

STATE OF ALASKA

*William A. Egan, Governor*



Annual Progress Report for

LIFE HISTORY INVESTIGATIONS OF NORTHERN PIKE  
IN THE TANANA RIVER DRAINAGE

*by*

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## RESEARCH PROJECT SEGMENT

*State:* Alaska

*Project No.:* F-9-3

*Name:* Sport Fish Investigations of Alaska.

*Study No.:* R-111

*Study Title:* Life History Investigations of Northern Pike in the Tanana River Drainage.

*Period Covered:* July 1, 1970 to June 30, 1971.

## ABSTRACT

During 1970, 378 northern pike, Esox lucius Linnaeus, were tagged in the Minto Flats. Thirty-six were recaptured.

Test netting showed pike are more abundant in the northwestern and southeastern sections of Minto Flats.

Creeel census data showed a decrease in fishing effort and catch in 1970 compared to 1969. Subsistence fishermen took approximately 800 pike.

Some pike spawning grounds were located and their characteristics assessed. Spawning occurred from approximately May 10 to June 15.

Age and growth studies utilizing scales and vertebrae from pike were begun. Aging by vertebrae appears to be more accurate than the scale method.

Water temperatures and chemistry were monitored during the summer in Minto Flats.

Food habit studies showed that fish were the most important food item, followed by invertebrates.

## RECOMMENDATIONS

1. A statistically based creel census should be continued and arranged so the entire Minto Flats can be censused. The subsistence fishery should be intensely monitored.
2. The tagging program should be continued to further define winter and summer movements.
3. Major spawning areas should be located, delimited, and assessed. Fecundity studies should be initiated.
4. Attempts should be made to estimate pike populations in various areas of Minto Flats.
5. Food habits studies should be continued.
6. Surveys of other pike waters throughout the Tanana River drainage should be initiated.

## TECHNIQUES USED

Northern pike were captured using graduated mesh gill nets, four- and five-inch stretched mesh gill nets, fyke nets, beach seines, and sport angling gear. All fish taken alive were weighed, measured, and tagged. Pike movements were determined by tagging and recovery. Floy yellow plastic dart tags were used and recaptures were made by Department personnel and subsistence and sport fishermen.

Creel census information was collected by interviewing anglers. Aerial boat counts were made and correlated with ground counts. Subsistence fishery estimates were made by interviewing fishermen and counting nets and fish.

Spawning grounds were located by foot and boat.

Scales, sections of dorsal fin rays, and the first four to eight vertebrae were taken for age determination. Pike were aged using scales and vertebrae. Scales were mounted between glass slides and read with a microprojector. Vertebrae were cleaned, dried, separated, placed in a clearing agent, and read with a binocular microscope.

Water temperatures were taken with hand and electric thermometers. Water chemistry was determined with a Hach Model AC-36-WR test kit. Some water samples were also analyzed by the Federal Water Pollution Control Administration, Alaska Water Laboratory.

## FINDINGS

### *Job R-III-A Distribution, Movement, and Population Indices.*

#### Objectives

1. To determine distribution and areas of abundance of Minto Flats pike.
2. To determine seasonal movements of pike.
3. To obtain population indices for selected areas in Minto Flats.

#### Distribution

Test netting was conducted between May 5 and August 31, 1970, in 33 locations in Minto Flats. Figure 1 is a schematic map of the Minto Flats study area. The northwestern and southeastern sections contained larger numbers of pike, *Esox lucius* Linnaeus, than other areas. The northwestern section consists of the middle section of the Tolovana River, Montana Creek, Windy Lake, and Uncle Sam Creek, plus many interconnecting sloughs. The southeastern section consists of the lower parts of the Chatanika River, Goldstream Creek, Minto Lakes, and interconnecting sloughs. The other two sections of Minto Flats are characterized by confined stream channels, few sloughs (for example, four sloughs on the lower 47 miles of the Tolovana River), and numerous isolated lakes and ponds.

