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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
Study No.:	AFS-42	Study Title:	A STUDY OF CUTTHROAT--STEELHEAD IN ALASKA
Job No.:	AFS-42-8-A	Job Title:	Development of Techniques for Enhancement & Management of Steelhead Trout in Southeast Alaska

Period Covered: July 1, 1979 to June 30, 1980

ABSTRACT

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

During 1979 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 anglers' catches at Petersburg Creek was conducted from April 4, 1979 to June 7, 1979. At Petersburg Creek, 31 percent of all steelhead examined were of hatchery origin.

At Montana Creek, near Juneau, no hatchery produced steelhead could be found during hook & line and foot surveys of the system in 1979. The lack of survival and return to Montana Creek may have been caused by: 1) a large geographic displacement from the brood source at Petersburg Creek, 2) genetic problems adapting to the Montana Creek system, or 3) environmental conditions that were unfavorable to smolt survival.

Evaluations of steelhead returning to Blind Slough were made at the weir on Crystal Creek and in the sport fishery on Blind Slough. A total of 86 adult steelhead were accounted for in the sport fishery and at the weir. These steelhead originated from smolts liberated in 1975 and 1976, with the 1976 release accounting for the majority of the return. Based on returns in 1978 and 1979, survival of smolts to returning adults was 9.2 percent.

The distribution and general abundance of spring run steelhead was determined for four stream systems throughout southeast Alaska during the spring of 1979. Pleasant Bay Creek on eastern Admiralty Island was surveyed in May 1979 to determine the strength of the run. Foot surveys of the entire length of the stream noted nine adult steelhead. Sitkoh Creek, located on southeast Chichagof Island was foot surveyed in May 1979 to assess the magnitude of the steelhead run. Restrictive bag and possession limits have

been in effect for this fishery for 2 years. A total of 17 adult steelhead were noted during the survey. Ward Creek, near Ketchikan, was surveyed in April and May 1979 to gather background data on the steelhead run prior to enhancement of this system to mitigate losses of steelhead caused by a chlorine spill in 1978. The 1979 adult steelhead run of over 100 fish was considerably above the previous estimates of 50-75 adults annually. Thoms Creek, on Wrangell Island, was foot surveyed in May 1979. Survey conditions were good, however, no adult steelhead were noted. Rearing steelhead were noted indicating that this system does contain a steelhead run, however, run size and timing remains undetermined.

Three stream systems were assessed during 1979 for their potential as brood stock donors for hatcheries in southeast Alaska. Kah Sheets Creek, located on southeast Kupreanof Island, was investigated as a possible alternate source of spring run steelhead brood stock for the Crystal Lake Hatchery. Kah Sheets Creek has a known run of 75-150 adult steelhead annually. Eleven samples were collected from adult steelhead in 1979. Pathological examination of these samples showed them to be free of both BKD and IHN virus. Ketchikan Creek, located in downtown Ketchikan, was monitored on a weekly basis during April and early May 1979. Adequate numbers of adult steelhead were present on May 8, 1979 and a small egg take was conducted. A total of 6,111 eggs were placed in the Deer Mountain Hatchery for incubation. Klawock River, located near the town of Klawock on Prince of Wales Island, was surveyed in May 1979. Surveys of three inlets to Klawock Lake failed to locate adult steelhead spawners. However, adult steelhead spawners were located in the main river below the lake. Plans were formulated to continue the fall run steelhead brood stock development at the Klawock hatchery with the capture of 30-40 fall run fish during the winter of 1979-1980.

BACKGROUND

The development of techniques for the management and enhancement of steelhead in southeast Alaska has taken on an organized form with the completion of the Steelhead Management and Enhancement Plan (Jones 1978). This plan has set guidelines for the management of the various exploited steelhead runs and has established recommendations for areas of enhancement.

The Crystal Lake Hatchery began spring run steelhead production when the first eggs were obtained from Petersburg Creek in 1974. Additional eggs were obtained in 1975 from Falls Creek and Petersburg 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. During the period of June 1-5, 1975, a total of 9,500 steelhead smolts were liberated at Crystal Creek and 8,000 were liberated in Petersburg Creek. Steelhead eggs taken in 1975 experienced high hatchery mortalities which resulted in 1,600 liberated at Crystal Creek, 6,500 at Petersburg Creek, 2,000 at Falls Creek, and 6,500 at Montana Creek. Adult returns from these releases have ranged from quite good at Crystal Creek, Falls Creek, and Petersburg Creek, to very poor at Montana Creek.

A continuing program has been under way since 1975 to identify streams in southeast Alaska that are 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, Kowee 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 plants of steelhead smolts.

A continuing program has been under way since 1976 to survey stream systems throughout southeast Alaska as possible sources for steelhead brood stock. Petersburg Creek and Falls Creek have been developed and used as sources for spring run steelhead. Eagle Creek, Salmon Bay Creek, Naha River and Klawock River have been investigated for fall run steelhead brood fish. A small number of fall run steelhead have been taken from the Klawock River run for an experimental egg take. Plotnikof River has been surveyed as a source of summer run steelhead, however, no fish have been taken to date.

The steelhead brood stock development of Crystal Lake Hatchery was suspended in the summer of 1978 when the facility was closed down to eradicate diseases identified in salmon. The disinfection of the facility resulted in the loss of all fish on hand. Steelhead fry in residence at the time were destroyed even though they were proven to be disease free. Also, the adults returning in 1979 were not used as brood stock as they might be carriers of various diseases.

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 steelhead. The steelhead enhancement program can no longer rely on one facility to supply the steelhead needs for southeast Alaska.

The Crystal Lake Hatchery will begin raising steelhead again in 1980. In addition, the Deer Mountain Hatchery at Ketchikan will soon be producing steelhead brood stock, and the Klawock Hatchery should be in steelhead production within 2 years. It will still be 3 or 4 years before adequate numbers of steelhead smolts will be available to enhance other systems.

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

RECOMMENDATIONS

Management

1. Establish 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 Crystal Lake Hatchery in 1978 and 1979. Eggs were taken from the 1978 females, however, these were lost when the hatchery was shut down for disease eradication measures. No eggs were taken from the 1979 return, as these adults were raised with disease infected salmon. Pathological examination of the 1978 and 1979 adults did not turn up any incidence of disease and it is expected that the 180 - 200 adults expected back in 1980 will be used for brood.

Table 1. 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

2. Develop a brood stock of spring run steelhead at the Deer Mountain Hatchery. Steelhead eggs were collected in Ketchikan Creek beginning in 1978 and have been taken on an annual basis through 1979. Resulting smolts from these egg takes will be used to rehabilitate Ward Creek and to build the brood stock in Ketchikan Creek. Surplus smolts will be used to enhance spring steelhead fisheries in the Ketchikan area.

