

## RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations  
of Alaska.

Project No.: F-9-7

Study No.: G-1 Study Title: INVENTORY AND CATALOGING

Job No.: G-1-E Job Title: Inventory and Cataloging of  
the Sport Fish and Sport Fish  
Waters of the Bristol Bay Area.

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

## ABSTRACT

King salmon, Oncorhynchus tshawytscha, catches by commercial, subsistence, and sport fisherman are presented for 1969-1974 for the Naknek River. King salmon escapement estimates are presented for the Naknek and Branch river systems.

Creel census data collected on the Newhalen River throughout the 1974 summer season is presented. Information collected includes numbers of angler hours, numbers of rainbow trout, Salmo gairdner, caught and kept, numbers of resident and nonresident anglers, and catch by gear type. Rainbow trout were also tagged in the Newhalen River and a limited number of tags were recovered.

Summaries of surveys made on Gibraltar and Tazimina rivers are included and spring rainbow spawning surveys are summarized.

## RECOMMENDATIONS

1. Conduct a creel census program at Igiugig on the Kvichak River.
2. Enumerate rainbow trout spawning stocks in Brooks and Naknek rivers and selected streams in the Iliamna drainage.

3. Develop a voluntary creel census program with guides and resident fishermen utilizing the Bristol Bay area.
4. Conduct a creel census program on king salmon in the Naknek River and Arctic char in the Wood River system.
5. Enumerate king salmon spawning stocks in the Naknek and Branch rivers and their tributaries.
6. Provide management recommendations for sport fishing resources in these waters and direction for future studies.
7. Discontinue any attempt to evaluate king salmon strength based on commercial or subsistence caught fish.

### OBJECTIVES

1. To determine environmental characteristics of existing or potential recreational fishing waters in the job area and obtain angler use and sport fish harvest estimates with emphasis on Newhalen River system.
2. To enumerate rainbow trout spawning stocks in Brooks, Copper, and Naknek rivers, as well as in Gibraltar and Newhalen rivers and their tributaries.
3. To enumerate king salmon spawning stocks in the Naknek and Branch rivers and their tributaries.
4. To assess commercial and recreational utilization of both freshwater and anadromous fish stocks, and determine the respective impacts upon the fish species concerned.
5. To provide management recommendations for sport fishing resources in these waters and direction for future studies.

### TECHNIQUES USED

King salmon and rainbow trout in the Naknek and Branch rivers were aerially estimated. Spawning ground counts for rainbow trout on smaller systems were obtained by walking along the banks and observing fish.

Rainbow trout were captured by hook and line. Sampling consisted of fork lengths of each fish to the nearest millimeter, removing scales for age determination, sexing the fish and finally tagging the trout if it was over 300 mm and appeared in healthy shape. Numbered FD-67 internal anchor tags (Floy Tag Company) were inserted into the dorsal body musculature in such a manner that the anchor section of the tag lodged between consecutive pterygiophores. Green tags were used on fish tagged in Gibraltar River, blue tags were used in Copper River, and gray tags were used in the Newhalen River.

Scales collected from the Newhalen and Gibraltar rivers are being mounted on numbered gum cards and may be analyzed at a future date.

The types of gear used by sport fishermen were identified and success of anglers 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, plugs, and artificial bait).

Expansion of actual creel census data into total "estimated angler harvest and use" was accomplished by following a ratio proportion formula:

Angler Use:  $\frac{\text{Anglers checked}}{\text{Angler hrs. checked}} = \frac{\text{Anglers observed}}{\text{Unknown (total angler hrs.)}}$

Angler Harvest:  $\frac{\text{Anglers checked}}{\text{Rainbow checked}} = \frac{\text{Anglers observed}}{\text{Unknown (total rainbow harvest)}}$

## FINDINGS

### Naknek and Alagnak River King Salmon

The 1974 recreational king salmon, Oncorhynchus tshawytscha, harvest from the Naknek River is estimated to be between 1,200 and 2,000 fish with a point estimate of 1,700 fish. These estimates are based on the voluntary military creel census forms completed daily by military anglers. An additional 650 kings were added to the catch estimate of 1,042 military caught kings to represent civilian caught salmon not reported on the voluntary creel census forms. The harvest of all species of fish, reported on the military creel census forms, is presented in Table 1 by weekly time periods.

Table 1. A Summary of Military Sport Caught Fish in the Naknek River, 1974, based on the Voluntary Military Creel Census Program.

