FRED Reports

Sand Point Area Stream
Clearance Feasibility Study

by
Lorne E. White
Bruce A. McCurtain
William J. Hauser

Number 135

Alaska Department of Fish & Game
Division of Fisheries Rehabilitation,
Enhancement and Development

Special Report To
Aleutians East Borough
(Cooperative Agreement No. 93-003)

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Alaska Department of Fish and Game
Commercial Fisheries Management
and Development Division

Carl L. Rosier
Commissioner

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Director

P.O. Box 25526
Juneau, Alaska 99802-5526

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ABSTRACT

Engineering and fisheries investigations were initiated in 1992 to assess the severity of blockages and to evaluate various clearance options in the stream outlets of three lake systems on the Shumigan Islands near the Alaska Peninsula. The three lakes selected are near the City of Sand Point. This was a cooperative project between the Aleutians East Borough and the Alaska Department of Fish and Game (ADF&G). A field survey was completed on 14 and 15 September 1992.

Investigations revealed that the outlet stream from Red Cove Lake could be temporarily cleared most effectively with backhoe-type equipment, but other innovative methods should also be evaluated. The outlet stream from Red Cove Lake would require inspection and, probably, annual maintenance. John Nelson Lake has been monitored and cleared in the past with a volunteer, all-labor force and should continue to be monitored and cleared on an "as-needed" basis with an all-labor force. The Wosnesenski Lake blockage could be cleared with a one-day, all-labor work effort and should only require annual surveys for escapement. Total cost of the project is estimated to be $131,800 for five years. If the outlet streams of these lake systems can be maintained as free-flowing migration corridors for anadromous salmon, they can be expected to contribute a significant number of fish on a regular basis. Recommendations are made concerning further surveys and monitoring.

INTRODUCTION

In 1992, three lake systems on the Shumigan Islands in the vicinity of Sand Point, Alaska, were investigated to evaluate the seriousness of blockages of anadromous lake outlet streams. The lakes investigated were Red Cove Lake on Popof Island, John Nelson Lake on Unga Island, and Wosnesenski Lake on Wosnesenski Island. These systems have characteristics that suggest a good potential to produce substantial numbers of salmon, but they also typically have blockages or a reputation for developing frequent blockages of their outlet streams. The blockages either prevent fish migration directly or cause the stream flow to become subterranean.

If the outlet streams of these lake systems can be maintained as free-flowing migration corridors for anadromous salmon, they can be expected to contribute a significant number of fish on a regular basis. These lakes will be included with other lakes in this area in a systematic survey of biological and physical parameters by ADF&G personnel beginning in July 1993 to evaluate the production potential for salmon in area lakes. In 1993, personnel from the ADF&G will include these lakes in an area-wide survey of biological and physical parameters and to inventory potential salmon production on the Alaska Peninsula.

The ADF&G, Division of Fisheries Rehabilitation, Enhancement and Development (FRED), provided technical expertise to evaluate the blockages and propose solutions to the stream blockage problem. The team worked from Sand Point and surveyed the blocked streams. The Aleutians East Borough provided transportation costs and a fishery biologist to assist with the field survey.

BACKGROUND

Red Cove Lake historically supported a run of sockeye (*Oncorhynchus nerka*) salmon but currently has no regular escapement because a barrier of rock and gravel frequently develops on the lake outlet stream. The lake is 0.8 km^2 (208 acres) in surface area and has a "moderately high level of saltwater" (Kyle et al. 1993). The system was selected as a lake for investigation to provide permanent access for sockeye and coho (*Oncorhynchus kisutch*) salmon.

John Nelson Lake is a small, circular-shaped lake of approximately 0.30 km^2 (80 acres) in surface area. The lake currently has small runs of sockeye and coho salmon. The outlet is periodically blocked and has been cleared by a caretaker from the cannery at Squaw Harbor over the past 8 to 10 years. Estimates of escapement into John Nelson Lake are as follows:

Year	Sockeye	Coho	Pink	Chum
1988	0	0	0	0
1989	200	0	0	0
1990	50	960	788	50
1991	0	0	5,285	0
1992	1,125	350	360	340

The commercial catch in statistical area 282-10 (including Red Cove and John Nelson Lakes), which is inclusive of Popof Strait (but does not include Popof Head or Kelly Rock) are as follows:

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1990	78	45,255	3,269	21,274	13,309	83,185
1991	149	25,047	6,479	248,707	17,265	297,647
1992	86	26,956	6,028	284,347	11,498	328,915

Prior to 1990, this statistical area included everything from Acheredin Point to West Head on Unga Island, and all of Popof, Andronica, and Korovin Islands. (Jim McCullough [1], personal communication).

Wosnesenski Lake is a very shallow system 1.6 km^2 (432 acres) in size. The outlet channel has been blocked by driftwood and is a partial barrier to sockeye and coho salmon migration. There is no reliable record of catch or escapement to this system, but more than 200 sockeye salmon were observed in the lake on 15 September 1992.

METHODS

On 14 September 1992, the regional engineer and an area biologist from ADF&G as well as an Aleutians East Borough fishery biologist surveyed Red Cove and John Nelson Lakes from Sand Point by traveling in an open aluminum skiff. The south end of the Red Cove Lake outlet area was measured to determine the distance between the lake and salt water at approximately high tide. The height of the barrier berm was measured with a hand-held clinometer. John Nelson Lake was also surveyed on 14 September 1992 in the same manner as Red Cove Lake.

On 15 September 1992, Wosnesenski Lake was surveyed with access from a fixed-wing aircraft with wheels equipped for beach landing. The survey was completed in the same manner and with the same personnel as for John Nelson and Red Cove Lakes.

RESULTS AND DISCUSSIONS

Of the three lakes surveyed, Red Cove Lake and John Nelson Lake are especially susceptible to developing blockages in their outlet streams. The surface elevation of John Nelson Lake is essentially at sea level. When the outlet is open, high tides flood into the lake. The surface elevation of Red Cove Lake is only slightly higher than a high tide, so the outlet stream gradient is minimal.

With the low (or nonexistent) gradient of the outlet streams from Red Cove Lake and John Nelson Lake, several important factors must be recognized. The most important factor is that a free-flowing outlet channel cannot be expected to be continuously maintained naturally. Both of these systems face long reaches of open seas. Any storm that approaches these systems from across these reaches can be expected to

[1] ADF&G, Commercial Fisheries Management and Development Division, 211 Mission Road, Kodiak, AK 99615-6399.

push rocks and gravel from the sea side onto the beach to raise and reinforce the beach berm, especially during a high tide. Because the lakes have relatively small drainage basins, the accumulation of fresh water inside the beach berms may not provide sufficient pressure to maintain the lake outflow during these events. In addition, because of the heavy surf action, the "fines" are sorted and extracted from the beach berm materials. It is evident in Figure 1 that Red Cove Lake drains through the beach berm, even when a free-flowing outlet stream exists.

When an outlet stream does provide an anadromous migration corridor for any of these lakes, it may not function at all tidal stages. Typically, at low tide, the stream channel is poorly defined and the water is very shallow and widely spread over the exposed beach. Juvenile salmon may be stranded and vulnerable to predation. Adults may be able to enter the stream only during high-tide stages.

Finally, if a storm-surge event coincides with a high-tide series, the beach berm is highly susceptible to overtopping, which would allow intrusion by sea water. As a result, the lake water would become brackish and/or the lake basin could include a bottom layer of salt water.

Red Cove Lake

The Red Cove Lake outlet (Figure 1) on 14 September 1992 was effectively blocked to prevent anadromous salmon migration by large, cobble-size (20-30 cm), smooth surface rocks (Appendix A) (Figures 2, 3, and 4). Water from the lake was percolating through the rocks at several points along the beach area adjacent to the lake. Adult coho salmon were observed jumping in the bay adjacent to the lake, and young salmonid fry were observed in the lake near the former lake outlet. It is apparent however, that under natural conditions, this blockage may be intermittent. Hauser (Appendix A) reported during an earlier investigation that the outlet stream from Red Cove Lake was free-flowing. It was approximately 6-8 in. deep and 10-12 ft. wide. Adult coho salmon were observed in the lake at that time. Also, on 9 September 1981, the outlet stream from Red Cove Lake was well-defined and functional (Figure 1).

It was concluded from the survey that a channel could be recreated by removing the rocks. The recommended method to recreate the channel is with the use of a small backhoe (e.g., Case 580 or equivalent) or small bulldozer (e.g., a Caterpillar D4 or equivalent). The channel should be approximately 70 m (230 ft) long and 5 m (16 ft) wide at the base (with banks sloped at 1:3) to create up to about 0.3 m (1 ft) of water depth flowing in the outlet stream to allow passage by the adult salmon (Figure 5). Because of the open exposure of the site and repeated storms, no structure is recommended to maintain a permanent opening. The site should be surveyed at least

