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STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

DEVELOPMENT OF TECHNIQUES FOR ENHANCEMENT & MANAGEMENT OF STEELHEAD TROUT IN SOUTHEAST ALASKA

by

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RESEARCH PROJECT SEGMENT

State:	ALASKA	Name:	Sport Fish Investigations of Alaska
Project No.:	AFS-42	Project Title:	A STUDY OF CUTTHROAT-STEELHEAD IN ALASKA
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Cooperator: Darwin E. Jones

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ABSTRACT

This report covers the fifth year of study in the development of techniques for the enhancement and management of steelhead, Salmo gairdneri (Richardson), in southeast Alaska.

During 1980, evaluation of steelhead enhancement resulting from hatchery produced smolts was conducted on Blind Slough and Crystal Creek. A total of 45 adult steelhead were trapped at Crystal Creek between May 2 and May 21, 1980. In addition, two adult steelhead were taken in the sport fishery in lower Blind Slough. These steelhead were mostly repeat spawners from the 1976 smolt releases in Crystal Creek, i.e., 77% of the females were repeat spawners and 48% of the males and females combined were repeat spawners. Steelhead smolts released in 1977 and 1978 did not contribute greatly to the 1980 adult return (Table 1).

The distribution and general abundance of spring run steelhead was determined for seven stream systems throughout southeast Alaska during the spring of 1980. Six of these streams were located in Bradfield Canal, an area slated for hydroelectric development.

Martin Creek, located near the mouth of Bradfield Canal's north side, was foot surveyed in May 1980. A total of 41 adult steelhead were noted during the survey.

Frank's Creek, a small stream just east of Martin Creek, in Bradfield Canal was foot surveyed for 2.8 km upstream. Two adult steelhead were noted near the upper end of the survey.

Table 1. Crystal Creek Steelhead 1975-1980.

Date Smolt Released	Number Released	Size	Adult Returns 1977-1980	% Returns
6/6/75	9,500	142 mm	28*	0.3
6/10/76	1,600	170 mm	139*	9.2
6/17/77	630	175 mm	5	0.8
5/26/78	10,700	162 mm	9*	0.09

* Includes steelhead harvested in the sport fishery in Blind Slough.

Tom Creek, located midway up the north side of Bradfield Canal, was surveyed both by helicopter and foot as far as Tom Lake. Little steelhead habitat was noted in the area surveyed and no adults were noted.

The Harding River, located near the head of Bradfield Canal on the north side, was surveyed upstream for 8 km via riverboat in May 1980. The Harding River is a large stream--15 meters wide by 2 meters in depth--and appears to contain excellent steelhead habitat, however, only one adult steelhead was noted during the survey.

Eagle River, located near the head of Bradfield Canal on the south side, was surveyed upstream for 8 km via jet riverboat in May. Eagle River contains excellent steelhead habitat and a total of 23 adult steelhead were noted.

Anan Creek, located near the mouth of Bradfield Canal on the south side, was surveyed via helicopter and foot during May. Anan Creek supports a spring-run of steelhead that reaches a peak in early June. The 1980 survey was too early to secure a peak count as only two adult steelhead were noted.

Sitkoh Creek, located on southeast Chichagof Island, was foot surveyed in May to assess the magnitude of the steelhead escapement. Restrictive bag and possession limits have been in effect for this system for the past 3 years. A total of 42 adult steelhead were observed during the survey. This is the highest total observed in Sitkoh Creek since annual surveys began in 1975.

Four stream systems were surveyed and/or used as brood stock donors for the hatcheries in southeast Alaska.

Ketchikan Creek, located in downtown Ketchikan, was monitored on a weekly basis during April and May, 1980. Adequate numbers of adult steelhead were present on May 10, 1980 and a total of 5,800 eggs were obtained for the Deer Mountain Hatchery.

The Klawock River, located near the town of Klawock on Prince of Wales Island, was tapped for fall-run steelhead brood stock in early March. A total of 15 adult steelhead were captured and a total of 15,000 eggs were placed in incubators at the Klawock Hatchery.

Peterson Creek, located on the Juneau road system, was investigated in May as a possible source of spring-run steelhead brood stock for use at the new Snettisham Hatchery. Two potential weir sites were investigated in 1980 together with assessing the magnitude of the steelhead escapement.

The Plotnikof River system, located on southwest Baranof Island, was surveyed in July to assess its potential for supplying summer-run steelhead brood stock for the Hidden Falls Hatchery. Adequate numbers of rearing steelhead were not located during the survey and it appears that this system offers too many physical and logistical probelms to be a reliable source for steelhead brood stock.

BACKGROUND

The development of techniques for the enhancement and management of the various races of steelhead occurring in southeast Alaska has begun to take on an organized form with the completion of the Steelhead Management and Enhancement Plan (Jones, 1978). This plan has been upgraded on an annual basis and has been used to set guidelines for the regulatory management of wild steelhead populations and as background for making recommendations for enhancement.

The Crystal Lake Hatchery began spring-run steelhead production when the first eggs were obtained in 1975 from Petersburg Creek and Falls Creek. The use of heated recirculated water at Crystal Lake Hatchery resulted in steelhead fry reaching smolt size in less than 1 year's time. A total of 9,500 steelhead smolts were liberated in Crystal Creek and 8,000 in Petersburg Creek during the spring of 1975 (Zorich, 1979).

Eggs collected during the spring of 1975 suffered a higher than normal hatchery mortality resulting in only 1,600 liberated at Crystal Creek, 6,500 at Montana Creek, 6,500 at Petersburg Creek, and 2,000 at Falls Creek. Adult returns from these plants began to appear in the fishery in 1978 and were complete in 1979. Returns ranged from good at Crystal Creek, Falls Creek, and Petersburg Creek to very poor at Montana Creek.

The steelhead brood stock development at Crystal Lake Hatchery was suspended in the summer of 1978 when the facility was closed down to eradicate diseases identified in resident salmon. The disinfection of the facility resulted in the loss of all fish on hand. Steelhead fry in residence at the time were destroyed. Adult steelhead returning in 1979 were not used as brood stock as they were suspected as carriers of Infectious Hematopoietic Necrosis Virus (IHNV) and Bacterial Kidney Disease (BKD). No wild egg takes were planned in 1979 and, therefore, no steelhead eggs were placed in the newly cleaned facility. Adult steelhead returning in 1980 were screened for IHNV and BKD. They were certified disease free and steelhead brood stock development was once again underway at Crystal Lake.

The Deer Mountain Hatchery at Ketchikan has started production of spring-run steelhead on a small scale. Eggs have been collected from Ketchikan Creek on an annual basis since 1978 and the first smolts were released in Ward Creek and Ketchikan Creek in 1980. The first adults from this plant are expected to begin contributing to the area fishery and hatchery in 1982. Until that time, wild steelhead will continue to be trapped in Ketchikan Creek for brood eggs.

The development of a fall-run steelhead brood stock was started at the Klawock Hatchery during the winter of 1978. A small number of eggs were obtained from six females and were reared to smolt size by the spring of 1980. A total of 3,000 fall-run steelhead smolts were liberated during the spring of 1980. A total of 30,000 eggs were obtained from wild Klawock River steelhead during early 1980. These steelhead will be released once they reach smolt size either in 1981 or 1982.

A continuing program has been underway since 1975 to identify streams in southeast Alaska that are suited for enhancement with hatchery produced steelhead. Twelve such streams have been identified to date. These streams include: Indian River and Salmon Creek in the Sitka area; Fish Creek, Montana Creek, Kowee Creek, and Peterson Creek in the Juneau area; Pat's Creek in the Wrangell area; Mahoney Creek and Ward Creek in the Ketchikan area; and Ohmer Creek, Falls Creek, and Petersburg Creek in the Petersburg area. Of these streams, only Montana Creek, Peterson Creek, Falls Creek, and Ward Creek have received plants of hatchery produced steelhead smolts.

A continuing program has been underway since 1976 to survey stream systems throughout southeast Alaska as possible sources for steelhead brood stock. Petersburg Creek and Falls Creek have been developed as a source for spring-run steelhead at the Crystal Lake Hatchery. Ketchikan Creek has been developed as a source for spring-run steelhead production at the Deer Mountain Hatchery. The Klawock River has provided adults for the development of fall-run steelhead at the Klawock Hatchery. The Plotnikof River has been surveyed as a source of summer-run steelhead; however, no fish have been taken to date.

A continuing program has been underway since 1975 to survey steelhead systems throughout Southeast. These surveys provide background data on numbers and run timing of wild steelhead. This information is used when land use activities or other development is planned for the stream. In addition, this data is used by management to formulate regulatory measures aimed at perpetuating the resource.

