Volume 15

Study G-I
Job R-IV-D
Study A-I

STATE OF ALASKA

William A. Egan, Governor

Annual Report of Performance for

INVENTORY AND CATALOGING

DISSEMINATION OF INFORMATION
COLLECTED ON DOLLY VARDEN

INVESTIGATIONS OF PUBLIC FISHING ACCESS
AND AQUATIC HABITAT REQUIREMENTS

by

J. B. Murray, F. Van Hulle, S. Hammarstrom,
L. J. Engel, D. L. Siedelman, F. T. Williams,
C. Morgan, M. J. Kramer, S. W. Kubik,
T. W. Trent, R. H. Armstrong, F. A. Stefanich,
D. L. Bill, Jr.

ALASKA DEPARTMENT OF FISH AND GAME

James W. Brooks, Commissioner

DIVISION OF SPORT FISH

Rupert E. Andrews, Director
Howard E. Metsker, Chief, Sport Fish Research

RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations of Alaska.

Project No.: F - 9 - 6

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

Job No.: G - I - G Job Title: Inventory and Cataloging of the Sport Fish and the Sport Fish Waters in Interior Alaska.

Period Covered: July 1, 1973 to June 30, 1974.

ABSTRACT

Creel census and angling pressure estimates were conducted on Badger Slough, but for continuity with past work, are reported on in Study R - I, Distribution, Abundance, and Natural History of the Arctic Grayling in the Tanana River Drainage.

A creel census was also conducted on the Chatanika River whitefish, Coregonus spp., harvest from September 1 - October 7. Results indicated a substantial increase in popularity of this fishery, with 538 participants in 1973 compared to 175 during 1972. There were 3,032 whitefish and 14 sheefish, Stenodus leucichthys, harvested in the Chatanika River during the census period.

A population estimate using the Schnabel tag and recovery method and visual counts was conducted prior to the spear fishing season on the Chatanika River. An estimated 12,000 least cisco, Coregonus sardinella, 7,000 humpback whitefish, Coregonus pidschian, and 100 - 125 sheefish were present.

A Birch Lake creel census, utilizing a voluntary system conducted at the Air Force recreation camp, revealed that 398 fishermen fished 1,484 hours to catch 361 rainbow trout, Salmo gairdneri. Six ponds were surveyed to determine potential for establishing a sport fishery, only two were determined to have potential. Winter dissolved oxygen analyses were conducted on 14 lakes and ponds and 4 rivers in the job area.

Four lakes were test netted to determine species composition, stocking success, and magnitude of predation from competing species. Two of these were found to be barren of fish life, probably the result of winter kill. Nine lakes were stocked with 1,000 rainbow trout, 150,000 Arctic grayling, Thymallus arcticus, and 412,127 silver salmon, Oncorhynchus kisutch.

RECOMMENDATIONS

1. Evaluate stocking success of lakes stocked with rainbow trout, silver salmon, or grayling.

2. Continue inventory and cataloging of waters in job area as time permits.

3. Continue creel census efforts on Birch Lake, the Chatanika River, and other important waters of the job area.

4. Conduct population estimates in selected segments of the Salcha and Chatanika rivers.

OBJECTIVES

1. To determine angler utilization and sport fish harvest of important waters in the district.

2. To continue fish population estimates in various segments of the Salcha and Chatanika rivers.

3. To determine limnological and fish population parameters of stocked and managed lakes in the district.

4. To evaluate fishery management techniques to provide recommendations for stocking, rehabilitation, and enhancement of waters in the district.

TECHNIQUES USED

Graduated mesh monofilament gill nets, 125' x 6' (38 x 1.8 meters) with five mesh sizes ranging from 1/2 to 2 1/2 inches (12 - 64 mm) bar measure were used to sample fish populations in lakes.

All fish were measured for fork length in millimeters.

Water samples were collected using a Kemmerer water sampler and chemical analysis was done with a Hach Model AL-36-WR kit. A Lowrance echo sounder was used along with a conventional sounding line to determine lake depths.

Angler counts and creel census on Birch Lake were conducted by military personnel at the Eielson Air Force Base Recreation Camp, using a voluntary reporting system.

Creel census of the Chatanika River whitefish fishery was designed to provide 50% coverage.

