

Checleset Bay

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ECOLOGICAL RESERVES COLLECTION
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The Effects of the Nestucca Oil Spill on the Sea Otter
Population and its Environment in Checleset Bay,
Ecological Reserve 109

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INTRODUCTION

On December 22, 1988 the oil barge Nestucca was rammed and holed by the barge towing it, off of Grays Harbour, Washington. As a result 875,000 litres of Bunker C oil was spilled into the ocean. The oil was carried northward by the Davidson current and winter storms, fouling the west coast beaches of Washington State and Vancouver Island (Waldichuck 1989).

On January 9 oil was found at Bajo Point threatening a group of 200 sea otters. By January 12 oil had drifted north to Checleset Bay threatening a second group of approximately 300 sea otters. On January 22 a dead, oiled sea otter was recovered from Gull Island within Checleset Bay Ecological Reserve 109. Death resulted from hypothermia caused by oiling. In addition the animal had ingested oil in an attempt to clean its fouled fur (Langelier 1989).

Sea otters lack the thick layer of insulating blubber found in most marine mammals and depend entirely upon the insulating qualities of their pelt to maintain body heat (Estes 1980). As a result sea otters are extremely susceptible to oil fouling as it destroys the integrity of the fur and allows water to contact the skin. In addition sea otters are potentially affected through the consumption of oil contaminated food. Sea otters feed primarily on shellfish. Areas affected by Nestucca oil were closed to commercial harvesting of shellfish during January and February 1989, in case oil caused shellfish to become toxic and unfit for consumption

Sea otters were hunted for their pelts throughout the 18th and 19th centuries. By 1930 they were extinct in British Columbia. Sea otters were reintroduced to Checleset Bay on the northwest coast of Vancouver Island from 1969 to 1972 (Bigg and MacAksie 1978). From the 89 sea otters originally released, the population has grown and expanded. The British Columbia sea otter population is listed as endangered. A 1984 population census determined that approximately 350 animals occurred in the waters of northwestern Vancouver Island (MacAskie 1987, 1984).

Research on the community ecology of sea otters was conducted in Checleset Bay from July to September in 1987 and 1988 (see Watson 1989). This data set can be used as baseline data to assess the affect of the Nestucca oil spill on the Checleset Bay sea otter population and their environment. This data includes weekly surveys of the Checleset Bay sea otter population conducted in 1988, the establishment of eight subtidal permanent sites in 1988 and 1987, which have been monitored annually, extensive subtidal benthic surveys throughout Checleset Bay and regular examination of beaches within the Checleset Ecological Reserve.

A study to determine the effects of the Nestucca oil spill on the sea otter population and their environment was conducted from July - September, 1989 in Checleset Bay. Weekly boat surveys of the population were made throughout Checleset Bay. The eight subtidal permanent sites were visually examined for oil. Sites used in benthic surveys in 1987 and 1988 were examined for oil

and oil effects. Beaches within Checleset Bay were visually examined for oil. The observed conditions of these beaches was compared to the condition reported during the oil spill and to the pre-oil spill conditions noted in 1987 and 1988.

This report summarizes the results of this work.

METHODS

A camp was established east of the Ecological reserve in the village of Kyuquot. Three biologists equipped with SCUBA gear and two inflatable boats made daily trips into the Ecological Reserve to conduct sea otter censuses and examine subtidal areas and beaches for oil.

Population Surveys

Eight sea otter surveys were conducted from July 23 to September 28, 1989. Each survey followed a route established in 1988, which was designed to cover major areas used by sea otters (Figure 1). Two observers and a boat operator counted sea otters from an inflatable boat. The location and number of sea otters was recorded on a chart. Surveys were conducted at approximately weekly intervals as weather and sea conditions permitted. The results of these surveys were compared to similar surveys conducted in 1988.

Subtidal Habitat Surveys

In 1987 and 1988 eight subtidal permanent sites were established to monitor the effects of sea otter foraging on nearshore community structure. Five sites were established in Checleset Bay and Kyuquot Sound, one site was established at

Nootka Island and two control sites were established in Barkley Sound (Figure 2, see Watson 1989 for a description). These sites have been monitored annually for three years and were examined in 1989 for oil or oil effects.

Twenty subtidal sites examined in 1988 were examined in July to September 1989 for visible signs of oil (Figure 3).

