Volume 20 Study AFS 42-7

STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

A STUDY OF CUTTHROAT-STEELHEAD IN SOUTHEAST ALASKA

by

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By: Ed Jones

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Volume 20 Study No. AFS-42

RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations of Alaska

Study No.: AFS-42 Study Title: A STUDY OF CUTTHROAT-STEELHEAD IN ALASKA

Job No.: AFS-42-7-A Job Title: Development of Techniques for Enhancement and Management of Steelhead Trout in Southeast Alaska

Period Covered: July 1, 1978 to June 30, 1979

ABSTRACT

This report covers the third year of study on the development of techniques for the management and enhancement of steelhead, *Salmo gairdneri* Richardson, in Southeast Alaska.

During 1978 an evaluation of steelhead enhancement resulting from hatchery produced smolts was conducted on three streams in Southeast Alaska. An evaluation of the contribution of hatchery steelhead to angler catches at Petersburg Creek was conducted from April 7, 1978 to June 5, 1978. At Petersburg Creek, 29 percent of the 95 fish examined were of hatchery origin. Censused anglers (136) caught 39 steelhead of which 25 percent were of hatchery origin. An additional 56 fish were sampled by hook and line and of these 32 percent were hatchery produced steelhead.

At Montana Creek, near Juneau, only two hatchery produced steelhead could be found during foot and hook and line surveys of the system. The poor return of steelhead to Montana Creek could be due to: (1) too large a geographical displacement from brood source at Petersburg Creek, (2) the brood stock may not be genetically adaptable to the Montana Creek system, or (3) environmental conditions in the marine environment in the Juneau area were unfavorable to survival during the spring of 1976.

Evaluation of returns at Crystal Creek was made at the weir at the Crystal Lake Hatchery. Approximately 9,500 steelhead smolts were released in Crystal Creek in 1975 and an additional 1,600 were liberated in 1976. A total of 69 adult steelhead were trapped in Crystal Creek between April 15 and June 6, 1978. Of this total, 10 were females and 59 were males. Twelve of these fish (.001%) were from the 1975 smolt release while 54 (3.4%) were of the 1976 smolt release. Three wild fish were also trapped. A total of 32,000 eggs were taken from these steelhead and placed in the Crystal Lake Hatchery.

The distribution and general abundance of spring run steelhead was determined for seven stream systems throughout Southeast Alaska during the spring of 1978.

Peterson Creek, located on the Juneau road system, is the only steelhead system easily accessible by auto from Juneau. Surveys in 1978 covered the lower 3 kilometers of stream which contain all of the steelhead water. Contacts with local anglers showed a harvest of six steelhead by four fishermen. Foot surveys also located an additional eight steelhead. Both numbers of fish caught and observed in 1978 were higher than numbers observed in 1977. Admiralty Creek, on the north shore of Admiralty Island, was surveyed during May, 1978, to determine the presence of spring steelhead. Four fish were noted, confirming their presence. Plotnikof River, on Baranof Island, was investigated in mid-May, 1978, for the presence of spring run steelhead. Rod-and-reel sampling in the upper intertidal area resulted in obtaining two steelhead. Examination of these fish showed one to be a one-ocean "jack" male steelhead while the other was an early run summer steelhead. These surveys confirmed that summer run steelhead begin entering the Plotnikof River system as early as May. Sumner Creek is a medium size stream system that enters the Ohmer Creek Estuary on Mitkof Island. A new logging road crosses this stream allowing auto access from Petersburg. Surveys in April and May, 1978, of the lower 2 kilometers showed a small run of steelhead with fish distributed throughout all accessible water. Manhattan and Devil Lake systems, located on Dall Island, were suveyed in late April, 1978. Clear-cut logging with attendant road access is planned for this area within the next 5 years. Little is presently known about fish populations in these two systems. Manhattan Lake was reported to contain a run of spring steelhead; however, surveys in 1978 failed to confirm the presence of either adults or rearing steelhead. Devil Lake system was found to contain a run of spring steelhead. Survey results indicated that the run size was small and would probably not exceed 50 fish annually. White River, on Revillagigedo Island, is known to contain a run of spring steelhead. Surveys were undertaken in early May, 1978, to determine the distribution and magnitude of this population. Helicopter access was used to reach a point 8 kilometers above George Inlet. Adult and rearing steelhead were noted throughout the surveyed section, indicating a population of over 100 adult spring steelhead in White River.

Two stream systems were assessed for their potential as brood stock for steelhead. Ketchikan Creek contains a run of 40-50 adult spring steelhead annually. Sport fishing is not allowed on these fish due to their urban habitat. It was determined that a portion of these fish would be used for brood stock development at the newly remodeled Deer Mountain Hatchery. A total of 15 steelhead was captured from Ketchikan Creek and 15,000 eggs were placed in the Deer Mountain Hatchery. The Klawak River supports a fall run of steelhead of unknown numbers. The new Klawak Hatchery became operational in late summer of 1978 and a weir was constructed across Klawak River. During coho salmon, *Oncorhynchus kisutch* (Walbaum), egg-take operations in November, 1978, sixteen fall run steehead were captured. These steelhead will be held over winter to maturity and will form the basis of a fall run steelhead brood stock.

BACKGROUND

The development of techniques for the management and enhancement of steelhead in Southeast Alaska has now taken on an organized form with the completion of the steelhead management and enhancement plan. This plan has set guidelines for the management of the various exploited steelhead runs and has established recommendations for areas of enhancement.

Completion of the Crystal Lake Hatchery in 1972 provided a facility capable of producing steelhead smolts in 1 year. A program of spring run steelhead production was initiated in 1974 when eggs were taken from wild stock at Petersburg Creek. The first smolts were ready for release in the spring of 1975. A total of 9,500 steelhead smolts was released at Crystal Creek and 8,000 were released in Petersburg Creek. Steelhead eggs were taken in 1975 at Petersburg Creek and Falls Creek. These fish were ready for release in June 1976. Sixteen-hundred were released at Crystal Creek, 6,500 at Petersburg Creek, 2,000 at Falls Creek and 6,500 at Montana Creek.

A program was begun in 1975 to identify streams in Southeast Alaska that were best suited for enhancement with hatchery produced steelhead. Nine streams have been surveyed to date. These streams include Indian River and Salmon Creek in the Sitka area; Fish Creek, Montana Creek, Cowee Creek, and Peterson Creek in the Juneau area; Pats Creek in the Wrangell area; and Mahoney Creek and Ward Creek in the Ketchikan area. Of these streams, only Montana Creek has received steelhead smolts.

Eight stream systems throughout Southeast have been surveyed as possible sources of brood stock for steelhead. Petersburg Creek and Falls Creeks have been developed as sources for spring run steelhead. Eagle Creek, Salmon Bay Creek and Naha River have been investigated for fall-run steelhead brood fish. Eighteen fall run steelhead were taken from Naha River; however, they did not survive the winter at the hatchery. Plotnikof River has been surveyed as a source of summer run steelhead; however, no fish have been taken to date.

The Crystal Lake Hatchery at Petersburg was a key element in the original enhancement plan for steelhead in Southeast Alaska. Adult steelhead returned to the facility in the spring of 1978 and a small egg-take was conducted. All indications looked good for the continued growth of the brood stock at Crystal Lake Hatchery. All this changed in early summer of 1978. Disease problems identified with salmon at the facility resulted in the complete eradication of all fish stocks and a shutdown of the facility for disinfection. Steelhead fry in resident at the time were destroyed even though they were proven to be disease free.

This action has caused a good deal of rethinking of the original plan. It is obvious that to have annually reliable sources of steelhead smolts for enhancement, other facilities must be used to raise these fish. The enhancement program can no longer rely on one facility to supply steelhead needs for Southeast Alaska.

New and remodeled hatcheries at Klawak and Ketchikan are potential alternate sites for steelhead brood stock development; however, they will require three to four years before they will be in full production.

