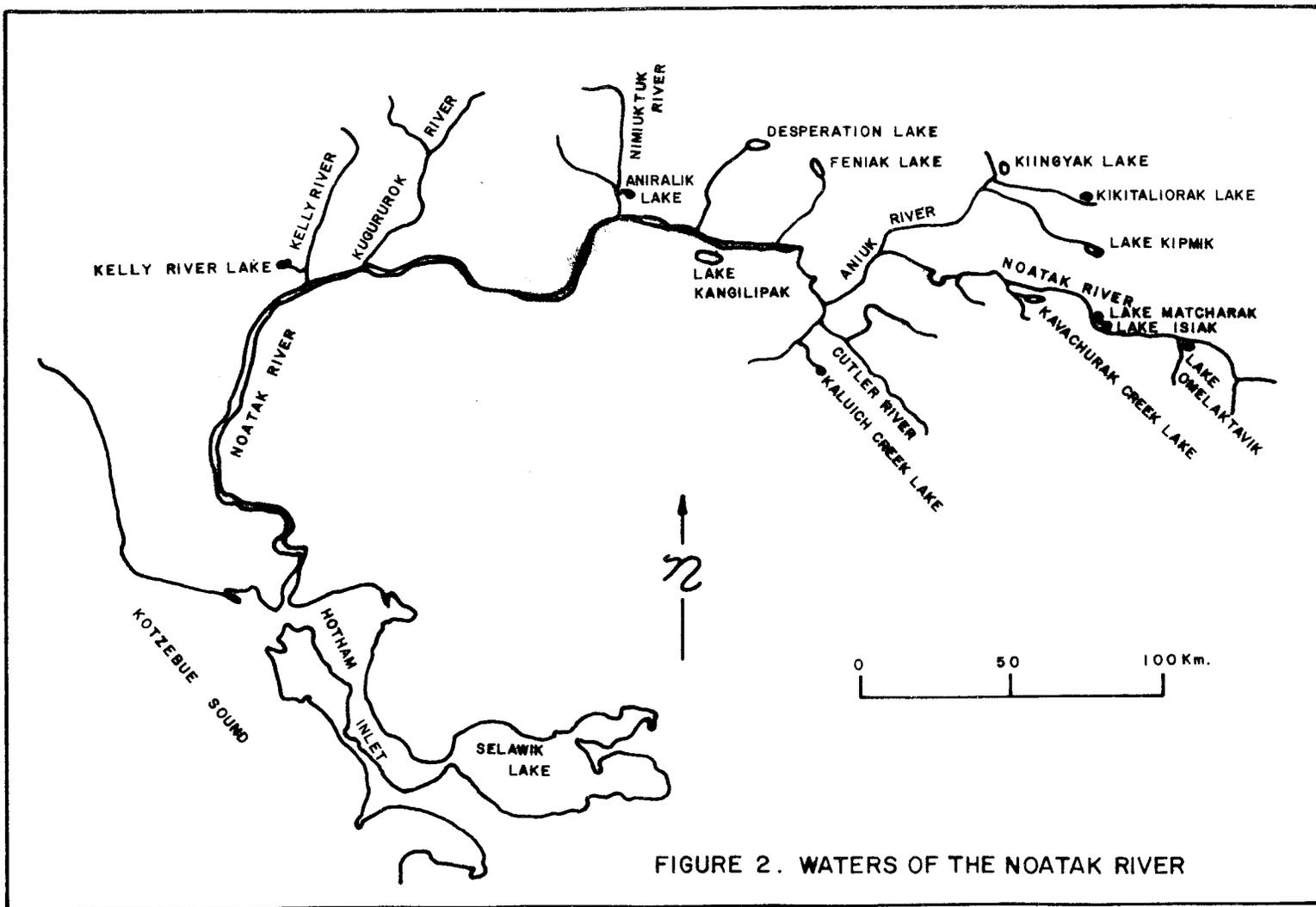


FIGURE 2. WATERS OF THE NOATAK RIVER

Table 4. Test net results Noatak River lakes, July 12-17, 1977.

