

STATE OF ALASKA

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Annual Report of Performance for
SPORT FISH STUDIES

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RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations
of Alaska.

Project No.: F - 9 - 6

Study No.: G-II Study Title: SPORT FISH STUDIES.

Job No.: G - II - J Job Title: Population Studies of Northern
Pike and Whitefish in the
Minto Flats Complex with
Emphasis on the Chatanika
River.

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

ABSTRACT

This study placed emphasis on numbers, movements, and life history of least cisco, Coregonus sardinella, and humpback whitefish, C. pidschian, in the Chatanika River, and northern pike, Esox lucius, and whitefish in Minto Flats. Eleven species were captured with gill nets during the study including broad whitefish, C. nasus, sheefish, Stenodus leucichthys, long-nose suckers, Catostomus catostomus, burbot, Lota lota, blackfish, Dallia pectoralis, chum salmon, Oncorhynchus keta, king salmon, O. tshawytscha, lake chub, Couesius plumbeus, Arctic grayling, Thymallus arcticus, and the three species named above.

Four species, least cisco, northern pike, humpback whitefish, and broad whitefish accounted for 94% of the catch. All species were netted in approximately the same numbers per net night as in 1972 except for an increase in the number of pike in 1973.

Four whitefish movements were detected. Three of these were associated with spawning migrations of least cisco, humpback whitefish, and broad whitefish, and one was associated with the migration to the Flats of young-of-the-year whitefish.

Aerial boat counts and angler interviews showed an estimated 1,005 pike were taken in 1,531 man hours of angling from May - August.

Pike completed spawning by June 2. Chatanika whitefish began spawning September 19. Egg counts from humpback whitefish were not closely correlated with size or age of fish.

A Schnabel population estimate revealed a combined spawning whitefish population of 19,100 in the Chatanika River.

RECOMMENDATIONS

It is recommended that this project be terminated with the exception of utilization and Chatanika River whitefish population aspects. These continuing objectives should be incorporated into other existing studies.

OBJECTIVES

1. To study the timing and movements of the fishes of the Chatanika River and Minto Flats.
2. To study the spawning ecology of the Minto Flats whitefish, sheefish, and pike.
3. To assess utilization of fish in the Chatanika River and Minto Flats.

BACKGROUND

The Minto Flats complex is an 800 square mile area of marsh, lakes, and stream channels located approximately 30 miles west of Fairbanks. The four major streams which feed this area are the Tolovana River, Chatanika River, Tatalina River, and Goldstream Creek. The lakes are shallow with heavy organic loads and large areas of aquatic vegetation. The streams are slow flowing and meander extensively.

This area is populated during ice-free months with northern pike, Esox lucius; least cisco, Coregonus sardinella; humpback whitefish, C. pidschian; and broad whitefish, C. nasus. There are also small numbers of sheefish, Stenodus leucichthys; longnose suckers, Catostomus catostomus; lake chub, Couesius plumbeus; burbot, Lota lota; and blackfish, Dallia pectoralis. Chum salmon, Oncorhynchus keta; king salmon, O. tshawytscha; and Arctic grayling, Thymallus arcticus, pass through this area during migrations. However, the severe ice conditions and low dissolved oxygen during the winter prevents all but a few isolated cases of overwintering fishes.

Minto Flats is utilized by sport fishermen during the ice free months for northern pike and sheefish. Whitefish and Pike are netted by the Minto Village natives in a subsistence fishery.

This study, G - II, was started July 1, 1972, and completed June 30, 1974, with emphasis on whitefish. Creel census during this study shows this area to be a popular and productive northern pike sport fishery.

TECHNIQUES USED

The distribution and movements of northern pike, humpback whitefish, broad whitefish, least cisco, and sheefish were studied in Minto Flats using graduated mesh monofilament gill nets. The Flats was divided into three areas: 1) Rock Island Slough, 2) Minto Lakes, 3) New Minto Village (Fig. I). Specific netting sites within these areas were selected on the basis of