Beach Surveys

Beaches examined in July to September 1988 and during the oil spill in January - February 1989 were re-examined. The condition of these beaches was compared to the condition reported during the oil spill and the pre-oil spill condition in July-September 1988 (Figure 4a, 4b)

RESULTS AND DISCUSSION

Population Surveys

Results from the 1989 weekly sea otter surveys were variable. In general more sea otters were seen in the 1989 weekly surveys than the 1988 surveys. Surveys were conducted in the same period in both years using similar methods. From July to September in 1989 an average of 221 (SD = 60.8) sea otters was seen per survey (Table 1). This compares to an average of 156 (SD = 33.5) per survey in the same period in 1988 (Table 2). The highest count of 328 sea otters was made on July 26. This included only animals within Checleset Bay. This is a 54% increase from the 1988 maximum estimate of 213 sea otters. The higher counts in 1989 reflect a growing familiarity with sea otter habits and a population increasing at a rate of

approximately 17% per year (Estes 1990).

The results of these surveys suggest the Nestucca oil spill has not had a measurable effect upon the sea otter population size in Checleset Bay.

In Checleset Bay sea otters appeared to inhabit the same areas in July to September 1989 as they did in the same period in 1988. In both years large rafts of mothers and dependent pups were seen at O'Leary and Clara Islets. More pups were sighted in 1989 than 1988 (Table 1 and 2). Rafts of independent animals (those without dependent pups, probably young males, see Watson 1989 for a discussion) were seen in the morning at Chief Rock, Clanninick Cove in both years. The fact that sea otter rafts were seen at similar locations in both summer 1988 and 1989 suggests that the oil spill has not affected sea otter habitat use or distribution in Checleset Bay.

The sea otter population in Checleset Bay extends from Brooks Peninsula to East Entrance Reef in Kyuquot Sound and when compared with the previous range extent seen in 1988 is expanding in a southeasterly direction. Eighteen sea otters were seen south of Thornton Island which was believed to be the most southeasterly group of sea otters in Checleset Bay in 1988.

The carcass of one dead oiled sea otter was recovered from Gull Island in Checleset Bay. A wolf scat found in the Cuttle Islands near the Acous Peninsula (Figure 3) contained oiled sea otter fur, suggesting additional sea otters may have been killed by the oil. Not all sea otter carcasses can be expected to wash

ashore and wolves, which are abundant throughout the area affected by oil, may have consumed dead or moribund sea otters as they washed ashore. Some sea otters were definitely killed by the Nestucca oil, but we have no way of determining the exact number.

Subtidal Habitat Surveys

The eight permanent sites were visually examined for oil and oil effects. Oil was not seen at any of the sites examined.

Twenty subtidal sites examined in July - September 1988 were visually examined for oil. Oil or oil effects were not seen at any subtidal location.

Beach Examinations

Twenty-four beaches were visually examined for oil from the winter high tide line down to the waters edge. Conditions in July-September 1989 were compared to conditions reported during the oil spill, and to pre-oil spill conditions known in July-September 1988.

In almost all cases clean up efforts appear to have been successful. Oil was generally in small globules above the high tide mark. In most cases the oil was weathering and covered by a crust of organic debris.

Several small beaches (Nasparti Inlet and Cuttle Islets) were apparently overlooked during the oil clean up efforts. At these locations oil was present in large patties, coating plastic debris, and spattered on logs. It was above the winter high tide line tossed up by winter storms and does not appear to pose any

threat to sea otters through remobilization.

Thirty eight bags of oiled debris, leftover from oil spill clean up efforts, were located, marked on a chart and reported to the Coast Guard. These were removed by the Coast Guard in mid October.

Signs of the Nestucca oil spill were apparent throughout Checleset Bay Ecological Reserve. Oil, where present, was above the high tide mark and did not appear to be remobilizing.

SUMMARY.

1. Weekly boat counts conducted in Checleset Bay in July-September 1989 indicate there were a minimum of 328 sea otters within Checleset Bay. The sea otter population in this area extends from Brooks Peninsula to East Entrance Reef in Kyuquot Sound.
2. The Nestucca oil spill did not have a measurable effect upon the size of the sea otter population in Checleset Bay. At least one (possibly two) sea otter was killed by the Nestucca oil spill. The exact number of sea otters killed cannot be determined.
3. In Checleset Bay rafts of sea otters were observed at the same locations in 1989 as in 1988 suggesting the Nestucca oil has not affected sea otter distribution or habitat use in this area. Sea otters are continuing to expand their range southeastward in Checleset Bay.
4. Oil or oil effects were not found subtidally at any of the

eight permanent sites. Oil was not seen at other subtidal sites visited in July - September 1989.

5. In Checleset Bay beach clean up efforts appear to have been successful. Oil is barely visible at most sites and where present does not appear to be remobilizing and seems to pose little threat to the sea otter population in Checleset Bay.

