

C.S.S. "RICHARDSON" 1963 REPORT

SURVEY AND SHIP OPERATIONS

IN THE

CANADIAN WESTERN ARCTIC

SUBMITTED BY

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C.S.S. "RICHARDSON" 1963 REPORT

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Introduction

This is a report on operations conducted by C.S.S. "Richardson" in the Western Arctic in 1963. The area of operation for 1963 stretched from Herschel Island to Pearce Point Harbour along the mainland shore; eastward to the north shore of Prince Albert Sound, and northward to Minto Inlet, Walker Bay, Prince of Wales Strait, Sachs Harbour, etc.

The report consists of a Planning & Preparation Section, followed by a Chronology of Events, leading to an Operational Section split into three sub-sections dealing with Hydrography, Oceanography and Ship operations.

The recommendations section, which follows, is also divided into these three sub-sections, and contains suggestions aimed at improving chart coverage and efficiency of operations in this region.

Finally, there are the conclusions to be drawn from the 1963 operation, and an index of sketches showing work accomplished in each area.

Planning and Preparation

C.S.S. "Richardson" was laid up at Tuktoyaktuk N.W.T. in the fall of 1962. Plans were laid for hydrographic and oceanographic surveys in the region lying between Herschel Island and Prince Albert Sound during the 1963 season. A fairly extensive programme was envisaged to test the capability of this vessel in her first full season in the Arctic.

Arrangements were made with Capt. Hall, Superintendent of Operations and Mr. F. Hunter, General Manager of Northern Transportation Co. Ltd., regarding supply of fuel and fresh provisions through the NTCL Camp at Tuktoyaktuk. A communication schedule was arranged with CJV72, the NTCL radio station at Tuktoyaktuk. Federal Electric Corporation were informed of our plans and agreed to assist our operations with communication checks and ground transportation at DEW Line sites.

Our plan of operation was integrated with that of our hydrographic team which would be operating from C.C.G.S. "Camsell", and arrangements were made for rendezvous and radio communication throughout the season.

Air transport was arranged by scheduled airline to Inuvik and charter flights beyond to Tuktoyaktuk for crew members and equipment.

Chronology of Events

29th May, 1963	Capt. McCulloch arrives Edmonton.
1st June, 1963	Capt. McCulloch and advance party arrive Tuktoyaktuk (Commence re-activation).
4th June, 1963	Remainder of crew arrive at Tuktoyaktuk.
6th June, 1963	Galley activated.
13th June, 1963	"Richardson" floating free of ice cover.
18th June, 1963	Main engine test OK - Propeller & rudder clear of ice.
20th June, 1963	"Richardson" moving around upper harbour.
21st June, 1963	Alongside NTCL Wharf.
22nd June, 1963	Alongside in Tuk Village.
26th June, 1963a	Stretch line survey of NTCL Beach Approaches.
28th June, 1963	Survey work in Kugmallit Bay.
6th July, 1963	"Camsell" Hydrographic team at Tuk.
11th July, 1963	Commenced survey of Trent Bay.
15th July, 1963	Completed survey of Trent Bay.
18th July, 1963	Reconnaissance survey off Kendall Island.
20th July, 1963	Establishing Tide Gauge at Herschel Island and survey of Passage.
25th July, 1963	Survey work off Toker Point - Mr. Gray, Dominion Hydrographer o/b for visit.
26th July, 1963	Commenced Oceanographic Observations at Tuk.
28th July, 1963	Completed Oceanographic Observations at Tuk.

Chronology of Events - (Continued)

29th July, 1963	Anchored Baillie Islands awaiting weather improvement.
31st July, 1963	Arrived Cape Parry.
1st Aug. "	Reconnaissance survey of Cape Parry Harbour.
2nd Aug. "	Commence survey of Pearce Pt. Harbour Approaches.
4th Aug. "	Complete " " " "
5th Aug. "	Investigating north shore Prince Albert Sound.
6th Aug. "	Investigating north shore Minto Inlet.
7th Aug. "	Investigating Walker Bay
8th Aug. "	Investigating Jesse Harbour.
9th Aug. "	Commence reconnaissance survey of Sachs Harbour.
12th Aug. "	Complete reconnaissance survey of Sachs Harbour
16th Aug. "	Commence sounding operations off Warren Point.
20th Aug. "	Complete sounding operations off Warren Point.
22nd Aug. "	Commence survey of McKinley Bay to Novorak Point area.
26th Aug. "	Complete survey of McKinley Bay to Novorak Point area

Chronology of Events - (Continued)

30th Aug. 1963	Reconnaissance survey off delta.
31st Aug. "	Recover Tide Gauge at Herschel Island.
3rd Sept. "	Complete sounding out Herschel Island Passage.
5th Sept. "	Commence sounding out James Shoal area.
8th Sept. "	Completed sounding out James Shoal area.
9th Sept. "	Sounding in Liverpool Bay, etc.
11th Sept. "	Completed sounding in Liverpool Bay.
12th Sept. "	Messrs. Ages & Randell transferred from "Camsell".
13th Sept. "	Commenced oceanographic observations at Tuk.
16th Sept. "	Completed oceanographic observations at Tuk.
17th Sept. "	Commenced de-activation.
22nd Sept. "	Completed de-activation.
24th Sept. "	Crew departed Inuvik.
25th Sept. "	Crew arrived Victoria.

Operations

Hydrography

Herschel Island Vicinity (See Plate 1)

A reconnaissance survey was carried out of the passage between Herschel Island and the mainland. In addition reconnaissance soundings were run along the western shore of Herschel Island, and between Pauline Cove and Kay Point. A temporary tide gauge was established at Herschel Island which was serviced by the R.C.M.P. over a 27 day period.

Summary: 1 Tide Gauge established
 200 Miles Sounding

Bar 2 - (Trent Bay) (See Plate 2)

A controlled survey was undertaken of the approaches to BAR 2 landing beach. Horizontal control was extended along the beaching area and out to Escape Reef, and sounding coverage established to the four mile limit.

Summary: 6 Stations Built
 3 Stations Observed
 2 Tellurometer Distances Measured
 2 Rock Posts Planted
 4 Stations Photo-identified
 44 Miles Sounding

Operations

Hydrography (Cont'd.)

Mackenzie Delta (See Plate 3)

Each time the vessel ran from Tuktoyaktuk toward the Mackenzie Bay area and return,, the opportunity was seized to run additional lines of radar controlled sounding. In addition, the approaches to the various islands north of the delta were explored.

Summary: 656 Miles Sounding

Kugmallit Bay (See Plate 4)

Radar controlled sounding was run in the area north of Hendrickson Island and west toward Pullen Island. In this area horizontal control was established by tellurometer traverse.

Summary: 2 Sun Azimuths

5 Stations Built

4 Stations Observed

4 Tellurometer Distances Measured

4 Rock Posts Planted

157 Miles Sounding

1 Tide Gauge Inspected

Warren Point Vicinity (Plate No. 5)

Controlled sounding was extended east of Toker to the entrance to Hutchison Bay. Additional sounding marks were established to facilitate this operation. Radar controlled sounding was undertaken in the vicinity of James Shoal and the limits of the shoal area delineated.

Summary: 4 Stations Built

2 Stations Observed

266 Miles Sounding

OperationsHydrography (Cont'd.)Warren Point to Cape Dalhousie (See Plate No. 6)

Reconnaissance soundings were continued in this area, and Russell Inlet was thoroughly explored. Horizontal control was extended along the coast from Atkinson Point to Novorak Point, partly by NTCL helicopter.

Summary: 8 Stations Built
 6 Stations Observed
 6 Tellurometer Distances Measured
 1 Sun Azimuth
 5 Rock Posts Planted
 6 Station Photo-Identified
 153 Miles Sounding

Liverpool Bay (Including Baillie Island) (See Plate 7)

Radar-controlled sounding was continued in the Liverpool Bay area, and a reconnaissance survey of the Baillie Islands anchorage and approaches was undertaken.

Summary: 342 Miles Sounding

Cape Parry Vicinity (See Plate 8)

Radar-controlled sounding was continued in the vicinity of the Cape Parry Peninsula and ^{Van}Damley & Franklin Bays. Balaena Bay and the entrance to Kendall Inlet were investigated and a reconnaissance survey of Gillet Harbour was completed.

Summary: 224 Miles Sounding

OperationsHydrography (Cont'd.)Pearce Point to Cape Lyon (See Plate 9)

A tellurometer traverse was extended from Pearce Point Harbour to the offshore islands and thence to Cape Lyon. The approach area to Pearce Point Harbour between Cape Lyon and Cape Pearce was thoroughly sounded out to a distance of three miles north of the offshore islands.

Summary: 5 Stations Built
 5 Stations Observed
 3 Tellurometer Distances Measured
 3 Rock Posts Inserted
 96 Miles Sounding

Prince Albert Sound & Holman Island (See Plate 10)

The north shore of Prince Albert Sound was explored as far east as Investigator Island. Soundings were carried out both inside chain and outside the Island, and various bays investigated. Sounding tracks were run in the vicinity of Holman Post and Island.

Summary: 145 Miles Sounding

Minto Inlet (See Plate 11)

Various bays and inlets along the north shore of Minto Inlet were investigated, and a sounding track recorded.

Summary: 75 Miles Sounding

Walker Bay (See Plate 12)

The various bays and coves comprising Walker Bay were investigated and a sounding track recorded.

Summary: 61 Miles Sounding

OperationsHydrography (Cont'd.)Jesse Harbour (See Plate 13)

This harbour in Prince of Wales Strait is practically land-locked, but has excellent depths both in the narrow entrance and inside the spacious harbour. A reconnaissance survey of the area was completed.

Summary: 30 Miles Sounding.

Sachs Harbour (See Plate 14)

A reconnaissance survey of Sachs Harbour and Approaches was undertaken. Horizontal control was established east and west of the settlement.

Summary: 7 Stations Built
 7 Stations Observed
 3 Tellurometer Distances Measured
 5 Rock Posts Inserted
 50 Miles Sounding.

Track Sounding

Sounding tracks were run across Amundsen Gulf from Pearce Pt. Harbour to Prince Albert Sound and from Sachs Harbour to the Baillie Islands. In addition sounding tracks were run from operational area to area where such soundings were deemed to be necessary.

Summary: 839 Miles Sounding

Operations

Hydrography (Cont'd.)

Sailing Directions - Corrections to Vol. III

- Page 6 - Line 40 Add "Vessels drawing less than five feet can navigate this passage if the recommended track is followed as shown on Chart 7623."
- Page 8 - Line 45 "Richardson" investigated this area in 1963 and found less than six feet of water within a quarter mile of the entrance to this harbour. According to local eskimoes, this harbour has shallowed in recent years and no longer offers sufficient water for boats drawing more than three feet.
- Page 9 - Line 5 Capt. Reid of "Radium Dew" anchored here in 1963 and estimates 10 to 12 feet of water in the entrance with deeper water to be found inside the harbour.
- Page 12 - Line 44 Should read "The James Shoal, the southern tip of which lies 4 miles north of Toker Point, extends for six miles in a NNE'ly direction. Minimum depths of 9 feet have been found in the shoal area."
- Page 17 - Line 30 Large school and new HBC Store & Tuk Trading Post being erected in 1963. Also 2 conspicuous oil tanks painted red.

OperationsHydrography (Cont'd.)Sailing Directions

- Page 21 - Line 37 Amend to read "Shoal examined to a least depth of 6 feet"
- Page 24 Local name for Novorak Pt. is "Cape Brown".
- Page 23 - Line 5 The 200 ft. tower was dropped in the fall of 1963.
- Page 24 Small vessels drawing less than 4 feet can ride out a W'ly in "Seal Bay".
* See Chart 7605.
- Page 25 - Line 5 Add, A shoal area with a least depth of 11 feet lies approx. $5\frac{1}{2}$ miles NE of Cape Dalhousie.
- Page 26 A 30 ft. radar refl. tower was established approx. $10\frac{1}{2}$ miles SSE of Cape Dalhousie in 1963.
- Page 27 - Line 15 Add. Eight fathoms of water exists within a mile of the western shore of the Baillie Islands. In the channel between the islands and the mainland, average depths are 11 feet with 9 feet being found in the northern entrance.
- Page 27 - Line 30 Add. Depths of 12 feet with good holding ground in mud, are found within three cables of the main island inside the anchorage.

Operations

Hydrography (Cont'd.)

