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STATE OF ALASKA

Bill Sheffield, 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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ABSTRACT

Results of late winter dissolved oxygen readings taken on 26 lakes in the Fairbanks area in 1982 are presented.

Stocking of nine Fairbanks area lakes is reported on. Test netting results and fish sampling summaries from 18 area lakes currently being managed by the Sport Fish Division are presented.

Lake surveys conducted on five remote fly-in lakes located in the Yukon Flats are reported on.

Northern pike, Esox lucius Linnaeus, investigations in the Minto Flats area are discussed. Four northern pike from three locations in the Minto area were tagged with surgically implanted radio transmitters. Late fall and early winter movements of these individuals were monitored and results, as well as techniques, are discussed.

KEY WORDS

Fairbanks area, dissolved oxygen, lake stocking, Yukon Flats, lake surveys, Minto Flats, northern pike, test netting and radio tags.

* "This research report has been numbered in a manner consistent with past projects which were partially funded with Federal dollars. Though no Federal dollars were available this year, the consistent project numbering will enable future researchers to locate this data."

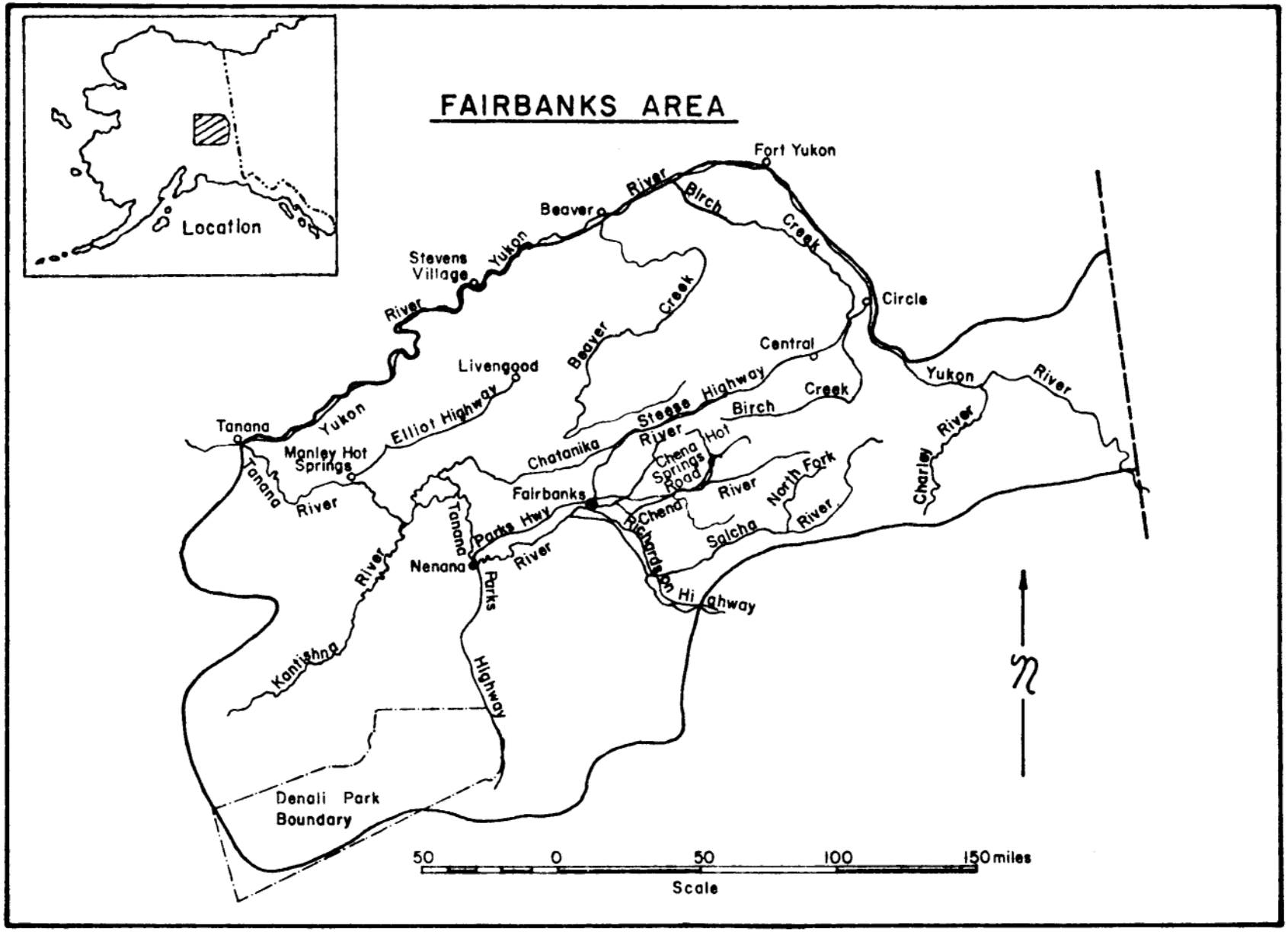


Figure 1. Fairbanks Management Area

BACKGROUND

The Fairbanks Management Area (Figure 1) of approximately 52,0000 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.

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 or need additional data. 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.

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

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

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 snow machine or aircraft, have also been stocked with rainbow trout, coho salmon, and grayling. The remote water stocking program is well received by sportsmen.

RECOMMENDATIONS

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

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

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

OBJECTIVES

1. To evaluate stocking policies of grayling, coho salmon and rainbow trout and formulate stocking recommendations for optimum growth and survival. Evaluations will also be conducted on waters requiring enhancement or rehabilitation.

2. To assess the environmental characteristics, fish species composition and population structure of the waters within the job area and, where practical, obtain estimates of existing or potential angler use and sport fish harvest.

3. To continue surveys of the lower Tanana and middle Yukon River waters, and to update information on previously surveyed waters.

TECHNIQUES

A float-equipped Cessna 185 aircraft was used to transport field crews and equipment to remote lakes within the study area, and to monitor northern pike movements.

Physiographic data, as well as latitude and longitude, were calculated from 1956 U.S. Geological Survey (USGS) 1:250,000 maps.

Water chemistry data were measured using a Hach AL-36B field test kit. Water depths were determined with a Lowrance fathometer, and a standard 10-in Secchi disc was used for water clarity.

Multifilament and monofiliment graduated mesh sinking or floating gill nets, measuring 125 x 6 ft and consisting of five 25-ft panels of 1/2-in through 2-1/2-in bar mesh, were used to capture fish.

All data were recorded on standard Alaska Department of Fish and Game stream and lake survey forms.

All fish samples were grouped by date and location. Weights were recorded to the nearest gram using a Chatillon spring scale. Fork lengths were measured to the nearest millimeter, and sex and stage of maturity were determined by examining gonads.

