ADF&G TECHNICAL DATA REPORT NO. 70
(Limited Distribution)

STATE OF ALASKA
Jay S. Hammond, Governor

# PACIFIC HERRING (*Clupea harengus pallasii*) HARVEST STATISTICS AND A SUMMARY OF HYDROACOUSTICAL SURVEYS CONDUCTED IN SOUTHEASTERN ALASKA DURING THE FALL, WINTER, AND SPRING OF 1977-78, 1978-79, AND 1979-80

By:
Dennis Blankenbeckler
and
Robert Larson

March 1982

ALASKA DEPARTMENT OF FISH AND GAME
P.O. Box 3-2000, Juneau, Alaska 99802

Ronald O. Skoog
Commissioner

## ADF&G TECHNICAL DATA REPORTS

This series of reports is designed to facilitate prompt reporting of data from studies conducted by the Alaska Department of Fish and Game, especially studies which may be of direct and immediate interest to scientists of other agencies.

The primary purpose of these reports is presentation of data. Description of programs and data collection methods is included only to the extent required for interpretation of the data. Analysis is generally limited to that necessary for clarification of data collection methods and interpretation of the basic data. No attempt is made in these reports to present analysis of the data relative to its ultimate or intended use.

Data presented in these reports is intended to be final, however, some revisions may occasionally be necessary. Minor revisions will be made via errata sheets. Major revisions will be made in the form of revised reports.

# PACIFIC HERRING *(Clupea harengus pallasii)* HARVEST STATISTICS AND A SUMMARY OF HYDROACOUSTICAL SURVEYS CONDUCTED IN SOUTHEASTERN ALASKA DURING THE FALL, WINTER, AND SPRING OF 1977-78, 1978-79, AND 1979-80

By

Dennis Blankenbeckler

and

Robert Larson

Alaska Department of Fish and Game
Division of Commercial Fisheries
Ketchikan, Alaska 99901

March 1982

TABLE OF CONTENTS

| | Page |
|---|---|
| LIST OF TABLES | i |
| LIST OF FIGURES | ii |
| ABSTRACT | iii |
| HARVEST | 1 |
| HYDROACOUSTICAL SURVEYS | 9 |
| ACKNOWLEDGMENTS | 31 |
| LITERATURE CITED | 32 |
| APPENDIX I | 33 |

LIST OF TABLES


| Table | | Page |
|---|---|---|
| 1. | Southeastern Alaska herring catches in pounds x 1000, 1900-1979 | 4 |
| 2. | Summary of harvest information 1977-78, 1978-79, and 1979-80 seasons | 5 |
| 3. | Summary of bait and food herring fishery in Southeastern Alaska, 1977-78 | 6 |
| 4. | Summary of sac roe herring fisheries in Southeastern Alaska, 1978 | 8 |
| 5. | Summary of bait and food herring fisheries in Southeastern Alaska, 1978-79 | 10 |
| 6. | Summary of sac roe herring fisheries in Southeastern Alaska, 1979 | 11 |
| 7. | Summary of bait and food herring fisheries in Southeastern Alaska, 1979-80 | 12 |
| 8. | Summary of sac roe herring fisheries in Southeastern Alaska, 1980 | 13 |
| 9. | Acoustical computer estimates, 1977-1978 | 14 |
| 10. | Acoustical computer estimates, 1978-1979 | 18 |
| 11. | Acoustical computer estimates, 1979-1980 | 25 |
| 12. | Summary of computer acoustical assessments in Southeastern Alaska, 1970-71 to 1979-80 in million of pounds | 29 |

## LIST OF FIGURES


| Figure | | Page |
|---|---|---|
| 1. | Fishing areas (Northern Southeastern) . . . . . | 2 |
| 2. | Fishing areas (Southern Southeastern) . . . . . | 3 |

ABSTRACT

Harvests are shown for the Southeastern herring *(Clupea harengus pallasii)* fisheries since 1900 with the data emphasis on the fishing years of 1978, 1979, and 1980. Harvest by area and commercial gear for sac roe herring and winter bait and food fisheries is recorded. Hydroacoustic surveys are also summarized since 1970 and areas surveyed with results of computer analyzed biomass is given for the years 1978, 1979, and 1980. A field calibration unit was used to allow for calibration of the entire acoustical system and trouble shooting electrical problems.

## HARVEST

The Southeastern Alaska herring fishery includes a winter bait and food fishery and a spring sac roe fishery. The winter fishery is conducted almost exclusively with purse seines, with a small percentage taken by herring pounds under a permit system, while the spring sac roe fishery utilizes both purse seines and set gill nets. The fishing areas are presented in Figures 1 and 2, and a historical review of the total annual Southeastern herring harvest from 1900 to 1980 is shown in Table 1. The 1977-78, 1978-79, and 1979-80 seasons' catch has averaged 14.50 million pounds: 6.83 million pounds for food and bait and 7.67 million pounds for sac roe. The food and bait proportion of the catch has declined from 8.08 million pounds in 1977-78 to 5.44 million pounds in 1979-80, while the sac roe portion has increased from 4.02 million pounds to 12.92 million pounds (Table 2). This shift was the result of the lack of large recruit year classes in the winter fishing areas and the increase of biomass estimates in the Kah Shakes and Sitka roe fishing areas, rather than market conditions. The total value of the herring fishery ranged from 2.89 million dollars in 1977-78 to 6.60 million dollars in 1978-79, due primarily to the fluctuations in the price of sac roe fish (Table 2). A summary of harvest information for the past three seasons is presented in Table 2.

Biomass assessments which are conducted by the Alaska Department of Fish and Game (ADF&G) on major stocks do not account for small discrete stocks found in most of Southeastern bays. The major separate stocks are managed on a quota basis by emergency regulations. The quotas are based on harvesting a percentage (10-20%) of each major stock as determined from available data on total biomass, age and growth, and spawning ground analysis.

The herring fishery in 1977-78 allowed a quota of 100 standard tons for the food and bait fishery in wintering areas not surveyed acoustically by the ADF&G in order to utilize the commercial fleet in locating herring concentrations. These non-surveyed areas made up a substantial portion of the catch because of the lack of herring in major wintering areas. A pre-assessment quota was also allowed in certain wintering areas to spread the fleet and harvest. The 1978 sac roe season marked the third year that significant catches of gillnet herring were harvested. Separate areas were established for set gillnet and purse seine fishing, which together caught 4.02 million pounds valued at $2.41 million (Table 2). Gillnets accounted for 23% and purse seines for 77% of the catch. As in previous years, the sac roe fisheries were of short duration. Market conditions reflected an unlimited bait, food, and sac roe demand. The season's catch totaled 12.1 million pounds, which amounted to an exploitation rate of 8% for the 156.7 million pounds assessed. Summaries by area of the 1977-78 winter bait and food fishery and the 1978 spring sac roe fisheries are presented in Tables 3 and 4, respectively.

The major change in the 1978-79 fishery was a decision to limit the harvest on stocks of unknown size. A two million pound threshold estimate was required in wintering areas before any fishing was allowed, and three sac roe fishing areas (Pybus, Gambier, and Helm Bays) were closed because available biomass and resulting spawn were too small to support a significant and

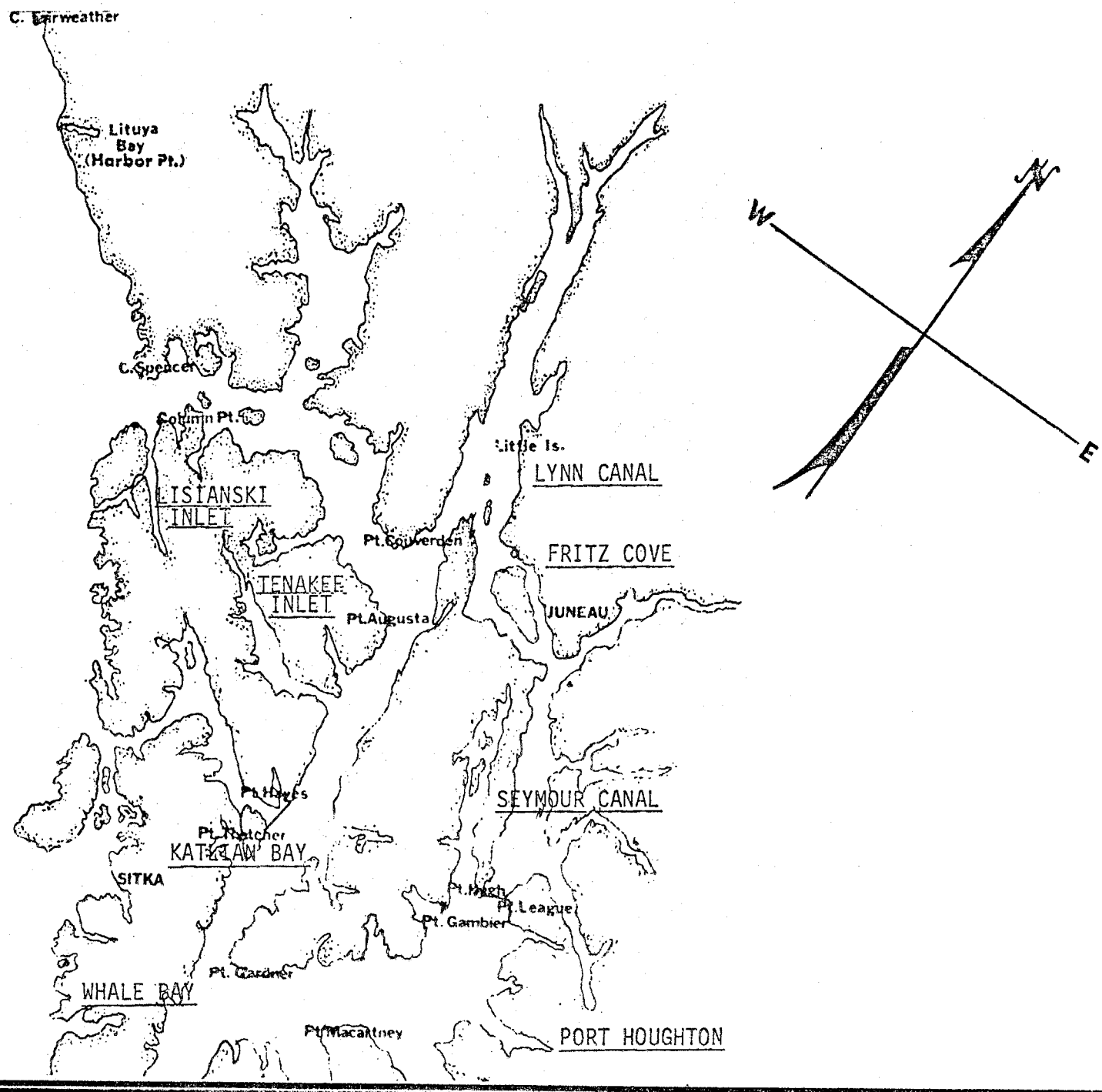



Figure 1. Fishing areas (Northern Southeastern).

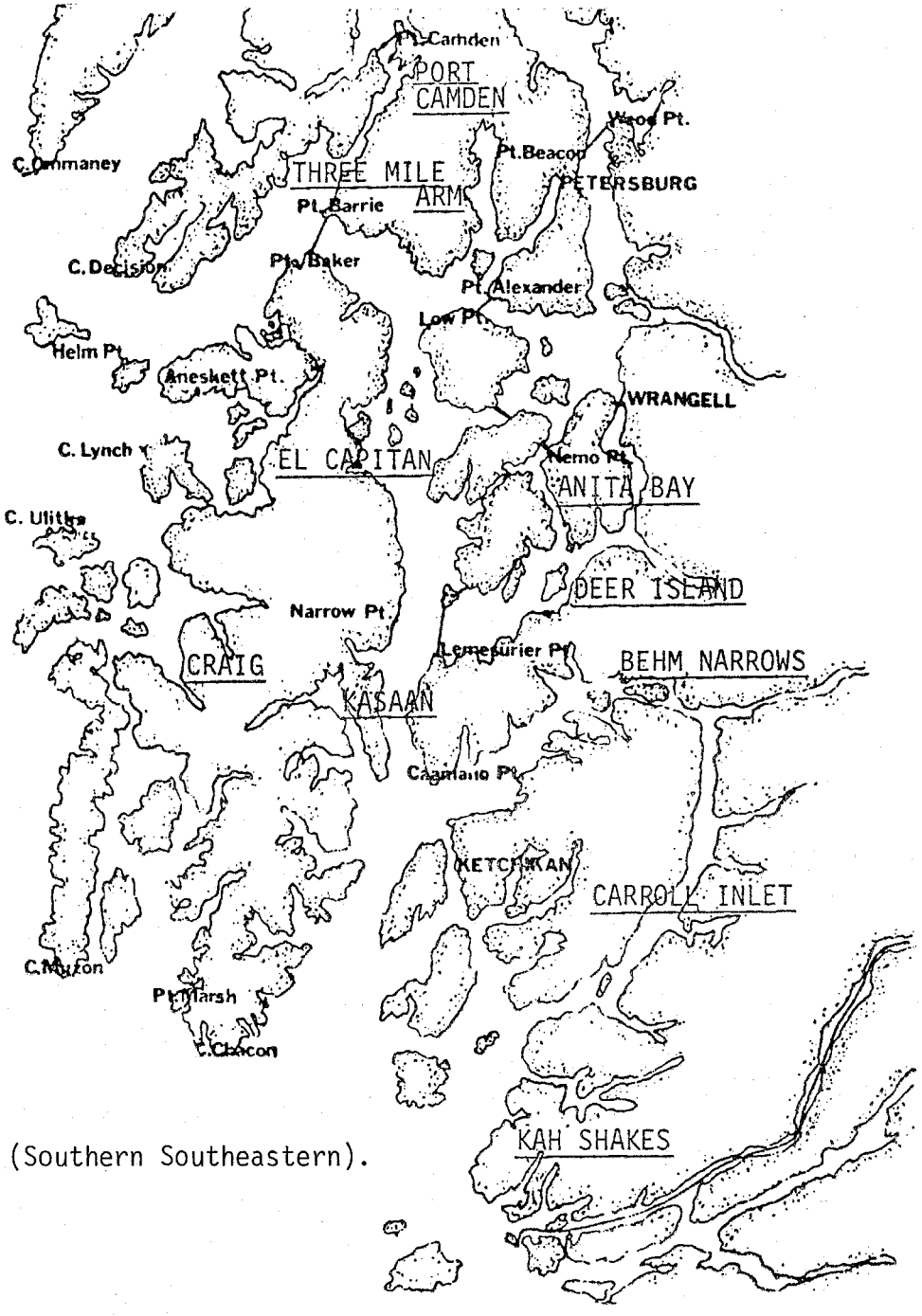



Figure 2. Fishing areas (Southern Southeastern).

Table 1. Southeastern Alaska herring catches in pounds x 1000, 1900-1979.

| Year[1] | Total Catch | Year | Total Catch |
|---|---|---|---|
| 1900 | 2,388 | 1941 | 12,460 |
| 1901 | 2,500 | 1942 | 7,382 |
| 1902 | 1,624 | 1943 | 12,470 |
| 1903 | 2,988 | 1944 | 33,602 |
| 1904 | 3,042 | 1945 | 48,252 |
| 1905 | 2,618 | 1946 | 75,128 |
| 1906 | 2,010 | 1947 | 83,658 |
| 1907 | 2,764 | 1948 | 32,250 |
| 1908 | 3,422 | 1949 | 28,558 |
| 1909 | 2,150 | 1950 | 26,822 |
| 1910 | 13,734 | 1951 | 21,304 |
| 1911 | 24,114 | 1952 | 32,040 |
| 1912 | 32,134 | 1953 | 24,870 |
| 1913 | 26,992 | 1954 | 12,892 |
| 1914 | 16,636 | 1955 | 22,736 |
| 1915 | 13,928 | 1956 | 45,638 |
| 1916 | 22,388 | 1957 | 49,490 |
| 1917 | 24,890 | 1958 | 77,594 |
| 1918 | 35,650 | 1959 | 99,732 |
| 1919 | 21,924 | 1960 | 77,812 |
| 1920 | 32,904 | 1961 | 49,418 |
| 1921 | 12,024 | 1962 | 33,874 |
| 1922 | 33,900 | 1963 | 31,212 |
| 1923 | 42,480 | 1964 | 46,698 |
| 1924 | 58,790 | 1965 | 24,318 |
| 1925 | 115,564 | 1966 | 10,680 |
| 1926 | 147,686 | 1967 | 6,050 |
| 1927 | 90,620 | 1968 | 3,632 |
| 1928 | 106,014 | 1969 | 7,364 |
| 1929 | 157,498 | 1970 | 6,648 |
| 1930 | 141,710 | 1971 | 8,414 |
| 1931 | 89,714 | 1972 | 11,827 |
| 1932 | 99,572 | 1973 | 12,536 |
| 1933 | 123,176 | 1974 | 15,944 |
| 1934 | 133,684 | 1975 | 16,195 |
| 1935 | 116,310 | 1976 | 17,297 |
| 1936 | 73,426 | 1977 | 12,106 |
| 1937 | 100,668 | 1978 | 13,050 |
| 1938 | 44,712 | 1979 | 18,408 |
| 1939 | 40,056 | | |
| 1940 | 6,274 | | |

[1] Catch would include total season although referenced as only one year. Example: 1976 year would include 1976-77 season's catch.

Table 2. Summary of harvest information 1977-78, 1978-79, and 1979-80 seasons.

| | 1977-78 season | 1978-79 season | 1979-80 season |
|---|---|---|---|
| Harvest winter food & bait fishery in lbs. x $10^6$ | 8.08 100% purse seine | 6.97 100% purse seine | 5.44 100% purse seine |
| Harvest spring sac roe fishery in lbs. x $10^6$ | 4.02 77% purse seine 23% gillnet | 6.08 83% purse seine 17% gillnet | 12.92 83% purse seine 17% gillnet |
| Total harvest x $10^6$ lbs. | 12.10 | 13.05 | 18.36 |
| Total herring biomass assessed x $10^6$ lbs. | 156.7 | 192.15 | 201.92 |
| % harvest of assessed biomass | 8.0 | 7.0 | 9% |
| Value of winter food & bait fishery | .48 @ 6¢/lb. | .42 @ 6¢/lb. | .54 @ 10¢/lb. |
| Value of spring sac roe fishery | 2.41 @ 60¢/lb | 6.08 @ $1.00/lb. | 2.58 @ 20¢/lb |
| Total value of herring fishery x $10^6$ dollars | 2.89 | 6.60 | 3.12 |

Table 3. Summary of bait and food herring fishery in Southeastern Alaska, 1977-78.

| Regulatory district | Area | Biomass[1] estimate x $10^6$ lbs | Percent age composition ≤ 3 | Percent age composition ≥ 4 | Quota x $10^6$ | Quota % biomass | Harvest x $10^6$ | Harvest % biomass |
|---|---|---|---|---|---|---|---|---|
| 1 | Behm Narrows | 3.5[2] | 3 | 97 | .2 | 6 | .265 | 8 |
| | Fitzgibbon Cove | | | | .2 | | .102 | |
| | Anchor Pass | | 3 | 97 | .2 | | .289 | |
| | Moser Bay | | | | .2 | | .072 | |
| | Tongass Narrows | 1.5 | 16 | 84 | .4[3] | 18 | .243 | 11 |
| | George Inlet | .71 | | | 0 | | .105 | |
| | Carroll Inlet | | | | 0 | | .014 | |
| | Bostwick | | | | 0 | | .048 | |
| | Halibut Bay | | | | .2 | | .039 | |
| | Dog Island | | | | .2 | | .013 | |
| 2 | Bronson & Nichols Bay | | 8 | 92 | .2 | | .156 | |
| 3 | Boca de Fines | 6.89 | | | 0 | | 0 | |
| 4 | Port Bazan | | 5 | 95 | .2 | | .079 | |
| | Mears Passage | | | | .2 | | .070 | |
| 5 | Affleck Canal | | | | .2 | | .091 | |
| | Alvin Bay | 3.52 | | | 3.52 | 10 | .208 | 6 |
| | Rocky Pass | | | | .2 | | .190 | |
| | Laboucheve Bay | | | | .2 | | .096 | |
| 6 | Mossman Inlet | | | | .2 | | .032 | |
| | Burnett Inlet | | | | .2 | | .086 | |
| | St. John Harbor | | | | .2 | | .107 | |
| 7 | Deer Island | 6.070 | 1 | 99 | .607 | 10 | .680 | 11 |
| | Fools Inlet | .040 | | | 0 | | 0 | |
| | Anita Bay | 6.350 | 4 | 96 | .635 | 10 | .370 | 6 |
| | Scow Bay | 2.350 | | | 0 | | 0 | |
| 8 | Wrangell Harbor | | | | .2 | | .014 | |
| | Stikine Straits | | 42 | 58 | .2 | | 0 | |
| | Woronofski | | | | .2 | | .177 | |

-Continued-

Table 3. Summary of bait and food herring fishery in Southeastern Alaska, 1977-78 (continued).

| Regulatory district | Area | Biomass[1] estimate x $10^6$ lbs | Percent age composition ≤ 3 | Percent age composition ≥ 4 | Quota x $10^6$ | Quota % biomass | Harvest x $10^6$ | Harvest % biomass |
|---|---|---|---|---|---|---|---|---|
| 9 | Port Camden | 4.936 | 1 | 99 | .483 | 10 | .333 | 7 |
| | Tebenkof Bay | | 79 | 21 | .2 | | .177 | |
| | Favorite Bay | 4.500 | | | 0 | | 0 | |
| 12 | Hawk Inlet | | 85 | 15 | .2 | | .397 | |
| | Freshwater Bay | | | | .2 | | .277 | |
| | Tenakee Inlet | | 72 | 28 | .2 | | .098 | |
| | Kelp Bay | | 70 | 30 | .2 | | 0 | |
| 13 | Lisianski Inlet | 26.400 | 88 | 12 | 1.32 | 5 | 1.400 | 5 |
| | Slocum Arm | | | | .2 | | .106 | |
| | Peril Strait | | | | .2 | | .084 | |
| | Whale Bay | 2.880 | 55 | 45 | .288 | 10 | .232 | 8 |
| | Crawfish Inlet | 2.140 | 97 | 3 | 0 | | 0 | |
| | Necker Bay | 6.110 | 52 | 48 | .611 | 10 | .524 | 9 |
| 14 | Port Althorp | | | | .2 | | .283 | |
| | Idaho Inlet | | | | .2 | | .189 | |
| | Port Frederick | | 85 | 15 | .2 | | .268 | |
| | Icy Strait | | | | .2 | | .148 | |
| | TOTAL | | | | 10.500 | | 8.08 | 10.300 |

[1] Includes catch to date plus computer estimate.

[2] Visual estimates.

[3] Includes quota for George and Carroll Inlets.

Table 4. Summary of sac roe herring fisheries in Southeastern Alaska, 1978.

| Fishing district | Area | Acoustical biomass estimate x $10^6$ lbs | Percent age composition ≥ 4 | Percent age composition ≤ 3 | 1978 egg deposition estimate x $10^6$ lbs | Quota x $10^6$ lbs | Quota percent biomass | Harvest by gear type x $10^6$ lbs [1] | Harvest percent biomass: Acoustical | Harvest percent biomass: Egg deposition |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Kah Shakes | None | 91 | 9 | 11.68 | 1.36 | 12%[2] | .35 SGN | - | 3 |
| 1 | Annette[3] (Ham Island) | None | Unknown | | None | - | - | .06 SGN, PS | - | - |
| 2 | Kasaan Bay | .23 | Assume all adult fish | | None | None | - | None | - | - |
| 11 | Seymour Canal | 27.4[6] | 36 mature | 64 immature | 2.75 | 1.0 | 10%[4] | 1.57 PS | 16 | 57 |
| 13 | Sitka Sound | 28.7 | 29 35% mature | 71 65% immature | 4.12 | .5 | 5%[5] | .5 PS | 5 | 12 |
| 15 | Juneau | 10.8 | 96 | 4 | 4.53 | 1.5 PS<br>.5 SGN | 19% | 1.2 PS<br>.69 SGN<br>4.37 Total | 18 | 42 |

[1] SGN is catch by set gillnets - PS is catch by herring purse seine.

[2] Quota set for 10% of 1977 biomass estimate of 13.6 million lbs which was later revised to 9.66.

[3] This area is part of the Annette Island Reserve and not under State fishery jurisdiction, data supplied by Pacific Rim Planners (1978).

[4] Average of high estimates.

[5] 10% of mature fish - 4% of total population estimate.

[6] 5% of mature fish in population - 2% of total population.

controllable fishery. The winter season was divided into two openings (15 November and 1 February) due to the number of vessels participating and their increased effectiveness. No sac roe harvest was allowed in Kasaan or Juneau, but the other areas had landings of 6.08 million pounds, worth approximately $6.08 million (Table 2). The catch was divided 17% to gillnetters and 83% to purse seiners. The total season's catch was 13.05 million pounds from 192.15 million pounds assessed for a total exploitation rate of 7%. Summaries of the 1978-79 winter bait and food fishery and the 1979 sac roe fishery are presented in Tables 5 and 6, respectively.

The 1979-80 season was opened for a pre-assessment winter food and bait fishery on 14 October, and a post-assessment fishery on 2 December. The quality of fish was considered poor because of the extended holding time in packers and processing facilities. The sometimes intense competition caused by increased effectiveness of the gear resulted in a limited selective harvest for size and the subsequent harvest of a large number of small (3-year-old) herring. There were also two new sac roe areas designated by the Board of Fisheries: Three Mile Arm and Peril Straits. Sufficient fish were not found in these two areas, nor in Kasaan or Seymour Canal to justify a fishery. The other areas landed 12.916 million pounds worth $2.58 million; a price which reflected a very weak Japanese market (Table 2). The catch was divided 17% to the gill nets and 83% to the purse seines. The total season's catch amounted to 18.36 million pounds which is an exploitation rate 9% of the 201.92 million pounds of herring assessed. Summaries of the 1979-80 winter bait and food fishery and the 1980 sac roe fishery are presented in Tables 7 and 8, respectively.

## HYDROACOUSTICAL SURVEYS

Hydroacoustical survey results for the 1977-78, 1978-79, 1979-80 seasons are shown in Tables 9, 10, and 11, respectively. A summary of peak surveys by area for the 1970 through 1979 seasons is presented in Table 12. Individual surveys describing the survey method and showing the location are grouped by area and year and presented in Appendix I. The acoustical equipment and computer analysis are described by Nunnallee (1974) and Moberly and Thorne (1974). Operation and calibration of equipment is described by Mattie (1975) and Blankenbeckler (1976, 1977). The acoustical equipment and field calibration unit was similar to that described by Blankenbeckler (1978). The field calibration unit was utilized for each of the past three seasons. This unit allows for calibration of the entire acoustical system and trouble shooting electrical problems. Analysis of the data to compute biomass was conducted under contract by the Fisheries Research Institute of the University of Washington using a computer digital data analysis system. Technical support was provided under a service contract with Bob Mattie of Seattle, Washington.

The amount of effort in the 1977-78 season increased sharply and resulted in 92 computer analyzed surveys. This can be compared with 76 surveys made during the 1976-77 season and 44 made during the 1975-76 season. Vessel support was considerably improved over past years, but the great number of areas in which fish were caught made it difficult to adequately assess the size of each

Table 5. Summary of bait and food herring fisheries in Southeastern Alaska, 1978-79.

| Regulatory district | Area | Biomass estimate x $10^6$ lbs | Percent age composition ≤ 3 | Percent age composition ≥ 4 | Quota x $10^6$ lbs | Quota % biomass | Harvest x $10^6$ lbs | Harvest Estimate % biomass |
|---|---|---|---|---|---|---|---|---|
| 1 | Behm Narrows Anchor Pass | 9.67 | 0 | 100 | 1.16 | 12% | 1.19 | 12% |
| | Ward Cove Clover Pass Bold Island Tongass Narrows Thorne Arm Bull Island | 10.42 | 60[1] | 40 | 0 | - | 0 | - |
| 3 | Boca de Finas | 1.49 | 0[1] | 100 | 0 | - | 0 | - |
| | El Capitan Tuxekan Passage | 8.41 | 72 | 28 | .84 | 10% | .33 | 4% |
| | Meares Pass | .49 | Unknown | | 0 | - | 0 | - |
| 7 | Deer Island | 1.65 | 1[1] | 99 | 0 | - | 0 | - |
| | Anita Bay | 14.96 | 71 | 29 | 1.83 | 12% | .61 | 4% |
| 9 | Port Camden | .95 | 1[1] | 99 | 0 | - | 0 | - |
| | Hood Bay | .74 | 53 | 57 | .20 | 27% | .24 | 32% |
| | Favorite Bay | 5.62 | 0[1] | 100 | 0 | - | 0 | - |
| 10 | Port Houghton | .85 | 0 | 100 | 0 | - | 0 | - |
| 12 | Tenakee Inlet | 4.60 | 40 | 60 | .4 | 9% | .4 | 9% |
| 13 | Lisianski Inlet | 23.12 | 36 | 64 | 3.6 | 16% | 3.66 | 16% |
| | Crawfish | 3.11 | 49 | 51 | .2 | 6% | .31 | 10% |
| | Whale Bay | 2.0[2] | 25 | 75 | .2 | 10% | .22 | 11% |
| 14 | Idaho Inlet | 6.88 | 36[1] | 64 | [3] | | [4] | |
| | | | | | | | 6.96 Total | |

[1] Visual estimate.
[2] Variable mesh gillnet sample.
[3] Quota for Idaho Inlet incorporated into quota for Lisianski, Port Althorp, and Idaho Inlet.
[4] All of catch from Lisianski Inlet.

Table 6. Summary of sac roe herring fisheries in Southeastern Alaska, 1979.

| Fishing district | Area | Acoustical biomass estimate x $10^6$ lbs | Percent age composition ≥ 4 | Percent age composition ≤ 3 | 1979 egg deposition estimate x $10^6$ lbs | Quota x $10^6$ lbs | Quota percent biomass | Harvest by gear type (2) x $10^6$ lbs | Harvest percent biomass: Acoustical | Harvest percent biomass: Egg deposition |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Kah Shakes | none | 88% | 12% | 22.6 | 1.17 | 10%[1] | 1.06 SGN[2] | | 5% |
| 1 | Annette | none | - | - | not sufficient spawn for est. | - | - | .09 SGN | | |
| 2 | Kasaan | 1.0[3] | - | - | 1.6 | none | | none | | |
| 11 | Seymour Canal | 5.0[4] | estimate includes only spawners | | none | .5 | 10% | .53 PS | 11% | |
| 13 | Sitka Sound | 62.8 | 38% | 62% | none | 4.6 | 7% | 4.5 | 7% | |
| 15 | Juneau | 5.3 | 29% | 71% | none | none | | none | | |
| | | | | | | | | 6.18 | | |

[1] Quota determined from 10% of herring biomass estimate for 1978.

[2] SGN is catch by set gill nets and PS is catch by herring purse seine.

[3] Visual estimate.

[4] Visual and acoustical estimate.

Table 7. Summary of bait and food herring fisheries in Southeastern Alaska, 1979-80.

| Regulatory district | Area | Biomass estimate | Percent age composition ≤ 3 | Percent age composition ≥ 4 | Quota x $10^6$ lbs | Quota % biomass | Harvest x $10^6$ lbs | Harvest Estimate % biomass |
|---|---|---|---|---|---|---|---|---|
| 1 | Thorne Arm<br>George Inlet<br>Carroll Inlet | 4.0[1] | Unknown | | 0 | - | 0 | - |
| | Spacious Bay<br>Behm Narrows<br>Burroughs Bay<br>Anchor Pass | 4.38[1] | 70 | 30 | .5 | 11% | .684 | 15% |
| 3 | El Capitan<br>Tuxekan<br>Trocadero<br>Bucareli Bay<br>Boca de Finas | 4.2[1] | Unknown | | 0 | - | 0 | - |
| | Meares Passage | 5.2 | 93 | 7 | .4 | 8% | .436 | 8% |
| 7 | Deer Island | <1.0 | Unknown | | 0 | - | 0 | - |
| | Anita Bay | 17.3 | 83 | 17 | 1.4 | 8% | 2.08 | 12% |
| 9 | Port Camden | 3.6 | Unknown[2] | | 0 | - | 0 | - |
| 12 | Tenakee Inlet | 8.0 | 12 | 88 | .8 | 10% | .88 | 11% |
| 13 | Crawfish<br>Necker<br>Whale Bay | 4.0[3] | Unknown[4] | | .4 | 10% | .28 | 7% |
| 14 | Lisianski | 7.0[5] | 6 | 94 | 1.26 | 18% | 1.0 | 14% |
| | Port Frederick | 3.2 | Unknown | | .32 | 10% | .06 | 2% |
| | Total | 61.88 | | | 5.08 | | 5.42 | |

[1] Sum of peak surveys for these areas.
[2] Majority young fish.
[3] Sum of visual estimates.
[4] Majority adult fish.
[5] Visual plus acoustical estimates.

Table 8. Summary of sac roe herring fisheries in Southeastern Alaska, 1980.

| Fishing district | Area | Acoustical biomass estimate x $10^6$ lbs | Percent age composition ≥ 4 | Percent age composition ≤ 3 | 1980 egg deposition estimate x $10^6$ lbs | Quota x $10^6$ lbs | Quota percent biomass | Harvest by gear type x $10^6$ lbs | Harvest percent biomass: Acoustical | Harvest percent biomass: Egg deposition |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Kah Shakes | none | 29% | 71% | 33.1 | 2.2 | 10%[1] | 2.19 SGN[2] | - | 7% |
| 1 | Annette Island | none | - | - | 2.24[3] | | | .64 SGN | - | 29% |
| 2 | Kasaan Bay | none | unknown | | none | none | none | none | - | - |
| 5 | Three Mile Arm | 1.2 | unknown | | not sufficient for spawn est. | none | none | none | - | - |
| 11 | Seymour Canal | none | base percentage of young fish | | 12.2 | none | none | none | - | - |
| 13 | Sitka | 79 | 89 | 11 | none | 8.0 | 10% | 8.77 PS | 11% | - |
| 13 | Peril Straits | visual est. 1.5 | unknown | | none | none | none | none | - | - |
| 15 | Juneau | 7 acoustical + 5 visual | 82 | 18[4] | 9[4] | 1.2 | 10% | 8.77 PS | 11% | - |
| | | | | | | | | 13.56 | | |

[1] Quota is 10% of herring biomass in 1979.
[2] SGN is catch by set gill nets and PS is catch by herring purse seine.
[3] This area is part of the Annette Island Reserve and not under State fishery jurisdiction, data supplied by personal communication from Pacific Rim Planners.
[4] Does not include fish spawning in Auke Bay.

Table 9. Acoustical computer estimates, 1977-1978.

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Deer Island | 10/6/77 | 1 | 1,457,709 | .68 | .99 |
| Deer Island | 10/12/77 | 1 | 1,942,183 | 3.1 | 6.0 |
| Deer Island | 10/12/77 | 2 | 1,942,183 | 2.4 | 4.66 |
| Deer Island | 10/13/77 | 1 | 1,329,087 | .28 | .38 |
| Anita Bay | 10/13/77 | 1 | 8,231,770 | .17 | 1.40 |
| Anita Bay | 10/13/77 | 2 | 8,231,770 | .12 | .99 |
| Deer Island | 10/14/77 | 1 | 771,728 | 2.4 | 1.85 |
| Deer Island | 10/14/77 | 2 | 771,728 | 4.2 | 3.24 |
| Boca de Finas | 10/24/77 | 1 | 11,876,042 | .32 | 3.8 |
| Boca de Finas | 10/24/77 | 2 | 11,876,042 | .58 | 6.89 |
| Tongass Narrows | 10/19/77 | 1 | 964,660 | .15 | .14 |
| Tongass Narrows | 10/19/77 | 2 | 964,660 | .08 | .07 |
| Port Camden | 11/3/77 | 1 | 10,430,000 | .44 | 4.60 |
| Whale Bay | 11/4/77 | 1 | 2,132,972 | 1.35 | 2.88 |
| Necker Bay | 11/4/77 | 1 | 3,054,758 | 2.00 | 6.11 |
| Necker Bay | 11/4/77 | 2 | 2,261,592 | .40 | .90 |
| Crawfish | 11/5/77 | 1 | 3,890,797 | .55 | 2.14 |
| Lisianski | 11/13/77 | 1 | 2,668,894 | 8.3 | 22.20 |
| Lisianski | 11/13/77 | 2 | 2,475,961 | 8.9 | 22.10 |
| Lisianski | 11/13/77 | 3 | 2,979,729 | 11.1 | 33.10 |
| Olga Straits | 11/19/77 | 1 | 4,235,787 | .59 | 2.50 |
| Olga Straits | 11/19/77 | 1 | 4,876,894 | .28 | 1.37 |
| Anita Bay | 11/19/77 | 1 | 9,174,993 | .65 | 5.98 |
| Anita Bay | 11/19/77 | 2 | 4,758,992 | .56 | 2.69 |
| Deer Island | 11/21/77 | 1 | 1,156,136 | 1.2 | 1.39 |
| Deer Island | 11/21/77 | 2 | 495,487 | 6.3 | 3.15 |
| Deer Island | 11/21/77 | 3 | 1,734,204 | 1.6 | 2.72 |

Table 9. Acoustical computer estimates, 1977-1978 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Scow Bay | 11/23/77 | 1 | 3,130,316 | .55 | 1.72 |
| Scow Bay | 11/23/77 | 2 | 2,399,995 | .98 | 2.35 |
| Anita Bay | 11/29/77 | 1 | 6,606,438 | .31 | 2.05 |
| Anita Bay | 11/29/77 | 2 | 2,725,156 | .62 | 1.69 |
| Fools Inlet | 11/30/77 | 1 | 2,006,706 | .02 | .04 |
| Boca de Finas | 12/1/77 | 1 | 5,574,000 | .10 | .56 |
| Deer Island | 12/1/77 | 1 | 1,321,287 | 1.96 | 2.59 |
| Deer Island | 12/1/77 | 2 | 1,321,287 | 1.91 | 2.52 |
| Clupea Bight | 12/1/77 | 1 | 619,354 | .033 | .02 |
| Deer Island | 12/2/77 | 1 | 949,676 | 1.16 | 1.10 |
| Deer Island | 12/2/77 | 2 | 949,676 | 5.25 | 4.99 |
| Fritz Cove | 12/13/77 | 1 | 3,419,185 | 1.80 | 6.15 |
| Port Camden | 12/15/77 | 1 | 2,394,834 | .68 | 1.63 |
| Port Camden | 12/15/77 | 2 | 4,129,024 | .80 | 3.30 |
| Port Camden | 12/15/77 | 3 | 1,930,319 | .56 | 1.08 |
| Keku Straits | 12/16/77 | 1 | 1,249,030 | .73 | .91 |
| Katlian | 12/17/77 | 1 | 3,129,787 | 3.1 | 9.7 |
| Katlian | 12/17/77 | 2 | 4,523,185 | 2.1 | 9.5 |
| Katlian | 12/18/77 | 1 | 5,327,069 | 2.6 | 13.8 |
| Katlian | 12/18/77 | 2 | 4,190,913 | 2.2 | 9.2 |
| Fritz Cove | 1/4/78 | 1 | 3,762,176 | 2.9 | 10.6 |
| Fritz Cove | 1/4/78 | 2 | 1,961,476 | 3.9 | 7.6 |
| Fritz Cove | 1/5/78 | 1 | 4,030,137 | 2.7 | 10.8 |
| Fritz Cove | 1/5/78 | 2 | 2,111,534 | 2.4 | 5.1 |
| George Inlet | 1/13/78 | 1 | 1,179,029 | 0.6 | .71 |
| George Inlet | 1/13/78 | 2 | 1,179,029 | 0.6 | .71 |
| Anita Bay | 1/10/78 | 1 | 4,294,185 | 0.3 | 1.29 |

Table 9. Acoustical computer estimates, 1977-1978 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Deer Island | 1/11/78 | 1 | 1,279,997 | 2.7 | 3.46 |
| Deer Island | 1/11/78 | 2 | 1,032,256 | 3.3 | 3.41 |
| Deer Island | 1/11/78 | 3 | 1,114,836 | 3.8 | 4.24 |
| Deer Island | 1/11/78 | 4 | 1,321,288 | 3.7 | 4.89 |
| Deer Island | 1/13/78 | 1 | 1,610,000 | 3.4 | 5.47 |
| Lisianski Inlet | 1/23/78 | 1 | 6,055,924 | 0.7 | 4.2 |
| Lisianski Inlet | 1/24/78 | 1 | 5,101,982 | 1.7 | 8.67 |
| Lisianski Inlet | 1/25/78 | 1 | 3,569,243 | 0.3 | 1.07 |
| Fritz Cove | 1/17/78 | 1 | 4,705,399 | .9 | 4.23 |
| Fritz Cove | 1/17/78 | 2 | 3,204,816 | 1.65 | 5.28 |
| Olga Straits | 1/27/78 | 2 | 2,283,039 | 3.4 | 7.75 |
| Anchor Pass | 1/30/78 | 1 | 348,350 | 1.0 | .35 |
| Alvin Bay | 2/2/78 | 1 | 1,865,000 | 1.0 | 1.87 |
| Alvin Bay | 2/2/78 | 2 | 829,000 | 1.4 | 1.16 |
| Alvin Bay | 2/2/78 | 3 | 1,761,000 | 2.0 | 3.52 |
| Tee Harbor | 2/9/78 | 1 | 1,329,088 | .8 | |
| West Crawfish | 1/30/78 | 1 | 1,457,709 | .42 | |
| Fritz Cove | 2/5/78 | 1 | 5,605,749 | .16 | |
| Sitka (Dog Pt.) | 3/23/78 | 1 | 1,982,913 | 15.3 | 29.0 |
| Sitka (Dog Pt.) | 3/23/78 | 2 | 1,414,835 | 20.4 | 28.6 |
| Sitka (Middle Is.) | 3/31/78 | 1 | 2,733,204 | 8.9 | 24.3 |
| Mid Is. to Nak. | 3/31/78 | 2 | 4,801,866 | 1.1 | 5.3 |
| Kasaan | 4/12/78 | 1 | 750,291 | .3 | .23 |
| Windfall Harbor | 4/5/78 | 1 | 4,299,380 | 3.3 | 14.2 |
| Windfall Harbor | 4/5/78 | 2 | 1,424,494 | 5.5 | 7.8 |
| Seymour Canal-Dorn Is. | 3/21/78 | 1 | 1,243,000 | | |
| Seymour Canal-Dorn Is. | 3/22/78 | 1 | 1,554,000 | | |

Table 9. Acoustical computer estimates, 1977-1978 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Seymour Canal-Dorn Is. | 3/22/78 | 2 | 466,000 | | |
| Seymour Canal | 4/22/78 | 1 | 3,320,000 | 9.8 | 32.5 |
| Seymour Canal | 4/23/78 | 1 | 5,390,000 | 4.4 | 23.7 |
| Seymour Canal | 4/23/78 | 2 | 4,380,000 | 1.9 | 8.3 |
| Seymour Canal | 4/23/78 | 3 | 3,110,000 | 8.4 | 26.1 |
| Seymour Canal | 4/23/78 | 4 | 4,690,000 | 5.8 | 27.2 |
| Seymour Canal | 4/25/78 | 1 | 4,660,000 | 5.9 | 27.5 |
| Seymour Canal | 4/24/78 | 1 | 4,060,000 | 4.6 | 18.7 |
| Seymour Canal | 5/4/78 | 2 | 6,000,000 | .86 | 5.2 |
| Seymour Canal | 5/5/78 | 1 | 6,300,000 | 4.4 | 27.7 |

Table 10. Acoustical computer estimates, 1978-1979.

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Lisianski Straits | 11/12/78 | 1 | 6,905,400 | 1.37 | 9,460,398 |
| Lisianski Straits | 11/12/78 | 2 | 889,631 | 7.16 | 6,369,758 |
| Lisianski Straits | 11/12/78 | 3 | 8,285,362 | 1.59 | 13,173,726 |
| Lisianski (Stag Bay) | 11/12/78 | 4 | 1,361,243 | 2.18 | 2,967,510 |
| Sitka (Olga Straits) | 11/19/78 | 1 | 5,680,779 | 0.34 | 1,931,464 |
| Sitka (Katlian) Area 1 | 11/20/78 | 1 | 728,854 | 1.44 | 1,049,549 |
| Sitka (Katlian) Area 1 | 11/20/78 | 2 | 535,923 | 2.19 | 1,173,671 |
| Sitka (Katlian) Area 2 | 11/20/78 | 3 | 3,044,060 | 14.23 | 43,316,973 |
| Sitka (Katlian) Area 2 | 11/20/78 | 4 | 2,626,020 | 2.8 | 7,352,856 |
| Thorne Arm | 11/19/78 | 1 | 4,491,030 | 1.96 | 8,802,418 |
| Thorne Arm | 11/19/78 | 2 | 2,893,982 | 1.39 | 4,022,634 |
| Tongass Narrows | 11/20/78 | 1 | 707,418 | 1.11 | 785,234 |
| Tongass Narrows | 11/20/78 | 2 | 493,049 | 0.36 | 177,497 |
| Bull Island | 11/7/78 | 1 | 289,398 | 7.71 | 2,231,258 |
| Favorite Bay | 11/4/78 | 1 | 415,340 | 7.16 | 2,973,834 |
| Favorite Bay | 11/4/78 | 2 | 542,621 | 4.07 | 2,208,467 |
| Tuxekan Passage | 11/30/78 | 1 | 1,918,603 | 0.56 | 1,074,418 |
| Tuxekan Passage | 11/30/78 | 2 | 1,918,603 | 2.33 | 4,470,344 |
| El Capitan | 11/27/78 | 1 | 7,663,692 | 0.24 | 1,839,286 |
| Ward Cove | 11/21/78 | 1 | 313,382 | 7.51 | 2,353,498 |
| Deer Island | 11/29/78 | 1 | 2,658,176 | 0.86 | 2,286,031 |
| Deer Island | 11/29/78 | 2 | 2,786,797 | 0.38 | 1,058,982 |
| Deer Island | 11/29/78 | 3 | 3,687,147 | 0.22 | 811,172 |
| Deer Island | 11/19/78 | 3 | 1,279,000 | 0.83 | 1,061,570 |
| Deer Island | 11/19/78 | 4 | 2,477,000 | 0.44 | 1,089,880 |
| Tenakee Inlet | 12/2/78 | 1 | 2,902,226 | 1.36 | 3,947,027 |
| | | | | | |

Table 10. Acoustical computer estimates, 1978-1979 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Tenakee Inlet | 12/2/78 | 2 | 2,110,710 | 2.20 | 4,643,562 |
| Anita Bay | 10/4/78 | 1 | 7,717,284 | 0.52 | 4,012,988 |
| Anita Bay | 10/4/78 | 2 | 10,332,586 | 0.77 | 7,956,091 |
| Behm Narrows | 10/20/78 | 2 | 3,044,039 | 2.35 | 7,153,491 |
| Anchor Pass | 10/20/78 | 1 | 557,359 | 4.12 | 2,296,319 |
| Anchor Pass | 10/20/78 | 2 | 557,359 | 4.52 | 2,519,262 |
| Boca de Finas | 10/28/78 | 1 | 4,501,749 | 0.19 | 855,332 |
| El Capitan | 10/27/78 | 1 | 3,719,302 | 2.26 | 8,405,623 |
| Favorite Bay | 10/12/78 | 1 | 328,252 | 2.92 | 1,124,936 |
| Hood Bay | 10/12/78 | 1 | 4,086,408 | 0.18 | 735,553 |
| Deer Island | 10/25/78 | 1 | 1,280,000 | 1.28 | 1,638,400 |
| Deer Island | 10/25/78 | 3 | 1,530,000 | 0.83 | 1,269,900 |
| Deer Island | 10/26/78 | 1 | 2,065,000 | 1.46 | 3,014,900 |
| Deer Island | 10/26/78 | 2 | 1,858,000 | 1.12 | 2,080,960 |
| Anita Bay | 10/26/78 | 1 | 18,870,000 | 1.05 | 19,813,500 |
| Anita Bay | 10/26/78 | 2 | 16,230,000 | 0.88 | 14,282,400 |
| Deer Island | 10/25/78 | 2 | 950,000 | 0.30 | 285,000 |
| Anita Bay | 10/27/78 | 1 | 14,780,000 | 0.73 | 10,789,400 |
| Port Houghton | 11/1/78 | 1 | 3,130,000 | 0.27 | 845,100 |
| Port Houghton | 11/1/78 | 2 | 2,590,000 | 0.19 | 492,100 |
| Port Houghton | 11/1/78 | 3 | 2,540,000 | 0.15 | 381,000 |
| Lisianski Straits | 11/11/78 | 1 | 1,608,934 | 0.79 | 1,271,057 |
| Lisianski Straits | 11/11/78 | 2 | 2,818,952 | 1.97 | 5,553,335 |
| Lisianski Straits | 11/11/78 | 3 | 2,818,952 | 2.00 | 5,637,904 |
| Idaho Inlet | 12/6/78 | 1 | 4,201,632 | 1.62 | 6,806,643 |
| Idaho Inlet | 12/6/78 | 2 | 3,129,787 | 2.22 | 6,948,127 |
| | | | | | |

Table 10. Acoustical computer estimates, 1978-1979 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Bold Island | 12/15/78 | 1 | 1,532,658 | 0.16 | 245,225 |
| Short Bay | 12/1/78 | 1 | 385,864 | 0.55 | 212,225 |
| Port Camden | 12/9/78 | 1 | 4,120,000 | 0.23 | 948,000 |
| Port Camden | 12/10/78 | 1 | 3,440,000 | 0.14 | 326,000 |
| Anita Bay | 11/20/78 | 1 | 17,716,000 | 0.27 | 4,783,320 |
| El Capitan | 1/9/79 | 1 | 3,912,234 | 0.80 | 3,129,787 |
| Meares Passage | 1/11/79 | 1 | 2,465,244 | 0.20 | 493,049 |
| Fritz Cove | 1/18/79 | 1 | 1,629,204 | 2.90 | 4,724,692 |
| Sitka (Olga Straits) | 1/10/79 | 1 | 1,597,049 | 29.20 | 46,633,830 |
| Sitka (Olga Straits) | 1/10/79 | 2 | 1,597,049 | 39.30 | 62,764,025 |
| Sitka (Olga Straits) | 1/14/79 | 1 | 1,189,747 | 52.60 | 62,580,692 |
| Sitka (Olga Straits) | 1/14/79 | 2 | 1,682,796 | 21.10 | 35,506,995 |
| Crawfish Inlet | 1/13/79 | 1 | 1,007,534 | 1.20 | 1,209,040 |
| Crawfish Inlet | 1/13/79 | 2 | 1,071,845 | 2.90 | 3,108,350 |
| Crawfish Inlet | 1/11/79 | 1 | 418,020 | 3.20 | 1,337,600 |
| Lisianski Inlet | 1/15/79 | 1 | 2,679,612 | 9.40 | 25,188,352 |
| Lisianski Inlet | 1/15/79 | 2 | 1,843,573 | 11.00 | 20,279,303 |
| Clover Pass | 1/18/79 | 1 | 1,028,971 | 1.00 | 1,028,971 |
| Clover Pass | 1/18/79 | 2 | 1,157,593 | 0.50 | 578,797 |
| Behm Narrows | 1/20/79 | 1 | 608,808 | 0.10 | 60,880 |
| Deer Island | 1/16/79 | 1 | 3,010,000 | 0.64 | 1,926,400 |
| Deer Island | 1/16/79 | 3 | 780,000 | 3.00 | 2,340,000 |
| Sitka (Katlian) | 2/17/79 | 1 | 3,869,360 | 6.62 | 25,600,000 |
| Sitka (Katlian) | 2/20/79 | 1 | 3,011,884 | 5.76 | 17,300,000 |
| Sitka (Katlian) | 2/18/79 | 1 | 2,872,545 | 7.94 | 22,800,000 |
| Sitka (Katlian) | 2/19/79 | 1 | 3,794,331 | 10.38 | 39,400,000 |
| | | | | | |

Table 10. Acoustical computer estimates, 1978-1979 (continued).

| Area | Date | Run # | Area $M^2$ | Lbs/$M^2$ | Biomass |
|---|---|---|---|---|---|
| Sitka (Olga Straits) | 2/20/79 | 3 | 975,379 | 0.54 | 530,000 |
| Sitka (Olga Straits) | 2/20/79 | 1 | 857,476 | 0.46 | 390,000 |
| Sitka (Olga Straits) | 2/20/79 | 2 | 857,476 | 1.34 | 1,150,000 |
| Sitka (Olga Straits) | 2/19/79 | 2 | 353,709 | 1.52 | 540,000 |
| Sitka (Olga Straits) | 2/19/79 | 1 | 1,552,202 | 0.40 | 62,000 |
| Sitka (Olga Straits) | 2/18/79 | 1 | 1,575,612 | 0.22 | 35,000 |
| Fritz Cove | 1/25/79 | 1 | 2,786,797 | 0.26 | 72,000 |
| Fritz Cove | 1/3/79 | 2 | 2,272,311 | 1.42 | 3,220,000 |
| Fritz Cove | 1/3/79 | 1 | 2,486,680 | 2.13 | 5,300,000 |
| Fritz Cove | 12/19/78 | 1 | 4,501,749 | 0.90 | 4,051,574 |
| Deer Island | 1/31/79 | 2 | 2,060,000 | 0.88 | 1,812,800 |
| Anita Bay | 2/3/79 | 1 | 5,020,000 | 0.67 | 3,363,400 |
| Port Camden(Keku Straits) | 3/13/79 | 2 | 1,248,000 | 0.90 | 1,120,000 |
| Seymour Canal | 3/25/79 | 1 | 4,460,000 | 0.12 | 535,200 |
| Seymour Canal | 3/25/79 | 2 | 27,550,000 | 0.05 | 1,377,500 |
| Scow Bay | 3/27/79 | 1 | 1,800,000 | 2.80 | 5,040,000 |
| Scow Bay | 3/27/79 | 2 | 1,830,000 | 1.00 | 1,830,000 |
| Scow Bay | 3/28/79 | 1 | 2,030,000 | 0.17 | 35,000 |
| Scow Bay | 3/28/79 | 2 | 2,290,000 | 0.97 | 2,220,000 |
| Scow Bay | 3/28/79 | 3 | 2,300,000 | 0.92 | 2,120,000 |
| Seymour | 4/21/79 | 1 | 1,800,000 | 1.80 | 3,300,000 |
| Seymour | 4/21/79 | 2 | 1,800,000 | .68 | 1,230,000 |
| Seymour (Windfall) | 4/28/79 | 1 | 1,140,000 | 1.00 | 1,140,000 |
| Seymour (Windfall) | 4/28/79 | 2 | 570,000 | 0.98 | 560,000 |
| Seymour (Staunch) | 4/28/79 | 1 | 3,500,000 | 1.58 | 5,500,000 |
| Seymour (Staunch) | 4/28/79 | 2 | 2,460,000 | 0.97 | 2,400,000 |
| | | | | | |

Table 10. Acoustical computer estimates, 1978-1979 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Seymour (Staunch) | 5/2/79 | 1 | 3,130,000 | 0.98 | 3,067,400 |
| Seymour (Windfall) | 5/2/79 | 1 | 1,190,000 | 0.82 | 975,800 |
| Anita Bay (North) | 4/3/79 | 1 | 7,760,000 | 0.07 | 543,200 |
| Burnett Inlet | 4/5/79 | 1 | 450,000 | 0.30 | 135,000 |
| Sitka (Olga Straits) | 3/17/79 | 1 | 1,093,282 | 0.90 | 983,954 |
| Sitka (Olga Straits) | 3/17/79 | 1 | 925,002 | 2.70 | 2,497,505 |
| Sitka (Olga Straits) | 3/17/79 | 2 | 653,825 | 5.40 | 3,530,655 |
| Sitka (Olga Straits) | 3/17/79 | 2 | 589,515 | 9.70 | 5,718,295 |
| Sitka (Olga Straits) | 3/17/79 | 3 | 771,728 | 1.30 | 1,003,246 |
| Sitka (Olga Straits) | 3/17/79 | 3 | 658,825 | 3.30 | 2,174,122 |
| Sitka (Katlian) | 3/17/79 | 1 | 2,293,748 | 12.00 | 27,524,976 |
| Sitka (Katlian) | 3/17/79 | 1 | 1,961,476 | 4.80 | 9,415,084 |
| Sitka (Katlian) | 3/17/79 | 2 | 2,111,535 | 5.40 | 11,402,289 |
| Sitka (Katlian) | 3/17/79 | 2 | 1,832,855 | 8.20 | 15,029,411 |
| Sitka (Katlian) | 3/17/79 | 3 | 1,950,758 | 12.00 | 23,409,096 |
| Sitka (Katlian) | 3/17/79 | 3 | 1,950,758 | 3.20 | 6,242,425 |
| Sitka (Katlian) | 3/18/79 | 1 | 1,532,738 | 16.90 | 25,903,272 |
| Sitka (Katlian) | 3/18/79 | 1 | 1,329,088 | 13.30 | 17,676,870 |
| Sitka (Katlian) | 3/18/79 | 2 | 1,618,486 | 12.30 | 19,907,377 |
| Sitka (Katlian) | 3/18/79 | 2 | 1,329,088 | 9.60 | 12,759,244 |
| Sitka (Katlian) | 3/18/79 | 3 | 1,618,486 | 15.1 | 24,439,139 |
| Sitka (Katlian) | 3/18/79 | 3 | 1,650,641 | 10.30 | 17,001,602 |
| Sitka (Olga Straits) | 3/19/79 | 1 | 1,446,991 | 7.20 | 10,100,000 |
| Sitka (Olga Straits) | 3/19/79 | 1 | 1,125,437 | 2.50 | 3,300,000 |
| Sitka (Katlian) | 3/19/79 | 1 | 1,404,117 | 11.50 | 16,100,000 |
| Sitka (Katlian) | 3/19/79 | 1 | 1,468,428 | 8.10 | 14,600,000 |

Table 10. Acoustical computer estimates, 1978-1979 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Sitka (Katlian) | 3/19/79 | 2 | 1,736,389 | 11.50 | 19,600,000 |
| Sitka (Katlian) | 3/19/79 | 2 | 1,575,612 | 5.50 | 10,600,000 |
| Sitka (Katlian) | 3/19/79 | 3 | 2,122,253 | 8.60 | 18,000,000 |
| Sitka (Katlian) | 3/19/79 | 3 | 2,497,399 | 3.90 | 9,739,856 |
| Sitka (Black Can) | 3/19/79 | 1 | 2,808,234 | 17.00 | 47,600,000 |
| Sitka (Black Can) | 3/19/79 | 1 | 3,011,881 | 12.40 | 37,200,000 |
| Fritz Cove(Bread Line) | 4/23/79 | 1 | 3,549,950 | 1.10 | 3,904,945 |
| Burnett Inlet | 4/5/79 | 2 | 740,000 | .06 | 44,400 |

Table 10. Acoustical computer estimates, 1978-1979 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Sitka (Katlian) | 3/19/79 | 2 | 1,736,389 | 11.50 | 19,600,000 |
| Sitka (Katlian) | 3/19/79 | 2 | 1,575,612 | 5.50 | 10,600,000 |
| Sitka (Katlian) | 3/19/79 | 3 | 2,122,253 | 8.60 | 18,000,000 |
| Sitka (Katlian) | 3/19/79 | 3 | 2,497,399 | 3.90 | 9,739,856 |
| Sitka (Black Can) | 3/19/79 | 1 | 2,808,234 | 17.00 | 47,600,000 |
| Sitka (Black Can) | 3/19/79 | 1 | 3,011,881 | 12.40 | 37,200,000 |
| Fritz Cove(Bread Line) | 4/23/79 | 1 | 3,549,950 | 1.10 | 3,904,945 |
| Burnett Inlet | 4/5/79 | 2 | 740,000 | .06 | 44,400 |

Table 11. Acoustical computer estimates, 1979-1980.

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Anita Bay | 10/13/79 | 1 | 9,389,362 | 0.7 | 6,572,553 |
| Anita Bay | 10/16/79 | 1 | 13,976,859 | 0.6 | 8,386,115 |
| Anita Bay | 10/16/79 | 2 | 13,290,878 | 0.6 | 7,974,527 |
| Scow Bay | 10/16/79 | 1 | 3,644,270 | 0.3 | 1,093,281 |
| Deer Island | 10/13/79 | 1 | 1,714,952 | 0.3 | 514,486 |
| Scow Bay | 10/17/79 | 1 | 3,831,842 | 0.15 | 574,776 |
| Burroughs Bay | 10/13/79 | 1 | 900,350 | 0.68 | 612,238 |
| Spacious Bay | 10/15/79 | 1 | 2,486,680 | 0.50 | 1,243,340 |
| Spacious Bay | 10/15/79 | 2 | 2,529,554 | 0.25 | 632,389 |
| Behm Narrows | 10/13/79 | 1 | 2,842,533 | 0.15 | 426,379 |
| Anchor Pass | 10/13/79 | 1 | 707,418 | 0.38 | 268,819 |
| Anchor Pass | 10/13/79 | 2 | 707,418 | 0.36 | 254,670 |
| Behm Narrows | 10/15/79 | 2 | 1,294,789 | 0.69 | 893,404 |
| Behm Narrows | 10/15/79 | 3 | 1,294,789 | 1.48 | 1,916,288 |
| Tongass Narrows | 10/19/79 | 1 | 489,029 | 0.05 | 24,451 |
| Ward Cove | 10/19/79 | 1 | 716,796 | 1.24 | 888,827 |
| Ward Cove | 10/19/79 | 2 | 716,796 | 1.49 | 1,068,026 |
| George Coon Island | 10/24/79 | 1 | 988,241 | 0.17 | 168,001 |
| George Coon Island | 10/24/79 | 2 | 988,241 | 0.08 | 79,059 |
| George Bull Island | 10/24/79 | 1 | 185,429 | 0.25 | 46,357 |
| Thorne Arm | 10/23/79 | 1 | 2,122,255 | 0.5 | 1,061,128 |
| Deer Island | 10/27/79 | 1 | 1,714,952 | 0.15 | 257,243 |
| Zimovia Straits | 10/27/79 | 1 | 1,800,700 | 0.3 | 540,210 |
| Anita Bay | 10/27/79 | 1 | 8,746,255 | 0.9 | 7,871,630 |
| Port Camden | 11/7/79 | 1 | 7,378,061 | .46 | 3,623,908 |
| Port Camden | 11/7/79 | 2 | 13,301,596 | .50 | 6,650,798 |
| | | | | | |

Table 11. Acoustical computer estimates, 1979-1980 (continued).

| Area | Date | Run # | Area $M^2$ | Lbs/$M^2$ | Biomass |
|---|---|---|---|---|---|
| Port Camden | 11/8/79 | 1 | 10,825,635 | .25 | 2,706,409 |
| Tebenkof Bay | 11/10/79 | 1 | 1,779,263 | .10 | 177,926 |
| Affleck Canal | 11/10/79 | 1 | 440,938 | .63 | 277,791 |
| Affleck Canal | 11/10/79 | 2 | 466,875 | .59 | 275,456 |
| Anita Bay | 11/14/79 | 1 | 16,892,277 | .41 | 6,925,834 |
| Anita Bay | 11/15/79 | 1 | 17,363,889 | 1.03 | 17,884,805 |
| Anita Bay | 11/15/79 | 2 | 12,819,266 | 1.25 | 16,024 |
| Port Frederick | 11/16/79 | 2 | 6,688,312 | .48 | 3,210,389 |
| Lisianski | 11/13/79 | 1 | 2,390,214 | 2.27 | 5,425,787 |
| Lisianski | 11/13/79 | 2 | 4,073,011 | 1.71 | 6,964,848 |
| Stag Bay | 11/13/79 | | Visual estimate 1 x $10^6$ | | pounds |
| Tenakee Inlet | 11/17/79 | 1 | 3,640,000 | 2.20 | 8,008,000 |
| Tenakee Inlet | 11/17/79 | 2 | 1,300,000 | 6.90 | 8,970,000 |
| Tenakee Inlet | 11/17/79 | 3 | 1,820,000 | 4.30 | 7,800,000 |
| El Capitan | 11/15/79 | 1 | 3,772,894 | .31 | 1,169,597 |
| El Capitan | 11/15/79 | 2 | 4,330,254 | .27 | 1,169,168 |
| Tuxekan Narrows | 11/16/79 | 1 | 1,039,690 | .10 | 103,969 |
| Tuxekan Narrows | 11/16/79 | 2 | 375,146 | .30 | 112,544 |
| Trocadero Bay | 11/17/79 | 1 | 5,627,186 | .54 | 3,038,680 |
| Meares Passage | 11/18/79 | 1 | 3,312,001 | 1.58 | 5,232,961 |
| Meares Passage | 11/18/79 | 2 | 3,869,360 | 1.13 | 4,372,377 |
| Diamond Pt. | 11/18/79 | 1 | 4,180,196 | .80 | 3,344,157 |
| Tenakee-Long Bay | 11/18/79 | | Visual estimate 1.0 x $10^6$ | | pounds |
| Lwr. Sitka, Crawfish, Necker, Whale | 11/19 & 11/18 | | Visual estimate 4.0 x $10^6$ | | pounds |
| Spacious Bay | 10/31/79 | 1 | 2,958,352 | 1.0 | 2,958,352 |
| Spacious Bay | 10/31/79 | 2 | 2,615,362 | .56 | 1,464,603 |
| | | | | | |

Table 11. Acoustical computer estimates, 1979-1980 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Anchor Pass | 11/1/79 | 1 | 642,907 | .40 | 257,163 |
| Anchor Pass | 11/1/79 | 2 | 642,907 | .36 | 231,447 |
| Bell Arm | 11/1/79 | 1 | 1,243,342 | .42 | 522,204 |
| Tongass Narrows | 11/6/79 | 1 | 1,804,418 | .30 | 541,325 |
| Anita Bay | 12/3/79 | 1 | 11,747,421 | .38 | 4,464,020 |
| Anita Bay | 12/3/79 | 2 | 5,959,458 | .99 | 5,899,863 |
| Anita Bay | 12/3/79 | 3 | 8,360,391 | .56 | 4,681,819 |
| Scow Bay | 12/7/79 | 1 | 3,814,185.9 | 1.47 | 5,606,852 |
| Meares Passage | 12/8/79 | 1 | 3,687,147 | .8 | 2,949,718 |
| Meares Passage | 12/8/79 | 2 | 2,572,428 | 1.1 | 2,829,671 |
| El Capitan | 12/10/79 | 1 | 4,405,283 | .46 | 2,026,430 |
| Scow Bay | 12/14/79 | 1 | 4,767,026 | .8 | 3,813,621 |
| Lynn Canal | 1/29/80 | 2 | 1,114,719 | 4.4 | 4,904,763 |
| Lynn Canal | 1/29/80 | 3 | 1,371,962 | 2.5 | 3,429,905 |
| Olga Straits | 1/24/80 | 1 | 978,594 | 2.3 | 2,250,766 |
| Olga Straits | 1/24/80 | 2 | 978,594 | 1.3 | 1,272,172 |
| Katlian | 1/24/80 | 1 | 3,007,597 | 14.1 | 42,407,118 |
| Katlian | 1/24/80 | 2 | 2,964,723 | 12.7 | 37,651,982 |
| Katlian | 1/24/80 | 3 | 3,425,617 | 11.0 | 37,681,787 |
| Katlian | 1/25/80 | 1 | 4,204,848 | 13.5 | 56,765,448 |
| Katlian | 1/25/80 | 2 | 3,736,452 | 12.2 | 45,584,714 |
| Lynn Canal | 2/1/80 | 1 | 5,213,454 | .85 | 4,431,435 |
| Lynn Canal | 2/1/80 | 2 | 2,255,162 | .87 | 1,961,990 |
| Lynn Canal | 2/1/80 | 3 | 2,717,814 | .34 | 924,057 |
| Anita Bay | 2/7/80 | 1 | 5,830,837 | .7 | 4,081,585 |
| Katlian | 2/23/80 | 1 | 364,427 | 1.5 | 546,640 |

Table 11. Acoustical computer estimates, 1979-1980 (continued).

| Area | Date | Run # | Area M² | Lbs/M² | Biomass |
|---|---|---|---|---|---|
| Olga Strait | 2/23/80 | 1 | 911,068 | 8.3 | 7,651,864 |
| Black Can | 2/23/80 | 1 | 3,151,224 | 22.5 | 70,902,540 |
| Olga Strait | 2/24/80 | 1 | 1,329,088 | 12.3 | 16,347,782 |
| Olga Strait | 2/24/80 | 2 | 1,329,088 | 9.4 | 12,493,427 |
| Black Can | 2/24/80 | 1 | 1,607,768 | 21.4 | 34,406,235 |
| Black Can | 2/25/80 | 1 | 3,676,428 | 16.5 | 60,661,062 |
| Black Can | 2/25/80 | 2 | 3,622,836 | 6.0 | 21,737,016 |
| Lynn Canal | 2/13/80 | 1 | 814,612 | 2.9 | 2,362,374 |
| Lynn Canal | 2/14/80 | 1 | 1,114,719 | .6 | 668,831 |
| Black Can | 2/24/80 | 2 | 911,068 | 5.7 | 5,193,087 |
| Anita | 2/7/80 | 1 | 5,830,837 | .07 | 408,159 |
| Black Can | 3/11/80 | 1 | 3,797,904 | 8.5 | 32,282,184 |
| Black Can | 3/11/80 | 2 | 2,443,807 | 9.7 | 23,704,927 |
| Black Can | 3/11/80 | 1 | 3,797,904 | 18.4 | 69,881,433 |
| Black Can | 3/11/80 | 2 | 2,443,807 | 5.2 | 12,707,796 |
| Black Can | 3/15/80 | 1 | 2,475,962 | 9.0 | 22,283,658 |
| Black Can | 3/15/80 | 2 | 1,832,855 | 1.0 | 1,832,855 |
| Black Can | 3/15/80 | 1 | 2,475,962 | 17.9 | 44,319,719 |
| Black Can | 3/15/80 | 2 | 1,832,855 | .1 | 183,285.5 |
| Black Can | 3/16/80 | 1 | 2,218,719 | 5.8 | 12,868,570 |
| Black Can | 3/16/80 | 2 | 2,218,719 | 1.0 | 2,218,719 |
| Black Can | 3/16/80 | 1 | 2,218,719 | 32.2 | 71,442,751 |
| Juneau | 4/13/80 | 1 | 857,476 | 8.9 | 7.6 |
| Juneau | 4/13/80 | 2 | 1,071,000 | 5.9 | 6.3 |
| Three Mile | 3/25/80 | 1 | 9,142,000 | .13 | 1.2 |
| Three Mile | 3/25/80 | 2 | 1,500,053 | .47 | .7 |
| Three Mile | 3/26/80 | 1 | 3,988,000 | .21 | .8 |

Table 12. Summary of computer acoustical assessments in Southeastern Alaska, 1970-71 to 1979-80 in millions of pounds.

| | | GEAR DEVELOPMENT STAGE NO SYSTEMATIC SURVEYS | | | | | SYSTEMATIC SURVEYING | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fishing District | Area | 70-71 | 71-72 | 72-73 | 73-74 | 74-75 | 75-76 | 76-77 | 77-78 | 78-79 | 79-80 |
| 1 | Ham Island | - | - | - | - | - | 3.80 | - | - | - | - |
| 1 | George Inlet | - | - | 1.10 | 5.28 | 8.33 | 2.9 | 4.92 | .71 | 2.23 | .21 |
| 1 | Carroll Inlet | - | 16.20 | 10.30 | .91 | .72 | - | .40 | - | - | - |
| 1 | Tongass Narrows | - | - | - | - | - | 1.30 | 2.94 | .14 | .79 | .54 |
| 1 | Ward Cove | - | .60 | .60 | .38 | .04 | - | - | - | 2.35 | 1.07 |
| 1 | Behm Narrows | - | - | - | - | - | - | - | .35 | 7.01 | 3.16 |
| 1 | Thorne Arm | - | - | - | - | - | - | - | - | 8.80 | 1.06 |
| 1 | Clover Pass | - | - | - | - | - | - | - | - | 1.03 | - |
| 2 | Kasaan Bay | - | - | - | - | - | 4.10 | 1.00 | .23 | - | - |
| 2 | Moira Sound | .36 | - | - | - | - | - | - | - | - | - |
| 2 | Twelve Mile Arm | .16 | - | - | - | - | - | - | - | - | - |
| 3 | Boca de Finas | - | - | 36.40 | - | .60 | 14.80 | 3.37 | 6.90 | .86 | - |
| 3 | El Capitan | 2.10 | - | - | - | - | 1.00 | - | - | 8.41 | 2.03 |
| 3 | Tuxekan Passage | - | - | - | - | - | - | - | - | 4.47 | .11 |
| 3 | Sukkwan St. | .70 | - | - | - | - | - | - | - | - | - |
| 3 | Klakas Inlet | .35 | - | - | - | - | - | - | - | - | - |
| 3 | Trocadero | - | - | - | - | - | - | - | - | - | 6.38 |
| 4 | Meares Passage | - | - | - | - | - | - | - | - | .49 | 2.95 |
| 5 | Shakan Straits | .97 | - | - | - | - | - | - | - | - | - |
| 5 | Affleck Canal | - | - | - | - | - | - | - | - | - | .28 |
| 5 | Alvin Bay | - | - | - | - | - | - | - | 3.52 | - | - |
| 5 | Three-Mile Arm | - | - | - | - | - | - | - | - | - | 1.20 |
| 6 | Scow Bay | - | 32.20 | .14 | .50 | .40 | 4.20 | 4.50 | 2.35 | 5.04 | 5.61 |

-Continued-

Table 12. Summary of computer acoustical assessments in Southeastern Alaska, 1970-71 to 1979-80 in millions of pounds (continued).

| | | GEAR DEVELOPMENT STAGE NO SYSTEMATIC SURVEYS | | | | | SYSTEMATIC SURVEYING | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fishing District | Area | 70-71 | 71-72 | 72-73 | 73-74 | 74-75 | 75-76 | 76-77 | 77-78 | 78-79 | 79-80 |
| 7 | Deer Island | - | 26.20 | 7.32 | .90 | .80 | 5.80 | 8.70 | 6.07 | 3.01 | .51 |
| 7 | Anita Bay | .46 | - | .36 | .20 | 1.40 | 16.10 | 10.70 | 6.35 | 19.81 | 17.89 |
| 7 | Fools Inlet | - | - | - | - | - | - | .80 | .04 | - | - |
| 7 | Burnett Inlet | - | - | - | - | - | - | - | - | .14 | - |
| 9 | Tebenkof | - | - | - | - | - | - | - | - | - | .18 |
| 9 | Port Camden | - | - | - | 1.20 | 6.30 | 3.30 | 10.60 | 4.93 | 1.12 | 6.65 |
| 10 | Port Houghton | - | - | - | .68 | - | - | - | - | .85 | - |
| 11 | Lynn Canal | - | 24.90 | 5.90 | 9.20 | 14.90 | 10.80 | 13.60 | 10.80 | 5.30 | 7.60 |
| 11 | Seymour Canal | - | .94 | 1.0 | 1.8 | .79 | - | 8.23 | 27.40[1] | 5.50 | - |
| 12 | Hood | - | - | - | - | - | - | 3.70 | - | .74 | - |
| 12 | Favorite | - | - | - | - | - | - | 6.97 | 4.50 | 2.97 | - |
| 12 | Tenakee | - | - | - | - | - | - | - | - | 4.64 | 8.97 |
| 12 | Whale Bay | - | - | - | - | - | - | - | 2.88 | - | [2] |
| 12 | Necker Bay | - | - | - | - | - | - | - | 6.11 | - | [2] |
| 12 | Crawfish Inlet | - | - | - | - | - | - | - | 2.14 | 3.11 | [2] |
| 12 | Sitka Sound | - | 14.4 | 20.0 | 2.0 | 12.80 | 14.60 | 11.30 | 29.60 | 62.76 | 79.01 |
| 12 | Slocum Inlet | - | - | - | .88 | - | - | - | - | - | - |
| 12 | Lisianski Inlet | .20 | .40 | .40 | 11.00 | 1.60 | 4.70 | 7.85 | 25.80[1] | 25.19 | 6.96 |
| 12 | Idaho Inlet | - | - | - | - | - | - | - | - | 6.95 | - |
| 12 | Port Frederick | - | - | - | - | - | - | - | - | - | 3.21 |

[1] Average of high estimates.

[2] Visual estimates only.

stock. There were 139 computer analyzed acoustical surveys conducted during the 1978-79 season which reflects both increased effort and an attempt to compare repetitive surveys for the same area. The repetitive survey results demonstrated the importance of timing, equipment settings, and fish movement. There were 102 computer analyzed acoustical surveys conducted during the 1979-80 season. This number of surveys was sufficient to provide good acoustical estimates of areas where there were fish present, plus provide for repetitive surveys to help further define under what conditions variation in acoustical estimates can be expected.

## ACKNOWLEDGMENTS

The author wishes to express thanks to Tom Copeland, David Street, and the Division of Commercial Fisheries management biologists in Southeastern Alaska for assistance in collection of the hydroacoustical data. Thanks is also extended to the crews of the research vessels, KITTIWAKE, AUKLET, SUNDANCE, JOHN COBB, and SEARCHER for collection of acoustical data and to Gary Gunstrom and Debra Geoffrion for assistance in preparation of this report. Thanks is also extended to the National Marine Fisheries Service, Auke Bay Laboratory, in collection of hydroacoustical data by their staff provided under a cooperative agreement between the agencies.

## LITERATURE CITED


Blankenbeckler, W.D. 1976. Pacific herring *(Clupea pallasii)* harvest statistics and a summary of hydroacoustical surveys conducted in Southeastern Alaska during the fall, winter, and spring of 1975-76. ADF&G Tech. Data Rpt. No. 28. 95 pp.

_____. 1978. Pacific herring *(Clupea pallasii)* harvest statistics and a summary of hydroacoustical surveys conducted in Southeastern Alaska during the fall, winter, and spring, 1976-77. ADF&G Tech. Data Rpt. No. 38. 149 pp.

Mattie, R.R. 1975. Instructions for calibrating and operating acoustical equipment for herring assessment. Applied Physics Laboratory, U. of W.

Moberly, S.A. and R.E. Thorne. 1974. Assessment of Southeastern Alaska herring stocks using hydroacoustical techniques, 1970-72. ADF&G Info. Leaflet No. 165. 24 pp.

Nunnallee, E.P., Jr. 1974. A hydroacoustical data acquisition and digital data analysis system for the assessment of fish stock abundance. Div. of Marine Resources, U. of W. WSG 74-2. 48 pp.

APPENDIX I

Appendix 1

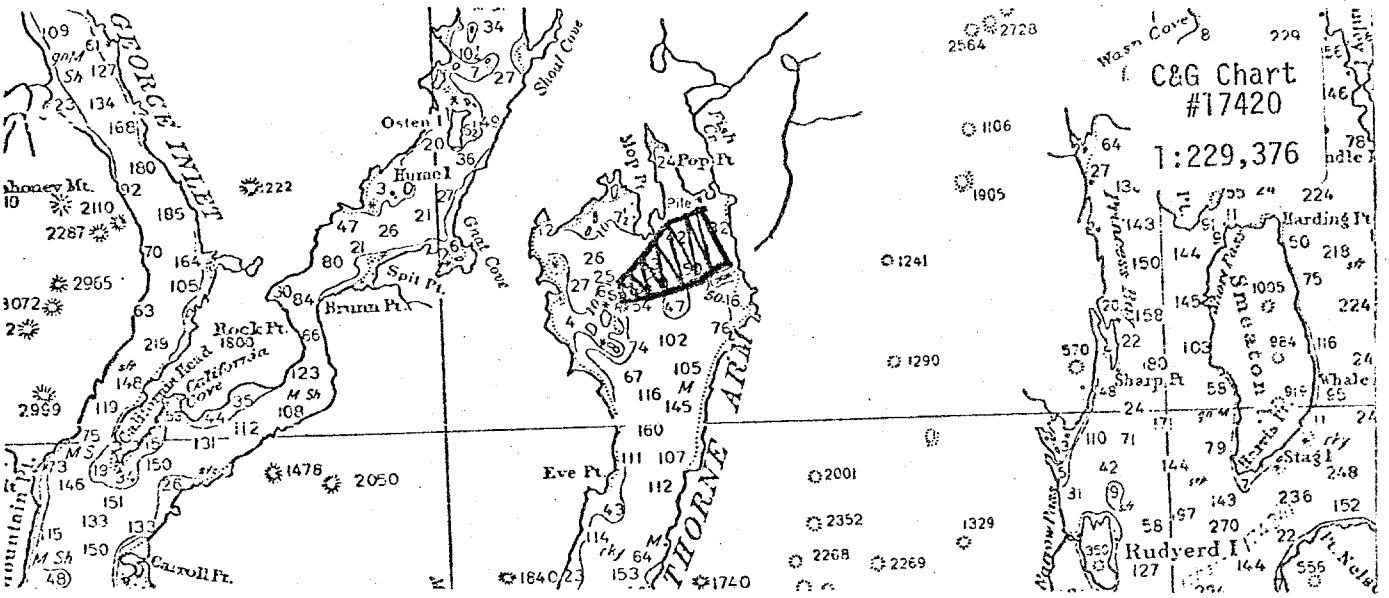
## ACOUSTICAL SURVEY SUMMARY

Area Thorne Arm Date 11/19/78 Vessel Sundance Run # 1

Gain 5.3 Attenuated -12 dB Operators Street

Time of Survey: Start 12:54 End 13:49 Tide

COMMENTS: The survey area covered all fish observed in the area. Vessel speed was 10 knots.

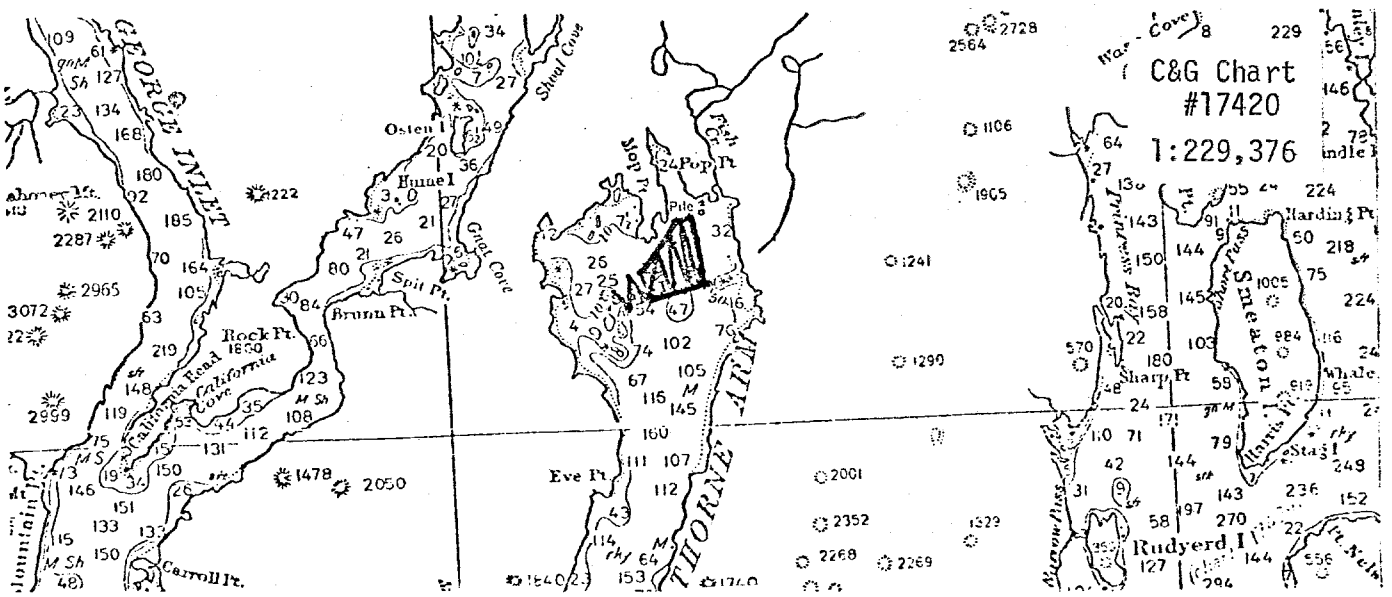



Area Thorne Arm Date 11/19/78 Vessel Sundance Run # 2

Gain 4.8 Attenuated -12 dB Operators Street

Time of Survey: Start 14:03 End 14:34 Tide

COMMENTS: Vessel speed was 10 knots.



Appendix 1 continued.

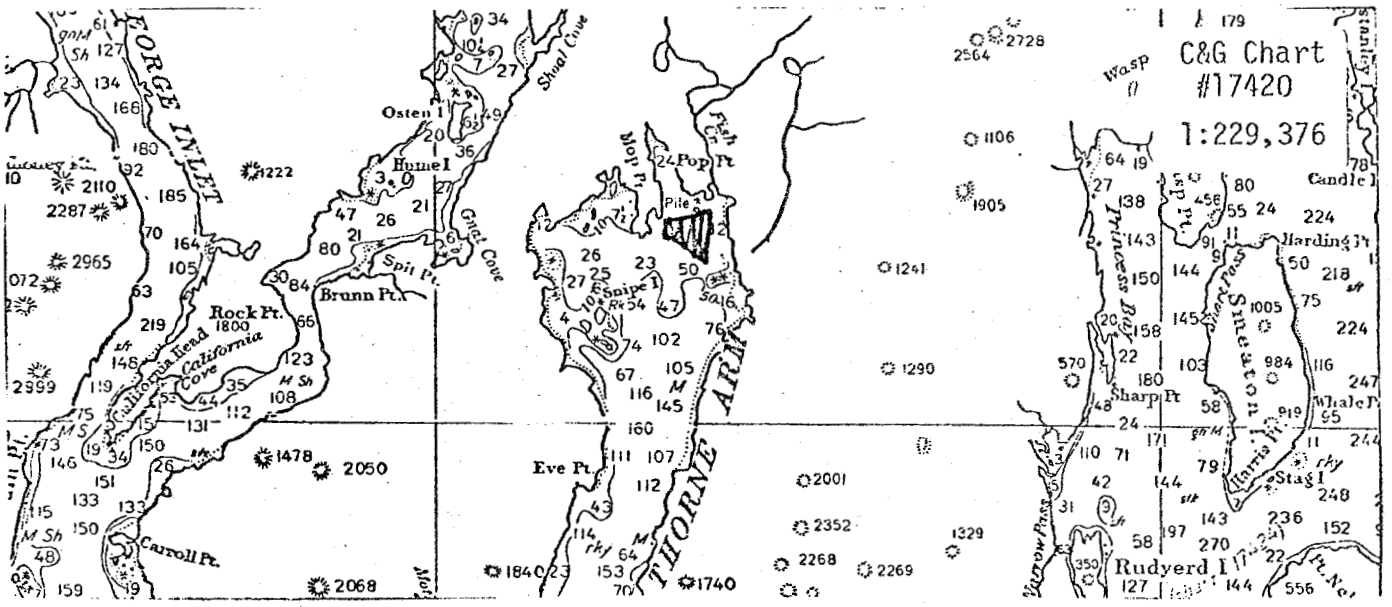
## ACOUSTICAL SURVEY SUMMARY

Area Thorne Arm Date 10/23/79 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12dB Operators Street

Time of Survey: Start 15:29 End 16:08 Tide

COMMENTS: There is a small amount of herring in the survey area. Vessel speed was 8 knots.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

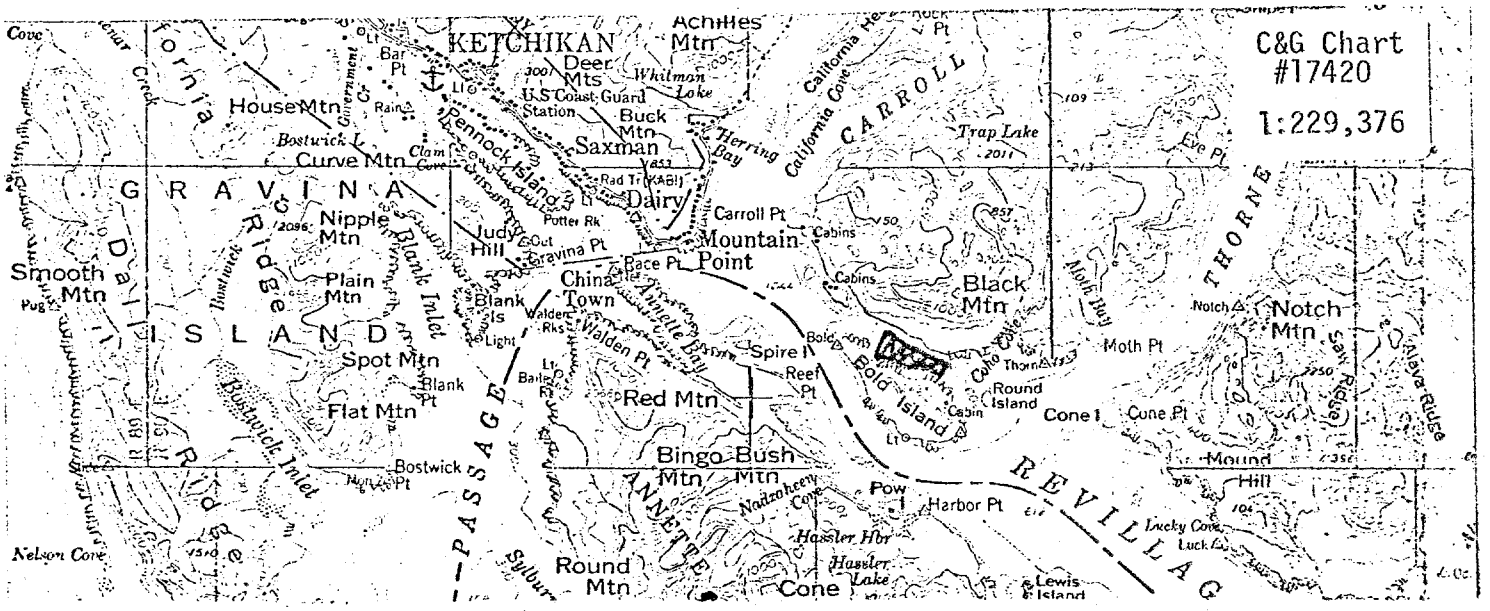
## ACOUSTICAL SURVEY SUMMARY

Area Bold Island Date 12/15/78 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12 dB Operators DeJong, Francisco

Time of Survey: Start 09:45 End 10:17 Tide

COMMENTS:




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

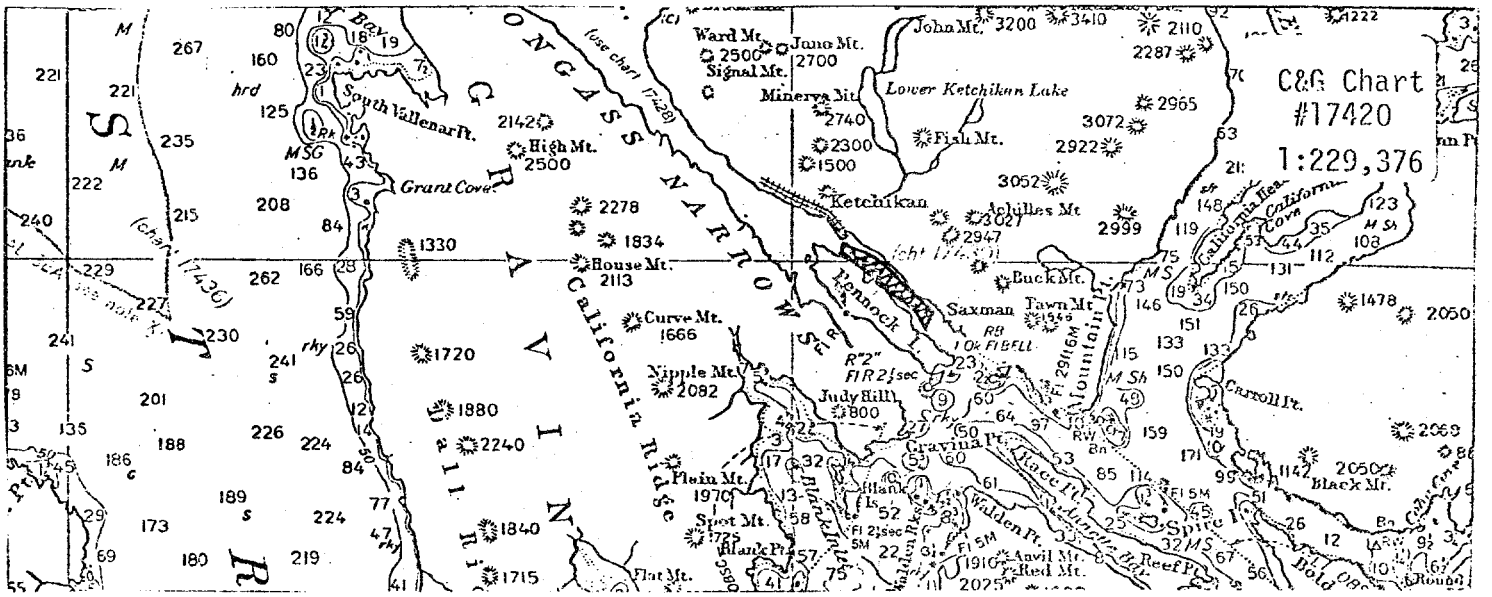
## ACOUSTICAL SURVEY SUMMARY

Area Tongass Narrows Date 10/19/77 Vessel Auklet Run # 1

Gain 6.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 15:07 End 15:41 Tide

COMMENTS: Herring scattered in small schools. Herring also laying next to Pennock Island shore with some missed on run. No saturation observed. 7.5 knot speed.

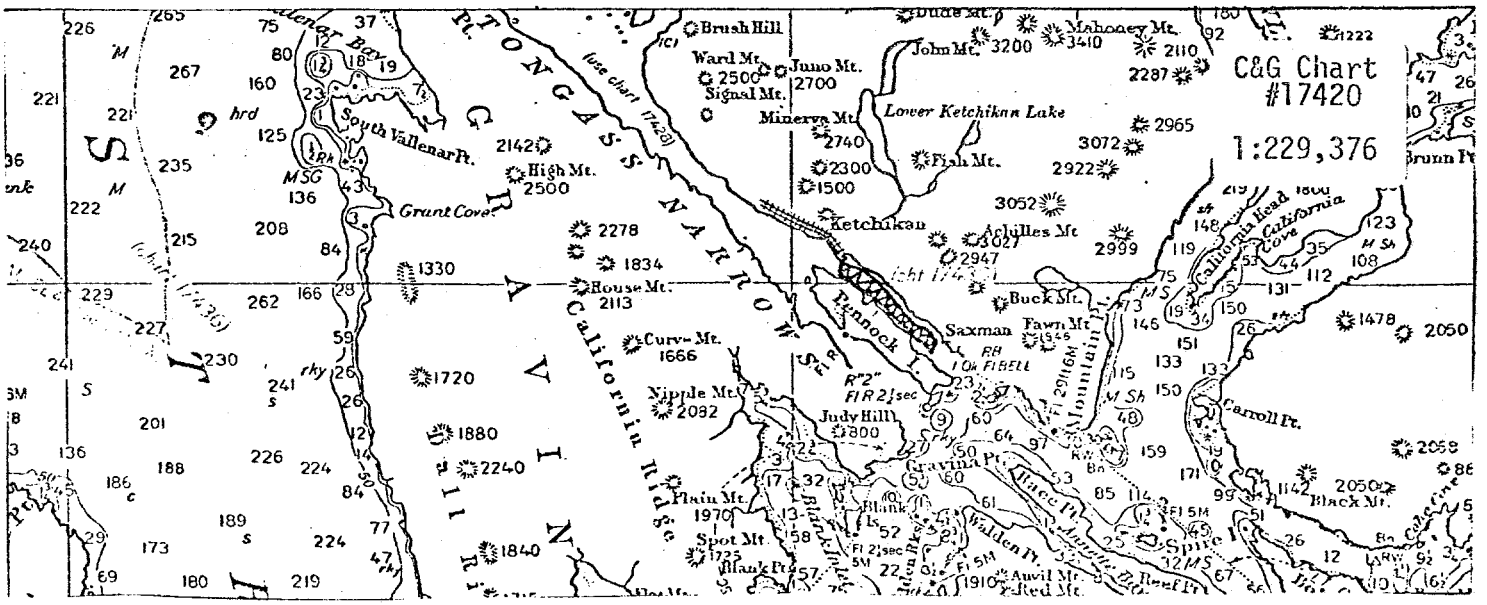



Area Tongass Narrows Date 10/19/77 Vessel Auklet Run # 2

Gain 6.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 15:41 End 16:23 Tide

COMMENTS: This was a reverse of Run #1. 6 knot speed.



Appendix 1 continued.

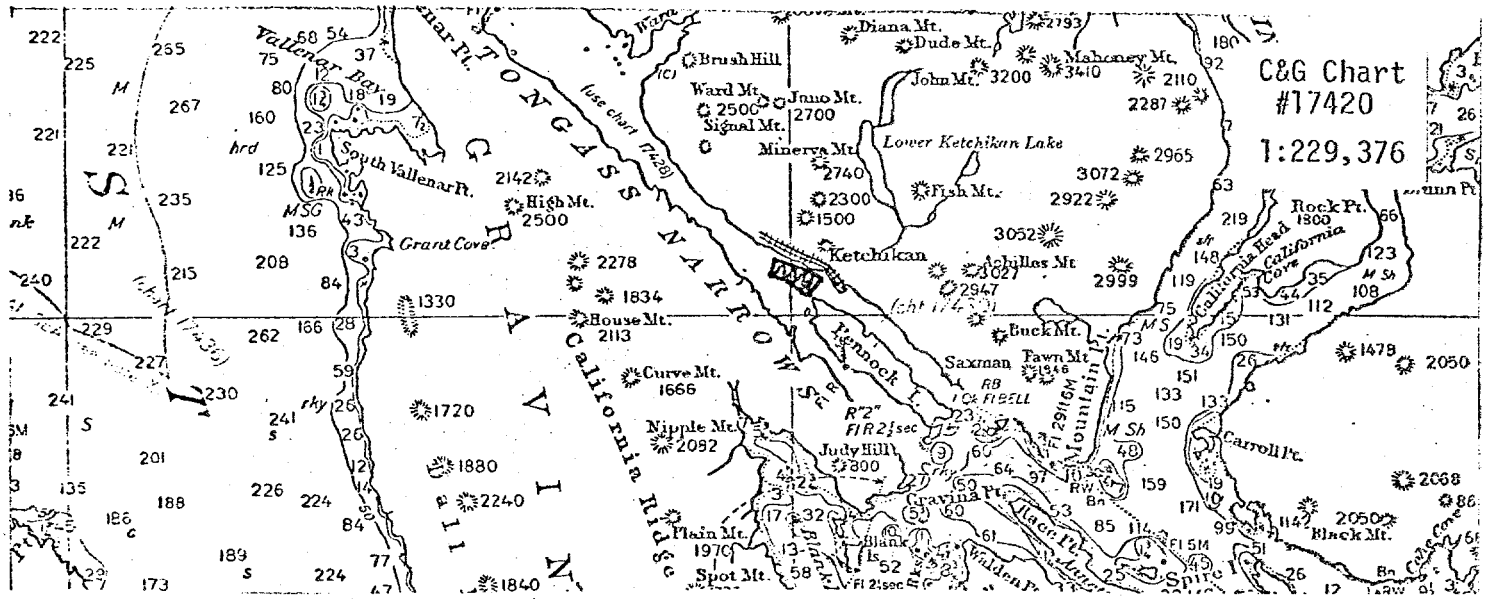
## ACOUSTICAL SURVEY SUMMARY

Area Tongass Narrows Date 11/20/78 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12 dB Operators Street

Time of Survey: Start 1537:30 End 15:59 Tide

COMMENTS: Moving schools avoided vessel.

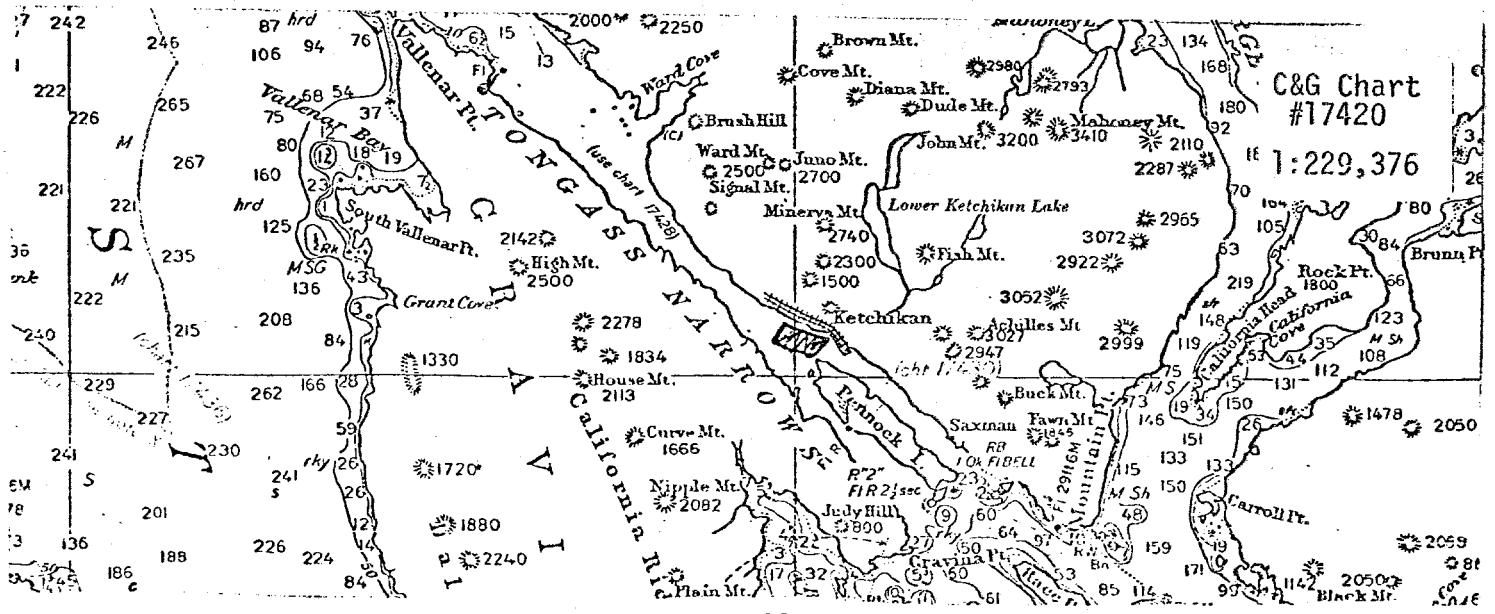



Area Tongass Narrows Date 11/20/78 Vessel Sundance Run # 2

Gain 4.7 Attenuated -12 dB Operators Street

Time of Survey: Start 16:04 End 16:26 Tide

COMMENTS: Moving schools avoided vessel.



Appendix 1 continued.

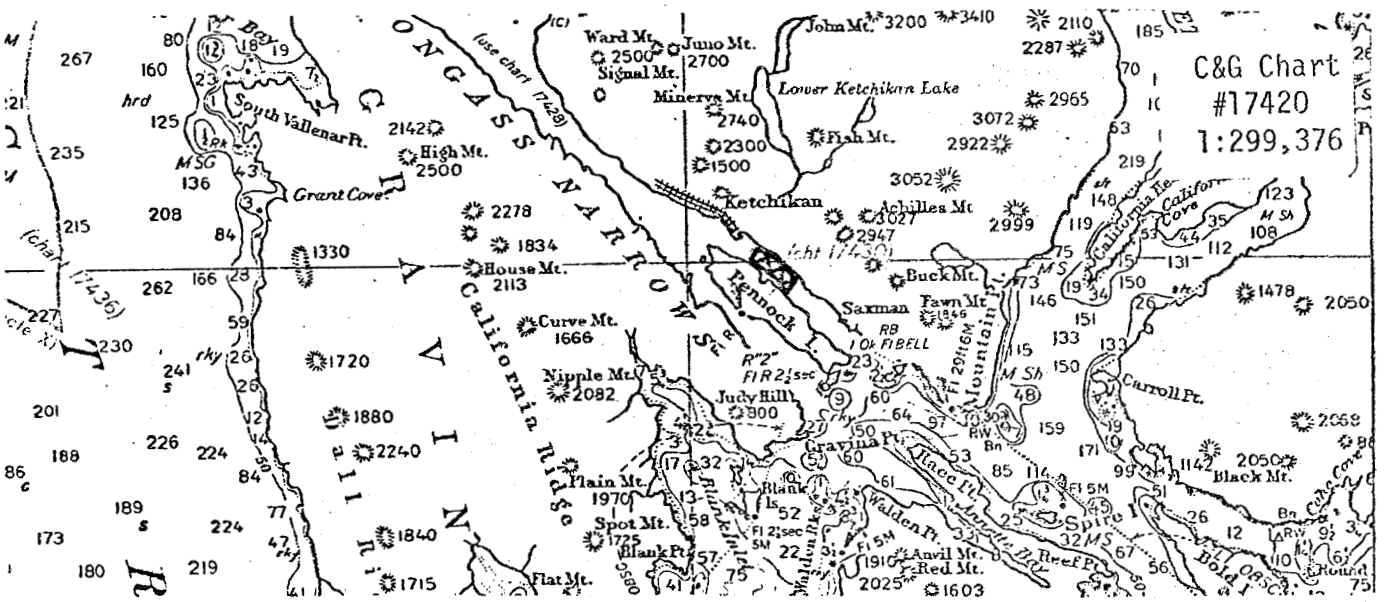
## ACOUSTICAL SURVEY SUMMARY

Area Tongass Narrows Date 10/19/79 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12dB Operators Street

Time of Survey: Start 1417:05 End 1431:50 Tide

COMMENTS: A small amount of herring in survey area, shallow in depth, some saturation. Vessel speed was 8 knots.

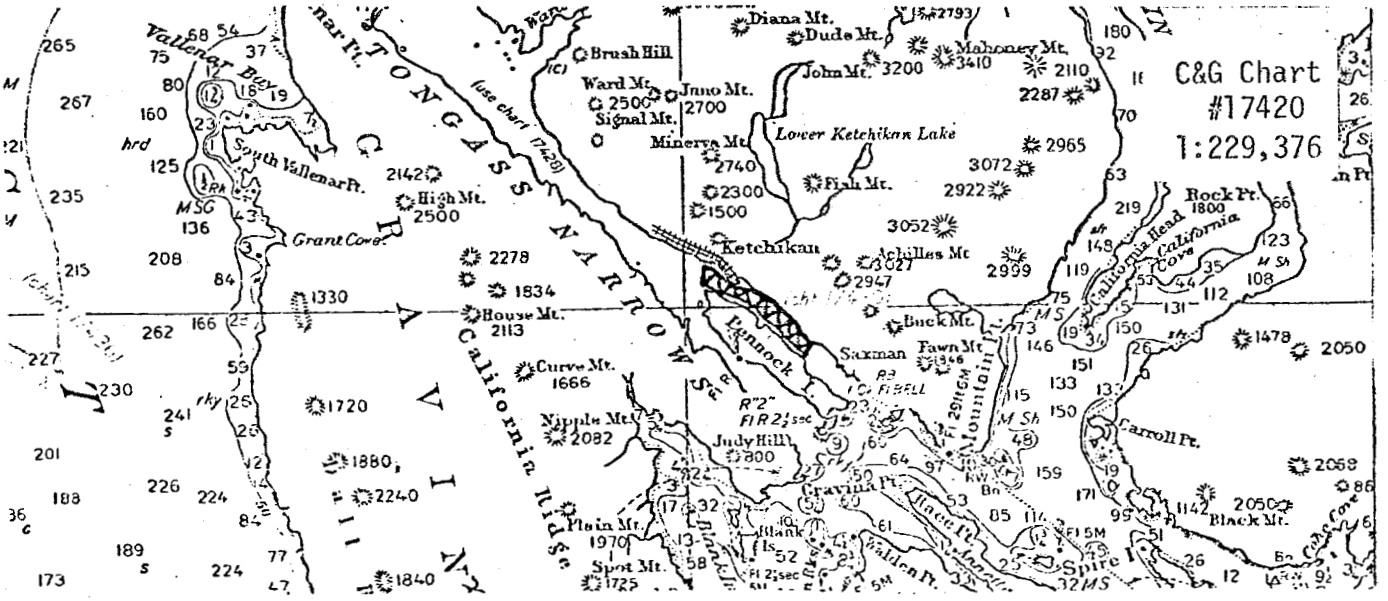



Area Tongass Narrows Date 11/6/79 Vessel Sundance Run # 1

Gain 2.5 Attenuated -12dB Operators Street

Time of Survey: Start 1057:20 End 1140:30 Tide

COMMENTS: Majority of herring between 10 and 20 fathoms in depth.



Appendix 1 continued.

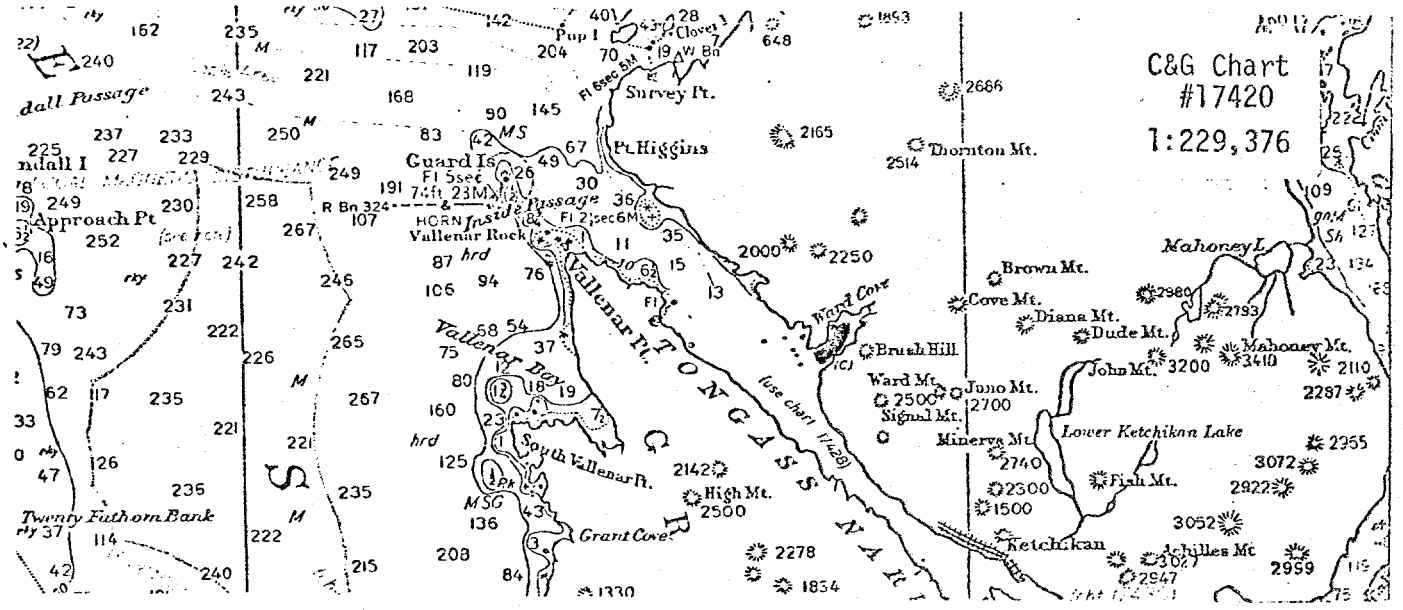
## ACOUSTICAL SURVEY SUMMARY

Area Ward Cove Date 11/21/78 Vessel Sundance Run # 1

Gain 4.5 Attenuated -12 dB Operators Street, DeJong

Time of Survey: Start 15:19 End 15:43 Tide

COMMENTS: Not a comprehensive survey, schools were avoiding vessel. Vessel speed was 10 knots.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

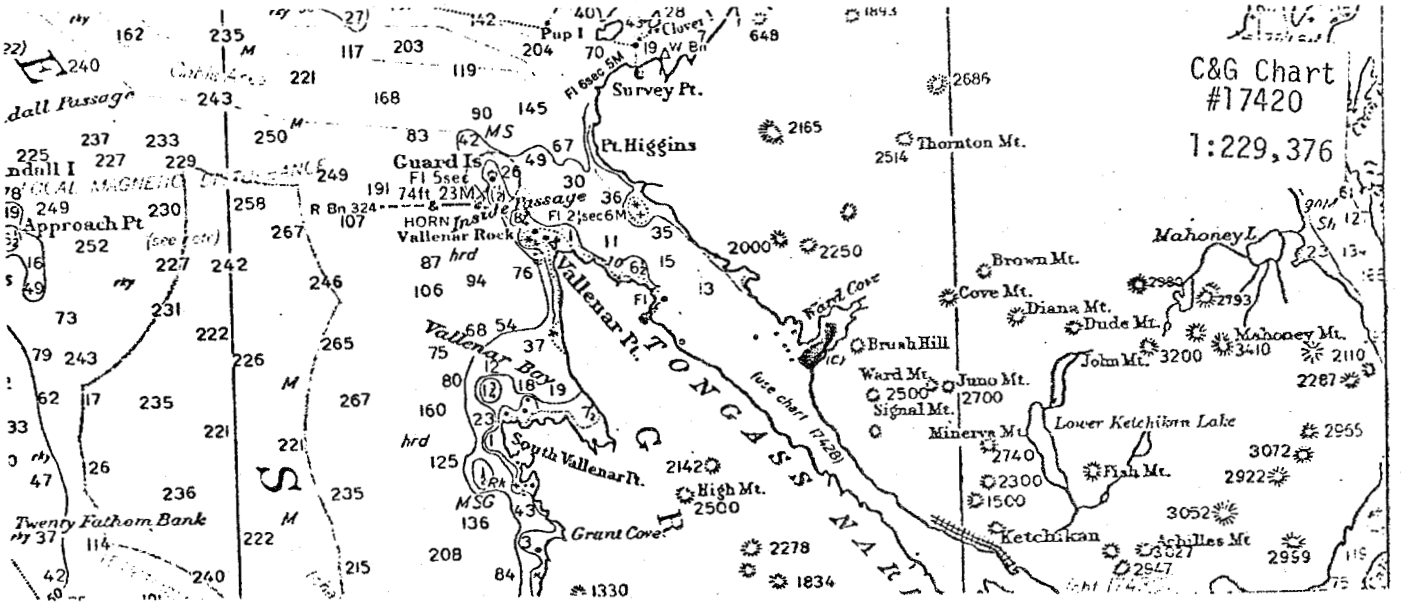
## ACOUSTICAL SURVEY SUMMARY

Area Ward Cove Date 10/19/79 Vessel Sundance Run # 1

Gain 1.5 Attenuated -12dB Operators Street

Time of Survey: Start 1136:20 End 1204:05 Tide

COMMENTS: Small steady voltages throughout survey. A large amount of herring outside area and on bottom. Vessel speed was 5 knots.

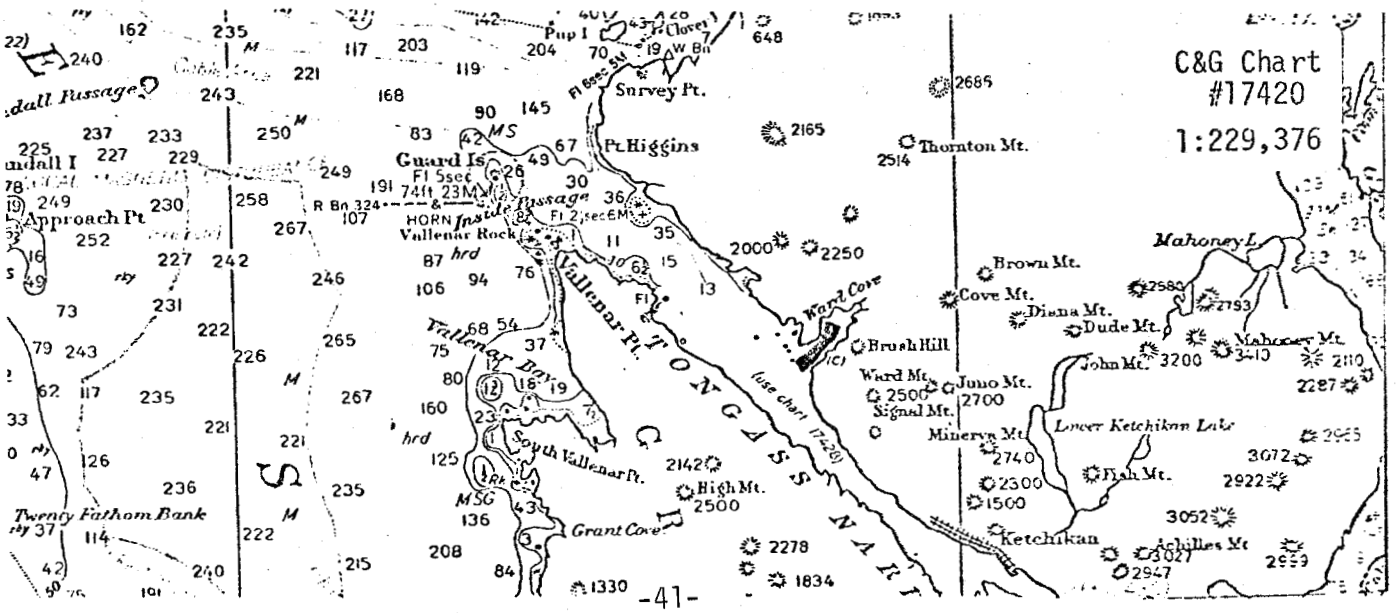



Area Ward Cove Date 10/19/79 Vessel Sundance Run # 2

Gain 1.8 Attenuated -12dB Operators Street

Time of Survey: Start 1211:30 End 1237:35 Tide

COMMENTS: Small steady voltages throughout survey. Herring appear to be moving into the cove and to the bottom with the flooding tide. Run #1 is a better survey of the herring in the area.



Appendix 1 continued.

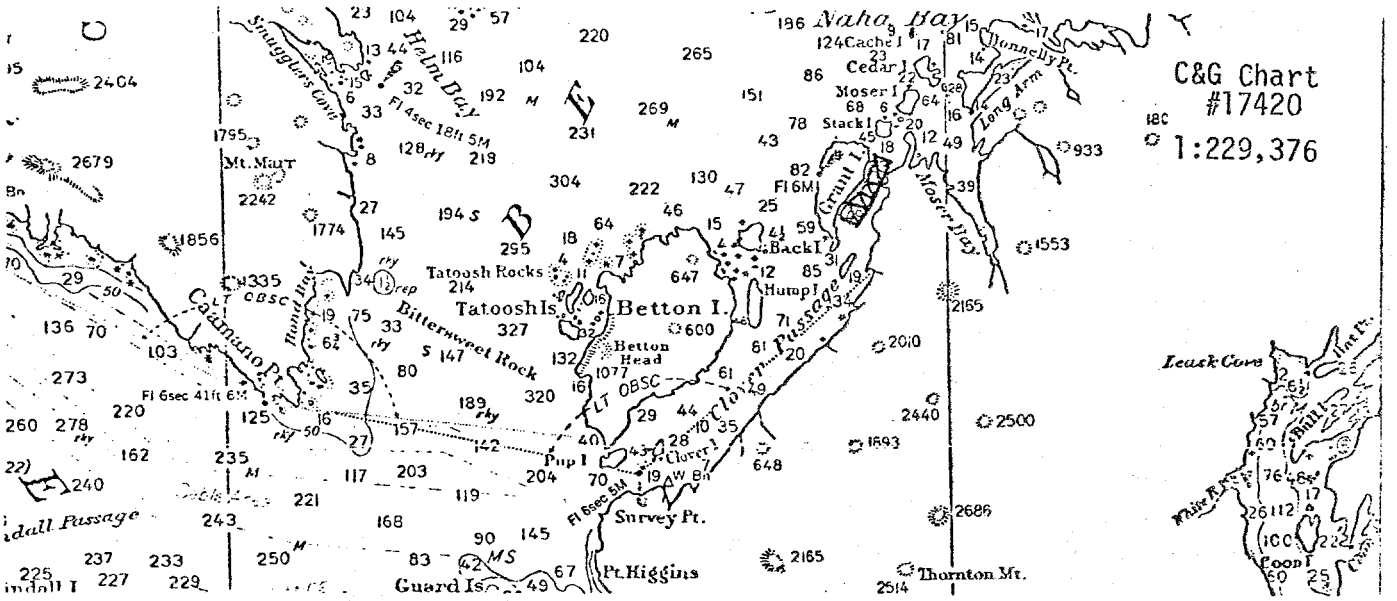
## ACOUSTICAL SURVEY SUMMARY

Area Clover Pass, Grant Island  Date 1/18/79  Vessel Sundance  Run # 1

Gain 3.5  Attenuated -12 dB  Operators Street

Time of Survey: Start 11:39  End 1151:15  Tide

COMMENTS: Vessel speed was 7 knots. Approximately 400 glaucous gulls and 200 murres on surface.

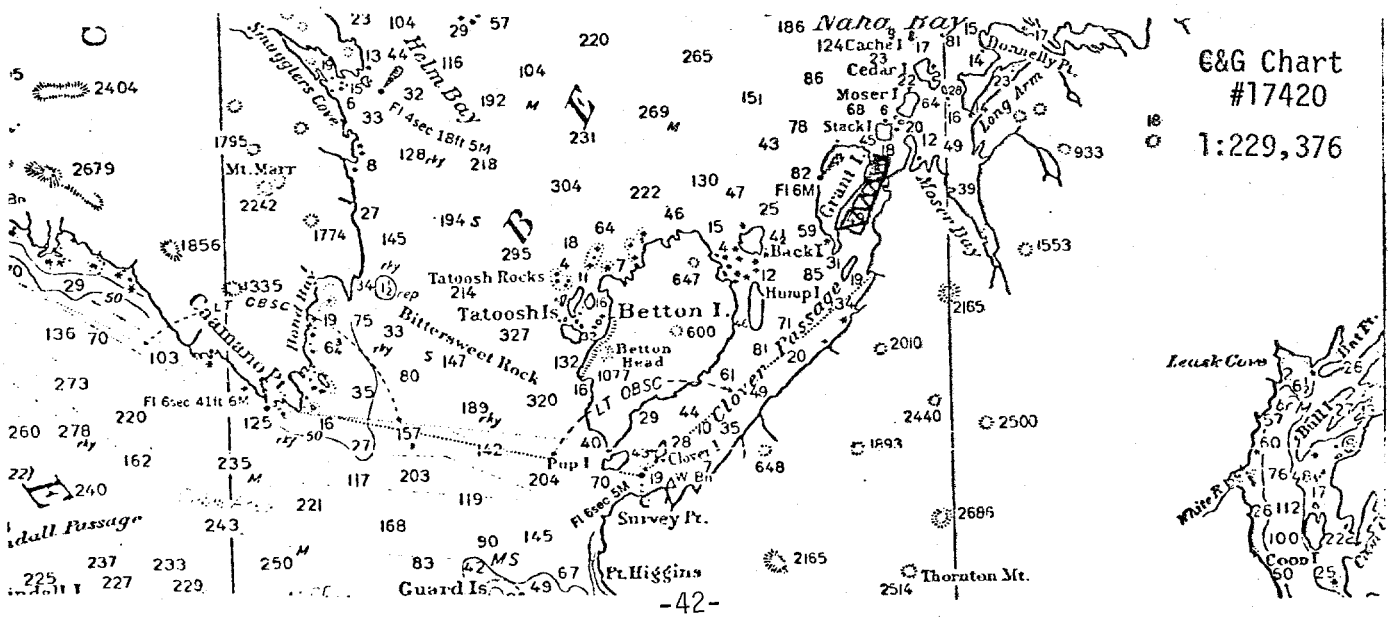



Area Clover Pass, Grant Island  Date 1/18/79  Vessel Sundance  Run # 2

Gain 3.5  Attenuated -12 dB  Operators Street

Time of Survey: Start 11:54  End 12:10  Tide

COMMENTS: Vessel speed was 7 knots.



Appendix 1 continued.