- Page 39 - Line 30 A depth of four fathoms five feet was found in the entrance to Balaena Bay with deeper water to be found inside the harbour. "Richardson" anchored in 3 fathoms 2 feet with rocky bottom, about one mile west of the entrance.
- Page 44 - Line 10 Amend. Mid channel depths of 3 fathoms 4 feet exist in the entrance to Gillet Harbour. Depths of eight fathoms are found inside the shoal area with depths of three fathoms found close to the shore immediately west of the trading post.
- Page 91 - Line 20 A least depth of 4 fathoms is found just east of the entrance. A deep channel (11 fathoms), about 2 cables wide, leads into the harbour.
- Page 100 - Line 33 See "Richardson" work for 1963.
- Page 103 - Line 25 Amend - Population (1963) 72 Eskimoes and 4 whites.
Add - Anglican Mission & Nursing Station.
- Page 105 - Line 7 See "Richardson" work for 1963.
- Page 105 - Line 46 A stream enters this arm at the north eastern extremity. "Richardson" obtained fresh water here in 1963.

Operations

Tide Gauge Inspection

The tide gauge at Tuktoyaktuk was inspected and a levelling check carried out. Discussions were held with the tide gauge operator re procedure, etc. The inspection results proved consistent with those obtained in 1962. However, a great deal of activity on the wharf, and a fluctuating cargo load which was stowed on the wharf, caused minor variations in the levelling record between the months of June and September. From the 1962 and 1963 records, it would appear that BM 2/1959 has sunk 3" into the permafrost. Both BM 1 & 4 appear to have retained a constant elevation.

The wooden wharf is slowly deteriorating, with the result that the slightest movement, of ship or vehicle, causes the tide gauge to vibrate and makes a really accurate record of levels exceedingly difficult to obtain. The operator requires replacement of heating lamps (300 W) and a new tape.

Oceanography

Tuktoyaktuk (Bottle Stations) (See Plate 15)

A series of Oceanographic Stations were occupied during the 1963 season in the approaches to Tuktoyaktuk and inside Tuktoyaktuk Harbour. These stations were first occupied in late July after receipt of equipment, and again in the middle of September shortly before de-activation commenced. Samples and records were forwarded to Mr. F.G. Barber, Oceanographic Research, Ottawa.

Summary: 47 Oceanographic Stations occupied.
 248 Samples obtained.
 264 Temperature Record Obtained.

Search for Harbour

Cape Parry Peninsula (Plate 8) Balaena Bay:

- (1) Well protected from ice movement.
- (2) Dimensions 2 miles by 1 mile.
- (3) Low lying land with no high ridges.
- (4) Maximum depth 45 feet with depths of 20 feet recorded in the W'ly arm.
- (5) No noticeable inflow of fresh water.
- (6) Suitable for landing light aircraft if levelling of area undertaken.

Entrance to Kendall Inlet: (Plate 8)

- (1) Open to ice movement.
- (2) Dimensions 1 mile by 1 mile.
- (3) Low lying land with no high ridges.
- (4) Average depth in bay 30 feet, with a bar of 23 feet at the entrance.
- (5) No noticeable inflow of fresh water.
- (6) DEW Line Station about 3 miles away appears nearest suitable area to land aircraft.

Note: No other bays in the Cape Parry region were explored due to adverse weather conditions.

Search for Harbour Prince Albert Sound (See Plate 10)Fresh Water Bay (First large bay south & east of Holman Port)

- (1) Would be subject to ice movement in S'ly weather.
- (2) Dimensions 2 miles by 3 miles.
- (3) The terrain generally is rugged, high bluffs alternating with low lying land.
- (4) Depths vary from 10 fathoms to 30 fathoms over the bay.
- (5) Two fairly large streams are situated in the arms projecting north from the main bay.
- (6) A plateau, about 200 feet above sea level, on the Westerly side of the harbour, appears suitable for landing light aircraft.

Rocky Bay (Bay just east of Freshwater Bay)

"Richardson" attempted to enter bay, but found entrance blocked by shoals and indications of very shallow depths inside the bay. No further attempt made to investigate bay.

Bay "A" (Two miles NW of Investigator Island)

- (1) Would be protected from ice movement by outer chain of islands.
- (2) Dimensions $1\frac{1}{4}$ miles by $1\frac{1}{4}$ miles.
- (3) High bluffs exist on the west and north sides of the bay with lower lying broken-up ground on the eastern side.
- (4) The bay is quite deep, averaging about 114 fathoms in depth.
- (5) No fresh water streams were noted in the area.
- (6) There would not appear to be a spot suitable to land a light aircraft.

Operations

Oceanography (Cont'd.)

Search for Harbour Prince Albert Sound (See Plate 10)

Bay B (Bay lies about 4 miles NW of Investigator Island)

- (1) Protected by outer chain of islands from ice movement.
- (2) About 2 miles E to W and about $1\frac{1}{2}$ miles N to S.
- (3) Land is all fairly uniform, rising gradually away from the water.
- (4) Average depth in centre of bay about 12 fathoms with about 10 fathoms across entrance.
- (5) No large fresh water streams were noted in the area.
- (6) A suitable location to land light aircraft would appear to exist on the south shore of the bay.

Minto Inlet (See Plate 11)

Bay C (Five Miles West of Fish Bay)

- (1) Would be affected by ice movement.
- (2) Bay measures about 2 miles across the entrance, and is about $1\frac{1}{2}$ miles deep.
- (3) A prominent bluff pushes out toward the centre of the bay for about $\frac{1}{2}$ mile, splitting the northern part of the bay into two arms. At the head of each arm the land is fairly flat.
- (4) Depths across the entrance to this bay are about 30 fathoms, with 18 fathoms in the centre of each arm.
- (5) A small stream empties into the W'ly arm of this bay.
- (6) The flat land at the head of each arm would appear suitable for landing a light aircraft.

Operations

Oceanography (Cont'd.)

Search for Harbour

Minto Inlet (See Plate 11)

Bay D (Two Miles west of Fish Bay)

- (1) Would be affected by ice movement, in the event of S'ly weather.
- (2) Two miles N x S and $1\frac{1}{4}$ miles E x W.
- (3) A high prominent bluff juts out into Minto Inlet of the west side of the bay, the rest of the surrounding terrain being fairly flat and uniform close to shore.
- (4) Average depth in the centre of the bay is about 20 fathoms with 10 fathoms being the average toward the NE corner of the bay.
- (5) A small stream empties into this NE corner.
- (6) An area suitable for landing alight aircraft exists in the NW corner of the bay.

OperationsOceanography (Cont'd.)Search for HarbourMinto Inlet (See Plate 11)(Large Inlet east of Fish Bay)

- (1) The outer section of the inlet would probably experience some ice movement, but the inner section would have excellent protection from weather and ice movement.
- (2) The outer section is about 5 miles N x S and about 2 miles across. The Inner section is about 3 miles E x W and about 2 miles across. The inlet is roughly L shaped with the L being upside down when viewed from Minto Inlet. The outer section is clear of all islands and shoals, the inner section has several islands and islets in its eastern part.
- (3) In the outer section the land is high but rises gradually from the shore with no real bluffs or ridges to cause turbulence. In the inner section the terrain generally rises steadily but not too steeply from shore, except in the NE corner where an eye-catching bluff rises to about 1000 ft. above sea level.
- (4) The outer section has depths of 25 fathoms at the head with 40 fathoms on the east side and 9 fathoms on the west side. The inner section has depths on an average of 10 fathoms with 6 fathoms found close to shore in the far western section. No bar was indicated except between one islet and the main shore line.
- (5) One stream was noted in the NE corner of the outer section. Several large streams were noted emptying into the inner section.
- (6) An area on the eastern shore close to the entrance appeared suitable for landing light aircraft.

Terrain appearing suitable for landing light aircraft was noted in the SW corner of the inner section.

OperationsOceanography (Cont'd.)Search for HarbourWalker Bay (Winter Cove) (See Plate 12)

- (1) If barge were anchored behind the point, it probably would not encounter too much trouble from ice movement. However, the entrance is open to the West, which could cause ice pressure to build up.
- (2) 2 miles long E x W and $1\frac{3}{4}$ miles N x S.
- (3) Surrounding terrain is fairly uniform and flat.
- (4) 10 fathoms would appear to be an average depth with no indication of any bar.
- (5) There is a small river which enters the cove on the east side, and a smaller stream which enters the cove in the NE corner.
- (6) It would appear that a light aircraft could land up in this NE corner.

Walker Bay (Jago Bay) (See Plate 12)

- (1) Would have some protection against ice if barge moored well up in the easterly end of the bay, where a point of land would afford some protection, but really strong Westerly would probably cause some ice movement.
- (2) Width of bay across the top is approx. 4 miles and narrows gradually to about $\frac{1}{2}$ mile. Overall length of bay is about 7 miles.
- (3) There is a large bluff on the eastern side of the entrance, but otherwise the land is fairly uniform, rising gradually from the sea.
- (4) Depths vary from an average of 30 fathoms across the entrance to 14 fathoms at the head, with no indication of any bar.
- (5) Three medium sized streams were noted.
- (6) The flat land in the NW'ly part of the bay would appear suitable for landing a light aircraft.

OperationsOceanography (Cont'd.)Search for Harbour Jesse Harbour (Prince of Wales Strait) (See Plate 13)

- (1) Well protected from ice movement by a narrow entrance.
- (2) Dimensions 2 miles x 2 miles with an arm extending an additional mile in an E'ly direction.
- (3) With the exception of one ridge about 50 feet high, running N x S on the south side of the arm, the surrounding terrain is fairly flat and uniform.
- (4) There is a shoal area which stretches about 2/3 of the way across the entrance, but the main channel, about 2 cables wide, is 11 fathoms deep throughout. There is a four fathom bar about 3 cables west of the entrance. Depths outside this bar are in excess of 10 fathoms. Inside the harbour, depths average 15 fathoms in centre with 8 fathoms close to the western shore line.
- (5) Although the deltas of two small rivers were noted, they both appeared to be fairly dry at this time (August, 1963).
- (6) It would appear possible to land a small aircraft on top of the afore-mentioned ridge which is fairly flat on top.

De Salis Bay

A quick look was taken at this bay lying about sixty miles south of Jesse Harbour on Banks Island. The appearance of the sand bar and the general location, indicated that it would be constantly exposed to ice movement and violent weather changes. No further investigation was carried out.

OperationsShipActivation and Fitting Out

"Richardson" survived her first winter in the ice, and was found to be in excellent condition, hull-wise, both externally and internally. Re-activation commenced on the 1st June and by the 20th June, "Richardson" was capable of steaming around the harbour through slushy and broken-up ice. By the first week of July all major repair, overhaul and maintenance work had been completed, and "Richardson" was ready for an active survey season. In order to reach peak performance in time for the commencement of the survey season, it was necessary for all hands to work a seven day week with a small amount of additional overtime. Co-operation received at this time from NTCL was outstanding. I would mention in particular the help given us by Mr. Burkhardt, NTCL Agent and Mr. Scammell Stores Superintendent, and the use of "LST 692 & Wacissa" facilities so kindly given us by the Masters of those vessels.

General Performance

In the main, general performance of "Richardson" remained at a fairly high level, with no breakdown of propulsion machinery at any time during the season. Minor mechanical troubles included a leaking heat exchanger and a leak in the hydraulic steering system. Due to lack of spare parts and adequate repair facilities, we were unable to make fresh water with our AMF Evaporator. It was noted that a great part of the freezer insulation has ended up in the bilges, thereby cutting down on the efficiency of this unit. Due to other pressing matters this problem was not investigated thoroughly, however, it would appear that the shipyard did not secure this insulation properly. In addition, we are still troubled with water seeping through the for'd wheelhouse windows in heavy weather. This water runs under the false deck in the wheelhouse, ending up in the passageway outside the Master's cabin, or in the galley. This problem should have been fixed by the shipyard. Our gyro compass continues to give trouble in heavy weather, particularly in violent pitching motions.

Operations

Ship (Cont'd.)

Fueling and Supplies

Fueling and Supplies were handled by NTCL. We received excellent co-operation and attention in both fields. Fresh provisions were of a first class quality and much appreciated by all concerned. Canned provisions were of a lower standard than expected, but were quite edible.

Fresh Water

Our fresh water supply was once more a problem, particularly as we had to make one fairly long cruise away from our base of operations. Our fresh water evaporator, installed this season, did not provide us with any fresh water, due to lack of spare parts and inadequate repair facilities. We were able to persuade FEC to give us fresh water at Cape Parry, and the DOT kindly helped us in this regard at Sachs Harbour. In Prince Albert Sound, we found a fresh water stream which provided us with the best water we had all season. However, all these are merely stopgap measures, and it is still true that our only reliable source of fresh water supply is the NTCL water barge at Tuktoyaktuk.