Ice, water and snow depths were measured to the nearest inch. Dissolved oxygen levels were measured using a Hach AL-36B field test kit and the low range titration procedure.

Scales used for age determination were cleaned and mounted between glass slides. A Bruning 200 microfiche reader was used to read the scales.

Cleithrum bones as described by Casselman (1980) were used for aging northern pike.

Four Telonics RB-5 radio transmitters were surgically implanted into the body cavity of northern pike using the technique outlined by Ross (1981). The transmitters ("tags") were imbedded in wax and had 250 mm (red teflon coated wire) antenna. The tags weighed approximately 30 g and had a battery life of about 6 months. The frequencies of the transmitters ranged from 150.000 MHz to 151.220 MHz.

The signals from the transmitters were received using a Telonics RA-2AK antenna mounted on the wing strut of a Cessna 185 aircraft, a Telonics TS-1 Scanner/Processor, and a Telonics TR-2 Biomedical Telemetry Receiver.

FINDINGS

Dissolved Oxygen Testing

A total of 26 area lakes and gravel pits were tested for dissolved oxygen levels in late winter-early spring when levels are considered to be at their lowest. Those results appear in Table 2. Eight gravel pits along the Steese Highway north of Fairbanks were tested. These gravel pits are currently being managed for sport fishing by the Sport Fish Division. All eight have been stocked with Arctic grayling at least once since 1975 when the program started and some have been re-stocked. Stocking success and age and growth of these fish are discussed in the section on fish sampling. Two gravel pits along the upper Chena Hot Springs Road were also tested; these areas are being considered for further enhancement work. Seven popular area waters along the Richardson Highway were also tested. These also have been stocked for sport fishing. The levels of dissolved oxygen in these seven waters appear to be adequate in most cases. Johnson Road Pit #2 had a dissolved oxygen level of only 0.5 ppm, which is considered marginal; however, no evidence of winter mortality was observed and summer test netted showed that the grayling introduced in this pit are surviving and growing well.

Nine remote fly-in lakes were also sampled. Two of these lakes, Burman and Clear, are located in the Yukon Flats and have been known to provide good

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

Water	Date	D.O. ppm	Ice Depth (in)	Snow Depth (in)	Water Depth (ft)	Sample Depth (ft)
Steese Highway Gravel Pits:						
Mile 29.6	March 23	3.2	24	9	9	3
Mile 30.6	March 23	0.9	24	12	6.5	4
Mile 31.6	March 23	4.0	24	12	8	5
Mile 33.0	March 23	3.4	24	11	11	5
Mile 33.5	March 23	.2	24	14	4	3
Mile 34.6	March 23	.6	20	16	11	5
Mile 35.8	March 23	1.7	17	19	12.5	5
Mile 36.6	March 23	5.6	22	12	14.5	5
Chena Hot Spring Road Gravel Pits:						
Mile 32.8	April 15	0.2	28	8	7	5
Mile 42.8	April 15	1.4	23	6	12	5
Richardson Hwy Pits:						
Moose Lake	March 26	1.7	23	14	11	5
28 Mi Pit	March 19	10.0	17	13	10	5
31 Mi Pit	March 19	1.7	22	11	6	4
Johnson Rd #1	March 19	4.1	22	13	11	4
Johnson Rd #2	March 19	0.5	22	13	10	3
Silver Fox Pit	March 17	5.5	45	6	10	4
Birch Lake Pit	March 17	4.0	26	10	10	5

(Continued)

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

Water	Date	D.O. ppm	Ice Depth (in)	Snow Depth (in)	Water Depth (ft)	Sample Depth (ft)
Remote Fly-In Lakes:						
Deadman Lake	Feb. 11	8.5	24	8	8	5
Dune Lake	Feb. 11	2.5	22	12	9	5
Burman Lake	March 23	5.0	20	12	10	5
Clear Lake (Yukon Flats)	March 23	6.0	24	12	40	12
Itsgezia Lake	April 9	6.0	26	6	14	5
Geskamena Lake	April 9	6.0	30	6	13	5
Kendamina Lake	April 9	9.0	28	6	29	5
West Twin Lake	April 9	12.0	26	6	10	5
Blind-luck Lake	April 9	9.0	34	6	43	5

summer fishery and some winter fishing for northern pike. The other six lakes are located in the Kantishna drainage. Dune Lake has been stocked with Arctic grayling and Geskakmina Lake has been stocked with coho salmon. West Twin Lake is a popular northern pike fishing water and, although Itsgiza and Blind-luck Lakes have not yet been test netted, they are reported to contain northern pike. All fly-in lakes except Dune Lake, which had a D.O. of 2.5 ppm, had substantial amounts of oxygen. However, Arctic grayling can tolerate D.O. levels down to and even below 1 ppm, thus in Dune Lake oxygen does not appear to be a limiting factor.

Lake Stocking Summary

Nine lakes in the Fairbanks area were stocked in 1982 (Table 3). Nearly 400,000 rainbow trout were stocked into Birch Lake. Chena Lake was stocked for the first time with rainbow trout and coho salmon. This lake was created when the Army Corp of Engineers joined together six borrow pits used during construction of the flood control project, to create one 260 acre lake. The lake was chemically treated in September 1981 to remove undesirable species of fish. The lake remained fallow for the 1981-82 winter and was then tested in May of 1982 to determine if the lake had detoxified. The chemical, rotenone, was still active at that time and stocking was postponed. In June, after the ice had gone out of the lake and wave action had aerated the water enough to detoxify the chemical, the lake was stocked with 27,551 rainbow trout and 27,607 coho salmon. However, within a month the Army Corps of Engineers chose to close access to the lake because of the potential conflicts between the public and ongoing construction work associated with the project. Efforts are being made to work with the Corps of Engineers to encourage them to leave access open to those parts of the lake not under construction during the 1983 season.

Koole Lake was the only other Fairbanks area lake to receive rainbow trout in 1983. Our stocking request of 1.5 million rainbow trout for Region III was far from met when the F.R.E.D. Division supplied us with only 744,000 total for the year. A total of 75,569 coho salmon was stocked in six land-locked lakes.

Harding Lake was experimentally stocked with 142,105 sheefish fingerlings in attempt to create a sport fishery for this species in the lake. However, this management plan is highly dependent on 2 or possibly 3 successive years stocking of sheefish fingerlings in order to determine its success.

No Arctic grayling were stocked in 1982 as egg-take attempts by the F.R.E.D. Division failed.

