

STATE OF ALASKA

Jay S. Hammond, Governor



Annual Performance Report for
SPORT FISH STUDIES

by

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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-E Job Title: Rainbow Trout Life History
Studies in Lower Talarik
Creek-Kvichak Drainage.

Period Covered: July 1, 1974 to June 30, 1975.

ABSTRACT

The Lower Talarik Creek weir (Kvichak River drainage) was reassembled and operated from April 30 through October 1, 1974. A total of 1,628 rainbow trout were captured and sampled at the weir. Of these, 1,281 were subsequently tagged (Floy anchor or fingerling tags) and released. Migrations were identified and age, weight, length data collected.

An estimated 1,200 rainbow trout spawned in the Lower Talarik Creek drainage during 1974. The spawning peak occurred between May 1-May 3 with spawners distributed between the weir site and the headwater lakes of both forks. Among 821 spawners sampled, females outnumbered males 1.7 to 1. Of 646 spawners aged, 607 (94%) were age VII or older.

Of the 977 rainbow trout spawners tagged at the weir during the spring of 1973, a total of 69 (7.1%) were recaptured in the stream as consecutive spawners during the spring of 1974.

Thirteen female and four male rainbow trout were artificially spawned to obtain eggs necessary for the state's native brood stock program. Approximately 35,000 eggs were obtained.

An estimated 285 maturing lake run rainbow trout migrated up through the weir during September. Of these, 21 (7.4%) were tagged originally in the stream as spawners during the spring of 1974.

A total of 347 rainbow trout tagged previously in Lower Talarik Creek were recaptured during 1974. Of these, 329 were captured back in the stream and 18 were recovered from other locations within the Kvichak River drainage.

A creel census of the sport fishery indicated anglers spent an estimated 259 angler days to capture 500 rainbow trout at Lower Talarik Creek. The catch per angler hour for rainbow trout averaged 0.48. An estimated 73 rainbow trout were retained by anglers. Fly fishermen and lure fishermen had approximately equal angling success as measured by the rate of catch per angler hour of effort.

RECOMMENDATIONS

1. Continue a basic life history study of rainbow trout in Lower Talarik Creek, a tributary to Lake Iliamna.
2. Continue monitoring the sport fishery on rainbow trout stocks at Lower Talarik Creek.

OBJECTIVES

1. To continue a basic life history study of rainbow trout in Lower Talarik Creek, a tributary to Lake Iliamna.
2. To determine the magnitude and impact of recreational fishing on rainbow trout stocks utilizing Lower Talarik Creek.
3. To determine whether correlations exist between the size of the sockeye salmon escapement entering Lake Iliamna and the numbers and condition of Lower Talarik Creek rainbow trout.

TECHNIQUES USED

Fish were captured using a 120-foot collapsible weir, a type V backpack electrofisher (Smith-Root Company), and hook and line.

The weir, of structural steel construction, supported two traps: a 6 ft. X 10 ft. "wulf" type trap designed to capture downstream migrants, and a 6 ft. X 10 ft. fyke trap designed to capture upstream migrants. Weir screens were constructed of 5/8 inch metal mesh and were reversible to facilitate cleaning.

Fish captured were checked for the presence of tags, and sampled to determine their fork length, weight, sex, maturity, and general condition. Fork lengths were determined using rigid portable measuring boards and were recorded to the nearest millimeter. Weights were obtained using a Chatillon 9 kilo autopsy scale, accurate to 10 grams.

Rainbow trout exceeding 300 mm in length were tagged with numbered brown FD-67 internal anchor tags (Floy Tag Company). The tags were inserted, using Dennison Mark II tagging guns, into the dorsal body musculature such that the anchor section lodged between consecutive pterygiophores. Rainbow

trout less than 300 mm in length were tagged with yellow FTF-69 fingerling tags. These tags were secured just beneath the anterior margin of the dorsal fin by inserting a needle with elastic vinyl thread through the musculature beneath the fin and tying the tag off externally with four overhand knots.

The sex and maturity of rainbow trout captured were identified using the following subjective criteria:

Immature: External sexual characteristics nondiscernable, induced distension of ovipositor not possible, generally silver coloration on larger fish, parr marks visible on smaller fish, no discharge of eggs or milt upon gentle pressure being applied to abdominal area.

This category is used to describe fish that would not be sufficiently developed to spawn during the next spawning season.

Maturing: Male - Developing kype, abdominal contour full and round, ovipositor absent, discharge of milt in some cases, generally 400 mm or greater in length.

Female - No indication of kype, head generally less elongate than a male's head, ovipositor visible in some cases, abdominal contour full and round, generally 400 mm or greater in length.

This category is used to describe fish captured in the fall or winter that would spawn the following spring.

Pre-spawner or ripe: Male - Fully developed kype, discharge of milt from anal vent, spawning coloration (reddish opercle and lateral line area, pronounced spotting), abdominal contour full and round, ovipositor absent.

Female - Kype absent, ovipositor distended, discharge of loose ripe eggs in some cases, spawning coloration, abdominal contour full and round.

This category is used to describe sexually mature fish migrating to, or present in, spawning areas prior to spawning in the spring.

Post-spawner or spent: Male - Fully developed kype, slender, abdominal contour concave, slight discharge of watery milt if pressure applied to abdominal area, anal vent loose and reddish in appearance, scratches and lacerations on abdominal area, ventral and caudal fin margins may be frayed, spawning coloration.

Female - Kype absent, ovipositor distended and generally reddish in color, slender, abdominal contour concave, generally a few retained eggs and ovarian fluid expelled if gentle pressure applied to the abdominal area, digging scars and scratches ventrally and on sides, ventral and caudal fin margins frayed, spawning coloration.

This category is used to describe fish that have recently completed spawning, generally in May or June.

Scale samples were taken from all rainbow trout captured at the weir (April 30-October 1, 1974). Scales of non-tagged fish were removed from the left side between the lateral line and dorsal fin insertion. Scales were selected from the right side of previously tagged fish to minimize the selection of regenerate scales. Scales were cleaned, mounted on numbered gum cards, and impressions were made in 0.002 inch thick cellulose acetate (2.5 inch x 5 inch). Scale impressions were read to determine age using a microprojector.

Ages of sampled rainbow trout were determined by counting annular rings from selected scales. The otoliths of several rainbow trout were examined as an alternate aging method to check the validity of ages obtained by scale reading.

Stomach contents from rearing juvenile rainbow trout were preserved in 10% formalin and subsequently identified using a Bausch and Lomb 1X-2X dissecting microscope.

Spawning ground escapement counts were obtained by foot surveys.

The abundance of juvenile rainbow trout in index side channels was investigated using backpack electroshocking gear.

Water temperatures were collected using a Taylor maximum-minimum registering thermometer submersed in the stream near the weir site. A Ryan Model D thermograph was also tried but leakage and chart advance problems rendered its data questionable.

Anglers were interviewed to determine creel information, effort, and gear preference. Creel census data gathered was expanded by month to determine total estimated "angler effort" and "rainbow trout harvest" using the following ratio proportion formula:

$$\text{Angler effort} \quad \frac{\text{No. anglers checked}}{\text{No. angler hours checked}} = \frac{\text{No. anglers observed}}{\text{Unknown (total angler hours)}}$$

$$\text{Rainbow trout harvest} \quad \frac{\text{No. anglers checked}}{\text{No. rainbow trout checked}} = \frac{\text{No. anglers observed}}{\text{Unknown (total rainbow trout harvest)}}$$

The types of gear used by sport fishermen at Lower Talarik Creek were identified and angler success using different gear types compared. For purposes of this comparison, flies and lures were defined as follows:

Flies - Terminal tackle constructed by methods known as fly tying, including nymphs, dry, wet, and streamer flies.

Lures - Terminal tackle other than flies, including spoons, spinners, jigs, and plugs.

All data collected were entered on Sport Fish Division field data collection forms. The data were subsequently key punched onto IBM computer cards for future analysis.

Data collectors during 1974 included Alfred DeCicco, Hans Hedlund, Steve Nowatak, Luke Zackar, Norman Jacko, Don Siedelman, Lou Gwartney, and Richard Russell.

FINDINGS

Rainbow Trout

For reporting purposes the 1974 field season has been divided into three periods as follows:

Period I	March 27-June 30
Period II	July 1-August 31
Period III	September 1-October 1

Period I represents the time interval in which spawning takes place and spawners may be present in the stream. Period II covers the interval in which the stream is inhabited mainly by juveniles, and Period III refers to the time interval in which the maturing lake-run fish return to the stream.

Period I:

A collapsible 120-foot metal weir was reassembled at Lower Talarik Creek for the third consecutive year. The weir located approximately one mile upstream of the stream outlet (Figure 1) was operational first on April 30, 1974.