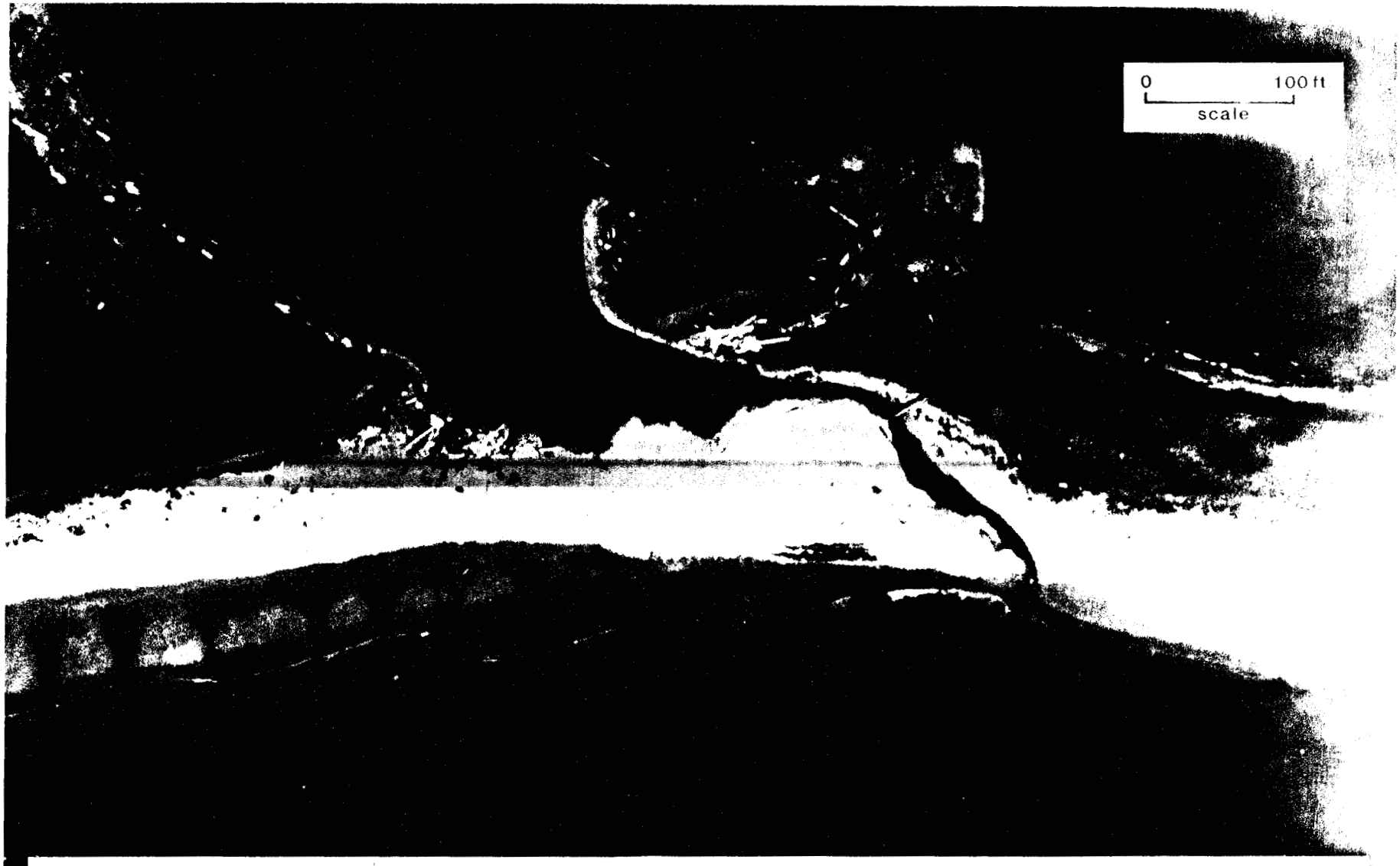


Figure 1: Aerial photograph of the free-flowing outlet stream of Red Cove Lake (9 September 1981). Note the V-shaped dark marks in the ocean beach (bottom-left) caused by the lake water leaching through the beach berm.

Figure 2: Ocean side of the beach berm of Red Cove Lake at approximately high tide (14 September 1992). Note the large-sized cobble.

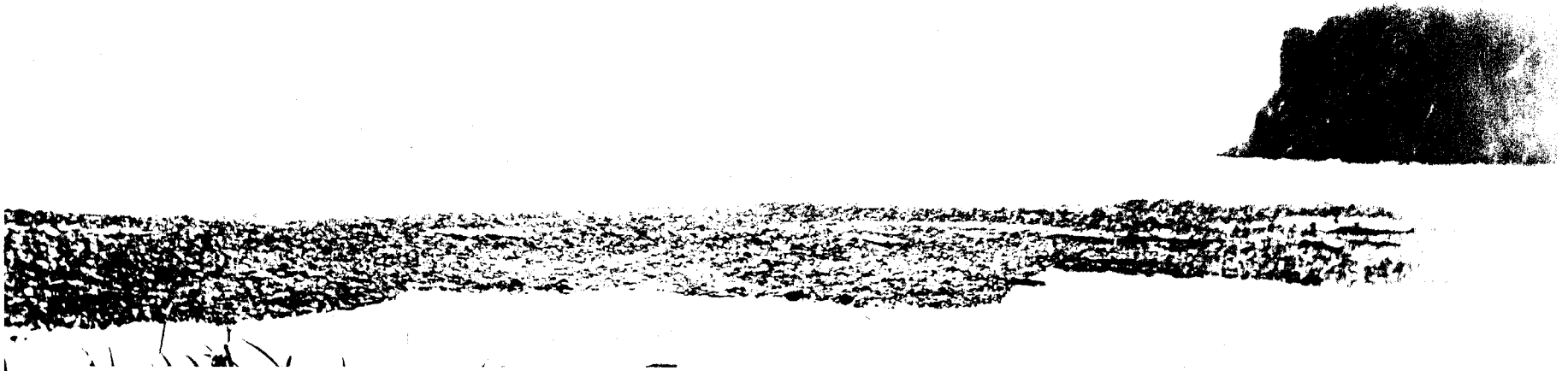
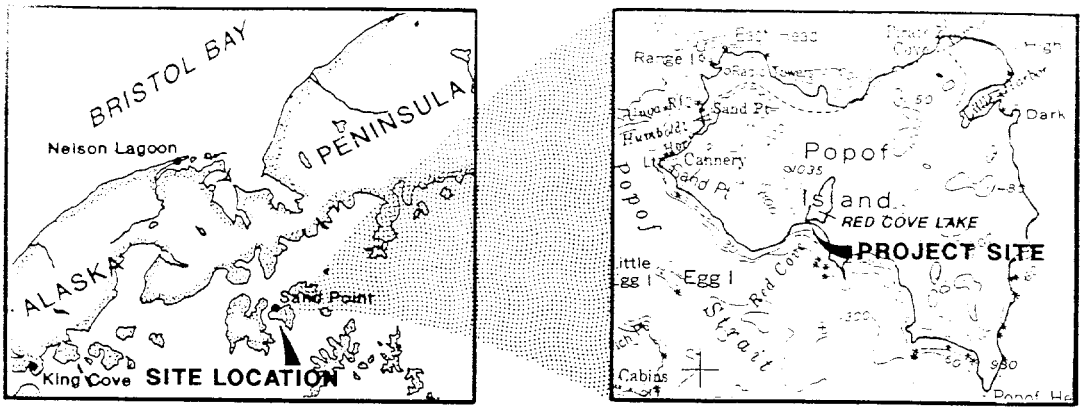
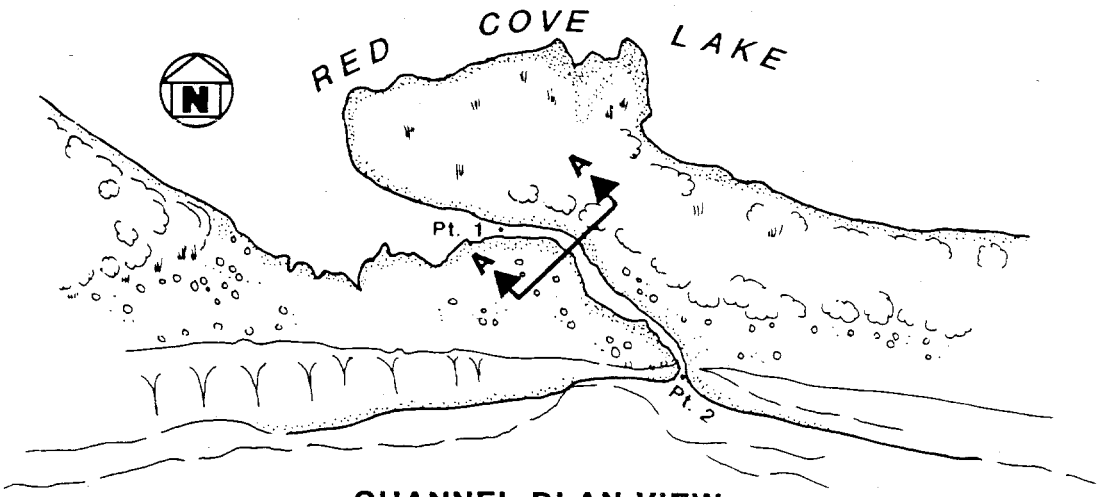


Figure 3: Beach berm of Red Cove Lake viewed from the lake side (14 September 1992). Note the large cobble and the small elevation differential between the lake level and the ocean.

Figure 4: Beach berm of Red Cove Lake at approximately the vicinity of the normal outlet (14 September 1992). Note the large sized cobble. Beach berm of Red Cove Lake at approximately the vicinity of the normal outlet (14 September 1992). Note the small difference in elevation between the lake and the ocean. Vegetated portion of the beach berm of Red Cove Lake (14 September 1992). Note the small difference in elevation between the lake and the ocean.

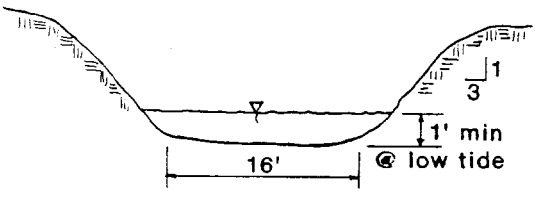




CHANNEL PLAN VIEW

1" = APPROX. 150'

CHANNEL CLEARING-Pt. 1 to Pt. 2 = approx. 230 feet



SECTION A-A

NOT TO SCALE

ALASKA DEPARTMENT OF FISH AND GAME SOUTHCENTRAL ENGINEERING ANCHORAGE, ALASKA			
RED COVE LAKE OUTLET			
DRAWN BY CDS	CHECKED BY BAM	DATE 5-26-93	SHEET OF 1
APPROVED BY BAM		SCALE AS NOTED	NUMBER 1

Figure 5: Plan for channel clearance for Red Cove Lake outlet stream.

twice a year; once during the spring (early May) migration of salmon smolt out of the system and again during the summer period when adults return. Annual maintenance of the outlet stream could be performed with logistical support based at the City of Sand Point.

Common sense and cost should be the driving factors in those methods employed to clear the system on an annual basis. The location of the channel should, most likely, follow the pathway wherever a natural free-flowing stream did exist. It will be expedient to excavate a shallow channel across the lowest elevation of the beach berm to initiate water movement and to allow the flow of water to expand the newly opened stream channel. As the water flows, the channel will enlarge and the materials returned to the ocean. Machine or hand labor may be required to deepen shallow portions of the stream, particularly during the adult migration.