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Literature Cited

- Bigg, M.A., I.B. MacAskie. 1978. Sea otters re-established in British Columbia. *J. Mammal.* 59:4:874-876.
- Estes, J.A. 1980. *Mammalia Species*. *Enhydra lutris*. 133:1-8.
- Estes, J.A. In Press. Growth and equilibrium in sea otter populations *Jour. Animal Ecol.* (1990).
- Langelier, K. 19889 The Nestucca oil spill. *Wildlife Veterinary Report*. 2:1:1-2.
- MacAskie, I. B. 1984. Sea otter censuses on Vancouver Island, 1984. Unpub. Rep. West Coast Whale Research Foundation.
- MacAskie, I.B. 1987. Updated status on the sea otter *Enhydra lutris* in Canada. *Canadian Field Naturalist* 101:279- 283.
- Waldichuck, M. 1989 The Nestucca oil spill; Editorial, *Marine Pollution Bulletin* 20:9:419-420.
- Watson, J. 1989. The community ecology of the sea otter *Enhydra lutris* in Checleset Bay (Ecological Reserve 109). Unpub. Report submitted to the Ecological Reserves Unit, British Columbia Ministry of Parks.
- Watson, J. 1990. The effects of the Nestucca oil spill on the British Columbia sea otter population and its environment. Unpub. Report submitted to the Marine Mammals Group, Department of Fisheries and Oceans, Nanaimo, British Columbia.

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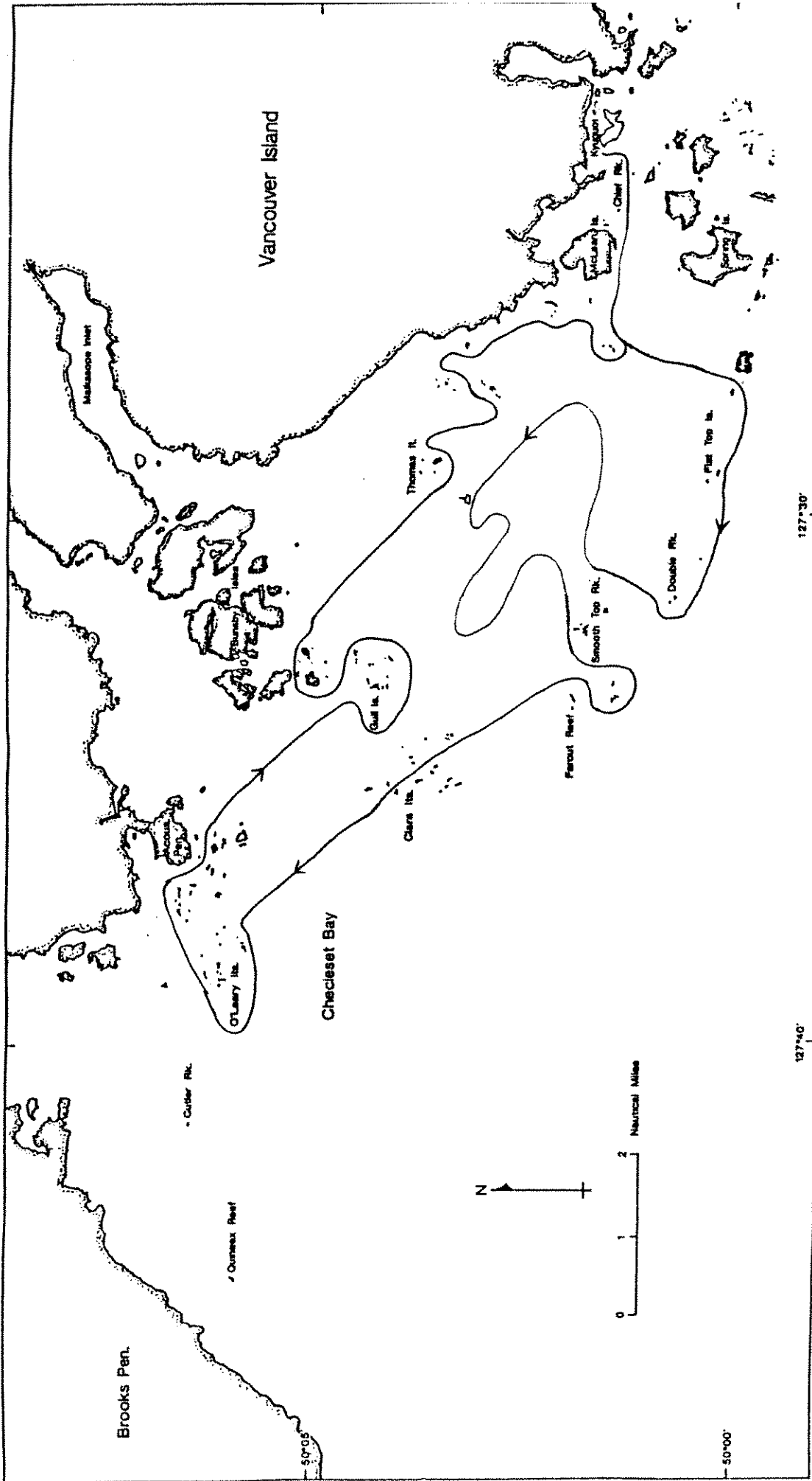


Figure 1. The survey route followed in Checleset Bay, on boat surveys.