3. Develop a brood stock of fall run steelhead at the Klawock Hatchery. An experimental egg take was conducted at the Klawock River Hatchery in early 1979. The resulting 3,000 smolts will be ready for release in 1980. It is recommended that an additional 40 steelhead be collected from the fall run for establishment of a strong brood run in Klawock River and for use in other systems on the Prince of Wales road system.

4. It is recommended that areas 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, together with an annual increase in numbers of anglers, will put increasing fishing pressure on the steelhead resource.

Research

1. Gather background data 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 rearing habitat will be necessary in order to afford reasonable protection from land use practices.

2. Select 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. Research on diseases of wild steelhead must be undertaken before these stocks can be used for hatchery brood.

3. Enumerate the steelhead population in the Situk River.

   Rapidly increasing fishing pressure on the Situk River steelhead population has made management of the fishery difficult. It is recommended that a research program be undertaken at the Situk River that will provide management with accurate counts of steelhead entering the system. In addition, harvest rates (e.g.), creel census, 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 eggs could be obtained for future brood stock development at the various hatchery facilities throughout Southeast.

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 4 and June 7, 1979, 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 in the Petersburg Creek system.

4. Periodic fishermen 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.

The distribution and general abundance of steelhead were determined for the following streams throughout southeast Alaska:

1. Pleasant Bay Creek was surveyed during May 1979, to determine adult steelhead numbers and distribution.

2. Sitkoh Creek was surveyed in early May 1979, to determine adult steelhead numbers.

3. Ward Creek was surveyed during April and May, 1979, to determine adult steelhead numbers and spawning grounds.

4. Thoms Creek system was surveyed in May 1979, to determine steelhead abundance and spawning grounds.

5. Wheeler Creek was foot surveyed to determine the presence and distribution of adult steelhead during 1979.

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. Kah Sheets Creek was sampled periodically during April and May 1979, to determine if sufficient numbers of spring steelhead were present for brood stock development.

2. Ketchikan Creek was monitored weekly during May 1979, to determine if sufficient numbers of steelhead were present for egg takes.

3. Admiralty Creek was foot surveyed during May 1979, to determine if sufficient numbers of spring run steelhead were present for brood stock development.

4. Klawock River was foot surveyed and sampled with hook and line in May 1979, to locate and test adult steelhead for brood stock.

The pickett weir on Crystal Creek was given routine maintenance in early April 1979. Returning adult steelhead were trapped, sexed, and scale samples collected. Kidney samples and ovarian fluid was collected for pathological testing.

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 in Petersburg Creek. A second plant of 6,500 smolts was conducted during the spring of 1976.

The evaluation of these plants continued during the spring of 1979 to determine the contribution of these hatchery smolts to the steelhead run in Petersburg Creek. Budgeting and other factors ruled out the use of a counting weir in 1979. Evaluation methods were limited to a daily creel census of steelhead fishermen, hook and line sampling by the field crew, and foot surveys of the system. These forms of evaluation serve only as indicators of hatchery contribution. A counting weir remains the best tool for assessing total figures.

Census of anglers fishing Petersburg Creek began on April 4, 1979, and continued on a daily basis through June 7, 1979. A census taker was stationed at the old weir cabin (Figure 1) and contacted steelhead anglers as they left the creek.

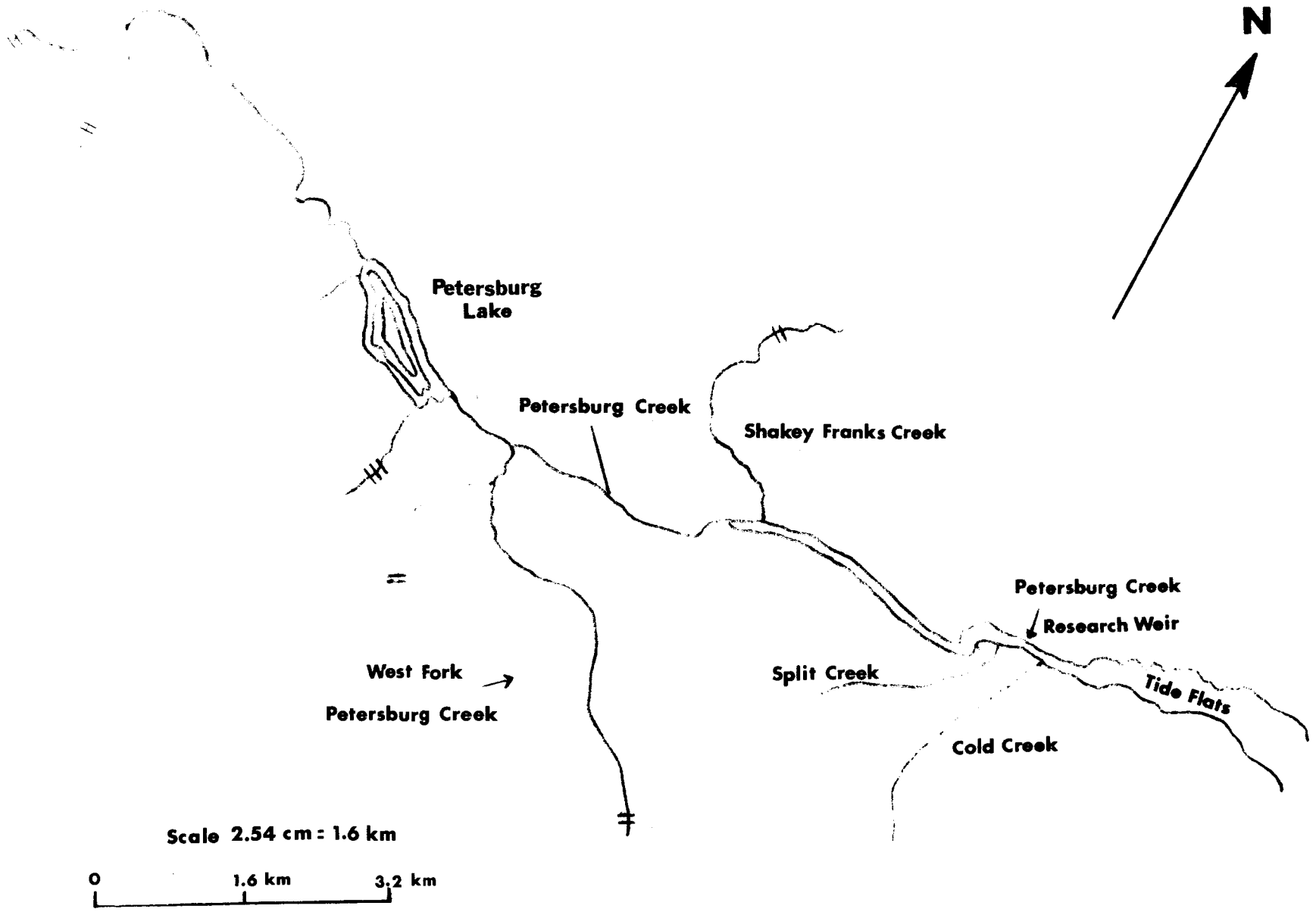


Figure 1. Petersburg Creek System

During the census period 115 anglers were censused, fishing 301 hours to catch a total of 39 steelhead. Examination of these steelhead showed that 8, or 21%, were of hatchery origin.