Time Period	No. Fishermen	No. Hours.	Rainbow Trout	Grayling	Dolly Varden	Silver Salmon	King Salmon	Pink Salmon	Red Salmon	Chum Salmon	Northern Pike	Lake Trout
4/1-6/1	6	39	2	1	-	-	-	-	-	-	-	-
6/2-6/8	65	525	34	21	1	-	-	-	-	-	21	2
6/9-6/15	193	1,304	123	144	-	1	43	-	-	-	43	1
6/16-6/22	352	3,021	80	96	-	1	175	-	12	-	2	3
6/23-6/29	387	3,189	27	12	-	5	257	-	-	-	7	-
6/30-7/6	407	3,627	28	6	4	4	275	4	305	8	10	-
7/7-7/13	372	2,144	17	-	4	-	214	1	602	15	8	-
7/14-7/20	127	763	-	21	-	4	73	-	258	-	2	-
7/21-7/27	6	15	-	-	-	-	5	-	10	-	-	-
7/28-8/3	-	-	-	-	-	-	-	-	-	-	-	-
8/4-end												
<b>Totals</b>	<b>1,915</b>	<b>14,627</b>	<b>311</b>	<b>301</b>	<b>9</b>	<b>15</b>	<b>1,042</b>	<b>5</b>	<b>1,187</b>	<b>23</b>	<b>93</b>	<b>6</b>

Commercial and subsistence harvests of king salmon are presented in Tables 2 and 3. Since it is impossible to determine the numbers of commercially caught kings destined for either the Naknek or the Kvichak systems, the entire reported harvest for the Naknek-Kvichak district is presented in Table 2 as an index to the health of both river stocks. This concept has its drawbacks, however, since nothing is known about migrational routes or year class strength of these king salmon and little is known about migrational timing of king salmon. Finally, a significant number of king salmon taken in the commercial fishery are never reported but retained by the fishermen for a salted home pack. The number of days fishing permitted during the emergency order period is also presented in Table 2 and may help to explain the lower harvests during 1973 and 1974. Table 3 presents estimates of the sport harvest, aerial escapements counts, and total annual king salmon run between 1969 and the present. This year's run of 5,200 is not apparently different from any run since 1969 when one considers the inaccuracies involved in estimating any of these parameters.

Table 2. Commercial Harvest of King Salmon, and Fishing Time Allowed, in the Naknek-Kvichak District\*, 1969-1974.

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<u>Year</u>	<u>No. King Salmon Reported</u>	<u>No. Days of Fishing During Emergency Order Period 6/23-7/17</u>
1969	19,016	17.2
1970	18,488	14.0
1971	10,254	16.9
1972	2,126	3.0
1973	867	1.0
1974	506	13.9**

\* The Naknek-Kvichak district is defined in the 1974 Alaska Commercial Fishing Regulations as:

- (b) Naknek-Kvichak district: Kvichak Bay north of a line extending in a northwesterly direction from a marker near the mouth of Johnson Hill Creek at 58° 37' 09" N. lat., 157° 15' 18" W. long., to a marker on the opposite shore of Kvichak Bay at 58° 43' 43" N. lat., 157° 42' 36" W. long.

\*\*Naknek section only - Kvichak closed.

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Table 3. Estimated Catch and Escapements of King Salmon in the Naknek River System, 1969-1974.

Year	Estimated Sports Catch	Estimated Subsistence Harvest	Estimated* Escapement	Estimated Total Run*
1969	4,631	400	8,799	13,830
1970	2,730	300	4,360	7,390
1971	3,500	200	2,866	6,566
1972	1,668	400	2,791	4,859
1973	1,000	600	2,536	4,136
1974	2,700	900	2,600	5,200

\* Includes all tributary streams surveyed.

\*\*Excludes commercial harvest.

#### Alagnak (Branch River) King Salmon

King salmon escapements into the Alagnak River, a major tributary of the Kvichak River, have been aerially estimated since 1969 (Table 4). The estimate of 1,600-1,800 king salmon in 1974 was two times the estimate of 1973, but below the average estimate since 1969.

Table 4. Aerial King Salmon Escapement Estimates for the Alagnak (Branch) River, 1968-1974, Made During Peak Spawning Periods.

Year	Estimated Escapement
1968	7,000-10,000
1969	5,000- 7,000
1970	4,600- 5,300
1971	1,400- 1,500
1972	2,200- 2,500
1973	825- 1,250
1974	1,600- 1,800

#### Rainbow Trout, Newhalen River

The Newhalen River is a major tributary to Lake Iliamna flowing from Lake Clark into Iliamna on the north shore. The mouth is approximately five miles west of the town of Iliamna. The river is 25 miles long and averages 250 feet wide and 12 feet deep. Mean annual discharge (1951-1968) was 9,303 cfs with a range of 1,000-36,000 cfs. Three rapids in the lower river present partial blockage at most water levels to fish and total blockage to fishermen traveling the river by boat upstream from Lake Iliamna. The first block upstream is approximately two miles upstream from Lake Iliamna. Rainbow