Communications

Prior to the commencement of our working season, the NTCL technician overhauled our radio-telephone, and as a result, communications on 5295 Kcs, 5940Kcs & 2182 Kcs were excellent throughout the season. We received fine co-operation from GJV72 at Tuktoyaktuk, the DEW Line Station and CMS "Camsell" when operating within 600 miles or so. However, we still have difficulty picking up the weather and ice forecasts from Coppermine or Cambridge Bay on 4428.6 Kcs. Communications between ship and shore party were adequate but could be improved.

Operations

Ship (Cont'd.)

Liaison

As in 1962, we received excellent co-operation from NTCL. We are particularly grateful to Captain Hall, Superintendent of Operations, Captain Garvie, Western Arctic Superintendent, and Mr. Burkhardt, NTCL Agent at Tuktoyaktuk.

Liaison with "Camsell" was good, and resulted in much appreciated co-operation from Captain Davidson and the crew of "Camsell".

Liaison with FEC was a bit hazy, and depended to a large extent on the co-operative spirit of individual station chiefs. We are particularly grateful to the Station Chiefs at BAR B, BAR 2 and BAR 4.

Weather & Ice

The weather in 1963 was quite unusual for the Western Arctic, being very changeable for most of the season. A series of small storms made life uncomfortable, but not unbearable.

One strong westerly gale was encountered in late July which lasted three days, and another in mid August which lasted two days, otherwise the weather just remained unsettled and uncomfortable. Long periods of E'ly weather were noted in late August and during September. In fact, it blew steadily from the East along the coast between Herschel Island and Liverpool Bay for seventeen days without break, causing the water level to fall two or three feet below normal levels.

Ice had all cleared from Tuktoyaktuk Harbour by the end of June, and from Kugmallit Bay by the first week in July. Arctic pack pressing down on the north, extremity of the delta and on the coast east of Warren Point, prevented "Richardson" moving out of the bay before the 11th July. From that date until the end of the season "Richardson" had no trouble with ice in any locality of operation. Small quantities of scattered bergy bits and block and brash were noted in the northern part of the Mackenzie Bay and close to Herschel Island in late July. Similar quantities of scattered bergy bits were noted in Prince of Wales Strait in early August.

Operations

Ship (Cont'd.)

Gyro Compass

The gyro compass continued to cause considerable anxiety, particularly in heavy weather. The modifications supplied by the Sperry Company have not corrected the problem of the compass swinging way off True course in any violent pitching motion. The present condition of this compass causes considerable apprehension while navigating, and renders it almost useless as a survey instrument.

Work Boat

The Davidson life-boat once more performed admirably as a work boat and small sounding launch. Any difficulties encountered, were mainly due to breakdowns of the Mercury Outboard Engine, which eventually packed up altogether. One additional difficulty noted was the poor securing arrangement for hoisting this boat in heavy weather, and how useless the boat became as a sounding launch in any weather with a stronger than 15 knot wind.

Echo Sounder

Both the MS26B on "Richardson" and the MS30 on the work boat performed well throughout most of the season. A speed error was noted on the MS26B and was corrected by replacement of brushes.

Operations

Ship (Cont'd.)

De-Activation

The de-activation procedure was a complete reversal of the process in the spring. All equipment for shipment south was unloaded at the wharf and packed. Gear unable to fit inside the accommodation was stowed ashore, and all supplies, gear, etc., likely to be damaged by cold weather, were stowed ashore in the NTCL heated warehouse.

All deck openings were well covered and secured. All sanitary, domestic and cooling lines have been drained and flushed with anti-freeze. All outlets and intakes have been grease packed, and batteries fully charged.

"Richardson" is secured alongside the NTCL vessels moored to the buoys south of Nallok Point. This is a similar location to that in which she was laid up in 1962. Shelter is considered excellent with regard to ice movement and bad weather.

The NTCL watchman has been instructed to include "Richardson" on his twice weekly inspection trips, and to report monthly to Captain McCulloch. Arrangements have been made to hire labour for ice cutting work around the hull.

Crew

The entire crew on "Richardson" worked well during the 1963 season. The additional seaman carried this year was found to be quite an asset to the operation, and enabled "Richardson" to produce a great deal more survey work than would have been possible without him.

Recommendations

Hydrography

During the 1964 season, hydrographic surveys should be undertaken in the following areas.

- Komakuk Beach - Detailed survey of approaches.

- Kendall Island Vicinity - Investigation of reported channel into river deep enough for "Richardson" to navigate. If this proved feasible, surveys of areas of the Mackenzie River could be undertaken by "Richardson", and her base of operations changed to Inuvik, thereby lengthening her operational season.

- Kugmallit Bay - Detailed survey of the area lying north and west of Hendrickson Island toward Pullen Island. Some means of electronic position fixing is still considered essential for this area. This type of equipment is also required for the area lying beyond the northern extremity of James Shoal as reported in 1963. "Camsell" ran several short sounding lines in this area, but Mr. Ages does not consider her radar fixing too reliable in this instance.

RecommendationsHydrography (Cont'd.)

- | | | |
|------------------------------|---|---|
| Hutchison Bay - Atkinson Pt. | - | Detailed survey. |
| Cape Dalhousie Vicinity | - | Detailed survey of shoal area. |
| Liverpool Bay | - | Reconnaissance survey. |
| Cape Parry | - | Investigation of small bays in
Damley & Franklin Bays. |
| Kings Bay Approaches | - | Detailed survey of approaches. |
| Prince Albert Sound | - | Reconnaissance survey. |
| Minto Inlet | - | Reconnaissance survey. |
| Dolphin & Union Strait | - | Detailed survey of area north &
west of Lady Franklin Point. |
| Coppermine | - | Detailed survey of approaches. |
| Sachs Harbour | - | Additional soundings in area
between harbour & Cape Kellett. |

Recommendations

Oceanography

If it is planned to use "Richardson" to conduct Oceanographic Surveys in 1964, may we please be advised of the extent of these proposed operations by December 1963 in order that these projects may be incorporated into the Instructions to the Western Arctic Survey Group, and a definite priority regarding the various hydrographic and oceanographic surveys agreed upon.

Also, it would be appreciated if equipment to carry out any Oceanographic Project were received in Tuktoyaktuk by the middle of June at the latest.

Ship

Navigational Aids

The closing down of the Intermediate DEW Line Sites and the dropping of their large towers, which have been so useful and reassuring as navigational aids, has posed a problem in certain areas. The loss of the 200 ft. tower at Atkinson Point is a particularly troublesome fact, due to the low-lying land along this stretch of the coast and the numerous shoal areas to be encountered.

I would like to recommend that "Camsell" take on the task of establishing several first class radar reflector towers in this general area in 1964, in order that the mariner may continue to navigate through this rather hazardous zone. A meeting of Captain Davidson and myself to discuss this subject, might prove quite fruitful.

Recommendations (Cont'd.)

Ship

Gyro Compass

The 1963 season's operations proved beyond the shadow of a doubt that our Sperry Master Gyro Unit simply cannot be relied upon in heavy weather. This matter should be solved prior to the 1964 season commencing. Possibly a re-location of the Master Unit, with subsequent re-wiring, may be necessary. I trust the Sperry Company will do their utmost to rectify this matter.

In discussions held with Capt. Davidson of "Camsell", I was interested to learn of the experience "Camsell" has had with her "ARMA-BROWN" Gyro Compass. Capt. Davidson maintains that this compass has given reliable service in all conditions in the Arctic, and was considered to be more accurate than the Sperry Mark XIV in this region. If Sperry cannot come up with a satisfactory answer to our problem, consideration should be given to purchase of this compass. In any case, in this region where magnetic compasses are virtually useless, perhaps an additional Gyro Compass wouldn't be a bad idea, when it is considered that the primary purpose of this vessel is accurate hydrographic surveys.

Radar

Our Decca 404 Radar worked very well all summer. However, it is now some time since installation of this unit, and a thorough overhaul by the NTCL Technician is indicated. At extreme range, targets are not so well defined as formerly, and clutter increases the longer the set remains switched on.

Recommendations (Cont'd.)

Ship

Work Boat

The Davidson lifeboat is after all a lifeboat, and is cumbersome to use as a means of transportation in areas where speed is essential. I would like to recommend that we purchase either a light-weight aluminum boat, or a rubber boat, to which we would fit an outboard engine capable of driving along at 15 Knots or so. This would result in quite a saving in time when horizontal control was being established, and in any operation where speed would increase production & efficiency.

Fitting Out Procedure

The procedure in the spring of 1963 worked out very well. I recommend that the advance party board "Richardson" by the 1st June, the remainder of the crew following soon after to carry out painting & other maintenance duties. Vessel should be ready for operations in late June 1964.

Communication

If the CBC could be prevailed upon to issue weather forecasts for the Western Arctic over their local broadcasting station at Inuvik, this would ensure all vessels operating in this area of up to date weather information. At present, if a vessel is outside the range of Coppermine or Cambridge Bay, she has to ask CJV72 to contact some station who can receive these forecasts, for a relay of the message. This all takes time, and with the atmospheric conditions sometimes found in this region, can be most frustrating.

The portable R/T now carried has been found most useful on all kinds of operations. An additional set would be of some advantage, particularly in tellurometer operations. I recommend that another set be purchased for the 1964 operation.

Recommendations (Cont'd.)

Ship

Communications (Cont'd.)

2382 Kc's is a frequency used a great deal by NTCL. As we are at present only finding use for four of the nine channels on our R/T set, I recommend that we install this additional frequency. S.K.

Our D/F set has receiving crystal space available. If this set were fitted with various receiving crystals, we could guard more than one channel at once, a situation which would have been useful on more than one occasion in the past. I recommend the installation of these additional crystals. S.K.

Fresh Water

Every effort will be made to make our AMF Evaporator effective next spring, however FEC should be advised of our problem and their co-operation sought in order that we have no trouble in getting fresh water at DEW-LINE sites in an emergency. ✓

Repairs

Repairs to the wheelhouse window frames should be carried out next spring, to stem the flow of sea water which at present seeps through into the interior of the vessel and causes such a great deal of damage.

If possible, additional insulation should be secured around the freezer, to increase the efficiency of this unit.

Recommendations (Cont'd.)

Ship

Spare Outboard Engine

The outboard engine was used a great deal all during the 1963 season. As a result, a lot of maintenance and repair work were necessary to keep this machine operating. Finally, about three weeks before the season ended, it packed up altogether. It was necessary to hire an outboard engine for this period.

As we rely on this means of transportation completely in many areas, an additional outboard engine would be quite an asset. I recommend acquiring a spare outboard engine.

Miscellaneous

During the 1963 season "Richardson" had to spend much of her time in Tuktoyaktuk Harbour at anchor, due to lack of wharf facilities. There is no real relaxation for the master of any vessel at anchor in the Western Arctic region, due to the low-lying land offering little protection from high winds, even in harbours almost completely land-locked. I would suggest that we purchase one of several old wooden barges moored around the harbour, and secure such barge to the old HBC Wharf at Tuktoyaktuk, thereby giving us sufficient water to dock and a secure tie-up for the night.

Recommendations (Cont'd.)ShipLong Range Planning

Once more I would like to emphasize the need for a larger hydrographic and oceanographic survey vessel to operate in the Western Arctic Region. Such a vessel could either sail into the Arctic each year at the same time as "Camsell", returning to Victoria in late September, or could be based at Tuktoyaktuk the year round.

This vessel should be equipped with the latest electronic position fixing gear, helicopter, etc., to take full advantage of every opportunity presented.

Summary of Hydrographic Operations

1	Tide Gauge Established
32	Stations Built
28	Stations Observed.
18	Tellurometer Distances Measured
19	Rock Posts Planted
10	Station Photo-Identified
3	Sun Azimuths
1	Tide Gauge Inspected
3338	Miles Sounding.

List of Charts to be Revised

<u>Number</u>	<u>Location</u>	<u>Recommendation</u>
7080	Demarcation Point to Cape Bathurst	New Edition
7081	Cape Bathurst to Cape Baring	Hand Correction & Patch Insert of Sachs Harbour.
7091	Prince of Wales & McClure Straits	Patch and Hand Correction
7601	Demarcation Point to Kay Point	Patch and Hand Correction.
7602	Mackenzie Bay	New Edition
7604	Kugmallit Bay and Approaches	New Edition
7605	Toker Point to Cape Dalhousie	New Edition
7606	Liverpool Bay	New Edition
7607	Cape Bathurst to Booth Islands	Patch & Hand Correction
7609	Cape Lyon to Tinney Point	Patch & Hand Correction
7623	Firth River to Stokes Point	Patch Correction
7624	Landing Beaches Komakuk Beach to Police Point	Patch Correction
7626	Approaches to Tuktoyaktuk Harbour	Hand Correction
7627	Tuktoyaktuk Harbour	Hand Correction
7632	Baillie Islands & Approaches	New Edition
7637	Cape Parry & Approaches	Patch and Hand Correction
7641	Pearce Point Harbour	New Edition
7658	Holman Island & Approaches	New Edition

Conclusions

The 1963 season has been a fairly successful one for "Richardson" and probably can be considered as typical of the scope and production to be expected from this type of vessel operating in the Western Arctic. I think she has already justified her expenditure, and the considerable thought and effort that lead to her eventual acquisition by the department.