A list of common names, scientific names, and abbreviations of all species mentioned in this report is presented in Table 2.

RECOMMENDATIONS

Management

1. Reestablish a brood stock of spring-run steelhead at the Crystal Lake Hatchery. The first full cycle (two- and three-ocean) of steelhead adults returned to the Crystal Lake Hatchery during 1978 and 1979. Survival from smolt to adult was 9.2%. This brood stock was lost in 1978 and 1979 when it became necessary to shut down Crystal Lake Hatchery for disease eradication measures. Steelhead eggs were again taken in the spring of 1980 from a small number of disease-free adults. It is recommended that this program continue.

2. Continue the development of the spring-run steelhead at the Deer Mountain Hatchery. Spring-run steelhead eggs have been collected from Ketchikan Creek on an annual basis since 1978 and the first smolts were liberated during the spring of 1980. As this program expands, spring-run steelhead smolts will be available for enhancement of other fisheries in the Ketchikan area.

Table 2. List of common names, scientific names, and abbreviations.

Common Name	Scientific Name and Author	Abbreviation
Steelhead	Salmo gairdneri Richardson	SH
Rainbow Trout	Salmo gairdneri Richardson	RT
Chinook Salmon	Oncorhynchus tshawytscha (Walbaum)	KS
Coho Salmon	Oncorhynchus kisutch (Walbaum)	SS

3. Develop a brood stock of spring-run steelhead at the Snettisham Hatchery. At present, there is no brood source of steelhead available for enhancement of the Juneau area streams. Work on this program should begin as soon as a disease-free wild brood source is identified and space is available at the Snettisham Hatchery.

4. Continue the development of the fall-run steelhead stock at the Klawock Hatchery. Eggs have been collected from wild fall-run steelhead from the Klawock River annually since 1978. The first smolts were liberated into the Klawock River during the spring of 1980. As this brood stock program expands, fall-run steelhead smolt will become available for release in the Prince of Wales area.

5. It is recommended that areas already developed or planned for development be monitored by creel census, escapement counts, and other survey techniques. The ever increasing mileage of logging roads throughout southeast Alaska, together with an annual increase in numbers of anglers, will put increasing fishing pressure on the steelhead resource.

Research

1. Continue to gather background data on steelhead streams in southeast Alaska.

   Additional steelhead streams in southeast Alaska should be surveyed on an annual basis. These surveys should proceed to determine adult steelhead abundance, run timing, distribution, and angler harvest. Surveys of spawning and rearing habitat will be necessary in order to provide reasonable protection from various land use practices.

2. Evaluate adult returns to streams that have been stocked with hatchery steelhead.

   Evaluation of stocked systems will provide the background data necessary to formulate stocking levels. In addition, this evaluation will gather data on the contribution of hatchery fish to the sport fishery.

3. Continue the evaluation of brood stocks for use in the various hatcheries in southeast Alaska.

   Research needs to be continued on the selection of brood stocks of steelhead for hatchery use. This research should include run timing, average size, age at migration, and habitat preference. Investigations of diseases of wild steelhead must be undertaken before those stocks can be used for hatchery brood.

4. Enumerate the steelhead population in the Situk River.

   Rapidly increasing fishing pressure on the Situk River's steelhead population has made management of the fishery difficult. It is

recommended that a research program be undertaken that will provide management with accurate counts of steelhead entering the system. In addition, harvest rates will also be required.

OBJECTIVES

1. Evaluate adult steelhead returns to streams that have been stocked with hatchery reared steelhead smolts.

2. Determine distribution and abundance of adult steelhead throughout southeast Alaska.

3. Determine streams in which spring, fall, and summer-run steelhead could be obtained for brood stock development at the various Fisheries Rehabilitation, Enhancement and Development Division's hatchery facilities throughout Southeast.

TECHNIQUES USED

Evaluations of adult steelhead returns to streams stocked with hatchery smolts were accomplished by the following means:

1. Periodic fishermen contacts were conducted at the "rapids" area of Blind Slough to determine the harvest of adult steelhead bound for the Crystal Lake Hatchery.

2. Weir counts were monitored at Crystal Creek to determine return of adult steelhead to the hatchery.

In May 1980, the distribution and general abundance of steelhead were determined for the following streams throughout southeast Alaska: Eagle River (Bradfield Canal), Harding River, Tom Creek, Martin Creek, Anan Creek and Sitkoh Creek.

Baited fry traps were fished in those systems where the distribution of rearing steelhead was unknown. In addition, maps were drawn for those systems not previously surveyed.

Evaluations were made of the following stream systems to determine their suitability for brood stock development.

1. Peterson Creek was surveyed during May to determine if adequate numbers of spring-run steelhead were present for brood stock development.

2. The Plotnikof River system was surveyed during July to determine if adequate numbers of rearing steelhead were available for transplant to the Hidden Falls Hatchery for brood development.

3. Ketchikan Creek was monitored weekly during May 1980. When sufficient numbers of spring-run steelhead were counted, dip nets and beach seines were employed to capture the brood stock.

4. Hook and line and gill net were employed during early March to capture fall-run steelhead brood stock from the Klawock River.

5. The pickett weir on Crystal Creek was given routine maintenance in early April. Returning adult spring steelhead were trapped, sexed, and scale samples collected. When these fish were sexually mature they were spawned. Kidney samples and ovarian fluid were collected for pathological testing.

FINDINGS

Steelhead Enhancement Evaluation

Crystal Creek:

The development of a brood stock of spring-run steelhead at the Crystal Lake Hatchery was initiated in 1974 using broodstock from Petersburg Creek. Petersburg Creek remained the source of eggs until 1976 when brood eggs were obtained from Falls Creek. Falls Creek was again tapped for brood in 1977. No wild steelhead brood fish have been used since 1977, as adults began returning to the hatchery in 1978.

The enhancement of the steelhead run to Crystal Creek began with hatchery smolt releases in 1975 and were continued on an annual basis through the spring of 1978 (Table 1). The first adult steelhead returned to Crystal Creek in 1977 when two adults were trapped. The return to Crystal Creek in 1978 was much stronger with 70 fish trapped (Zorich, 1978). During the spring of 1978, a total of 32,000 eggs were taken from 10 females and placed in incubators at the hatchery.

The development of spring-run steelhead brood stock at Crystal Lake Hatchery suffered a setback in July 1978 when it became necessary to shut down the hatchery to rid it of serious disease problems. The IHN virus and BKD were identified in king and coho salmon being raised in Crystal Lake. All stocks of fish in residence at the time (coho, king and steelhead) were destroyed. This action eliminated the 1978 brood of steelhead that were scheduled for release in 1979. No steelhead smolts have been released in Crystal Creek since 1978 and it will be 1982 before the next batch of smolts are ready for release.

Adult steelhead began entering the trap on Crystal Creek on May 2 and a total of 45 were collected before the run terminated on May 21. The 1980 steelhead run to Crystal Creek consisted of 27 females and 18 males.

The females were mostly repeat spawners from the 1976 smolt release, while the males were mostly from the 1977 and 1978 smolt releases. BKD samples

and ovarian fluid for IHNV testing were collected from all 45 adults. Pathological examination of these samples cleared 23 female and 14 male steelhead of possible disease. The remaining eight steelhead had already spawned. A total of 55,000 eggs were spawned and placed in the incubator.

The 55,000 steelhead eggs placed in the Crystal Lake Hatchery in 1980 marks the beginning of a new brood stock. It may be necessary to return to Falls Creek in 1981 and 1982 to obtain wild stock, as very few hatchery adults are expected to return during those years.

The expected return of 200-300 adults to Crystal Creek did not materialize in 1980. The causes for the poor return in 1980 are not known. Only a few two-ocean males returned from the large 1978 smolt release, and this is not a good indicator that many three-ocean adults will return in 1981.

The lack of adult steelhead in the "rapids" area of Blind Slough caused a failure of the sport fishery. Periodic checks of the area during May contacted only 14 anglers with a total of two steelhead. The lack of steelhead was the cause for the light angler interest in the area. Good runs of wild fish in other area streams also contributed to the lower than expected angler interest in Blind Slough steelhead.

Adult Spring-Run Steelhead Surveys

Surveys were conducted on seven stream systems throughout southeast Alaska during the spring of 1980 to determine the presence, distribution, and general abundance of spring-run steelhead.

Marten Creek, located on the north shore of Bradfield Canal (Figure 1) heads in Marten Lakes and flows in a southwestern direction for approximately 3 km before entering the tidewater in Bradfield Canal (Figure 2).