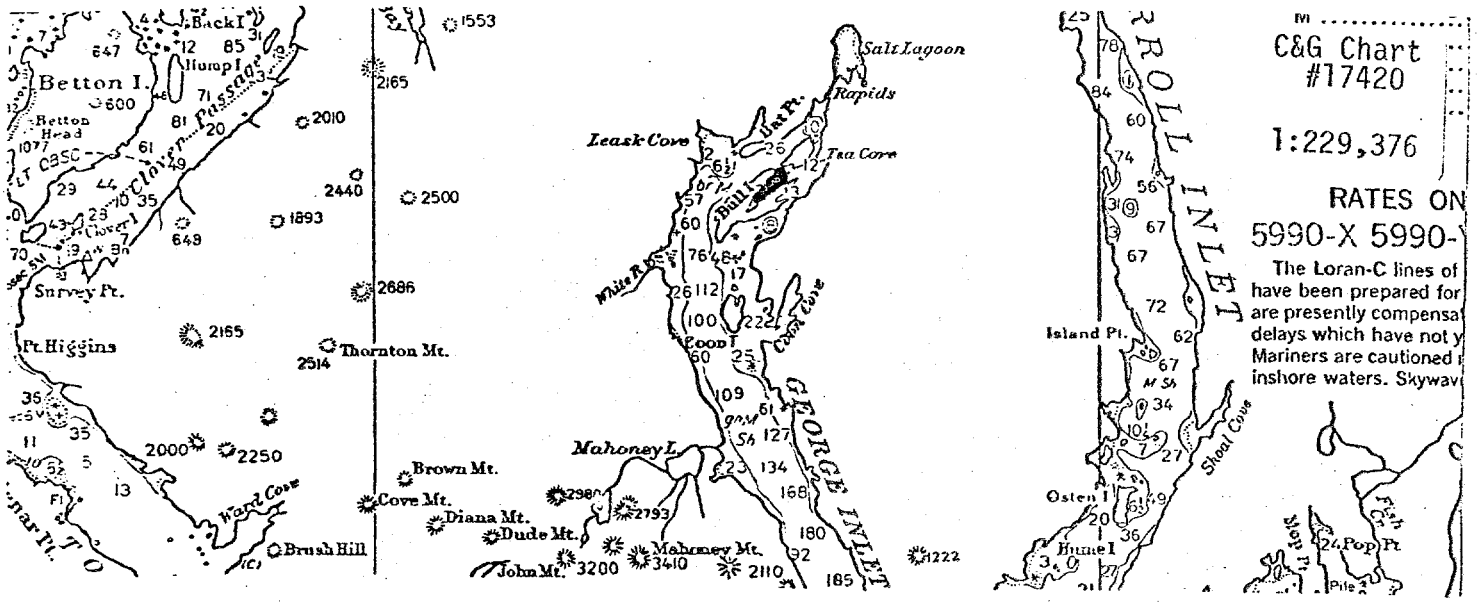
## ACOUSTICAL SURVEY SUMMARY

Area George Inlet Date 11/7/78 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12 dB Operators Street, DeJong

Time of Survey: Start 1714:30 End 17:26 Tide

COMMENTS: Vessel speed was approximately 6 knots. This is a small, difficult survey area. Great numbers of 2" and 5" herring observed at night.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

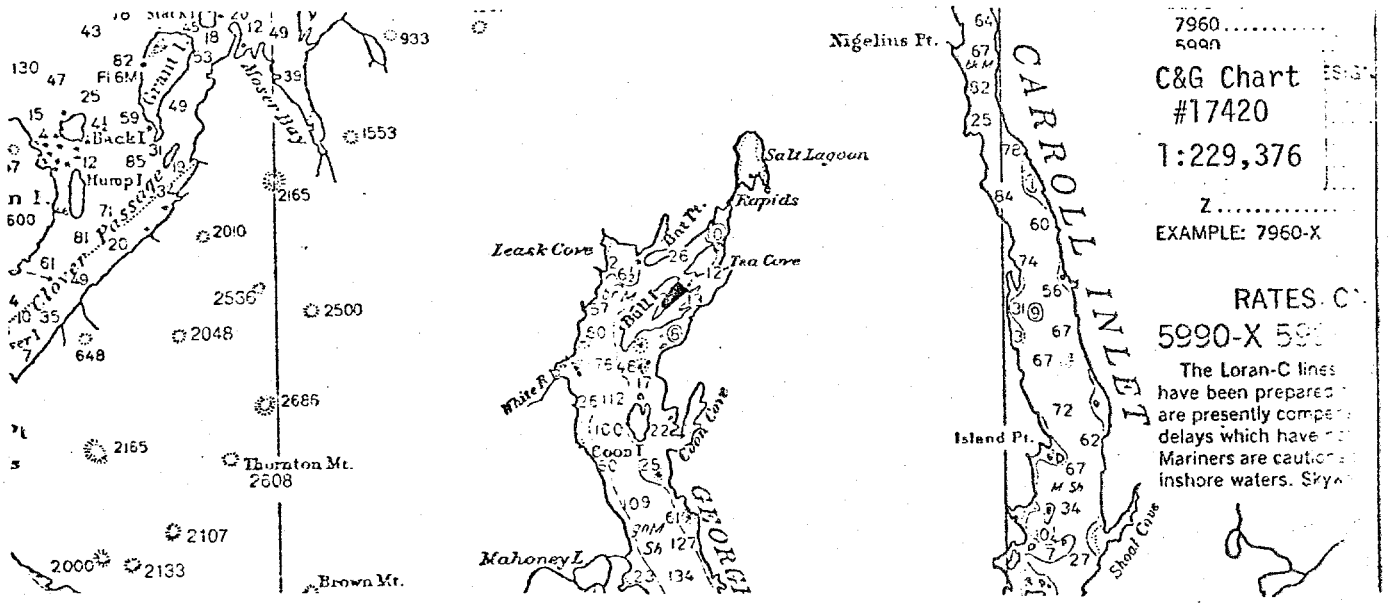
## ACOUSTICAL SURVEY SUMMARY

Area Bull Island Date 10/24/79 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12dB Operators Street

Time of Survey: Start 1109:35 End 1119:35 Tide

COMMENTS: This is a small difficult area to survey. There is herring along the bottom and slight saturation on shallow water schools. Vessel speed was 4 knots.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

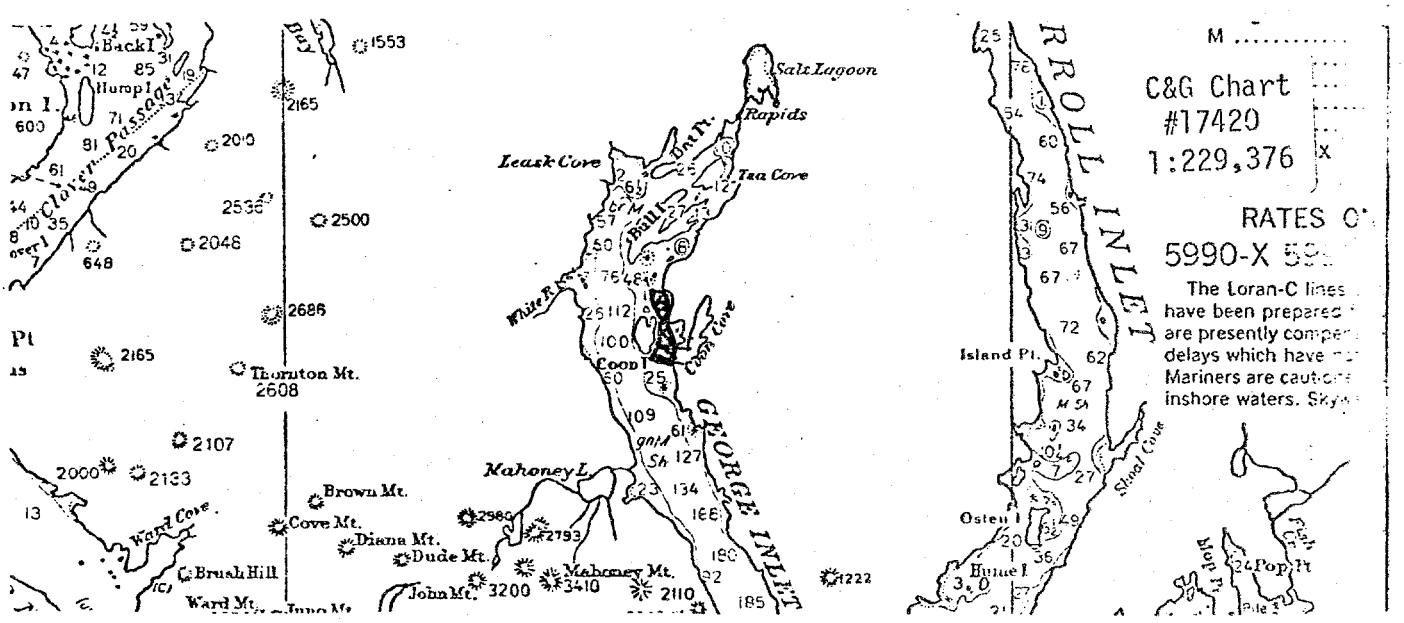
## ACOUSTICAL SURVEY SUMMARY

Area Coon Island Date 10/24/79 Vessel Sundance Run # 1

Gain 4.8 Attenuated -12dB Operators Street

Time of Survey: Start 0939:35 End 1006:45 Tide

COMMENTS: Herring were schooled in several different density distributions. There was some saturation from the denser schools. Vessel spped was 6 knots.

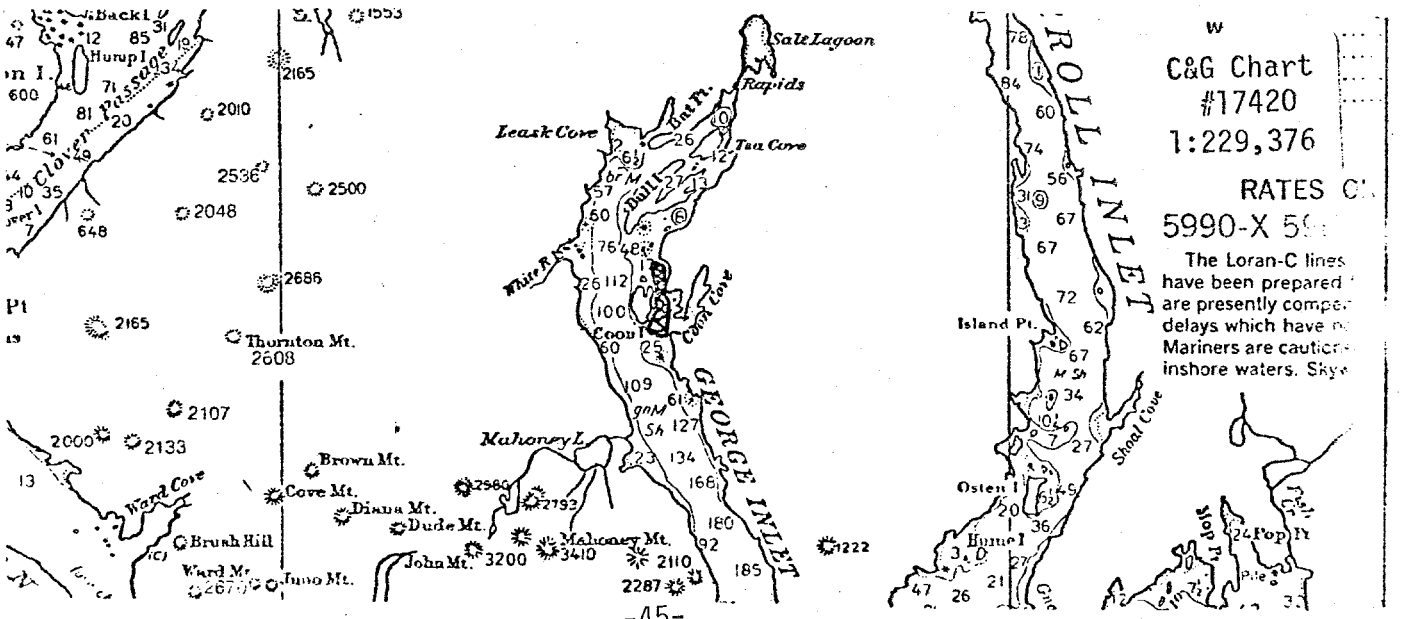



Area Coon Island Date 10/24/79 Vessel Sundance Run # 2

Gain 4.5 Attenuated -12dB Operators Street

Time of Survey: Start 1248:40 End 1314:00 Tide

COMMENTS: The herring have descended in the water column since Run #1. There appears to be less herring in the area than in Run #1. Vessel speed was 6 knots.



Appendix 1 continued.

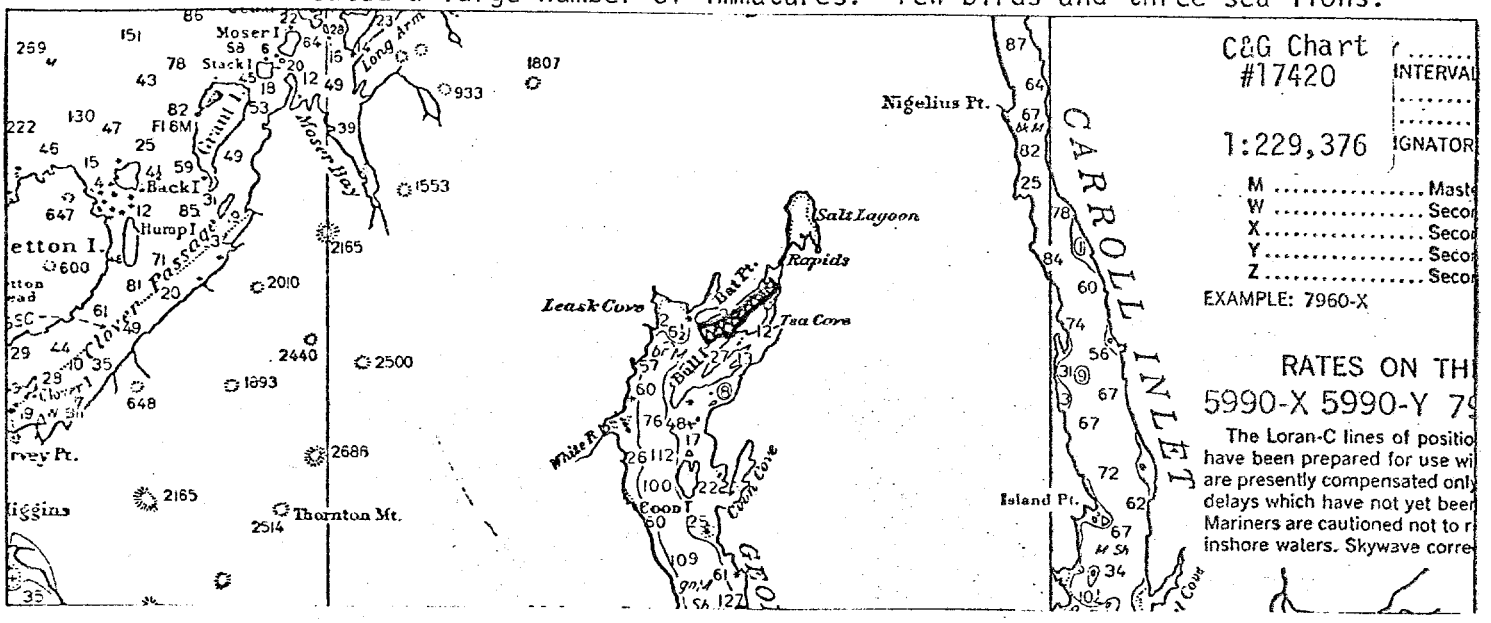
## ACOUSTICAL SURVEY SUMMARY

Area George Inlet Date 1/13/79 Vessel Sundance Run # 1

Gain 6.0 Attenuated -12 dB Operators Blankenbeckler, DeJong

Time of Survey: Start 15:20 End 16:04 Tide Large tides

COMMENTS: Herring distributed in scattered small schools with varied densities. Saturation occurred on several of the smaller schools. Seine sampling indicated a large number of immatures. Few birds and three sea lions.

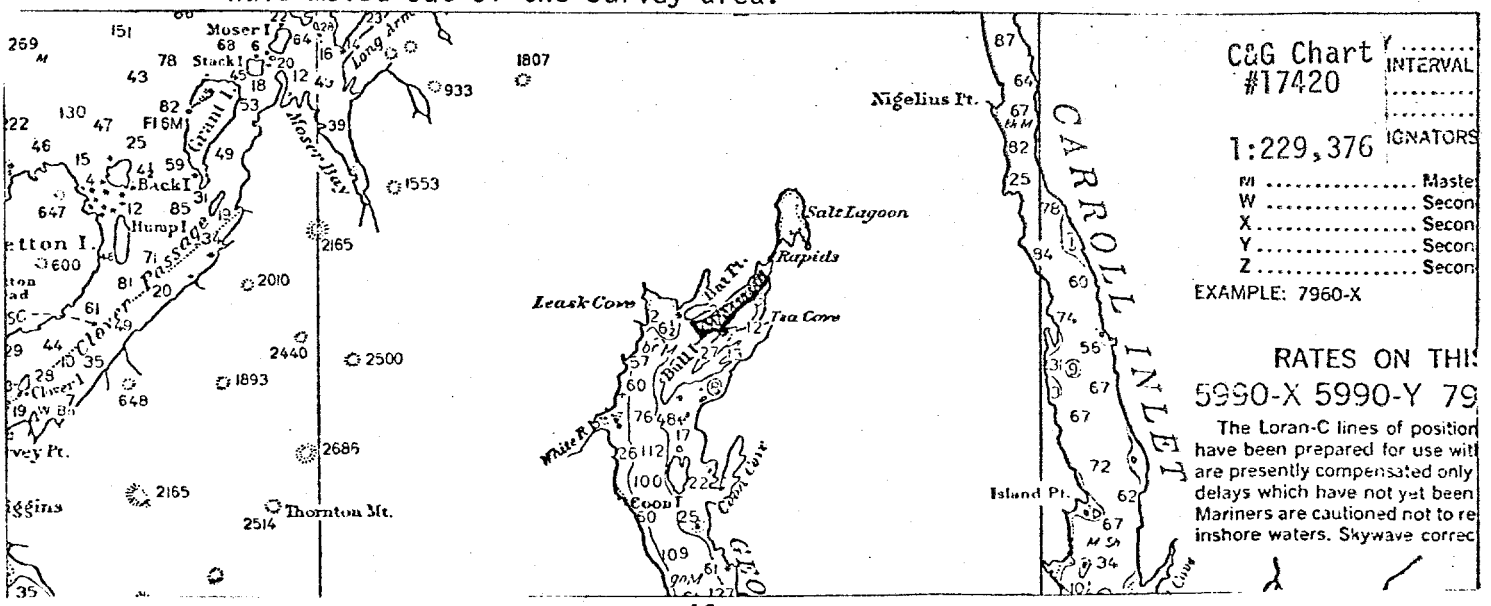



Area George Inlet Date 1/13/79 Vessel Sundance Run # 2

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler, DeJong

Time of Survey: Start 16:15 End 16:55 Tide Large tides

COMMENTS: Survey pattern the same as Run #1. Only slight saturation. Some fish have moved out of the survey area.



Appendix 1 continued.

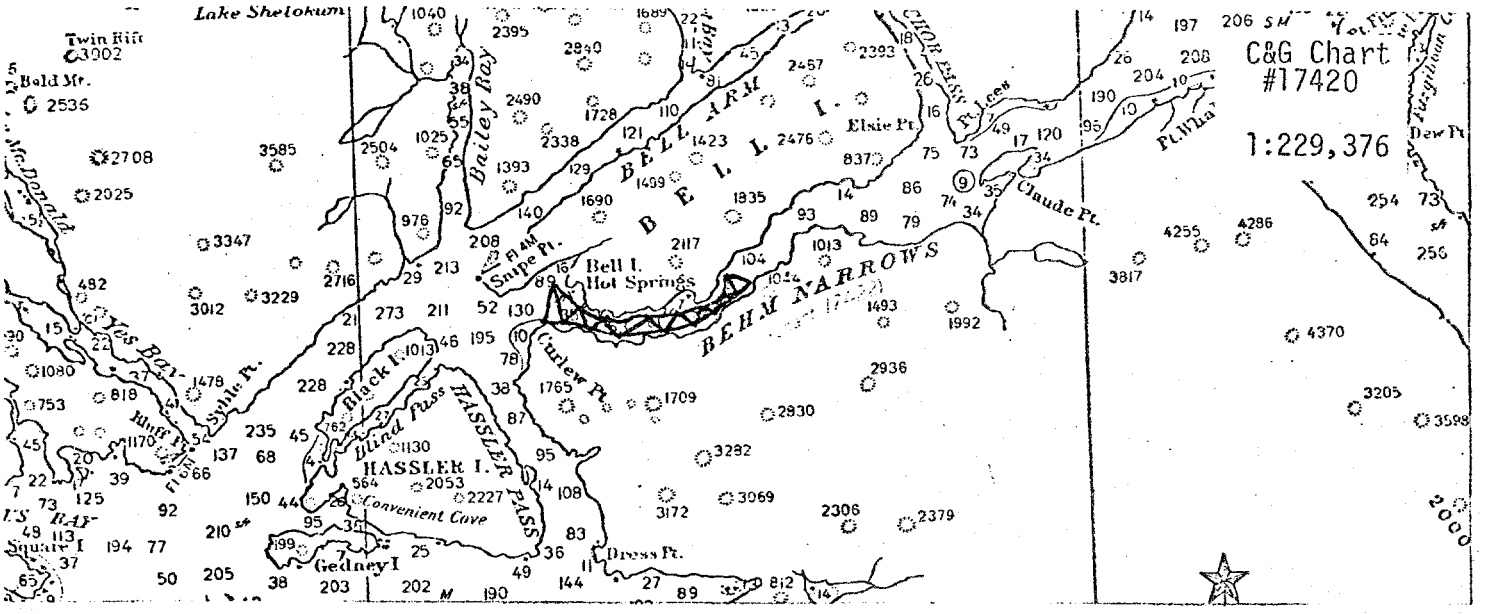
## ACOUSTICAL SURVEY SUMMARY

Area Behm Narrows Date 10/20/78 Vessel Steller Run # 2

Gain 5 Attenuated -20 dB Operators Street

Time of Survey: Start 12:44 End 13:15 Tide

COMMENTS: There is much saturation.

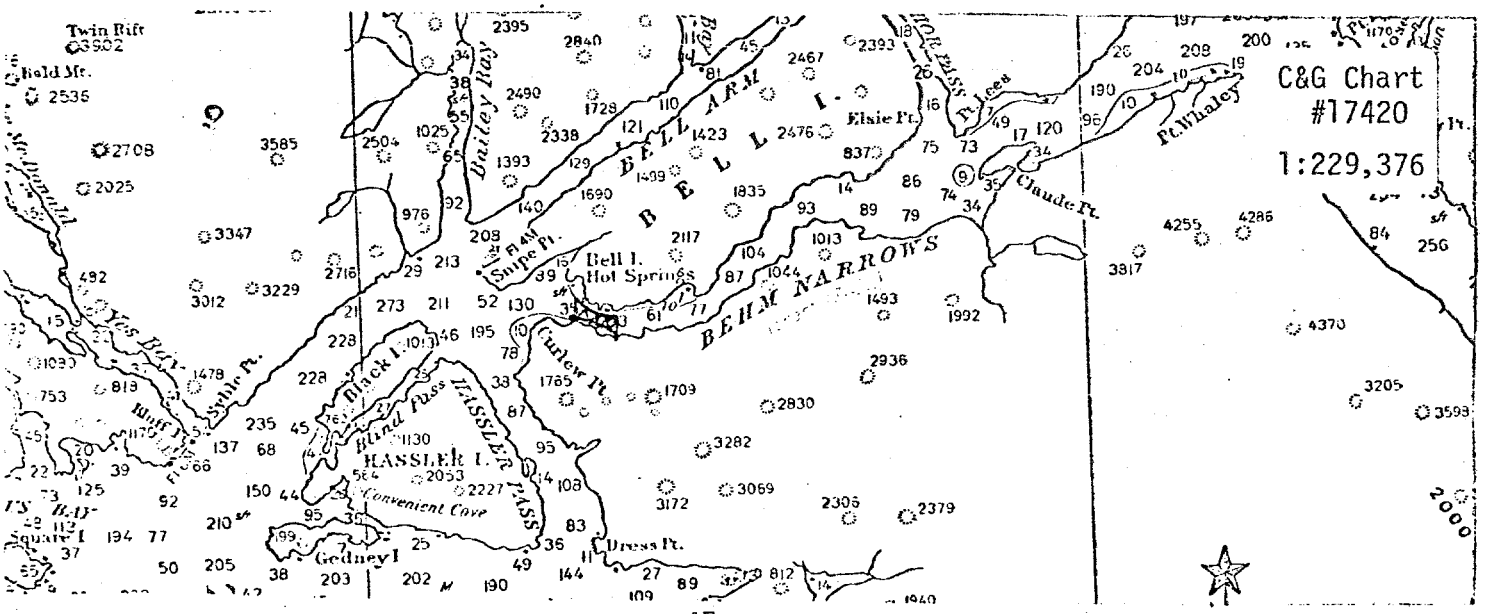



Area Behm Narrows Date 1/20/79 Vessel Sundance Run # 1

Gain 4.5 Attenuated -12 dB Operators Street

Time of Survey: Start 0922:30 End 0931:20 Tide

COMMENTS: Vessel speed 9 knots.



Appendix 1 continued.

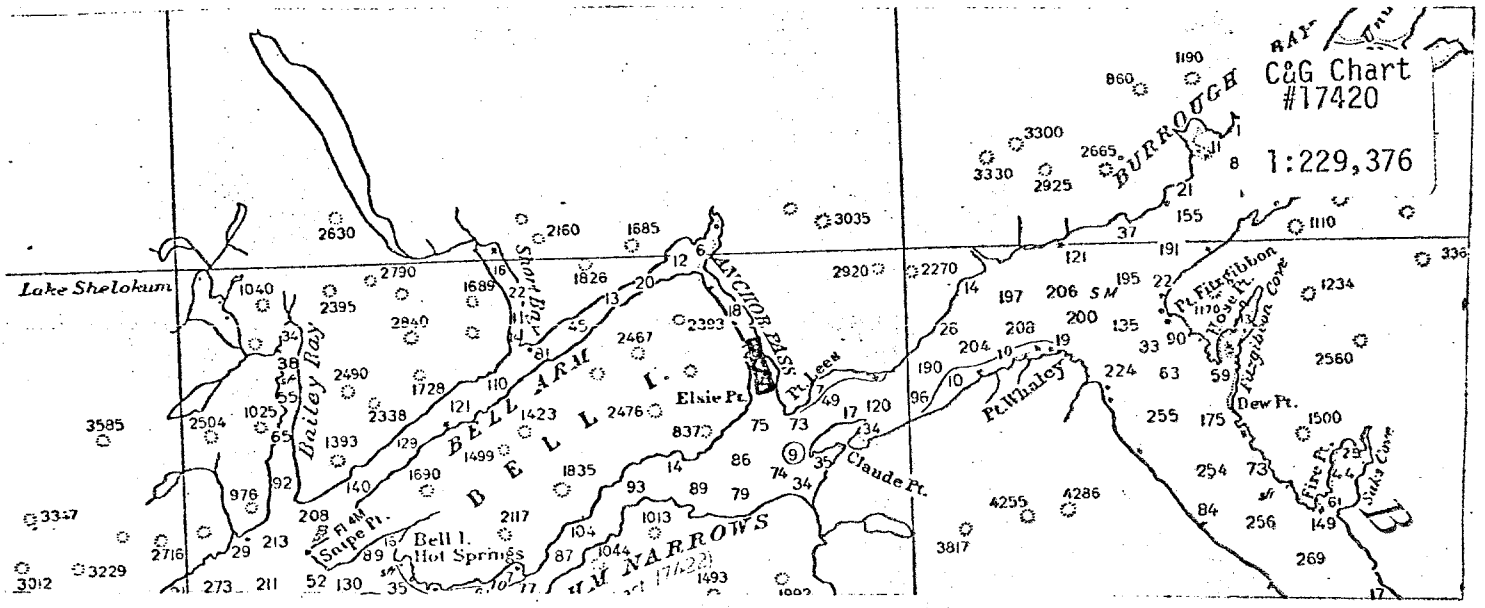
## ACOUSTICAL SURVEY SUMMARY

Area Anchor Pass Date 10/20/78 Vessel Steller Run # 1

Gain 3 Attenuated -12 dB Operators Street

Time of Survey: Start 11:24 End 11:37 Tide

COMMENTS: There is little saturation on the tape.

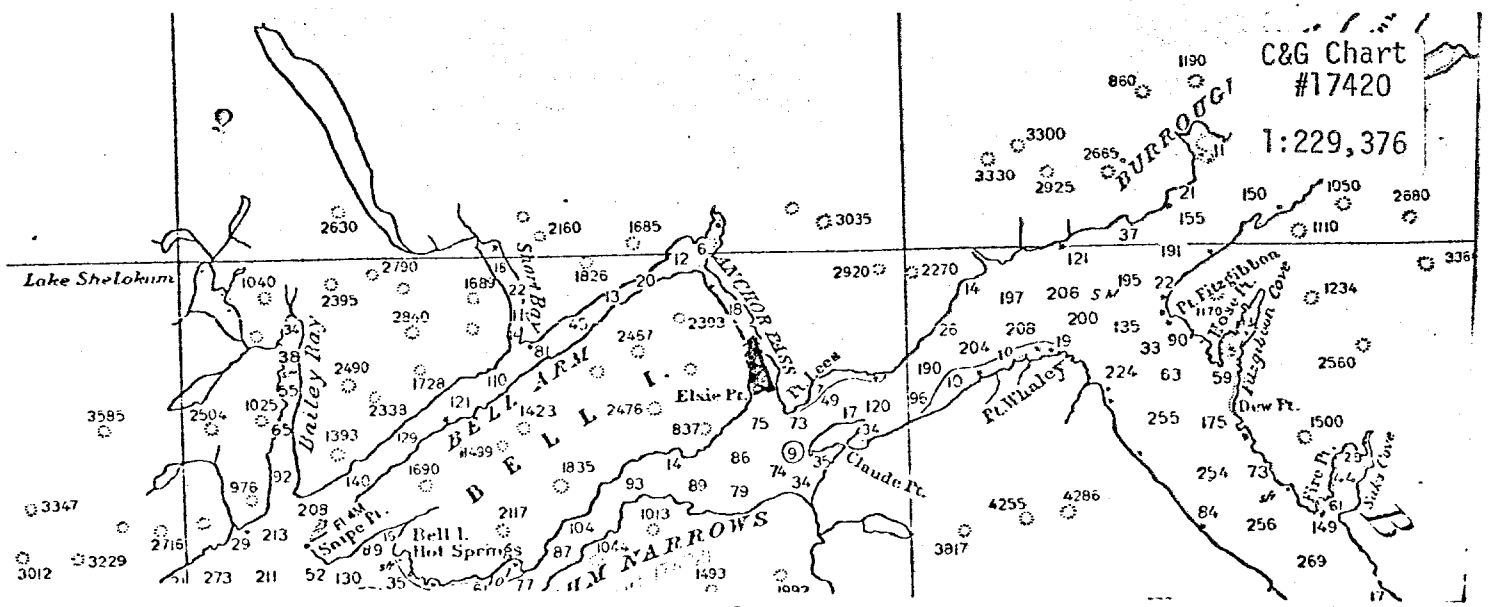



Area Anchor Pass Date 10/20/78 Vessel Steller Run # 2

Gain 2 Attenuated -12 dB Operators Street

Time of Survey: Start 11:37 End 11:45 Tide

COMMENTS: There is little saturation on the tape.



Appendix 1 continued.

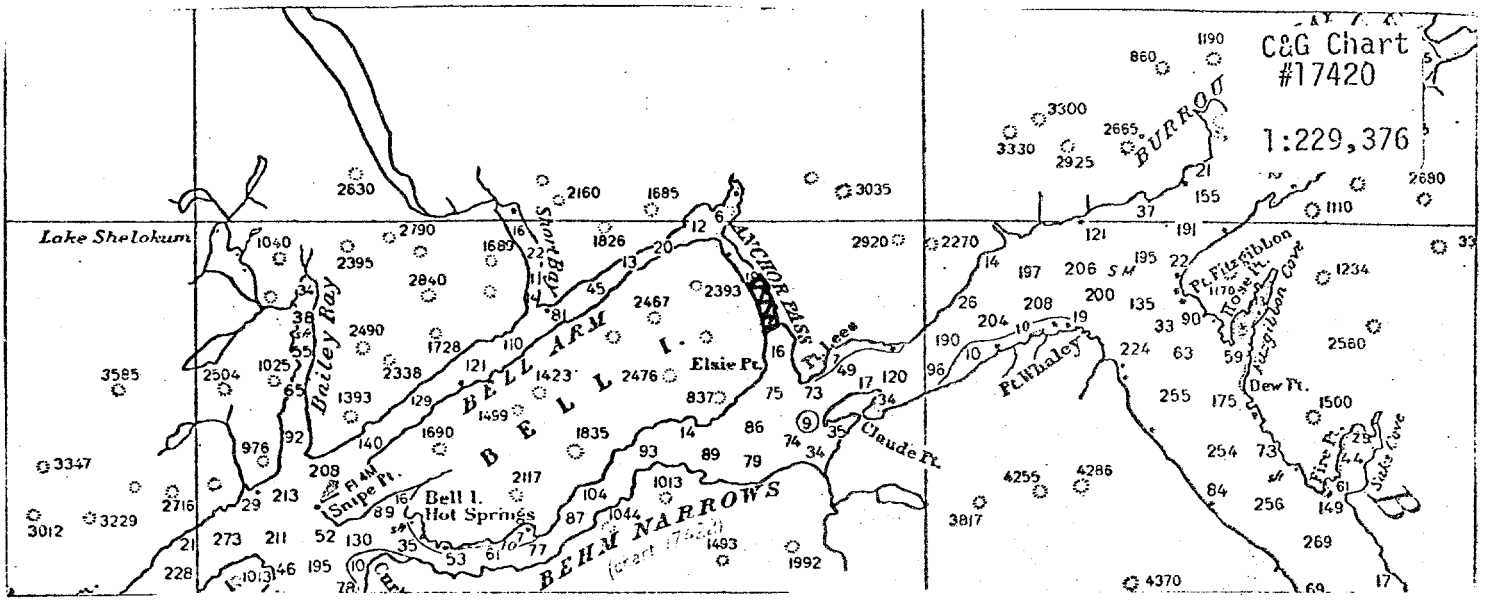
## ACOUSTICAL SURVEY SUMMARY

Area Anchor Pass Date 1/30/78 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12 dB Operators DeJong, Francisco

Time of Survey: Start 18:29 End 18:42 Tide

COMMENTS: Small spikes of saturation. No birds noted in area.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

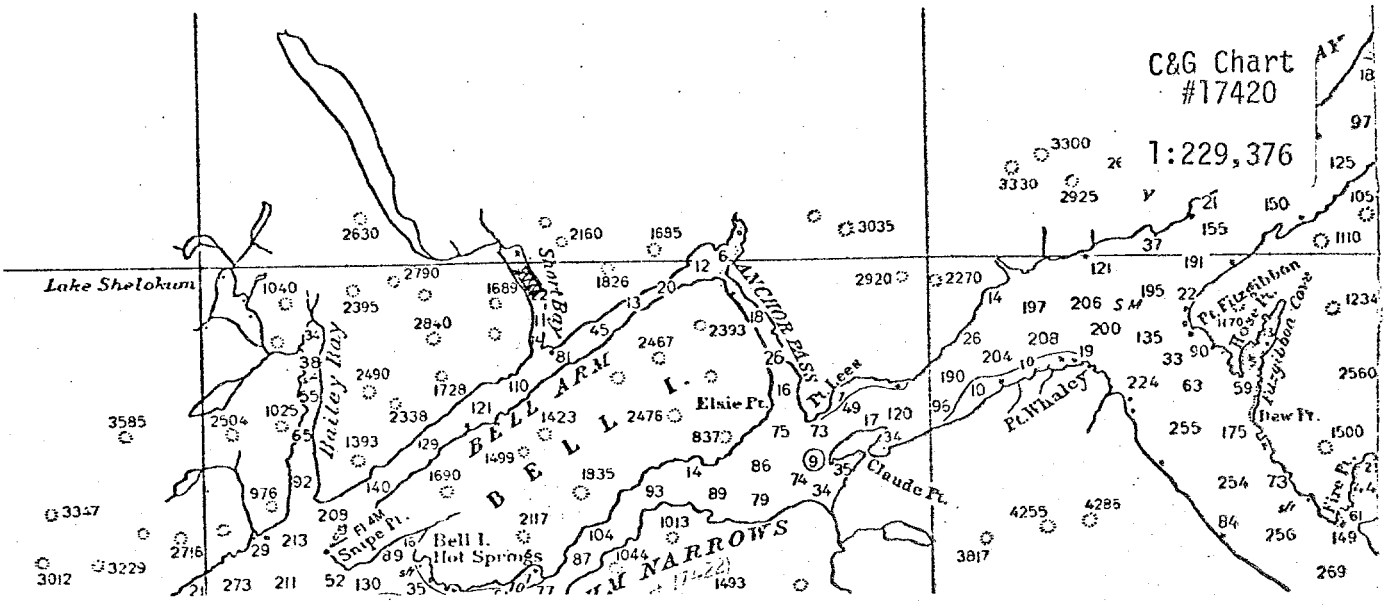
## ACOUSTICAL SURVEY SUMMARY

Area Short Bay Date 12/1/78 Vessel Steller Run # 1

Gain 5 Attenuated -12 dB Operators Street

Time of Survey: Start 1551:15 End 1602:45 Tide

COMMENTS: Vessel speed was 7 knots. Immature fish were observed (<5 inches).




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

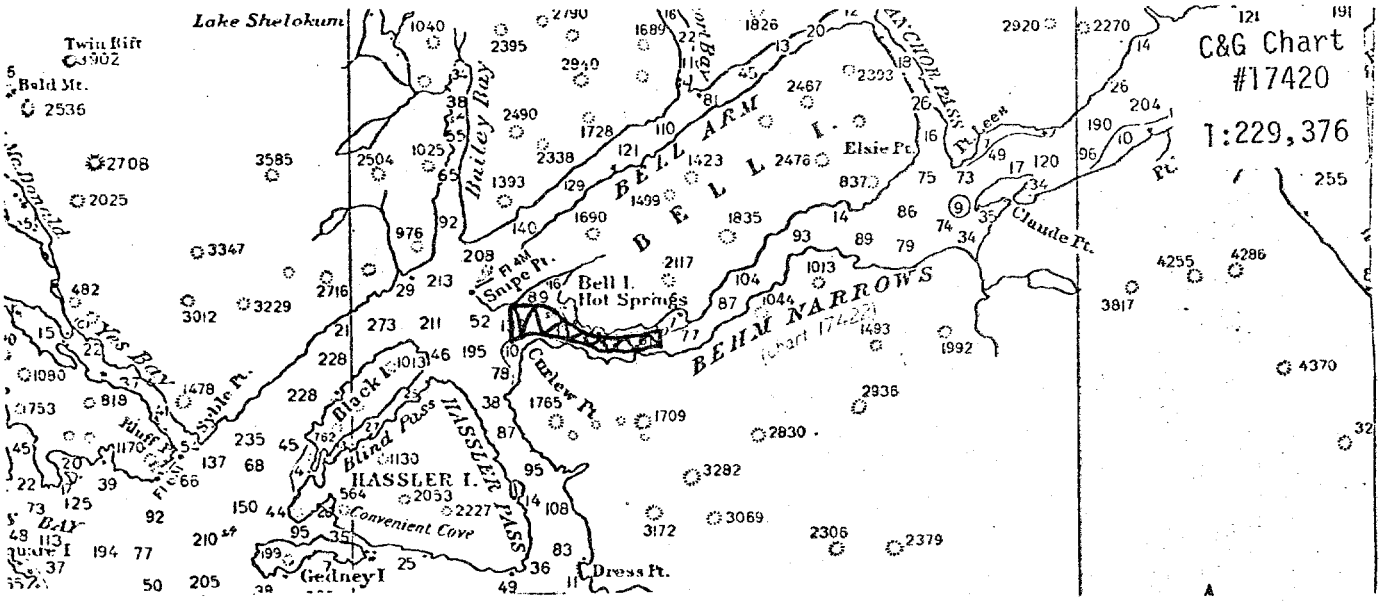
## ACOUSTICAL SURVEY SUMMARY

Area Behm Narrows Date 10/13/79 Vessel Sundance Run # 1

Gain 5.5 Attenuated -12dB Operators Street

Time of Survey: Start 1036 End 1108:55 Tide

COMMENTS: Scattered schools throughout survey area. Herring also outside of the survey area and at surface.

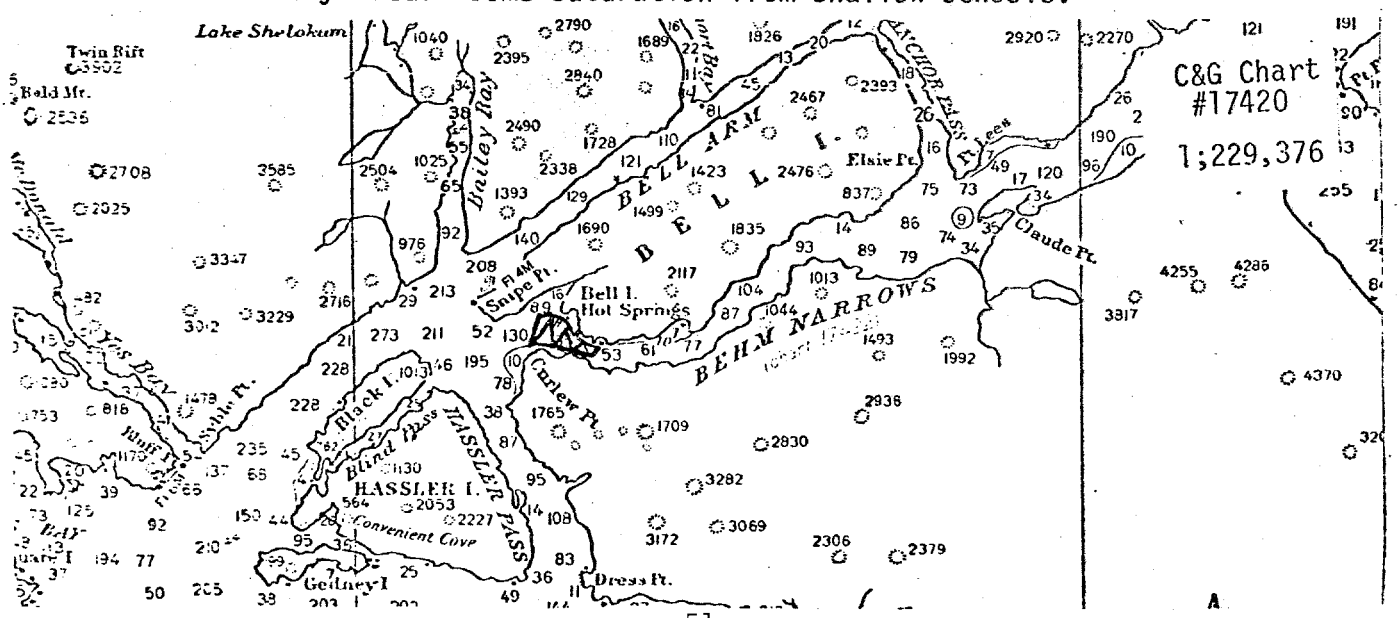



Area Behm Narrows Date 10/15/79 Vessel Sundance Run # 2

Gain 3.0 Attenuated -12dB Operators Street

Time of Survey: Start 1235:25 End 1255:05 Tide

COMMENTS: Piling schools generally along edges at shallow depths. Small herring seen at surface throughout survey area. Large amount of herring outside survey area. Some saturation from shallow schools.



Appendix 1 continued.

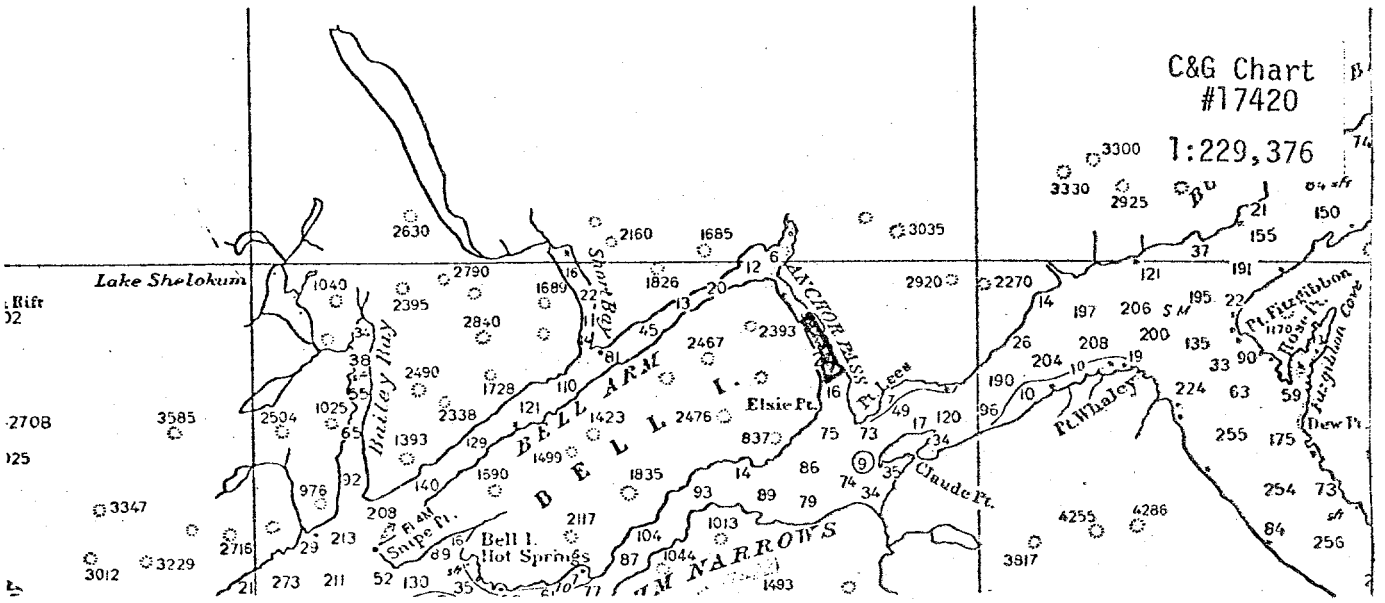
## ACOUSTICAL SURVEY SUMMARY

Area Anchor Pass Date 10/13/79 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12dB Operators Street

Time of Survey: Start 1210:30 End 1222:15 Tide

COMMENTS: This survey covers herring in the area well. Seine sets during the fishery indicated this to be predominately small herring (<7").

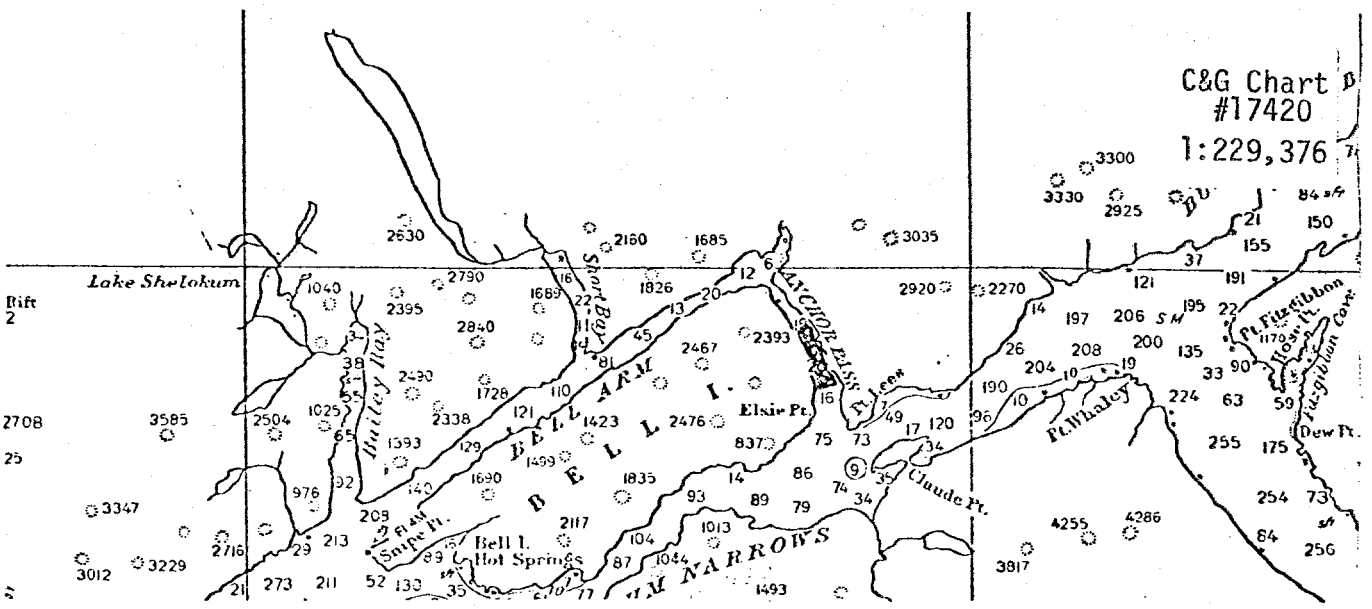



Area Anchor Pass Date 10/13/79 Vessel Sundance Run # 2

Gain 4.0 Attenuated -12dB Operators Street

Time of Survey: Start 1231:50 End 1244:20 Tide

COMMENTS: This is a reverse of Run #1 and covers the herring in the area well.



Appendix 1 continued.

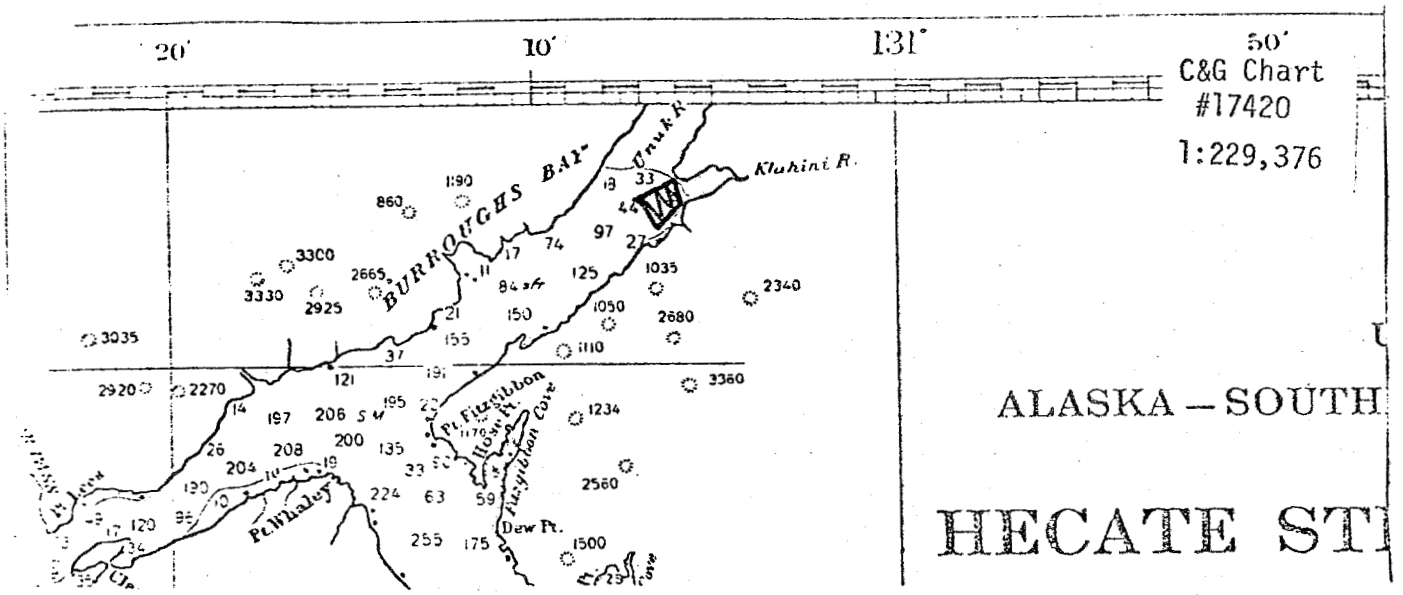
## ACOUSTICAL SURVEY SUMMARY

Area Burroughs Bay Date 10/13/79 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12dB Operators Street

Time of Survey: Start 1506:20 End 1519:00 Tide

COMMENTS: Herring scattered through water column over large area. Survey area encompasses only the largest concentration. Very silty water.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

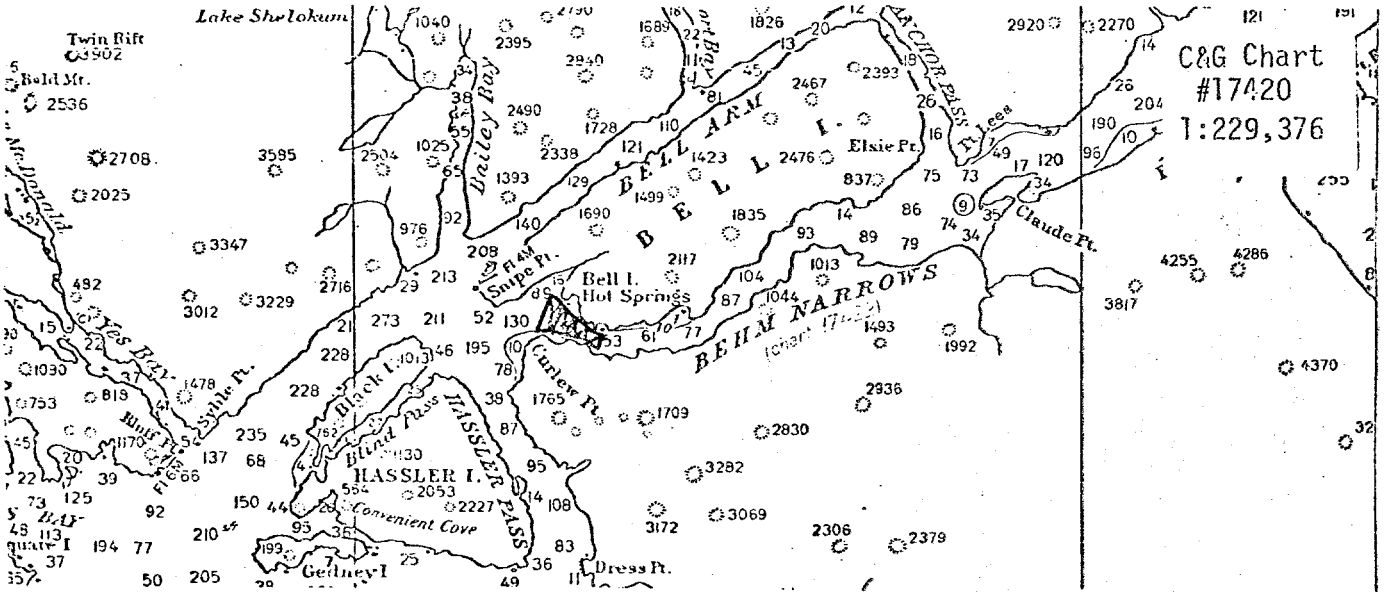
## ACOUSTICAL SURVEY SUMMARY

Area Behm Narrows Date 10/15/79 Vessel Sundance Run # 3

Gain 3.0 Attenuated -12dB Operators Street

Time of Survey: Start 1257:00 End 1318:10 Tide

COMMENTS: Some saturation. This run is a better, more representative sampling of the fish in the area than Run #2.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

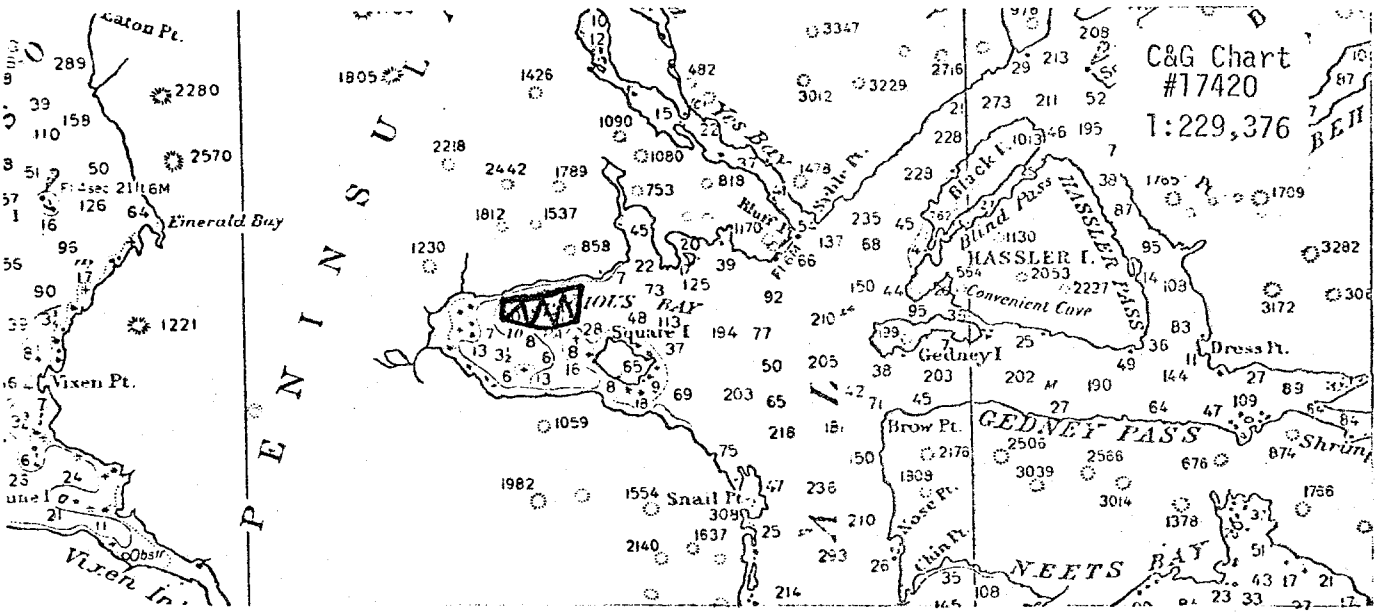
## ACOUSTICAL SURVEY SUMMARY

Area Spacious Bay Date 10/15/79 Vessel Sundance Run # 1

Gain 3.0 Attenuated -12dB Operators Street

Time of Survey: Start 0927:40 End 0956:25 Tide

COMMENTS: Shallow stick-like schools throughout survey area. Some trouble with shallow water saturation. The survey area encompasses most all the fish in the area.

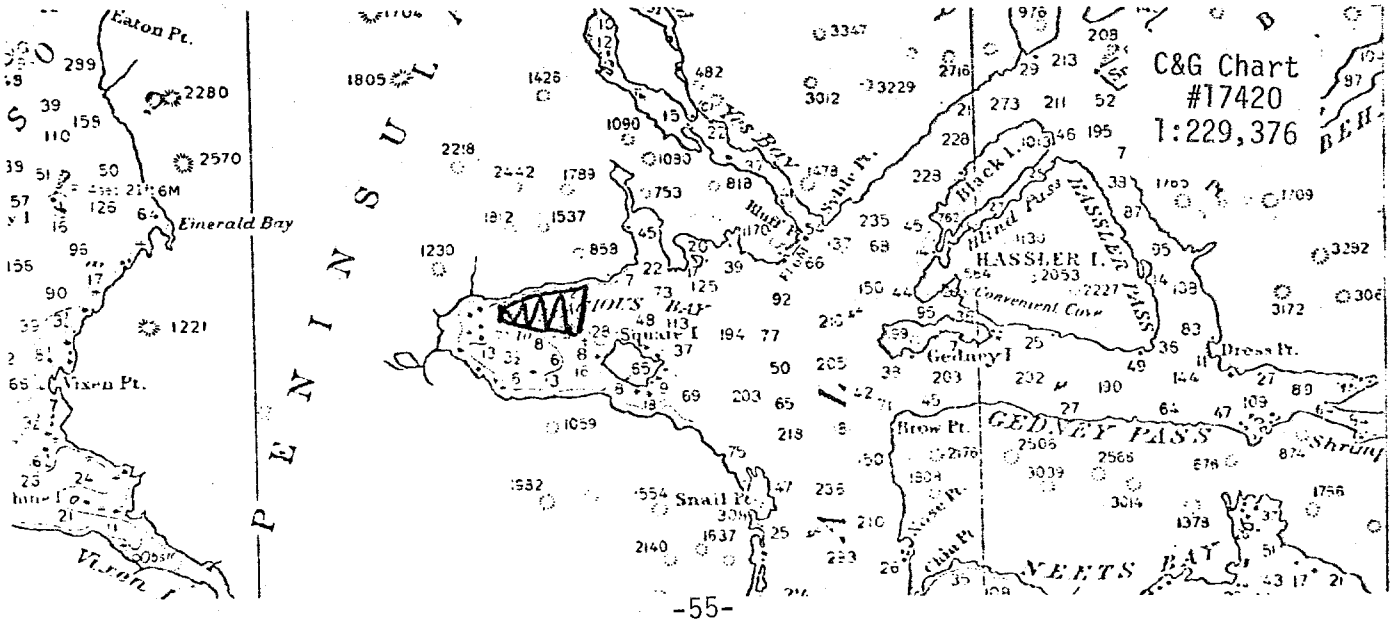



Area Spacious Bay Date 10/15/79 Vessel Sundance Run # 2

Gain 3.0 Attenuated -12dB Operators Street

Time of Survey: Start 0927:40 End 0956:25 Tide

COMMENTS: Stick-like schools throughout survey area. The survey area includes most all of the fish in the area. Some saturation.



Appendix 1 continued.

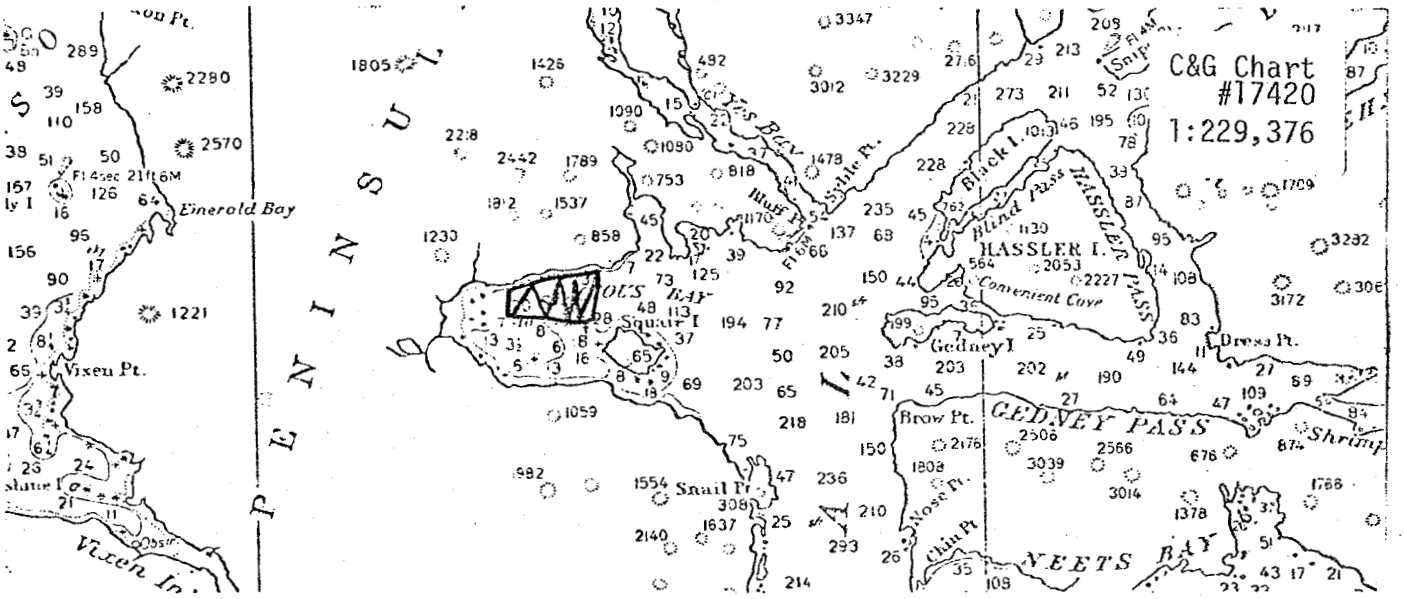
## ACOUSTICAL SURVEY SUMMARY

Area Spacious Bay Date 10/31/79 Vessel Sundance Run # 1

Gain 2.5 Attenuated -12dB Operators Street

Time of Survey: Start 1551:30 End 1624:20 Tide

COMMENTS: Slight saturation with schools in shallow water. This is a better run than Run #2.

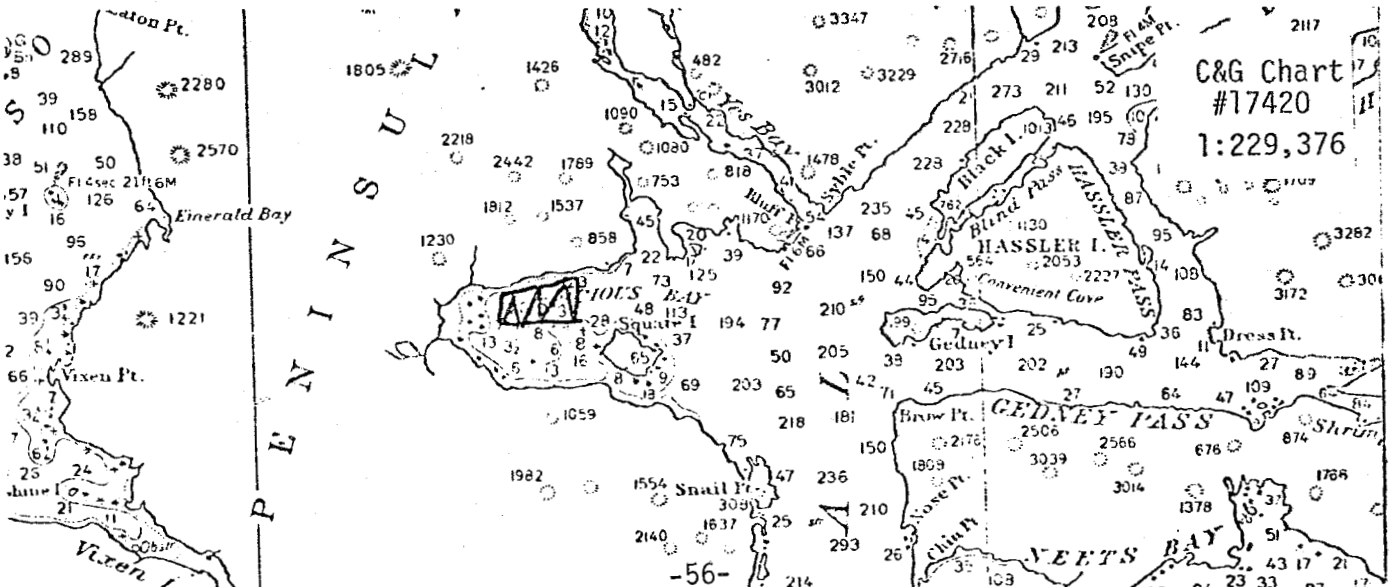



Area Spacious Bay Date 10/31/79 Vessel Sundance Run # 2

Gain 2.0 Attenuated -12dB Operators Street

Time of Survey: Start 1629:25 End 1701:00 Tide

COMMENTS: Does not cover the herring as well as Run #1. The herring seem to be moving quickly towards the head of the bay and upon the flats. The tide had just begun to flood.



Appendix 1 continued.

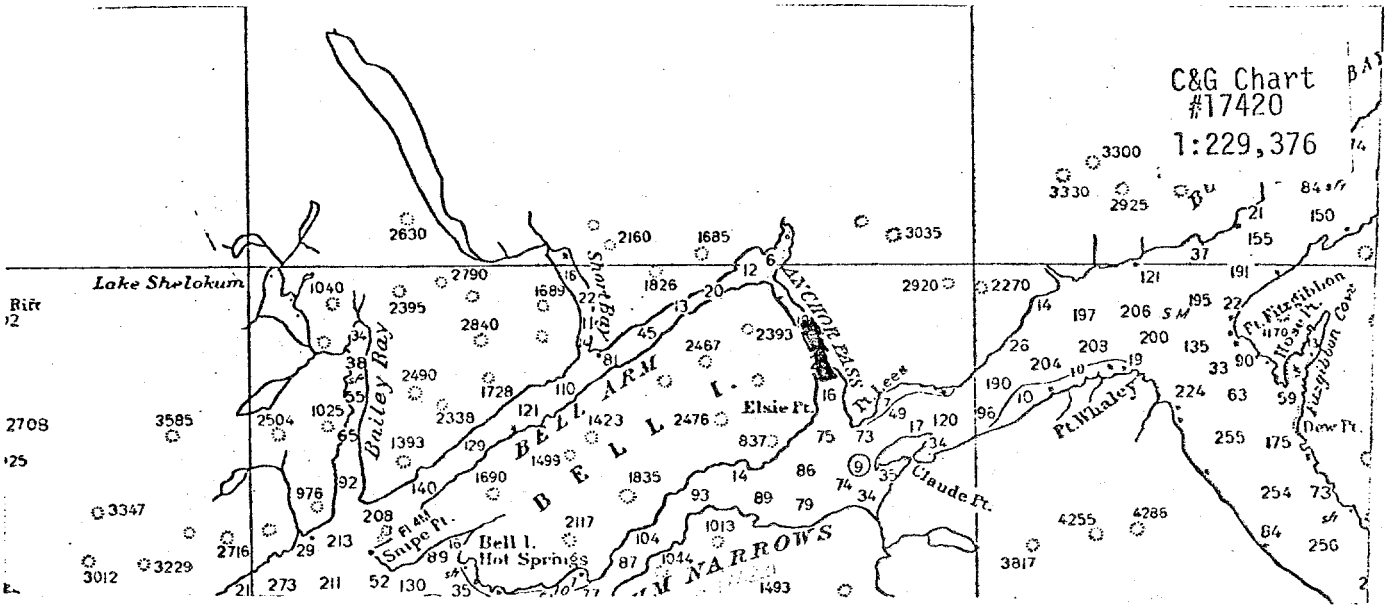
## ACOUSTICAL SURVEY SUMMARY

Area Anchor Pass Date 11/1/79 Vessel Sundance Run # 1

Gain 4.3 Attenuated -12dB Operators Street

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

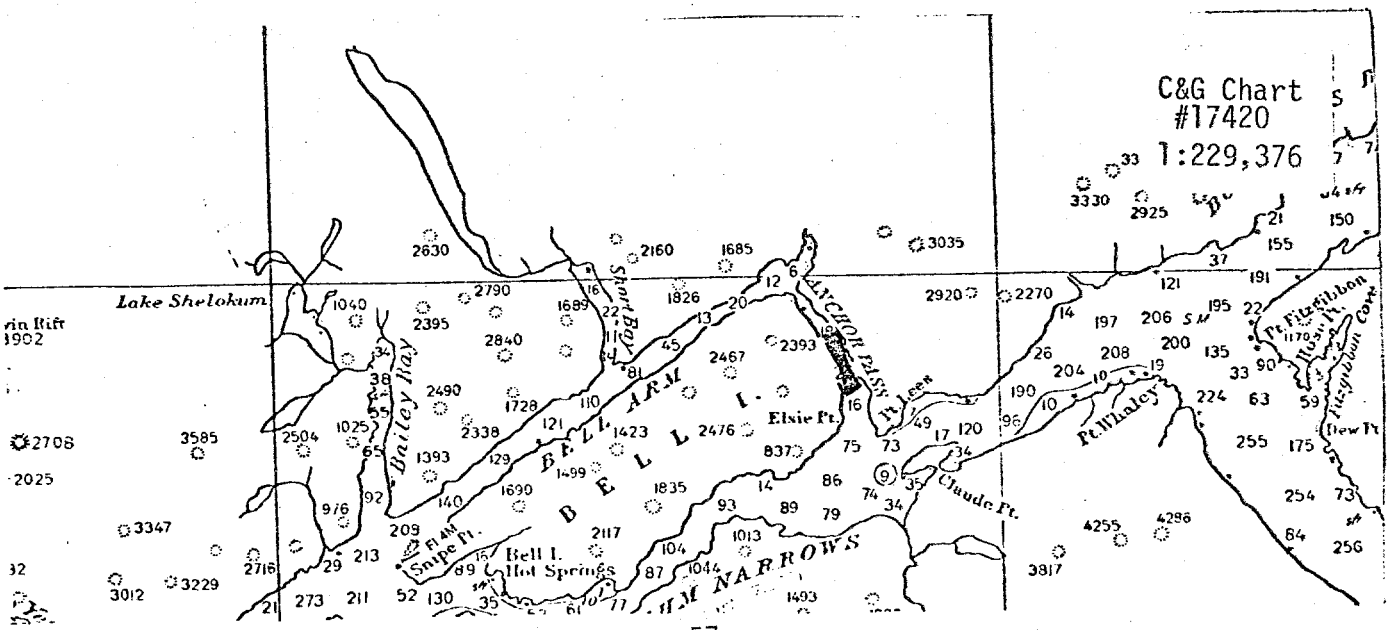



Area Anchor Pass Date 11/1/79 Vessel Sundance Run # 2

Gain 4.3 Attenuated -12dB Operators Street

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:



Appendix 1 continued.

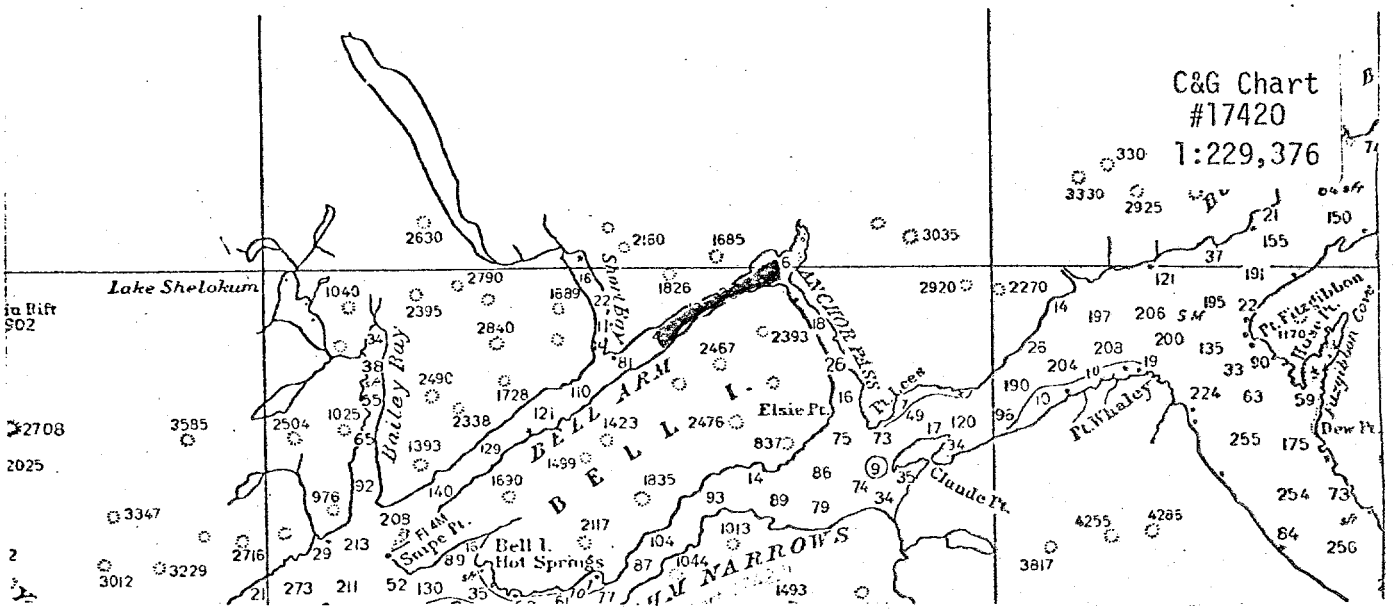
## ACOUSTICAL SURVEY SUMMARY

Area Bell Arm Date 11/1/79 Vessel Sundance Run # 1

Gain 2.5 Attenuated -6dB Operators Street

Time of Survey: Start 1049:05 End 1122:50 Tide

COMMENTS: This is not the best survey that could be expected of herring in this area. The bulk of herring had moved out of the survey area.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

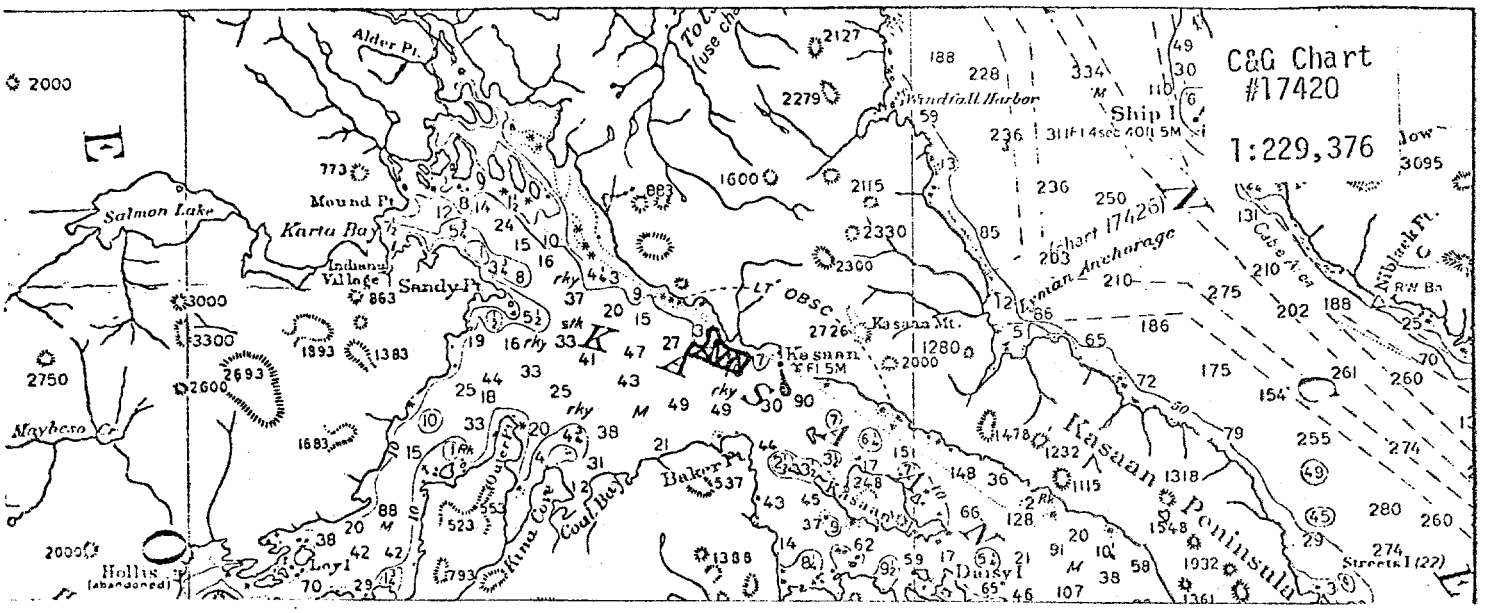
## ACOUSTICAL SURVEY SUMMARY

Area Kasaan Bay Date 4/12/78 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12 dB Operators DeJong

Time of Survey: Start 12:15 End 12:39 Tide

COMMENTS: 5 knot constant speed.

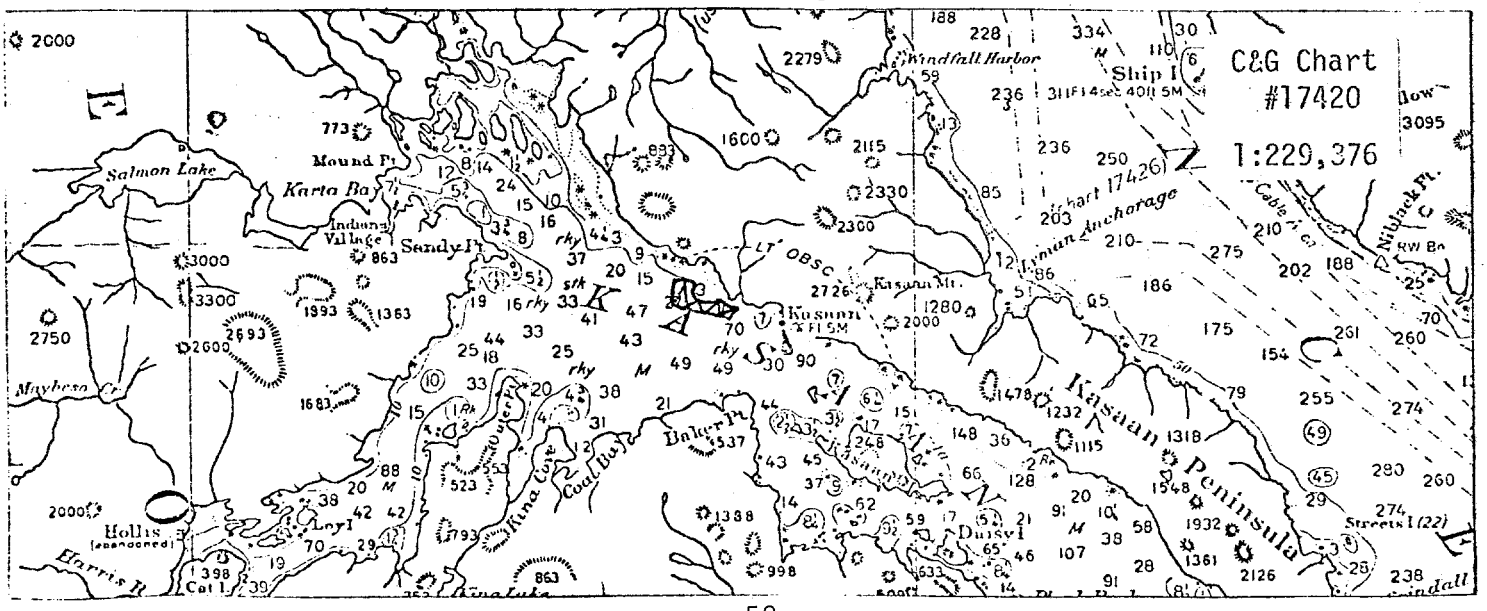



Area Kasaan Bay Date 4/12/78 Vessel Sundance Run # 2

Gain 4.5 Attenuated -12 dB Operators DeJong, Francisco

Time of Survey: Start 13:03 End 13:35 Tide

COMMENTS: Saturation noted on one school only.



Appendix 1 continued.

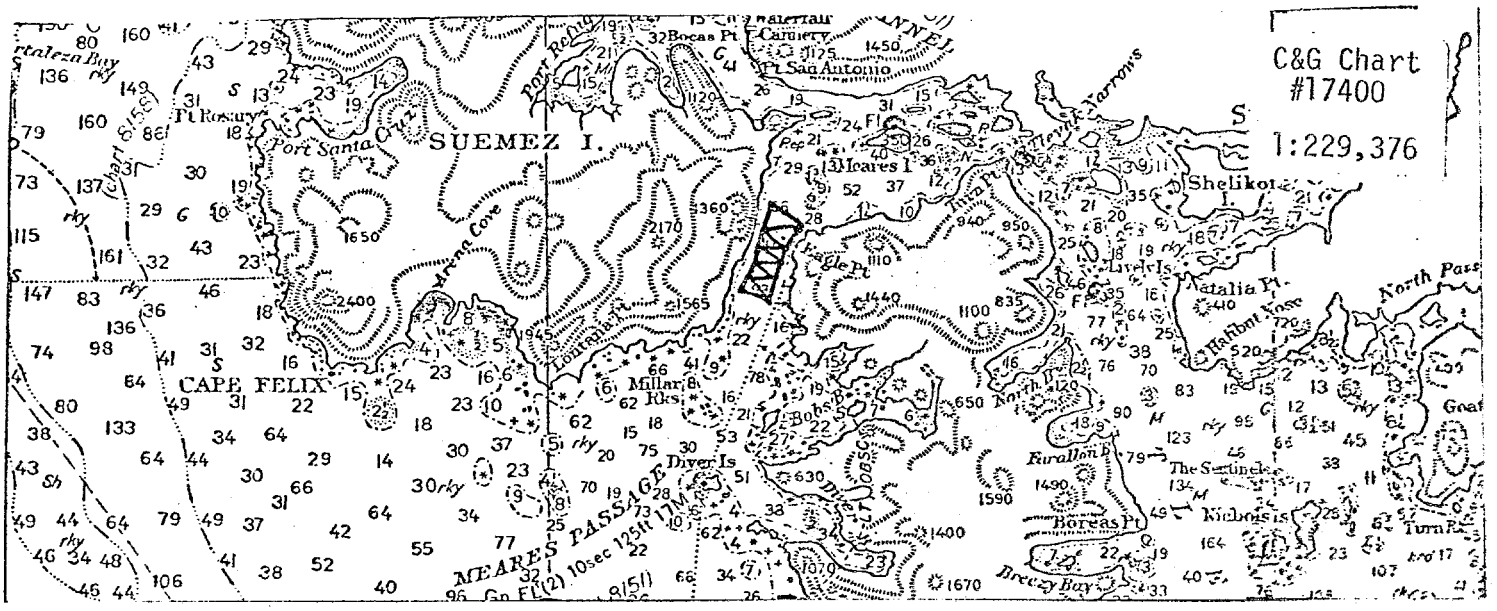
## ACOUSTICAL SURVEY SUMMARY

Area Meares Passage Date 1/11/79 Vessel Sundance Run # 1

Gain 6.0 Attenuated -12 dB Operators Street

Time of Survey: Start 1549:30 End 1610:45 Tide

COMMENTS: Fish were deep; approximately 85 fathoms.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

## ACOUSTICAL SURVEY SUMMARY

Area Meares Passage Date 11/18/79 Vessel Sundance Run # 1

Gain -12dB Attenuated -12dB Operators Street

Time of Survey: Start 0901:35 End 0932:25 Tide

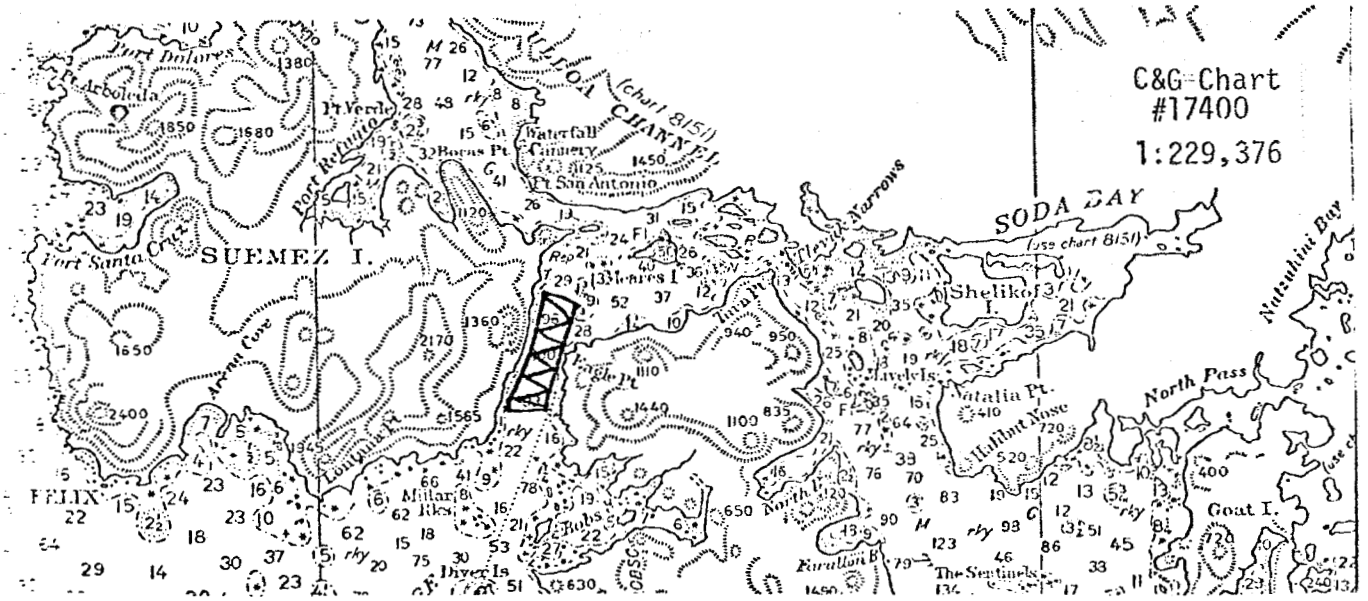
COMMENTS: Herring at 55, 65, and 70 fathoms.

Area Meares Passage Date 11/18/79 Vessel Sundance Run # 2

Gain 4.5 Attenuated 012dB Operators Street

Time of Survey: Start 0936:05 End 1011:15 Tide

COMMENTS: Herring at 55, 65, and 70 fathoms.



Appendix 1 continued.

## ACOUSTICAL SURVEY SUMMARY

Area Meares Passage Date 12/8/79 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12dB Operators DeJong

Time of Survey: Start 1312 End 1351 Tide

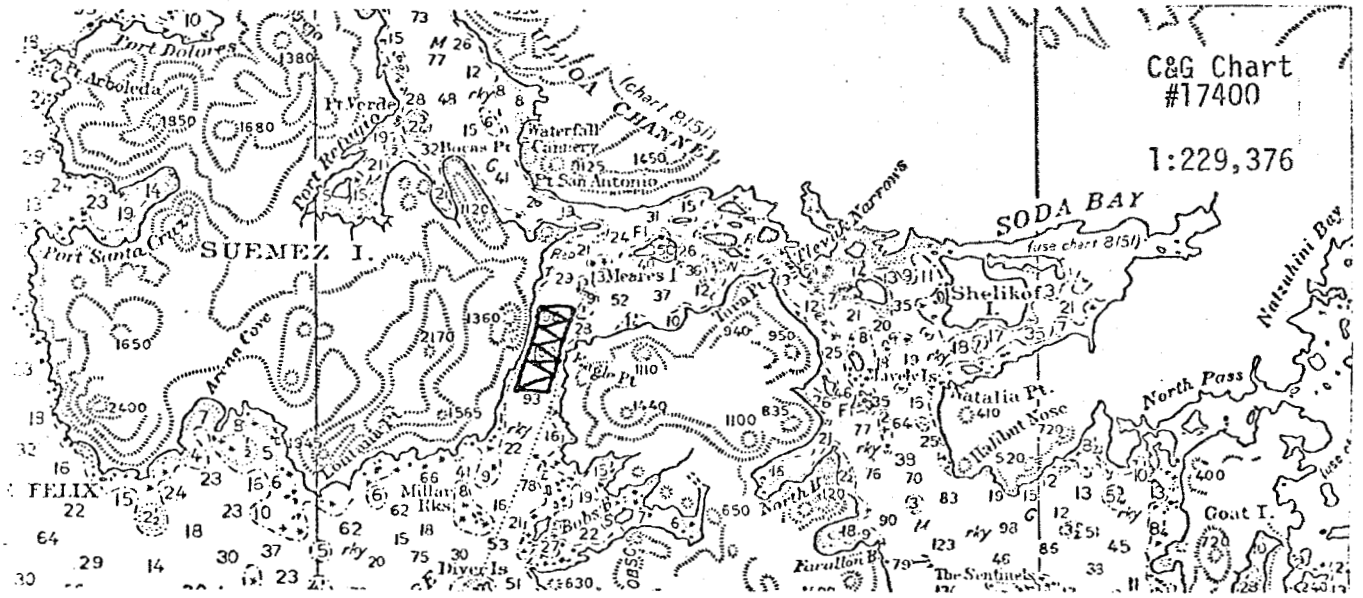
COMMENTS:

Area Meares Passage Date 12/8/79 Vessel Sundance Run # 2

Gain 5.0 Attenuated -12dB Operators DeJong

Time of Survey: Start 1401 End 1430 Tide

COMMENTS:



Appendix 1 continued.

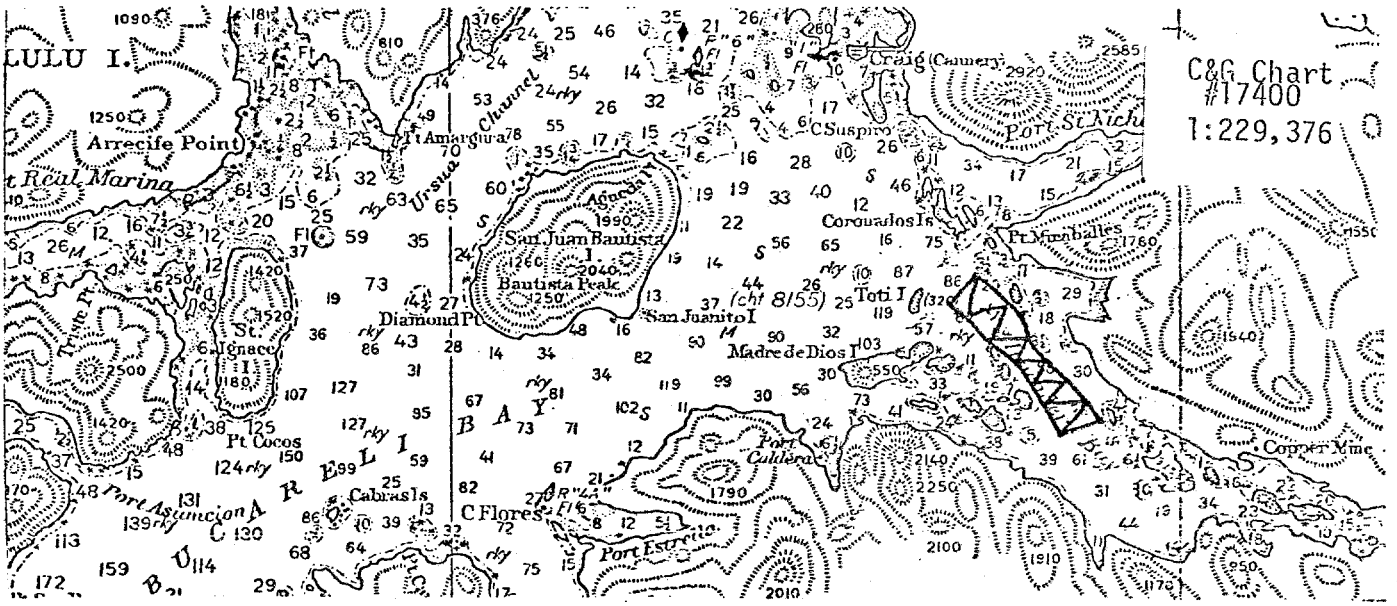
## ACOUSTICAL SURVEY SUMMARY

Area Trocadero Bay Date 11/17/79 Vessel Sundance Run # 1

Gain 5.7 Attenuated -12dB Operators Street

Time of Survey: Start 1409:20 End 1458:40 Tide

COMMENTS: Herring at 50 and 65 fathoms.

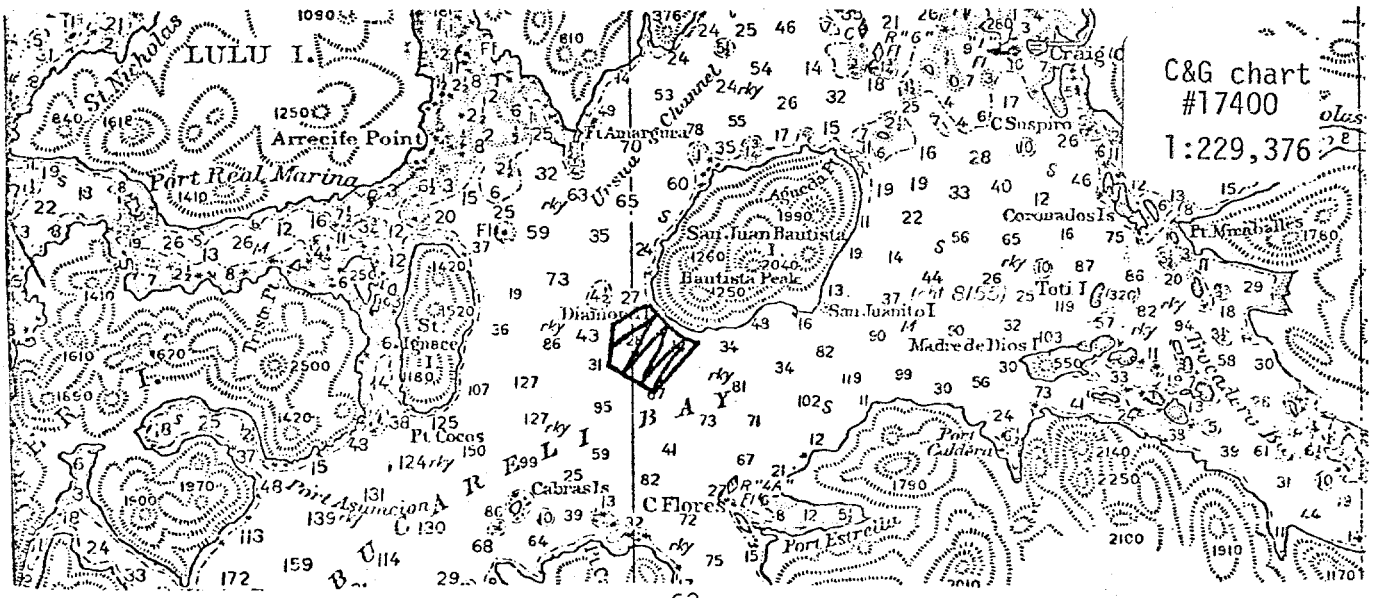



Area Diamond Pt. Date 11/18/79 Vessel Sundance Run # 1

Gain 3.0 Attenuated -12dB Operators Street

Time of Survey: Start 1157:20 End 1232 Tide

COMMENTS:



Appendix 1 continued.

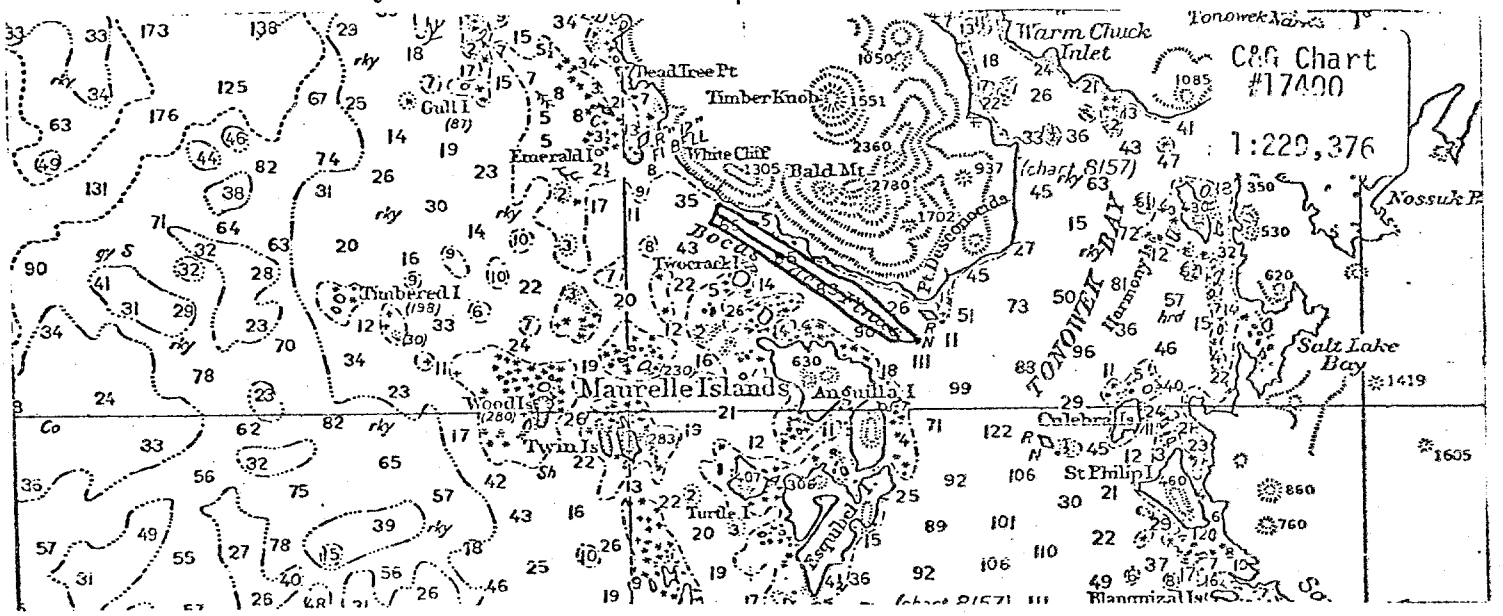
## ACOUSTICAL SURVEY SUMMARY

Area Boca de Finas Date 10/24/77 Vessel Sundance Run # 1

Gain 6.0 Attenuated -12 dB Operators Copeland

Time of Survey: Start 14:44 End 15:39 Tide

COMMENTS: Estimated area surveyed represents 20% of fish present in area. Weather and whales had fish broken up. Best bird and whale activity observed in several years. Wind N.E. 40 mph.

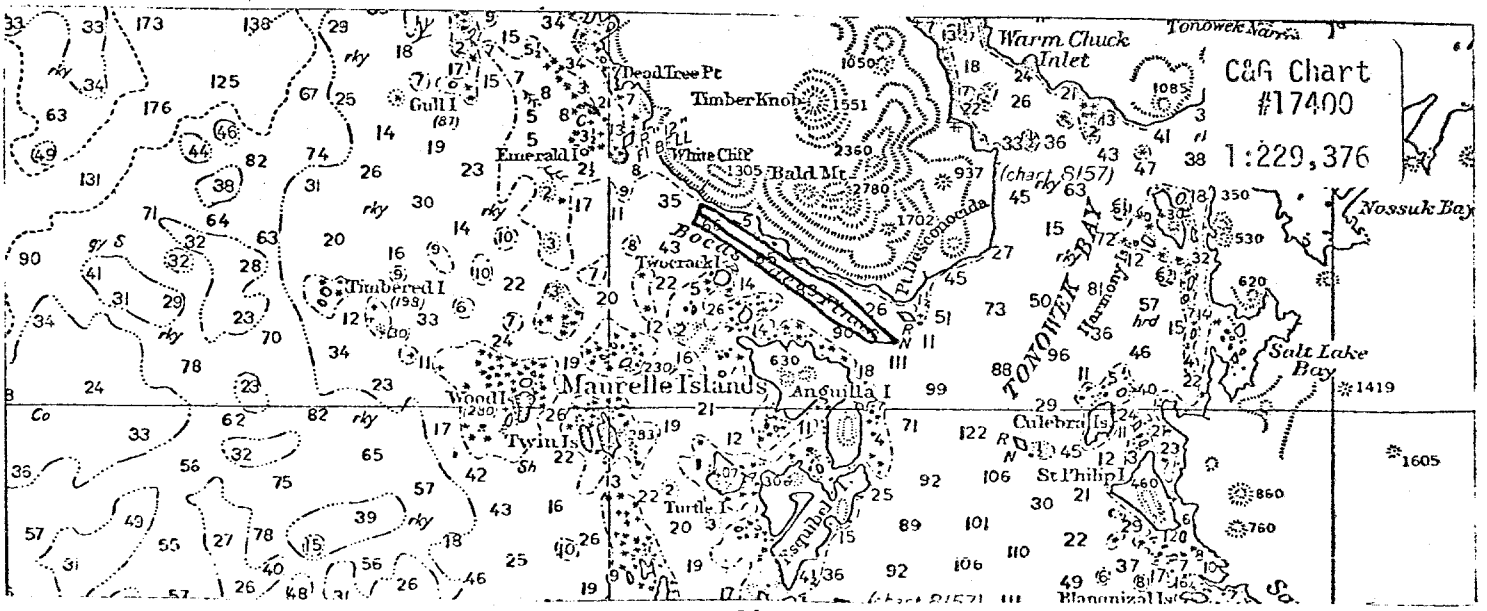



Area Boca de Finas Date 10/24/77 Vessel Sundance Run # 2

Gain 6.5 Attenuated -12 dB Operators Copeland

Time of Survey: Start 15:59 End 16:56 Tide

COMMENTS: Not a good transect pattern. Extremely rough water.



Appendix 1 continued.

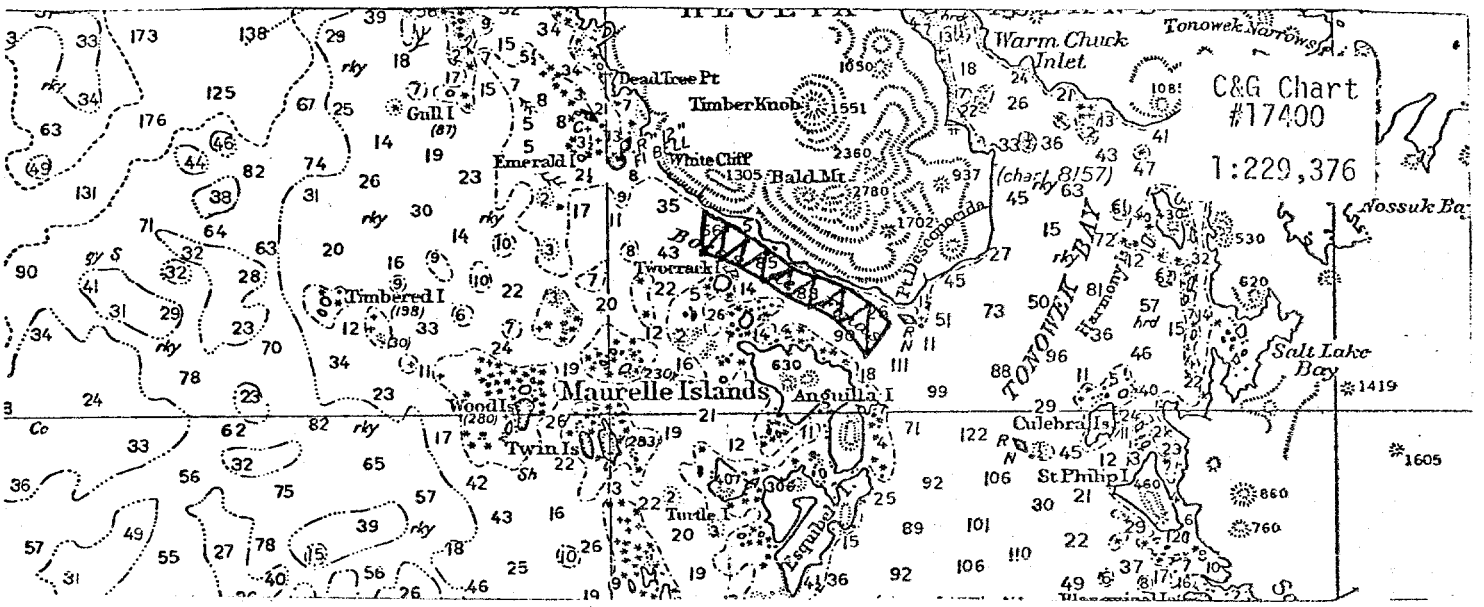
## ACOUSTICAL SURVEY SUMMARY

Area Boca de Finas Date 12/1/77 Vessel Sundance Run # 1

Gain 6.5 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 16:56 End 18:04 Tide

COMMENTS: Clear weather; 15 knot westerly wind. 6 knot speed. No saturation. Fish rising throughout survey and near surface at end of survey.

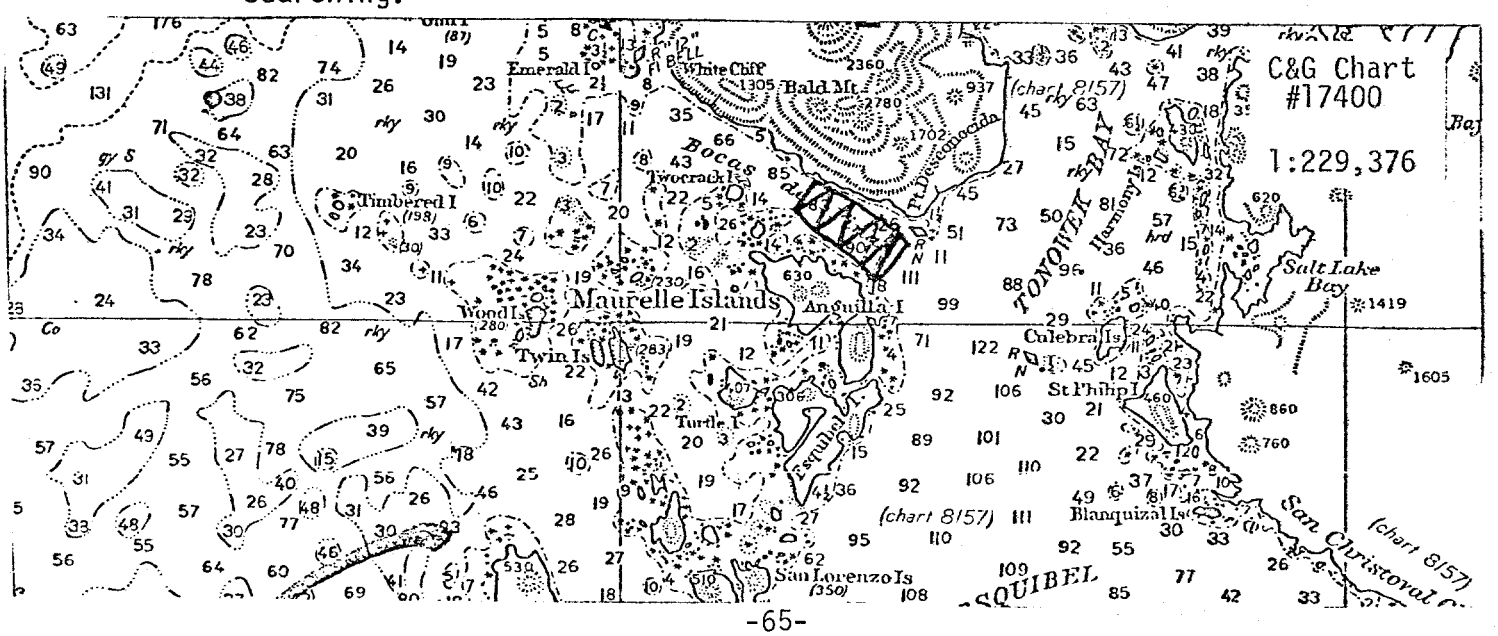



Area Boca de Finas Date 10/28/78 Vessel Sundance Run # 1

Gain 5.5 Attenuated -12 dB Operators Street, Francisco

Time of Survey: Start 12:35 End 13:11 Tide

COMMENTS: Fish mostly at 53 - 58 fathoms. Best bunch of fish seen in two days of searching.



Appendix 1 continued.

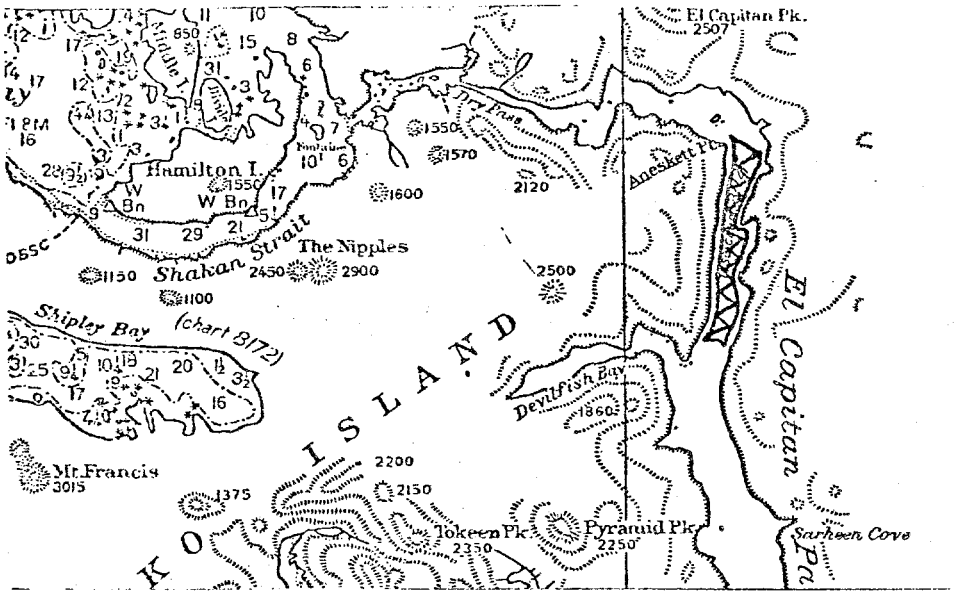
## ACOUSTICAL SURVEY SUMMARY

Area El Capitan Date 10/27/78 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12 dB Operators Street, Francisco

Time of Survey: Start 10:15 End 10:54 Tide

COMMENTS: There were small, dense, scattered schools in this area at a depth of approximately 10 fathoms.




C&G chart #17400

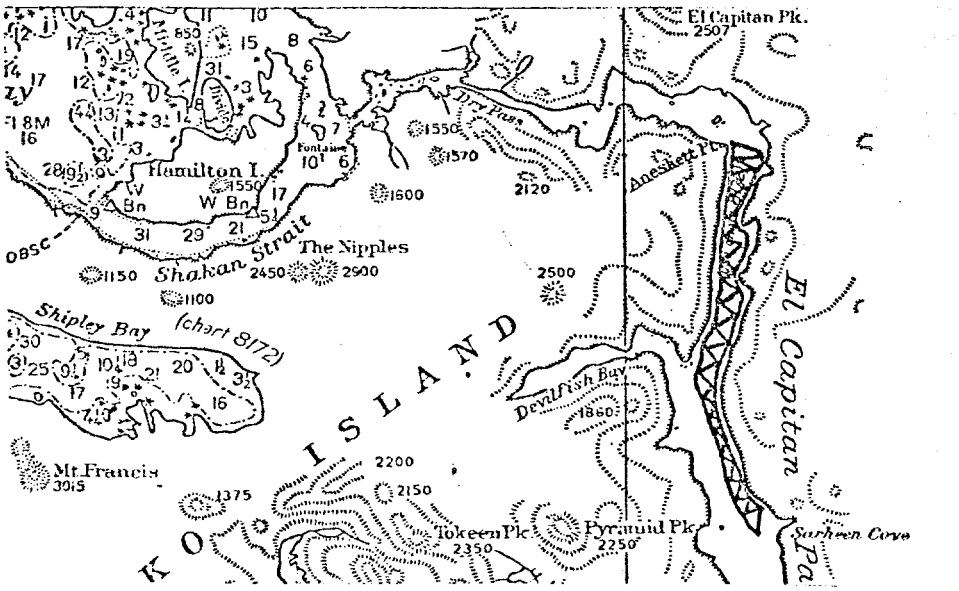
1:229,376

Area El Capitan Date 11/27/78 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12 dB Operators DeJong

Time of Survey: Start 16:18 End 17:18 Tide

COMMENTS: Steady .1 - .3 Vpp throughout total survey area.




C&G Chart #17400

1:229,376

Appendix 1 continued.

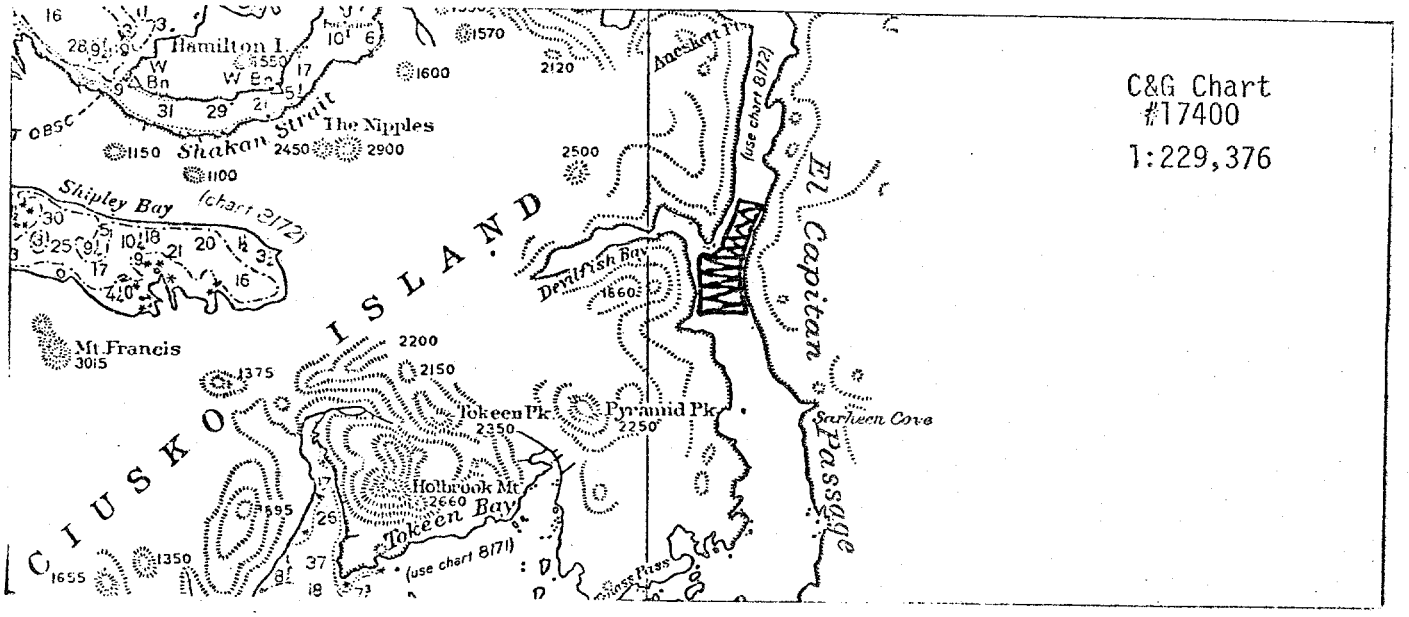
## ACOUSTICAL SURVEY SUMMARY

Area El Capitan Date 11/15/79 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12dB Operators Street

Time of Survey: Start 1029:45 End 1157:15 Tide

COMMENTS: Vessel speed was 5 knots. Herring at 30, 35, and 40 fathoms.

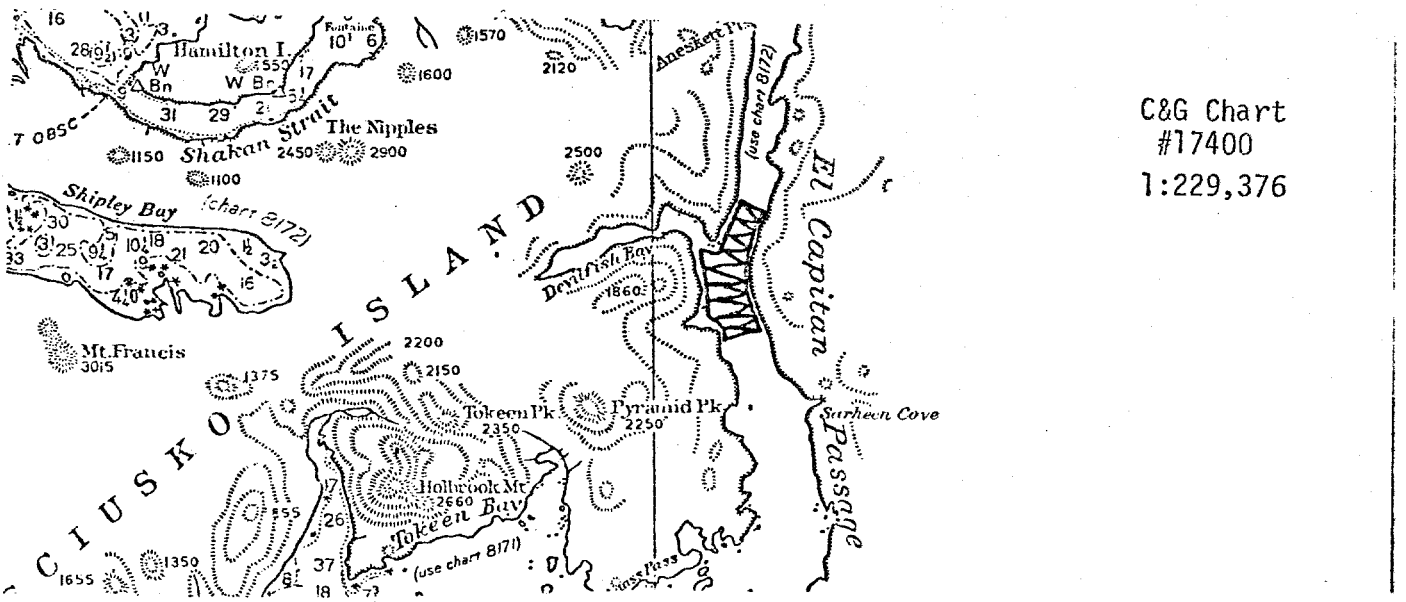



Area El Capitan Date 11/15/79 Vessel Sundance Run # 2

Gain 5.0 Attenuated -12dB Operators Street

Time of Survey: Start 1222 End 1347:40 Tide

COMMENTS: Vessel speed was 8 knots. Herring at 30, 35, and 40 fathoms.



Appendix 1 continued.

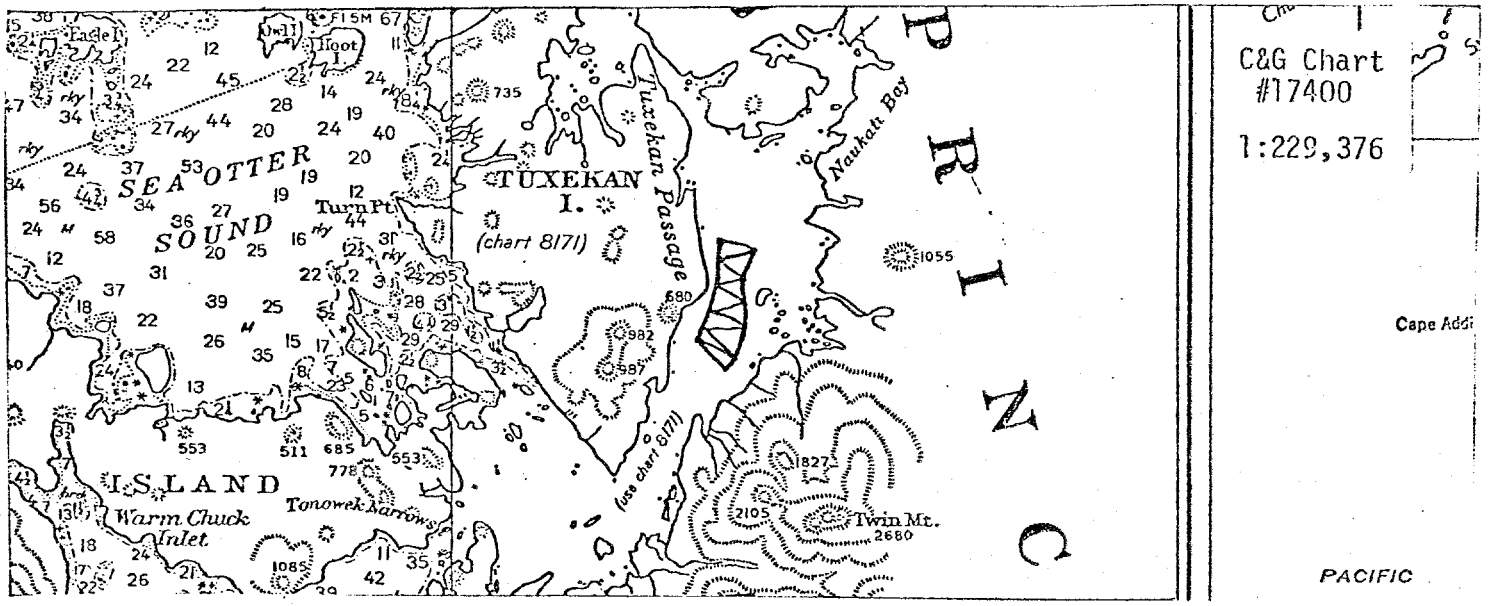
## ACOUSTICAL SURVEY SUMMARY

Area Tuxekan Passage Date 11/30/78 Vessel Sundance Run # 1

Gain 5 Attenuated -12 dB Operators DeJong

Time of Survey: Start 3:34 End 4:15 Tide

COMMENTS:

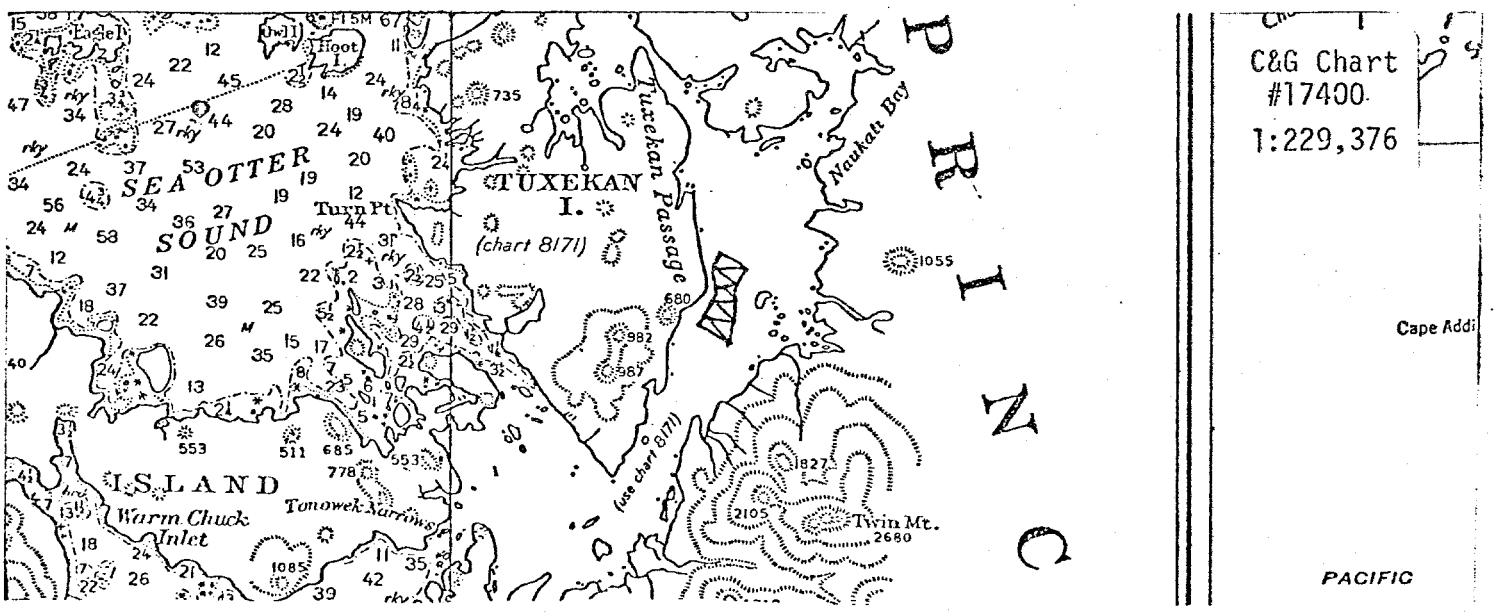



Area Tuxekan Passage Date 11/30/78 Vessel Sundance Run # 2

Gain 5 Attenuated -12 dB Operators DeJong

Time of Survey: Start 4:37 End 5:06 Tide

COMMENTS: Reverse transect of Run #1. Heavy saturation on one leg.



Appendix 1 continued.