During 1963 she steamed a total of 4312 miles, often in very rough weather, without a major breakdown of machinery or equipment.

There are various modifications in design which could be considered if a similar vessel is ever to be constructed in the future. These modifications naturally can only be considered in the light of experience. However, at present I consider we have a fine little vessel with the capability of fulfilling many of the more urgent hydrographic tasks in this region.

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Plate 1	Herschel Island and Vicinity
Plate 2	Trent Bay
" 3	Mackenzie Bay
" 4	Kugmallit Bay
" 5	Warren Point Vicinity
" 6	Warren Point to Cape Dalhousie
" 7	Liverpool Bay
" 8	Cape Parry & Vicinity
" 9	Pearce Point to Cape Lyon
" 10	Prince Albert Sound & Holman Island
" 11	Minto Inlet
" 12	Walker Bay
" 13	Jesse Harbour
" 14	Sachs Harbour
" 15	Tuktoyaktuk Harbour & Approaches

PLATE 1
HERSCHEL IS. & VICINITY
Scale $\approx 1:250,000$

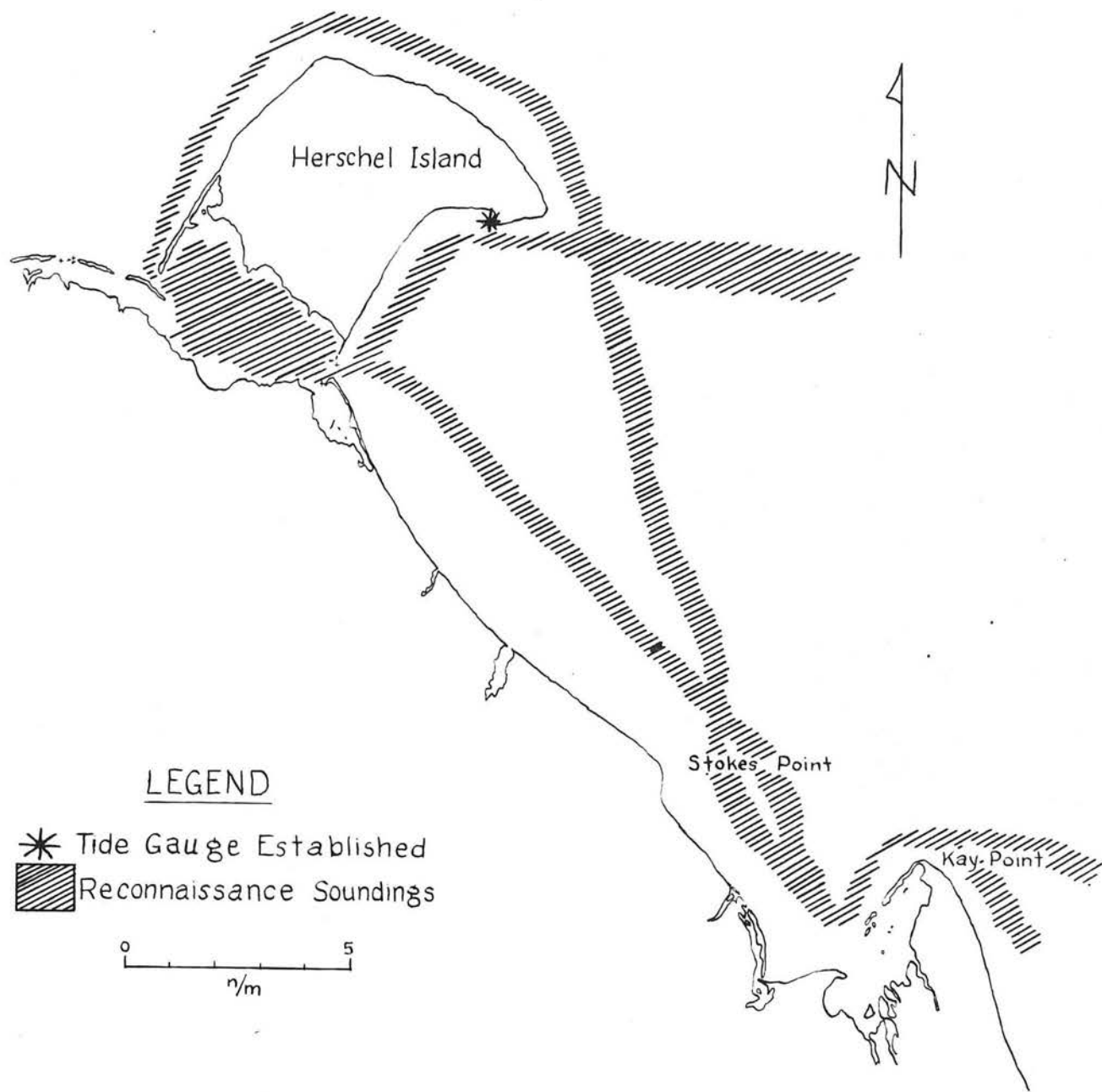
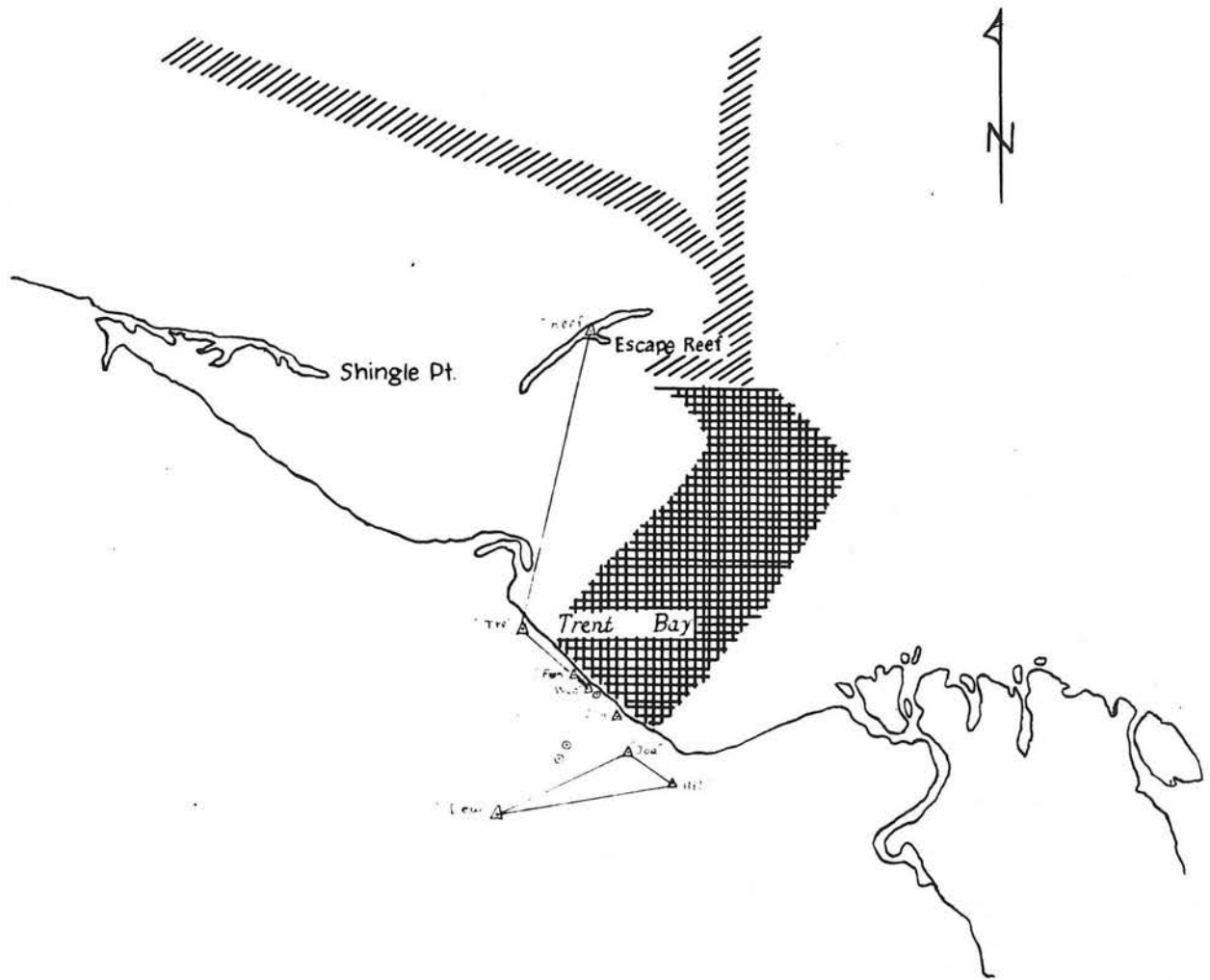
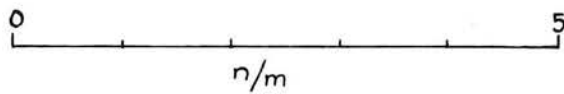


PLATE 2
TRENT BAY
Scale $\approx 1:125,000$



LEGEND






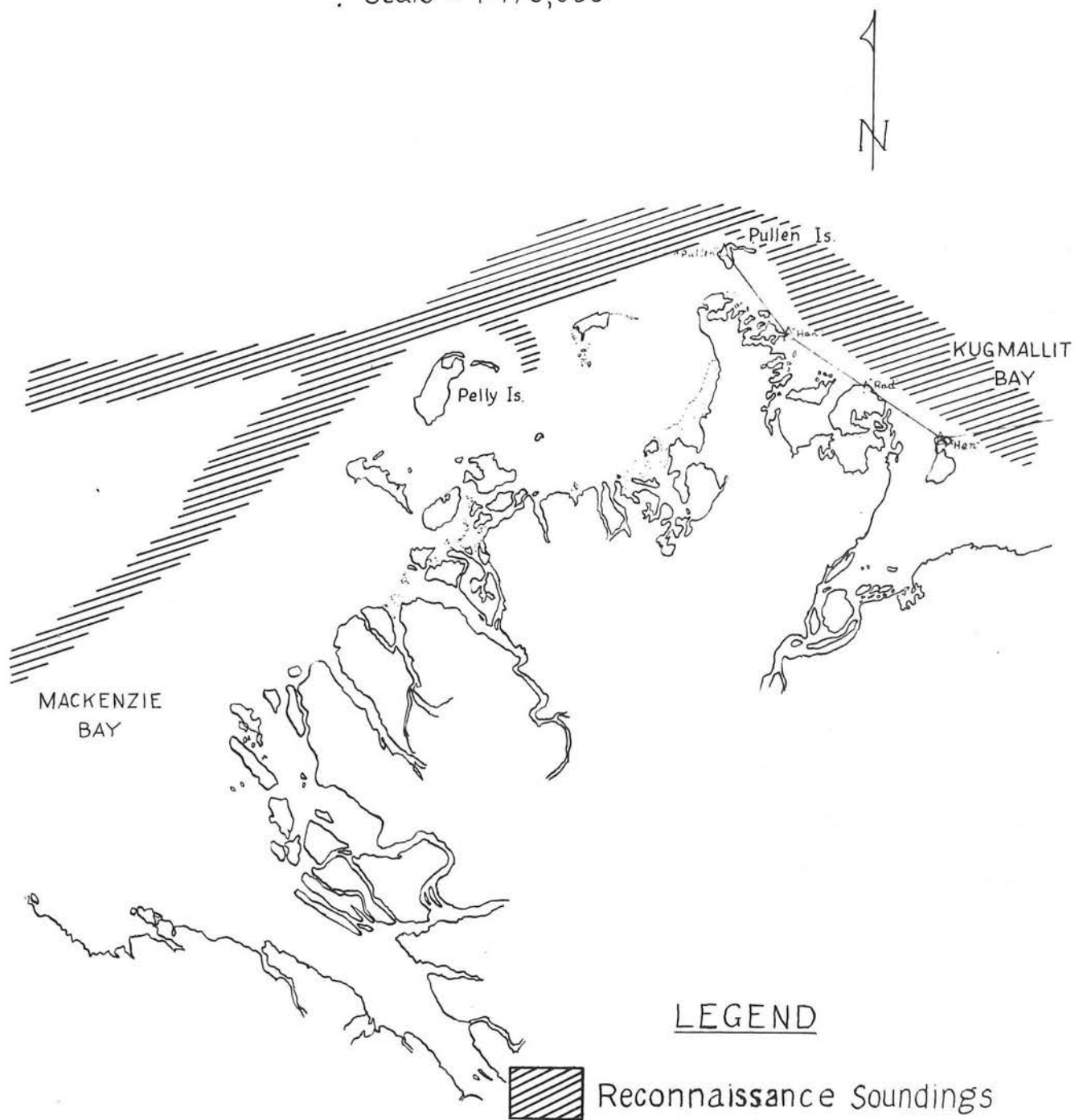
-  Reconnaissance Soundings
-  Controlled Soundings
-  Tellurometer Traverse & Triangulation