An alternating current shocker boat as described by Van Hulle (1968) was used to capture Chatanika River whitefish for population estimates.

Whitefish were tagged with Floy FD - 67 internal anchor tags.

FINDINGS

Creel Census

Badger Slough:

Creel census and angling pressure estimates were conducted on Badger Slough, but for continuity with past work, are reported, as in previous years, in Study R - I, Distribution, Abundance, and Natural History of the Arctic Grayling in the Tanana River Drainage.

Chatanika River:

Spear fishing for whitefish, Coregonus spp., was initiated in the Tanana River drainage in 1970, providing Interior residents with a new sport fishery.

The Chatanika River receives nearly all of the spear fishing pressure in the Tanana drainage due to its relatively easy access and its abundant concentrations of whitefish. The calculated total harvest in 1972 showed that 175 fishermen caught 433 least cisco, Coregonus sardinella, 197 humpback whitefish, Coregonus pidschian, and 71 round whitefish, Prosopium cylindraceum, (Kepler, 1973). The low catch was due to a short harvest period, as the season opened October 1 and spearing was only possible for a two-week period prior to freeze-up.

In 1973, opening day was set at September 1, which gave spear fishermen a much greater opportunity to partake of this recreational activity. The creel census was designed to cover 50% of the fishing activity. All weekends in September and the first weekend in October were censused for five hours each day to determine the sheefish, Stenodus leucichthys, harvest. Every other night between September 1 and October 7 was censused from 8 PM - 12 PM to determine whitefish harvest. Creel census calculations indicate that the whitefish fishery is experiencing a rapid growth in popularity (Table 1).

A harvest of 2,174 least cisco, 542 humpback whitefish, and 316 round whitefish, represents a 332% increase from 1972.

In 1973, 538 fishermen fished 1,356 hours as compared to 175 fishermen who fished 302 hours in 1972.

Chatanika River Whitefish Population Estimate

A population estimate of least cisco and humpback whitefish was conducted on the Chatanika River from August 27 - September 10 using the Schnabel tag and recover method. These estimates were correlated with visual counts on September 17 and 18. An estimated population of 12,000 least cisco and 7,000 humpback whitefish was found in the area from 10 miles (16 km) below the Elliot Highway bridge to 12 miles (19.3 km) above the bridge. The

TABLE 1. Chatanika River Whitefish and Sheefish Harvest Summary, September 1 - October 7, 1973.

Whitefish Creel Census Summary:

Estimated number of fishermen	538
Estimated number of angler hours	1,356
Estimated total harvest	3,032
Estimated fish per angler hour	2.24
Estimated fish per angler trip	5.64

Methods used in harvest:

	Number of Fishermen	% of Fishermen	Total Fish Harvest	% of Total Harvest
Hook and line (snagging)	154	29	690	23
Spear	384	71	2,342	77

Estimated number of fish harvested by species:

	Number	%
Humpback whitefish	542	18
Least cisco	2,174	72
Round whitefish	316	10

Sheefish Creel Census Summary:

Estimated number of fishermen	24
Estimated angler hours	42
Estimated total catch	14
Estimated catch per angler hour	0.33

majority of least cisco (11,000) were found below the bridge, while the majority of humpback whitefish (5,000) were found above the bridge. The visual counts agreed closely with the Schnabel estimates. Approximately 100 - 125 sheefish were visually counted in the same sample area. The mean fork length of the humpback whitefish was 436 mm (range 275 - 520 mm) with a mean age of VII (range III - XI yrs.). Males ranged from age III to X, while females had an age range of V to XI.

The mean fork length of the least cisco was 328 mm (range 275 - 440).

Seven hundred sixty-two humpback whitefish and 798 least cisco were tagged in 1973 to provide data on spawning frequency and for population estimates.

Birch Lake:

A voluntary creel census on Birch Lake was conducted at the Air Force Recreation Camp. Only military personnel and dependents were involved. The census period was May 24 - August 5 and a total of 398 fishermen fished 1,484 hours to harvest 361 rainbow trout, Salmo gairdneri, for a fish per angler hour of 0.24. Periodic checks by Department personnel revealed 0.21 fish per angler hour. Summaries of the 1973 creel census and past and present Birch Lake creel census are presented in Tables 2 and 3, respectively. The tables indicate that, although the catch per hour was better in 1973 than in recent years, total usage and fish size are down.