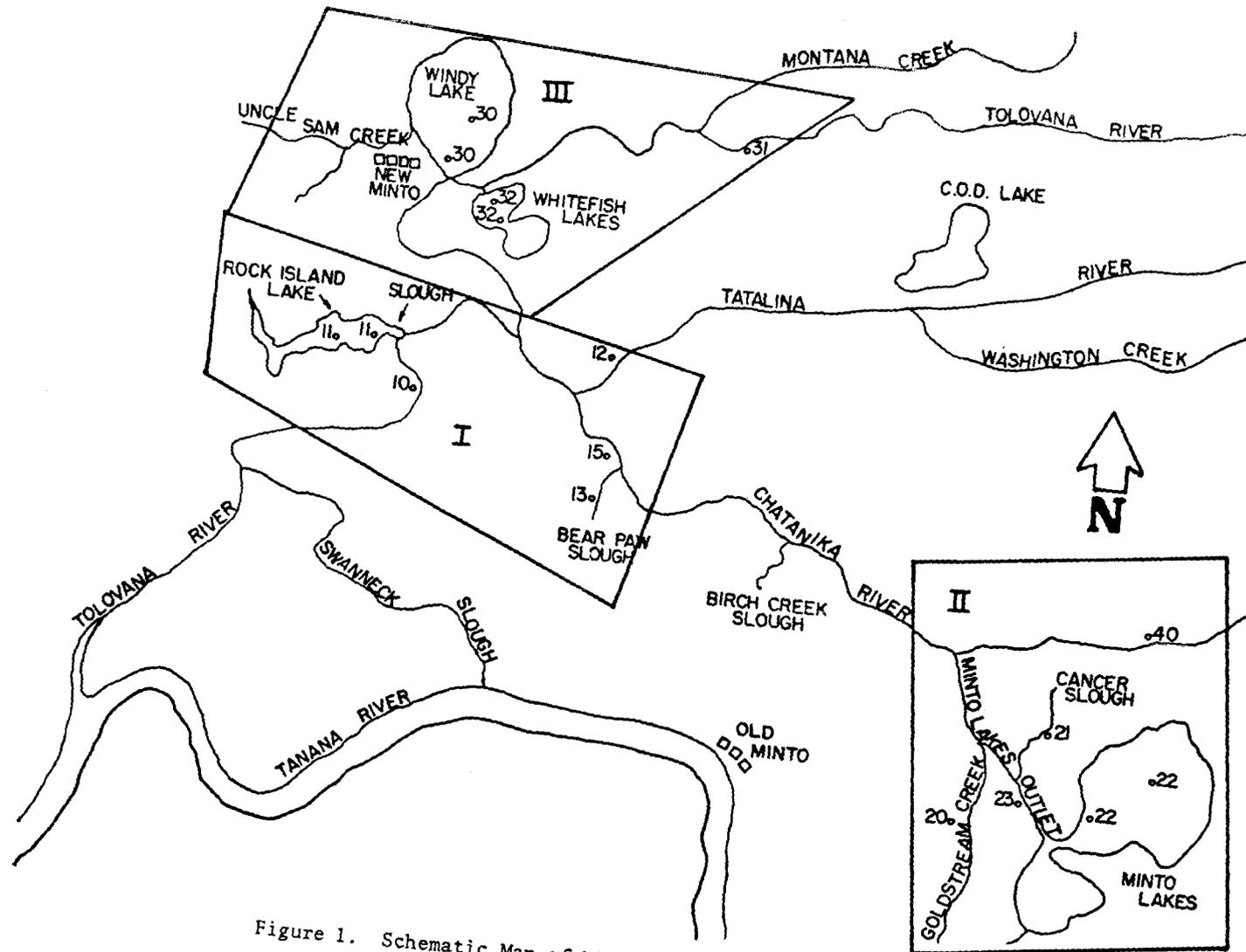


Figure 1. Schematic Map of Minto Flats. Numbers Represent Netting Sites.

prior knowledge of the Flats ecology and were considered representative of the fish habitat in the Flats (Table 1). Length, weight, sex, and maturity data were recorded and placed on computer cards.

TABLE 1. Locations of Minto Flats Netting Sites.

Area	Site No.	Location
1	10	Tolovana River below Rock Island Slough
	11	Rock Island Slough and Lake
	12	Tatalina River
	13	Bear Paw Slough
	15	Chatanika River above Tatalina River confluence
2	20	Goldstream Creek
	21	Cancer Slough, off Minto Lake outlet
	22	Minto Lake
	23	Minto Lake outlet between Cancer Slough & Minto Lake
3	30	Windy Lake
	31	Tolovana River, upriver from mouth of Montana Creek
	32	Whitefish Lakes

Angler interviews and aerial boats counts were conducted throughout the summer.

Subsistence fishery estimates were made by counting nets and interviewing fishermen.

One-half inch mesh monofilament gill nets and dip nets were used to capture young-of-the-year fish.

Broad whitefish were tagged with yellow Floy internal anchor tags in August. Five days of netting were conducted in the Flats and on the Tanana River in mid-September to recover tagged fish. Fish wheels near Nenana were checked in September for tagged broad whitefish.

Humpback whitefish, least cisco, and sheefish were tagged with red FT-2 Floy internal anchor tags in the Chatanika River in late August and early September. Fish were captured by electrofishing. Spawning populations of these species were estimated by the Schnabel tag and recovery method and visual counts by boat.

Spawning areas were located by foot and boat surveys. Commencement of spawning was determined by grayling stomach analysis and night observations in the spawning areas. A boat equipped with a portable generator and flood lights was used for night observations.

Humpback whitefish were taken for fecundity samples by electrofishing. Egg counts were determined using the volumetric method. Ovaries were removed intact and preserved in 4% formalin prior to counting. One 5 ml. egg sample was counted for each fish. The mean number of eggs per ml was multiplied by the volume of water displaced by the total number of eggs in both ovaries. Ovarian tissue was separated from the eggs with a series of Tyler sieves.