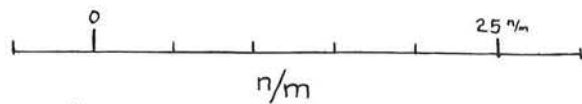
PLATE 3
MACKENZIE DELTA

Scale $\approx 1:170,000$



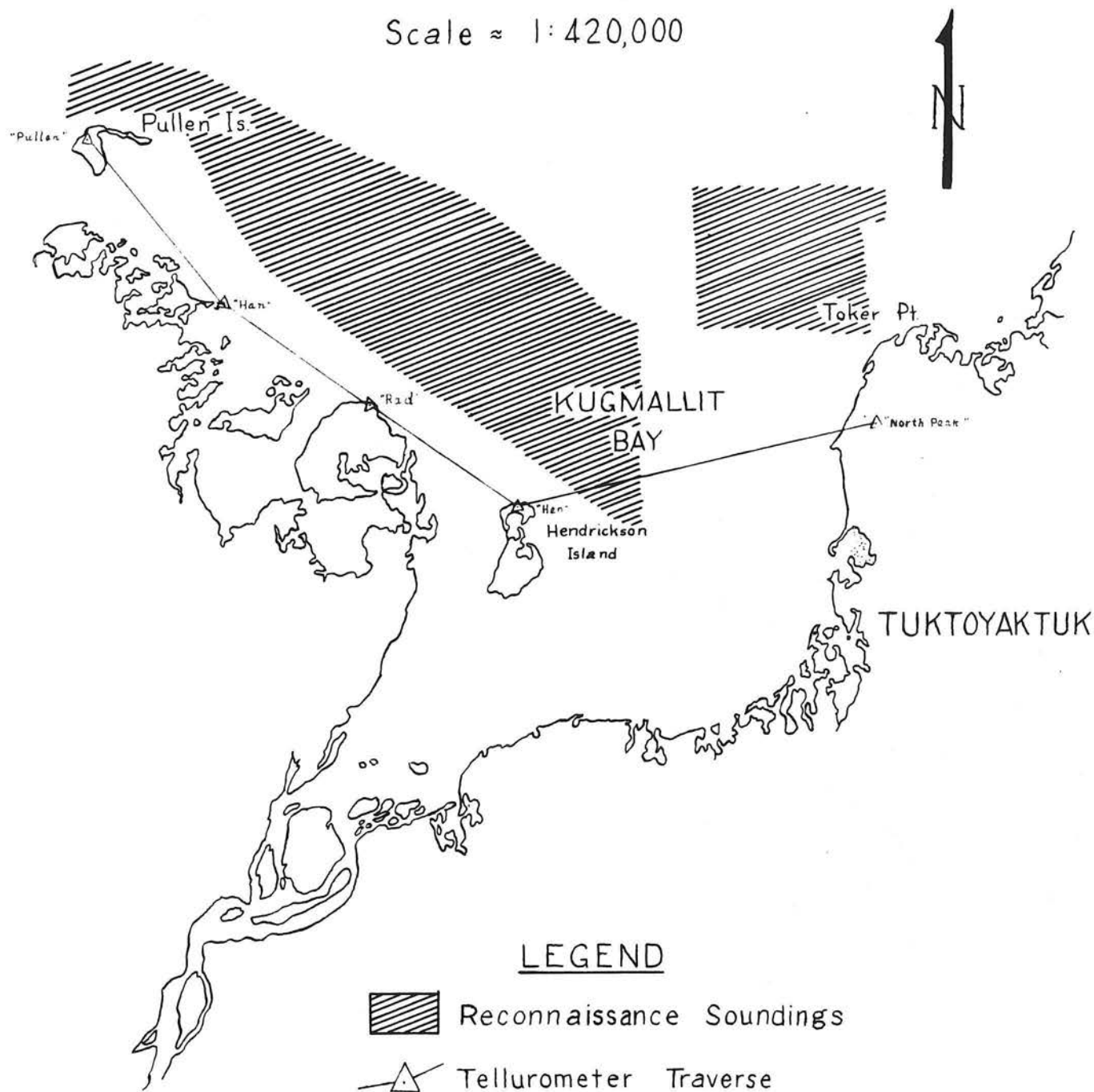
LEGEND

 Reconnaissance Soundings



 Tellurometer Traverse

PLATE 4
KUGMALLIT BAY
Scale $\approx 1:420,000$



LEGEND

-  Reconnaissance Soundings
-  Tellurometer Traverse

0 25

n/m

PLATE 5
WARREN POINT VICINITY

Scale $\approx 1:250,000$

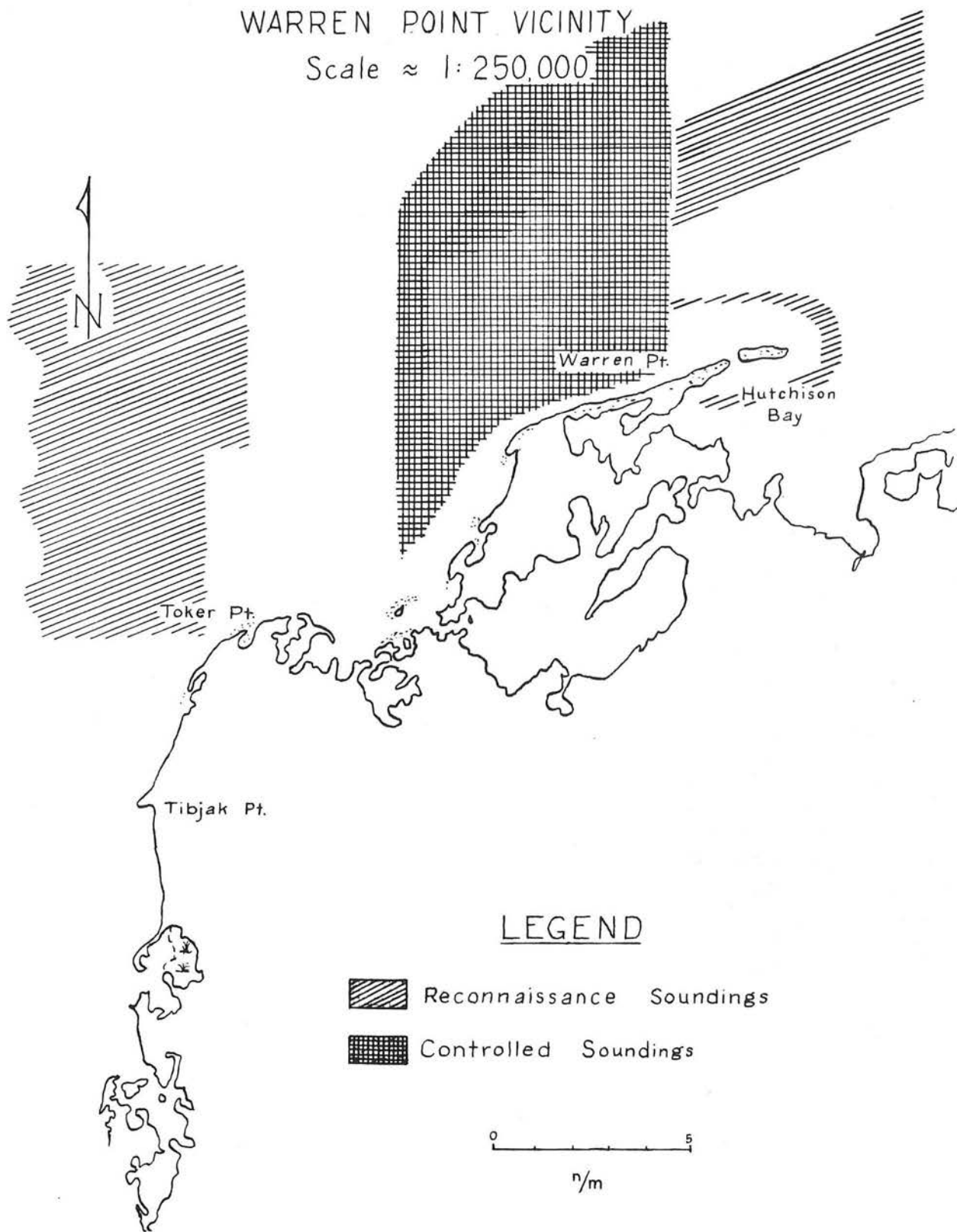
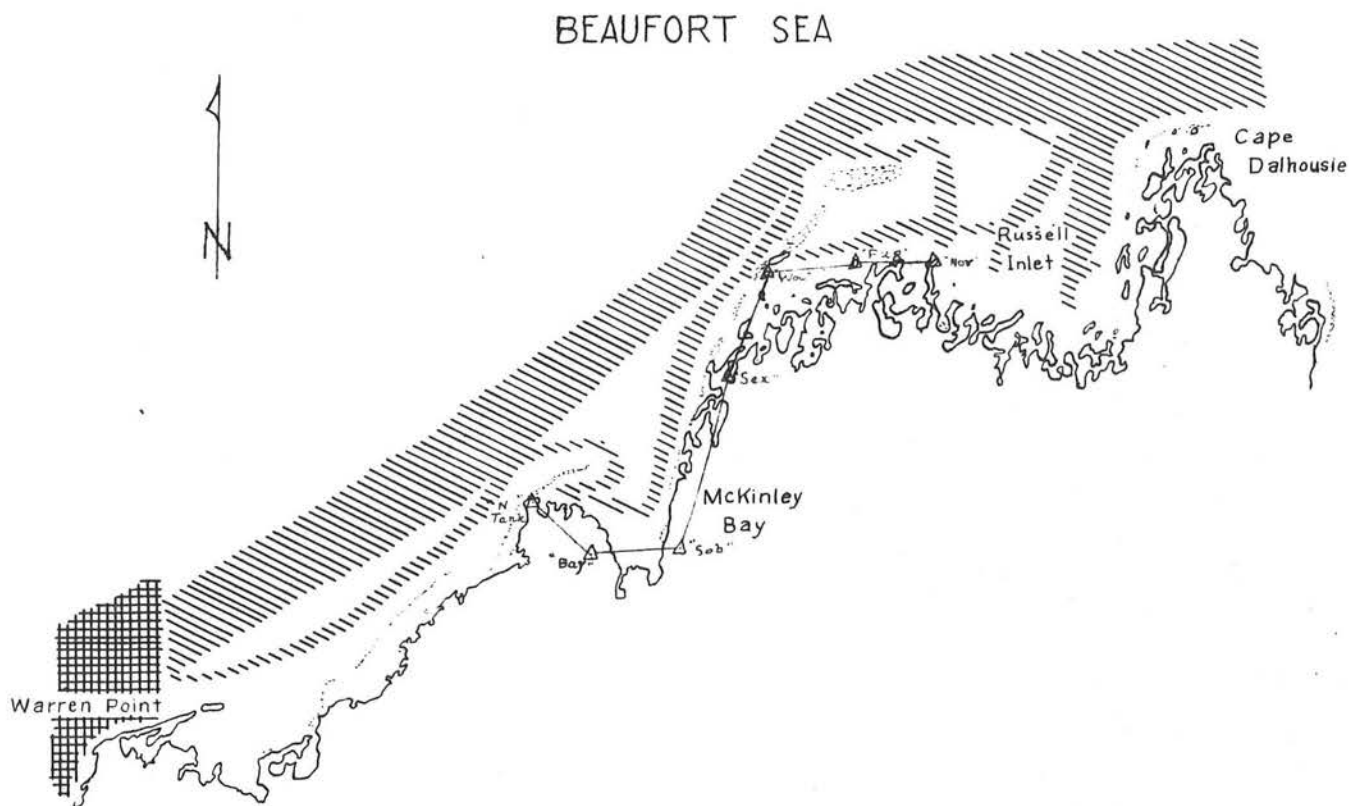