A list of common names, scientific names and abbreviations of all species mentioned in this report is presented in Table 1.

RECOMMENDATIONS

Management

1. A brood stock of spring run steelhead should be developed at the Crystal Lake Hatchery. The first significant return of hatchery produced steelhead adults returned to the Crystal Lake Hatchery in the spring of 1978. Eggs were spawned from nine female steelhead and placed in incubation. Steelhead fry from these eggs were lost in July, 1978, when the Crystal Lake Hatchery was shut down for disease eradication measures. Three-ocean adult steelhead are expected to return in the spring of 1979 to Crystal Creek. An estimated 20 adult females should provide the eggs necessary to begin a new "clean" brood of steelhead at Crystal Creek.

2. A brood stock of fall run steelhead should be developed at the Klawak River Hatchery. Small numbers of fall run steelhead are presently being held at the Klawak Hatchery for ripening, and resulting eggs from these fish will provide the basis of a hatchery produced brood stock of fall run steelhead for enhancement work throughout Southeast Alaska.

3. Approximately ten female and six male steelhead should be obtained from Ketchikan Creek for egg-take purposes. The resulting fish to be reared at the Deer Mountain Hatchery (Ketchikan) for release in Ward Creek. This will mark the second year of steelhead eggs designed to rehabilitate Ward Creek. It is also recommended that steelhead smolts be released in Ketchikan Creek to enhance the existing population.

4. Areas being affected by various forms of development should be monitored by creel census programs, escapement counts and other survey techniques. The ever increasing mileage of logging roads throughout Southeast Alaska will put additional fishing pressure on steelhead streams.

Research

1. The returns of spring run steelhead to streams stocked with hatchery produced smolts should be monitored.

   Spring run steelhead smolts have been liberated in Petersburg Creek, Falls Creek, Crystal Creek and Montana Creek. The first two-ocean adults returned to these systems during the spring of 1978. The number of adults noted in all but Montana Creek were encouraging

Table 1. List of common names and scientific names and their abbreviations.

Common Name	Scientific Name & Author	Abbreviation
Steelhead	*Salmo gairdneri* Richardson	SH
Chinook salmon	*Oncorhynchus tshawytscha* (Walbaum)	KS
Coho salmon	*Oncorhynchus kisutch* (Walbaum)	SS

in 1978. Evaluation of these returns will be monitored by a weir at Crystal Creek and by angler contact at Petersburg Creek, Falls Creek, and Montana Creek. Final analysis of the 1978 and 1979 adult returns will provide guidelines for future management and enhancement work with spring run steelhead.

2. Background data should be gathered on all steelhead streams in Southeast Alaska.

   Many steelhead streams in Southeast Alaska have yet to be surveyed. These surveys should proceed on a timely basis to determine adult steelhead abundance, run timing, distribution, and angler harvest. Surveys of steelhead rearing habitat will be necessary in order to afford reasonable protection from land use practices.

3. Hatchery construction is forging ahead at a rapid pace throughout Southeast Alaska.

   Research needs to be undertaken throughout Southeast Alaska on the selection of brood stocks of steelhead for hatchery use. This research should include run timing, average size, age of migration and habitat preference. Research on diseases of wild steelhead must be done before any wild stock can be certified for hatchery use.

4. Selected stream systems near population centers should continue to receive investigational work to determine which are most suitable for enhancement with steelhead.

   Preliminary surveys have been completed on nine streams throughout Southeast. From these surveys it has been noted that some systems are better suited to steelhead enhancement than others. Additional work needs to be undertaken to identify the best possible systems for enhancement when steelhead smolts become available from the various rearing facilities.

5. Continue investigations of possible sources of spring, fall, and summer run steelhead for future brood stock development.

   Klawak River fall run steelhead appear, at present, to be usable as a brood source at the Klawak Hatchery. However, if the run size at Klawak River is small, additional sources of fall run steelhead may be necessary in the future to meet brood stock requirements. Additional sources of spring run brood stock should be investigated for use in hatcheries being built in northern Southeast Alaska. Summer run steelhead brood stock development may be several years in the future; however, possible sources should be identified for possible selection when it becomes possible to develop a brood stock of this race of steelhead in Southeast Alaska.

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 fall and summer run steelhead eggs or fry could be obtained for future brood stock development.

4. Assist in the development of a brood stock of spring run steelhead at the Crystal Lake Hatchery.

TECHNIQUES USED

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

1. A creel census was conducted on Petersburg Creek between April 1 and June 15, 1978 on a 7-day per week basis.

2. All adult steelhead censused at Petersburg Creek were examined for fin clips, and lengths and scale samples were collected.

3. Foot surveys and rod-and-reel sampling were conducted to determine the distribution of returning hatchery steelhead to the Petersburg Creek system.

4. Periodic fisherman contacts and foot surveys were conducted at Montana Creek to determine the return of adult steelhead to the system.

5. Weir counts were monitored at Crystal Creek to determine the return of hatchery produced steelhead to Blind Slough.

To supply needed information for the steelhead enhancement and management manual, the distribution and general abundance of steelhead was determined for the following streams throughout Southeast Alaska:

1. Peterson Creek was surveyed during May, 1978, to determine adult steelhead numbers and distribution.

2. Admiralty Creek was surveyed during May, 1978, to determine presence of adult steelhead. Additional physical data were collected and a map was drawn.

3. Pleasant Bay Creek was foot surveyed during May, 1978, to determine the magnitude of the steelhead population.

4. Plotnikof River was foot surveyed and hook and line sampled to determine the presence of spring run of steelhead.

5. Duncan Salt Chuck was surveyed in May, 1978, to determine numbers and distribution of adult steelhead.

6. Sumner Creek was foot surveyed and rod-and-reel sampled to determine the abundance and distribution of steelhead in the system.

7. Manhattan Lake was surveyed in April, 1978, to determine adult steelhead numbers and distribution.

8. Devils Lake system was surveyed in April, 1978, to determine adult steelhead numbers and distribution.

9. White River system was foot surveyed and rod-and-reel sampled in May, 1978, to determine adult steelhead numbers and distribution.

Baited minnow 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. Plotnikof River system was the site for a test program of minnow trapping rearing summer steelhead.

2. Ketchikan Creek was surveyed in May, 1978, to determine if sufficient numbers of spring run steelhead were present for brood stock development.

3. The Naha River system was surveyed in the fall of 1978 to determine the feasibility of using this system as a sources of fall run steelhead brood stock.

The tripod and pickett weir on Crystal Creek was given routine maintenance in early April, 1978. Returning adult steelhead were trapped, sexed, held until ripe, spawned and the eggs were placed in incubators at the Crystal Lake Hatchery.

FINDINGS

Steelhead Enhancement Evaluation

Petersburg Creek:

The enhancement of spring run steelhead systems with smolts produced at the Crystal Lake Hatchery was initiated in 1975 with the release of

8,000 smolts that averaged 142 mm in Petersburg Creek. A second plant of 6,500 smolts that averaged 170 mm were liberated during the spring of 1976.

A program was initiated in April of 1978 to determine the contribution of the hatchery smolts to the steelhead run in Petersburg Creek. This evaluation was initially designed around the use of a counting weir; however, this sampling method was not allowed in 1978. Evaluation methods were limited to a creel census of steelhead fishermen, hook and line sampling by a field crew and foot surveys of the system. These forms of evaluation serve as limited indicators of hatchery contribution. A weir remains as the only tool capable of producing total assessment figures.

Census of anglers fishing Petersburg Creek began on April 7, 1978 and continued on a daily basis through the first week of June. A census taker was stationed at the weir cabin (Figure 1) and contacted steelhead anglers as they left the Creek.

During the census period 136 anglers were censused fishing 471 hours to catch a total of 39 steelhead. Examination of these 39 steelhead showed that 10 or 25% were of hatchery origin.