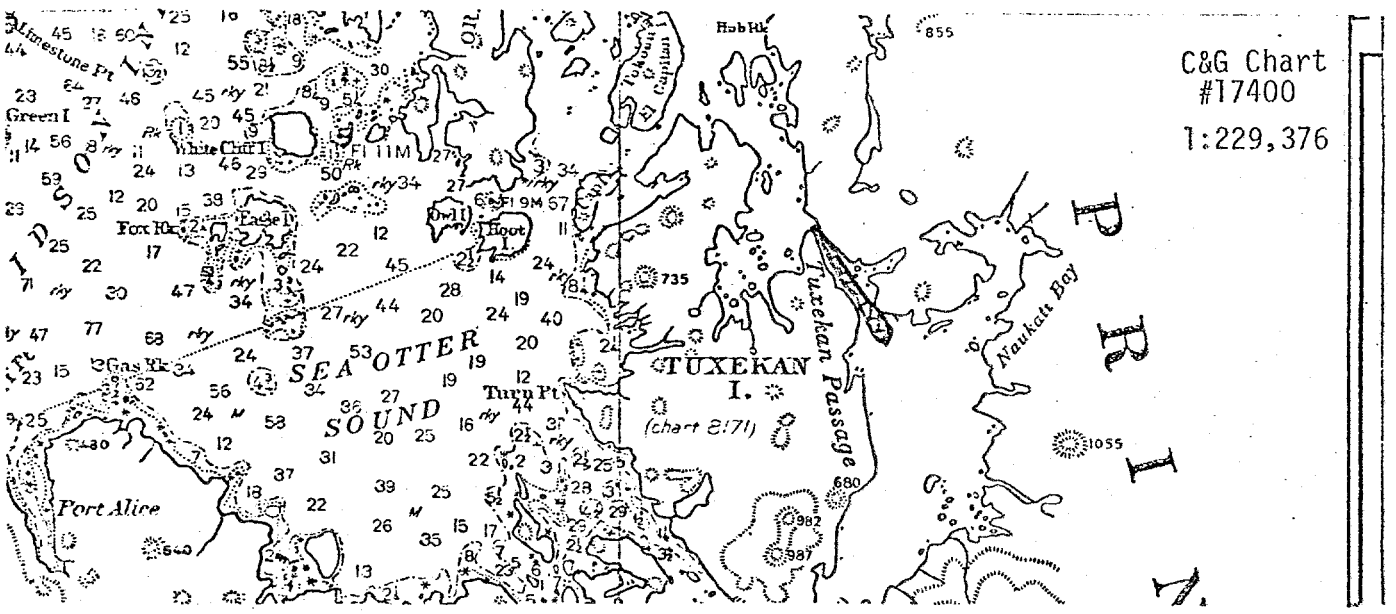
## ACOUSTICAL SURVEY SUMMARY

Area Tuxekan Narrows Date 11/16/79 Vessel Sundance Run # 1

Gain 4.8 Attenuated -12dB Operators Street

Time of Survey: Start 0842:25 End 0914:15 Tide

COMMENTS:

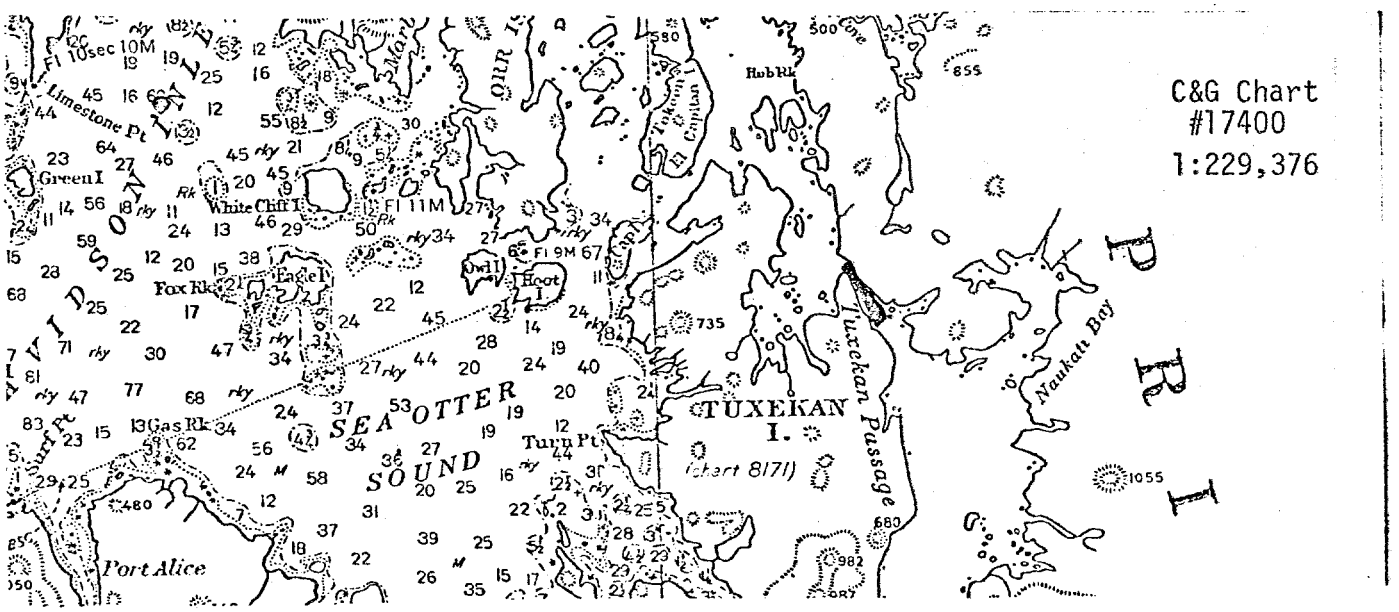



Area Tuxekan Narrows Date 11/16/79 Vessel Sundance Run # 2

Gain 3.8 Attenuated -12dB Operators Street

Time of Survey: Start 0921:15 End 0932:50 Tide

COMMENTS:



Appendix 1 continued.

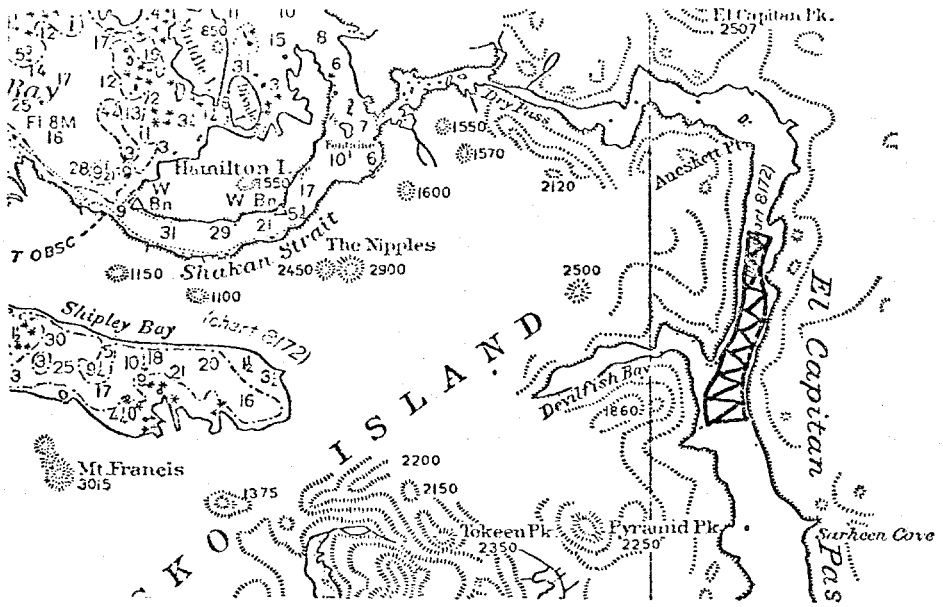
## ACOUSTICAL SURVEY SUMMARY

Area El Capitan Date 12/10/79 Vessel Sundance Run # 1

Gain 4.5 Attenuated -12dB Operators DeJong

Time of Survey: Start 1406 End 1505 Tide

COMMENTS:




C&G Chart #17400

1:229,376

Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

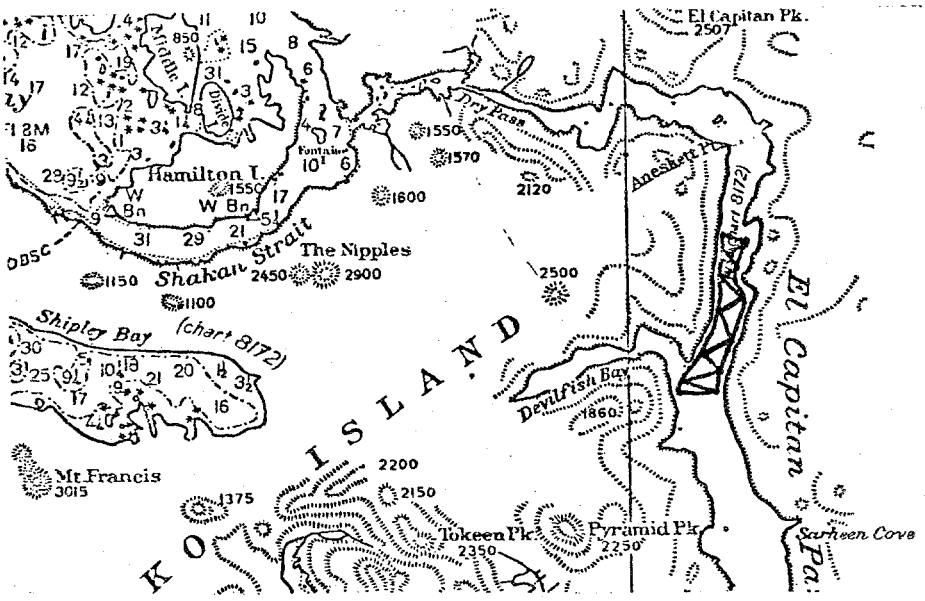
## ACOUSTICAL SURVEY SUMMARY

Area El Capitan Date 1/9/79 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12 dB Operators Street

Time of Survey: Start 1215:00 End 1214:45 Tide

COMMENTS: Stick type schools near Aneskett Pt. Sparsely scattered cormorants, mew, and glaucous gulls on the surface of the survey area.




C&G Chart #17400
1:229,376

Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

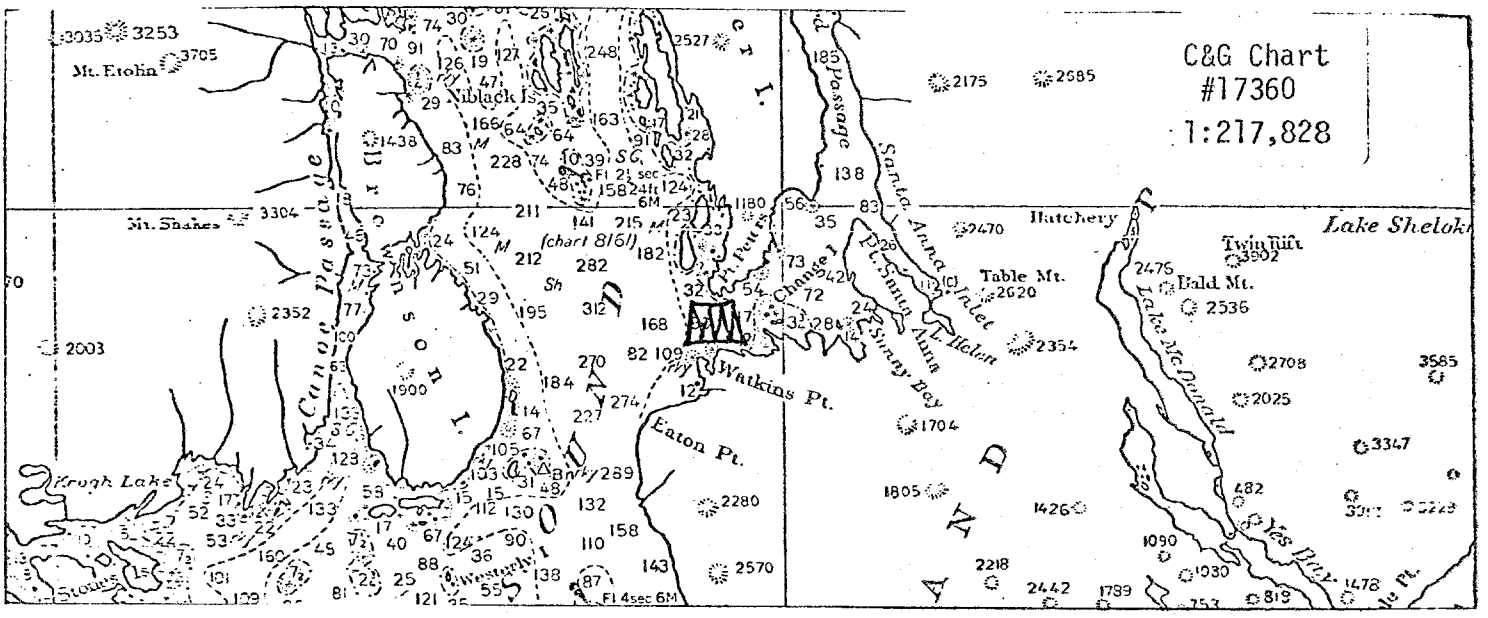
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 10/6/77 Vessel Auklet Run # 1

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 16:32 End 17:08 Tide Low

COMMENTS: Looking at one nice school hit (1) transect; no saturation observed. Gulls in area of herring. Fish identified as herring by fishery. Vessel speed 8 knots. $H_2O$ temp. = 5°C

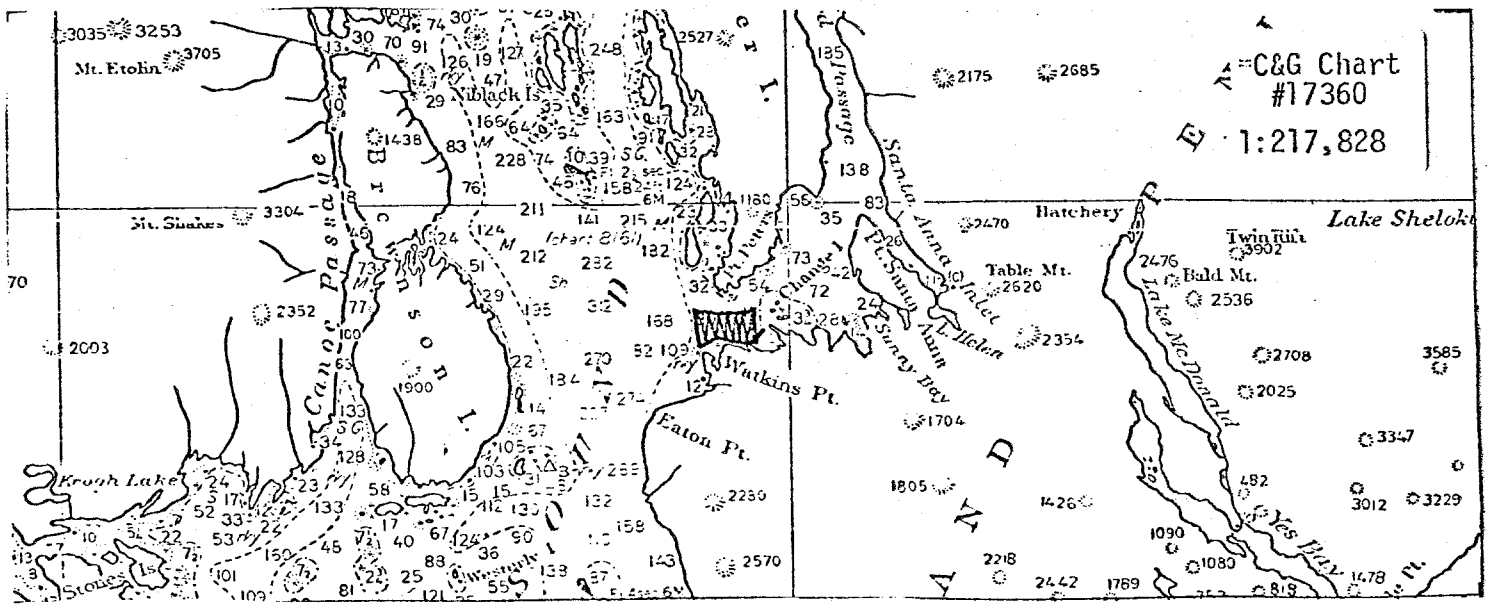



Area Deer Island Date 10/12/77 Vessel Auklet Run # 1

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler, DeJong

Time of Survey: Start 17:33 End 18:26 Tide

COMMENTS: Some saturation noted on run. Sea gulls in area of school. Vessel speed 5 knots. $H_2O$ temp. = 5°C



Appendix 1 continued.

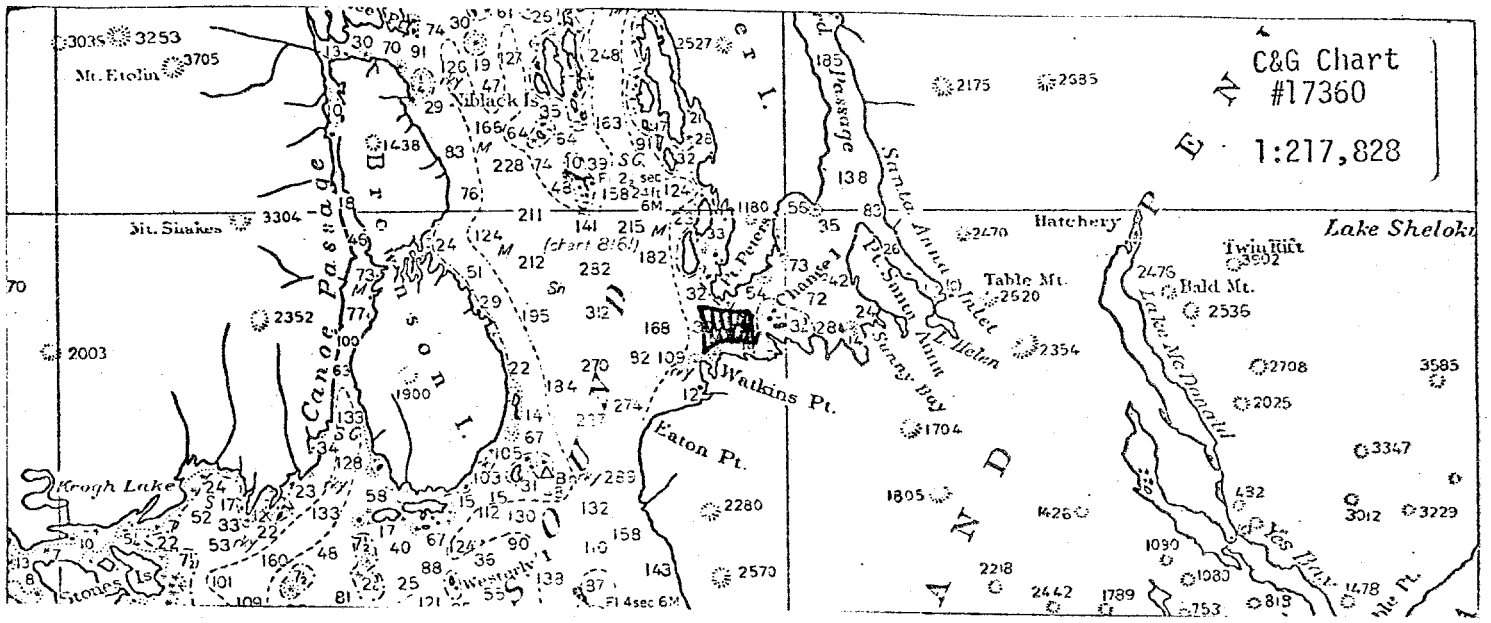
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 10/12/77 Vessel Auklet Run # 2

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler, DeJong

Time of Survey: Start 18:09 End 18:45 Tide

COMMENTS: $H_2O$ temp. = 5°C

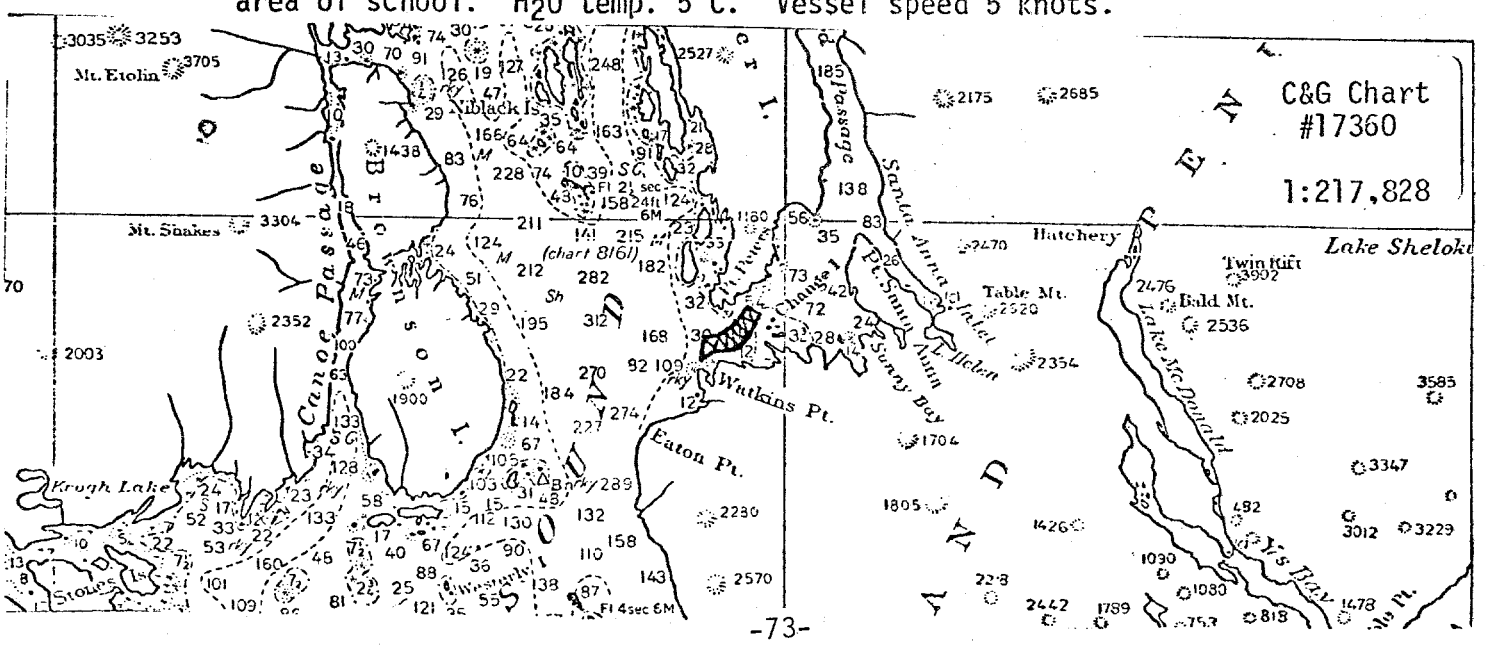



Area Deer Island Date 10/13/77 Vessel Auklet Run # 1

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler, DeJong

Time of Survey: Start 08:25 End 09:01 Tide

COMMENTS: Herring observed flipping at the surface on one leg of survey. Birds in area of school. $H_2O$ temp. 5°C. Vessel speed 5 knots.



Appendix 1 continued.

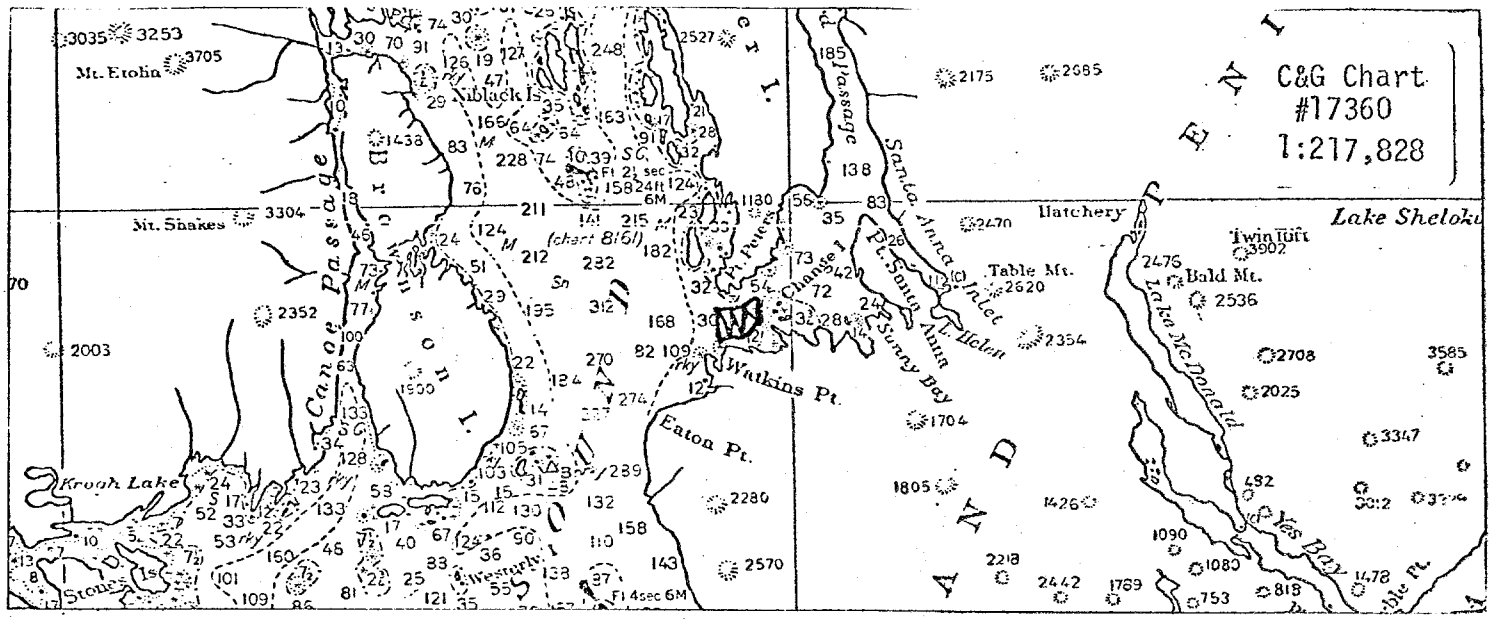
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 10/14/77 Vessel Auklet Run # 1

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler, DeJong

Time of Survey: Start 15:07 End 15:25 Tide

COMMENTS: Fish vulnerable for survey during daylight hours. Big tides; S.E. 15 mph; overcast.

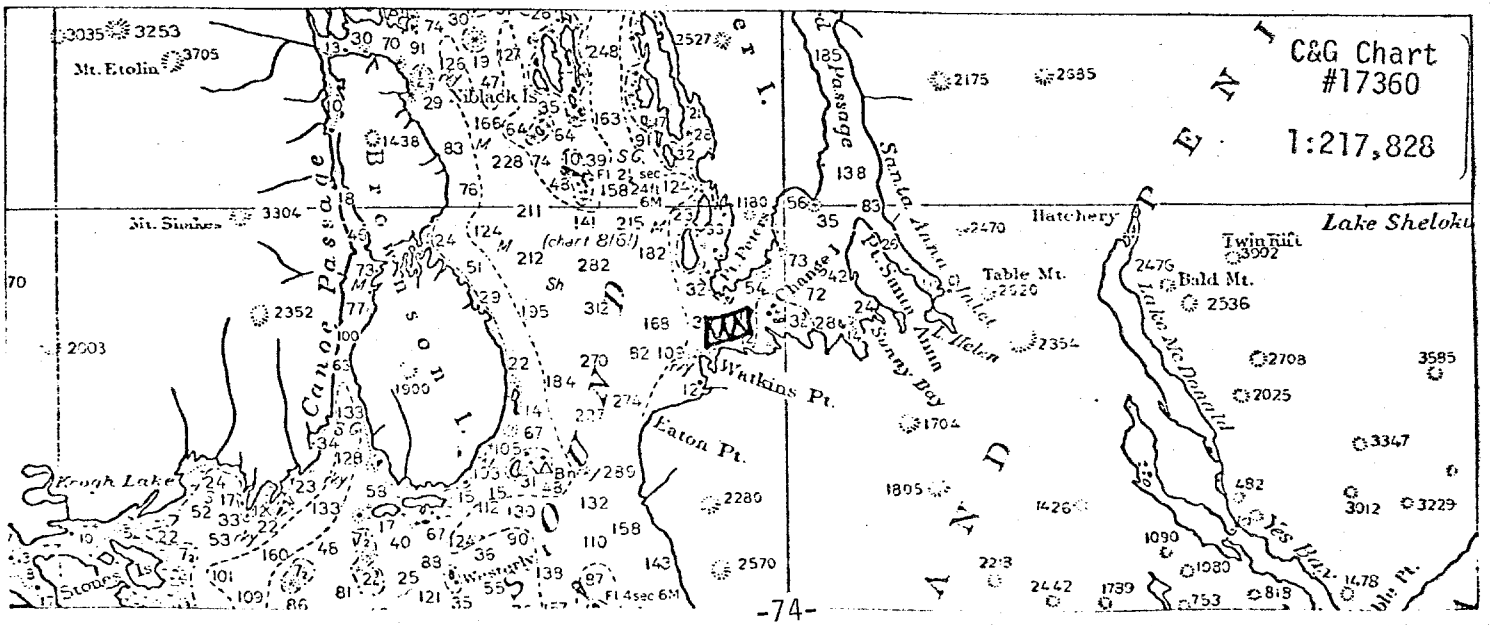



Area Deer Island Date 10/14/77 Vessel Auklet Run # 2

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler, DeJong

Time of Survey: Start 15:28 End 15:48 Tide

COMMENTS: Same survey as Run #1. No saturation.



Appendix 1 continued.

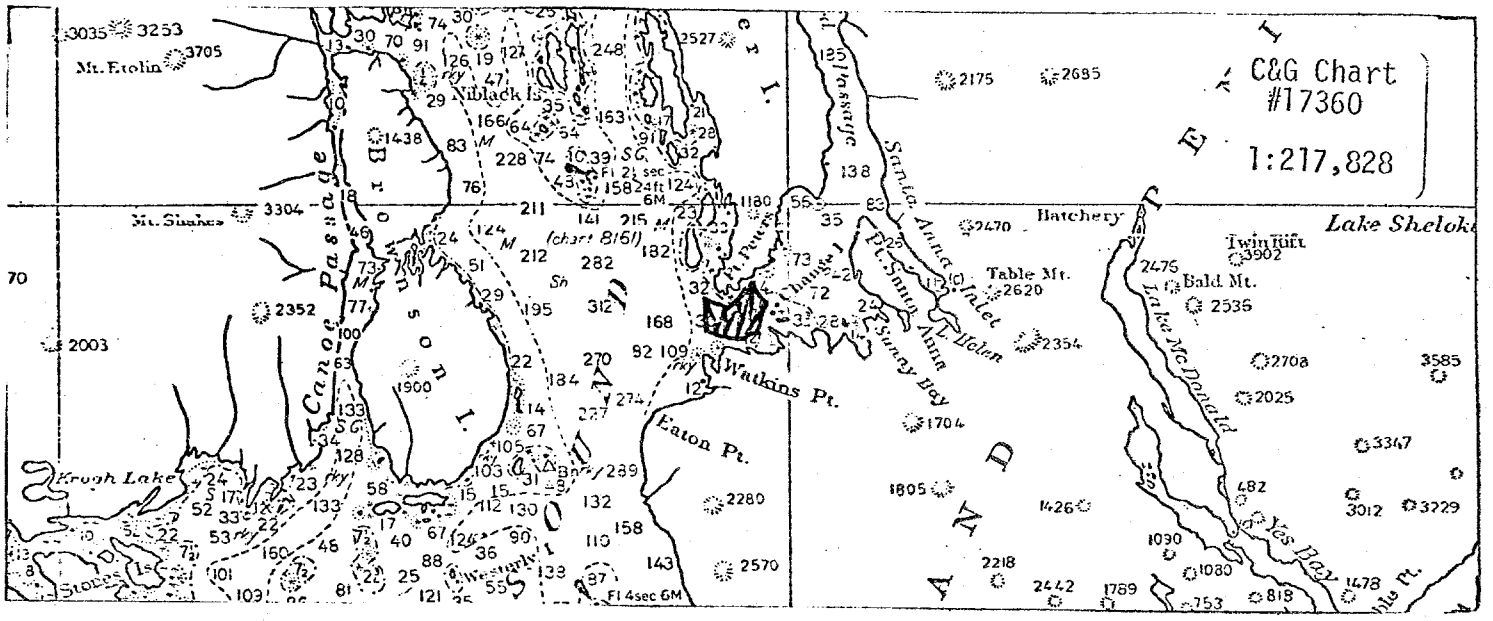
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 11/21/77 Vessel Auklet Run # 1

Gain 5.5 Attenuated -12 dB Operators Timothy

Time of Survey: Start 06:00 End 06:47 Tide Flooding

COMMENTS:

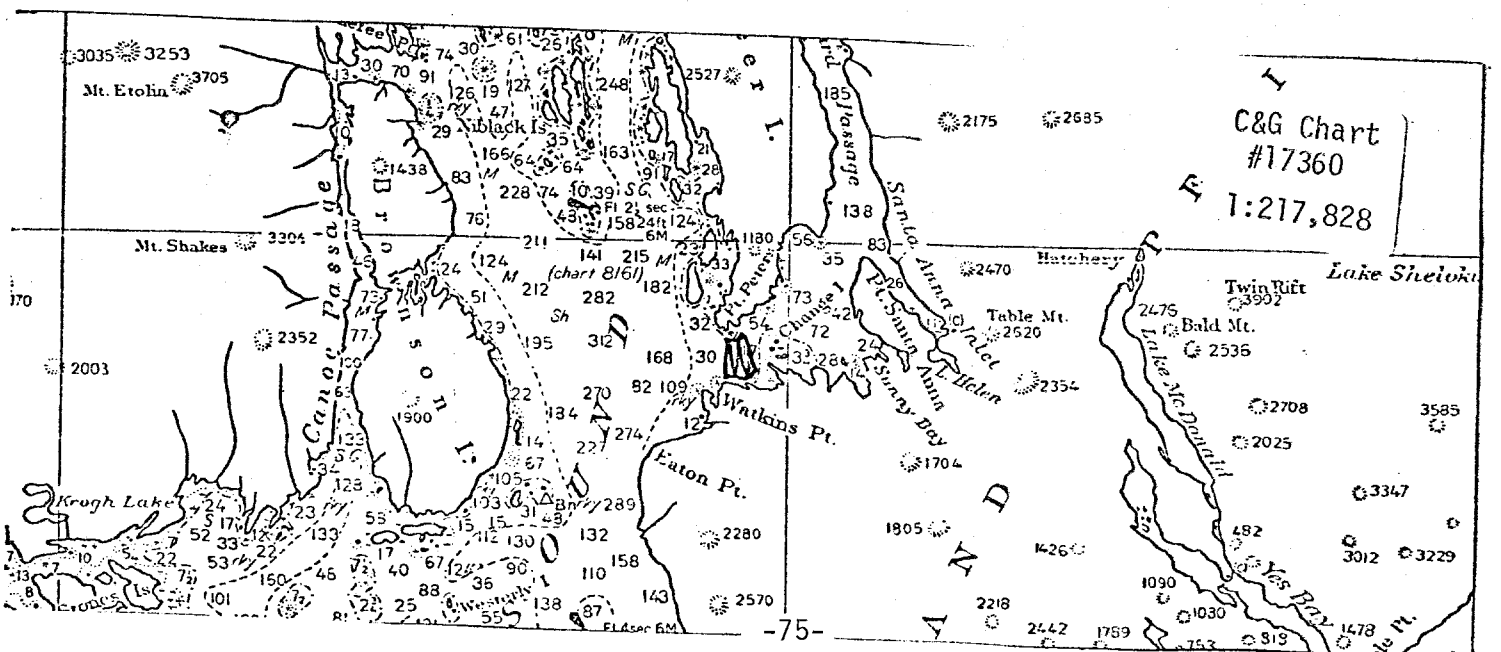



Area Deer Island Date 11/21/77 Vessel Auklet Run # 2

Gain 5.5 Attenuated -12 dB Operators Timothy

Time of Survey: Start 06:55 End 07:15 Tide Flooding

COMMENTS:



Appendix 1 continued.

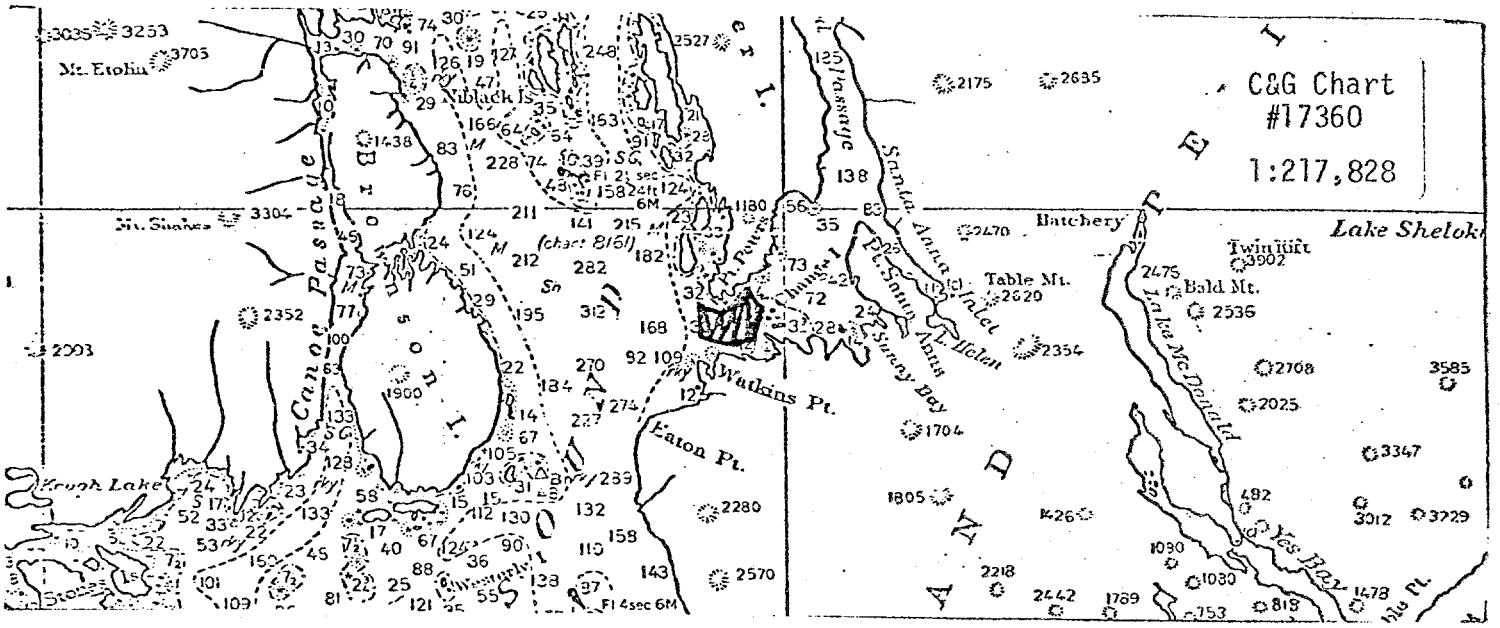
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 11/21/77 Vessel Auklet Run # 3

Gain 5.5 Attenuated -12 dB Operators Timothy

Time of Survey: Start 07:28 End 08:32 Tide Flooding

COMMENTS:

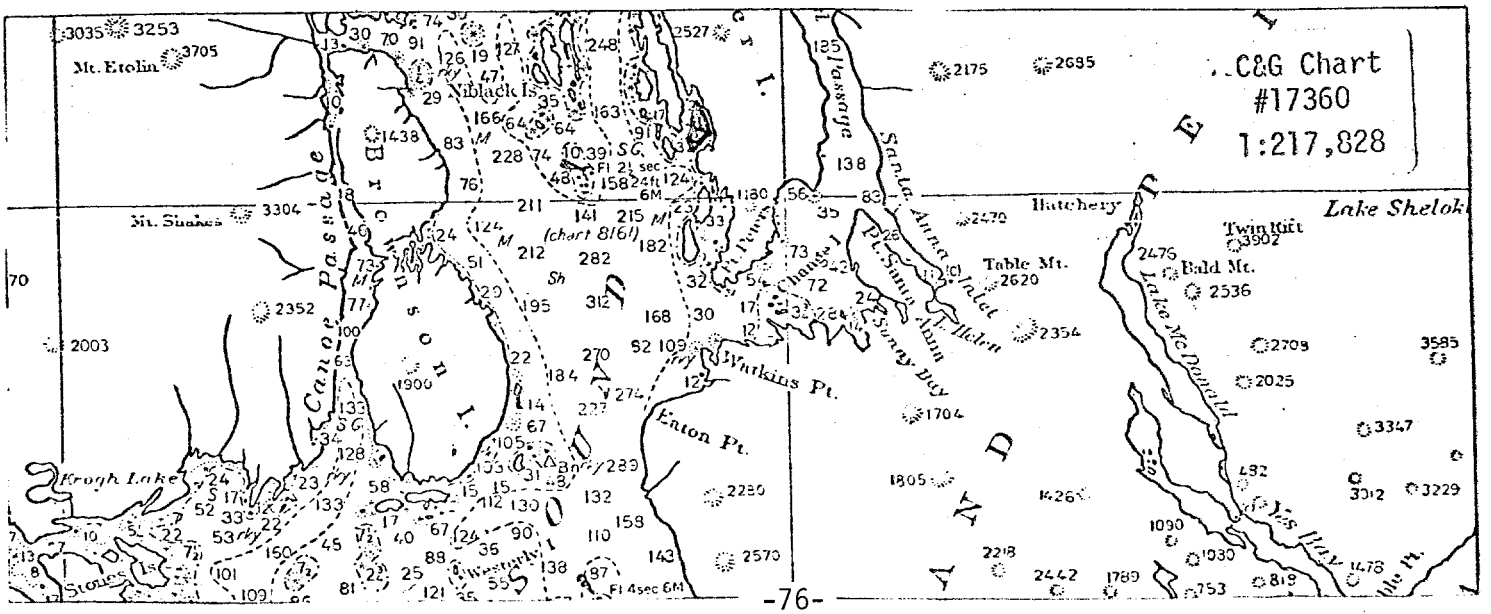



Area Deer Island Date 12/1/77 Vessel Auklet Run # 1

Gain 7.0 Attenuated -12 dB Operators Bracken

Time of Survey: Start 11:25 End 11:55 Tide Low

COMMENTS:



Appendix 1 continued.

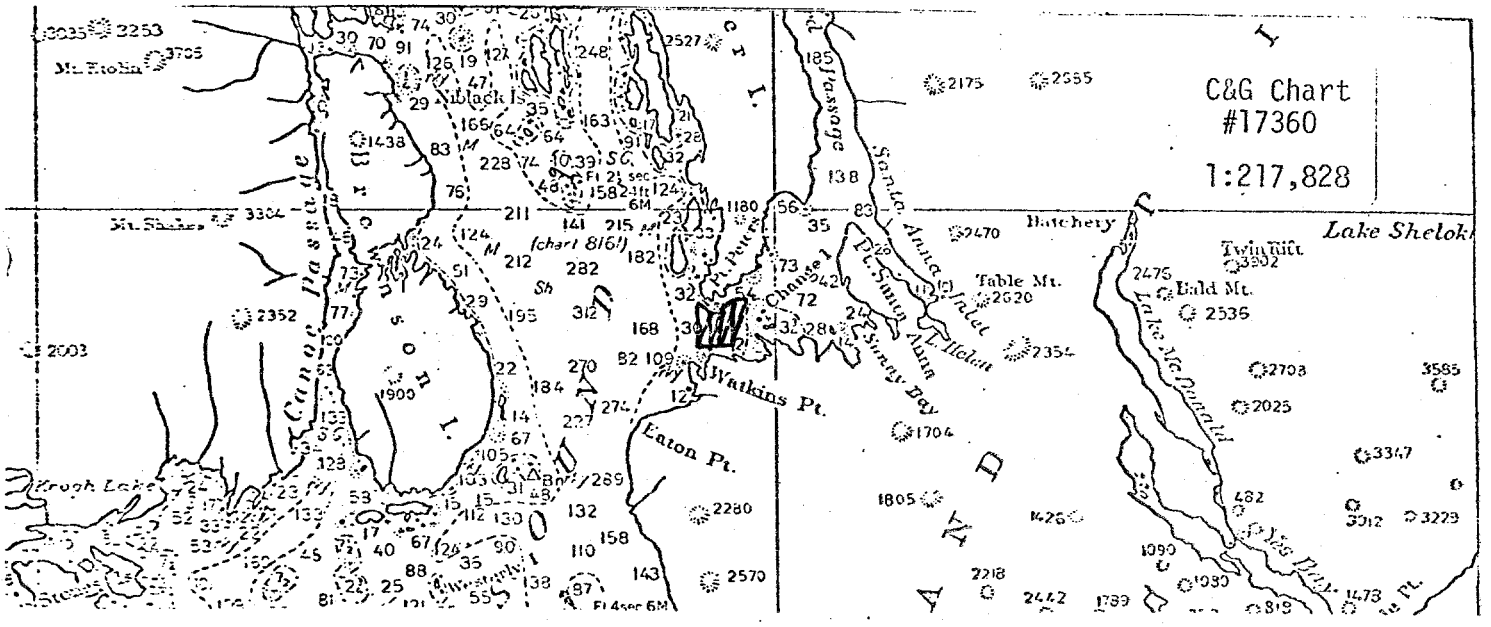
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 12/1/77 Vessel Auklet Run # 1

Gain 6.5 Attenuated -12 dB Operators Bracken

Time of Survey: Start 13:05 End 13:51 Tide

COMMENTS: Some saturation may have occurred.

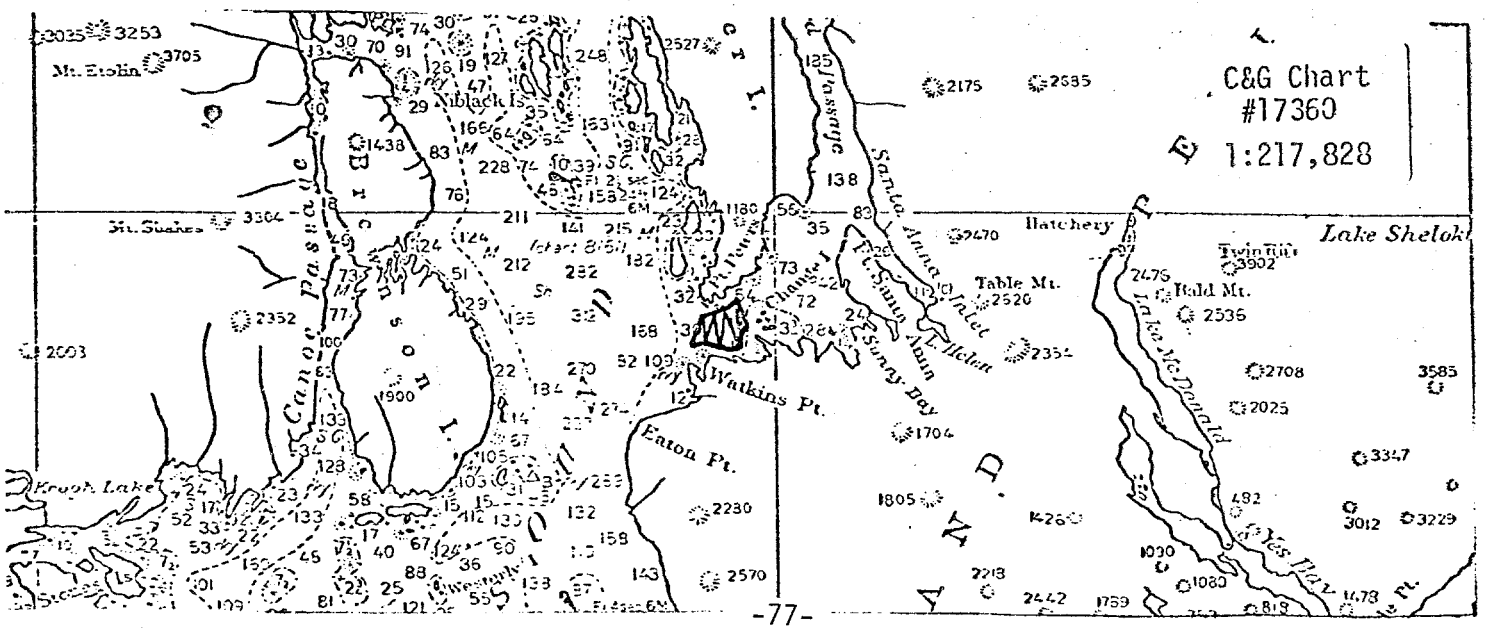



Area Deer Island Date 12/1/77 Vessel Auklet Run # 2

Gain 6.25 Attenuated -12 dB Operators Bracken

Time of Survey: Start 15:00 End 15:44 Tide

COMMENTS: Fish moved toward mainland shore.



Appendix 1 continued.

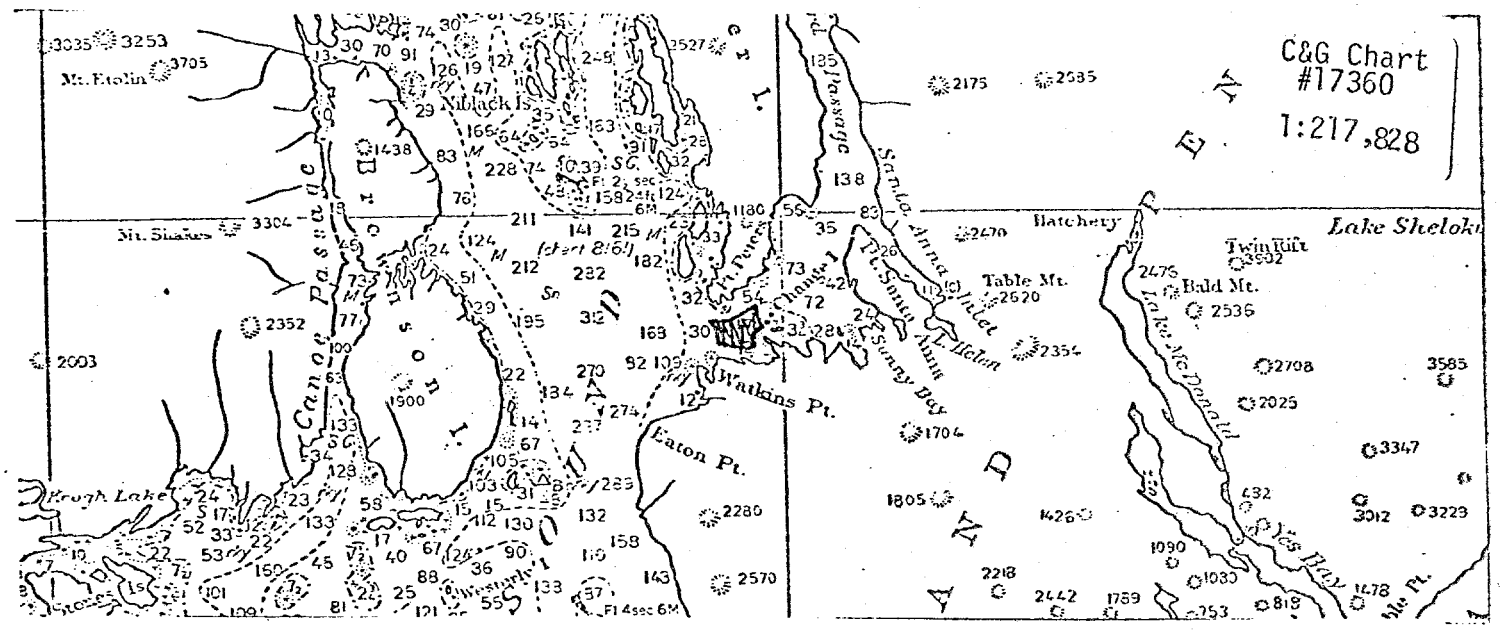
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island (Herring Cove) Date 12/2/77 Vessel Auklet Run #1

Gain 7.0 Attenuated -12 dB Operators Bracken

Time of Survey: Start 07:10 End 07:55 Tide

COMMENTS:

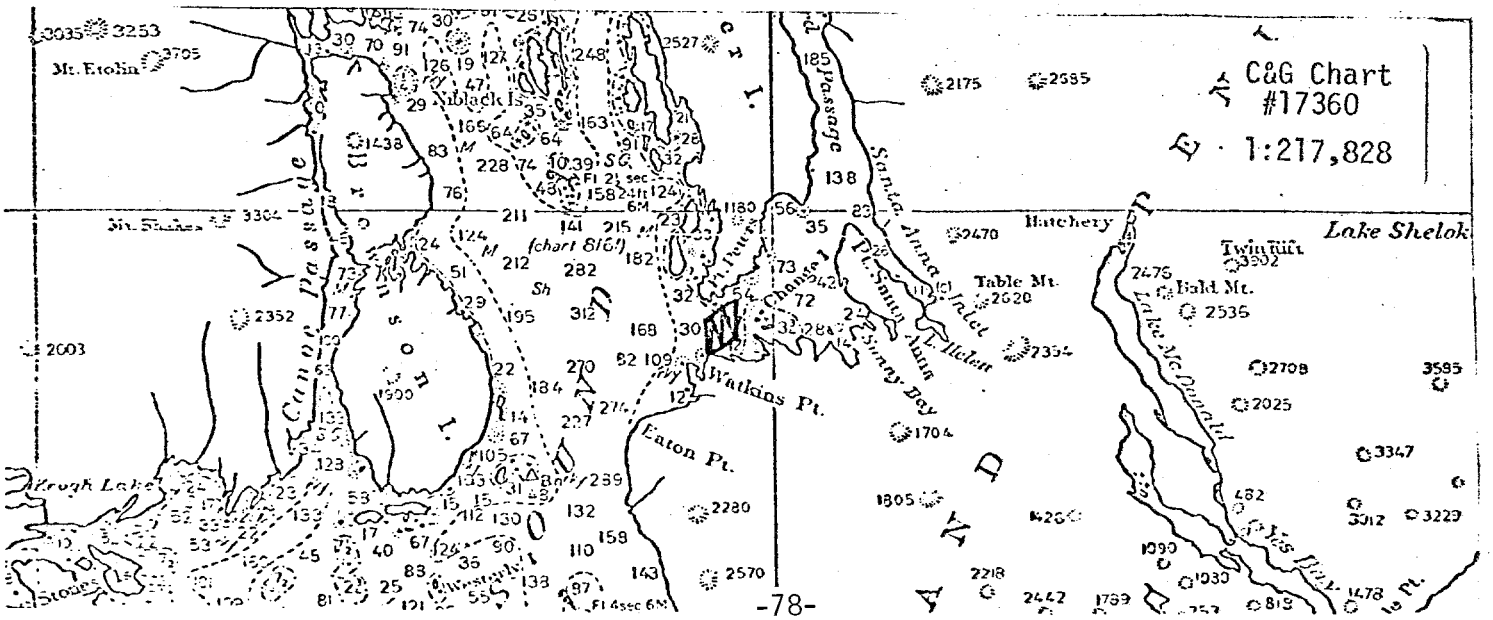



Area Deer Island (Herring Cove) Date 12/2/77 Vessel Auklet Run # 2

Gain 6.25 Attenuated -12 dB Operators Bracken

Time of Survey: Start 08:10 End 08:37 Tide Mid ebb

COMMENTS: Fish were moving toward the Pt. Peters side and concentrating. Some saturation may have occurred on the first two legs of the transect.



Appendix 1 continued.

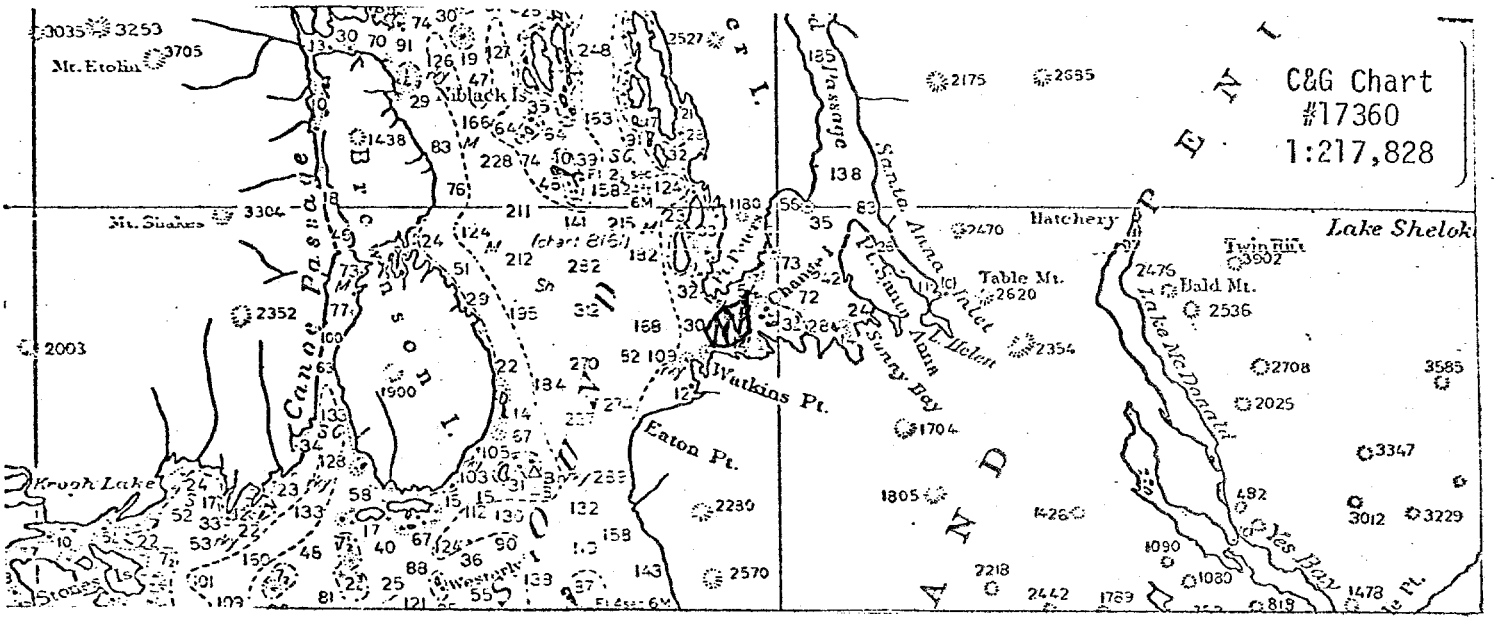
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 1/11/78 Vessel Auklet Run # 1

Gain 6.0 Attenuated -12 dB Operators Bergmann

Time of Survey: Start 14:00 End 14:30 Tide Low 08:56 (.8') Flooding

COMMENTS: Four schools observed.

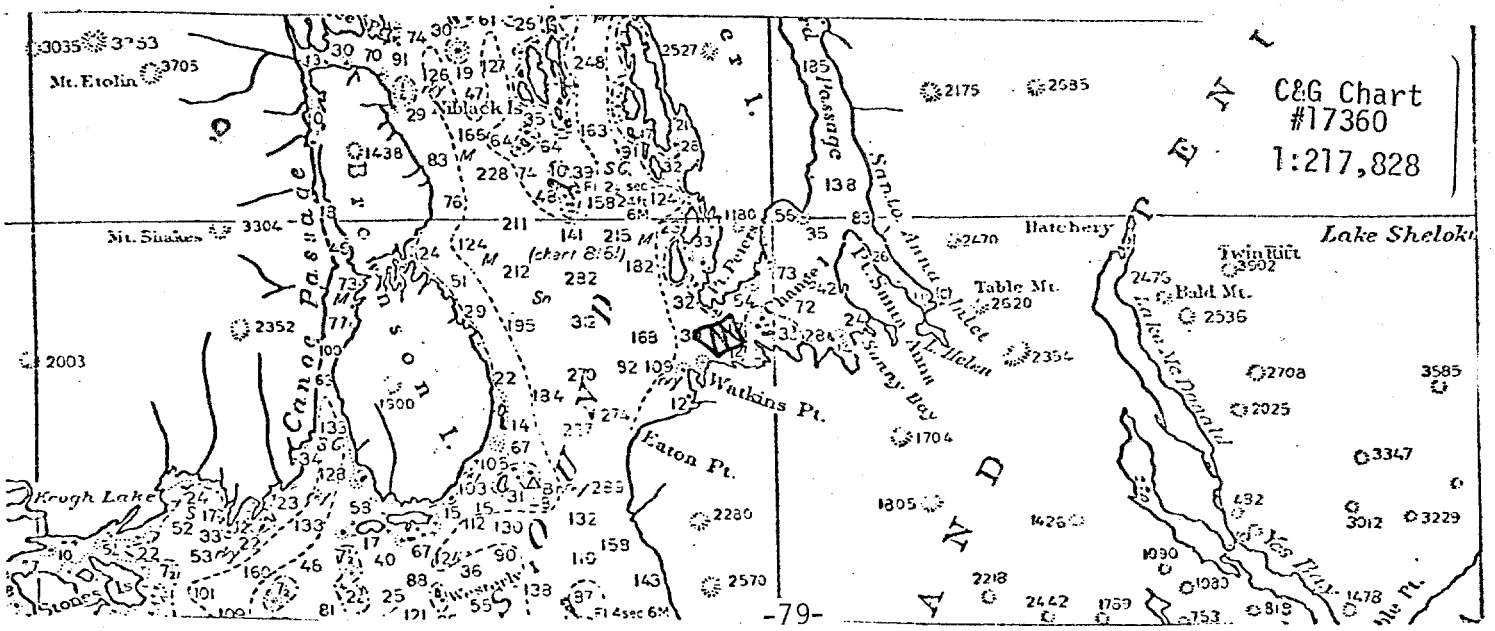



Area Deer Island Date 1/11/78 Vessel Auklet Run # 2

Gain 6.0 Attenuated -12 dB Operators Bergmann

Time of Survey: Start 14:45 End 15:13 Tide High 15:01 (18.5') High slack

COMMENTS: Slight saturation.



Appendix 1 continued.

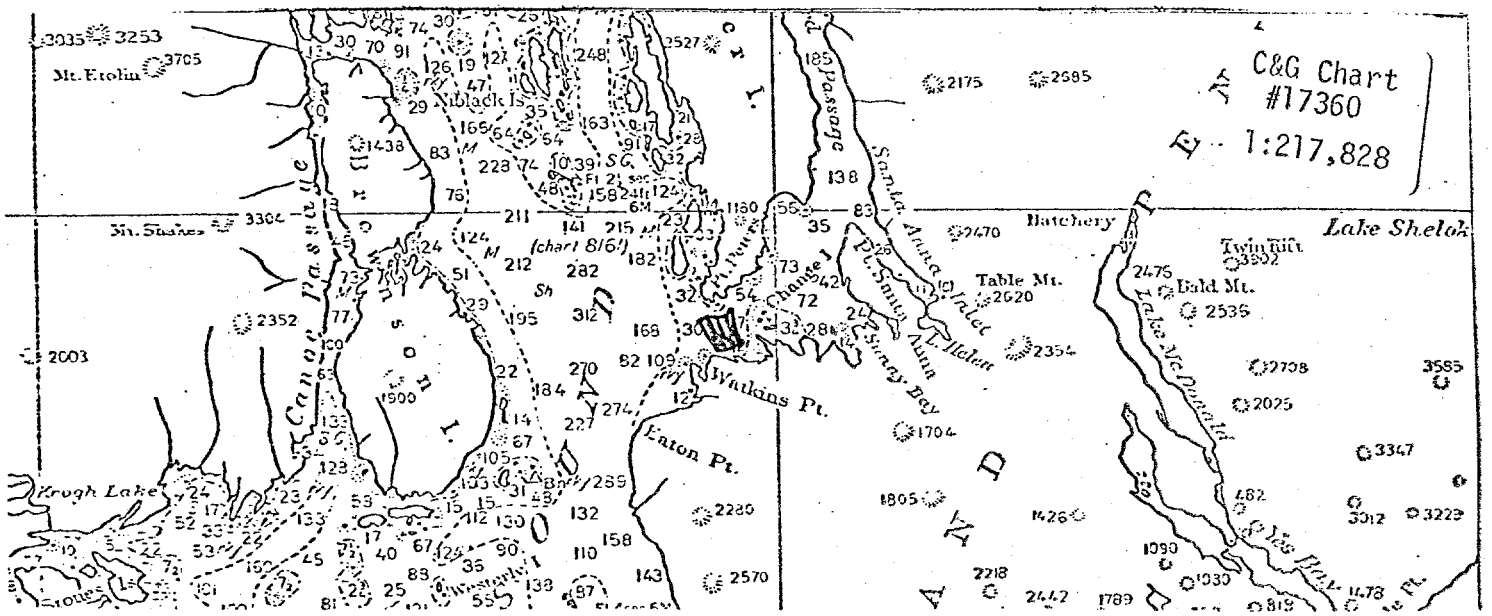
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 1/11/78 Vessel Auklet Run # 3

Gain 5.5 Attenuated -12 dB Operators Bergmann

Time of Survey: Start 15:18 End 15:50 Tide Ebb - high 15:01 (18.5')

COMMENTS: Six schools; fish more scattered than in Runs 1 and 2.

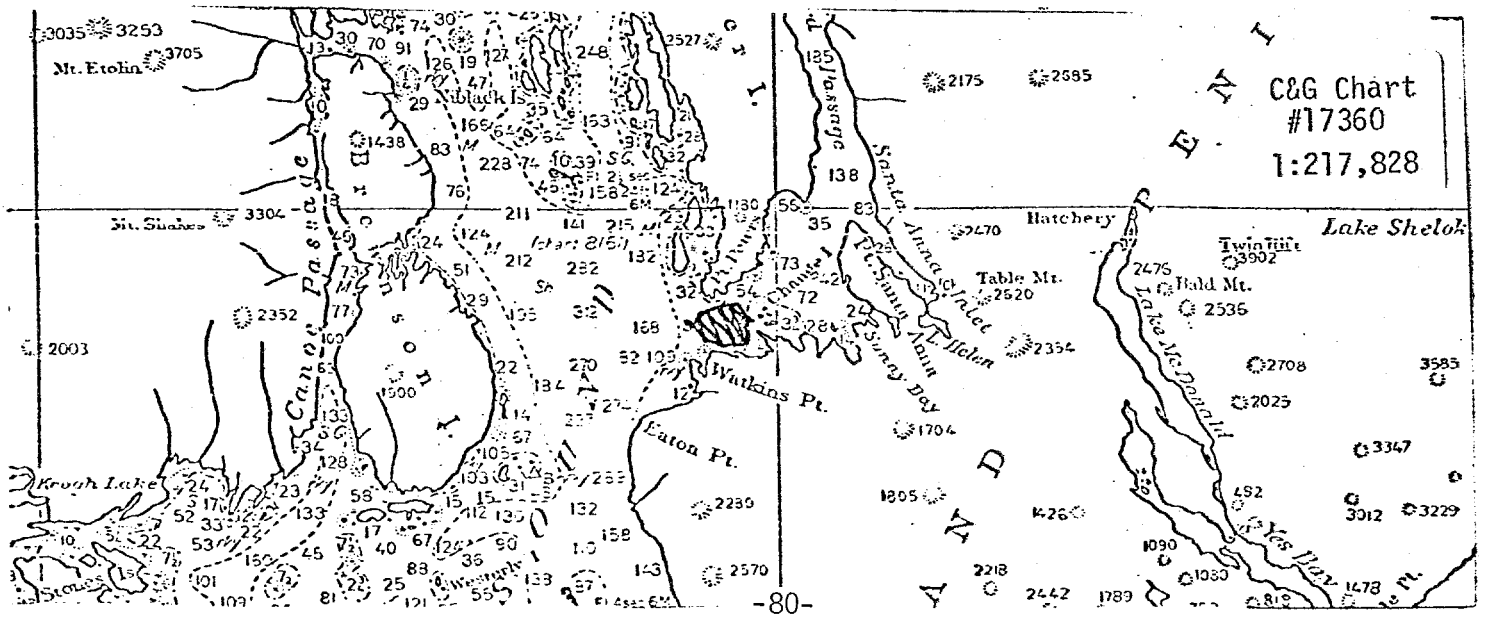



Area Deer Island Date 1/11/78 Vessel Auklet Run # 4

Gain 5.5 Attenuated -12 dB Operators Bergmann

Time of Survey: Start 15:59 End 16:43 Tide Ebb - high 15:01 (18.5')

COMMENTS: Significant saturation on last school. Four schools; fish getting denser and tighter on the bottom.



Appendix 1 continued.

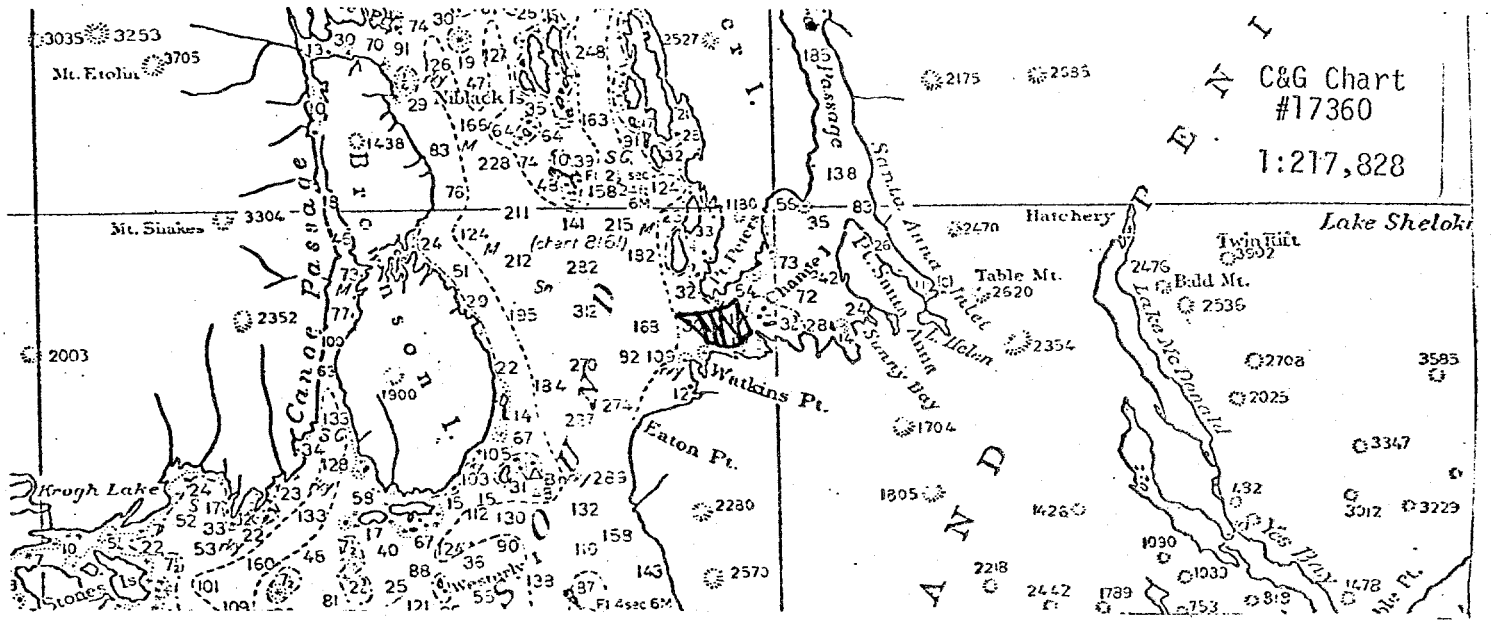
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 1/13/78 Vessel Auklet Run # 1

Gain 5.5 Attenuated -12 dB Operators Bergmann

Time of Survey: Start 08:17 End 09:00 Tide Ebb - high 16:39 (16.8')

COMMENTS: Started before dawn. Two schools; significant saturation in legs 1 and 2. Fish becoming denser right at dawn.

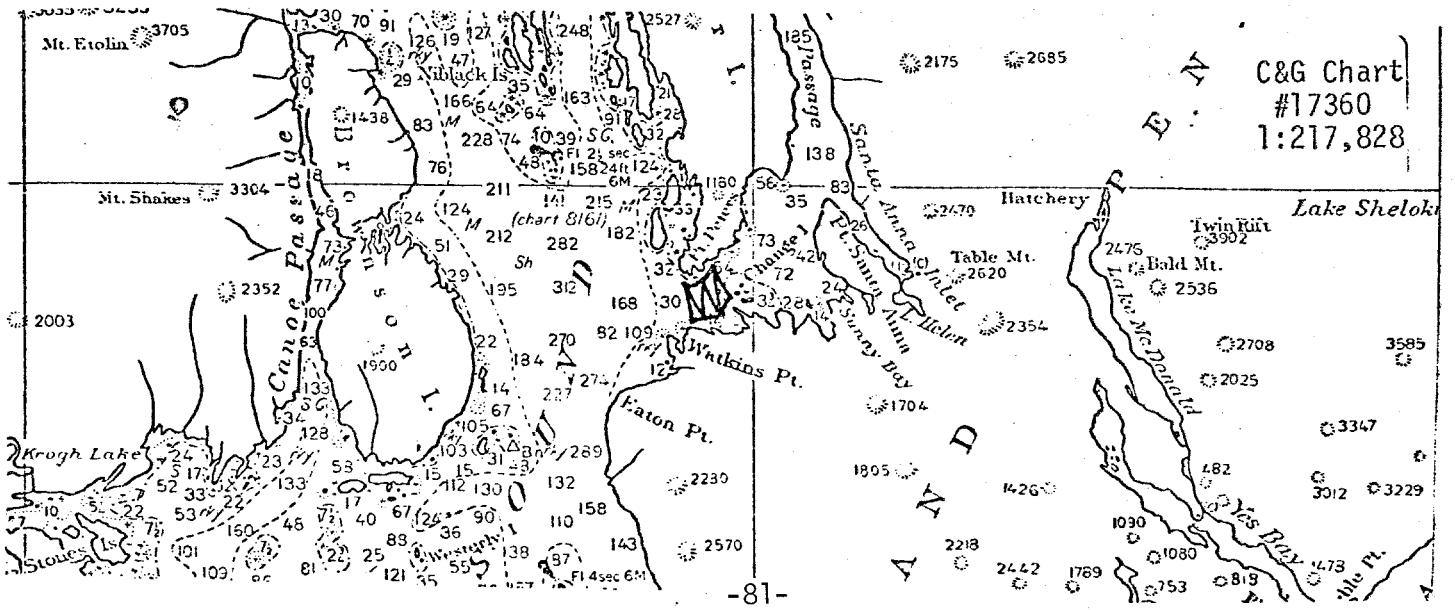



Area Deer Island Date 10/25/78 Vessel Steller Run # 1

Gain 6.0 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 1730:00 End 1753:30 Tide

COMMENTS: Saturated considerably on first of three large schools encountered. Average school depth - 38 fathoms.



Appendix 1 continued.

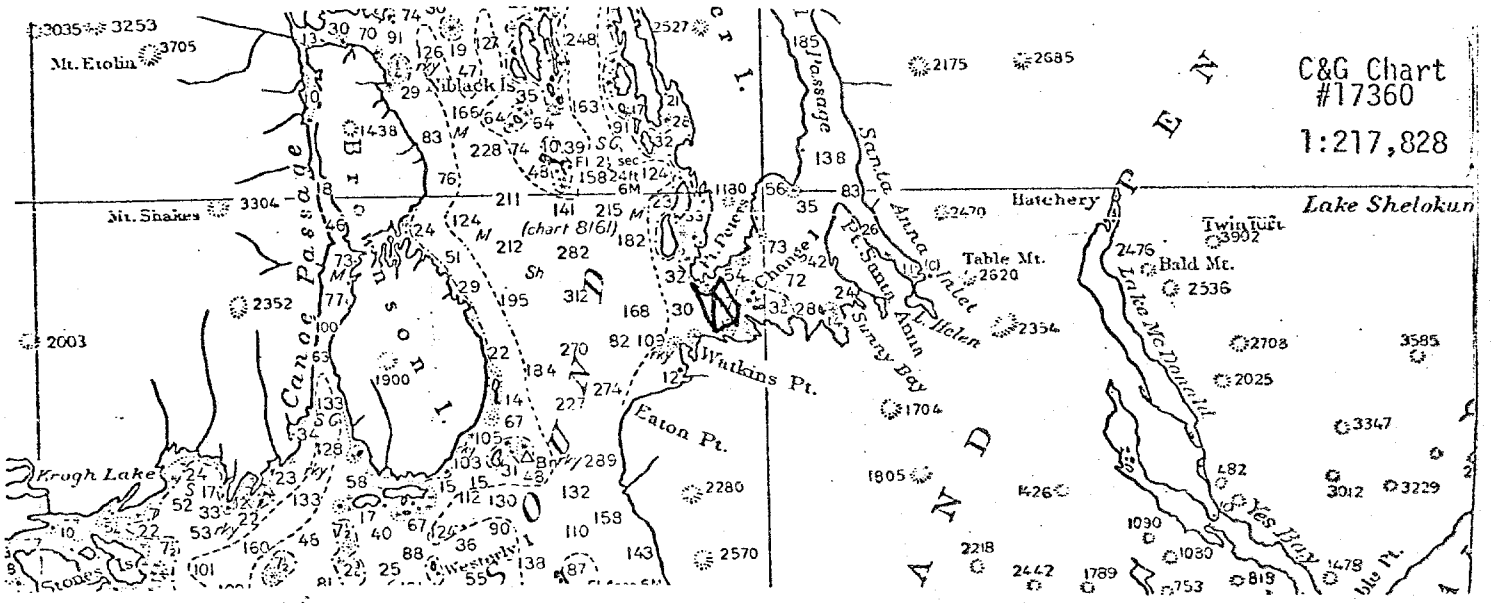
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 10/25/78 Vessel Steller Run # 2

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 1757:45 End 1817:45 Tide

COMMENTS: Average school depth of 38 fathoms.

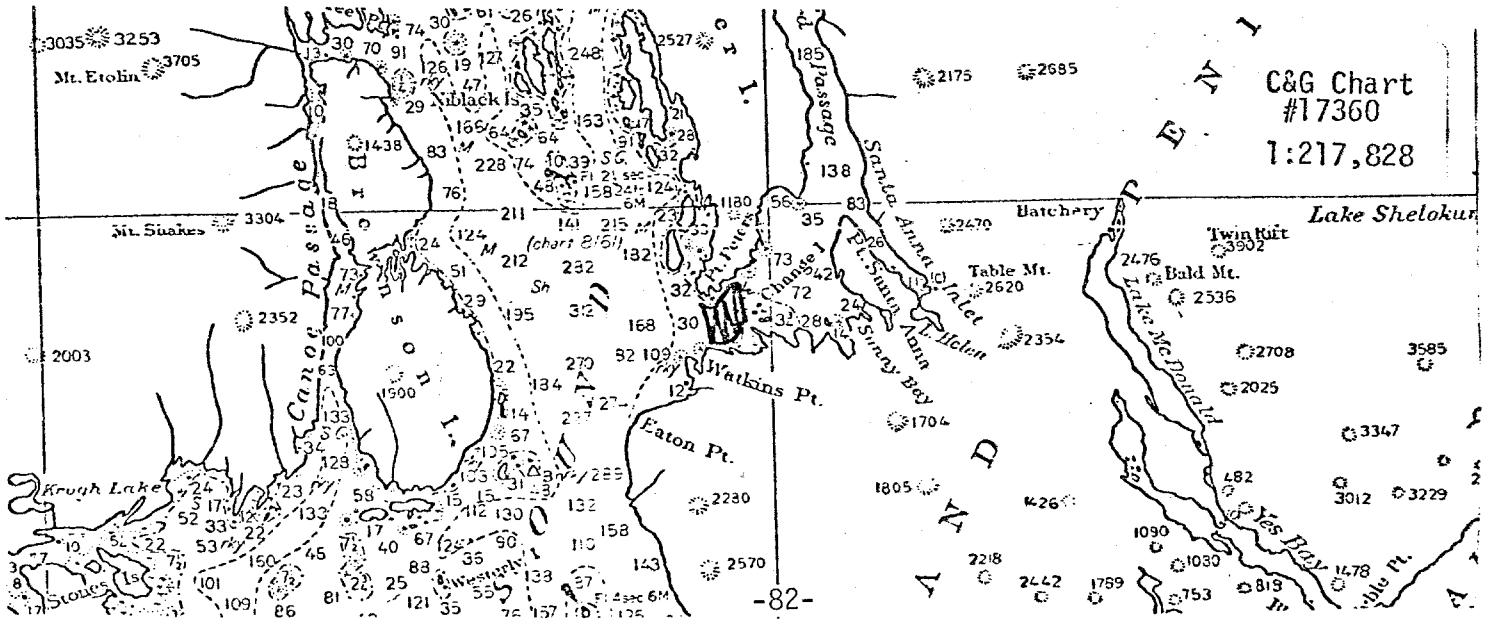



Area Deer Island Date 10/25/78 Vessel Steller Run # 3

Gain 6.0 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 1822:15 End 1850:45 Tide Flood

COMMENTS: Getting dark; fish moving into cove south of Change Island.



Appendix 1 continued.

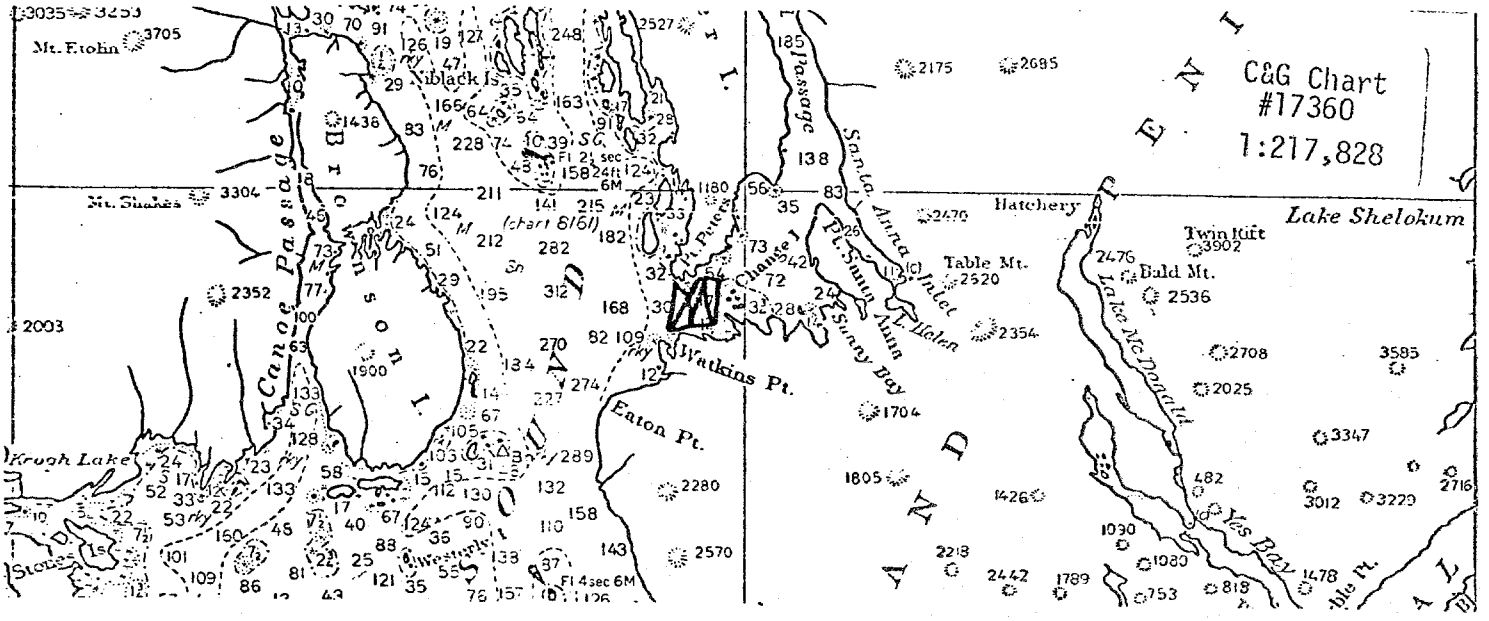
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 10/26/78 Vessel Steller Run # 1

Gain 6.0 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 0912:15 End 0945:00 Tide

COMMENTS: Fish along Deer Island shore and off Pt. Peters. Not a typical herring configuration.

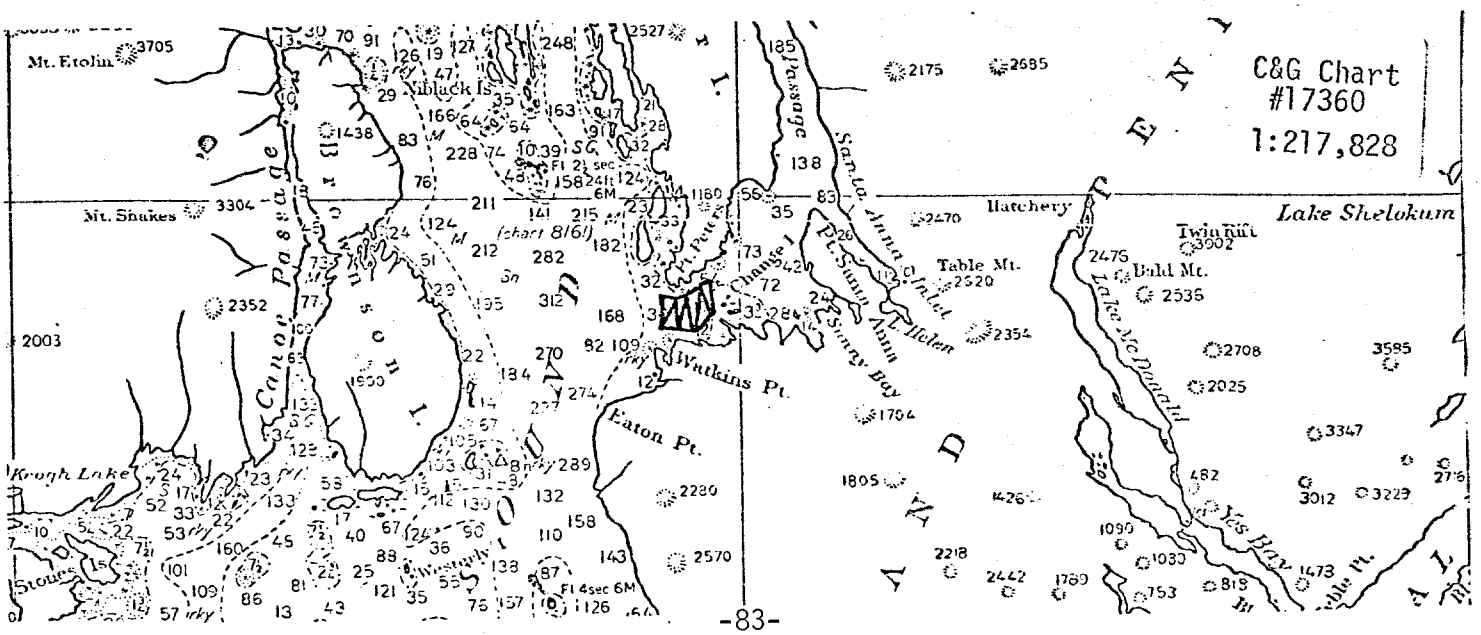



Area Deer Island Date 10/26/78 Vessel Steller Run # 2

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 09:50 End 10:25 Tide Flood - high 10:50 (12.6')

COMMENTS: Cloudy - fish on Deer Island shore right on rock wall.



Appendix 1 continued.

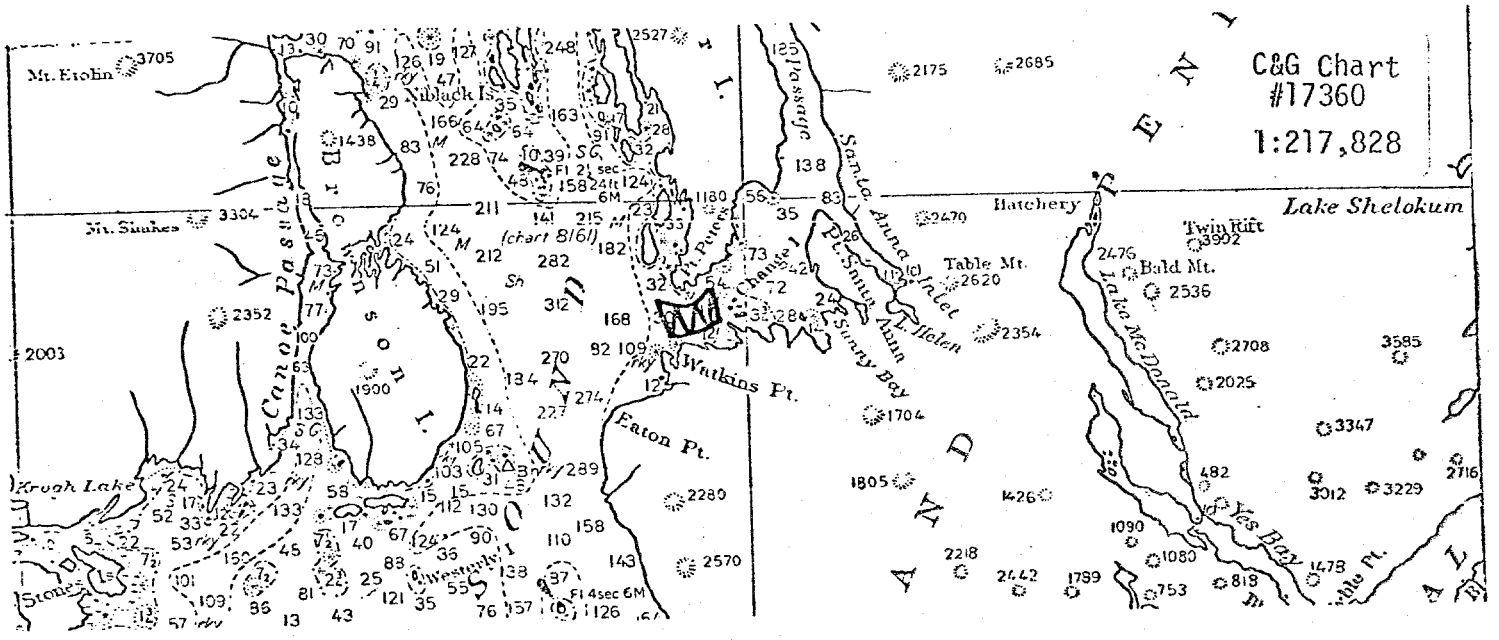
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 11/19/78 Vessel Steller Run # 3

Gain 6.0 Attenuated -12 dB Operators Timothy, Murphy

Time of Survey: Start 07:37 End 08:02 Tide ebbing - low 9:56 (4.5')

COMMENTS: Heavy saturation on two legs; fish moving from Sunny Bay to middle.

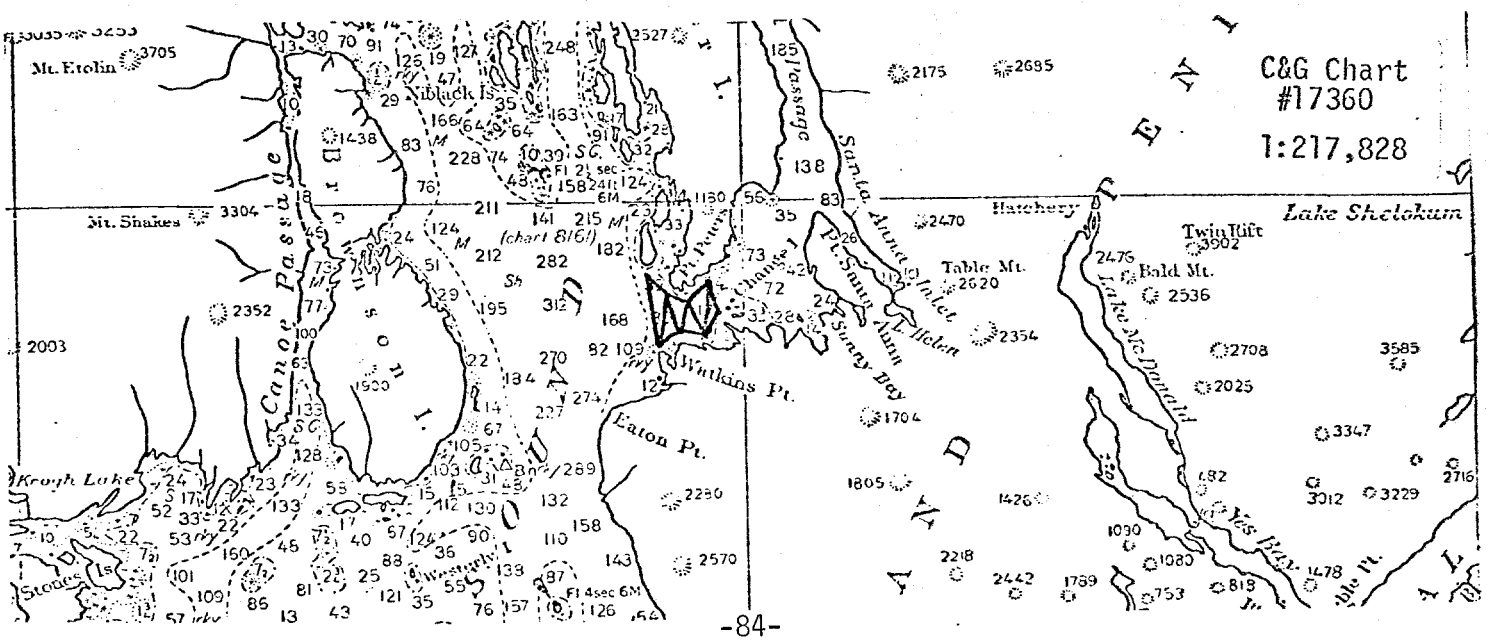



Area Deer Island Date 11/19/78 Vessel Steller Run # 4

Gain 5.5 Attenuated -12 dB Operators Timothy, Murphy

Time of Survey: Start 08:08 End 08:43 Tide ebbing; low 09:56 (4.5')

COMMENTS: Most of the herring out of the Sunny Bay area.



Appendix 1 continued.

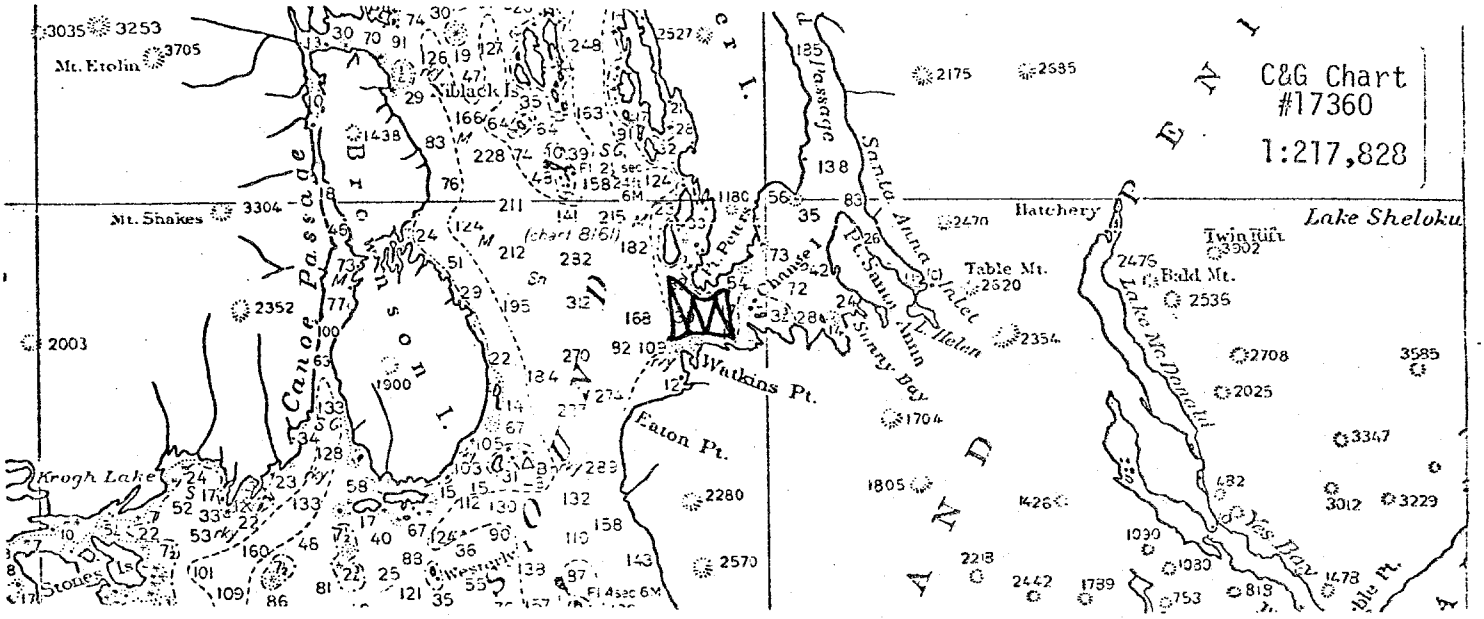
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 11/29/78 Vessel Steller Run # 1

Gain 4.2 Attenuated -12 dB Operators Street

Time of Survey: Start 12:24 End 12:51 Tide

COMMENTS: The survey doesn't completely cover the area intended due to breakdown of equipment. It may provide a low estimate.

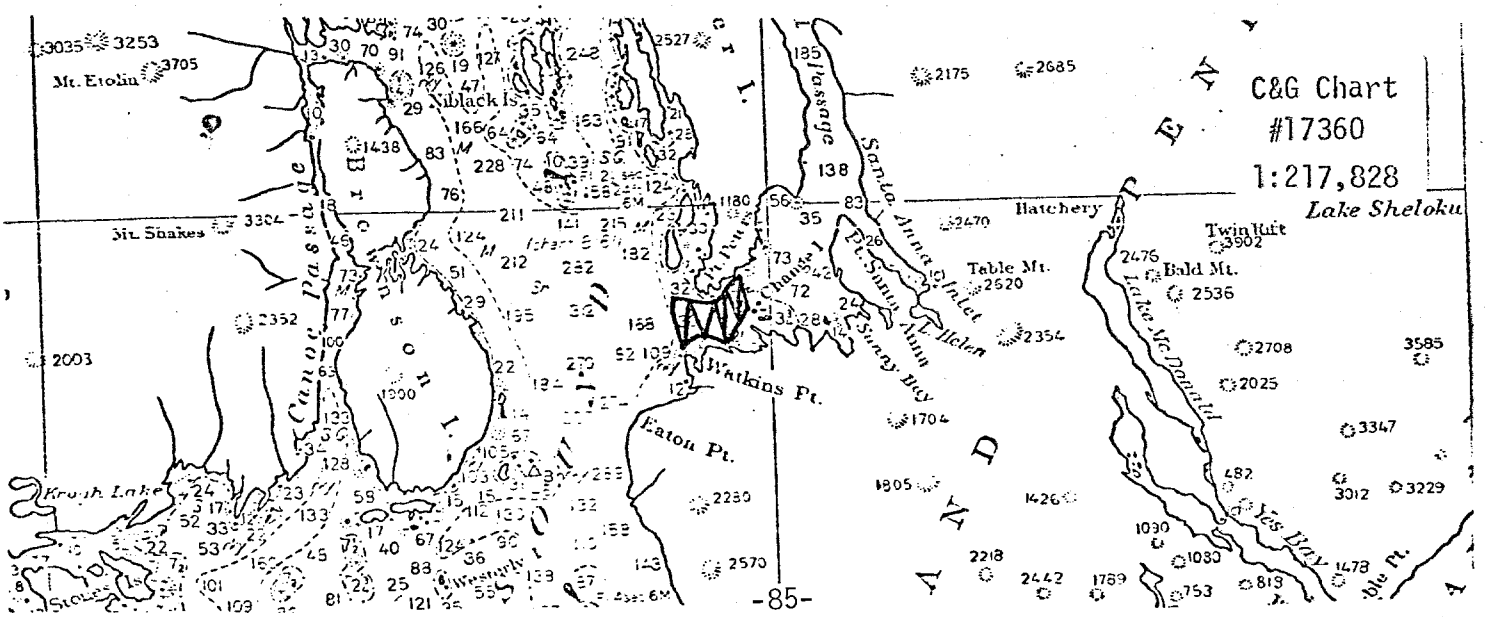



Area Deer Island Date 11/29/78 Vessel Steller Run # 2

Gain 4.2 Attenuated -12 dB Operators Street

Time of Survey: Start 14:19 End 14:58 Tide

COMMENTS: Schools are moving throughout the survey area.



Appendix 1 continued.

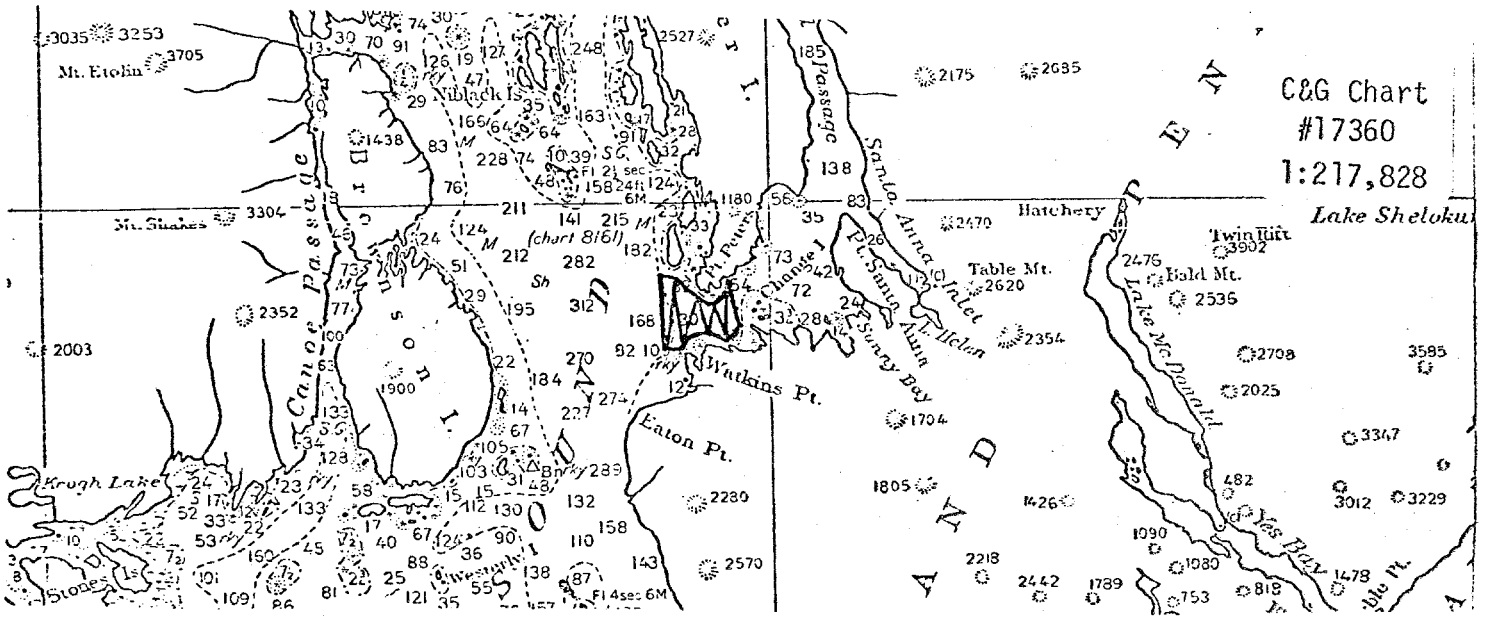
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 11/29/78 Vessel Steller Run # 3

Gain 4.5 Attenuated -12 dB Operators Street

Time of Survey: Start 15:19 End 15:57 Tide

COMMENTS:

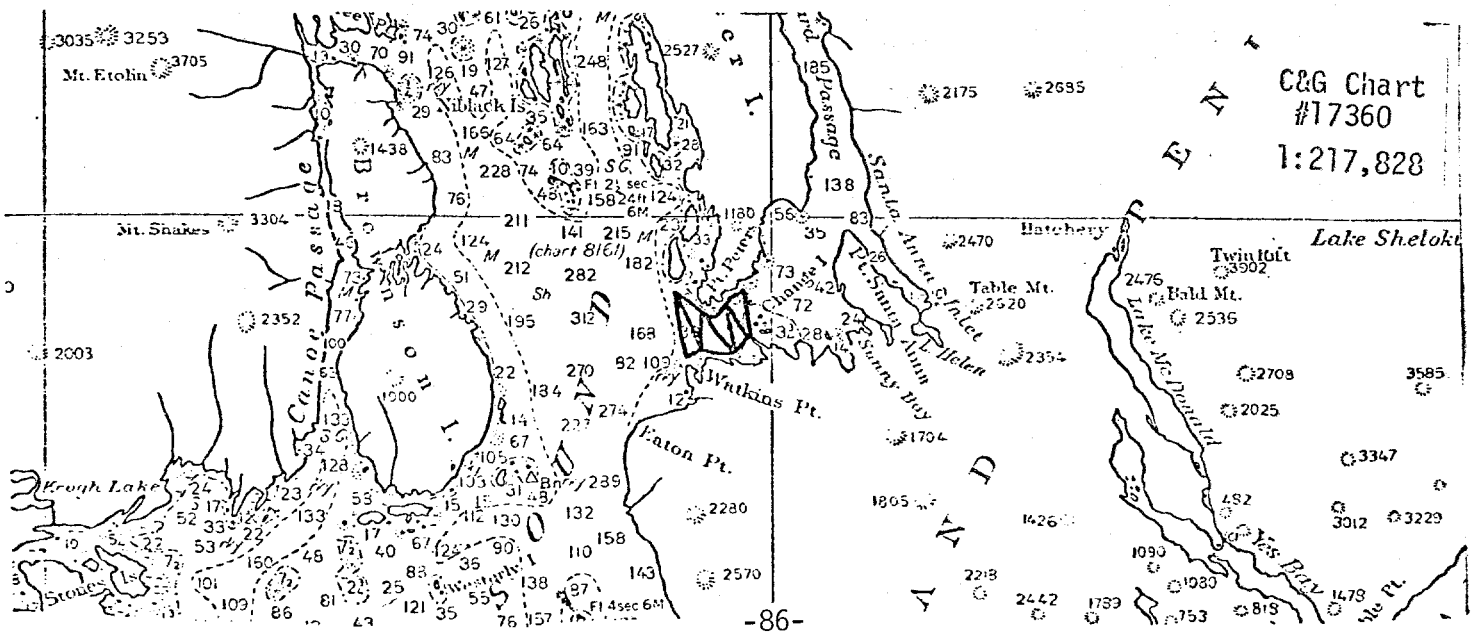



Area Deer Island Date 1/16/79 Vessel Steller Run # 1

Gain 4.5 Attenuated -12 dB Operators Timothy, Murphy

Time of Survey: Start 08:48 End 09:21 Tide Low 09:14 (3.2')

COMMENTS: Average school depth: 50 fathoms.



Appendix 1 continued.

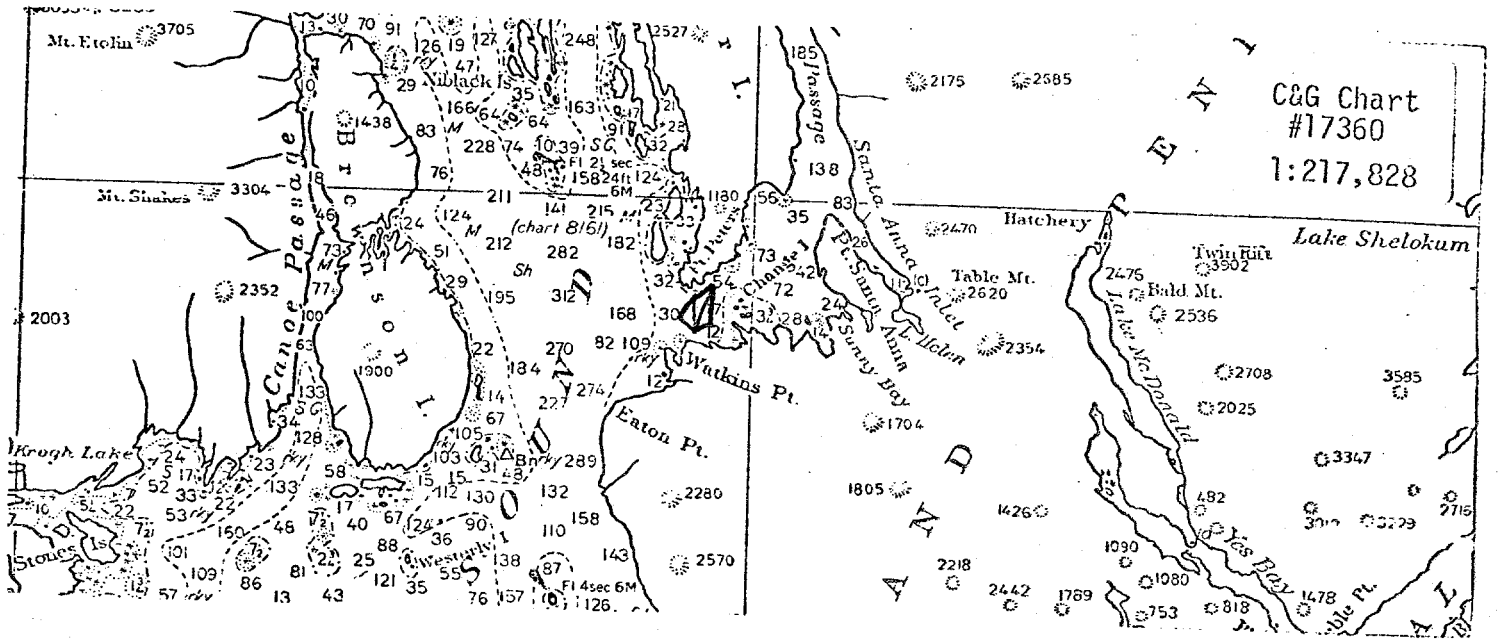
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 1/16/79 Vessel Steller Run # 3

Gain 4.5 Attenuated -12 dB Operators Timothy, Murphy

Time of Survey: Start 17:29 End 17:44 Tide Ebb High 14:43 (16.0')

COMMENTS: Schools in 30-40 fathoms. Fish moved into shallow water on bottom after this survey.

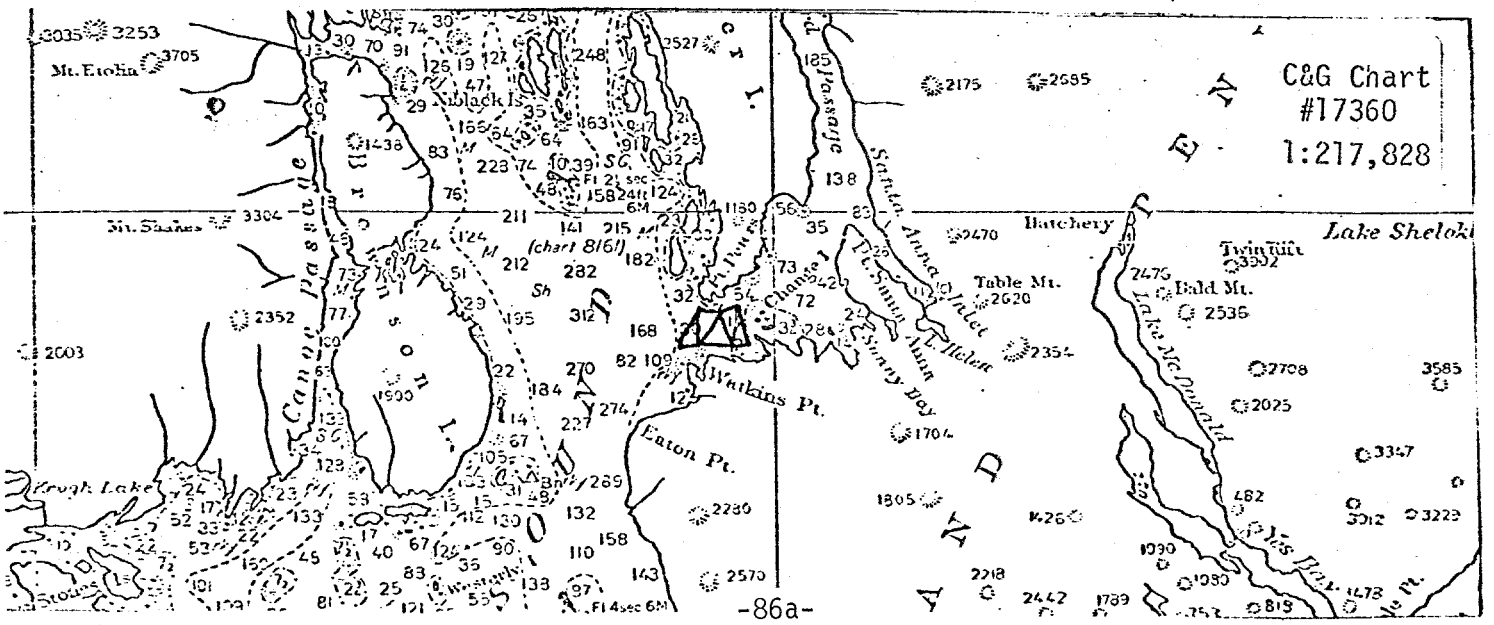



Area Deer Island Date 1/31/79 Vessel Steller Run # 2

Gain 6.0 Attenuated -12 dB Operators Bergmann, Jackinsky

Time of Survey: Start 1814:45 End 1843:15 Tide 29½ min.

COMMENTS: Peak voltage = 2.59. Vessel speed = 10 knots. Calm/dark



Appendix 1 continued.

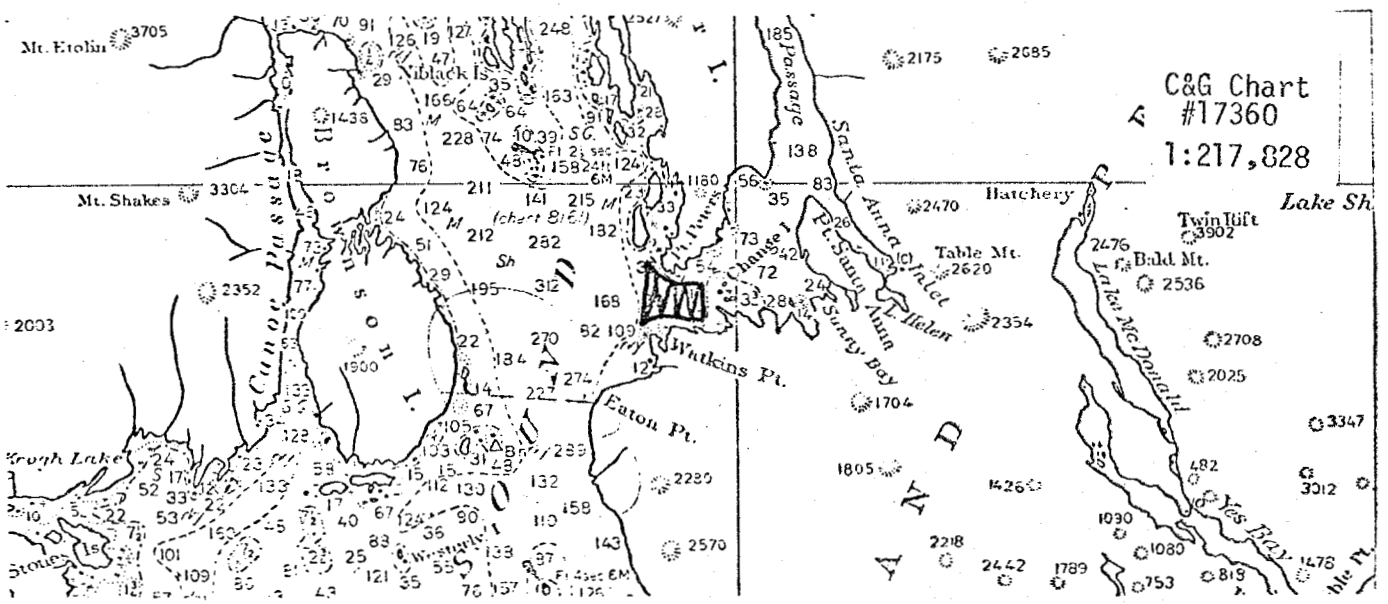
## ACOUSTICAL SURVEY SUMMARY

Area Deer Island Date 7/16/80 Vessel Sundance Run # 1

Gain 5.5 Attenuated -12dB Operators Larson, Buoy

Time of Survey: Start 0920 End 0959 Tide

COMMENTS: Fish distributed well. All fish in the area, except for several tiny sticks inside Sunny Bay and another small stick on the southeast side of Deer Island, included in this survey.

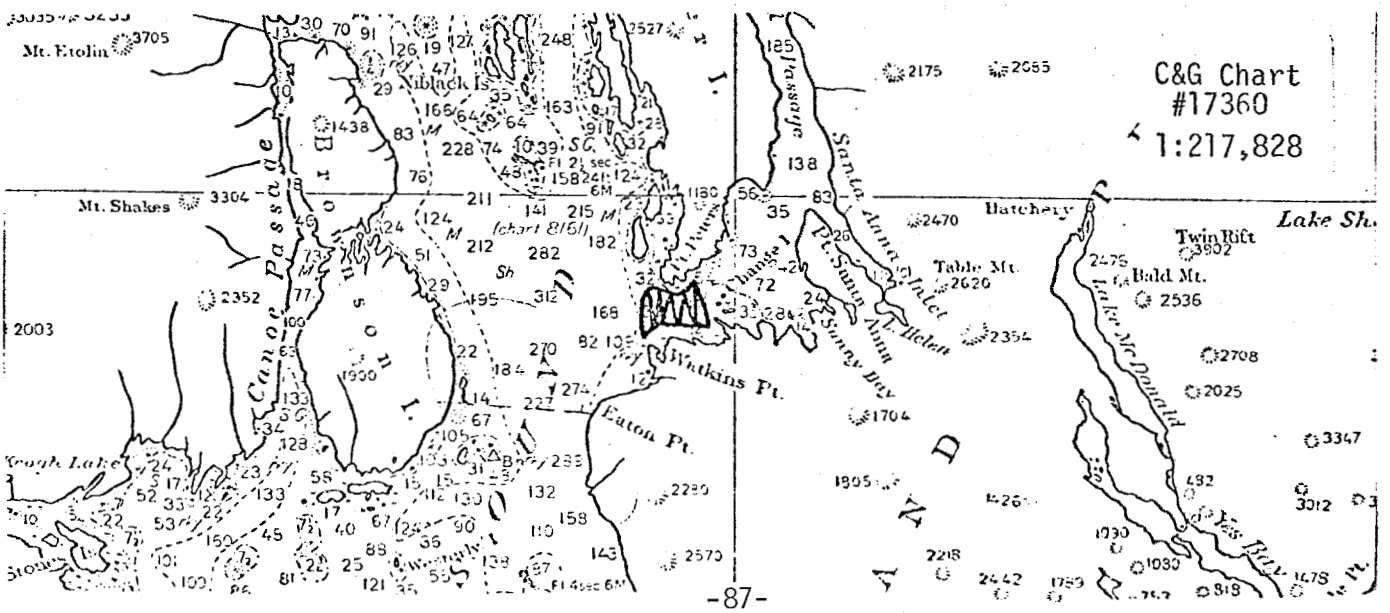



Area Deer Island Date 10/27/69 Vessel Steller Run # 1

Gain 5.0 Attenuated -12dB Operators Larson, Buoy

Time of Survey: Start 0852 End 0928 Tide 1/2 Ebb

COMMENTS: Fifty large gulls and 200 smaller gulls in the area; no marine mammals.



Appendix 1 continued.

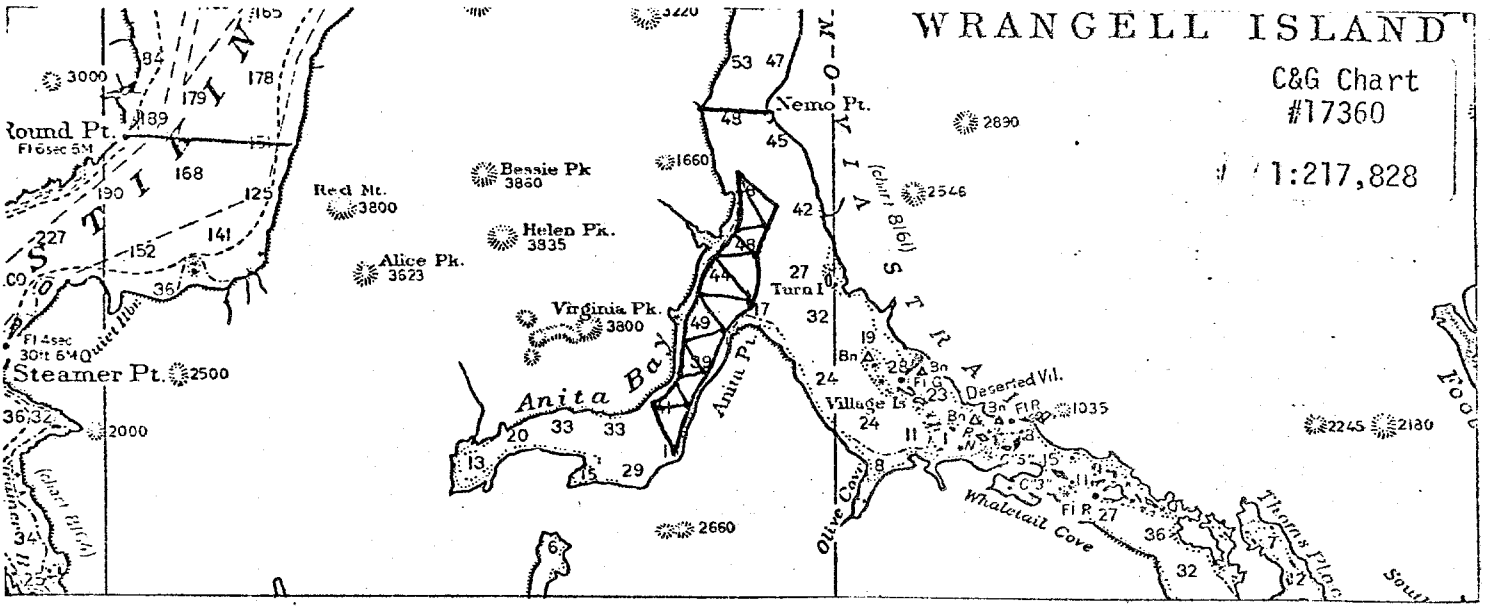
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 10/13/77 Vessel Auklet Run # 1

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler, DeJong

Time of Survey: Start 13:11 End 14:24 Tide

COMMENTS: Vessel speed was 7 knots. Very few birds in the area. Herring schools were small and dispersed off bottom. Searched outside Anita Bay near Nemo Pt. - only one school observed.

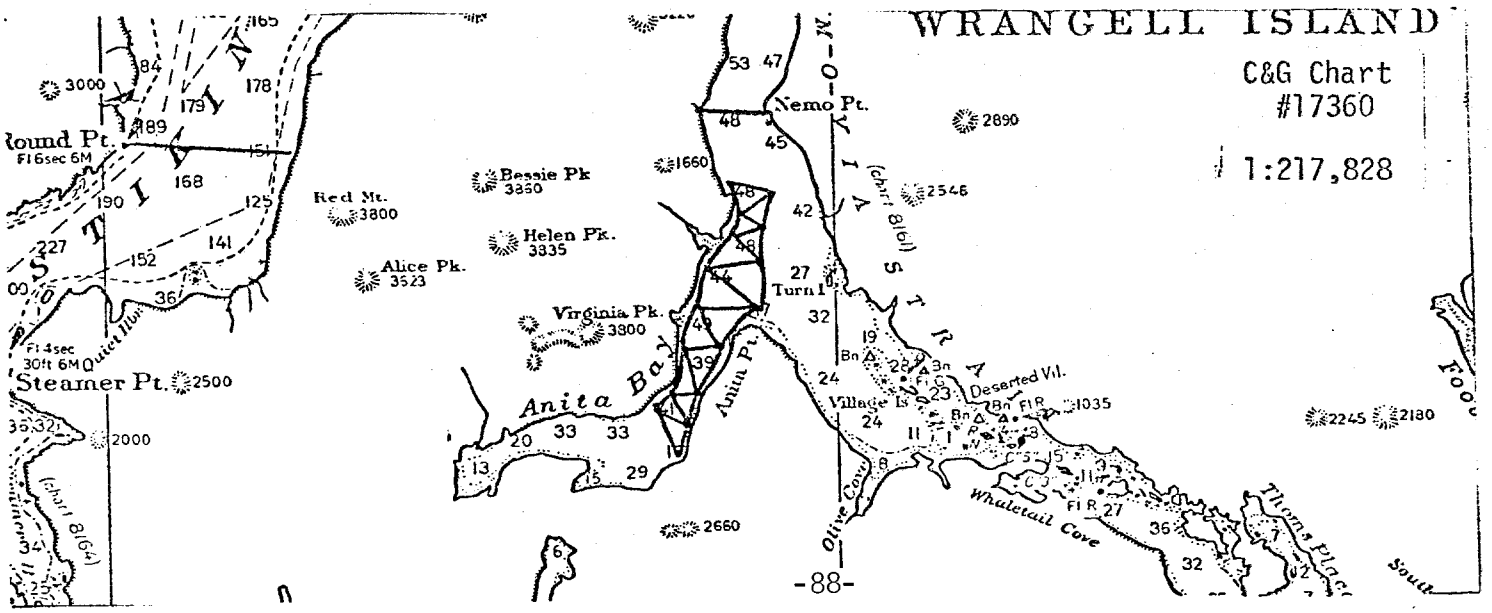



Area Anita Bay Date 10/13/77 Vessel Auklet Run # 2

Gain 6.0 Attenuated -12 dB Operators Blankenbeckler, DeJong

Time of Survey: Start 15:55 End 17:05 Tide

COMMENTS: Same survey as Run #1 only reversed. No saturation at higher gain - better signal. 5°C is $H_2O$ temp.



Appendix 1 continued.