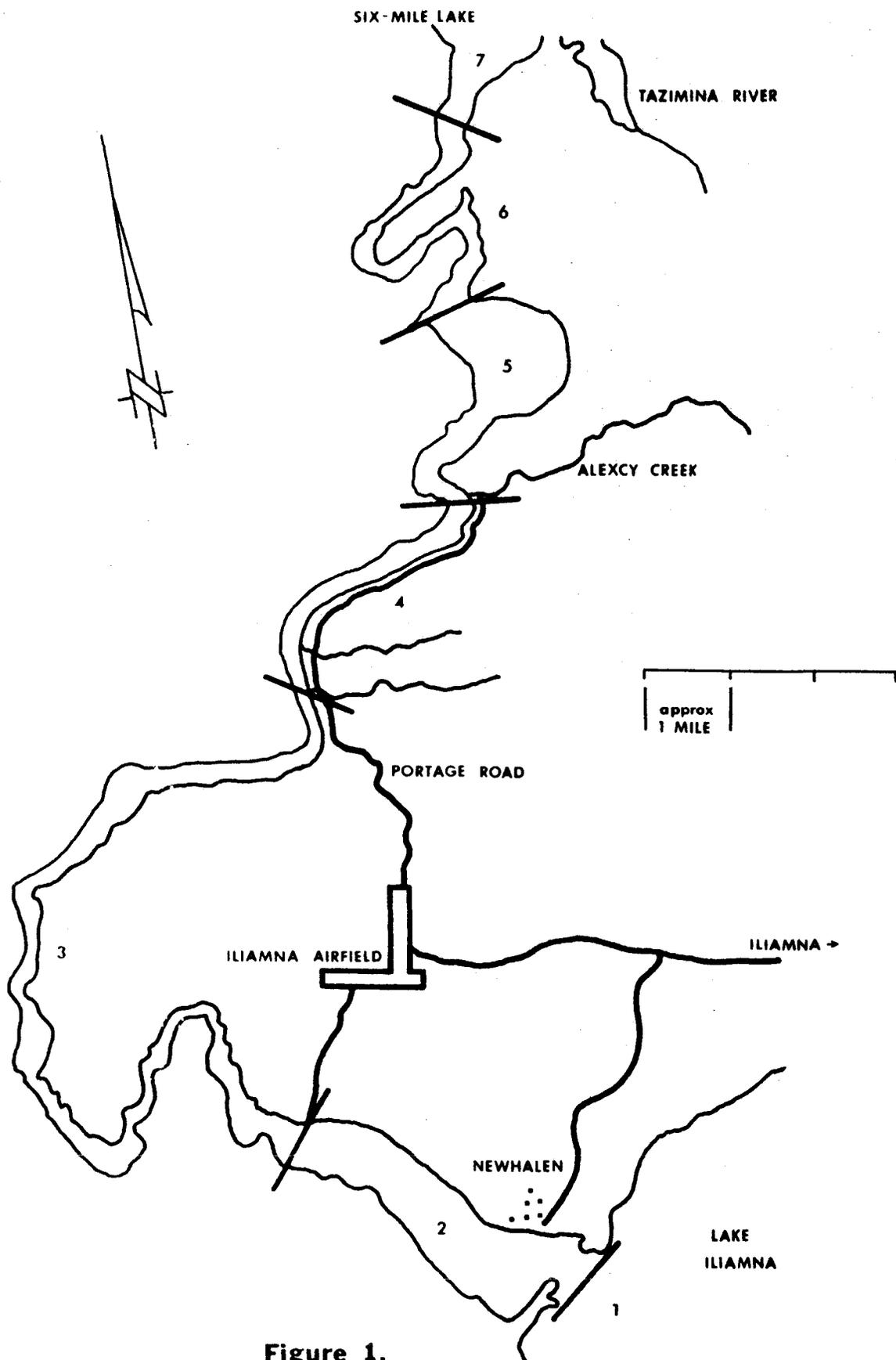


Figure 1.

Newhalen River with section boundaries

trout fishing occurs in this lower two miles throughout the summer from both the shore and from boats by trolling or casting. Figure 1 presents a map of the river.

During the summer, 1974, a creel census program was conducted on the Newhalen River and surrounding waters. Angler information collected included number of residents and nonresidents fishing, and the type of gear utilized. Estimates of total fishing hours, rainbow trout catch and success by gear were made. Table 5 presents the results of the creel census on rainbow trout in the Newhalen by month. The total catch of rainbow trout by anglers is estimated at 204 fish with 72 of these retained. Two hundred thirty-one angler days were spent by residents and 199 days by nonresidents. Success was nearly equal between lure and fly fishermen with the rainbow trout catch per hour at 0.10 for lures and 0.09 for flies. Compared to data collected by Siedelman (1974) and Russell (1975) on Lower Talarik Creek and Copper River, this catch per hour is significantly lower.