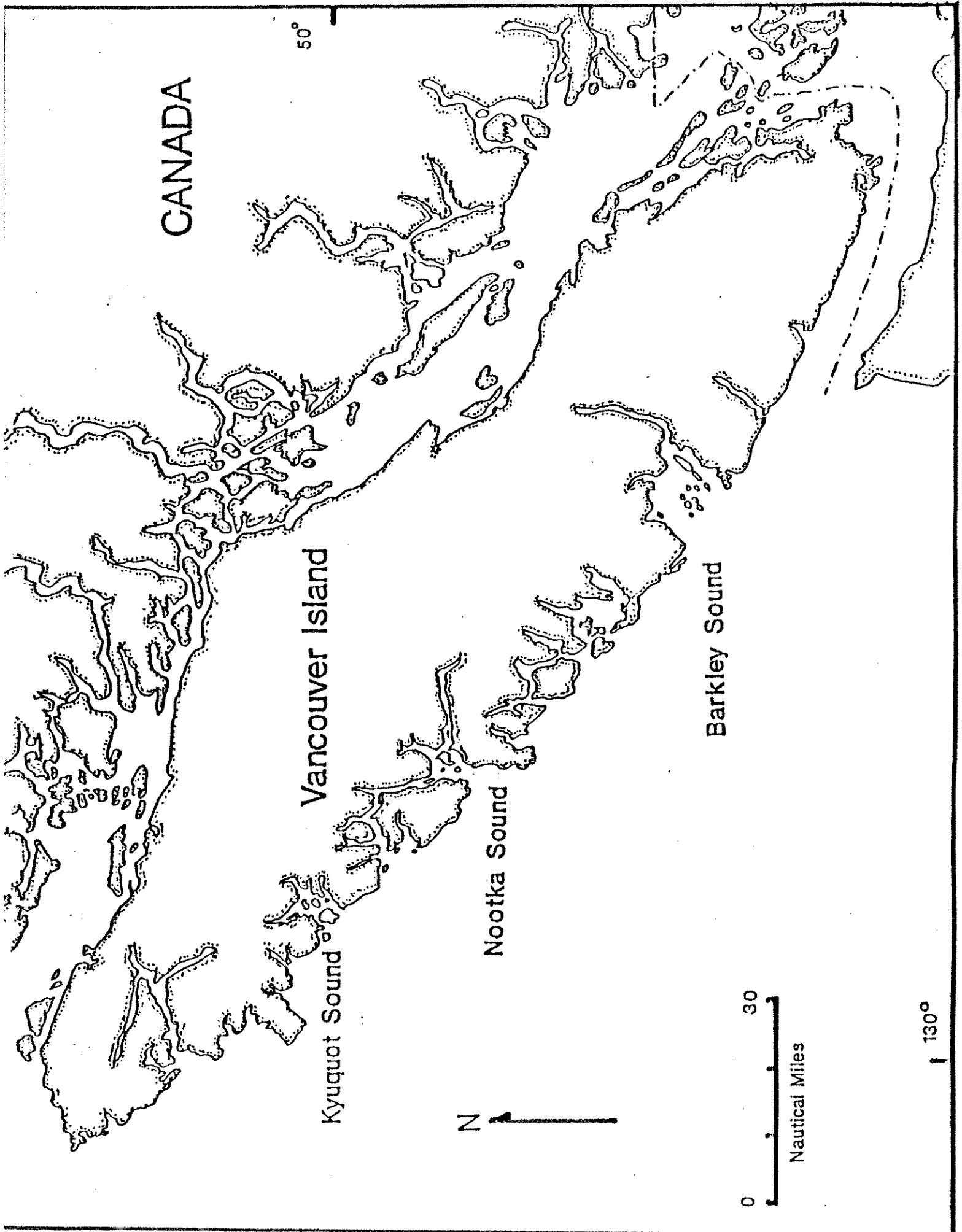


Figure 2. Location of the permanent sites on Vancouver Island.

Figure 3. Location of the subtidal sites examined for oil.