Lake	Maximum Depth (m)	Temp.	Net Nights	LT	GR	RWF	NP	LCI	AC
Omelaktavik	4.5	17°C	1				9		
Isiak	6.8	16°C	1	1		10	11	2	
Matcharak	18.3	15°C	1	4		7		2	
Kavachurak Cr. L.	10.1		1		3	1			
Kipmik	13.4	15°C	1	1		1			
Kaluich Cr. L.	1.8	20°C	2		43				25
Kiingyak	2.9	15°C	1	3	7	5			
Kikitaliorak	4.9	17°C	1	4	5	13		3	
Feniak	24.5	11°C	2	8	16	10			
Aniralik	1.3	24°C	1		14	10			
Kangillipak	7.2	21°C	1			3	1	5	
Kelly River L.*	3.2	7°C	1		16	1			

Desperation Lake has LT, RWF, GR, but was not netted.

* Sockeye and chum salmon also present.

gravel and sand bottom. A gill net set overnight took three lake trout, two least cisco and seven round whitefish. One lake trout in poor condition was taken during 2 hours of hook and line fishing. Sculpin and young-of-the-year least cisco were observed along shore.

Kipmik Lake is a large mountain type lake 738 m above sea level at 67°57'N, 156°09'W. It is 3.8 x 2.2 km and has 30% shoal area with a maximum depth of 13.5 m (41'). The lake has two inlets on the south side and an outlet on the northwest side connecting it with Lake Amitchiak then to the Aniuk River via Mountain Creek. This scenic lake has a gravel beach and some rock was evident close to shore. Only one round whitefish was captured in an overnight gill net set and one lake trout and one grayling were taken during 2 hours fishing with hook and line. The lake would appear to be a good lake trout lake but catches did not bear this out. Water temperature on July 12 was 15°C.

Kavachurak Creek Lake is located in a steep valley between two mountains 5 km south of the Noatak River at 623 m elevation at 67°49'N, 156°32'W. It is actually two lakes and only the western lake was surveyed. Kavachurak Creek Lake is 3.8 x 0.7 km in dimensions but is quite shallow and has about 70% shoal area. The greatest depth was 9.4 m (31'). The lake was surrounded by muskeg and the bottom was composed of mud, aquatic vegetation and some gravel. A 7 km long outlet stream connects to Kavachurak Creek. A gill net set overnight took three grayling and one round whitefish.

Kaluich Creek Lake is a small glacial thaw lake of 1.2 x 0.8 km located 492 m above sea level at 67°40'N, 158°09'W on a plateau in the Cutler River Valley. The lake is extremely shallow and the entire bottom could be seen during and overflight. The water was 20°C, light brown colored and had a mud and rock bottom with a maximum depth of 1.7 m (5.5'). A tiny outlet might flow at high water level. This outlet leads to Kaluich Creek then to the Cutler River. The lake appeared to have poor habitat for fish but the catch was the highest for any lake surveyed. A gill net set for two nights took 43 grayling and 25 Arctic char. This was the only lake on the Noatak found to contain landlocked Arctic char.

Kikitaliorak Lake is a 2 x 1.1 km landlocked lake in the Inyorurak Lakes system at the very head of the Flora Creek (Aniuk River) in Howard Pass at 2,100' elevation and 68°07'30", and 156°14'W. It is a glacial thaw lake 688 m in the flat plain separating the Noatak and Colville River drainages. The lake had 50% shoal area and a maximum depth of 5 m (15') with a gravel beach and bottom composed of mud, gravel and rocks. A small island contained evidence of past camping activity. Water temperature on July 13 was 17°C. A gill net set overnight took 4 lake trout, 15 grayling, 13 round whitefish and 3 least cisco.