FINDINGS

Summer Abundance and Distribution

The fishes of Minto Flats consisted of 11 species, with 4 species accounting for 94% of the total (Table 2). The four dominant species were least cisco, northern pike, humpback whitefish, and broad whitefish in descending order of abundance.

TABLE 2. Number of Fish Captured during 128 Net Nights of Gill Netting*, Minto Flats, May - August, 1973.

Month	Area	Species Captured**					
		LCi	HWF	BWF	SF	NP	Other
May	I	104	117	10	2	95	52
	II	173	178	19	1	122	8
	III	66	88	25	4	112	38
June	I	27	89	31	3	46	89
	II	210	159	37	1	50	1
	III	63	62	37	0	86	1
July	I	11	27	15	3	79	10
	II	151	65	47	0	79	0
	III	65	27	60	4	104	0
August	I	13	14	9	2	54	3
	II	98	32	23	1	117	0
	III	160	66	18	3	110	2
Total		1,141	924	331	24	1,074	204

TABLE 2. (cont.) Number of Fish Captured during 128 Net Nights of Gillnetting*, Minto Flats, May - August, 1973.

Month	Area	Species Captured**					Other
		LCi	HWF	BWF	SF	NP	

* Area I = 48 Net Nights
 Area II & III = 40 Net Nights Each

** LCi - Least cisco
 HWF - Humpback whitefish
 BWF - Broad whitefish
 SF - Sheefish
 NP - Northern pike
 Other - Longnose sucker, chum salmon, burbot, Arctic grayling, lake chub, blackfish.

The relative number of northern pike in Minto Flats is undoubtedly less than shown by the netting results since pike are attracted to gillnets by the struggling of other fish in the nets, and thus are captured more frequently than their abundance would indicate.

Sheefish were caught in small numbers throughout the summer. Pre-spawning longnose suckers, migrating up the Tolovana and Tatalina rivers in May and June, contributed most heavily to the composition of other species captured during that period.

Arctic grayling were caught in the Flats only in early May and were presumably migrating from their wintering areas to their spawning areas in the upper Tolovana, Tatalina, and Chatanika rivers.

The remaining species were caught in small numbers with no apparent pattern except for the chum salmon which migrate through the Flats to the upstream gravel areas of the Chatanika River in mid-July to spawn.

Tables 3 - 5 show the results of 128 net nights of gillnet fishing for the five major species in Minto Flats. Table 6 is a summarized comparison of the 1972 and 1973 netting results.

There was no apparent change in the numbers or size of least cisco between these two summers.

The humpback whitefish data show an increase in fish size and numbers in 1973. However, netting was not conducted in June 1972 when adult fish were still widely distributed throughout the Flats prior to migrating up the Chatanika River. Since netting was conducted in June 1973, a difference between 1972 and 1973 was noted because of the presence of larger numbers of adult fish.

The catch of broad whitefish remained essentially the same with an indication of a small increase in fish size. The size difference could be an influence of a strong year class, but since no age determinations were conducted on this species, this is only speculation.

TABLE 3. Gillnet Catch in Area I of Minto Flats for Eight Netting Cycles. Mean Fork Length (mm) for Each Species is Listed in Parentheses after Catch per Site.

Month	Site	Net Nights	Species Captured*					Total
			LCi	HWF	BWF	SF	NP	
May	10	2	0	4(343)	0	1(655)	0	5
	11	4	51(293)	48(372)	2(488)	0	48(487)	149
	12	2	19(308)	51(406)	2(602)	1(650)	7(491)	80
	13	2	34(312)	12(389)	5(534)	0	40(557)	92
	15	2	0	2(342)	0	0	0	2
June	10	2	3(203)	28(250)	4(591)	0	2(672)	37
	11	4	13(306)	39(353)	18(537)	0	14(579)	84
	12	2	0	3(375)	7(545)	2(788)	4(566)	16
	13	2	10(279)	13(341)	0	0	26(418)	49
	15	2	1(325)	6(392)	0	1(670)	0	8
July	10	2	0	0	2(565)	0	2(135)	4
	11	4	7(345)	10(379)	12(565)	0	54(483)	83
	12	2	3(290)	1(335)	1(480)	1(640)	1(345)	7
	13	2	1(280)	8(323)	1(500)	0	20(464)	30
	15	2	0	9(401)	1(585)	2(730)	2(405)	13
August	10	2	0	0	0	1(730)	0	1
	11	4	6(284)	11(404)	5(577)	0	39(386)	62
	12	2	6(238)	1(380)	3(571)	1(720)	4(458)	15
	13	2	0	1(270)	0	0	10(543)	11
	15	2	1(330)	1(350)	0	0	1(150)	3
Total		48	155(297)	247(361)	65(549)	10(710)	274(477)	751

*LCi - Least Cisco
 HWF - Humpback whitefish
 NP - Northern pike

BWF - Broad whitefish
 SF - Sheefish

TABLE 4. Gillnet Catch for Area II in Minto Flats for Eight Netting Cycles. Mean Fork Length (mm) for Each Species is Listed in Parenthesis After Catch Per Site.