The intertidal reach cannot be ignored, especially during the smolt migration. If smolts migrate over an intertidal reach where there is no discrete stream channel, they may become stranded or vulnerable to predation.

A backhoe is especially practical with a large amount of rubble; however, other innovative, less expensive methods should also be considered. For example, a high pressure water sluice may be effective for removing smaller bed loads and a plow-like device towed by heavy machinery or a powerful boat may be effective to create a shallow channel. Alternatively, it may be easier and safer to anchor an engine-powered capstan on one side of the beach berm as a puller for a plow or scraper device.

Reestablishing salmon runs into the lake may occur naturally with time. Surveys of the system should occur each September to document sockeye and coho salmon spawning events. If natural spawning does not occur within two years, releases of sockeye and coho salmon fry could be made into the lake. Kyle et al. (1993) recommended discontinuing of investigative work for sockeye salmon enhancement at Red Cove Lake because of moderately high salinity. However, there are many Alaskan lakes that have saltwater levels that support sockeye and coho salmon; e.g., John Nelson Lake on Unga Island and Lake Rose Tead on Kodiak Island. It is our conclusion that maintenance of the lake is worthwhile to permit migration of fish.

John Nelson Lake

John Nelson Lake (Figure 6) has an outlet directly to salt water on the north side of the lake (Figure 7). The west bank of the outlet is fractured rock but the east bank is made up of accumulated accretion of beach rock and sand. The channel is approximately 15 m (50 ft) wide and 60 m (200 ft) long at low tide (Figure 8). Each

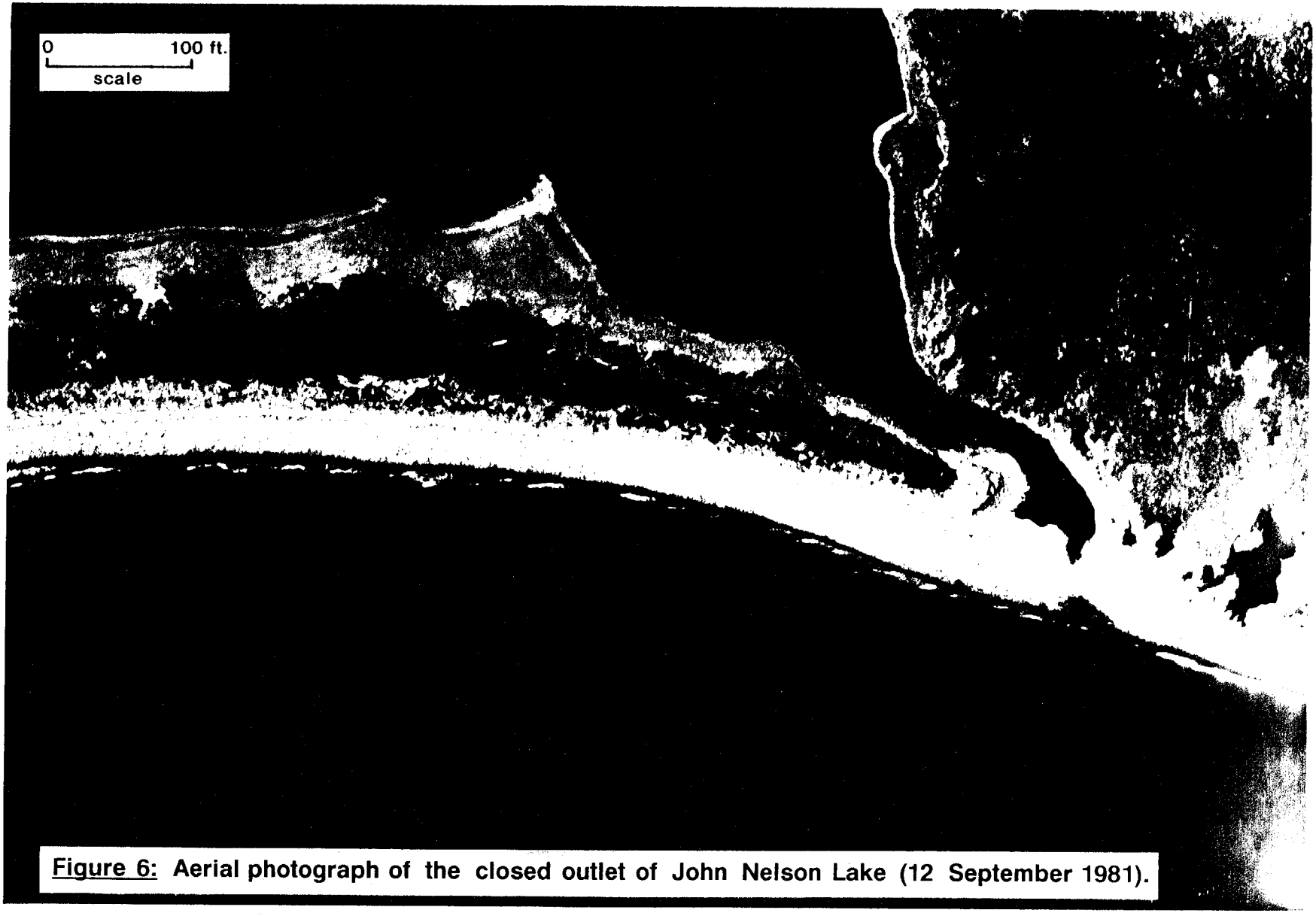


Figure 6: Aerial photograph of the closed outlet of John Nelson Lake (12 September 1981).

Figure 7: Outlet of John Nelson Lake viewed from the lake (14 September 1992). Note that the lake surface elevation is the same as sea level in the background.

Figure 8: (Upper photograph) Outlet of John Nelson Lake (14 September 1992). Lake is in background. (Lower photograph) Outlet of John Nelson Lake (14 September 1992). Ocean is in background.

year the channel typically becomes blocked during winter storms by rock and floating timbers. This channel shows erosion working toward the lake. The stream outlet has been kept open by the caretaker of the cannery at Squaw Harbor, located directly across Baralof Bay from John Nelson Lake. He has voluntarily maintained this stream to eliminate blockages for the last 8-10 years. This year, however, is expected to be his last, due to his retirement. Based on information from the caretaker, this stream must be opened every year. When the outlet is open, John Nelson Lake is flooded by seawater during high tides.

Although salinity levels in the lake were not measured, marine organisms, including bryozoans and barnacles (*Balanus hesperius*), were observed on the rocks 200 m inside the lake. An estimated total of 2,000 "ocean bright" coho salmon were inside the lake, and several small, dark sockeye salmon were also observed on 14 September 1992.

It is recommended that this system also be surveyed annually for escapement and, at least twice a year (May and mid to late summer), remove blockages to assure that passage is maintained for both smolt and adult migrations. As with Red Cove Lake, a shallow channel should be opened across the lowest elevation of the beach berm to initiate water flow that will assist with the expansion of the channel. Most of the blockages at John Nelson Lake result from timbers deposited by storms. Efforts to open the channel can be provided by hand labor with hand tools by three people in one day.

Wosnesenski Lake

Wosnesenski Lake is very shallow. The outlet channel from the lake has a low-gradient, well-developed meander pattern approximately 390 m (1,275 ft) to the beach (Figures 9, 10, and 11). The channel is 3.0 m (10 ft) wide and, at the time of the survey, was flowing approximately 11,356 liters/min (3000 gpm). The only blockage in the stream was found halfway up the stream at an elbow where several driftwood timbers and logs were jammed (8 m x 2.5 m) (Figure 12). This blockage could be removed with the use of chainsaws and would be the easiest of the three systems surveyed to keep open. The only blockage expected would be by timbers brought up by storm or high-tide surges. It appears that this does not happen often, as there was no evidence of other timbers lying in the area.

Bricker (1977, 1980) reported stream channel clearance and rehabilitation efforts that were successful at a much larger scale. The streams were located near Unalaska, on Kupreanof Peninsula and Cape Kumlik. These log jams required 2-3-person crews and 8-22 days to be cleared. He first tried to burn the logs down to the stream water level, cutting the remaining debris with a chainsaw or extracting the logs with a "come-