Fish Sampling In Area Waters

Managed Waters:

Eighteen area waters currently being managed by the Sport Fish Division were test netted in 1982. Results of the netting appear in Table 4. Eight of these waters are small (2-5 acres) gravel pits which have been abandoned by the Alaska Dept. of Transportation, and are located adjacent to the

Table 3. Lake stocking summary, Fairbanks area 1982.

Lake	Location	Date	Species	Size	Number
Birch Lake	Richardson Highway	June 5	RT	59/lb	97,278
		Aug. 23	RT	349/lb	298,500
Chena Lake	Flood Control Project Site	June 8	RT	8/lb	7,134
		June 8	RT	59/lb	20,417
		June 8	SS	300/lb	21,233
		June 8	SS	224/lb	6,374
Lost Lake	Richardson Highway	June 8	SS	300/lb	23,784
Little Harding Lake	Richardson Highway	June 8	SS	300/lb	15,933
Les's Lake	Parks Highway	June 17	SS	224/lb	750
28 Mile Pit	Richardson Highway	June 17	SS	224/lb	2,000
Moose Lake	Eielson A.F.B.	June 17	SS	224/lb	5,495
Koole Lake		Aug. 23	RT	349/lb	38,400
Harding Lake	Richardson Highway	June 4	SF	fingerlings	71,505
		June 7	SF		70,230
		July 9	SF	12 in	370

461,729 RT
75,569 SS
142,105 SF

Table 4. Fish sampling summary. Fairbanks area managed waters, 1982.

Water	Date	Species	No.	Age	Fork Length mm Range	Fork Length mm Mean	Weight (g) Range	Weight (g) Mean	
Steese Hwy Pits:									
29.6 Mi Pit	May 28	GR	8	I	120-133	125	14-21	17	*
			2	IV	210-242	226	110-144	127	1978 Stocking
		RWF	2		296-300	298	220-249	230	
30.6 Mi Pit	May 20	GR	5	II	144-153	148	26-29	27	*
			3	IV	232-256	247	134-149	141	1978 Stocking
33.0 Mi Pit	May 20	0							
31.6 Mi Pit	May 20	GR	2	I	125-130	128	16-18	17	*
			3	III	220-225	223	105-116	111	*
			7	IV	230-260	241	118-142	127	1978 Stocking
33.5 Mi Pit	May 27	GR	2	I	130-134	132	18-22	20	*
			1	IV	241	241	162	162	1978 Stocking
		BB	1		227	227			
34.5 Mi Pit	May 27	0							
35.8 Mi Pit	May 28	0							
36.6 Mi Pit	May 28	GR	1	I	120	120	16	16	*
			1	II	157	157	59	59	*
			3	III	185-206	197	82-87	85	*
		RWF	2		392-414	403	574-682	625	
Richardson Hwy Pits:									
Hidden Lake	May 27	GR	1	III	209	209	124	124	
			3	IV	225-249	236	128-166	148	
			6	V	240-265	254	162-228	198	
			3	VI	280-294	288	190-332	254	
		LC	6						
		LNS	1						
Bathing Beauty Pond	May 27	GR	2	II	153-185	169	41-66	53	
			4	III	182-210	200	68-96	85	
			2	IV	213-220	216	102-104	103	
			5	V	220-236	229	117-134	121	

Table 4. (Cont'd) Fish sampling summary. Fairbanks area managed waters, 1982.

Water	Date	Species	No.	Age	Fork Length mm Range	Fork Length mm Mean	Weight (g) Range	Weight (g) Mean
Richardson Hwy Pits (cont'd):								
Grayling Lake	May 27	GR	4	III	201-212	206	76-108	92
		SF	1					
		LC	100					
Moose Lake	June 25	SS	17		170-224	190	56-136	82
		SS	2		241-280	260	169-199	184
28 Mi Pit	June 25	SS	4		148-154	151	38-48	42
31 Mi Pit	June 25	GR	18		155-250	198	36-173	95
		LC	21		106-130	119		
Johnson Road #1	June 25	GR	14		212-241	221	114-148	131
Johnson Road #2	June 25	GR	23		217-269	234	133-220	155
		BB	1		400		283	
Silver Fox Pit	June 24	SF	1		232		154	
Birch Lake Pit	June 24	GR	2		177-253	215		

* Natural reproduction in pit.

Steese Highway north of Fairbanks. Over the years these have become popular recreational areas for many Fairbanks residents. Three of the gravel pits were initially stocked in 1975 with Arctic grayling. Five pits were stocked in 1977 and six in 1978, again with Arctic grayling. No grayling have been available for stocking of these areas since 1978. Our test netting results of these eight gravel pits showed that three, 33.0, 34.5 and 35.8 Mile Pits, had no fish in them. The land around 33.0 Mile Pit is privately owned, making public access to it questionable. The other five gravel pits contained grayling that were originally stocked in them, as well as Age I and II grayling, indicating that natural reproduction is occurring.

Richardson Highway waters are similar to those found along the Steese Highway in that most of them are old gravel pits that have good public access and have been stocked by the Sport Fish Division. Test netting results for Richardson Highway waters are also presented in Table 4. Those lakes having grayling in them were last stocked in 1978. Growth rates of Arctic grayling in these gravel pits vary considerably. Those grayling in Hidden Lake exhibit faster growth in Age Classes III through VI than do the native grayling in the Chena River (Hallberg, 1982), while grayling growth rates in Bathing Beauty Pond are similar to those of Chena River fish.

Coho salmon were stocked in two lakes, Moose Lake and 28 Mile Pit, and an experimental stocking of sheefish was made to Silver Fox Pit. These stockings afford area sportsmen increased opportunity to angle for a variety of sport fish. It is important that fish are made available in future years from the F.R.E.D. Division so that programs such as these can continue.

Yukon Flats Lake Surveys 1982

The Yukon River traverses the Yukon Flats for more than 200 mi. The flats extend westward from Circle City to the Dalton Highway bridge, a distance of about 175 mi. The foothills of the Brooks Range is the northern boundary of the flats, while the White and Crazy Mountains make up its southern border.

Surveys in 1982 were conducted in that portion of the flats lying south of Fort Yukon between the Yukon River and the White Mountains. The flats near the Yukon River is a broad flood plain, dotted with thousands of lakes, ponds, oxbows and potholes, interspersed with stands of spruce, birch, and willow.

An aerial reconnaissance of this area revealed that the majority of these water bodies are extremely shallow, with no inlets or outlets and, consequently, are not suitable as fish habitat. However, one such lake (82-5) that was found to have a maximum depth of 8 feet did have both an inlet and outlet and contained a variety of fish.