Table 5. Rainbow Trout Census Information Collected from the Newhalen River Between June 11-September 30, 1974.

	Months				Totals
	June	July	August	September	
Anglers Observed	125	161	117	44	447
Anglers Checked	125	155	112	40	432
Angler Hours Observed	591	554	410	137	1,692
Rainbows Caught	72	47	25	37	181
Rainbows Kept	26	19	9	11	65
<u>Expanded Information</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>Totals</u>
Total Angler Days	125	166	140	55	486
Total Hours	591	593	513	188	1,885
Total Rainbow Catch	72	50	31	51	204
Total Rainbows Kept	26	20	11	15	72
Catch/hour	0.1	0.1	0.1	0.3	0.1

In addition to collecting creel census information from the Newhalen River, hook and line sampling for rainbow trout was conducted nearly every day. Rainbows captured by hook and line were measured for fork length, sexed if possible, and tagged with numbered FD-67 gray Floy tags. Several scales were taken from each fish for age analysis. A length frequency of rainbow trout captured from the Newhalen River is presented in Table 6 for the whole season. There is, however, a size difference by month which is masked by this summary. Means and standard deviations by month for fish caught on hook and line are as follows:

	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>
Mean + Standard Deviation in mm	475-+134	399-+121	392-+134	421-+129
Sample Size	47	93	67	127

Table 6. Length Frequencies of Rainbow Trout Captured with Hook and Line From Several Streams During 1974 in the Iliamna Area.

<u>Fork Length (mm)</u>	<u>Newhalen River</u>	<u>Tazimina River</u>	<u>Gibraltar River</u>	<u>Copper River</u>
Less than 125	-	2	-	-
125-149	2	1	-	-
150-174	2	11	-	-
175-199	8	14	-	-
200-224	11	16	2	2
225-249	17	7	-	2
250-274	25	12	9	2
275-299	16	6	10	2
300-324	17	5	8	3
325-349	10	4	16	1
350-374	17	-	11	-
375-399	18	-	18	-
400-424	17	1	16	1
425-449	19	1	17	1
450-474	23	-	14	-
475-499	30	-	8	1
500-524	24	-	4	1
525-549	19	-	2	1
550-574	18	-	-	3
575-599	10	-	-	1
600 and larger	17	-	1	1

It is further recognized that sampling for length or age data with hook and line can introduce biases not common to more random methods; however, no other sampling methods appear feasible in this area at this time.

One hundred ninety-three rainbow trout were tagged in the Newhalen River in 1974. Most rainbows tagged were over 300 mm in fork length and were considered to be in good condition.

Tag recoveries were also made in the Newhalen (Table 7). In June and early July, nine rainbows were recovered that had been tagged at the weir on Lower Talarik Creek. One recovery was made from a rainbow tagged in Copper River and 10 were recovered in July and August that were tagged earlier in the Newhalen River. No tag recoveries were made in September; however, there

were more big fish available during September than either July or August. One tag recovery in October from a subsistence fisherman at Chekok Point (near Knutson Bay) was the only Newhalen tagged rainbow returned from another area.

