

Research Unit #19

Alaska Marine Environmental Assessment Project
Herring Spawning Surveys - Southern Bering Sea

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I N T R O D U C T I O N

This report describes studies conducted during June and early July, 1975, in the area from Cape Newenham north along the coast to the Yukon River delta. A total of \$4,700 was made available during Fiscal Year 1975 and was utilized in completing reconnaissance surveys during suspected spawning dates.

Due to time and fund limitations, only a small portion of the coast included under Research Unit #19 could be covered during this study. The area between Cape Newenham and the Yukon River delta was selected due to the lack of documented information and its proximity to the Alaska Department of Fish and Game office in Bethel. During the ensuing months, the study area will be extended to cover the coast between Unimak Island and the Yukon River delta.

Herring (Clupea harengus pallasii) in the study area are known to play an important role in subsistence utilization by coastal residents, but the magnitude and importance of the harvest has not been documented. Herring also represent a latent commercially exploitable resource of potential benefit to Alaskan coastal residents. In addition, herring and herring eggs constitute one of the fundamental sources of food for many species of fish, mammals and birds.

Herring are known to spawn on open, exposed beaches in the tidal and sub-tidal zones. Therefore, the developing eggs and larvae are highly susceptible to surface-borne pollution.

Very little information exists regarding the range, distribution, seasonal occurrence, relative abundance and life history in addition to the location of spawning areas. This information is necessary to provide information for pro-

tecting and mitigating impacts of potential oil and gas exploration and development on the coastal herring resource.

Study objectives include the following:

- a. determine seasonal occurrence, distribution, and relative abundance of spawning herring and herring spawn in the inter-tidal and shallow sub-tidal zones;
- b. determine the dependance upon and utilization of herring and herring spawn by coastal residents;
- c. determine the important life history characteristics (age, sex and size compositions) of selected spawning populations;
- d. determine the kinds of mineral and plant substrates used for spawning.

Similar information regarding smelt (several species) and capelin (Mallotus villosus) will be obtained incidentally during the study.

M E T H O D S

Observations of schooled fish were made by experienced Department fishery biologists from chartered aircraft (single engine, fixed wing). These aircraft were flown at altitudes of 700-1000 feet and at speeds of 80-90 miles per hour. The locations of schooled fish were entered on U.S.G.S. topographic maps.

With the exception of the May 31 and July 3 surveys, each school observed from the aircraft was subjectively classified as to relative size based on surface area in the following manner:

- a. small: less than 500 square feet in surface area.
- b. medium: 500-5000 square feet.
- c. large: in excess of 5000 square feet.

Utilization of herring by subsistence fishermen was obtained from the return of specially prepared catch forms. A local resident was hired to collect and mail each completed form to the Department's Bethel office.

The scope and purpose of the study was carefully explained during a meeting in Bethel with representatives from most of the coastal villages in the study area. As a followup to this meeting, Nunam Kitlutsisti, an environment-oriented group with the Association of Village Council Presidents, sent a letter to all concerned village councils explaining the purpose of the study and requesting cooperation of the local residents.

R E S U L T S A N D D I S C U S S I O N

Schooled fish were observed during four aerial surveys made on May 31, June 8, June 20 and July 3. Locations of individual schools observed during these surveys are shown in Figure 1. Table 2 shows the relative size of schools so classified.

Most schools were observed in relatively shallow water (less than 60 feet) and within 600 feet of the shoreline. The only evidence of active spawning was observed June 20 approximately 1.5 miles south of Cape Vancouver and on May 31 inside Goodnews Bay. Gulls were commonly observed feeding on schooled fish. Only two seals were observed actively feeding on schooled fish, one at Cape Vancouver and the other near Cape Romanzov.

Based on interviews with local residents, both herring and capelin spawn in the study area during the spring and early summer. Based on very preliminary information, herring appear to spawn earlier on or near large kelp-covered rocks, while capelin spawn later on sand or gravel beaches. Since both species apparently occur in schools of similar density and size, species identification from aircraft was judged not feasible during the study period.

The greatest volume of schooled fish was observed adjacent to Cape Vancouver on June 20. Another concentration was observed the same date near Cape Romanzov (between the Cape and the airstrip) but the relative size of these schools was difficult to determine due to turbid water conditions.

Kelp, at least where especially abundant, was easily detected from aircraft.

In general, kelp was evident wherever the substrate consisted of large rocks and these areas were usually adjacent to high bluffs or cliffs. The most extensive kelp beds were observed in the Newenham area from Castle Rock to Cape Peirce.

All coastal residents in the study area apparently utilize herring for subsistence purposes to varying degrees. A total of 133 persons (heads of family units) from four villages reported a herring catch of 366,820 fish. Catch data for each village is shown below:

<u>Village</u>	<u>Numbers of Persons</u>	<u>Numbers of Herring</u>
Tanunak	26	87,130
Umkumiut	38	131,795
Tooksook	45	136,810
Hooper Bay	34	11,085
	<u>133</u>	<u>366,820</u>

To date catch data has not been received from other coastal villages, i.e. Scammon Bay, Chefornek, Mekoyruk.