In addition to the above creel census, the field crew at Petersburg Creek undertook a rod-and-reel sampling program to determine the contribution of hatchery steelhead to the 1978 run. Periodic sampling throughout the system resulted in the capture of 56 additional steelhead. Of these 56 additional steelhead, 18 or 32% were of hatchery origin.

All steelhead checked during the creel census and the sampling program were examined for finclips. In addition, lengths, sex and scale samples were collected. Examination of all steelhead showed that 46, or 48% of the total, were of hatchery origin. The majority of these adults were the result of the 1976 smolt plant with only 6 adults showing the fin clip of the 1975 release.

A popular belief among steelhead anglers in the Pacific Northwest is that hatchery steelhead are generally smaller than their wild counterparts. However, Royal (1972) states in his examination of the Washington State steelhead program that hatchery steelhead usually are equal to their wild counterparts in size. Examination of 28 initial wild steelhead spawners and 29 hatchery steelhead at Petersburg Creek showed very little difference in overall size (Table 2). Of the fish sampled, wild steelhead were only slightly larger.

Table 2. Petersburg Creek steelhead, 1978.

	No.	Length Range mm	Average Length mm
Hatchery Steelhead	29	562 - 722	685
Wild Steelhead	28	609 - 785	694

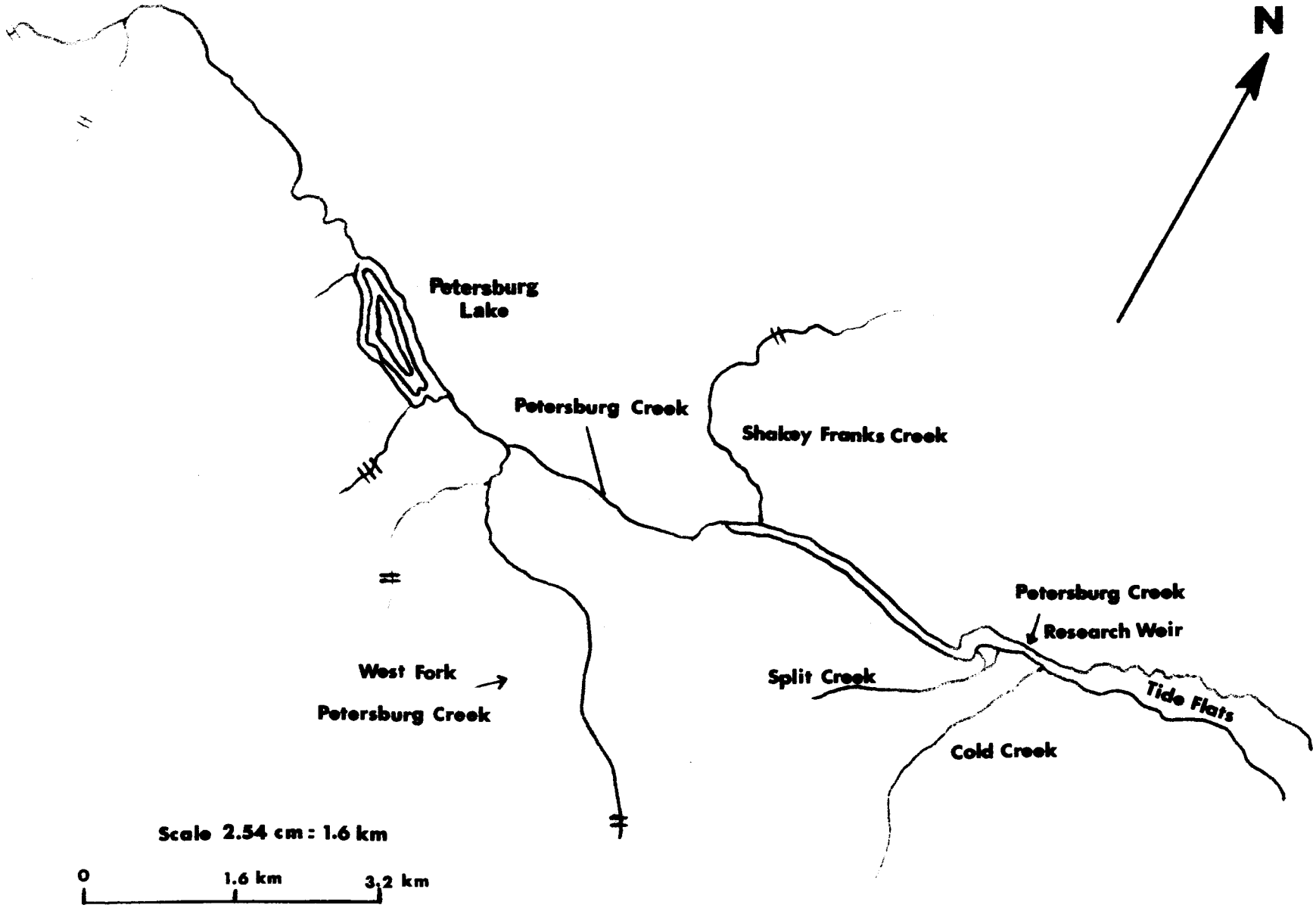


Figure 1. Petersburg Creek System

Foot surveys of Petersburg Creek during April and May, 1978, determined that hatchery steelhead were distributed throughout the system (Figure 1). There was a tendency for the hatchery steelhead to school in the area where they were released for a few days before moving on upstream to the spawning beds. Two pairs of hatchery steelhead did dig redds in the area where they were released as smolts.

Evaluations will continue at Petersburg Creek in the spring of 1979. Creel census and rod-and-reel sampling will be employed in an attempt to assess the return of three-ocean steelhead from the 1975 and 1976 smolt releases. Results in 1978 were encouraging and data collected in 1979 should give an overall picture of what can be expected from hatchery smolt releases.

Montana Creek:

Montana Creek, located on the Juneau road system, is the first non-native steelhead system to be enhanced with hatchery produced smolts. A plant of 6,500 steelhead smolts averaging 170 mm was made in upper Montana Creek on June 5, 1976. The steelhead smolts released at Petersburg Creek and Montana Creek were from the same batch of brood stock and were liberated within a week of each other; both averaged 170 mm in length. The first two-ocean adult steelhead should have returned in the spring of 1978.

Montana Creek was foot surveyed on May 9-11 and 24-26, 1978. Rod-and-reel sampling was conducted on most of the steelhead holding water throughout the system. No adult steelhead were noted on any of the survey days. One steelhead was caught in late May at the confluence of Montana Creek and Mendenhall River. One additional steelhead was taken in late June from the same area. Examination of scales from these fish showed that they were from the 1976 smolt release. Both steelhead were quite small, much smaller than those that returned to Petersburg Creek.

The small return to Montana Creek in 1978 is somewhat disappointing in view of the apparent good return noted at Petersburg Creek. The steelhead smolts released at Petersburg Creek and Montana Creek were from the same batch of brood stock and were liberated within a week of each other; both averaged 170 mm in length. The causes for this poor return at Montana Creek are not fully understood. The local environment in Montana Creek may have caused undue mortalities on the smolts or perhaps the marine environment may have not been suitable when the smolts reached Auke Bay. Montana Creek will be surveyed again in 1979 to determine if any three-ocean steelhead return. Future enhancement of this system may depend upon findings in 1979.

Crystal Creek:

The development of a brood stock of spring run steelhead at the Crystal Lake Hatchery was initiated in 1974 using stock from Petersburg Creek and Falls Creek. Eggs were obtained in 1974 and 1975 from Petersburg Creek and from Falls Creek in 1976 and 1977.

Smolt releases began in Crystal Creek in 1975 and have been continued on an annual basis through the spring of 1978 (Table 3). The first adults from these releases were expected to return in the spring of 1977. Close observation of Crystal Creek in 1977 turned up only two returning adults. The 1975 smolt release was comprised of small size fish (<140 mm average) which may account for the poor return in 1977.