Nenana Pond (FAA Pond) Rehabilitation Project

Nenana Pond, located approximately two miles south of Nenana, was chemically rehabilitated on June 18, 1973. This 10-acre borrow pit, with a volume of 130 acre feet, was treated with 55 gallons of liquid rotenone to dispose of northern pike, Esox lucius, humpback whitefish, and sucker, Catostomus catostomus, populations which were introduced during the 1967 Tanana River flood. The pike observed after treatment ranged from 150 - 635 mm. One whitefish and numerous suckers were observed. The lake was restocked with 2,000 silver salmon, Oncorhynchus kisutch, fingerlings, following a 72-day detoxification period.

TABLE 2. Voluntary Birch Lake Creel Census (Air Force Recreation Area). May 24 - August 5, 1973.

	Anglers Censused	Angler Hours	Fish Taken	Fish/Angler Hour
May	62	178	37	0.21
June	145	609	165	0.27

TABLE 2. (cont.) Voluntary Birch Lake Creel Census (Air Force Recreation Area). May 24 - August 5, 1973.

	Anglers Censused	Angler Hours	Fish Taken	Fish/Angler Hour
July	174	648	153	0.24
August	17	49	6	0.12
Total	398	1,484	361	.24

TABLE 3. Summary of Past Birch Lake Creel Census Totals.

Year	Dates	Censused Anglers	Angler Hours	Fish/ Angler Hour	Fish Taken	Mean Trout Length
1969[a]	May & June	376	1,007	0.36	366	
1970[b]	May-Sept.	1,293	5,305	0.17	928	400 mm
1971[c]	May-Sept.	1,123	4,037	0.15	589	406 mm
1972[d]	May-Aug.	1,597	4,462	0.12	531	381 mm
1973	May-Aug.	398	1,484	0.24	361	304 mm

a - From Namtvedt, 1970
b - From Peckham, 1971
c - From Peckham, 1972
d - From Peckham, 1973

Lake Surveys

Four ponds on Ft. Wainwright and two borrow pits on the Richardson Highway were surveyed during the reporting period.

Duck ponds #1, #2, #3, and #4 on Ft. Wainwright were surveyed to determine potential for possible future sport fisheries. Duck ponds #2, #3, and #4 were covered with emergent vegetation, indicating very low potential. Duck

TABLE 4 Interior Waters Tested for Dissolved Oxygen, 1973

Name	Date	Water Temperature °F	Water Temperature °C	Ice Thickness Ft	Ice Thickness m	Water Depth Ft	Water Depth m	D.O. (ppm)	pH	Snow Depth Ft	Snow Depth m	Sample Depth Ft	Sample Depth m
Bear Lake	4/3	32	0	3.0	0.9	10.0	3.0	2	7	1.0	0.3	6.0	1.8
Engineer Hill Lake	4/3	32	0	3.3	1.0	7.0	2.1	3	6	0.6	0.2	6.0	1.8
Ace Lake	4/2	32	0	3.1	0.9	5.5	1.6	trace	6.5	0.9	0.3	5.0	1.5
Silver Fox Pit (mile 313.3)	4/3	32	0	5.0	1.5	6.0	1.8	2.6	8	0		5.0	1.5
Harding Lake	4/5	32	0	2.5	0.8	8.0	2.4	18	7.5	0.9	0.3	6.0	1.8
	4/5	32	0	3.0	0.9	---	---	16	7.0	0.9	0.3	14.0	4.3
Little Harding L.	4/5	32	0	2.0	0.6	4.5	1.4	8	6.5	0.6	0.2	4.0	1.2
Birch Lake	4/5	32	0	3.5	1.0	---	---	11	7.0	---	---	13.0	4.0
Delta Clearwater R.	4/5	39	3.9	---	---	1.2	0.4	15	8.0	---	---	1.2	0.4
Badger Slough:	4/9												
Hurst Road		39	3.9	---	---	1.0	0.3	10	7.5	---	---	0.9	0.3
Plack Road		33	0.5	---	---	2.1	0.6	10	7.5	---	---	2.0	0.6
Peede Road		34	1.1	---	---	2.4	0.7	12	7.5	---	---	2.0	0.6
Ice Bridge		32	0	---	---	overflow		12	7.5	---	---	---	---
Chena River	4/9	34	1.1	---	---	1.5	0.5	13	6.0	---	---	1.0	0.3

TABLE 4. (cont.) Interior Waters Tested for Dissolved Oxygen, 1973.