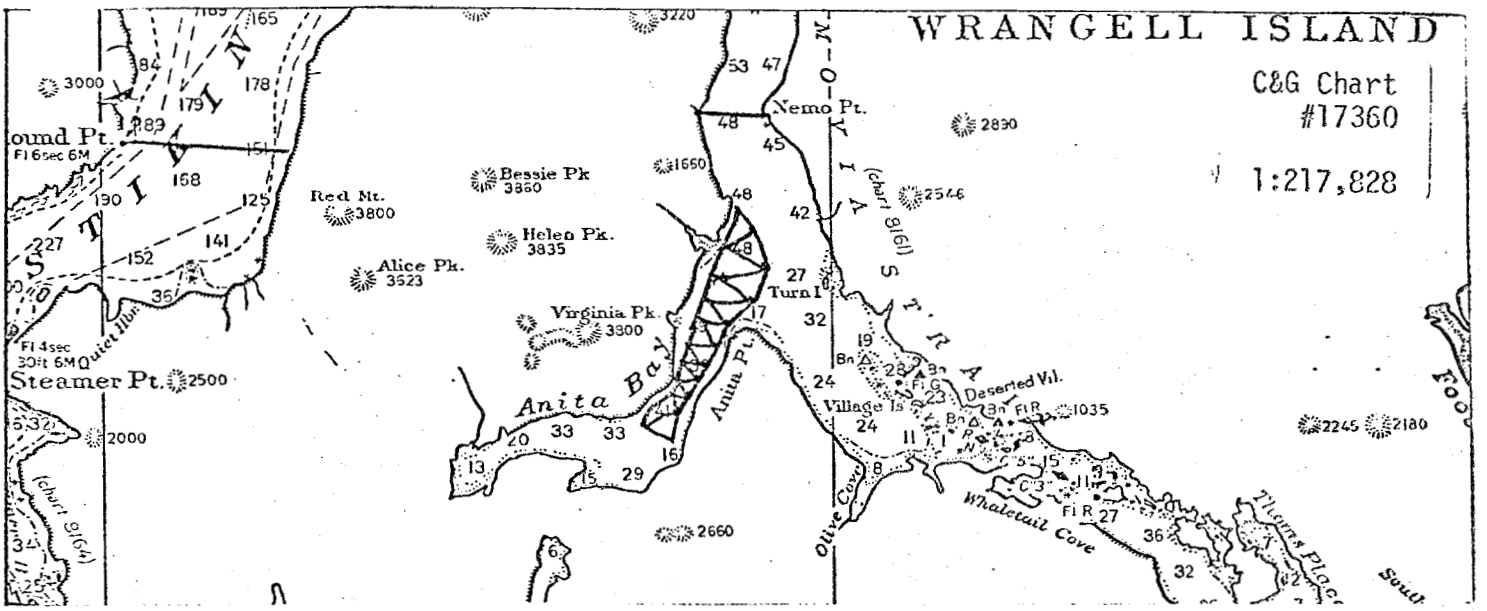
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 11/19/77 Vessel Auklet Run # 1

Gain 6.0 - 5.5 Attenuated -12 dB Operators Bergmann, Timothy

Time of Survey: Start 15:13 End 16:43 Tide Flooding

COMMENTS: Constant 7.5 knots. Some schools saturated prior to changing gain to 5.5.

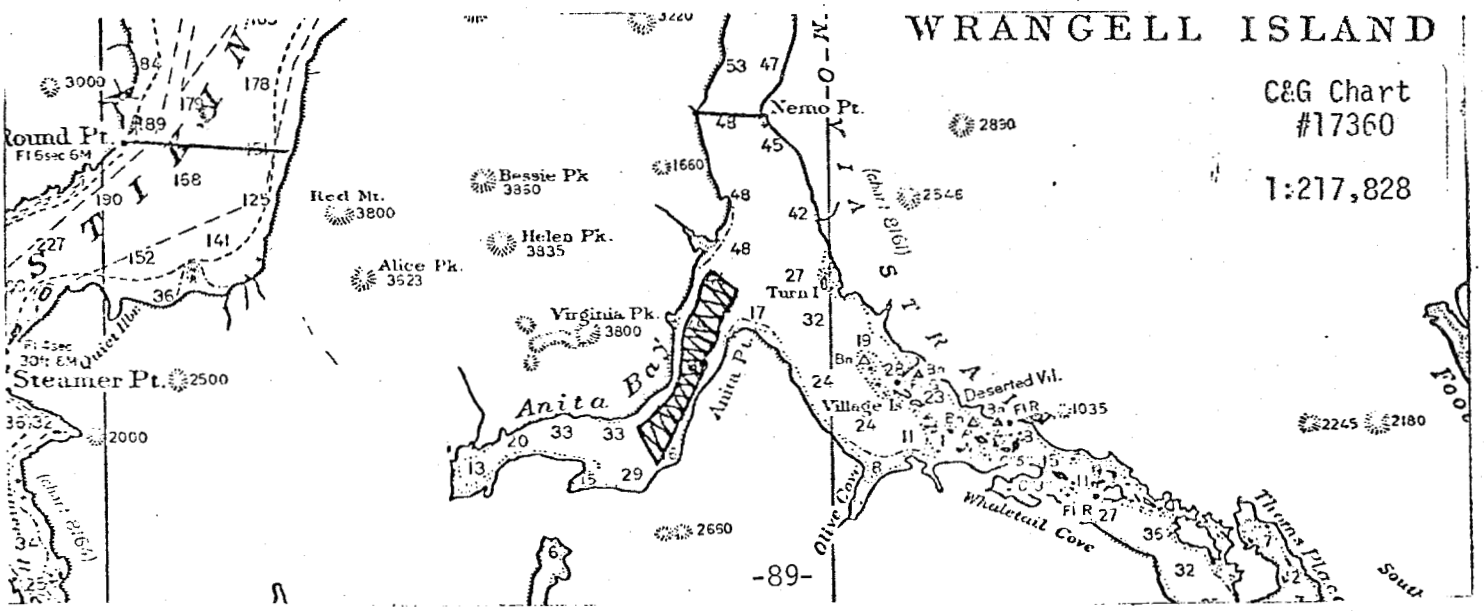



Area Anita Bay Date 11/19/77 Vessel Auklet Run # 2

Gain 5.5 - 6.0 Attenuated -12 dB Operators Bergmann, Timothy

Time of Survey: Start 17:06 End 19:44 Tide Flood-Low 15:00 (3.4')

COMMENTS: This run utilized two tapes and two gain settings.



Appendix 1 continued.

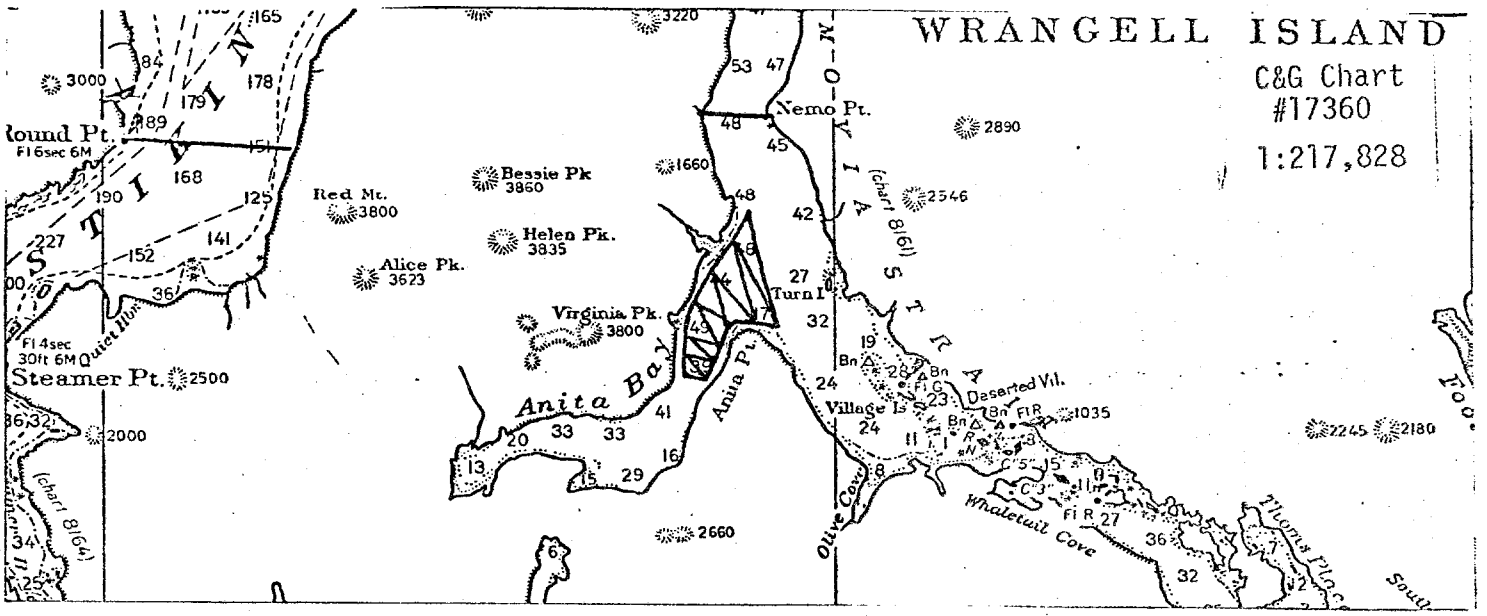
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 11/29/77 Vessel Auklet Run # 1

Gain 6.52 Attenuated -12 dB Operators Bracken

Time of Survey: Start 12:55 End 14:25 Tide Flood

COMMENTS: About 50% of the schools in the area were missed.

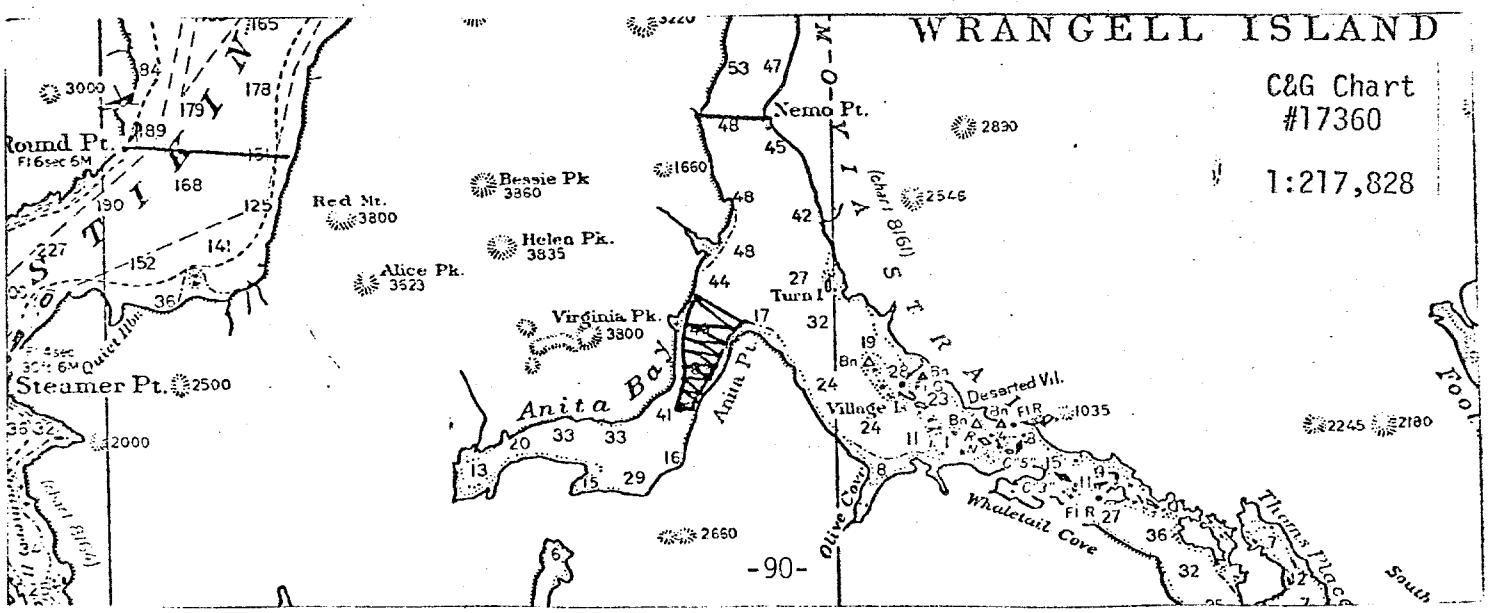



Area Anita Bay Date 11/29/77 Vessel Auklet Run # 2

Gain 6.0 - 6.5 Attenuated -12 dB Operators Bracken

Time of Survey: Start 16:15 End 17:40 Tide Ebb

COMMENTS: This appeared to be a good run with fish just coming off the bottom. Recorded at two gain settings.



Appendix 1 continued.

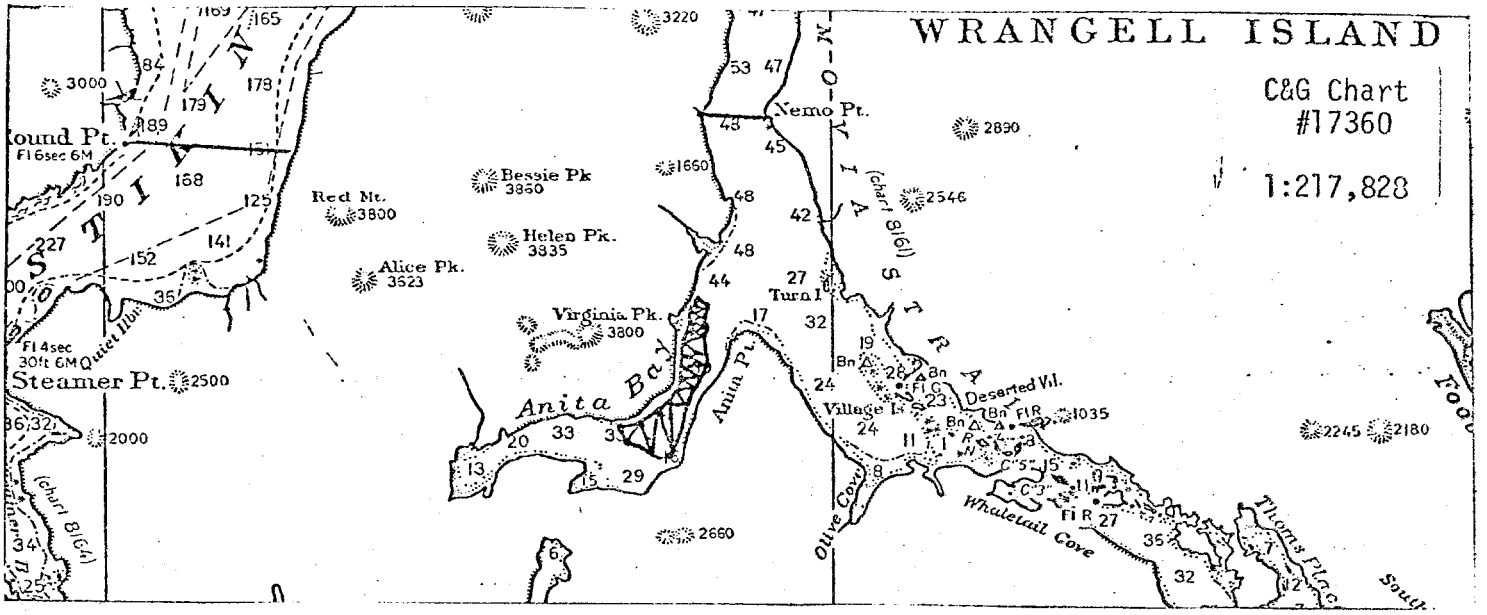
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 1/10/78 Vessel Auklet Run # 1

Gain 5.5 - 6.0 - 6.5 Attenuated -12 dB Operators Bergmann

Time of Survey: Start 17:46 End 19:14 Tide Ebbing, high (19.2') 14:14

COMMENTS: Fish dispersed shallower and towards the beach during the survey. The gain was increased from 5.5 to 6.0 to 6.5.

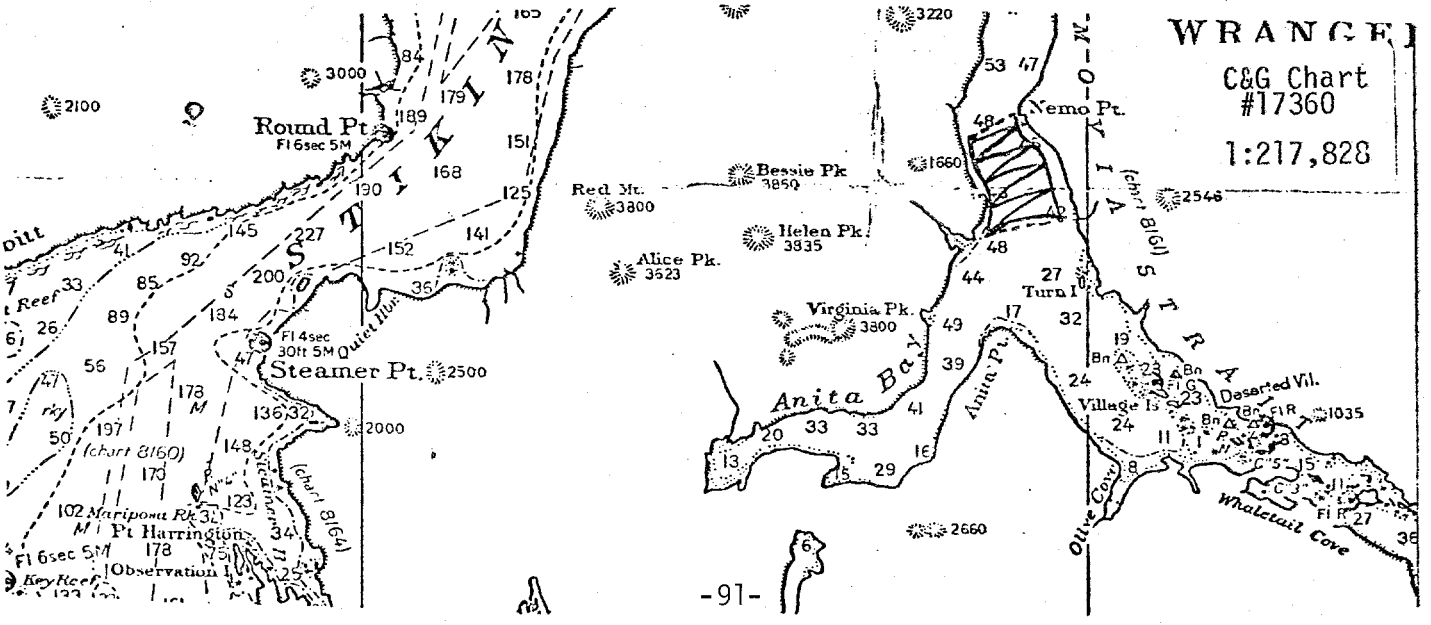



Area Anita Bay (outside) Date 10/4/78 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 14:43 End 15:45 Tide

COMMENTS: No saturation noted during survey. Fish distributed for good daytime survey. Average herring depth during survey - 40 fathoms.



Appendix 1 continued.

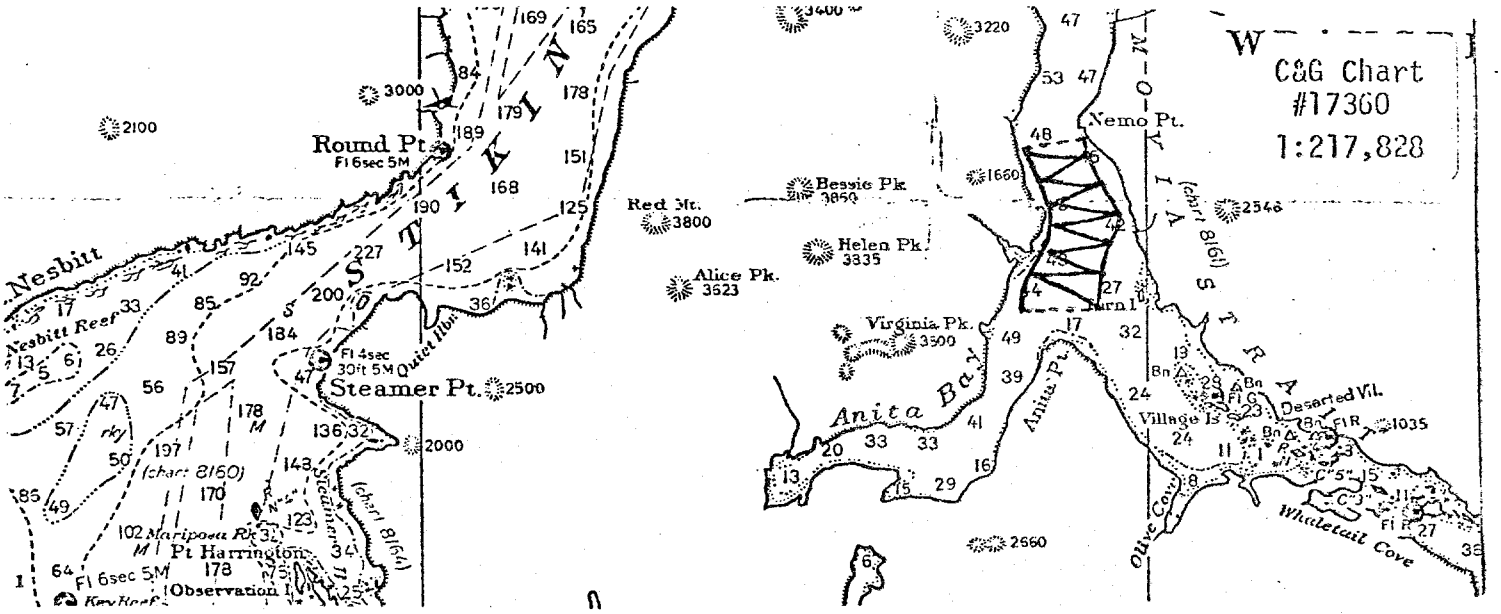
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 10/4/78 Vessel Sundance Run # 2

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 16:22 End 17:34 Tide

COMMENTS: Slight saturation noted on only one school. Herring were starting to move to the surface towards the end of run.

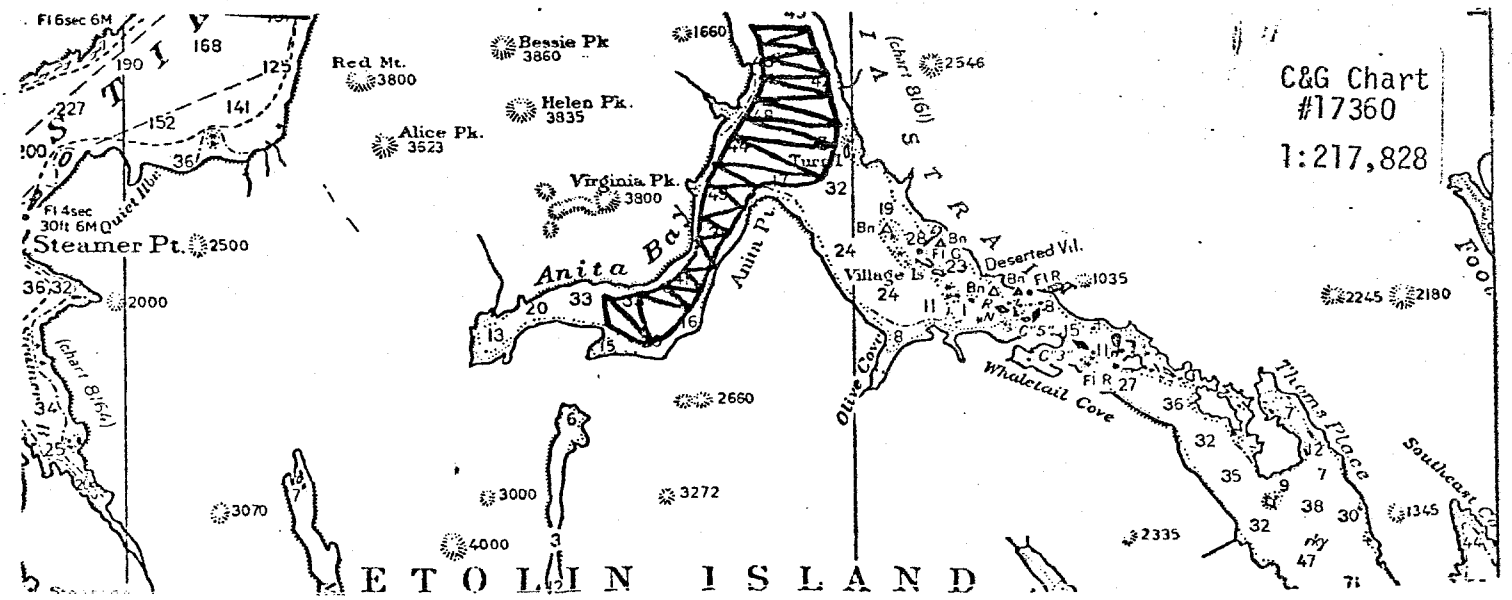



Area Anita Bay Date 10/26/78 Vessel Steller Run # 1

Gain 6.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 1405:30 End 16:25 Tide Ebb

COMMENTS: Vessel speed - 10 knots. Light, overcast.



Appendix 1 continued.

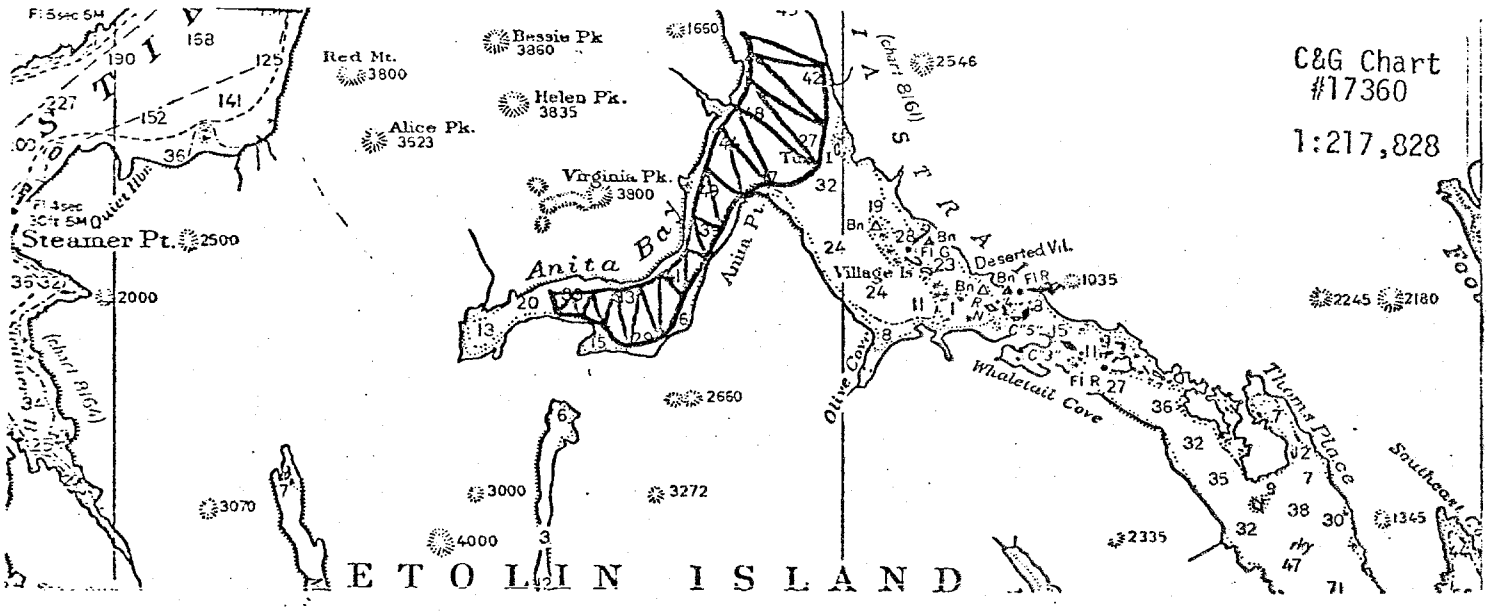
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 10/26/78 Vessel Steller Run # 2

Gain 6.0 Attenuated -12 dB Operators Bergmann, Mitchell

Time of Survey: Start 1632:30 End 18:21 Tide

COMMENTS: Vessel speed - 10 knots. It became darker during survey.

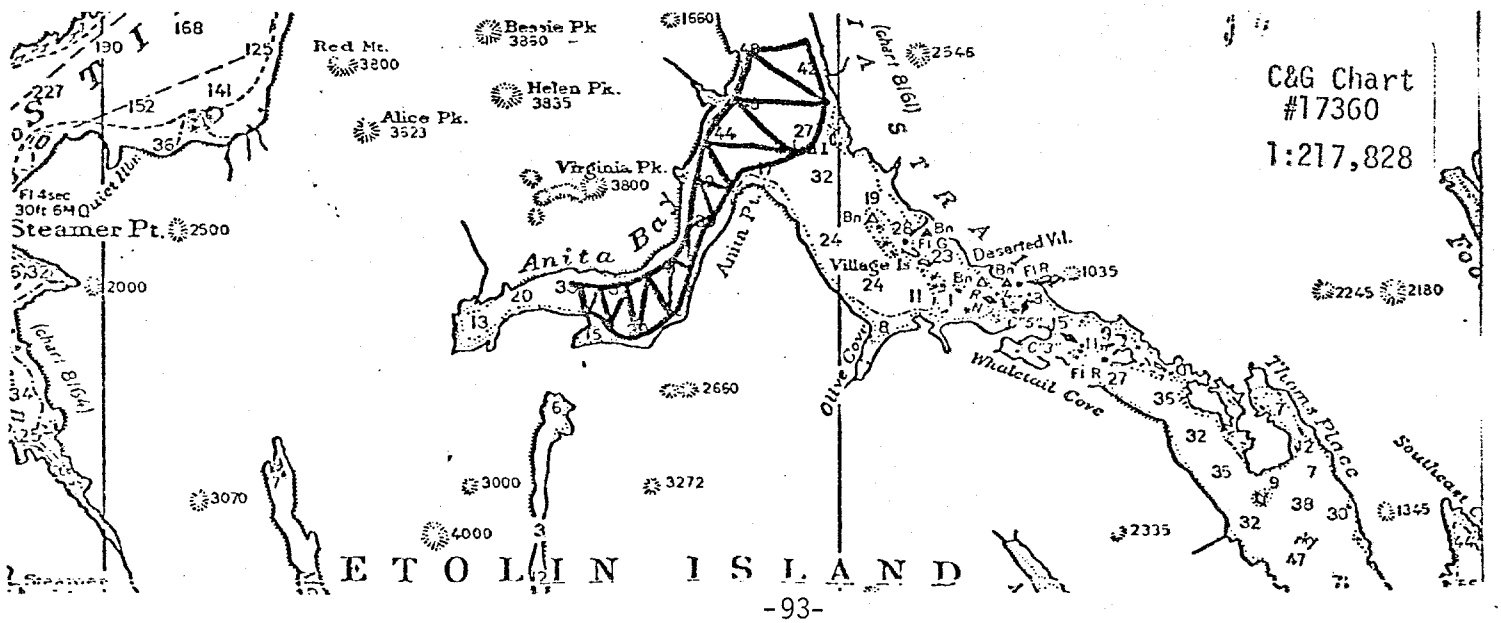



Area Anita Bay Date 10/27/78 Vessel Steller Run # 1

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 09:03 End 10:40 Tide Flood, high 11:37, 13.6'

COMMENTS: High fog and clouds. Fish concentrated along east shore inside Anita Pt.



Appendix 1 continued.

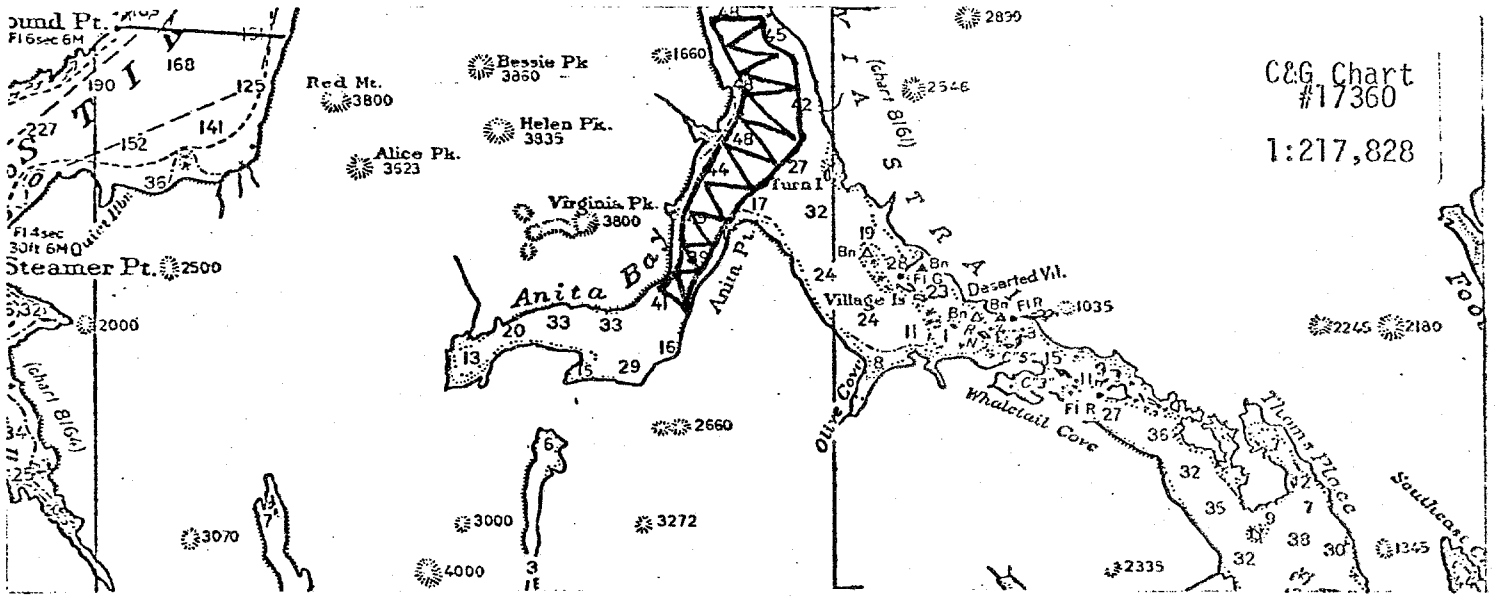
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 11/20/78 Vessel Steller Run # 1

Gain 5.5 Attenuated -12 dB Operators Timothy, Murphy

Time of Survey: Start 08:46 End 11:04 Tide Low (10:39 - 5.3')

COMMENTS: Area has been fished for five nights. Portion of fish on bottom.

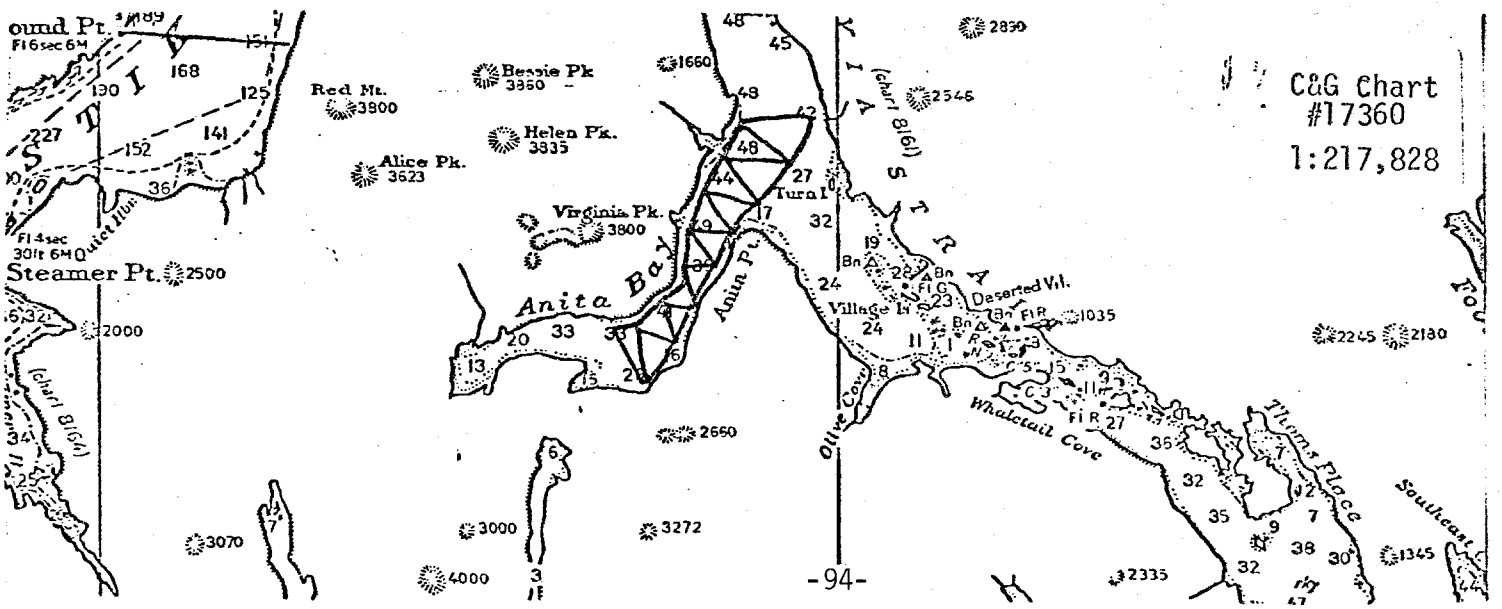



Area Anita Bay Date 2/3/79 Vessel Steller Run # 1

Gain 6.0 Attenuated -12 dB Operators Bergmann, Jackinski

Time of Survey: Start 08:10 End 10:09 Tide

COMMENTS:



Appendix 1 continued.

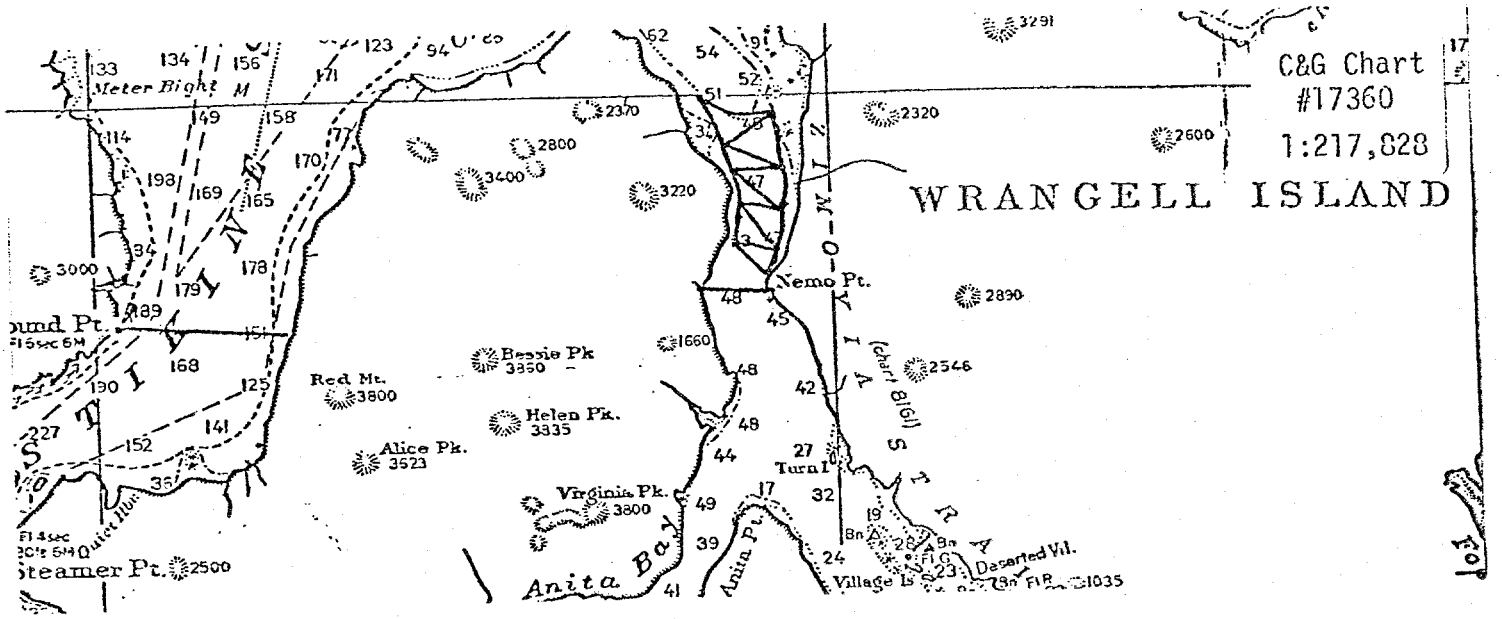
## ACOUSTICAL SURVEY SUMMARY

Area North of Anita Bay Date 4/3/79 Vessel Steller Run # 1

Gain 6.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 20:05 End _____ Tide Ebb, low 12:22 (1.8')

COMMENTS: Fish were too shallow to survey April 2, 1979; two small spawning schools out of survey area. Approximately 1/4 million pounds.




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

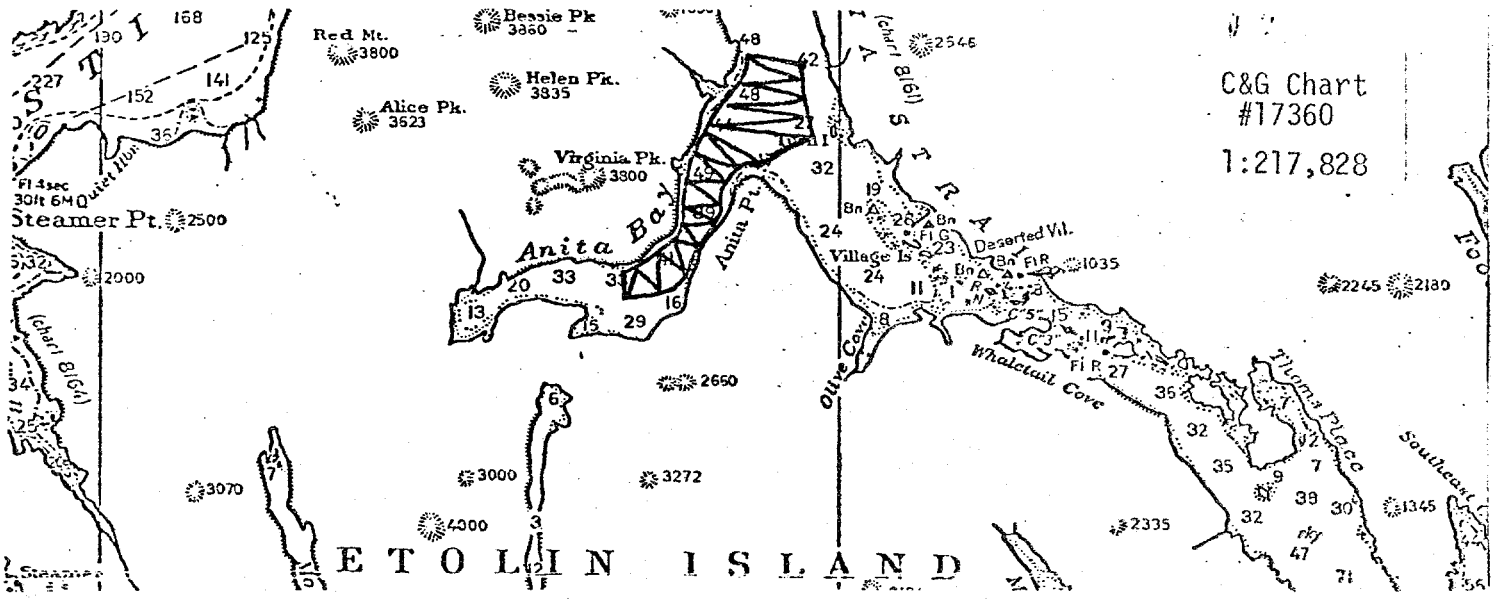
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 10/16/79 Vessel Steller Run # 1

Gain 5.5 Attenuated -12dB Operators Larson, Bergmann, Timothy

Time of Survey: Start 0934:30 End 1055 Tide

COMMENTS: This is the morning after a commercial fishery took 1.25 million lbs.

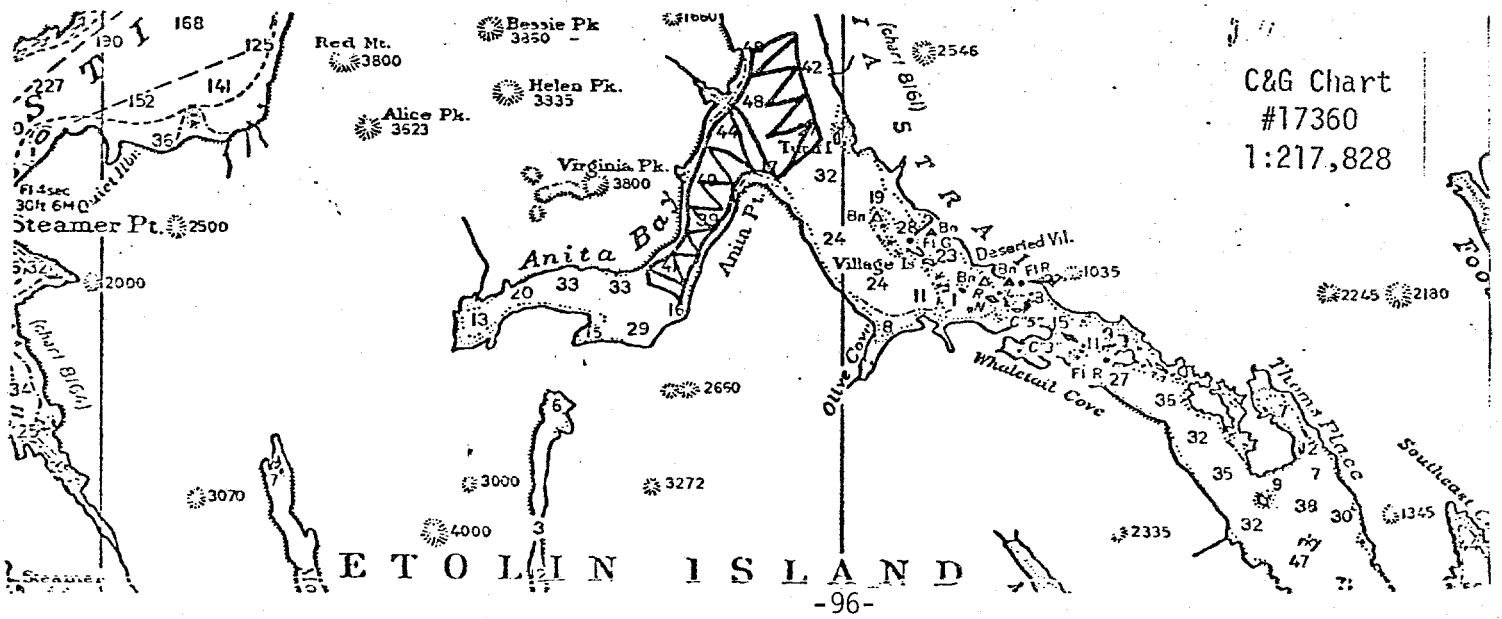



Area Anita Bay Date 10/16/79 Vessel Steller Run # 2

Gain 5.5 Attenuated -12dB Operators Larson, Bergmann, Timothy

Time of Survey: Start 1104 End 1236 Tide Flood

COMMENTS: Fish are in tighter schools during this run than they were in Run #1.



Appendix 1 continued.

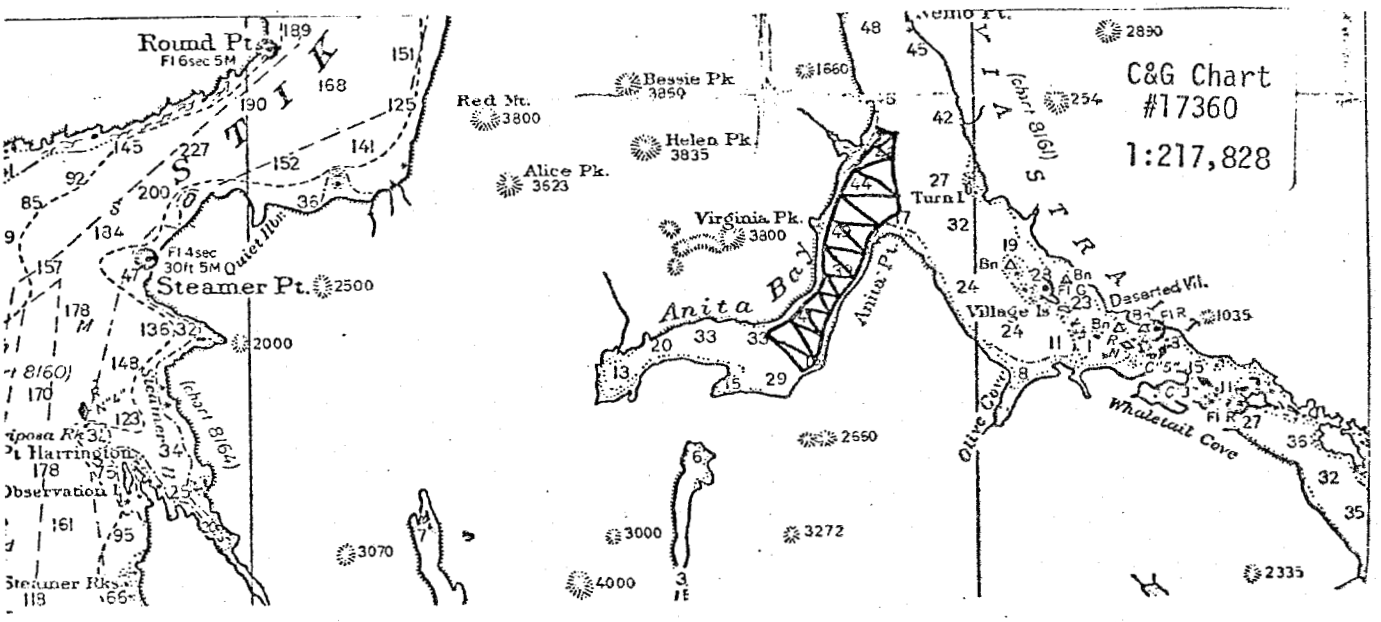
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 10/27/79 Vessel Steller Run # 1

Gain 5.0 Attenuated -12dB Operators Larson, Buoy

Time of Survey: Start 1611 End 1742 Tide Flood; high at 1851 hrs.

COMMENTS: This includes almost all of the targets observed in the vicinity. Trollers in the area report taking king salmon from 20 fathoms that had been feeding on small herring.

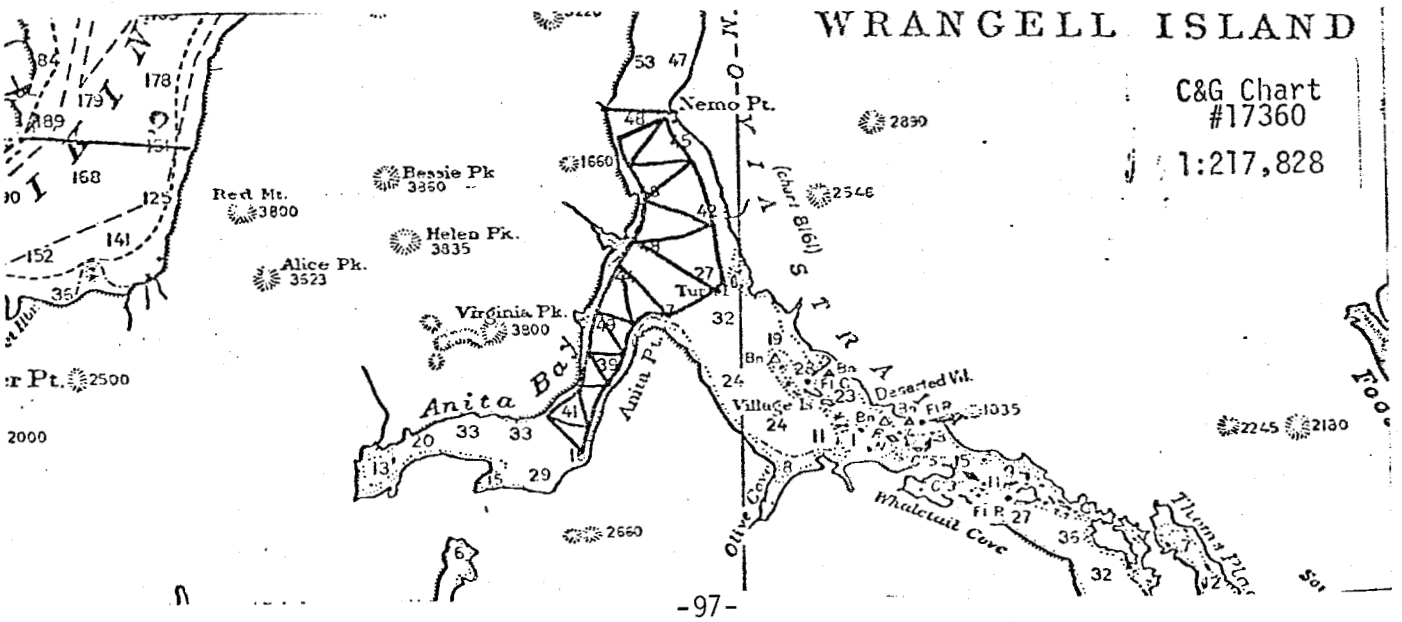



Area Anita Bay Date 11/14/79 Vessel Steller Run # 1

Gain 5.5 Attenuated -12dB Operators Larson, Buoy

Time of Survey: Start 1647 End 1801 Tide Low at 1700 hrs.

COMMENTS:



Appendix 1 continued.

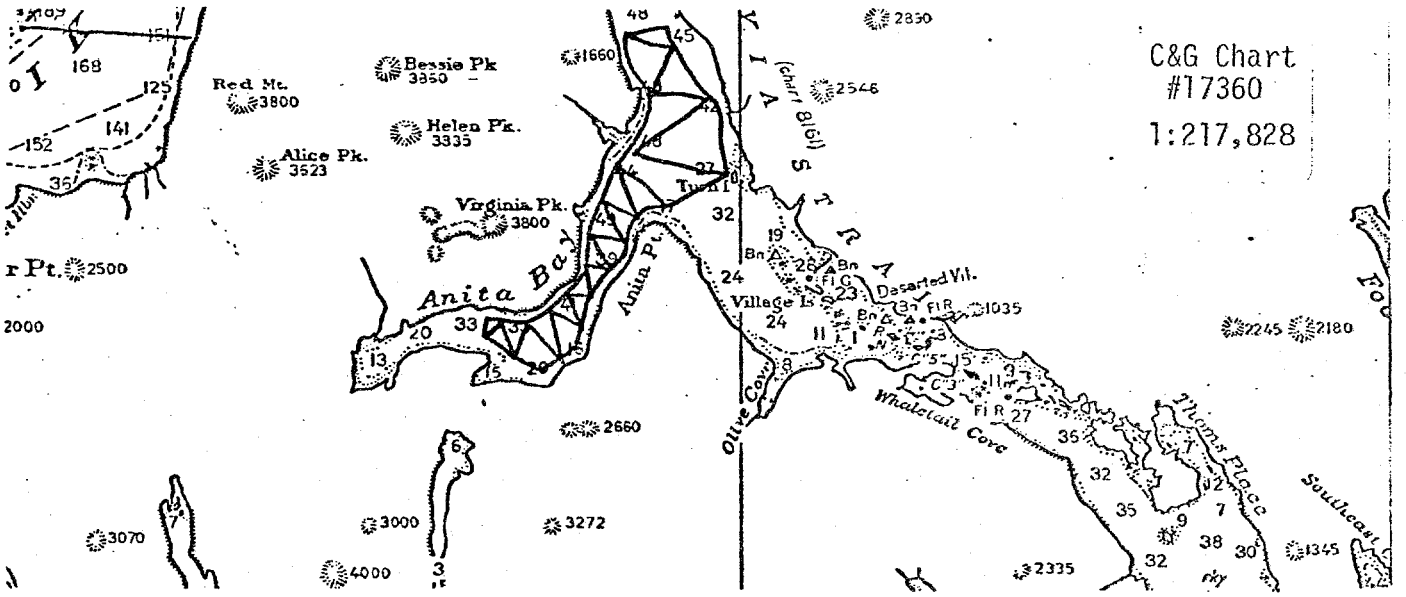
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 11/15/79 Vessel Steller Run # 1

Gain 5.5 Attenuated -12dB Operators Larson, Buoy

Time of Survey: Start 0814 End 0945 Tide

COMMENTS:

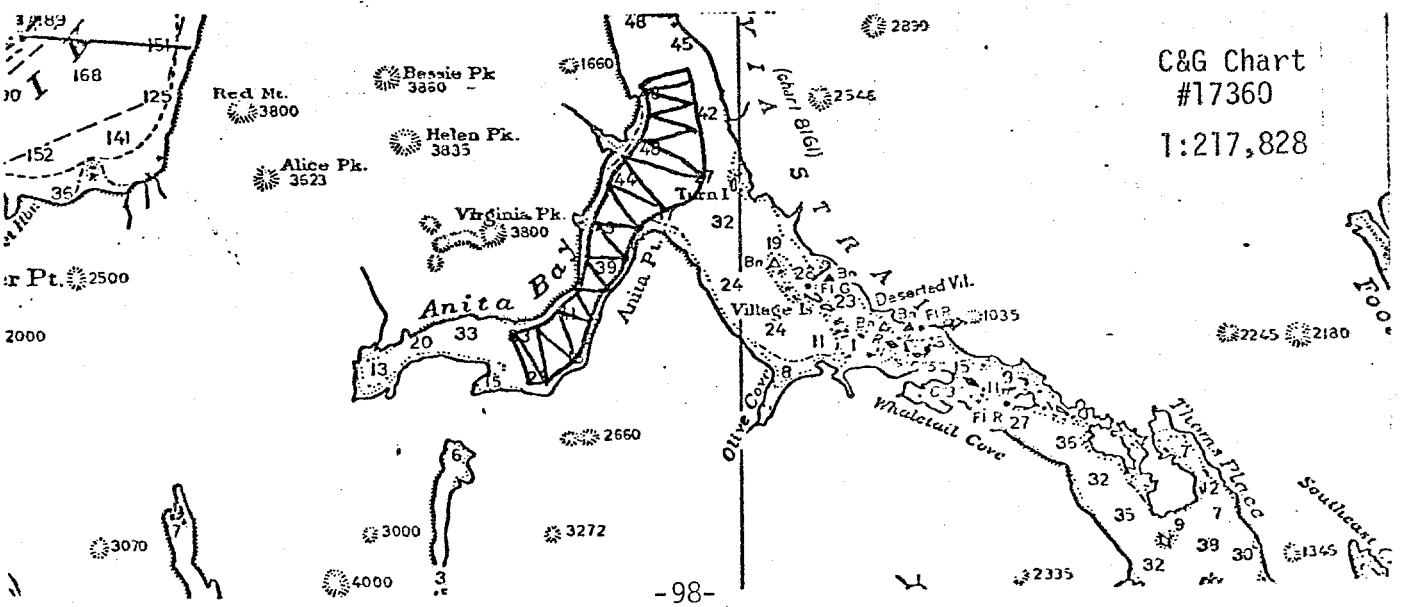



Area Anita Bay Date 11/15/79 Vessel Steller Run # 2

Gain 5.0 Attenuated -12dB Operators Larson, Buoy

Time of Survey: Start 1535 End 1701 Tide

COMMENTS:



Appendix 1 continued.

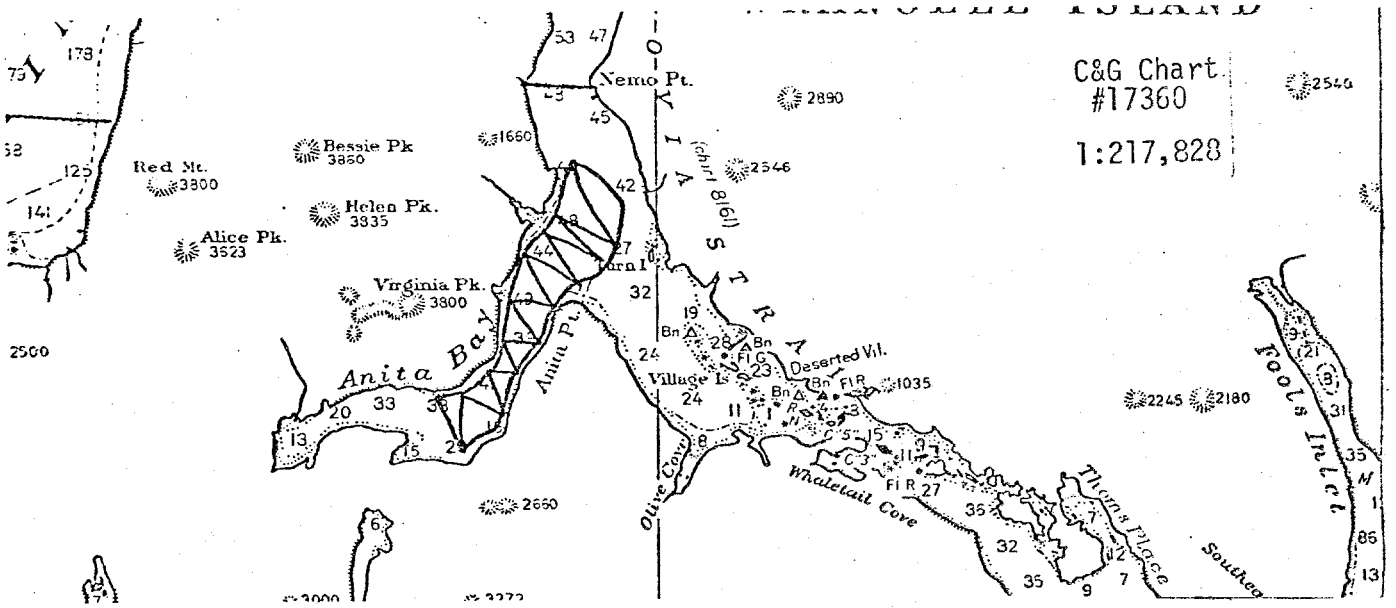
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 12/3/79 Vessel Steller Run # 1

Gain 5.5 Attenuated -12dB Operators Timothy, Osborne, Buoy

Time of Survey: Start 0819 End 0949 Tide

COMMENTS: Fishery on 12/2/79 harvested 350 tons of primarily 3-year-old fish.

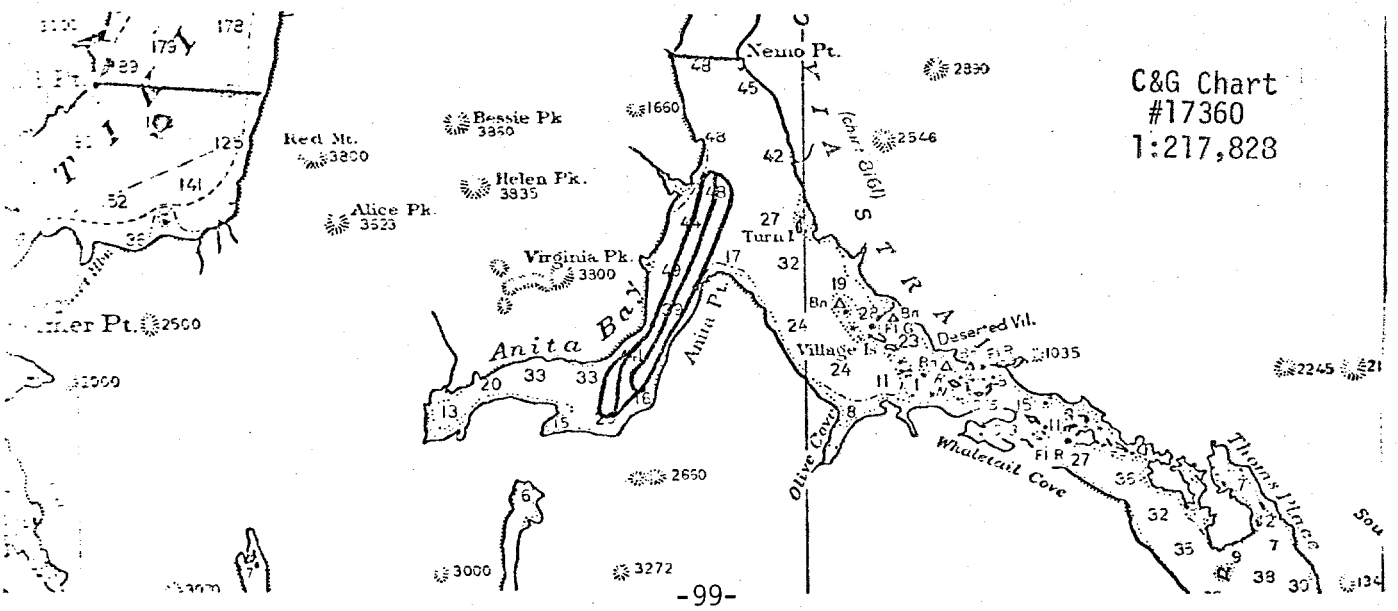



Area Anita Bay Date 12/3/79 Vessel Steller Run # 2

Gain 5.5 Attenuated -12dB Operators Timothy, Osborne, Buoy

Time of Survey: Start 1515 End 1626 Tide Flood

COMMENTS:



Appendix 1 continued.

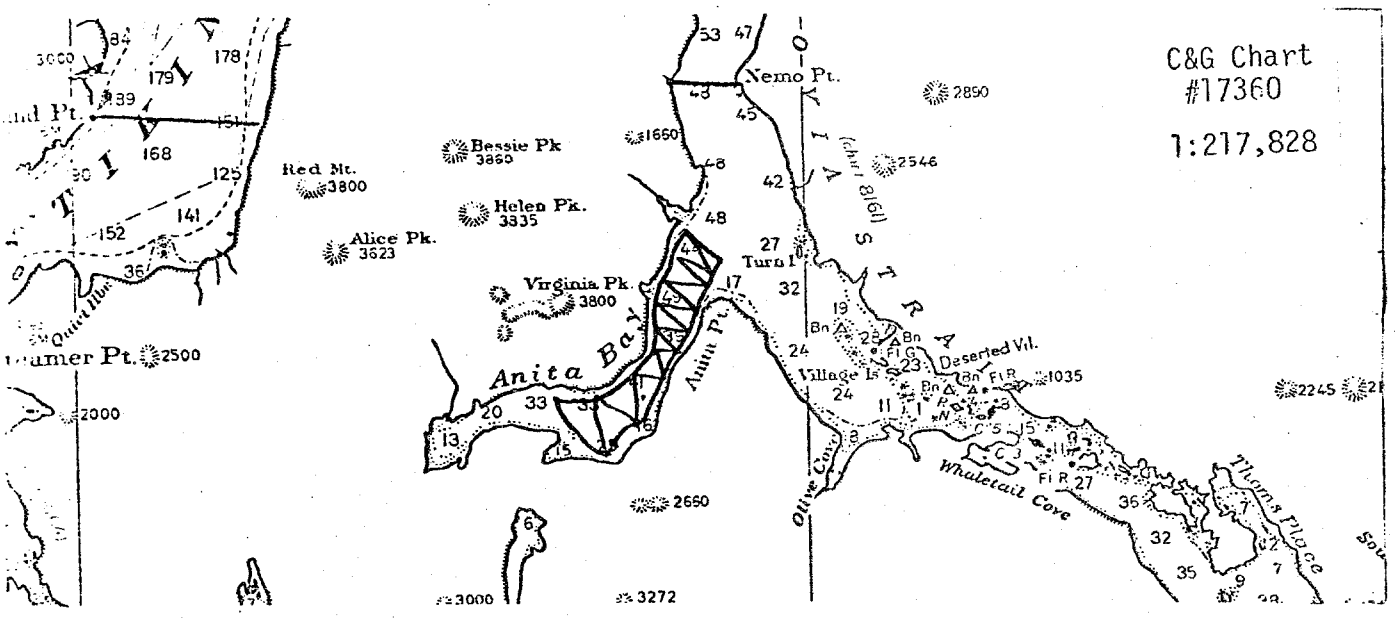
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 12/3/79 Vessel Steller Run # 3

Gain 5.0 Attenuated -12dB Operators Timothy, Osborne, Buoy

Time of Survey: Start 1634 End 1733 Tide High

COMMENTS:

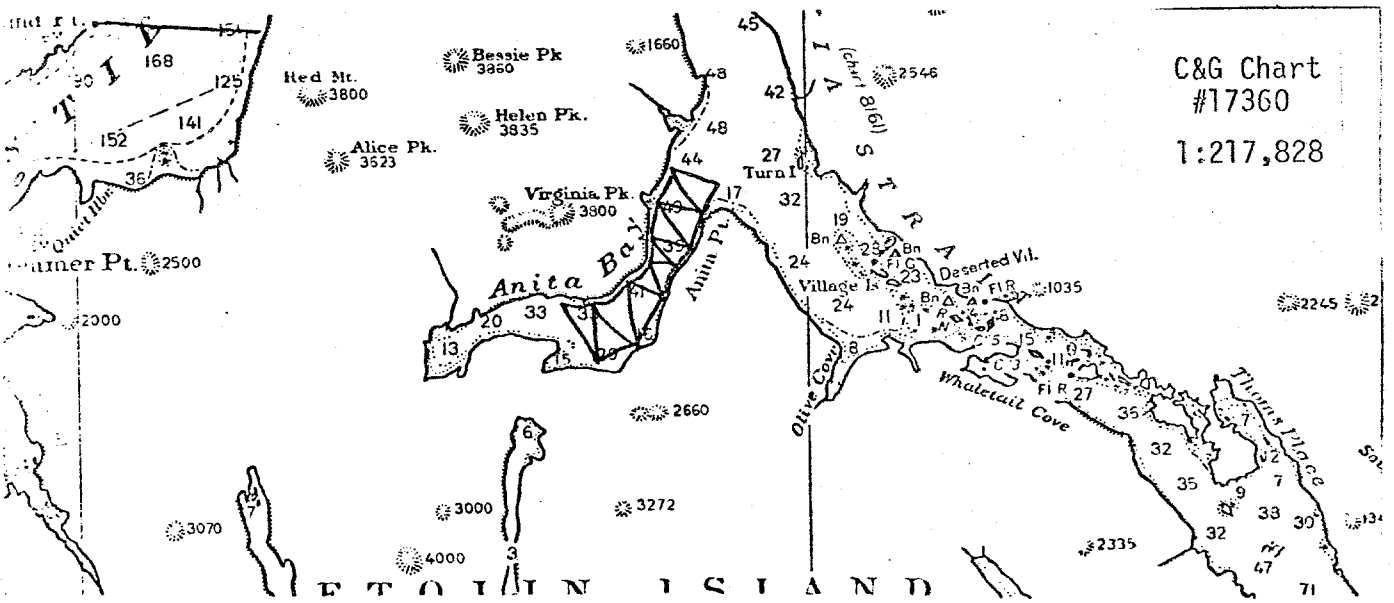



Area Anita Bay Date 1/15/80 Vessel Steller Run # 1

Gain 6.0 Attenuated -12dB Operators Buoy, Osborne, Timothy

Time of Survey: Start 0823 End 0917 Tide

COMMENTS: This is the most representative of the three runs. Fish near bottom towards end of run. Fish at head of bay are not included in this run.



Appendix 1 continued.

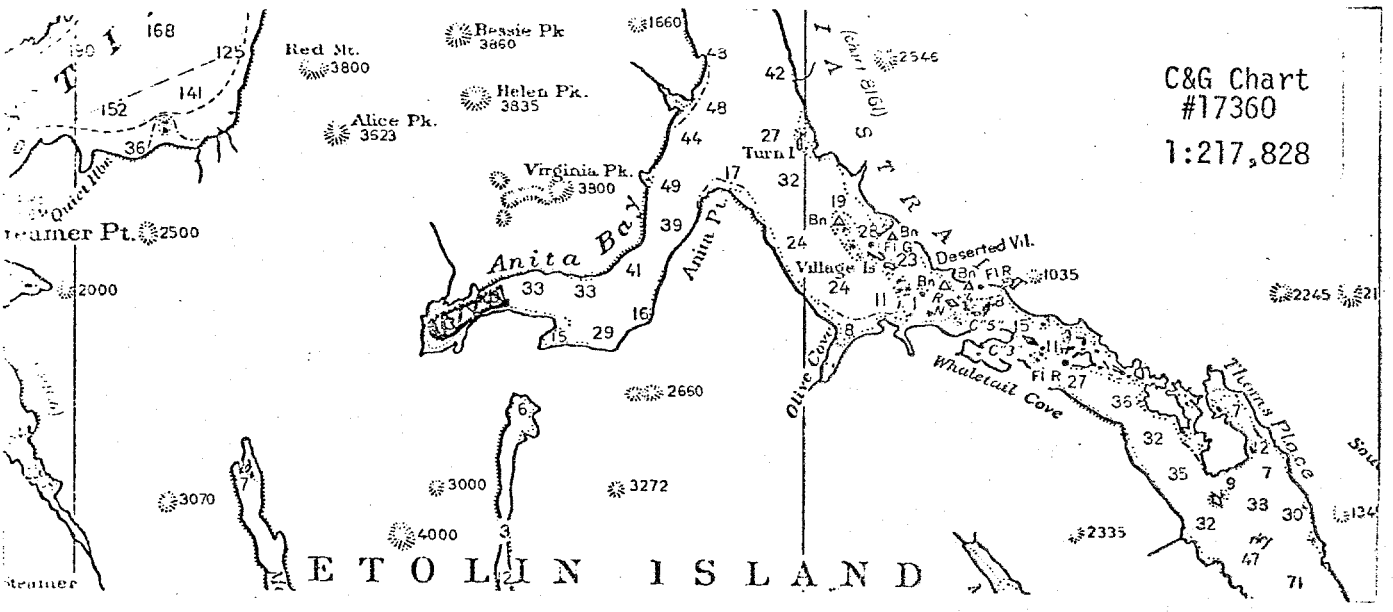
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 1/15/80 Vessel Steller Run # 2

Gain 2.5 Attenuated -12dB Operators Buoy, Osborne, Timothy

Time of Survey: Start 1002 End 1034 Tide High

COMMENTS: Significant portions of schools between 5 and 10 fathoms so surveys will vary and not be representative. Fish at head of bay, on bottom and along the ice. Fish spooked and moving fast.

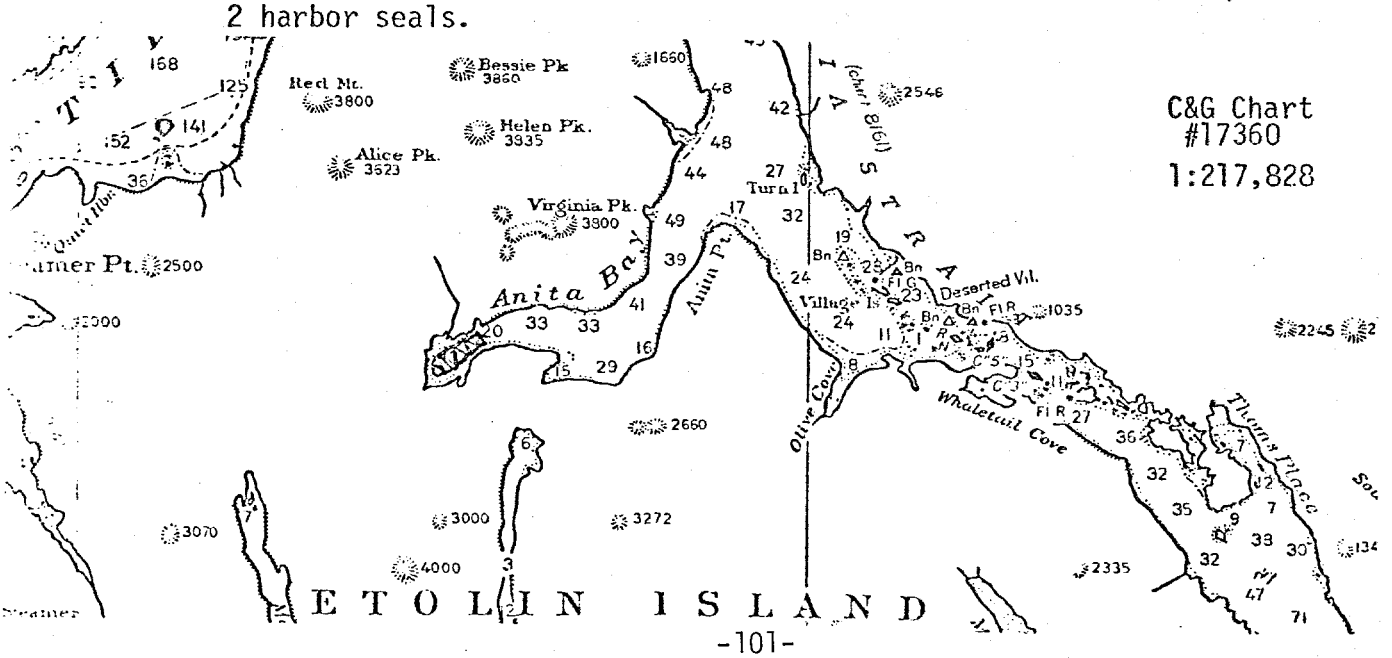



Area Anita Bay Date 1/16/80 Vessel Steller Run # 1

Gain 2.5 Attenuated -12dB Operators Buoy, Osborne, Timothy

Time of Survey: Start 1204 End 1222 Tide High

COMMENTS: Significant portion of fish between 5 and 10 fathoms so runs will vary and not be representative. Observed: 100 murres, 15 sealions, and 2 harbor seals.



Appendix 1 continued.

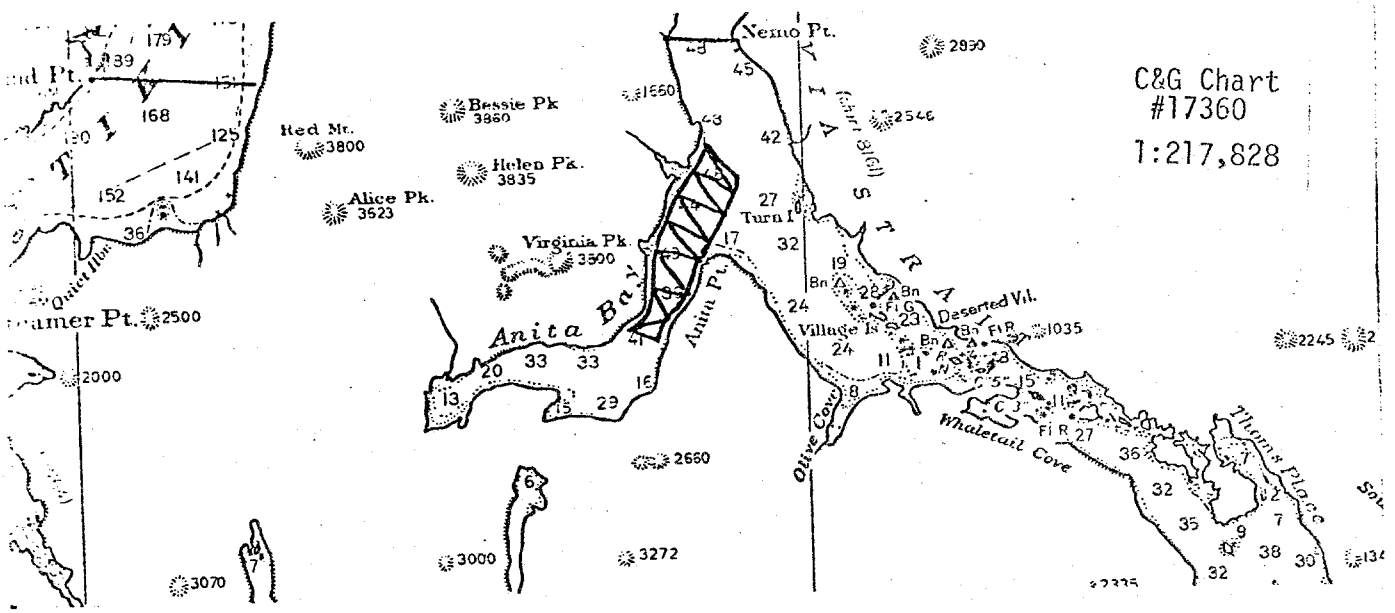
## ACOUSTICAL SURVEY SUMMARY

Area Anita Bay Date 2/7/80 Vessel Steller Run # 1

Gain 6.5 Attenuated -12dB Operators Larson, Street, Bergmann

Time of Survey: Start 0855 End 0947 Tide 1/2 Ebb

COMMENTS: Trawl sample 2/6/80 (1).




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

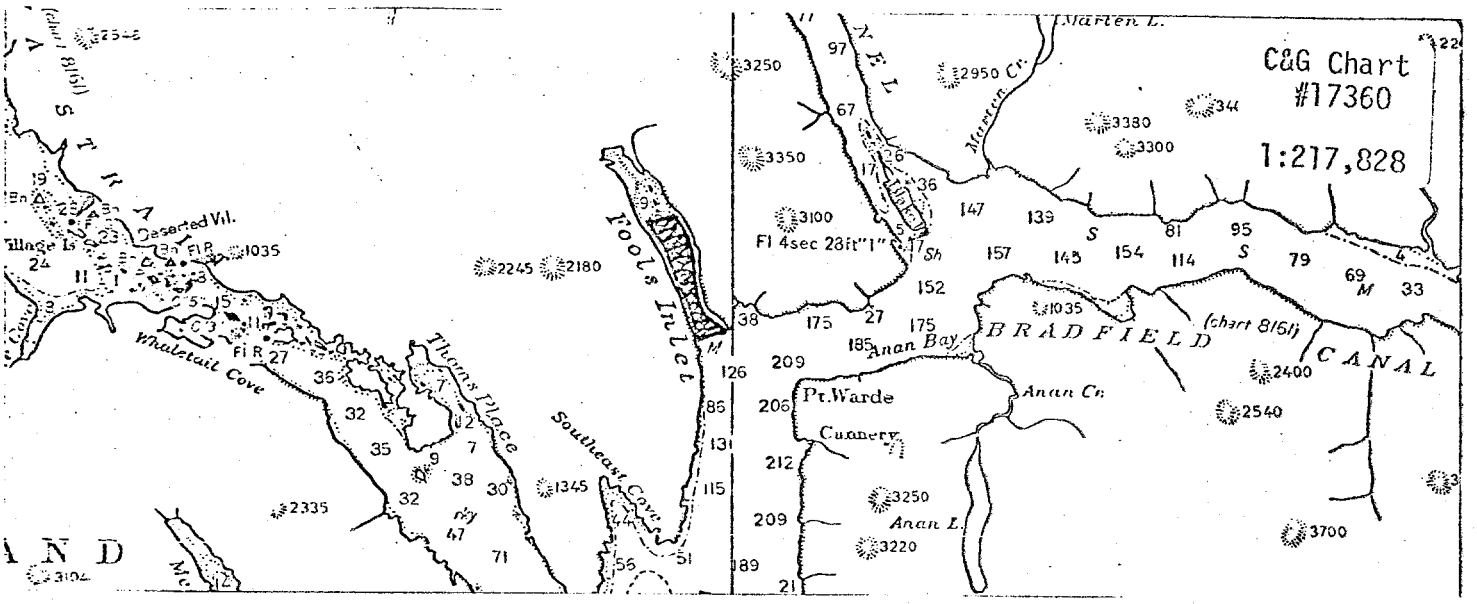
## ACOUSTICAL SURVEY SUMMARY

Area Bradfield Canal (Fools Inlet) Date 11/30/77 Vessel Auklet Run # 1

Gain 6.5 Attenuated -12 dB Operators Bracken

Time of Survey: Start 14:20 End 15:23 Tide

COMMENTS: This should be a representative run for Fools Inlet.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

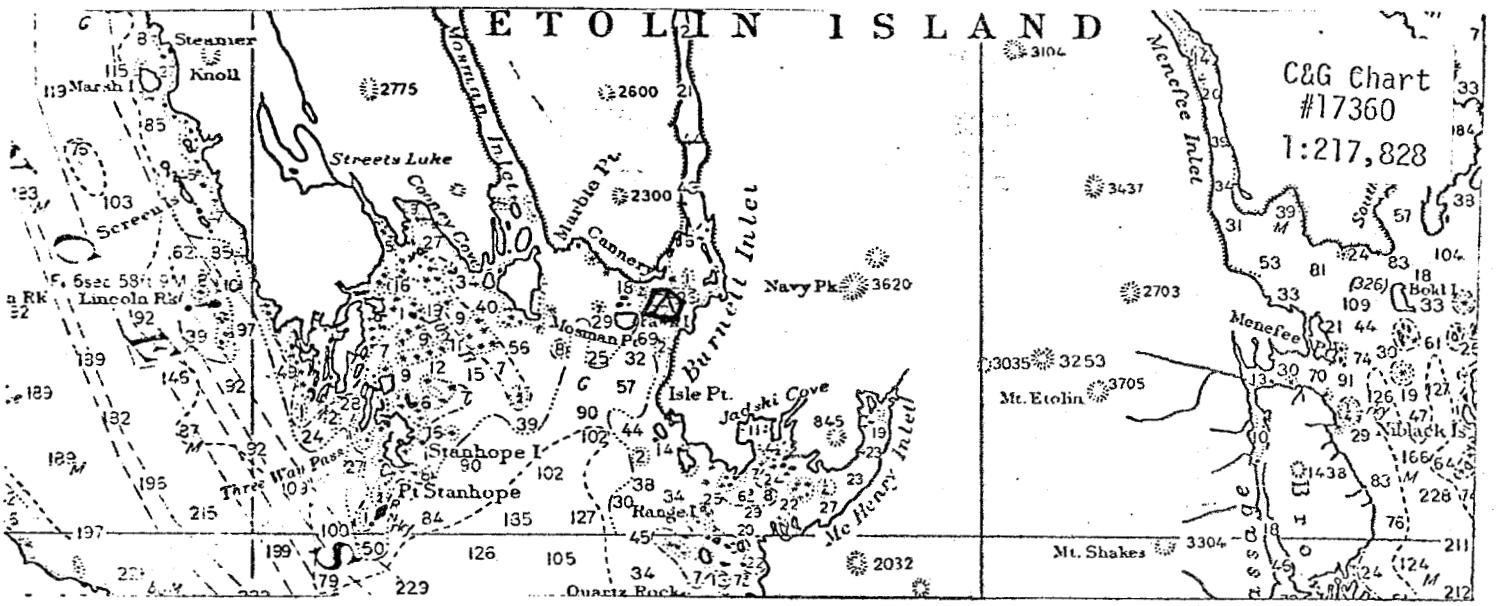
## ACOUSTICAL SURVEY SUMMARY

Area Burnett Inlet Date 4/5/79 Vessel Steller Run # 1

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 08:19 End 08:32 Tide

COMMENTS: Poor bottom separation on largest school. Only four or five schools observed in the area.

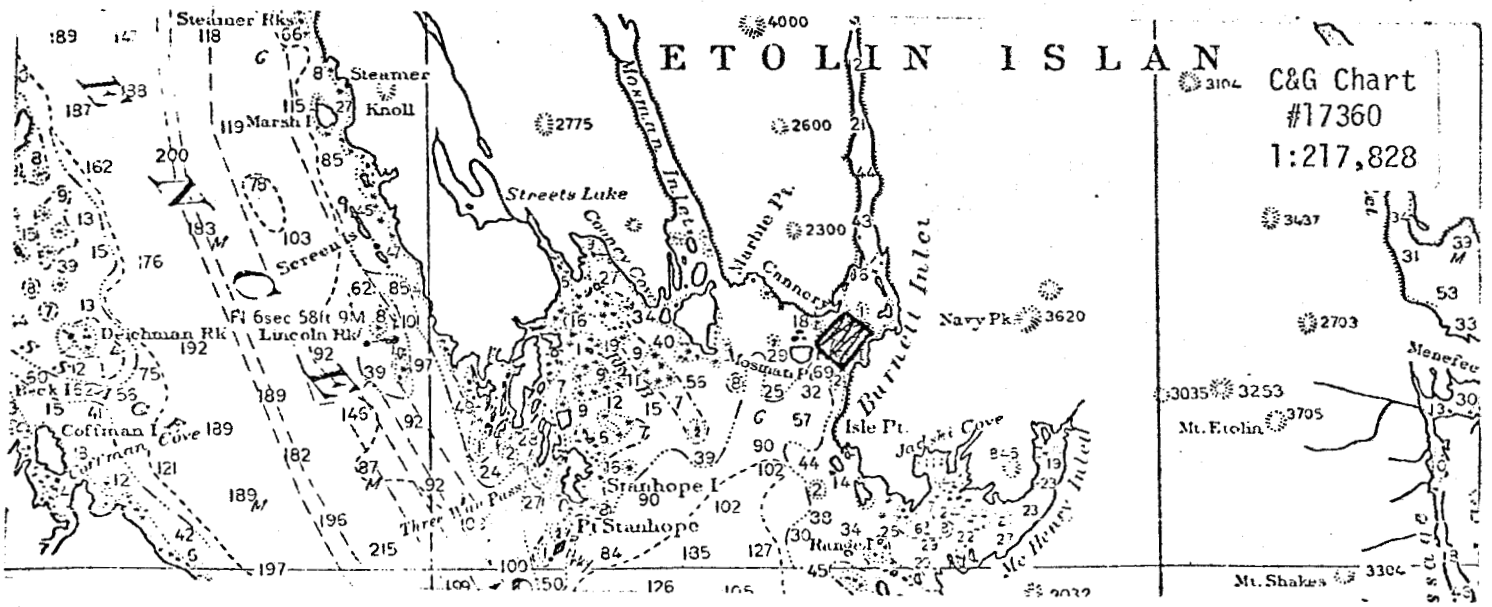



Area Burnett Inlet Date 4/5/79 Vessel Steller Run # 2

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 08:33 End 08:56 Tide

COMMENTS: Poor bottom separation in a couple of schools.



Appendix 1 continued.

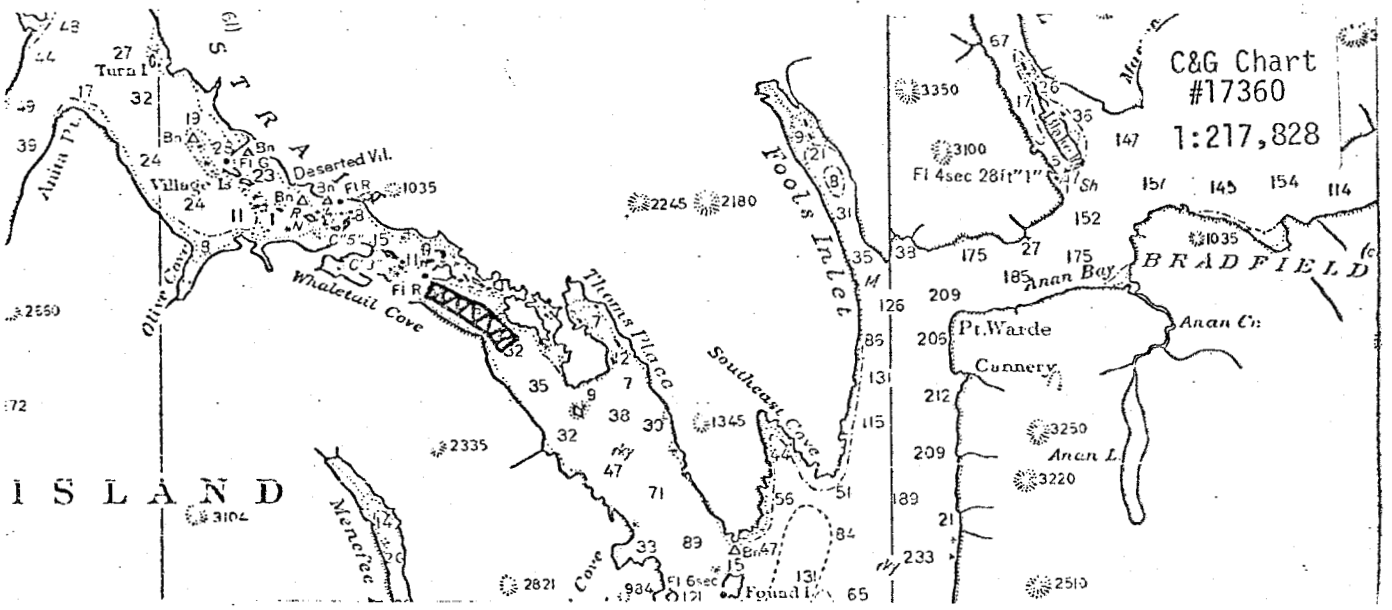
## ACOUSTICAL SURVEY SUMMARY

Area So. Zimovia Straits Date 10/27/79 Vessel Steller Run # 1

Gain 5.0 Attenuated -12dB Operators Larson, Buoy

Time of Survey: Start 1139 End 1213 Tide Ebbing; low at 1253 hrs.

COMMENTS: A commercial troller working this area caught 11 king salmon this date.

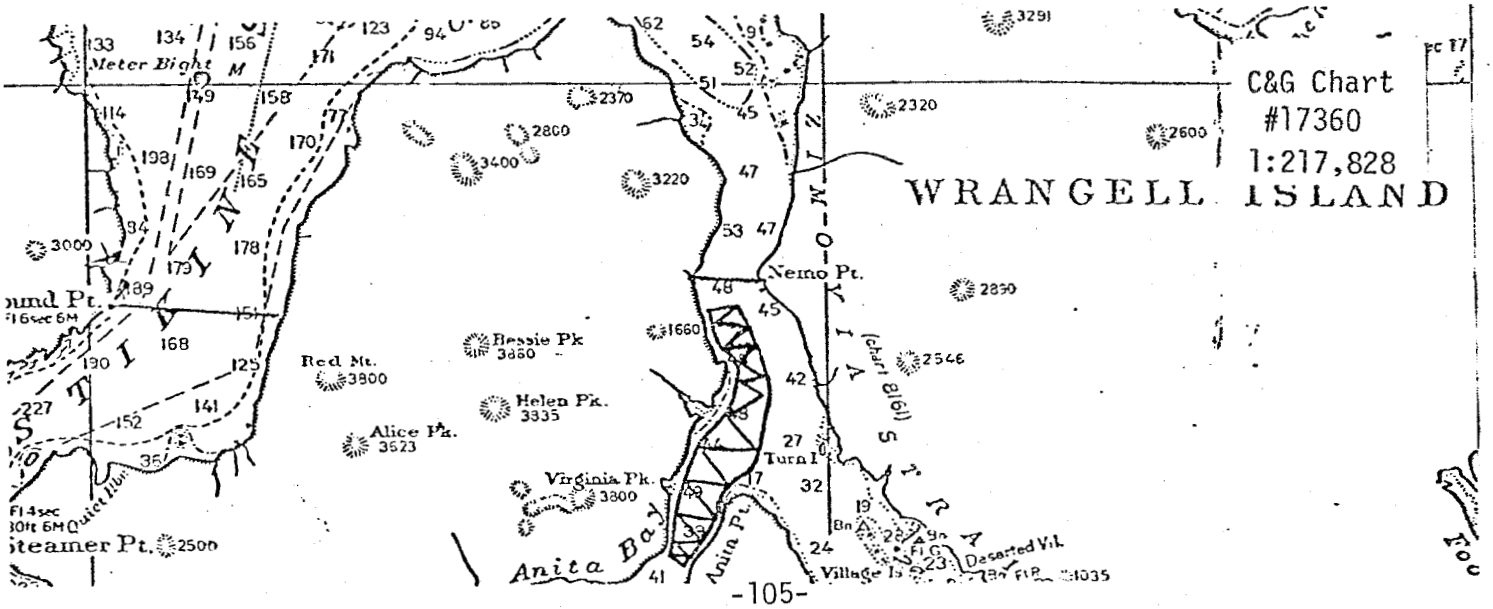



Area Anita Bay Date 10/13/79 Vessel Steller Run # 1

Gain 5.0 Attenuated -12dB Operators Larson, Buoy

Time of Survey: Start 1524 End 1642 Tide Flood, low at 1503 hrs.

COMMENTS: Survey area encompasses the great majority of herring observed. Five commercial trollers working the area.



Appendix 1 continued.

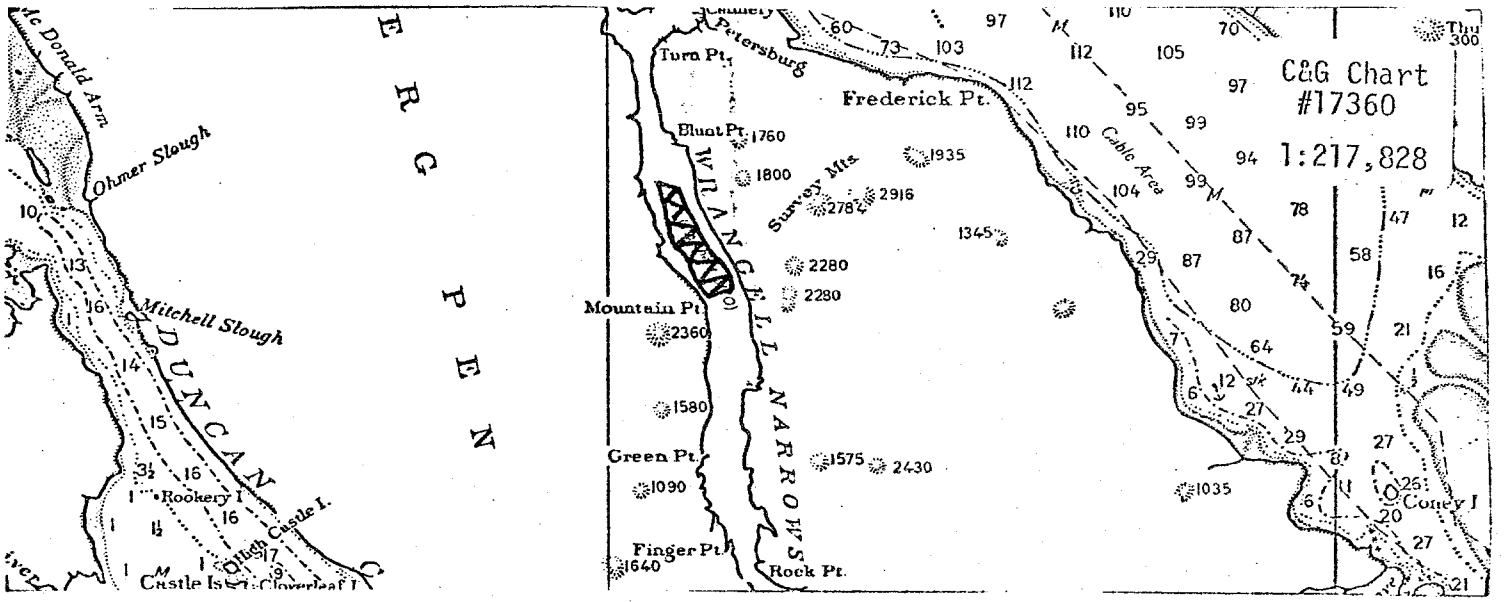
## ACOUSTICAL SURVEY SUMMARY

Area Scow Bay Date 11/23/77 Vessel Auklet Run # 1

Gain 6.30 Attenuated -12 dB Operators Bergmann, Koeneman

Time of Survey: Start 08:45 End 09:42 Tide Half-tide, flooding.

COMMENTS: This run was not indicative of the stock present. Saturation occurred a number of times and some herring were tight on the bottom.

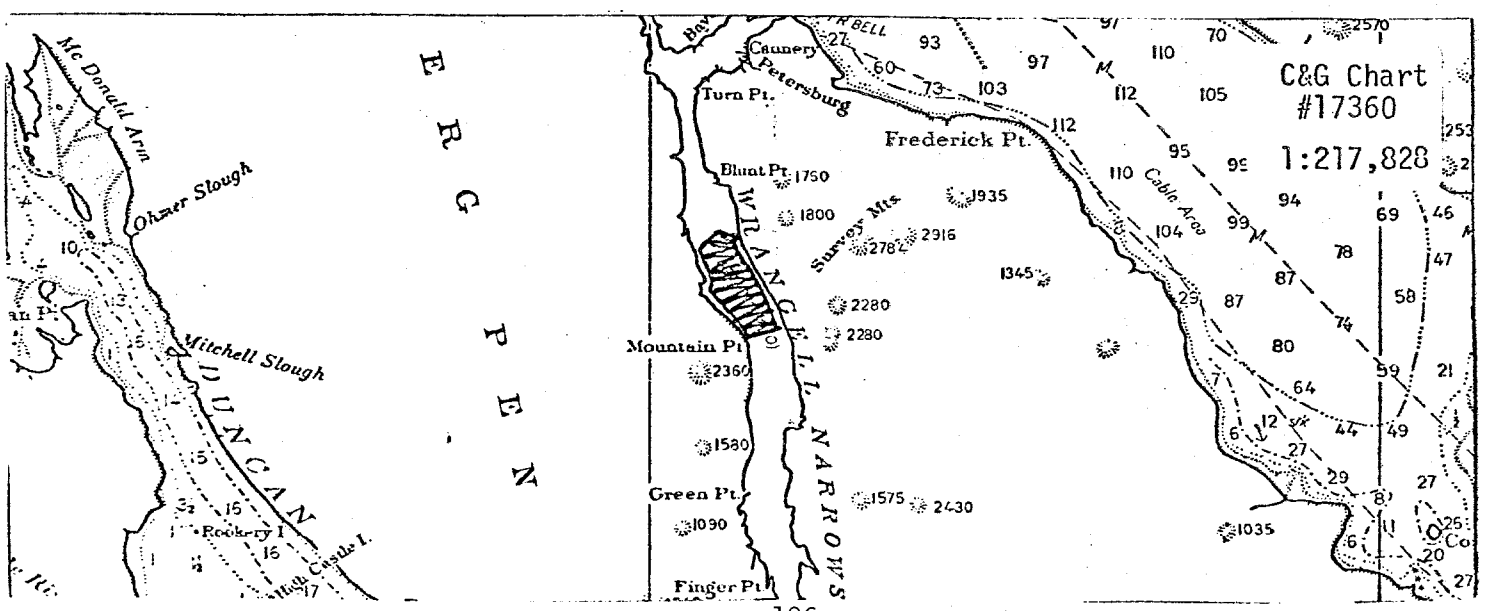



Area Scow Bay (Wrangell Narrows) Date 11/23/77 Vessel Auklet Run # 2

Gain 5.5 Attenuated -12 dB Operators Bergmann, Koeneman

Time of Survey: Start 10:05 End 11:45 Tide Flood

COMMENTS: This run is not indicative of the stock size. Some fish were on the bottom and Leg #18 and #19 had considerable saturation.



Appendix 1 continued.

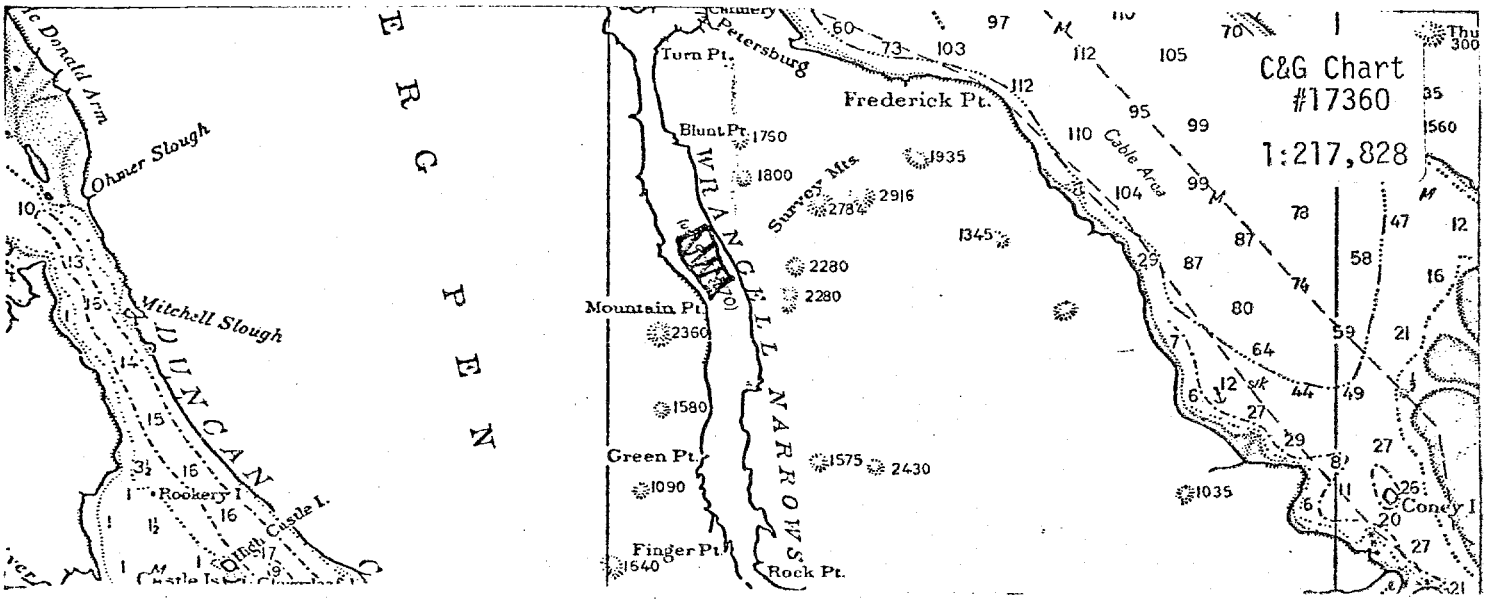
## ACOUSTICAL SURVEY SUMMARY

Area Scow Bay Date 12/27/77 Vessel Auklet Run # 1

Gain 5.5 Attenuated -12 dB Operators Bergmann

Time of Survey: Start 09:04 End 09:48 Tide

COMMENTS: Saturation during the first 5 legs. Almost all schools were tight on the bottom. Sea lions over schools.

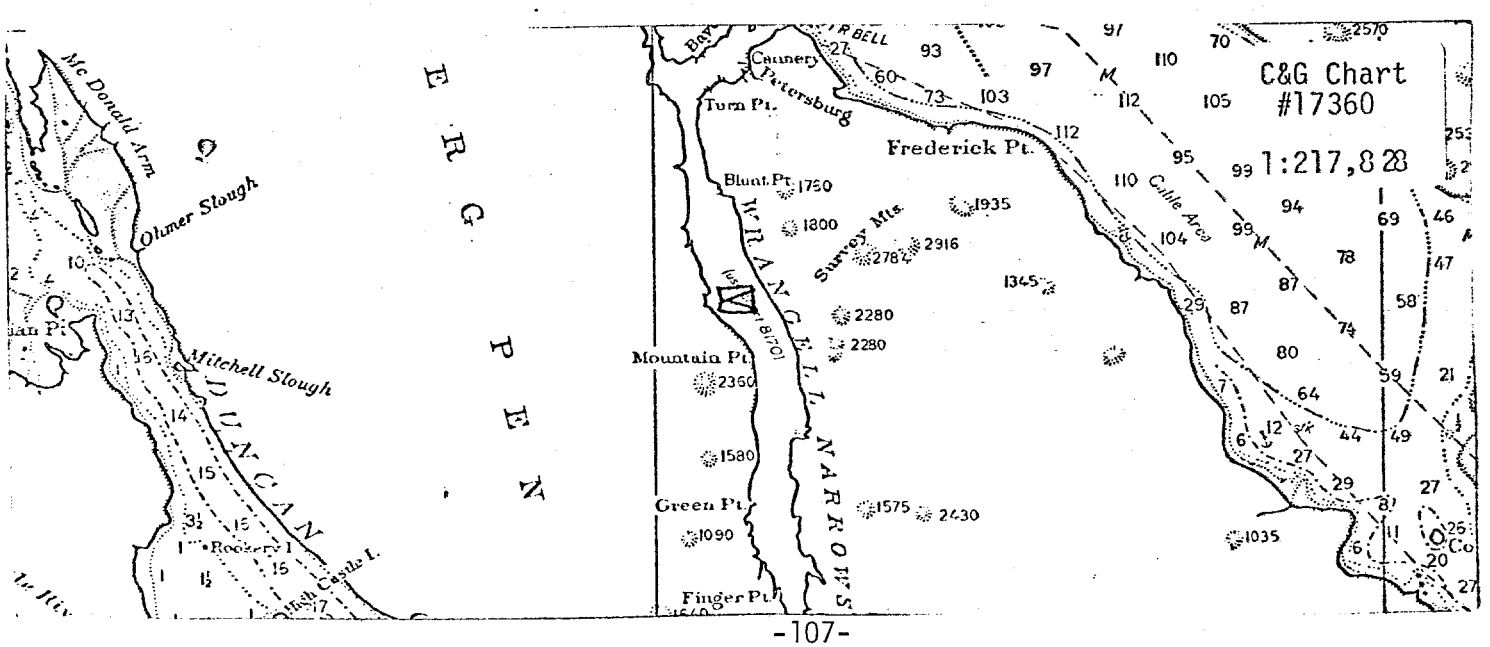



Area Scow Bay (Wrangell Narrows) Date 12/27/77 Vessel Auklet Run # 2

Gain 5.0 Attenuated -12 dB Operators Bergmann

Time of Survey: Start 10:26 End 10:42 Tide

COMMENTS: Vessel speed was 6 knots.



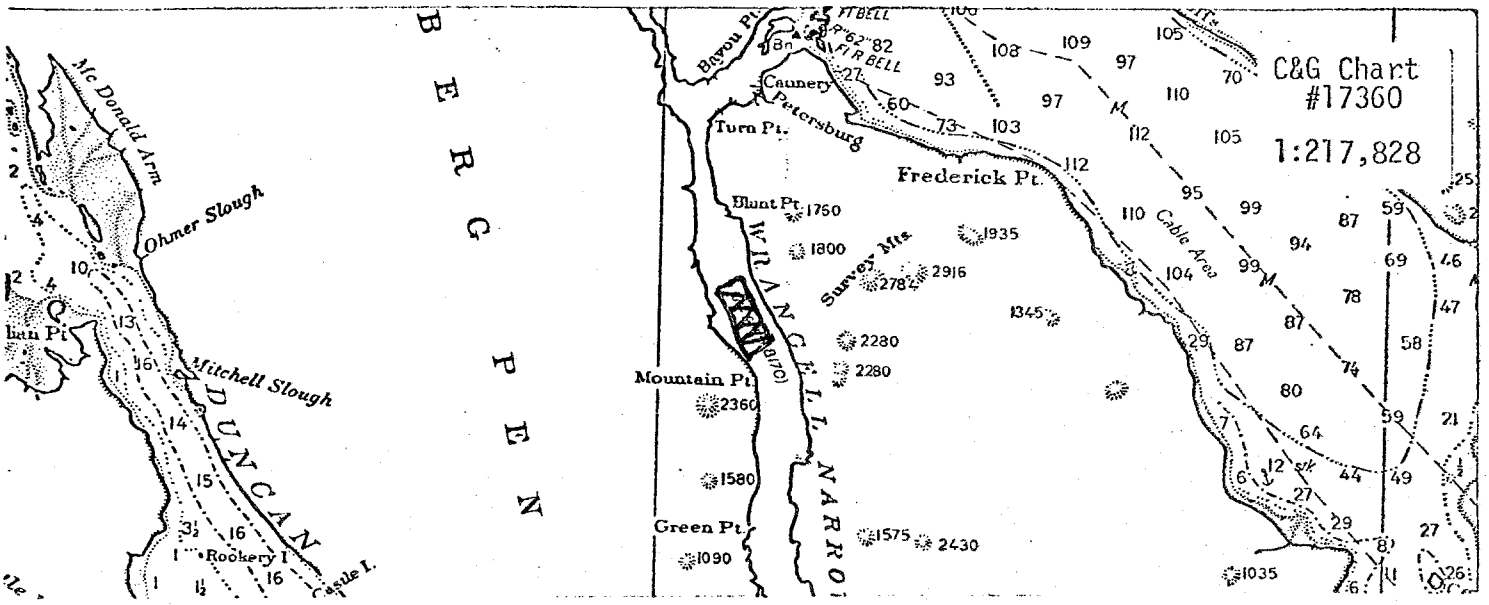
Appendix 1 continued. ACOUSTICAL SURVEY SUMMARY

Area Scow Bay Date 3/27/79 Vessel Steller Run # 1

Gain 6.0 Attenuated 0 dB and -12 dB Operators Bergmann, Murphy

Time of Survey: Start 2000:15 End 2020:15 Tide Low -2.7' @ 19:40

COMMENTS: Fish were tight along shore and outside of survey area in first six legs. Bottom separation wasn't complete but best observed this year. Considerable saturation on larger schools.

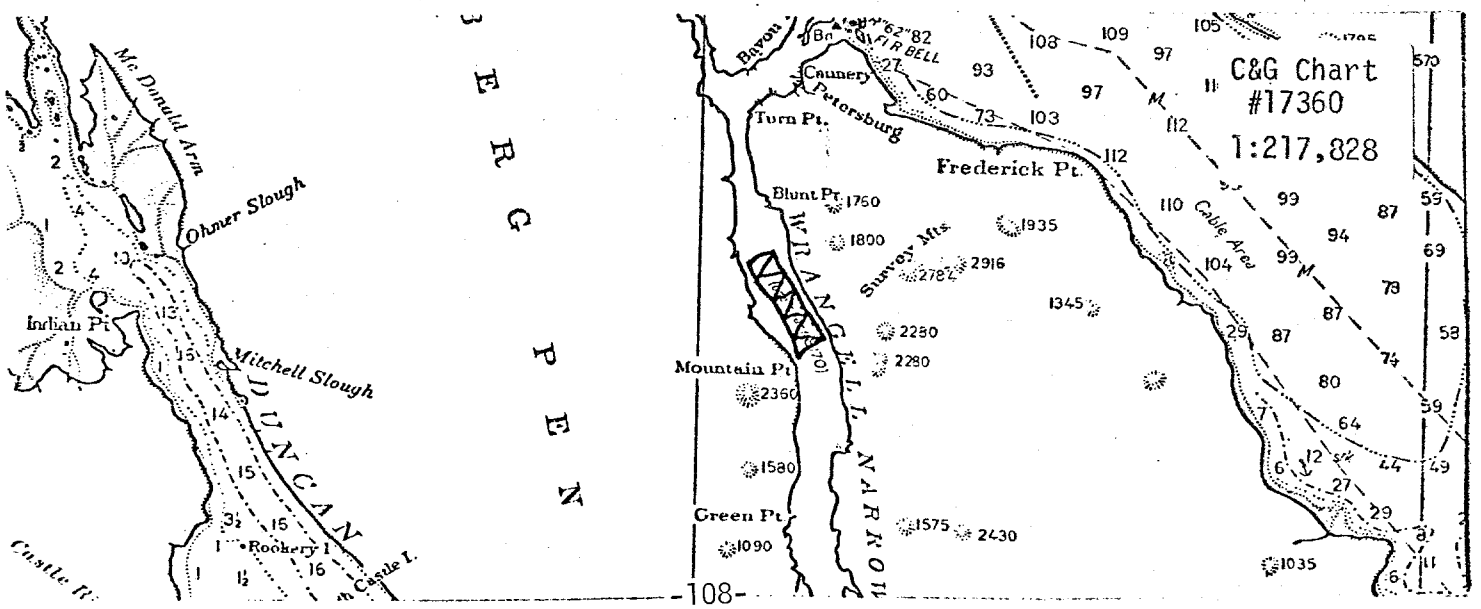



Area Scow Bay Date 3/27/79 Vessel Steller Run # 2

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 2027:00 End 2040 Tide Low -2.7 @ 19:40

COMMENTS: Fish shallow in water column and still along side shore outside of survey area. One large school encountered at mouth of Petersburg Creek on way out so estimate will be very low.



Appendix 1 continued.

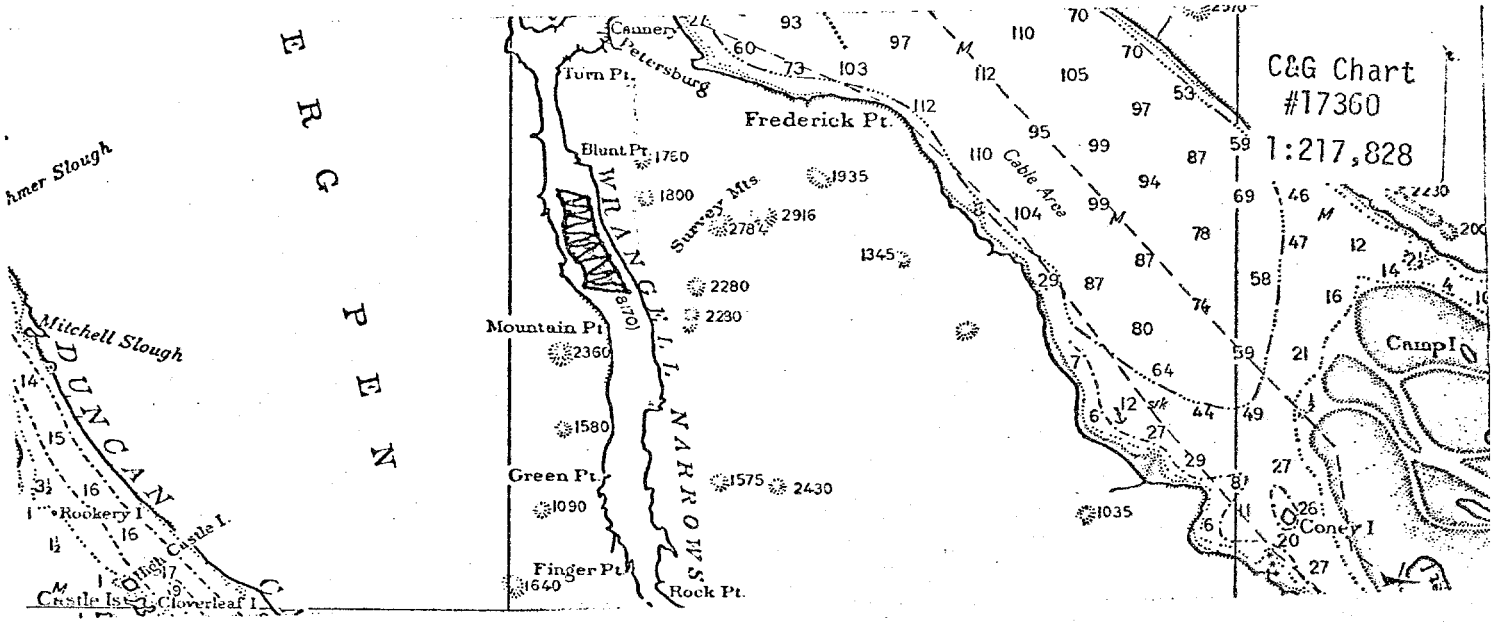
## ACOUSTICAL SURVEY SUMMARY

Area Scow Bay Date 3/28/79 Vessel Steller Run # 1

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 1945:15 End 2022:15 Tide Low -2.4, 20:21

COMMENTS: Considerable quantities of fish outside area along Mountain Point shore. Poor bottom separation during early portions of survey.

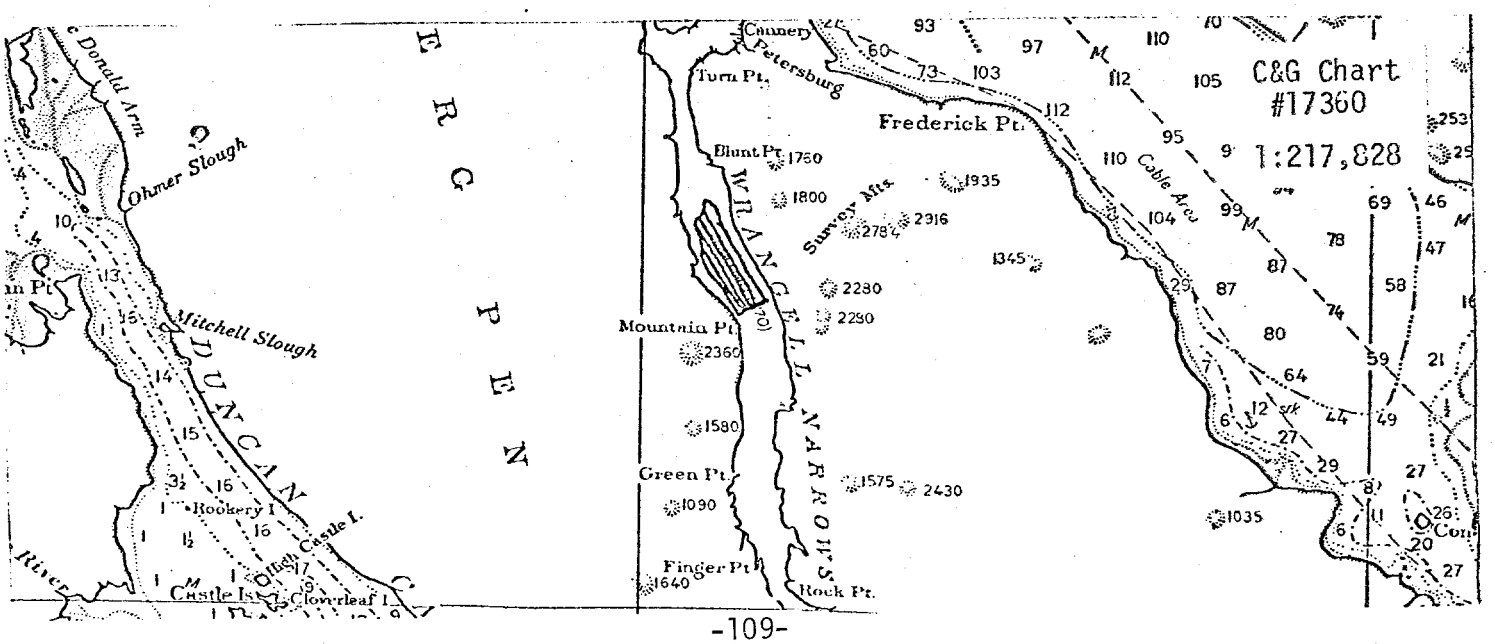



Area Scow Bay Date 3/28/79 Vessel Steller Run # 2

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 2028:45 End 2117 Tide Low -2.4, 20:21

COMMENTS:



Appendix 1 continued.

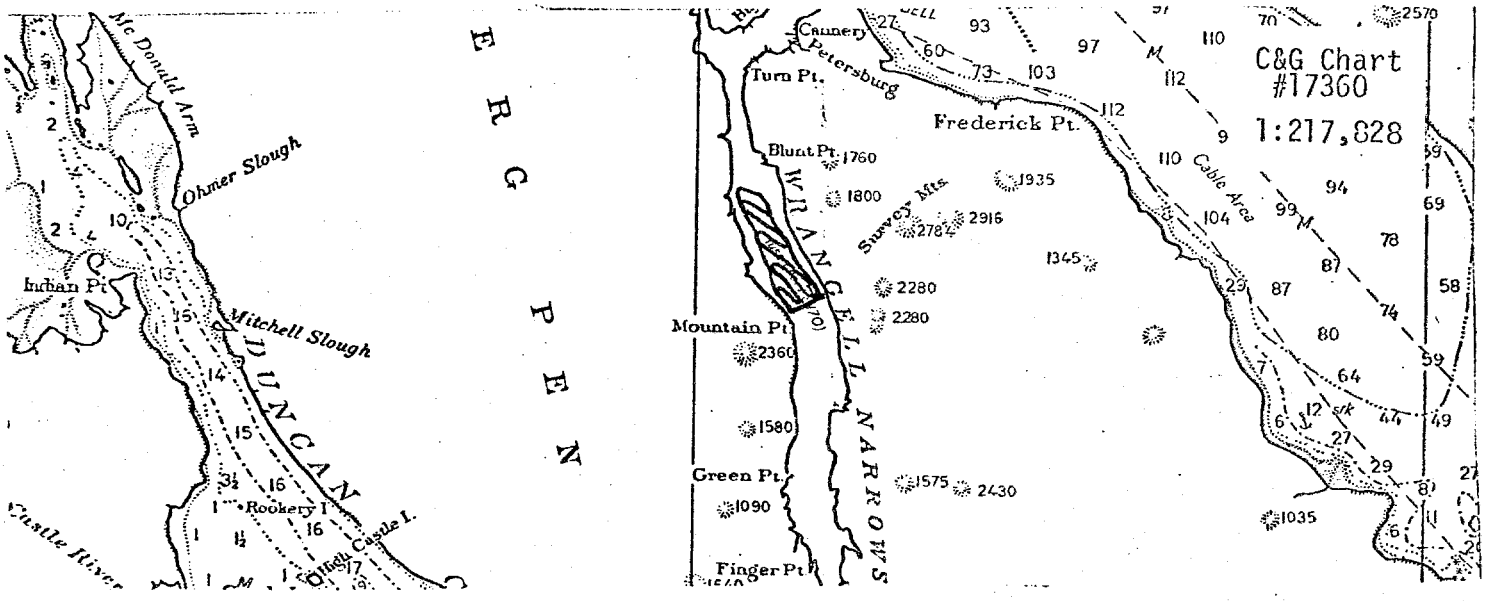
## ACOUSTICAL SURVEY SUMMARY

Area Scow Bay Date 3/28/79 Vessel Steller Run # 3

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 2122:45 End 2203:15 Tide

COMMENTS: Fish more spread out than previous survey.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

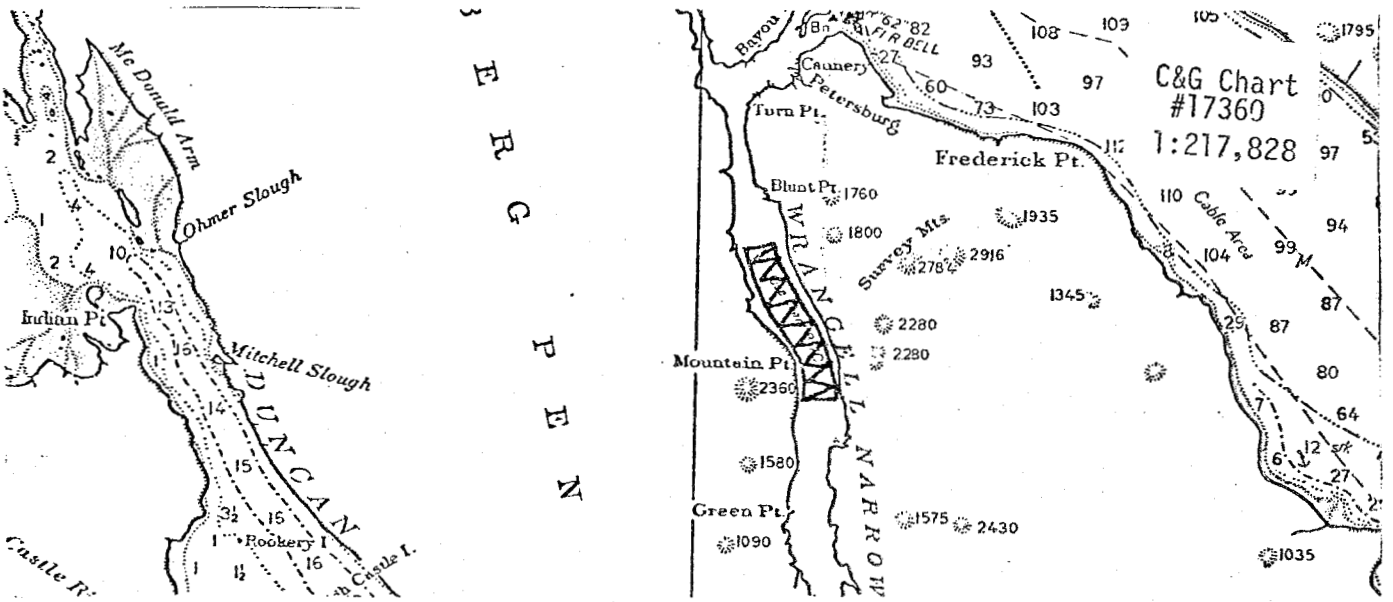
## ACOUSTICAL SURVEY SUMMARY

Area Scow Bay Date 10/16/79 Vessel Steller Run # 1

Gain 5.0 Attenuated -12dB Operators Larson, Bergmann

Time of Survey: Start 1730 End 1808 Tide Low at 1830 hrs.

