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Study T

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Annual Performance Report for
WESTERN ALASKA RAINBOW TROUT STUDIES

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RESEARCH PROJECT SEGMENT

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ABSTRACT

Summer distribution of rainbow trout, *Salmo gairdneri* Richardson, in the Aniak and Kwethluk Rivers in 1985 was closely tied to distribution of spawning chum salmon, *Oncorhynchus keta* (Walbaum), and chinook salmon, *Oncorhynchus tshawytscha* (Walbaum). Fish were most common in tributary streams, sloughs, and side channels of the Aniak River and in sloughs, side channels, and moderate current portions of the main Kwethluk River. Rainbow trout were more abundant in the Kwethluk River than in the Aniak River. Maximum size of fish in both rivers was larger than in 1975. Recreational fishing catch and effort figures are unavailable, but the catch is thought to be low.

KEY WORDS

Rainbow trout, habitat parameters, Kuskokwim River, age and growth studies.

BACKGROUND

The rainbow trout, *Salmo gairdneri* Richardson, is a highly respected and much sought-after recreational species in waters of southwest Alaska. They have a limited distribution and abundance in streams that drain the Aklun and Kilbuck Mountains and enter the Kuskokwim River from the south. These streams, (Aniak, Kisaralik, and Kwethluk Rivers) are generally clear and moderately swift and have gravel-bottom streams in their middle reaches where most rainbow trout are found. Rainbows are more abundant in the streams that flow directly into Kuskokwim Bay (Kanektok and Goodnews Rivers).

During 1975 and 1976 a fisheries resource investigation was conducted on a 20,000-sq-mi area encompassing these rainbow trout streams (Fig. 1). The results of this investigation provided the first published data on rainbow trout and their habitats in southwest Alaska (Alt 1977).

During the original study, sport fishing pressure was light, but some concern was voiced about the impact of the local winter-ice fishery on the Aniak River. The Aniak River harvest peaked at about 400 rainbow trout per winter in the late 1970s and has probably been less than that in the past 5 years. However, guided-fishing activity on the streams in the study area has increased in the last 4 years. Within the past few years, the introduction of jet boats to the Bethel area has enabled many local residents to reach the prime rainbow trout waters in the middle reaches of these rivers. In 1984 a number of guides and local residents voiced concern about the continued viability of rainbow trout populations under the increased fishing pressure. Proposals from the public and the Alaska Department of Fish and Game to reduce the limit for rainbow trout resulted in the adoption of a regulation in 1985 lowering the bag limit from 15 per day and 30 in possession to two per day and two in possession. In spite of increased protection provided by the new regulation, local residents continued to be concerned about the health of rainbow populations in the Aniak and Kwethluk Rivers.

As a response to these concerns, the Sport Fish Division began a multi-year study in 1985 on the Kwethluk, Aniak, and Kisaralik Rivers. The short-term objectives were to characterize summer rainbow trout distribution by habitat parameters; to collect age, length, and weight (A-W-L) data for comparison with data collected ten years ago; and to monitor harvest trends. This small-scale study was also undertaken in an effort to determine the feasibility of initiating a larger-scale rainbow trout study on the Aniak, Kisaralik, and Kwethluk Rivers that would produce population estimates.

The U.S. Fish and Wildlife Service, Togiak Refuge staff began a 2-year study of rainbow trout in the Kanektok River, and additional data from the Goodnews River were collected in September 1985 by the Sport Fish Division.

RECOMMENDATIONS

Research

1. The population size of rainbow trout over 300 mm in length in the Aniak, Kwethluk, and Kisaralik Rivers should be determined.

Management

The harvest of rainbow trout in the Aniak, Kwethluk, and Kisaralik Rivers, especially those harvested by local residents during ice-covered months, should be monitored.