Month	Site	Net Nights	Species Captured*					Total
			LCI	HWF	BWF	SF	NP	
May	20	2	53(330)	43(388)	6(417)	1(790)	49(380)	152
	21	2	31(335)	36(432)	1(620)	0	5(549)	73
	22	4	54(339)	40(442)	6(557)	0	54(537)	154
	23	2	35(348)	59(392)	6(598)	0	14(541)	114
June	20	2	24(328)	26(424)	17(549)	0	3(508)	70
	21	2	38(328)	19(365)	3(511)	0	15(540)	75
	22	4	80(342)	63(429)	8(545)	0	18(609)	169
	23	2	68(332)	51(430)	9(575)	1(595)	14(641)	143
July	20	2	36(330)	13(378)	2(510)	0	17(619)	68
	21	2	16(308)	8(310)	4(588)	0	24(566)	52
	22	4	56(346)	22(395)	30(556)	0	37(556)	145
	23	2	43(342)	22(378)	11(538)	0	21(598)	97
August	20	2	0	0	1(490)	0	8(572)	9
	21	4	12(309)	4(335)	1(560)	0	33(533)	50
	22	4	67(297)	23(343)	19(555)	0	49(589)	158
	23	2	19(322)	5(314)	2(582)	1(150)	27(589)	54
Total		40	632(331)	434(403)	126(549)	3(511)	388(546)	1583

*LCi - Least cisco
HWF - Humpback whitefish
BWF - Broad whitefish
SF - Sheefish
NP - Northern pike

TABLE 5. Gillnet Catch For Area III in Minto Flats for Eight Netting Cycles. Mean Fork Length (mm) for Each Species is Listed in Parentheses After Catch Per Site.

Month	Site	Net Nights	Species Captured*					Total
			LCi	HWF	BWF	SF	NP	
May	30	4	20(286)	52(402)	17(540)	2(573)	36(554)	127
	31	2	1(290)	0	1(580)	0	8(593)	10
	32	4	45(306)	36(377)	7(549)	2(593)	68(554)	158
June	30	4	36(306)	34(410)	12(589)	0	37(632)	119
	31	2	0	0	4(576)	0	2(780)	6
	32	4	27(293)	28(412)	21(586)	0	47(598)	123
July	30	4	34(300)	10(386)	18(566)	3(756)	39(552)	104
	31	2	6(311)	2(340)	9(531)	1(570)	20(517)	38
	32	4	25(313)	15(298)	33(556)	0	45(537)	118
August	30	4	111(169)	41(306)	6(528)	2(728)	65(584)	225
	31	2	3(270)	1(310)	0	1(775)	4(507)	9
	32	4	46(204)	24(294)	12(552)	0	41(508)	123
Total		40	356(247)	243(365)	140(560)	11(672)	412(563)	1160

*LCi - Least cisco
HWF - Humpback whitefish
BWF - Broad whitefish
SF - Sheefish
NP - Northern pike

TABLE 1. Comparison of fish catch and mean fork length of fish in the three areas.

Area	Species*	1972	1973	Mean Fork Length (mm)	
		Fish per Net Night	Fish Per Net Night	1972	1973
I	LCi	3.65	3.23	283	297
II	LCi	11.69	15.80	314	331
III	LCi	<u>12.19</u>	<u>8.85</u>	227	247
All	LCi	8.69	8.91	285	301
I	HWF	3.08	5.15	341	361
II	HWF	6.69	10.85	390	403
III	HWF	<u>4.35</u>	<u>6.08</u>	348	365
All	HWF	4.50	7.22	364	382
I	BWF	0.89	1.35	552	549
II	BWF	4.15	3.15	532	549
III	BWF	<u>3.97</u>	<u>3.50</u>	529	560
All	BWF	2.81	2.59	539	554
I	SF	0.30	0.21	714	710
II	SF	0.15	0.08	504	511
III	SF	<u>0.26</u>	<u>0.28</u>	730	672
All	SF	0.24	0.19	676	668
I	NP	4.59	5.71	476	477
II	NP	8.08	9.70	460	546
III	NP	<u>4.77</u>	<u>10.30</u>	505	564
All	NP	5.62	8.39	482	535

*LCi - Least cisco
 HWF - Humpback whitefish
 BWF - Broad whitefish
 SF - Sheefish
 NP - Northern pike

Sheefish catches were consistently low for both years. The samples sizes were too small to draw any conclusions about fish length differences.