COMMENTS:

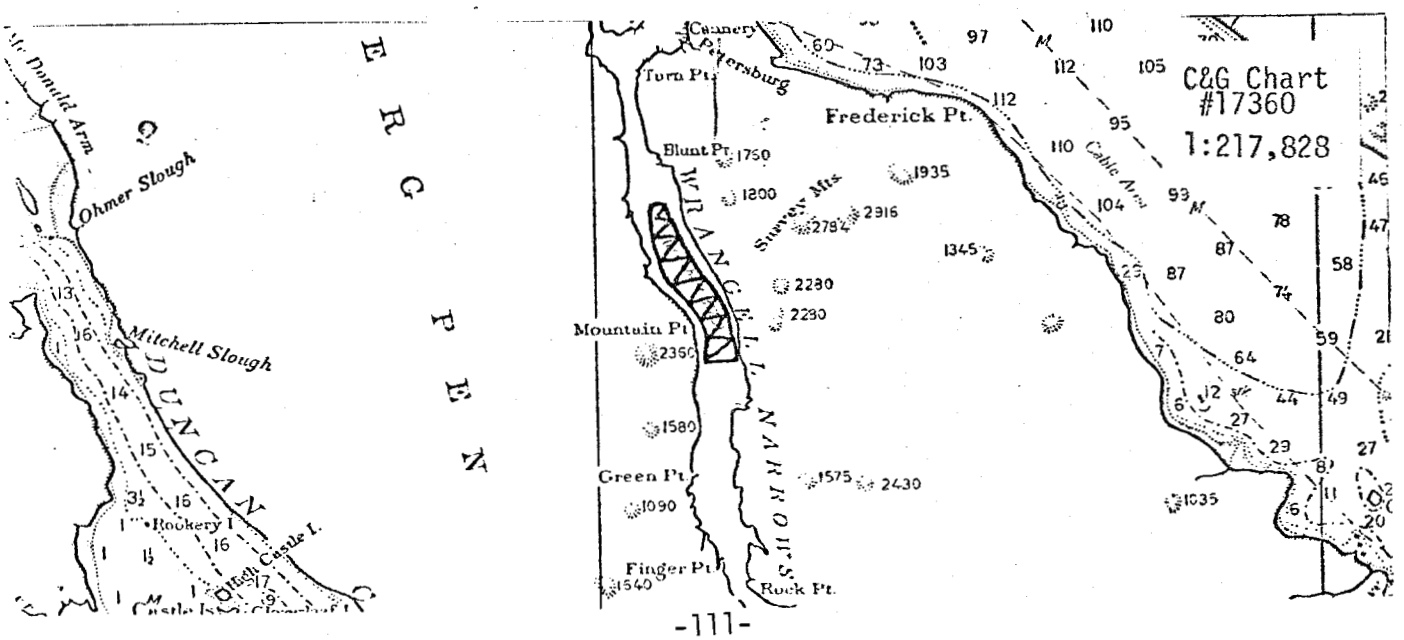



Area Scow Bay Date 10/17/79 Vessel Steller Run # 1

Gain 5.5 Attenuated -12dB Operators Larson, Buoy

Time of Survey: Start 0813 End 0856 Tide First of flood; low at 0636 hrs.

COMMENTS:



Appendix 1 continued.

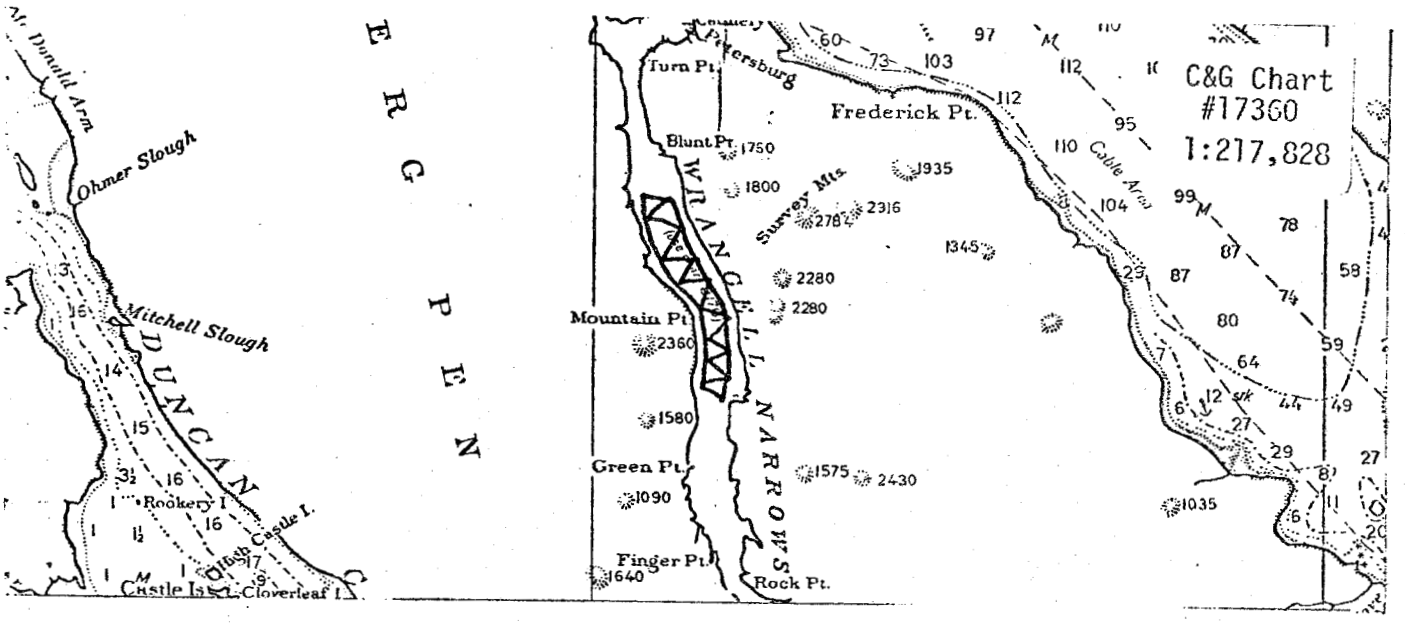
## ACOUSTICAL SURVEY SUMMARY

Area Scow Bay Date 12/7/79 Vessel Steller Run # 1

Gain 6.5 Attenuated -12dB Operators Osborne, Buoy

Time of Survey: Start 1527 End 1637 Tide Flood high

COMMENTS:

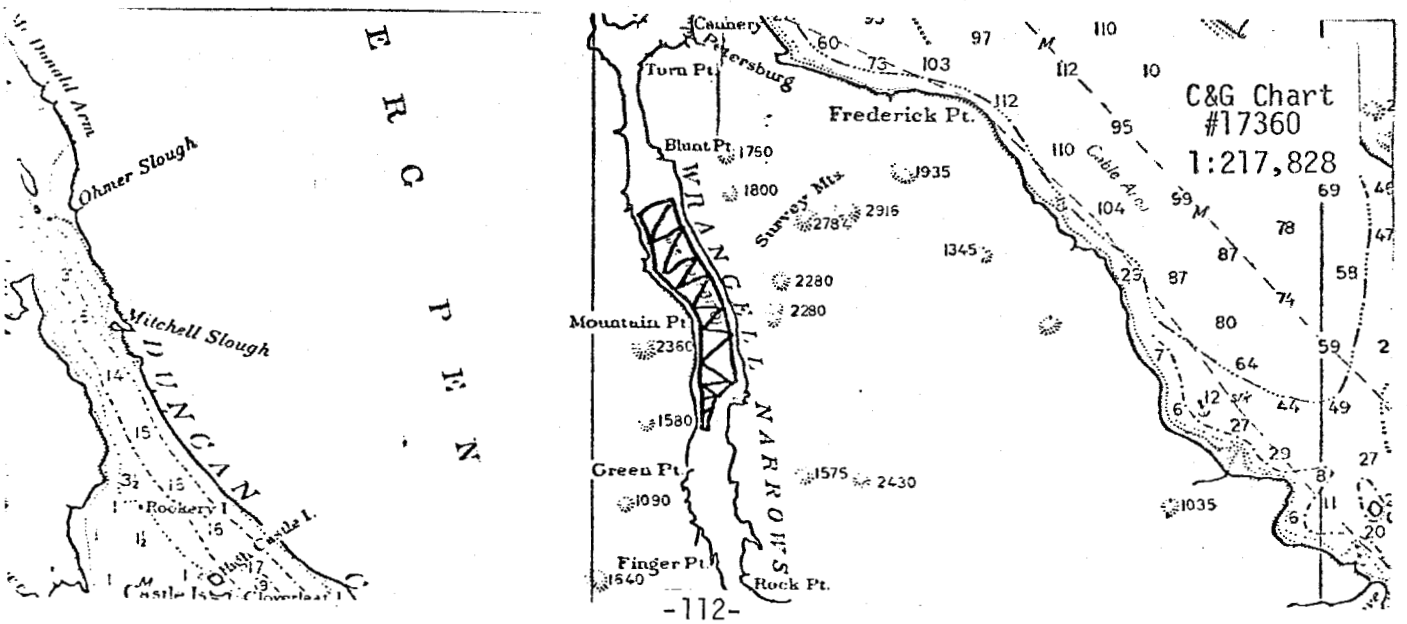



Area Scow Bay Date 12/12/79 Vessel Steller Run # 1

Gain 6.0 Attenuated -12dB Operators Osborne, Buoy

Time of Survey: Start 1548 End 1640 Tide Low - flood

COMMENTS:



Appendix 1 continued.

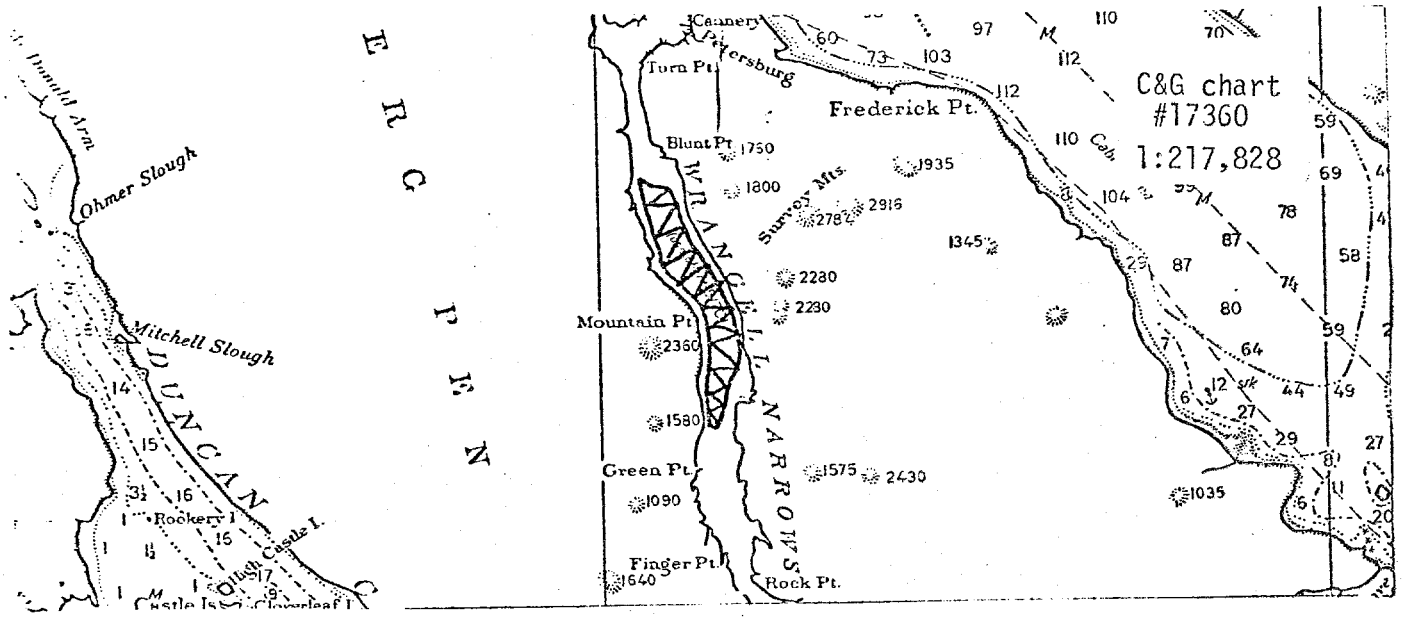
## ACOUSTICAL SURVEY SUMMARY

Area Scow Bay Date 12/14/79 Vessel Steller Run # 1

Gain 4.5 Attenuated -12dB Operators Osborne, Buoy

Time of Survey: Start 1625 End 1719 Tide Low-ebb

COMMENTS: Weather: clear




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

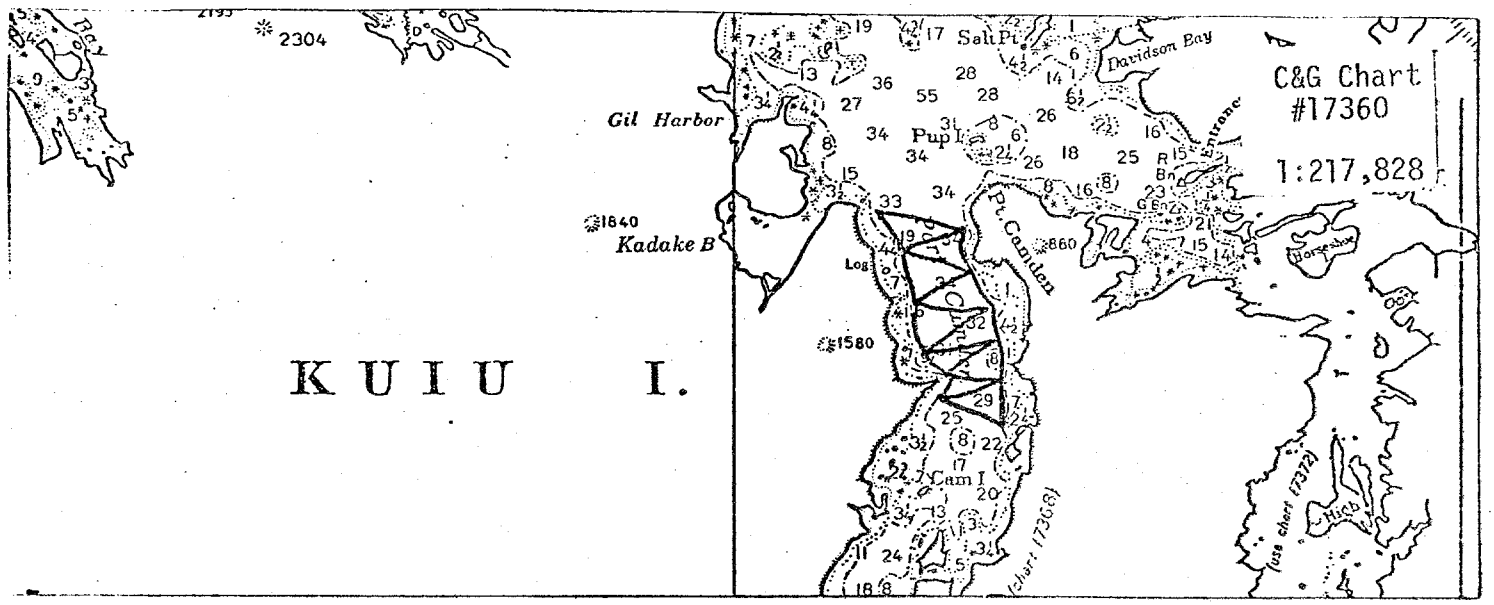
## ACOUSTICAL SURVEY SUMMARY

Area Port Camden Date 11/13/77 Vessel Auklet Run # 1

Gain 6.36 Attenuated -12 dB Operators Bergmann, Timothy

Time of Survey: Start 08:12 End 09:45 Tide Ebbing, 06:51 high

COMMENTS: Fish close to bottom and very thin. Herring are still moving into the area.

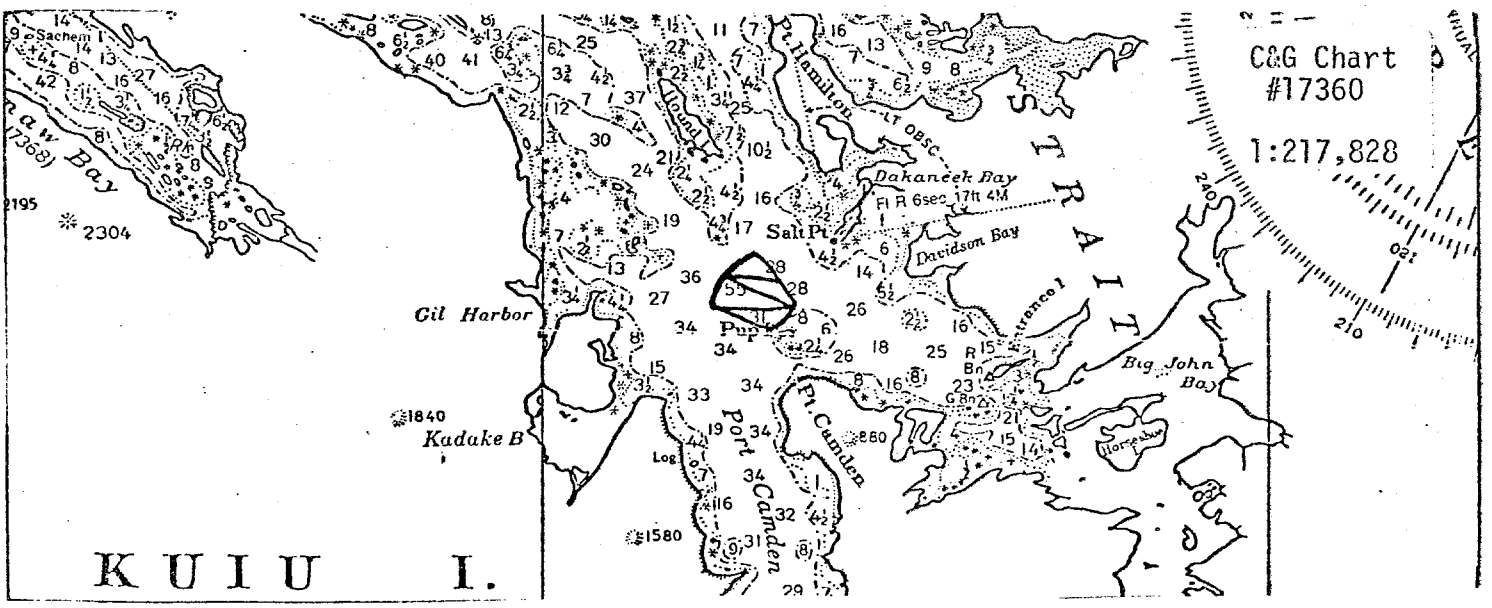



Area Port Camden Date 12/15/77 Vessel Auklet Run # 1

Gain 7 Attenuated -12 dB Operators Bracken, Drummend

Time of Survey: Start 08:50 End 09:27 Tide Low ebb

COMMENTS: Fish were stationary with the possibility of some saturation.



Appendix 1 continued.

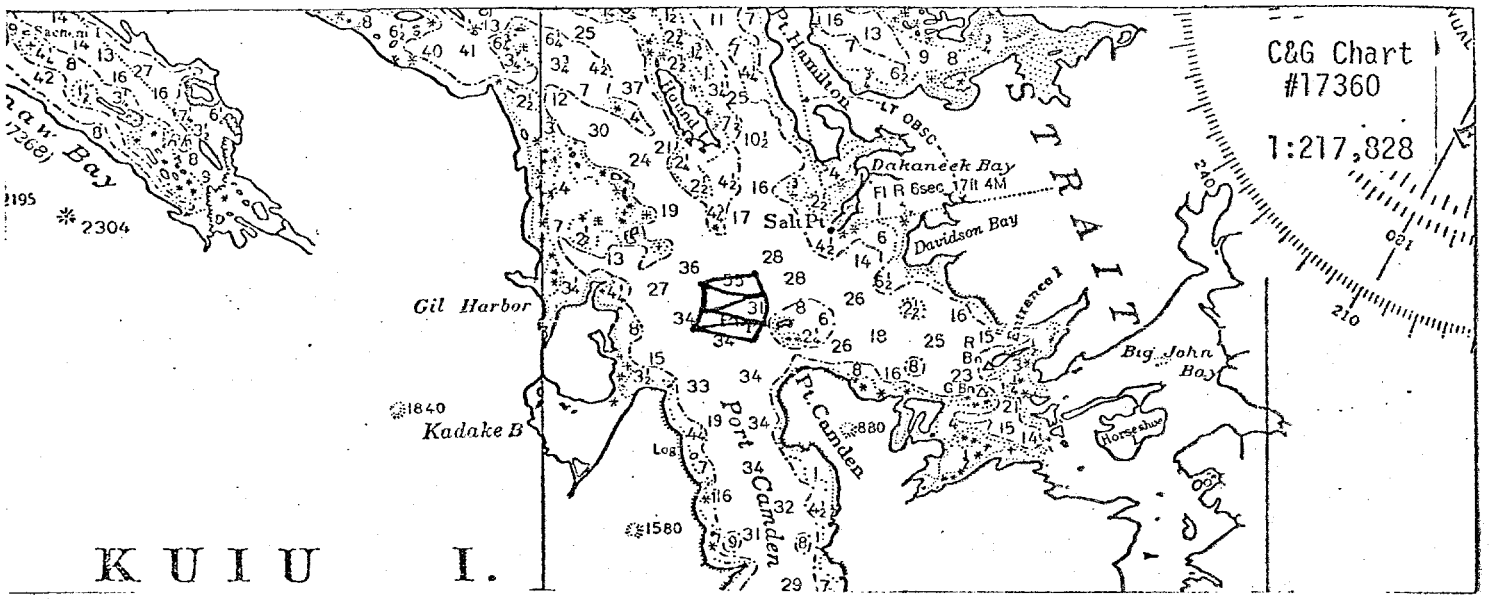
## ACOUSTICAL SURVEY SUMMARY

Area Port Camden Date 12/15/77 Vessel Auklet Run # 2

Gain 6 Attenuated -12 dB Operators Bracken, Drummend

Time of Survey: Start 17:10 End 17:52 Tide High ebb

COMMENTS: Gain 6 looked good. Some schools were missed.

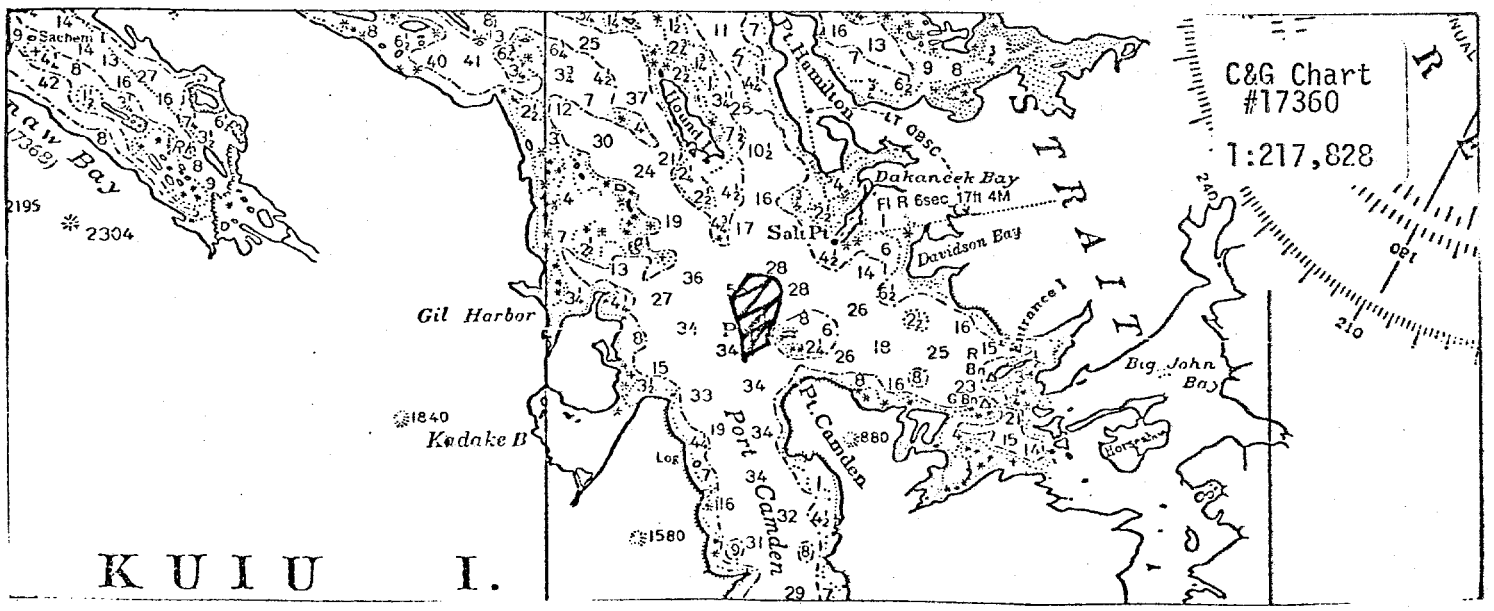



Area Port Camden Date 12/15/77 Vessel Auklet Run # 3

Gain 7 Attenuated -12 dB Operators Bracken, Drummend

Time of Survey: Start 18:10 End 18:56 Tide High ebb

COMMENTS: Fish thinned as run progressed. This run taped portions of three massive schools.



Appendix 1 continued.

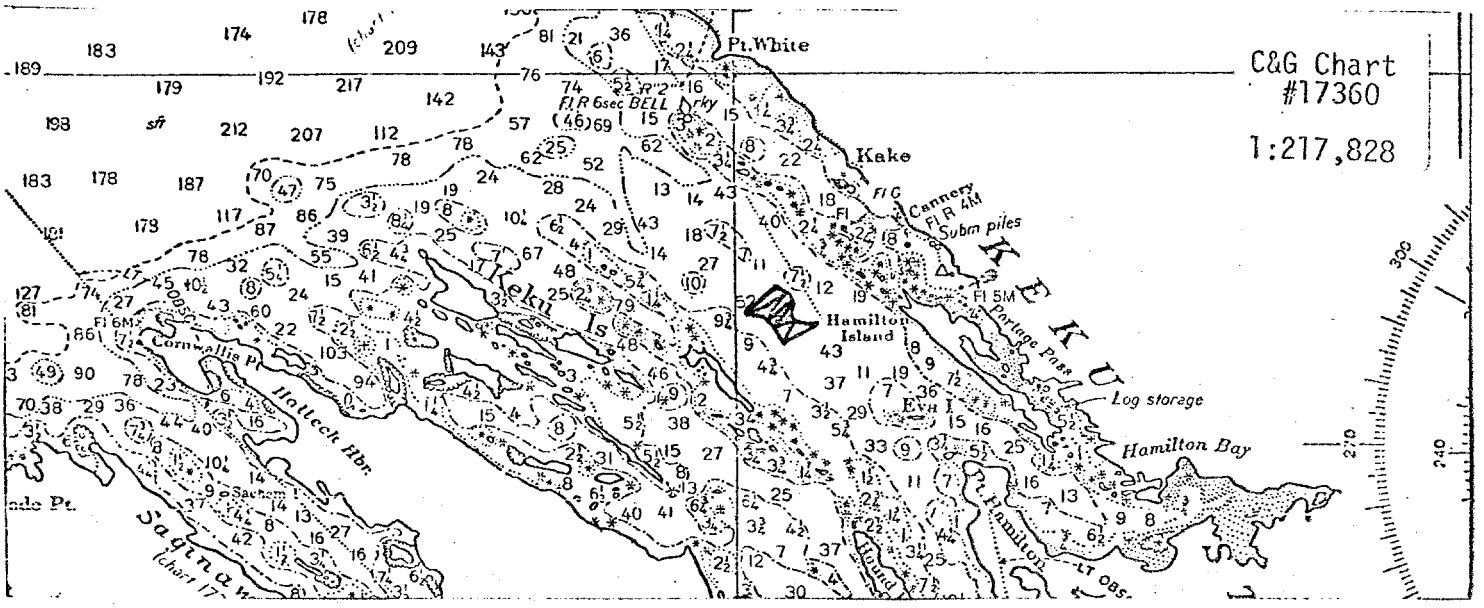
## ACOUSTICAL SURVEY SUMMARY

Area Keku Strait Date 12/16/77 Vessel Auklet Run #1

Gain 6.5 Attenuated -12 dB Operators Bracken, Drumm

Time of Survey: Start 08:45 End 09:28 Tide High ebb

COMMENTS: Whales were scattering fish in this area. Several small schools were missed. Fish were moving toward direction of run so results should be lower than actual biomass.




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

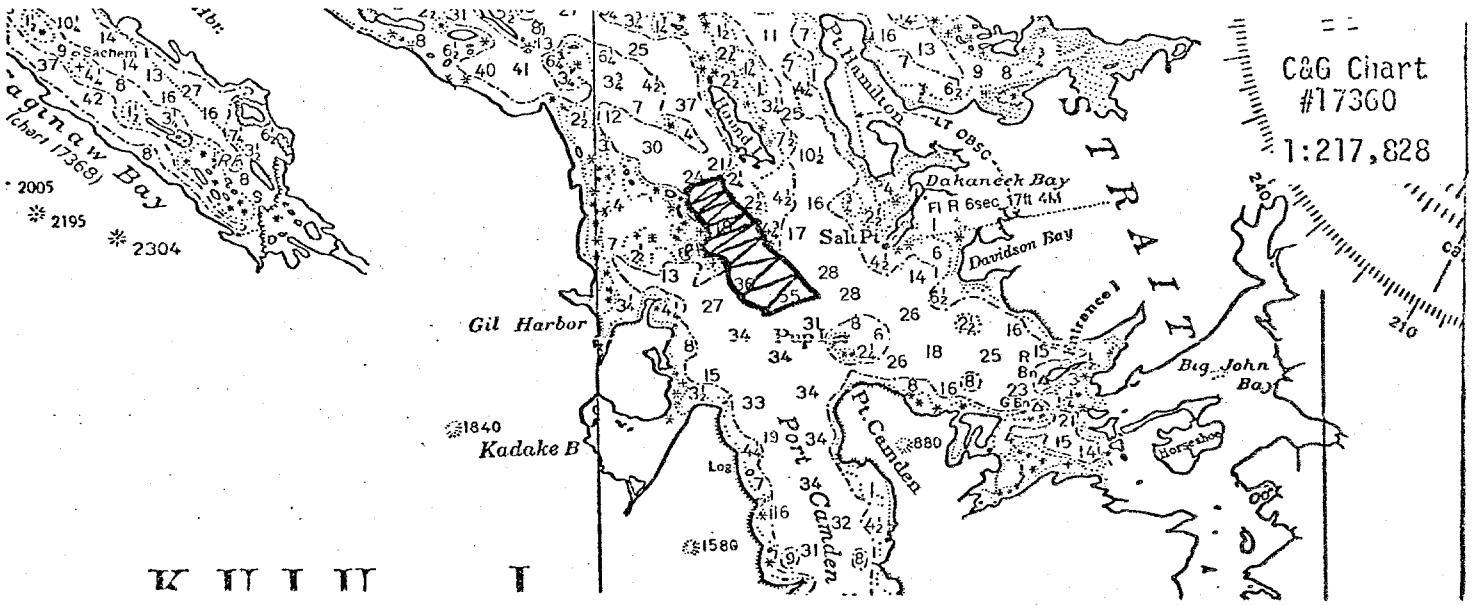
## ACOUSTICAL SURVEY SUMMARY

Area Port Camden Date 12/9/78 Vessel Steller Run # 1

Gain 5.5 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 15:41 End 16:54 Tide 73 min.

COMMENTS: Continuous school of fish about 1.7 miles long. Fish concentrated on steep west bank below 30 fathom contour. Herring disposed after dark.

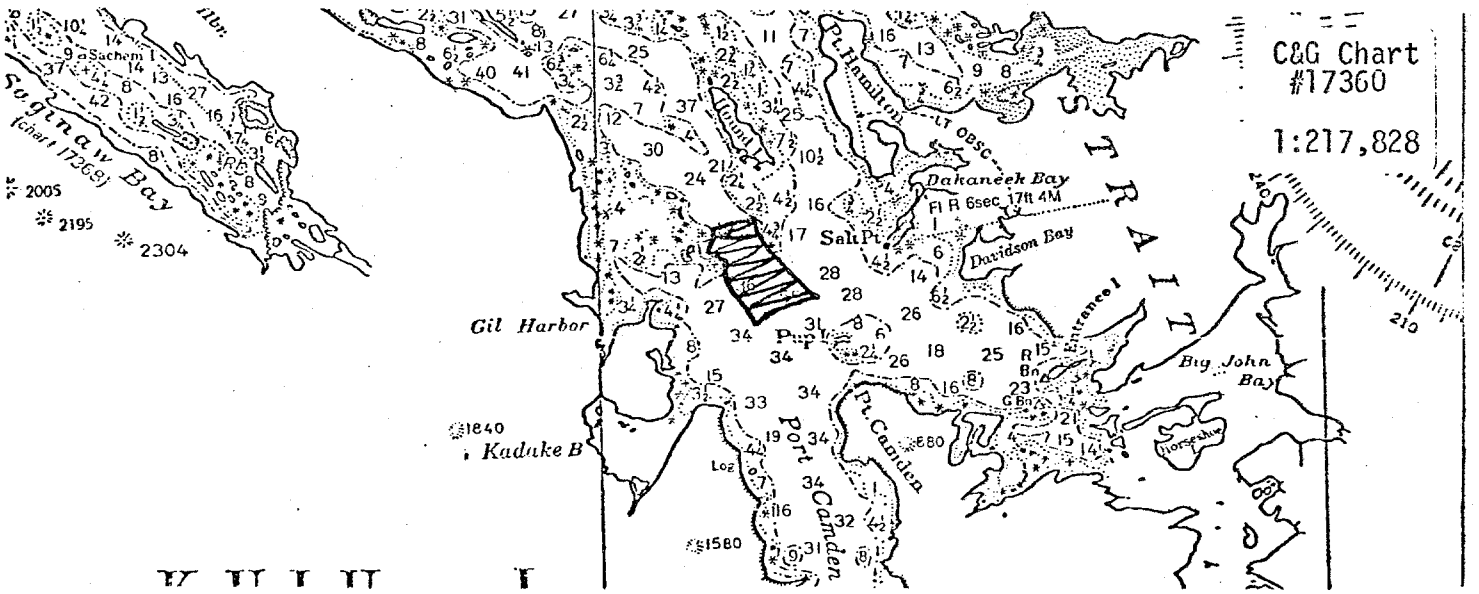



Area Port Camden Date 12/10/78 Vessel Steller Run # 1

Gain 6.0 Attenuated -12 dB Operators Bergmann, Murphy

Time of Survey: Start 13:04 End 14:21 Tide Ebb 11:44 am 14.7' (J.D.)

COMMENTS: Survey biomass is conservative due to poor bottom separation and some fish outside of area.



Appendix 1 continued.

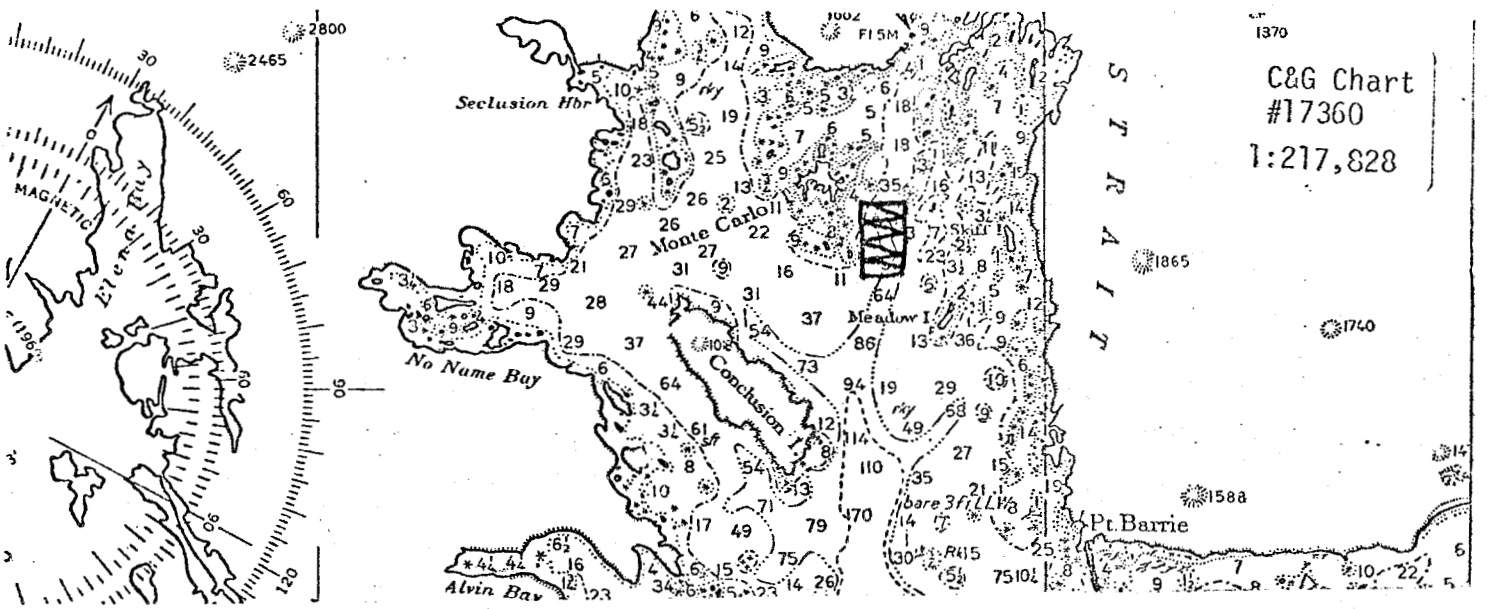
## ACOUSTICAL SURVEY SUMMARY

Area Keku Strait Date 3/13/79 Vessel Steller Run # 2

Gain 5.5 Attenuated -12 dB Operators Timothy, Murry

Time of Survey: Start 1629:00 End 1652:30 Tide High (Ktn) 13:35/13.7'

COMMENTS: Fish at 45 fathoms in 60 fathoms of water; holding in deep and not moving.




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

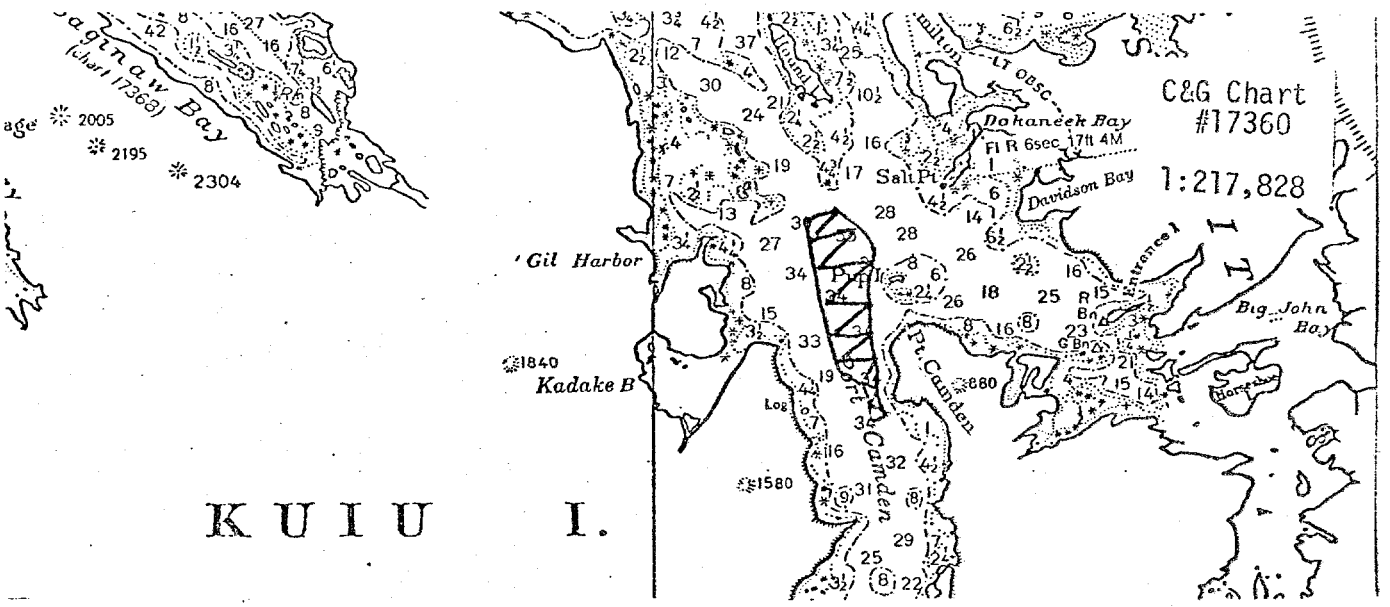
## ACOUSTICAL SURVEY SUMMARY

Area Port Camden Date 11/7/79 Vessel Steller Run # 2

Gain 6.0 Attenuated -12dB Operators Larson, Bergmann, Osborne

Time of Survey: Start 1040 End 1208 Tide Flood

COMMENTS:

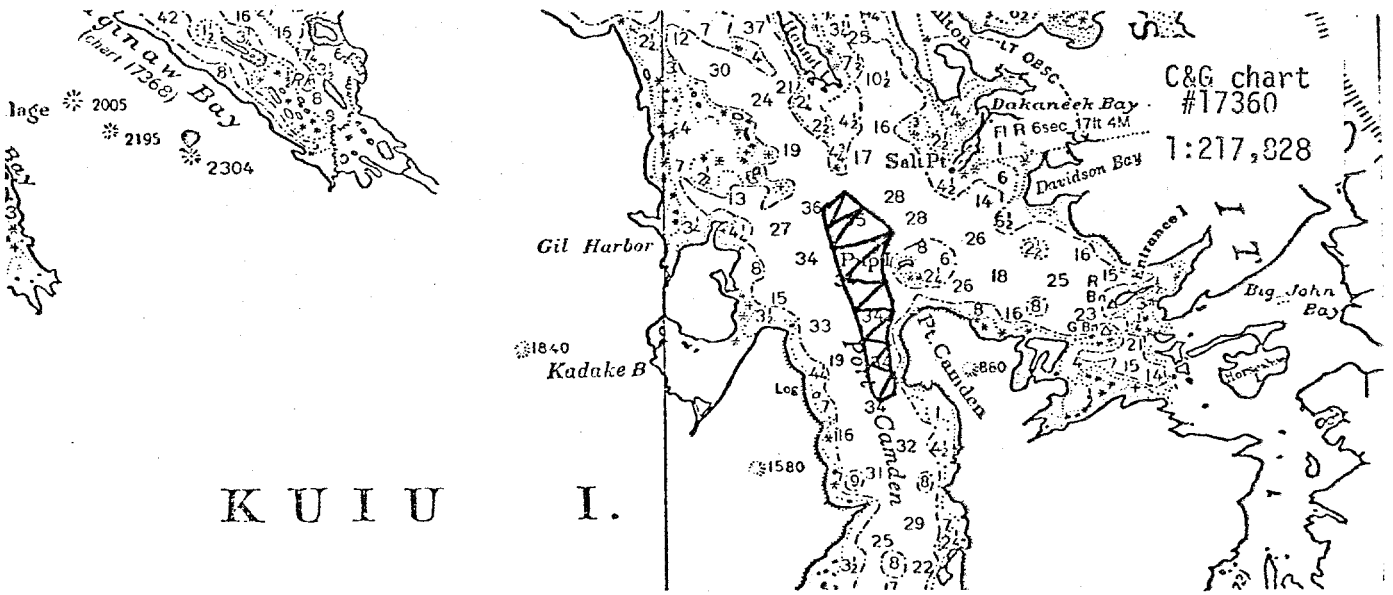



Area Port Camden Date 11/8/79 Vessel Steller Run # 1

Gain 5.5 Attenuated -12dB Operators Larson, Bergmann, Osborne

Time of Survey: Start 0851 End 1001 Tide Ebb-1021 hrs. low

COMMENTS:



Appendix 1 continued.

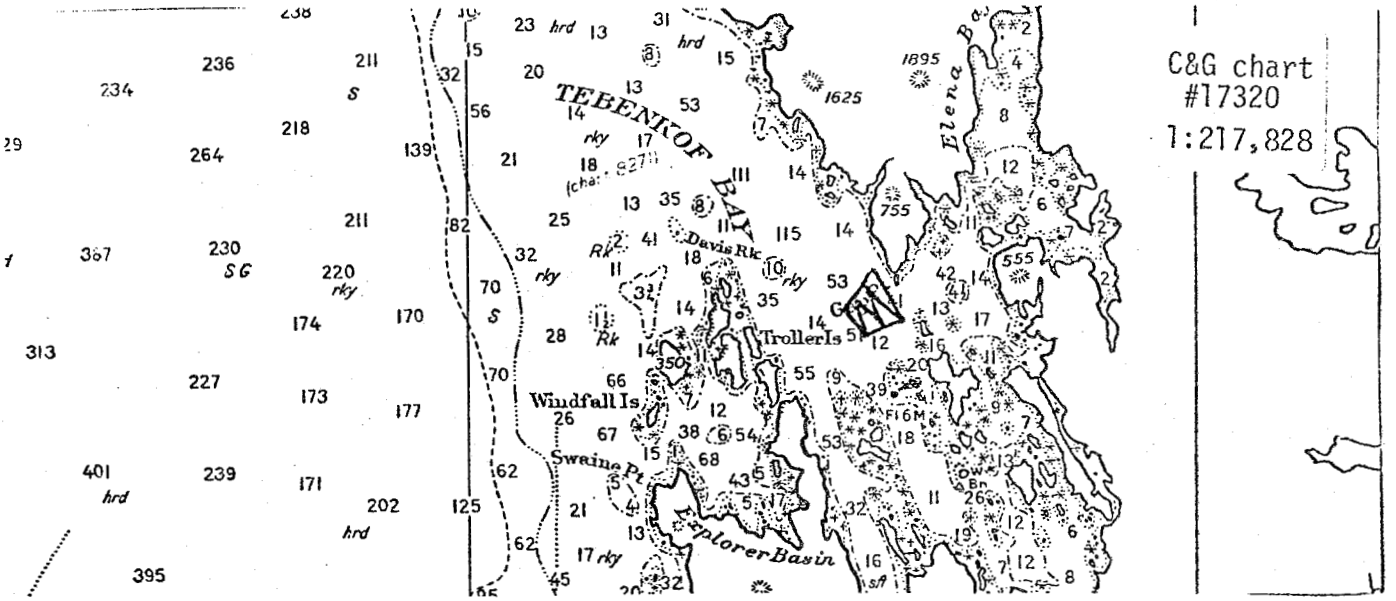
## ACOUSTICAL SURVEY SUMMARY

Area Tebenkof Date 11/10/79 Vessel Steller Run # 1

Gain 6.5 Attenuated -12dB Operators Larson, Osborne, Buoy

Time of Survey: Start 0945 End 1006 Tide Ebb, high at 0609 hrs.

COMMENTS:

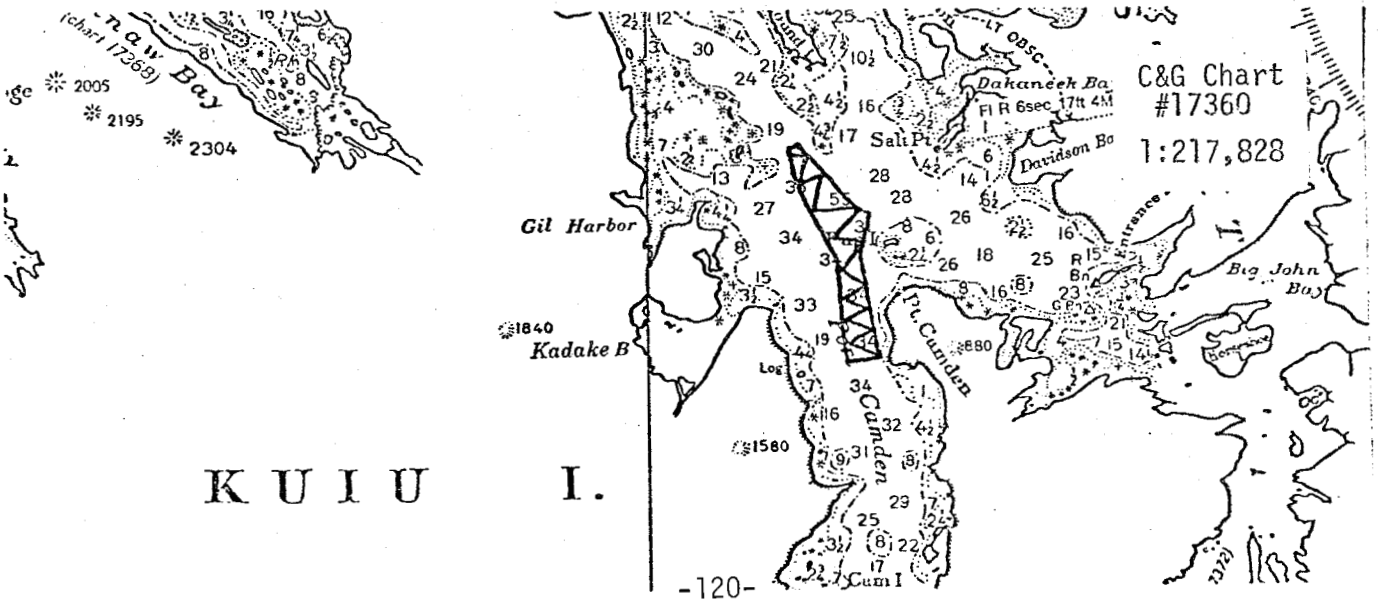



Area Port Camden Date 11/7/79 Vessel Steller Run # 1

Gain 6.0 Attenuated -12dB Operators Larson, Bergmann, Osborne

Time of Survey: Start 0917 End 1020 Tide Low at 0936 hrs.

COMMENTS:



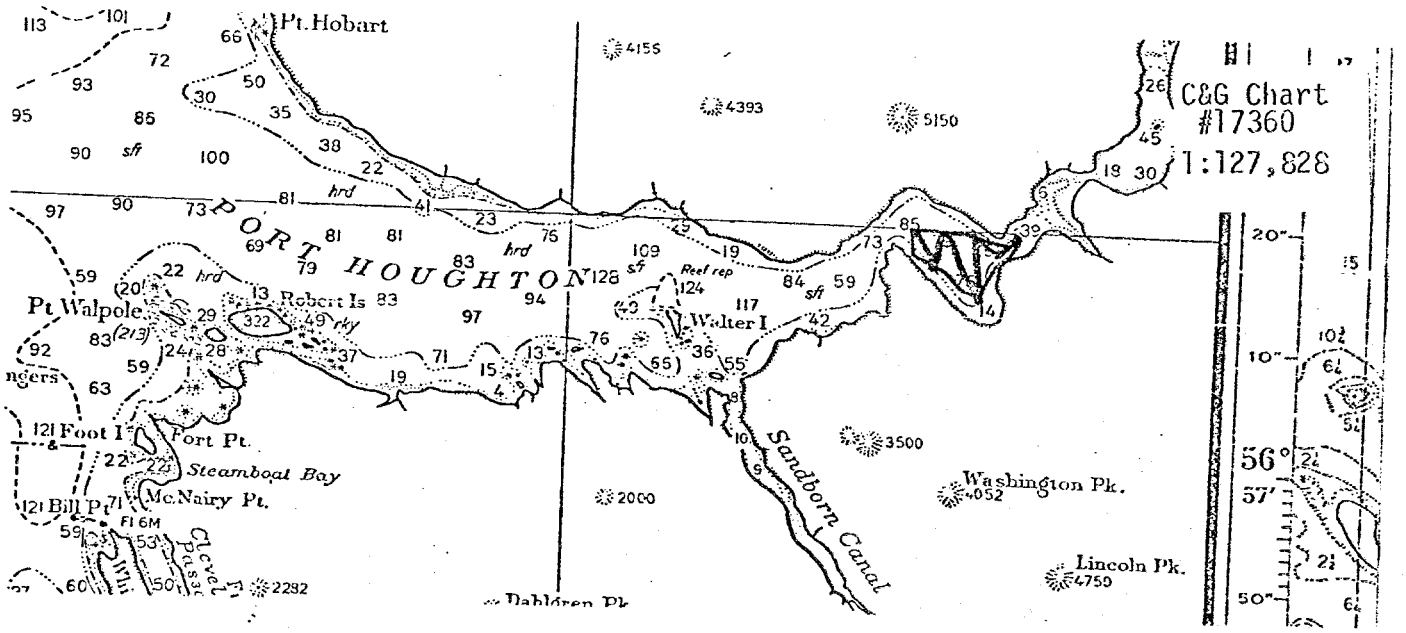
Appendix 1 continued. ACOUSTICAL SURVEY SUMMARY

Area Port Houghton Date 11/1/78 Vessel Steller Run # 1

Gain 6.0 Attenuated -12 dB Operators Bergmann, Timothy

Time of Survey: Start 09:42 End 10:17 Tide Flooding; low 7:34 (.1')

COMMENTS: Vessel speed = 7.5 knots.

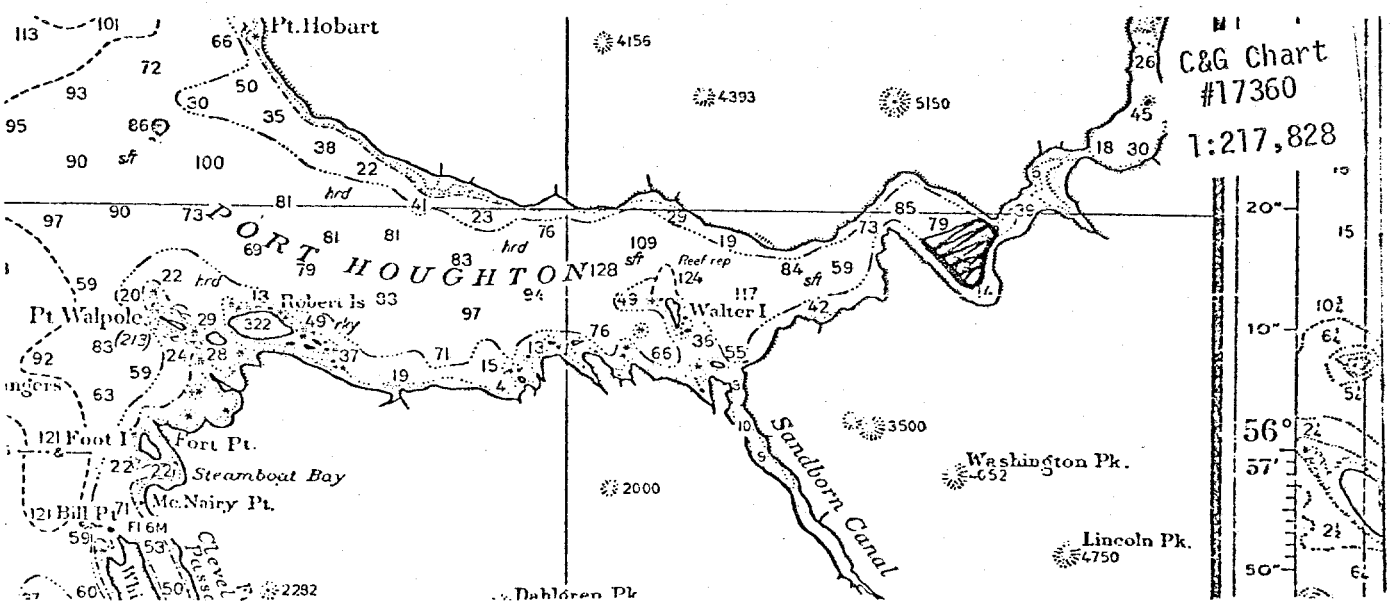



Area Port Houghton Date 11/1/78 Vessel Steller Run # 2

Gain 5.5 Attenuated -12 dB Operators Bergmann, Timothy

Time of Survey: Start 10:37 End 11:32 Tide Flooding - low 7:34 (.1')

COMMENTS:



Appendix 1 continued.

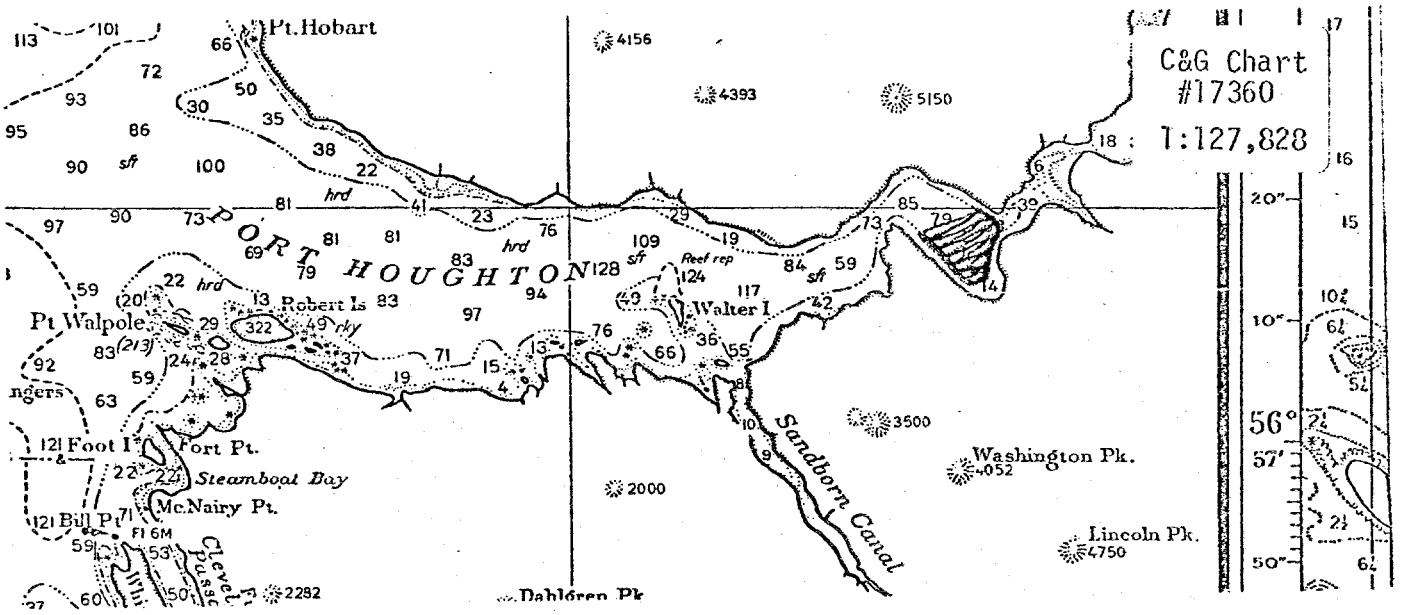
## ACOUSTICAL SURVEY SUMMARY

Area Port Houghton Date 11/1/78 Vessel Steller Run # 3

Gain 5.5 Attenuated -12 dB Operators Bergmann, Timothy

Time of Survey: Start 1221:30 End 1345:15 Tide 1:23:45

COMMENTS: Transects very tight. Whales feeding. Turned on one school - fish moving fast.




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

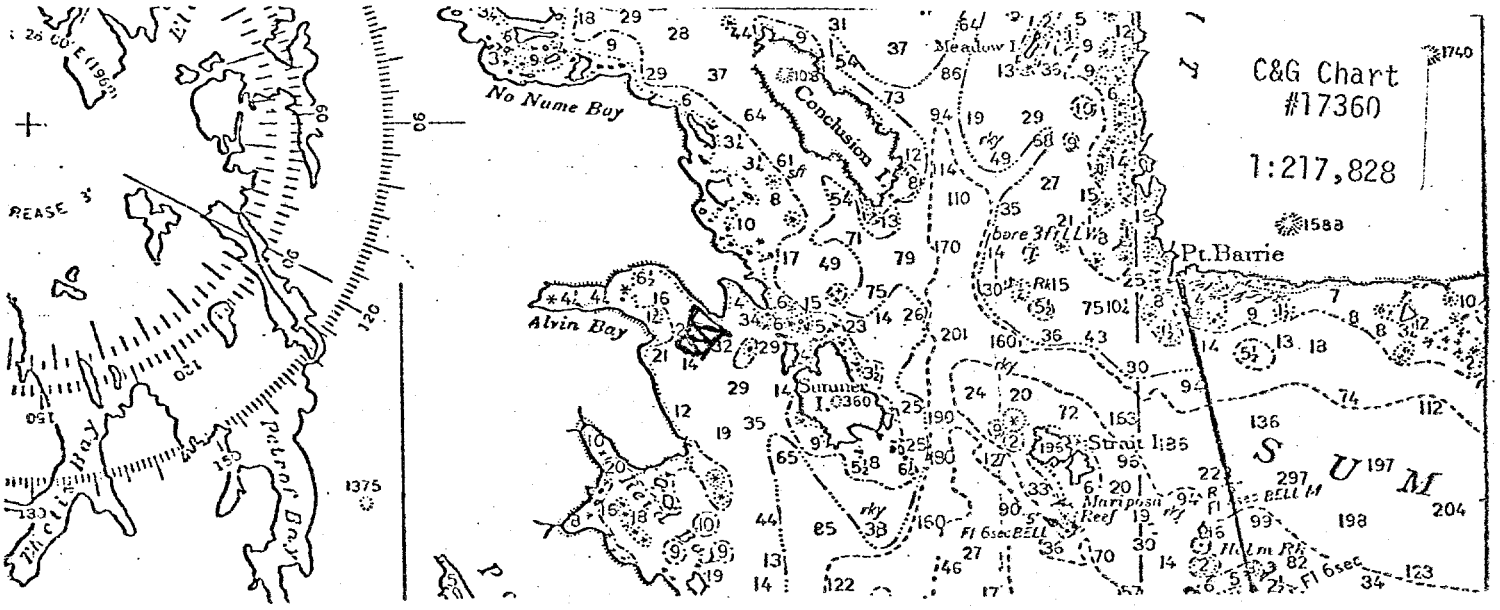
## ACOUSTICAL SURVEY SUMMARY

Area Alvin Bay Date 2/2/78 Vessel Auklet Run # 1

Gain 5.5 Attenuated -12 dB Operators Timothy

Time of Survey: Start 10:20 End 11:08 Tide Ebbing; high 08:12 (14.8')

COMMENTS: Fish in shallow water. Some saturation. Many birds, moving fish; 100 tons of herring caught in this area 2/1/78.

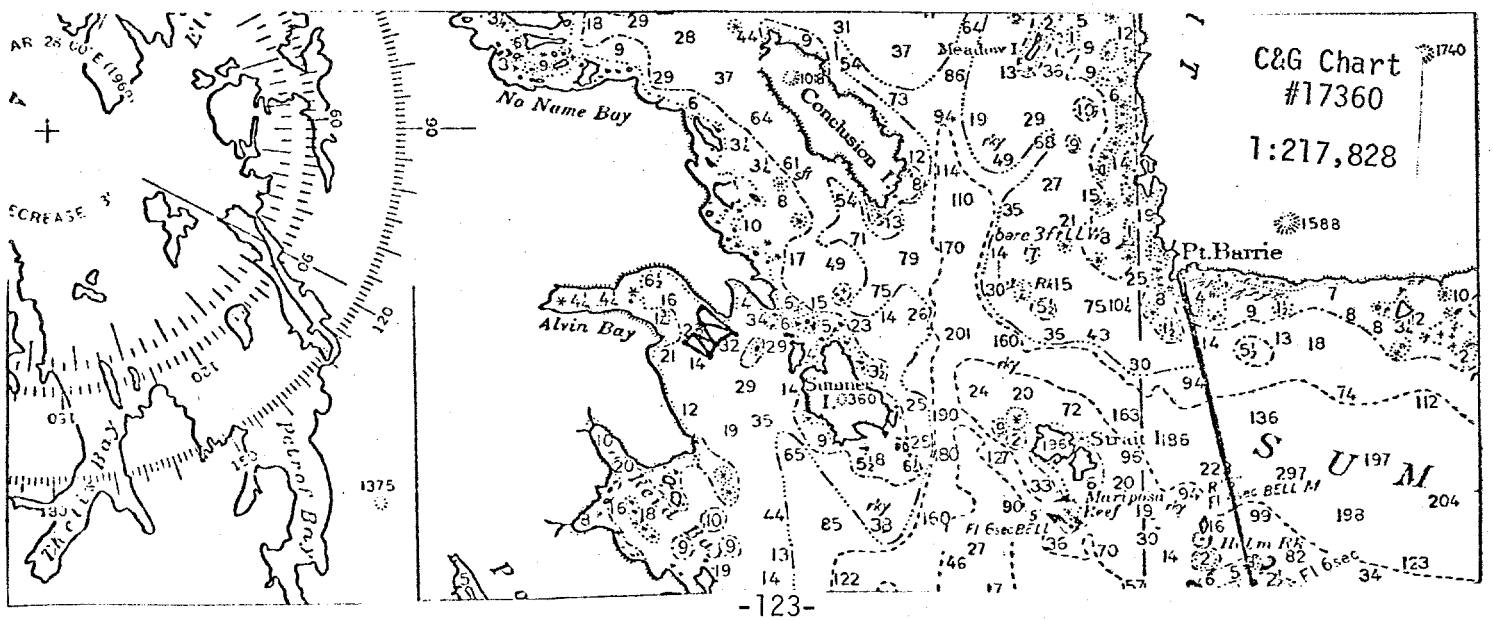



Area Alvin Bay Date 2/2/78 Vessel Auklet Run # 2

Gain 5. Attenuated -12 dB Operators Timothy

Time of Survey: Start 11:25 End 11:51 Tide Ebb, high 08:12 (14.8')

COMMENTS: Ran at 6.0 knots. Could not get a survey in part of the area that herring were caught in the night before.



Appendix 1 continued.

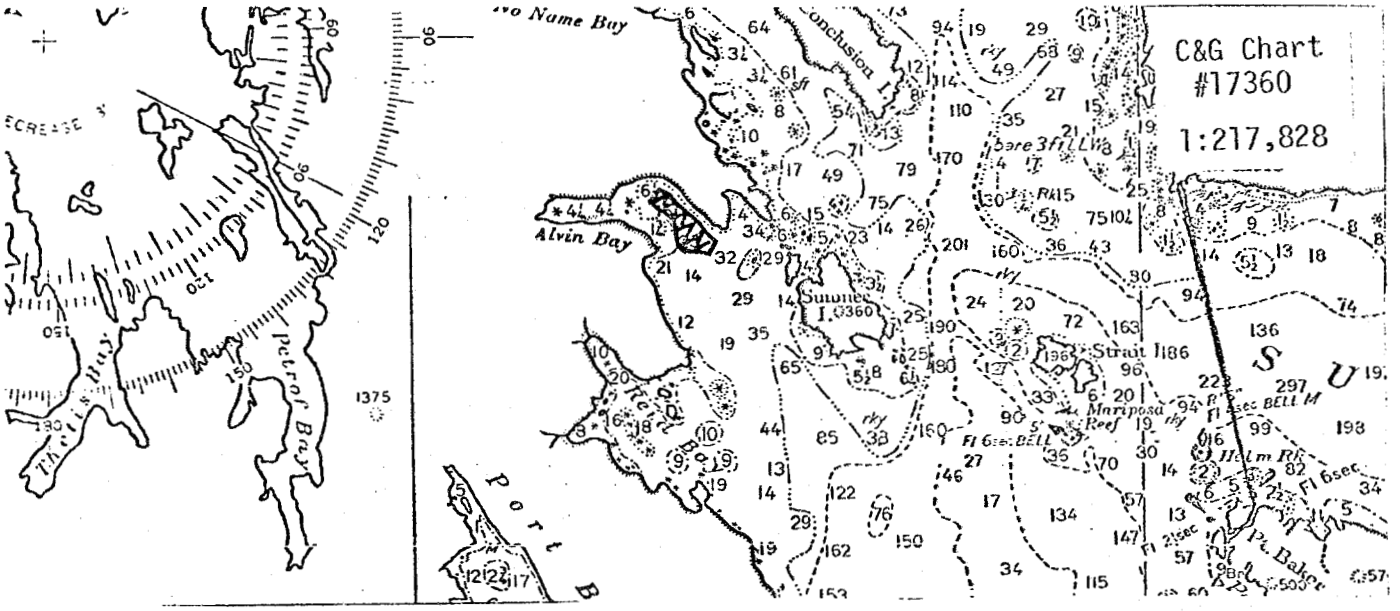
## ACOUSTICAL SURVEY SUMMARY

Area Alvin Bay Date 11/12/79 Vessel Steller Run # 1

Gain 3.0 Attenuated -12dB Operators Larson, Bergmann

Time of Survey: Start 0845 End 0924 Tide High at 0838 hrs.

COMMENTS: Fish dense and shallow; acoustical theory does not apply.

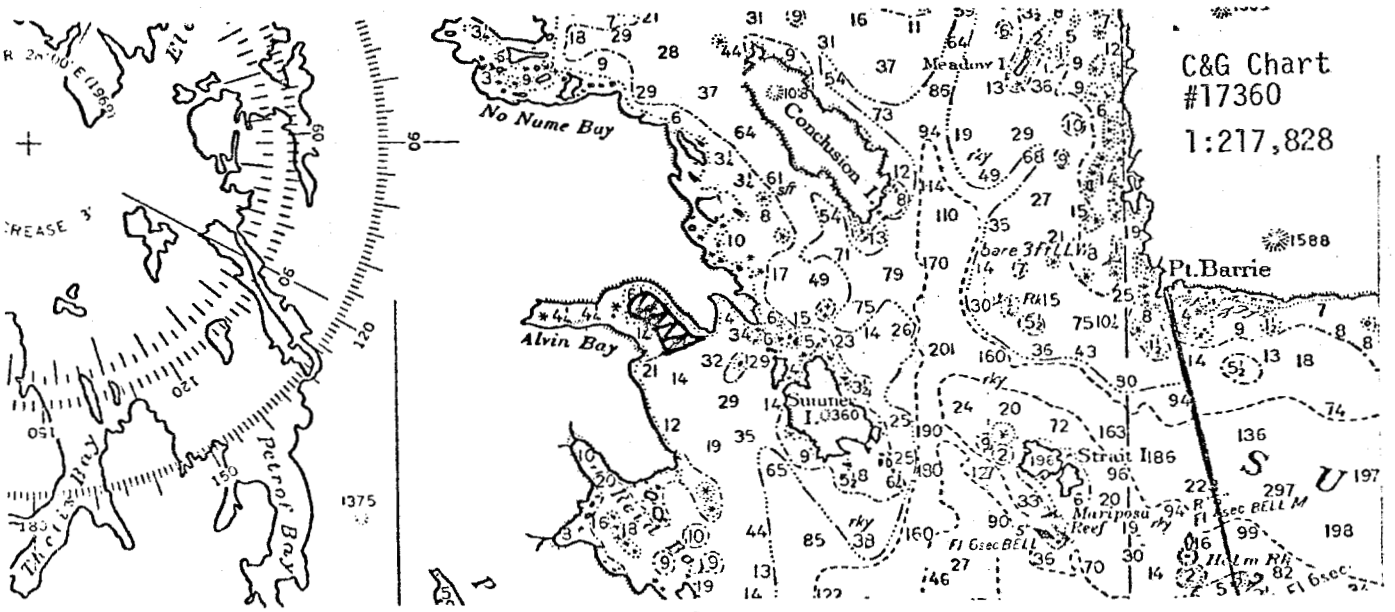



Area Alvin Bay Date 11/12/79 Vessel Steller Run # 2

Gain 2.0 Attenuated -12dB Operators Larson, Bergmann

Time of Survey: Start 0936 End 1005 Tide Ebbing; high 0828 hrs.

COMMENTS: Very good sized school observed outside the area surveyed.



Appendix 1 continued.

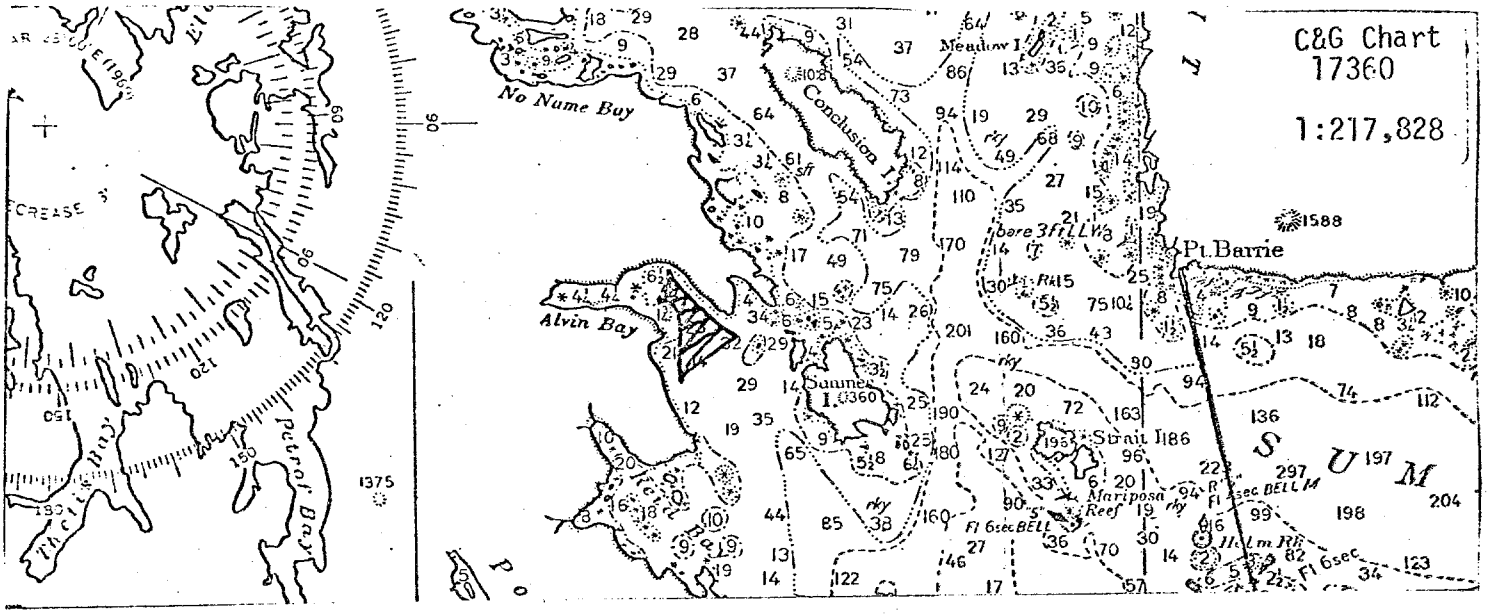
## ACOUSTICAL SURVEY SUMMARY

Area Alvin Bay Date 2/2/78 Vessel Auklet Run # 3

Gain 5.0 Attenuated -12 dB Operators Timothy

Time of Survey: Start 12:03 End 12:52 Tide Ebb, high 08:12 (14.8')

COMMENTS: Ran at 6.0 knots.




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

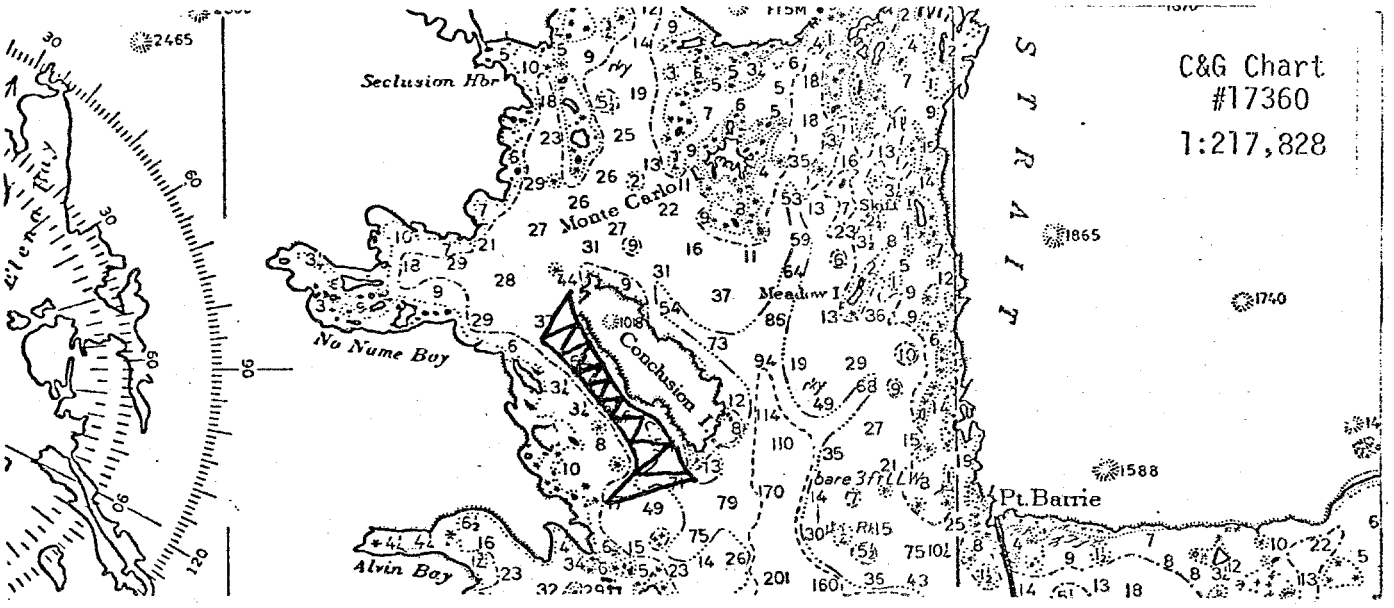
## ACOUSTICAL SURVEY SUMMARY

Area Threemile Arm Date 3/25/80 Vessel Steller Run # 1

Gain 6.0 Attenuated -12dB Operators Osborne, Loveless

Time of Survey: Start 1344 End 1450 Tide Ebbing

COMMENTS:

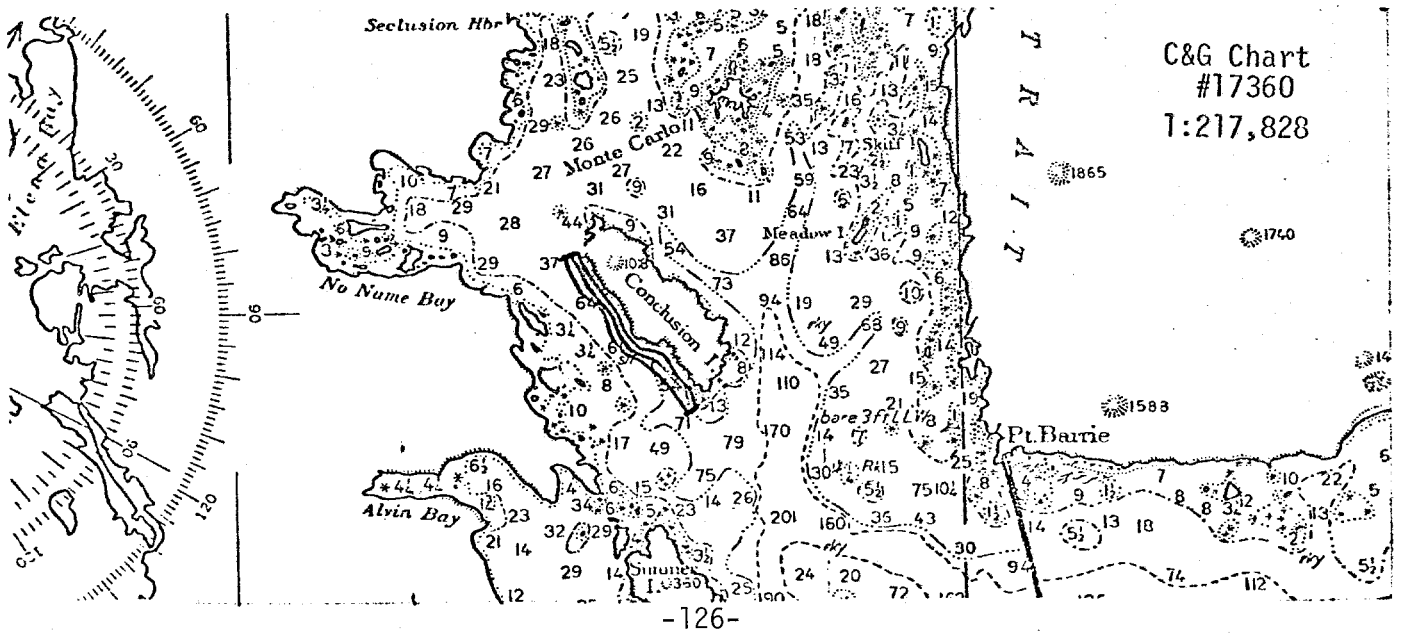



Area Threemile Arm Date 3/25/80 Vessel Steller Run # 2

Gain 6.0 Attenuated -12dB Operators Osborne, Loveless

Time of Survey: Start 1515 End 1611 Tide Low

COMMENTS:



Appendix 1 continued.

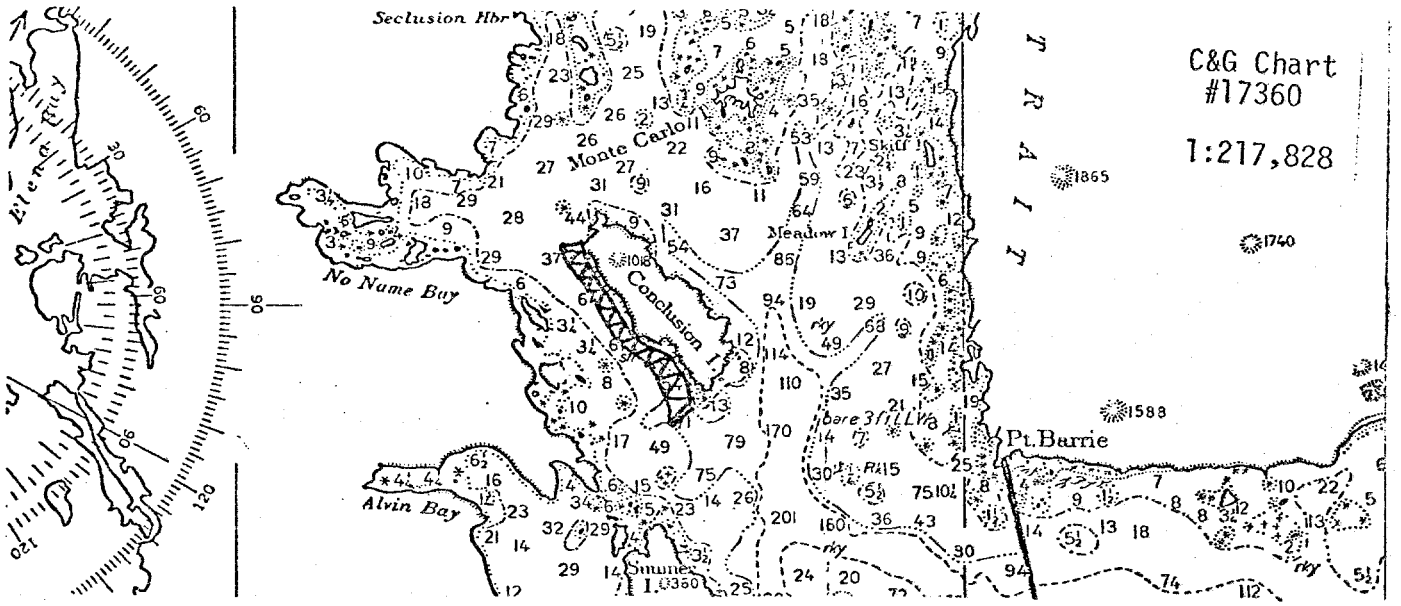
## ACOUSTICAL SURVEY SUMMARY

Area Threemile Arm Date 3/26/80 Vessel Steller Run # 1

Gain 6.0 Attenuated -12dB Operators Osborne, Loveless

Time of Survey: Start 0900 End 1018 Tide High

COMMENTS:




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

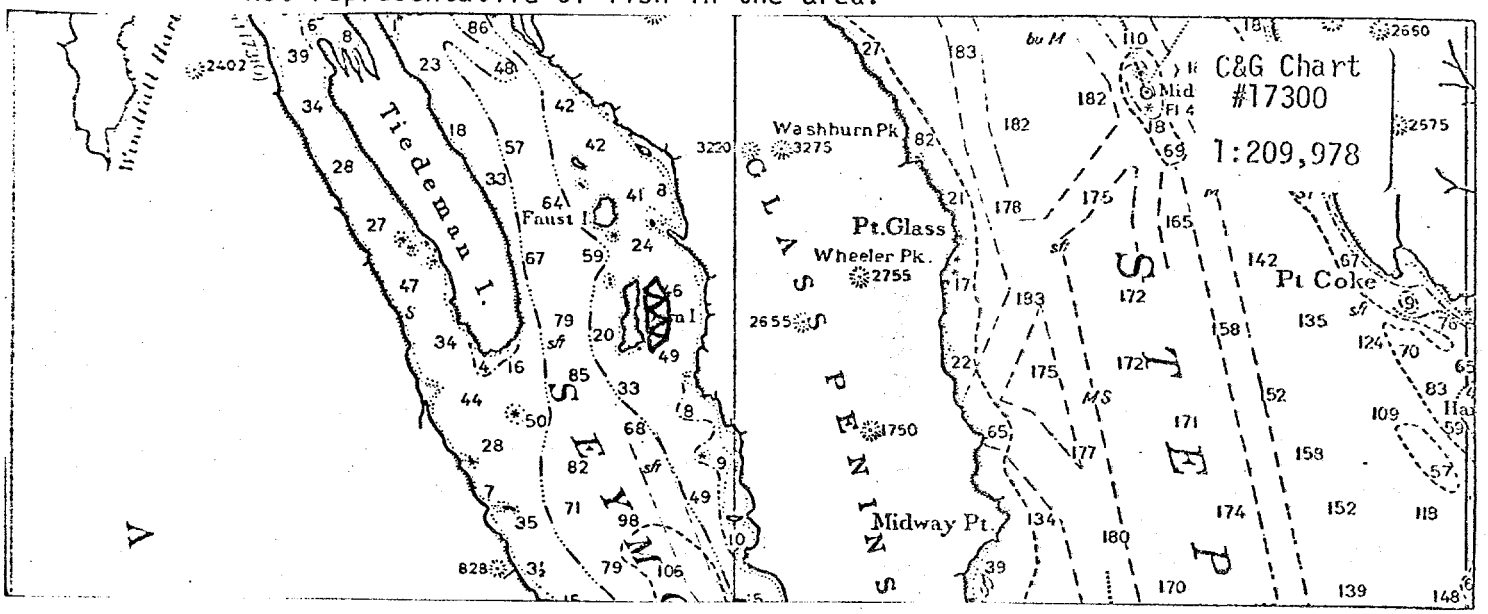
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal - Dorn Island  Date 3/21/78  Vessel Auklet  Run # 1

Gain 5.5  Attenuated -12 dB  Operators Bergmann

Time of Survey: Start 12:48  End 13:10  Tide Ebb

COMMENTS: Fish encountered were off bottom; only one major school observed. Not representative of fish in the area.

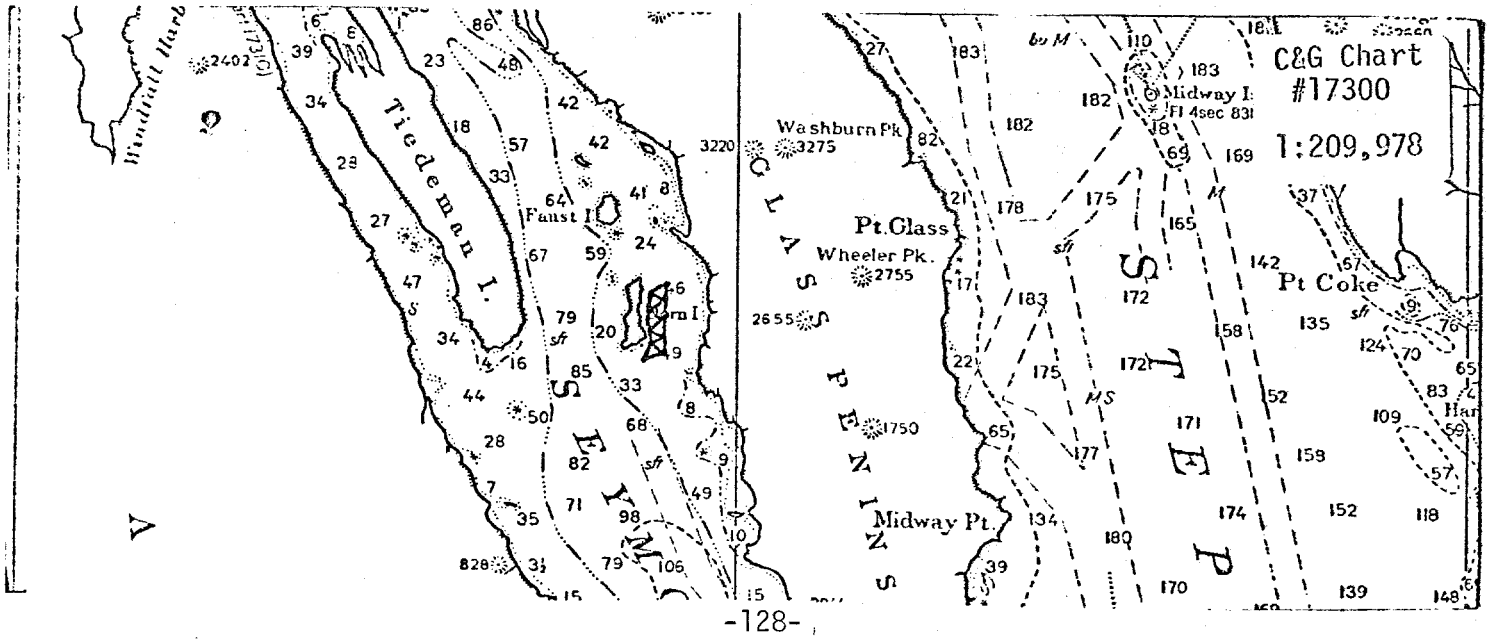



Area Seymour Canal - Dorn Island  Date 3/22/78  Vessel Auklet  Run # 1

Gain 5.5  Attenuated -12 dB  Operators Bergmann

Time of Survey: Start 09:55  End  Tide Flooding

COMMENTS: Small scattered schools. Some schools are tight on bottom.



Appendix 1 continued.

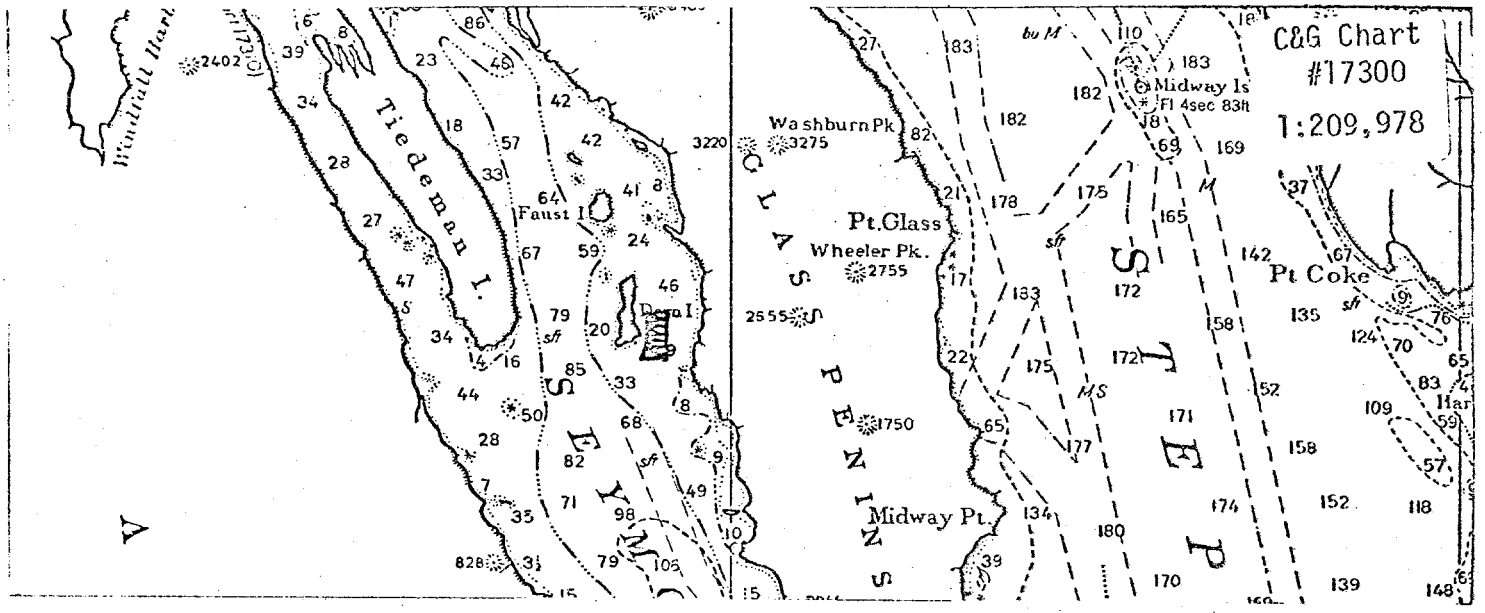
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal - Dorn Island  Date 3/22/78  Vessel Auklet  Run # 2

Gain 5.5  Attenuated -12 dB  Operators Bergmann

Time of Survey: Start 11:00  End 11:33  Tide Flooding - Low 6:30 - 1.9' - High 12:48 - 15.9

COMMENTS: Fish moved to the bottom during taping.

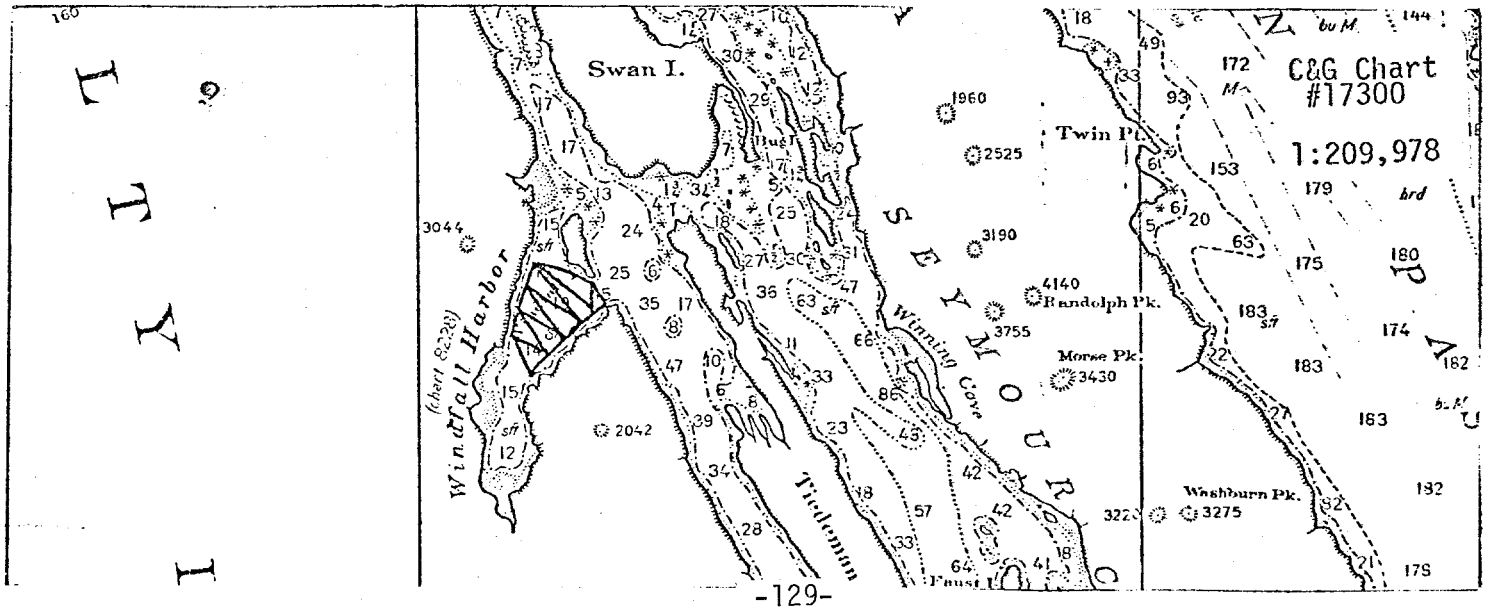



Area Seymour Canal - Windfall Harbor  Date 4/5/78  Vessel Auklet  Run # 1

Gain 5.5  Attenuated -12 dB  Operators Bracken, Teuber

Time of Survey: Start 13:36  End 14:44  Tide High ebb

COMMENTS: Scattered bottom and midwater schools distributed evenly throughout the bay. Bottom schools were saturating, midwater schools were not.



Appendix 1 continued.

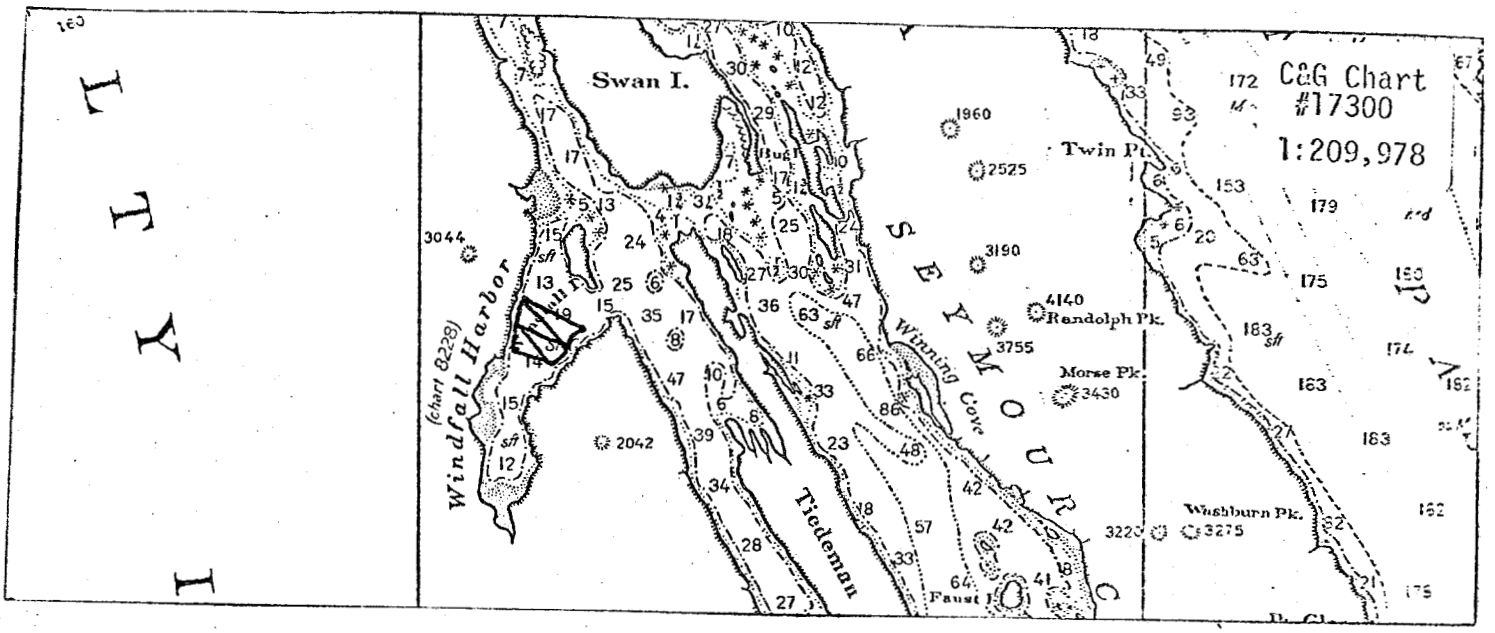
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal (Windfall Harbor) Date 4/5/78 Vessel Auklet Run # 2

Gain 5.5 Attenuated -12 dB Operators Bracken, Teuber

Time of Survey: Start 20:38 End 21:11 Tide Low flood

COMMENTS: There were fish inside us when we started this run but were too close to the ice to survey safely at night. No saturation.

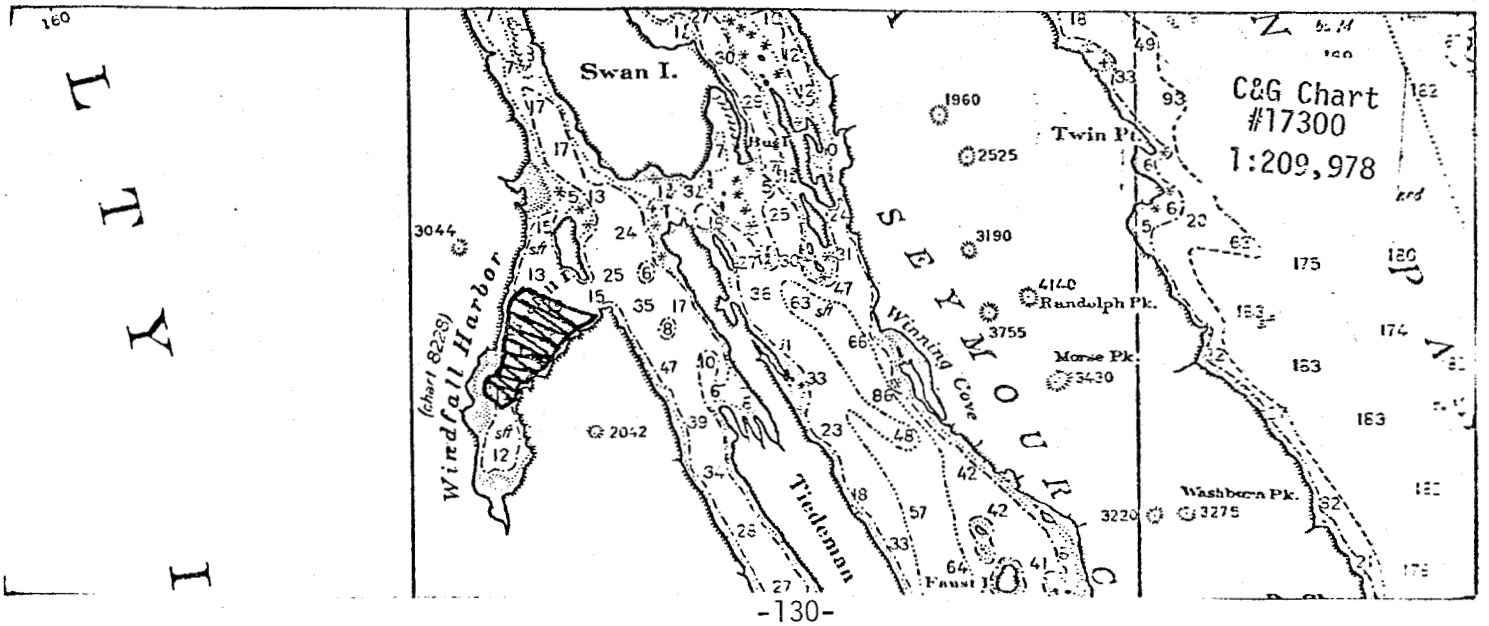



Area Seymour Canal (Windfall Harbor) Date 4/22/78 Vessel Auklet Run # 1

Gain 5.0,4.5, 4.0,3.0 Attenuated -12 dB Operators Bergmann

Time of Survey: Start 19:49 End 21:20 Tide 19:36 (-.1) Beginning of flood

COMMENTS: Numerous small schools. Very shallow, some saturation. Lowered gain to 4.5 then 4.0 then 3.0 as transects progressed out into bay.



Appendix 1 continued.

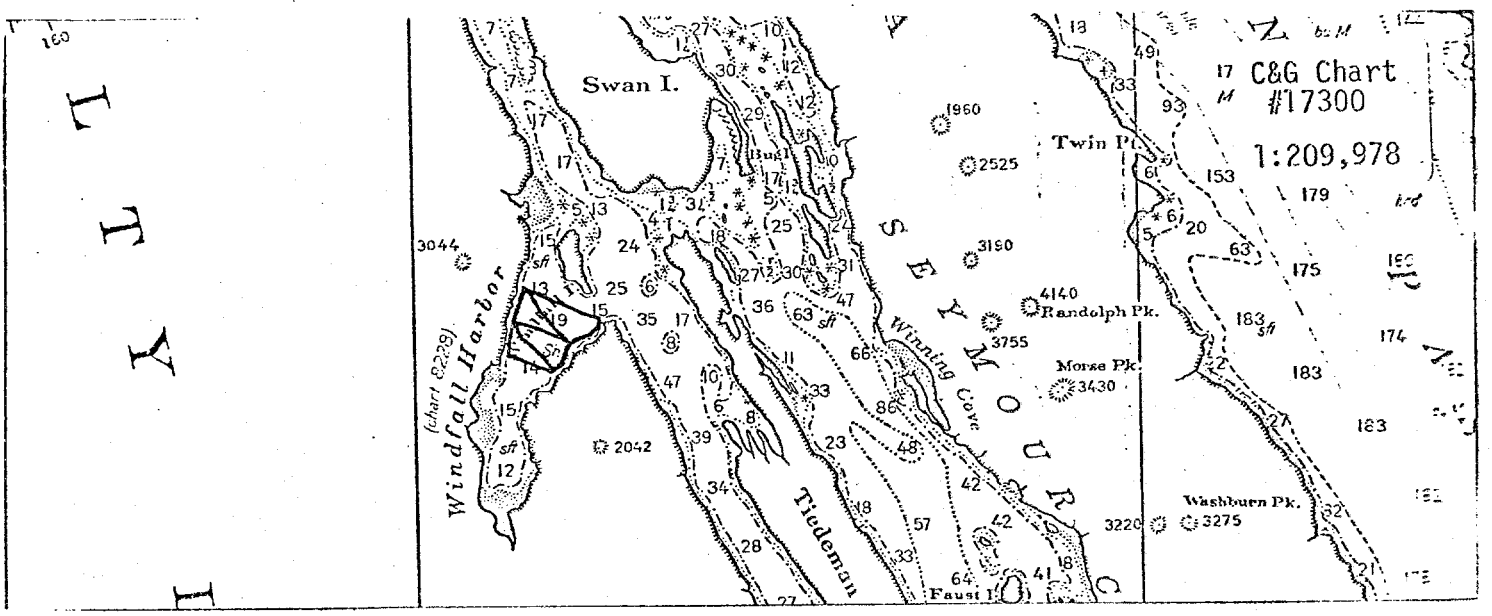
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal Windfall Harbor  Date 4/23/78  Vessel Auklet  Run # 3

Gain 4.0  Attenuated -12 dB  Operators Bergmann, Bracken

Time of Survey: Start 19:44  End 20:19  Tide Low 20:13 (0.0')

COMMENTS: Fish are scattered enough to get representative biomass from the widely spaced legs. Fish are concentrated towards the mouth. Probably too much saturation.

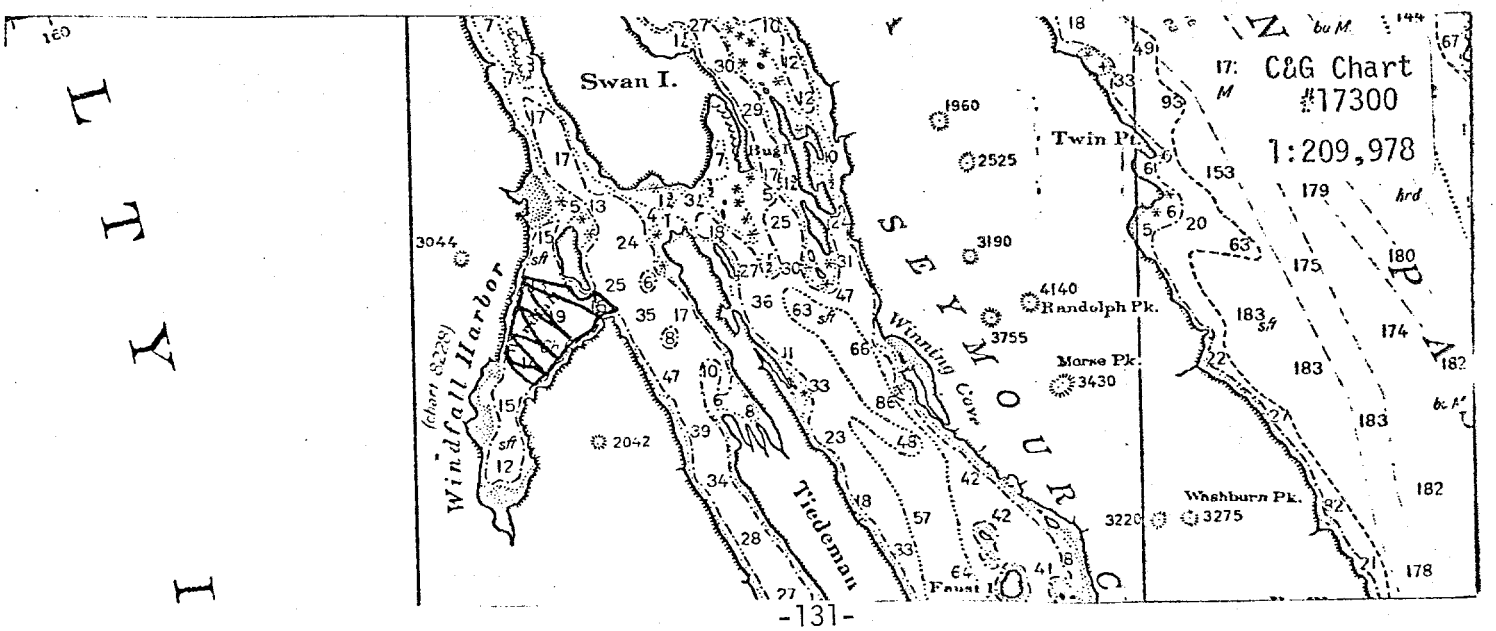



Area Seymour Canal Windfall Harbor  Date 4/23/78  Vessel Auklet  Run # 4

Gain 3.5  Attenuated -12 dB  Operators Bergmann, Bracken

Time of Survey: Start 21:17  End 22:13  Tide Flood

COMMENTS: Fish concentrated towards the middle of the bay. Shallow school.



Appendix 1 continued.

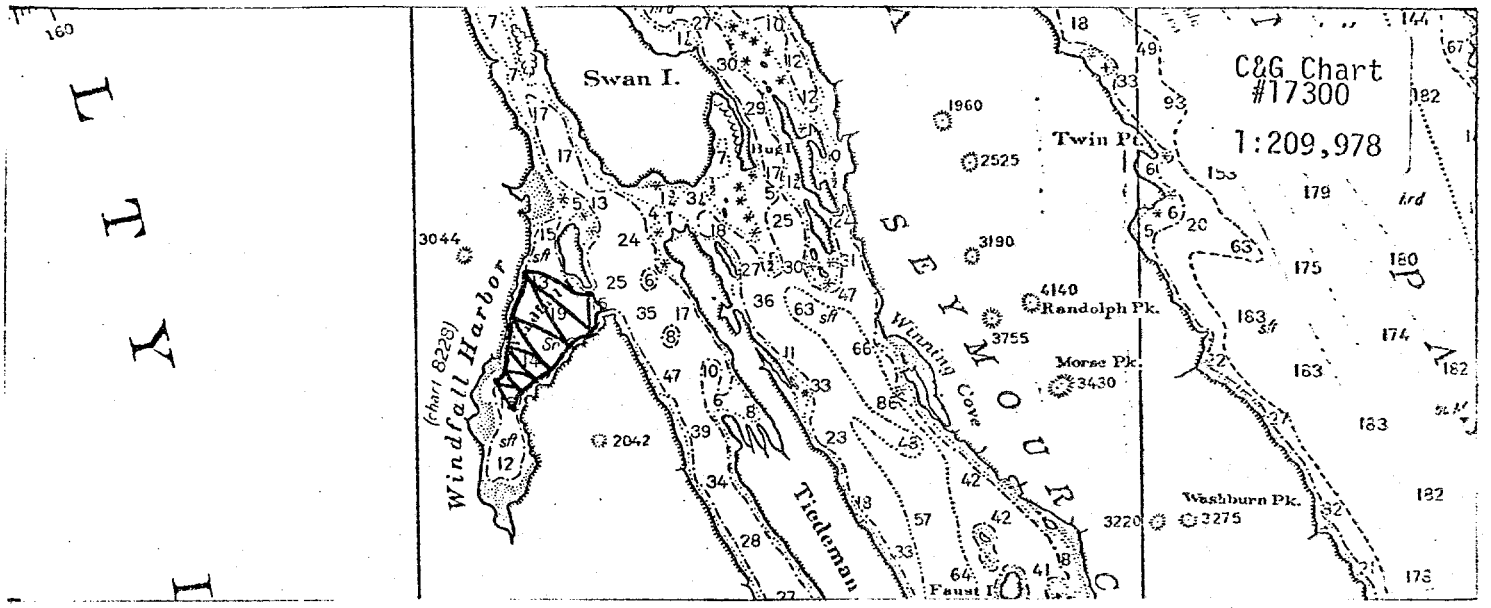
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal (Windfall Harbor) Date 4/23/78 Vessel Auklet Run # 1

Gain 3.5 Attenuated -12 dB Operators Bergmann, Bracken

Time of Survey: Start 11:13:10 End 12:09:45 Tide Low flood

COMMENTS: Almost all schools separated from bottom. Very little saturation. Fish concentrated toward mouth of bay. Fish shallower than survey allows.

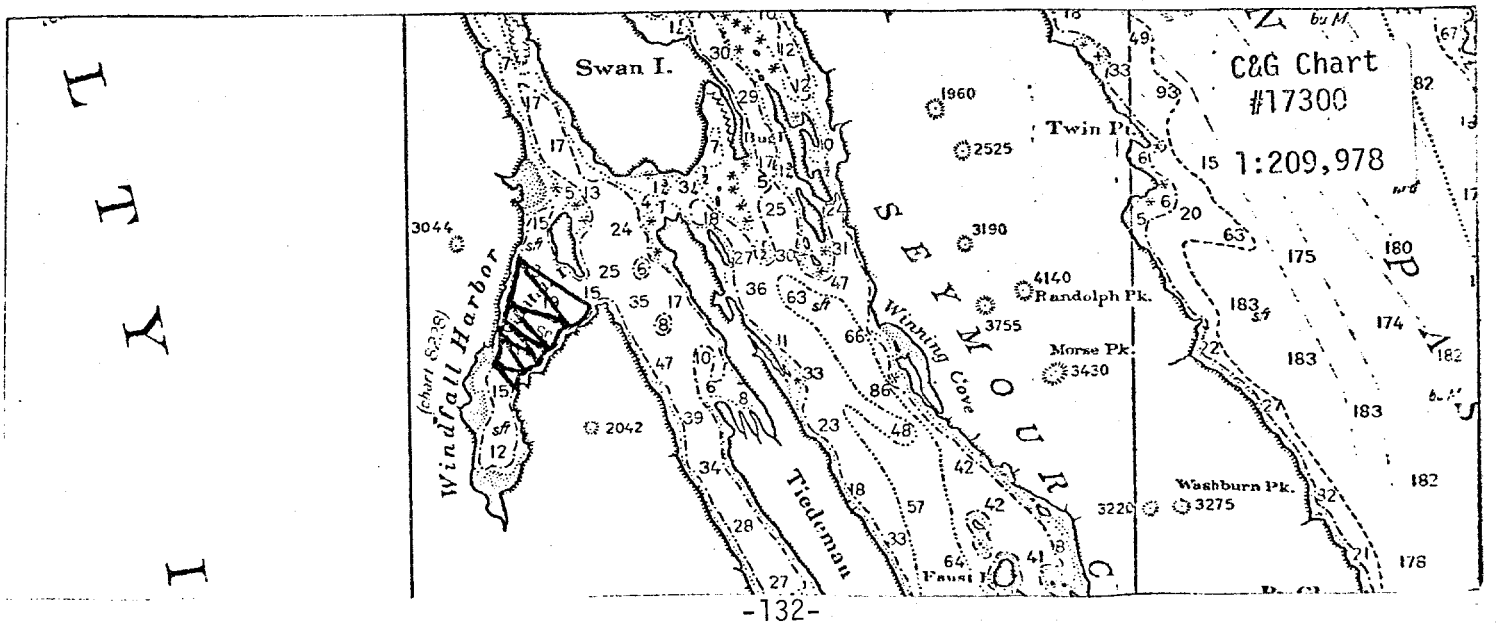



Area Seymour Canal (Windfall Harbor) Date 4/23/78 Vessel AukTet Run # 2

Gain 3.5 Attenuated -12 dB Operators Bergmann, Bracken

Time of Survey: Start 12:54 End 13:48 Tide Flooding, low 8:04 (-2.7)

COMMENTS: This run didn't show as many fish as previous run. Fish may have been tight on bottom.



Appendix 1 continued.

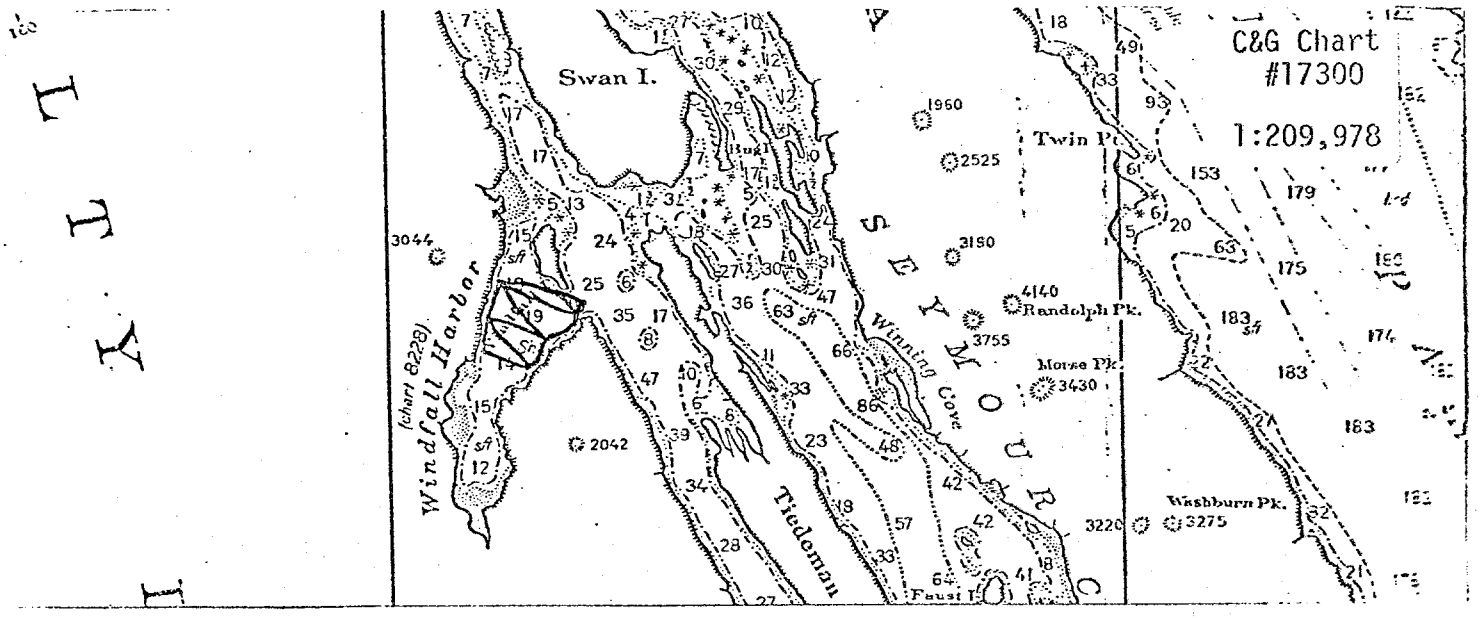
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal Windfall Harbor  Date 4/24/78  Vessel Auklet  Run # 1

Gain 4.0  Attenuated -12 dB  Operators Bergmann, Bracken, Drummend

Time of Survey: Start 21:09:30  End 22:00:15  Tide Flooding, low 20:53 (0.3')

COMMENTS: Largest, densest school of fish observed to date.

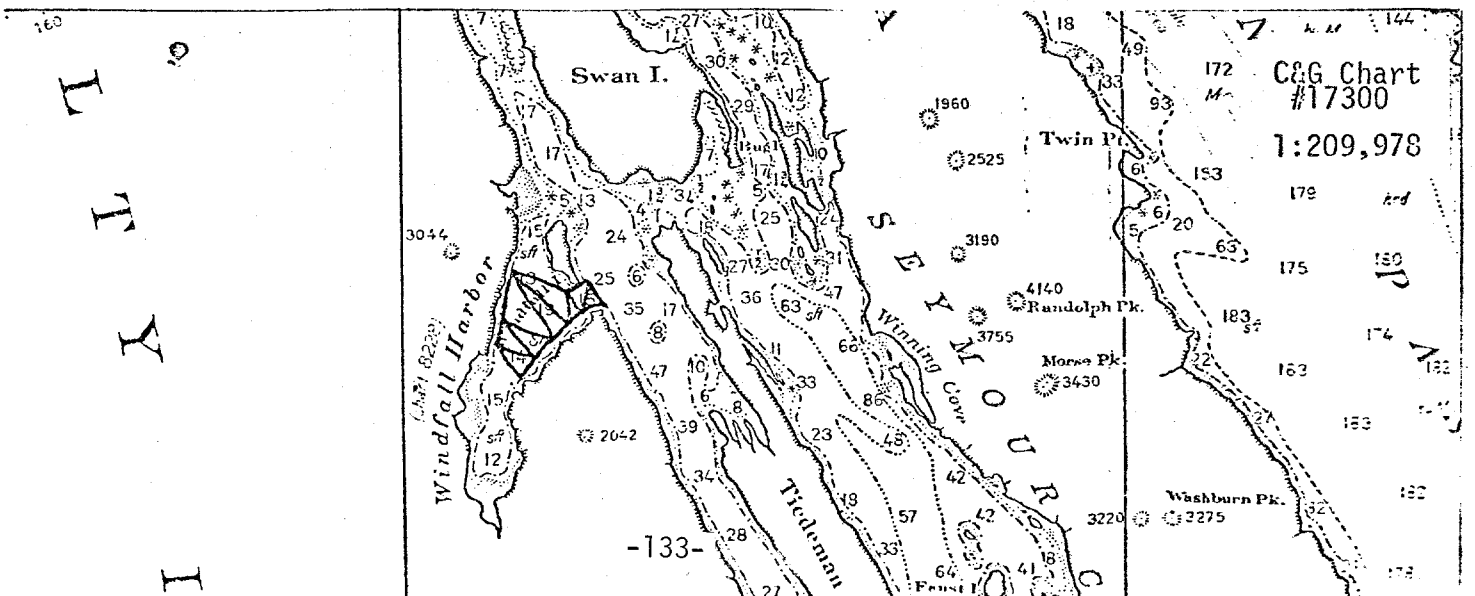



Area Seymour Canal Windfall Harbor  Date 4/25/78  Vessel Auklet  Run # 1

Gain 4.5  Attenuated -12 dB  Operators Bergmann, Bracken, Drummend

Time of Survey: Start 09:58  End 10:50  Tide Flooding

COMMENTS: Fish spread out in less dense schools than during evening. Some saturation but major portion of dense schools was not saturated. Poor bottom separation noted in three schools. Fish appeared to be piling up around lip of harbor outlet.



Appendix 1 continued.

