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LAKE AND STREAM INVESTIGATIONS

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ALASKA DEPARTMENT OF FISH AND GAME
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Study G-III-H

STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

EVALUATION OF INTERIOR ALASKA WATERS AND SPORT FISH WITH EMPHASIS ON MANAGED WATERS, FAIRBANKS DISTRICT

by

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and
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Cooperators: Michael J. Kramer, Jerome Hallberg

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ABSTRACT

A great number of highly used fisheries exist in interior Alaska, especially in the Fairbanks area. Data are presented on utilization of important waters, as well as more remote waters where baseline data are just beginning to be collected. This is in an attempt to evaluate fish population status and angler use.

Specific areas of emphasis are presented. Results of late winter dissolved oxygen readings taken on 23 Interior lakes or gravel pits in 1981 and 1982 are presented. Results of lake stocking in the Fairbanks area are reported. Four managed lakes were sampled to evaluate stocking success. Test netting of Chena Lake and subsequent chemical rehabilitation are discussed. Surveys were conducted on the Chatanika River and Beaver Creek.

KEY WORDS

Interior Alaska, Fairbanks area, stocking recommendations and assessments, rainbow trout, coho salmon, Arctic grayling, white fish, sport harvest, environmental parameters.

BACKGROUND

The Fairbanks management area (Figure 1), of approximately 52,000 sq mi, includes waters of the Tanana drainage from the Little Delta River downstream to the Tanana River mouth, including roadside waters of the Parks Highway south to the Denali Highway, the Richardson Highway south to Birch Lake, the Steese and Elliott Highways, and the Chena Hot Springs Road. Also in the area are all north-flowing tributaries of the upper Yukon River from Tanana to the Canadian Border.