Prior to April 30, surveys indicate rainbow trout were present in the stream, but ice conditions prevented the operation of a weir. Ice fishermen interviewed at Lower Talarik Creek on March 27, and again on April 4-6, had captured rainbow trout in the upper lagoon (Figure 1) below the weir site. Subsequent sampling indicated several of these fish were ripening prespawners. Seventeen pair of rainbow trout were observed occupying redds upstream of the weir site during an April 26 survey of the West Fork.

Thus, at the time the weir became functional, the spawning migration was already well in progress. The upmigration continued through May 29 (Table 1) with 164 upmigrants intercepted at the weir.

LOWER TALARIK CREEK

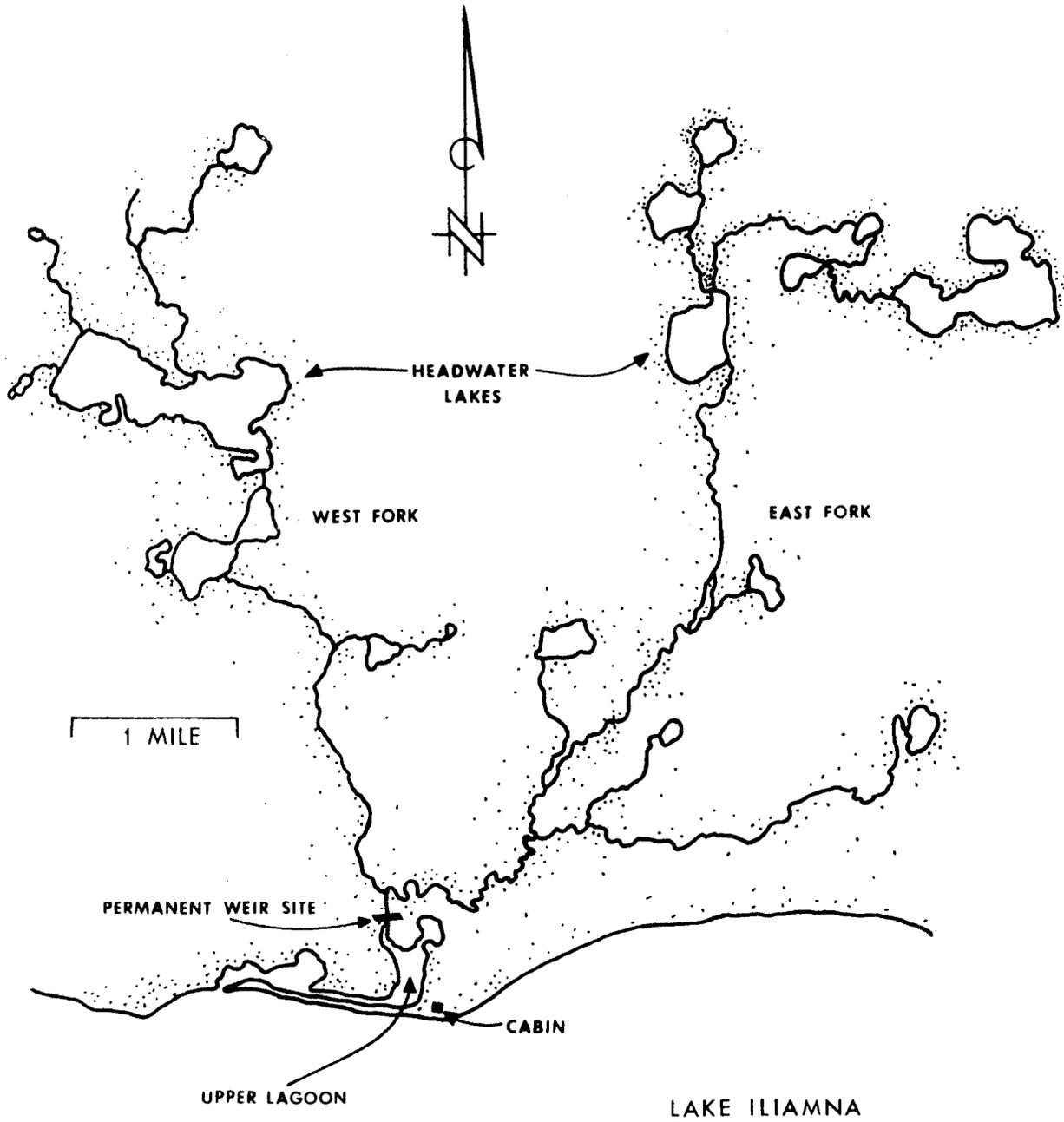


FIGURE 1. Rainbow Trout Research Site, Lower Talarik Creek.

Table 1. Movement of Rainbow Trout Spawners,* Lower Talarik Creek Weir, April 29-June 30, 1974.

Date	Migrants		Date	Migrants	
	Upstream	Downstream		Upstream	Downstream
4/29	-	-	6/3	-	13
4/30	1	1	6/4	-	24
5/1	-	1	6/5	-	30
5/2	16	3	6/6	-	9
5/3	15	1	6/7	-	8
5/4	2	3	6/8	-	2
5/5	15	5	6/9	-	8
5/6	15	2	6/10	-	4
5/7	29	-	6/11	-	3
5/8	12	1	6/12	-	5
5/9	8	5	6/13	-	1
5/10	11	4	6/14	-	3
5/11	5	5	6/15	-	3
5/12	1	62	6/16	-	2
5/13	-	45	6/17	-	1
5/14	5	18	6/18	-	1
5/15	-	14	6/19	-	-
5/16	3	14	6/20	-	1
5/17	3	13	6/21	-	-
5/18	-	5	6/22	-	1
5/19	-	6	6/23	-	-
5/20	3	12	6/24	-	1
5/21	2	10	6/25	-	-
5/22	6	27	6/26	-	-
5/23	-	18	6/27	-	-
5/24	3	40	6/28	-	2
5/25	2	33	6/29	-	1
5/26	3	39	6/30	-	-
5/27	2	21			
5/28	-	19	Total	164	696
5/29	2	14			
5/30	-	21			
5/31	-	20			
6/1	-	43			
6/2	-	48			

*Recaptures counted only once in each direction.

Both forks of Lower Talarik Creek were surveyed during May to estimate the actual spawning population and determine the period of peak spawning activity. Based on the counts obtained from these surveys, it appears that the peak of spawning occurred between May 1-May 3. At the peak, the distribution of spawners was fairly equally divided between the East Fork (508 spawners) and the West Fork (418 spawners). In addition, an estimated 30 rainbow trout were spawning between the weir site and the confluence of the forks, while no spawning was observed downstream of the weir site. By totalling the number of spawners observed on the spawning grounds during the peak surveys (956), and the number of upmigrant spawners passed through the weir in the days following these surveys (147), a minimum estimate of the total spawning population in the stream was obtained (1,103). Allowing for a minimal down-migration into Lake Iliamna or up-migration into the headwater lakes prior to the peak surveys, it is estimated that approximately 1,200 rainbow trout spawned in Lower Talarik Creek during 1974. Comparative spawning population estimates for the years 1971-1974 are presented in Table 2.

Table 2. Rainbow Trout Spawning Population Estimates, Lower Talarik Creek, 1971-1974.

<u>Date</u>	<u>Estimated Spawning Population</u>	<u>Duration of Spawning</u>	<u>Spawning Peak</u>
1971	800	5/14-6/17	5/30
1972	600*	5/25-6/17	6/ 6
1973	1,000	4/20-5/30	5/10
1974	1,200	4/26-5/30	5/ 3

*Based on surveys of the West Fork, extrapolated to include the entire stream.

Spawning was essentially completed by May 30 with no pairing observed after that date. Following spawning, the "spent" rainbow trout left the highly vulnerable shallow spawning areas and a majority migrated downstream into Lake Iliamna. A total of 696 were captured as down-migrants at the weir (Table 1). The bulk of this down-migration occurred from May 12-June 5 with stragglers following through the end of June. The weir structure appeared to impede the down-migration somewhat as several fish with recognizable scars or wounds were observed actively seeking a way around it from the upstream side for several days. The extent of the delay isn't known, but a 3-5 day delay (based on these observations) is hypothesized.

Approximately 400 known spawners were not accounted for as down-migrants through the weir. It is assumed that some of these missing fish were natural

mortalities as several carcasses attributable to predation by otter, eagles, etc., were observed in the spawning areas. In addition, several stream-dead fish, bearing no obvious external injuries, were found in and along the stream during spawning. Some post spawners may have migrated into head-water lakes upon leaving the spawning areas. Still others, a majority perhaps, may have bypassed the weir by using a small side channel that connects the upper lagoon to the main stream channel at a point approximately 250 yards upstream of the weir. Efforts to block movement through this channel were largely ineffective, and during one survey a total of 21 spent rainbow trout were observed in the channel. This channel was effectively blocked with a small picket weir later in the season.

Eight hundred and twenty-one spawners were sampled during Period I (Table 3). Females outnumbered males 517 to 304 (1.7 to 1). Males ranged in length from 267-810 mm with a mean fork length of 624 mm. Females ranged in length from 371-720 mm with a mean fork length of 578 mm.