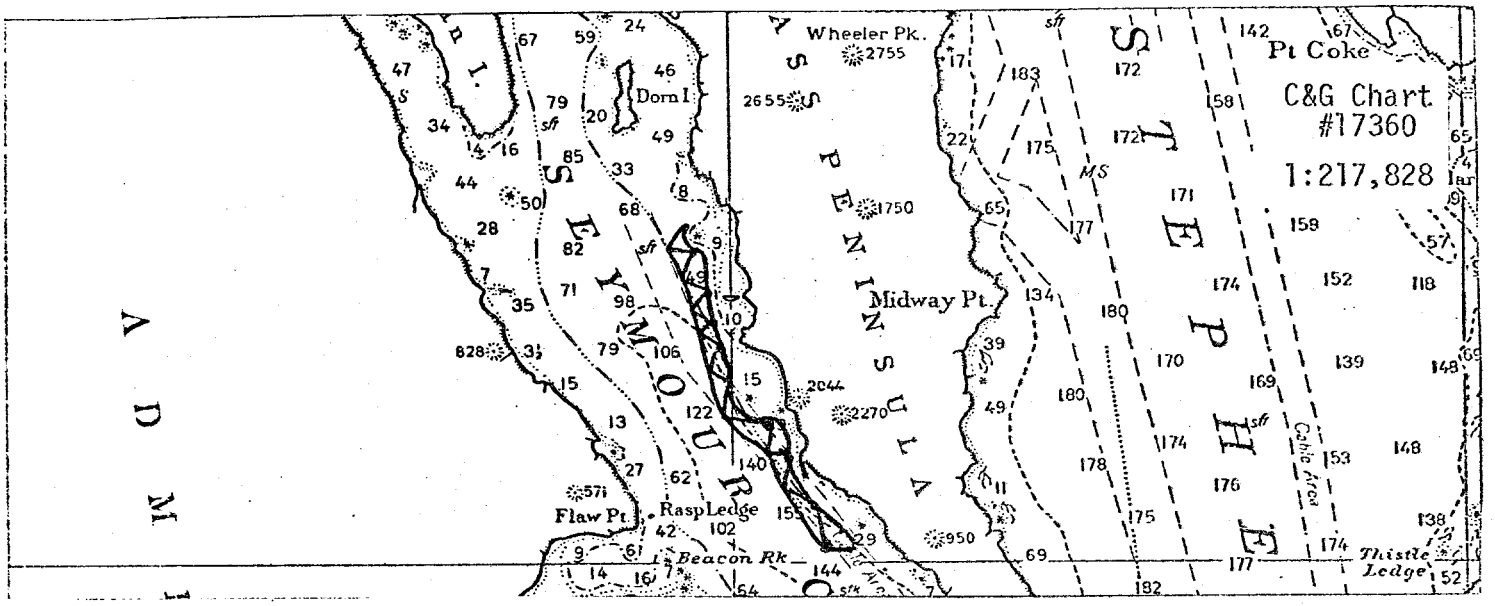
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal - Sorethumb  Date 5/4/78  Vessel Kittiwake  Run # 1

Gain 4.0  Attenuated -12 dB  Operators Bergmann, Bracken, Timothy, McLeod

Time of Survey: Start 11:20  End 11:40  Tide Flooding

COMMENTS: Ten schools passed and two intercepted.

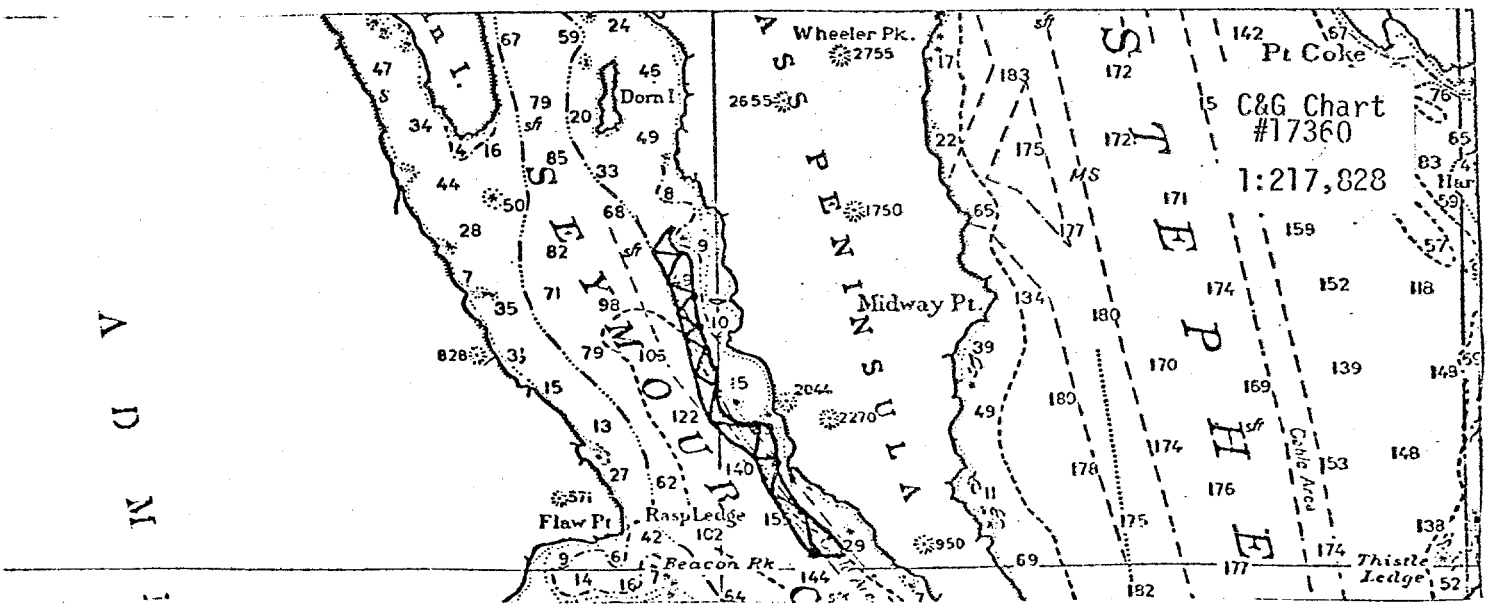



Area Seymour Canal - Sorefinger  Date 5/5/78  Vessel Kittiwake  Run # 1

Gain 4  Attenuated -12 dB  Operators Bergmann, Timothy

Time of Survey: Start 12:28  End 13:29  Tide

COMMENTS: Schools were shallow and close to the shore (scattered over a wide area).



Appendix 1 continued.

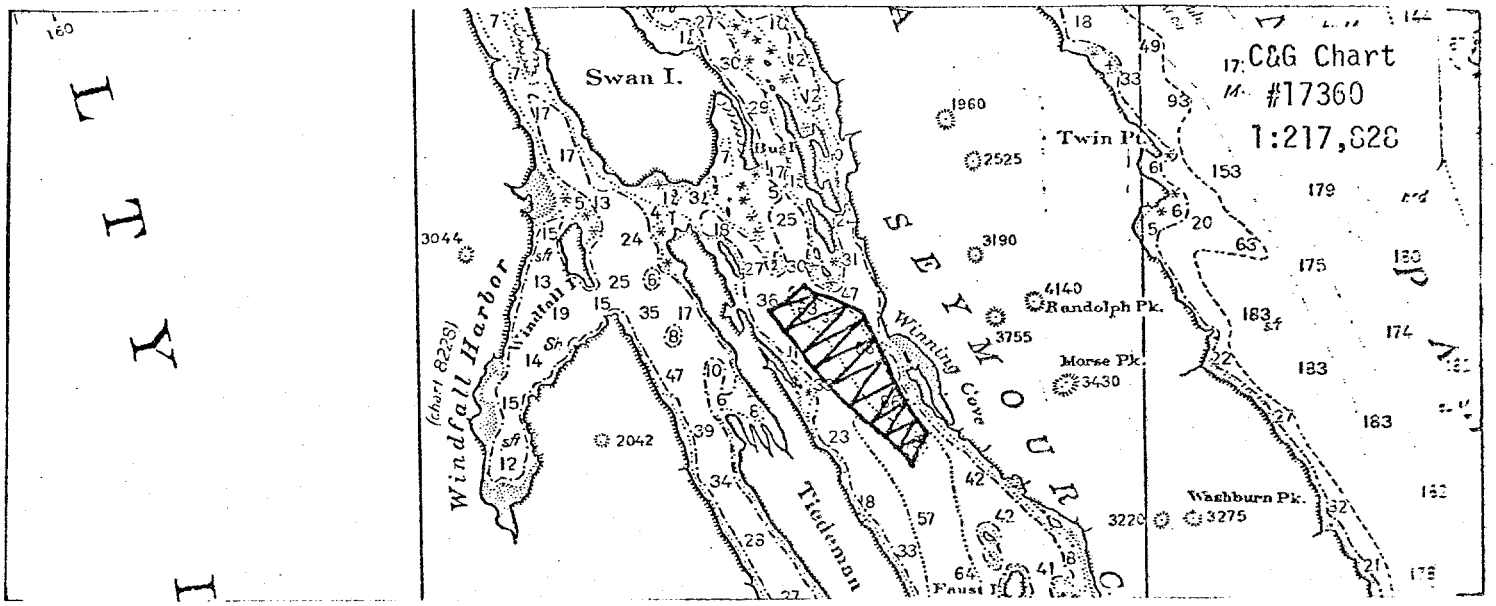
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal Date 3/25/79 Vessel Steller Run # 1

Gain 6.5 Attenuated -12 dB Operators Timothy, Murphy

Time of Survey: Start 0633:40 End 0735:40 Tide Low, 5:41 am, 1.7'(Jnu)

COMMENTS: Fish moving deeper and tighter during tape. Started taping at first light.

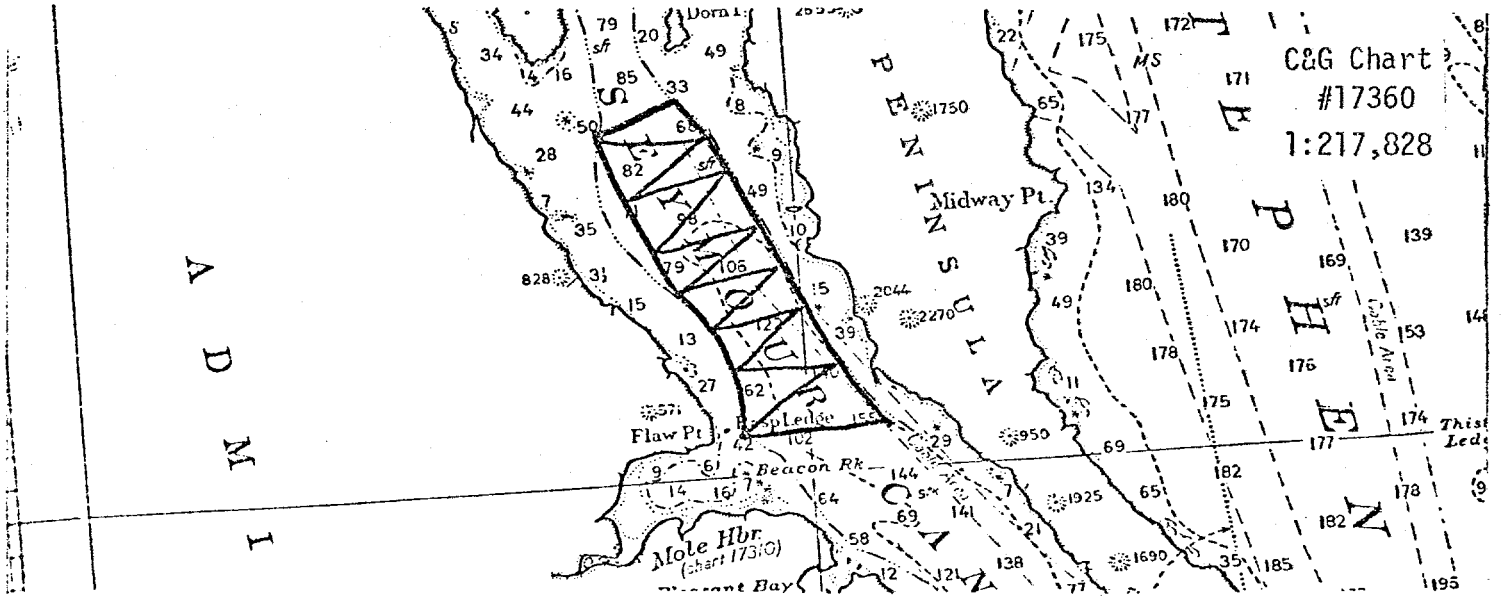



Area Seymour Canal Date 3/25/79 Vessel Steller Run # 2

Gain 6.5 Attenuated -12 dB Operators Timothy, Murphy

Time of Survey: Start 0901:35 End 1032:20 Tide Interm, High 11:49 am (16.9' - Jnu)

COMMENTS: Sunny and clear; fish not too close to shore - probably mostly pollock.



Appendix 1 continued.

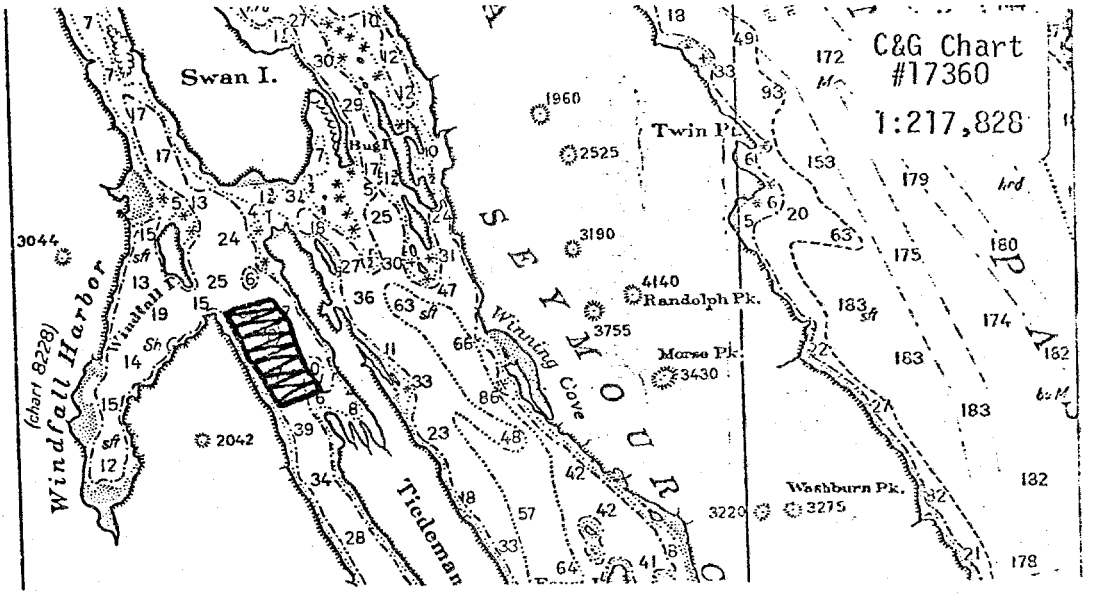
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal (Staunch Pt.) Date 4/21/79 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12 dB Operators Timothy, Jackinsky, Buoy

Time of Survey: Start 1404:45 End 1443:40 Tide 2 hours to low

COMMENTS: Lost two minutes taping because of crabs caught in gear.

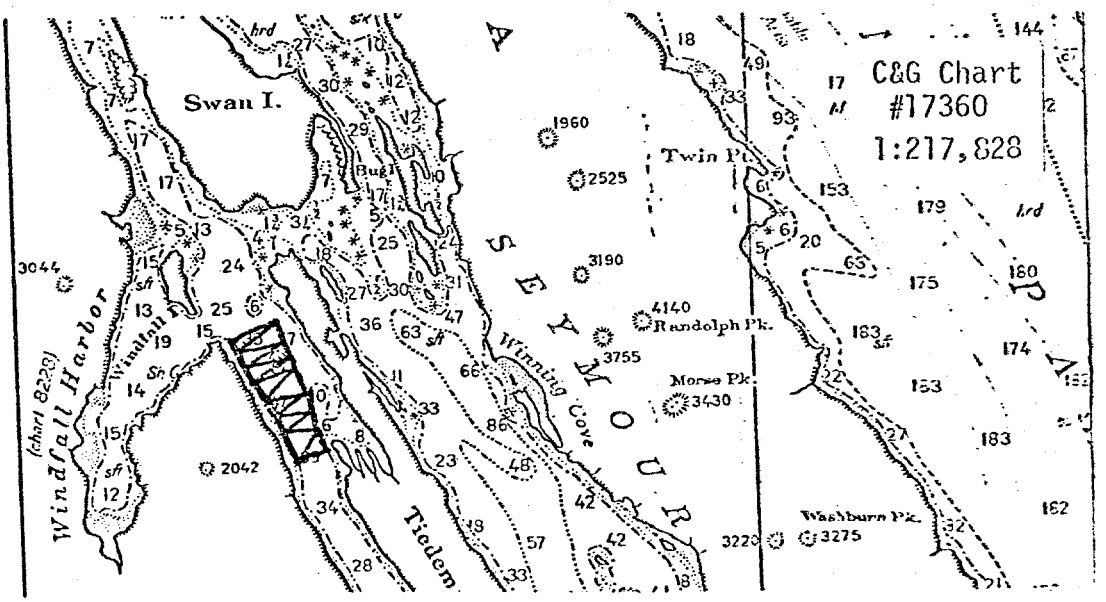



Area Seymour Canal (Staunch Pt.) Date 4/21/79 Vessel Sundance Run # 2

Gain 4.5 Attenuated -12 dB Operators Timothy, Jackinsky, Buoy

Time of Survey: Start 1448:25 End 1522:20 Tide 33:55

COMMENTS: Ran transects in same area as Run #1.



Appendix 1 continued.

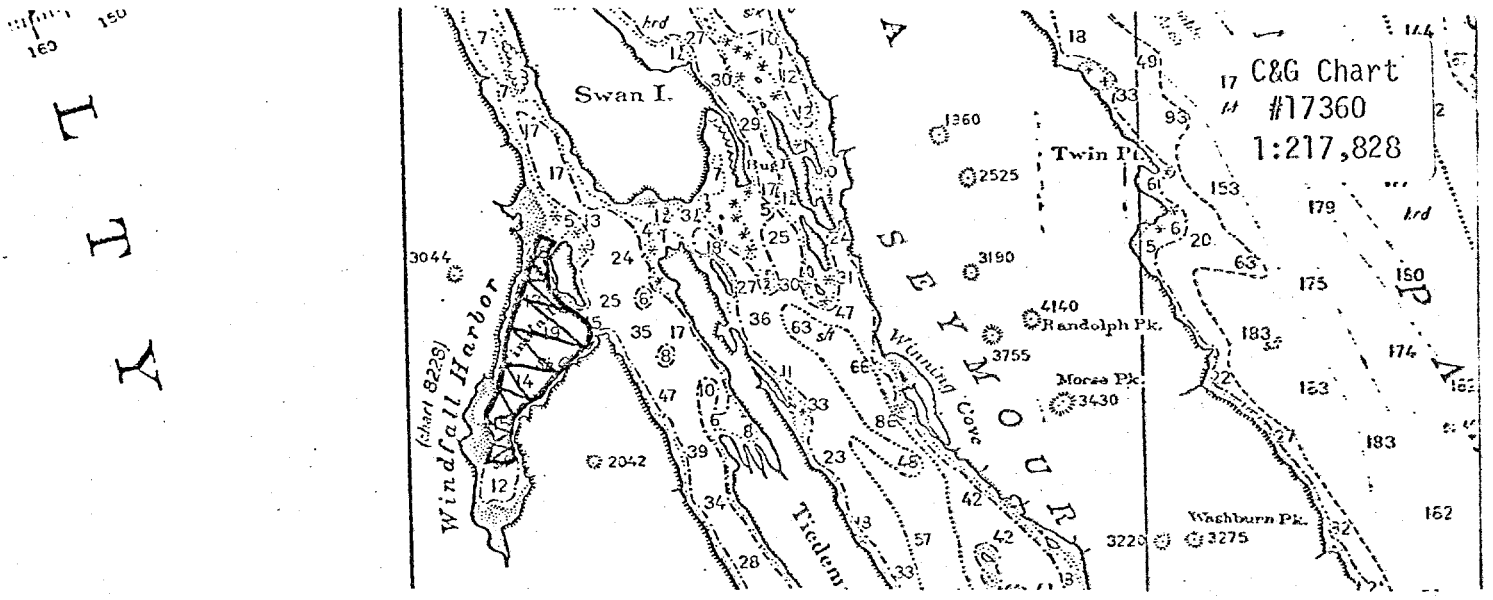
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal (Windfall Harbor) Date 4/21/79 Vessel Sundance Run # 1

Gain 1.75 Attenuated -12 dB Operators Timothy, Jackinsky, Buoy

Time of Survey: Start 1836:30 End 1939:20 Tide 2 hours past low

COMMENTS: Some ice still in harbor. Thirty seals. Looks comparable to 1978 Auklet surveys (15-20 million pounds).

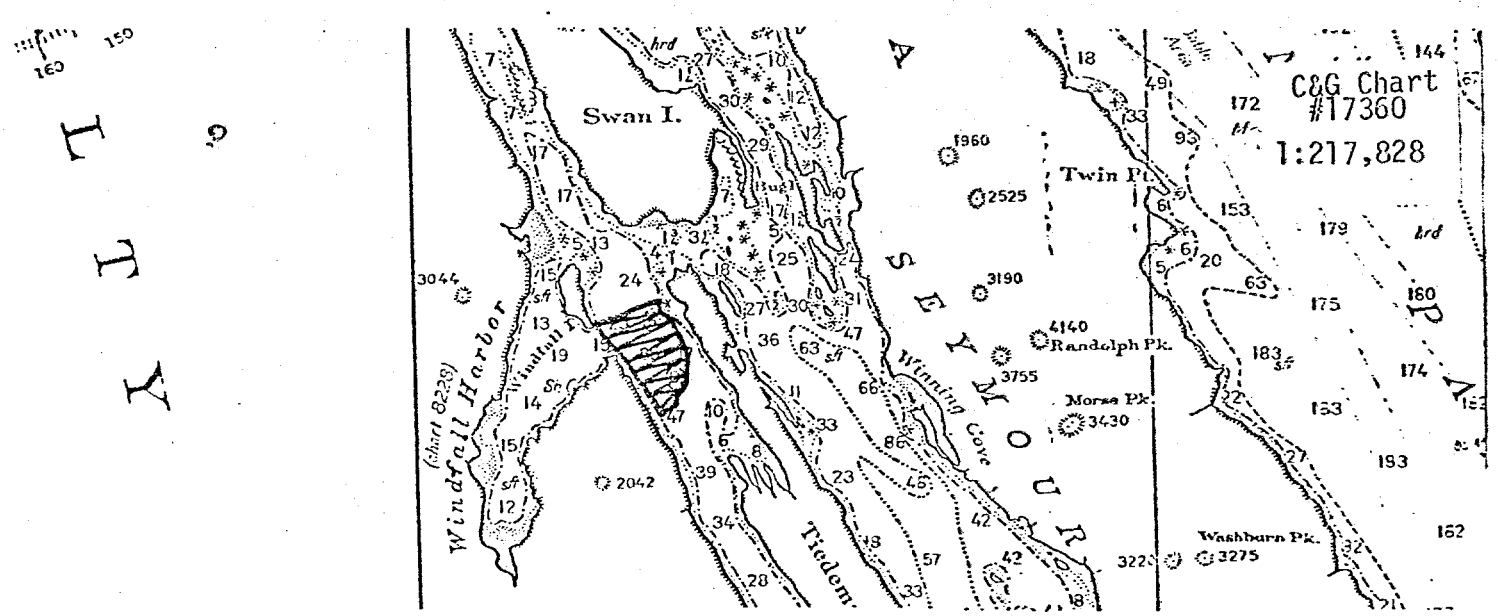



Area Seymour Canal (Staunch Pt.) Date 4/28/79 Vessel Kittiwake Run # 1

Gain 4.5 Attenuated -12 dB Operators Bergmann, Larson, McLeod

Time of Survey: Start 1231 End 1336 Tide Flood

COMMENTS: Varimesh gill net set on greatest concentration.



Appendix 1 continued.

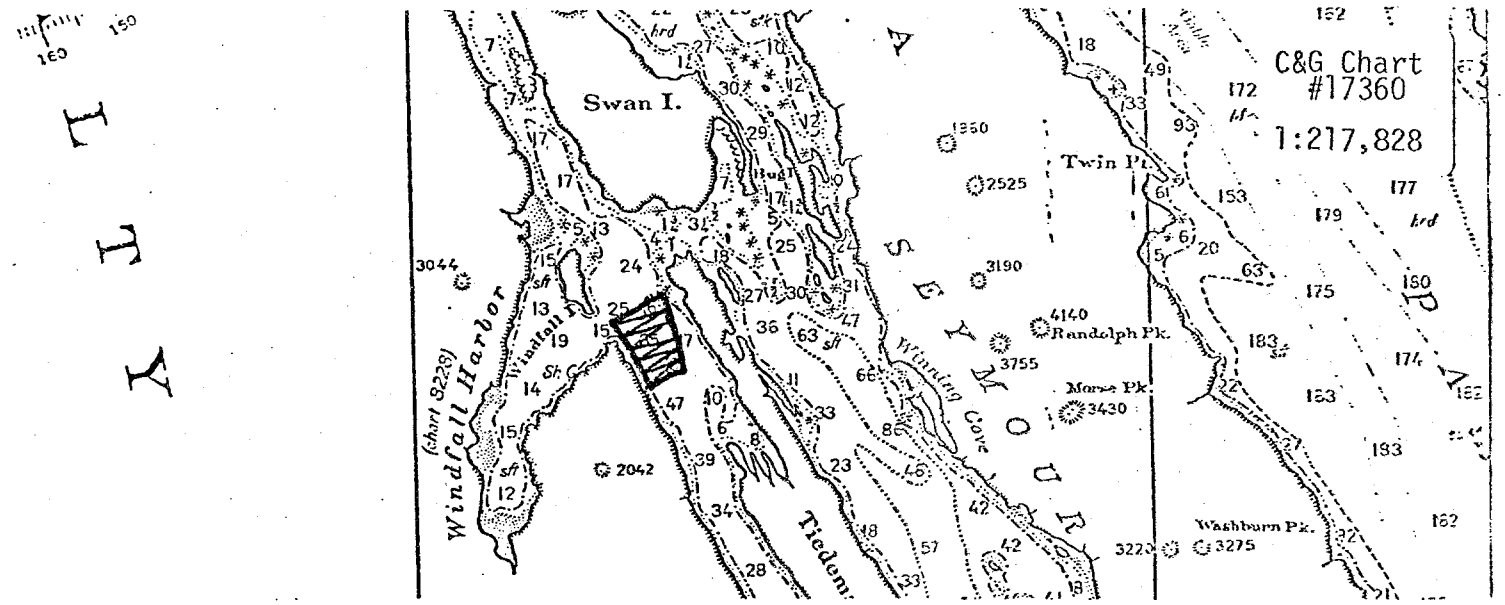
## ACOUSTICAL SURVEY SUMMARY

Area Windfall Harbor Date 4/28/79 Vessel Kittiwake Run # 2

Gain 4.5 Attenuated -12 dB Operators Bergmann, Larson, McLeod

Time of Survey: Start 1344 End 1429 Tide ½ flood - large tides

COMMENTS:

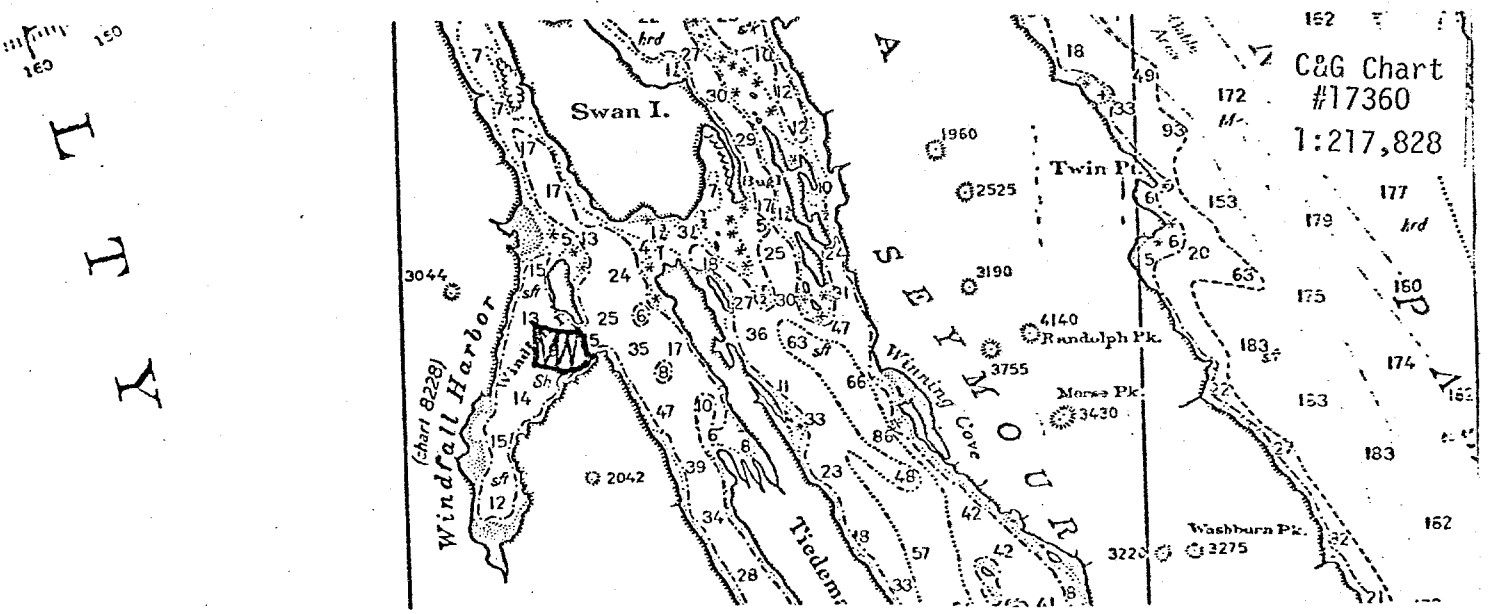



Area Windfall Harbor Date 4/28/79 Vessel Kittiwake Run # 1

Gain 5.0 Attenuated -12 dB Operators Bergmann, Larson, McLeod

Time of Survey: Start 1900 End 1926 Tide

COMMENTS: Varimesh gill net set on greatest concentration.



Appendix 1 continued.

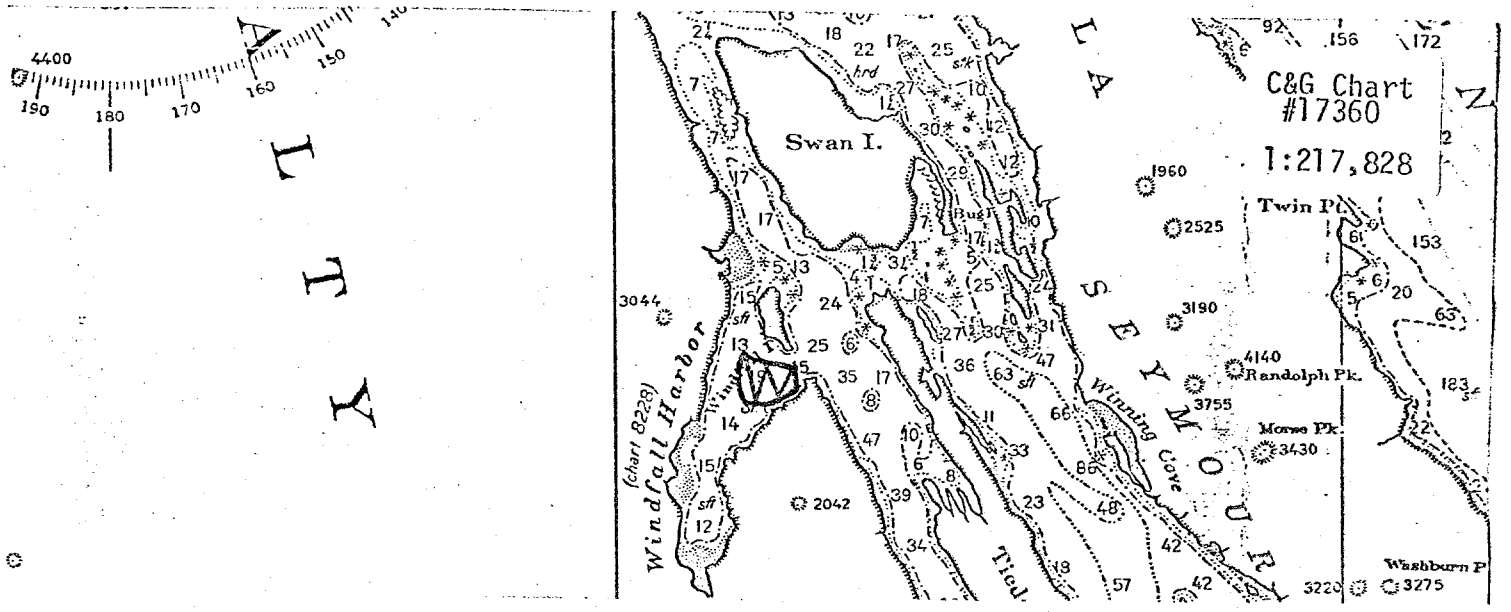
## ACOUSTICAL SURVEY SUMMARY

Area Windfall Harbor Date 4/28/79 Vessel Kittiwake Run # 2

Gain 5.0 Attenuated -12 dB Operators Bergmann, Larson, McLeod

Time of Survey: Start 1930 End 1948 Tide Large tides, Low (Ebbing)

COMMENTS:

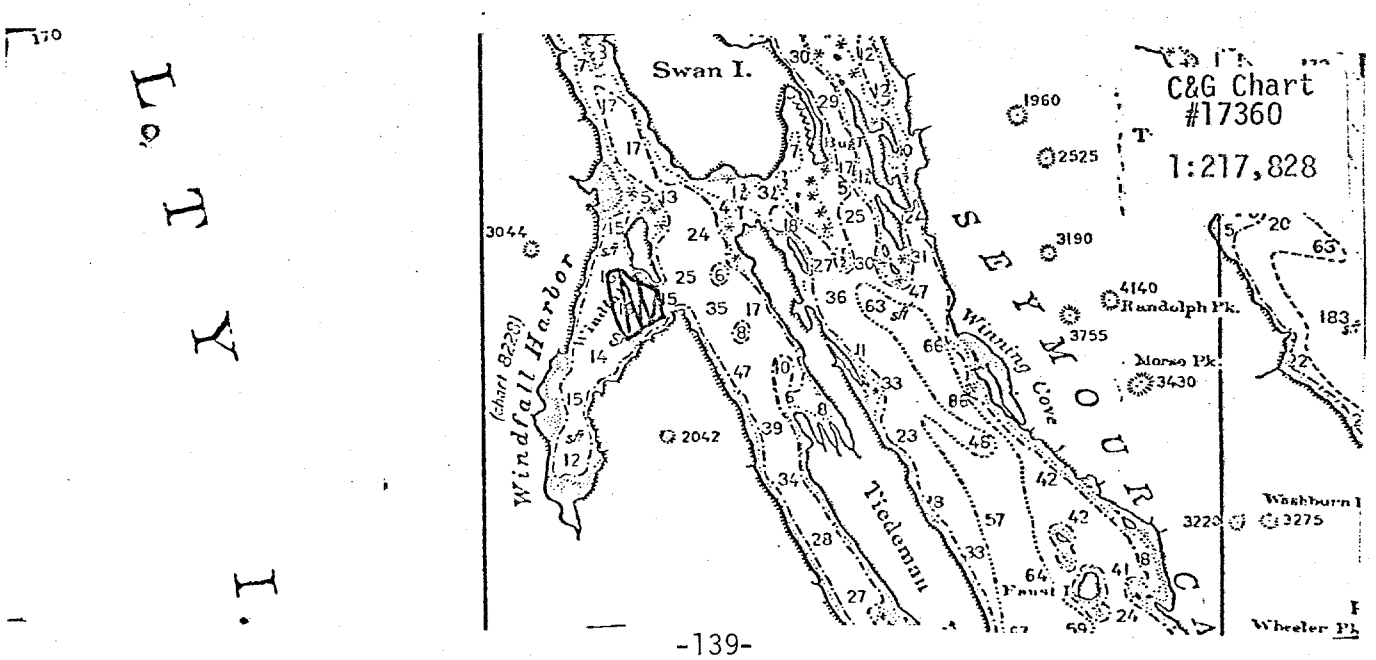



Area Seymour Canal (Windfall) Date 5/2/79 Vessel Kittiwake Run # 1

Gain 5.0 Attenuated -12 dB Operators Bergmann, Larson, Tate

Time of Survey: Start 1915 End 1945 Tide

COMMENTS: Appearing to be as much or more here than the 30th.



Appendix 1 continued.

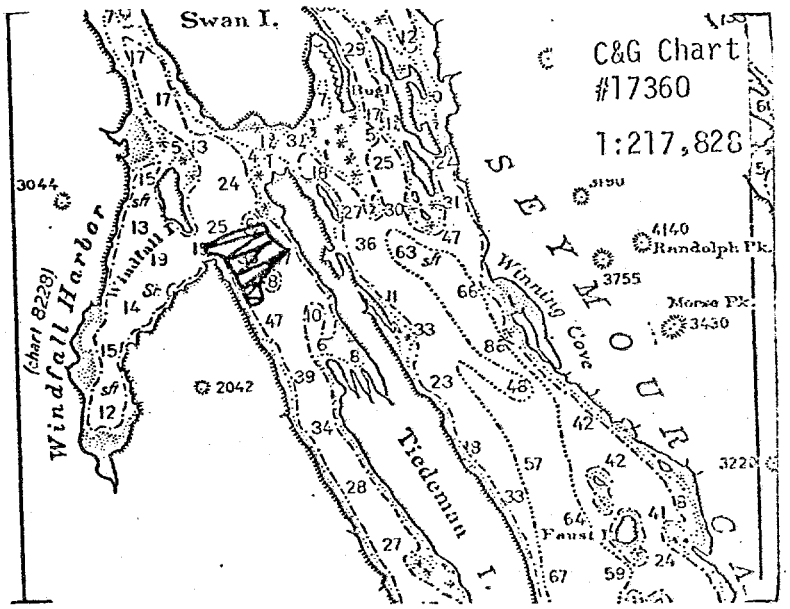
## ACOUSTICAL SURVEY SUMMARY

Area Seymour Canal (Staunch Pt.) Date 5/2/79 Vessel Kittiwake Run # 1

Gain 5.5 Attenuated -12 dB Operators Bergmann, Larson

Time of Survey: Start 1955 End 2054 Tide

COMMENTS: Appears to be just as much here as on April 30. Ten medium-sized schools observed south - inside Tiedeman.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

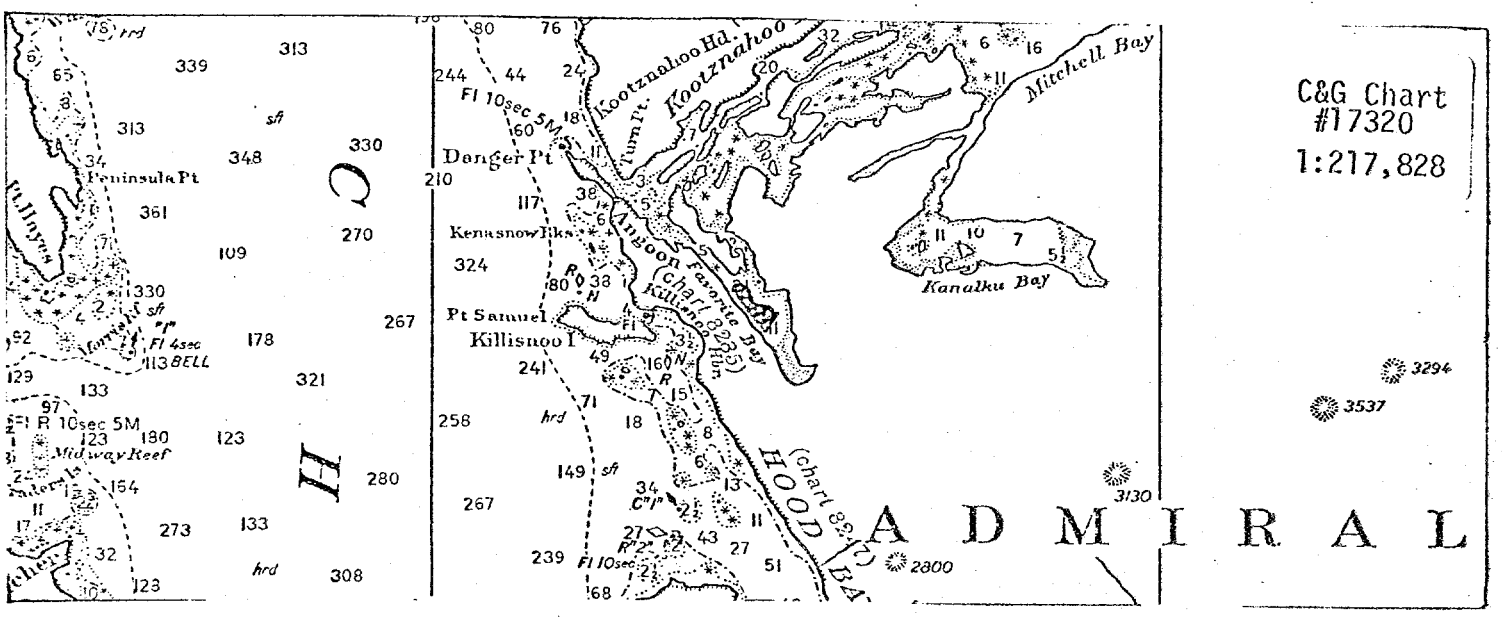
## ACOUSTICAL SURVEY SUMMARY

Area Favorite Bay Date 2/26/78 Vessel Kittiwake Run # 1

Gain 3.5 Attenuated -12 dB Operators Staska, Havens

Time of Survey: Start 10:15 End 10:35 Tide Low 10:00 (-1')

COMMENTS:

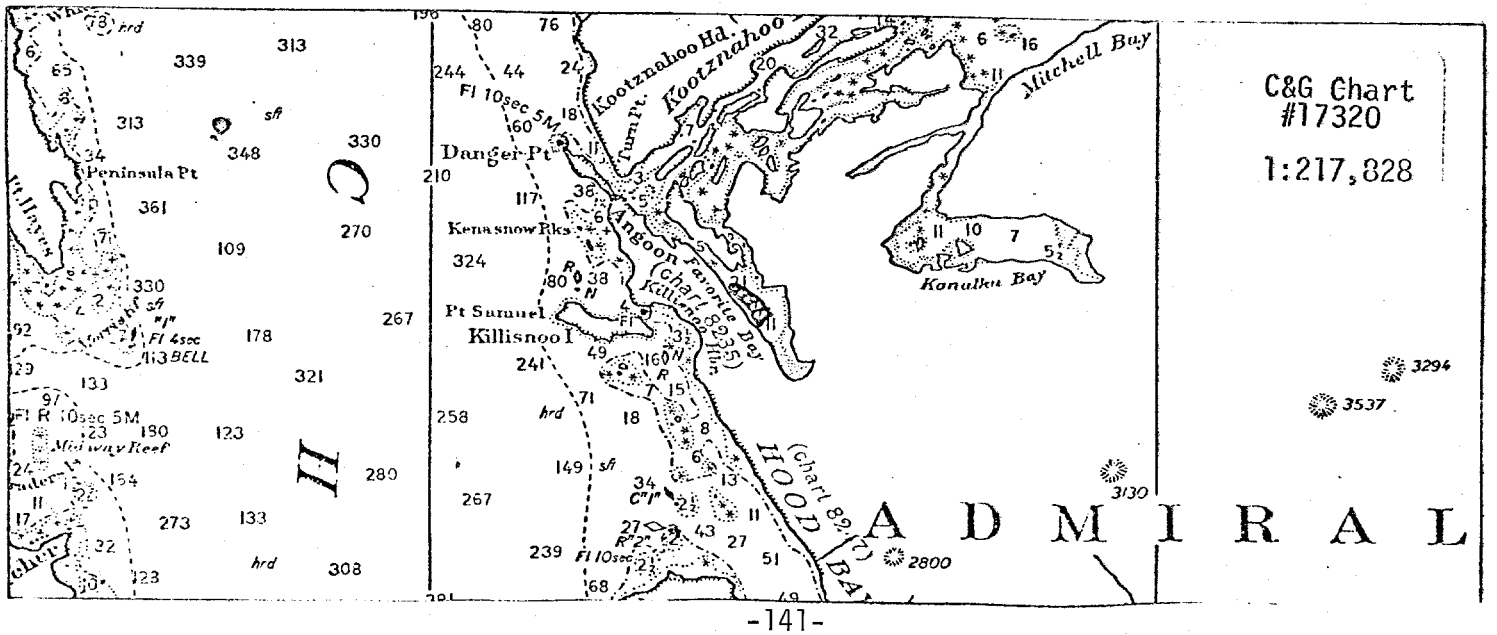



Area Favorite Bay Date 2/26/78 Vessel Kittiwake Run # 2

Gain 2.5 Attenuated -12 dB Operators Staska, Havens

Time of Survey: Start 10:45 End 11:04 Tide Low (.1')

COMMENTS:



Appendix 1 continued.

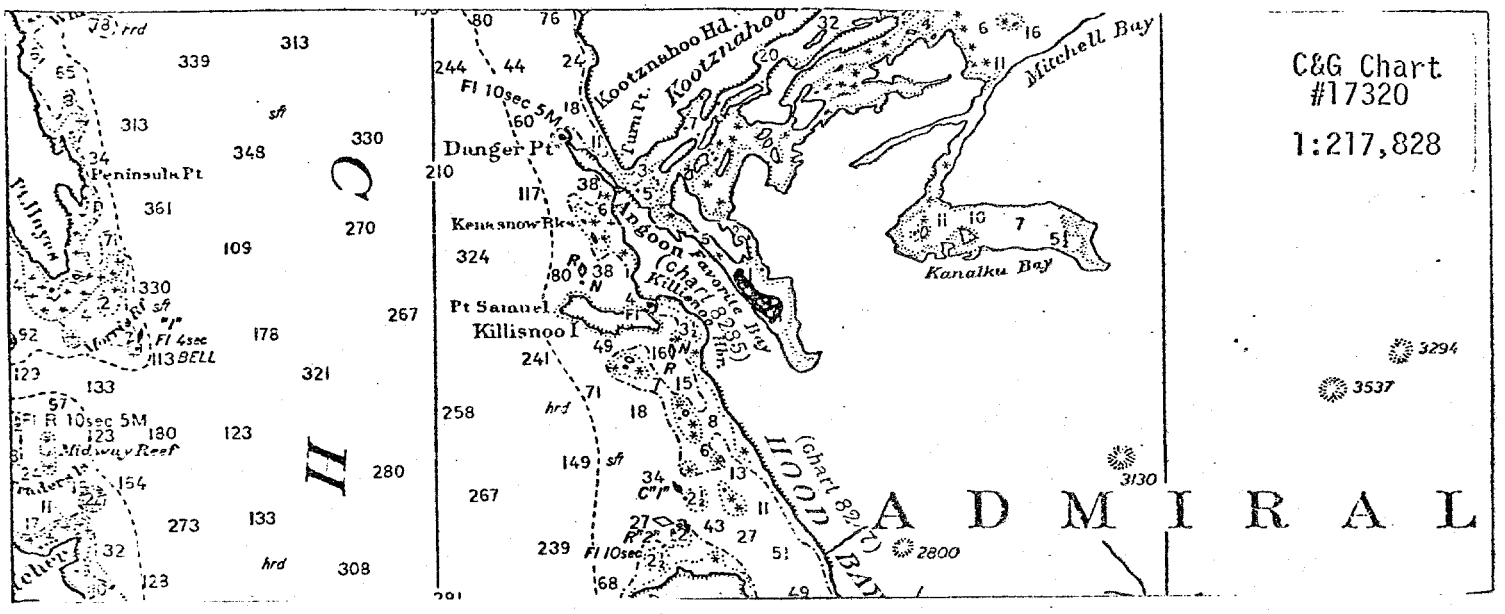
## ACOUSTICAL SURVEY SUMMARY

Area Favorite Bay Date 2/26/78 Vessel Kittiwake Run # 3

Gain 1.5 Attenuated -12 dB Operators Staska, Havens

Time of Survey: Start 11:07 End 11:27 Tide Flooding

COMMENTS:

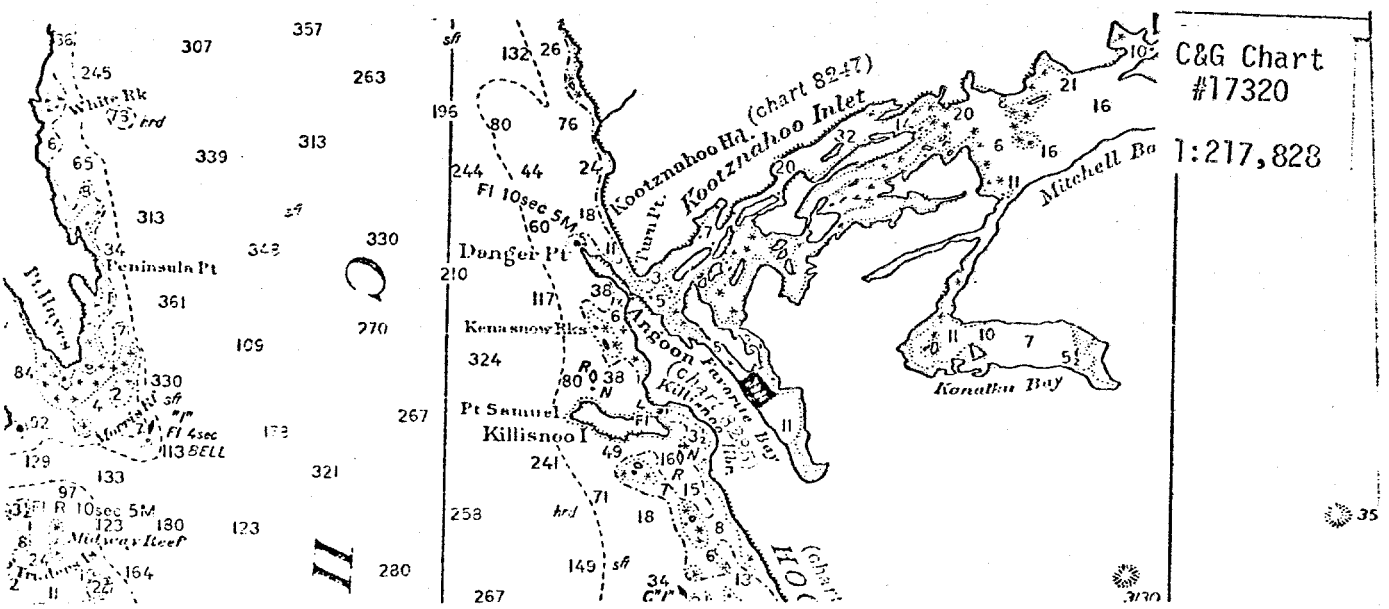



Area Favorite Bay Date 10/12/78 Vessel Kittiwake Run # 1

Gain 3.0 Attenuated -12 dB Operators Ingledue

Time of Survey: Start 1442 End 1455 Tide Going out

COMMENTS:



Appendix 1 continued.

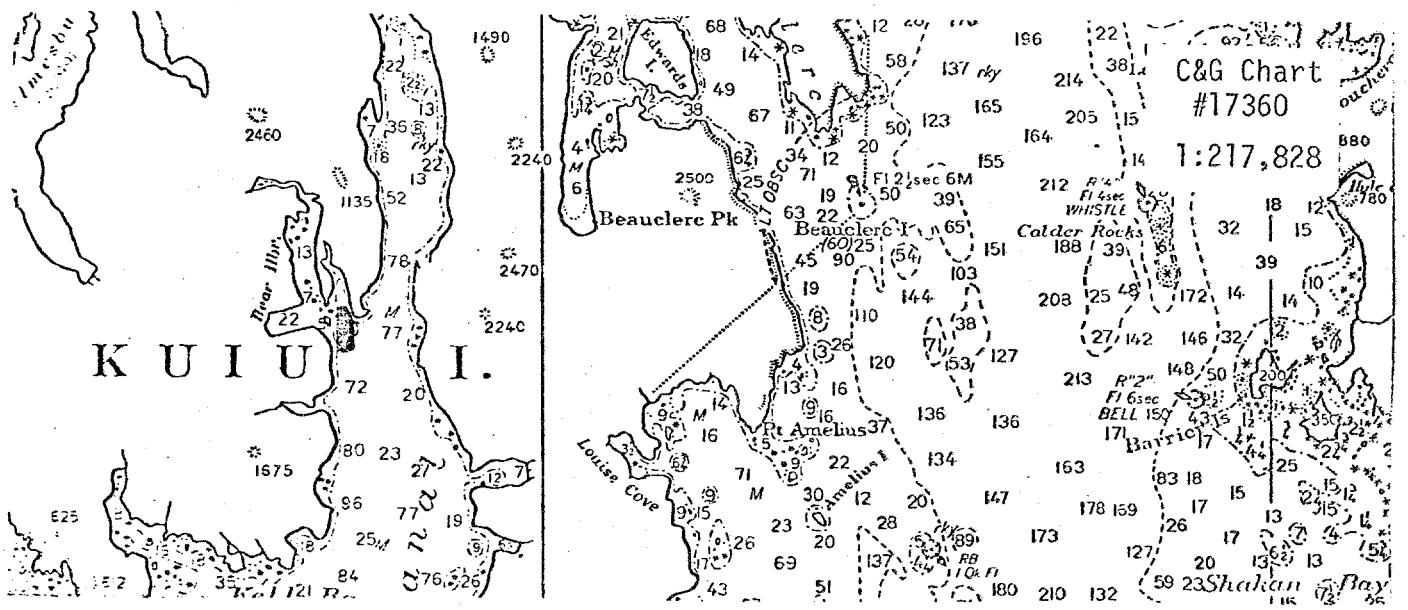
## ACOUSTICAL SURVEY SUMMARY

Area Affleck Canal (Bear Harbor) Date 11/10/79 Vessel Steller Run # 1

Gain 5.5 Attenuated -12dB Operators Larson, Bergmann, Buoy

Time of Survey: Start 1649 End 1703 Tide Flood

COMMENTS:

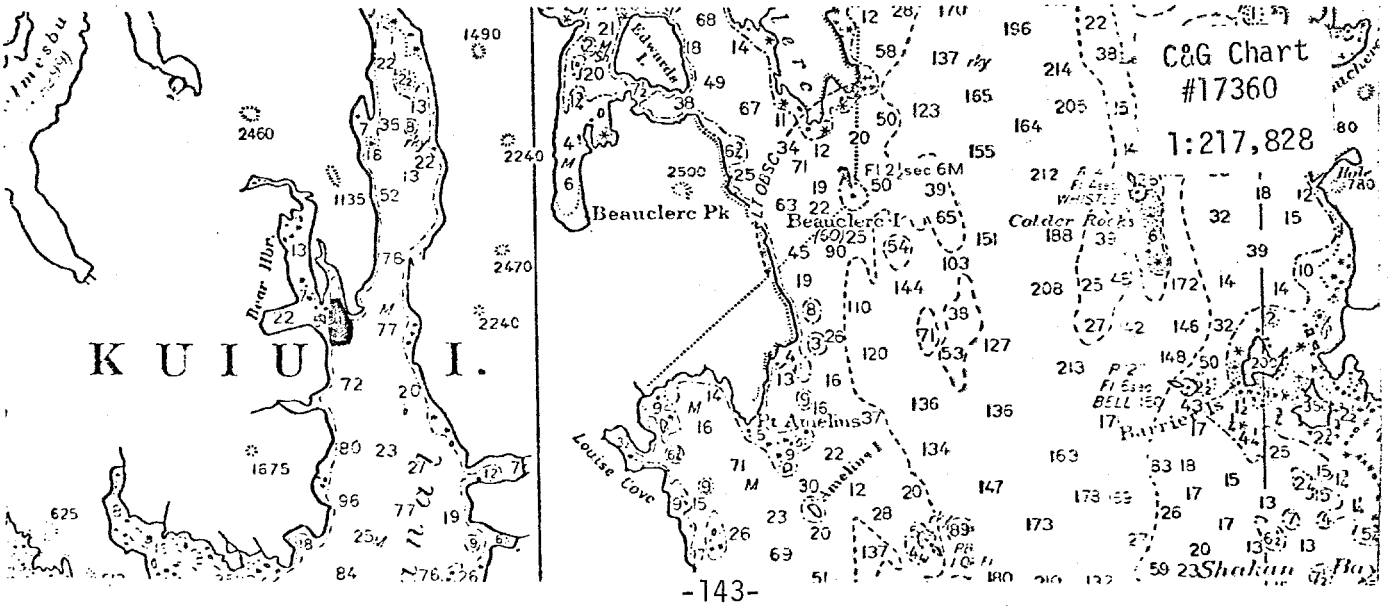



Area Affleck Canal (Bear Harbor) Date 11/10/79 Vessel Steller Run # 2

Gain 5.5 Attenuated -12dB Operators Larson, Bergmann, Buoy

Time of Survey: Start 1703 End 1716 Tide Flood

COMMENTS:



Appendix 1 continued.

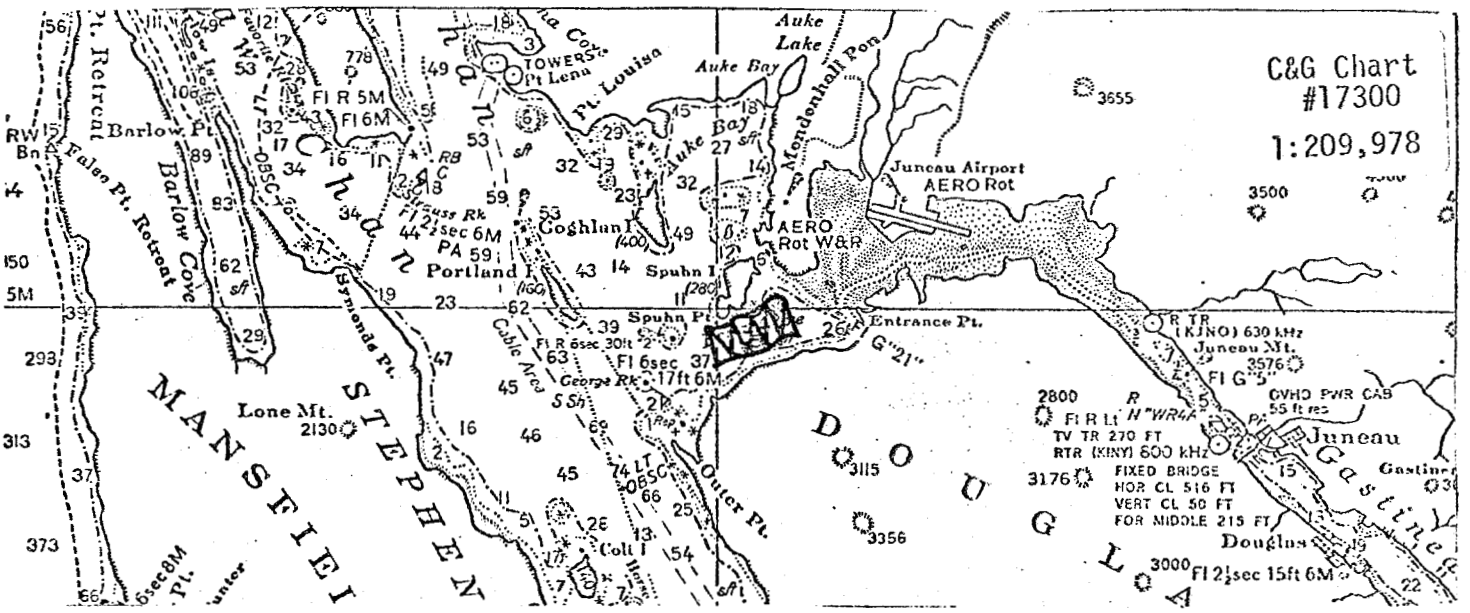
## ACOUSTICAL SURVEY SUMMARY

Area Fritz Cove Date 12/13/77 Vessel Searcher Run # 1

Gain 4.0 Attenuated -12 dB Operators Krieger, Dahlberg, Staska

Time of Survey: Start 14:35 End 15:51 Tide 76 min.

COMMENTS: Surface water temp. 4.5°C

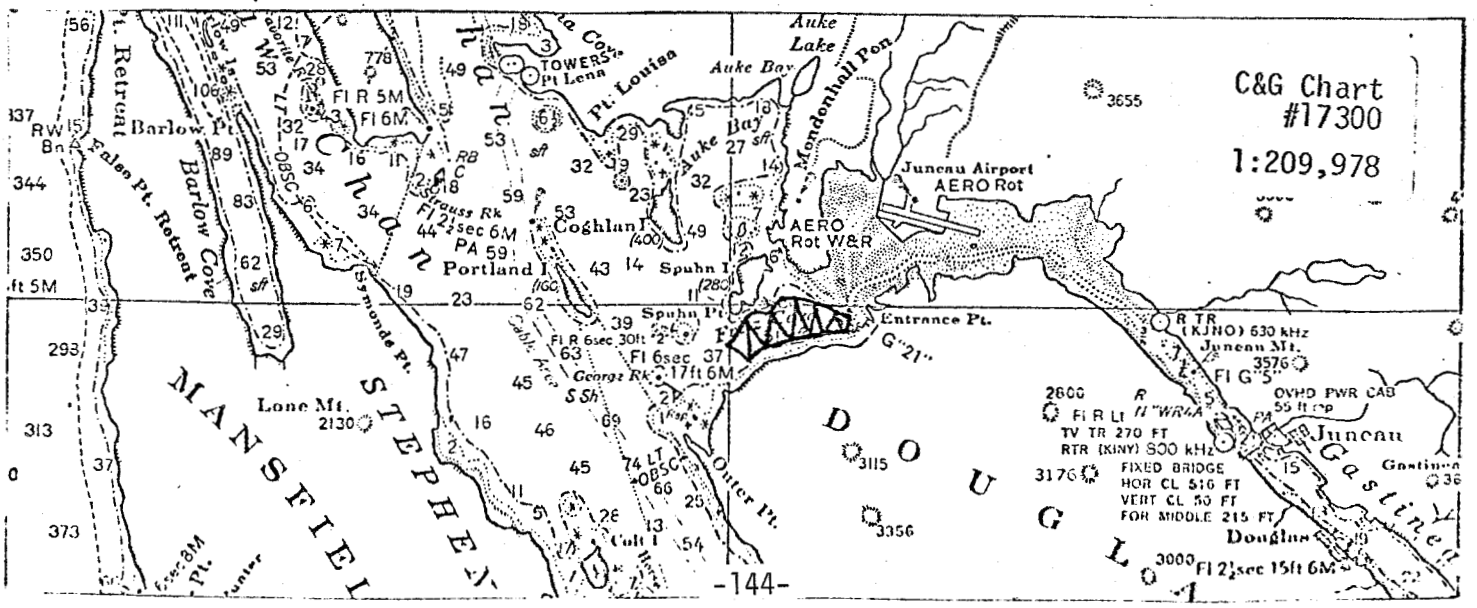



Area Fritz Cove Date 1/4/78 Vessel Sundance Run # 1

Gain 4.7 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 16:35 End 17:55 Tide

COMMENTS: Approximately 7 knot speed. Clear, cold and calm. Three humpback whales, sea lions, and birds in the area. A few spike schools saturated but no problem with main echo.



Appendix 1 continued.

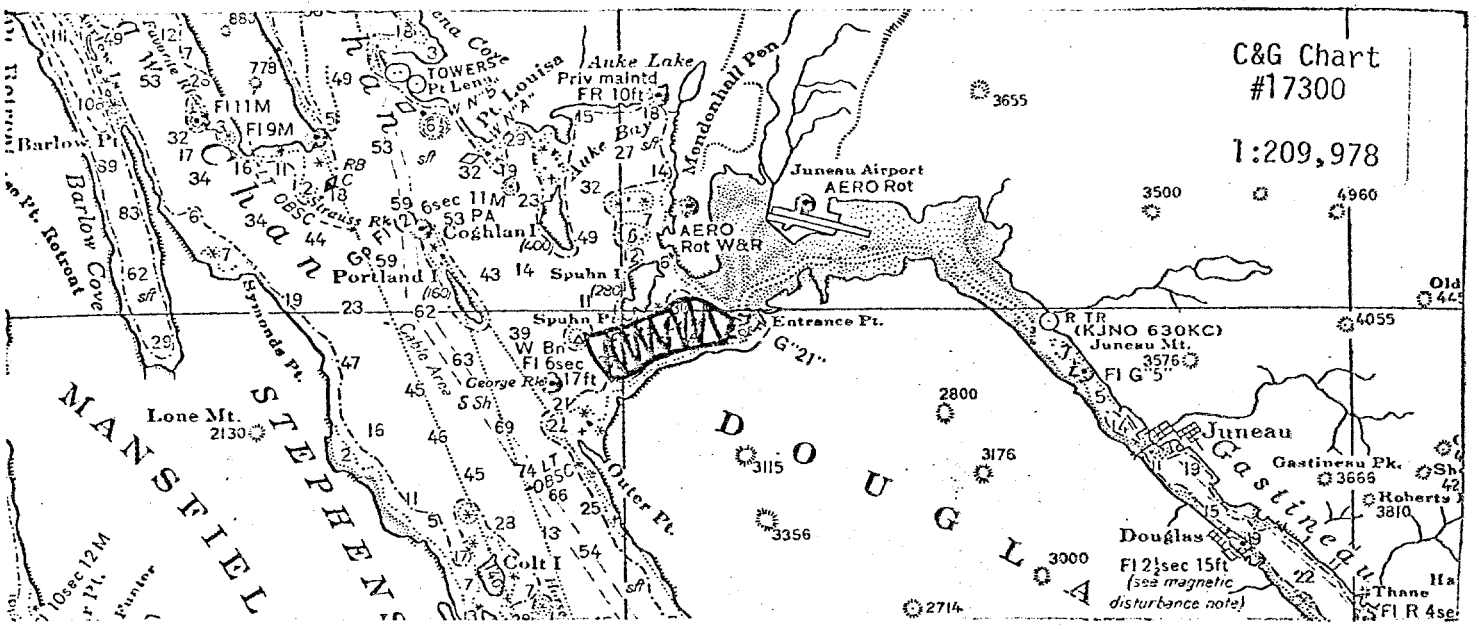
## ACOUSTICAL SURVEY SUMMARY

Area Fritz Cove Date 12/19/78 Vessel Murre II Run # 1

Gain 6.0 Attenuated -12 dB Operators Krieger, Staska

Time of Survey: Start 1104 End 1224 Tide

COMMENTS:

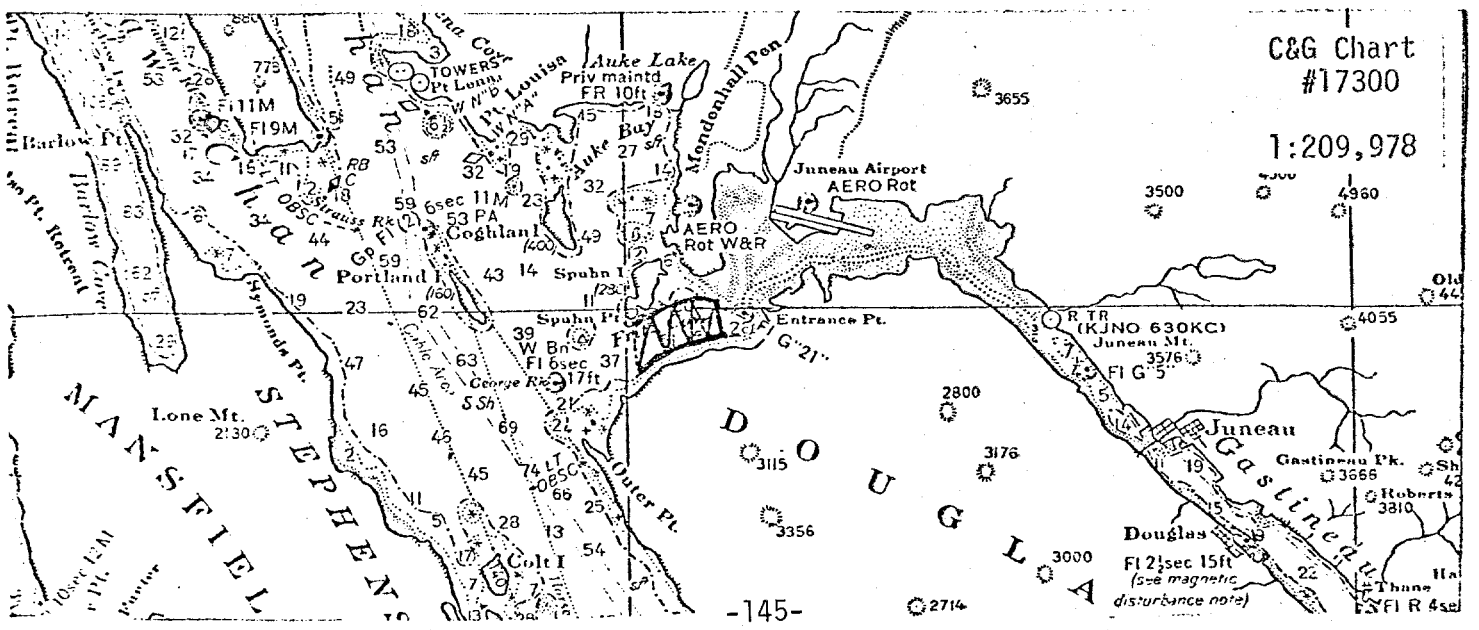



Area Fritz Cove Date 1/3/79 Vessel Auklet Run # 1

Gain 6.0 Attenuated -12 dB Operators Ingledue, Muir, Kissner

Time of Survey: Start 1445 End 1520 Tide

COMMENTS:



Appendix 1 continued.

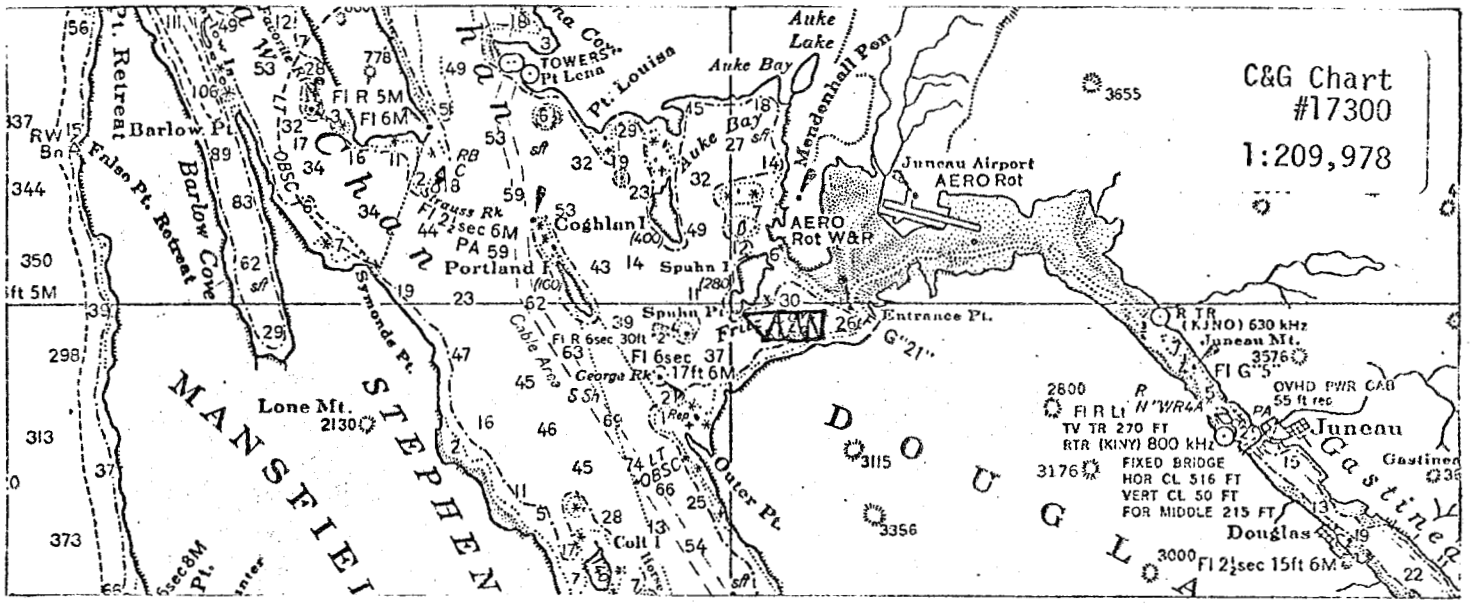
## ACOUSTICAL SURVEY SUMMARY

Area Fritz Cove Date 1/4/78 Vessel Sundance Run # 2

Gain 4.7 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 17:30 End 17:55 Tide

COMMENTS: Area condensed to fit distribution of school. No movement between runs. Biomass should be comparable to Run #1

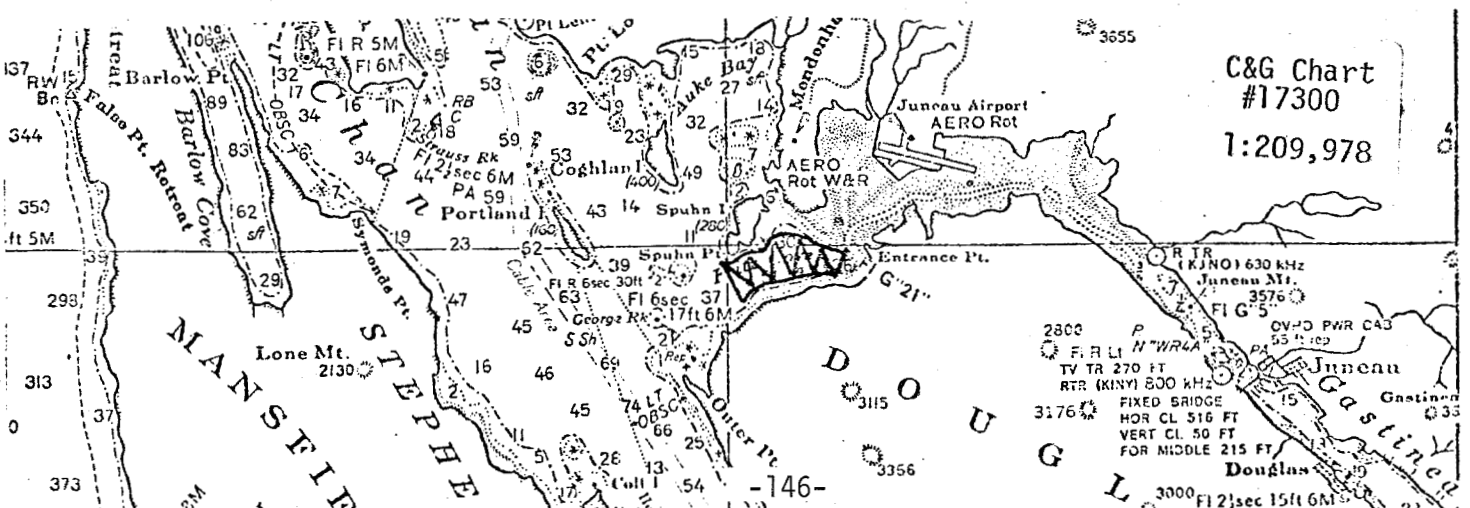



Area Fritz Cove Date 1/5/78 Vessel Sundance Run # 1

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 15:08 End 16:02 Tide

COMMENTS: Approximately 7 knot speed. Herring laying similar as to runs on 1/4/78. Three humpback whales in the area, sea lions, and birds. Birds and lions actively feeding in shallows by fish pens. No fish observed outside of survey area. No saturation observed. Weather: clear, cold (17°F), slight swell.



Appendix 1 continued.

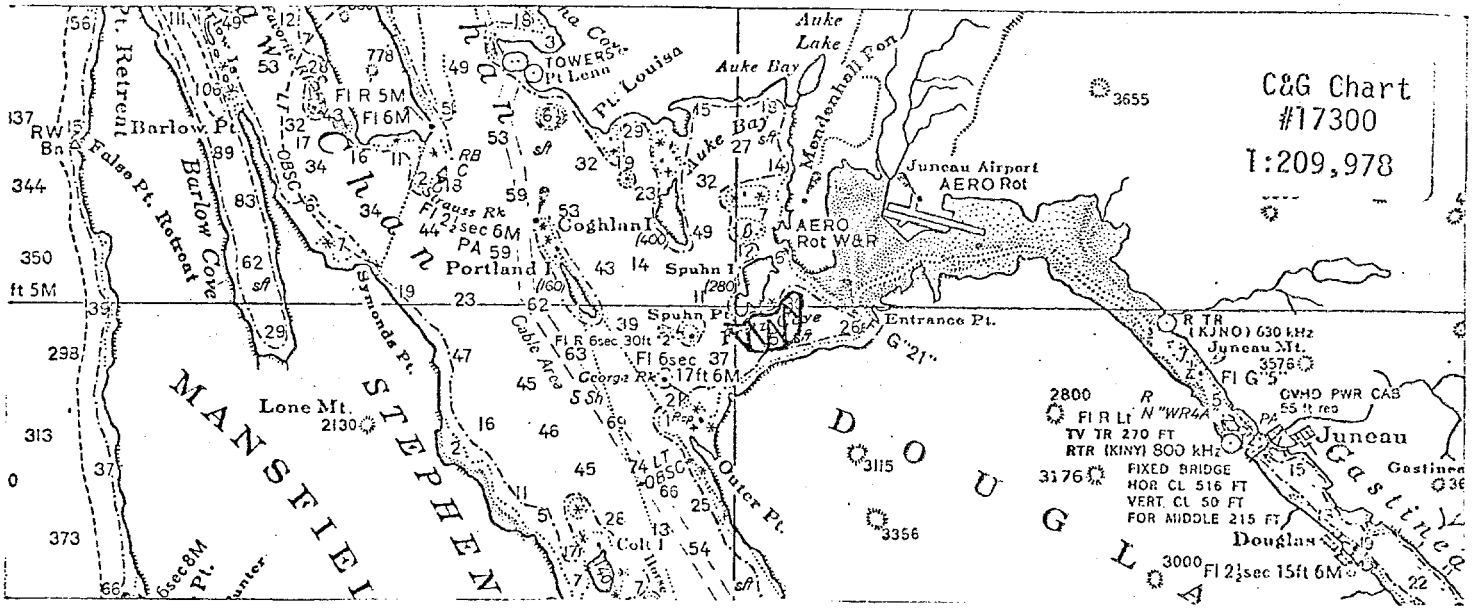
## ACOUSTICAL SURVEY SUMMARY

Area Fritz Cove Date 1/5/78 Vessel Sundance Run # 2

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 16:05 End 16:36 Tide

COMMENTS: Area of survey condensed to fit distribution of herring. No movement noted from Run #1. Biomass should be comparable.

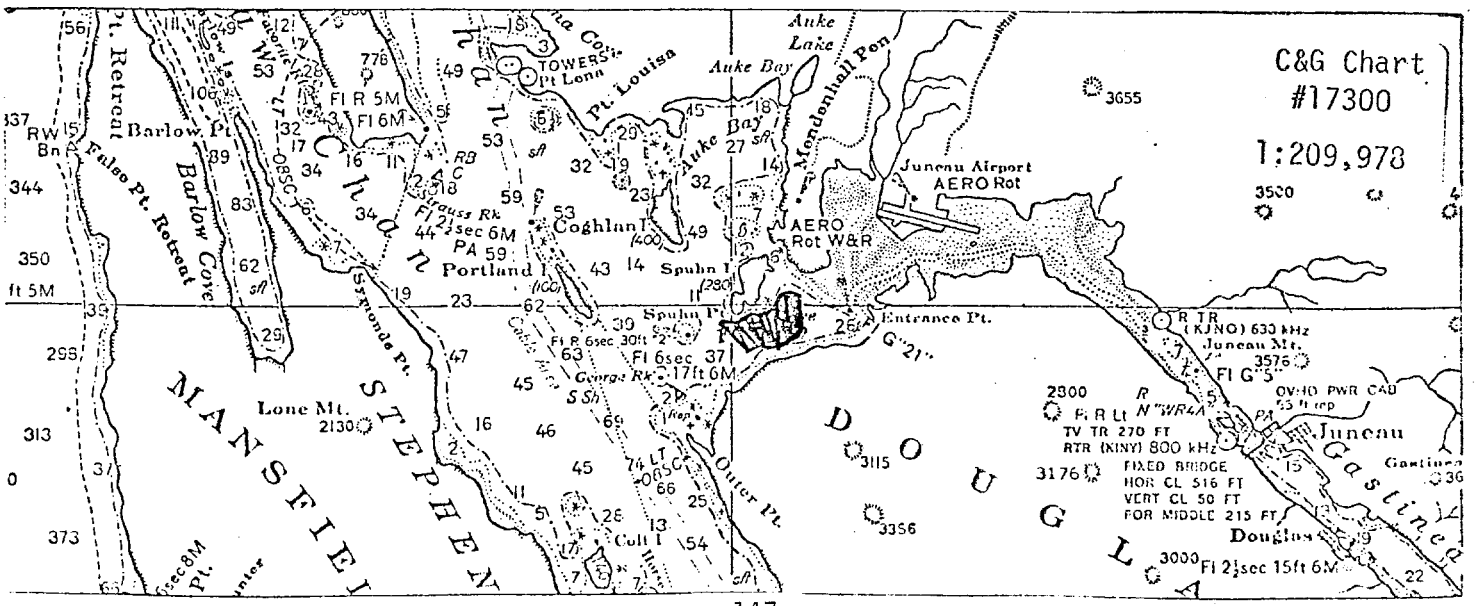



Area Fritz Cove Date 1/17/78 Vessel J.N. Cobb Run # 1

Gain 5.9 Attenuated -12 dB Operators Krieger

Time of Survey: Start 11:55 End 13:09 Tide

COMMENTS:



Appendix 1 continued.

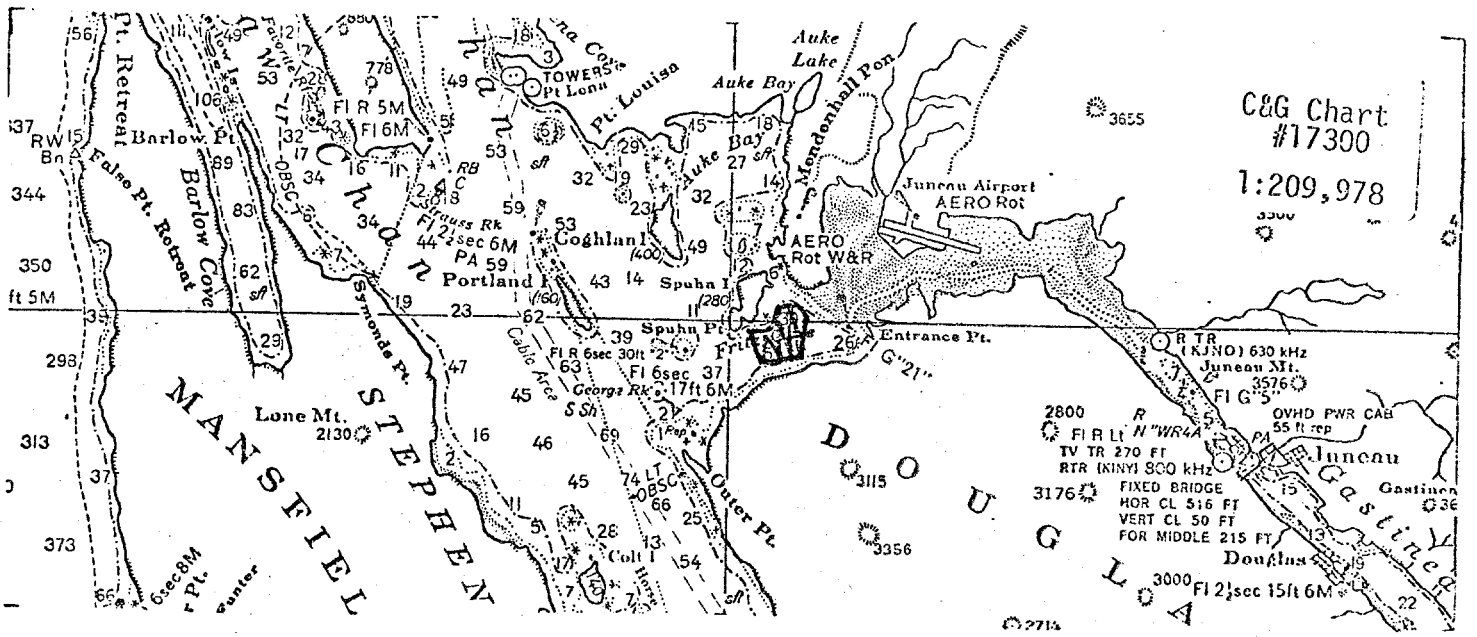
## ACOUSTICAL SURVEY SUMMARY

Area Fritz Cove Date 1/17/78 Vessel J.N. Cobb Run # 2

Gain 5.9 Attenuated -12 dB Operators Krieger

Time of Survey: Start 13:29 End 14:21 Tide

COMMENTS:

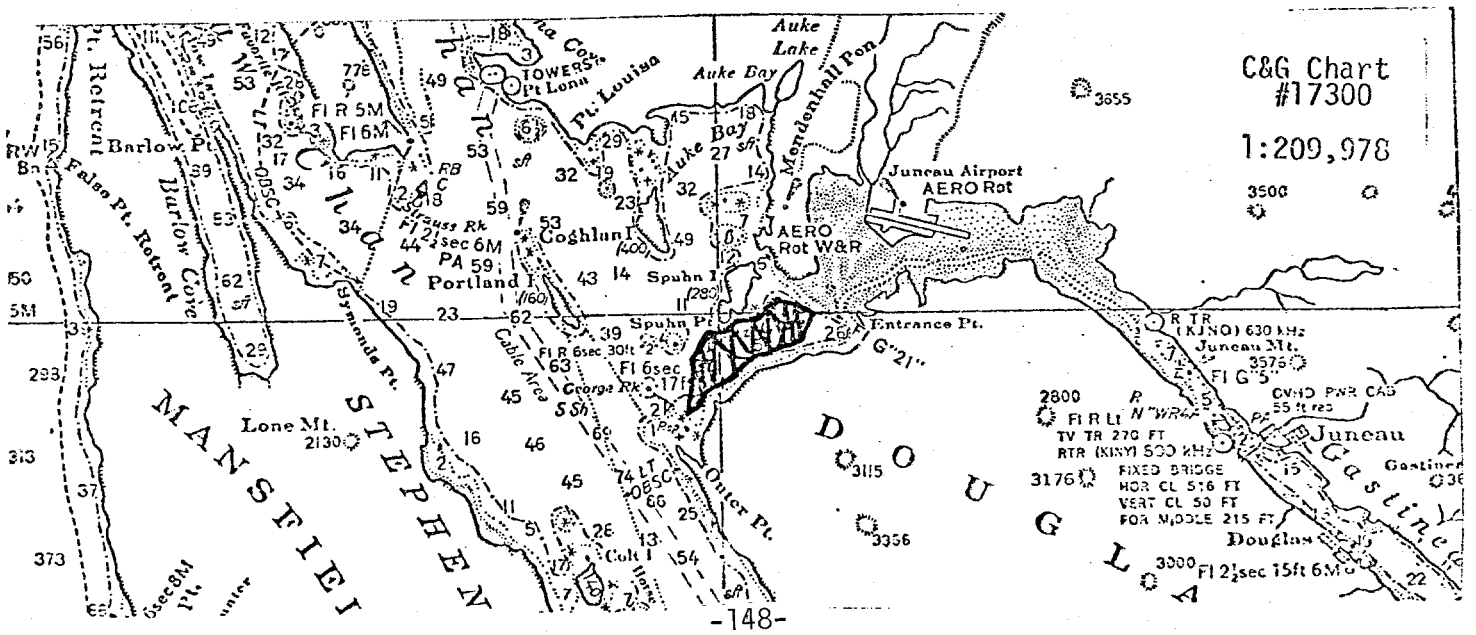



Area Fritz Cove Date 2/5/78 Vessel J.N. Cobb Run # 1

Gain 7.5 Attenuated -12 dB Operators Krieger

Time of Survey: Start 09:14 End 11:02 Tide

COMMENTS:



Appendix 1 continued.

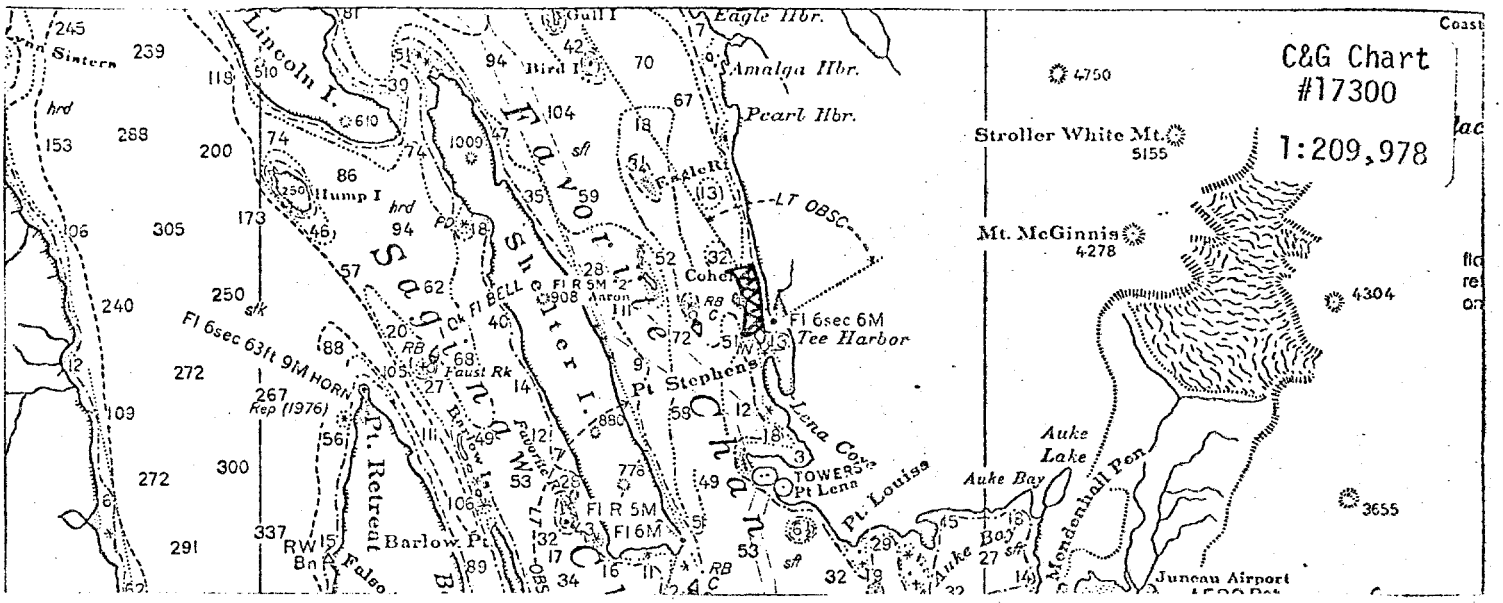
## ACOUSTICAL SURVEY SUMMARY

Area Tee Harbor Date 2/9/78 Vessel Kittiwake Run # 1

Gain 4.0 Attenuated -12 dB Operators Ingledue

Time of Survey: Start 15:52 End 16:15 Tide 1 hr. after high water

COMMENTS:

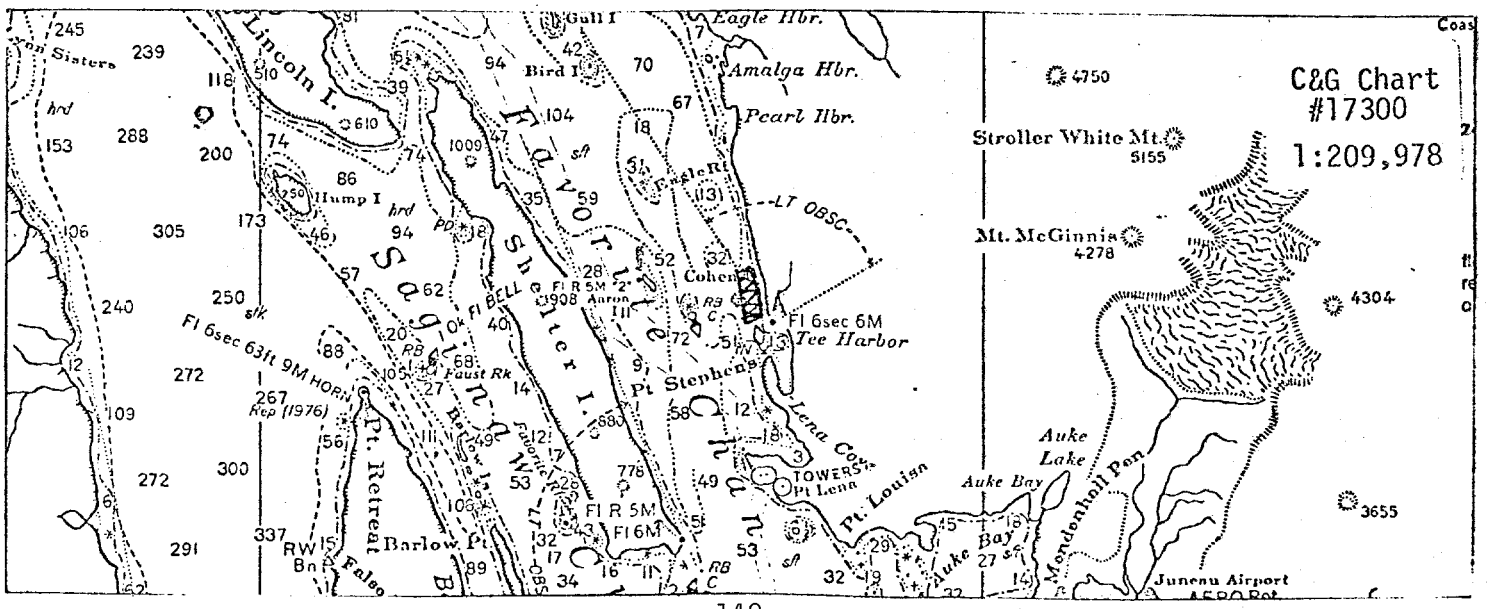



Area Tee Harbor Date 2/10/78 Vessel Kittiwake Run # 1

Gain 4.3 Attenuated -12 dB Operators Ingledue

Time of Survey: Start 14:05 End 14:29 Tide 1/2 flood

COMMENTS:



Appendix 1 continued.

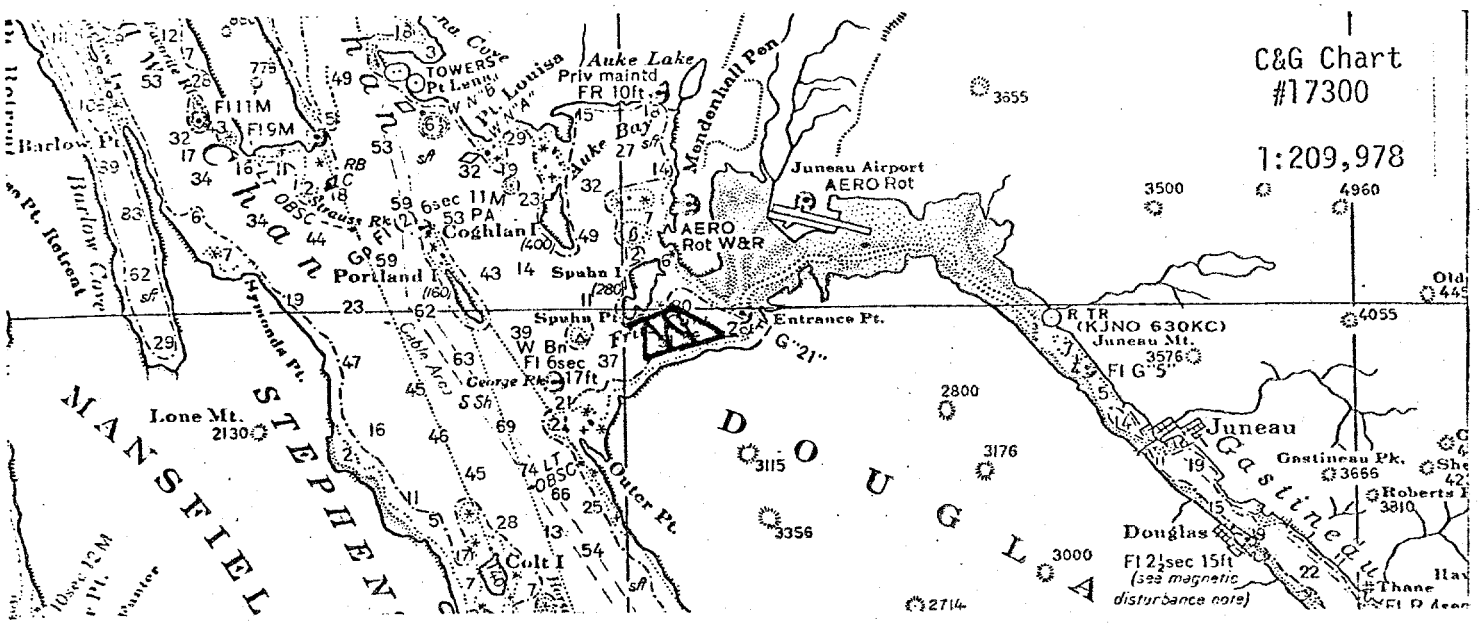
## ACOUSTICAL SURVEY SUMMARY

Area Fritz Cove Date 1/3/79 Vessel Auklet Run # 2

Gain 6.0 Attenuated -12 dB Operators Ingledue, Muir, Kissner

Time of Survey: Start 1445 End 1520 Tide

COMMENTS:

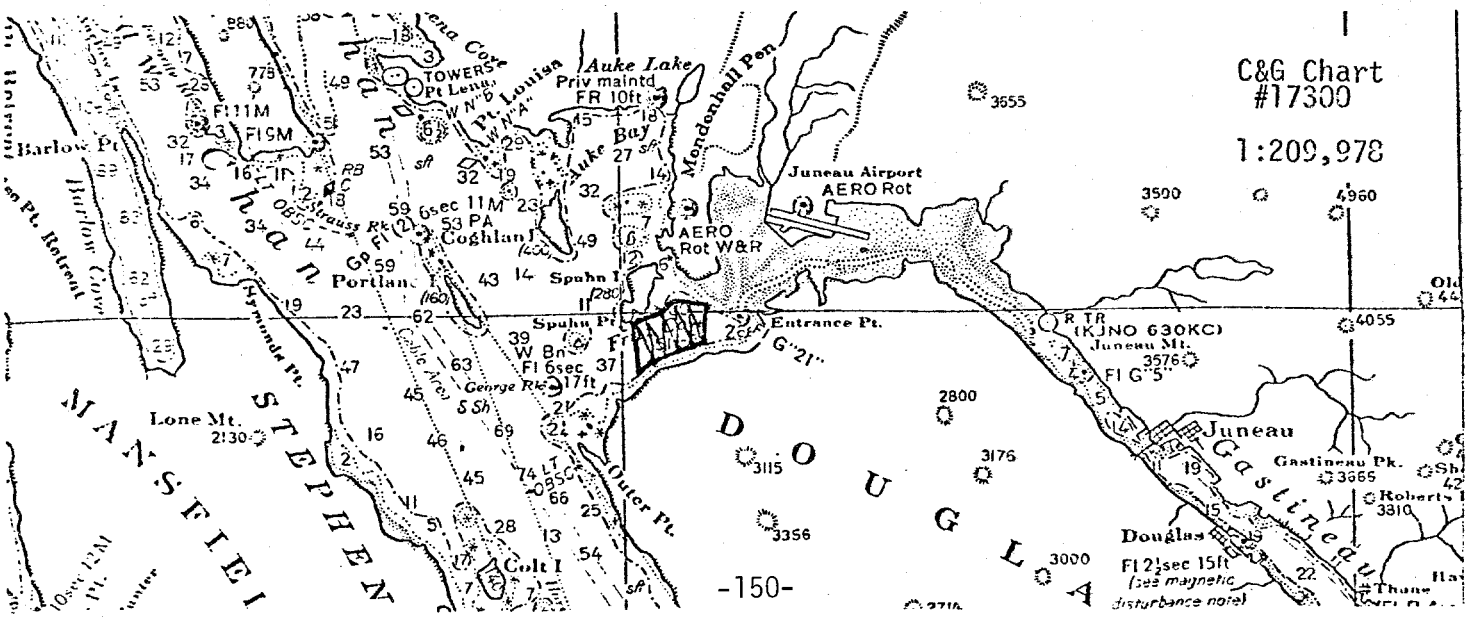



Area Fritz Cove Date 1/18/79 Vessel Kittiwake Run # 1

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 0947 End 1010 Tide

COMMENTS: Started while still dark. Fish above bottom at start but by the end of the survey they were laying solid on floor.



Appendix 1 continued.

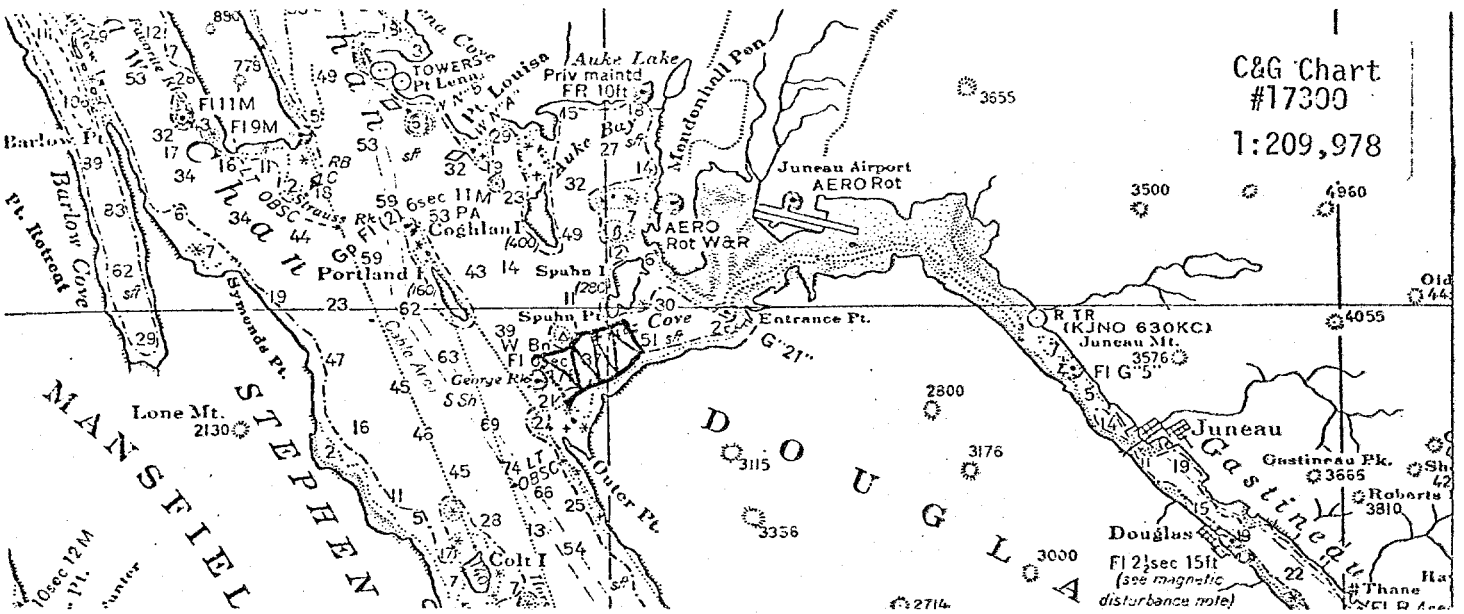
## ACOUSTICAL SURVEY SUMMARY

Area Fritz Cove Date 1/25/79 Vessel Kittiwake Run # 1

Gain 6.4 Attenuated -12 dB Operators Muir

Time of Survey: Start 1708 End 1733 Tide Low

COMMENTS: Most likely not herring - sign completely disappeared at Gain 5.




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

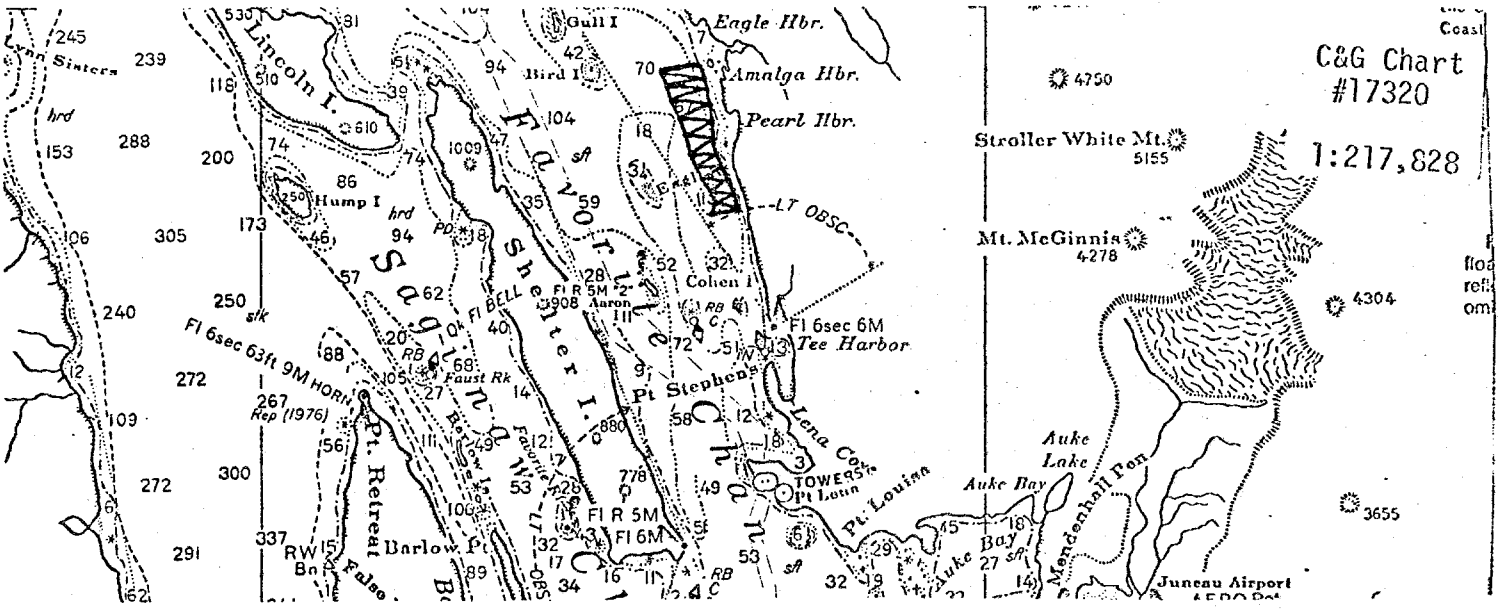
## ACOUSTICAL SURVEY SUMMARY

Area Lynn Canal (Pearl Harbor) Date 4/23/79 Vessel Auklet Run # 1

Gain 5.0 Attenuated -12 dB Operators Ingledue

Time of Survey: Start 1705 End 1821 Tide

COMMENTS: Schools spread out. Less dense than in previous days.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

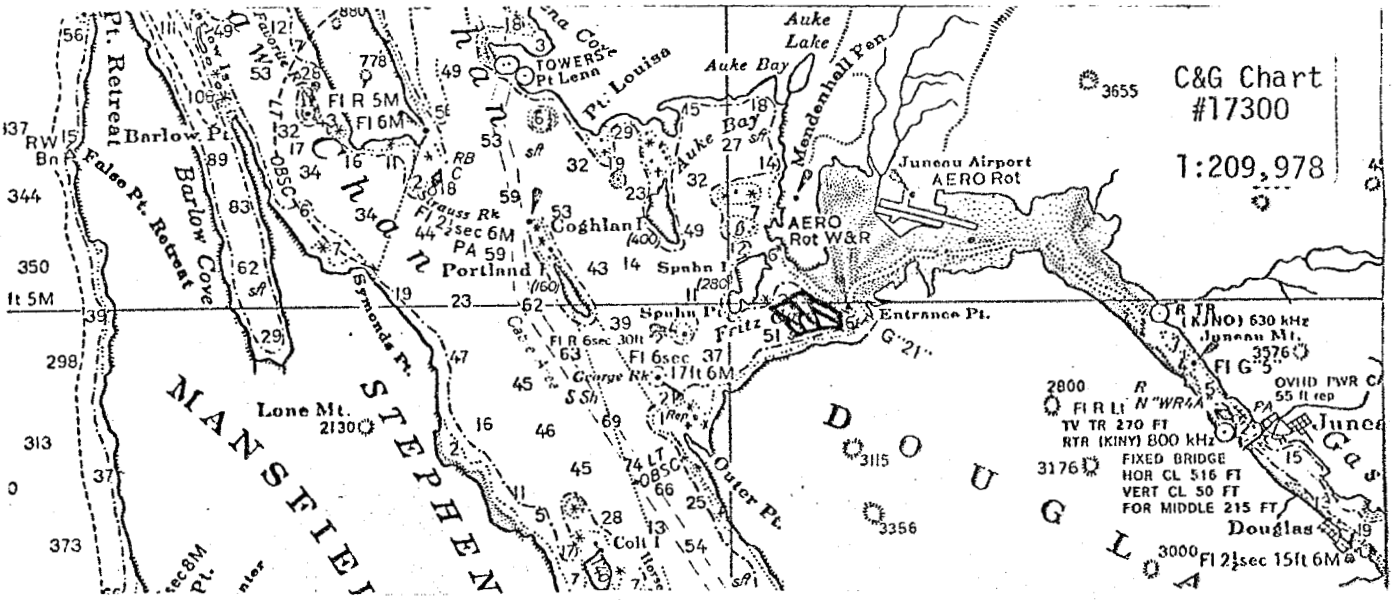
## ACOUSTICAL SURVEY SUMMARY

Area Fritz Cove Date 12/7/79 Vessel Auklet Run # 1

Gain 3.5 Attenuated -12dB Operators Muir, Ingledue

Time of Survey: Start 1220 End 1247 Tide Flood

COMMENTS: Birds and whales working in the area.

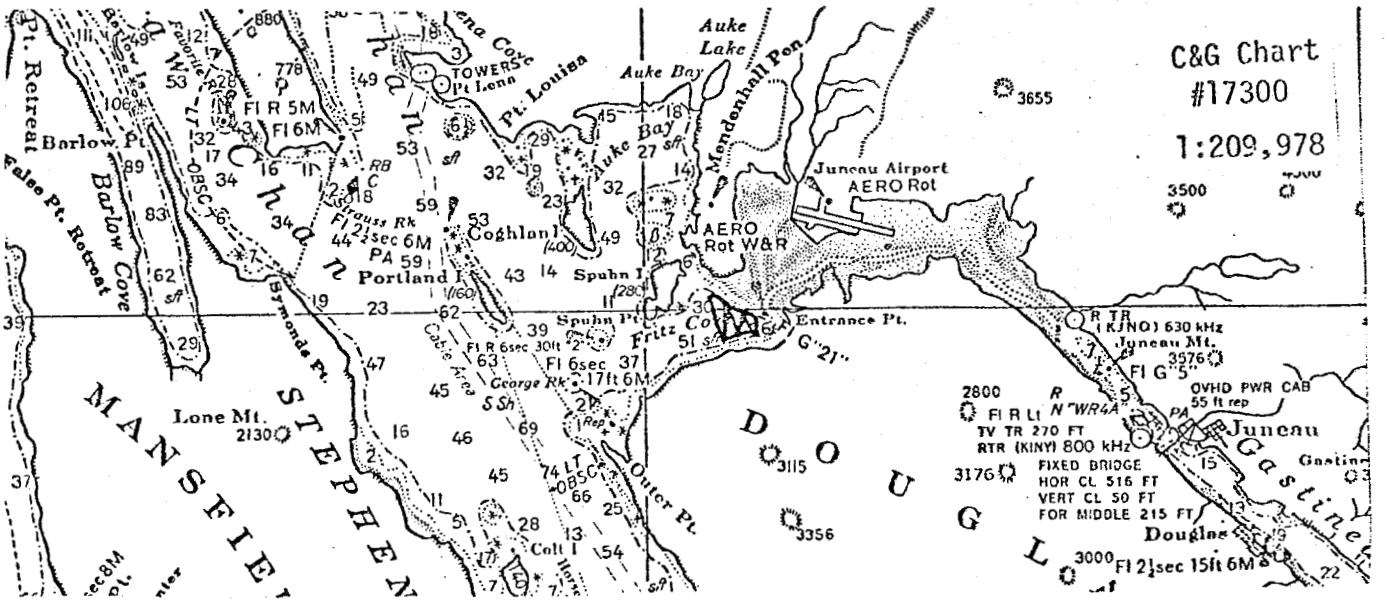



Area Fritz Cove Date 12/10/79 Vessel Kittiwake Run # 2

Gain 3.0 Attenuated -12dB Operators Ingledue, Muir

Time of Survey: Start 1400 End 1412 Tide

COMMENTS:



Appendix 1 continued.

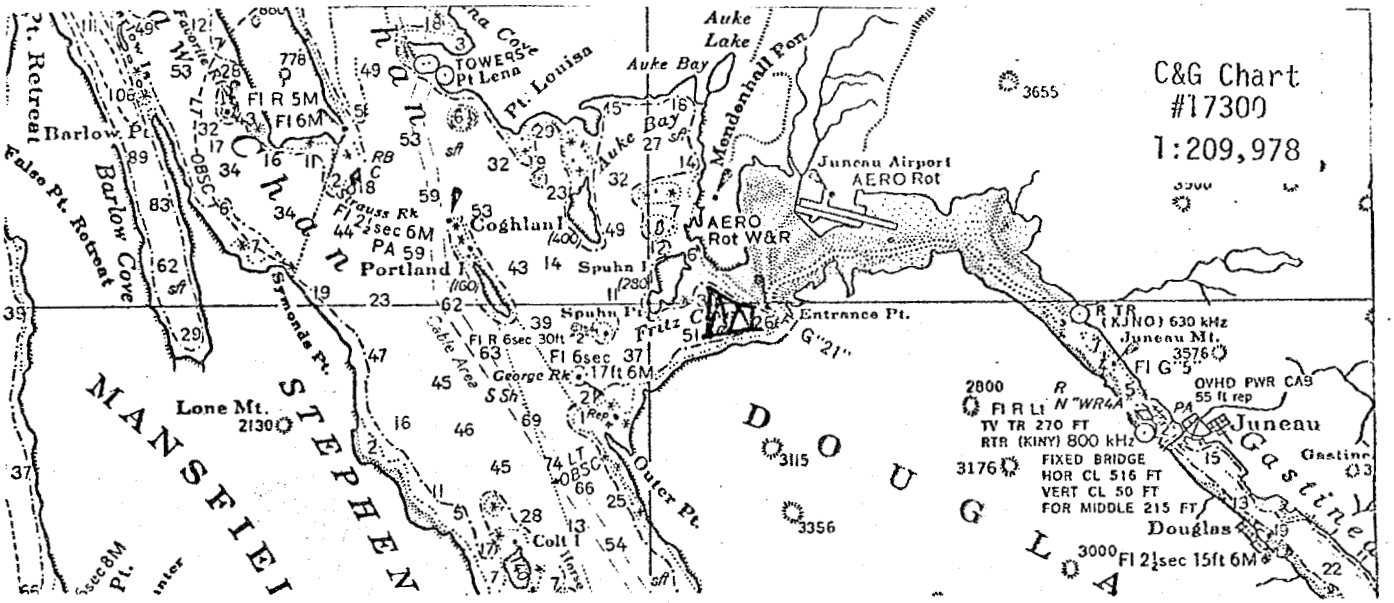
## ACOUSTICAL SURVEY SUMMARY

Area Fritz Cove Date 12/10/79 Vessel Kittiwake Run # 3

Gain 3.7 Attenuated -12dB Operators Ingledue, Muir

Time of Survey: Start 1427 End 1439 Tide

COMMENTS:

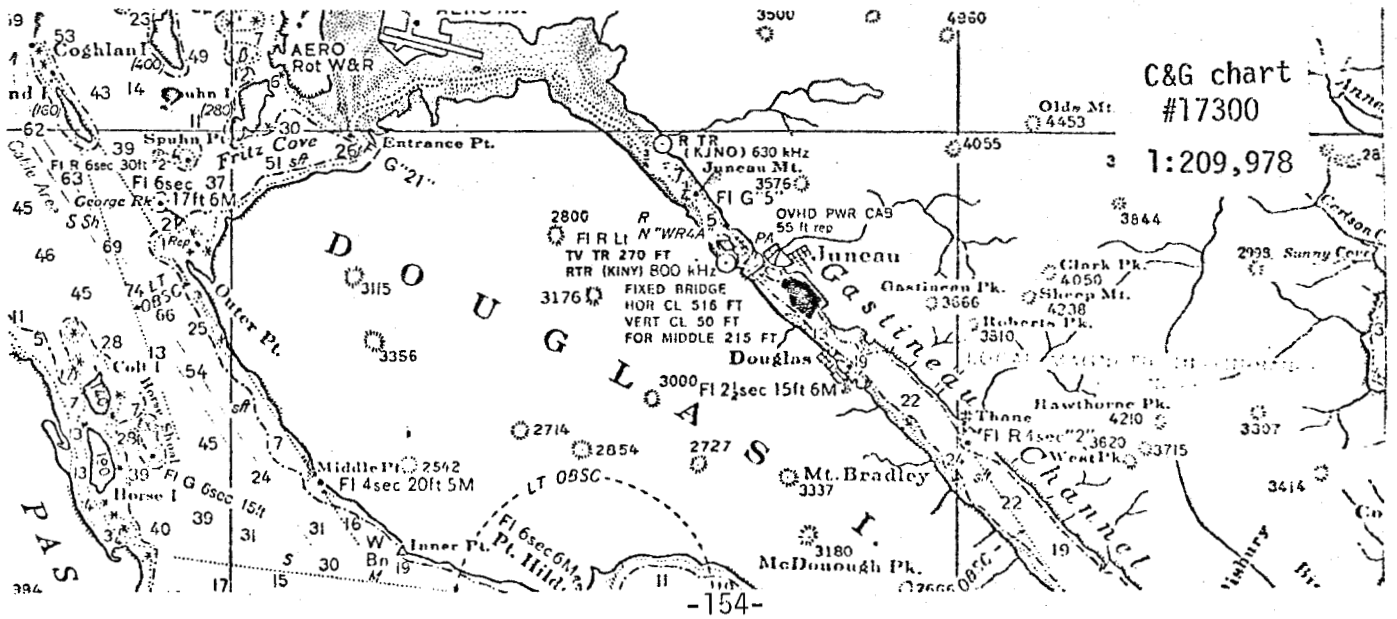



Area Gastineau Channel Date 2/8/80 Vessel Kittiwake Run # 1

Gain 4.4 Attenuated -12dB Operators Muir

Time of Survey: Start 1747 End 1905 Tide

COMMENTS:



Appendix 1 continued.

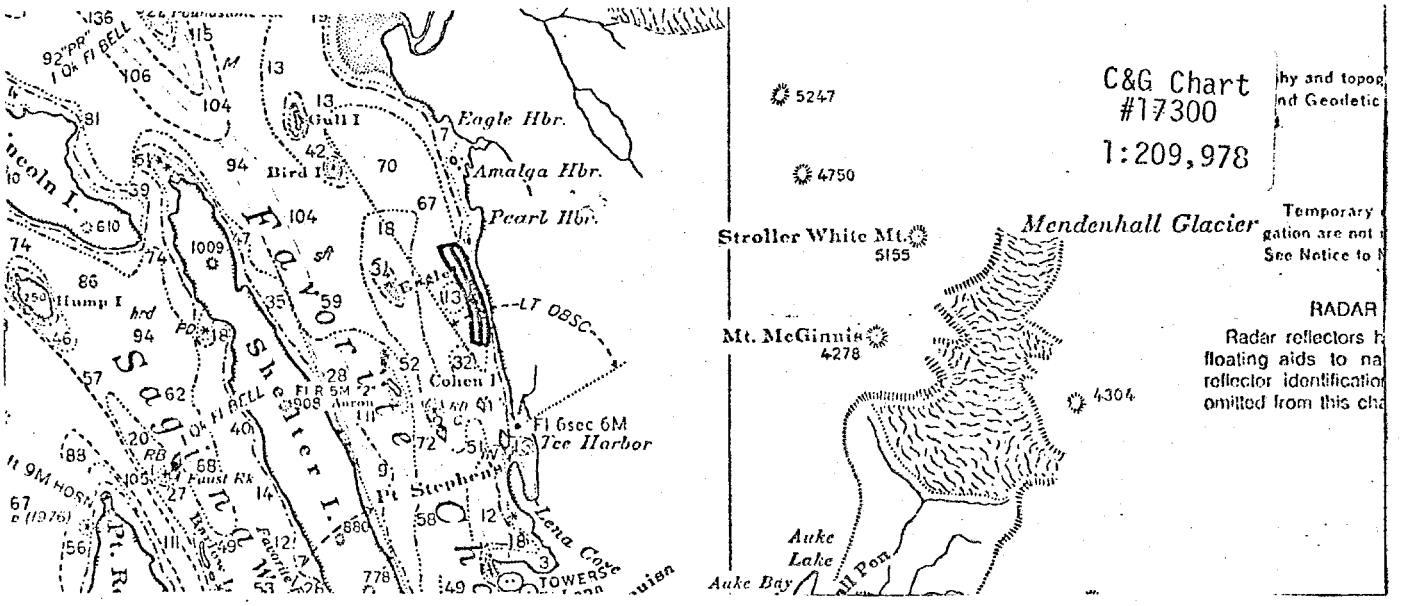
## ACOUSTICAL SURVEY SUMMARY

Area Lynn Canal (Shrine) Date 1/29/80 Vessel Auklet Run # 2

Gain 6.5 Attenuated -12dB Operators Muir, Ingledue

Time of Survey: Start 1830 End 1900 Tide Ebb

COMMENTS:

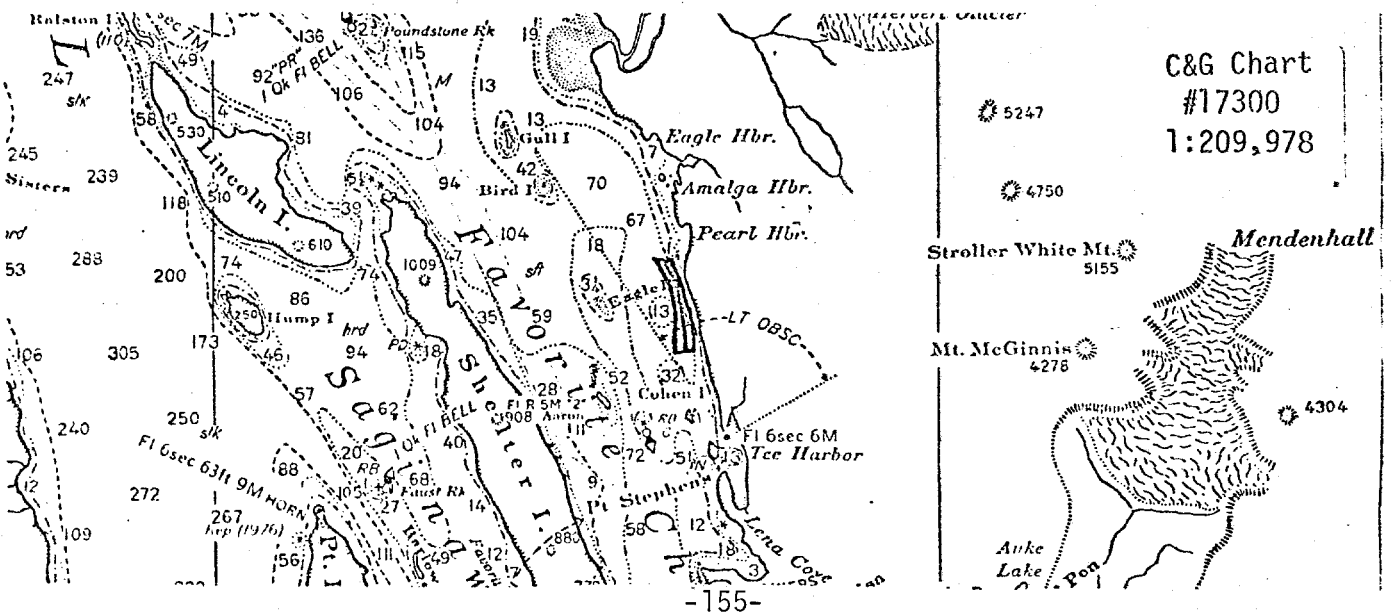



Area Lynn Canal (Shrine) Date 1/29/80 Vessel Auklet Run # 3

Gain 6.5 Attenuated -12dB Operators Muir, Ingledue

Time of Survey: Start 1918 End 1957 Tide Low

COMMENTS: Weather becoming rough.



Appendix 1 continued.