- | | |
|--------------------|--------------------------|
| 1. Spring Island | 11. Canoe Island |
| 2. Clanninick Cove | 12. Island West of Acous |
| 3. Gull Island | 13. McLean Island |
| 4. Nasparti Inlet | 14. Chief Rock |
| 5. Gay Passage | 15. Yule Rock |
| 6. Acous Peninsula | 16. Aktis Island |
| 7. Amos Island | 17. Polygon Island |
| 8. Kamils Island | 18. Clara Islets |
| 9. No Name Island | 19. Nasparti Islands |
| 10. Thomas Island | 20. Mission Island |

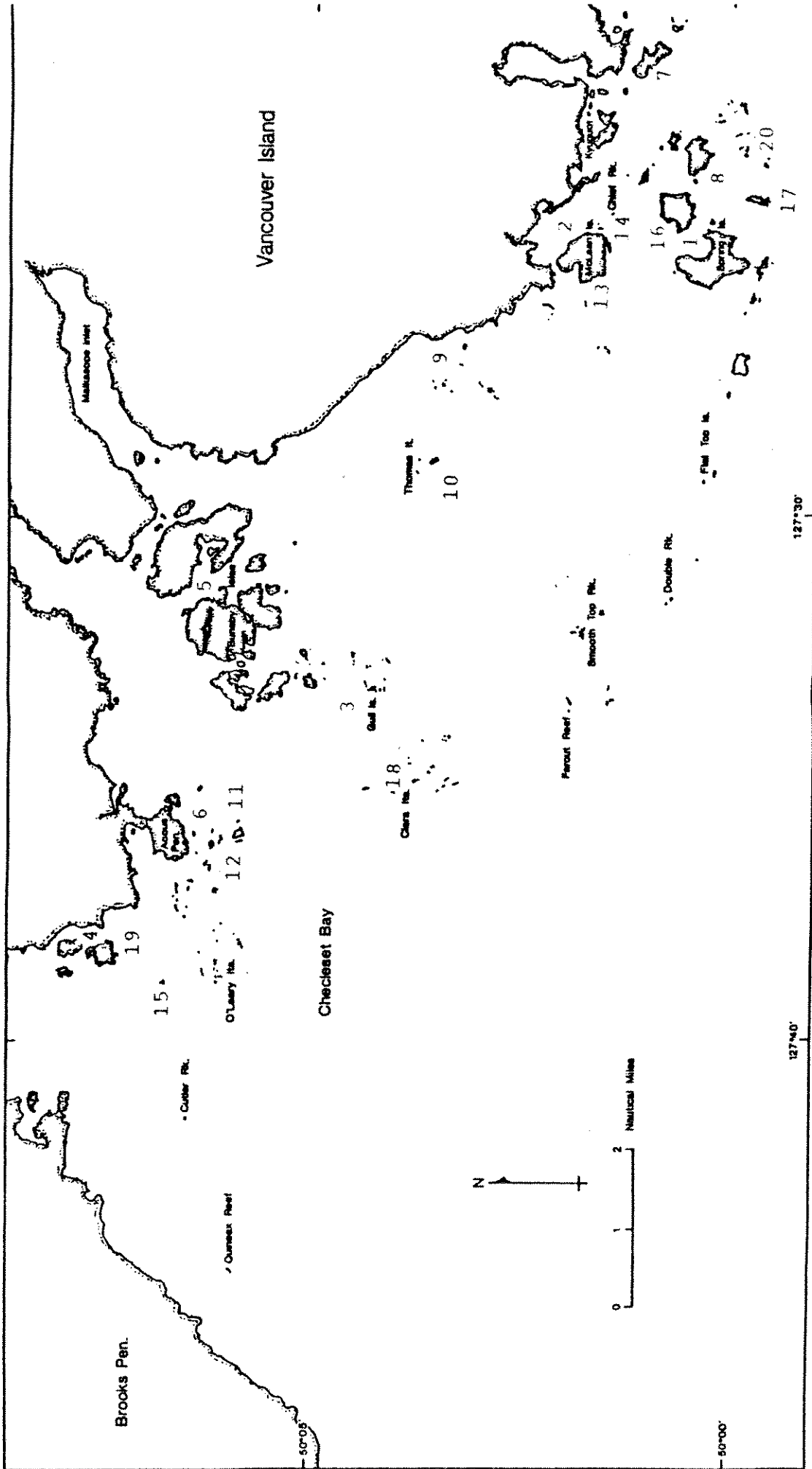


Figure 3. Location of the subtidal sites examined for oil.

Figure 4a. Beaches re-examined for oil in summer 1989.