Surveys of lakes within this area began in 1979 when four of the larger lakes west of the Beaver Creek and five to the east were surveyed and found to have angling potential for northern pike (Kramer, 1981). In 1982 four such lakes were surveyed, all east of Beaver Creek. Because none of the lakes had ever been surveyed or named, for reporting purposes they will be

referred to as lakes 82-1 through 82-5. These four lakes have a very irregular shoreline configuration and contain numerous bays, separated by narrows and points. All four lakes were at least 1 mile long and one was over 2 mi total length. Their surrounding shorelines consisted of dense stands of black spruce with some birch and willow mixed in.

Lake 82-1 (Figure 2.). This lake of approximately 220 acres is located 110 mi northeast of Fairbanks, or about 7 mi east and 2 mi north of Burman Lake at lat. 66° 07'N, long. 145° 43'W. The lake is 2 mi long and has a surface elevation of 605 ft. Depth soundings along the entire length of the lake showed a maximum depth of 35 feet near the east end of the lake. The lake has two small inlets, one at the south end which had low to moderate flows, less than 1 cfs, and one on the north shore which flows intermittently. The outlet, at the east end of the lake also had a low flow. Water chemistry on June 14 was: acidity 51 ppm, hardness 68 ppm, alkalinity 51 ppm, pH 6.5 and water temperature was 56°F. Only one northern pike was captured in a 125' experimental gill set off the north shore for 1 night. It measured 445 mm (17.5") and weighed 1 1/2 lbs. A total of 2 hours spent angling failed to produce any fish.

Lake 82-2 (Figure 3). This lake is approximately 115 mi northeast of Fairbanks or 11 mi east and 2 mi north of Burman Lake at lat. 66° 07' N, long. 145° 34'W. The lake is a little more than a mile long from east to west and only a quarter mile wide at its widest part. It is the northernmost lake of a chain of four which are connected by a stream that flows only intermittently. It has a surface elevation of 640 ft and is estimated to have 240 surface acres. The lake has a stained appearance and the Secchi disk reading was only 6 ft. Bottom was mostly soft, muddy material and the lake lacked any significant weed beds. An inlet at the east end and an outlet at the west end both have intermittent flows, usually not suitable for fish passage. Water chemistry on June 14 was: acidity 34 ppm, hardness 85 ppm, alkalinity 60 ppm, pH 7.5 and a water temperature of 54°F. While no fish were caught in a 125 ft gill net set overnight, one northern pike 18" in length was caught in 2 hours of angling.

Lake 82-3 (Figure 4). This lake is located approximately 108 mi northeast of Fairbanks or about 15 mi due east of Burman Lake at lat. 66° 03'N, long. 145° 28'W. The lake has three large bays along the western shoreline and one on the east. Its estimated size is 195 acres and it lies at a surface elevation of about 800 feet. The lake is the deepest of those surveyed, with a maximum depth of 65 feet. While it was somewhat stained in color, it had a Secchi disk reading of 9 feet. Water chemistry here on June 15, 1982 was: acidity 17 ppm, hardness 51 ppm, alkalinity 51 ppm, pH 7 and water temperature of 63° F. One 125' gill net set off the largest point on the lake for 1 night caught 18 northern pike ranging from 1/4 to 14 1/2 lbs in weight and from 6 to 39 inches fork length. The lake had no inlets or outlets but did have a considerable shoal area with emergent aquatic vegetation.

Lake 82.4 (Figure 5). This lake is located 115 mi northeast of Fairbanks or 20 mi due east of Burman Lake at lat. 66°, 07' N long. 145° 15' W. This 210 acre lake has an elevation of 750' and is the farthest south and longest (1 3/4 mi long) in a chain of three lakes. Fathometer readings