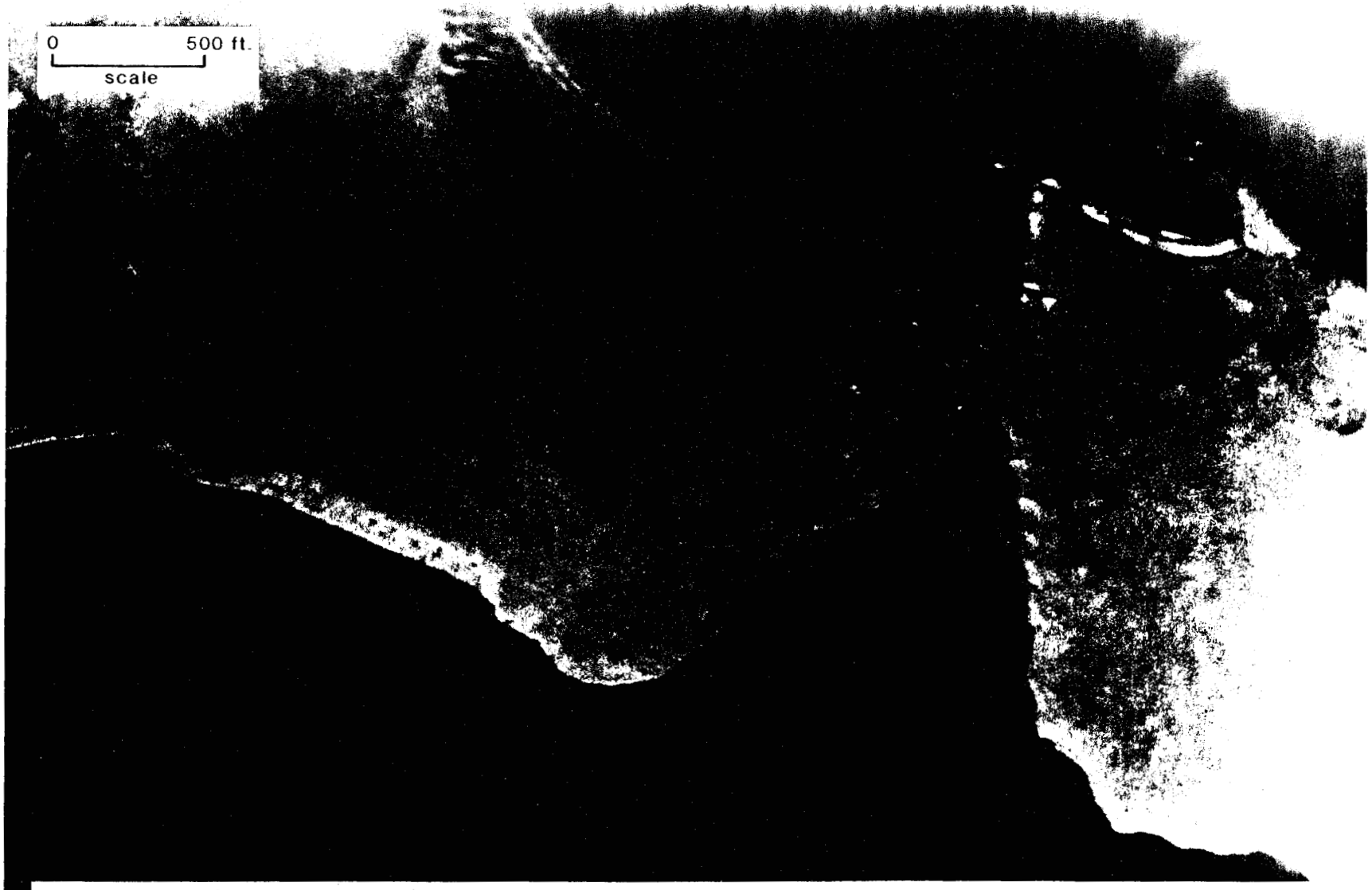


Figure 9: Aerial photograph of the outlet of Wosnesenski Lake (26 August 1983). Note the sinuous course of the stream channel that is typical of a low gradient stream.

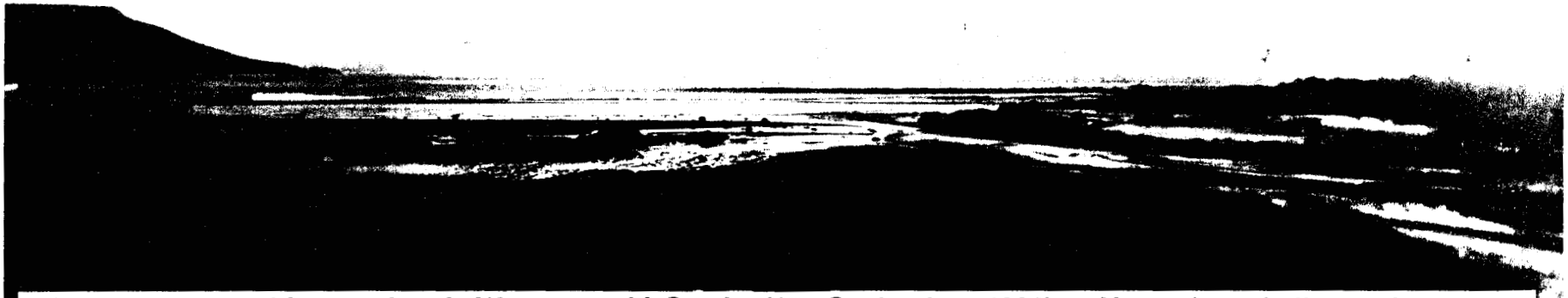


Figure 10: Intertidal reach of Wosnesenski Creek (15 September 1992). Note the shallow, widespread appearance of the water that may be a migration barrier during low tide.

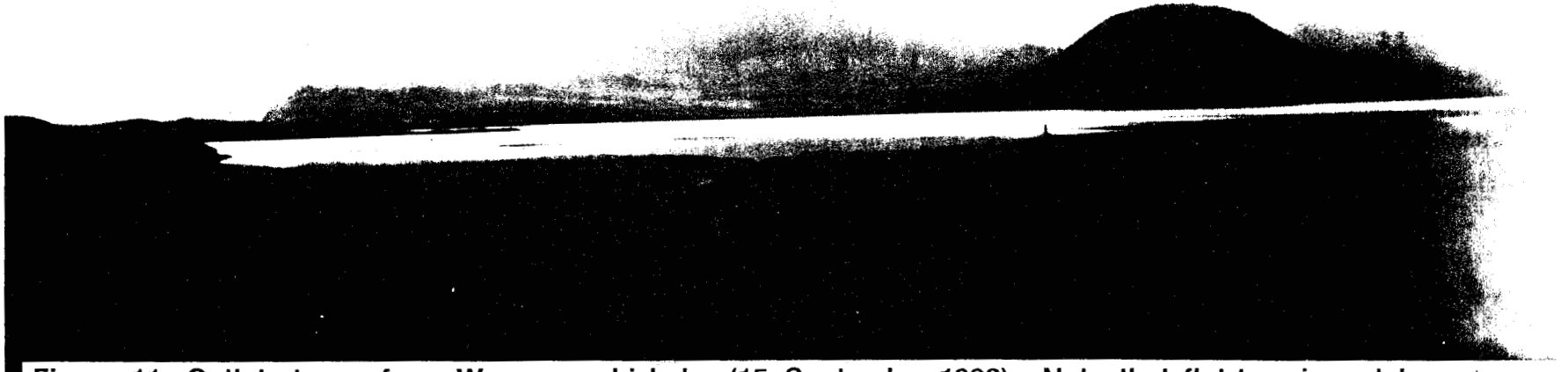


Figure 11: Outlet stream from Wosnesenski Lake (15 September 1992). Note that flat terrain and low stream gradient.

Figure 12: Log jam in the outlet stream from Wosnesenski Lake (15 September 1992) formed by a tsu... or storm-driven surge. A log jam such as this may periodically become a migration barrier for salmon sm... or adults.

a-long" attached to a tripod. Bricker speculated that the logs originated from Southeast Alaska and Canada and had broken loose from large booms during storms. He commonly found large "periphery boom logs with three-inch diameter holes drilled in their ends."

A total of 250 spawning sockeye salmon were estimated along the Wosnesenski Lake shore, and one pink (*Oncorhynchus gorbuscha*) salmon carcass was found in the lake outlet above the barrier. The barrier probably slows adult salmon migration and increases predation by wild dogs and eagles. After this system is cleared, it should be surveyed by aircraft annually for at least five years to evaluate usage.

RECOMMENDATIONS

Scope of Work

A. Red Cove Lake

Project Objective

The principal objective of this project is to maintain a free-flowing outlet stream at Red Cove Lake for anadromous fish migration.

Work Description

1. Survey lake twice yearly (May and late August-early September) to evaluate stream blockage.
2. Barge excavation equipment to site to open outlet.
3. Survey from aircraft for maintenance needs and escapement.

Cost is based on shipping and barging a small-track vehicle from Sand Point to Red Cove Lake to open the existing outlet.

Cost Estimate (per year)

Shipping charges (mini-backhoe)	$ 1,300
Mobilization/Demobilization	$ 600
Vessel rental ($2,000/day x 2 days/trip x 2 trips/year)	$ 8,000
Mini-backhoe and operator (10-hr. x $150/hr)	$ 1,500
Standby time	$ 600
Aircraft for surveys ($1,000/trip x 4 trips/yr.)	$ 4,000
Total	$16,000

This estimate is based on a conceptual design, so one can expect a cost variance of 35%. There may be other major components which would influence the cost and design concept. It could be anticipated that this cost would be increased every 2-5 years to maintain an open outlet for anadromous salmon in Red Cove Lake.

Alternatives

Stream blockage removal by a small backhoe (or similar equipment) is recommended as the most reliable and most predictable method. Other alternatives, however, could be evaluated. These may include use of a high pressure pump to create a hydraulic sluice action to reopen a channel through the beach berm. Also, a plow-like device towed with a cable from a vessel or an anchored power capstan may by useful.

B. **John Nelson Lake**

Project Objective

The principal objective of this project is to maintain a free-flowing outlet stream from John Nelson Lake for anadromous fish migration.

Work Description

1. Survey lake twice per year for blockage, once in May and again in late August-early September.

2. Hire an all-labor force to clear blockage.

3. Survey twice per year for spawner escapement counts for five years.

Cost Estimate (per year)

Survey for blockage ($1,000/trip x 2 trips)		$2,000
Survey for escapement ($1,000/trip x 2 trips)		$2,000
Hire all-labor force (10 hrs. x 3 people x $25/hr. x 2)		$1,500
Transport labor force ($1,000/trip x 2 trips)		$2,000
	Total	$7,500

C. **Wosnesenski Lake**

Project Objective

The principal objective of this project is to maintain a free-flowing outlet stream at Wosnesenski Lake for anadromous fish migration.

Work Description

1. Hire an all-labor force to open barrier on outlet: three people for one 12-hour day with chainsaws and other hand tools to cut/remove and burn driftwood. (This task is not expected to be repeated each year.)

2. Survey from aircraft twice per year for five years for spawner usage.

Cost Estimate (per year)

Charter flight to position crew and equipment ($1,000/trip x 2)	$2,000
Equipment rental (chainsaws)	$ 360
Groceries and miscellaneous supplies	$ 500
All-labor force (12 hrs. x 3 people x $25/hr)	$ 900
Standby (16 hrs. x 3 people x $12/hr)	$ 576
Escapement survey flights ($1,000/trip x 2 trips)	$2,000
Total	$6,336
Rounded:	$6,300

D. **Budget Summary**

		Year 1	Subsequent Years
1.	Red Cove Lake	$16,000	$16,000
2.	John Nelson Lake	$ 7,500	$ 7,500
3.	Wosnesenski Lake	$ 6,300	$ 2,000
		Total $29,800	$25,500

Note 1. A five-year program to maintain free-flowing anadromous outlet streams from Red Cove and John Nelson Lakes and a one-time clearance of the outlet stream from Wosnesenski Lake with annual escapement surveys is expected to total $131,800.

Note 2. Some economy may be realized with careful scheduling and combining trips and aerial surveys to accomplish the tasks at the three lakes.

ACKNOWLEDGMENTS

The authors would like to thank Jim McCullough, ADF&G, Commercial Fisheries Management and Development Division, for providing data and field survey equipment; Denby Lloyd for his assistance during the field survey; Carol Schneiderhan for her assistance with the figures; and Christy Nielsen and Heather Denning for typing the manuscript.