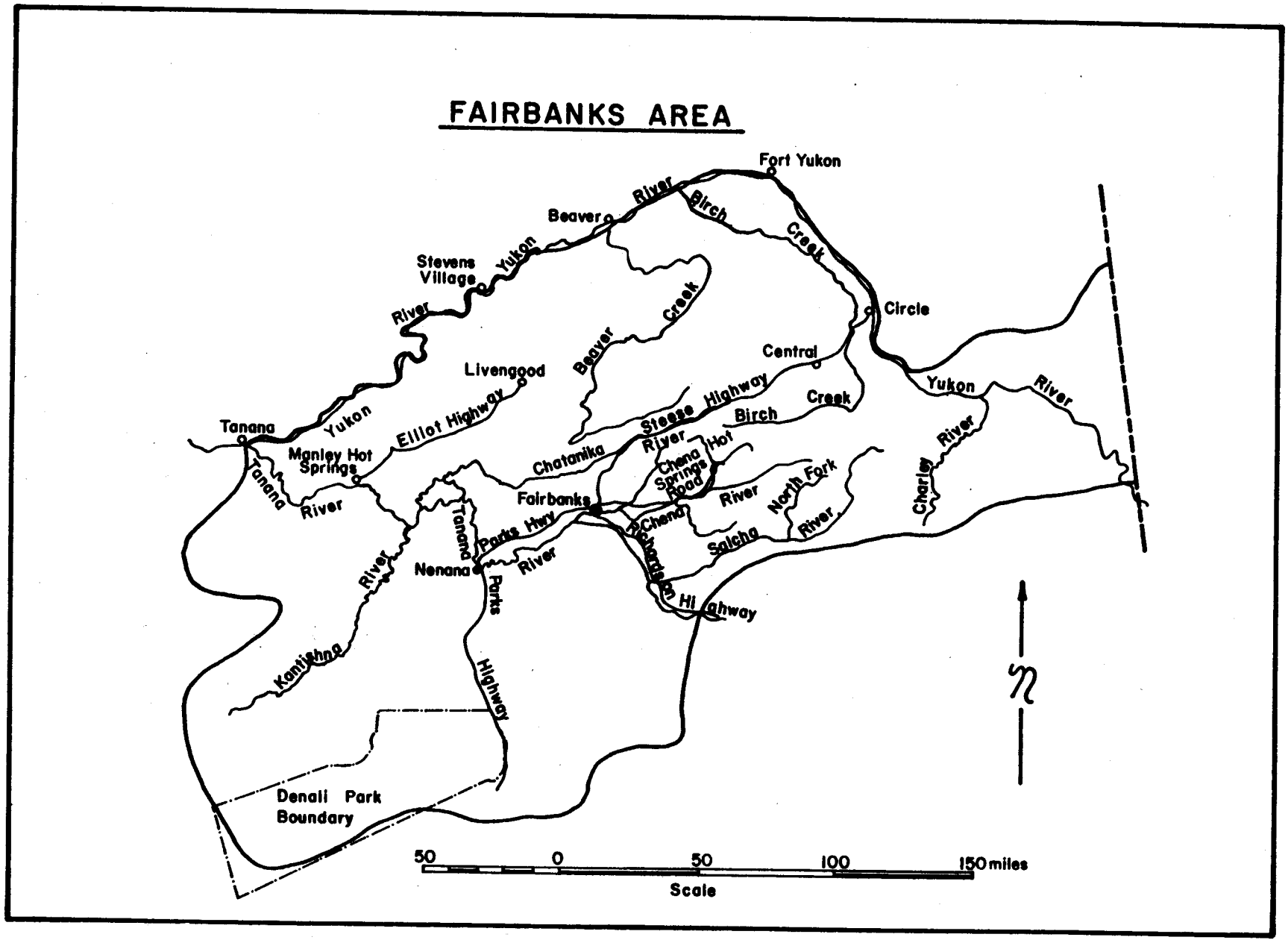

Figure 1. Fairbanks Management Area

This area includes some of the most highly used fisheries in the Interior, including the Chena, Chatanika, and Salcha Rivers, Minto Flats and Harding and Birch Lakes. There are many popular fly-in lakes in the Tanana Flats. Communities served include Fairbanks, North Pole, Central, Circle, Eagle, Livengood, Minto, Manley Hot Springs, Rampart, Nenana, Anderson, Healy and Cantwell. Fort Wainwright Army Post, Eielson Air Force Base, and Clear Air Force Site are also included in this area.

The climate is one of harsh contrasts, with spring coming as early as mid April and snowfall, with subfreezing temperatures, occurring as late as June. The short, 3-month summers are characterized by long daylight hours and temperatures occasionally exceeding 90°F. The fall may extend through early November, with snowfall and decreasing temperatures. During the dead of winter, from mid-November to mid-March, temperatures may plummet below -70°F. Annual precipitation averages around 11 inches, with most falling between June and September.

The lakes are generally iced-over by late October and breakup can occur as late as June. Seasonal surface runoff streams flow from May through September, due to periods of spring ice melt and later summer rains. The streams, fed by groundwater or springs, may either run with marginal ice cover, or occasionally form glaciers over the streambed.

The Tanana Valley is relatively unglaciated. However, large quantities of gravel, sand and silt are discharged by nearby glacial melt. Lake formation occurs either from the damming of drainages leading from nearby hills, by silt from the Tanana River, by the melting of a former ice mass buried in the subglacial soil, or by the melt of permafrost brought upon by vegetative disturbance. Yearly precipitation regulates the levels of the majority of lakes, with only those near the Tanana subject to fluctuation by river-regulated water tables.

Creel census studies are conducted on all high-use fisheries in the area including the Chatanika, Salcha, Little Salcha, and Chena Rivers, Badger Slough, Minto Flats and stocked lakes such as Birch, Harding, Little Harding, and Lost Lakes.

Nearly all of the important waters near the major road systems have been surveyed. A number of fly-in waters have not been surveyed and that additional data is needed. Future emphasis will be placed on surveys of lower Tanana drainage waters. Data will be collected on previously unsurveyed waters and files will be updated on waters previously surveyed. Table 1 contains scientific and common names and abbreviations of all fish mentioned in this report.

Fisheries are currently maintained in 27 lakes and ponds in the management area by stocking rainbow trout, coho salmon and grayling. Most waters stocked are adjacent to the road system; however, several remote lakes, accessible only by snowmachine or aircraft, have also been stocked with rainbow trout, coho salmon, and grayling. The remote water stocking program is well received by sportsmen.

Table 1. Scientific and common names of fish mentioned in this report.