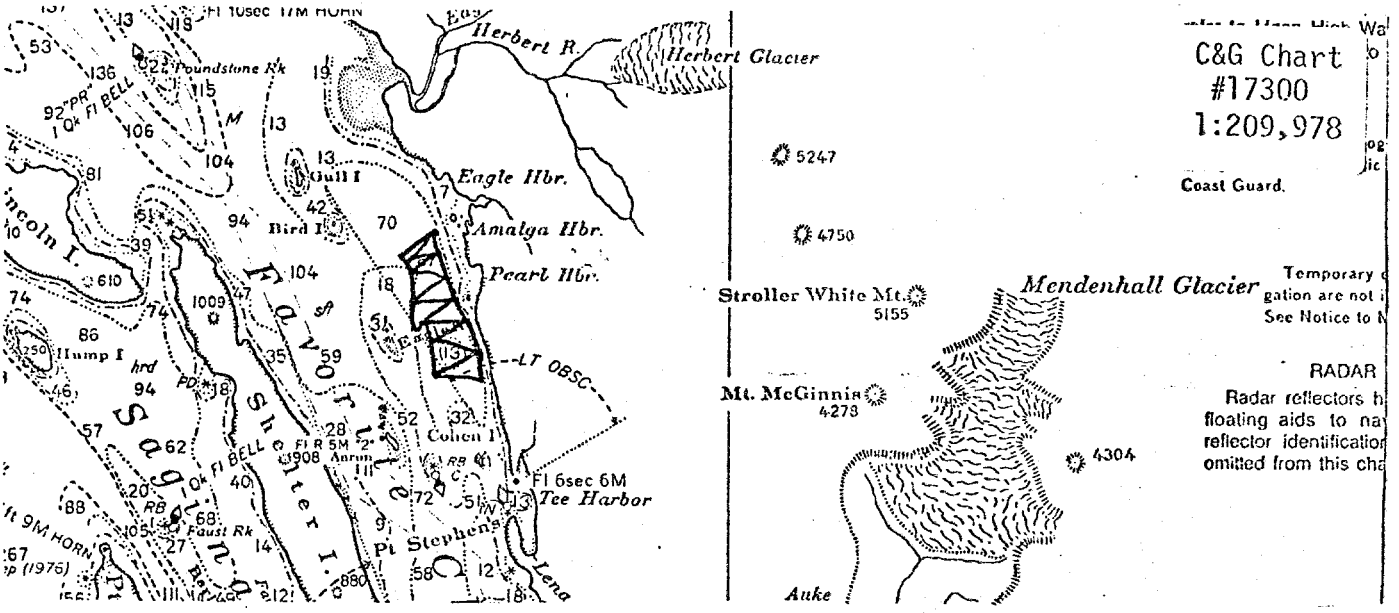
## ACOUSTICAL SURVEY SUMMARY

Area Lynn Canal Date 2/1/80 Vessel Kittiwake Run # 1

Gain 7.0 Attenuated -12dB Operators Ingledue

Time of Survey: Start 1735 End 1821 Tide

COMMENTS: Voltage looked good at the start but began saturating heavily at the end.

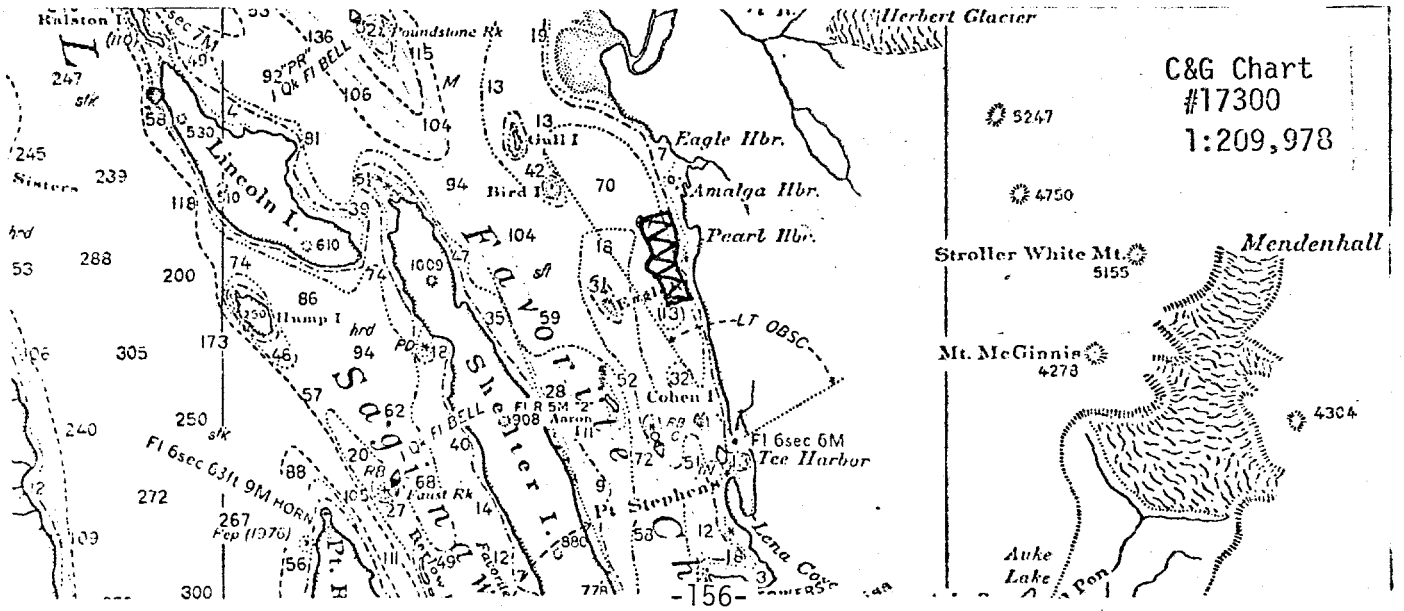



Area Lynn Canal Date 2/1/80 Vessel Kittiwake Run # 2

Gain 5.0 Attenuated -12dB Operators Ingledue

Time of Survey: Start 1828 End 1850 Tide

COMMENTS: Weak signal, needs to be recorded at higher gain.



Appendix 1 continued.

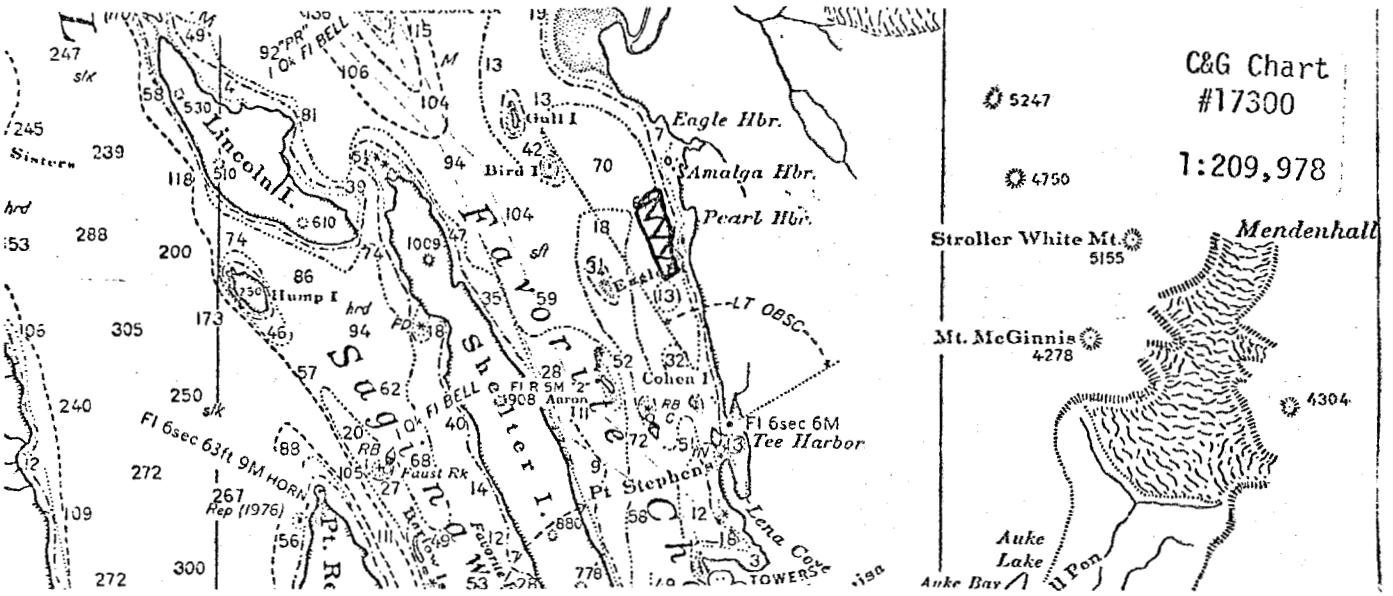
## ACOUSTICAL SURVEY SUMMARY

Area Lynn Canal Date 2/1/80 Vessel Kittiwake Run # 3

Gain 6.0 Attenuated -12dB Operators Ingledue, McLeod

Time of Survey: Start 1858 End 1924 Tide Ebbing

COMMENTS: This is the best survey of the three. Fish moving onto the beach and becoming less dense toward the end of the survey.

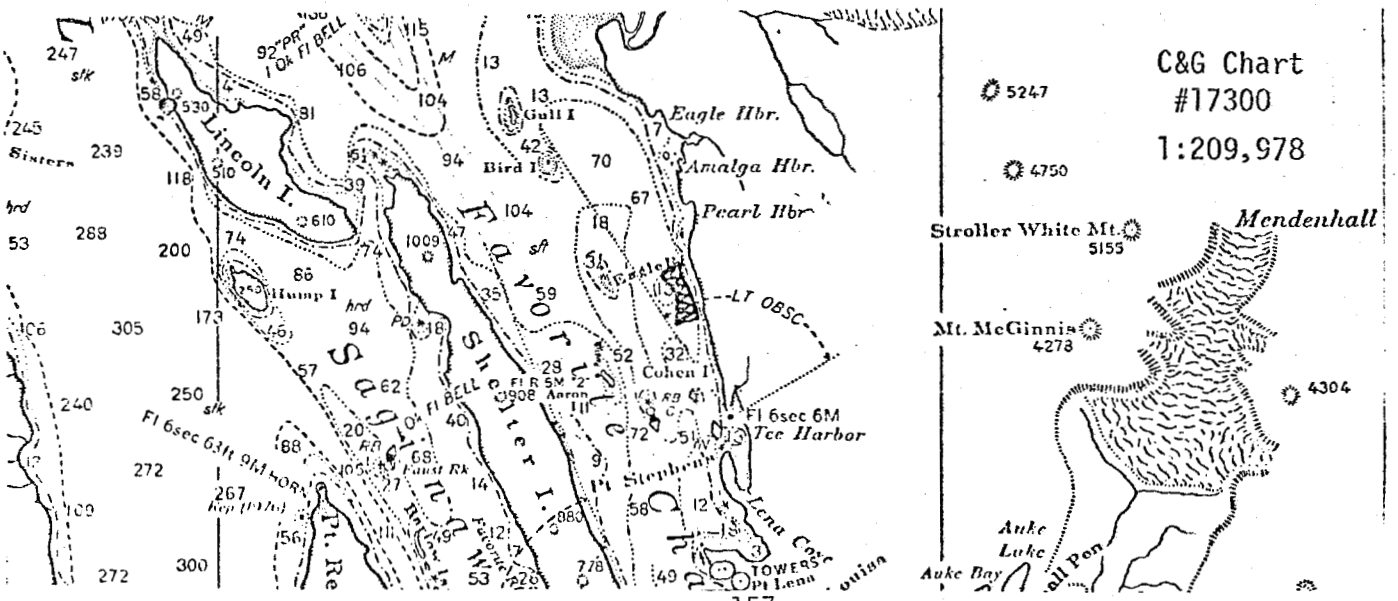



Area Lynn Canal Date 2/13/80 Vessel Kittiwake Run # 1

Gain 6.5 Attenuated -12dB Operators Ingledue, Muir

Time of Survey: Start 1846 End 1908 Tide Low-flood

COMMENTS:



Appendix 1 continued.

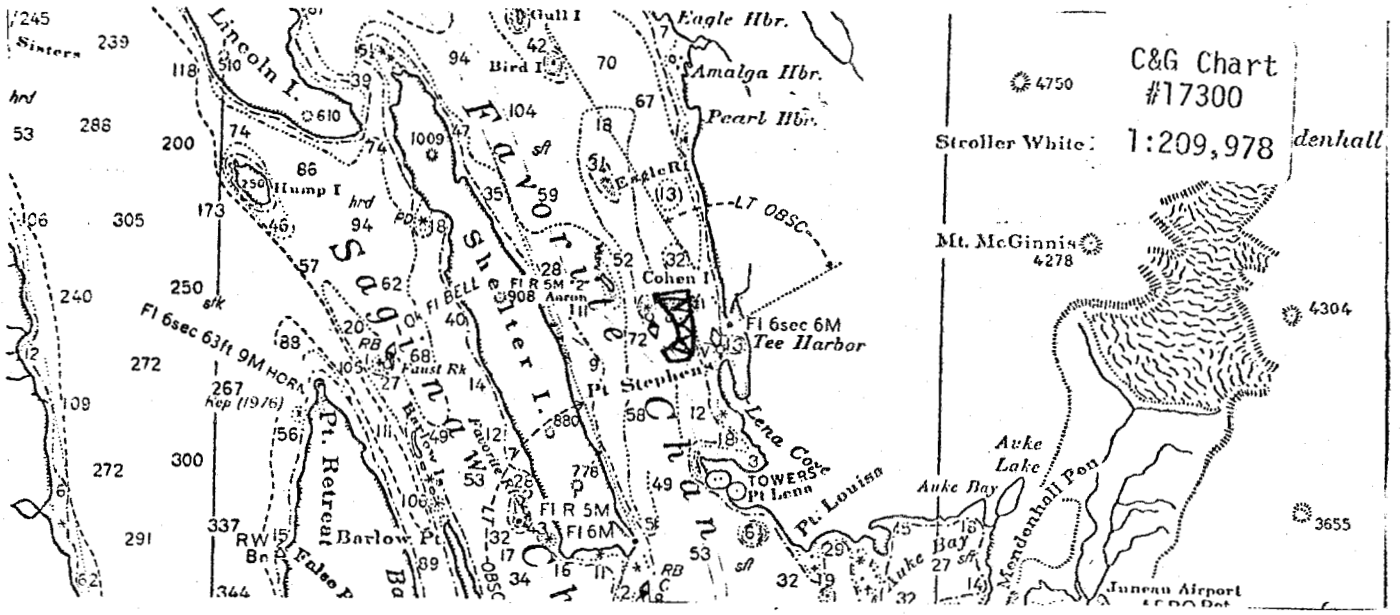
## ACOUSTICAL SURVEY SUMMARY

Area Lynn Canal Date 2/14/80 Vessel Kittiwake Run # 1

Gain 6.5 Attenuated -12dB Operators Ingledue, McLeod

Time of Survey: Start _____ End 1823 Tide Flood

COMMENTS:




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

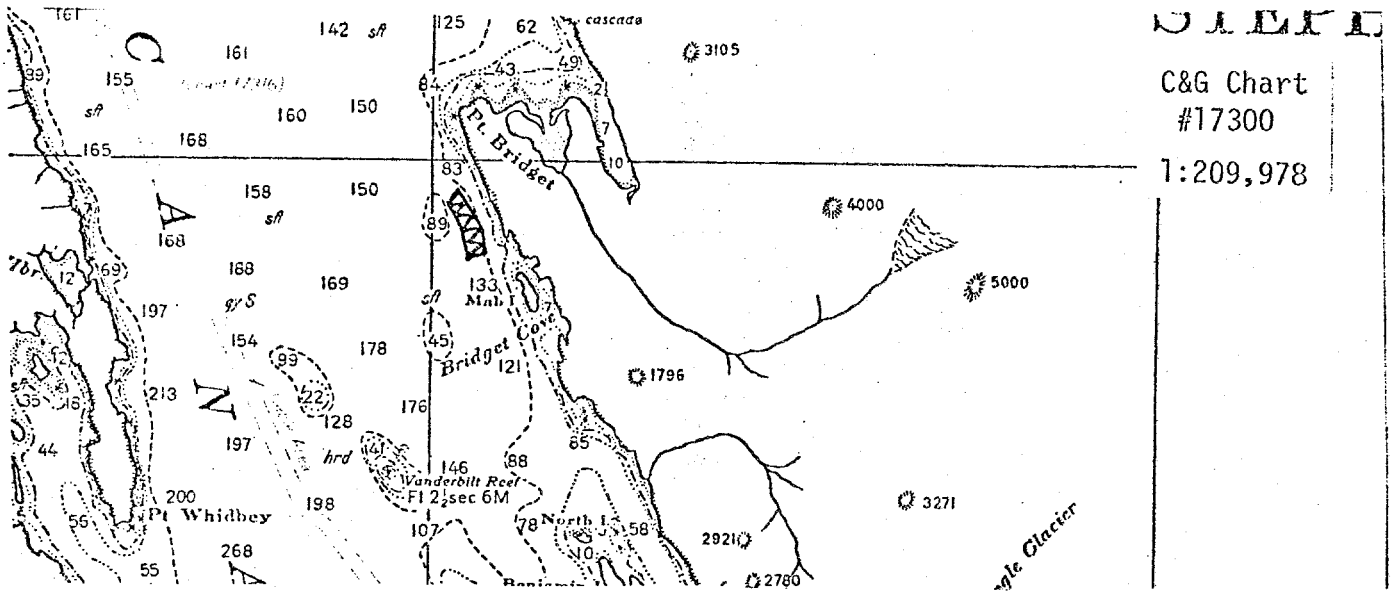
## ACOUSTICAL SURVEY SUMMARY

Area Lynn Canal Date 4/13/80 Vessel Auklet Run # 1

Gain 4.5 Attenuated -12dB Operators Staska, Ingledue

Time of Survey: Start 1619 End 1635 Tide 16 minutes

COMMENTS:

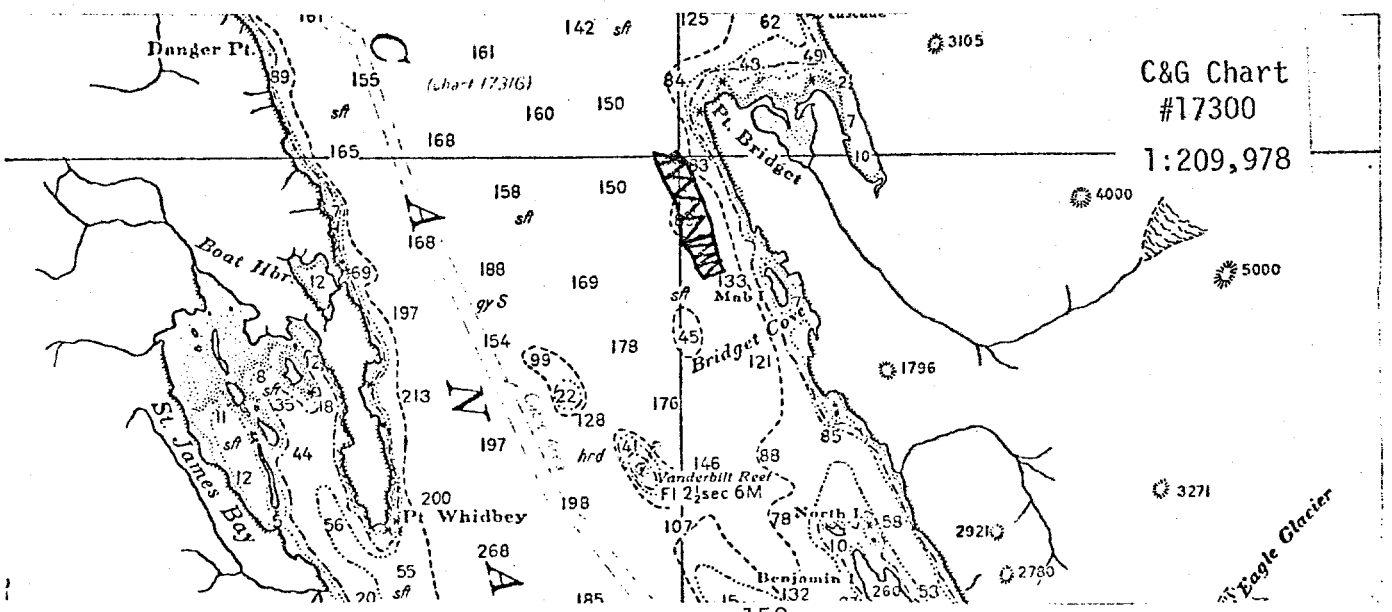



Area Lynn Canal Date 4/13/80 Vessel Auklet Run # 2

Gain 4.5 Attenuated -12dB Operators Staska, Ingledue

Time of Survey: Start 1652 End 1722 Tide 30

COMMENTS:



Appendix 1 continued.

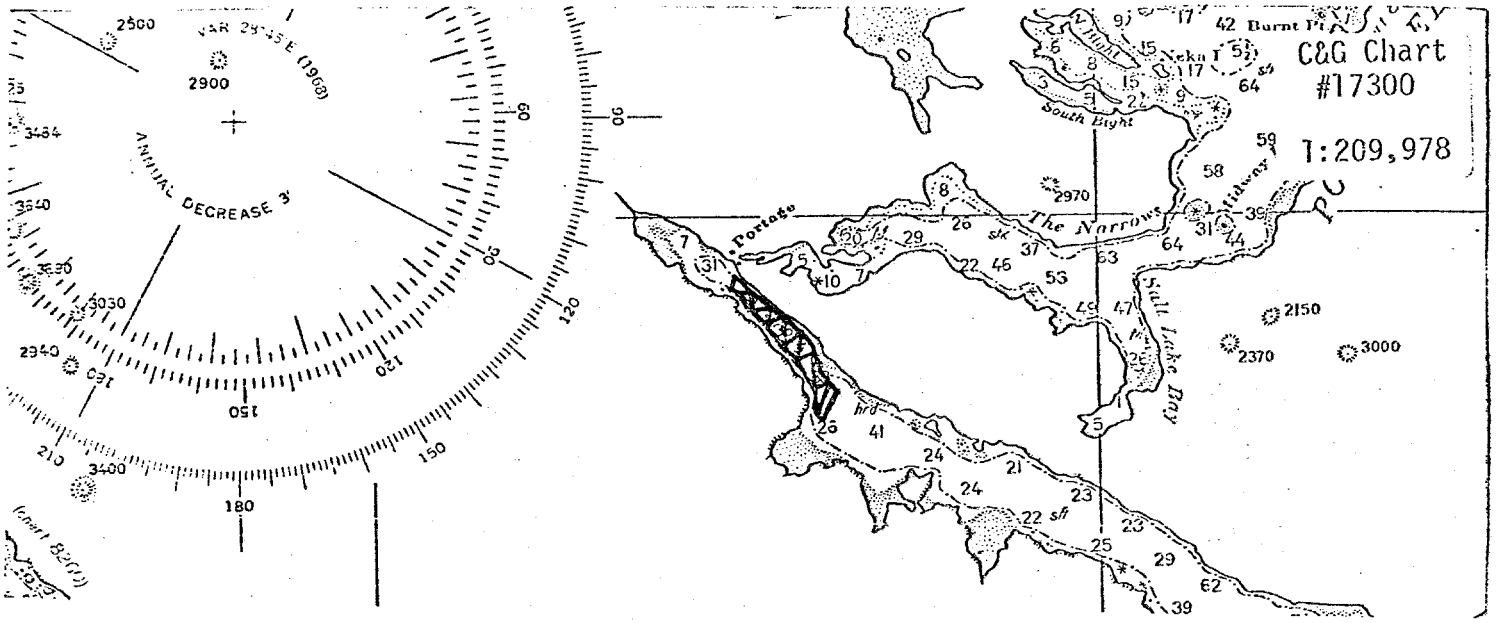
## ACOUSTICAL SURVEY SUMMARY

Area Tenakee Inlet(Head) Date 12/2/78 Vessel Kittiwake Run # 1

Gain 4.0 Attenuated -12 dB Operators Staska

Time of Survey: Start 1720 End 1745 Tide Ebb

COMMENTS: Two whales present over schools.

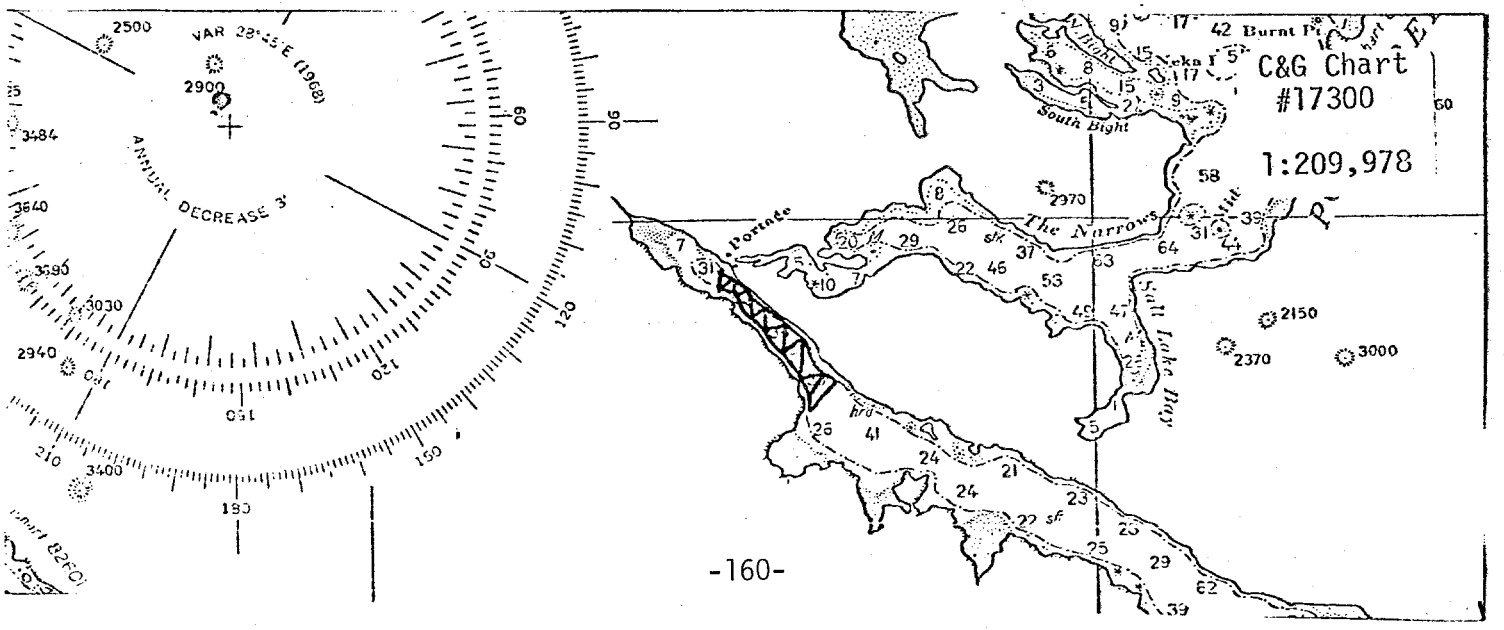



Area Tenakee Inlet(Head) Date 12/2/78 Vessel Kittiwake Run # 2

Gain 5.5 Attenuated -12 dB Operators Staska

Time of Survey: Start 1800 End 1830 Tide Ebb

COMMENTS: Reversed direction of Run #1. One minute of fish echo lost on turn of Transect 4.



Appendix 1 continued.

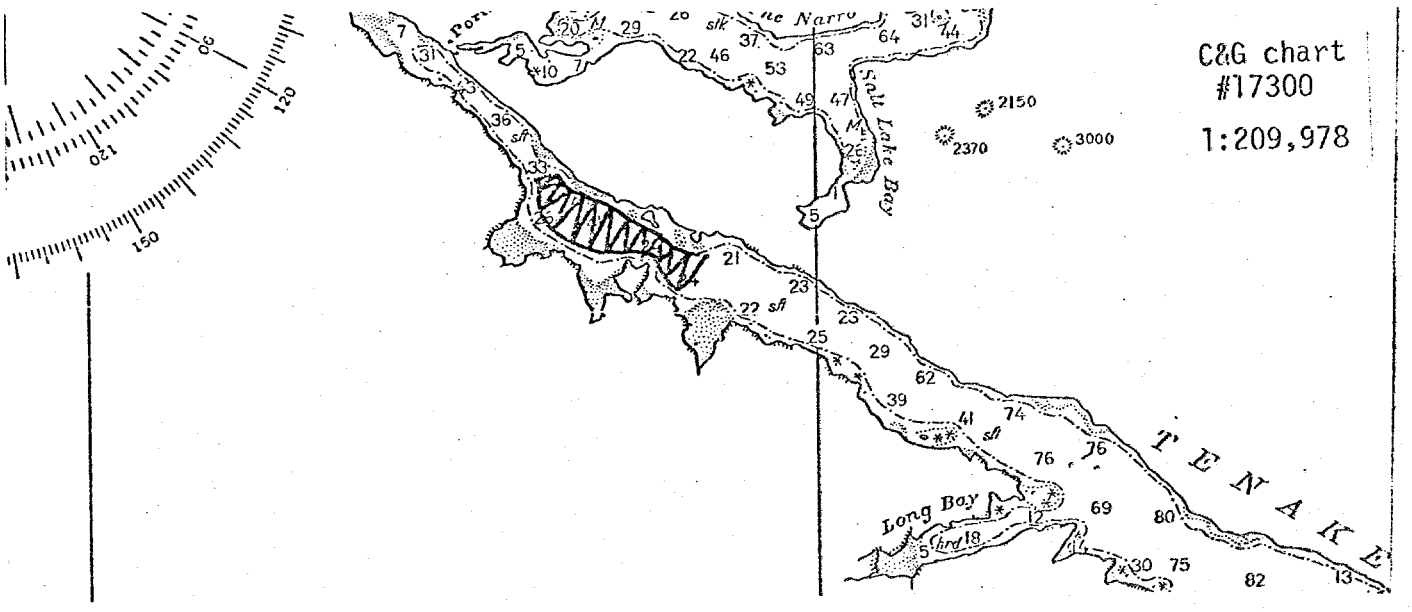
## ACOUSTICAL SURVEY SUMMARY

Area Tenakee Inlet Date 11/17/79 Vessel Kittiwake Run # 1

Gain 4.5 Attenuated -12dB Operators Blankenbeckler, McLeod

Time of Survey: Start 1000 End _____ Tide _____

COMMENTS: Good distribution; slight to no saturation. Birds and eight humpback whales present.

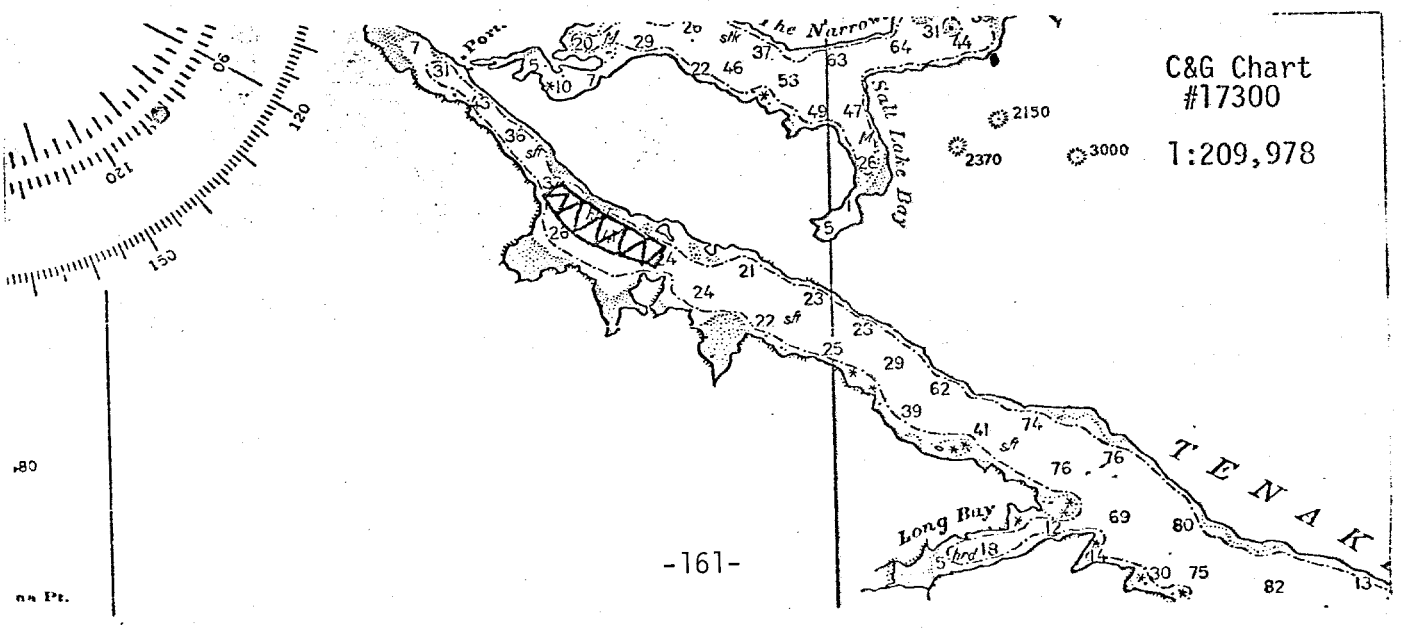



Area Tenakee Inlet Date 11/17/79 Vessel Kittiwake Run # 2

Gain 3.5 Attenuated -12dB Operators Blankenbeckler, McLeod

Time of Survey: Start 1045 End _____ Tide _____

COMMENTS: Wide transect pattern. Whales obviously breaking up herring.



Appendix 1 continued.

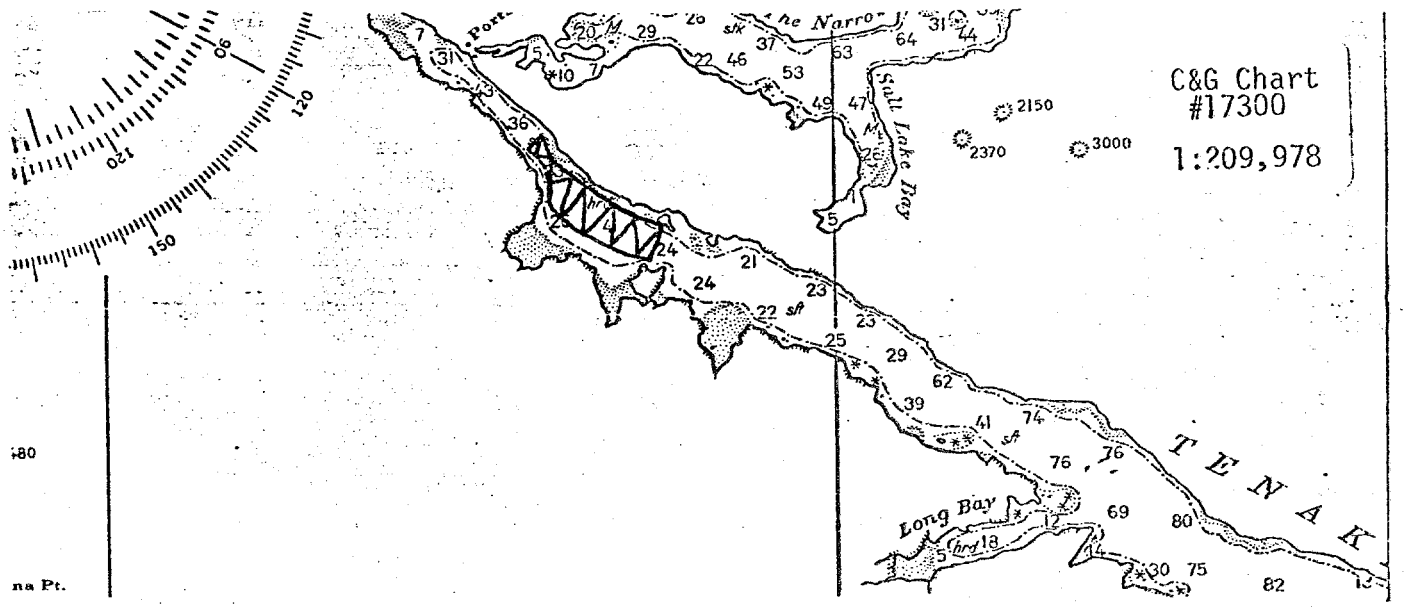
## ACOUSTICAL SURVEY SUMMARY

Area Tenakee Inlet Date 11/17/79 Vessel Kittiwake Run # 3

Gain 3.0 Attenuated -12dB Operators Blankenbeckler, McLeod

Time of Survey: Start 1130 End _____ Tide _____

COMMENTS: Some fish movement evident but still in good survey pattern.




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

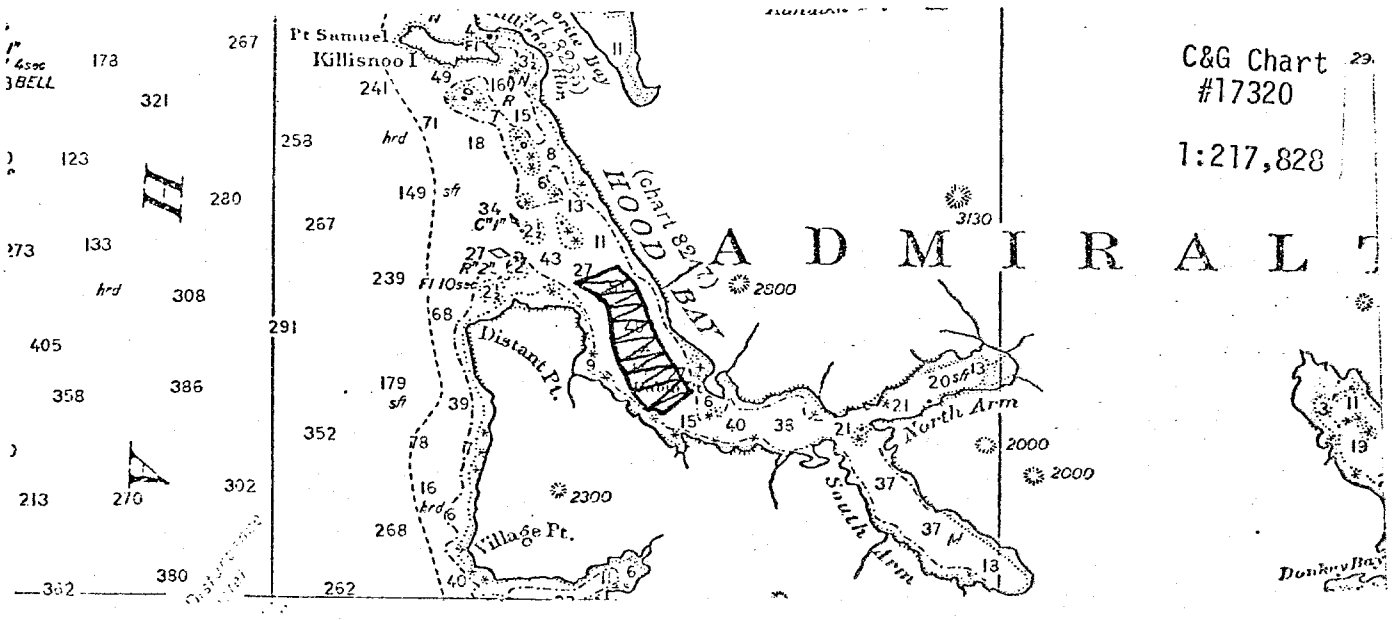
## ACOUSTICAL SURVEY SUMMARY

Area Hood Bay Date 10/12/78 Vessel Kittiwake Run # 1

Gain 4 Attenuated -12 dB Operators Ingledue, McLeod

Time of Survey: Start 0908 End 1010 Tide high at noon

COMMENTS: Two Humpback whales; herring gulls on beach.




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

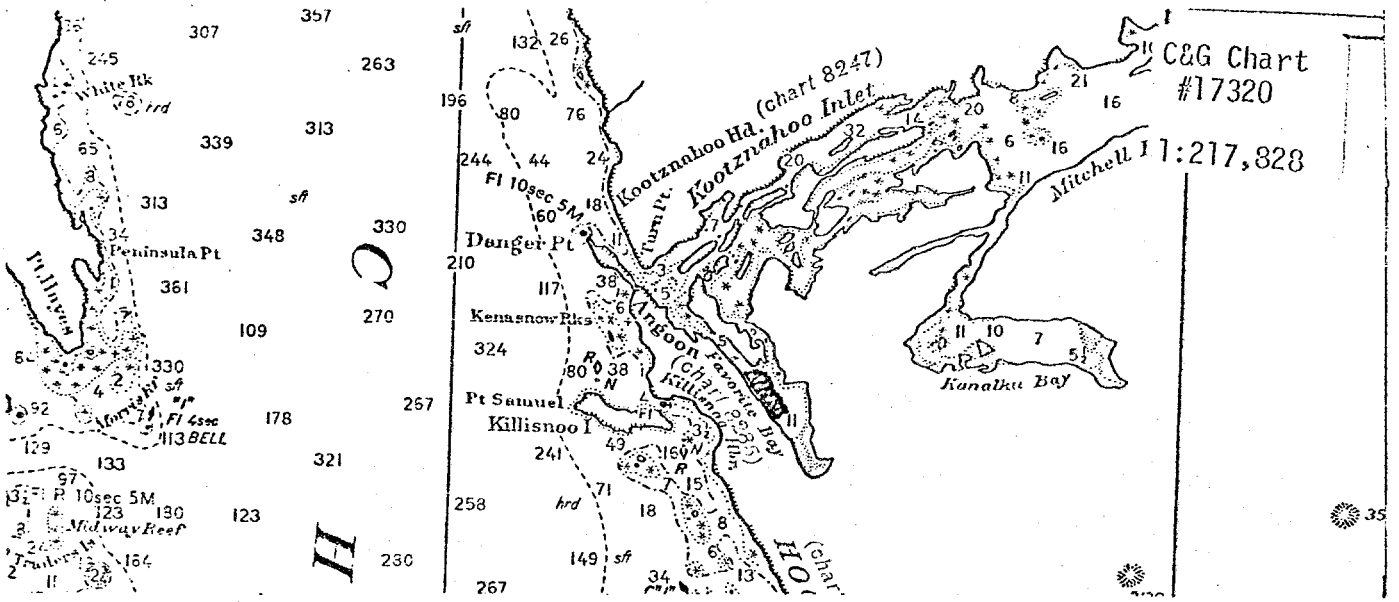
## ACOUSTICAL SURVEY SUMMARY

Area Favorite Bay Date 11/4/78 Vessel Auklet Run # 1

Gain 3.0 Attenuated -12 dB Operators Ingledue

Time of Survey: Start 1135 End 1154 Tide Low slack

COMMENTS:

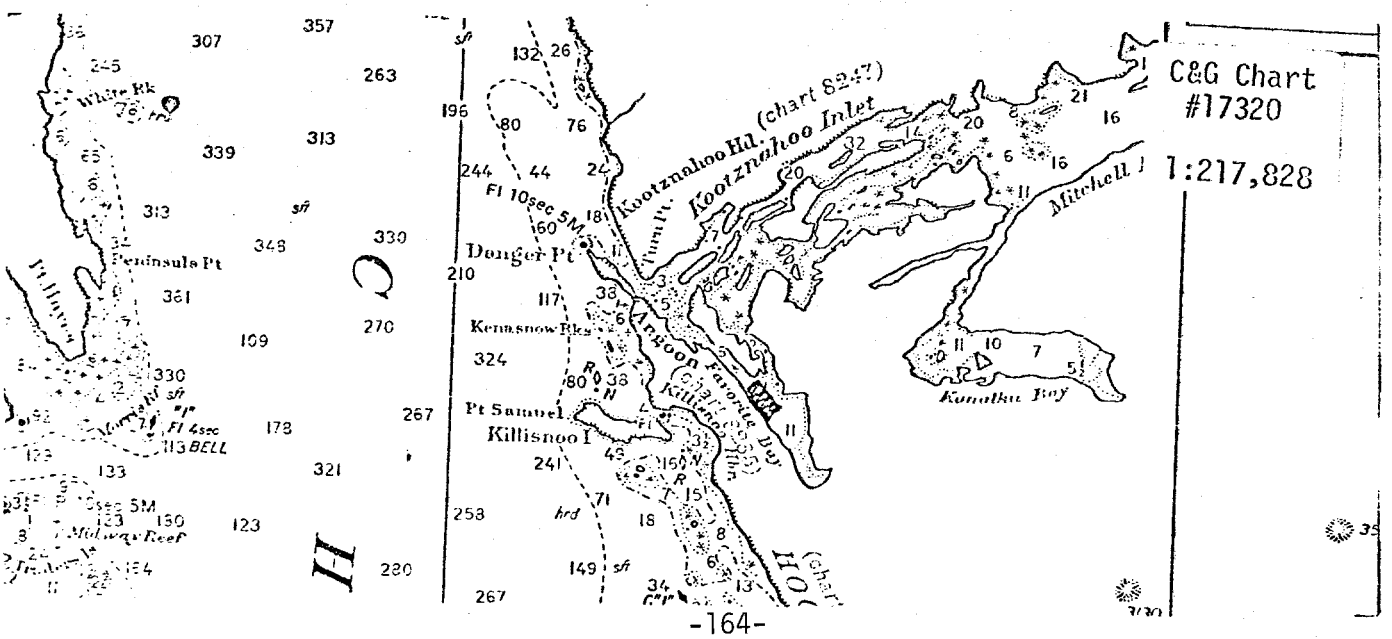



Area Favorite Bay Date 11/4/78 Vessel Auklet Run # 2

Gain 3.0 Attenuated -12 dB Operators Ingledue

Time of Survey: Start 1228 End 1251 Tide Flooding

COMMENTS:



Appendix 1 continued.

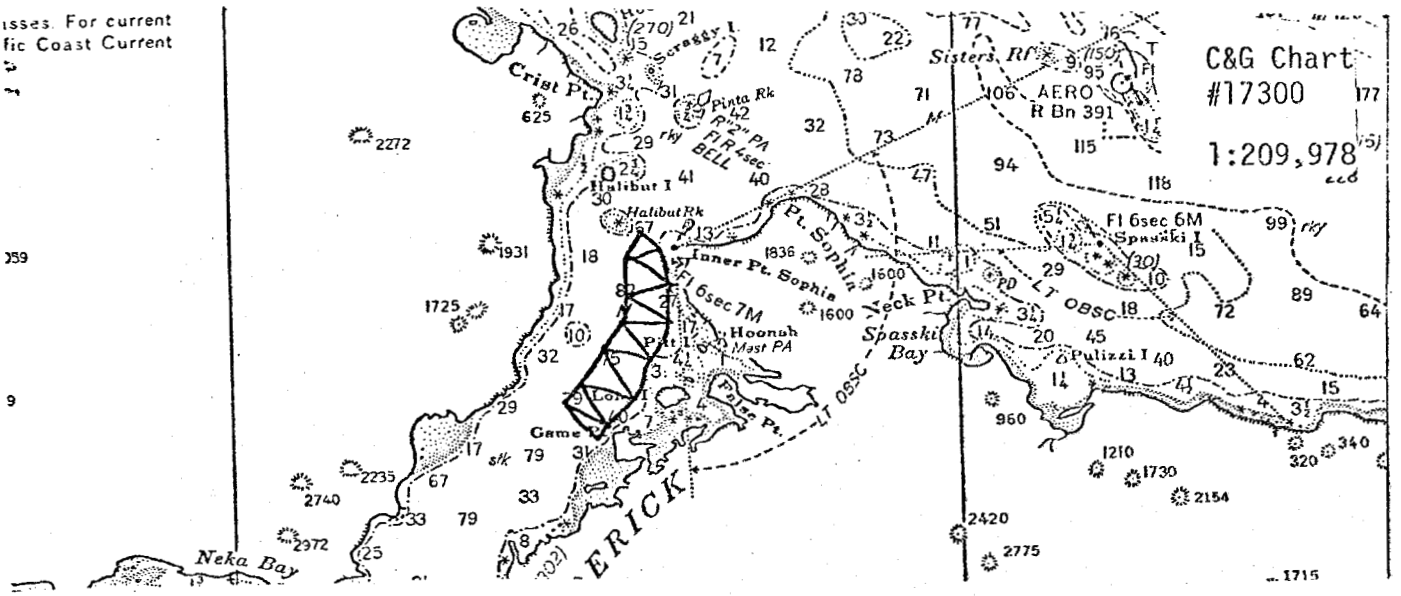
## ACOUSTICAL SURVEY SUMMARY

Area Port Frederick Date 11/16/79 Vessel Kittiwake Run # 1

Gain 6.5 Attenuated -12dB Operators Blankenbeckler, McLeod

Time of Survey: Start 1000 End 1047 Tide

COMMENTS: Some herring observed.

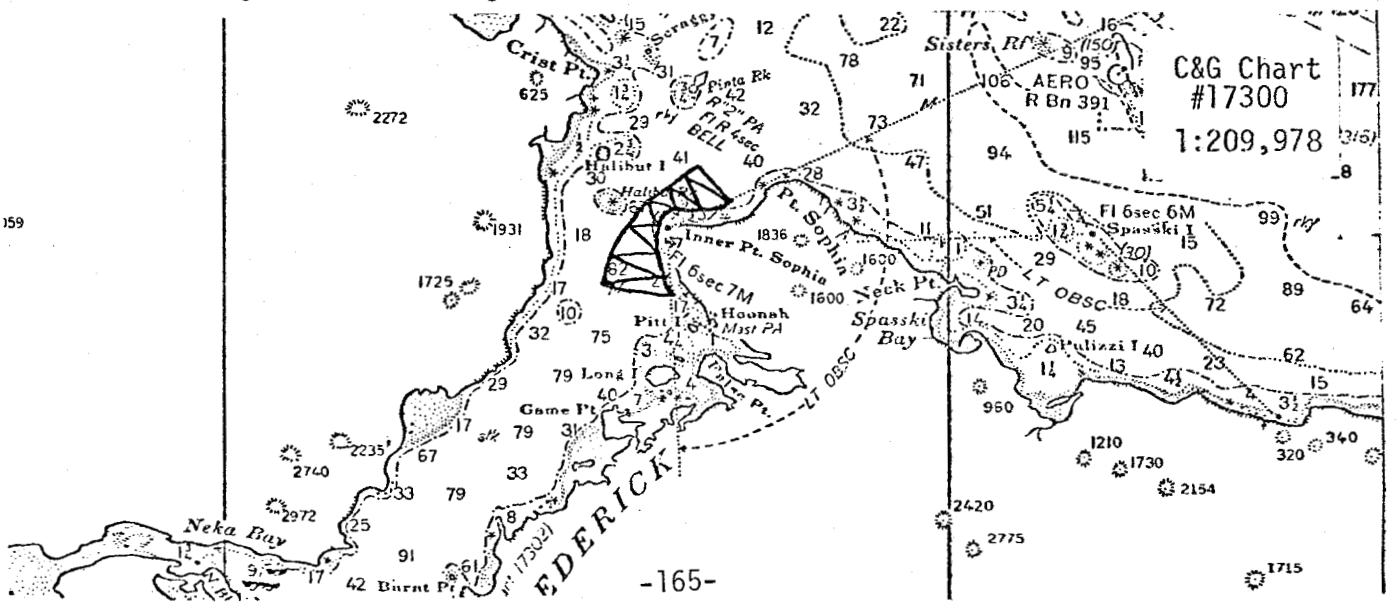



Area Port Frederick Date 11/16/79 Vessel Kittiwake Run # 2

Gain 5.7 Attenuated -12dB Operators Blankenbeckler, McLeod

Time of Survey: Start End Tide

COMMENTS: Scattered small schools with varied densities. Questionable that all targets are herring.



Appendix 1 continued.

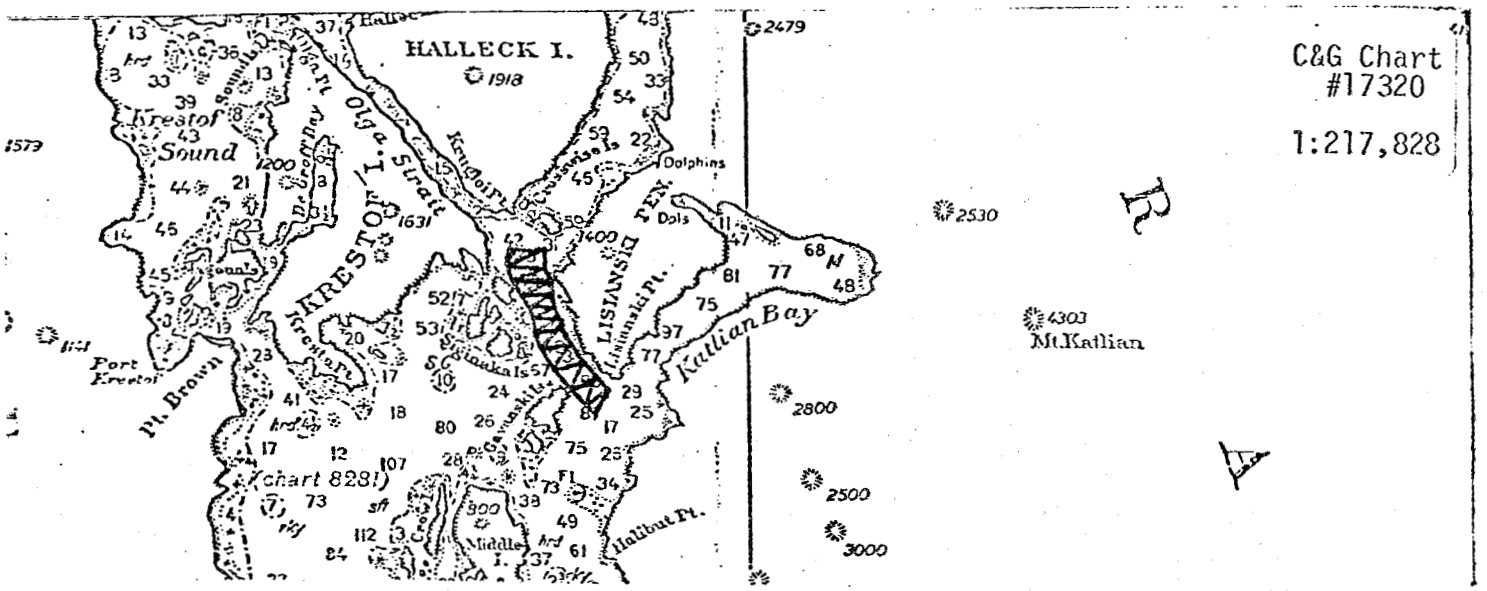
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 11/19/77 Vessel J.N. Cobb Run # 1

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler, Krieger

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

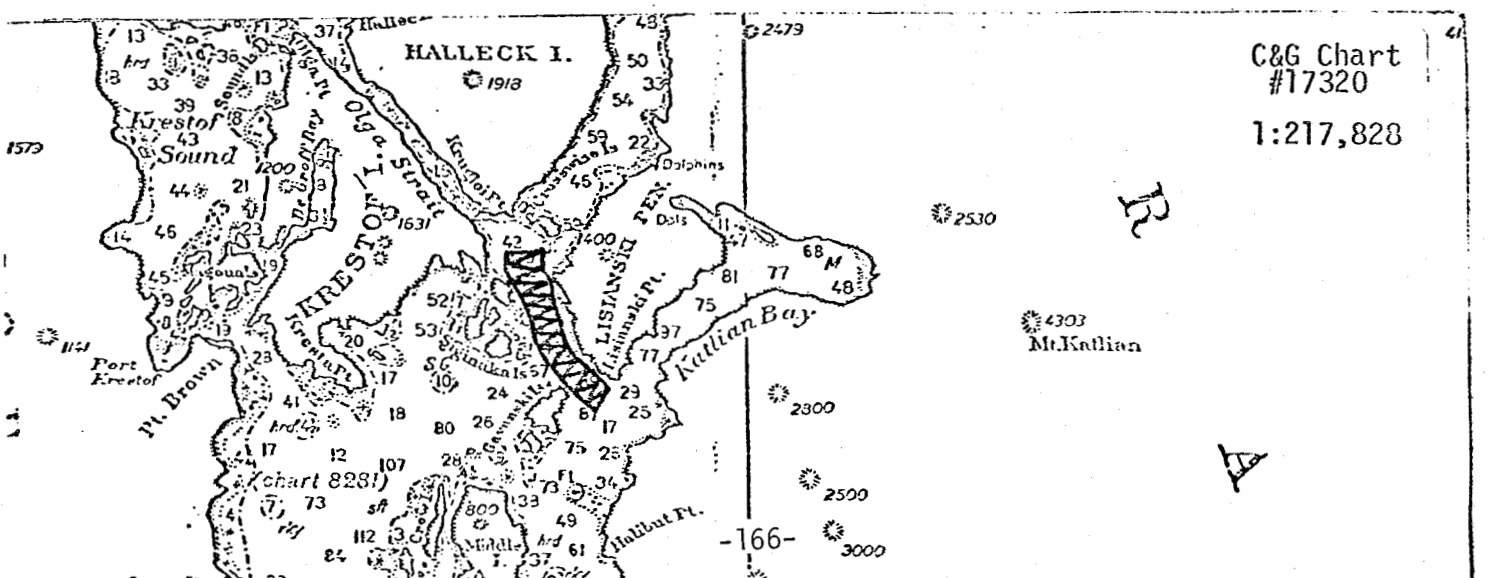



Area Olga Straits Date 1/27/78 Vessel J.N. Cobb Run # 2

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler, Kreiger

Time of Survey: Start 17:46 End 18:55 Tide _____

COMMENTS: Best run for fish distribution. No saturation noted during taping. Herring distributed for good survey. Two whales and birds in area of herring. Trawl sample taken on survey. area.



Appendix 1 continued.

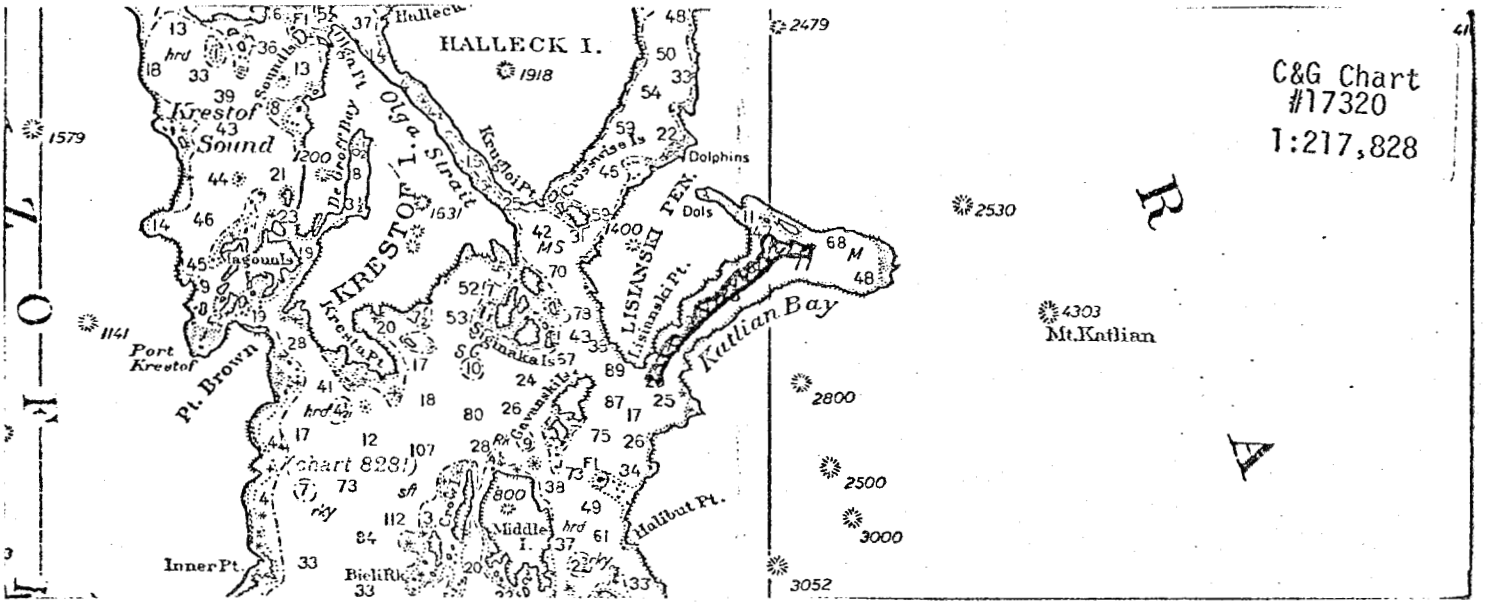
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 12/17/77 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler, Copeland

Time of Survey: Start 14:00 End 15:26 Tide

COMMENTS: Saturation noted on Leg #5. Seventy-five sea lions and three Humpback whales in the area. Clear, calm, medium tides.

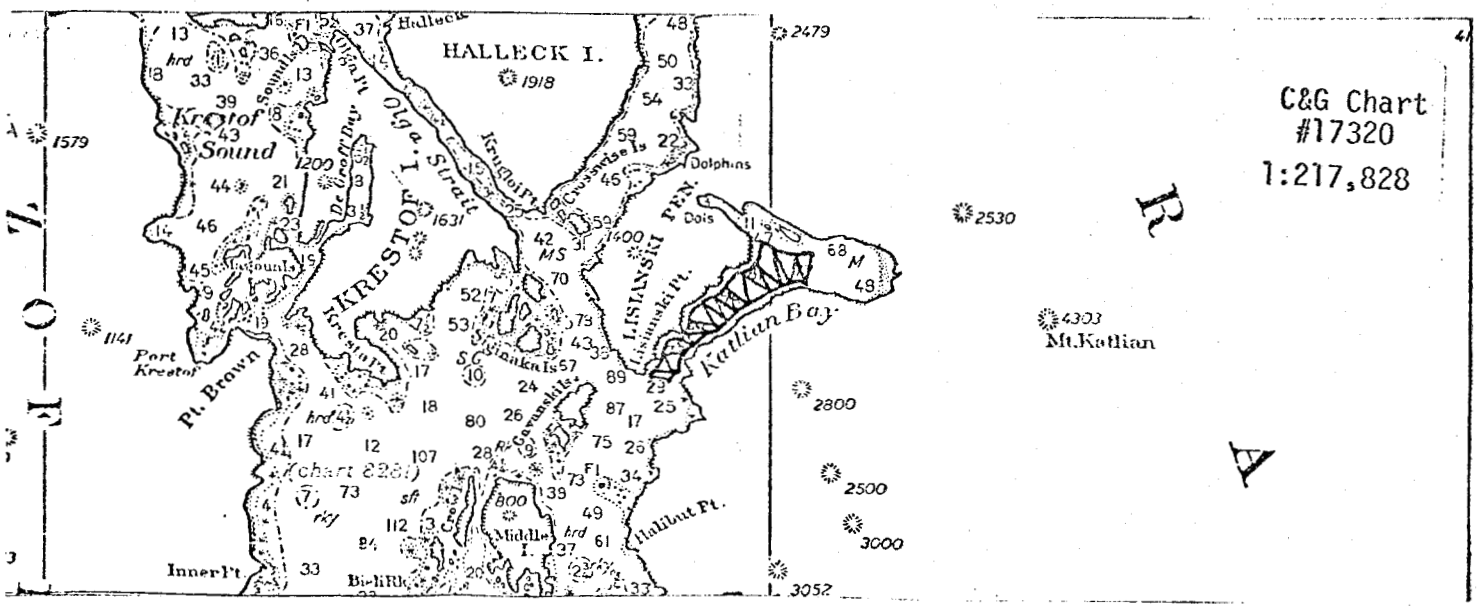



Area Katlian Date 12/17/77 Vessel Sundance Run # 2

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler, Copeland

Time of Survey: Start 15:50 End 17:13 Tide

COMMENTS: No saturation noted.



Appendix 1 continued.

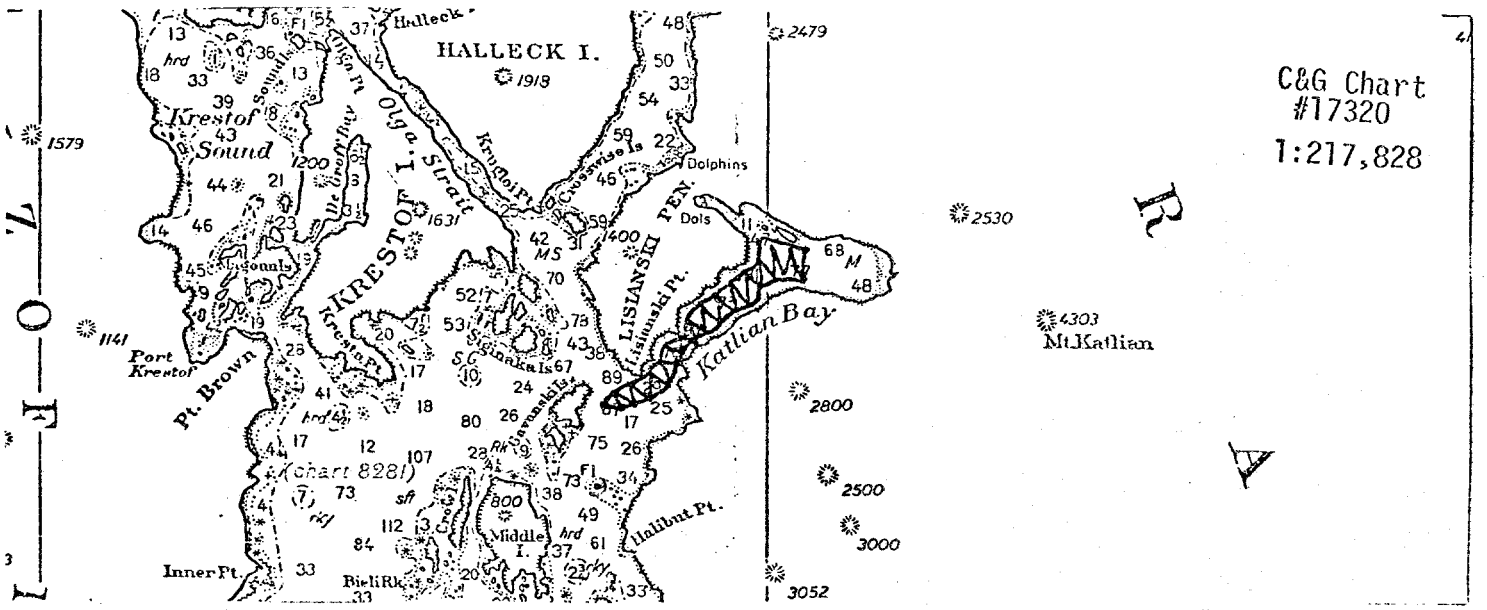
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 12/18/77 Vessel Sundance Run # 1

Gain 5.0 Attenuated -12dB Operators Blankenbeckler, Copeland

Time of Survey: Start 13:32 End 14:55 Tide

COMMENTS: Spikes saturating Leg #20, saturation Leg #28. Heavy snow and wind.

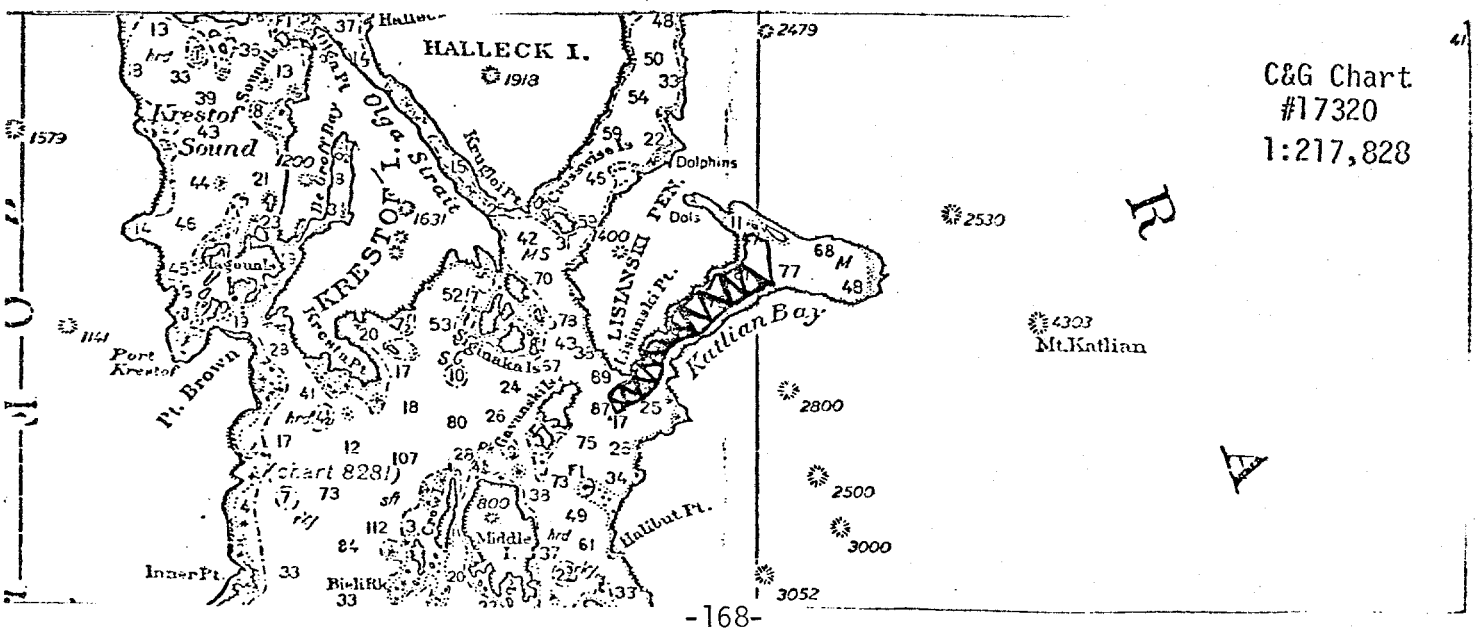



Area Katlian Date 12/18/77 Vessel Sundance Run # 2

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler, Copeland

Time of Survey: Start 15:21 End 16:24 Tide

COMMENTS: Same movement from first run. Weather changed from snow to clear.



Appendix 1 continued.

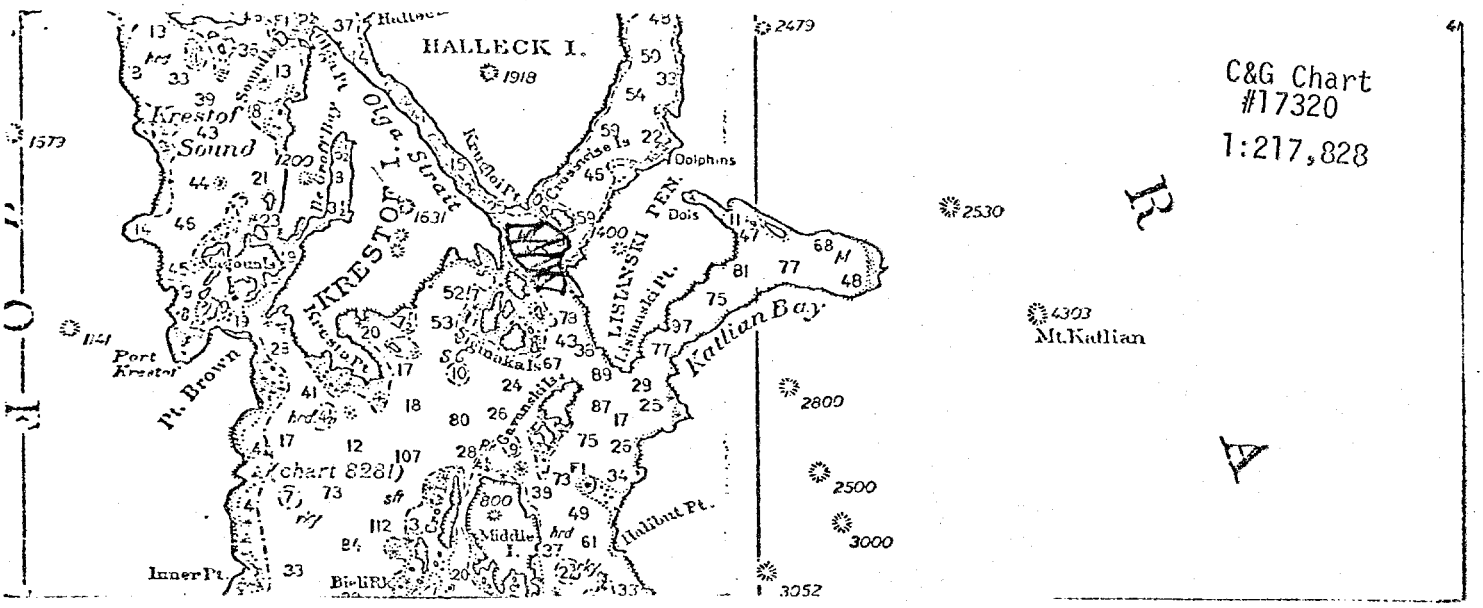
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 1/27/78 Vessel J.N. Cobb Run # 2

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler, Kreiger

Time of Survey: Start 17:46 End 18:55 Tide

COMMENTS: Best run for fish distribution. No saturation noted during taping. Two whales and birds seen in area of herring. Trawl sample taken.

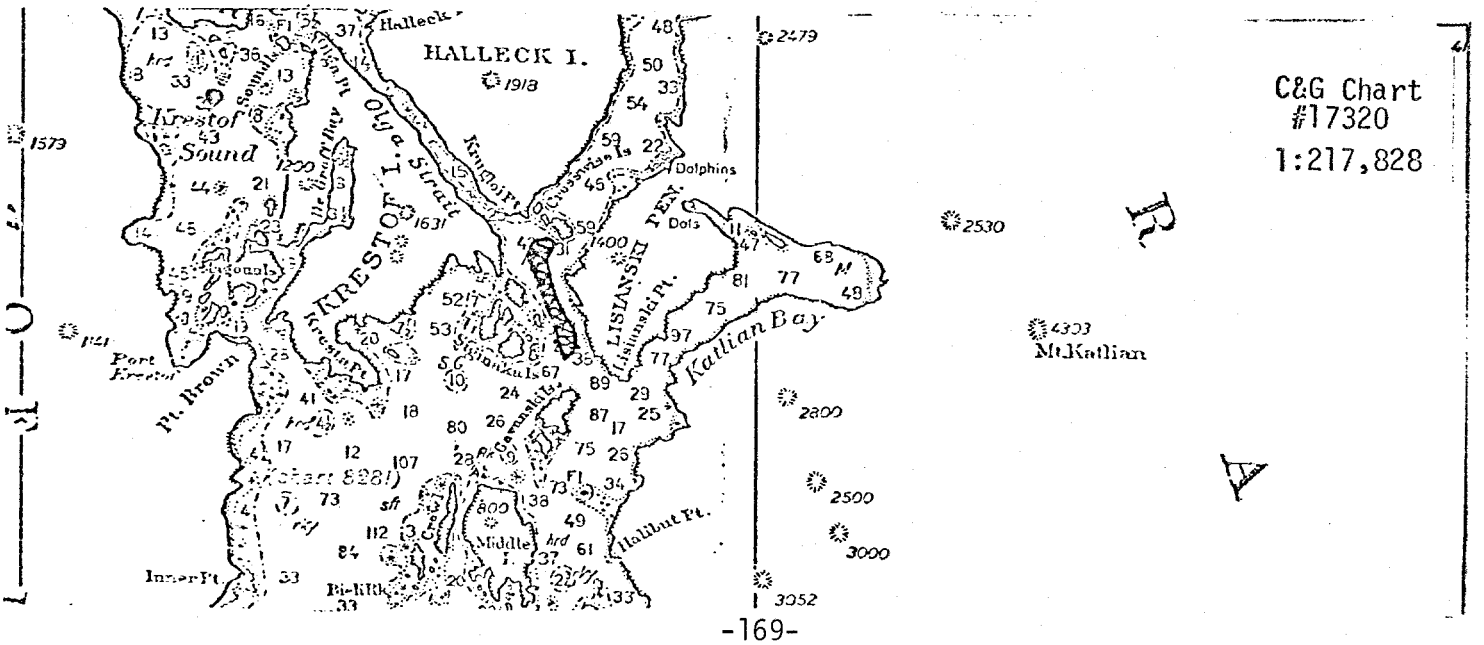



Area Olga Straits (Dog Pt.) Date 3/23/78 Vessel Kittiwake Run # 1

Gain 5.0 Attenuated -12 dB Operators Copeland

Time of Survey: Start 14:22 End 15:02 Tide

COMMENTS: Build up of fish; both juveniles and adults observed in harbors. Eighty to 100 sea lions in area.



Appendix 1 continued.

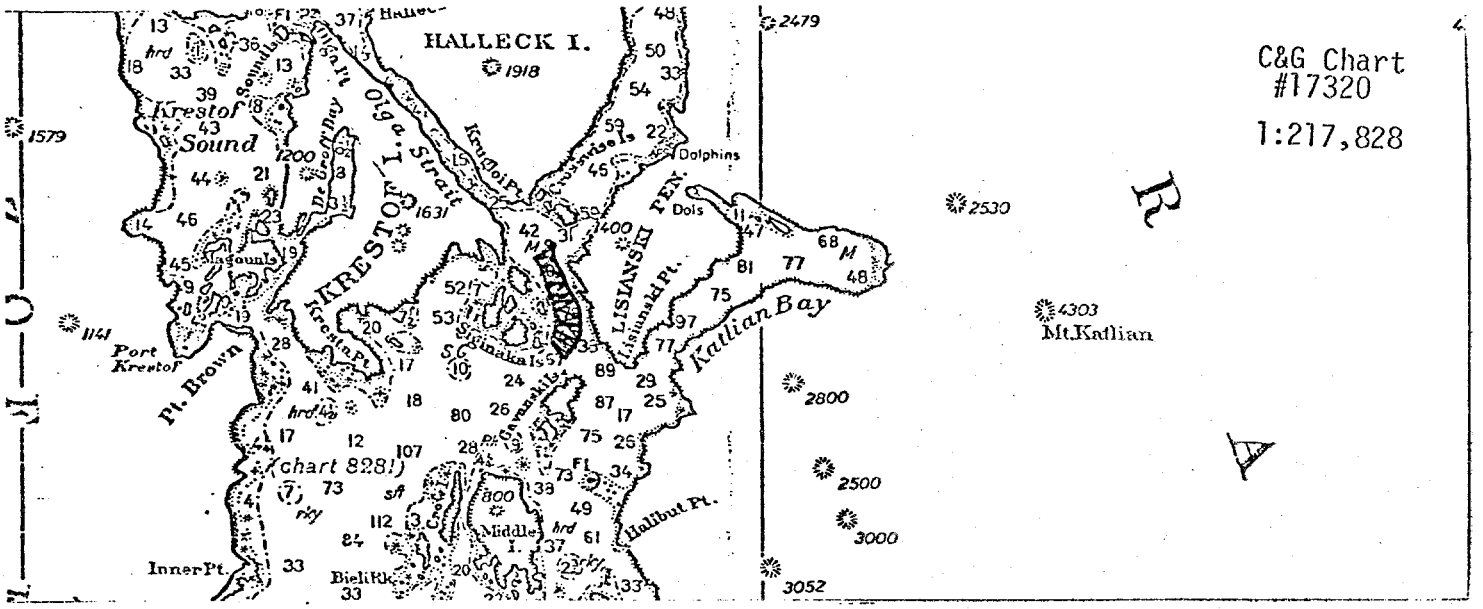
## ACOUSTICAL SURVEY SUMMARY

Area Olga Strait (Dog Pt.) Date 3/23/78 Vessel Kittiwake Run # 2

Gain 5.0 Attenuated -12 dB Operators Copeland

Time of Survey: Start 15:20 End 16:00 Tide Ebb

COMMENTS: Build up of herring; both juveniles and adults observed in harbors.

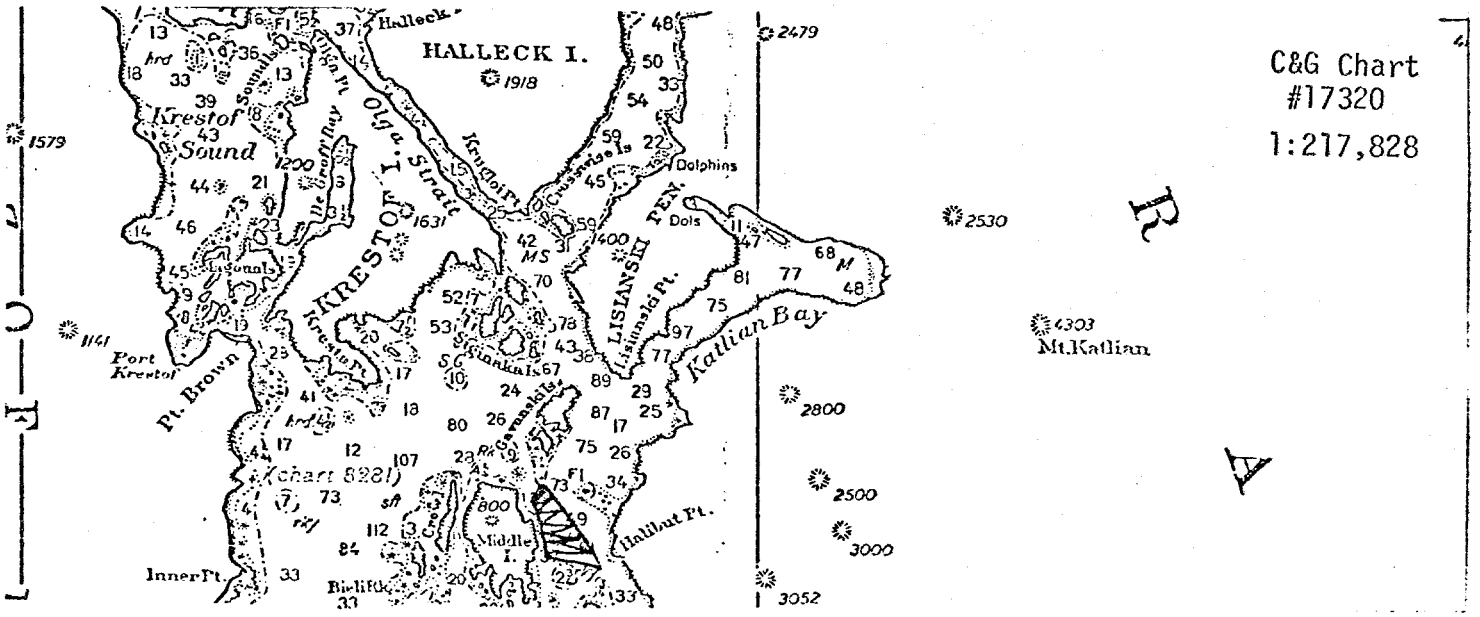



Area Olga Strait (Middle Island) Date 3/31/78 Vessel Kittiwake Run # 1

Gain 3.8 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 18:25 End 19:15 Tide

COMMENTS: 70 - 80% Age II and III from seine sample (Verna C)



Appendix 1 continued.

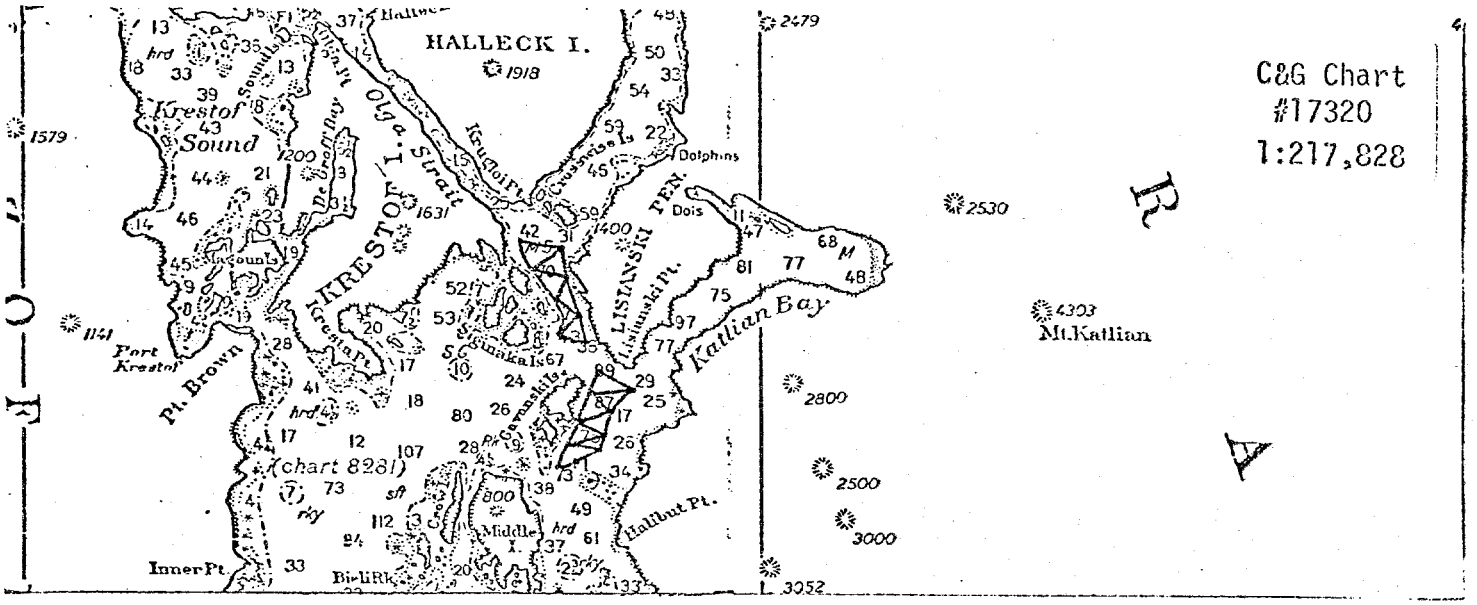
## ACOUSTICAL SURVEY SUMMARY

Area Olga Strait (Middle Island) Date 3/31/78 Vessel Kittiwake Run # 2

Gain 5.0 Attenuated -12 dB Operator Blankenbeckler

Time of Survey: Start 19:24 End 20:24 Tide

COMMENTS: This was a large area with numerous small schools. Very few birds or sea mammals present during Run #1 or #2. Slight saturation on a couple smaller schools.

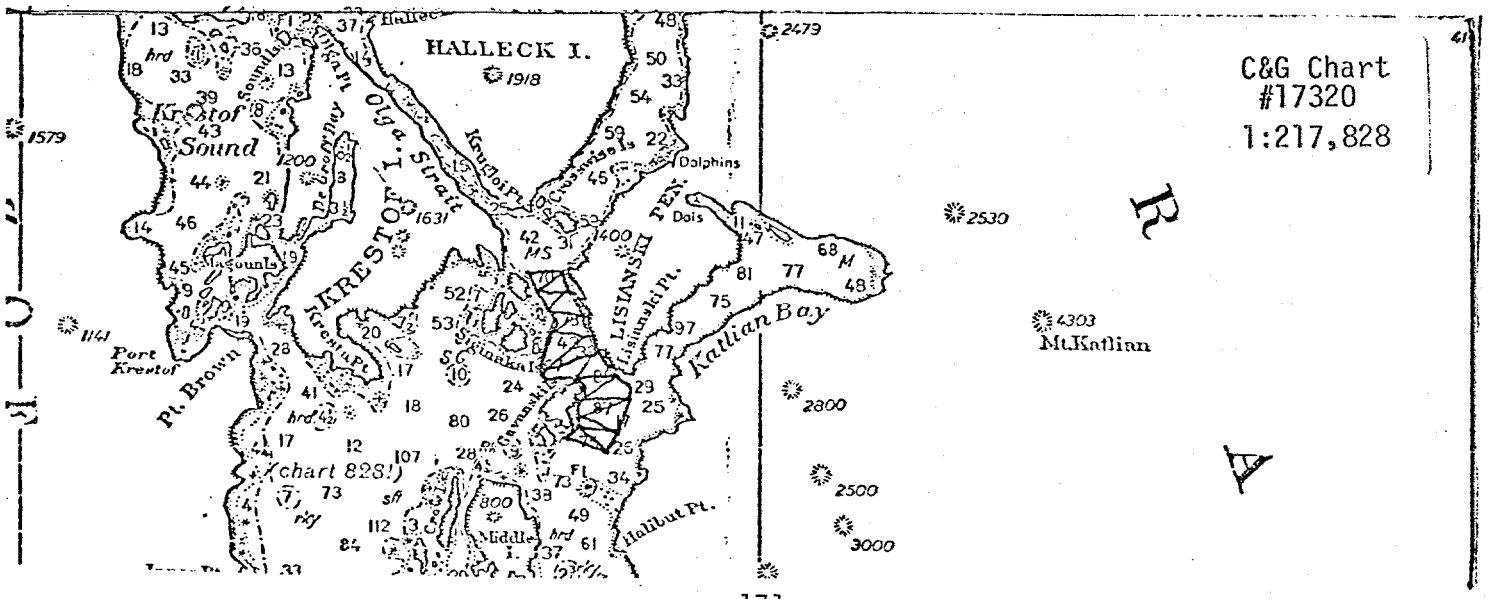



Area Olga Straits (Sitka Sound) Date 11/19/78 Vessel Kittiwake Run # 1

Gain 5 Attenuated -12 dB Operator Blankenbeckler

Time of Survey: Start 2113 End 2217 Tide Small

COMMENTS: No saturation noted. Clear evening. Numerous gulls in area of the herring.



Appendix 1 continued.

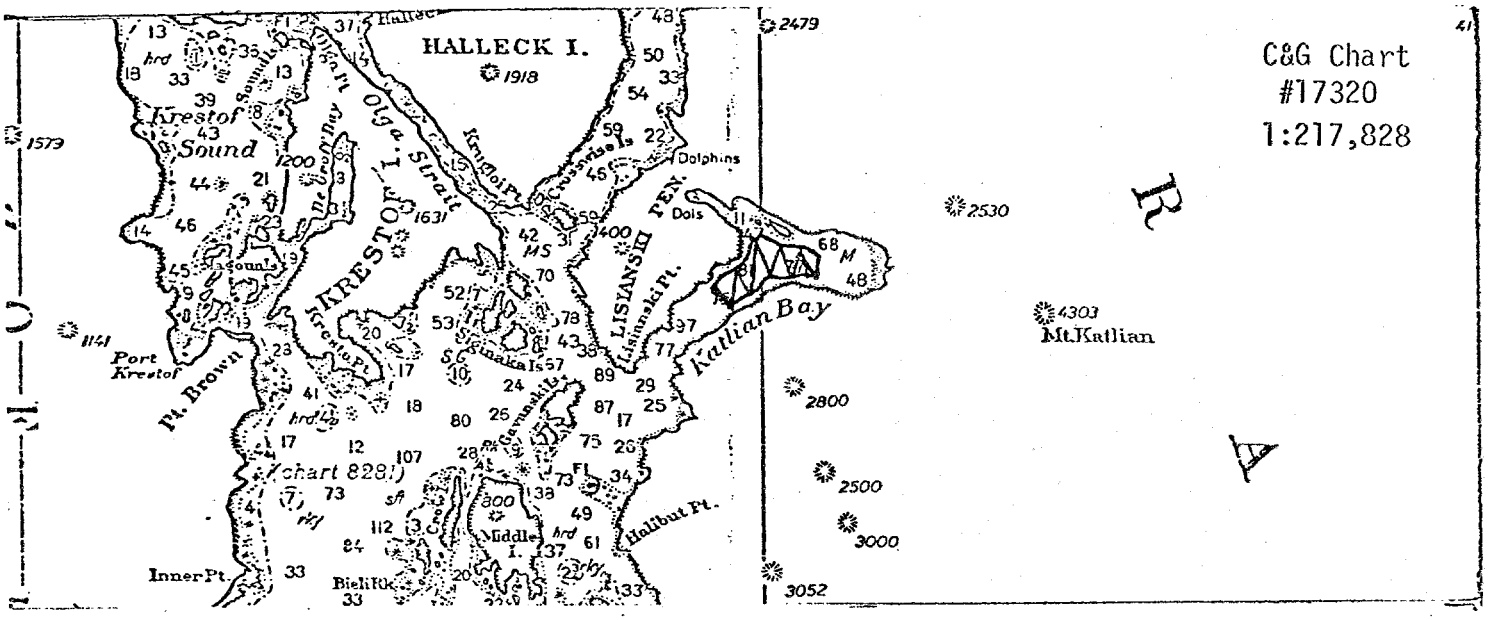
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 11/20/78 Vessel Kittiwake Run # 3

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1713 End 1750 Tide Decreasing

COMMENTS: Some spikes noted to saturate. Herring just coming off the bottom at dusk.

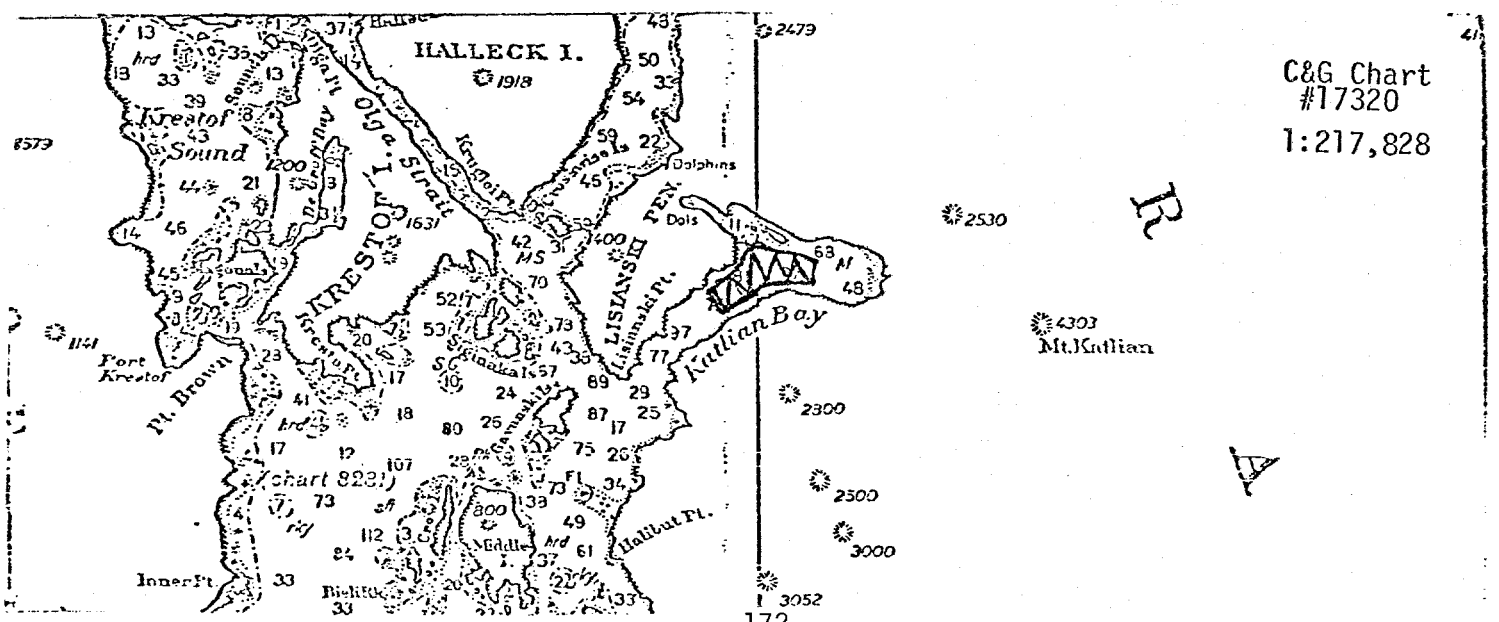



Area Katlian Date 11/20/78 Vessel Kittiwake Run # 4

Gain 3.6 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1805 End 1838 Tide Decreasing

COMMENTS: This is a repeat of Run #3. The herring were rising and dispersing fast. The herring were vulnerable for a good survey for only one hour.



Appendix 1 continued.

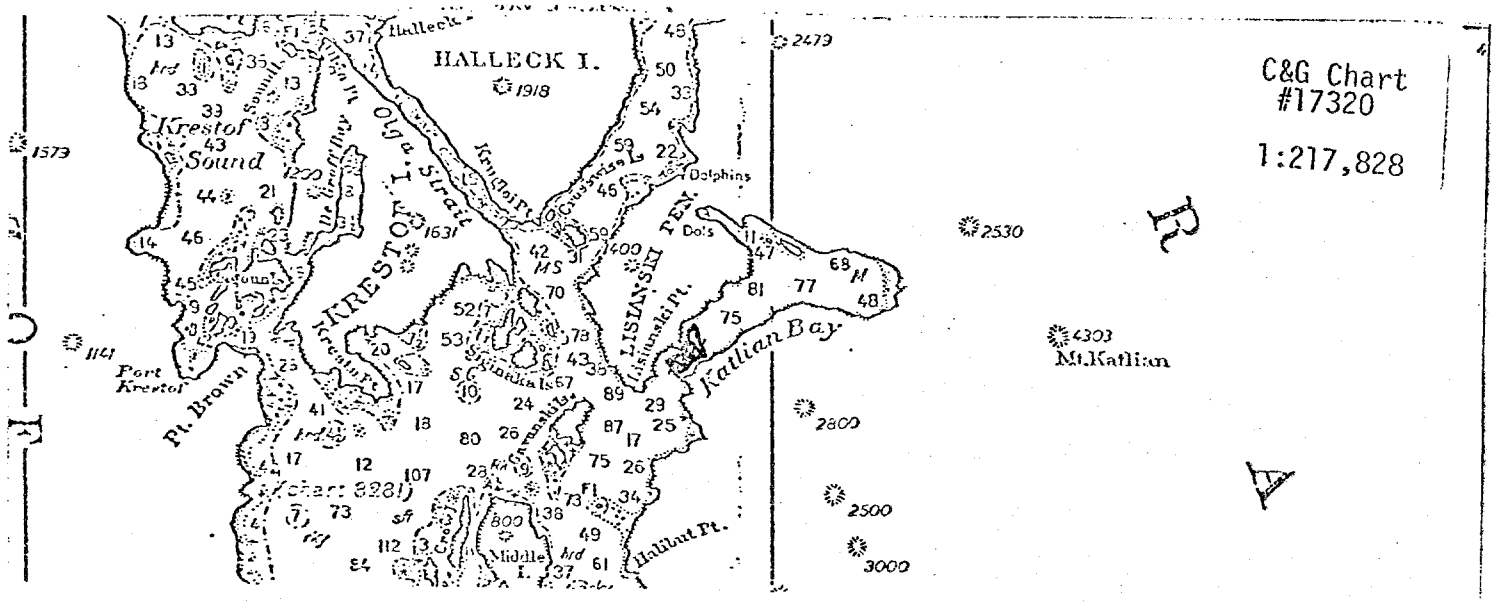
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 11/20/78 Vessel Kittiwake Run # 1

Gain 4.8 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1605 End 1627 Tide Decreasing

COMMENTS:

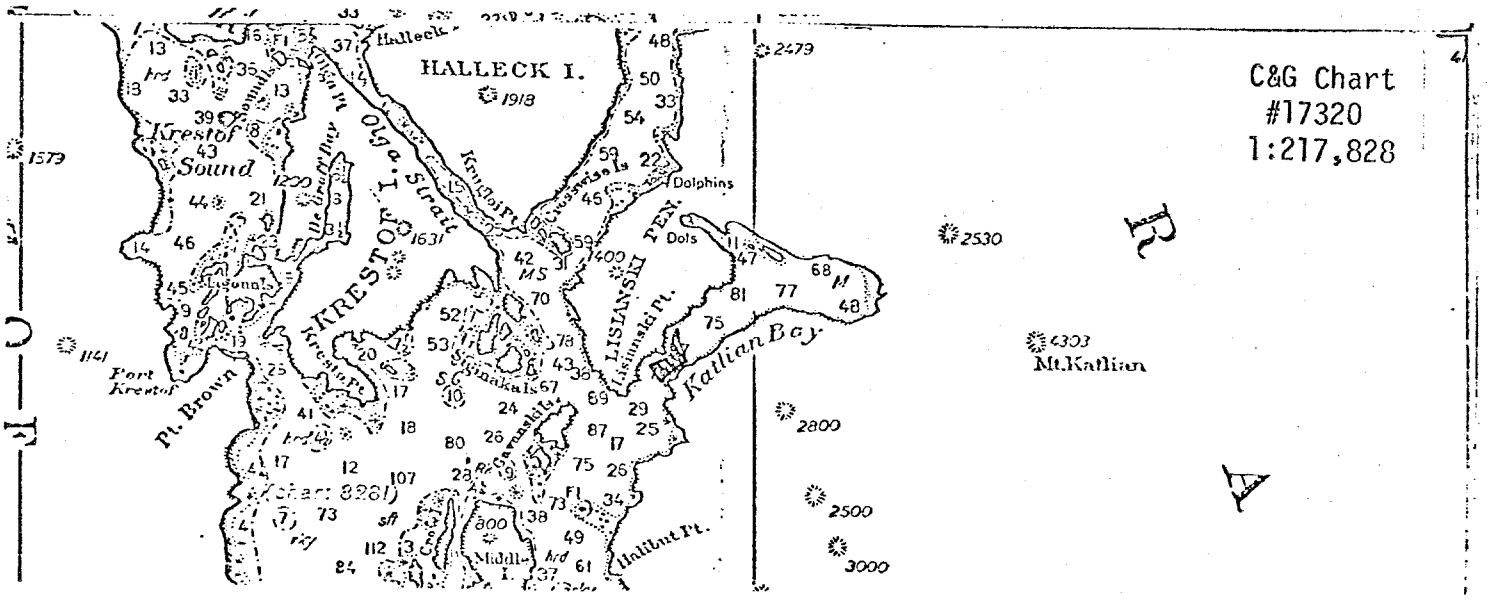



Area Katlian Date 11/20/78 Vessel Kittiwake Run # 2

Gain 4.8 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1632 End 1650 Tide

COMMENTS:



Appendix 1 continued.

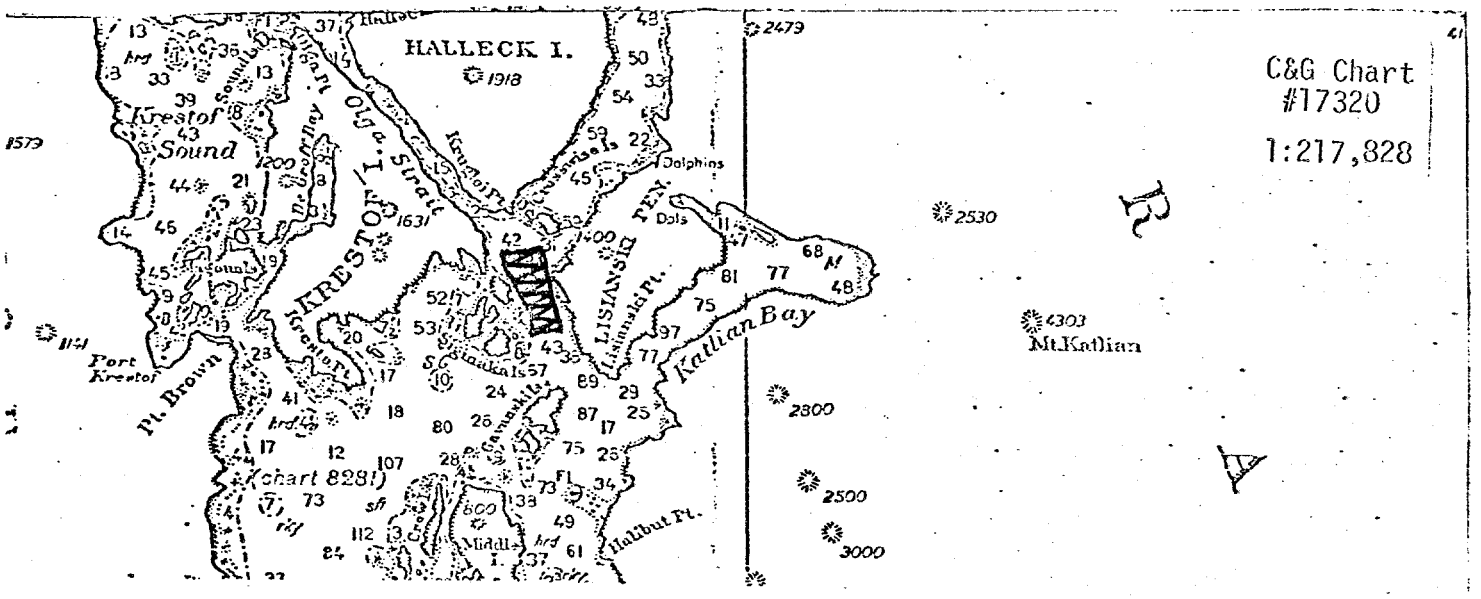
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits (Sitka Sound) Date 1/10/79 Vessel Kittiwake Run # 1

Gain 3.4 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1633 End 1708 Tide Large

COMMENTS: Survey made as herring were just starting to move off the bottom in trench area. Time approximately one hour before dark. High density school blocked out bottom on several legs.

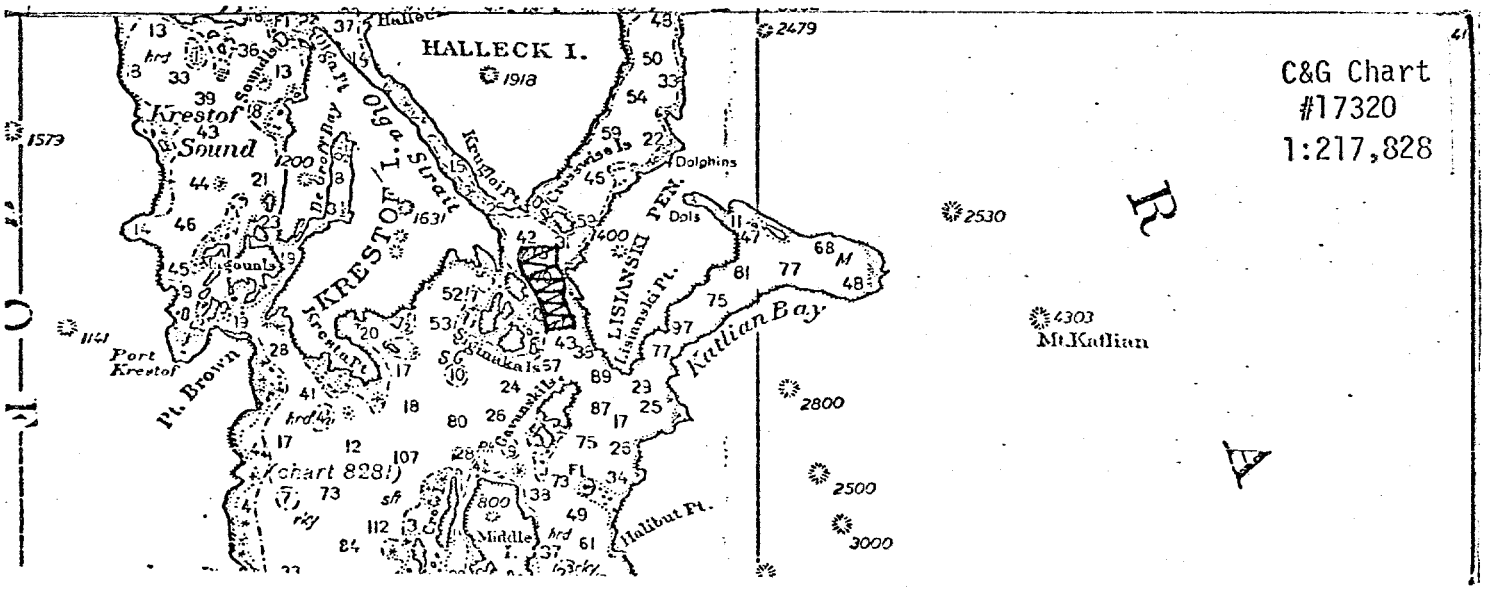



Area Olga Straits (Sitka Sound) Date 1/10/79 Vessel Kittiwake Run # 2

Gain 3.4 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1717 End 1753 Tide Large

COMMENTS: Same survey as Run #1, but fish were 10 - 20 fathoms shallower. By 1820 the top of the school had reached 20 fathoms.



Appendix 1 continued.

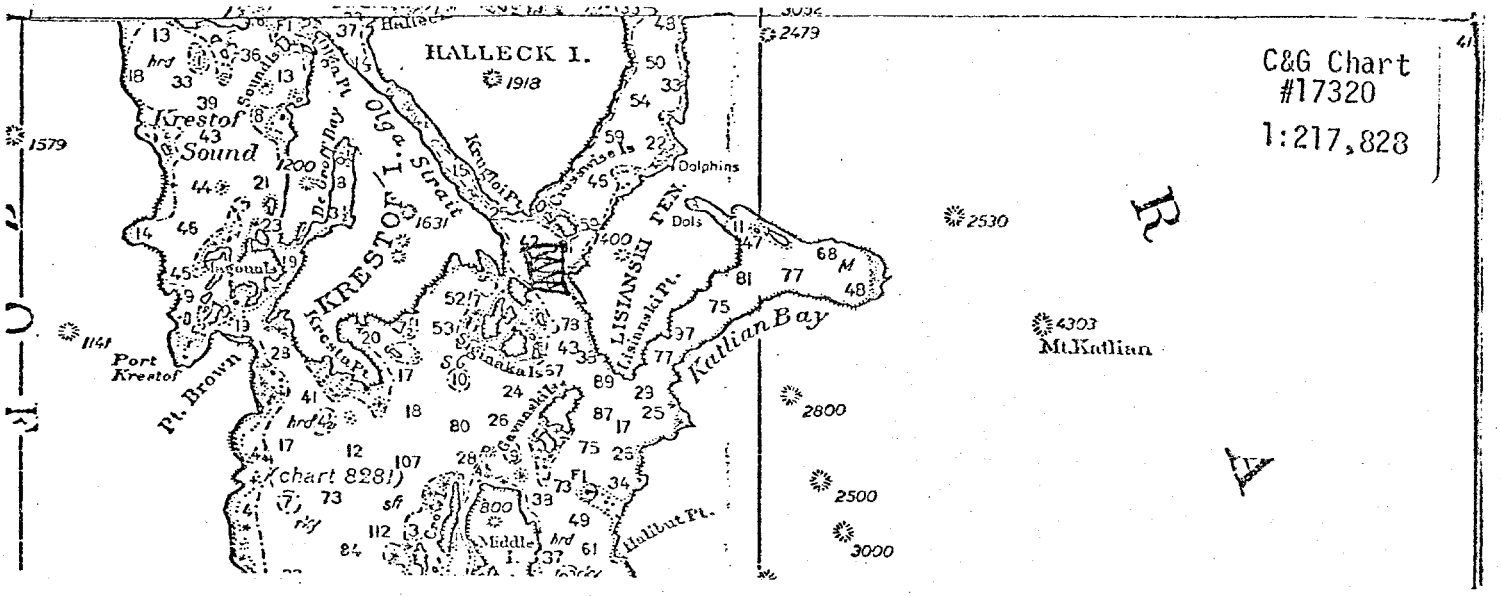
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits (Sitka Sound) Date 1/14/79 Vessel Kittiwake Run # 1

Gain 3.2 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1710 End 1743 Tide

COMMENTS: Weather was overcast and dark when herring started off the bottom, moving fast and dispersing. Predators (whale and sea lions) present.

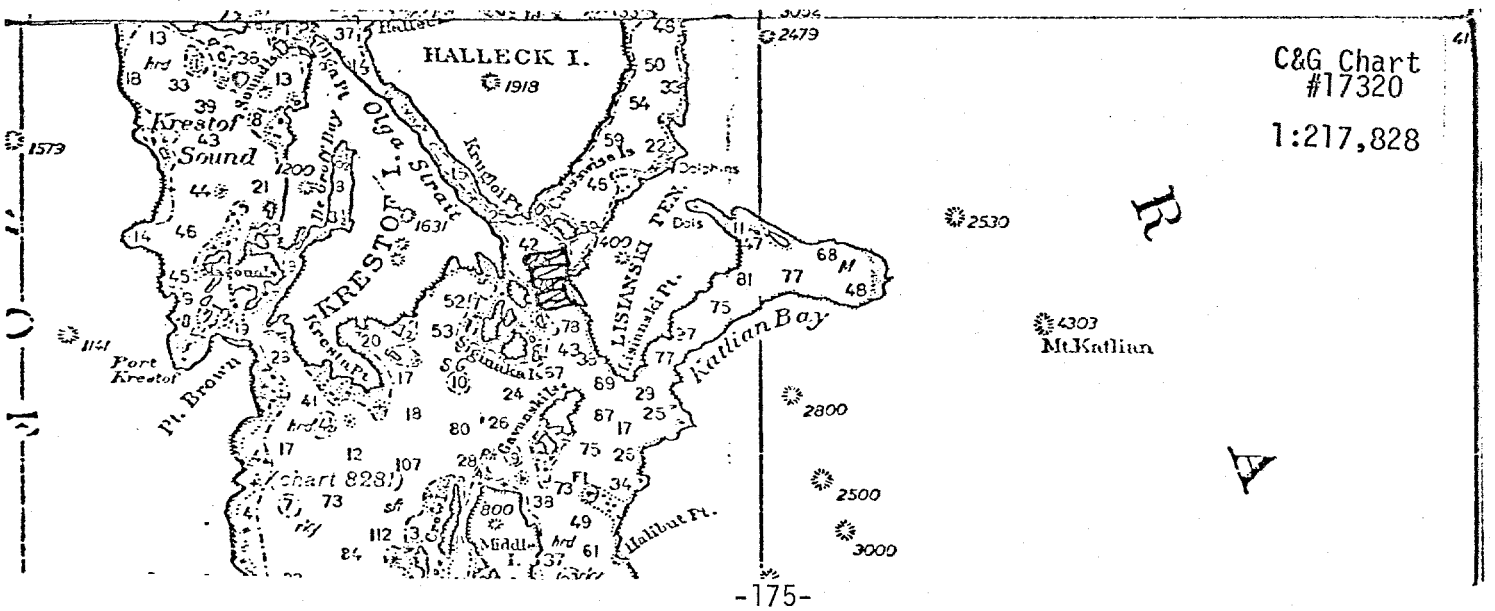



Area Olga Straits (Sitka Sound) Date 1/14/79 Vessel Kittiwake Run # 2

Gain 3.2 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1751 End 1832 Tide

COMMENTS: Herring rising fast and heading toward shore during this run. Expect biomass results to be lower than what is actually present.



Appendix 1 continued.

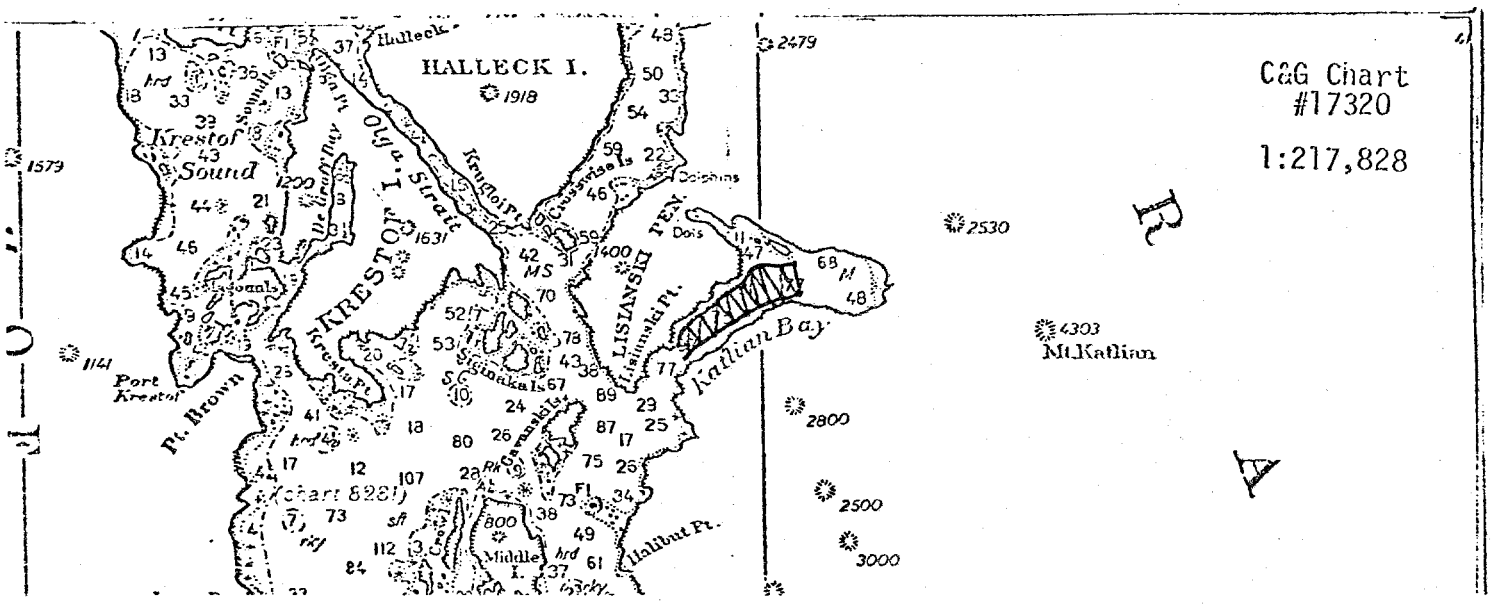
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 2/17/79 Vessel Sundance Run # 1

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler, Larson

Time of Survey: Start 1808 End 1853 Tide

COMMENTS: Sea lions and birds common in area. Clear, calm day. Slight saturation observed on some legs.

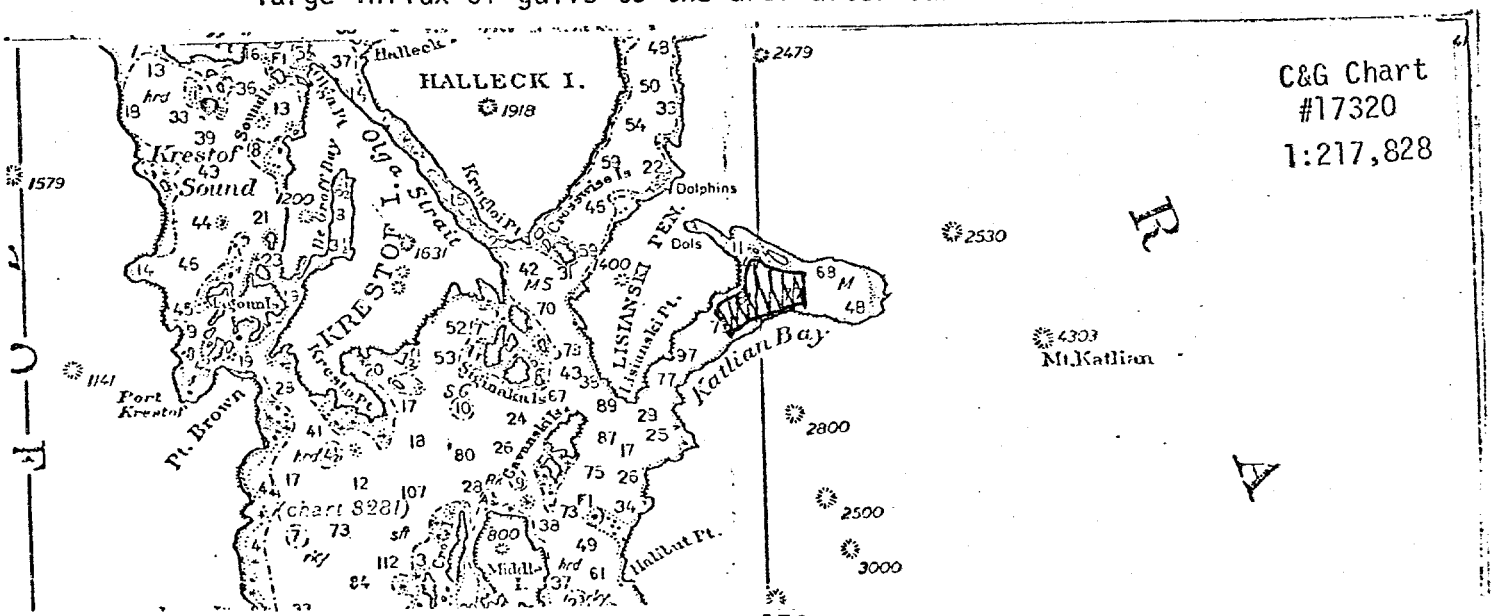



Area Katlian Date 2/18/79 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler, Larson

Time of Survey: Start 1758 End 1853 Tide

COMMENTS: No problem with saturation. Estimated 40 sea lions in area. Very large influx of gulls to the area after dark.



Appendix 1 continued.

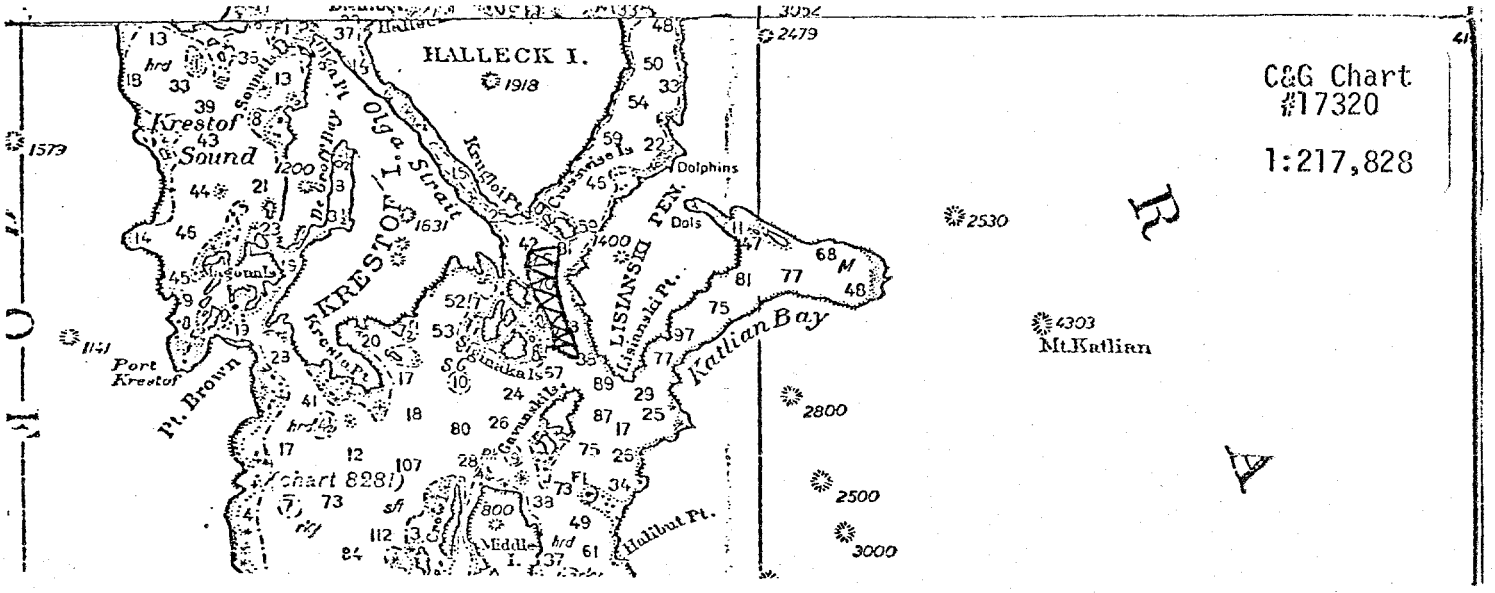
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 2/18/79 Vessel Sundance Run # 1

Gain 4.3 Attenuated -12 dB Operators Blankenbeckler, Larson

Time of Survey: Start 1529 End 1600 Tide

COMMENTS: No saturation noted. Birds and sea lions in area of schools. Herring were near the beach and some were in the shallows which were not included in the survey.

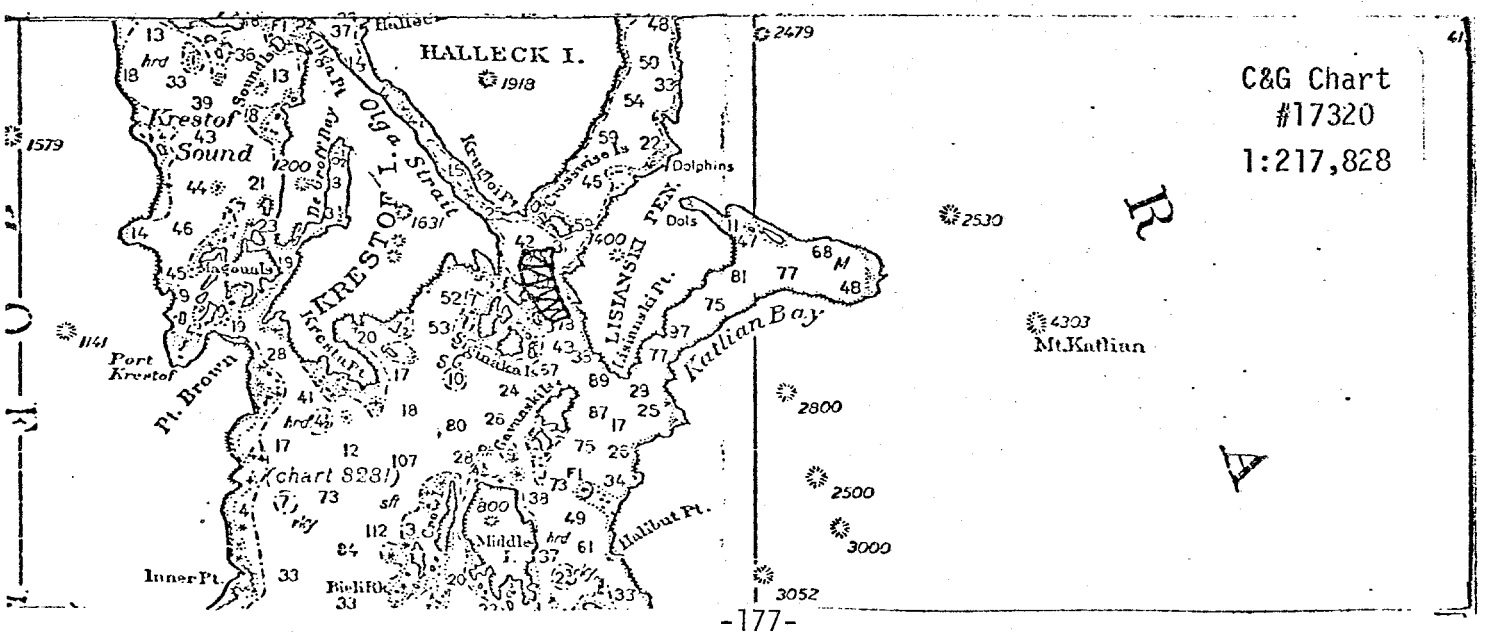



Area Olga Straits Date 2/19/79 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1512 End 1546 Tide

COMMENTS: No saturation noted. Survey conducted during daylight hours due to movement shoreward noted the two previous evenings.



Appendix 1 continued.