REFERENCES

Bricker, M. J. 1977. Channel clearance to rehabilitate two Alaska Peninsula salmon streams, 1977. Unpublished FRED Division Report. 7 p.

Bricker, M. J. 1980. Channel clearance to rehabilitate two Alaska Peninsula salmon streams, 1978. Unpublished FRED Division Report. 9 p.

Kyle, G. B., J. A. Edmundson, and V. P. Litchfield. 1993. Limnological and fisheries investigations for sockeye salmon (*Oncorhynchus nerka*) enhancement in five Alaska Peninsula lakes: 1991-1992 progress report. Alaska Department of Fish and Game, FRED Technical Report No. 126. 32 p.

APPENDIX A

Sand Point Trip Reports:

- 23-24 August, 1990, William J. Hauser

- 14-15 September, 1992, Bruce A. McCurtain

- 14-15 September, 1992, Lorne E. White

yellow

Memorandum **State of Alaska**

TO: Tom Kron
Regional Supervisor
FRED - Anchorage

DATE: August 28, 1990

FILE: BHTrip.WP5

FROM: Bill Hauser WH
Regional Biologist
FRED - Anchorage

SUBJECT: Sand Point Trip Report
August 23 - 24, 1990

Background: Sand Point is included in an area that is beginning the Regional Planning Team process. Never-the-less, several sites have been identified as candidate enhancement projects. On August 23 - 24, 1990, I visited two of these sites to collect preliminary information to begin the evaluation process.

Local Contacts:

Jim McCullough, C.F., Area Biologist-Sand Point	383-2066
Arnie Shaul, C.F., Area Biologist-Cold Bay	532-2419
Dave Osterback, Chairman, RPT	383-3701 (home)

Activities: The schedule was planned to collect water samples and limnological data from two lakes; Wosnesenski and Red Cove (see attached maps). Dave Osterback would provide transportation on F/V Pacific Maid; go ashore with a power skiff, and haul a light skiff over the beach berm into the lake for a sampling platform.

The actual schedule was determined by weather conditions. First, the trip was delayed two days because of a storm. After I arrived, on August 23, I boarded the Pacific Maid and traveled to Red Cove Lake. High surf prevented a safe landing on the beach that is exposed to a long reach of southwest winds. Instead, we selected another lake, John Nelson Lake, (that would also be another candidate for enhancement) where a safe approach was possible. Sampling was incomplete because of some equipment failure.

Weather continued to improve, but, although conditions appeared good in Sand Point on August 24, deteriorating weather was forecast. Mr. Osterback predicted that by the end of the four hour trip across open seas to Wosnesenski Island, conditions would be too poor for a beach landing. These were not expected to improve for several days.

As an alternative, Red Cove Lake was reconsidered. Access could be achieved by 4-wheelers on the weekend, or by aircraft landing on the beach. Flying conditions were

good (but this entailed a cross-wind landing and take-off), however it first took an hour to locate and mobilize an inflatable raft, pump, and oars. Sampling was completed despite increasing winds.

Observations: 1. First and foremost, special thanks are extended to Mr. Dave Osterback and to Mr. Steve Hakala, pilot, who volunteered free transportation services for this sampling trip.

2. It was immediately clear that there is strong local support for any fisheries enhancement projects in this area. In addition, it is apparent that there are many more opportunities than I had previously imagined. These two lakes are only the start of a list of systems that will need evaluation and assessment. A dedicated effort will be required.

3. Lake outlets: outlets of the Red Cove Lake and John Nelson Lake as well as many other lakes in this area are highly subject to blockage because of severe winter storms. Beach berms of rock and sand and/or driftwood may build up and "seal" the outlets. Water discharges through the berm and fish are prevented from immigration or egress. John Nelson Lake outlet is maintained open annually by fishermen. Red Cove Lake outlet may be blocked for 3-5 years at a time. This year it was blocked until approximately August 22, when heavy rainfall combined with high seas breached an opening. The problem of outlet blockage should be the subject of a separate study. . . to determine if a "permanent" solution could be designed, or to evaluate blockage removal methods.

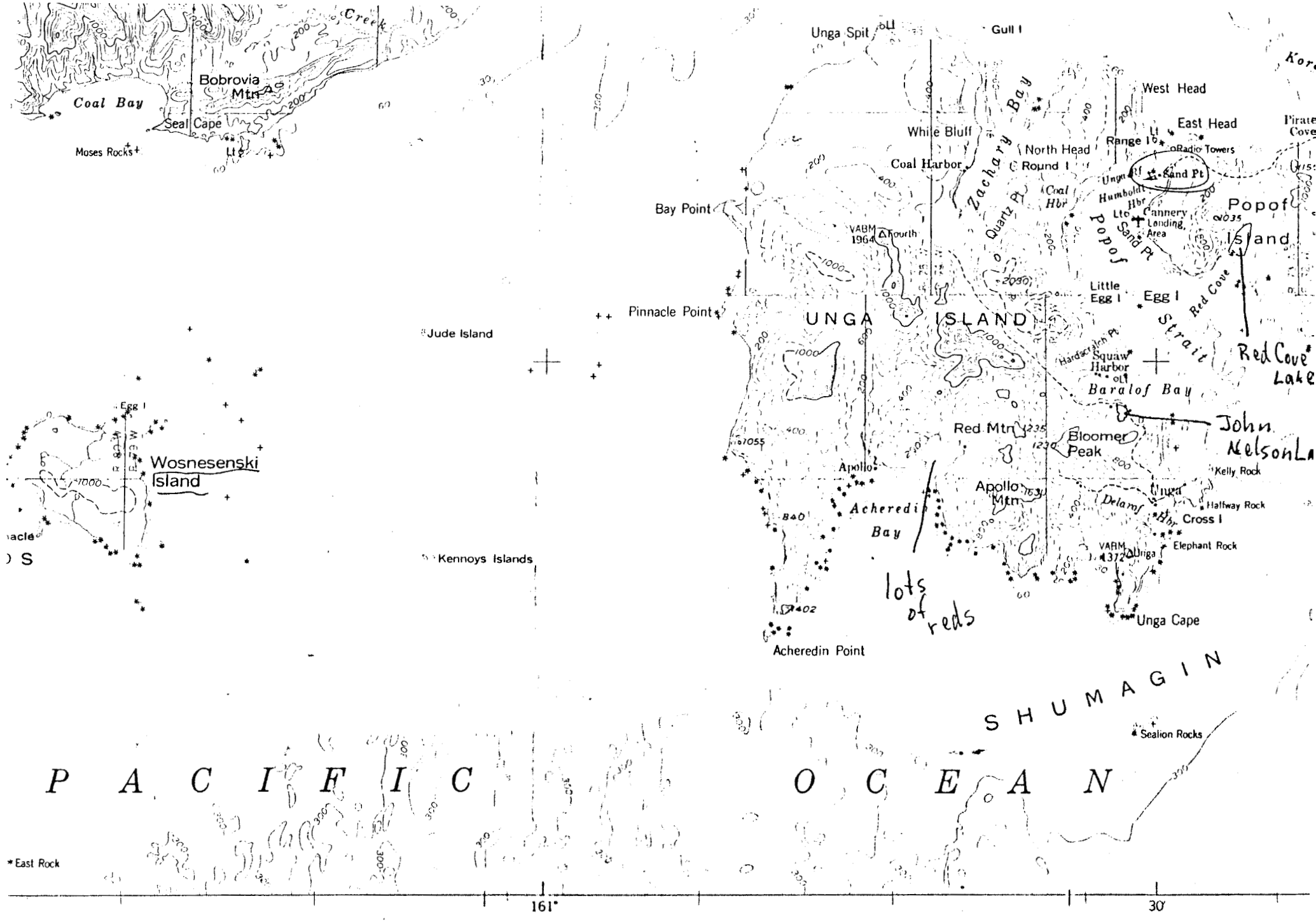
4. Red Cove Lake was studied approximately 15 years ago by an individual who proposed stocking 10 million sockeye salmon fry for a private-for-profit hatchery. Deep - "25 fathoms"; may have a salt water lens because of intrusion through the sill or tidal inflow. Marine (cod) and brackish water (sculpin) fish are caught in the lake. Fish have worms. . . . "tested unfit for human consumption". . . "alive in the stomach (body cavity?)." Numerous coho "jumpers" on August 24, 1990, were also observed entering the lake. Weeds on anchor. Outlet stream: 6-8 inches deep, 10-12 feet wide, low velocity; meandering (at approximately mid-tide) across 100 - 150 yards sandy or pebble beach. Two inlet streams; one at head of drainage-short; meandering, moderate gradient; 8-10 feet wide; one at northeastern corner . . . smaller and shorter (map shows another at northwestern corner and headwater drainage appears more extensive) Accessible from Sand Point by 4-wheeler trail which may be developed into a road.

5. John Nelson Lake: smaller and shallower than Red Cove Lake; "small reds, big silvers". Bottom mud on anchor was anoxic; weeds on anchor. Outlet stream: 1 1/2 feet deep, 6 feet wide, fast, steep; 50 yards long at approximately high tide. Substrate large cobble; water also leaking through beach berm.