Marten Creek was surveyed in early May to determine the abundance and distribution of the spring steelhead run. Martin Creek was foot surveyed upstream for approximately 2 km above tidewater to a 12-m falls that blocks further anadromous migration. The reach of Martin Creek open to anadromous migration offers abundant spawning gravel intermixed with deep pools and fast boulder chutes. Steelhead rearing habitat appeared to be excellent throughout. A total of 41 adult steelhead were observed on the spawning riffles or in the large pools. A total of six adults were either recently spawned-out or nearing spawning which suggests that the survey was conducted during the peak of the run.

Franks Creek:

Franks Creek, located on the north shore of Bradfield Canal, heads in a high glacial valley and flows in a southeasterly direction for 6 km before entering Bradfield Canal (Figure 2).

Frank's Creek was surveyed in early May to determine the distribution and abundance of the spring-run steelhead population. Franks Creek was

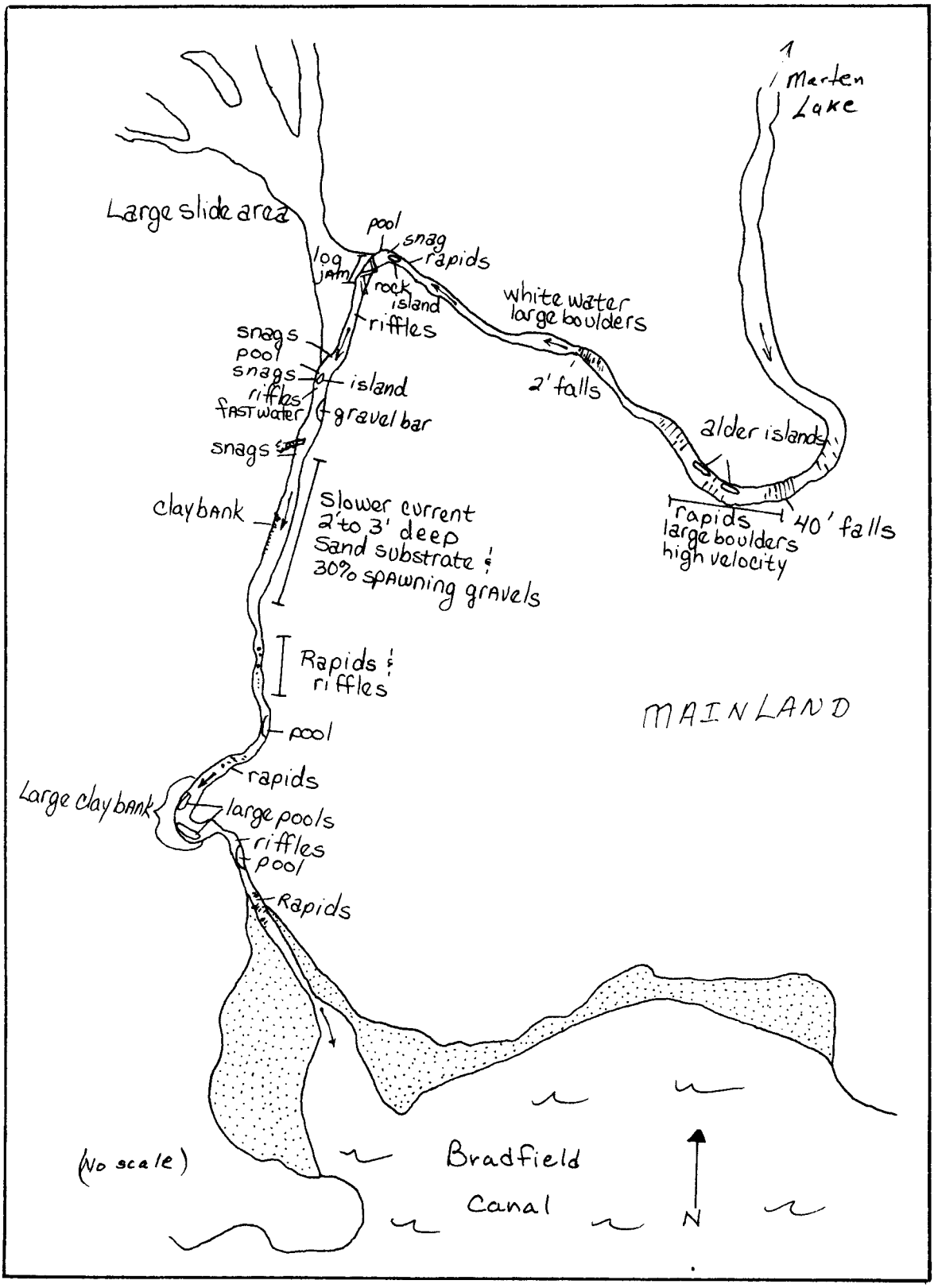

Figure 1. Marten Creek

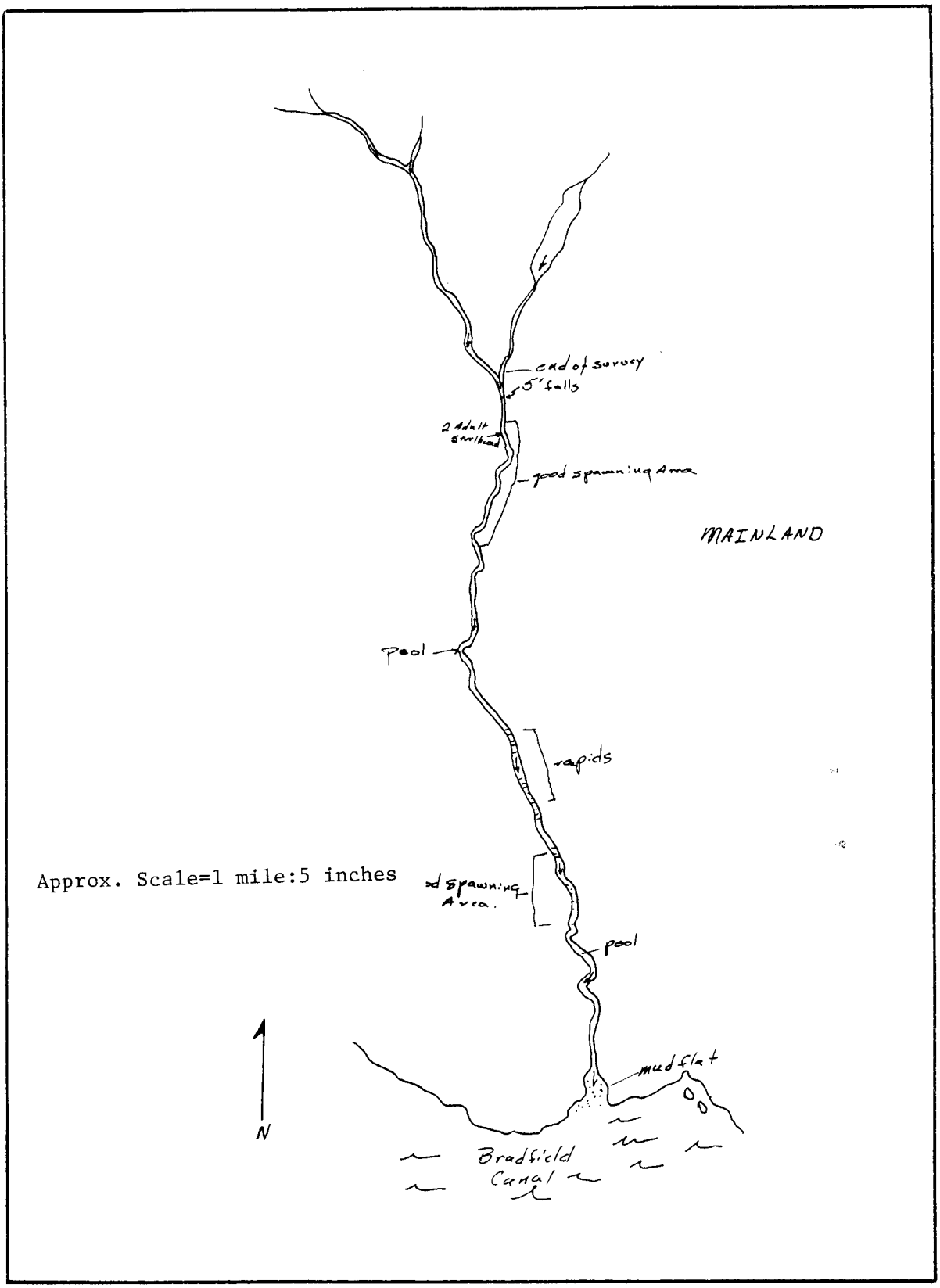

Figure 2. Franks Creek

surveyed by foot from the beach to approximately 2.8 km upstream. A 2-meter falls was encountered at this point, which may be the end of anadromous migration as neither adult nor rearing steelhead were found above this point.