Table 3. Length Frequency by Sex, Rainbow Trout Spawners, Lower Talarik Creek, March 27-June 30, 1974.

<u>Length (mm)</u>	<u>Males</u>	<u>Females</u>	<u>Total</u>
250-274	1	-	1
275-299	-	-	-
300-324	-	-	-
325-349	1	-	1
350-374	-	1	1
375-399	1	-	1
400-424	-	1	1
425-449	2	3	5
450-474	1	7	8
475-499	-	9	9
500-524	6	28	34
525-549	13	67	80
550-574	30	110	140
575-599	41	103	144
600-624	46	105	151
625-649	51	50	101
650-674	46	26	72
675-699	28	5	33
700-724	24	2	26
725-749	8	-	8
750-774	2	-	2
775-799	2	-	2

Table 3. (Cont) Length Frequency by Sex, Rainbow Trout Spawners, Lower Talarik Creek, March 27-June 30, 1974.

<u>Length (mm)</u>	<u>Males</u>	<u>Females</u>	<u>Total</u>
800-824	<u>1</u>	<u>-</u>	<u>1</u>
Total	304	517	821
Length Range (mm)	267-810	371-720	267-810
Mean Length (mm)	624	578	598

Age breakdown by sex of rainbow trout spawners is presented in Table 4. A total of 646 spawners had scales legible for age determinations. Male spawners ranged in age from V to X, while females ranged from V to XI. Age groups VII, VIII, and IX fish comprised 90.3% of the spawning population. The data indicate that a majority of both sexes mature during their sixth and seventh years. Of interest is the apparent decrease in survivability between the ninth and tenth years. These data also point out the numerical dominance by age group of females in the spawning population.

Table 4. Age Breakdown by Sex, Rainbow Trout Spawners, Lower Talarik Creek, March 27-June 30, 1974.

<u>Age Group</u>	<u>Males</u>			<u>Females</u>			<u>Total</u>	
	<u>No.</u>	<u>% of Total</u>	<u>% of Age Group</u>	<u>No.</u>	<u>% of Total</u>	<u>% of Age Group</u>	<u>No.</u>	<u>% of Total</u>
V	2	0.9	50.0	2	0.5	50.0	4	0.6
VI	10	4.3	28.6	25	6.1	71.4	35	5.4
VII	46	19.7	28.9	113	27.5	71.1	159	24.6
VIII	96	41.0	37.4	161	38.9	62.6	257	39.8
IX	74	31.6	44.3	93	22.6	55.7	167	25.9
X	6	2.6	28.6	15	3.6	71.4	21	3.2
XI	-	-	-	3	0.7	100.0	3	0.5
Total	234	100.0	36.2	412	100.0	63.8	646	100.0

The mean weight versus age of rainbow trout spawners is presented in Table 5. Eleven prespaw (ripe) males had a mean weight of 2.43 kg, while the mean weight of 215 post spawn (spent) males was 2.22 kg. Ninety-six prespaw females had a mean weight of 2.23 kg while the mean weight of 308 post spawn females was 1.71 kg.

Table 5. Mean Weight by Age and Sex, Rainbow Trout Spawners, Lower Talarik Creek Weir, April 30-June 30, 1974.

	Age Group						Totals
	<u>VI</u>	<u>VII</u>	<u>VIII</u>	<u>IX</u>	<u>X</u>	<u>XI</u>	
No. Ripe Males	1	2	4	4	-	-	11
Mean Weight (kg) Ripe Males	-	-	2.36	3.19	-	-	2.43
No. Spent Males	9	41	92	67	6	-	215
Mean Weight (kg) Spent Males	1.42	1.71	2.20	2.63	2.45	-	2.22
No. Ripe Females	3	26	38	25	4	-	96
Mean Weight (kg) Ripe Females	1.64	1.75	2.21	2.60	3.64	-	2.23
No. Spent Females	21	87	119	67	11	3	308
Mean Weight (kg) Spent Females	1.20	1.45	1.75	2.03	2.11	2.39	1.71

Sixty-nine rainbow trout captured in Lower Talarik Creek during Period I, 1974, were consecutive spawners (tagged originally as spawners in the stream during the spring of 1973). As 974 spawners were captured in the stream during the spring of 1973 (Russell, 1973) these 69 fish represent a 7.1% return. This should be considered a minimum return considering the incomplete capture of post spawners at the weir. Fifty-seven consecutive spawners were females, ranging in age from VII to XI (a majority, 31, were age IX). Twelve were males, ranging in age from VIII to X.

Of 219 rainbow trout captured as spawners in Lower Talarik Creek during the spring of 1972 (Siedelman, Cunningham, Russell, 1972) only one was recaptured in the stream as a spawner during Period I, 1974.

Eighty (18.9%) of the 428 maturing up-migrant rainbow trout captured at the weir during the fall of 1973 were captured in the stream as spawners during Period I. The fate of the other 348 is unknown. Although no fall spawning has been documented in Bristol Bay streams, some people have theorized that the maturing rainbow trout entering the streams from the lakes in the fall were fall spawners. The recovery of 80 of these fall upmigrants as subsequent spring spawners is evidence to the contrary.

Thirteen female and four male rainbow trout were captured and artificially spawned at Lower Talarik Creek during May, 1974. A total of 34,976 eggs (hand counted) was obtained. As the eggs from each female were kept separate until they had been counted, an average yield per female was obtained. Subtracting 2,220 eggs taken from two females only partially spawned, the remainder, 32,756 eggs (11 females) represents a mean yield of 2,978 eggs per female. No estimates of egg retention were obtained as the fish were released following spawning. The females ranged in age from VII to IX years, and in length from 566-696 mm. Males ranged in age from IX-X years, and in length from 584-705 mm. No particular selection for any age group, size group, or other characteristic was exercised. Joe Wallis and Bill Rosenbalm of Hatchery Services supervised egg taking operations. The fertilized, water-hardened eggs were transported for incubation to the Fire Lake Hatchery, Eagle River, Alaska, by Fish and Wildlife Service planes and personnel.

Fecundity data collected on nine other Lower Talarik Creek rainbow trout (1971-1974) indicates a mean yield of 3,852 eggs per female. The number of mature eggs per female ranged from 2,552-5,484. These females ranged in length from 558-692 mm and in age from VIII-IX years. The ovaries were removed from these fish and the eggs counted.

As egg size may influence survival, samples of mature eggs have been measured to determine egg diameters. Egg samples from 19 Lower Talarik Creek spawners sampled (1971-1974) ranged in diameter from 4.8-6.2 mm with a mean diameter of 5.3 mm. Donor fish ranged in length from 530-692 mm, and in age from VII-IX years. More samples are necessary to indicate any correlations between length, weight, or age and egg size.

Juvenile rainbow trout were also present in Lower Talarik Creek during the spawning period. The movement of these fish through the weir is presented in Table 6. While not too much movement occurred, there does appear to have been a small down-Migration during the last week of may and first week of June.

Table 6. Movement of Non-spawning and Juvenile Rainbow Trout, Lower Talarik Creek Weir,* April 30-June 30, 1974.

<u>Date</u>	<u>Upstream Migrants</u>	<u>Downstream Migrants</u>	<u>Date</u>	<u>Upstream Migrants</u>	<u>Downstream Migrants</u>
4/30	-	-	5/30	-	5
5/ 1	-	-	5/31	-	4
5/ 2	1	-	6/ 1	-	6
5/ 3	2	-	6/ 2	-	5
5/ 4	1	-	6/ 3	-	6
5/ 5	1	-	6/ 4	-	3
5/ 6	1	-	6/ 5	-	2
5/ 7	-	1	6/ 6	-	1
5/ 8	-	-	6/ 7	1	1
5/ 9	1	-	6/ 8	-	1
5/10	-	-	6/ 9	-	-
5/11	1	1	6/10	-	-
5/12	-	5	6/11	-	1
5/13	-	2	6/12	-	-
5/14	-	1	6/13	-	-
5/15	-	-	6/14	-	-
5/16	-	1	6/15	-	1
5/17	-	-	6/16	-	-
5/18	-	1	6/17	-	-
5/19	1	1	6/18	-	-
5/20	-	4	6/19	-	-
5/21	-	4	6/20	-	-
5/22	-	1	6/21	-	-
5/23	-	-	6/22	-	-
5/24	-	-	6/23	-	-
5/25	-	1	6/24	-	-
5/26	1	-	6/25	-	-
5/27	-	24	6/26	-	-
5/28	-	19	6/27	-	-
5/29	-	8	6/28	-	1
			6/29	-	-
			6/30	-	-
			Total	11	111

*Recaptures counted only once in each direction.

The length frequency for the juvenile and non-spawning fish is presented in Table 7. These fish ranged in length from 135-576 mm.

Table 7. Length Frequency of Immature and Non-spawning Rainbow Trout, Lower Talarik Creek, April 30-June 30, 1974.