More northern pike were caught in each area in 1973 than in 1972. This suggests a larger number of pike were present in the flats in 1973. An increase in mean length for pike was found in areas II and III in 1973 and no difference in mean length for pike in area I. Since area I was utilized most heavily by anglers, it is possible enough large fish were removed to decrease the mean length of the pike in this area. Further studies may be useful in verifying this hypothesis.

Summer Movements

Four whitefish movements were detected in Minto Flats. The first was the immigration of young-of-the-year least cisco and humpback whitefish which hatched in the upper Chatanika River in early spring. This movement was first detected in mid-June as these fish moved through shallow water at the confluence of the Tolovana and Chatanika rivers. The direction of migration was downstream in the Chatanika River and upstream in the Tolovana River. The fish were bunched in groups of 50 - 150 individuals. Numbers of fish per hour were estimated for 24 consecutive hours June 18 and 22. An average of 1,000 fish per net hour passed the observation point. Small groups of these young-of-the-year whitefish, caught by dip net, ranged from 25 - 40 mm fork length and 2 - 4 gm in weight. These fish were too small to catch in gill nets in June. However, in August large numbers were caught in gill nets in area II and III.

The second movement was detected June 24 at site 40, when 3 potential spawner humpback whitefish were netted, indicating migration upstream toward the spawning grounds. Mature humpback whitefish, 20 total, were caught here through August 8, 1973. Kepler (1973) suggested that all potential spawners had passed this site by July 1, since no whitefish were caught at this site in July and August 1972. However, the 1973 results show this is not the case.

The low number of fish caught at site 40 was in part due to debris fouling the net, beavers cutting the net and anchor line, and the deep channel allowing escapement, were some of the reasons for no fish being netted during July and August, 1972.

A third movement was detected on July 2 when a potential least cisco spawner was caught at site 40. Ten more of these fish were caught here between July 3 and August 21.

Figures 2 and 3 also demonstrate the movements of humpback whitefish and least cisco. These figures were constructed from fish collected at sites 22 and 30, where relatively consistent numbers of both species were caught. The mature humpback whitefish leave area III (site 30) a few days prior to the mature least cisco departure, and young-of-the-year of both species arrive in this area together. This results in a sharp reduction in the mean fork length of both species caught in area III between July 15 and August 15. Fish of these species caught in area II, site 22, show a later reduction in mean fork length because area II is 40 miles closer

to the spawning grounds. These mature fish need not leave this area as soon to reach the spawning grounds. Figure 2 also shows that least cisco leave area II later than the humpback whitefish.

The fourth movement was the apparent migration of broad whitefish out of the Flats. A reduction in the numbers of broad whitefish in the nets was found in August when only 0.39 fish per net night were caught as compared with 0.97 fish per net night in July. Five net nights September 20 - 22 at 5 sites, where broad whitefish were caught in the largest numbers during the summer, yielded 0.83 fish per net night. Broad whitefish apparently migrate downstream from the Flats, since none were caught at site 31 after July and none were caught at site 40 throughout the summer.

Creel Census

The 1973 creel census of Minto Flats was conducted from May - August 1973. Three areas as described by Cheney (1972) were used for more effective contact with anglers. Interviews were conducted for completed trips whenever possible. Contact with anglers was accomplished by travelling a regular boat circuit to popular angling areas and by creel checks at the New Minto Village boat landing. Aerial boat surveys (Table 7) conducted at 2 PM each Saturday were used to locate and enumerate anglers, along with weekday and late arrival counts from information gathered during angler interviews. The aerial surveys included 79% of the weekly number of anglers.

TABLE 7 Aerial Angler Counts, Minto Flats, 1973. Parentheses indicate Late Arrivals and Weekday Anglers.

Month	Number Boats	Number Planes	Number Boat Anglers	Number Plane Anglers
June	23(5)	0	75(14)	0
July	28(11)	2(1)	77(35)	7(3)
August	<u>12(1)</u>	<u>3(1)</u>	<u>24(2)</u>	<u>5(3)</u>
Sub Total	63	5	176	12
*Late Arrivals	9	0	28	0
**Weekdays	<u>8</u>	<u>2</u>	<u>23</u>	<u>6</u>
1973 Totals	80	7	227	18
1972 Totals	85	6	249	12

*Arrived after 3 PM Saturday, Surveys were conducted from 2 PM - 3 PM on Saturdays.