PLATE 6
WARREN POINT TO CAPE DALHOUSIE
Scale $\approx 1:670,000$



LEGEND

-  Reconnaissance Soundings
-  Controlled Soundings
-  Tellurometer Traverse

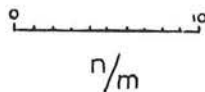
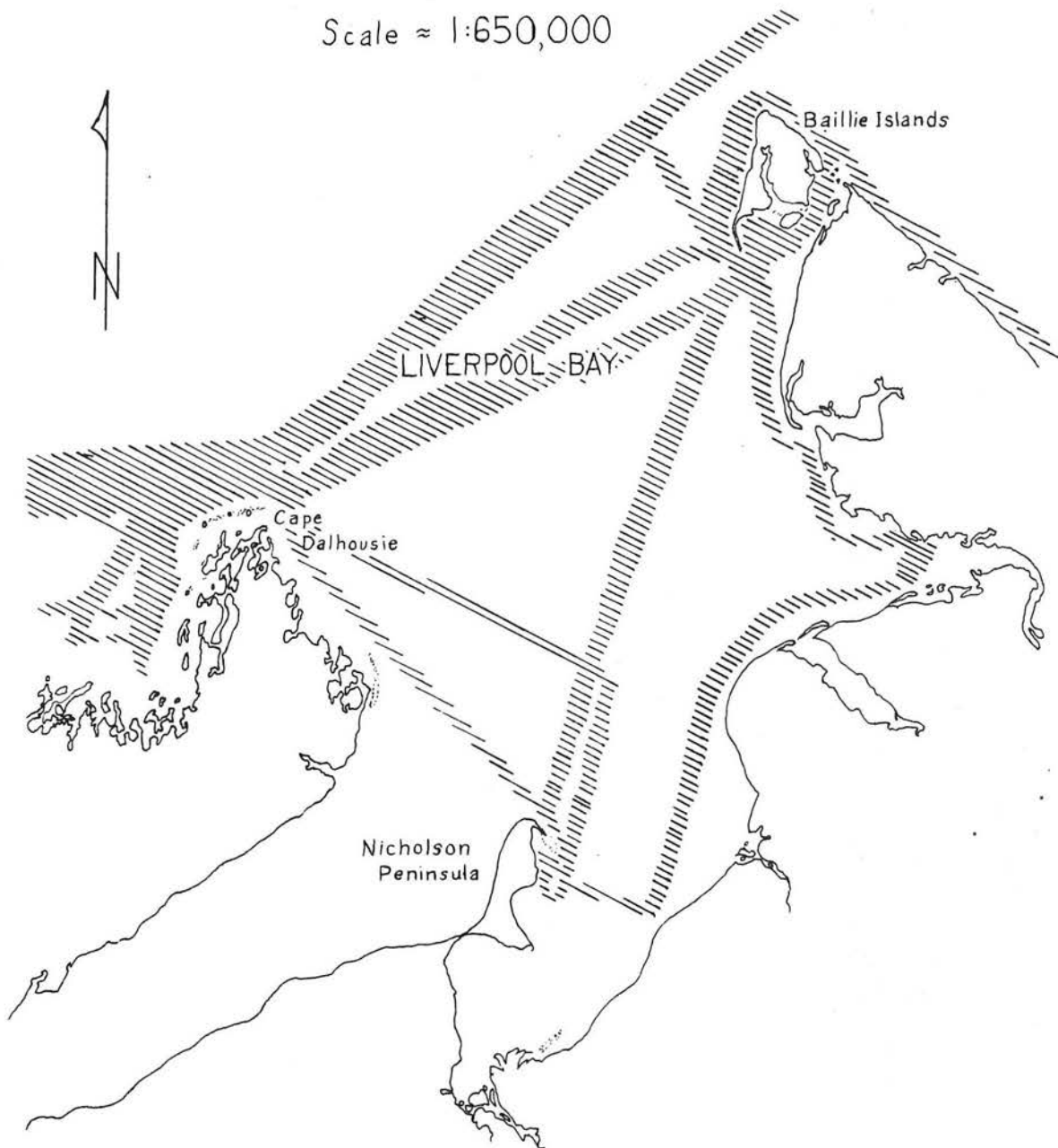



PLATE 7
LIVERPOOL BAY
Scale $\approx 1:650,000$



LEGEND

 Reconnaissance Soundings

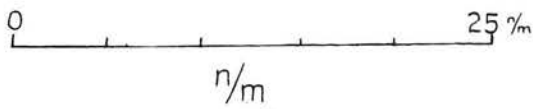
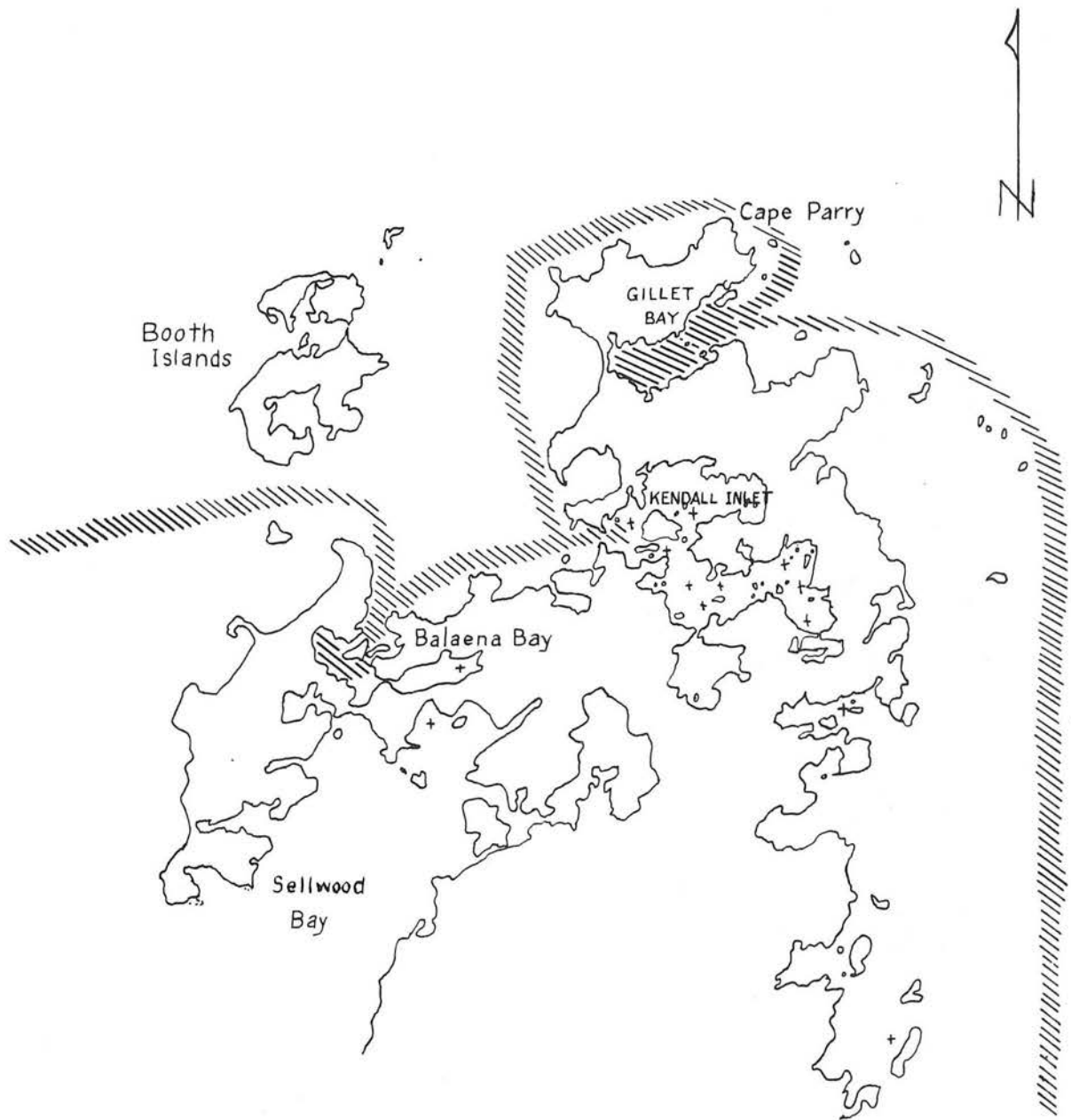


PLATE 8
CAPE PARRY & VICINITY
Scale $\approx 1:290,000$



LEGEND

 Reconnaissance Soundings

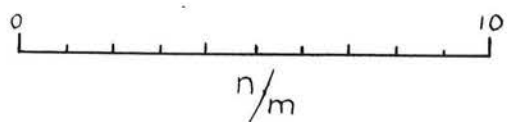
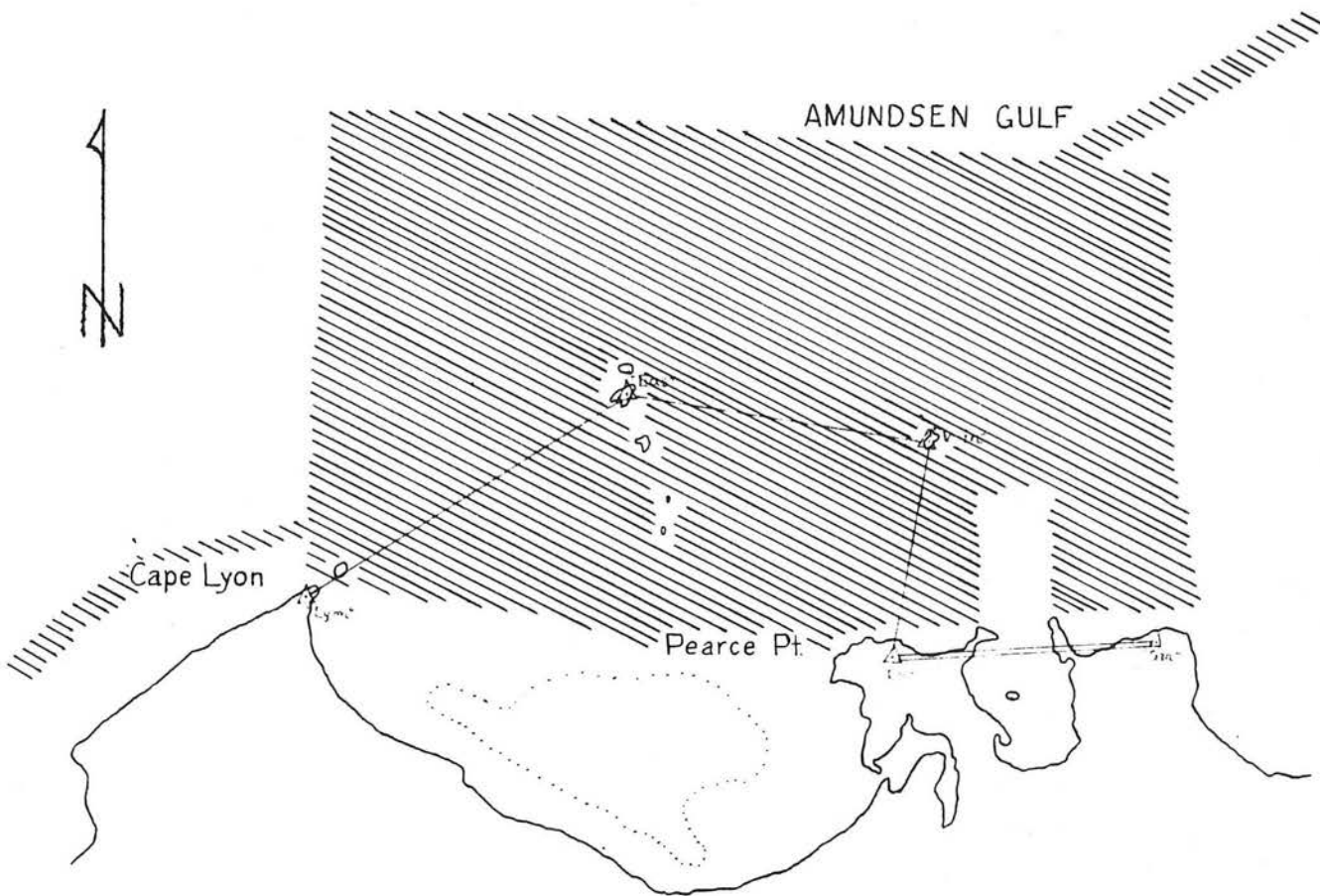