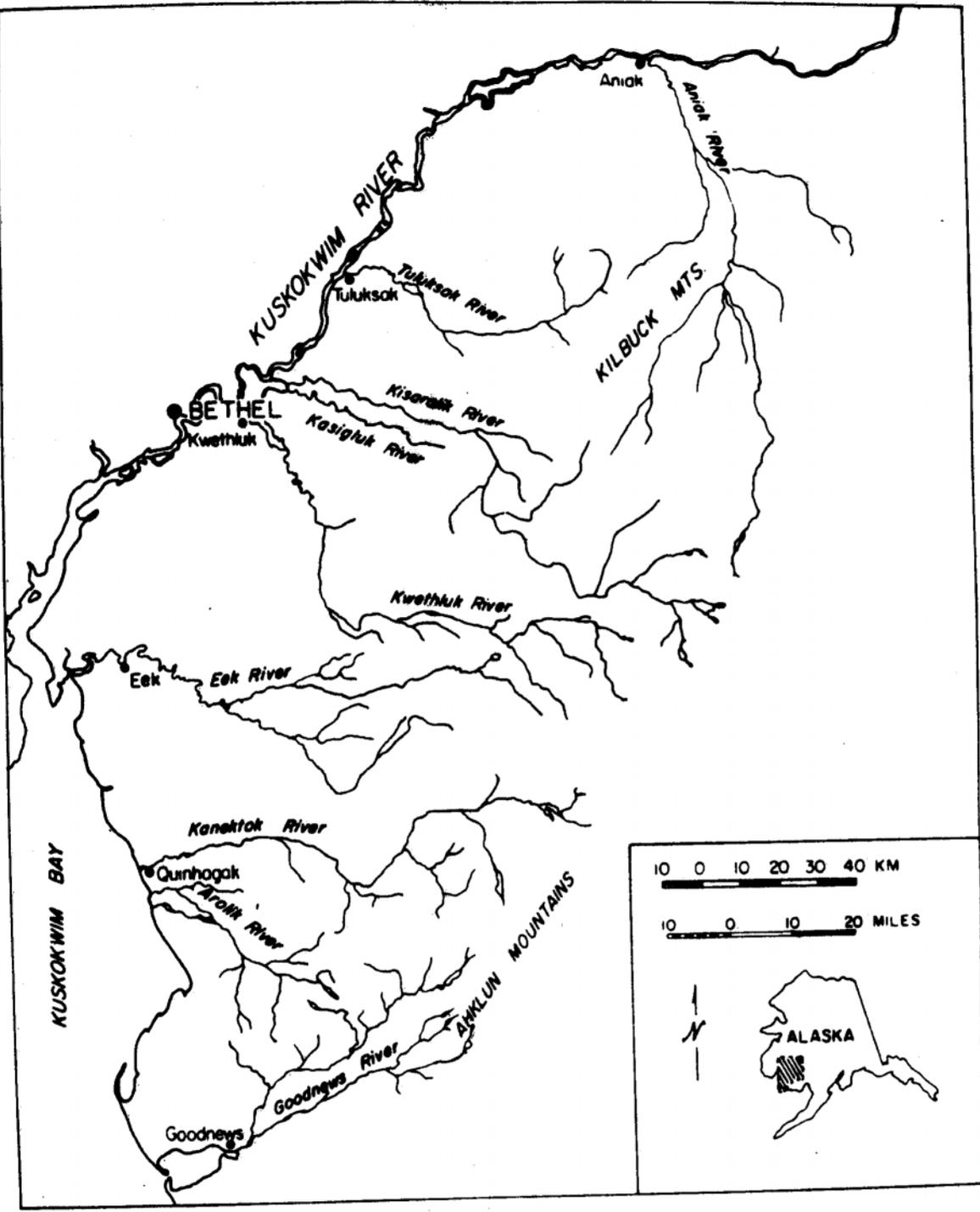


Figure 1. Lower Kuskokwim River and Kuskokwim Bay study area. Inset shows Alaskan location.

OBJECTIVES

1. To characterize rainbow trout captured in Kuskokwim streams by age, length and weight.
2. To document summer feeding areas of rainbow trout.
3. To locate spawning areas of rainbow trout.