The following information was obtained during a July 3 visit to the village of Tanunak: Local residents report that the herring catch this season was above average in magnitude. Herring are captured with gillnets fished in the Cape Vancouver area. At the present time most fishermen have replaced their herring gillnets with salmon gillnets. The few herring gillnets still operating are taking cod (species unidentified). Capelin are abundant but only a few are currently being taken along shore with dip nets, Capelin are too small to entangle in the gillnets. After capture, herring are gilled and gutted and are strung on braided grass ropes to dry in the sun. Each string contains about 75 fish and is approximately 5-feet long. The herring roe is sun dried on flattened cardboard boxes.

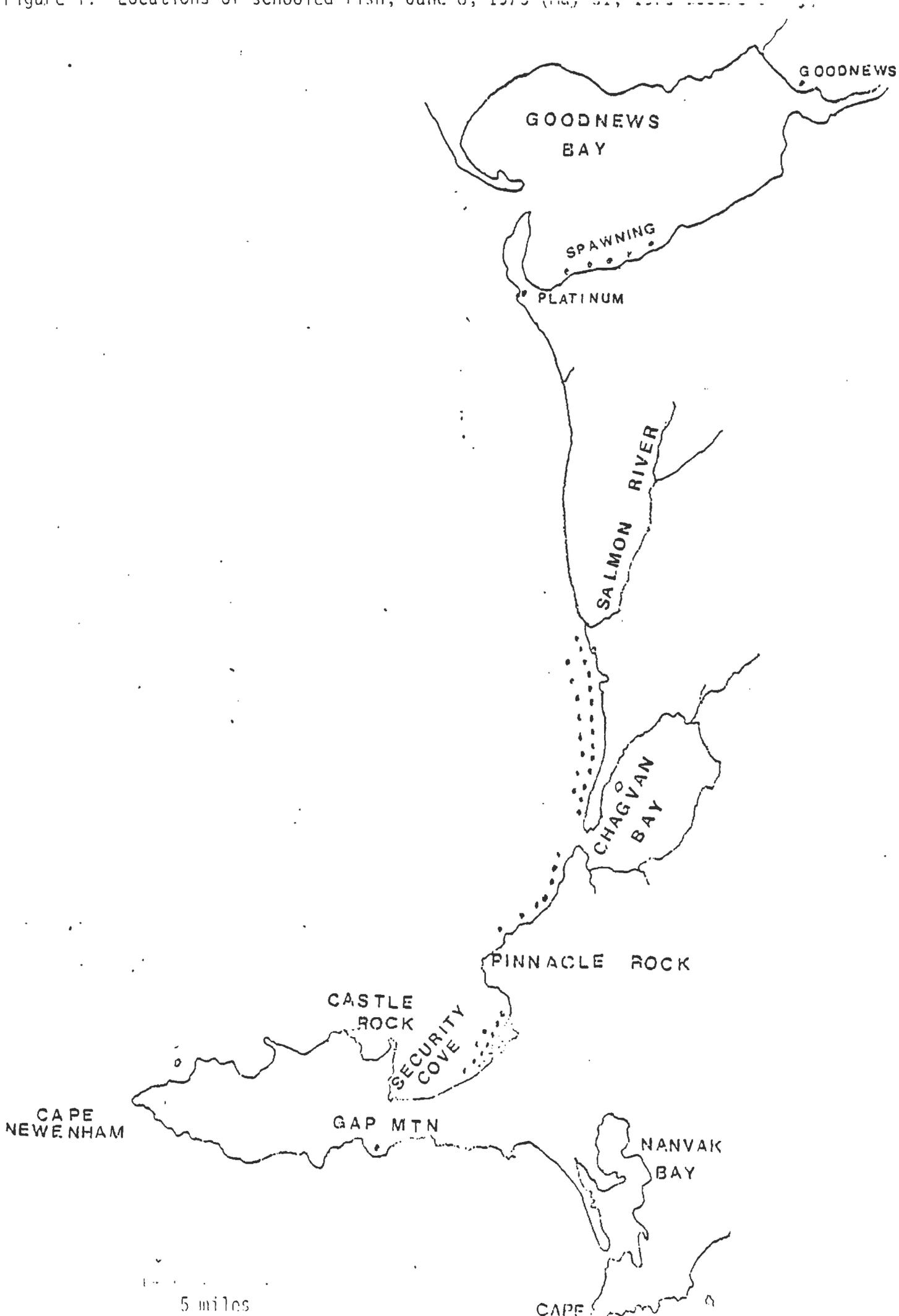


Figure.1 (cont.) Locations of schooled fish, June 20, 1975

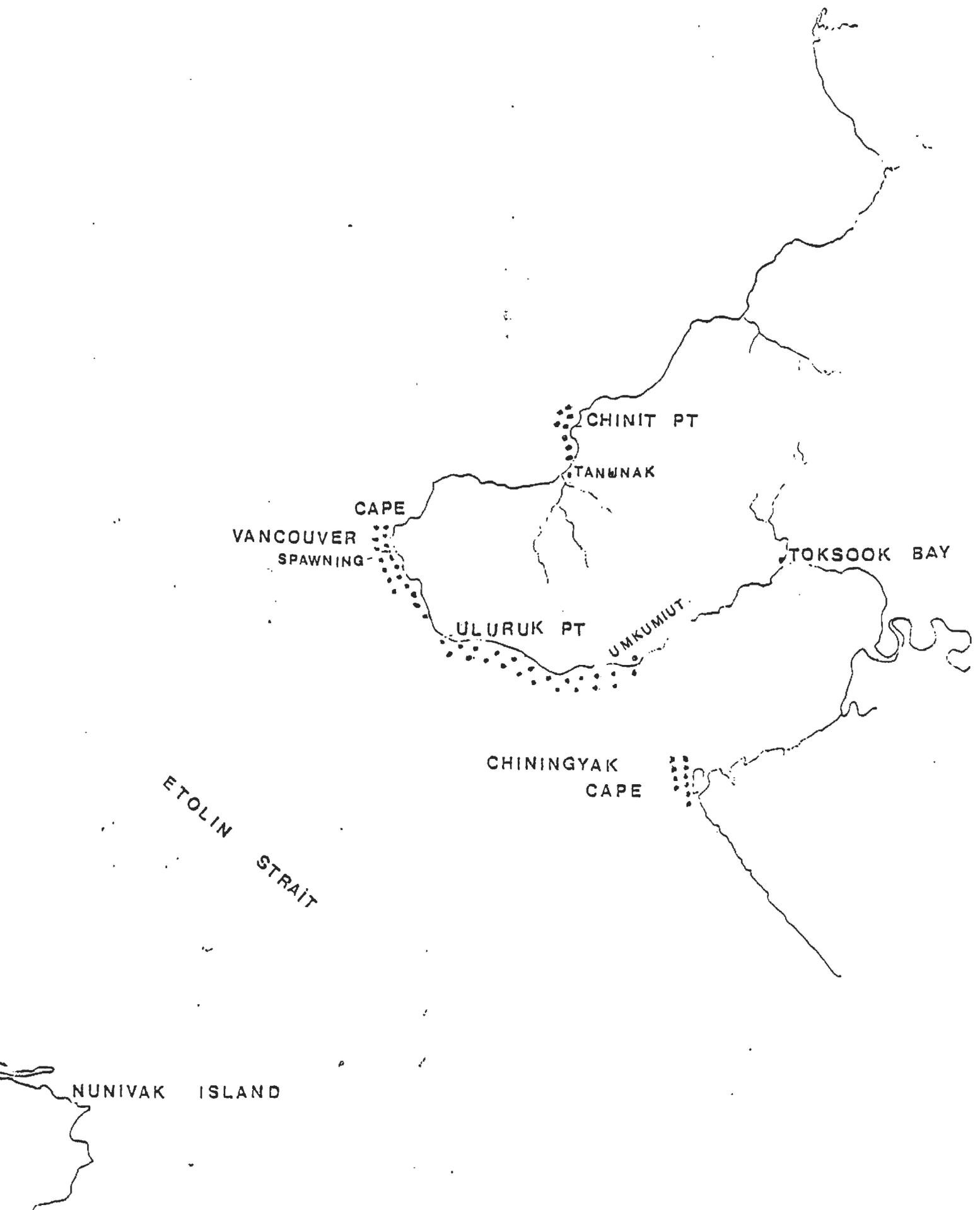


Figure 1. (cont.) Locations of schooled fish, June 20, 1975.