Common Name	Scientific Name	Abbreviation
Round whitefish	Prosopium cylindraceum (Pallas)	RWF
Humpback whitefish	Coregonus pidschian (Gmelin)	HWF
Least cisco	Coregonus sardinella Valenciennes	LCI
Coho salmon	Oncorhynchus kisutch (Walbaum)	SS
Rainbow trout	Salmo gairdneri Richardson	RT
Arctic grayling	Thymallus arcticus (Pallas)	GR
Northern pike	Esox lucius (Linnaeus)	NP
Longnose sucker	Catostomus catostomus (Forster)	LNS
Sheefish	Stenodus leucichthys (Güldenstadt)	SF
Burbot	Lota lota (Linnaeus)	BB
Lake chub	Couesius plumbeus (Agassiz)	LC

RECOMMENDATIONS

1. Stocking success in area lakes stocked with rainbow trout, coho salmon or grayling will be evaluated.

2. Investigations into the status of the Minto Flats northern pike populations and the whitefish/sheefish populations in the Chatanika River will be conducted. Efforts should be made to assess angling pressure and sport fish harvest.

3. Data will be collected on unsurveyed waters within the study area.

OBJECTIVES

1. To evaluate stocking policies for grayling, rainbow trout and coho salmon and formulate stocking recommendations for optimum survival and growth.

2. To conduct angler utilization investigations on important sport fisheries throughout the district as they occur.

3. To obtain a population estimate of whitefish in selected areas of the Chatanika River.

4. To continue surveys of lower Tanana and middle Yukon River waters.

TECHNIQUES USED

Scales used for age determination were cleaned and mounted between glass slides. A Bruning 200 microfiche reader was used to read the scales. All fish were measured for fork length in millimeters. Water samples for dissolved oxygen determinations were collected using a Kemmerer water sampler and analysis was done with a Hach Model AL-36-WR kit. Graduated mesh monofilament and multifilament gill nets, 125 ft x 6 ft with five mesh sizes ranging from 1/2 in to 2 1/2 in bar measure were used to sample fish populations.

FINDINGS

Dissolved Oxygen Testing

Results of 23 Interior lakes or gravel pits tested for dissolved oxygen content during the winters of 1981 and 1982 appear in Table 2. Five of these lakes are currently being managed by the Division of Sport Fish. Of these managed waters only Engineer Hill Lake, which is stocked with grayling, showed signs of a shortage of dissolved oxygen with a reading of 0.6 ppm. Test netting will be done in 1982 to determine the status of these fish. Six gravel pits along the Chena Hot Springs road were tested for dissolved oxygen content in March of 1982. No trace of dissolved oxygen was found in two of these pits, 33.3 Mile Pit and 44.8 Mile Pit.

Table 2. Fairbanks area waters tested for dissolved oxygen, 1981 and 1982.

Water	Date	Ice Depth (in)	Water Depth (ft)	Snow Depth (in)	Sample Depth (ft)	D.O. ppm
1981						
Chena Lake	Jan 20	24	24	6	18	9.0
	March 02	24	20	6	10	5.0
East Fork Chena River	March 12	54	4	4	2	10.0
Spencer Lake	March 03	30	18	0	10	3.0
Lakeview #2	March 20	26	36	6	15	5.0
White Alice Pit	March 31	36	10	1	5	3.0
Grayling Lake *	March 20	27	14	1.5	5	4.0
Hidden Lake *	March 20	23	9	3	5	4.0
Engineer Hill Lake (Lily *)	March 23	26	7	0	4	0.6
Moose Lake						
(*North Half)	March 20	34	20	0	10	5.0
(*South Half)	March 20	30	15	0	5	1.8

Table 2. (Cont'd) Fairbanks area waters tested for dissolved oxygen, 1981 and 1982.

Water	Date	Ice Depth (in)	Water Depth (ft)	Snow Depth (in)	Sample Depth (ft)	D.O. ppm
1981						
Mullins Pits (* Large)	March 24	23	24	0	5	4.0
(* Small)	March 24	24	11	0	5	0.6
Pike Lake *	March 20	24	7.5	2	5	1.0
Rainbow Lake*	March 20	27	19.5	3	5	0.8
Scout Lake	March 20	28	12.5	2	5	9.0
Tar Kettle Lake*	March 20	24	19	0	5	0.4
Big Twin Lake*	March 23	29	10	0	5	4.0
Little Twin Lake*	March 23	31	13.5	3	5	0.6
28 Mile Pit*	March 20	22	15	0	5	11.0
Mile 338.7 Pit*	March 20	25	14	2	5	2.0
Manchu Lake*	March 24	27	8	0	4	8.0

Table 2. (Cont'd) Fairbanks area waters tested for dissolved oxygen, 1981 and 1982.