**Arrived and left between midnight Sunday and noon Friday.

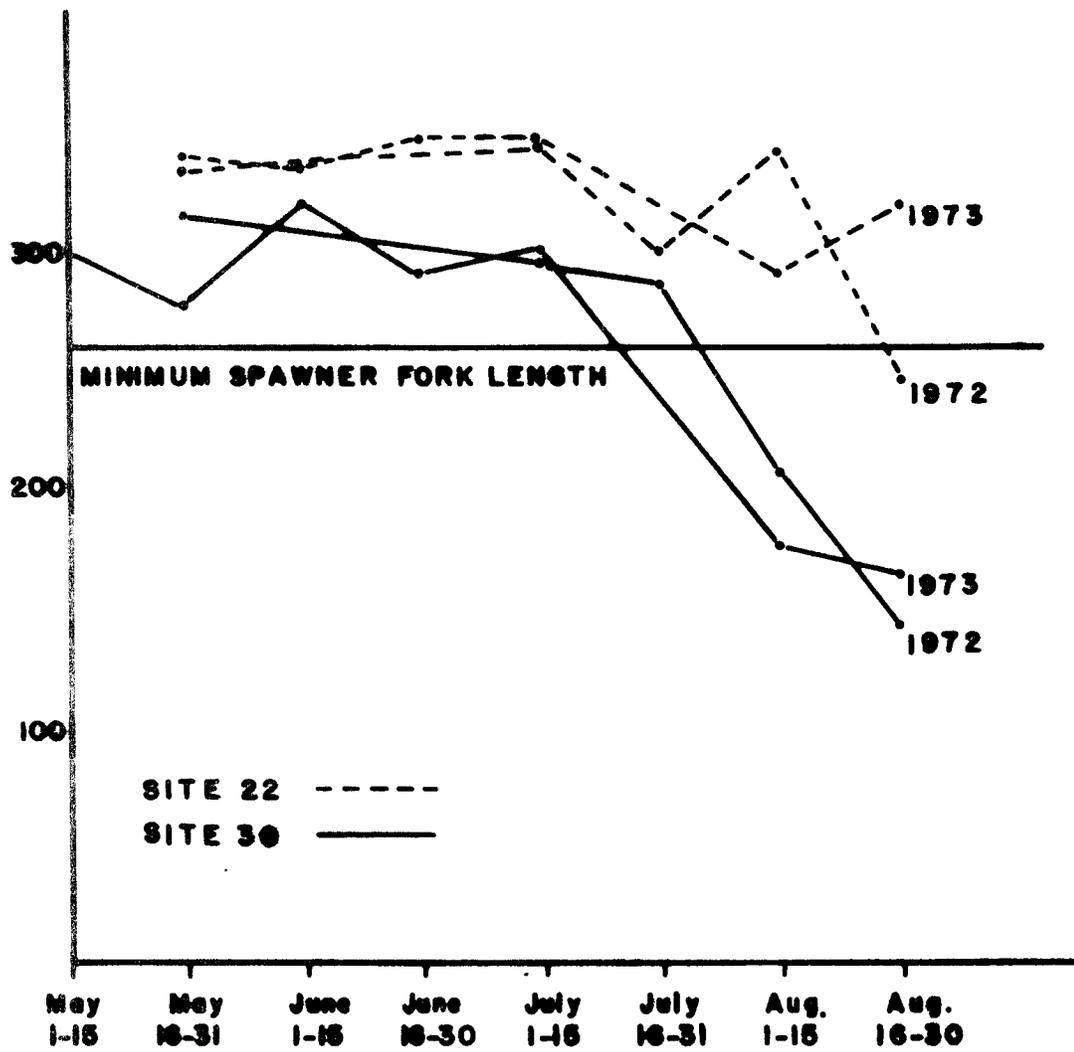


Figure 2. Mean Fork Length of Least Cisco at Two Sites in Minto Flats, May-August, 1972 and 1973.