Franks Creek is a small system as steelhead streams go, however, adequate spawning and rearing habitat are available. Two adult steelhead were noted on a redd just downstream from the 2-meter falls. The annual spring-run of steelhead to Franks Creek most likely does not exceed 25-30 fish.

Tom Creek:

Tom Creek, located on the north shore of Bradfield Canal, heads in a high mountain valley and is fed from Campbell and Tom Lakes (Figure 3). Tom Creek flows approximately 8 km in a southeasterly direction before entering tide water.

Tom Creek was surveyed via helicopter and foot in early May to determine the abundance and distribution of spring steelhead. Tom Creek is physically quite different from the other anadromous streams in Bradfield Canal. A boulder rapids is present on Tom Creek just above the high tide line. From this point upstream to just below Tom Lake the stream has a very flat gradient producing a uniform slow current and slough-like channel. This stretch of Tom Creek appears to provide little in the way of steelhead habitat. No rearing or adult steelhead were found in this section. Above Tom Lake, the west fork picks up gradient and becomes more suitable habitat for steelhead. Steelhead have been reported to inhabit Tom Creek; however, none were noted on the May survey. If indeed they do occur in Tom Creek, their numbers are small due to the general lack of habitat preferred by steelhead.

Harding River:

The Harding River, located near the head of Bradfield Canal, heads in a high glacial valley of the coastal range and flows 28 km in a southeasterly direction before entering tide waters (Figures 4 and 5).

The Harding River was surveyed via jet river boat in early May 1980 to determine the abundance and distribution of a possible run of spring steelhead.

The Harding River is physically one of the largest anadromous fish systems in Bradfield Canal. The main river below Fall Lake averages 15 meters in width and contains pools in excess of 2 meters in depth. During the summer months, glacial melt imparts a blue-green color to the Harding River which makes observation of fish difficult in the deeper pools.

The Harding River was surveyed upstream for 8 km. A velocity chute at this point effectively blocks anadromous fish migration. Abundant spawning and rearing habitat is present throughout the lower reaches of the Harding River; however, only one adult steelhead was observed during the May survey. The low number of rearing and adult steelhead observed suggests that the run to the Harding River is less than 50 adults annually.