Figure 2: Lake No. 82-1 Depths are Shown in Feet

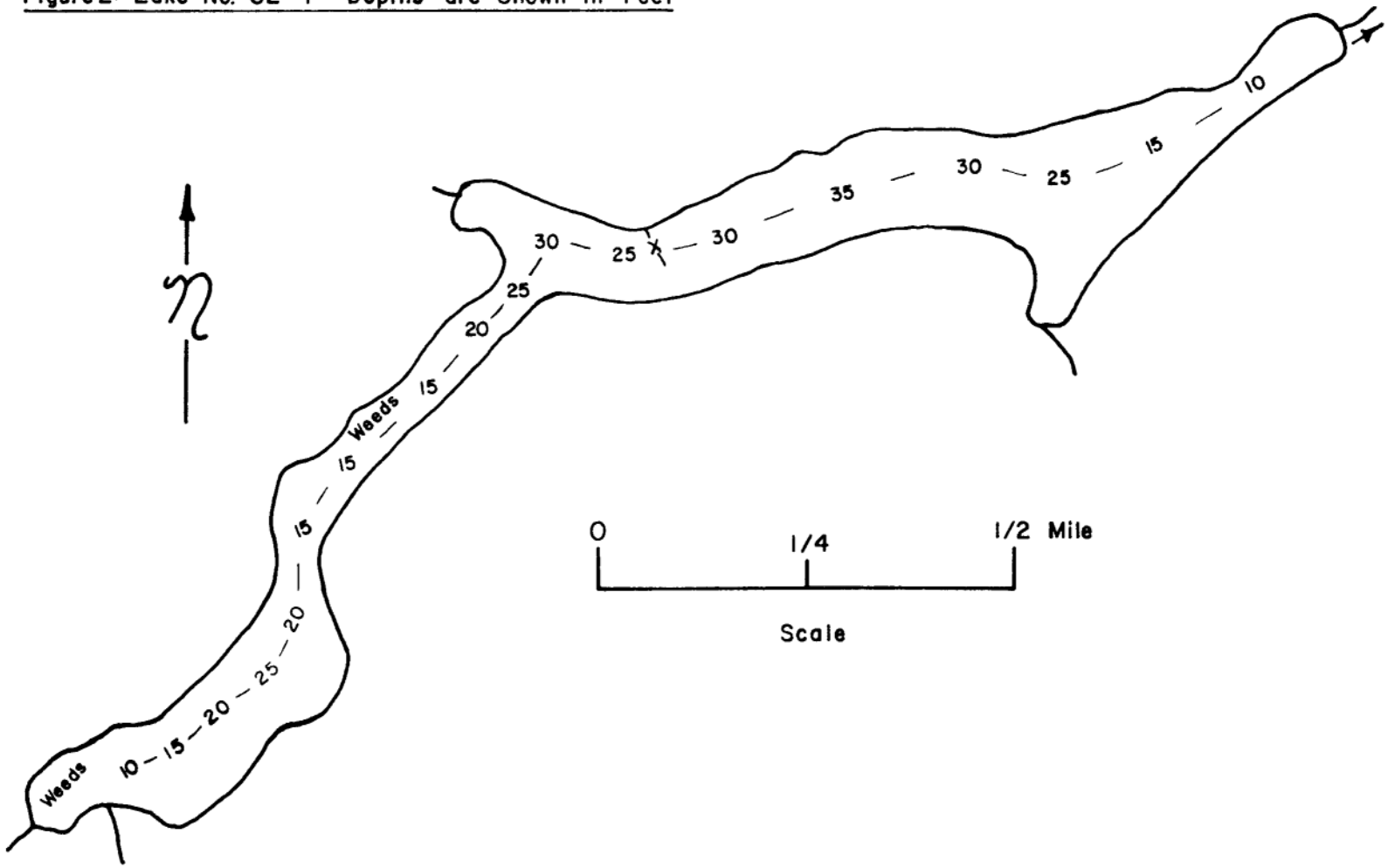


Figure 3: Lake No. 82-2 Depths are Shown in Feet

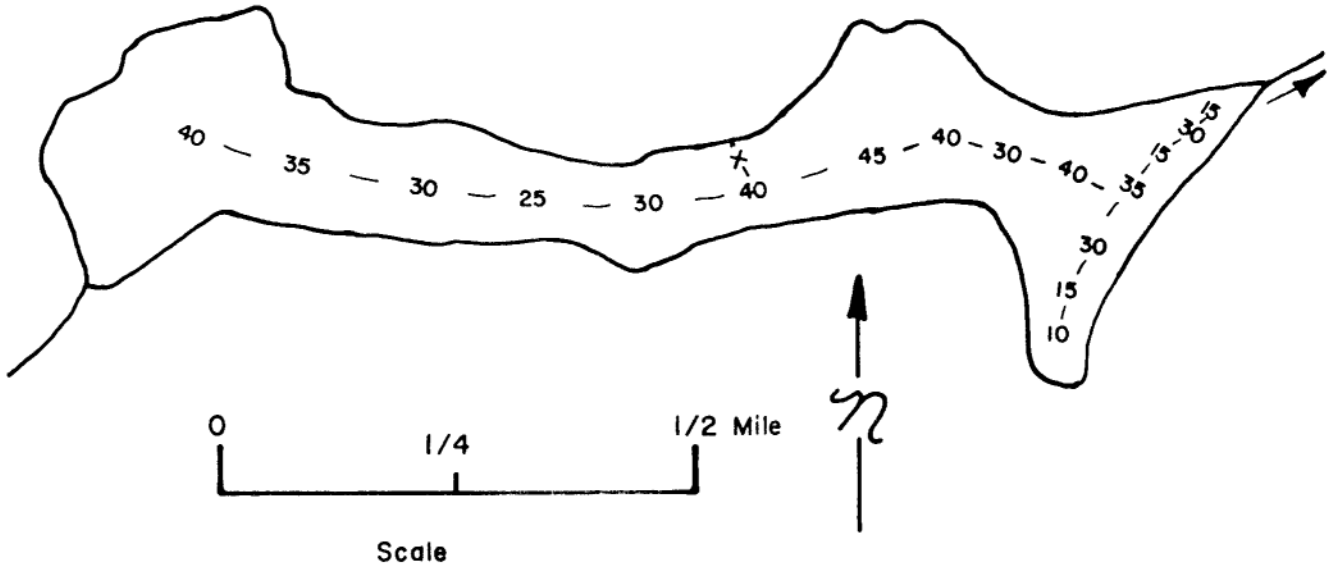


Figure 4: Lake No. 82-3 Depths are Shown in Feet

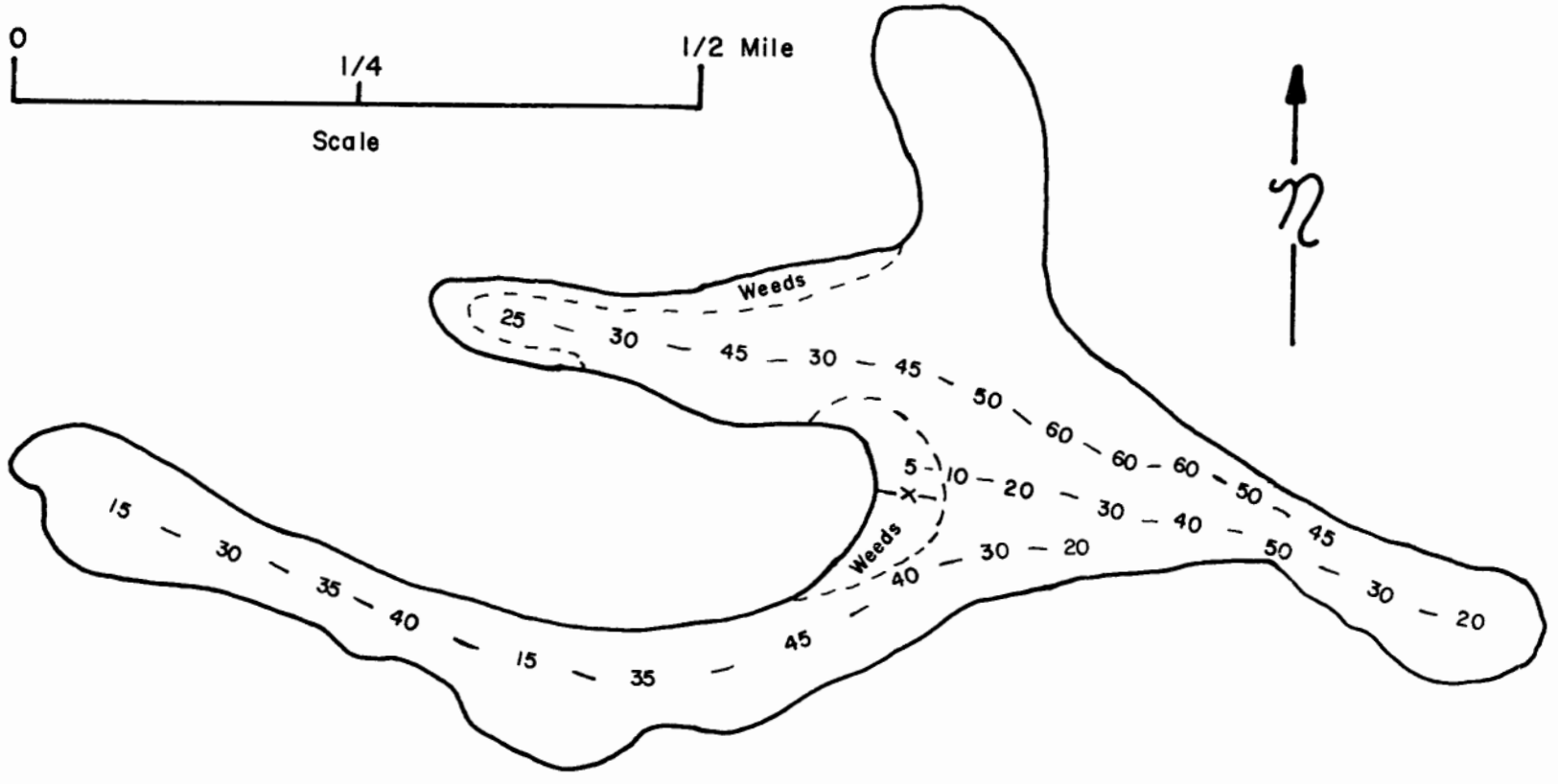
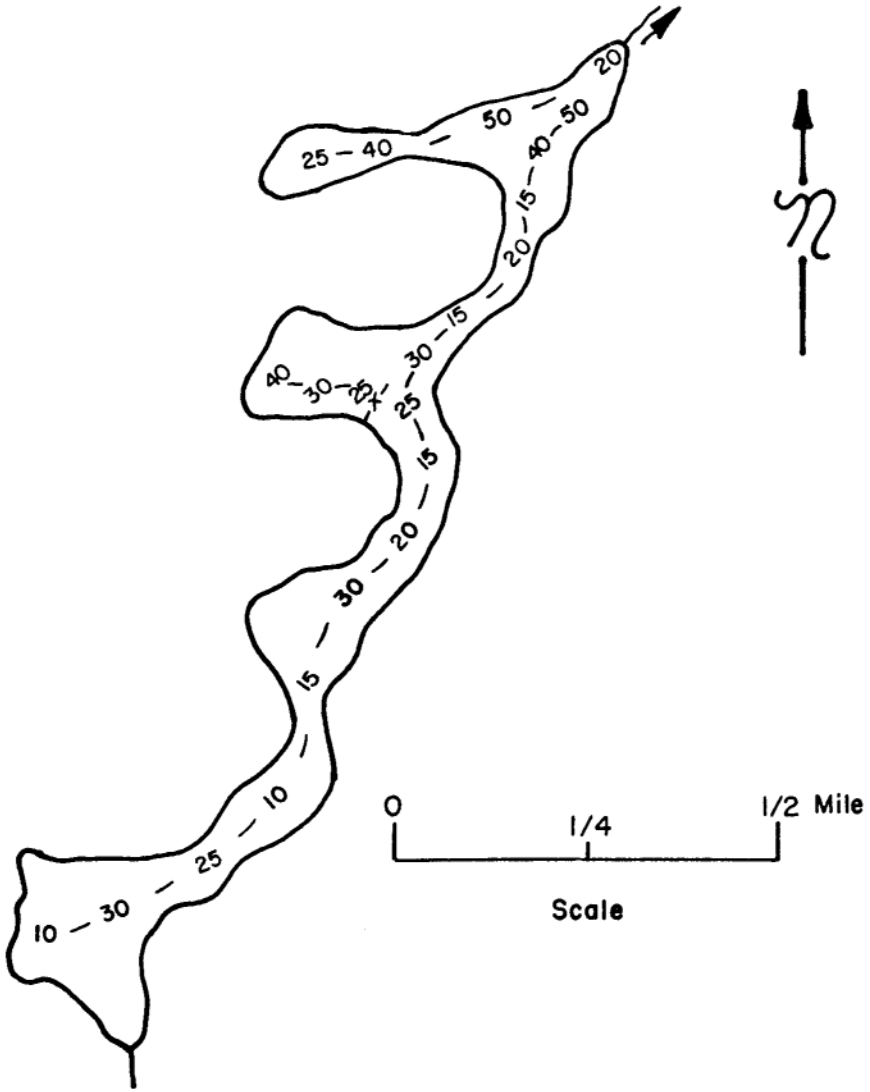


Figure 5: Lake No. 82-4 Depths are Shown in Feet



collected along the length of the lake showed a depth of 50 feet near the north end. The lake had an intermittent inlet at the south end and a small outlet on the north end. Very little flow was evident. Water chemistry on June 15 was: acidity 34 ppm, hardness 34 ppm, alkalinity 34 ppm, pH 6.5, water temperature 60°F and Secchi disk reading was 5 feet. The lake had moderate emergent vegetation, mostly horsetails and lily pads. A 125' gill net set for 24 hours caught 3 northern pike, weighing from 2 to 8 pounds.

Lake 82-5 (Figure 6). This lake is located approximately 120 mi northeast of Fairbanks or about 25 mi southwest of Fort Yukon at lat. 66° 12' N, long. 145° 28' W. While the lake was obviously shallow, it had a substantial inlet and outlet. Discovery Creek, a fairly large tributary to Birch Creek flows into the southeast corner of the lake then out the west side before eventually emptying to Birch Creek near the village of Birch Creek. This 450 acre lake has a surface elevation of 475 ft. Its shape is nearly round and the water is darkly stained with only a 3.5' Secchi disk reading. The bottom is mostly soft mud and maximum depth is only 9 feet. Water chemistry here on June 15 was: acidity 34 ppm, hardness 51 ppm, alkalinity 34 ppm, pH 6.5 and water temperature 64°F. A 125' experimental gill net set for 1 night near the outlet produced 3 northern pike from 3-8 lbs, 2 humpback whitefish, 1 least cisco, 1 broad whitefish and 20 longnose suckers.

The presence of the variety of fish in Lake 82-5 can be attributed to Discovery Creek which provides good access to the lake, as well as good summer habitat. Because of the shallow depth of the lake it is doubtful that any overwintering of fish occurs here.

Minto Flats Northern Pike Investigations

Two trips by riverboat to the Minto Flats area (Fig. 7) were conducted in 1982. The first trip was from August 9-12. The purpose of the trip was to test-net areas around the flats to obtain information about the northern pike distribution and population structure, to assess the sport fishing use, and to observe the extent of the subsistence fishing in late summer. The water level in the Minto Flats area and the four river systems which drain the area, Goldstream Creek and the Chatanika, Tolovana and Tatalina Rivers, was extremely high due to recent heavy rains. Goldstream Creek was very turbid from placer mining activities in the headwater areas. No sport fisherman were observed on this trip. Visits were made to two popular sport fishing camps and no sign of any recent fishing activity was evident at either camp. No float planes or riverboats were observed in the area.

Test netting results (Table 5) showed that both northern pike and sheefish were present at this time of the year. The nets also produced good catches of least cisco, which are part of a spawning migration enroute to the upper Chatanika River.