Comments: Although this trip may have been more productive and more well coordinated with better planning and longer lead-time, it was successful and worthwhile. It initiates field sampling and project planning and it clearly demonstrates local logistical considerations and the need for adequate planning, preparation and coordination; and in particular, the importance of the Regional Planning Team process. A three day trip to

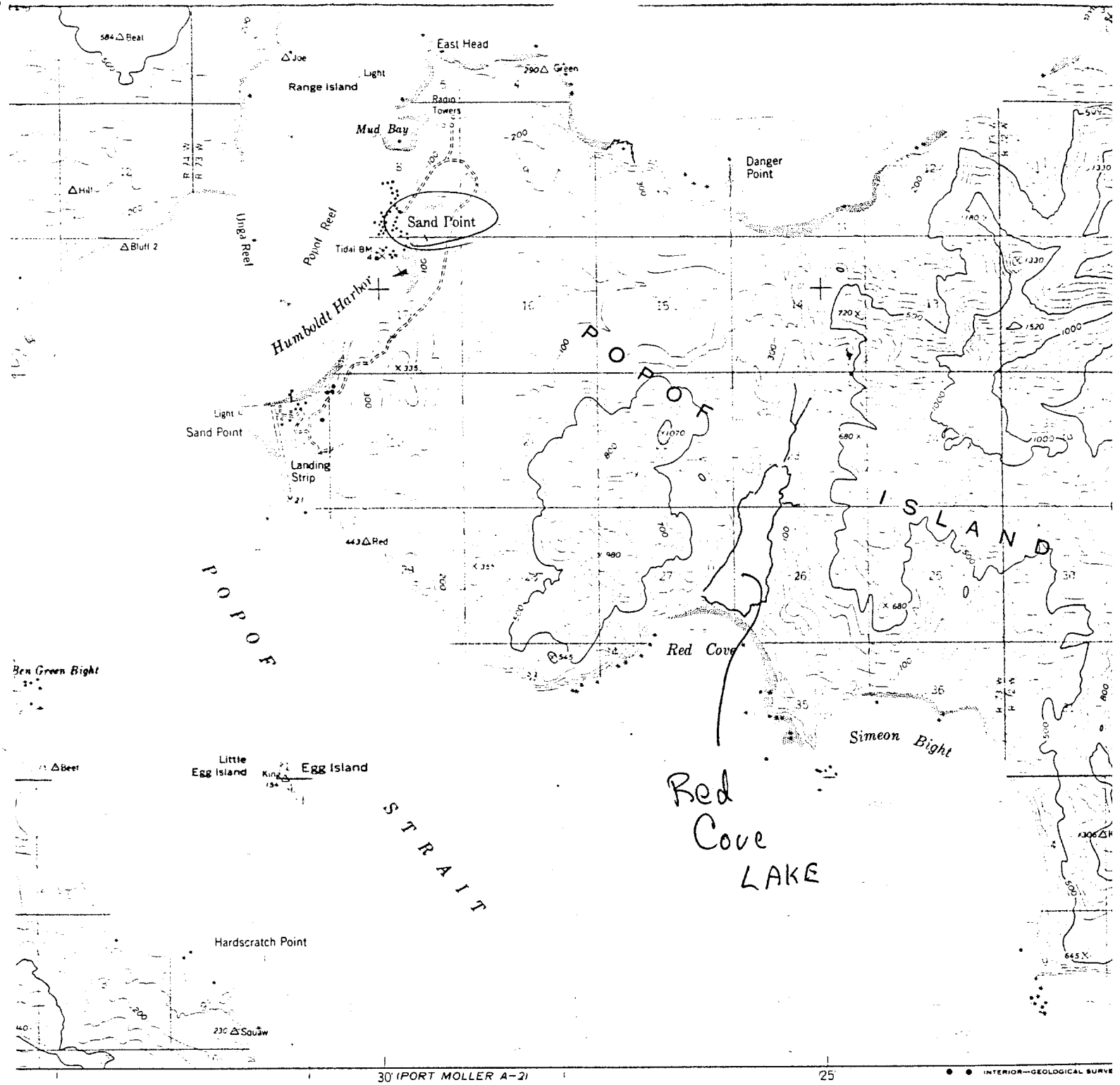
take "grab samples" from one, two, or three, convenient lakes is inadequate to address the prioritized list of many "study" systems that will be developed with proper planning and scheduling.

cc: McCullough
Shaul
Osterback
Koenings
Pratt
McDaniel
McCurtain



SCALE 1:250 000

LOCATION INDEX



SCALE 1:63360

1 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

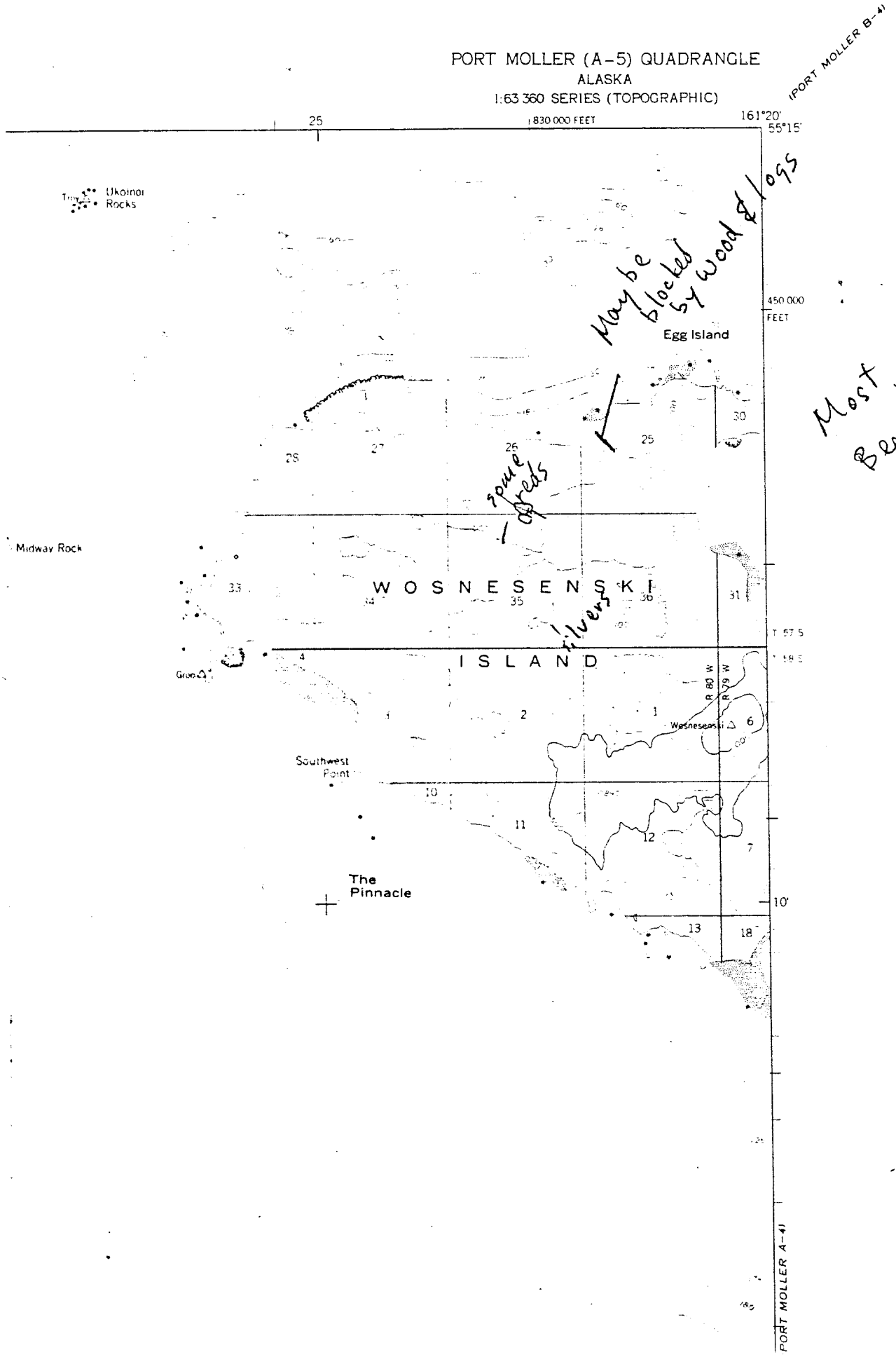
1 5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL
DEPTH CURVES IN FEET DATUM IS MEAN LOWER LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 5 FEET

QUADRANGLE LOCATION

FOR SALE BY U. S. GEOLOGICAL SURVEY
FAIRBANKS, ALASKA 99701, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

PORT MOLLE
N5515-


PORT MOLLER (A-5) QUADRANGLE
ALASKA
1:63 360 SERIES (TOPOGRAPHIC)
(PORT MOLLER B-4)
1830 000 FEET
161°20'
55°15'
450 000 FEET
Ukolnoi Rocks
Egg Island
Midway Rock
WOSNESENSKI
ISLAND
Wosnesenski
Southwest Point
The Pinnacle
R 80 W
R 79 W
T 57 S
10'
PORT MOLLER A-4)
May be blocked by wood & logs
some reds
Most reds Beach spawners

SAND POINT TRIP REPORT

Subject: Sand Point Area Stream Clearance Feasibility - Preliminary Engineering Investigation.

INTRODUCTION

The purpose of this report is to transmit the results of the preliminary engineering investigation of three stream surveys for stream blockage. Two stream outlets from John Nelson and Wosnesenski Lakes (JNW) will require yearly minimum maintenance for clearing of blockage during fish runs.

Red Cove Lake outlet was non existent at the date of survey. An outlet from the lake to the beach would be difficult to sustain because of wave action and storm surges.

RECOMMENDATION

It is recommended that JNW stream outlets be identified as enhancement projects. These two sites could be kept open for fish passage by force account or volunteer labor. No special equipment would be required for this work.

A second recommendation is to open a stream outlet for Red Cove Lake. This would require use of heavy equipment and would be costly and still might not produce fish passage for any length of time.

COST AND FUNDING

The total cost to maintain stream opening for JNW would depend on storms generated in the area. Based on information from the caretaker, who has removed stream blockage at John Nelson for the last 8-10 years, once a year before fish migration starts is usually sufficient.

The cost for removing blockage from Wosnesenski Lake outlet would be minimal. The existing log debris in the stream appears to have been there for quite awhile.

Red Cove Lake would require a large capital expenditure to provide a stream opening. The expenditure would probably have to be available each year because of site location in respect to storm surges. None of these costs associated with this project are in the 1993 budget.

PROBLEM DESCRIPTION

Red Cove Lake: Located on the south side of Popof Island with a surface are of approximately 224 acres (91 hectare). There is no direct outlet to saltwater. Aerial photographs taken in 1981 indicate a stream outlet to saltwater. As the site specific location faces directly into the Pacific Ocean it is hit by high winter storm surges. The winter storms have caused fairly uniform accretion of rock on the beach along the south end of the lake. At the time of survey the beach profile, made up of large boulders of fairly uniform size, was 3′± above lake level with 30′± crest and sloped to the ocean with

a 15 percent grade. Opening an outlet to allow fish passage would be determined by the tides in the area and the lake elevation to be maintained.