Name	Date	Water Temperature °F	°C	Ice Thickness Ft	m	Water Depth Ft	m	D.O. (ppm)	pH	Snow Depth Ft	m	Sample Depth Ft	m
Rich. Hwy. Pits:													
Mi. 338.8	4/10	32	0	3.0	0.9	8.0	2.4	12	7.5	---	---	6.0	1.8
Mi. 338.6	4/10	32	0	3.2	1.0	2.0	0.6	2.4	7.5	---	---	1.5	0.5
Mi. 338.3	4/10	Active pit											
Mi. 337.3	4/10	36	2.2	2.3	0.7	5.7	1.7	1	7.0	---	---	3.7	1.1
Mi. 336.6	4/10	Active pit											
Mi. 333.1	4/17	32	0	2.9	0.9	12.0	3.7	0.6	7.0	---	---	12.0	3.7
	4/17	32	0	3.2	1.0	14.0	4.3	0.4	7.0	---	---	3.0	0.9
Mi. 331.2	4/10	No Water											
Salcha River	4/10	32	0	2.8	0.8	5.3	1.6	14	6.0	0.8	0.3	4.0	1.2

pond #1 had a maximum depth of 21 feet (6.4 meters) and a surface area of approximately 5 acres. One gill net was set overnight on August 2 but caught no fish. Dissolved oxygen samples will be taken to determine overwintering capability of this pond.

Twenty-eight Mile Pit on the Richardson Highway was found to be 12 feet deep (3.7 meters), with a steep shoreline and no vegetation. Thirty-one Mile Pit on the Richardson Highway was recently enlarged during construction activities and was found to be a maximum of 22 feet (6.7 meters) deep with a surface area of 18 acres. Twenty-five thousand grayling fry were stocked in 31 Mile Pit on June 15, 1973.

Dissolved Oxygen Testing

Numerous interior waters were tested for dissolved oxygen content and pH during the reporting period (Table 4.)

Lake Stocking

Nine lakes were stocked in the Fairbanks District during 1973 (Table 5). During May and June, 1973, 20,207 silver salmon smolts were transferred to Harding Lake from Little Harding Lake. The fish had been planted as fingerlings (78,000 at 243/lb.) in Little Harding Lake on August 29, 1972, where they were reared until the transfer.

TABLE 5. Lake and Pond Stocking, Fairbanks District, 1973.

Lake	Location	Date	Species*	Size	Number
Clear Pond	Clear A.F.B.	8/29	RT	108/lb.	1,000
Engineer Hill Lake	Eielson A.F.B.	6/15	GR	Fry	25,000
Harding Lake	Richardson Highway	5/20-6/11	SS	Smolt	20,207
		7/13	SS	440/lb.	108,300
		8/29	SS	128/lb.	40,800
Little Harding Lake	Richardson Highway	7/13	SS	440/lb.	40,000
Lost Lake	Richardson Highway	7/11	SS	440/lb.	177,500
		7/13	SS	440/lb.	23,320

TABLE 5. (cont.) Lake and Pond Stocking, Fairbanks District, 1973.

Lake	Location	Date	Species*	Size	Number
Nenana Pond	Fbks-Anch. Highway	8/29	SS	95/lb.	2,000
Olnes Pond	Elliot Highway	6/15	GR	Fry	25,000
Ottos Lake	Fbks-Anch. Highway	6/15	GR	Fry	75,000
31 Mile Pit	Richardson Highway	6/15	GR	Fry	25,000

*RT - Rainbow trout
SS - Silver salmon
GR - Grayling

The smolts were captured using a temporary fish trap placed in the outlet of Little Harding Lake. They were then transported to Harding Lake where they were released in deep water to avoid northern pike in the littoral zone.