Figure 2 shows test netting results at four locations in Minto Flats. Rock Island Slough, Bear Paw Slough, and the junction of the Chatanika and Tolovana rivers are in the northwestern section. Minto Lake is in the southeastern section. Catch per unit of effort decreased rapidly after mid-May. This may be due to dispersal of pike after spawning. Catch per unit of effort declines rapidly after mid-May. The reason for the greater catch at Minto Lakes later in the summer is unclear. Possibly, pike move into the main lake from surrounding spawning areas in late June to feed.

#### Seasonal Movements

A tagging program initiated in 1967 and continued through 1970 has resulted in tagging 1,413 pike with metal jaw tags or plastic dart tags. To date, 89 tagged fish (6.3%) have been recovered.

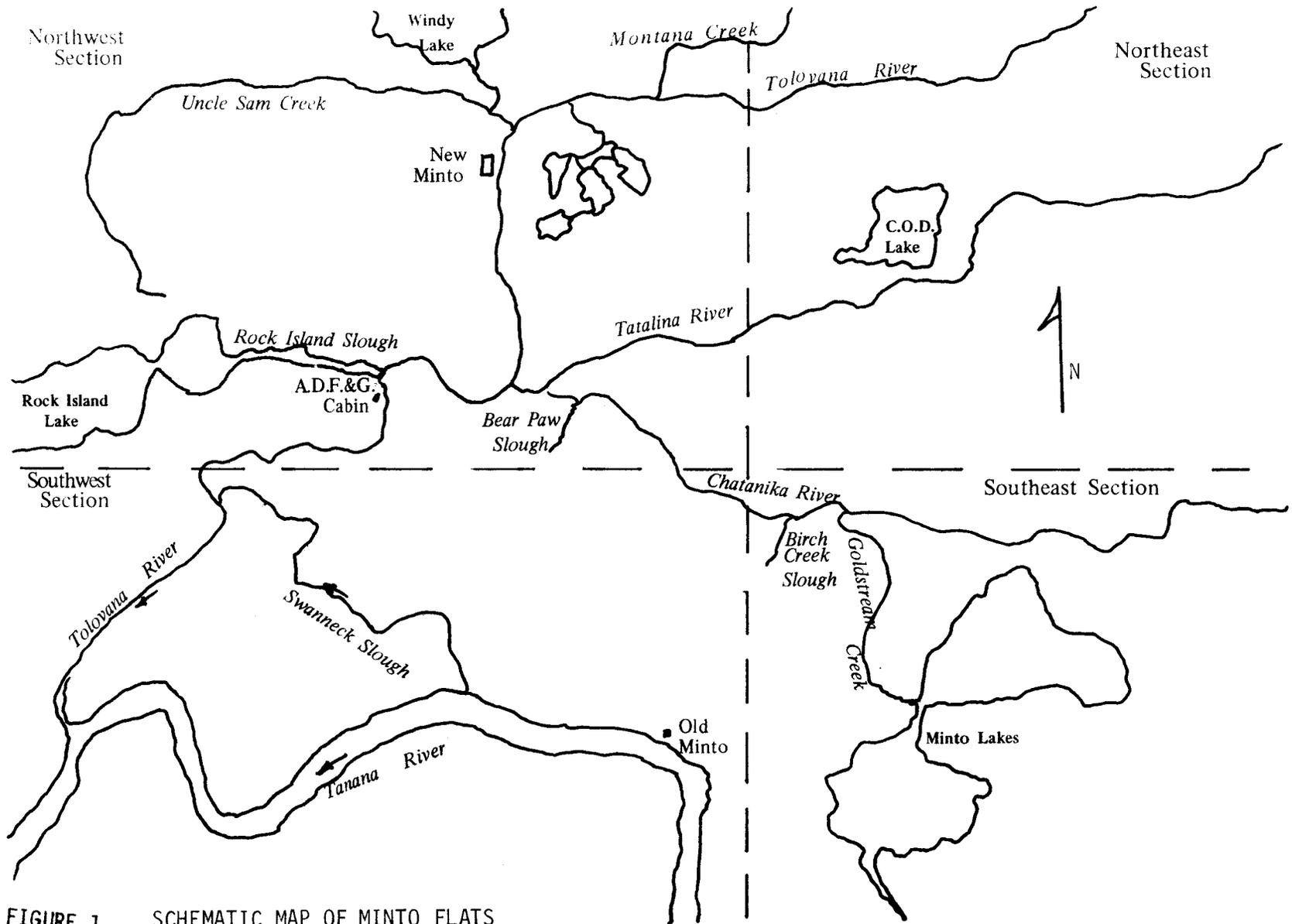


FIGURE 1 SCHEMATIC MAP OF MINTO FLATS

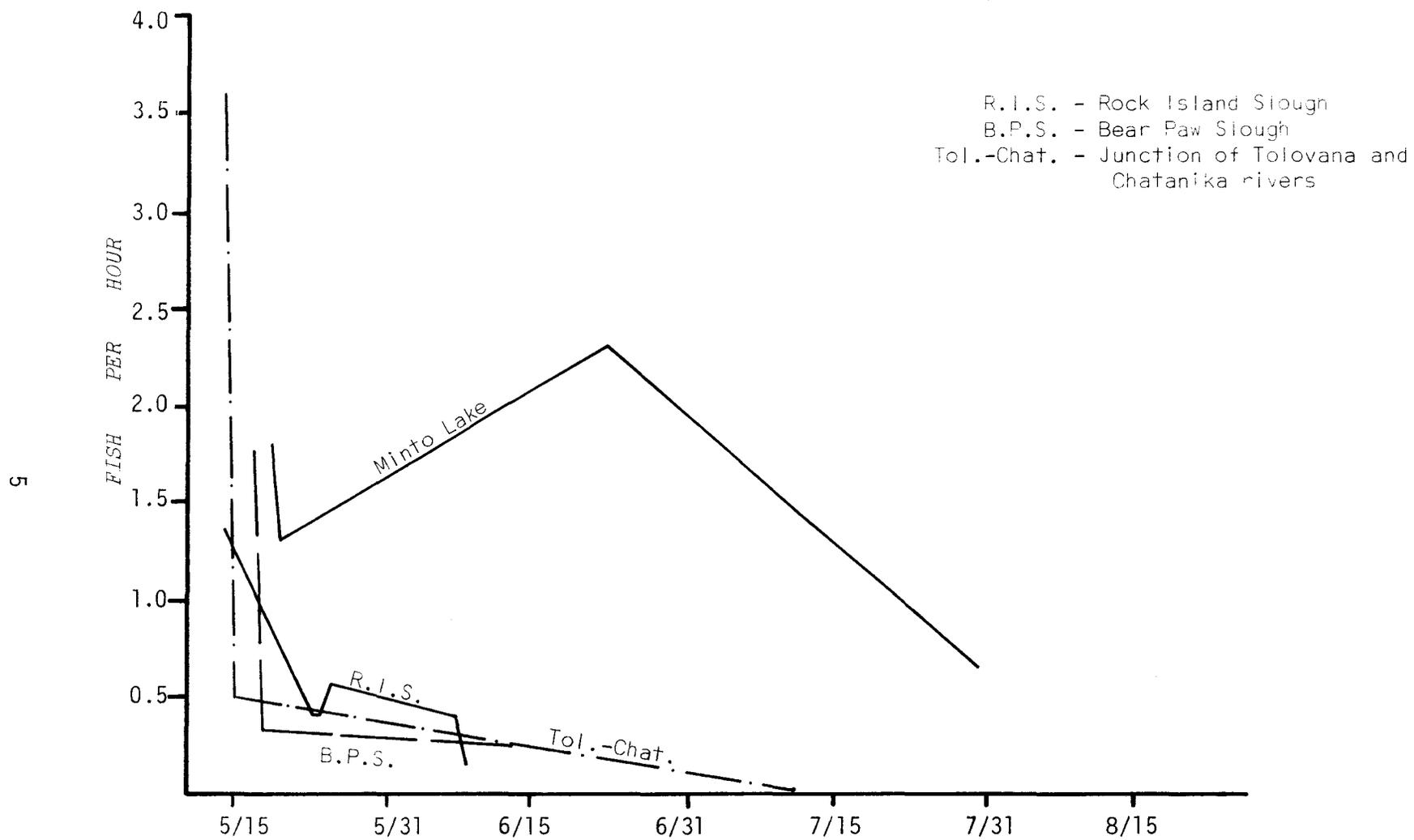


FIGURE 2 RESULTS OF NORTHERN PIKE TEST GILL NETTING, MINTO FLATS, 1970.

Table 1 summarizes tag-and-recapture information for the last four years. Percentage of recaptured pike has remained nearly constant. In earlier years, fishing pressure was greater than in 1970 (Alt, 1967; 1968; 1969), but there were fewer tagged fish in the population. In the future, recoveries should rise due to increases in fishing pressure and numbers of tagged fish.