Sport angling at many locations was equally as productive as the net catches. Catch of northern pike and sheefish at the Goldstream-Chatanika confluence, for example, was 2 fish per hour. The reason for the absence of sport fisherman in what is considered to be a fairly popular area is not fully understood. However, Goldstream Creek was extremely muddy due to placer mining operations in the headwaters and this may have discouraged

Figure 6: Lake No. 82-5 (Discovery Lake) Depths Shown in Feet

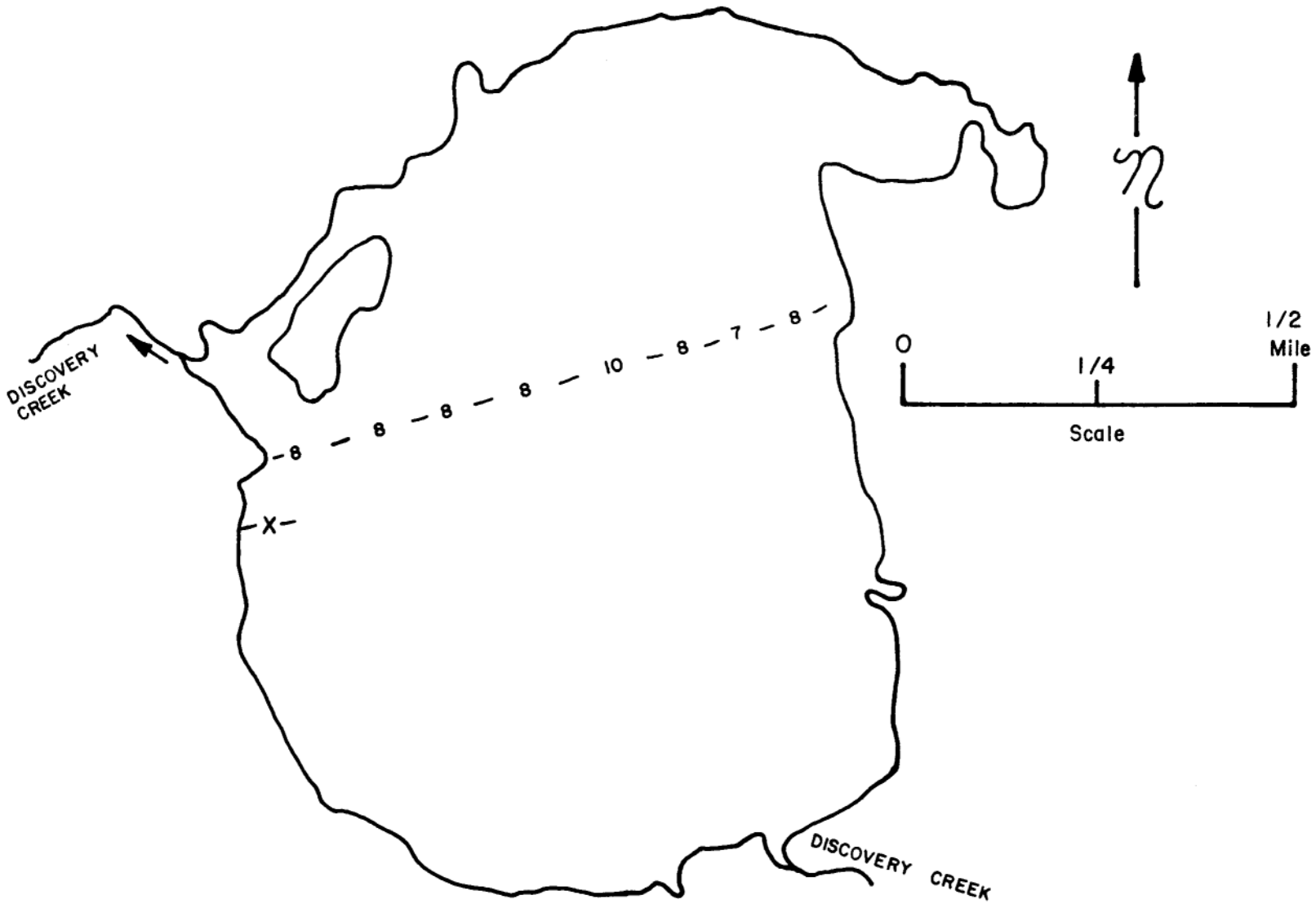


Figure 7: Schematic Map of Minto Flats

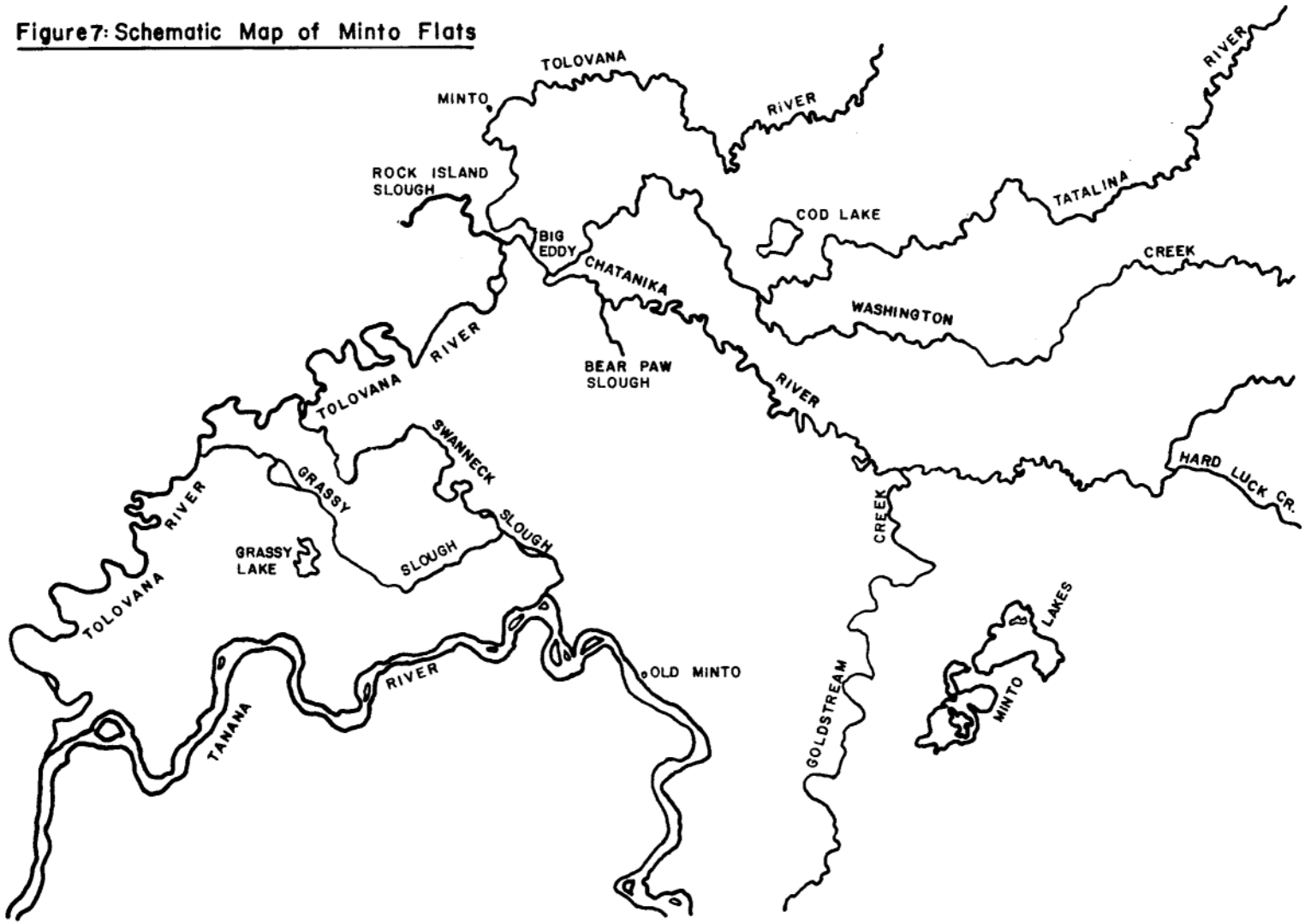


Table 5. Test netting results and age and length of fish sampled in Minto Flats, 1982.

Location	Date	Species	Length (in)	Length (mm)	Weight (lbs)	Age	Sex/ Maturity
Lower Tolovana (Confluence of Swanneck Slough & Tolovana River)	8/10	SF	35 1/2	900	13 1/2	X	M Redev.
		SF	27	690	7 1/2	VIII	M Mature
		NP	26	665	5 1/4	IV	M Mature
		NP	24 1/2	625	4 1/4	IV	M Redev.
		HWF	17	430	2 1/4	IV	F Mature
		BB	25 1/2	650	3 1/2		M Redev.
		LCI	13 1/4	340	14 oz	III	F Mature
		LCI	4	105		0	Imm.
		LCI	4	102		0	Imm.
Big Eddy (Confluence of Chatanika & Tolovana Rivers).	8/11	HWF	16	405	2	V	M Mature
		LCI	15	380	1 1/2	IV	F Mature
		LCI	14	355	1 1/4	III	F Mature
		LCI	8 1/2	220	7 oz	II	Imm.
		LCI	4	100		0	Imm.
Tatalina and Chatanika Rivers Confluence	8/11	SF	28 1/2	725	9 1/2	VIII	F Mature
		SF	26	660	7	VI	M Mature
		SF	25 1/2	655	7	V	M Mature
		NP	29	735	6	V	F Redev.
		NP	9	230	7 oz		M Imm.
		LCI	5	130		I	Imm.
Goldstream and Chatanika Rivers Confluence	8/12	NP	29 1/2	750	6	V	M Redev.
		NP	26 3/4	680	4 3/4	V	M Redev.
		LCI	13 1/2	340	1 1/2	III	F Mature
		LCI	13	335	1 1/4	III	M Mature

(continued)

Table 5. (Cont'd) Test netting results and age and length of fish sampled in Minto Flats, 1982.

Location	Date	Species	Length (in)	Length (mm)	Weight (lbs)	Age	Sex/ Maturity
Goldstream and Chatanika Rivers Confluence	8/12	LCI	12 3/4	325	1	III	M Mature
		LCI	12 1/2	315	12 oz	II	M Mature
		LCI	4 1/2	112	...	0	Imm.
			4 1/4	110	...	0	Imm.
			4	105	...	0	Imm.
			4	105	...	0	Imm.
			4	100	...	...	Imm.

angling. Also, the high water levels and late summer season may have been contributing factors. Cheney (1971) pointed out that when water levels are low, fish tend to concentrate in deep holes or at the confluences of rivers and sloughs and are easily caught, and that high water periods such as what we experienced, provide "vastly expanded habitable areas for pike", making fishing more difficult. His creel census here in 1970 also indicated that the month of August accounted for the fewest anglers and the fewest pike caught for the period from late May through August.

Only three subsistence nets were observed and they were in the Tolovana River in front of the village of Minto.

The purpose of the second trip to the Minto Flats area in mid September was to capture and surgically implant radio transmitters in northern pike to monitor fall and winter movements and to identify their overwintering habitat.