John Nelson Lake: Located on Unga Island with a surface area of approximately 80 acres (32 hectares). This lake has a very defined outlet directly to salt water on the north side of the lake. The west bank is fractured rock with east bank made up of accumulated accretion of beach rock and sand. The channel is approximately 50′ wide and 200′ long at low tide. Each year the channel is blocked during winter storms by rock and timbers. This channel shows erosion working toward the lake. The stream outlet has been kept open by the caretaker of the cannery at Squaw Harbor, located directly across Baralof Bay from John Nelson Lake. He has maintained this stream from blockage for the last 8-10 years, this year might be his last, due to retirement. Based on information from the caretaker this stream would have to be opened every year. John Nelson Lake is flooded during high tide.

Wosnesenski Lake: Located on Wosnesenski Island with a surface area of approximately 432 acres (175 hectares). This lake is very shallow. The outlet channel from the lake is a well developed meander approximately 1,275′ to the beach. The channel is 10′ wide and at time of survey was flowing approximately 3000gpm. The only blockage in the stream was half way up the stream at an elbow where several logs were jammed. This blockage could be easily removed with use of chainsaws and a little muscle. This stream would be the easiest of the three surveyed to keep open. The only blockage would be by timbers brought up by storm surges. It appears that this doesn't happen often because there was no evidence of other timbers laying in the area.

FUTURE WORK

John Nelson and Wosnesenski Lake will require yearly maintenance to maintain open streams. If Red Cove lake is accepted for implementation for mitigation a project consistency review based on the Alaska Costal Management Program would have to be completed.

Figure 1: Aerial photograph of the free-flowing outlet stream of Red Cove Lake (9 September 1981). Note the V-shaped dark marks in the ocean beach (bottom-left) caused by the lake water leaching through the beach berm.

Figure 2: Ocean side of the beach berm of Red Cove Lake at approximately high tide (14 September 1992). Note the large-sized cobble.

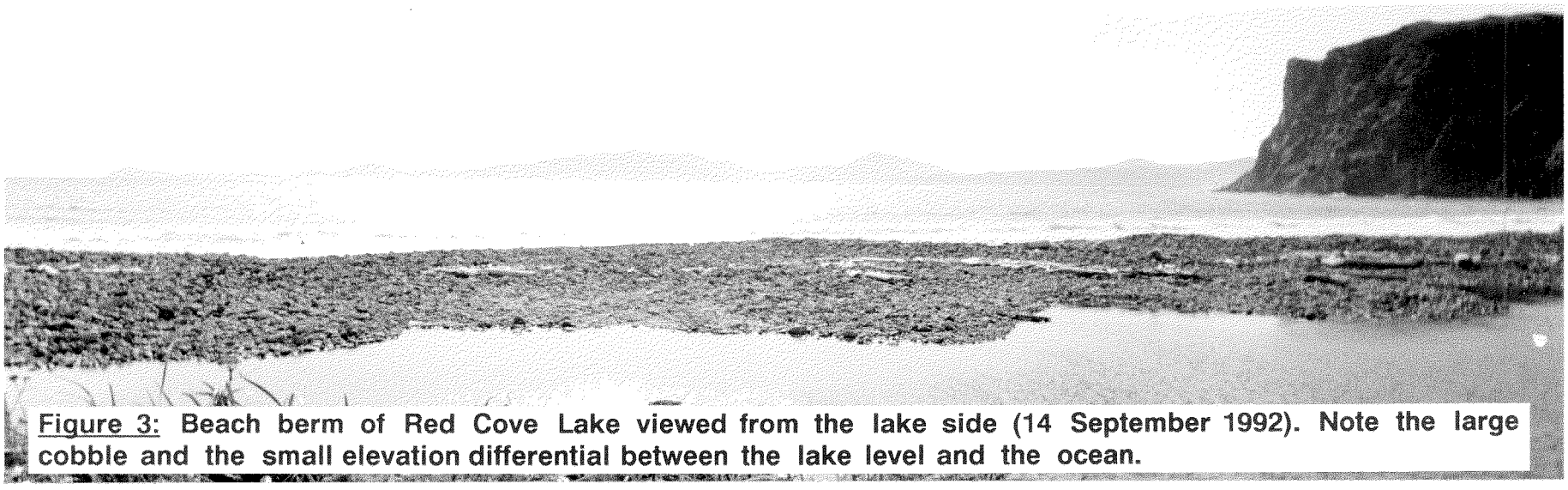
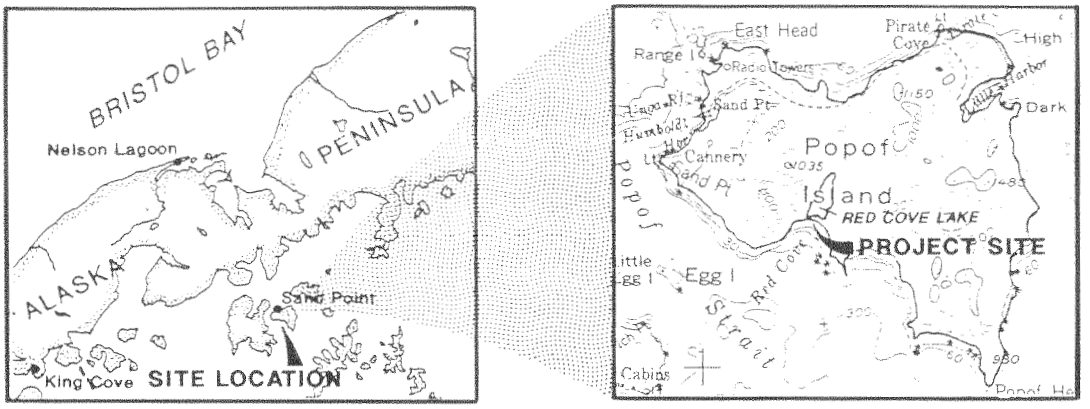
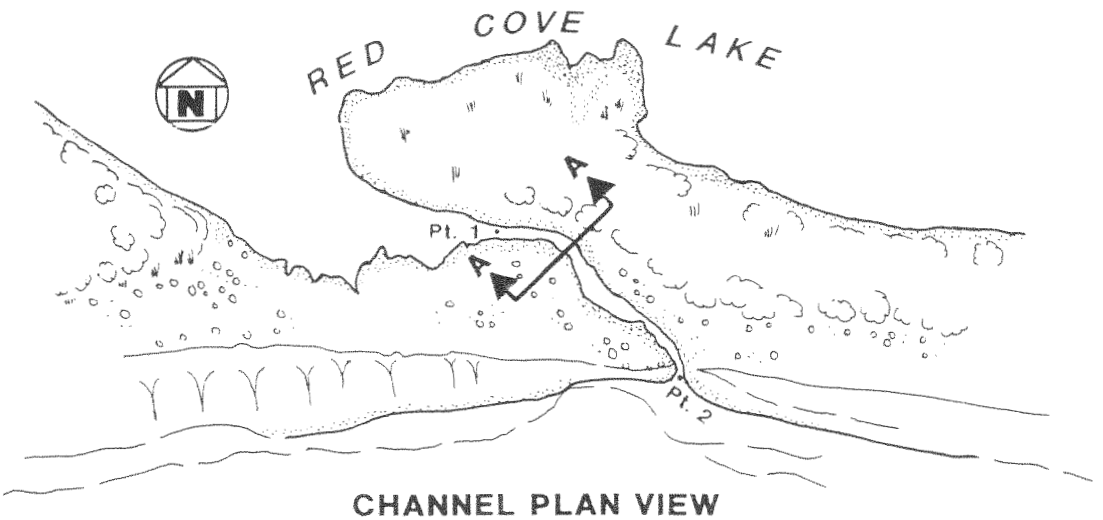


Figure 3: Beach berm of Red Cove Lake viewed from the lake side (14 September 1992). Note the large cobble and the small elevation differential between the lake level and the ocean.

Figure 4: Beach berm of Red Cove Lake at approximately the vicinity of the normal outlet (14 September 1992). Note the large sized cobble. Beach berm of Red Cove Lake at approximately the vicinity of the normal outlet (14 September 1992). Note the small difference in elevation between the lake and the ocean. Vegetated portion of the beach berm of Red Cove Lake (14 September 1992). Note the small difference in elevation between the lake and the ocean.

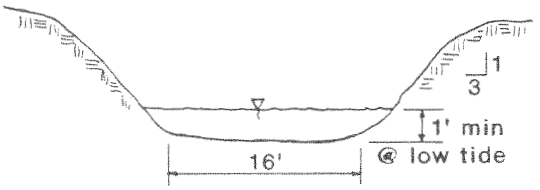




CHANNEL PLAN VIEW

1" = APPROX. 150'

CHANNEL CLEARING–Pt. 1 to Pt. 2 = approx. 230 feet



SECTION A–A

NOT TO SCALE

ALASKA DEPARTMENT OF FISH AND GAME SOUTHCENTRAL ENGINEERING ANCHORAGE, ALASKA			
RED COVE LAKE OUTLET			
DRAWN BY CDS	CHECKED BY BAM	DATE 5-26-93	SHEET 1 OF
APPROVED BY BAM		SCALE AS NOTED	NUMBER 1

Figure 5: Plan for channel clearance for Red Cove Lake outlet stream.