TECHNIQUES USED

Fish were captured by hook and line. Age, length, and weight data were collected by standard techniques. Scales were used for aging rainbow trout. Habitat parameter values were subjective.

FINDINGS

Summer Distribution by Habitat

Rainbow trout in the Aniak and Kwethluk Rivers were most abundant in the middle reaches of the river where the bottom was gravel-covered, current speed was moderate to fast, cover was generally available, and salmon were present. Aniak rainbow trout were captured from 18 to 21 July, while Kwethluk River fish were captured from 31 July to 5 August. The presence of chum salmon, *Oncorhynchus keta* (Walbaum), and chinook salmon, *Oncorhynchus tshawytscha* (Walbaum), seemed to be the most important factor relating to the presence of rainbow trout. Even though considerable time was spent angling in sections of the rivers where salmon were absent, very few rainbow trout were encountered. Local anglers and guides mentioned that during the salmon spawning season nearly all rainbows are found in close association with the salmon. The current in the main stem Aniak River is swifter than in the main stem Kwethluk River; thus, in the Aniak most salmon spawn in the tributary streams or sloughs and side channels of the river. In contrast, in the Kwethluk River many salmon were spawning in moderate-current areas of the main river. Rainbow trout were most abundant in these areas (Tables 1 and 2). Nearly all rainbow trout were caught over a gravel bottom.

Aniak River rainbow trout have a fairly limited summer distribution. They are found in the Aniak River from Mile 38 to the mouth of Kipchuk River (Mile 50) as well as in lower Timber Creek, lower Salmon River, and, possibly, lower Kipchuk River. In the Kwethluk River a few rainbow trout are found as far downstream as Three Step Mountain (Mile 35) as well as above Elbow Mountain (Mile 60); Fred DeCicco (pers. comm.) captured a few in 1979 at Canyon Creek, but he reported low abundance from there to Elbow Mountain. In 1985 rainbow trout were most widely distributed in the area 5 mi above Three Step Mountain to Elbow Mountain.

The late-spring and early summer rainbow trout distributions are different from the summer distribution in the Aniak and Kwethluk Rivers.

Table 1. Location by habitat of 49 rainbow trout captured by hook and line in Aniak River, 18 to 21 July 1985.

Habitat Parameter	No. of Rainbow Trout Caught
Bottom composition	
Gravel	45
Silt and Sand	4
Water depth	
0 - 2'	1
2 - 4'	20
4 - 8'	28
Cover	
Shore Cover	19
Downed Timber	11
Log jam	10
No cover	9
Current speed	
Slow current	23
Mod. current	20
Fast current	6
Stream Habitat	
Tributary	20
Slough or side channel	28
Main channel	1
Location within channel	
Cut bank	33
Main part of channel	14
Shore	2
Presence of salmon	
Salmon Present	42*
Salmon Absent	7

* In most cases salmon (chum and chinook) were spawning.

Table 2. Location by habitat of 162 rainbow trout captured by hook and line in the Kwethluk River, 31 July to 5 August 1985.

Habitat Parameter	No. of Rainbow Trout Caught
Bottom Composition	
Gravel	151
Silt and sand	11
Water depth	
0' - 2'	15
2' - 4'	101
4' - 8'	46
Cover	
Shore Cover	111
Downed Timber	12
Log jam	4
No cover	35*
Current Speed	
Slow current	27
Moderate current	113
Fast current	22
Stream Habitat	
Tributary	0
Slough or side channel	67
Main channel	95
Location within channel	
Cut bank	94
Main part of channel	63
Shore	5
Presence of salmon	
Salmon present	133**
Salmon absent	29

* Fish in this category were often in a deep hole

** Salmon were actively spawning in most cases

In early summer trout were found farther downstream, generally in slower water and in sloughs (Alt 1977). Local anglers and guides have reported similar distributions.