Presented in Table 2 is a comparison of the hatchery steelhead contribution to the sport angler at Petersburg Creek for 1978 and 1979:

Table 2. Petersburg Creek Creel Census 1978-1979

Dates of Census	No. of Anglers	Angler Hours	No. SH	%Hatchery SH
4/7-6/9-1978	136	471	39	25%
4/4-6/7-1979	115	301	39	21%

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 1979 run. Periodic sampling throughout the system from mid-April to mid-July resulted in the capture of 41 additional steelhead. of these 41 additional steelhead sampled, 17 or 41% were of hatchery origin.

During 1978 (Jones 1979) the sampling by the field crew produced 56 steelhead of which 32% were of hatchery origin. The difference in percentages of hatchery steelhead taken by the public and by the sampling crew is significant, however, no ready explanation was apparent. The general public fished the same water during the same time frame.

All steelhead checked during the creel census and sampling program were examined for fin clips given the steelhead smolts before they were liberated from the Crystal Lake Hatchery. Examination revealed that 31% of all steelhead caught in Petersburg Creek in 1979 were of hatchery origin. Examination of 25 hatchery steelhead and 80 wild steelhead at Petersburg Creek showed very little difference in overall size (Table 3). Of the fish measured, wild steelhead averaged 60 mm larger than hatchery steelhead.

Table 3. Petersburg Creek Steelhead, 1979

Type	No.	Length Range mm	Average Length mm
Hatchery Steelhead	25	610-850	800
Wild Steelhead	80	650-985	860

Foot surveys of Petersburg Creek and its major tributaries during May and early June 1979, determined that hatchery steelhead were distributed throughout all available and/or preferred spawning habitat (Figure 1). There was a tendency for hatchery fish to school near the release site below Shakey Franks Creek. This area is prime spawning habitat and was used by both wild and hatchery fish.

The evaluation of the initial hatchery plants in the Petersburg Creek system is now complete, as 1979 marked the final year initial hatchery produced spawners would enter Petersburg Creek. All hatchery fish returning in 1980 and the future will be repeat spawners and will contribute to a lesser extent to the overall fishery.

Montana Creek:

Montana Creek, located on the Juneau road system, is the first non-native steelhead system to be stocked with hatchery produced smolts. A plant of 6,500 steelhead smolts of Falls Creek and Petersburg Creek origin averaging 170 mm was made in upper Montana Creek on June 5, 1976.

Twice in the spring of 1979, portions of Montana Creek were foot surveyed and sampled with rod and reel for returning steelhead from the plant in 1976.

The first survey was conducted on May 16 and 17, 1979. The upper portion of Montana Creek (Figure 2) from the first bridge below McGinnis Creek downstream for 0.5 km was surveyed with negative results. In addition, both the section of Montana Creek upstream from the Loop Road, as well as the downstream section of the creek from the Loop Road to the Mendenhall River, was surveyed. No steelhead were seen or taken in this section.

A second survey of Montana Creek was conducted on May 31 and June 1, 1979. The same sections as described above were again foot surveyed and sampled with rod and reel. No steelhead were observed or sampled in any portion of the creek. In addition, a staff biologist from the Juneau office had just completed a rearing fish survey of Montana Creek and reported that no steelhead were observed during his survey work. Contacts with local Juneau anglers who had fished Montana Creek on a regular basis in 1979 also reported no observations of steelhead in Montana Creek.

Surveys of Montana Creek in 1978 (Jones 1979) turned up a total of only two steelhead. It is possible that a few adult steelhead did return to Montana Creek in 1979, however, their numbers were few and they did not contribute to the local fishery.

The failure of the Falls Creek-Petersburg Creek brood stock of steelhead in the Montana Creek system is most likely due to environmental and displacement problems. Future enhancement of Montana Creek should be done with a steelhead brood stock secured from a system more in tune with environmental conditions found in the Juneau area.