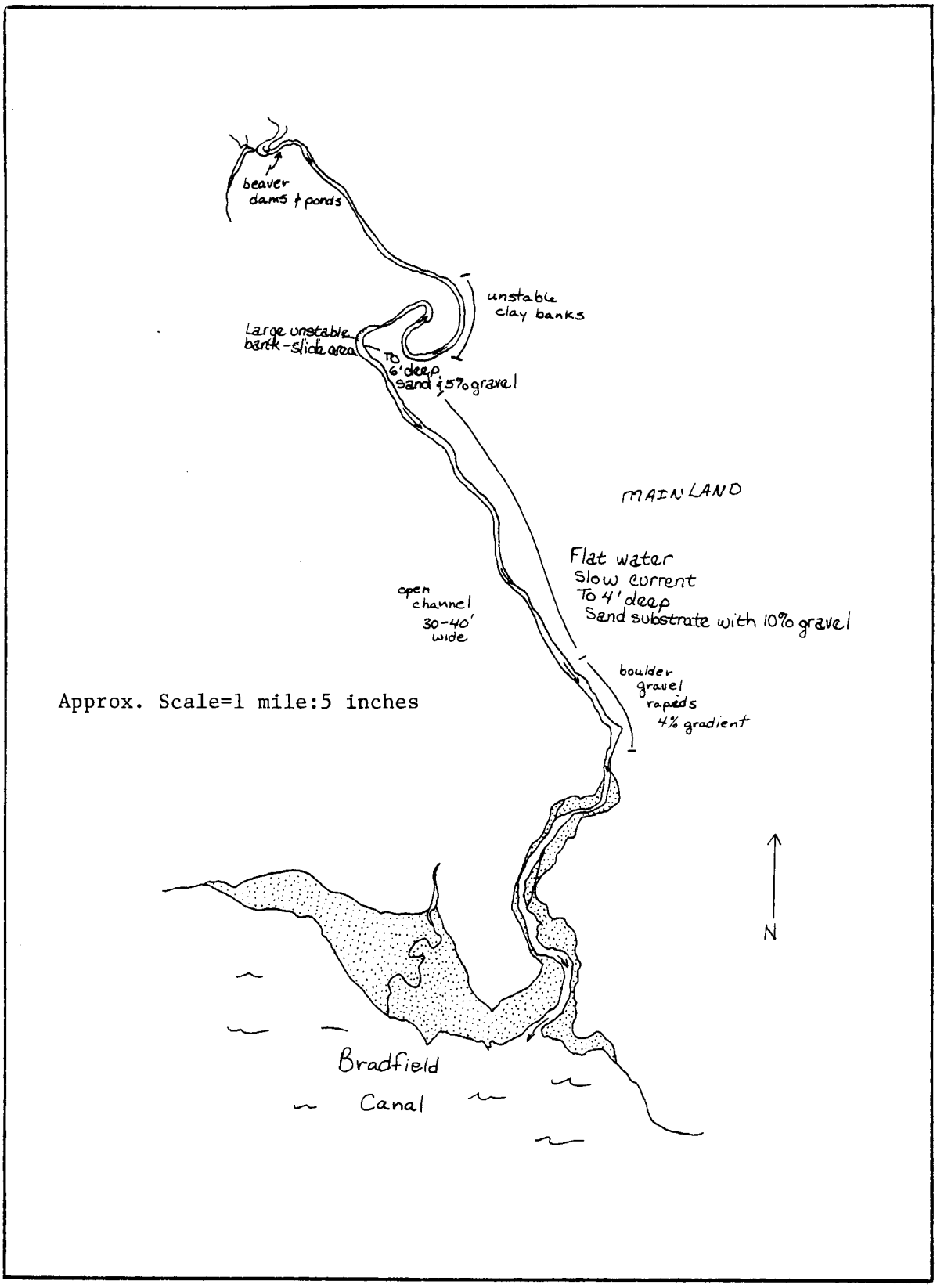

Figure 3. Tom Creek

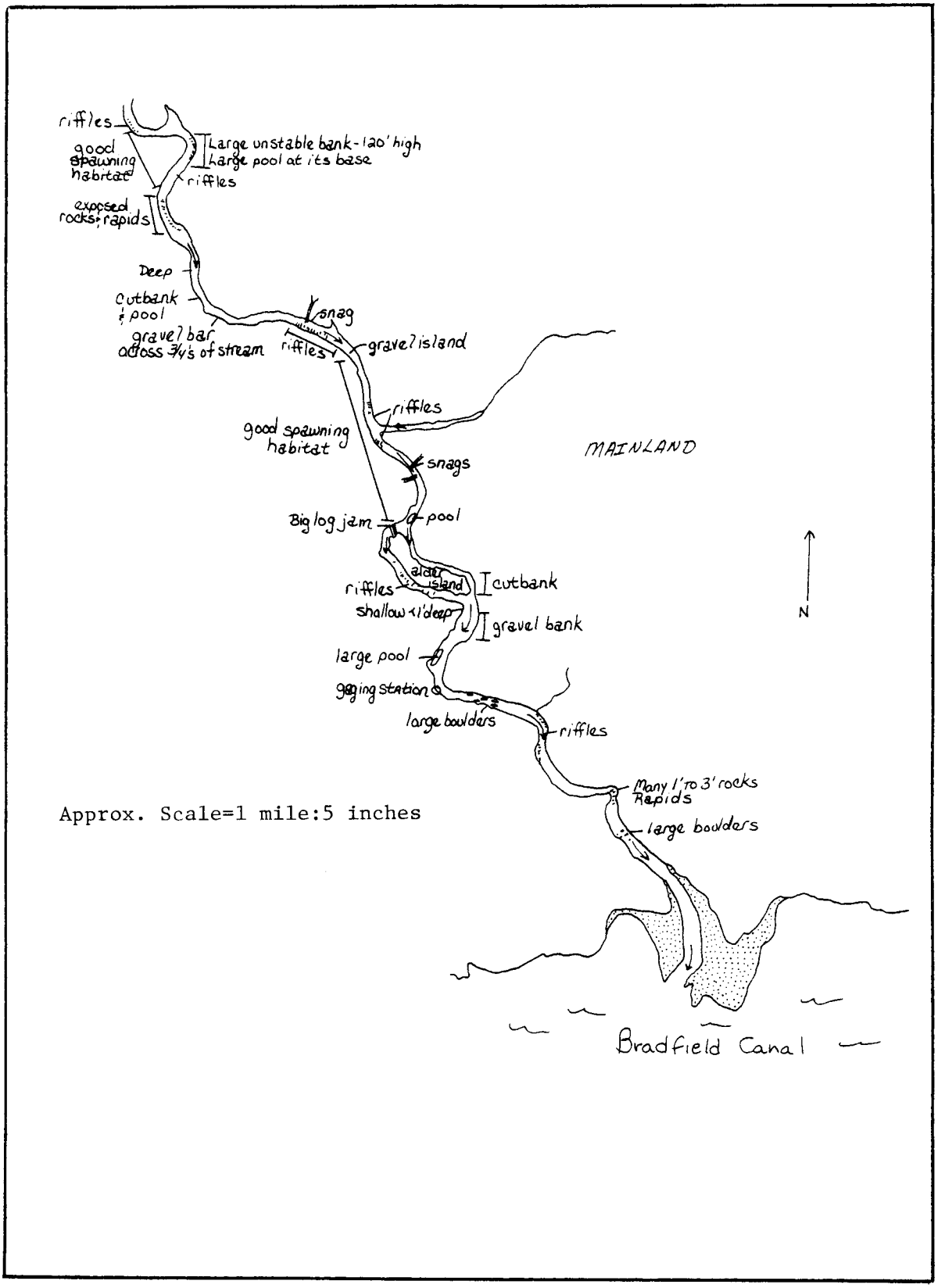

Figure 4. Lower Part of Harding River

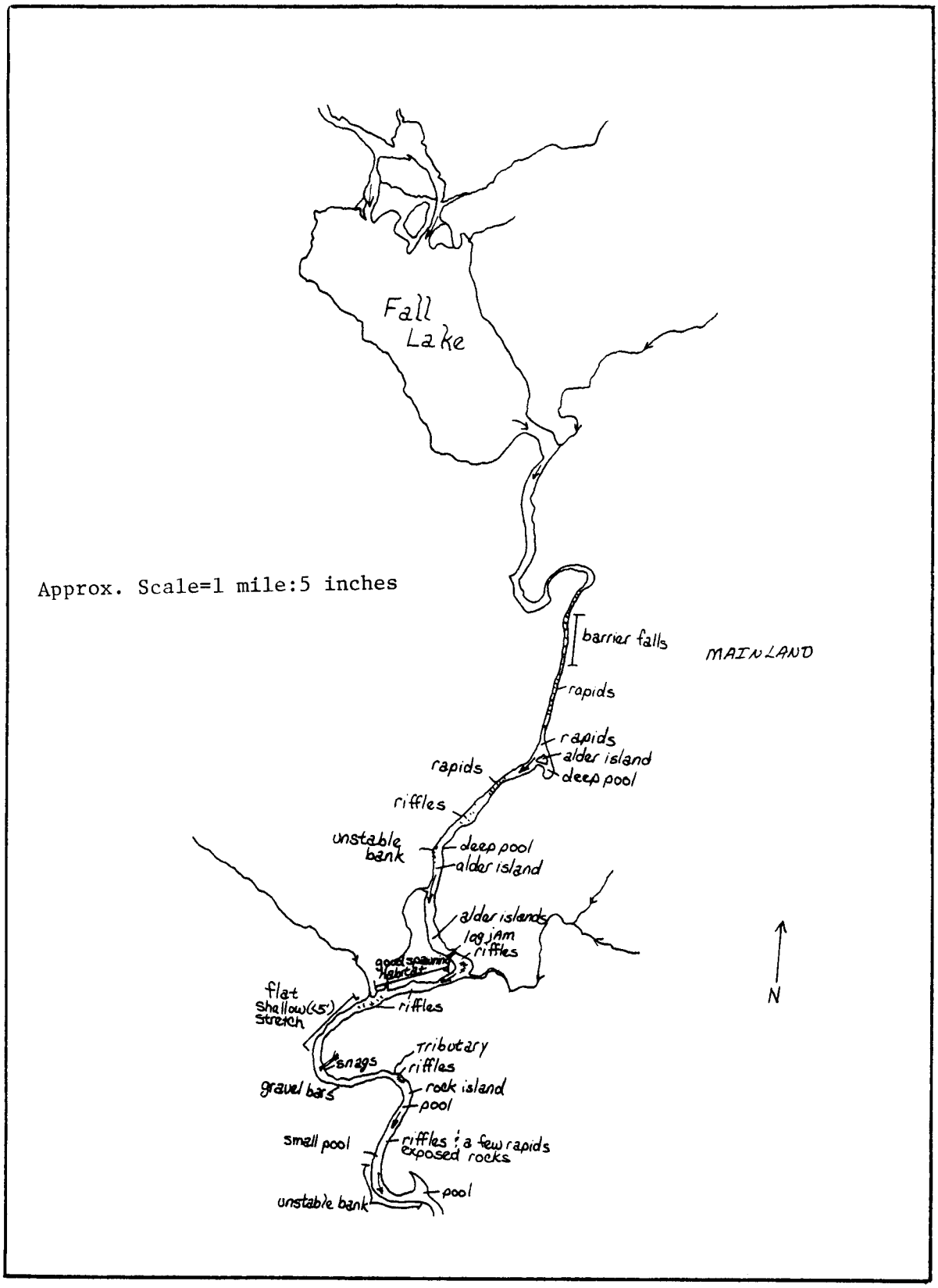

Figure 5. Upper Part of Harding River

Eagle River:

Eagle River, located on the south side of Bradfield Canal, heads in Eagle Lake and flows in a northwesterly direction for approximately 12 km before entering the canal (Figure 6).

Eagle River was surveyed by jet river boat and on foot in early May to determine the distribution and abundance of spring-run steelhead.

Eagle River is a large system, 10-12 meters wide, and is open to anadromous fish movement for approximately 8 km above tide water. A 3-meter falls blocks access to Eagle Lake. Eagle River was surveyed from the falls downstream. This area contained numerous deep pools, runs, and excellent spawning riffles. Steelhead rearing habitat appeared to be both excellent and abundant. A total of 23 adult steelhead were observed and four fish were sampled for biological data. Because of abundant spawning habitat and the presence of mature steelhead, the spring run of steelhead to Eagle River appears strong and may exceed 100 fish annually.

Anan Creek:

Anan Creek, located near the mouth on the south side of Bradfield Canal, was also surveyed in May to determine the abundance of spring steelhead (Figure 7).

Anan Creek heads in Anan and Boulder Lakes (west fork) and in a high mountainous valley (east fork) and flows in a northwesterly direction for 16 km before entering Bradfield Canal.

Anan Creek has an excellent reputation as a steelhead system and the 1980 survey was directed more to defining distribution than to assessing abundance. A helicopter was used to reach the east fork area while the west fork was foot-surveyed to Anan Lake. Rearing steelhead were found as far upstream as the survey went on the east fork and were located all the way up the west fork to Anan Lake. Time limitations did not allow for additional upstream sampling on the east fork.

Anan Creek has one of the latest runs of spring steelhead in Southeast. The normal peak of steelhead entry in most streams in central Southeast is in May; however, steelhead normally peak in early June in Anan Creek. The early May survey turned up only two adult steelhead just above tide water. Both fish were bright and some time from spawning. The late entry timing of Anan fish may be caused by the cold snow melt source of the east fork.

Sitkoh Creek:

Sitkoh Creek, located on the southeast end of Chichagof Island, heads in Sitkoh Lake and flows in an easterly direction for 5 km before entering Sitkoh Bay (Figure 8).

Sitkoh Creek was foot surveyed from Sitkoh Lake to tide water on May 12 in an effort to assess the magnitude of the 1980 steelhead run.