Water	Date	Ice Depth (in)	Water Depth (ft)	Snow Depth (in)	Sample Depth (ft)	D.O. ppm
1981						
Bear Lake (*Small End)	March 23	32	17	3	5	3.0
(*Main Lake)	March 23	26	18	1	5	0.0
1982						
30.0 Mile Pit Chena Hot Springs Rd.	March 16	18	9	24	6	2.0
30.9 Mile Pit Chena Hot Springs Rd.	March 16	24	4	20	3	2.0
43.7 Mile Pit Chena Hot Springs Rd.	March 16	24	8	20	5	3.0
47.9 Mile Pit Chena Hot Springs Rd.	March 16	30	19	10	10	3.0

* Water is located on Eielson Air Force Base and dissolved oxygen levels were collected by Base Natural Resources Manager.

Dissolved oxygen readings for the remaining four pits are presented in Table 2.

All four of these gravel pits are within sight of the Chena Hot Springs road, and they range in size from 10-20 acres. A more complete survey and test netting will be done during the upcoming field season and reported on next year. These areas, if found to be devoid of fish, could be stocked with Arctic grayling and would provide excellent angling opportunity along the much-traveled and heavily-fished upper Chena River.

Included in Table 2 are the results of dissolved oxygen determinations made on Chena Lake and Spencer Lake. The chemical rehabilitation of Chena Lake, completed in September 1981, is discussed later in this report and plans are to stock it with coho salmon or rainbow trout in 1982. Spencer lake is scheduled to be rehabilitated in 1982 and stocked in late 1982 or 1983.

Dissolved oxygen levels were measured during winter test netting on the East Fork of the Chena River in March 1981 to document presence of overwintering fish (Table 2).

Lake Stocking

Nine area lakes were stocked in 1981 and stocking summaries appear in Table 3. Birch, Harding, Little Harding and Lost Lakes stocking and subsequent stocking evaluation are detailed by Doxey (1982). Three lakes, Moose, Engineer Hill and 28 Mile Pit are located on Eielson Air Force Base. Moose Lake was rehabilitated in 1980 to remove a population of stunted northern pike. The lake was test netted and found to contain no fish, indicating complete eradication of fish as result the 1980 rotenoning. Moose Lake was stocked with coho salmon in May of 1982.

Engineer Hill Lake was chemically rehabilitated in 1976 to rid the lake of a large population of lake chubs. Because the dissolved oxygen levels in this lake were too low for rainbow trout and coho salmon, Arctic grayling, which are able to withstand lower oxygen levels, were introduced in 1977 and were restocked in 1981.

Twenty-eight Mile Pit was stocked for the third time with coho salmon and receives considerable fishing pressure during the summer months. Les's Lake near Clear Air Force Base is accessible by foot, snow machine or all-terrain vehicle, and was stocked with fingerling coho salmon for the second time. Dune Lake, a remote fly-in lake located some 25 miles southwest of Nenana, was restocked with Arctic grayling after it was determined that the initial stocking was extremely successful (Kramer, 1980).

Due to production problems at the Fisheries Rehabilitation Enhancement and Development Division (F.R.E.D.) hatcheries in 1981, the only rainbow trout stocked in area waters were 50,654 sub-catchables (yearlings) which went into Birch Lake. A total of 4,800 fingerling rainbow trout destined for Little Harding lake experienced 92% mortality due to stress from transport; consequently only 378 surviving rainbows were stocked. Of a total of 262,700 rainbow trout requested for Region III, only 51,024 were actually stocked in area lakes. Difficulties were also experienced with F.R.E.D.

Table 3. Lake Stocking, Fairbanks Area, 1981.

Lake	Location	Date	Species	Size	Number
Birch Lake	Richardson Highway	May 19	SS	302/lb	30,000
		May 19	RT	20/lb	50,654
Little Harding Lake	Richardson Highway	May 19	SS	302/lb	20,000
		July 16	RT	450/lb	368
Lost Lake	Richardson Highway	May 19	SS	302/lb	10,000
Harding Lake	Richardson Highway	July 16	SS	150/lb	32,215
28 Mile Pit	Richardson Highway	May 19	SS	302/lb	2,000
Moose Lake	Eielson Air Force Base	May 19	SS	302/lb	5,000
Engineer Hill Lake		June 5	GR	Sac fry	27,202
Les's Lake	Parks Highway (near Clear A.F.B.)	May 19	SS	302/lb	750
Dune Lake	25 Mi S.W. of Nenana	June 11	GR	Sac fry	50,394

Division's grayling production. Approximately 430,000 fry were requested and 196,451 were stocked, with 77,000 going into Fairbanks area waters and the balance going to the Delta Junction area.