1. Gay Passage
2. Kamils Anchorage
3. Canoe Island
4. Acous Peninsula
5. Chekaklis Island
6. B.C. Island
7. Pedlars Cove
8. Battle Bay
9. Gull Island
10. Thomas Island
11. Clanninick Cove
12. Aktis Island
13. Spring Island
14. Nasparti Island
15. Big Cuttle Island
16. Polygon Island
17. Sobry Island
18. Mclean Island

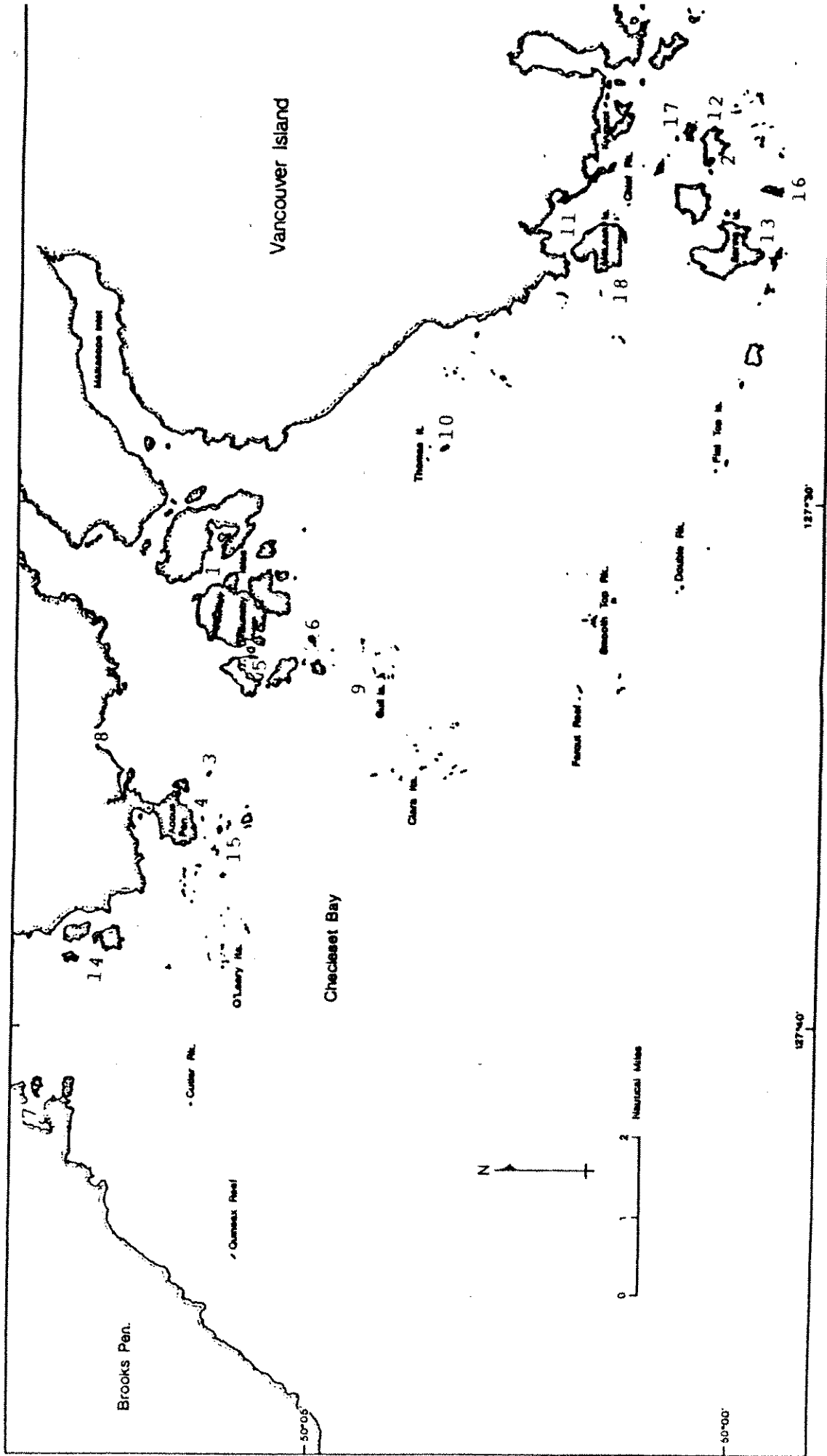


Figure 4a. Beaches re-examined for oil in summer 1989.

Figure 4b. Beaches re-examined for oil in summer 1989.

- | | |
|---------------------------|-------------------------|
| 19. Thornton Island | 22. Kyuquot Bay |
| 20. Kapoose Point | 23. Kyuquot Bay Islands |
| 21. Kapoose Point Beaches | 24. Amos Island |