Closely attended gill nets were used to capture the fish. Once caught they were immediately transferred to a holding tub and anesthetized using MS-222 (Tricainemethanesulfonate). Techniques used in the surgical implantation of the transmitter into the body cavity of the pike were the same as those described by Ross (1981). The fish recovered equilibrium within 1 to 2 minutes after being returned to the holding tub. It was then held for a period of 1 to 4 hours. Only after it was apparent that the fish had fully recovered was it finally released back into the river.

Four northern pike ranging from 4 3/4 lbs to 12 lbs were tagged at three different locations: one at the Chatanika/Goldstream confluence, two at the Tatalina-Chatanika River confluence and a fourth at the Swanneck Slough-Tolovana River confluence.

Fish movements were monitored using an airplane equipped with an antenna and radio receiver unit. Flights were conducted weekly to locate the fish and mark their locations on maps.

The fish were tagged the week of September 16 to 19, 1982. There appeared to be small or random movements of all four fish during the first 3 weeks, until early October. The fish moved only 1-5 mi from where they were tagged.

A tracking flight on October 6 found that three of the four fish moved from 7 to 13 mi from their previous week's location. At this time the rivers were flowing ice and many of the lakes, sloughs and backwater areas were completely iced-over. From October 6 to November 1 two of the individuals moved in excess of 20 mi downstream. The third fish that had exhibited strong movements in early October could not be located after November 1; and for the following 6 weeks, during 5 tracking flights searching for the tagged fish, it was suspected that the transmitter had quit. However, on December 29, it was located in Swanneck Slough, emitting a strong signal. It remains a mystery as to where the fish had gone during the 6 week period it was missing. The fourth fish, which was tagged at the Goldstream Creek-Chatanika River confluence, did not respond to the onset of winter by moving downstream as did its cohorts. From initial tagging on September 18

to November 17 its movements were random, but mostly in an upstream direction in the Chatanika River (5 to 7 mi). The fish then moved upstream another 4 mi into the lower canyon area of the Chatanika, and for the last 5 weeks of 1982 remained in the same area. While the number of mi the fish had moved to what may be considered overwintering areas is interesting, what is more important is to identify these areas and pinpoint their locations. Once these areas have been located, winter test netting will be conducted. We also hope to learn more about the physical and chemical profiles of these overwintering areas and the variety of fish species that utilize them.

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