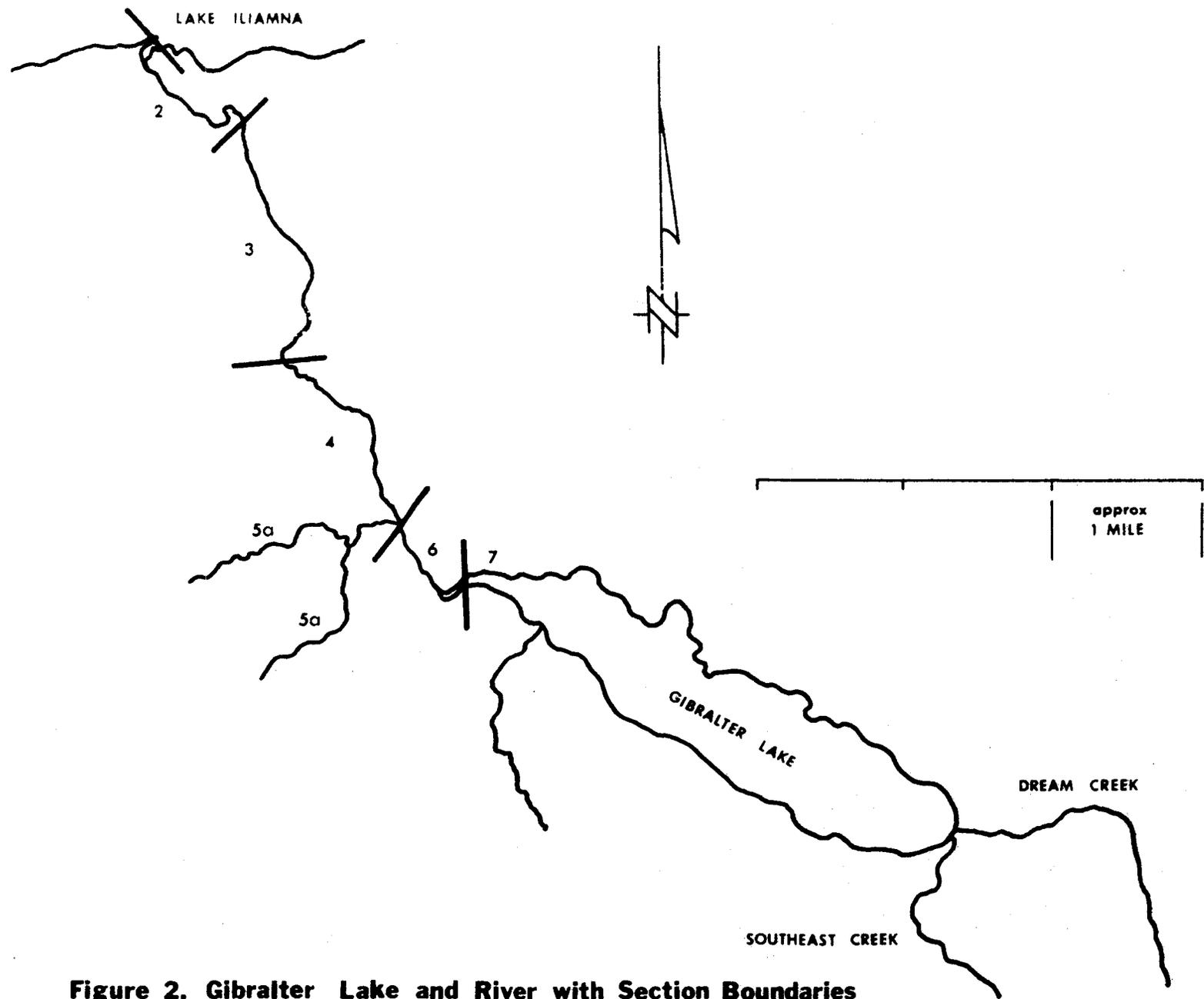
Table 7. Rainbow Trout Tag Recoveries Made in the Newhalen River During 1974.

Recovery Information				Release Information	
Date	Tag No.	Tag Color	Recovery Section*	Date Tagged	Release Location
6/16	13777	Brown	2	9/14/73	Lower Talarik Creek
6/18	10230	Brown	2	8/18/72	Lower Talarik Creek
6/22	14438	Brown	1	5/31/74	Lower Talarik Creek
6/25	13823	Brown	2	9/15/73	Lower Talarik Creek
6/29	14135	Brown	2	5/13/74	Lower Talarik Creek
7/ 3	14325	Brown	2	5/26/74	Lower Talarik Creek
7/ 9	14577	Brown	1	6/ 5/74	Lower Talarik Creek
7/10	95037	Gray	7	6/24/74	Sec. 4, Newhalen
7/11	11152	Brown	2	5/ 6/73	Lower Talarik Creek
7/11	14598	Brown	2	6/ 6/74	Lower Talarik Creek
7/22	11368	Blue	2	9/20/73	Copper River
7/28	95074	Gray	2	7/24/74	Sec. 2, Newhalen
7/30	95068	Gray	2	7/23/74	Sec. 2, Newhalen
8/ 2	95075	Gray	2	7/24/74	Sec. 2, Newhalen
8/ 3	95056	Gray	2	7/ 9/74	Sec. 1, Newhalen
8/ 3	95099	Gray	2	8/ 2/74	Sec. 2, Newhalen
8/ 3	95069	Gray	2	7/23/74	Sec. 2, Newhalen
8/10	95108	Gray	2	8/ 4/74	Sec. 2, Newhalen
8/14	95091	Gray	2	7/28/74	Sec. 2, Newhalen
8/14	95075	Gray	2	7/24/74	Sec. 2, Newhalen
10/19	95208	Gray	Chekok Point (near Knutson Bay)	9/19/74	Sec. 2, Newhalen

\*See Figure 1.