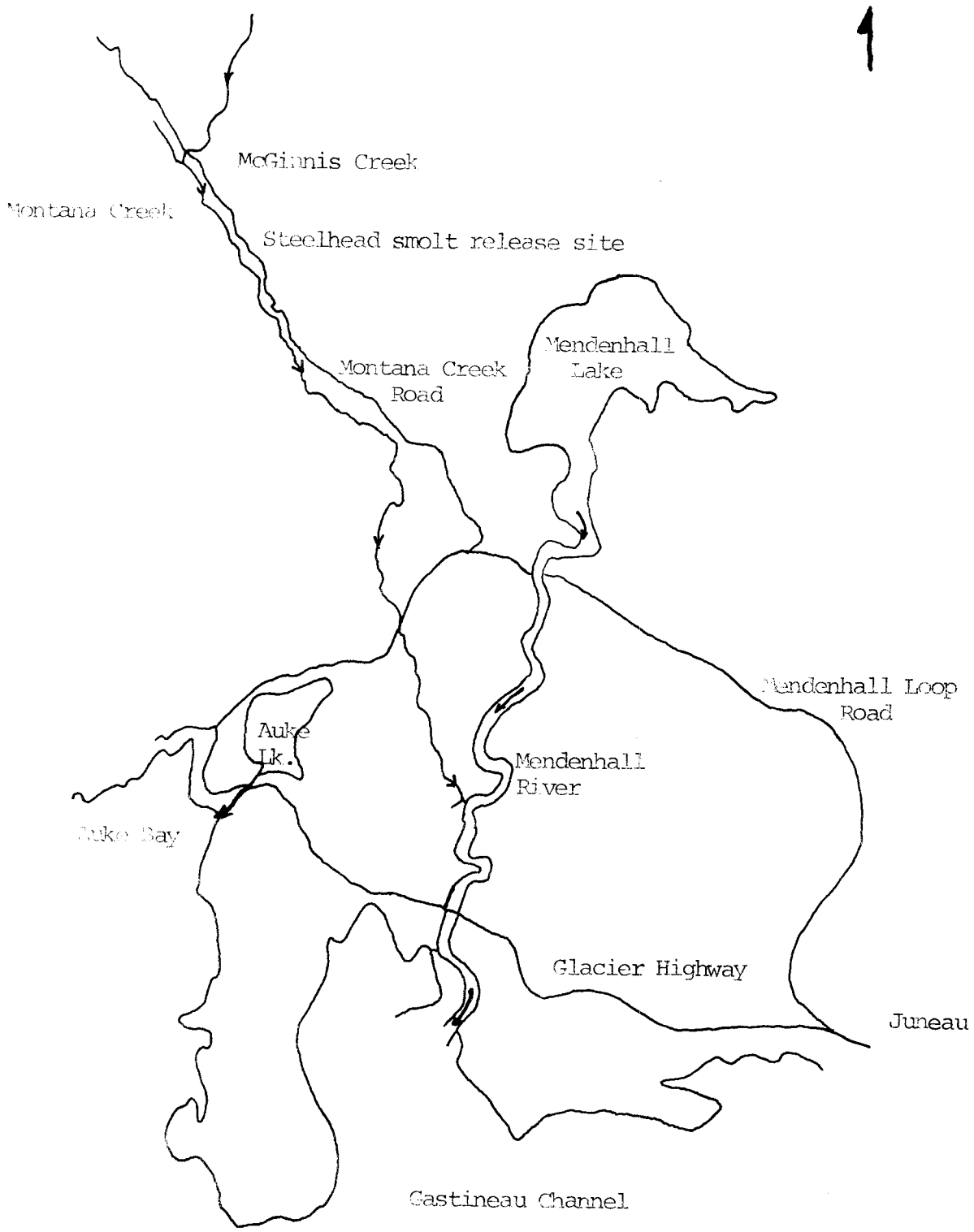

McGinnis Creek
Montana Creek
Steelhead smolt release site
Montana Creek Road
Mendenhall Lake
Mendenhall Loop Road
Auke Lk.
Mendenhall River
Auke Bay
Glacier Highway
Juneau
Gastineau Channel

Figure 2

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. Petersburg Creek steelhead were again used in 1975. Brood fish were obtained from Falls Creek during 1976 and 1977. No wild brood stocks have been used since 1977, as returns were beginning at Crystal Creek in 1978.

Smolt releases began in Crystal Creek in 1975 and have continued on an annual basis through the spring of 1978 (Table 4). The first adults returned to Crystal Creek in 1977 when two fish were trapped. The second return to Crystal Creek in 1978 was much stronger and 70 fish were trapped between April 15 and June 10, 1978 (Zorich 1978). A total of 32,000 eggs were taken from 10 female steelhead and placed in incubators at the hatchery.

Table 4. Crystal Creek Steelhead 1975-1979

Date Smolt Released	No. Released	Size	Adult Returns 1977-1979	% Returns
6/6/75	9,500	142mm	28*	0.3
6/10/76	1,600	170mm	139*	9.2
6/17/77	630	175mm	...	...
5/27/78	10,700	162mm	...	...

* Includes steelhead harvested in the sport fishery in Blind Slough

The development of 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 serious disease problems. The viruses, IHN and BKD, had been identified in chinook and coho salmon being raised at Crystal Lake. These diseases were not identified in the Steelhead in residence 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.

Adult steelhead began entering the traps on Crystal Creek on April 28, 1979 and a total of 94 were collected before the run terminated in early June 1979. Attempts were made to certify these steelhead for hatchery use, however, as they originated from brood that was in residence before the hatchery was disinfected, they were deemed to be possible carriers of IHN and BKD and were disallowed for use as brood stock. BKD kidney samples and ovarian fluid for IHN testing were collected from 80 steelhead at Crystal Creek in 1979. Pathological examination of these samples did not turn up any positive carriers. Steelhead returning to Crystal Creek have now had a clean bill of health throughout their short history at Crystal Lake Hatchery.

Returns of hatchery steelhead in Washington State (Royal 1972) averaged 8% to 10%. The return of the 1976 brood steelhead to Crystal Lake was 9.2%, which is consistent with expected hatchery practices. With these figures a proven fact, it is anticipated that there will be approximately 200-300 steelhead returning to Crystal Creek in 1980.

Adult Spring Run Steelhead Surveys

Surveys were conducted on four stream systems throughout southeast Alaska during the spring of 1979 to determine the presence, distribution and general abundance of spring run steelhead.

Pleasant Bay Creek:

Pleasant Bay Creek, located on eastern Admiralty Island (Figure 3) heads in Pleasant Bay Lake and flows in an easterly direction for approximately 4 km before entering tide water in Pleasant Bay.

Pleasant Bay Creek supports one of the few steelhead fisheries on Admiralty Island. A survey was conducted on May 23, 1979 to determine the abundance and distribution of the 1979 steelhead run. A foot survey was conducted from Pleasant Bay Lake downstream to tide water. A 3 to 4-meter falls approximately 0.8 km below Pleasant Bay Lake blocks anadromous fish access to the remainder of the system. Water levels at the time of the survey were normal and visibility was considered excellent. Adult steelhead were first observed in two large pools a short distance downstream from the falls. Pleasant Bay Creek is characterized by extensive riffle and fast water areas with a limited number of pools. This tends to concentrate adult steelhead in only a few areas. A total of nine adult steelhead were observed and seven were sampled on rod and reel. All fish sampled were males in post spawning condition which indicated that the peak of spawning was already past.

A commercial herring fleet normally fishes in Seymour Canal each May. Crew members from these boats normally sport fish Pleasant Bay Creek. In 1979, this commercial fishery was not opened and therefore Pleasant Bay Creek steelhead were not subjected to the usual heavy fishing pressure. The number of steelhead observed in Pleasant Bay Creek in 1979 was the best in several years and is attributable to a lack of effort.

Sitkoh Creek

Sitkoh Creek, located on the southeast end of Chichagof Island, heads in Sitkoh Lake and flows in an easterly direction for five kilometers before entering Sitkoh Bay (Figure 4).