PLATE 9
PEARCE PT. TO CAPE LYON
Scale $\approx 1:100,000$



LEGEND

 Reconnaissance Soundings

 Tellurometer Traverse

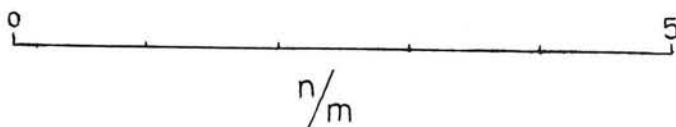
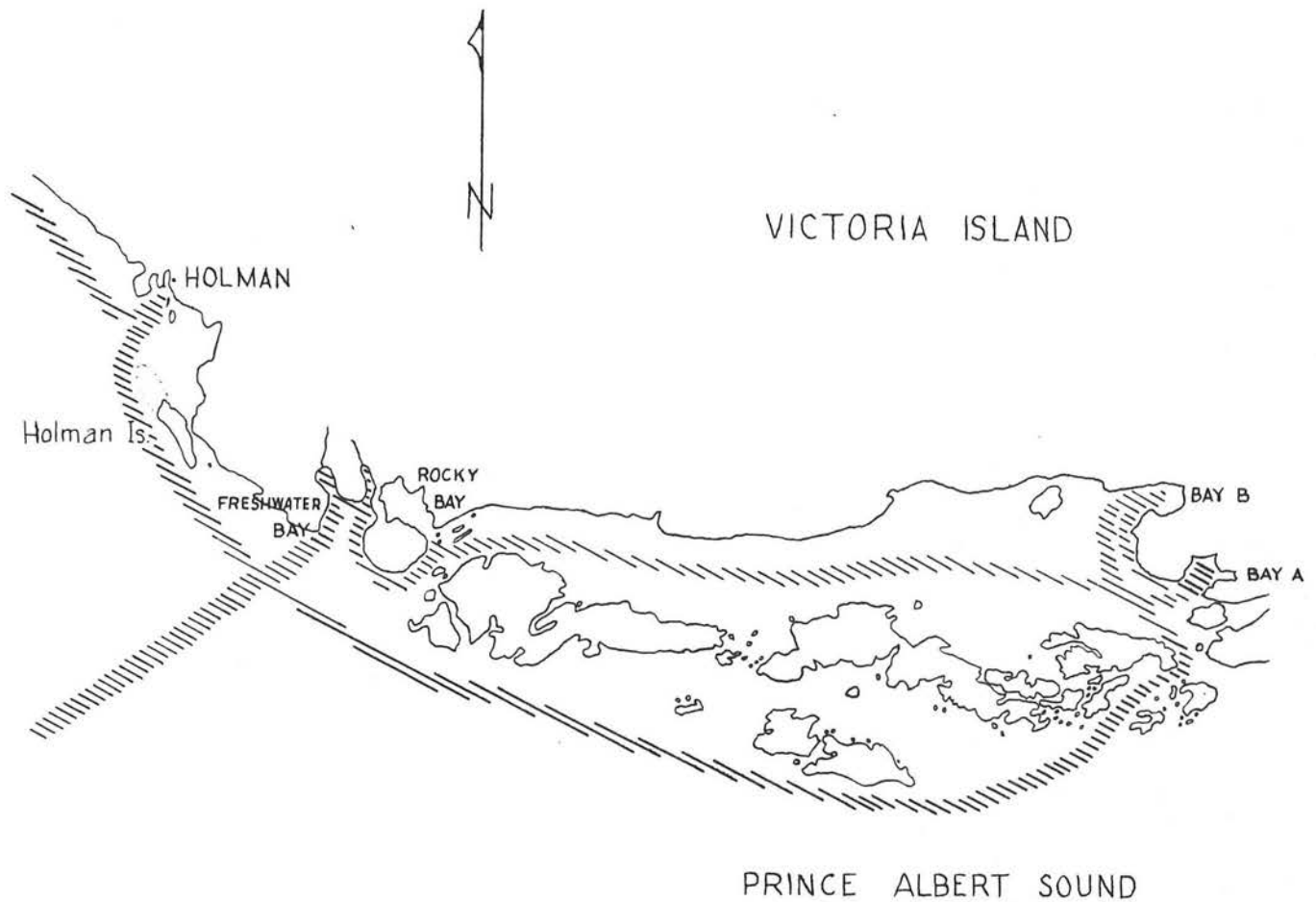



PLATE 10
PRINCE ALBERT SOUND & HOLMAN IS.
Scale $\approx 1:420,000$



LEGEND

 Reconnaissance Soundings

See Airphotos: A 17338-10,11,17-20
A 17372-119,120-126

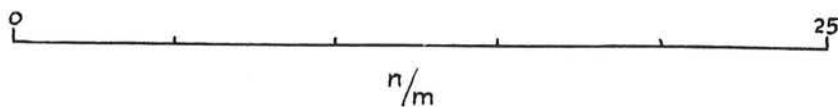
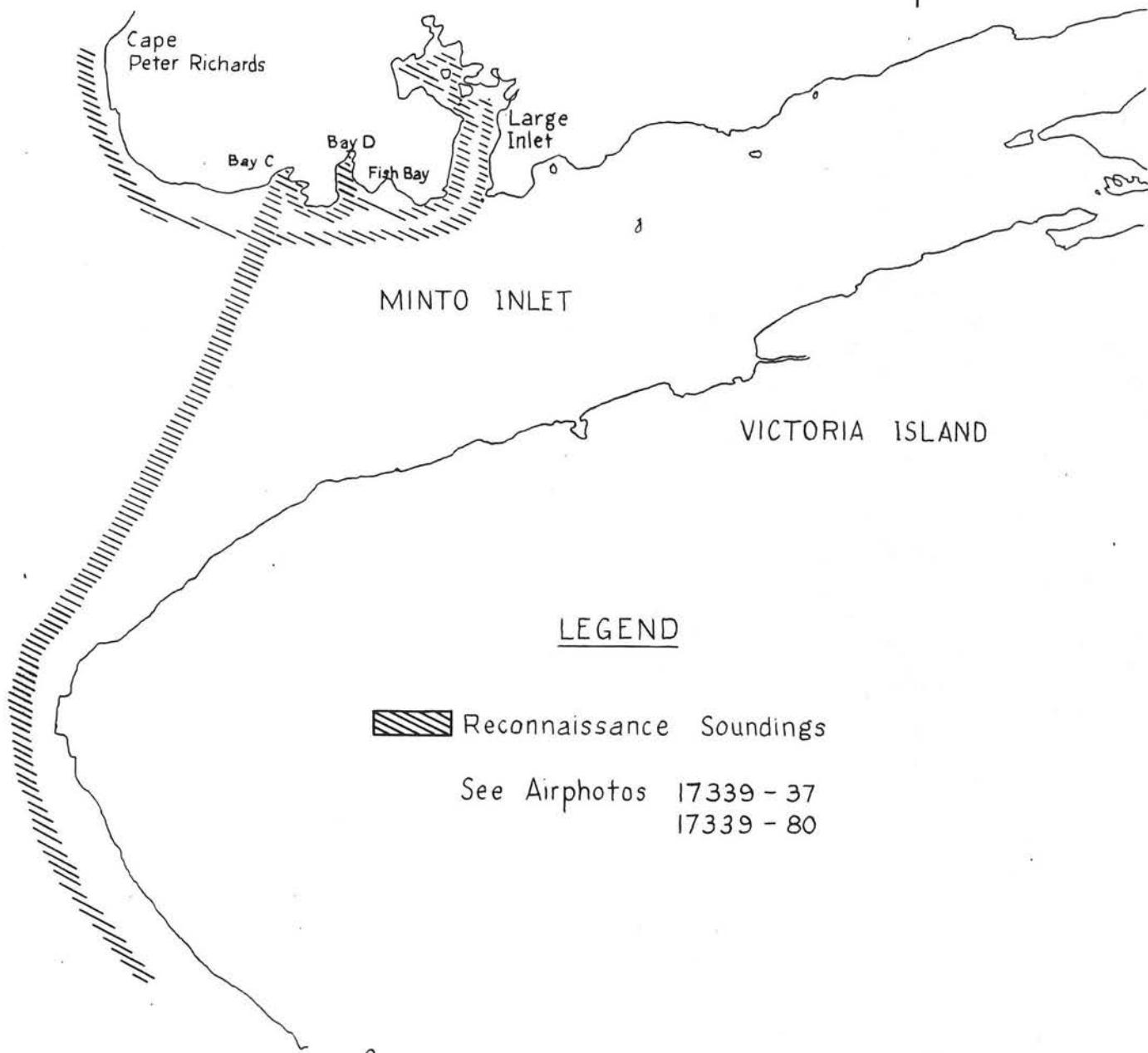



PLATE 11
MINTO INLET
Scale $\approx 1:500,000$



LEGEND

 Reconnaissance Soundings

See Airphotos 17339 - 37
17339 - 80

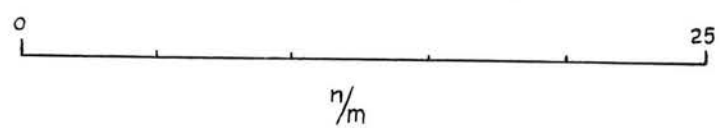
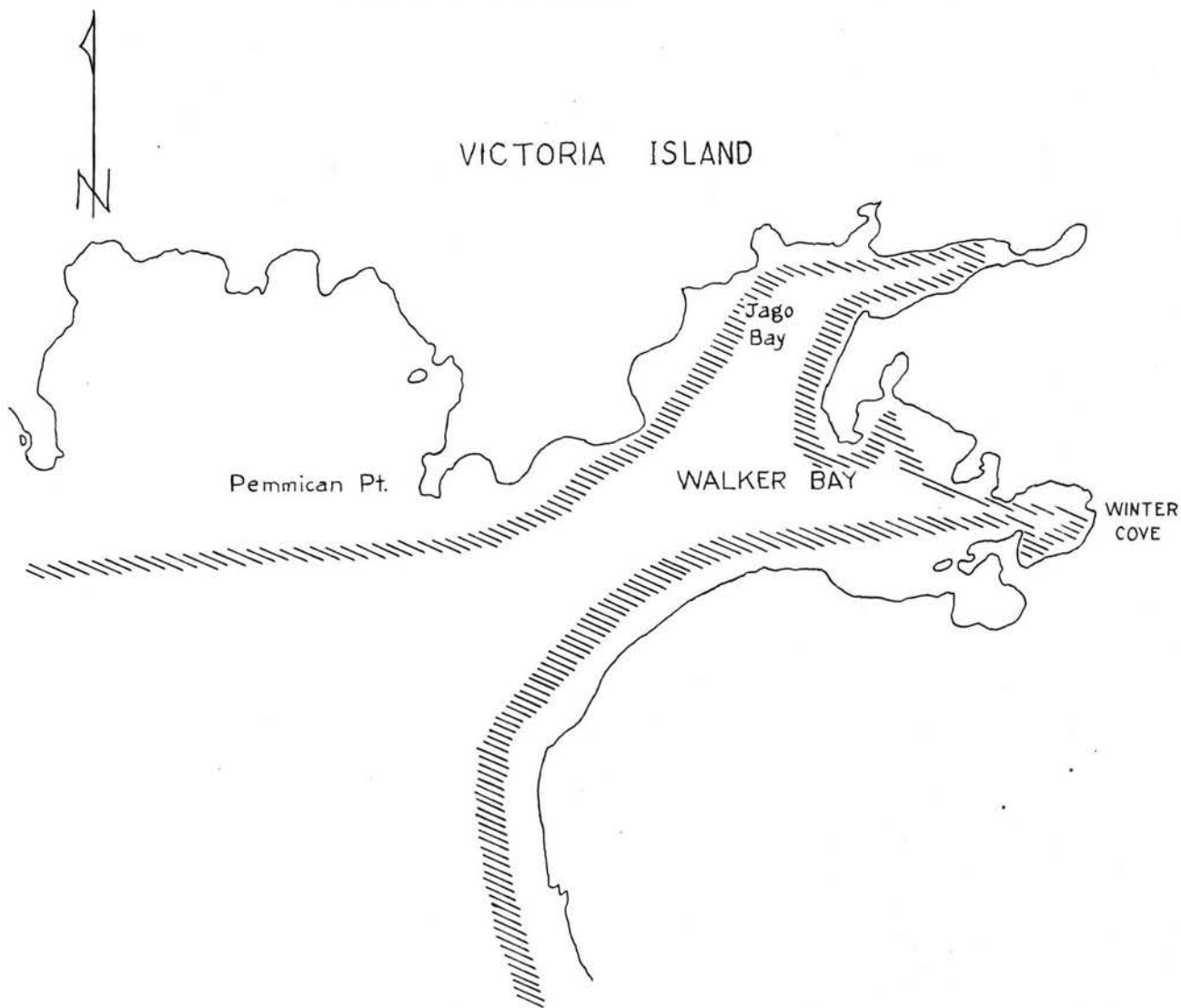