### Gibraltar River

Two surveys of Gibraltar River were conducted in August and September, 1974. Gibraltar River is approximately seven miles long, originating at Gibraltar Lake and draining north into Lake Iliamna (Figure 2). Each survey consisted of pulling a boat from Gibraltar Lake to Lake Iliamna, fishing with hook and line, measuring, sexing, collecting scales, and tagging each rainbow trout captured (tags were only used on fish over 300 mm). The first survey lasted three and one-half days (August 20-23), and the second last five days (September 21-25). A length frequency of fish caught is included in Table 6. Number of fish caught, their average fork lengths, and standard deviations by trip are as follows:



**Figure 2. Gibraltar Lake and River with Section Boundaries**

August 20-23

September 21-25

Mean & Standard Deviation  
(mm)

375-+ 78

396-+71

Sample Size

61

75

Sockeye salmon, O. nerka, were very abundant during the August survey and still present in fair numbers in September. Larger rainbow trout were encountered as we neared Lake Iliamna on both occasions. Tags recovered in Gibraltar River are listed in Table 8. It is apparent that there is some movement of fish between Dream Creek and Gibraltar River through Gibraltar Lake. Also, one fish tagged previously in Copper River was recovered in Gibraltar River.

Table 8. Rainbow Trout Tag Recoveries Made in Gibraltar River During 1974.

Recovery Information				Release Information	
Date	Tag No.	Tag Color	Recovery Section*	Date Tagged	Release Location
6/15	12928	Blue	7	6/ 6/73	Sec. 3, Copper River
6/18	7129	Green	10	6/12/73	Sec. 12, Dream Creek
6/30	7235	Green	9	Unable to locate	
8/?	7247	Green	L. Iliamna**	6/13/73	Sec. 13, Dream Creek
8/?	7398	Green	L. Iliamna**	9/25/73	Sec. 2, Gibraltar R.
9/22	7120	Green	7	6/11/73	Sec. 12, Dream Creek
9/25	7402	Green	2	9/25/73	Sec. 2, Gibraltar R.
9/ 6	7462	Green	Gibraltar R.	8/22/74	Sec. 3, Gibraltar R.
9/22	12325	Blue	6***	10/ 3/71	Sec. 3, Gibraltar R.

\* See Figure 2.

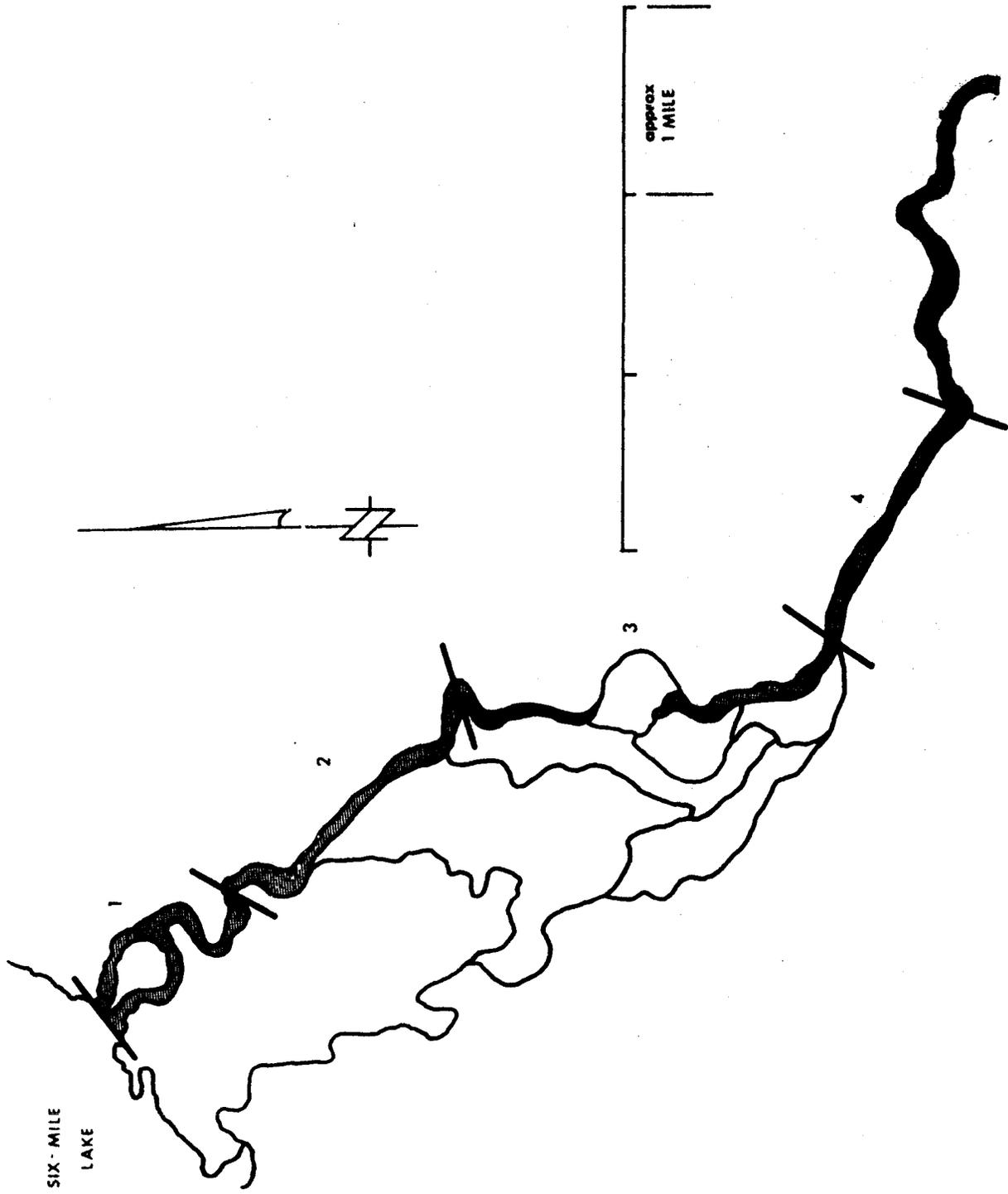
\*\* Caught in subsistence net in front of Kokhanok village.