Adult steelhead began entering the trap in Crystal Creek in mid-April, 1978, and a total of 69 were trapped before the run was complete in early June. Of this total, 10 were females and 59 were males. Examination of these fish showed 12 to be from the 1975 smolt release, 54 to be from the 1976 release and 3 were wild steelhead. The females were all ripe the last of May, and 32,000 eggs were placed in the incubators at the hatchery. The high percentage of male steelhead in the 1978 return to Crystal Creek was expected as it was found at Peterburg Creek that steelhead that mature after two years at sea are predominantly males (Jones 1977). The return of three-ocean steelhead in 1979 to Crystal Creek should be comprised of more females than males.

Spring run steelhead brood stock development at Crystal Lake Hatchery suffered a setback in July 1978 when it was decided to shut down the hatchery to rid it of a serious disease problem. IHN virus and BKD had been identified in chinook and coho salmon being raised at Crystal Lake. These diseases were not identified in the steelhead at Crystal Lake; however, they were destroyed along with all fish on hand. This action eliminated the 1978 brood steelhead that were scheduled for release in the spring of 1979. A decision is still pending on allowing the use of the adults that are scheduled to return in 1979. If they can be certified as non-carriers of IHN and BKD they will be allowed for brood stock. If not, additional disease-free brood stocks of steelhead will need to be developed if steelhead are to be raised at the Crystal Lake facility.

Adult Spring Run Steelhead Surveys

Surveys were conducted on seven stream systems throughout Southeast Alaska during the spring of 1978 to determine the presence, distribution and general abundance of spring run steelhead.

Peterson Creek:

Peterson Creek originates in Peterson Lake and flows approximately 7 km before dumping into the waters of Lynn Canal. Approximately 3 km above salt water is located a 15 meter falls that stops any further upstream movement by anadromous fish. Surveys in 1978 covered the area from the base of the falls to tidewater.

Peterson Creek (Figure 2) does not contain a large number of fishable pools which tend to concentrate both steelhead and steelhead anglers.

Access to Peterson Creek is good via a Forest Service trail that leaves the Glacier Highway near the highway bridge. The small native steelhead run to Peterson Creek is presently the only steelhead population accessable by auto from Juneau and therefore receives heavy fishing pressure.

Table 3. Crystal Creek steelhead 1975-1978.

Date	No. Released	Size	Returns M	Returns F	Brood Source
6/6/75	9,500	142 mm	4	8*	Petersburg Creek
6/10/76	1,600	170 mm	53	1*	Petersburg Creek Falls Creek
6/17/77	630	175 mm	-	-	Falls Creek
5/27/78	10,700	162 mm	-	-	Falls Creek

* These steelhead were captured in Crystal Creek in April and May, 1978.

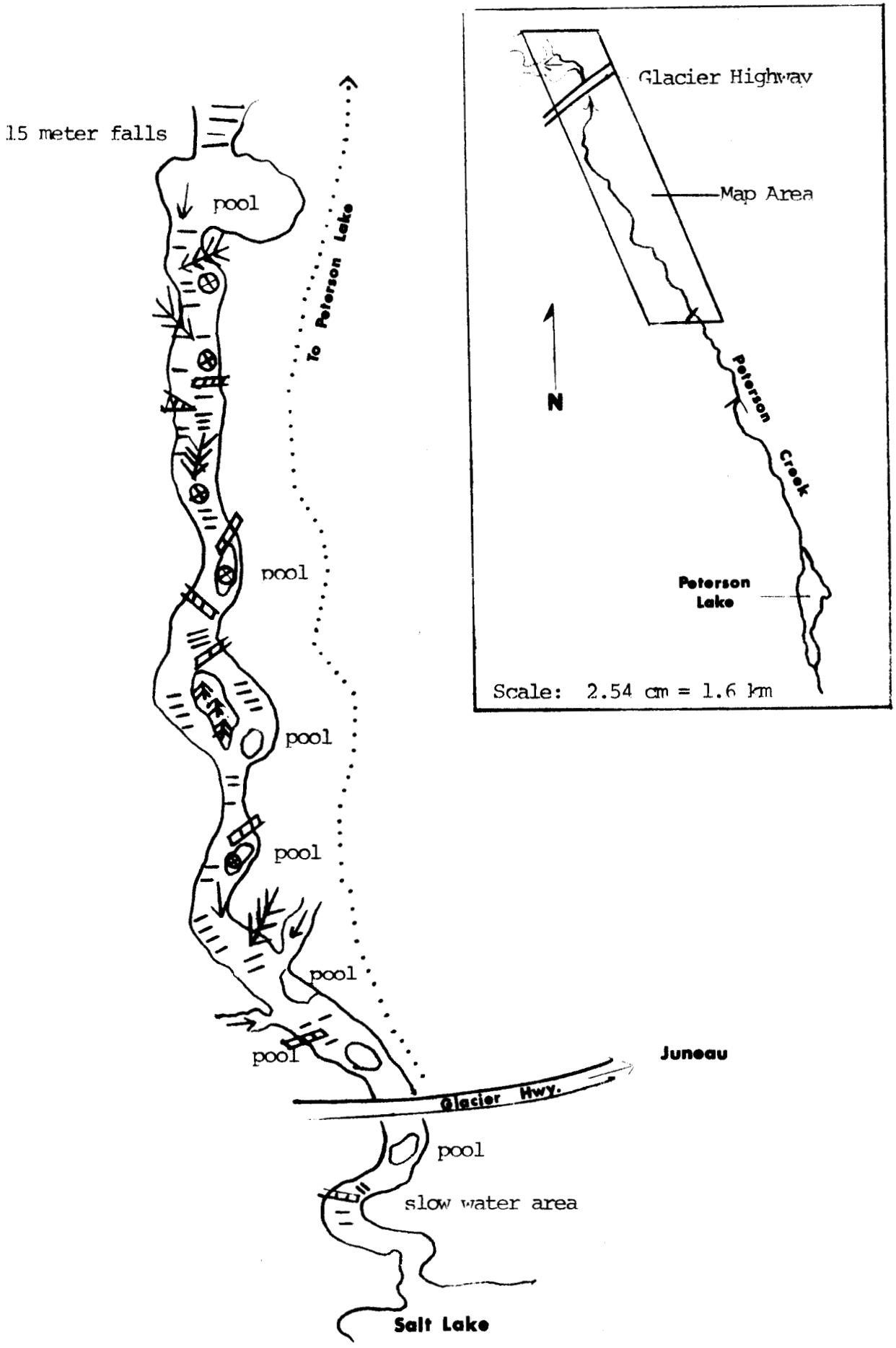


Figure 2. Peterson Creek

Two foot surveys were made on Peterson Creek in May, 1978. Contacts with local anglers showed a harvest of six steelhead by four anglers. Foot surveys also located an additional eight steelhead. Both numbers of fish caught and observed in 1978 were higher than those recorded in 1977.

Admiralty Creek:

Admiralty Creek, in Young Bay, Admiralty Island, (Figure 3) originates in Young Lake and flows 7 km to Admiralty Cove, Young Bay. An impassable falls is located approximately 3 km above salt water.

Admiralty Creek, in the area surveyed (first 3 km), is characterized by a braided stream channel that appears to be quite unstable. Large numbers of blowdown logs cross the stream channel throughout the area. Pools are scattered throughout the area surveyed with the better holding water occurring in the upper area.

Admiralty Creek had been reported to contain a run of spring steelhead, and a day long survey on May 10, 1978 confirmed this rumor. The first steelhead were observed approximately 1 km above salt water. Four additional fish were observed in the area surveyed. Steelhead sampled by rod and reel were all bright and immature indicating that the run was in the early stages. Baited minnow traps were fished throughout the lower stream area but no rearing steelhead were captured. Cold water temperatures ($2^{o}C$) may be the reason for the poor trapping results or perhaps rearing steelhead are found further upstream.