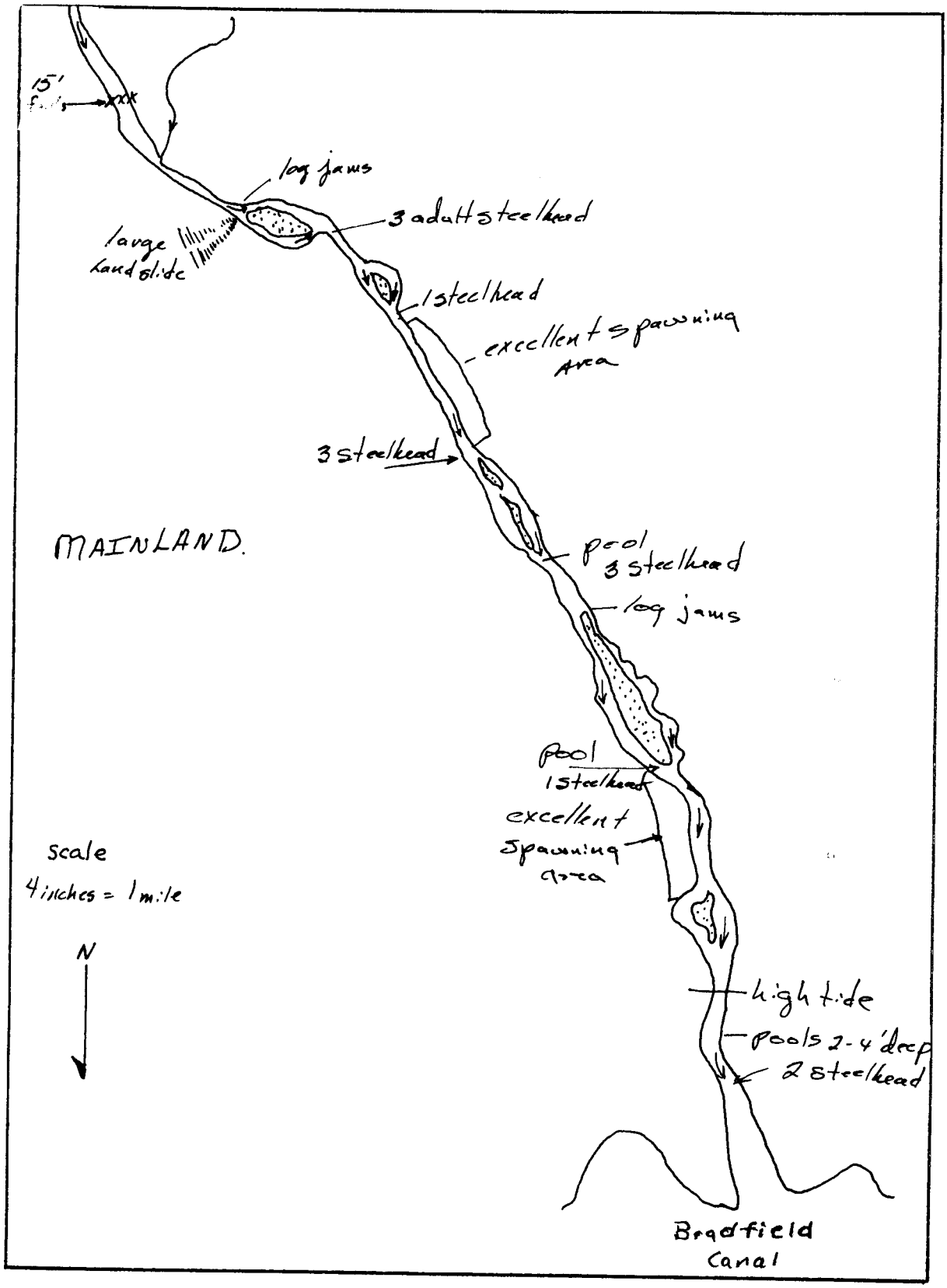

Figure 6. Eagle River

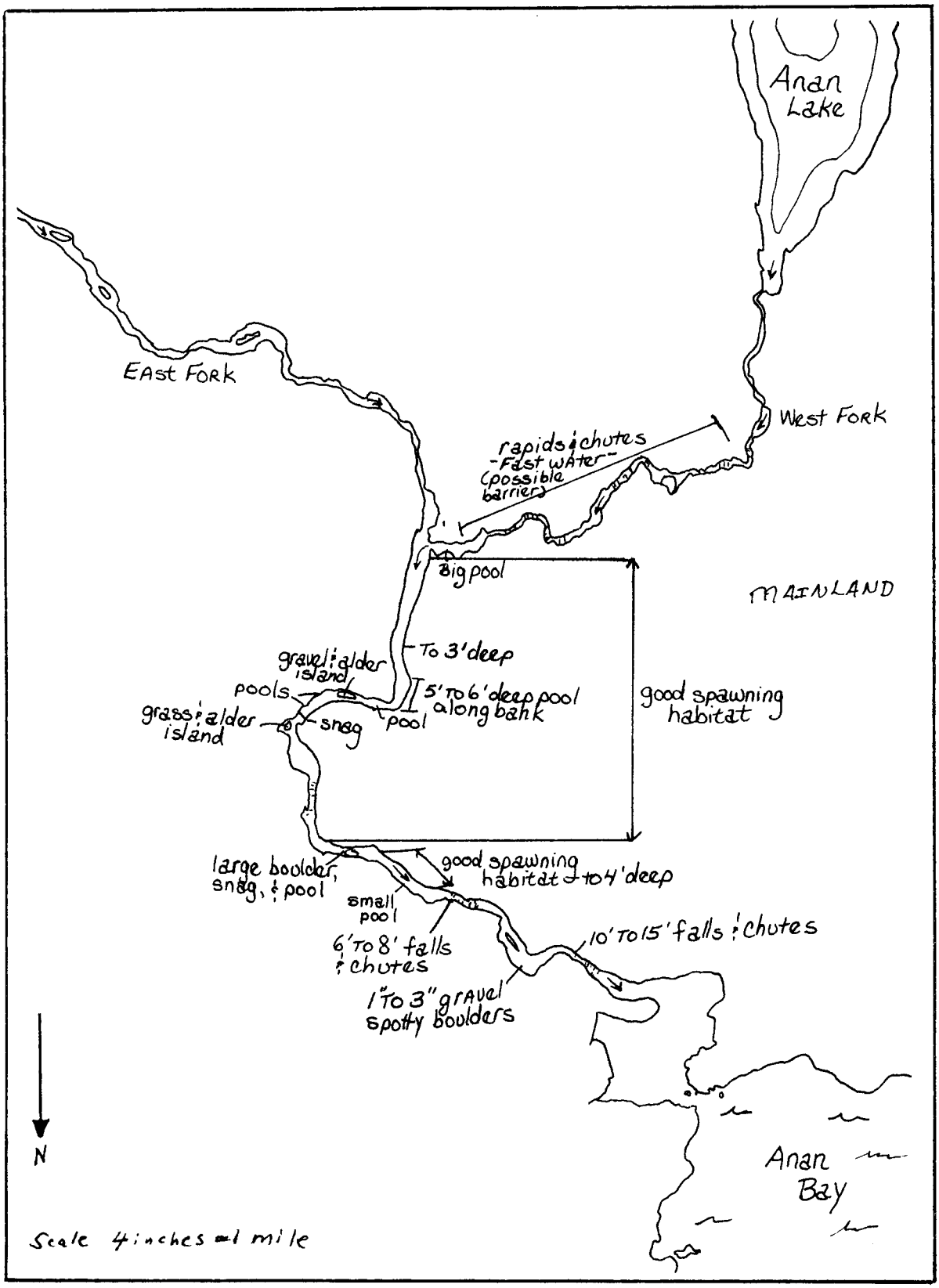

Figure 7. Anan Creek

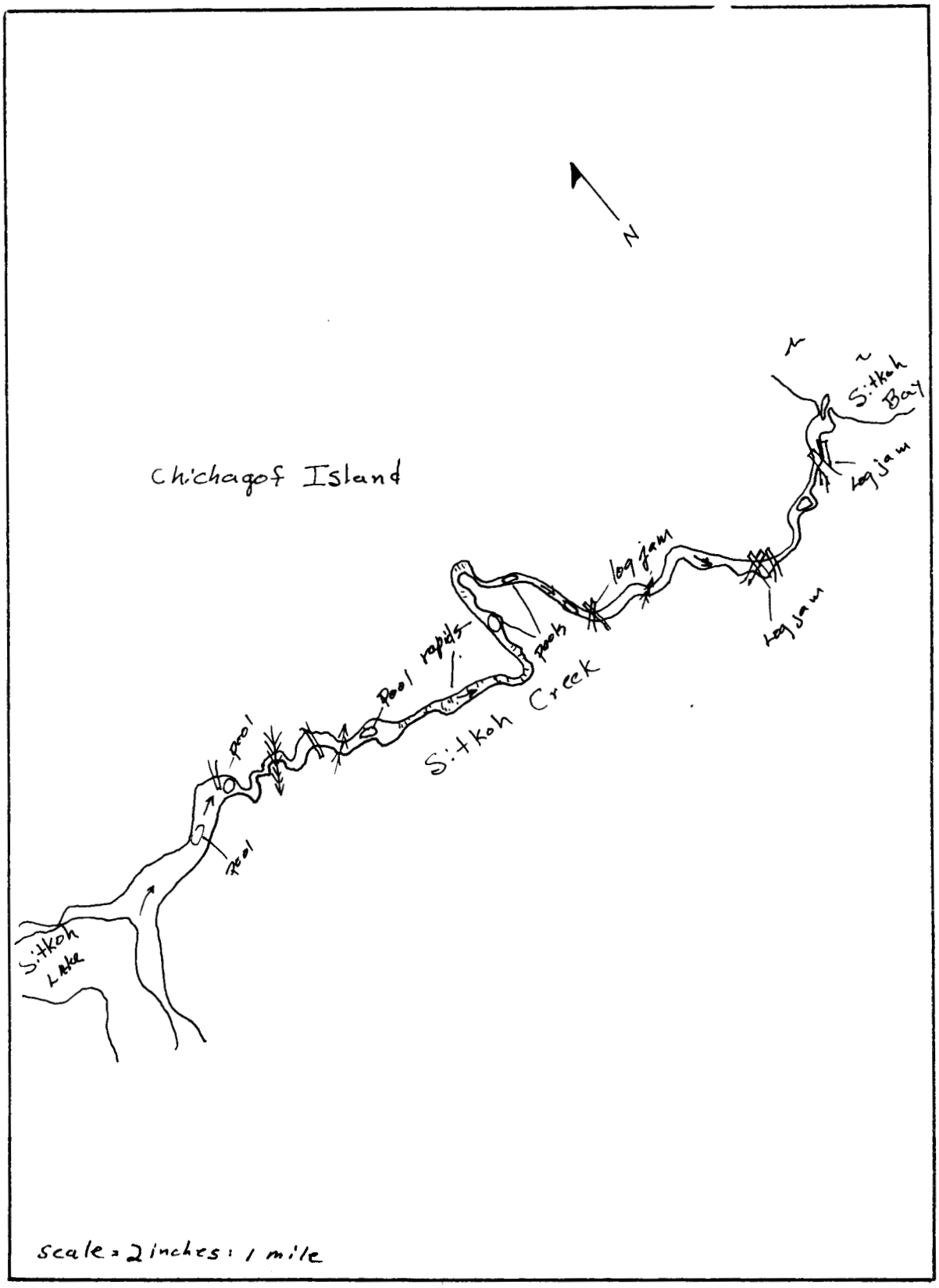

Figure 8. Sitkoh Creek

Restrictive bag and possession limits, i.e., one steelhead per day and in possession over 33", have been in effect for Sitkoh Creek for the past 3 years. Water conditions were excellent during the 1980 survey and a total of 42 adult steelhead were observed. In addition, a total of four steelhead were captured, sampled for biological information, and released. The 1980 steelhead run to Sitkoh Creek was the best observed since surveys were begun in 1975 and were more than double the number noted in 1979 (Jones, 1980). Many of the steelhead observed were under 760 mm (30 inches) which indicates that a better than average return of two-ocean fish were in Sitkoh Creek in 1980. It would appear that restrictive regulations on Sitkoh Creek for the past 3 years are beginning to show results in an increased escapement.

Steelhead Brood Stock Development

The development of a brood stock of spring-run steelhead for southeast Alaska was started at the Crystal Lake Hatchery in 1975. This program has continued and is reported on in the Background section of this report.

A genetic policy change in 1978 dictated that hatchery brood stocks would not be moved over a large geographic area. This policy made it necessary to develop brood stocks of steelhead at other facilities for use in southern and northern southeast Alaska. Starting in 1979, investigations have been underway to establish steelhead brood stocks at the Deer Mountain (Ketchikan), Klawock, Snettisham, and Hidden Falls hatcheries.

Deer Mountain Hatchery--Ketchikan Creek:

The newly remodeled Deer Mountain Hatchery on Ketchikan Creek was enlarged in 1978 and began the development of steelhead brood stock that year with the first egg take from Ketchikan Creek. This program continued in 1979 when 6,000 eggs were placed in incubators.

Weekly surveys of Ketchikan Creek during April and May were conducted to determine when adequate numbers of adult steelhead were present. Adequate numbers were observed on May 10, and a small egg take was undertaken. A total of 5,800 eggs was obtained and placed in the hatchery for incubation.

The building of the hatchery brood stock at Deer Mountain Hatchery began in earnest with the release of 3,200 steelhead smolt into Ketchikan Creek in early June. The first hatchery adults should return to Ketchikan Creek during the spring of 1982, with the remainder returning in 1983.

Klawock Hatchery--Klawock River:

The new Klawock River Hatchery became operational in the summer of 1978 and is now considered the prime facility for the development of a fall-run steelhead brood stock. The Klawock River receives a wild run of fall steelhead from October through December each year. Brood stock development of fall-run steelhead began in the fall of 1978 when 16 adults were captured. These fish were held until ripe and spawn was taken in early 1979.