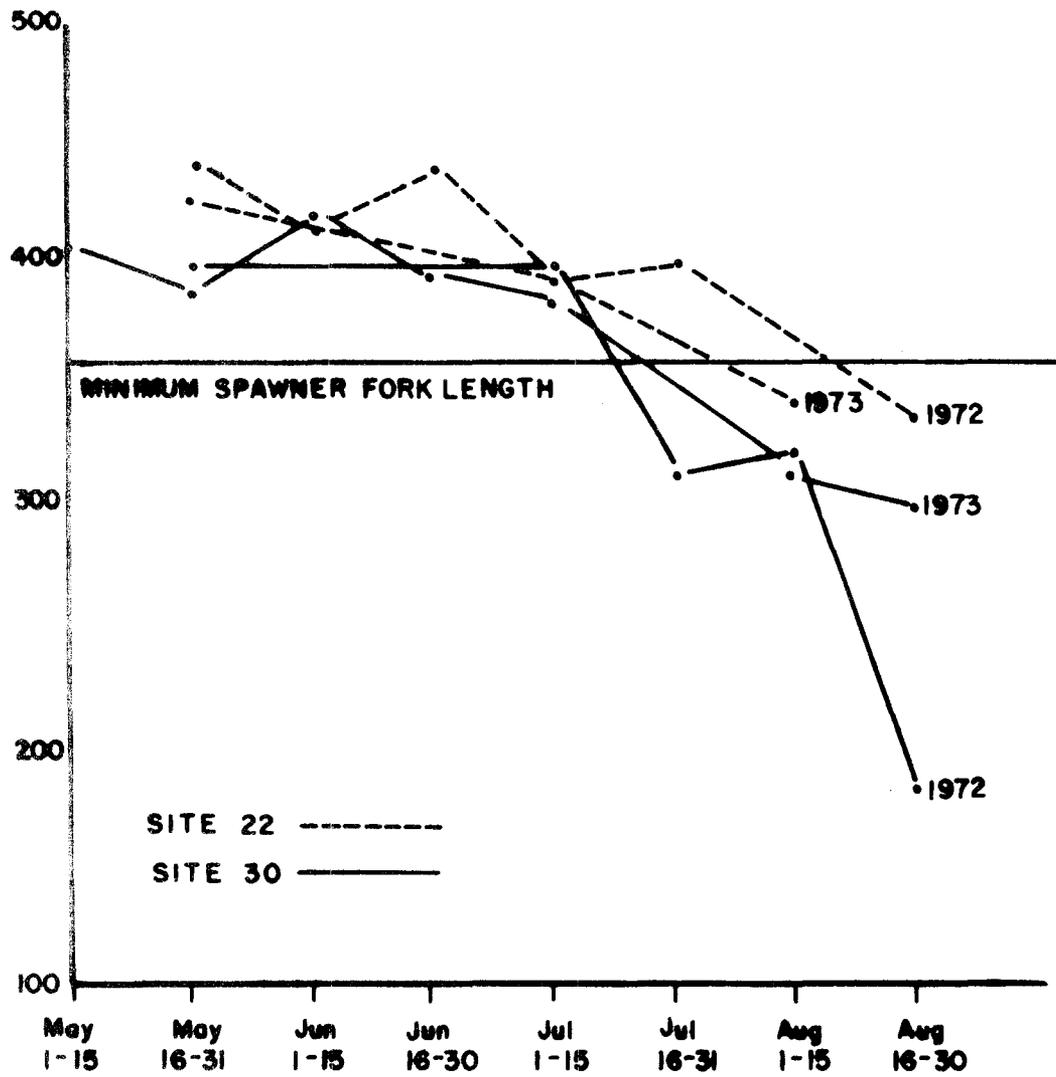


Figure 3. Mean Fork Length of Humpback Whitefish at Two Net Sites in Minto Flats, May-August, 1972 and 1973.

However, anglers arriving by airplanes were difficult to survey; thus the numbers presented for these anglers are minimum counts. Due to the low numbers of anglers in May and August, 100% interviews were possible, while the larger number of anglers during June and July made total census impractical. During June and July, 53% and 50% of the anglers, respectively, were interviewed. Table 8 contains the results of the creel census, both actual and expanded. The 1969 - 1972 results (Cheney, 1972 and Kepler, 1973) indicate a decline in the number of angler hours through 1972 (Table 9).

TABLE 8. Results of Angler Interviews, Minto Flats, 1973.

	Number Anglers	Total Hours	Hours/ Trip	Total Pike	1973 Pike/ Hour	1973 Pike/ Trip
May						
Interviewed	12	43				
100%	12	43	3.5	10	0.23	0.83
June						
Interviewed	47	234				
100%	89	442	5.0	387	0.88	4.36
July						
Interviewed	56	421				
100%	112	842	7.5	466	0.55	4.16
August						
Interviewed	32	204				
100%	32	204	6.5	142	0.70	4.44

TABLE 9. Minto Flats Creel Census 1969 - 1973*.

	1969	1970	1971	1972**	1973
Anglers Hours	3,198	2,133	1,803	1,355	1,531
Pike Caught	6,199	958	246	708	1,005
Pike/hour	1.94	0.45	0.14	0.52	0.66

*1969 - 1971 (Cheney, 1972)
 **1972 - (Kepler, 1973)

The comparison of creel census data indicates a drop in angler success per unit effort from 1969 - 1971 and an increase in success in 1972 and 1973. Although differences in interview timing and technique may account for some of the observed differences in catch rate from 1969 - 1972, the major contributing factor was probably water levels in the Flats, as extremely high water levels in 1970 and 1971 were associated with decreased harvest rates (Cheney 1971 and 1972).

During the 1973 census, 17 sheefish and approximately 20 trophy pike over 15 pounds were caught.

Subsistence Fishery

During July and August approximately 450 fish were taken for subsistence purposes in the Minto Flats. Two of seven nets set, periodically throughout July and August, amounted to 94 and 90 net nights of effort respectively; for an increase of 75 net nights (69%) effort over the 1972 season. Approximately 90% of the effort was expended in the Tolovana River and Whitefish Lakes, near New Minto Village. A small portion of the subsistence catch was sampled for species composition and weight. Approximately 80% of the catch was northern pike, the remainder was humpback whitefish, broad whitefish, least cisco, and sheefish. Average weights of these species caught were 5 pounds, 3 pounds, 8 pounds, and 10 pounds, respectively, a catch similar to the 1972 catch. Estimated total weight of the subsistence catch was approximately 2,600 pounds, double the 1972 catch.