Sitkoh Creek was foot surveyed from Sitkoh Lake to tide water on May 8, 1979, in an effort to assess the magnitude of the 1979 run of steelhead. Restrictive bag and possession limits e.g., (one steelhead per day and in possession over 33") have been in effect on Sitkoh Creek for the past 2 years. Water conditions in Sitkoh Creek were favorable for surveying and a total of 17 adult steelhead were either seen or sampled on rod and reel. Steelhead were distributed throughout the system with major concentrations above and below the canyon area. Conversations with two anglers who had

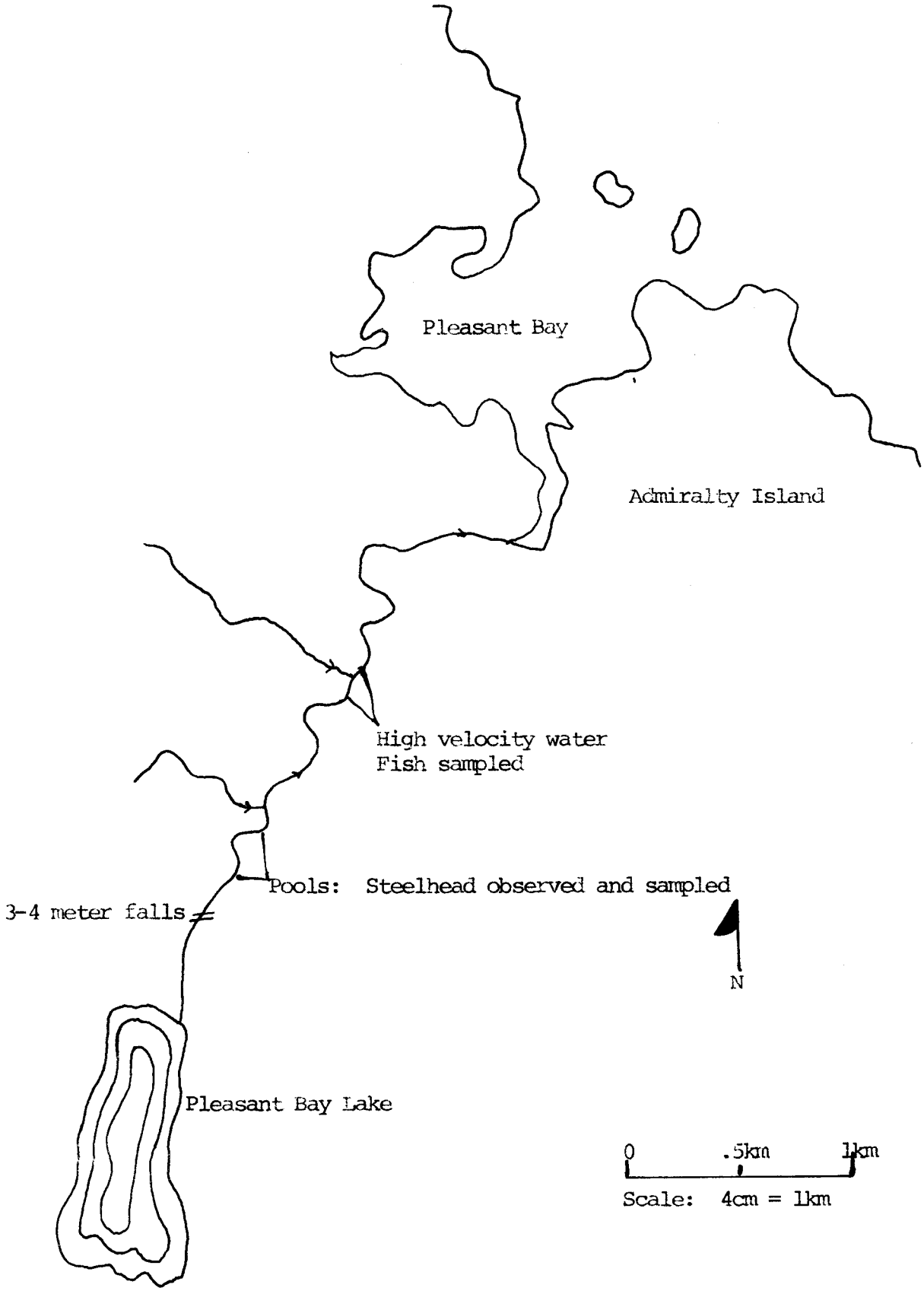
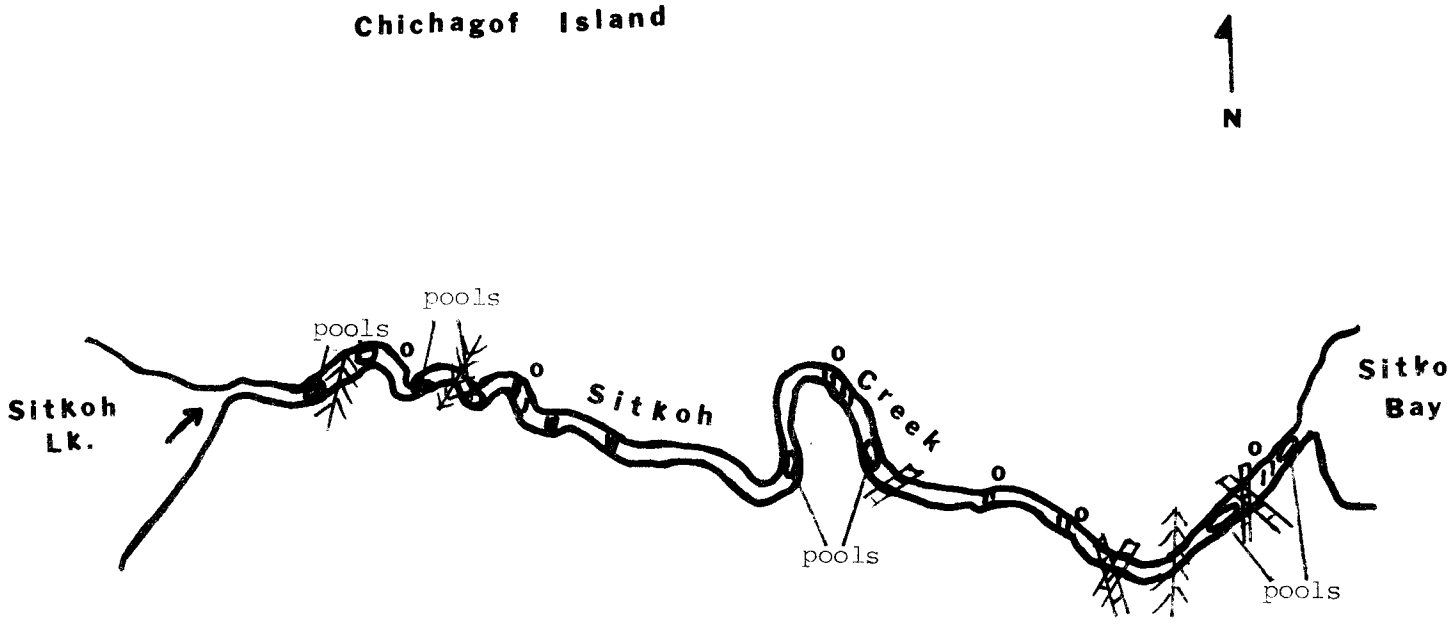

Pleasant Bay
Admiralty Island
High velocity water
Fish sampled
Pools: Steelhead observed and sampled
3-4 meter falls
N
Pleasant Bay Lake
0 .5km 1km
Scale: 4cm = 1km

Figure 3



o = steelhead spawning sites.