TABLE 1 Northern Pike Tagged and Recaptured, Minto Flats, 1967-1970.

Year	Tagged		Recaptured		Recaptured	
	No.	Cum.	No.	Cum.	%	Cum. %
1967	201	201	4	4	2.0	1.9
1968	228	429	7	11	1.6	2.7
1969	606	1,035	42	53	4.1	5.1
1970	378	1,413	36	89	2.5	6.3

Of the tagged fish recovered, 49 (55.1%) were caught within two miles of the tagging site, while 38 (42.7%) were taken at farther distances. Two (2.2%) had unknown recovery locations. No strong tendency to return to the same area in subsequent years was noted.

Summer Movements:

Table 2 summarizes summer movements of pike in Minto Flats. At present, no correlation can be made between pike movements and summer water levels. Water levels in 1969 were lower than in 1970, although movement patterns for the two years were quite similar.

TABLE 2 Summer Movements of Minto Flats Pike, 1967-1970.\*

Year	n	Location (Mi.)		Tagging to Recovery Time (Days)		Distance from Tagging Site (Mi.)		
		Range	Mean	Range	Mean	0 - 2	2 - 10	10+
1967	4	0 - 2.25	0.63	11 - 25	15.5	75.0%	25.0%	0.0%
1968	1	1.0	--	29	--	100.0%	0.0%	0.0%
1969	29	0 - 40.5	9.5	2 - 163	37.1	53.9%	11.5%	34.6%
1970	11	0 - 28.0	7.2	99 - 84	32.8	45.4%	18.2%	36.4%

\*Pike tagged and recovered during the same summer.