Eielson Creel Census

Creel census on some of the managed lakes and ponds on Eielson Air Force Base was conducted under a cooperative program by the Base Natural Resources Manager. Three of these lakes (out of a total of nine lakes) accounted for 76% of all fish sampled from the creel. They also provided 60% of the total man hours of fishing on base and had a catch per unit effort of 0.49 fish per hour. The significance of this creel census is that managed lakes play an important role in providing fishing opportunity in these areas and thus relieve some of the pressure from the other already intensively-used waters.

Fish Sampling in Area Waters

Because Fairbanks area waters have received so few fish for stocking purposes in the past 3 years, fish sampling and test netting of managed lakes that are required to evaluate these practices have been greatly reduced. In 1981 only four managed lakes were test netted and those results appear in Table 4.

Thirty-one Mile Pit

This gravel pit was last stocked in 1978 with 12,500 grayling fry. Grayling were also stocked in 31 Mile pit in 1973 and 1975. Kramer (1979) reported that young-of-the-year and Age III grayling were present. These young-of-the-year grayling may represent the first natural reproduction of this species in 31 Mile Pit. Test netting in 1980 found five year classes of grayling, ages I-V, but no young-of-the-year fish. In 1981 only Age III fish were captured. The presence of longnose suckers and least cisco was first documented in 1980 and they again were captured in test netting in 1981. The origin of these two undesirable species is unknown. However, it appears that some member of the public is putting fish into this gravel pit. This may also be the origin of young-of-the-year grayling. Thirty-one Mile Pit has become one of the more popular roadside fisheries in past years. If the longnose sucker and least cisco problem intensifies, chemical rehabilitation may be required to remove these competing species so that good grayling fishing can be maintained.

Chena Lake

Chena Lake (Fig. 2) was created when the U.S. Army Corps of Engineers restored a group of central borrow pits to form a 259-acre lake near the control structure at the Chena River Lakes Flood Control Project. The Sport Fish Division, Alaska Department of Fish and Game, has worked closely with the Corps during construction of the lake to assure proper physical characteristics so that the lake can sustain a year-round fish population. Features such as sufficient depth to maintain adequate dissolved oxygen levels during winter months were insisted upon. Proper slope of the near shore area "littoral zone" to promote growth and reproduction of the aquatic vegetation which provides both food and cover for fish was to be

Table 4. Fish sampling summaries, 1981.

Water	Date	Species	No.	Fork Length mm Range	Mean	Age	Frequency
Johnson Road #1	July 30	GR	15	106-230	212	III	0.63
Johnson Road #2	July 30	GR	4	196-223	206	III	0.17
31 Mile Pit	July 30	GR	3	180-212	192	III	0.13
		LC	19				0.80
		LNS	4				0.17
28 Mile Pit	July 30	SS	14	92-130	103	YOY	0.59
Chena Lake	June 03	LNS	235				3.27
		LCI	22				0.31
		GR	16				0.23
		HWF	13				0.18
		RWF	12				0.17
		NP	4				0.05
		BB	1				0.02
Chatanika River (Elliott Hwy to Goldstream)	June 8-12	GR	32	145-290	232	II-VII	...
Beaver Creek (From Nome Creek to Yukon River)	June 17-July 1	GR	53	145-360	252	II-VIII	...