The brood stock development at the Klawock River Hatchery continued in 1980. During early March 1980, a total of 15 adult fall-run steelhead were captured from the Klawock River. These fish were held at the hatchery until a total of 15,000 eggs were collected in late March.

A total of 2,055 age one phase fall steelhead smolts was released into the Klawock River during early June, 1980. This marked the first release of fall-run steelhead in southeast Alaska. Returns of this release, in the fall-winter of 1982-83 and 1983-84, should provide guidelines for additional work with fall steelhead.

Snettisham Hatchery--Peterson Creek:

The Snettisham Hatchery, located south of Juneau in Port Snettisham, is still under construction. When construction is completed, hopefully in 1981, space will be available to begin a brood stock of spring-run steelhead for use in northern southeast Alaska.

Investigations for a suitable source of steelhead brood stock for the Snettisham Hatchery have been underway for some time.

Peterson Creek, located on the Juneau road system, has been surveyed on an annual basis since 1978. These surveys have shown that the spring-run of steelhead to Peterson Creek is light--probably no more than 50 fish annually--and the late May 1980 survey found the 1980 run to be no exception. Even though the run to Peterson Creek is small, it is still considered the prime source of wild steelhead stock for the Snettisham Hatchery. Two potential weir sites were identified during the 1980 survey (Figure 9).

Hidden Falls Hatchery--Plotnikof River:

The Hidden Falls Hatchery, located in Kasnyku Bay on the eastern side of Baranof Island, has tentatively been selected as the site for the development of a summer-run steelhead brood stock.

Summer-run steelhead occur in only one island system in southeast Alaska. The Plotnikof River system is the only system in which wild summer-run steelhead occur. The Plotnikof system was surveyed in 1978 (Jones, 1979) to determine if adults could be captured for egg takes. It was found that the large size of the river would make it extremely difficult and expensive to weir. In addition, it was found that the summer-run fish would have to be held for up to 8 months before ripe eggs could be taken.

Survey work in July 1980 was aimed at determining if adequate numbers of rearing summer-run steelhead could be captured for transplant and subsequent release at the Hidden Falls Hatchery. A total of 40 fry traps were set at various locations throughout lower Plotnikof Lake and upper Plotnikof River (Figure 10). The catch of rearing steelhead was disappointingly low. It appears that the best steelhead rearing areas are in the middle and lower reaches of the Plotnikof River. The capture and transportation of any number of rearing steelhead out of this area would prove logistically difficult.