Habitat preference of trout in the Goodnews River (Table 3) in early fall is similar to that in the Aniak and Kwethluk Rivers; however, the trout are not associated with salmon. The chinook and chum salmon have completed spawning by that time, and while coho salmon, *Oncorhynchus kisutch* (Walbaum), were present in the area, none were actively spawning. The Middle Fork of the Goodnews River is considerably shallower than the Aniak or Kwethluk Rivers, so Goodnews fish were generally found in less than 4 ft of water. The Goodnews River has many grassy banks, and rainbow trout were abundant along this shore cover. Downed timber and snags are also less abundant in the Goodnews than in the Kwethluk and Aniak Rivers. The Goodnews is a much more stable river, and few sloughs, side channels, or tributary streams are present.

Age and Growth

Limited age and growth data collected during 1985 indicated slightly faster rainbow trout growth than in 1975 (Table 4). Fewer small fish were caught during the 1985 study. The Goodnews River sample from 1985 was taken from the middle fork, while the 1975 sample came from the main fork of the river. The maximum size as well as the number of fish having over a 500-mm (20") fork length were larger in 1985 for fish from the Aniak and Kwethluk Rivers.

Abundance

Rainbow trout are less abundant in the Aniak River than in the Kwethluk River. The Aniak River catch per unit of effort (CPUE) for myself and an assistant was 0.78 rainbow trout per hour, using rod and reel (40 fish in 51 hours). A party of guided anglers had a CPUE of 0.12 fish/hour. The Kwethluk River CPUE was 2.3 fish/hour (162 rainbow trout in 70 hours). The Goodnews River CPUE was 1.00 (90 rainbow trout in 90 hours). On all three rivers, an effort was made to capture only rainbows; thus, our CPUE was higher than that for guided anglers, who also actively angled for salmon, char, *Salvelinus malma* (Walbaum), and grayling, *Thymallus arcticus* (Pallas). In the Aniak and Kwethluk Rivers, a considerable portion of our total angling time each day was spent in all available habitats to determine if rainbow trout were also present in the "less suitable" ones. On the Aniak River approximately 40% of the angling day was spent casting lures and flies in dead-water slough areas of the lower river, sloughs with sand and silt bottoms in the section of the river where rainbows were found, spring areas, swift-water sections of the main river, moderately flowing sections of the main river, shore areas, and areas where salmon were not actively spawning. We found few rainbow trout in these habitats. Local guides have also fished these habitats during a similar seasonal period but have rarely hooked a trout there. In early summer and late fall these "marginal" areas contain trout.

Since rainbow trout were more abundant and widely distributed in the Kwethluk River, probably less than 30% of our time was spent angling in

Table 3. Location by habitat of 88 rainbow trout captured by hook and line in the Goodnews River, 27 August to 4 September 1985.

Habitat Parameter	No. of Rainbow Trout Caught
Bottom composition	
Gravel	87
Silt and Sand	1
Water Depth	
0' - 2'	6
2' - 4'	77
4' - 8'	5
Cover	
Shore Cover	32
Downed Timber	13
Log jam	1
No cover	42
Current Speed	
Slow Current	10
Moderate Current	66
Fast Current	12
Stream Habitat	
Tributary stream	0
Slough or side channel or confluence	13
Main channel	75
Location Within Channel	
Cut Bank	32
Main part of channel	54
Shore	2
Presence of salmon	
Salmon present	2
Salmon absent	86

Table 4. Comparative age-length* data for rainbow trout from Kuskokwim River and Kuskokwim Bay waters, 1975 and 1985.

	AGE											
	1	2	3	4	5	6	7	8	9	10	11	12
Goodnews R. 1975 n=66	124	130	256	347	408	432	496	510	526	560		630
Goodnews R. 1985 n=82			356	392	460	469	510	546	571	602		
Kwethluk R. 1975 n=37	98	129		298	352	386	417	451	470	473		
Kwethluk R. 1985 n=126			236	292	346	395	433	495	544			
Aniak R. 1975 n=93	96	133	208	308	290	366	407	440	469	487		
Aniak R. 1985 n=39				293	339	406	449	470	513			
Arolik R. 1975 n=24					395	435	462	523	560			
Kisaralik R. 1975 n=19	97	155			375	367	412	450	490			

* Length in millimeters

unproductive habitat. Current speeds were not measured; they were subjectively categorized as slow, fast, or moderate. Fast current was considered to be 4 to 5 ft per second; current considered fast in the Kwethluk was probably a bit slower than that in the Aniak River. Future research should quantify current parameters as they relate to rainbow trout abundance.