Scale: 5 cm = 1.6 kilometers.

Figure 4. Sitkoh Creek. Steelhead spawning areas.

been fishing Sitkoh Creek for several days confirmed the observations that the steelhead run to Sitkoh Creek in 1979 was, if not outstanding, as good as any in the past several years.

Ward Creek:

Ward Creek, located on the Tongass Narrows side of Revillagigedo Island, heads in Connell Lake and flows 6.5 kilometers to Ward Cove (Figure 5).

An accidental spill of chlorine in April 1978 near Connell Lake caused an almost total fish kill in the upper third of Ward Creek. The adult steelhead run to Ward Creek in 1979 was unaffected by this spill, however, returns in 1980 through 1983 will be impacted. Background information on the wild run in 1979 will aid rehabilitation efforts scheduled to begin in 1980.

Ward Creek emerges from behind the Ketchikan Pulp Company Dam on Connell Lake. Water flow is regulated by the water needs at the pulp mill and does not experience the extreme high and low flows common in undeveloped streams in the area. The upper section of Ward Creek is of fairly high gradient with several pools, rapids and small falls. This area contains several holding spots for adult steelhead. The middle section of Ward Creek flows through a narrow valley with few pools connected with numerous fast water areas. The gradient of Ward Creek moderates in the lower area before entering Ward Lake. Below Ward Lake the stream is confined in a shallow canyon with a few rock studded pools and lots of fast water. Access to Ward Creek is excellent throughout it's entire length. Ward Cove Road runs parallel to the stream from the Tongass Highway to Connell Lake. A developed campground and recreation area is located at Ward Lake.

Surveys of Ward Creek in past years pegged the annual steelhead run at 50-75 adults annually. The steelhead run in 1979 was quite strong with an estimated 120-125 fish entering the creek in April and May. Angler effort and harvest were also high in 1979 with an estimated 60 steelhead harvested. Enhancement of the stream with steelhead from the Deer Mountain Hatchery will be necessary to maintain this roadside steelhead fishery.

Thoms Creek:

Thoms Creek, located on the southwest side of Wrangell Island, heads in Thoms Lake and flows in a southeasterly direction for 7 km to tide water (Figure 6).

Thoms Creek was surveyed in mid-May 1979 to determine the abundance and distribution of the spring run of steelhead. Thoms Creek below the lake is a slow meandering stream 8-9 m wide for a distance of 1.2 km below the lake. At this point, the creek passes through a small muskeg lake. Below the muskeg lake Thoms Creek increases in gradient and size. Spawning gravel was found in several stretches, however, the majority of the stream bed was large rock and exposed bed rock. Thoms Creek was found to contain only a limited number of pools large and deep enough to hold adult steelhead. Rearing steelhead were abundant in several areas indicating that Thoms Creek does contain a steelhead run, however, their run timing and the magnitude of the run is still unknown.