The mean fork length of the smolts transferred, based on a sample of 20 taken May 22, 1973, was 106 mm with a range of 96 - 116. Mean weight was 12.5 gm (36.3/lb.). An intensive gill netting operation was conducted in both Little Harding and Harding lakes to determine growth rate and survival of stocked silver salmon and relative abundance of other species in the two lakes (Table 5). Three yearling salmon were netted in Harding Lake on August 9, 1972, having a mean fork length of 149.6 mm (range 145 - 155 mm). One age II salmon (240 mm fork length) was netted, presumably from the 1971 planting of fingerlings. While netting Little Harding Lake between August 7 and August 10, nine salmon were captured having a mean fork length of 195.8 mm with a range of 185 - 200 mm. It appears that silver salmon remaining in Little Harding Lake grew faster than those transferred to Harding Lake but more intensive sampling is needed to determine to what degree.

Length Frequency

One hundred thirty-three pike captured by gill net in Harding Lake were measured to determine length frequency. These ranged in length from 255 - 830 mm with a mean of 515.9 mm. One hundred two pike captured by gill net in Little Harding Lake ranged from 120 - 435 mm with a mean of 266.8 mm.

Pike Predation

One hundred sixteen stomachs were analyzed from Harding Lake pike to determine extent of predation on recently stocked silver salmon. Of these,

TABLE 8. Test-Netting Summaries, Harding and Little Harding Lakes, 1973.

Lake Name	Date	Species*	Number of Fish Netted	Fork Length (mm) Range	Fork Length (mm) Mean	Net Hours	Frequency**	Percent Composition***
Harding	5/22-8/10	LT	8	630-730	696.8	419.5	0.02	3
		NP	148	255-830	515.9		0.35	57
		LCi	76	-----	-----		0.18	29
		SS	25	145-155	150		0.06	10
		BB	2	580-665	622.5		0.005	1
Little Harding	6/9-8/10	SS	68	185-200	196	799.5	0.09	36
		NP	120	120-435	266.8		0.15	64

*LT - Lake trout, Salvelinus namaycush
LCi - Least cisco
NP - Northern pike
SS - Silver salmon
BB - Burbot, Lota lota

**Frequency is the number of fish per net hour.

***Composition includes all fish netted.

only 52 had recognizable contents. Of stomachs with food, 37% contained silver salmon, 40% contained least cisco, and the remaining, 23% contained other fish and insects. Sixty-four stomachs were analyzed from Little Harding Lake pike of which 31 had recognizable contents. Of the stomachs with food, 71% contained silver salmon and the remaining 29% contained insects.

If this predation factor in Little Harding Lake were eliminated through chemical rehabilitation, it is conceivable that the already high survival rate of 25 percent attained by the silver salmon could be increased, as approximately 800 pike were netted from the lake subsequent to stocking silver salmon in 1972 (Peckham, 1973).

Otto's Lake near Healy was netted on June 19 and no fish were captured. Apparently this lake winter killed. Fifty thousand grayling were planted in 1970 and another 50,000 were planted in 1972. This lake has a history of low dissolved oxygen levels.

LITERATURE CITED

Kepler, P.P. 1973. Population Studies of Northern Pike and Whitefish in the Minto Flats Complex with Emphasis on the Chatanika River. Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1972 - 1973. Project F-9-5. 14: 29 pp.

Namtvedt, T.B. 1970. Inventory and Cataloging of the Sport Fish Waters in Interior Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1969 - 1970. Project F-9-2. 11: 263-278.

Peckham, R.D. 1971. Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Interior Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress 1970-1971, Project F-9-3, 12: 137-148.

_____ 1972. Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Interior Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1971-1972, Project F-9-4, 13: 111-127.

_____ 1973. Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Interior Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1972-1973, Project F-9-5, 14.

Tack, S.L. 1971. Distribution, Abundance and Natural History of the Arctic Grayling in the Tanana River Drainage. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1970-1971. Project F-9-3, 12: 35 pp.

_____ 1972. Distribution, Abundance and Natural History of the Arctic Grayling in the Tanana River Drainage. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1971-1972. Project F-9-4, 13: 36 pp.

_____ 1973. Distribution, Abundance and Natural History of the Arctic Grayling in the Tanana River Drainage. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1972-1973. Project F-9-5. 14: 43 pp.

Van Hulle, F. D. 1968. Investigation of the Fish Populations in the Chena River. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1967-1968, Project F-5-R-9.

Prepared By:

Michael J. Kramer
Fishery Biologist

Approved By:

s/Howard E. Metsker
Chief, Sport Fish Research

s/Rupert E. Andrews, Director
Division of Sport Fish