<u>Length</u>	<u>Up-migrants</u>	<u>Down-migrants</u>
125-149	1	-
150-174	2	-
175-199	-	1
200-224	1	4
225-249	2	6
250-274	-	19
275-299	1	18
300-324	1	16
325-349	2	11
350-374	-	7
375-399	-	8
400-424	-	4
425-449	-	5
450-474	-	4
475-499	-	1
500-524	-	4
525-549	-	2
550-574	-	1
575-599	<u>1</u>	<u>-</u>
Total	11	111
Length Range (mm)	135-576	186-555

Referring to the length-age frequency for all Period I rainbow trout aged (Table 8) it appears that most of the juveniles and non-spawners sampled ranged in age from III-VI years. The data also indicate that the maximum rate of length increase occurs between the fifth and sixth years of life.

Table 8. Length-Age Frequency, Rainbow Trout, Lower Talarik Creek, March 27-June 30, 1974.

<u>Length (mm)</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>	<u>IX</u>	<u>X</u>	<u>XI</u>	<u>Total</u>
125-149	1	-	-	-	-	-	-	-	-	-	1
150-174	-	-	-	-	-	-	-	-	-	-	-
175-199	-	1	-	-	-	-	-	-	-	-	1
200-224	-	2	1	-	-	-	-	-	-	-	3
225-249	-	1	5	-	-	-	-	-	-	-	6
250-274	-	-	8	2	-	-	-	-	-	-	10
275-299	-	1	9	5	-	-	-	-	-	-	15
300-324	-	-	5	9	1	-	-	-	-	-	15
325-349	-	-	2	8	2	-	-	-	-	-	12
350-374	-	-	1	4	1	1	-	-	-	-	7
375-399	-	-	1	1	4	-	-	-	-	-	6
400-424	-	-	-	1	4	-	-	-	-	-	5
425-449	-	-	-	4	3	2	-	-	-	-	9
450-474	-	-	-	1	7	2	-	-	-	-	10
475-499	-	-	-	-	5	3	-	-	-	-	8
500-524	-	-	-	-	4	23	5	-	-	-	32
525-549	-	-	-	-	10	39	16	1	1	-	67
550-574	-	-	-	-	7	49	51	7	1	-	115
575-599	-	-	-	-	4	28	56	20	-	-	108
600-624	-	-	-	-	-	10	65	35	3	-	113
625-649	-	-	-	-	-	7	31	42	8	1	89
650-674	-	-	-	-	-	-	17	29	5	2	53
675-699	-	-	-	-	-	-	9	15	1	-	25
700-724	-	-	-	-	-	-	5	11	2	-	18
725-749	-	-	-	-	-	-	2	5	-	-	7
750-774	-	-	-	-	-	-	-	-	-	-	-
775-799	-	-	-	-	-	-	-	1	-	-	1
800-824	-	-	-	-	-	-	-	1	-	-	1
Total	1	5	32	35	52	164	257	167	21	3	737
Length	135	186-	215-	267-	307-	367-	514-	543-	632-	640-	135-
Range (mm)		295	376	465	587	649	745	810	720	668	810
Mean Length (mm)	-	226	282	340	484	554	603	640	646	661	564
% of Total	0.1	0.7	4.3	4.7	7.1	22.3	34.9	22.7	2.9	0.4	100.0
Mean Growth Increment(mm)	-	56	58	144	70	49	37	6	15		

One observation of interest occurred May 3 when a 159 mm immature female rainbow trout was found dead in the fyke trap. Upon examination of the stomach contents of this fish, 14 large rainbow trout eggs were found. Small rainbow trout in the 100-300 mm length range have often been observed among or near the much larger spawners on redds. These individuals, while not counted as spawners, are noted as it is suspected some may be precocial males. Perhaps this one case suggests another reason for their presence on the redds.

Young-of-the-year rainbow trout were first observed in the stream on June 29. Three were captured and measured, 25, 28, and 29 mm in length, respectively. The egg sacs were still visible on two of these.

Daily maximum stream temperatures for Period I appear in Table 9. The daily highs during the spawning peak ranged from 5°-7°C. They reached 18°-20°C by the end of June when the fry emergence began.

Period II:

Period II began July 1. It was a period characterized by very little rainbow trout movement. The stream water levels were very low and water temperatures were quite high (Table 10), reaching 22°C on one occasion. Sockeye salmon, Oncorhynchus nerka, arrived and began spawning in the stream, and insect emergence was at a peak, providing an abundance of food items for stream dwelling rainbow trout.

Ninety-three up-migrant and three down-migrant rainbow trout were sampled at the weir during this period. In addition, as the magnitude of the sockeye salmon up-migration was substantial until late August, several weir screens were removed to facilitate passage of these fish and another 74 up-migrant and six down-migrant rainbow trout passed through without being sampled. Rainbow trout passage totals by day are presented in Table 11.

Table 9. Daily High Water Temperatures, Lower Talarik Creek, April 25 - June 30, 1974.

<u>Date</u>	<u>Temp. °C</u>	<u>Date</u>	<u>Temp. °C</u>
4/25	2	5/30	15
4/26	1	5/31	13
4/27	6	6/1	15
4/28	4	6/2	15
4/29	6	6/3	16
4/30	7	6/4	11
5/1	7	6/5	16
5/2	5	6/6	15
5/3	5	6/7	15
5/4	5	6/8	13
5/5	5	6/9	16
5/6	6	6/10	15
5/7	5	6/11	16
5/8	5	6/12	17
5/9	5	6/13	16
5/10	6	6/14	9
5/11	6	6/15	9
5/12	6	6/16	13
5/13	6	6/17	14
5/14	9	6/18	16
5/15	5	6/19	13
5/16	6	6/20	11
5/17	6	6/21	15
5/18	8	6/22	15
5/19	11	6/23	16
5/20	10	6/24	14
5/21	12	6/25	17
5/22	14	6/26	16
5/23	15	6/27	20
5/24	16	6/28	18
5/25	14	6/29	18
5/26	16	6/30	20
5/27	15		
5/28	15		
5/29	14		

Table 10. Daily High Water Temperatures, Lower Talarik Creek,
July 1-August 31, 1973.

<u>Date</u>	<u>Temp. °C</u>	<u>Date</u>	<u>Temp. °C</u>
7/1	21	8/5	18
7/2	20	8/6	14
7/3	20	8/7	13
7/4	21	8/8	14
7/5	18	8/9	22
7/6	19	8/10	16
7/7	19	8/11	16
7/8	16	8/12	18
7/9	16	8/13	20
7/10	17	8/14	20
7/11	18	8/15	20
7/12	13	8/16	19
7/13	16	8/17	13
7/14	17	8/18	19
7/15	16	8/19	19
7/16	17	8/20	19
7/17	17	8/21	18
7/18	17	8/22	22
7/19	15	8/23	12
7/20	15	8/24	12
7/21	17	8/25	13
7/22	15	8/26	11
7/23	17	8/27	11
7/24	18	8/28	18
7/25	17	8/29	13
7/26	18	8/30	14
7/27	20	8/31	14
7/28	20		
7/29	16		
7/30	18		
7/31	17		
8/1	18		
8/2	19		
8/3	19		
8/4	20		

Table 11. Rainbow Trout Movement, Lower Talarik Creek Weir, July 1 - August 31, 1974.

<u>Date</u>	<u>Upstream Migrant</u>	<u>Downstream Migrant</u>	<u>Date</u>	<u>Upstream Migrant</u>	<u>Downstream Migrant</u>
7/1	-	-	8/5	2	-
7/2	-	-	8/6	9	-
7/3	-	-	8/7	-	-
7/4	-	-	8/8	1	-
7/5	-	-	8/9	-	-
7/6	1	-	8/10	1	-
7/7	1	2	8/11	2	-
7/8	-	-	8/12	1	-
7/9	1	1	8/13	5	-
7/10	-	-	8/14	2	-
7/11	1	1	8/15	-	-
7/12	-	-	8/16	5	-
7/13	-	-	8/17	3	-
7/14	-	-	8/18	4	-
7/15	-	-	8/19	1	-
7/16	-	-	8/20	-	-
7/17	2	-	8/21	4	-
7/18	2	1	8/22	1	-
7/19	-	1	8/23	2	-
7/20	1	-	8/24	10	-
7/21	*	*	8/25	2	-
7/22	*	*	8/26	1	-
7/23	*	*	8/27	6	1
7/24	*	*	8/28	4	-
7/25	*	*	8/29	8	-
7/26	*	*	8/30	3	-
7/27	22	-	8/31	5	-
7/28	11	2			
7/29	11	-			
7/30	10	-			
7/31	3	-			
8/1	7	-			
8/2	2	-			
8/3	4	-			
8/4	6	-			
			Total	167	9

* Weir inoperative for six days of repair work.