Kiingyak Lake is a 1.5 x 1.1 km glacial thaw lake located at the head of the Aniuk River in Howard Pass at 492 m elevation at 68°12'N, 156°58'W. This shallow lake (maximum depth 3 m or 9') sits on a flat plain and is easily affected by wind. The bottom is mainly mud although there is some gravel present. Water temperature was 15°C in this circular lake. A gill net set overnight took three lake trout, seven grayling and five round whitefish.

Desperation Lake is a 4.4 x 2 km thaw lake located at 426 m elevation at 68°20'N, 158°45'W. It drains into the Anisak River via Uivaksak Creek. On an overflight so many fish were seen from the air (thousands) that no gill net was set. During one hour's angling, four lake trout were taken. Large schools of round whitefish were observed. The lake was very shallow and the water was a yellow-brown color. Two inlet streams are present. The bottom was composed of mud and gravel. The lake appears very productive. The lake trout captured were small, approximately 0.8 kg, and appeared in poor condition.

Feniak Lake is undoubtedly the most beautiful of all lakes in the Noatak system. This large 7 x 3.8 km thaw lake at 68°15'N, 158°20'W has mountains in close proximity on the north side while the south side faces an open plain. Feniak is also the deepest lake surveyed with a maximum reading of 23 m (75') in the northcentral part of the lake. Feniak has one major inlet 25 m wide and 0.2 m deep entering from the north, and the major outlet, Makpik Creek, leaves from the south tip of the lake. The lake shore has an abundance of gravel and the bottom composition is gravel and sand with some rock. Water color is blue and the lake is somewhat affected by wind. Water temperature on July 14 was 11°C. The lake has two unimproved gravel strips. A gill net set overnight near the inlet stream took 3 round whitefish, 16 grayling and 2 lake trout. A net set in 14.7 m of water in the north central part of the lake took 7 lake trout (a 9 kg fish was released) and 7 round whitefish. In addition two grayling and four lake trout were caught in 3 1/2 hours of hook and line fishing. Grayling were observed in the inlet stream. Feniak Lake fish appeared to be in better condition than fish from other lakes.

Lake Kangilipak at 324 m elevation and 68°00'N, 159°10'W is one of a series of lakes that empty into the Noatak River via the 45 km long Aklumayak Creek. It is situated on a plateau south of the Noatak River and is 6 km long by 2.2 km wide. Maximum recorded depth was 6.7 m (22'). Bottom and shoreline are composed of mud, sand and gravel. A gill net set overnight took three round whitefish, one northern pike and two least cisco. Water temperature on July 13 was 21°C.

Aniralik Lake is a 3.5 x 1.5 km lake located 10 km northeast of the Nimiuktuk-Noatak river confluence at 68°11'N, 159°50'W. It is a very shallow lake with a maximum recorded depth of 2 m. The bottom is principally mud and gravel with some rocks present, and the shoreline is muskeg and willow. The lake drains into the Nimuktuk River to the west. Water temperature was 24°C. A gill net set overnight took 14 grayling and 10 round whitefish but the water was so warm that all were decomposed when the net was pulled.

Kelly River Lake is located 10 km north of the Noatak River and 6 km west of the Kelly River at an elevation of 82 m and 67°58'N, 162°27'W. It is one of a series of groundwater origin lakes that are connected by a 20 m wide outlet stream. The lake is a clear blue color and very cold (7°C). It has one tiny spring inlet but nearly all the water is from groundwater. Schools of grayling were observed from the air. This lake is situated in the spruce forest. Maximum depth was 3.2 m (10.5') on the northeastern shore. A gill net set overnight took 16 grayling and 1 round whitefish, and sockeye salmon fry were observed. Kelly River

Lake has a spawning population of both chum and sockeye salmon. The bottom in the northeastern part of the lake is composed of sand and gravel.