Admiralty Creek supports a small run--probably less than 100--of spring steelhead annually. Its ease of access and close proximity to the Juneau area should make this a popular steelhead stream once the Juneau area anglers become aware of the existing run.

Plotnikof River:

The Plotnikof Lake and River system, located at Port Banks on the west coast of Baranof Island, support the only known run of summer steelhead on the islands of Southeast Alaska.

Plotnikof River from Plotnikof Lake to Port Banks (Figure 4) has one of the steepest gradients known to be passable to anadromous fish. The river below the lake consists of a series of low falls 1-2 m high connected by rough rapids. The middle section of Plotnikof River is a 2 km section of lower gradient with many deep pools and excellent spawning riffles. The last .7 km of river again is comprised of several low falls and rapids and terminates in a 5 m falls at tidewater in Port Banks.

The existence of a run of summer steelhead at Port Banks has been known for some time, with fish available to fishermen from late June through July. Reports had been received for several years about a spring run of steelhead at Port Banks. To determine if these reports were true, a

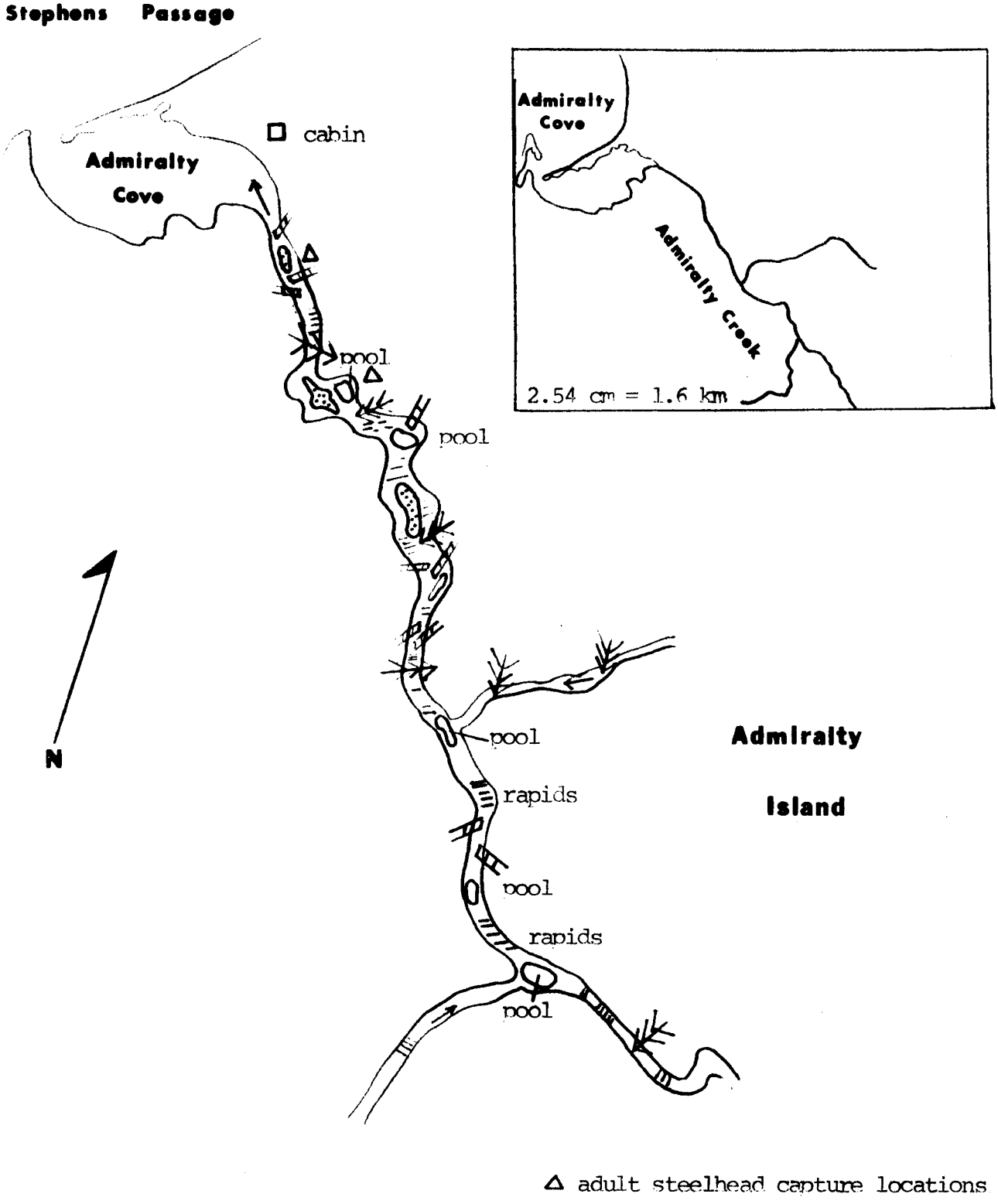
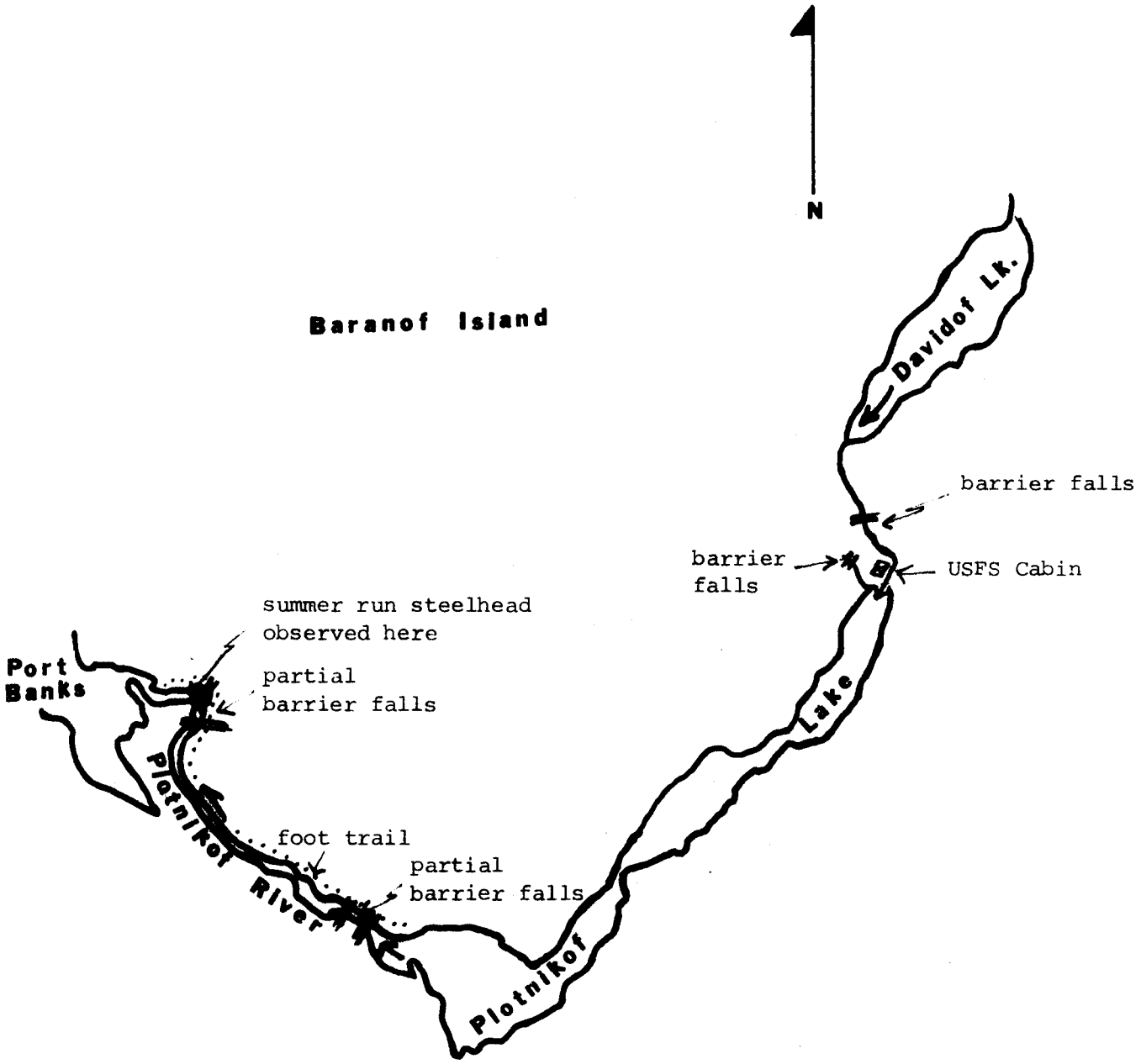