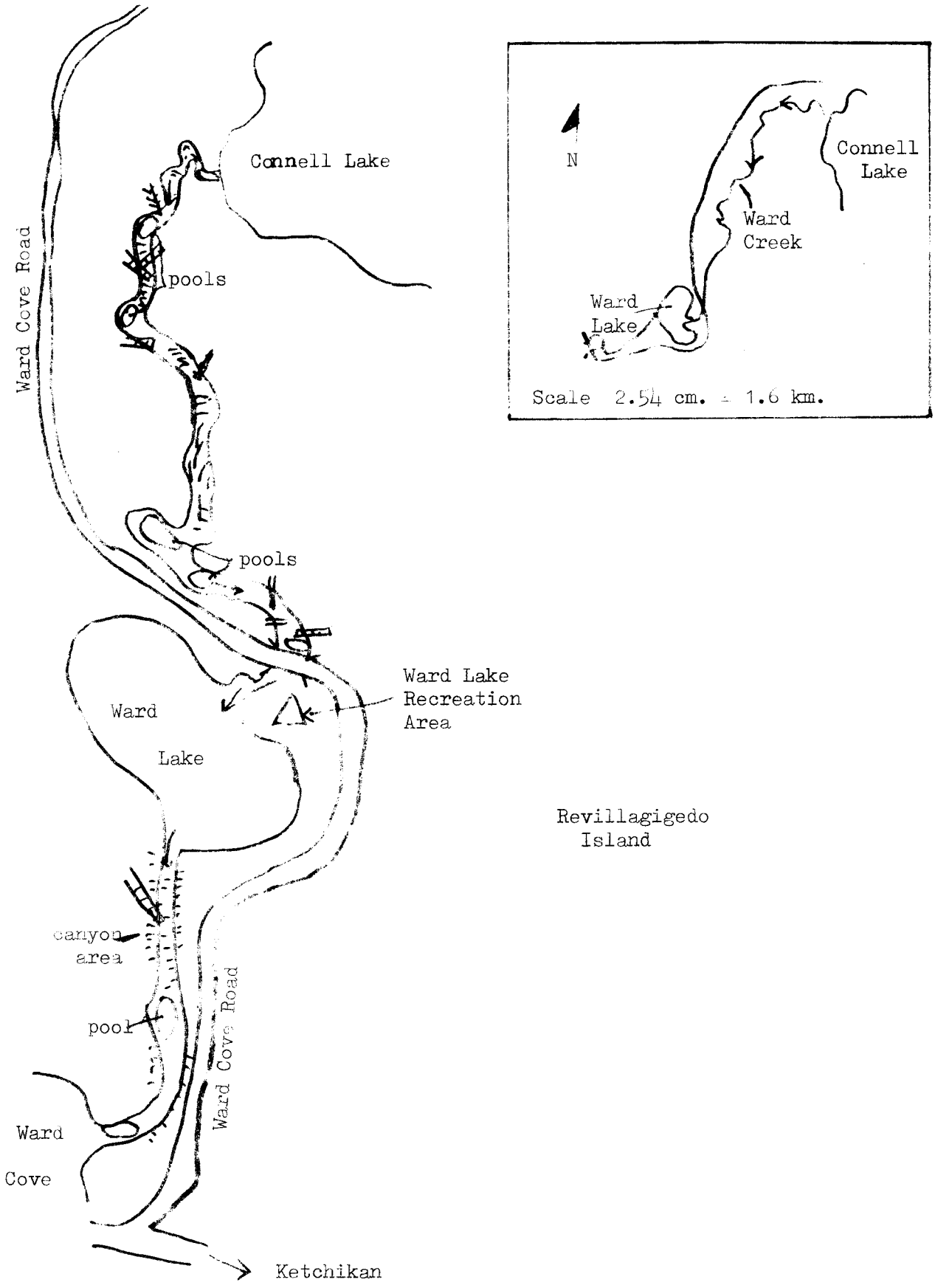
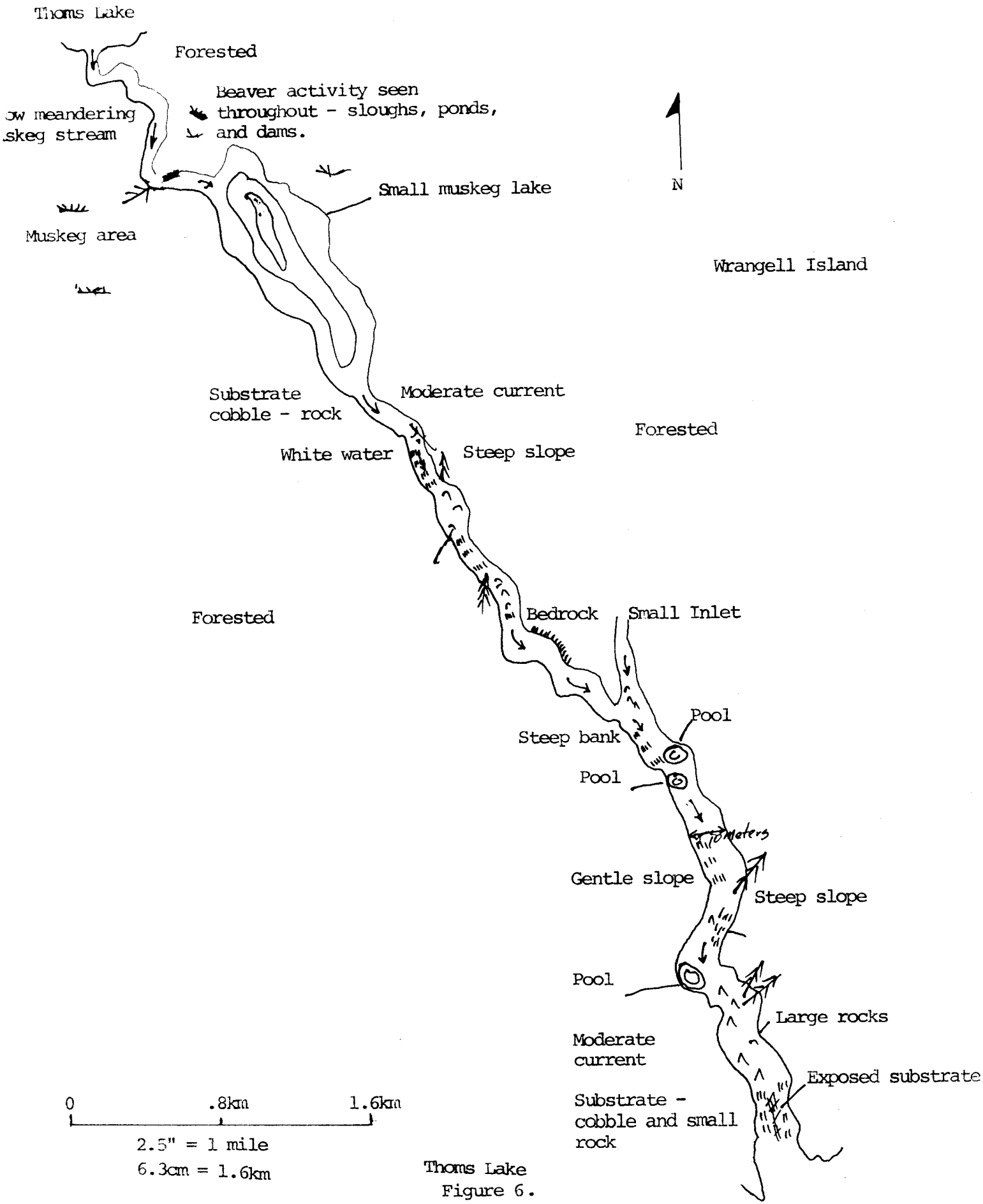


Figure 5. Ward Creek



Thoms Lake
Figure 6.

Due to time limitations and weather delays, survey work scheduled for Wheeler Creek was not carried out during 1979.

Steelhead Brood Stock Development

The development of a brood stock of spring run steelhead was started at the Crystal Lake Hatchery in 1975. This program was progressing in a timely manner until 1978. Disease problems associated with salmon being raised at Crystal Lake required the complete shutdown of the facility in 1978 with the attendent loss of fish on hand. Steelhead adults scheduled to the hatchery in 1979 were not to be allowed for egg takes as they were possible carriers of BKD and IHN virus. The above action made it clear that development of steelhead brood stock would require additional wild sources and/or the development of brood fish at other hatcheries.

Kah Sheets Creek:

Kah Sheets Creek, located on the southeast end of Kupreanof Island was selected as an alternate source for spring run steelhead brood stock for use at Crystal Lake Hatchery.

Kah Sheets Creek has been used as a steelhead brood stock source by the Department (Heckart 1967). It was determined by use of a weir that the adult run to Kah Sheets Creek numbered between 75-150 adults annually.

Surveys were undertaken during April and May 1979 to obtain samples from adult steelhead for pathological examination. All sampling was carried out with rod and reel and a total of 11 adults were taken. Fecal BKD samples were collected from all fish and ovarian fluid was taken from the females for IHN analysis. Results of the pathology tests were negative. Kah Sheets Creek has a proven weir site on the lower creek and will be used for brood stock at Crystal Lake Hatchery if returns to Crystal Creek can not be certified disease free.

Ketchikan Creek:

The newly remodeled Deer Mountain Hatchery on Ketchikan Creek was enlarged in 1978 and is now capable of rearing steelhead smolts. Steelhead smolts produced at Deer Mountain Hatchery are scheduled for use on the rehabilitation of Ward Creek and for building up the run to Ketchikan Creek.