Streams:

Very little ground survey of the Noatak system was conducted although most of the mainstem Noatak and its tributaries were flown. The source of the Noatak is partly of glacial origin and the upper portion of the river is green colored; the bottom is partially covered with glacial silt and the river is confined to a single channel. Fish habitat appeared to be poor and no fish were observed upstream of Cutler River. Deep pools were noted in lower Midas Creek but no grayling were observed or captured. Local residents from Kotzebue and Kobuk indicated that landlocked char are present in upper Noatak tributaries such as the Kugruk River and Portage Creek, and that chum salmon have been observed spawning in the lower end of Kugruk River. The lower Cutler River was overflowed and in spite of very low and clear water no fish were seen. The float plane could not be landed in the Noatak because of low water. No fish were seen in this area of the Noatak. The entire Aniuk River was followed by air and some small groups of grayling were seen. The river had a rocky bottom over most of its course and was composed mainly of riffles. The Anisak River was similar in character to the Aniuk although shorter and smaller in size.

As the Noatak River reaches the Nimiuktuk it gets deeper, wider and slightly slower and has sloughs, backwaters and pools, thus furnishing much more fish habitat. Anadromous Arctic char were captured in the Noatak River at the mouth of the Nimiuktuk on July 14. Lake trout and grayling were also present. A large aufeis area about 6 km upstream in the Nimiuktuk and similar areas in Tunit and Seagull creeks indicate spring areas and thus potential spawning grounds for Arctic char. The lower Nimiuktuk had large rocks and boulders in the river and the stream was quite braided and very swift. The Noatak remains essentially a wide single channel stream as it goes through the Grand Canyon of the Noatak, but below the Kelly River the Noatak becomes braided. Once it reaches the Igichuk hills it again becomes a single channel. On July 15 large groups of fish were observed in the Noatak River 1 km below the mouth of the Kugururok River. These were mainly humpback whitefish and grayling but about 50 silvery, mature Arctic char were present. The char captured on hook and line were up to 75 cm fork length. The silvery coloration of the char and a still bloody wound from a seal bite on one of the char indicated that these fish had migrated in from salt water during the course of the summer. The Kugururok River and its tributaries, Kagvik Creek and Trail Creek, were flown and small groups of char were seen in the lower Kugururok River as well as lower Kagvik Creek and Trail Creek. The streams were very low on July 15. Aufeis concentrations and abundant groundwater sources were observed on Kagvik Creek, upper Trail Creek and upper Kugururok River. Char have been reported spawning in all three of these areas in September. The Kugururok River is very braided, wide and shallow, with a rock and gravel bottom. The Kalutavik River, entering the Noatak from the north between the Nimiuktuk and Kugururok rivers, had an extensive aufeis field about 32 km upstream, indicating a potential char spawning area.

Arctic char and possibly chum salmon were observed in the Noatak River at the mouth of the Kelly River on July 15. According to local anglers groups of char keep entering this area before moving up the Kelly River or farther up the Noatak. The Kelly River and its tributaries were extremely low in mid July. Small schools of char were observed in the lower Kelly River and Wrench Creek migrating up to spawning areas. The Kelly River is a meandering, braided stream in its lower reaches, but is generally a single channel further upstream. It is a fairly fast flowing stream with gravel and rock bottom throughout and an abundance of pools and riffles. The lower Kelly River is in the spruce forest, while the upper section is in tundra upland. A major tributary, the Avan River, was found to have aufeis concentrations, and char spawning areas are probably present. The Kelly system is probably the major Arctic char spawning area on the Noatak River.