A majority of the rainbow trout sampled at the weir during this period were juveniles, although a few large, maturing, lake-run fish were captured in late August. The length frequencies of fish sampled are presented in Table 12.

Table 12. Length Frequency, Rainbow Trout, Lower Talarik Creek Weir, July 1-August 31, 1974.

<u>Length</u>	<u>Upmigrants</u>	<u>Downmigrants</u>
100-124	4	-
125-149	15	1
150-174	24	1
175-199	14	-
200-224	12	-
225-249	3	-
250-274	4	-
275-299	6	-
300-324	2	-
325-349	-	-
350-374	2	-
375-399	1	-
400-424	-	-
425-449	-	-
450-474	1	-
475-499	-	-
500-524	-	-
525-549	-	-
550-574	-	1
575-599	1	-
600-624	-	-
625-649	2	-
650-674	1	-
675-699	<u>1</u>	-
Total	93	3
Length Range (mm)	115-692	144-560

The length-age data for the fish sampled is presented in Table 13. It appears that a majority of the up-migrants belonged to age groups II and III.

Table 13. Length-Age Frequency, Rainbow Trout, Lower Talarik Creek Weir, July 1-August 31, 1974.

Length (mm)	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>	<u>IX</u>	<u>Total</u>
100-124	1	2	1	-	-	-	-	-	-	4
125-149	-	9	-	-	-	-	-	-	-	9
150-174	-	10	5	-	-	-	-	-	-	15
175-199	-	1	6	2	-	-	-	-	-	9
200-224	-	1	6	1	-	-	-	-	-	8
225-249	-	-	1	1	-	-	-	-	-	2
250-274	-	-	-	2	-	-	-	-	-	2
275-299	-	-	-	5	-	-	-	-	-	5
300-324	-	-	-	2	-	-	-	-	-	2
325-349	-	-	-	-	-	-	-	-	-	-
350-374	-	-	-	1	-	-	-	-	-	1
375-399	-	-	-	-	-	-	1	-	-	1
400-424	-	-	-	-	-	-	-	-	-	-
425-449	-	-	-	-	-	-	-	-	-	-
450-474	-	-	-	-	-	-	-	1	-	1
475-499	-	-	-	-	-	-	-	-	-	-
500-524	-	-	-	-	-	-	-	-	-	-
525-549	-	-	-	-	-	-	-	-	-	-
550-574	-	-	-	-	-	-	-	-	1	1
575-599	-	-	-	-	-	-	-	1	-	1
600-624	-	-	-	-	-	-	-	-	-	-
625-649	-	-	-	-	-	-	<u>1</u>	<u>1</u>	-	<u>2</u>
Total	1	23	19	14	0	0	2	3	1	63
Length range (mm)	117-	115-	123-	181-	-	-	390-	470-	560-	117-
		223	227	365			629	628		629

No tag recoveries occurred at the weir during Period II.

Period III:

Period III began September 1 and was characterized by an increase in rainbow trout movement (Table 14). During early September the large maturing, lake run fish continued to enter the stream. Aerial observations indicated 200-300 of these fish were present between the upper lagoon and stream outlet on September 6. These fish did not enter the weir traps in substantial numbers, however, until September 20. An estimated 285 maturing fish passed through the weir prior to October 1 (266 sampled plus 19 that slipped through while screens were being reversed).

Table 14. Rainbow Trout Movement, Lower Talarik Creek Weir, September 1-October 1, 1974.

<u>Date</u>	<u>Upstream Migrant</u>	<u>Downstream Migrant</u>	<u>Date</u>	<u>Upstream Migrant</u>	<u>Downstream Migrant</u>
9/ 1	1	-	9/21	61	1
9/ 2	2	-	9/22	10	1
9/ 3	4	-	9/23	17	-
9/ 4	3	2	9/24	41	1
9/ 5	3	2	9/25	19	-
9/ 6	5	-	9/26	12	3
9/ 7	1	-	9/27	10	1
9/ 8	6	-	9/28	11	-
9/ 9	1	1	9/29	17	1
9/10	-	1	9/30	13	56
9/11	5	-	10/ 1	<u>23</u>	<u>44</u>
9/12	8	6			
9/13	5	11	Total	425	151
9/14	1	-			
9/15	3	4			
9/16	7	16			
9/17	7	-			
9/18	12	-			
9/19	13	-			
9/20	104	1			

The length frequency of up-migrant rainbow trout is presented in table 15. Maturing males had a mean length of 618 mm, while the mean length of maturing females was 609 mm. One hundred and thirty-three juvenile up-migrants had a mean length of 224 mm.

Table 15. Length Frequency, Up-migrant Rainbow Trout, Lower Talarik Creek Weir, September 1-October 1, 1974.

<u>Length (mm)</u>	<u>Maturing Males</u>	<u>Maturing Females</u>	<u>Juveniles</u>	<u>Total</u>
75-99	-	-	1	1
100-124	-	-	2	2
125-149	-	-	6	6
150-174	-	-	12	12
175-199	-	-	23	23
200-224	-	-	23	23
225-249	-	-	25	25
250-274	-	-	22	22
275-299	-	-	11	11
300-324	-	-	2	2
325-349	1	-	3	4
350-374	2	1	-	3
375-399	-	-	2	2
400-424	-	-	1	1
425-449	-	1	-	1
450-474	2	-	-	2
475-499	1	-	-	1
500-524	2	1	-	3
525-549	4	8	-	12
550-574	8	21	-	29
575-599	15	38	-	53
600-624	10	36	-	46
625-649	19	34	-	53
650-674	19	16	-	35
675-699	9	7	-	16
700-724	6	3	-	9
725-749	<u>2</u>	<u>-</u>	<u>-</u>	<u>2</u>
Total	100	166	133	399
Length Range (mm)	335-746	373-720	82-422	82-746
Mean Length (mm)	618	609	224	483

Period III down-migrants totalled 151 (Table 16). A majority of these, 140, were juveniles (with a mean length of 265 mm). The mean down-migration occurred as the stream temperature approached freezing at the end of September. The stream was ice covered on October 1 and the weir was removed due to ice buildups. Whether or not the down-migration continued is unknown.

Table 16. Length Frequency, Down-migrant Rainbow Trout, Lower Talarik Creek Weir, September 1-October 1, 1974.

<u>Length (mm)</u>	<u>Maturing Males</u>	<u>Maturing Females</u>	<u>Juveniles</u>	<u>Total</u>
125-149	-	-	3	3
150-174	-	-	-	-
175-199	-	-	2	2
200-224	-	-	10	10
225-249	-	-	41	41
250-274	-	-	31	31
275-299	-	-	29	29
300-324	1	-	15	16
325-349	1	-	4	5
350-374	-	-	3	3
375-399	-	-	2	2
400-424	-	-	-	-
425-449	-	-	-	-
450-474	-	-	-	-
475-499	-	-	-	-
500-524	-	-	-	-
525-549	-	1	-	1
550-574	-	-	-	-
575-599	-	1	-	1
600-624	1	1	-	2
625-649	1	2	-	3
650-674	1	-	-	1
675-699	-	-	-	-
700-724	<u>1</u>	<u>-</u>	<u>-</u>	<u>1</u>
Total	6	5	140	151
Length Range (mm)	311-702	545-646	125-393	125-702

The daily high water temperatures during Period III appear in Table 17.

Table 17. Daily High Water Temperatures, Lower Talarik Creek, September 1-October 1, 1974.

<u>Date</u>	<u>Temp. °C</u>	<u>Date</u>	<u>Temp. °C</u>
9/ 1	12	9/21	10
9/ 2	14	9/22	11
9/ 3	14	9/23	11
9/ 4	14	9/24	11
9/ 5	15	9/25	10
9/ 6	14	9/26	10
9/ 7	13	9/27	10
9/ 8	11	9/28	8
9/ 9	14	9/29	7
9/10	12	9/30	5
9/11	11	10/ 1	1
9/12	12		
9/13	12		
9/14	11		
9/15	10		
9/16	12		
9/17	11		
9/18	11		
9/19	10		
9/20	11		

The length-age relationships for Period III fish are presented in Table 18. Referring to Tables 15, 16, and 18, it appears that a majority of juvenile migrants (both up and down) ranged in age from II-IV years while a majority of the maturing up-migrants ranged in age from VII-IX years. Age groups V and VI contributed very little to the intra-stream movement.

Table 18. Length-Age Frequency, Rainbow Trout, Lower Talarik Creek Weir, September 1-October 1, 1974.