Pike Spawning Ecology

Northern pike spawning commenced approximately May 10. Gonads from 25 mature pike were examined at this time. Three ripe females and one ripe male were found, the remainder had not begun running sex products. All spawners examined after June 2 were spent.

Three hundred eighty-nine pike were caught during the spawning period in the Minto Flats complex, Totchaket Slough, and Nenana River (Table 10). Ripe and spent spawners were caught at all sites in area I - III except 10 and 15.

Northern pike, as noted by Cheney (1972), generally spawn in water from three inches to two feet in depth. Low or nearly normal water levels in the Flats after breakup provided many suitable spawning locations throughout the Flats, although spawning observations were made only in Rock Island Slough, Bear Paw Slough, the confluence of Goldstream Creek and the Minto Lake outflow, and in Minto Lake (see Figure I, Kepler, 1973).

Spawning occurred during the day and night but was most intense between the hours of 8 PM - 2 AM. Spawning activity was greatest the second and third weeks of May. Males and females broadcast their milt and eggs in close proximity into rather heavy concentrations of vegetation consisting of Equisetum and Potamogeton spp., other grasses, and submerged brush near the bank's edge. Thrashing movements in shallow water often accompany spawning activity and are keys to spawning areas.

TABLE 10. Northern Pike Catch during Spawning Period May 10 - June, 1973 in Minto Flats and Vicinity.

Area	n	Net Nights	Catch Per Net Night	Spawners			Fork Length (mm)		Non	Non	Not	Egg
				♂	♀	Mean	Range	Consecutive Spawners	Spawners	Examined	Diameter Range (mm)	
I	112	26	4.7	86	41	45	570	385-925	10	13	3	1.6-2.1
II	122	16	7.6	75	45	30	550	405-840	4	32	11	1.7-2.1
III	120	22	5.5	103	52	51	592	385-870	8	6	3	1.7-2.2
Totchaket Slough	30	30	1	29	10	19	563	415-780	1			
Swanneck Slough	1	<u>5</u>	1	<u>5</u>	<u>1</u>	<u>4</u>	578	485-680	—	—	—	
Totals		199		298	149	149			23	51	17	

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TABLE 11. Egg Counts For 20 Humpback Whitefish Spawners, Upper Chatanika River, September, 1973.

Fork Length (mm)	Age	Total Egg Count	Egg/ml	Mean Eggs/ml	Mean Total Eggs/♀
395	VII	37,213	187	187	37,213
410	VIII	43,228	214		
410	VI	46,699	248.4	222.3	43,473
415	V	40,491	204.5		
420	V	42,833	211		
420	VII	36,630	222	195.7	38,089
425	VIII	34,804	154		
446	VIII	38,916	188		
449	VII	56,358	184.4		
449	X	51,744	176	181.4	51,937
450	VII	56,997	179.8		
456	IX	55,669	179		
460	IX	37,244	184.4		
465	V	51,789	169.8	177.1	44,517
475	XI	41,137	175.8		
480	VIII	61,380	165	175.9	57,236
485	XI	69,190	187		
495	VIII	65,300	213.4		
495	IX	52,988	147.6	180.5	59,144
520	X	77,310	183.2	183.2	77,300

Chatanika River Whitefish Spawners

A population estimate, using the Schnabel tagging and recovery method and visual counts, was conducted on humpback whitefish, least cisco, and sheefish from the upper Chatanika River during late September. A combined population of 19,100 spawners was present, including 12,000 least cisco, 7,000 humpback whitefish, and 100 - 125 sheefish. Further details of this population estimate are reported in Kramer (1974).

On September 19, seven grayling were caught by angling and one of these had a single whitefish egg in its stomach. Observations that night in known spawning pools confirmed that spawning had commenced. Five to ten spawning acts per hour were observed. Activity increased nightly to a peak of 90 - 100 spawning acts per hour per 20 meter diameter area within a pool by September 30. Spawning activity was the same as described by Kepler, 1973.

Table 11 contains the results of egg counts from 20 humpback whitefish. There was not a good correlation between total number of eggs per fish and age, length, or weight. A larger sample is planned in 1974.

The mean fork length for least cisco was 328 mm and the mean weight was 650 gms (1-1/2 lb.).

Only seven tagged fish from 1972 were recovered in the spawning areas during the 1973 tagging operations (two least cisco and five humpback whitefish). The tags were recovered from the same pools where these fish were tagged. Since approximately 10% of the spawning population was tagged in 1972 and again in 1973, the expected tag recovery was 100 - 150 of the 1972 tags in 1973. This assumes no mortality to tagged fish and a consecutive spawning pattern. The low number of tag recoveries could be due to increased mortality of tagged fish or a non-consecutive spawning pattern. A tag recovery program is scheduled for 1974 to check these theories.