Life History Data on Fishes Collected During 1977 Noatak Survey

Lake Trout:

Lake trout were present in eight of the lakes surveyed but never in great abundance (Table 5). Four fish per net night was the highest catch per effort. They were present in all the deeper lakes but also in lakes as shallow as the 3 m deep Kiingyak Lake and the 5 m deep Kikitaliorak Lake. They are probably found in fewer of the floodplain lakes. Many of the lakes containing lake trout had very little gravel and rock bottom substrate for spawning, but it must be suitable as many of the lakes are landlocked. Desperation Lake appeared to have a large population of small lake trout. Lake trout captured ranged in size from 360 mm and 450 g to an 820 mm, 9 kg lake trout in Feniak Lake. Scale determined ages of lake trout from the study lakes are given in Table 5. Lake trout ranged from age VIII to XX with most fish belonging to Age Class XI to XV. Otoliths were taken from some of the fish, and generally their ages agreed closely with scale ages up to age XI, but after that otoliths gave a considerably older age (up to 5-10 years at age XXX). There is much variability among age classes but generally growth is similar in all lakes. The small sample from Desperation Lake grew faster, which may be indicative of the fertility of the lake.

Limited data indicate that all lake trout captured were mature except for two age IX Matchurak Lake females under 400 mm fork length.

Lake trout stomachs contained snails, diptera larvae, and fish remains.

Northern Pike:

Northern pike were found only in three lakes surveyed. Isiak and Omelaktavik lakes are near headwaters of the Noatak while Lake Kangilipak is in the lower third of the river. Pike are probably much more abundant in numerous low elevation shallow lakes in the lower Noatak, but no test netting was conducted. The one pike from Lake Kangilipak was 140 mm fork length and age II; the one pike aged from Isiak Lake was 680 mm fork length, 2,300 g and age XVI. The Lake Omelaktavik sample included fish from age IX to XIX. The age IX fish was 397 mm, the age XI fish was 470, the age XV fish was 495, and the age XIX fish was 675 mm fork length and weighed 2,100 g.

Table 5. Age length data for lake trout from lakes on Noatak Valley. Mean fork length in mm.

Lake	Age at Capture												
	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
Feniak n=10		390			550	539	450	547				651	780
Matcharak n=4				500	480	592	570						
Kikitaliorak n=4		390				558							
Kiingyak n=2				590	565								
Desperation n=2	480	485											
Kipmuk n=1				512									

Least Cisco:

Least cisco were found in four lakes, all glacially formed, including two upper Noatak lakes, one at the head of the Aniuk River and one near the Nimiuktuk River. They are probably more abundant in lakes in the lower part of the river. Only 11 cisco were taken which ranged in age from age 0 to age VII (Table 6). All fish age IV and over except for one specimen from Kikitaliorak Lake were mature.

Arctic Char:

Arctic char were taken in only one lake of the 13 surveyed. Kaluich Creek Lake is a very shallow lake (1.6 m) on a plateau in the Cutler River Valley. The mud and rock bottom must provide suitable spawning habitat as all size ranges of char were captured (122-340 mm). The smaller char were age II, while a 246 mm char was age V, and the age VI char averaged 330 mm. Char 240 mm and larger were mature. Kaluich Creek Lake char were eating freshwater shrimp.

Landlocked Arctic char have been reported in small, fairly deep mountain lakes in the upper Noatak drainage. These lakes were not surveyed as they were too small for a plane.

Grayling:

Grayling were captured in test gill nets at seven lakes but they are also present in Kipmik Lake as one was taken by hook and line. They were most abundant in Kaluich Creek, Kelly River, Aniralik and Feniak lakes. Grayling ranged in length from 135 to 447 mm. Their ages were age I-IX (Table 7). The water temperature in Kelly River Lake was considerably colder than in other lakes so growth of grayling might be expected to be slower; however, this was not the case. A large sample of age VIII fish from Feniak and Kelly River lakes indicated similar growth.

In the Feniak Lake sample all grayling over age V were mature. The number of fish examined for maturity from the other lakes was small but, except for two Kaluich Creek Lake age IV mature grayling, all matured at age V.

Stomachs of feeding fish examined contained diptera larva in most cases and one stomach from Kelly River Lake contained fish remains.