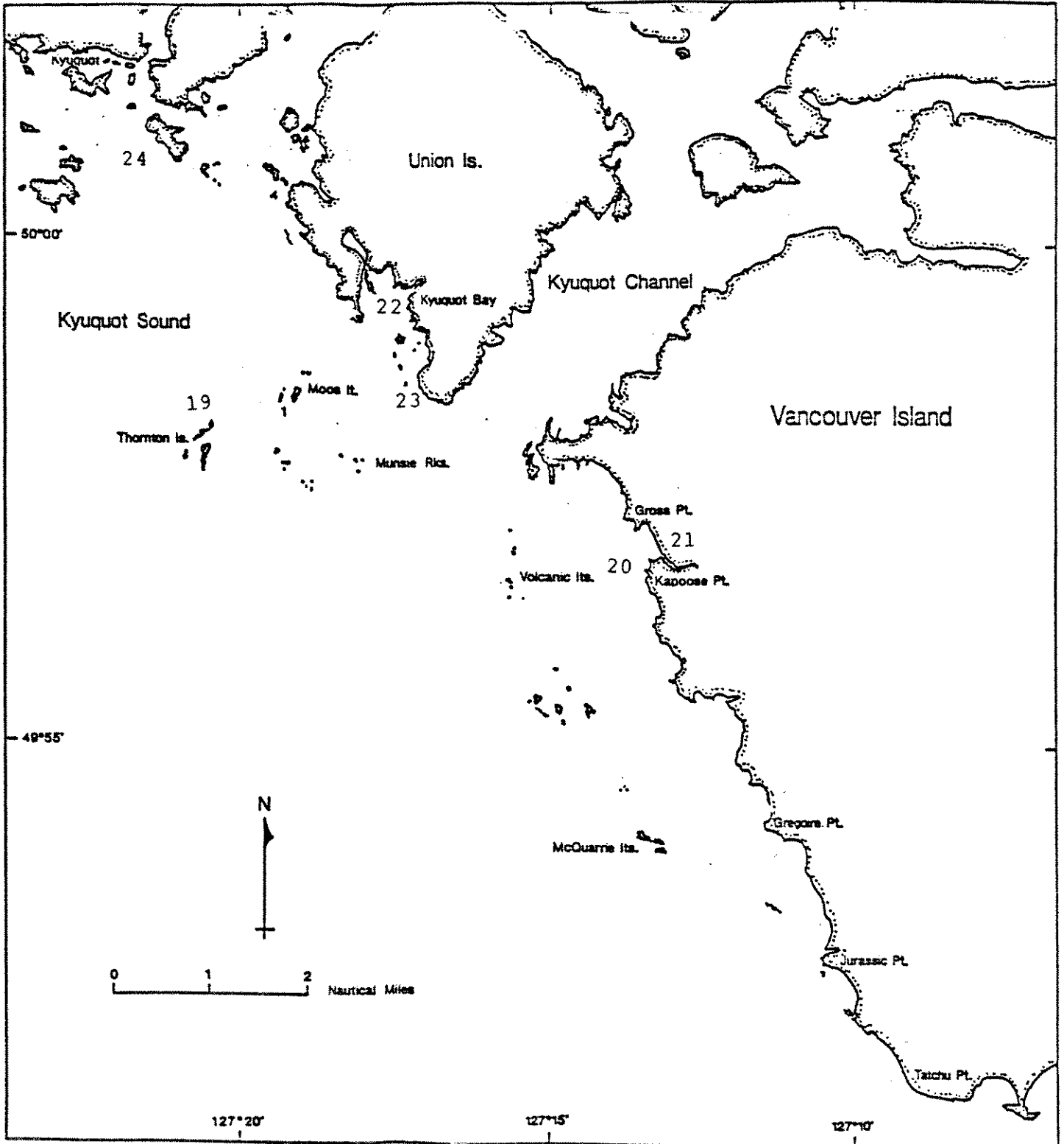


Figure 4b. Beaches re-examined for oil in summer 1989.

List of Tables

Table 1. Number of mothers (M), pups (P) and single (S) sea otters seen at each location along the Checleset Bay survey route (Figure 1) in 1989.

Table 2. Number of mothers (M), pups (P), and single sea otters seen at each location along the Checleset Bay survey route in 1988.