Figure 3. Admiralty Creek



Scale: 2.54 cm = 1.6 kilometers

Figure 4. Plotnikof Lake-River.

survey trip was made to Plotnikof River on May 15, 1978. Hook and line sampling in the lower river produced two steelhead landed for sampling and two more observed but not sampled. One of the fish landed was a female while the other was a male. The female was not sexually mature and would not spawn before the spring of 1979. The male steelhead was mature and was found to be a true "jack" in that it had spent only one winter in salt water before entering Plotnikof to spawn.

From the 1978 spring survey it appears that steelhead enter the system as early as mid-May and continue to enter as late as early August. Steelhead at Plotnikof are of the summer run race, being defined as steelhead that enter a system during the "summer" in an immature condition. These fish remain in the river system until the following "spring" before maturing and spawning. The steelhead entering the Plotnikof system in May will not spawn until the following April or May. Therefore, they are not spring steelhead but early run summer steelhead.

Sumner Creek:

Sumner Creek, located on south central Mitkof Island, heads in the Sumner Mountains of Mitkof Island and flows 10 km to Blind Slough. Anadromous fish are able to ascend Sumner Creek for a distance of 3 km on the right fork and 4 km on the left fork (Figure 5).

A new logging road that leaves the Mitkof Highway at mile 21.5 parallels the lower portion of Sumner Creek before crossing it 2 km above tidewater. This newly created access has put angling pressure on Sumner Creek where little occurred before the logging road was built. The area is slated for clear-cut logging in the next 5 years which will have additional impacts on fish populations in Sumner Creek.

Surveys of Sumner Creek on May 9 and 11, 1978 were conducted to determine the magnitude and distribution of steelhead. Rod-and-reel sampling captured a total of four steelhead. No additional steelhead were noted. With the limited rearing area available to steelhead in Sumner Creek it is believed that the steelhead run is small, probably no more than 75-100 adults annually.

Manhattan Lake System:

Manhattan Lake system, located on the northwest side of Dall Island, heads in a low valley between Squaw and White mountains and flows approximately 5 km to Manhattan Arm of Sea Otter Harbor (Figure 6).

Clear-cut logging with an attendant access road is planned for this valley within the next few years. Very little is presently known about the Manhattan system fish populations and, therefore, a survey was made on April 26 and 27, 1978 to assess the magnitude and distribution of the steelhead run in the system.