\*\*\*Found on dry bar in Little Gibraltar River.

### Tazimina River

Tazimina River is a tributary of Six-mile Lake in the Newhalen River drainage. It is 54 miles long, with an impassable falls nine miles from its mouth. It averages 150 feet wide and 2 feet deep with a normal summer flow of about 1,400 cfs. Figure 3 presents a map of the lower six miles.

Tazimina River was surveyed on foot on three occasions in 1974. Sampling was done by hook and line and the usual data collected. Table 6 includes a length frequency of rainbows caught. Twenty-five rainbows were tagged in the Tazimina River over 280 mm each. No tag recoveries were made in 1974.



**Figure 3. Tazimina River with Section Boundaries**

### Spring Spawning Ground Surveys

Rainbow trout spawning surveys were conducted on several streams within the area. Table 9 presents a summary of peak rainbow counts for these streams by date. All surveys listed in Table 9 were foot surveys. Compared to last year's surveys (Siedelman, 1974), the Brooks River spawning run was slightly larger and the Dream Creek run was smaller than in 1973. This was the first year that Roadhouse, Alexcy, Pete Andrew, or Zackar Creek have been surveyed.

Rainbow trout counted in the Copper River for the past three years are presented in Table 10. Figure 4 presents a graphic view of the river by section. Because of the low counts in both 1973 and 1974, a news release was issued and letters were sent to fishing guides and air taxi operators utilizing Copper River encouraging them to utilize other streams in the Trophy Fish Area. Anglers who fished the Copper River were encouraged to carefully handle and release all trout which they did not intend to keep. Based on reports from guides living on Copper River, the requests were successful and the harvest of rainbows was minimal.