PLATE 12
WALKER BAY
Scale $\approx 1:230,000$



LEGEND

 Reconnaissance Soundings

See Airphotos A17339 - 40
A17339 - 78

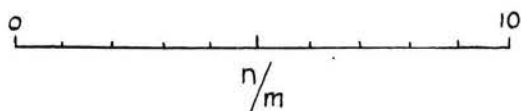


PLATE 13.
JESSE HARBOUR
Scale $\approx 1:125,000$

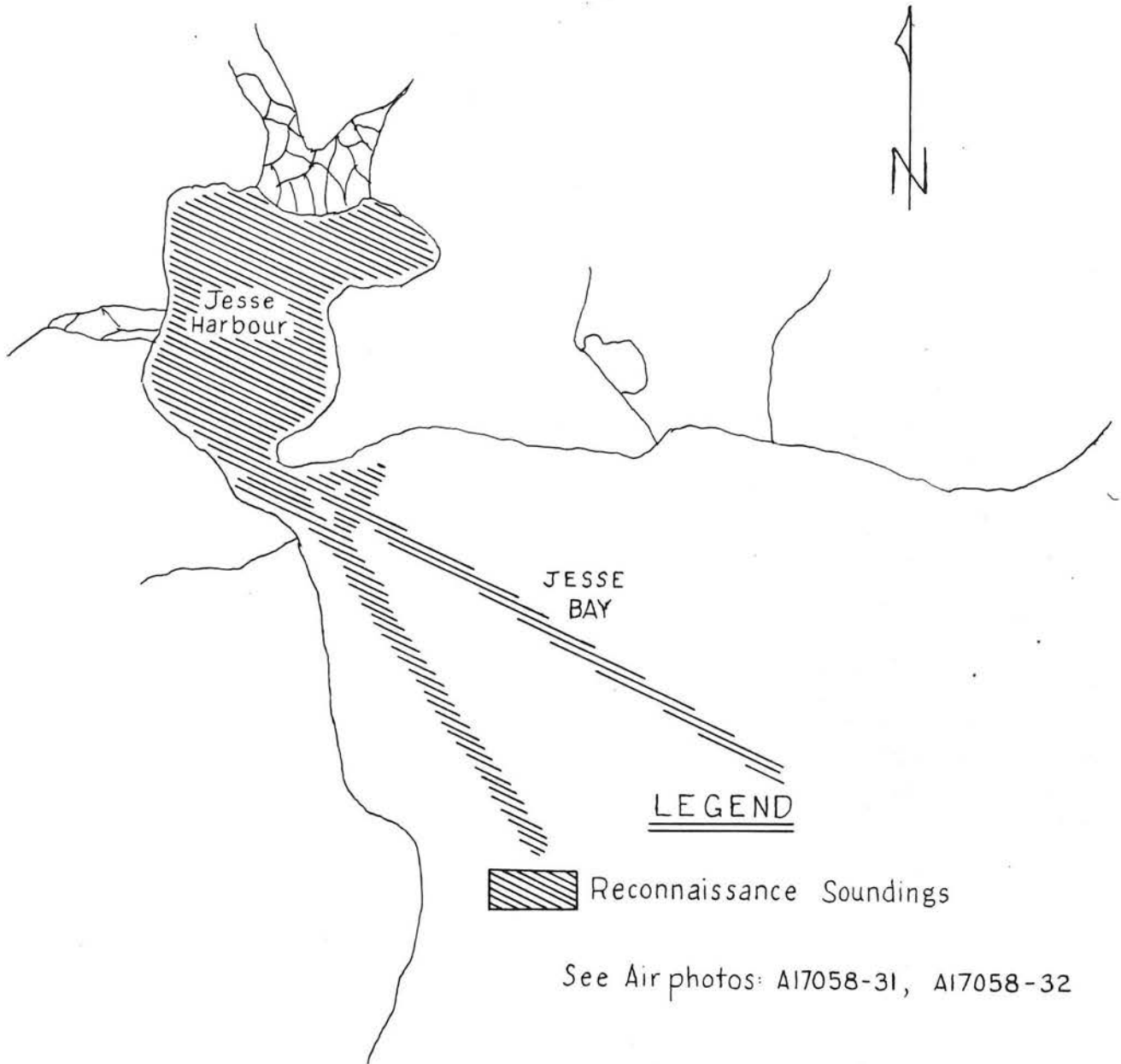
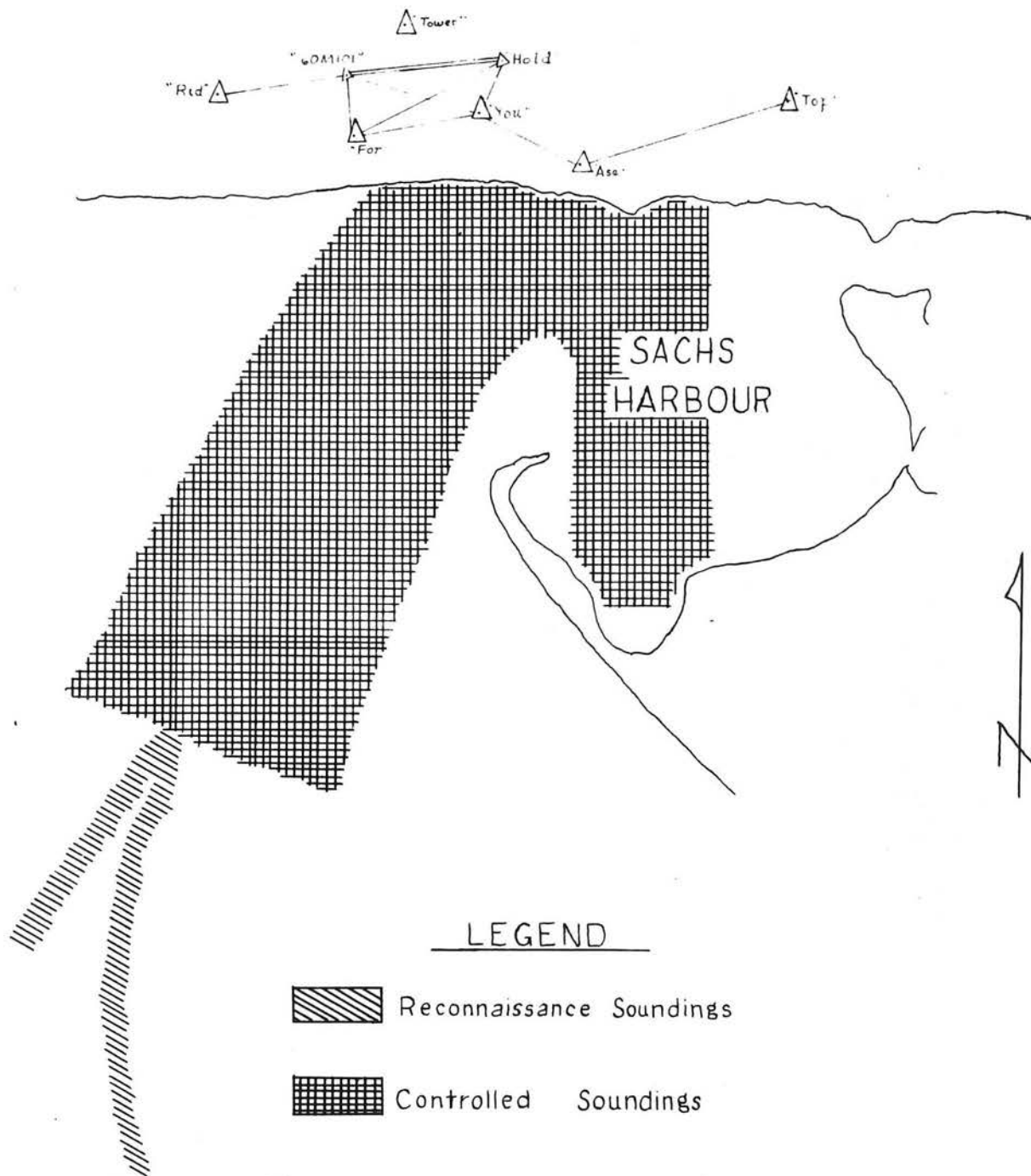



PLATE 14
SACHS HARBOUR
Scale $\approx 1:43,000$



LEGEND

 Reconnaissance Soundings

 Controlled Soundings

 Tellurometer Traverse & Triangulation




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PLATE 15
APPROACHES TO TUKTOYAKTUK HARBOUR
Scale $\approx 1:150,000$


LEGEND

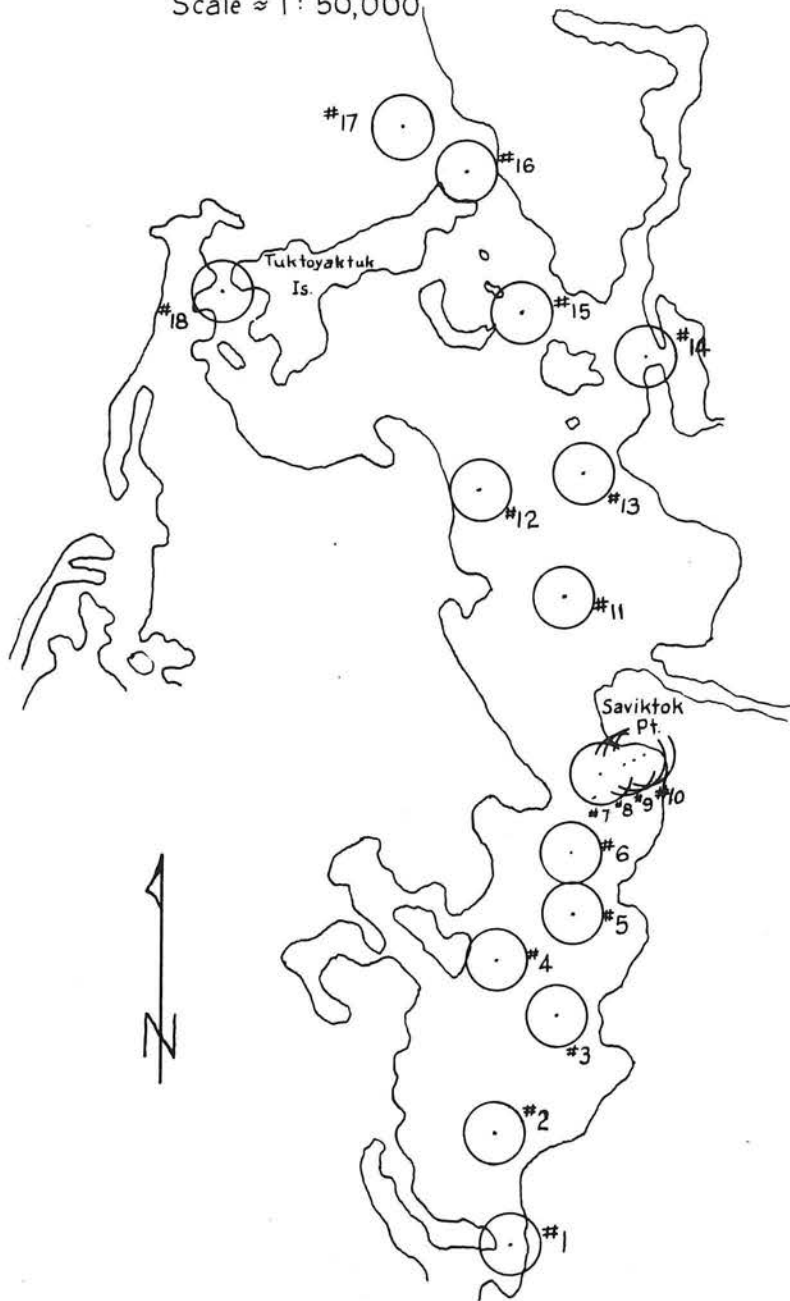
 Oceanographic Bottle Stations


 #22

KUGMALLIT BAY


TUKTOYAKTUK HARBOUR


 Oceanographic Bottle Stations
Scale $\approx 1:50,000$



 #21

Tibjak Pt.

 #20

 #19



TUKTOYAKTUK HARBOUR