The Fishery

The rainbow trout fishery in the Aniak and Kwethluk Rivers has a winter and a summer component. The winter fishery takes more fish than the summer fishery and is conducted by local residents fishing through the ice or in open-water leads in January, February, March, or April. Harvest is often related to the amount of time that safe access is assured to holes in the lower and middle parts of the river. Winter harvests in the Aniak River in the early 1980s reached 400 rainbow trout (LaMont Albertson, Aniak, pers. comm.) that were taken by residents of Aniak and Chuathbaluk. We have not documented winter harvests in recent years from the Aniak River, but local anglers report that the harvest is less than or similar to the early 1980s. Residents from Bethel and Kwethluk reportedly harvest some rainbow trout during the winter from the Kwethluk River, but the magnitude of this harvest is unknown.

The summer fishery has a local and a guided component. In the Aniak River there were three active guides in 1985; one guide began float operations from Aniak Lake, another started from 12 mi up the Salmon River, and a third had a permanent camp on the Aniak River at Mile 43. Additionally, only a few local residents got into the primary rainbow trout habitat on the Aniak River; because the river is so shallow and dangerous in this area, few people have the skill or type of motor needed to reach it. During one week on the river in 1985, clients of these three guides had killed only three rainbow trout, and local anglers had not been fishing for them. The summer harvest on the Aniak River is probably less than 50 fish per year. The Kwethluk River presently has no guided-fishing activity, but it is very close to an urban population center (Bethel). Local sport fishermen perceive that the increase in number of jet boats travelling into the prime Kwethluk River rainbow habitat during the past two summers is already having a negative effect on the rainbow trout population. With traditional outboard motors, Bethel residents were only able to reach the very lower end of this prime rainbow habitat area.

Bethel anglers generally retain the rainbows they catch on hook and line. An angler mentioned that the average number of rainbow trout he caught per trip over 21 inches in length decreased from 3 per trip in 1982 to one or less per trip in 1984 and 1985 (John White, pers. comm.). While on the river in 1985, we found evidence of prior camping and fishing activity (litter, rainbow trout heads) in the lower portion of the primary rainbow habitat but very little evidence farther upstream where the river is more difficult to navigate. The maximum size of the fish we caught in 1985 was larger than in 1975; the largest fish had a 495-mm fork length, while in 1985 ten fish having a >500-mm fork length were captured.

The questions of the magnitude of the recreational harvest in the Kwethluk River and whether the increasing use of jet boats to reach the primary summer habitat has threatened the resource have not yet been determined. The Kwethluk River harvest data have not been separated from that of other waters in the Statewide Harvest Study (Mills 1985), but the estimated harvest of 1,442 rainbow trout for the six rivers of the lower Kuskokwim area in 1984 would probably include 300 to 400 trout from the Kwethluk River.

Population Estimates

A short-term goal of the 1985 research was to determine if a population estimate could be made on Aniak or Kwethluk River rainbow trout. A tag-and-recapture study conducted during the peak-summer concentration would be the best method. Use of a shocker boat to capture rainbow trout for tagging is not feasible on the Aniak or Kwethluk Rivers. Traps, nets, or any other technique that the public could perceive to be injurious or lethal to fish should not be used. Salmon, char, and grayling are very abundant in areas where rainbows are found and would also be captured in large numbers if these methods were implemented. Hook and line would be the only feasible method. Population estimates on the Goodnews River could be conducted using a shocker boat to capture rainbow trout for tagging.

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