Round Whitefish:

Round whitefish are probably the most abundant and widely distributed fish in the section of the Noatak River surveyed and were present in 11 of the 13 lakes. Only Kaluich Creek Lake and Lake Omelaktavik did not contain round whitefish. Round whitefish are present in both shallow and deep lakes. In Feniak Lake that were taken in the shore set and in the set made in 14 m of water. Round whitefish were present in all lakes containing lake trout. Forty-five round whitefish from 136 to 454 mm and up to 975 g in weight were aged. They ranged from age II through XI with most fish belonging to Age Classes VII-XI (Table 8). Growth of round whitefish from the various lakes is similar and is also

Table 6. Age length data for 11 least cisco from lakes in the Noatak Valley. Mean fork length in mm.

Lake	Age at Capture							
	0	I	II	III	IV	V	VI	VII
L. Kangilipak n=5			137	166				294
Kikitaliorak L. n=3					212	230		
Isiak L. n=2		120					280	
Matcharak L. n=1	29							

Table 7. Age-length data for grayling from various lakes in the Noatak drainage. Mean fork length in mm.

Lake	Age at Capture								
	I	II	III	IV	V	VI	VII	VIII	IX
Kikitaliorak L. n=3						320	355	343	
Feniak L. n=12					320		376	406	395
Kavachurak Cr. L. n=3		140		245					
Kaluich Cr. L. n=8	150			250	318	357	400		
Kiingyak L. n=1								370	
Kelly R. L. n=17	138					336	390	399	439

Table 8. Age-length data for round whitefish from lakes in the Noatak drainage. Mean fork length in mm.

Lake	Age at Capture										
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Kikitaliorak L. n=12			185				330	369	388	403	440
Kiingyak L. n=6						330			410	420	447
Kipmik L. n=1		190									
Kavachurak L. n=1						284					
Isiak L. n=8						326	420	380	419		450
Feniak L. n=4									421	405	
Matchurak L. n=6								400	402	435	454
Kelly River L. n=1		136									

similar to growth of round whitefish from a number of lakes in the Kuskokwim Bay area of southwest Alaska (Alt, 1977).

All round whitefish of age VI and over captured in lakes of the Noatak were mature. All mature females would have spawned the current fall and no evidence of nonconsecutive spawning was found.

Utilization of Fishes of the Noatak Valley

Presently fishes of the Noatak River receive commercial, subsistence and sport fishing pressure. The commercial fishery takes chum salmon and a few incidental char in the Kotzebue Sound area, while subsistence fishermen from Noatak village take chum salmon, Arctic char and some pike, whitefish and grayling from the Noatak River. Sport fishing, except for a small amount near Noatak by residents of that village who use boats, is mainly by float or wheel equipped airplane. Much of the fishing pressure is from Kotzebue area residents with the heaviest fishing pressure on anadromous runs of Arctic char in the lower Kelly River. There is light pressure on the lower Kugururok and Nimiuktuk rivers. Arctic char, once they reach the vicinity of spawning grounds, are not vulnerable to anglers because of poor accessibility. Most lakes of the middle and upper Noatak drainage can be reached only by float equipped aircraft so fishing pressure is light. Most lakes drop off gradually and the lake trout are not concentrated, thus lowering angler access. Lake trout are the most sought after species in lakes. No sport anglers were observed on the surveyed lakes and little evidence of past use was observed except for Feniak Lake.

A more popular use of the Noatak River and a use that will continue to increase is floating the river in rafts, kayaks or canoes. Two parties of two people each were on the river during the survey. Most parties put in at Matcharak Lake and portage to the river or else land on gravel bars farther up the Noatak. In the upper Noatak only grayling are available while below the Nimiuktuk some Arctic char, chum salmon and possibly pike are also taken. Parties floating the river generally have minimal impact on the sport fishery. Lake Matcharak and its landlocked lake trout population would receive the greatest impact from increased use of the Noatak River.

Fishes from waters of the Noatak River drainage have fairly rapid growth rates, mainly due to the long summer growing period and the relative high productivity of many of the lakes.

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