Length (mm)	Age Group											Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	
100-124	1	-	-	-	-	-	-	-	-	-	-	1
125-149	2	7	-	-	-	-	-	-	-	-	-	9
150-174	1	6	3	-	-	-	-	-	-	-	-	10
175-199	2	13	5	-	-	-	-	-	-	-	-	20
200-224	-	11	21	-	-	-	-	-	-	-	-	32
225-249	-	13	44	3	-	-	-	-	-	-	-	60
250-274	-	-	33	14	-	-	-	-	-	-	-	47
275-299	-	-	15	18	-	-	-	-	-	-	-	33
300-324	-	-	4	11	1	-	-	-	-	-	-	16
325-349	-	-	2	4	2	-	-	-	-	-	-	8
350-374	-	-	1	2	2	-	-	-	-	-	-	5
375-399	-	-	-	-	2	2	-	-	-	-	-	4
400-424	-	-	-	-	1	-	-	-	-	-	-	1
425-449	-	-	-	-	-	1	-	-	-	-	-	1
450-474	-	-	-	1	-	-	1	-	-	-	-	2
475-499	-	-	-	-	-	-	-	-	-	-	-	-
500-524	-	-	-	-	-	-	3	-	-	-	-	3
525-549	-	-	-	-	-	3	5	2	-	-	-	10
550-574	-	-	-	-	-	4	18	4	1	-	-	27
575-599	-	-	-	-	-	5	24	13	1	-	-	43
600-624	-	-	-	-	-	2	11	14	8	-	-	35
625-649	-	-	-	-	-	-	13	27	6	-	-	46
650-674	-	-	-	-	-	-	4	15	10	2	-	31
675-699	-	-	-	-	-	-	-	3	7	1	-	11
700-724	-	-	-	-	-	-	-	2	5	-	-	7
725-749	-	-	-	-	-	-	-	-	-	-	1	1
Total	6	50	128	53	8	17	79	80	38	3	1	463
Length Range (mm)	123-190	125-249	163-369	233-465	322-422	388-624	472-663	547-716	553-720	670-692	740	123-740
Mean Length (mm)	160	195	246	293	369	546	590	627	655	679	-	420
% of Total	1.3	10.8	27.6	11.4	1.7	3.7	17.1	17.3	8.2	0.6	0.2	99.9
Mean Growth Increment (mm)		35	51	47	76	177	44	37	28	24	-	

The weight-age relationships of 460 Period III rainbow trout appear in Table 19. Weights ranged from 0.01-4.67 kg. It appears that the maximum rate of weight gain occurs in age groups IV-VI.

Table 19. Weight-Age Frequency, Rainbow Trout, Lower Talarik Creek Weir, September 1-October 1, 1974.

Weight (kg)	Age Group											Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	
0.00-0.24	6	50	105	19	-	-	-	-	-	-	-	180
0.25-0.49	-	-	19	32	3	-	-	-	-	-	-	54
0.50-0.74	-	-	1	2	4	2	-	-	-	-	-	9
0.75-0.99	-	-	-	-	1	-	-	-	-	-	-	1
1.00-1.24	-	-	-	-	-	1	1	-	-	-	-	2
1.25-1.49	-	-	-	-	-	-	1	-	-	-	-	1
1.50-1.74	-	-	-	-	-	-	1	1	-	-	-	2
1.75-1.99	-	-	-	-	-	4	6	1	1	-	-	12
2.00-2.24	-	-	-	-	-	4	14	5	-	-	-	23
2.25-2.49	-	-	-	-	-	1	14	9	-	-	-	24
2.50-2.74	-	-	-	-	-	3	20	7	4	-	-	34
2.75-2.99	-	-	-	-	-	1	8	20	4	-	-	33
3.00-3.24	-	-	-	-	-	-	7	9	8	-	-	24
3.25-3.49	-	-	-	-	-	1	2	12	3	-	-	18
3.50-3.74	-	-	-	-	-	-	5	9	6	1	-	21
3.75-3.99	-	-	-	-	-	-	-	4	3	2	-	9
4.00-4.24	-	-	-	-	-	-	-	2	5	-	-	7
4.25-4.49	-	-	-	-	-	-	-	-	-	-	-	-
4.50-4.74	-	-	-	-	-	-	-	1	4	-	1	6
4.75-4.99	-	-	-	-	-	-	-	-	-	-	-	-
Total	6	50	125	53	8	17	79	80	38	3	1	460
Weight Range (kg)	0.01-0.07	0.02-0.18	0.04-0.58	0.11-0.65	0.35-0.90	0.64-3.25	1.11-3.65	1.70-4.51	1.92-4.67	3.68-3.86	4.55	0.01-4.55
Mean Weight (kg)	0.04	0.08	0.18	0.30	0.59	2.05	2.52	3.00	3.44	3.78	-	1.41

A total of 90 tag recoveries occurred in the stream during Period III, 1974. All of these were tagged originally in Lower Talarik Creek as follows:

Tagged in spring as spawner, 1972	1
Tagged in spring as immature, 1972	1
Tagged in spring as spawner, 1973	5
Tagged in spring as immature, 1973	4
Tagged in fall as maturing, 1973	22
Tagged in fall as immature, 1973	11
Tagged in spring as spawner, 1974	21
Tagged during Period III as immature, 1974	20
Tagged during Period III as maturing, 1974	<u>5</u>
Total	90

These data indicate that spawners from at least three previous spawning seasons (spring of 1972, 1973, and 1974) returned to Lower Talarik Creek in the fall of 1974. The immatures tagged during 1972 and 1973 were maturing when they returned during Period III, 1974. None of the down-migrant immatures tagged during Periods I and II, 1974 returned as up-migrants.

Two small side channels located on the west side of the stream between the weir site and the confluence of the east and west forks were sampled during the first week of September to obtain a measure of the abundance of rearing juveniles. Electroshocking techniques were used. Sample areas were blocked off, measured, and shocked to determine the number of juvenile rainbow trout per square foot of bottom. Results obtained from the first channel were of little use as attempts to prevent immigration and emigration failed. However, the following day a large tank was used to hold all fish captured and fish were prevented by barriers from re-entering the second sample area during shocking. The second sample area covered approximately 1,500 square feet of stream bed and contained 130 juvenile rainbow trout for an approximate abundance of 0.09 per square foot (or one fish per every 11.5 square feet). These fish ranged in length from 39-263 mm. with a mean length of 118 mm. They ranged in age from young-of-the-year to age group IV fish. Of the juveniles ages, 11 were young-of-the-year fish with a mean length of 56 mm.

Sixty-two of the juveniles captured during the two days of electroshocking were sampled for stomach contents. The most abundant food items in the stomachs were sockeye salmon eggs (33 stomachs), coleoptera larvae, (16 stomachs), and maggots (9 stomachs). Other items found included stonefly nymphs, mayfly nymphs, chironomid larvae, caddis fly larvae, mosquitoes, and a couple of tiny spiders.

General Season Comments

A total of 1,628 rainbow trout were captured at the Lower Talarik Creek weir during 1974 (counting the recaptures each time they were passed). Of these, 1,281 were subsequently tagged.

Three hundred and forty-seven rainbow trout tagged originally at Lower Talarik Creek were recaptured during 1974. Of these, 18 (5.2%) were recaptured outside the stream at the following locations: Newhalen River (9), Kvichak River (6), Kokhanok Bay (2), and Gibraltar River (1).

The other 329 (94.8%) were recaptured back in the stream. Though a great majority of the recoveries were accomplished at Lower Talarik Creek, it should be mentioned that the recovery effort outside this stream was slight, thus biasing any conclusions regarding "homing" behavior. Recovery locations of rainbow trout tagged at Lower Talarik Creek (1969-1974) appear in Figure 2.

Of 1,614 rainbow trout tagged in the stream during 1972, 13 (0.1%) were recaptured in 1974. Two hundred and eleven (8.7%) of the 2,425 rainbow trout tagged during 1973 were recaptured in 1974, as were 122 (9.5%) of the 1,281 tagged during 1974. One recapture each of rainbow trout tagged in 1970 and 1971 also occurred.

A summary of the mean length by age group and time period for 1974 rainbow trout is presented in Table 20. From these data it appears that the maximum rate of growth occurs between the fourth and sixth years of life and that during this time a majority of these age groups are living somewhere other than in the stream itself.

Table 20. Mean Length by Age and Time Period, Rainbow Trout, Lower Talarik Creek, March 27-October 1, 1974.