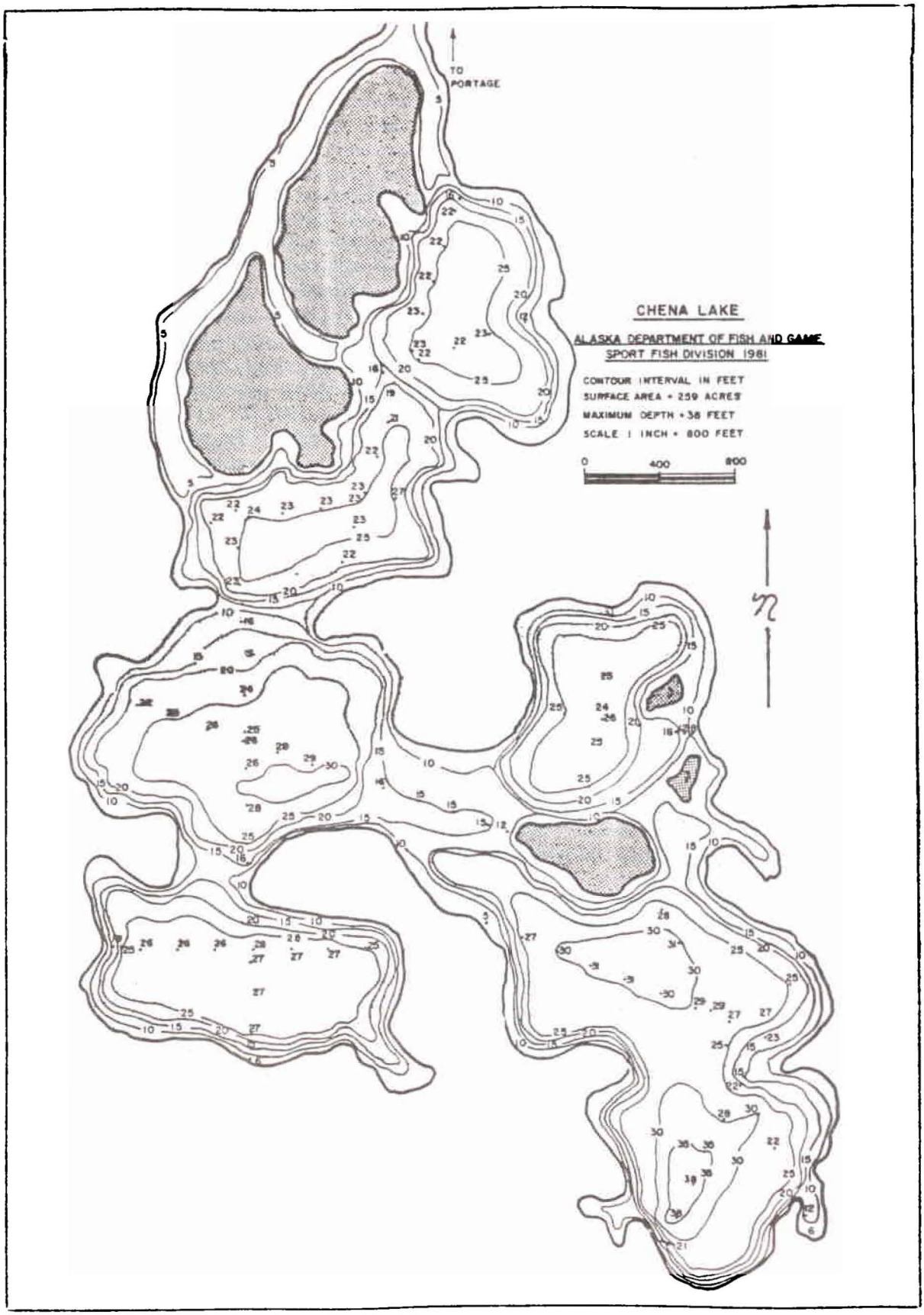

Figure 2. Chena Lake

used. We encouraged the Corps to put back into the lake the organically rich overburden, initially stripped off of the area, to speed up plant succession and increase the nutrient levels of the lake. We also insisted that the Corps make the lake free of any inlet or outlet structure that would allow for the interchange of water and fish between the lake and the Chena River. The Corps has been very accommodating and has done excellent work on the "Chena Lake" part of the project. We also stipulated that before the Division of Sport Fish goes any further with management plans (lake stocking), a test of the entire project be conducted to learn if the lake would be affected during times of flooding. July of 1981 was an extremely wet month, with above average rainfall. The Corps, anticipating possible flooding in the lower areas around Fairbanks, elected to close the flood gates, thus providing flood protection as well as an opportunity to test the facility. Upon completion of their testing, we felt that the lake would not be affected by flooding conditions from the nearby Chena River.

Limnological data collected in 1979 and 1980 (Hallberg 1980, 1981) indicated that the physical and chemical parameters necessary to support year-round fish populations in Chena Lake were present. Water chemistry data collected on June 12, 1981 are as follows: total alkalinity, 120 ppm; CO_2, 10 ppm; total hardness, 154 ppm; and pH 7.8. The dissolved oxygen level in January 1981 was 9 ppm at 18 feet and in March 1981 was 5 ppm at 10 feet. The increased presence of invertebrate life, aquatic vegetation and algae indicates that the lake is reclaiming itself as an aquatic community instead of remaining a gravel pit. Test netting results in Table 4 show seven different species of fish already in the lake, all of which would limit the success of stocking rainbow trout or coho salmon. With these factors in mind, plans were initiated to chemically rehabilitate the lake to remove the undesirable fish species and bring the lake into production by restocking it in 1982.