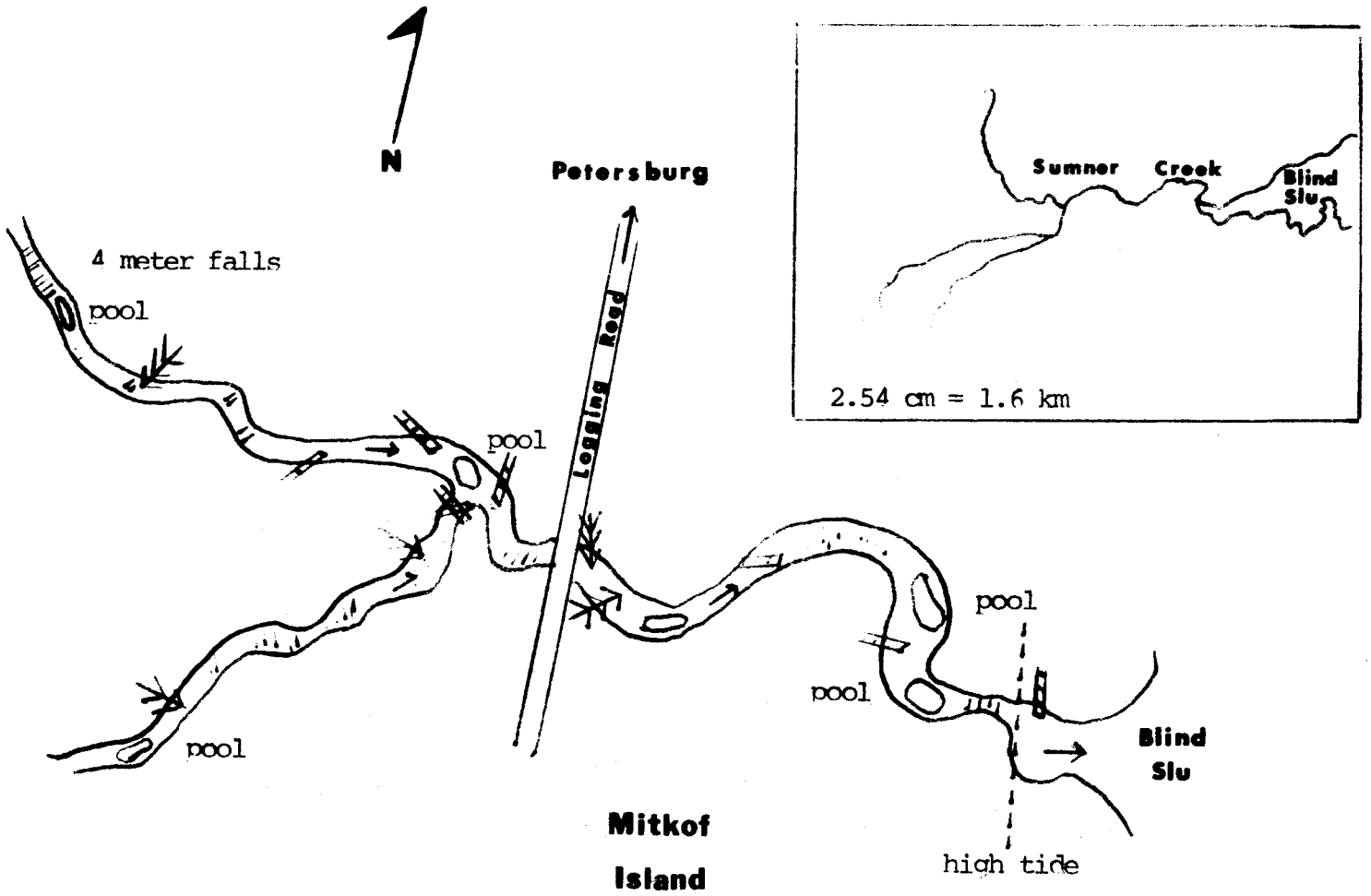


Figure 5. Sumner Creek

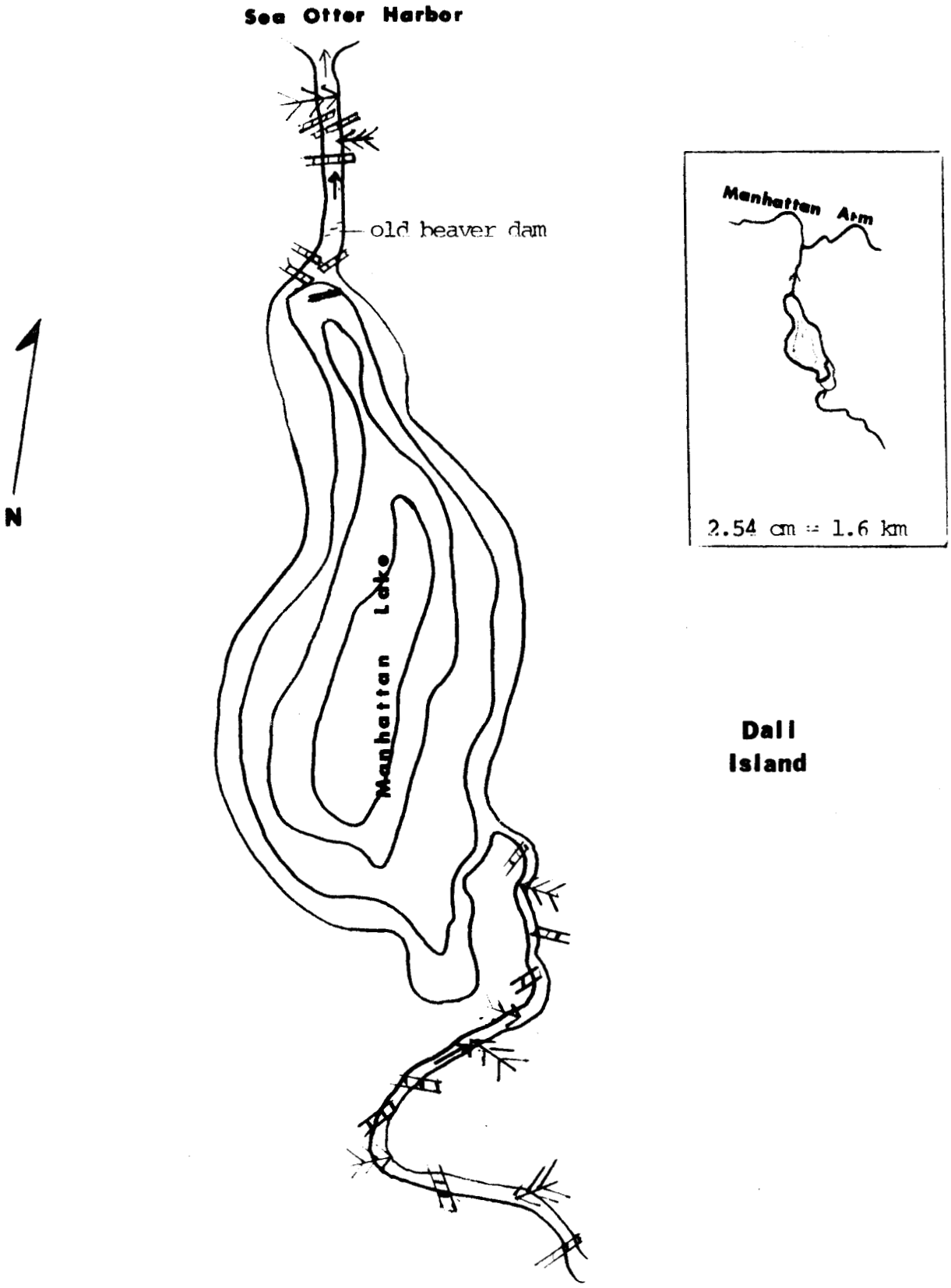


Figure 6. Manhattan Lake System

Anadromous fish migrations are possible for a distance of approximately 3 km above Manhattan Lake. The 1978 survey was limited to the first 1.5 km of inlet stream and the outlet stream. Rod-and-reel and baited minnow traps failed to locate any adult or rearing steelhead. Previous reports of steelhead in this system are apparently in error.

Devil Lake System:

The Devil Lake system, located on the west coast of Dall Island, heads in a short mountain valley and flows for 4 km before emptying into Camp Cove (Figure 7).

Devil Lake system is also slated for clear-cut logging within a few years which will provide access to the area. At present there is only limited knowledge of the fish populations in the system. A 2-day survey was conducted on April 25, 1978 to determine the magnitude of the steelhead population in the system.

The inlet to Devil Lake is of a low gradient and at the time of the survey was quite low due to a spell of dry weather. No adult steelhead were located in the first 2 km of Devil Creek or in the entire lake outlet. Baited minnow traps fished in the inlet captured small numbers of rearing steelhead. Gill nets fished in Devil Lake off the main inlet captured three adult steelhead.

From these surveys it appears that this system supports a small run of spring steelhead with no more than 50 adults annually. Anything other than light fishing pressure will make the management of this population difficult.

White River:

White River, located on the northwest end of Revillagigedo Island, flows 13 km before dumping into upper George Inlet (Figure 8). Steelhead are known to run the White River; however, their numbers and distribution had not been determined.

A 1-day survey of the lower 8 km was conducted in early May 1978. Access to the upstream area was via helicopter from Ketchikan.

White River, from the point of survey throughout, is characterized by a series of excellent holding pools interspaced with good to excellent spawning riffles. Rearing fish habitat is varied in type and is abundant throughout.

Baited minnow traps were fished in all likely habitat types throughout the length of the survey. Rearing steelhead were captured from the starting point all the way to salt water. Twenty-five adult steelhead were counted in various holding pools throughout the survey. The observation of 25 adults in the area surveyed is an indicator that White River supports a good run of spring steelhead.