Weekly surveys of Ketchikan Creek during April and early May were conducted to determine when adequate numbers of adult steelhead were present. Adequate numbers were observed on the 8th of May and a small egg take was undertaken. A total of 6,111 eggs were obtained and placed in Deer Mountain Hatchery for incubation.

Klawock River:

Klawock River, located on the west coast of Prince of Wales Island, heads in Klawock Lake and flows in a westerly direction for 1.8 kilometers before it enters Klawock Harbor (Figure 7).

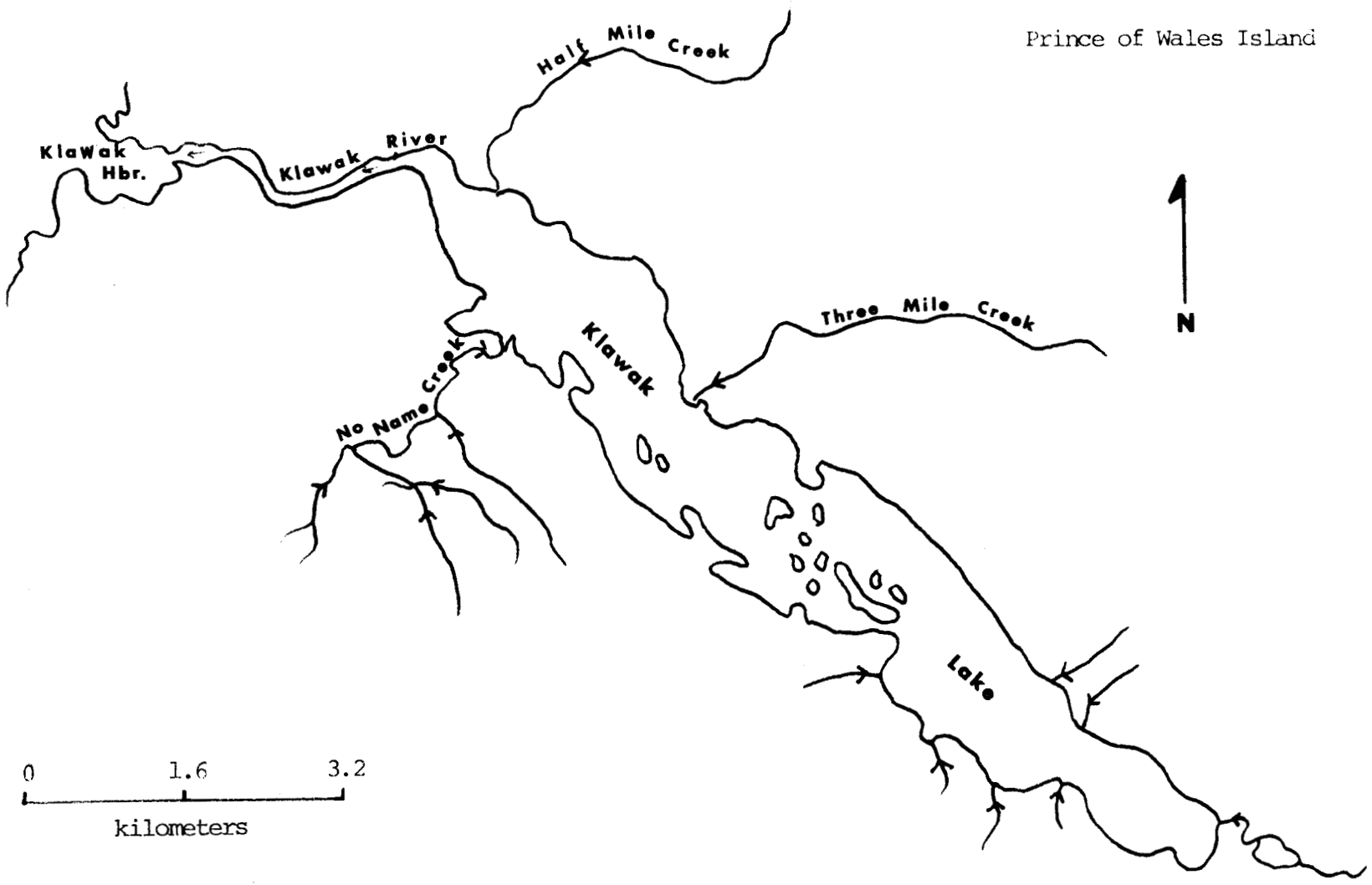


Figure 7. Klawak Lake System

The new Klawock River Hatchery became operational in the summer of 1978 and now is considered the prime facility for the development of a full run steelhead brood stock. Klawock River receives a fall run of steelhead during October and November each year, however, the extent of this run in unknown. During coho salmon egg-take operations at the Klawock Hatchery in November 1978, 16 fall run steelhead were captured. Holding losses were high with less than 5,000 eggs obtained.

A 2-day survey of the Klawock system was conducted during mid-May 1979 in an effort to locate the spawning grounds of the fall run steelhead.

Klawock River was surveyed from the outlet of Klawock Lake to tide water. A total of seven adult steelhead were observed. These fish appeared to be spring run fish indicating that the fall run fish had completed spawning as much as 2 weeks earlier.

Three inlets to Klawock Lake; Three Mile Creek, Half Mile Creek and "44" Creek, were surveyed for adult steelhead. No steelhead were seen nor were any redds observed indicating that most, if not all, of the systems steelhead spawn in the main river below the lake.

Plans have been made to continue with the establishment of the fall run steelhead brood stock at Klawock Hatchery with the capture of 30-40 fall run fish during the winter of 1979-1980.

Due to time limitations and weather delays, a survey scheduled for Admiralty Creek was not carried out during 1979.

DISCUSSION

It is now apparent that the enhancement of an existing steelhead run is possible, if the brood stock originates from the enhanced system or from one in the same general area. The success at Petersburg Creek and Blind Slough point this out. On the other hand, the failure of the plant made at Montana Creek demonstrates the inability of some steelhead to adapt to a different set of environmental conditions. Future enhancement with steelhead should take these findings into consideration.

The loss of 2 years of brood stock development at Crystal Lake Hatchery has set back enhancement plans for Southeast. It also has made it quite clear that there must be brood stocks of steelhead at more than one facility in southeast Alaska. Development underway at Deer Mountain Hatchery in Ketchikan and the Klawock Hatchery hold promise for the future.

The rapid expansion of forest logging highways throughout the region will continue to create management problems for many systems. Future survey work on these road systems will identify problem areas and offer management prescriptions best suited to maintain viable populations of steelhead.

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