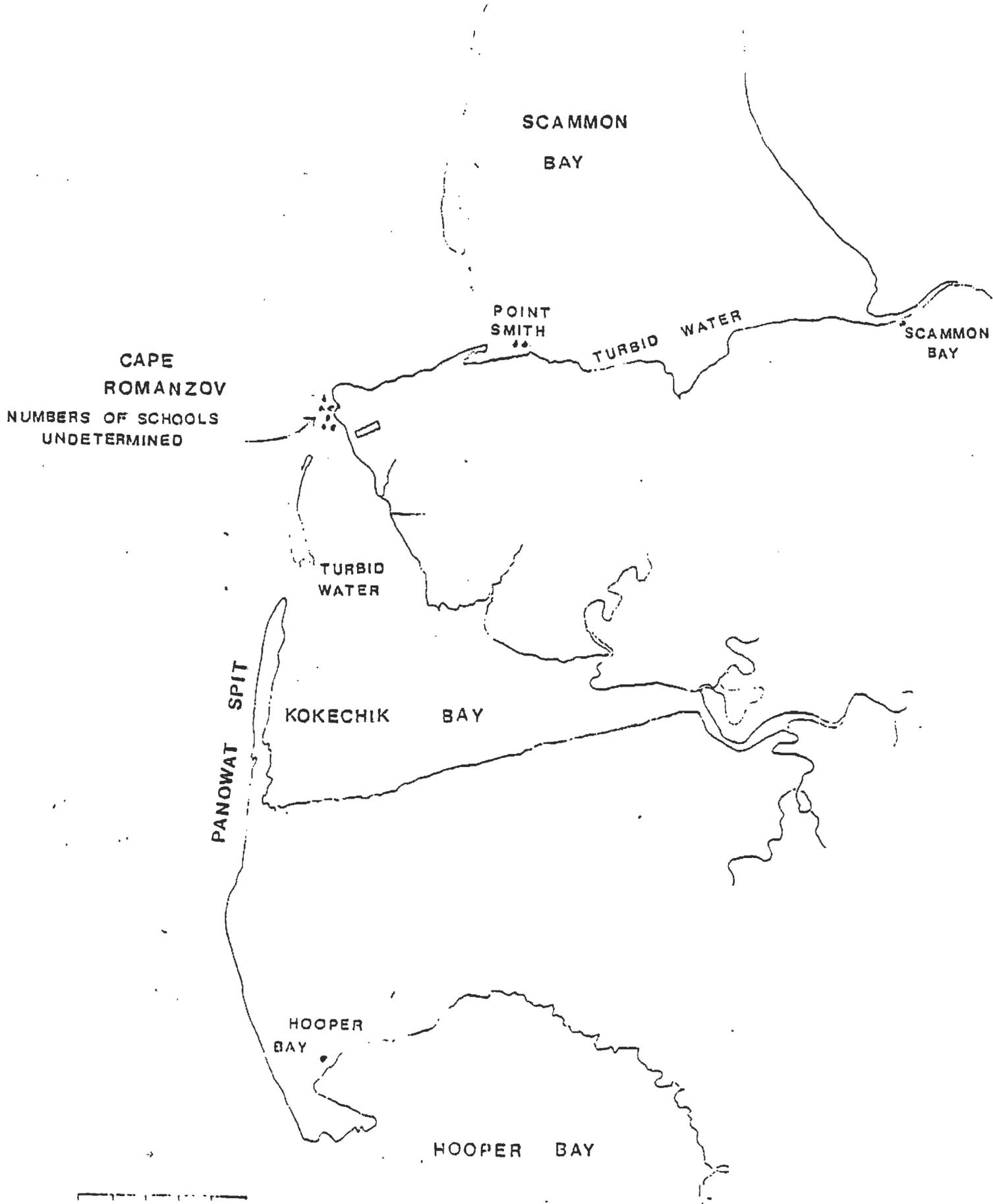


Table 1. Numbers of fish schools classified as to relative size, Cape Newenham to Yukon River delta, 1975.

Date	Area Surveyed	small ^{1/}	medium ^{2/}	large ^{3/}	Unclassified	Total
5-31-75	<u>Goodnews Bay</u>					
	Little Beluga Mt. to Platinum (200)				5	5
	Remainder of Bay				0	0
					<u>5</u>	<u>5</u>
6-8-75	<u>Cape Peirce to and including Goodnews Bay</u>					
	Cape Peirce to Castle Rock (17-18)					0
	Security Cove (12)	6	3			9
	Pinnacle Rock to Chagvan Bay entrance (16)	7				7
	Chagvan Bay (14)					0
	Chagvan Bay entrance to Goodnews Bay entrance (200)	22	4			26
	Goodnews Bay (200)					0
		<u>35</u>	<u>7</u>			<u>42</u>
6-20-75	<u>Cape Chinigyak to Scammon Bay</u>					
	Cape Chinigyak 22	10				10
	Kangirlvar Bay 23					0
	Unkumiut to Uluruk Point 24	22	3			25
	Unkumiut to Cape Vancouver 25	9	6	2		17
	Cape Vancouver to Tununak 26					0
	Tununak to Chinit Point 27	6		2		8
	Chinit Point to Panawat Spit 28					0
Kokechik Bay including Cape Romanzov (29)				schooled fish present	?	
	Cape Romanzov to Scammon Bay village (30)	2				2
		<u>49</u>	<u>9</u>	<u>4</u>		<u>62</u>

1/ Surface area estimated less than 500 square feet.

2/ Surface area estimated 500-5000 square feet.

3/ Surface area estimated in excess of 5000 square feet.