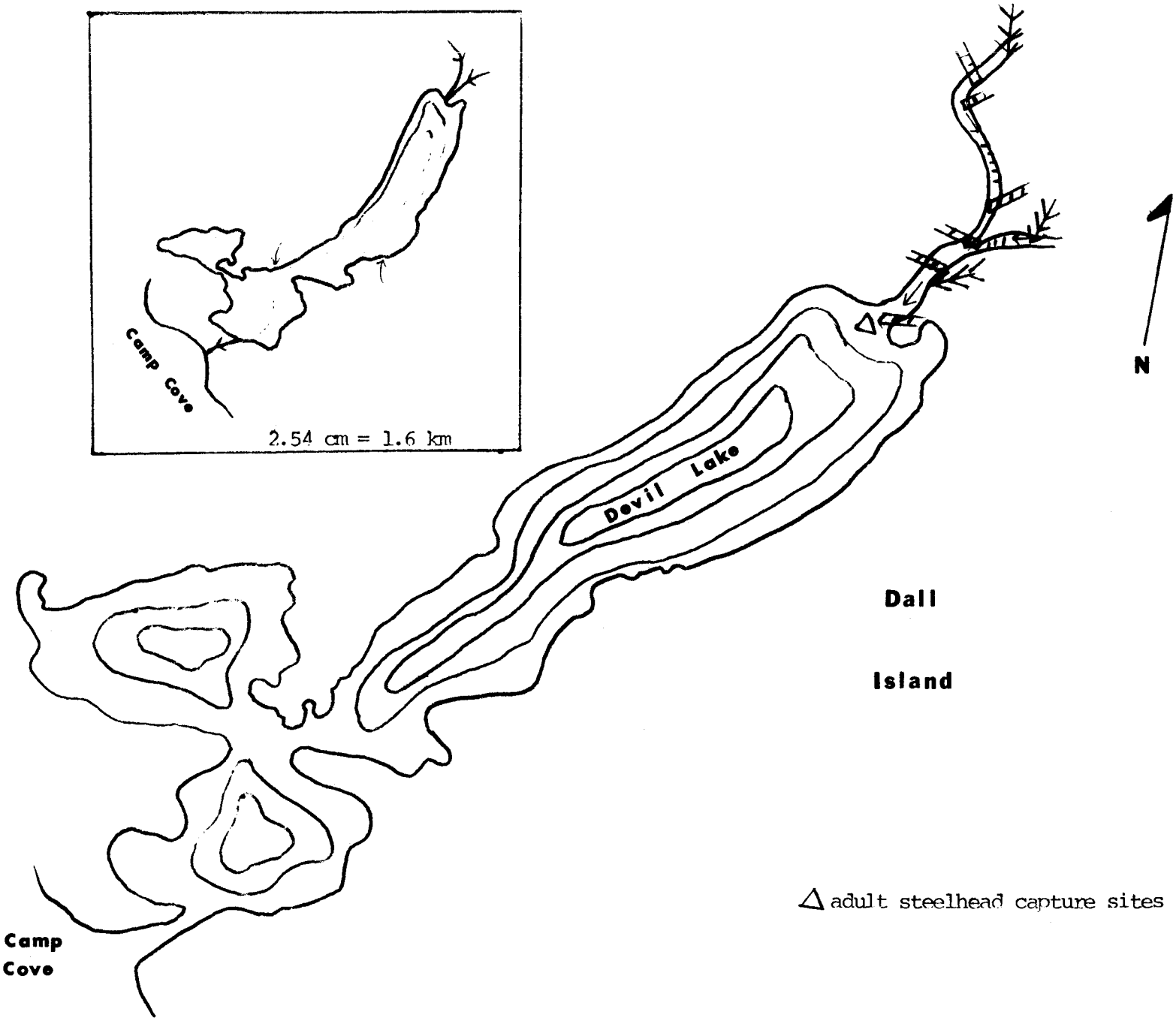


Figure 7. Devil Lake System

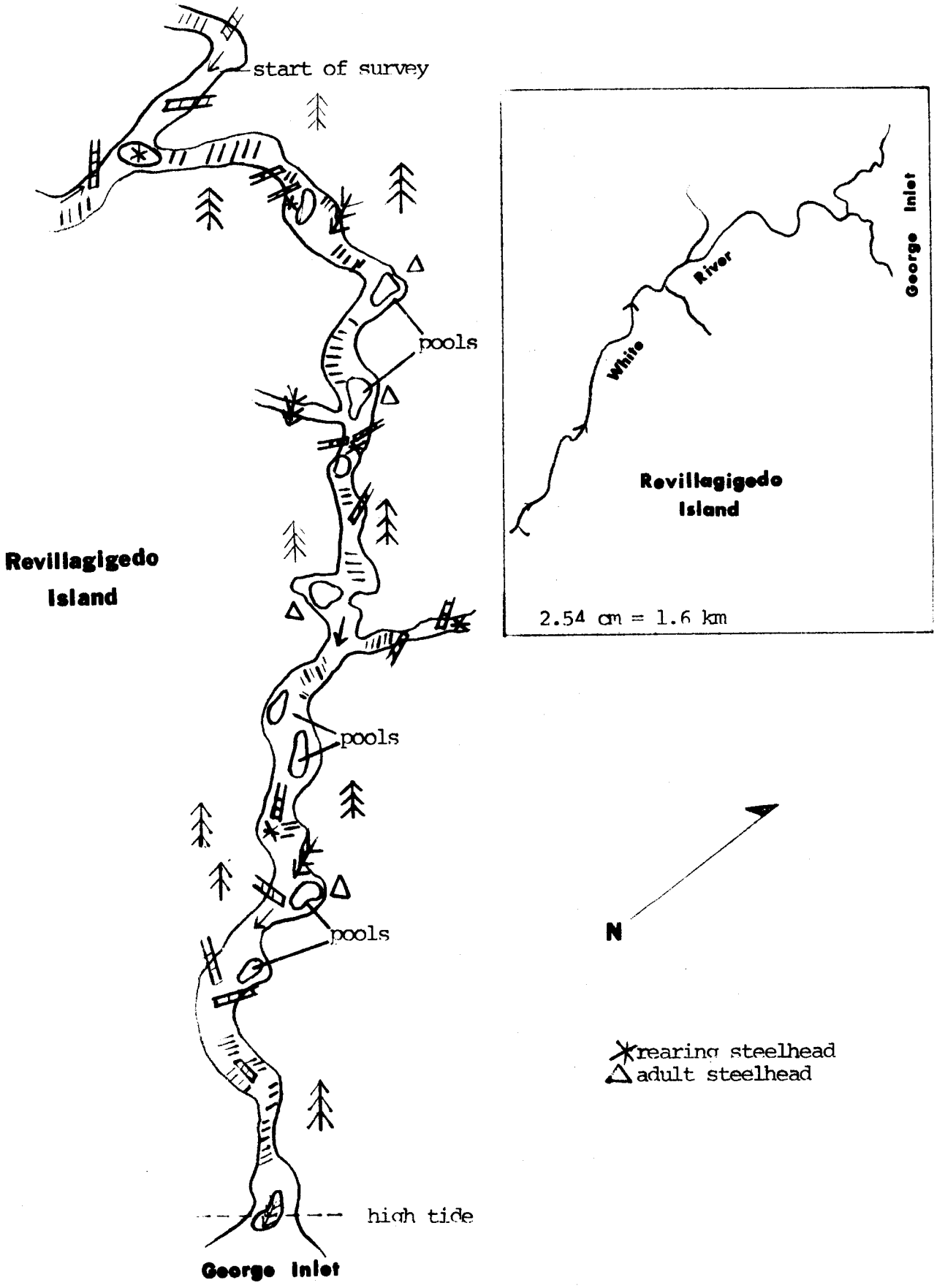


Figure 8. White River

Due to time limitations and weather delays, surveys scheduled for Pleasant Bay Creek and Duncan Salt Chuck Creek were not carried out during 1978.

Steelhead Brood Stock Development

The development of a brood stock of spring run steelhead was started at the Crystal Lake Hatchery in 1975 with releases of fish from Petersburg Creek and Falls Creek. This program has been continued on a small scale at Crystal Lake until the present time.

Disease problems with salmon being reared at Crystal Lake required the complete shutdown of the facility in 1978 with the attendant loss of fish on hand. With the above action, it has become apparent that the development of steelhead brood stock must be carried out at more than one facility in order to protect the program.

The newly remodeled Deer Mountain Hatchery in Ketchikan now has the capability of rearing steelhead smolts. A small egg-take of spring run steelhead from Ketchikan Creek was conducted in May, 1978. A total of 15,000 eggs was taken. These eggs were placed in the Deer Mountain Hatchery for hatching and rearing to smolts. These smolts are scheduled for release in Ward Creek and Ketchikan Creek.

The Klawak River Hatchery became operational in late summer of 1978. The Klawak River system receives a fall run of steelhead that enter the system in October and November. The extent of this run is unknown.

During coho salmon egg-take operations at the Klawak River in November, 1978, sixteen fall run steelhead were captured. These fish will be used to test the hatcheries ability to hold steelhead over winter and to begin a brood source for fall run steelhead.

DISCUSSION

The management and enhancement of the various races of steelhead in Southeast Alaska have been made more difficult by the failure at the Crystal Lake Hatchery and the ever increasing amounts of roads being constructed for timber harvest.

Loss of the brood stock at Crystal Lake Hatchery has made it quite clear that there must be brood stocks at more than one facility. Ongoing research and enhancement programs have and will suffer for several years until additional brood sources of steelhead can be developed at other facilities.

The rapid expansion of forest logging roads throughout the region will continue to create management problems on streams with small steelhead populations. Special management regulations may be necessary in the future to maintain these wild runs.

On the positive side, recent Presidential action creating extensive wilderness areas in Southeast Alaska has taken the pressure off some steelhead systems. Many of the better steelhead systems are outside the newly created wilderness areas and will require additional effort to protect the habitat from land use activities which include urban development, road building and logging. Additionally, restrictive steelhead bag and possession limits and closed areas may be necessary on certain waters to maintain a viable sport fishery for wild steelhead.

LITERATURE CITED

Jones, D.E. 1977. A study of steelhead-cutthroat in Alaska. Alaska Department of Fish and Game. Anadromous Fish Studies, Annual Performance Report 1976-1977, 18 (AFS-42-5-A) 1-26.

Royal, L. A. 1972. An Examination of the Anadromous Trout Program of the Washington State Game Department. Special Report 175 pp.

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