Age Group	Period I		Period II		Period III	
	No. Aged	Mean Length (mm)	No. Aged	Mean Length (mm)	No. Aged	Mean Length (mm)
I	-	-	1	-	6	160
II	1	-	23	151	50	195
III	5	226	19	188	128	246
IV	32	282	14	271	53	293
V	35	340	-	-	8	369
VI	52	484	-	-	17	546
VII	164	554	2	-	79	590
VIII	257	603	3	560	80	627
IX	167	640	1	-	38	655
X	21	646	-	-	3	679
XI	3	661	-	-	1	-
Total	737	-	63	-	463	-

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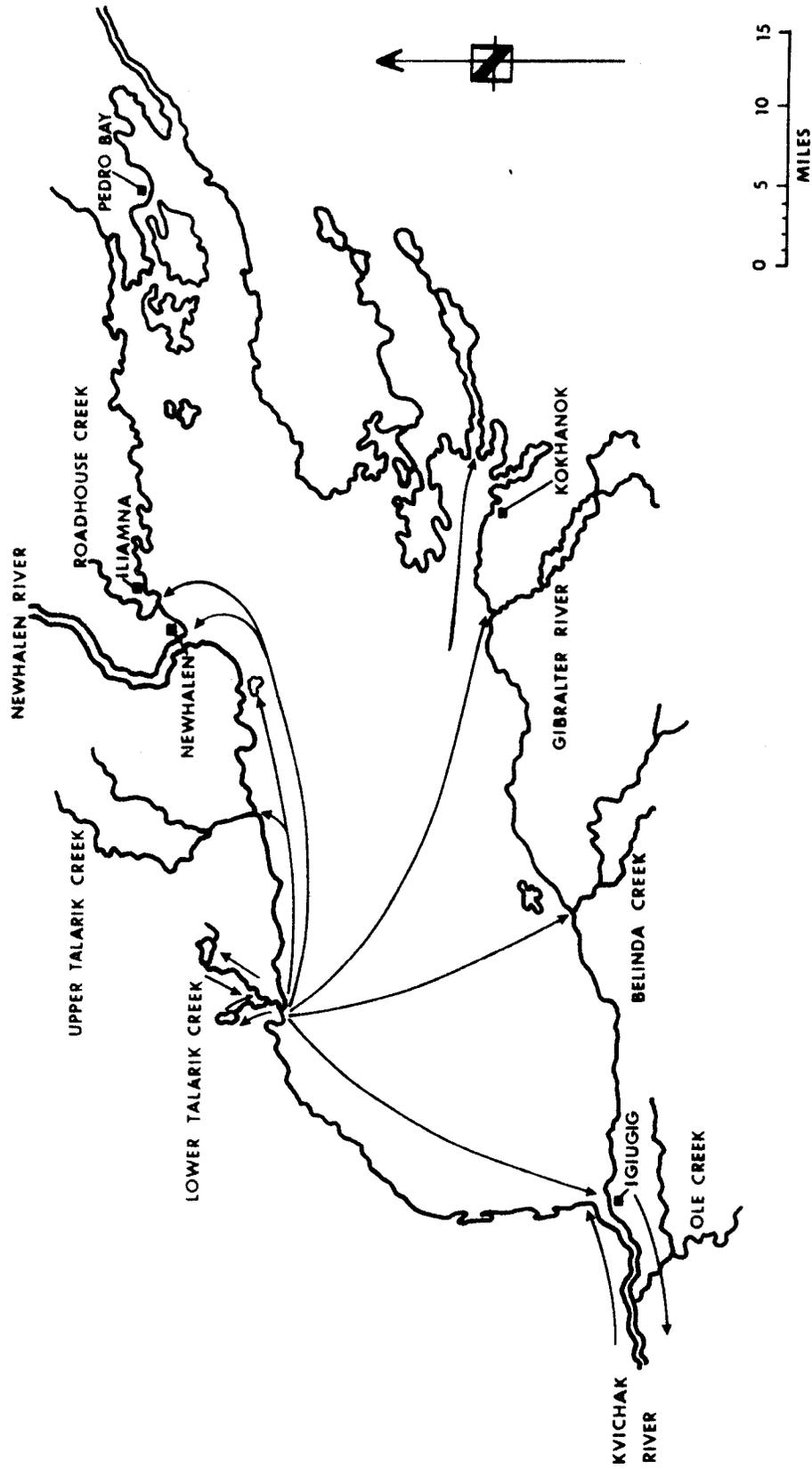


FIGURE 2. Recovery Locations of Rainbow Trout Tagged at Lower Talarik Creek: 1969-1974

The mean yearly growth increments by age for 104 rainbow trout tagged in 1973 and recaptured during 1974 (known growth) are presented in Table 21. Only the growth increments of fish recaptured 11-13 months after tagging are included in this table. It appears that the mean growth increments approximate fairly closely the growth increments obtained by scale analysis (Tables 8 and 18). One would expect the growth of these recaptured fish to be slightly less perhaps than that of fish previously untagged, due to any tagging-induced stress (this will be evaluated at a later date when more data become available).

Table 21. Mean Growth by Age Group, for Rainbow Trout Tagged During 1973 and Recaptured During 1974.

Age Group (1974)	No. Recaptured*	Mean Length at Tagging (mm)	Mean Length at Recapture (mm)	Mean Growth Increment (mm)
VII	11	503	582	79
VIII	41	559	607	48
IX	44	588	629	41
X	8	597	619	22
Total	104			

*Only recaptures occurring 11-13 months after the date of tagging are included.

Of the 80 fall up-migrants (1973) recaptured during Period I, 1974, lengths were obtained for 69. Comparison of the length change between fall and spring for these fish gives an indication of winter growth. These comparisons appear in Table 22. It appears that growth, during the period from early September to late June was minimal for these fish (age groups VII-X). The negative growth reported for one of the age groups is due either to minor measuring errors or to tail erosion occurring during spawning (all lengths are fork lengths).

Table 22. Overwinter Growth by Age, of Rainbow Trout Tagged During the Fall of 1973 and Recaptured During the Spring of 1974, Lower Talarik Creek.

Age Group (1974)	No. Recaptured*	Mean Length at Tagging (mm)	Mean Length at Recapture (mm)	Mean Growth Increment (mm)
VII	9	554	557	+3
VIII	36	598	599	+1
IX	21	642	645	+3
X	3	637	636	-1
Total	69			

*All fish considered in this table were tagged at the Lower Talarik Creek weir during September, 1973, and were recaptured in Lower Talarik Creek between March 27 and June 30, 1974.

Incidental Species

Several fish species, in addition to rainbow trout were captured and passed through the Lower Talarik Creek weir. Incidental fish passage by month (exclusive of sockeye salmon) is presented in Table 23. Sockeye salmon passage by day appears in Table 24.

Arctic grayling, Thymallus arcticus, migrated upstream to spawn during late April and early May. They spawned from the upper lagoon upstream, with many spawning between the weir site and confluence of the east and west forks. Peak of spawning occurred during the first ten days of May. Following spawning these fish apparently migrated on upstream and remained there until mid-September when they again appeared as down-migrants at the weir. Grayling fry were observed first in the upper lagoon on June 1.

Round whitefish, Prosopium cylindraceum, were only occasionally captured at the weir until September when a small out-migration occurred.

Arctic char/Dolly Varden, Salvelinus alpinus/malma, sporadically appeared at the weir. All were fairly small (150-400 mm) and only one, a late September down-migrant female, appeared to be mature.

Longnose sucker, Catostomus catostomus, were frequent visitors to the weir. Their abundance seems to have decreased somewhat during August and September. They spawned in large numbers in the channel between the upper lagoon and the stream outlet in late May.

Table 23. Fish Passage Totals by Month, Incidental Species, Lower Talarik Creek Weir, April 30-October 1, 1974.

Species	Months												Total			
	April		May		June		July		August		September		October		Up	Down
	Up	Down	Up	Down	Up	Down	Up	Down	Up	Down	Up	Down				
Arctic grayling	11	15	394	278	5	9	10	-	8	2	32	257	-	-	460	561
<u>Thymallus arcticus</u>																
Round whitefish	-	-	10	1	-	2	1	3	2	3	13	110	-	-	26	119
<u>Prosopium cylindraceum</u>																
Dolly Varden/Arctic char	-	-	13	2	6	-	83	12	32	-	48	2	-	-	182	16
<u>Salvelinus malma/alpinus</u>																
Pink salmon	-	-	-	-	-	-	-	-	3	-	-	-	-	-	3	-
<u>Oncorhynchus gorbuscha</u>																
Chum salmon	-	-	-	-	-	-	-	-	5	-	1	-	-	-	6	-
<u>Oncorhynchus keta</u>																
Coho salmon	-	-	-	-	-	-	-	-	6	-	7	-	-	-	13	-
<u>Oncorhynchus kisutch</u>																
Northern pike	-	-	2	5	1	-	-	-	-	1	1	-	-	-	4	6
<u>Esox lucius</u>																
Longnose sucker	-	-	1,258	1,036	396	285	604	1	55	-	70	52	-	-	2,383	1,374
<u>Catostomus catostomus</u>																

Table 24. Red Salmon Passage, Lower Talarik Creek Weir, 1974.