On September 15, 1981 Chena Lake was chemically treated at 1.5 ppm with 2.5% synergized rotenone. Approximately 2,500 gallons of the chemical was required. It is expected that a 100% kill occurred and spring test netting should bear this out. The lake will be restocked with coho salmon or rainbow trout. Because of its size (259 acres) and close proximity to Fairbanks (20 miles), Ft. Wainwright Army Post and Eielson Air Force Base, we anticipate that this lake will be extremely popular and could relieve much of the pressure now being placed on other area lakes and streams.

Chatanika River Whitefish Studies

Plans to conduct a creel census on the Chatanika River in September and October during the whitefish spearing season were canceled when muddy water conditions persisted through the fall. The severity of the problem of turbid water caused by placer mining operations in the upper Chatanika drainage beginning in 1979 can be seen from the following use figures for the Chatanika compiled by Mills (1979, 1980, 1981a and 1981b):

Year	Man-days fished
1977	9,925
1978	10,835
1979	4,853
1980	5,576

Kramer (1980) noted that in 1979 the Chatanika river was muddy most of the summer. This coincides with a reduction in fishing effort of 55% from the previous year. Extremely muddy conditions continued in the summers of 1980 and 1981. In late September of 1980 the river cleared up, allowing spear fishermen to harvest approximately 1,587 whitefish. However, in 1981 the river remained muddy until mid-October shortly before freeze-up and the whitefish harvest was negligible. Efforts to conduct a visual population estimate on whitefish in the Chatanika River also met with no success due to the turbid water. Efforts are being made to work with agencies involved, like the Alaska Department of Environmental Conservation and the Habitat Protection Division of Alaska Department of Fish and Game, to keep them apprised of the problems and to come up with a workable solution.

Area Surveys

In 1981, stream surveys were conducted on Beaver Creek and the Chatanika River.

The Chatanika River from the Elliott Highway bridge to its confluence with Goldstream Creek, a total of 70 miles, was surveyed from June 8-12. The purpose of the trip was principally to assess the summer sport fishing potential for Arctic grayling. Grayling sampled during the survey were measured and scale samples collected and those results appear in Table 4. This section of the Chatanika River provides the angler with good opportunity to catch grayling in the 6-12" range. Larger fish were observed but not sampled. Angling was found to be more productive in the deeper pools or long stretches of slow moving water than in the riffle areas.

Approximately 300 miles of Beaver Creek were surveyed from June 17 to July 1. Like the Chatanika River survey, the purpose of the Beaver Creek trip was to investigate summer sport fishing opportunities with emphasis on Arctic grayling. Sampling results also appear in Table 4. Beaver Creek offers a little better fishing opportunity than does the Chatanika River. The reason may be that it is a considerably larger system overall, offering more suitable habitat for grayling. Grayling here ranged from 8-15" in length and fishing was again best in the deeper slower moving areas. A complete summary of both river surveys, outlining the chemical and physical characteristics of each stream is detailed in Hallberg (1982).

Minto Flats Sport Fishing Survey

In early June a trip was made to the lower Chatanika River and Minto Flats to assess the early season fishing potential and check for evidence of sport fishing activity in the area.

All sampling in the Chatanika River was by hook and line. Angling in the lower Chatanika produced numerous grayling (up to 10 GR/hour). The average

length of grayling was 224 mm. Two 5-pound sheefish were also captured on hook and line in the extreme lower section of the Chatanika River.

Northern pike were taken by hook and line in sloughs and shallow backwater areas off the main rivers in the flats. Angling success in these areas was good for short periods of time with pike up to 18 pounds being captured. The average size pike was 3-6 pounds. Fishing was poor at the confluences of the main rivers and in the lakes. One overnight gill net set produced 3 humpback whitefish, 10 immature least cisco, 6 longnose suckers, and only 1 small northern pike.

Three separate parties were observed floating the Chatanika and Tolovana Rivers during the 5 days of this survey. The guided fishing operations had not started yet, but one group of riverboaters was seen fishing. In general, the June pike fishing was poor in the areas which are known to be better in mid and late summer (i.e. confluences of the major rivers). However, some good action was available and the area appears to provide good recreational and fishing opportunities to river floaters at this time of year.

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