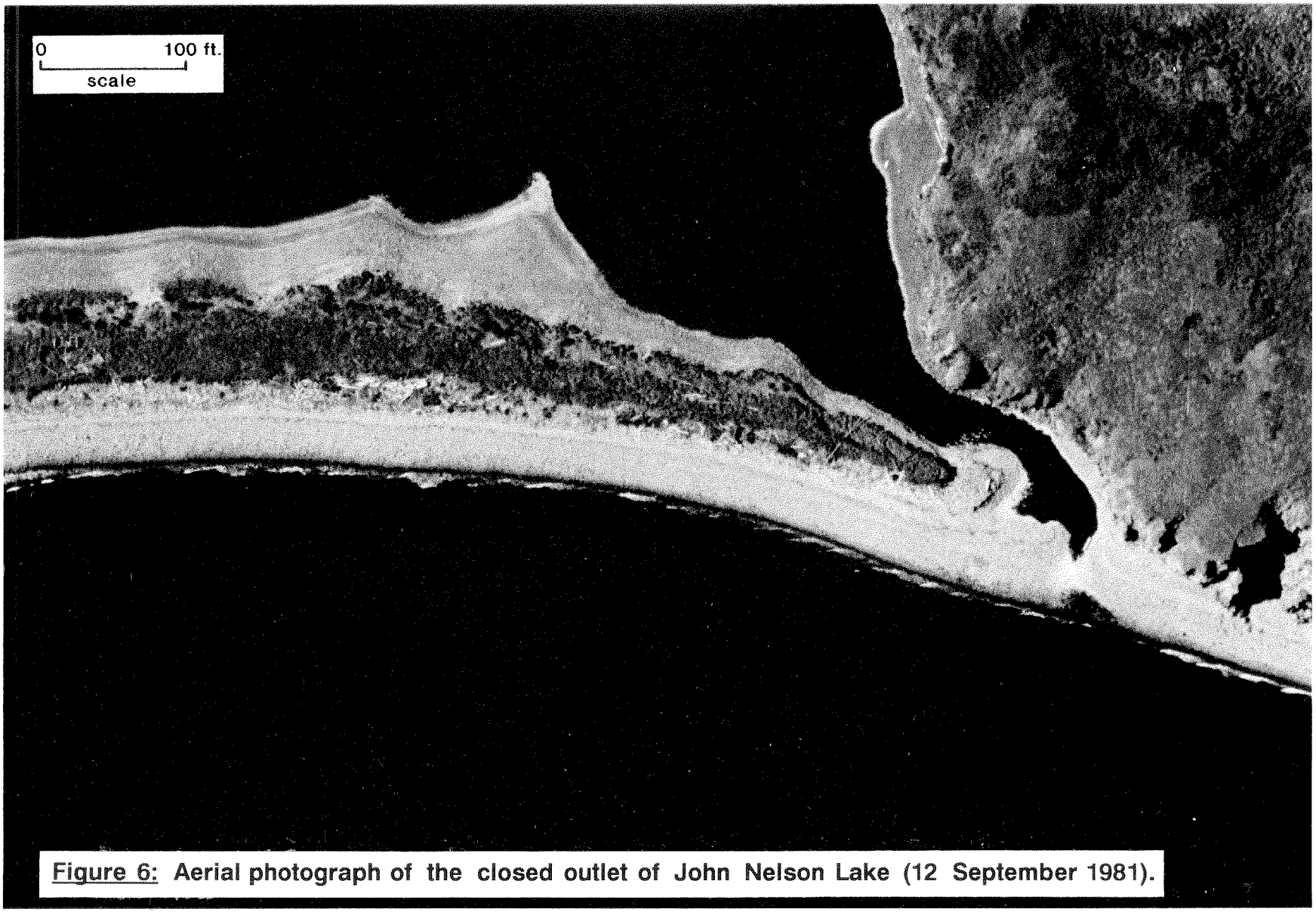


Figure 6: Aerial photograph of the closed outlet of John Nelson Lake (12 September 1981).

Figure 7: Outlet of John Nelson Lake viewed from the lake (14 September 1992). Note that the lake surface elevation is the same as sea level in the background.

Figure 8: (Upper photograph) Outlet of John Nelson Lake (14 September 1992). Lake is in background. (Lower photograph) Outlet of John Nelson Lake (14 September 1992). Ocean is in background.

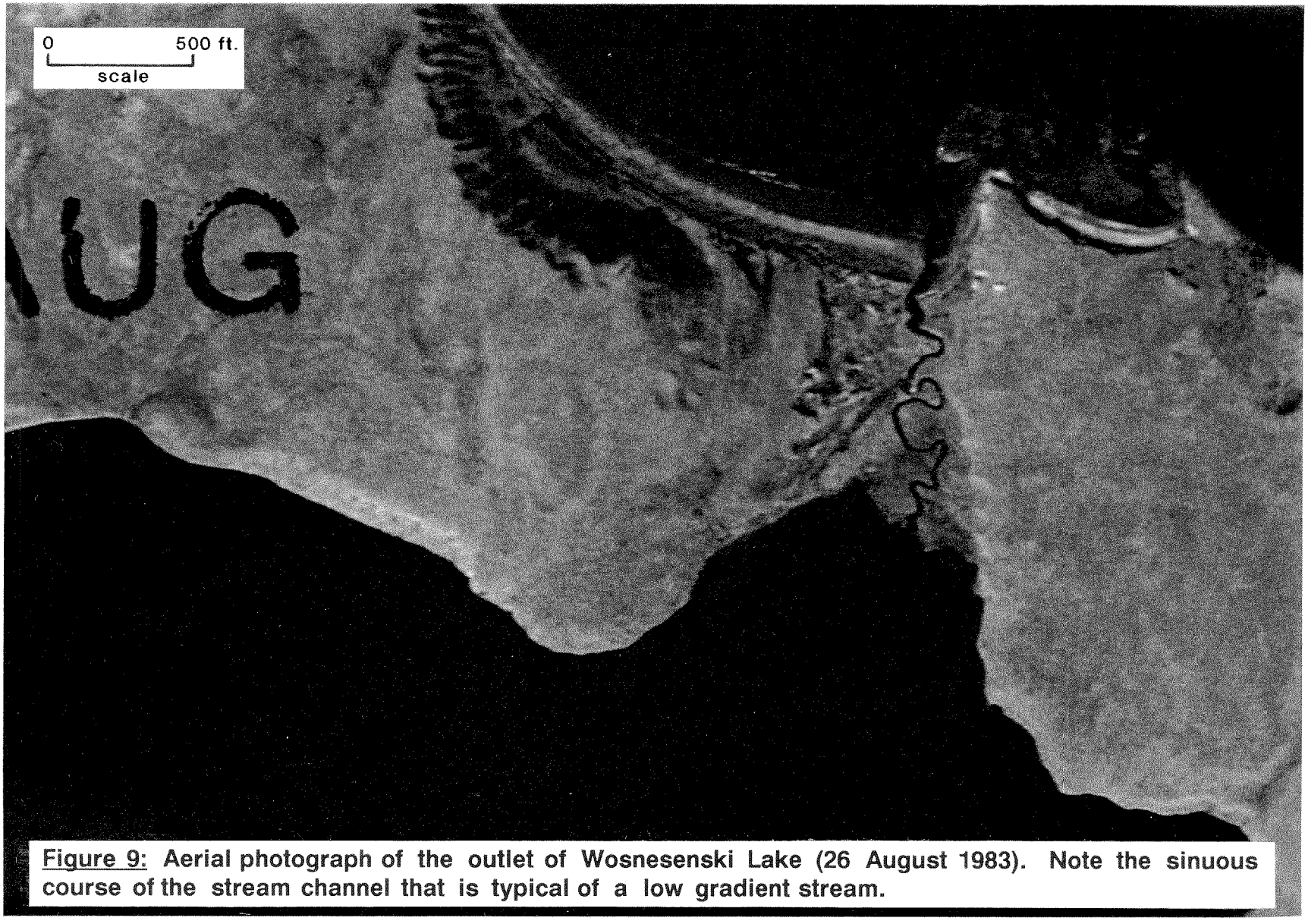


Figure 9: Aerial photograph of the outlet of Wosnesenski Lake (26 August 1983). Note the sinuous course of the stream channel that is typical of a low gradient stream.

Figure 10: Intertidal reach of Wosnesenski Creek (15 September 1992). Note the shallow, widespread appearance of the water that may be a migration barrier during low tide.

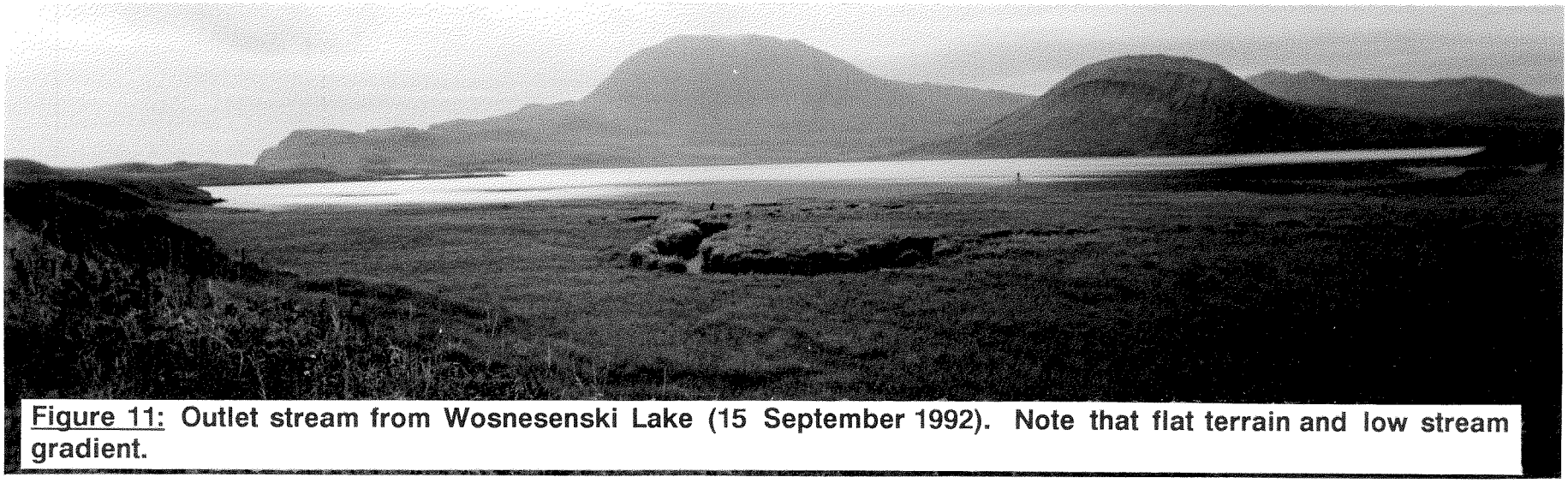


Figure 11: Outlet stream from Wosnesenski Lake (15 September 1992). Note that flat terrain and low stream gradient.

Figure 12: Log jam in the outlet stream from Wosnesenski Lake (15 September 1992) formed by a tsunami or storm-driven surge. A log jam such as this may periodically become a migration barrier for salmon smolts or adults.