Date	No.	Date	No.	Date	No.
6/30	1	7/30	6,531	8/29	367
7/ 1	-	7/31	6,353	8/30	258
7/ 2	-	8/ 1	8,887	8/31	115
7/ 3	-	8/ 2	9,277	9/ 1	139
7/ 4	905	8/ 3	2,414	9/ 2	86
7/ 5	6,312	8/ 4	8,076	9/ 3	63
7/ 6	1,383	8/ 5	22,939	9/ 4	53
7/ 7	961	8/ 6	12,878	9/ 5	44
7/ 8	8,092	8/ 7	10,139	9/ 6	27
7/ 9	12,320	8/ 8	13,198	9/ 7	13
7/10	5,229	8/ 9	9,237	9/ 8	25
7/11	9,625	8/10	5,251	9/ 9	8
7/12	31,865	8/11	3,301	9/10	14
7/13	8,671	8/12	1,451	9/11	9
7/14	6,725	8/13	1,467	9/12	6
7/15	10,727	8/14	1,890	9/13	3
7/16	9,227	8/15	1,476	9/14	6
7/17	5,759	8/16	5,196	9/15	7
7/18	6,460	8/17	3,754	9/16	2
7/19	4,579	8/18	2,322	9/17	5
7/20	4,251	8/19	3,175	9/18	2
7/21	5,247*	8/20	2,562	9/19	-
7/22	5,247*	8/21	4,185	9/20	2
7/23	5,247*	8/22	4,382	9/21	-
7/24	5,247*	8/23	4,184	9/22	1
7/25	5,247*	8/24	1,756	9/23	-
7/26	5,247*	8/25	1,732	9/24	1
7/27	863	8/26	1,149	9/25	-
7/28	585	8/27	382	9/26	1
7/29	7,866	8/28	563		
				Total Weir	335,252

Estimate 20,000 spawned below weir.

Total stream estimate - 350,000-360,000.

*Weir out for six days, so totalled the five preceding and five succeeding days and applied this 10-day average to the six open days.

An estimated 335,252 adult sockeye salmon up-migrants were passed through the weir in 1974. The peak of spawning occurred in mid-August. Spawning was essentially over by late September.

Other species observed at the weir included coho salmon, Oncorhynchus kisutch, pink salmon, O. gorbuscha, chum salmon, O. keta, pond smelt, Hypomesus olidus, northern pike, Esox lucius, three-spine sticklebacks, Gasterosteus aculeatus, sculpins, Cottus sp., and lampreys, Lampetra sp..

Creel Census

The sport fishing season in the Bristol Bay Trophy Fish area opened June 11. Anglers visiting Lower Talarik Creek were interviewed to determine creel data. Creel census totals by month appear in Table 25. Angler success was greatest during September. The early spring spawning peak and subsequent out-migration contributed to lower than anticipated success and effort in June. Sport anglers caught an estimated 500 rainbow trout and retained an estimated 73 during the June 11-October 3 sample period. No estimate of angling effort and catch was obtained for the winter ice fishing (this fishery closes April 15).

Table 25. Creel Census Totals by Month, Lower Talarik Creek, June 11-October 5, 1974.

	Months				Season's Total	
	June	July	August	September		October
Total angler days observed	12	19	12	215	1	259
Total angler days checked	12	19	12	203	1	247
% angler days checked	100.0	100.0	100.0	94.4	100.0	95.4
Angler hours expended (observed)	29.0	58.0	35.0	866.5	1.0	989.5
Angler hours expended (expanded)	29.0	58.0	35.0	918.0	1.0	1,041.0
No. rainbow trout caught (observed)	9	25	13	428	0	475
No. rainbow trout caught (expanded)	9	25	13	453	0	500
Rainbow trout catch/hour*	0.31	0.43	0.31	0.49	0	0.48
Rainbow trout retained (observed)	0	1	11	58	0	70
Rainbow trout retained (expanded)	0	1	11	61	0	73
Rainbow trout retained/caught	0	1/25	1/1.2	1/7.4	0	1/6.5

*Computed using expanded figures.

A summary of the effectiveness of various gear types used in the Lower Talarik Creek summer and fall sport fishery is presented in Table 26.

Table 26. Comparative Effectiveness of Terminal Gear Used by Anglers, Lower Talarik Creek, June 11-October 3, 1974.

<u>Angler Effort and Catch</u>	<u>Flies</u>	<u>Lures</u>	<u>Other*</u>	<u>Total</u>
Total angler hours	544.5	322.0	124.0	989.5
Total rainbow trout caught	270	147	58	475
Rainbow trout catch/hour	0.49	0.46	0.47	0.48
Total rainbow trout retained	33	33	4	70
Rainbow trout retained/hour	0.06	0.10	0.03	0.07

*Some anglers used both flies and lures during a single day and separate results for each gear type were not identifiable. The category "other" is used to describe the catch and effort for these anglers.

Only unbaited artificial lures are considered legal gear in the Bristol Bay Trophy Fish Area (including Lower Talarik Creek) from the opening day of the summer sport fishing season (June 11) through October 31 (bait is legal gear during the winter through-the-ice fishery). Data for 1974 do not indicate any significant difference in catch per hour between anglers using single hook lures and anglers using flies during the summer and fall sport fisheries.

DISCUSSION

The Lower Talarik Creek weir again proved an effective means for capturing migrating rainbow trout during the period when the stream was ice-free. However, for the second year in succession, stream ice conditions prevented assembling the weir early enough in the spring to capture a majority of the up-migrant spawners. In addition, due to its location upstream, the weir does not necessarily capture all fish entering or leaving Lower Talarik Creek. It was particularly frustrating this past fall (Period III) to have several hundred large, maturing rainbow trout "holding" several hundred yards below the weir. Although approximately 275 of these did eventually enter the fyke trap at the weir an equal number probably did not.

The tagging program, implemented originally to gather data on intra- and inter-stream migration, age, growth rates, sex ratios, age at maturity, frequency of spawning, and other aspects of the life history of Lower Talarik Creek rainbow trout, has been moderately successful. An adequate return of tagged older age rainbow trout has been obtained through weir operation.

Information collected on growth and age from these fish has provided data against which non-tagged specimens can be compared. However, the tagging of juvenile rainbow trout has failed to yield much valuable data, as very few have been recaptured. Whether this is due to tag loss, mortality, or some other factor is unknown. Thus, information concerning the amount of time these fish spend in the stream environment, their movement patterns outside the stream within Lake Iliamna, and factors influencing their growth (especially during their fourth to sixth years of life), etc., are still unknown.

As scale samples were removed from tagged rainbow trout each time they were recaptured, the subsequent analysis of these scales yielded information on the accuracy of previous aging. Unfortunately, based on tag recovery information and selected otolith examination, it appears that the 1973 Lower Talarik Creek rainbow trout scales were incorrectly interpreted. Selected scales (from tag recoveries) have been re-read and, in nearly all cases, they were read one year less than in 1973. As more tagged fish are recaptured during the next year or two, the reliability of age readings from scales will improve. The 1973 scales will be re-read during 1975. Comparisons of age and growth between 1973 and 1974 rainbow trout samples must be postponed pending the re-interpretation of these scales.

Comparisons of 1974 fish passage totals with those of 1973 (Russell, 1973) indicate 1,232 fewer rainbow trout passed through the weir during 1974 (2,890 to 1,628). There could be several reasons for this decrease. First, the 1973 sockeye salmon run entering Lake Iliamna (and Lower Talarik Creek) was the smallest on record. The 1974 Lower Talarik Creek sockeye salmon up-migration alone was approximately 100,000 fish greater in magnitude than the entire run (approximately 240,000 fish) entering Lake Iliamna during 1973. Thus, there may have been a shortage of food present for species that prey upon salmon eggs, fry, and decaying carcasses as rainbow trout are known to do. Secondly, the 1974 water levels in all the Lake Iliamna tributaries were lower than have been observed in many years. With low flows, the stream water temperatures were higher in 1974 than during 1973, reaching 22°C on one occasion and with daily highs ranging between 18°-21°C for a large portion of the summer. This combination of low flows and high stream temperatures may have discouraged movement in the lower reaches of the stream. A third alternative that must be considered is that the large scale capture and handling of rainbow trout at the weir may be contributing to a decrease in numbers. This will be investigated.

Although the number of rainbow trout captured at the weir was smaller in 1974 than in 1973, the number of spawners observed in the stream in 1974 was the largest since surveys were initiated in 1971.

Angler use (Table 27) dropped between 1973 and 1974 and the trend, since 1971, toward decreasing sport fishing activity continued. Factors that may be responsible for this decline in sport fishing activity include: a lower catch per angler hour in recent years, the presence of the weir structure (constructed during 1972) and its crew of operators, the recent economic uncertainty, an increase in emphasis by concessioners on Nushagak River and Wood River drainage sport fisheries, and changes in the angling regulations

(especially a restriction placed on bait fishing) in the Bristol Bay Trophy Fish area of which Lower Talarik Creek is a part. It is felt that at present use levels, the sport angler is not significantly affecting the population structure of Lower Talarik Creek rainbow trout.

Table 27. Comparative Expanded Seasons' Creel Census Data Collected for the Years 1971-1974.

Year	Angler Days		Hours	Rainbow Trout Catch	Catch/Angler Hour	Rainbow Trout Retained
	Observed	Checked				
1971	587	414	2,314	2,045	0.88	388
1972	316	245	1,652	760	0.46	143
1973	381	226	1,563	964	0.62	126
1974	259	247	1,041	500	0.48	73

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