Date	26/07/89	27/07/89	03/08/89	05/08/89	12/08/89	24/08/89	01/09/89	07/09/89	09/09/89
Otter Category	M P S	M P S	M P S	M P S	M P S	M P S	M P S	M P S	M P S
Weather	Good	* Good	Fair	Good	Good	Poor	**Good	Good	Good
Entrance to Kyuquot	2 2 26	* Survey of area east of normal survey route.	0 0 45	0 0 5	0 0 7	0 0 13	0 0 5	0 0 3	0 0 1
Cole Rock	0 0 1		0 0 1	0 0 2	0 0 5	0 0 1	0 0 0	0 0 1	0 0 2
Flat Rocks	0 0 2		0 0 3	0 0 8	2 2 3	0 0 1	0 0 2	0 0 2	0 0 2
Double Rocks	0 0 0		0 0 0	0 0 0	0 0 0	0 0 0	0 0 5	0 0 0	0 0 0
Smooth Top	23 23 30		2 2 4	1 1 9	4 4 9	2 2 6	0 0 52	0 0 5	0 0 20
Can Buoy	0 0 2		0 0 0	4 4 9	0 0 1	0 0 0	0 0 25	0 0 16	0 0 26
Can Buoy to Clara	10 10 23		0 0 0	0 0 8	0 0 10	0 0 3	0 0 45	0 0 50	0 0 85
Far Out	2 2 2		2 2 4	2 2 3	3 3 5	0 0 1	0 0 2	0 0 6	0 0 0
Farthest Out	0 0 0		0 0 0	1 1 0	0 0 3	0 0 3	0 0 4	0 0 0	0 0 0
Clara Islets	69 69 9		42 42 0	31 31 0	33 33 7	17 17 28	0 0 42	0 0 53	0 0 64
O'Leary	6 6 6	0 0 15	25 25 0	30 30 11	8 8 30	0 0 73	0 0 58	0 0 60	
Yule Rock	0 0 0	0 0 0	0 0 0	0 0 1	0 0 0	0 0 0	0 0 2	0 0 1	
Acous Peninsula	0 0 1	0 0 1	0 0 0	0 0 3	0 0 1	0 0 1	0 0 1	0 0 1	
Gull Island	0 0 0	0 0 1	0 0 2	0 0 1	0 0 1	1 1 4	0 0 1	0 0 5	
Bunsby Islands	0 0 0	0 0 1	0 0 3	0 0 0	0 0 2	0 0 1	0 0 1	0 0 1	
Gay Passage	0 0 2	0 0 1	0 0 0	0 0 0	0 0 2	0 0 0	0 0 0	0 0 2	
Thomas Island	0 0 0	0 0 1	0 0 0	0 0 1	0 0 3	0 0 1	0 0 0	0 0 0	
Breakers	0 0 0	0 0 0	0 0 0	0 0 0	0 0 3	0 0 0	0 0 0	0 0 0	
TOTAL	112 112 104	18	46 46 77	64 64 49	72 72 70	27 27 95	1 1 260	199	270
GRAND TOTAL	328	18	169	177	214	149	262	199	270

* Survey of area east of normal survey route.
 ** Pups no longer consistently distinguishable from adults.

Table 1. Number of mothers (M) pups (P) and single otters (S) seen at each location along the Checleset Bay survey route (Figure 1) in 1989.

Survey #	1			2			3			4			5			6			7		
	Date	S	M	P	S	M	P	S	M	P	S	M	P	S	M	P	S	M	P		
1. Entrance Kyoquot (Chief Rk)	17	10	10	9	0	0	33	2	2	17	2	2	46	8	8	30	4	4	49	9	9
2. Cole Rk.	2	0	0	1	0	0	0	0	0	6	0	0	7	0	0	7	1	1	7	0	0
3. Cole Rk. - Thomas It.	4	0	0	2	1	1	5	0	0	1	0	0	6	3	3	3	0	0	2	0	0
4. Thomas It.	2	9	9	2	2	2	7	8	8	8	3	3	7	2	2	1	0	0	0	0	0
5. Bursby It.	1	0	0	5	0	0	3	0	0	1	0	0	0	0	0	0	1	1	3	0	0
6. Gull Island	0	0	0	1	0	0	1	1	1	3	1	1	3	1	1	1	0	0	1	0	0
7. Acous Peninsula	1	0	0	1	0	0	0	1	1	0	0	0	2	0	0	1	0	0	0	0	0
8. O'Leary Its.	3	12	12	0	0	0	4	13	13	15	22	22	5	6	6	7	14	14	25	8	8
9. Clara Its.	12	2	2	13	5	5	11	5	5	16	6	6	24	13	13	14	5	5	12	2	2
10. Farout Reefs	3	0	0	1	2	2	1	1	1	3	0	0	4	5	5	2	1	1	6	1	1
11. Smooth Top Rocks	21	13	13	20	7	7	2	0	0	12	3	3	8	4	4	3	0	0	5	1	1
12. Double Rocks	3	1	1	3	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0	0
13. Flat Top Rocks	3	2	2	8	3	3	13	1	1	3	0	0	6	0	0	2	0	0	2	0	0
14. Lookout Island	2	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15. Mission Group	2	0	0	2	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
16. Cole Rock - Flat Top	0	0	0	0	0	0	0	0	0	1	1	1	5	1	1	3	0	0	3	0	0
TOTAL	76	50	50	69	21	21	82	32	32	87	38	38	127	43	43	74	26	26	117	21	21
GRAND TOTAL	176			111			146			163			213			126			159		

Table 2. Number of mothers (M) pups (P) and single otters (S) seen at each location along the Checleset Bay survey route in 1988.