#### Winter Movements:

Winter movements of Minto Flats pike are largely unknown. Much of the Minto Flats goes dry and many of the larger bodies of water such as Minto Lake become totally oxygen depleted during the winter (Roguski, 1967). Marked oxygen reduction also occurs in the main rivers of the Minto Flats (Roguski, 1967; Alt, 1969). Pike probably move out of these low oxygen waters into the lower reaches of the Tolovana River and possibly the Tanana River.

Timing of in- and outmigrations are unknown. However, pike were taken at New Minto on May 5, 1970, while ice was still in the Tolovana River. Natives fishing through the ice in mid-November, 1970, at Rock Island Slough caught two pike. Attempts to catch pike by hook and line in late November, 1970, and late March, 1971, at several locations in Minto Flats proved unsuccessful.

An air-taxi operator reported several pike taken at the mouth of Swanneck Slough in April, 1968, several weeks before breakup. Pike may overwinter there.

Winter movements may be extensive. A pike tagged at the mouth of Goldstream Creek on July 31, 1968, was recovered at the mouth of the Tanana River, 180 miles downstream on May 24, 1969.

#### Population Indices

Estimation of the Minto Flats pike population was not feasible in 1970 due to difficulty in recapturing tagged pike and the unrestricted movements of fish within the Flats because of high water.

In 1971 attempts will be made to estimate pike numbers in selected areas of the Flats by capture with an A-C shocker boat.