### Aerial Surveys

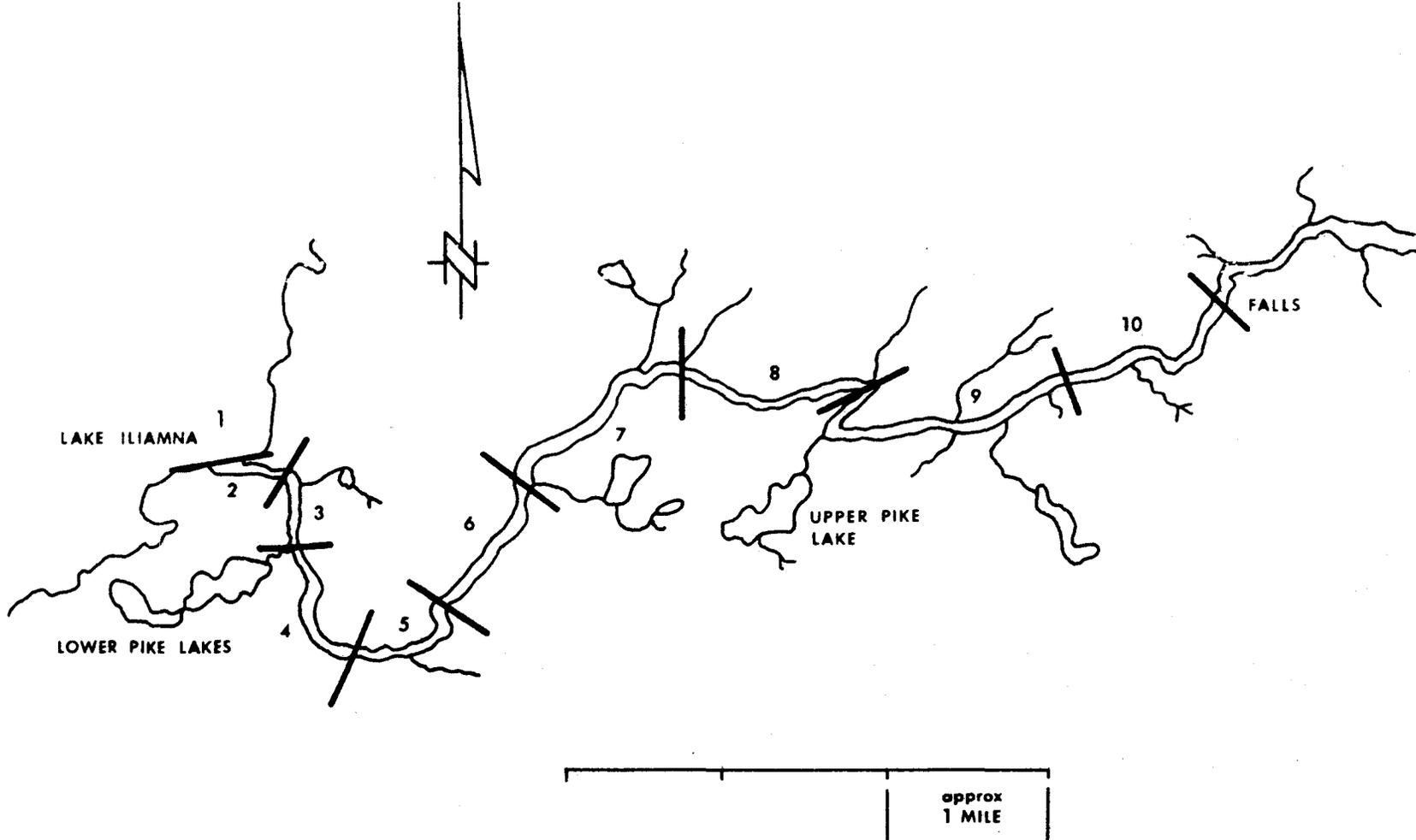
The Naknek River was surveyed from the air several times during 1974. The spawning peak was established on May 1 when approximately 150 rainbow trout were observed.

The Ugashik Lake system was aerial surveyed on May 17 for spawning Arctic grayling. Grayling were observed spawning in Crooked and Deer creeks on Upper Ugashik Lake. No fish were observed in the Upper Ugashik Creek area.

On Lower Ugashik Lake, spawning grayling were observed in the first creek west of Ugashik Narrows. Black Creek, on the lower lake, had the largest spawning population both in size and numbers.

Table 9. A Summary of Peak Rainbow Trout Spawning Surveys Made on Several Streams in the Iliamna, Gibraltar, and Naknek Drainage During the Spring, 1974 (Foot Surveys Only).

<u>Date</u>	<u>Drainage</u>	<u>Stream</u>	<u>Number of Rainbows</u>	<u>Approx. No. of Miles Surveyed</u>	<u>Observer</u>
5/ 6	Iliamna	Roadhouse	27	6.5	Aumiller
5/9	Iliamna	Alexcy	18	4.0	Aumiller-Russell
5/14	Iliamna	Zackar	67	4.5	Aumiller-Russell
5/15	Iliamna	Pete Andrew	53	5.0	Aumiller-Russell
5/22-23	Iliamna	Copper River	91	11.5	Aumiller-Russell
5/24	Gibraltar	Dream Creek	43	4.0	Russell-Siedelman
5/25	Naknek	Brooks River	169	1.0	Russell-Siedelman



**Figure 4. Copper River with Section Boundaries**

Table 10. Rainbow Trout Spawning Distribution by Section in Copper River, 1972-1974.

<u>Sections</u>	<u>Dates</u>		
	<u>6/5-7/72</u>	<u>5/31-6/1/73</u>	<u>5/22-23/74</u>
1	-	-	-
2	0	-	-
3	0	0	2
4	10	4	20
5	195	35	26
6	157	30	17
7	49	1	6
8	41	17	11
9	110	13	3
10	<u>68</u>	<u>2</u>	<u>6</u>
Total	630	102	91

## LITERATURE CITED

- Siedelman, D. I. 1974. Inventory and cataloging of the sport fish and sport fish waters of the Bristol Bay area. Alaska Dept. of Fish and Game. Fed. Aid in Fish Restoration, Annual Report of Progress, 1973-1974, Project F-9-6, 15:95-119.
- Russell, R. B. 1975. Life history studies of rainbow trout in the Kvichak drainage of Bristol Bay. Alaska Dept. of Fish and Game. Fed. Aid in Fish Restoration, Annual Report of Progress, 1974-75, Project F-9-7, 16: (In process).

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