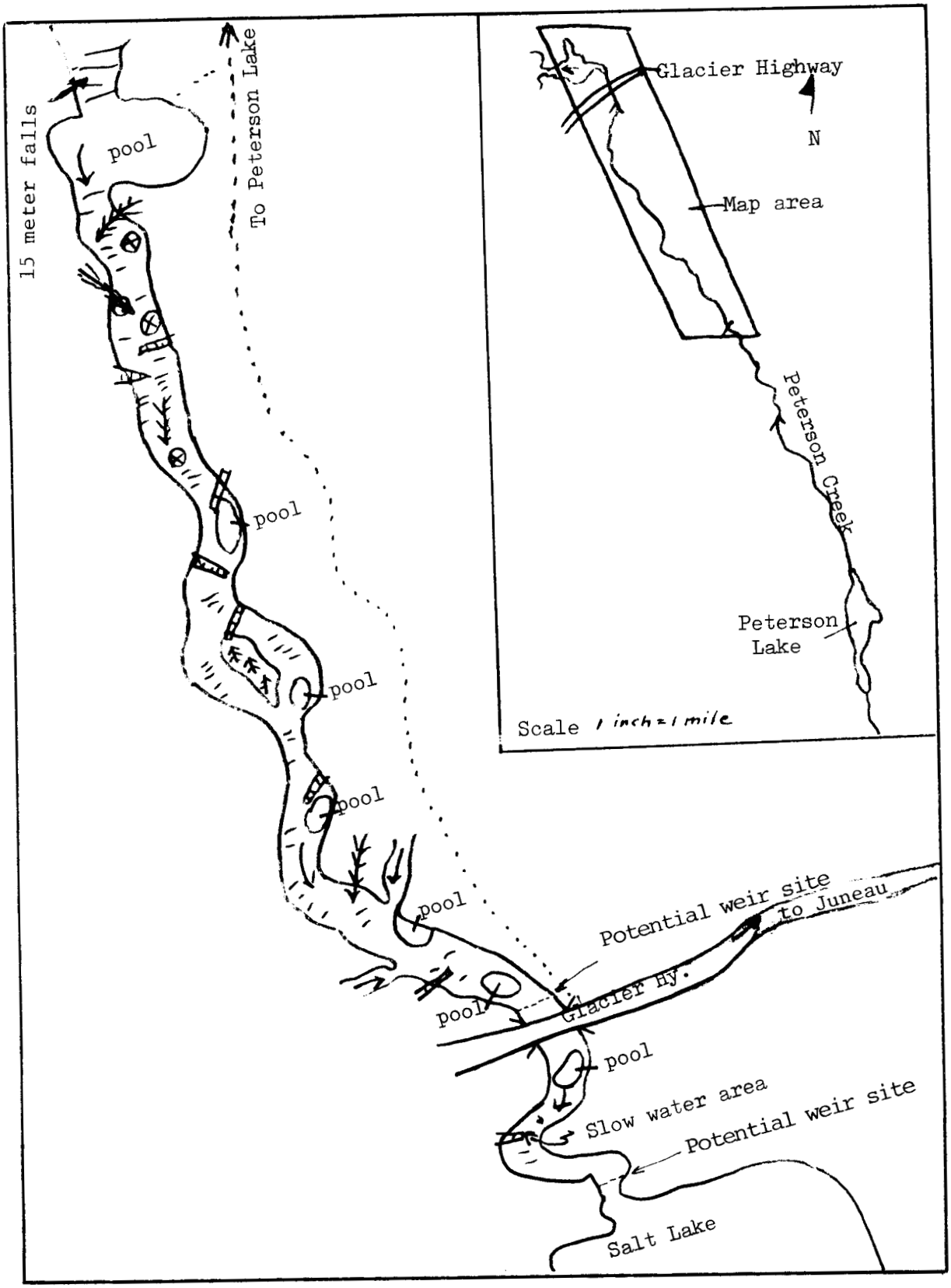

Figure 9. Peterson Creek

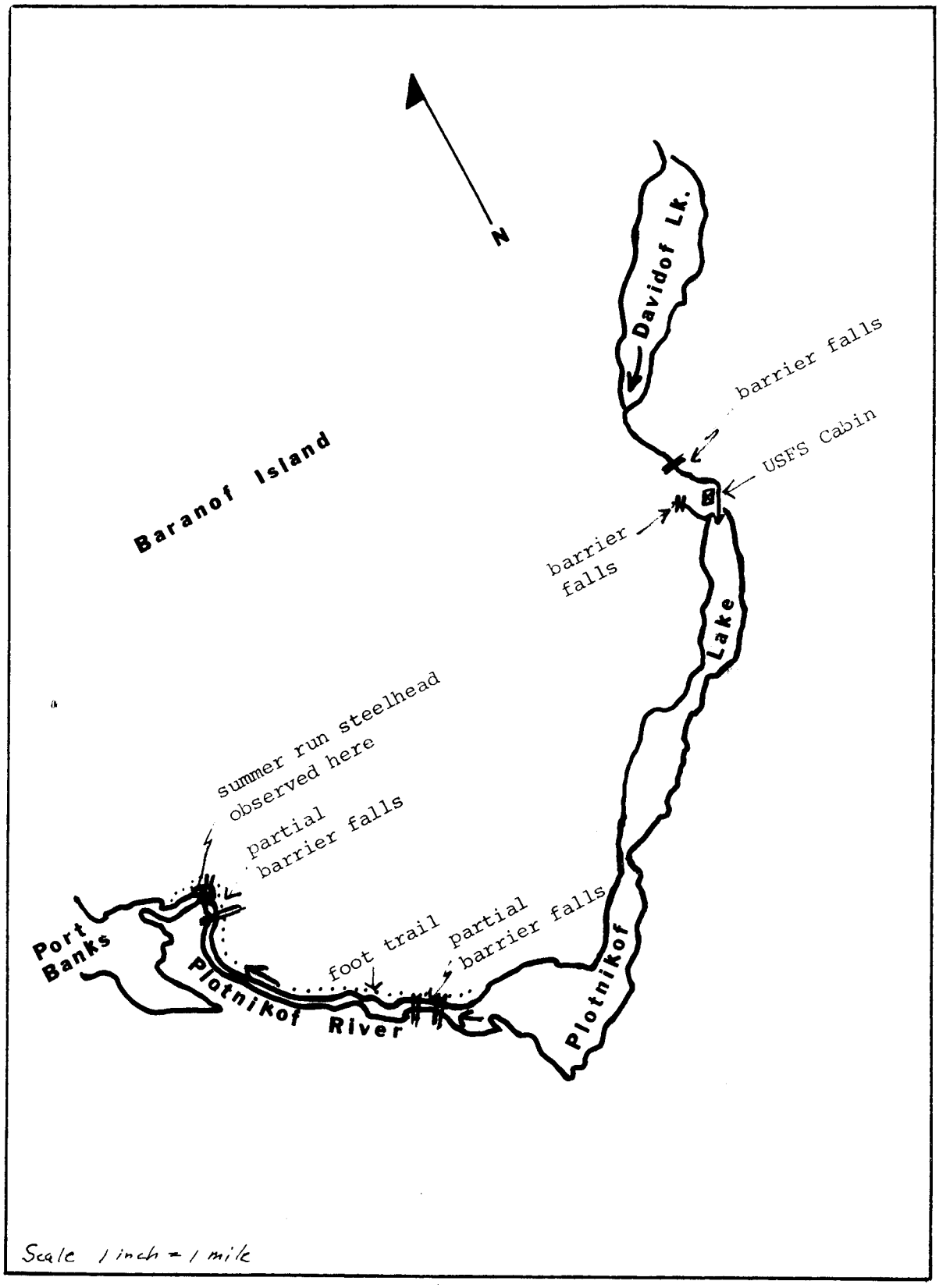

Figure 10. Plotnikof Lake-River

DISCUSSION

The establishment of brood stocks at the various hatcheries throughout southeast Alaska is well underway. Past experience has shown that the best results are obtained when the wild brood stock is obtained from the general hatchery area.

The loss of 2 years of brood stock development at Crystal Lake has set back enhancement plans and it will be 3 or 4 years before an expanded program can begin. The fall-run steelhead program at the Klawock Hatchery is still experimental and enhancement plans for this stock will be dependent on the return of hatchery fish in the mid-1980's.

The ever-increasing expansion of forest logging highways throughout the region will continue to create management problems for many steelhead streams. Survey work must be continued in advance of these problem areas to prescribe management prescriptions best suited to maintaining viable populations of steelhead. Hatchery enhancement of the areas' steelhead fishery is still several years down the line and until that time the steelhead fishery in southeast Alaska will continue to be dependent on wild stocks.

LITERATURE CITED

Jones, D. E. 1978. Development of techniques for the enhancement and management of steelhead trout in southeast Alaska. Alaska Dept. of Fish and Game. Anadromous Fish Studies, Annual Performance Report 1977-1978, 19 (AFS-42-6-A) pp. 1-115.

_____. 1980. Development of techniques for the enhancement and management of steelhead trout in southeast Alaska. Alaska Dept. of Fish and Game. Anadromous Fish Studies, Annual Performance Report 1979-1980, 21 (AFS-42-8-A) pp. 1-22

Zorich, R. 1978. Crystal Lake Hatchery steelhead data series report. Alaska Dept. of Fish and Game. Fisheries Rehabilitation Enhancement and Development Division Series Report 1978, pp. 1-9.

_____. 1979. Crystal Lake Hatchery steelhead data series report. Alaska Dept. of Fish and Game. Fisheries Rehabilitation Enhancement and Development Division Series Report 1979, pp. 1-11.

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