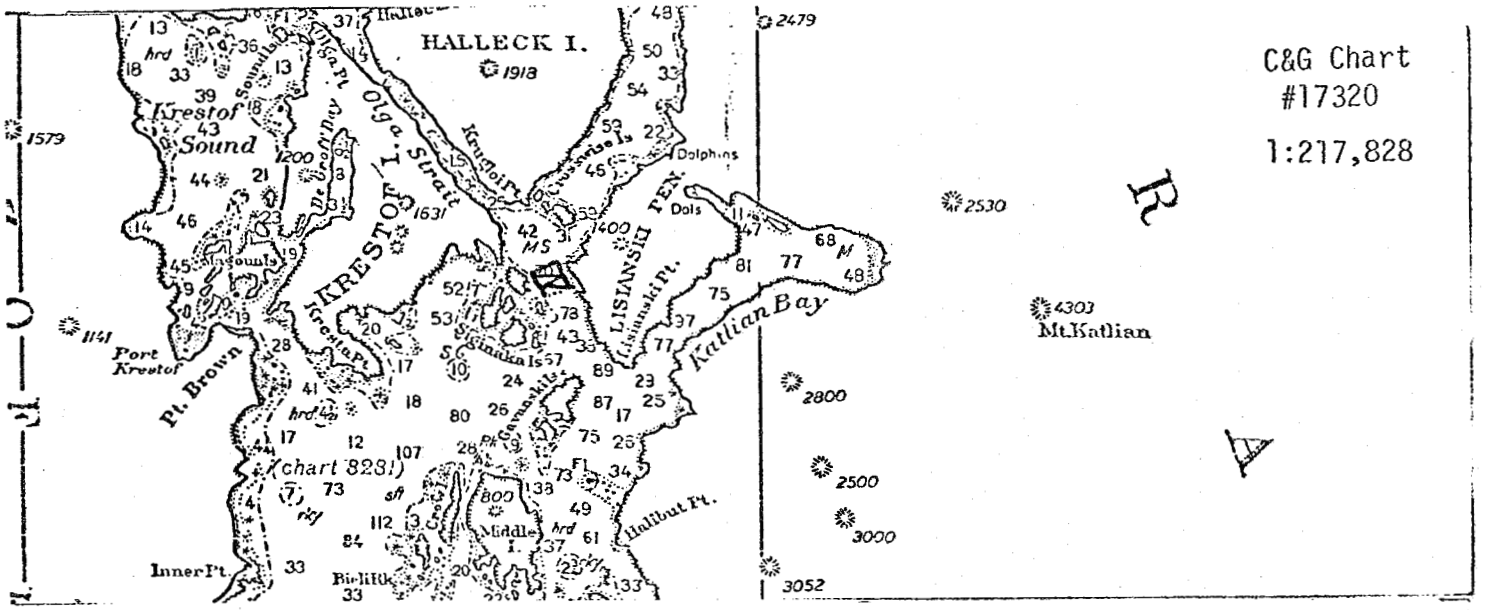
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 2/19/79 Vessel Sundance Run # 2

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1557 End 1604 Tide

COMMENTS: This was a reverse of Run #1 condensed to legs herring observed.

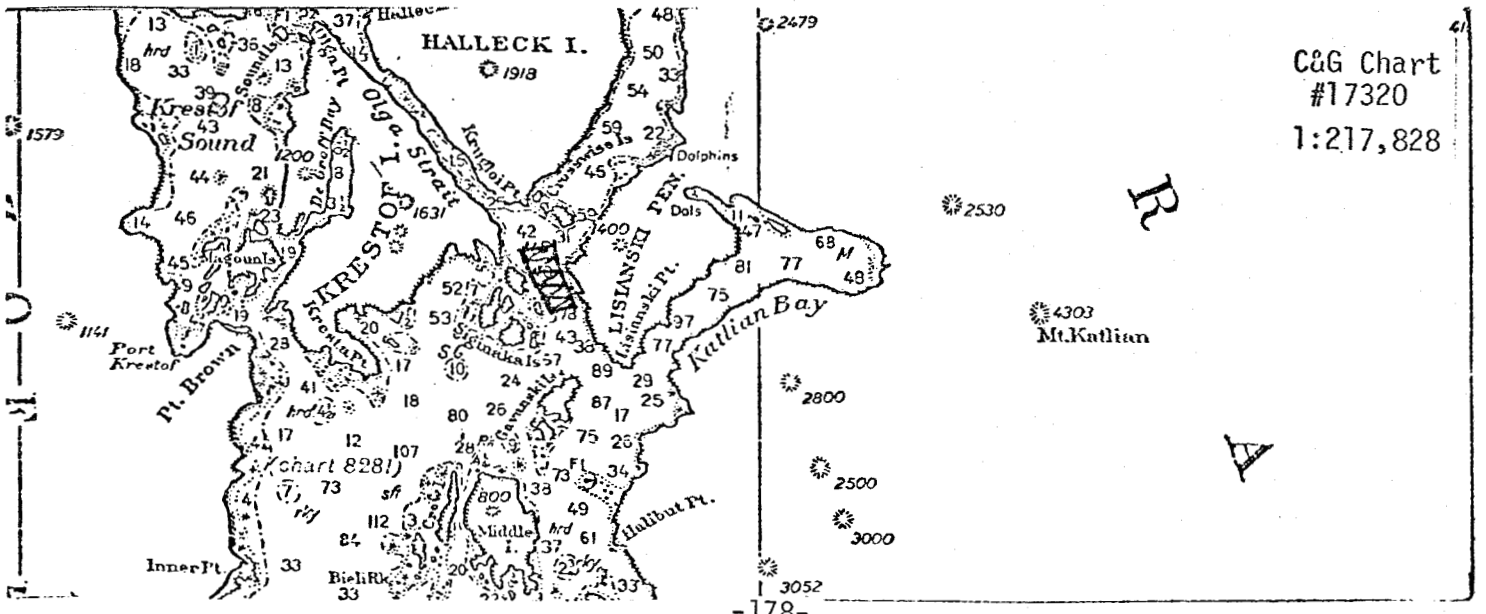



Area Olga Straits Date 2/20/79 Vessel Sundance Run # 1

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1501 End 1514 Tide

COMMENTS: The first of three short runs all with the same survey pattern except for Run #3 where an extra leg was added.



Appendix 1 continued.

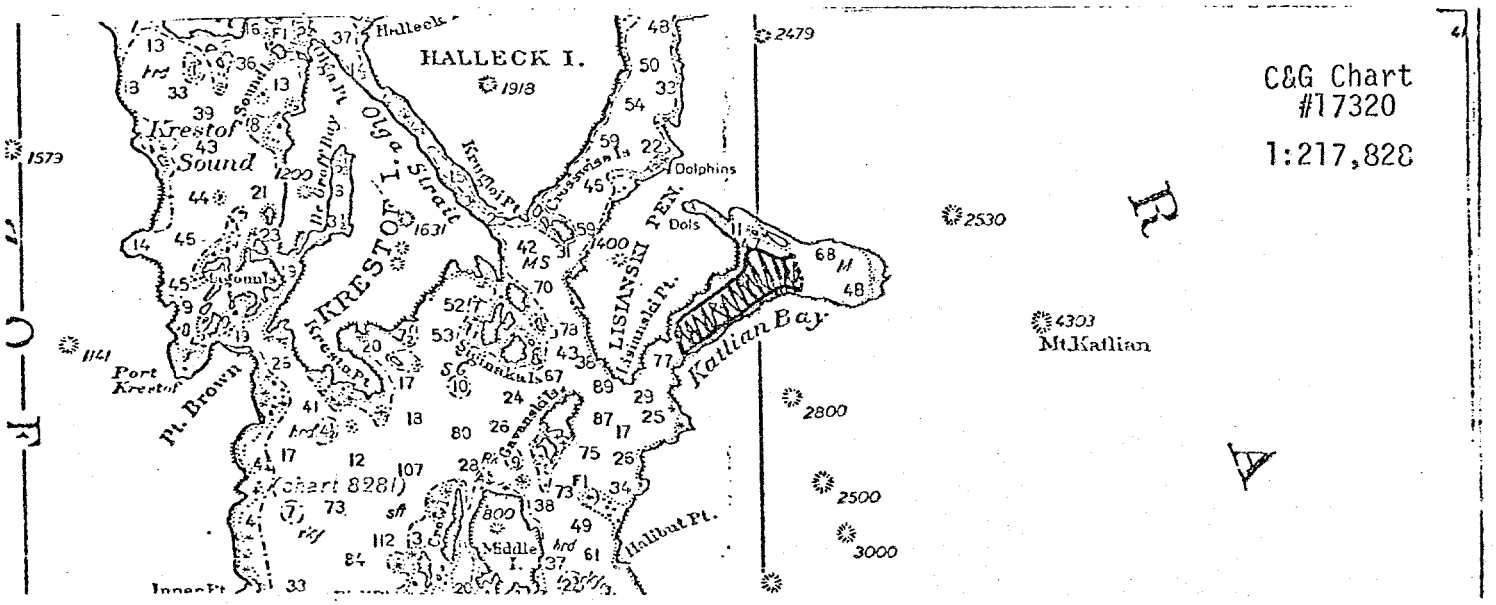
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 2/19/79 Vessel Sundance Run # 1

Gain 3.8 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1758 End 1907 Tide Ave. High - 6.6' @ 1851 hrs

COMMENTS: Some saturation noted at end of survey. Herring moving rapidly after dusk.

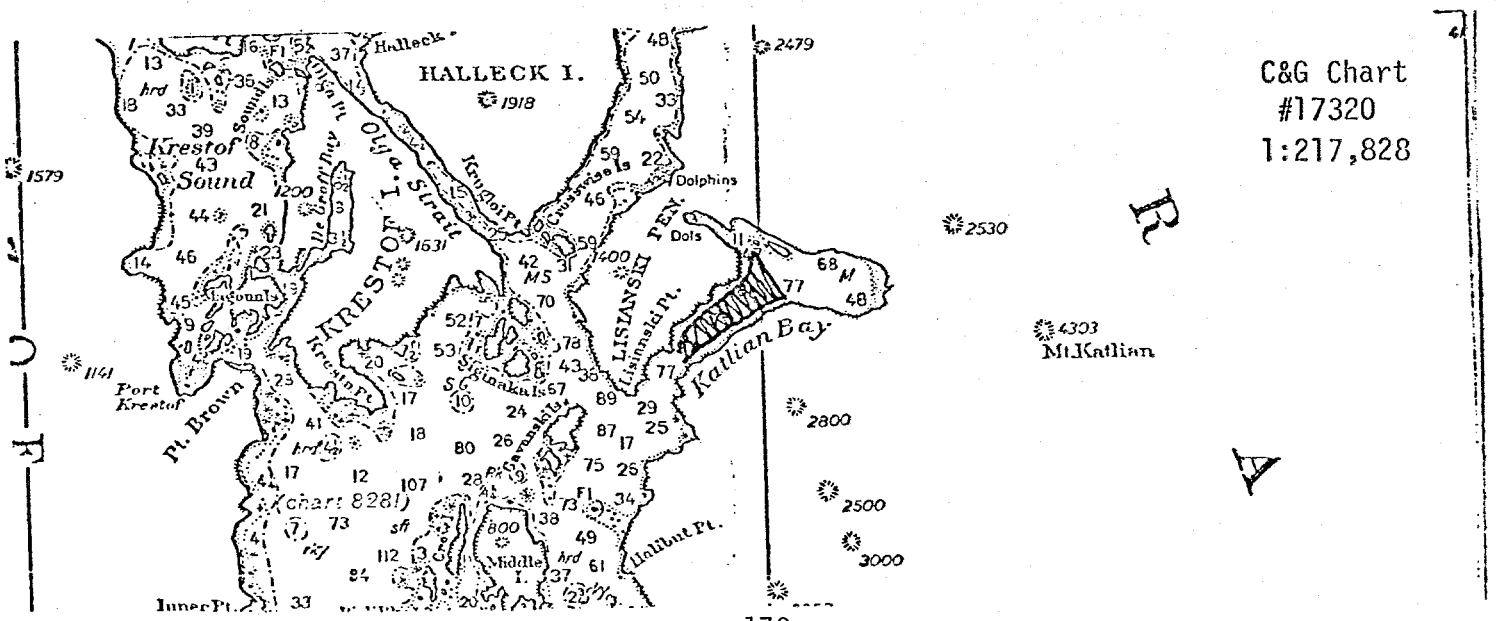



Area Katlian Date 2/20/79 Vessel Sundance Run # 1

Gain 3.4 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1802 End 1854 Tide High 2000 hrs.

COMMENTS: No saturation noted.



Appendix 1 continued.

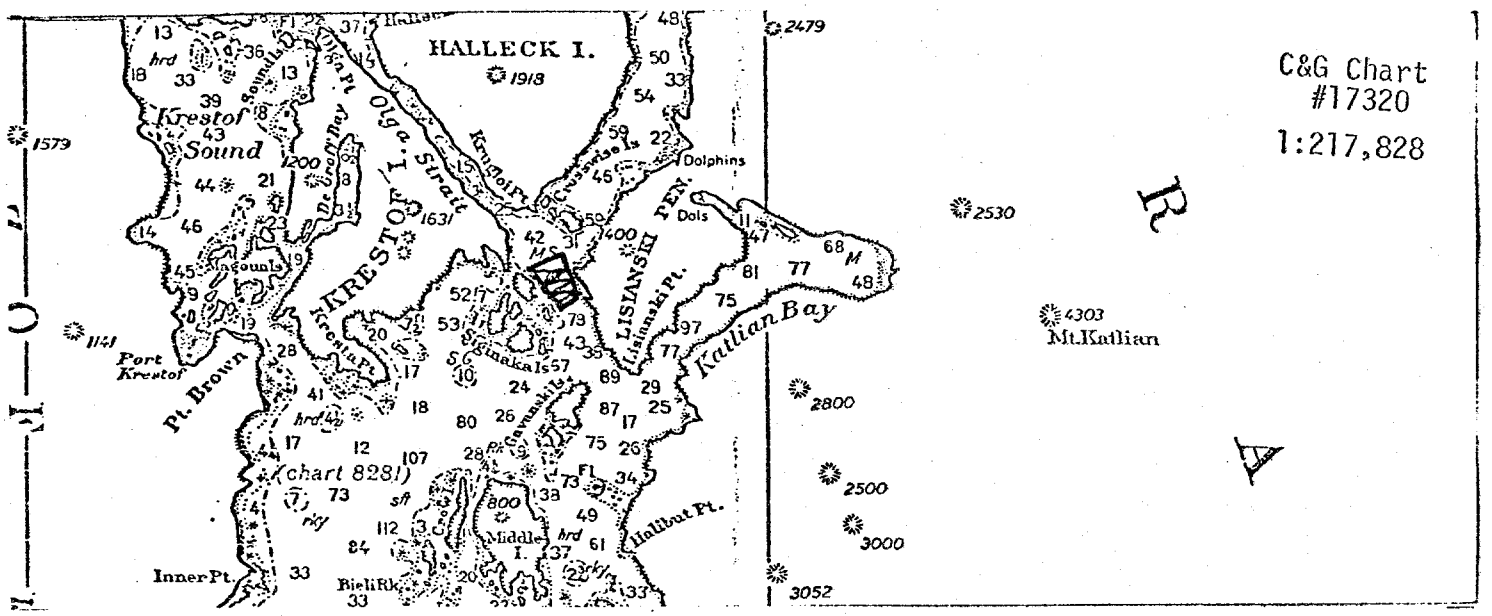
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 2/20/79 Vessel Sundance Run # 2

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1516 End 1524 Tide

COMMENTS: Sea lions and birds in the area. Some movement was evident possibly due to sea lion activity.

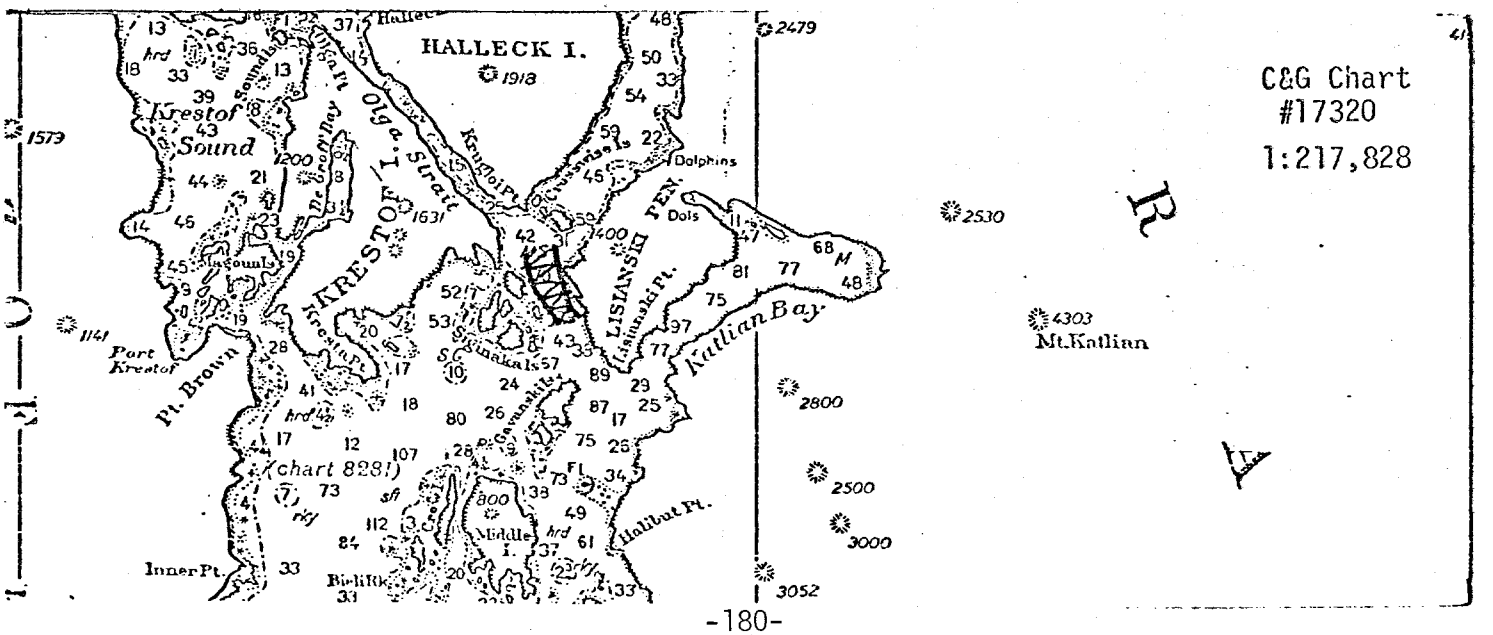



Area Olga Straits Date 2/20/79 Vessel Sundance Run # 3

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1530 End 1544 Tide

COMMENTS: Repeat of Runs #1 and #2 with one leg added. Herring close to bottom.



Appendix 1 continued.

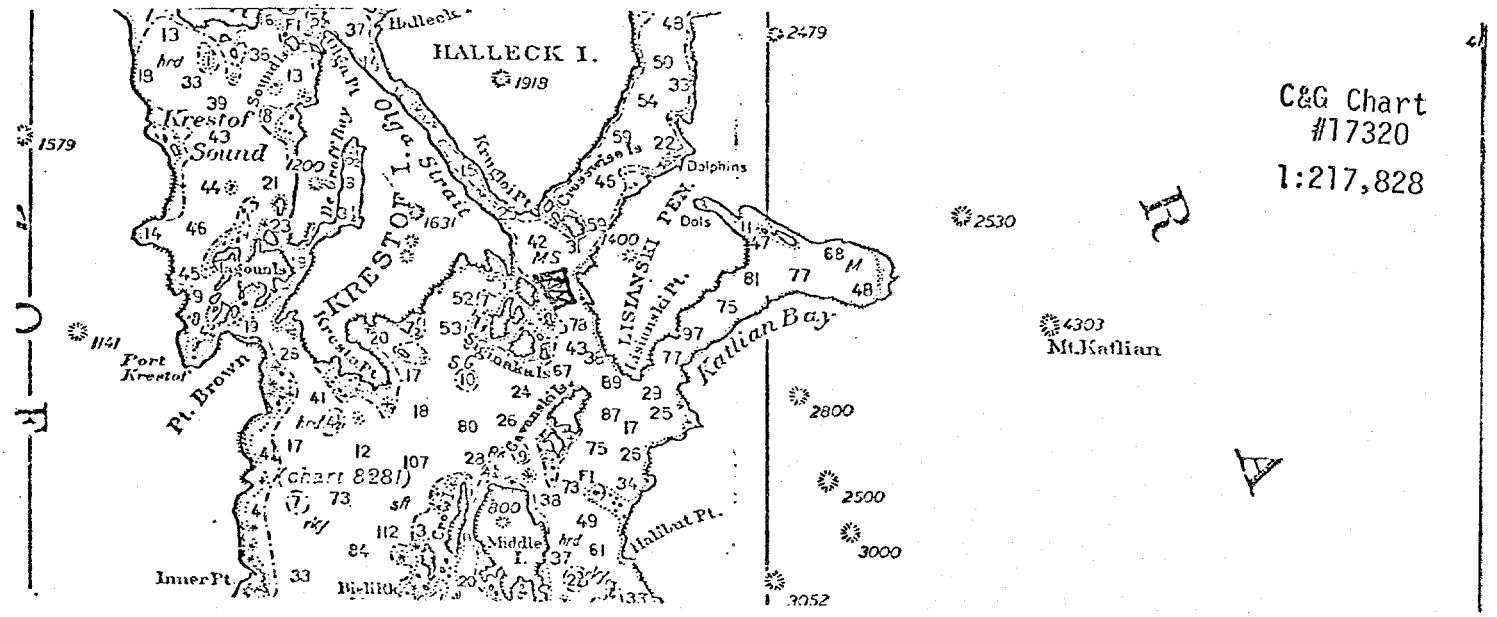
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 3/17/79 Vessel Steller Run # 2

Gain 3.7 Attenuated -12 dB Operators Street

Time of Survey: Start 1529:15 End 1541 Tide

COMMENTS: Saturation noted on two or three dense moving schools. Closely followed Kittiwake for duplication of Run #2, 3/17/79.

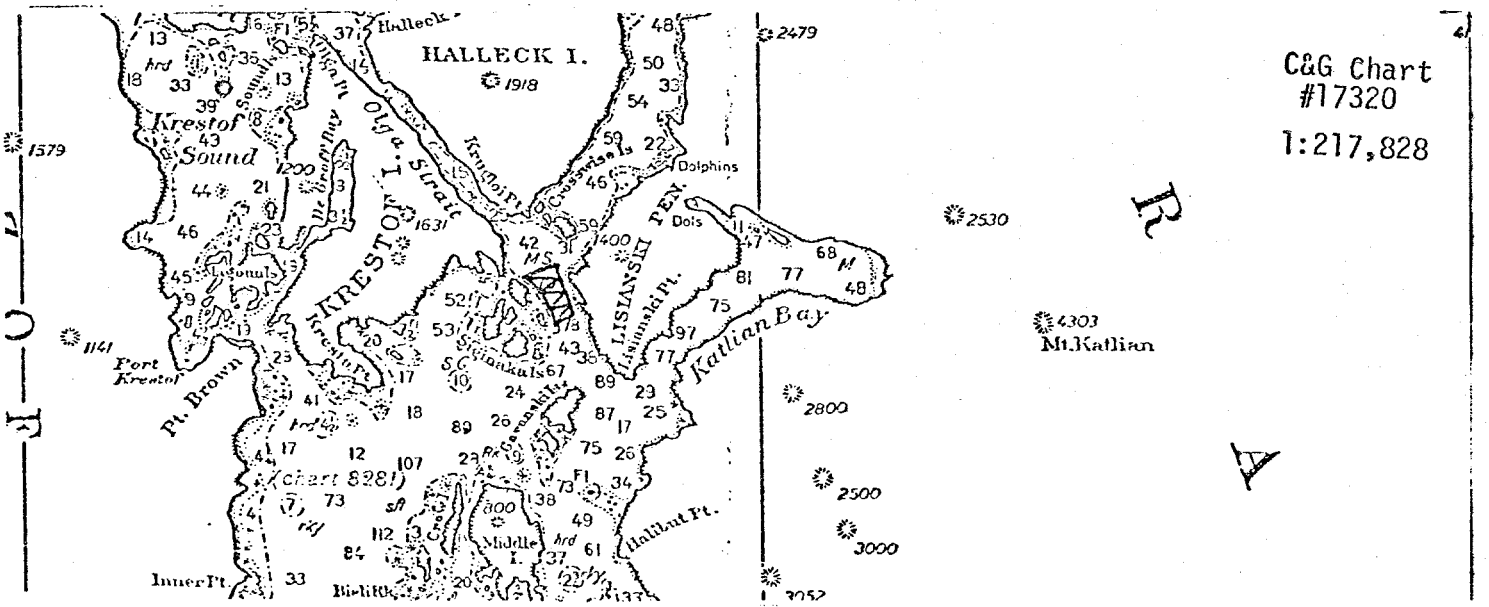



Area Olga Straits Date 3/17/79 Vessel Steller Run # 3

Gain 3.2 Attenuated -12 dB Operators Street

Time of Survey: Start 1550:10 End 1603:40 Tide

COMMENTS: No saturation. Steller followed closely after Kittiwake in survey (Run #3, 3/17/79).



Appendix 1 continued.

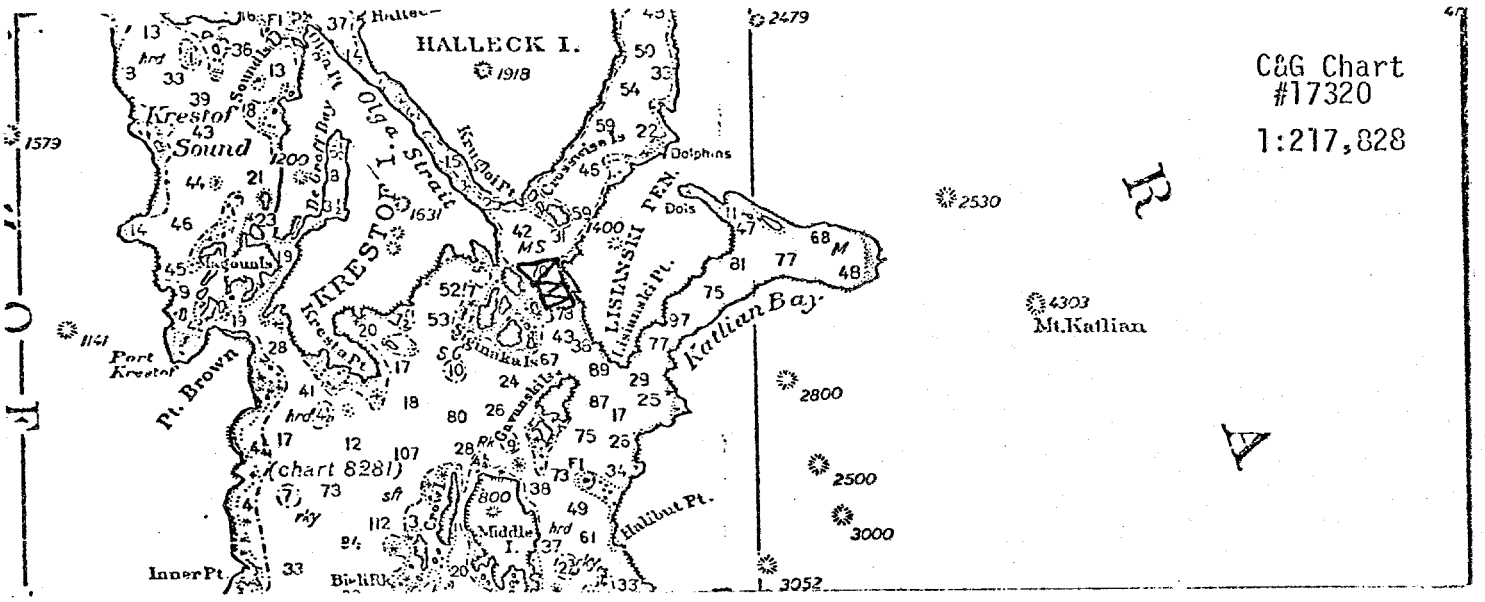
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 3/17/79 Vessel Kittiwake Run # 3

Gain 3.0 Attenuated -12 dB Operators Blankenbeckler, Larson

Time of Survey: Start 1554 End 1606 Tide Large

COMMENTS: Steller followed in wake. A few sea lions in the area but very few birds. Calm weather.

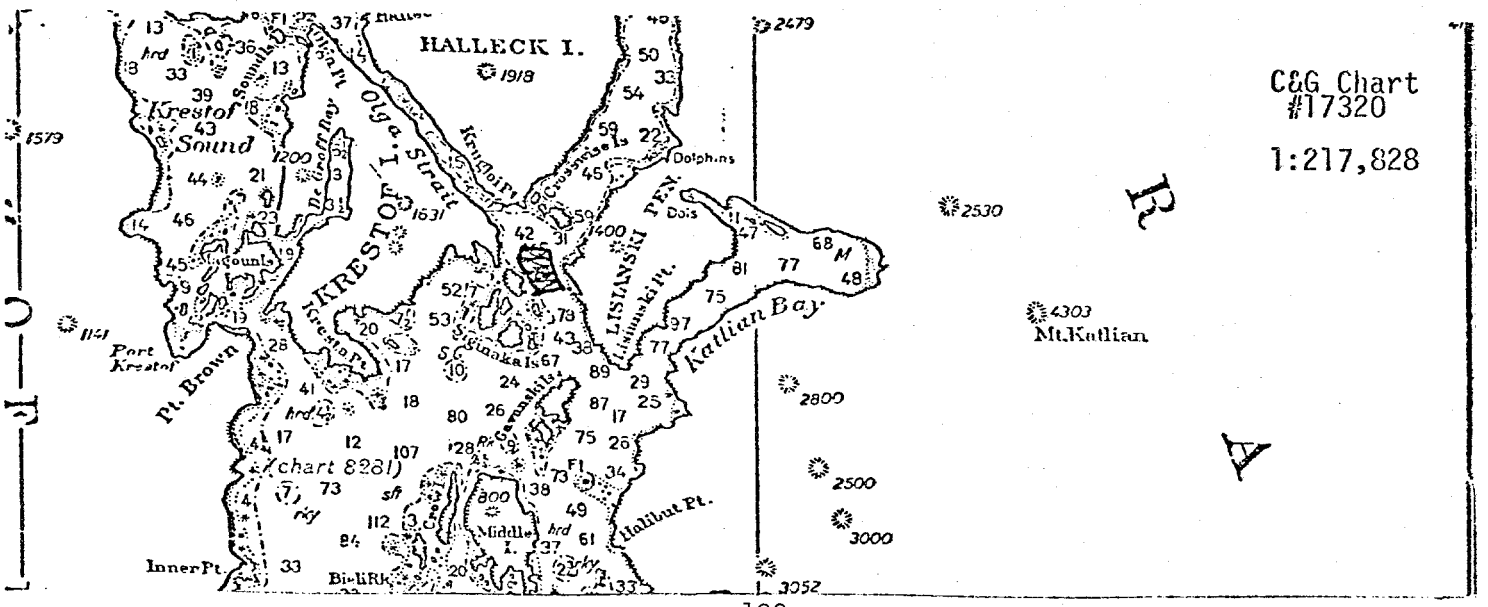



Area Olga Straits Date 3/17/79 Vessel Steller Run # 1

Gain 4.0 Attenuated -12 dB Operators Street

Time of Survey: Start 1504:30 End 1521 Tide

COMMENTS: Slight saturation noted. Duplication of Kittiwake survey (3/17/79, Run #1).



Appendix 1 continued.

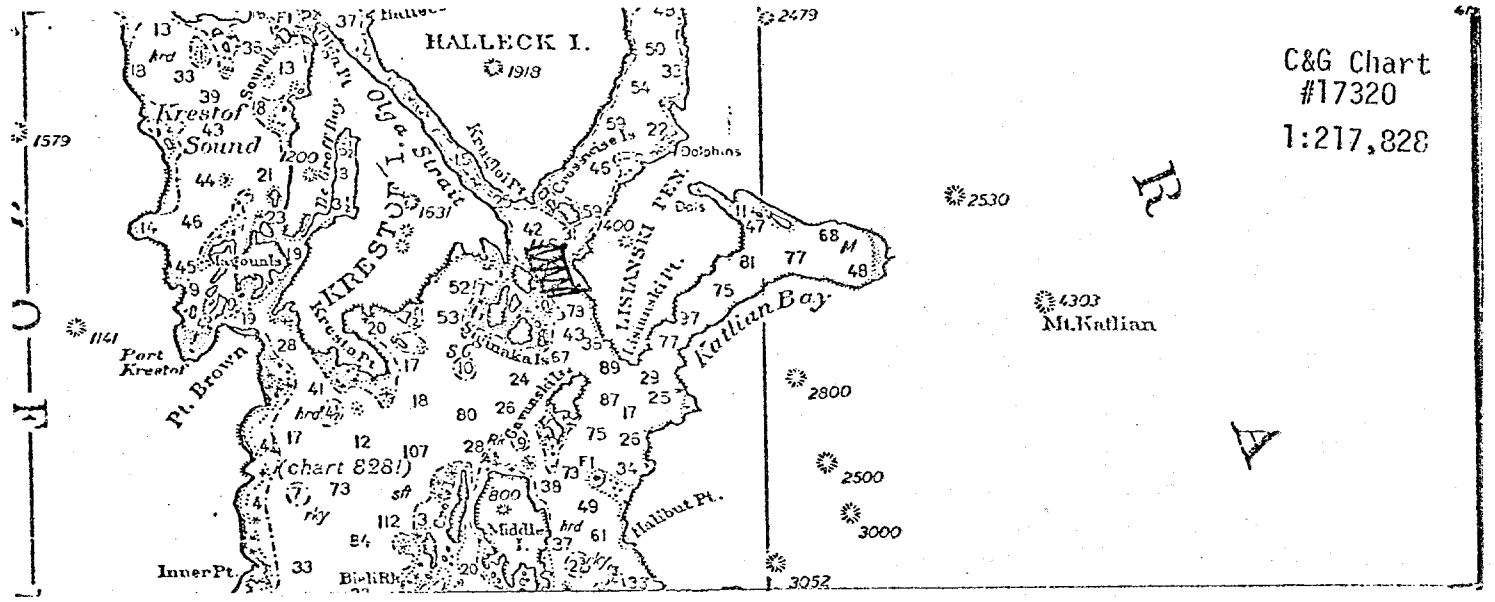
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 3/17/79 Vessel Kittiwake Run # 1

Gain 3.0 Attenuated -12 dB Operators Blankenbeckler, Larson

Time of Survey: Start 1506 End 1526 Tide Large

COMMENTS: No saturation noted. Steller ran exact pattern directly behind Kittiwake on all three runs.

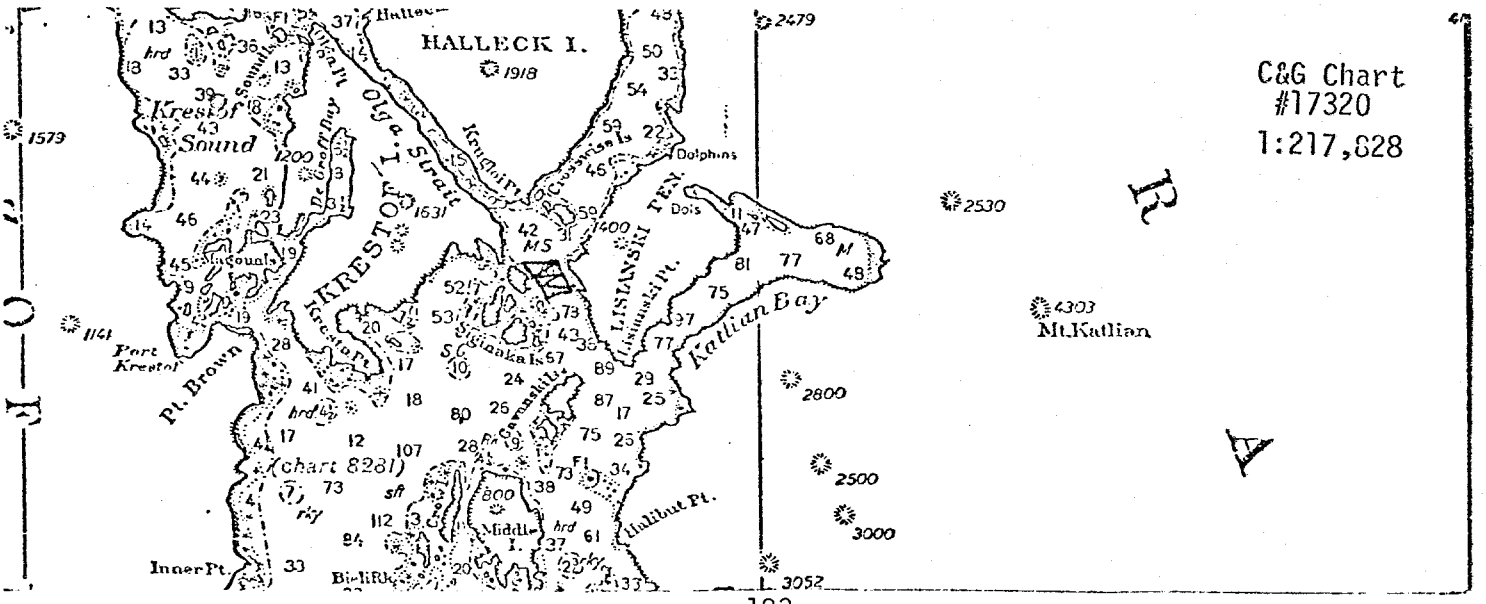



Area Olga Straits Date 3/17/79 Vessel Kittiwake Run # 2

Gain 3.0 Attenuated -12 dB Operators Blankenbeckler, Larson

Time of Survey: Start 1532 End 1544 Tide Large

COMMENTS: Steller followed directly behind Kittiwake. Fish were moving some and favoring the beach.



Appendix 1 continued.

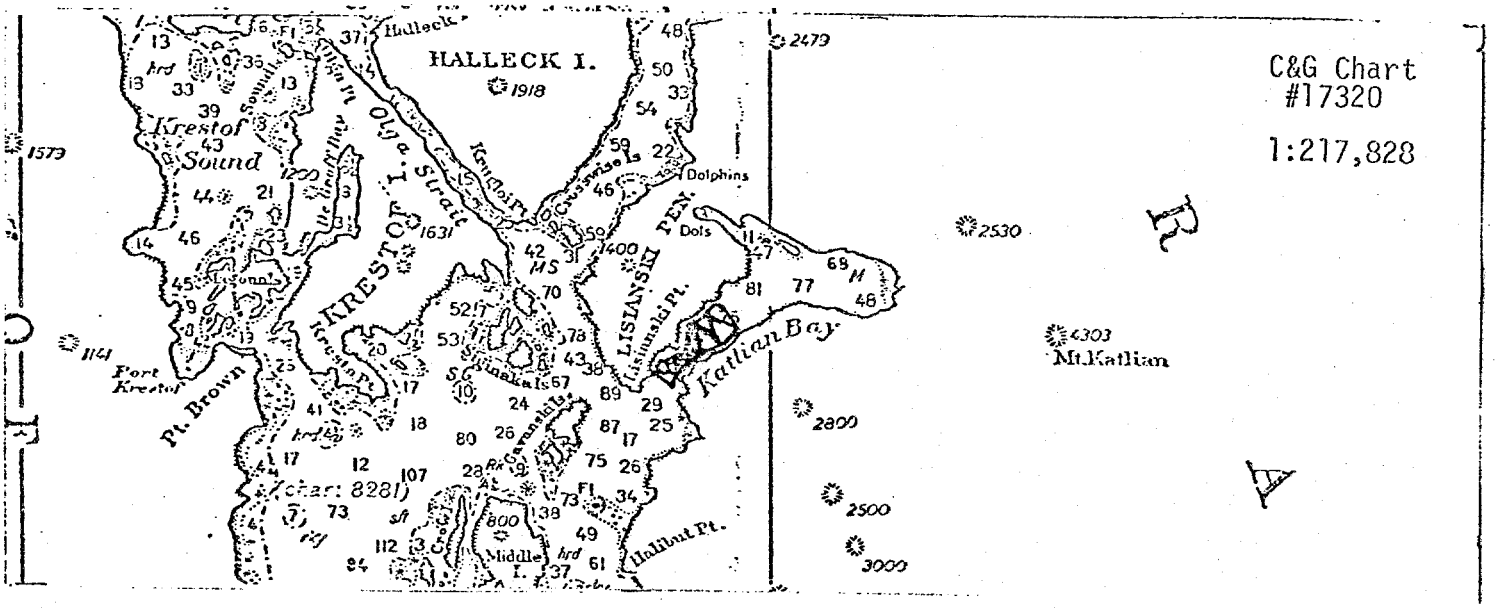
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 3/17/79 Vessel Kittiwake Run # 1

Gain 3.5 Attenuated -12 dB Operators Blankenbeckler, Larson

Time of Survey: Start 1656 End 1726 Tide

COMMENTS: No saturation noted. Fish are breaking up and moving from Katlian. Steller ran exact same pattern directly behind the Kittiwake.

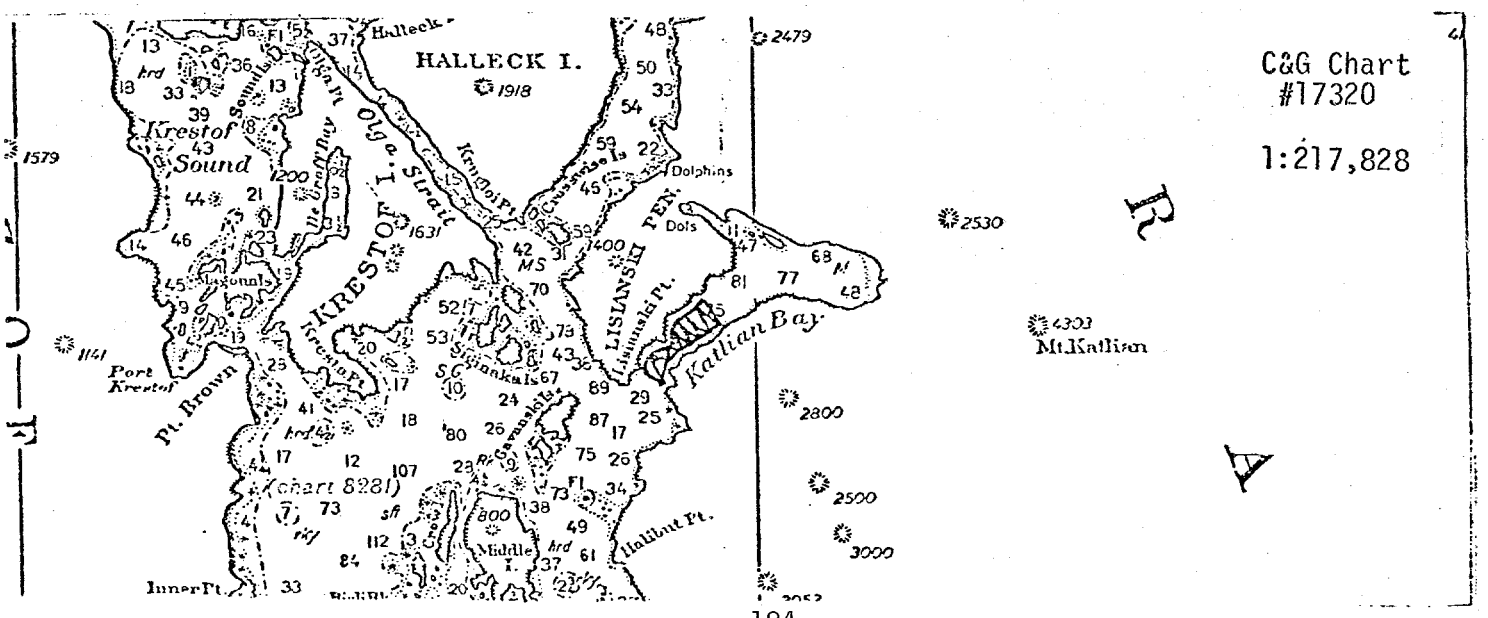



Area Katlian Date 3/17/79 Vessel Kittiwake Run # 2

Gain 3.5 Attenuated -12 dB Operators Blankenbeckler, Larson

Time of Survey: Start 1738 End 1808 Tide

COMMENTS: Some problem with herring being distributed close to shore. The Steller ran exact same pattern directly behind the Kittiwake.



Appendix 1 continued.

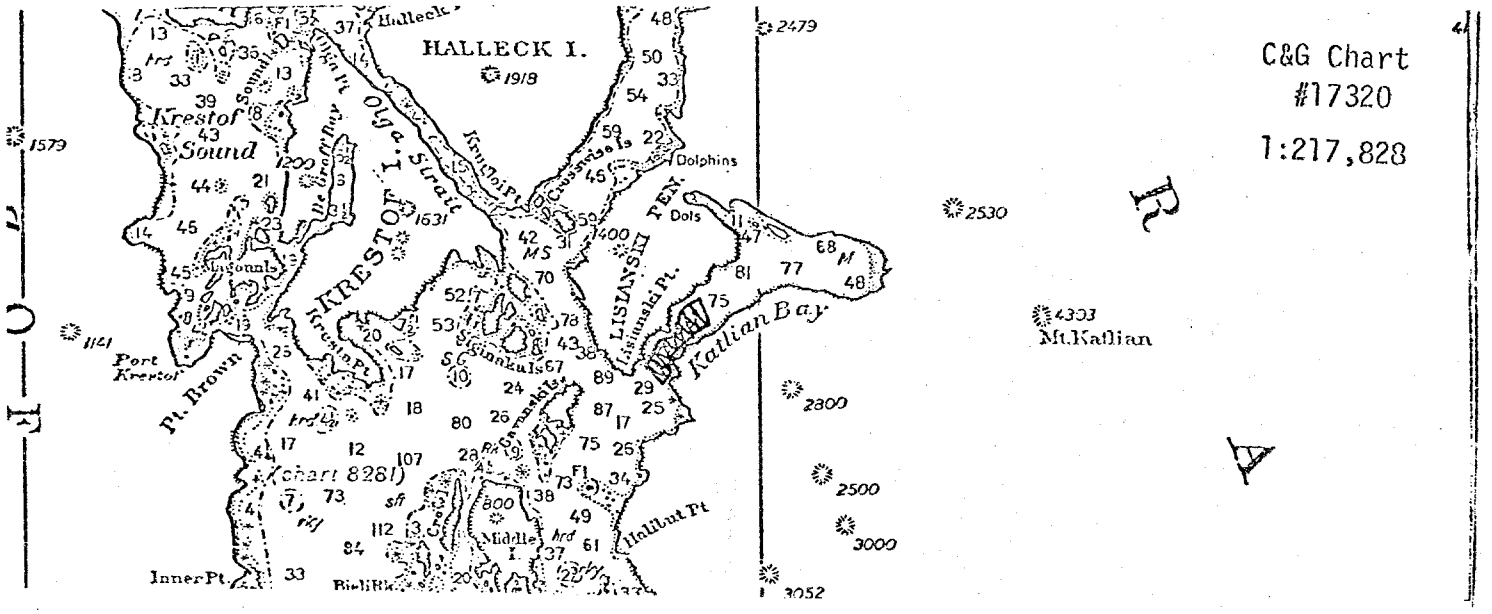
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Bay Date 3/17/79 Vessel Kittiwake Run # 3

Gain 3.5 Attenuated -12 dB Operators Blankenbeckler, Larson

Time of Survey: Start 1821 End 1902 Tide Large tides

COMMENTS: No saturation noted. Herring not distributed tight against the bottom during daylight hours as in February and December surveys. Herring observed out of survey area past Sitka Rocks. Steller followed closely in wake and did the same survey.

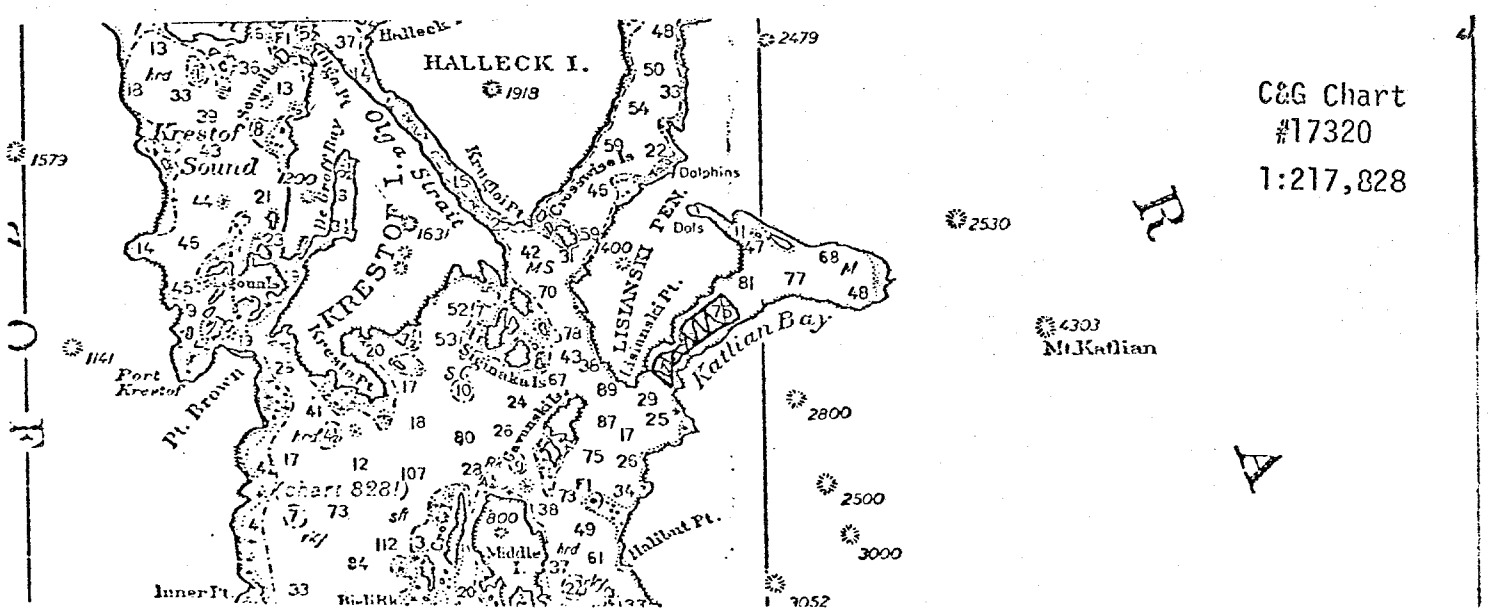



Area Katlian Date 3/17/79 Vessel Steller Run # 1

Gain 3.5 Attenuated -12 dB Operators Street

Time of Survey: Start 1630 End 1720:30 Tide 30 min. 30 sec.

COMMENTS: No saturation. Fish near beach. This is a duplication of Kittiwake survey (Run #1, 3/17/79).



Appendix 1 continued.

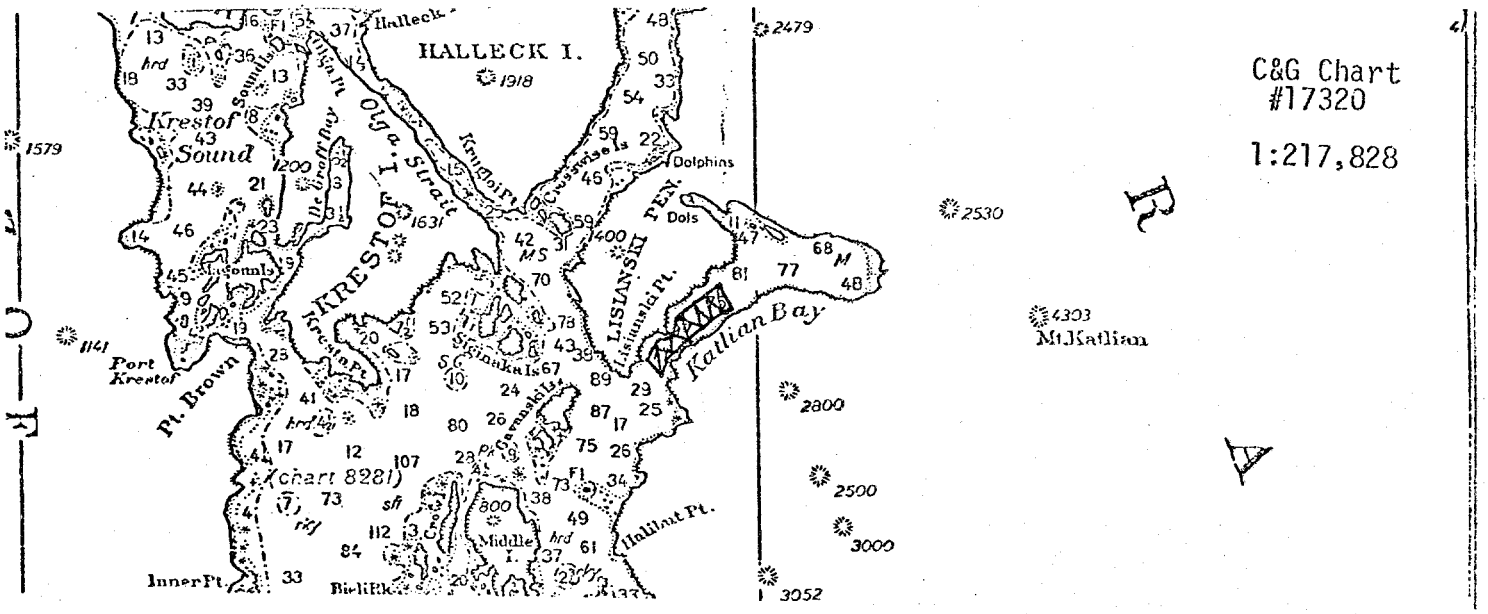
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 3/17/79 Vessel Steller Run # 2

Gain 3.5 Attenuated -12 dB Operators Street

Time of Survey: Start 1733:20 End 1803:50 Tide 30 min. 30 sec.

COMMENTS: No saturation noted. No bird or marine predators noted. This is a duplication of Kittiwake survey (Run #2, 3/17/79).

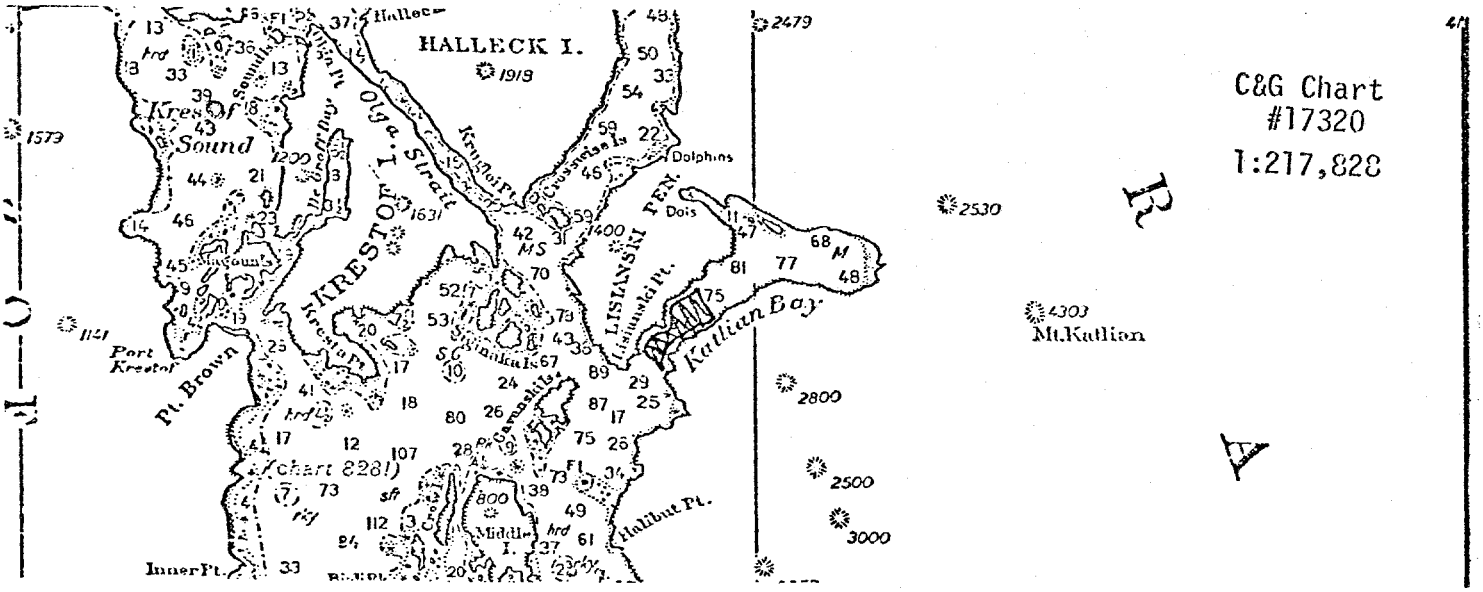



Area Katlian Date 3/17/79 Vessel Steller Run # 3

Gain 3.5 Attenuated -12 dB Operators Street

Time of Survey: Start 1815:45 End 1856:40 Tide 40 min. 55 sec.

COMMENTS: This is a duplicate of Kittiwake survey (Run #3, 3/17/79).



Appendix 1 continued.

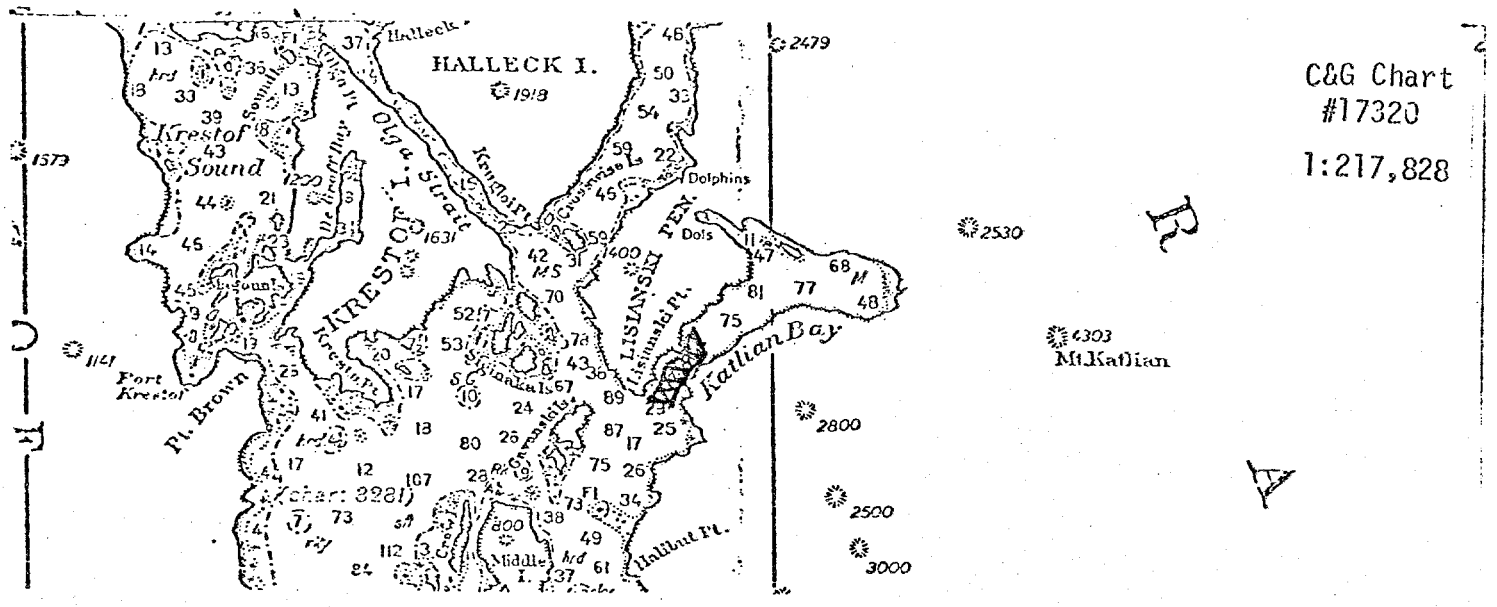
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 3/18/79 Vessel Kittiwake Run # 1

Gain 3.5 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1448 End 1532 Tide Large tides

COMMENTS: Small amount of saturation. Some herring distributed against beach. Steller repeated the same survey and followed closely in wake.

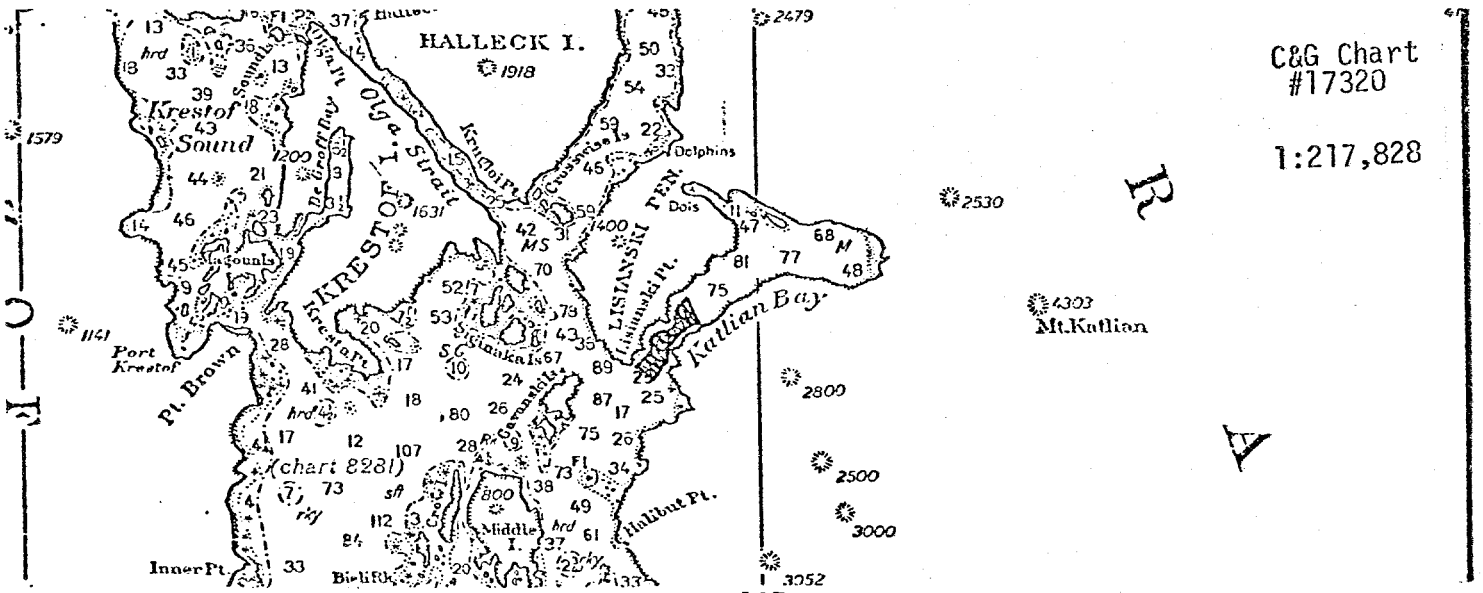



Area Katlian Date 3/18/79 Vessel Kittiwake Run # 2

Gain 3.4 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1553 End 1632 Tide Large tides

COMMENTS: Herring outside of area near the Black Can. Steller followed closely on stern and repeated the same survey. Survey pattern different than Run #1.



Appendix 1 continued.

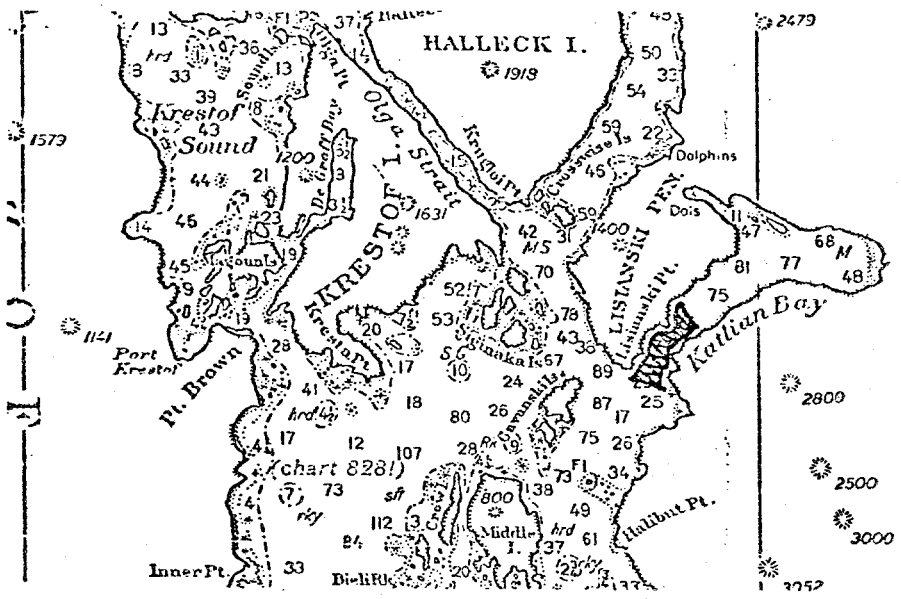
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 3/18/79 Vessel Kittiwake Run # 3

Gain 3.2 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1705 End 1745 Tide Large tides

COMMENTS: Steller made same survey pattern and followed closely on stern. Only slight saturation.




C&G Chart #17320

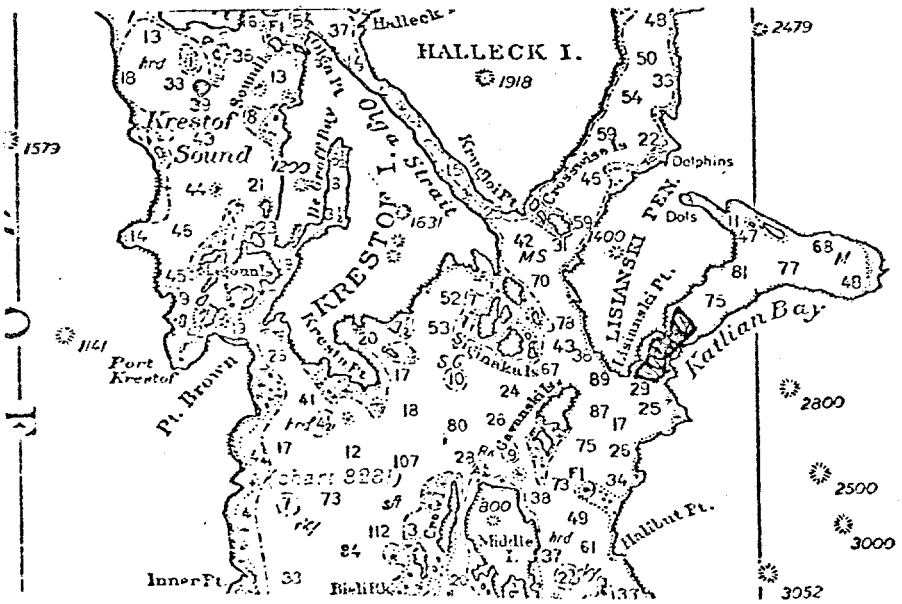
1:217,828

Area Katlian Date 3/18/79 Vessel Steller Run # 1

Gain 3.5 Attenuated -12 dB Operators Street, Larson

Time of Survey: Start 1442 End 1528 Tide

COMMENTS: Twenty sea lions in area. Duplicate of Kittiwake survey (Run #1, 3/18/79).




C&G Chart #17320

1:217,828

Appendix 1 continued.

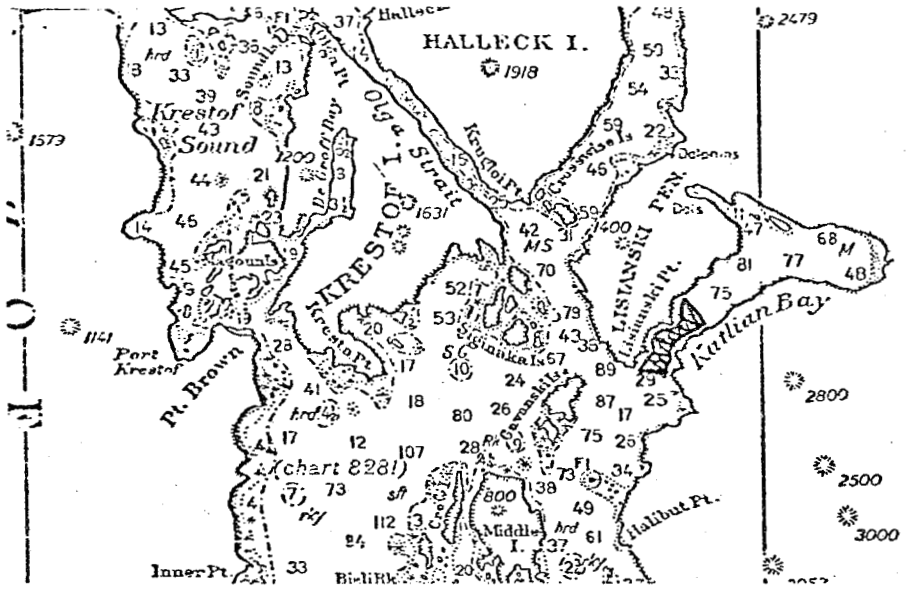
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 3/18/79 Vessel Steller Run # 2

Gain 3.5 Attenuated -12 dB Operators Street, Larson

Time of Survey: Start 1546:45 End 1628:40 Tide

COMMENTS: Slight saturation noted. Duplicate of Kittiwake survey (Run #2, 3/18/79)




C&G Chart #17320

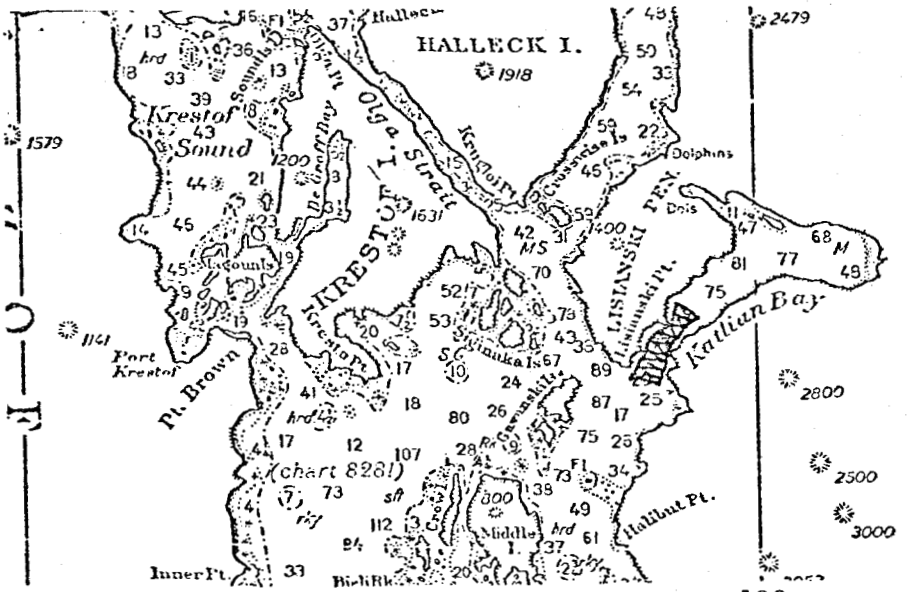
1:217,828

Area Katlian Date 3/18/79 Vessel Steller Run # 3

Gain 3.3 Attenuated -12 dB Operators Street, Larson

Time of Survey: Start 1657:45 End 1741:45 Tide

COMMENTS: Approximately 20 sea lions in the area. Duplicated Kittiwake survey (Run #3, 3/18/79).




C&G Chart #17320

1:217,828

Appendix 1 continued.

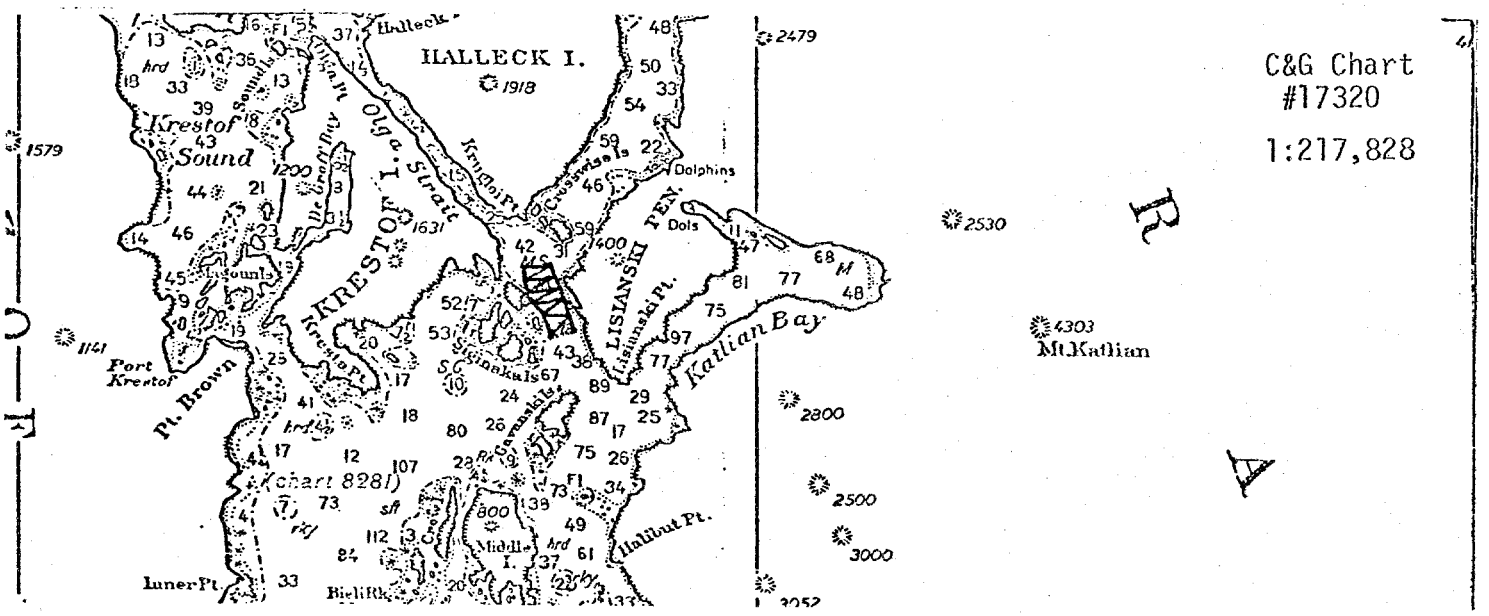
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 3/19/79 Vessel Kittiwake Run # 1

Gain 3.2 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1804 End 1827 Tide Large tide

COMMENTS: No saturation noted. Steller followed closely on stern and duplicated survey.

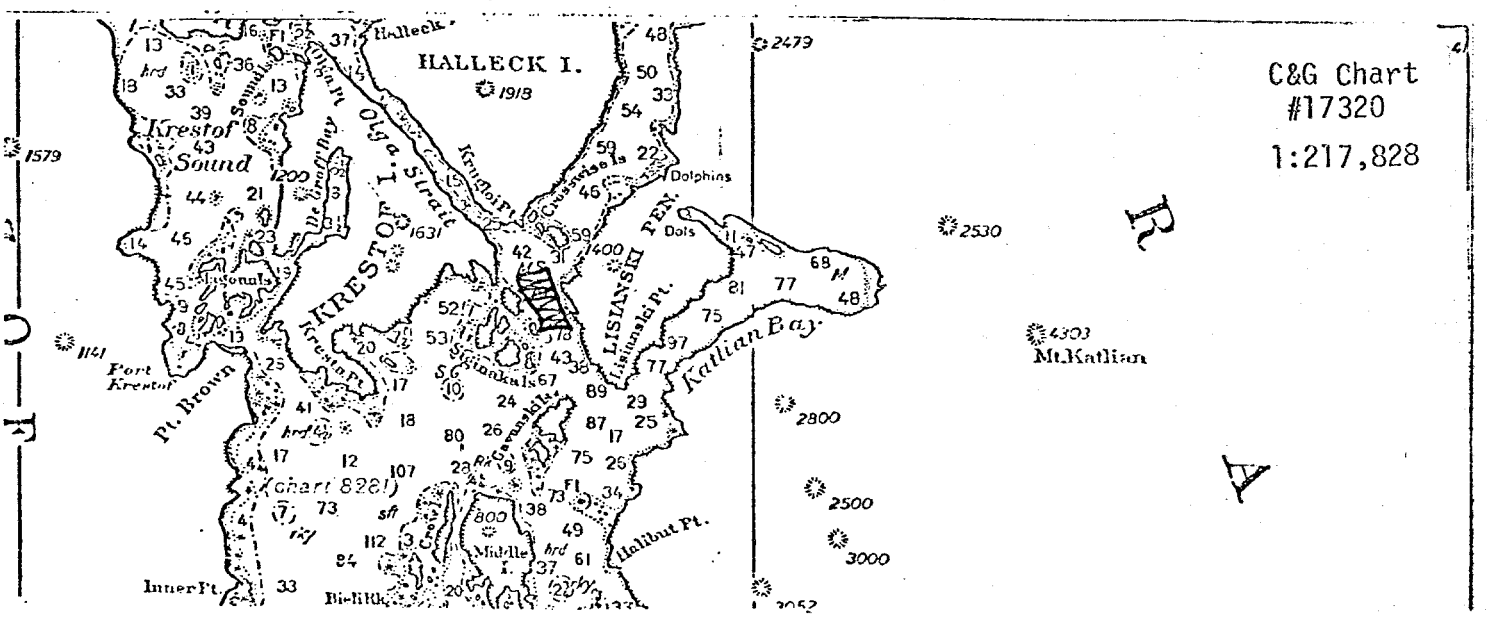



Area Olga Straits Date 3/19/79 Vessel Steller Run # 1

Gain 3.2 Attenuated -12 dB Operators Street, Larson

Time of Survey: Start 1758:15 End 1821:05 Tide 22 min. 50 sec.

COMMENTS: Approximately 20 sea lions in the area. Duplicated Run #1, 3/19/79 Kittiwake survey.



Appendix 1 continued.

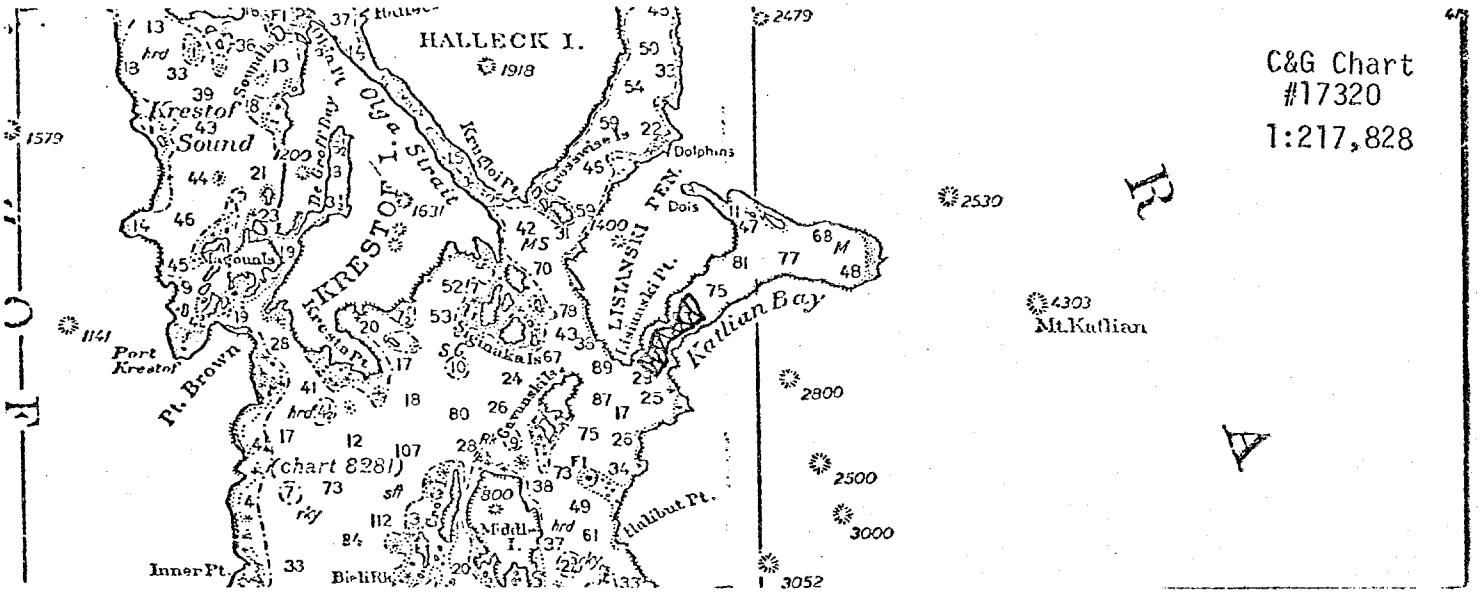
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 3/19/79 Vessel Kittiwake Run # 1

Gain 3.2 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1420 End 1454 Tide Large tides

COMMENTS: Herring distributed similar to last two days. Steller followed closely on stern and repeated the same survey.

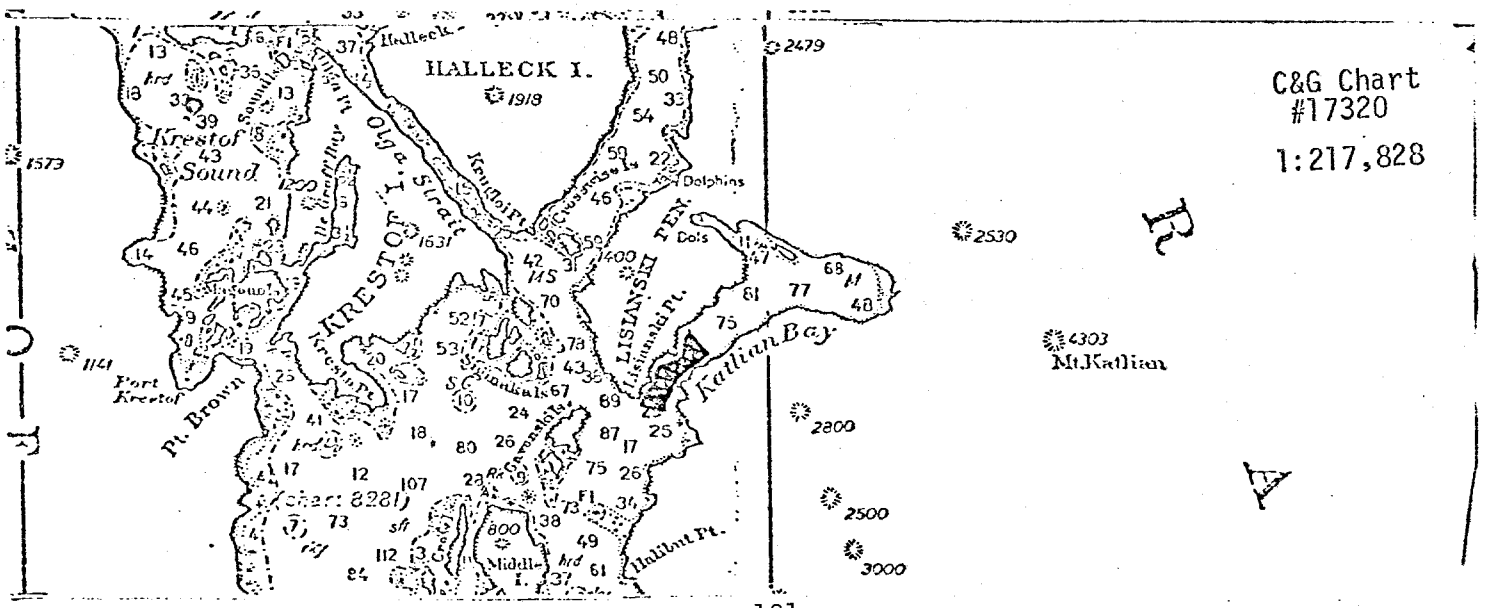



Area Katlian Date 3/19/79 Vessel Kittiwake Run # 2

Gain 3.2 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1518 End 1555 Tide Large tides

COMMENTS: No saturation. Steller made same transect pattern following closely on the stern.



Appendix 1 continued.

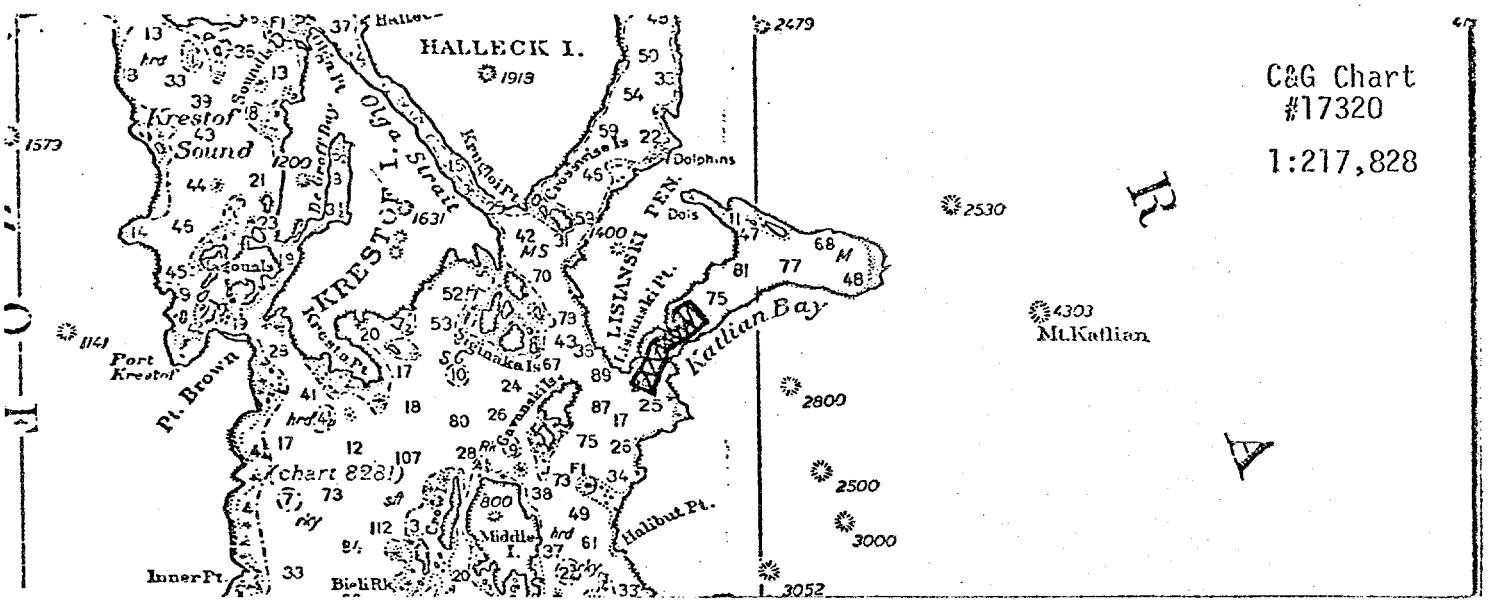
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 3/19/79 Vessel Kittiwake Run # 3

Gain 3.2 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1626 End 1715 Tide Large tides

COMMENTS: No saturation. Steller made same transect pattern following closely on the stern.

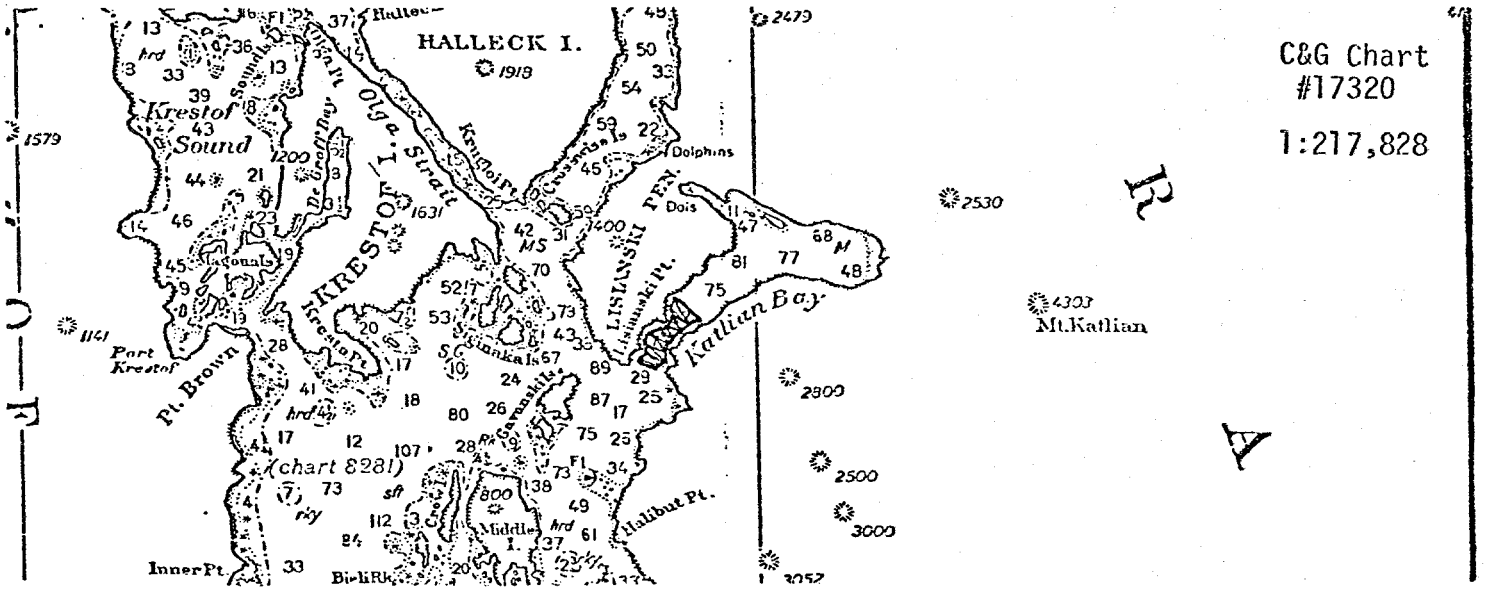



Area Katlian Date 3/19/79 Vessel Steller Run # 1

Gain 3.5 Attenuated -12 dB Operators Street, Larson

Time of Survey: Start 1414:15 End 1448:45 Tide 34 min. 30 sec.

COMMENTS: Twenty sea lions in the area. Duplicated Kittiwake survey (Run #1, 3/19/78).



Appendix 1 continued.

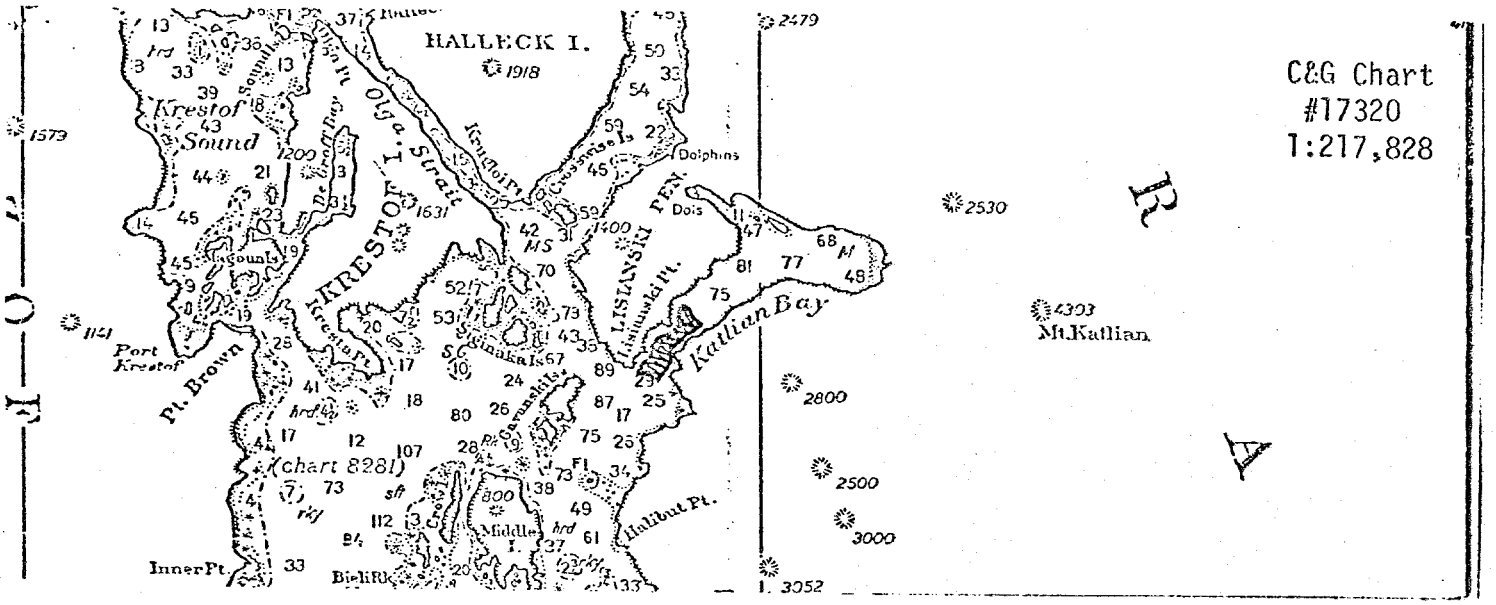
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Date 3/19/79 Vessel Steller Run # 2

Gain 3.3 Attenuated -12 dB Operators Street, Larson

Time of Survey: Start 1507 End 1550 Tide

COMMENTS: Duplicate of Kittiwake survey (Run #2, 3/19/79).

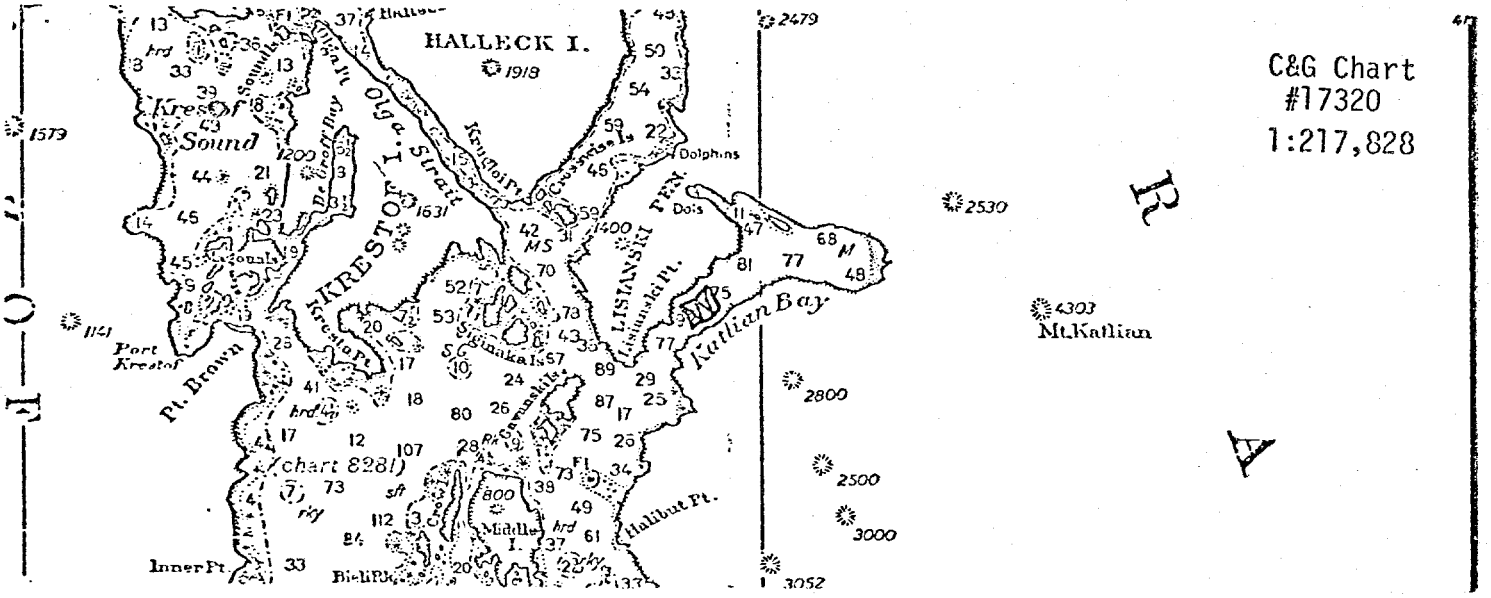



Area Katlian Date 3/19/79 Vessel Steller Run # 3

Gain 3.4 Attenuated -12 dB Operators Street, Larson

Time of Survey: Start 1620:20 End 1710 Tide

COMMENTS: Duplicate of Kittiwake survey (Run #3, 3/19/79).



Appendix 1 continued.

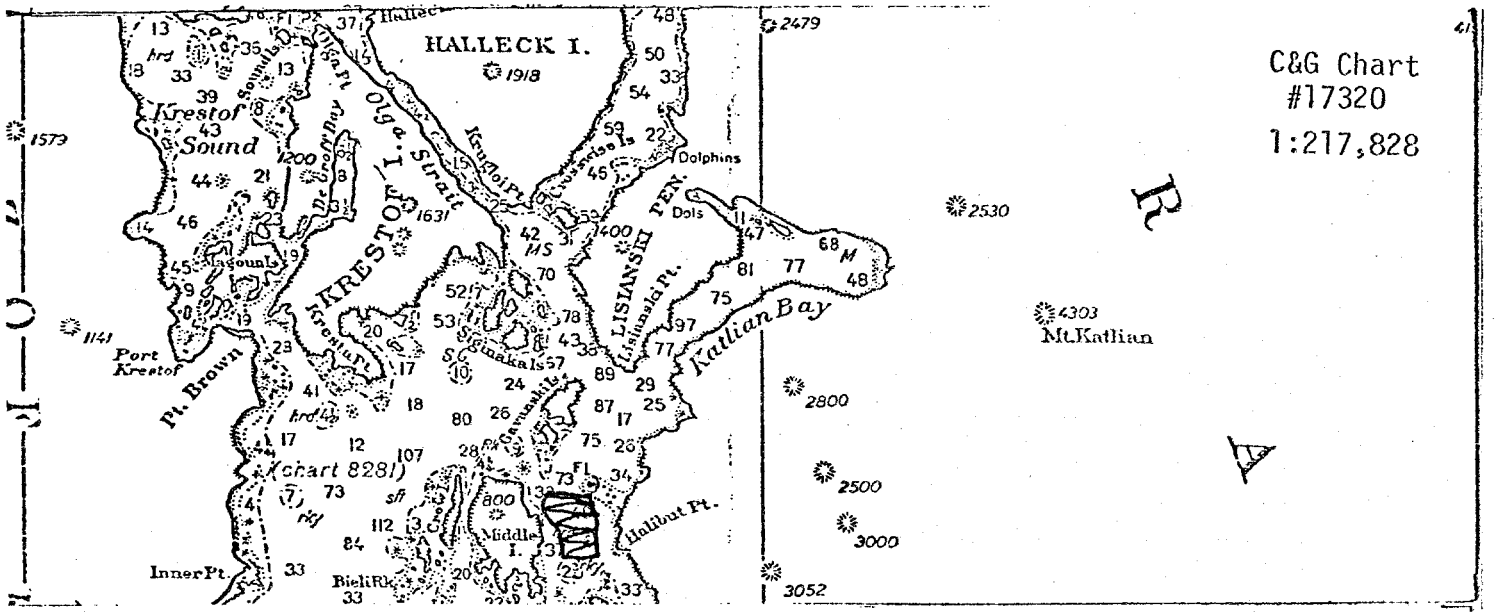
## ACOUSTICAL SURVEY SUMMARY

Area Sitka, Black Can Date 3/19/79 Vessel Kittiwake Run # 1

Gain 3.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1931 End 2013 Tide Large tide

COMMENTS: Slight saturation during survey. Steller followed on stern and repeated survey. Herring moving rapidly at 15-25 fathoms.

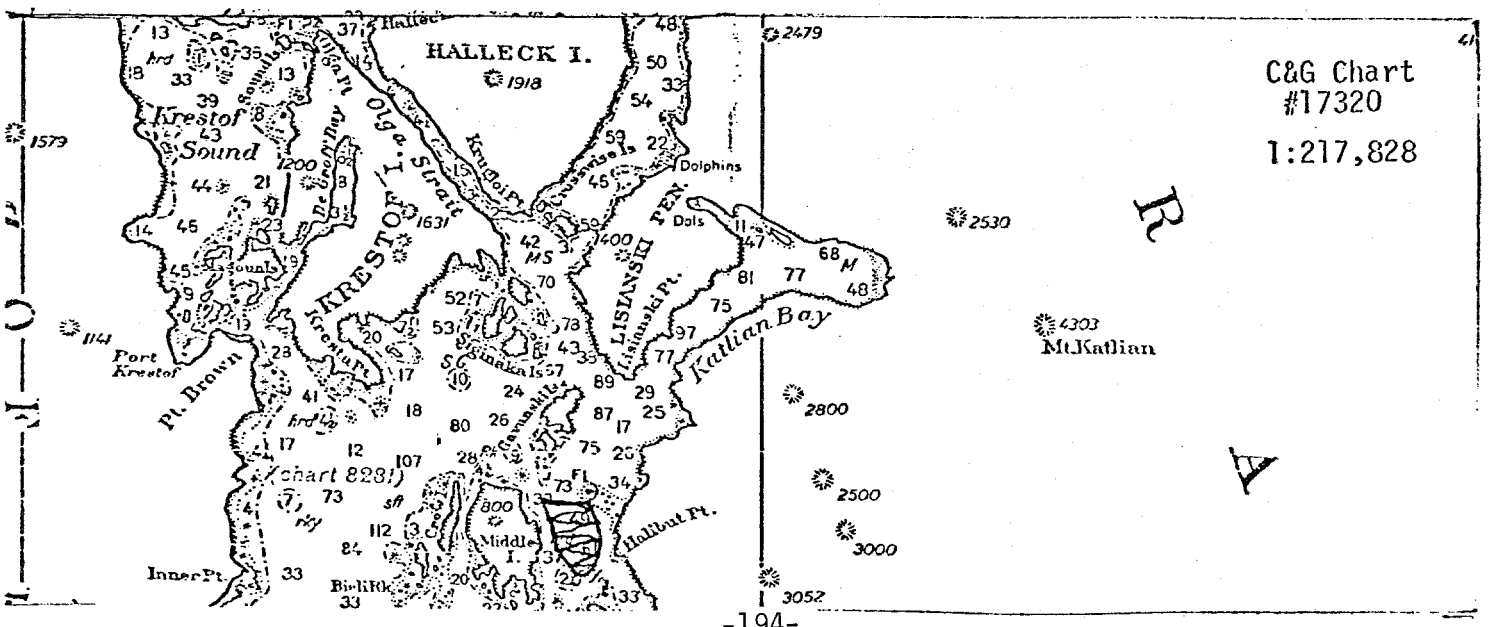



Area Sitka, Black Can Date 3/19/79 Vessel Steller Run # 1

Gain 2.5 Attenuated -12 dB Operators Street, Larson

Time of Survey: Start 1924:10 End 2008 Tide

COMMENTS: Fish in process of lifting away from bottom. This is a duplicate of Kittiwake survey, Run #1, 3/19/79.



Appendix 1 continued.

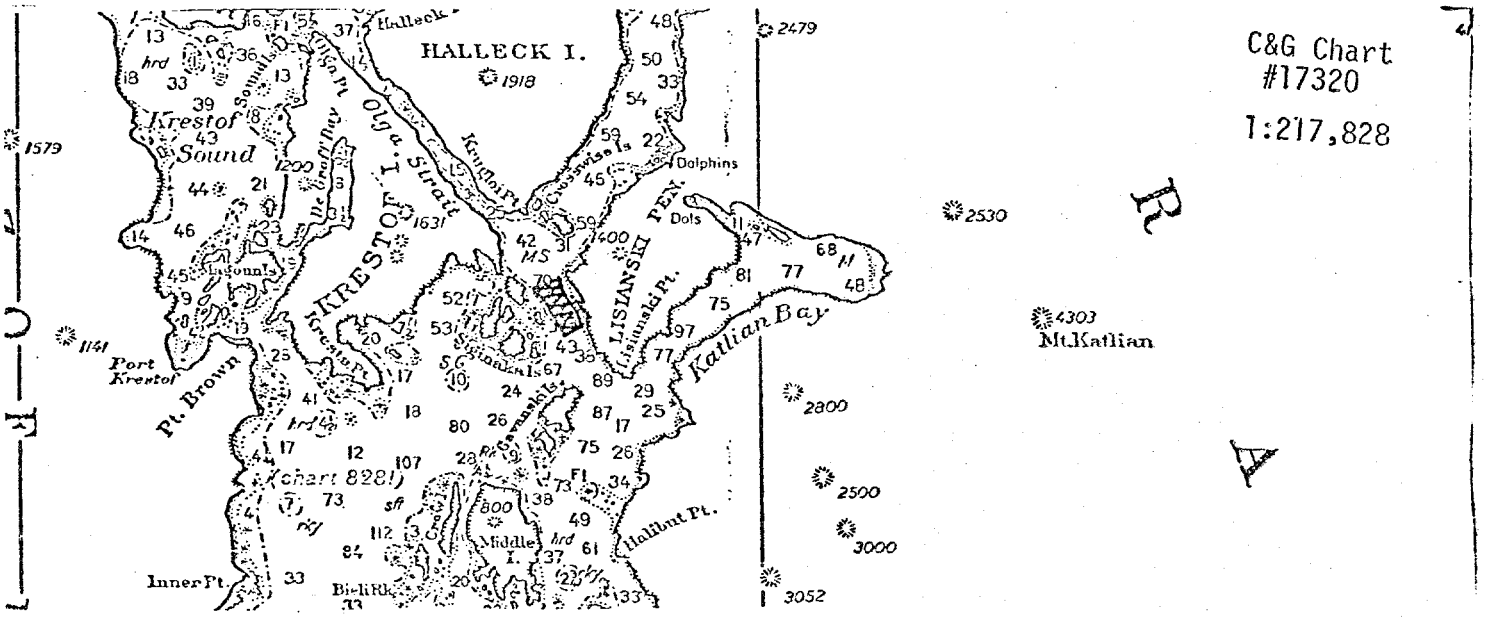
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 1/24/80 Vessel Kittiwake Run # 2

Gain 5.0 Attenuated -12dB Operators Blankenbeckler, Larson

Time of Survey: Start 1351 End 1418 Tide

COMMENTS: Same survey and same herring as Run #1.

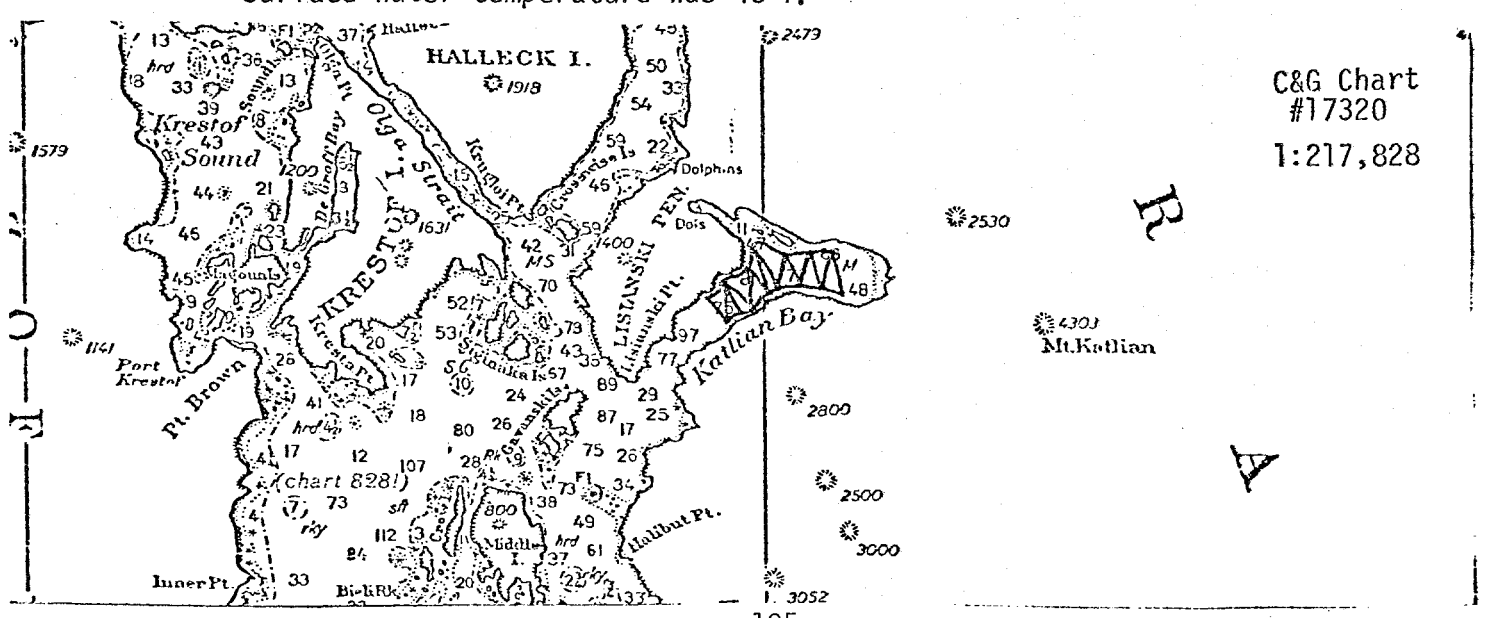



Area Katlian Bay Date 1/25/80 Vessel Kittiwake Run # 1

Gain 4.2 Attenuated -12dB Operators Blankenbeckler, Larson

Time of Survey: Start 1722 End 1801 Tide

COMMENTS: Herring were distributed in the same general area as on 1/24/80 except that they were closer to bottom, and we had to wait until dusk to survey. Surface water temperature was 43°F.



Appendix 1 continued.

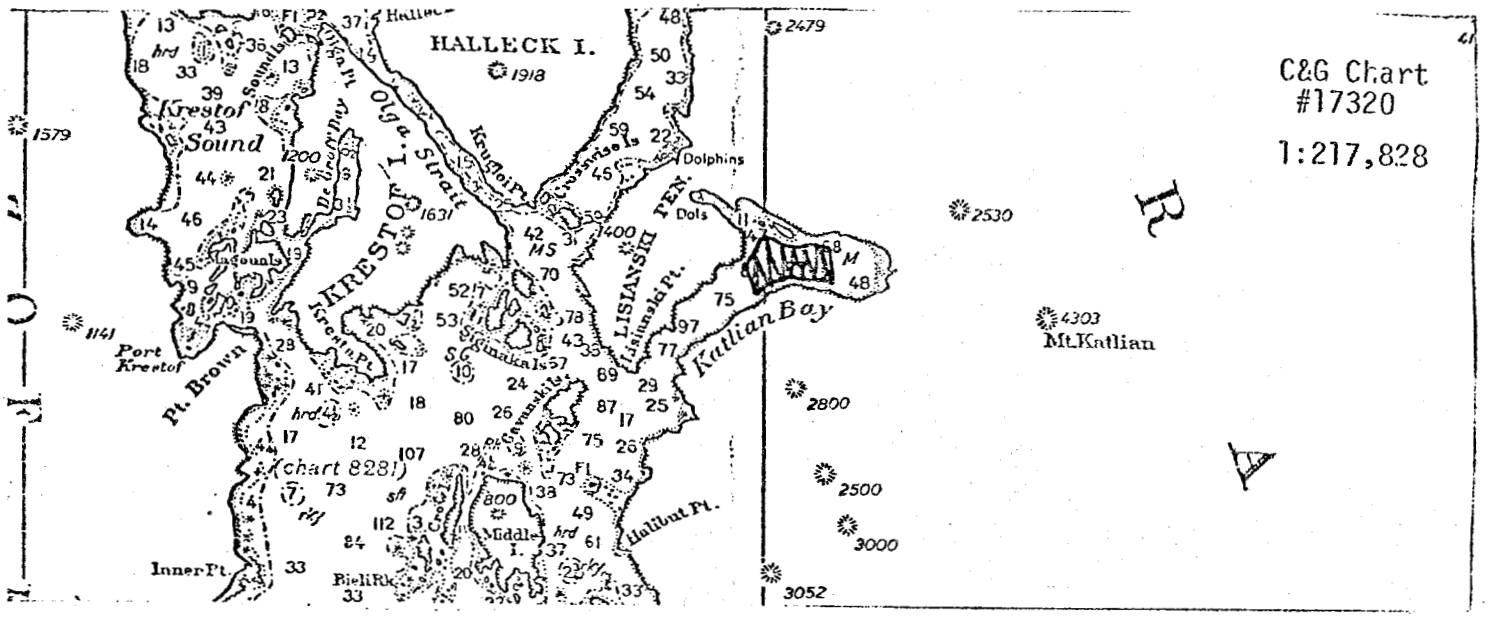
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Bay Date 1/24/80 Vessel Kittiwake Run # 1

Gain 4.2 Attenuated -12dB Operators Blankenbeckler, Larson

Time of Survey: Start 1551 End 1648 Tide

COMMENTS: No saturation. Part of the herring close to the bottom. Starting to just lose some daylight. Very little vertical movement observed during the survey.

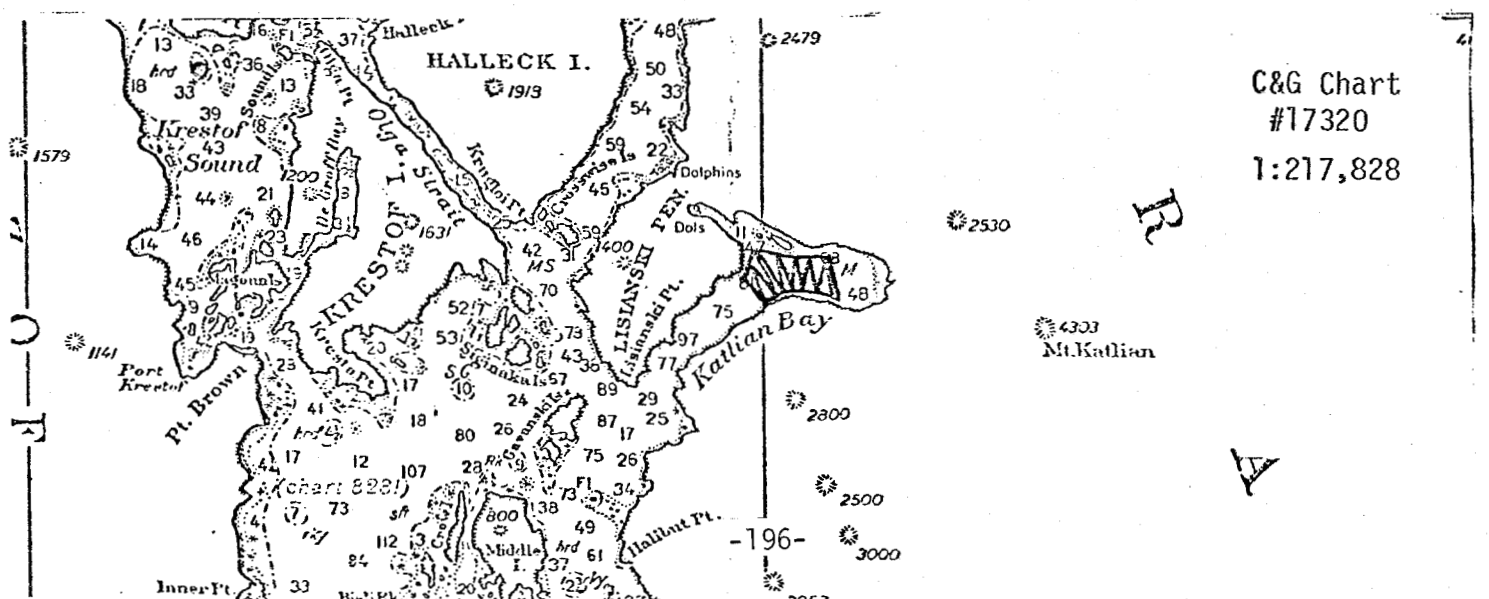



Area Katlian Bay Date 1/24/80 Vessel Kittiwake Run # 2

Gain 4.2 Attenuated -12dB Operators Blankenbeckler, Larson

Time of Survey: Start 1659 End 1743 Tide

COMMENTS: No saturation. Survey area changed slightly to account for the herring movement toward the head of the bay and away from shore. Beginning vertical movement. Losing light fairly rapidly by the end of the run.



Appendix 1 continued.

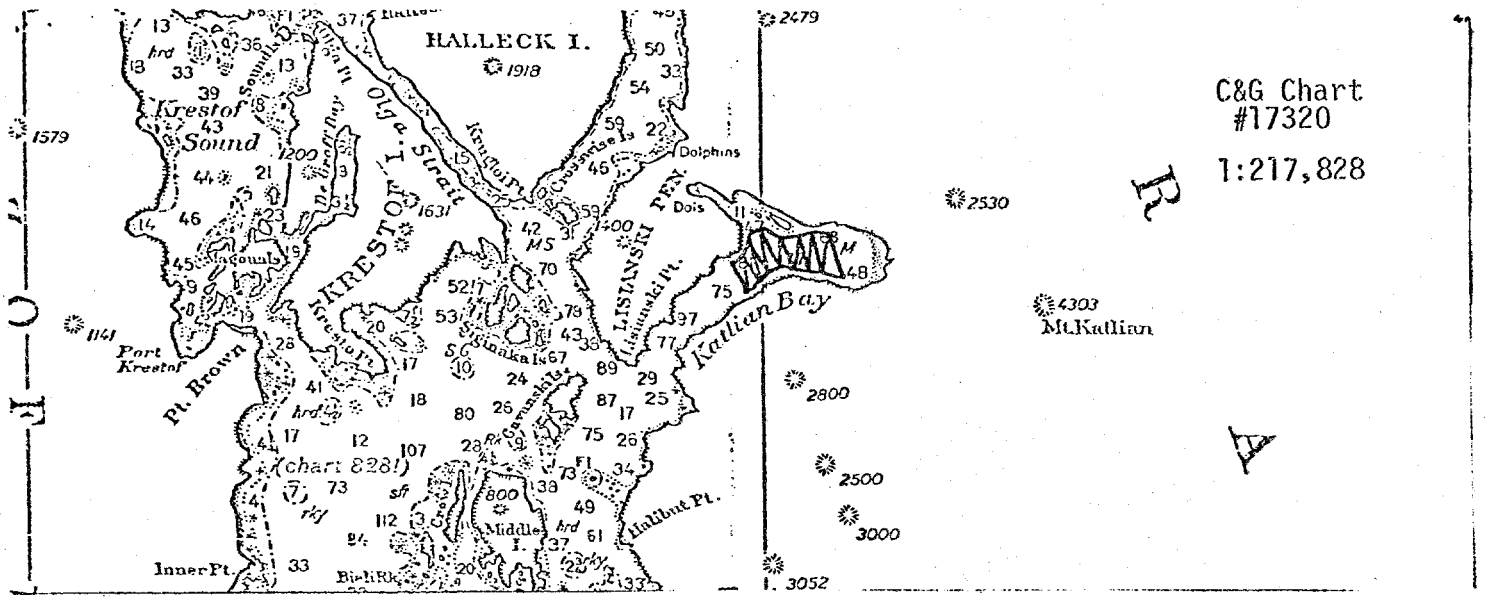
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Bay Date 1/24/80 Vessel Kittiwake Run # 3

Gain 4.2 Attenuated -12dB Operators Blankenbeckler, Larson

Time of Survey: Start 1745 End 1828 Tide

COMMENTS: Some spike saturation noted. Herring rising rapidly but not dispersing or moving shoreward as expected. Most of the daylight was gone by half the survey, and by the end of the survey it was dark.

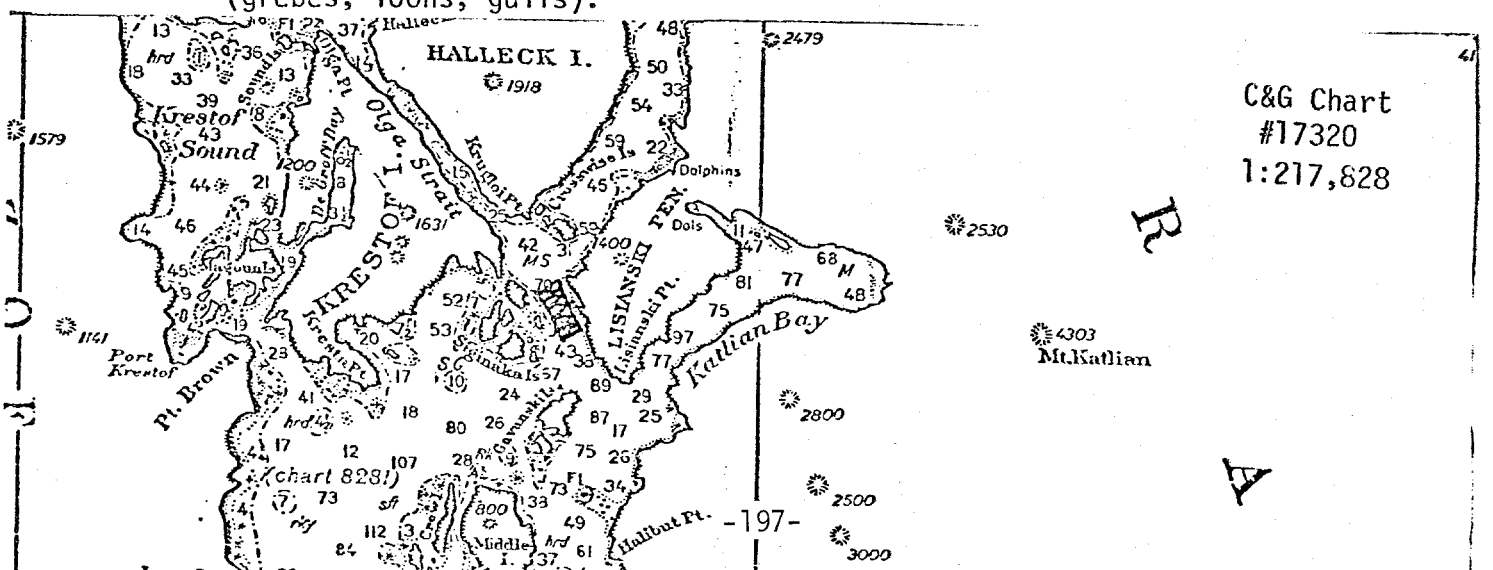



Area Olga Straits Date 1/24/80 Vessel Kittiwake Run # 1

Gain 5.0 Attenuated -12dB Operators Blankenbeckler, Larson

Time of Survey: Start 1308 End 1335 Tide

COMMENTS: No saturation. Herring were in ideal distribution for taping (offshore and bottom). No lateral or vertical movement observed during the survey. Approximately 100 sea lions were in the area, in addition to numerous birds (grebes, loons, gulls).



Appendix 1 continued.

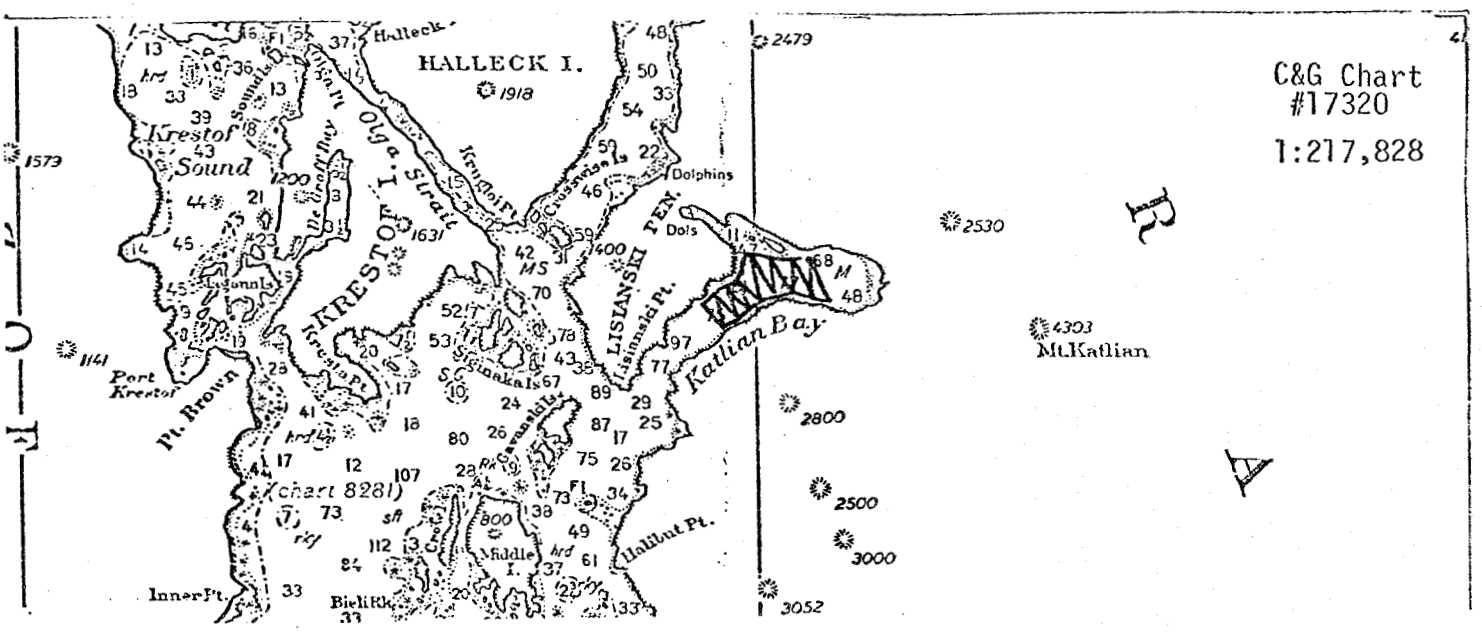
## ACOUSTICAL SURVEY SUMMARY

Area Katlian Bay Date 1/25/80 Vessel Kittiwake Run # 2

Gain 4.2 Attenuated -12dB Operators Blankenbeckler, Larson

Time of Survey: Start 1806 End 1849 Tide

COMMENTS: Herring rising rapidly to the surface. No herring observed near shore.

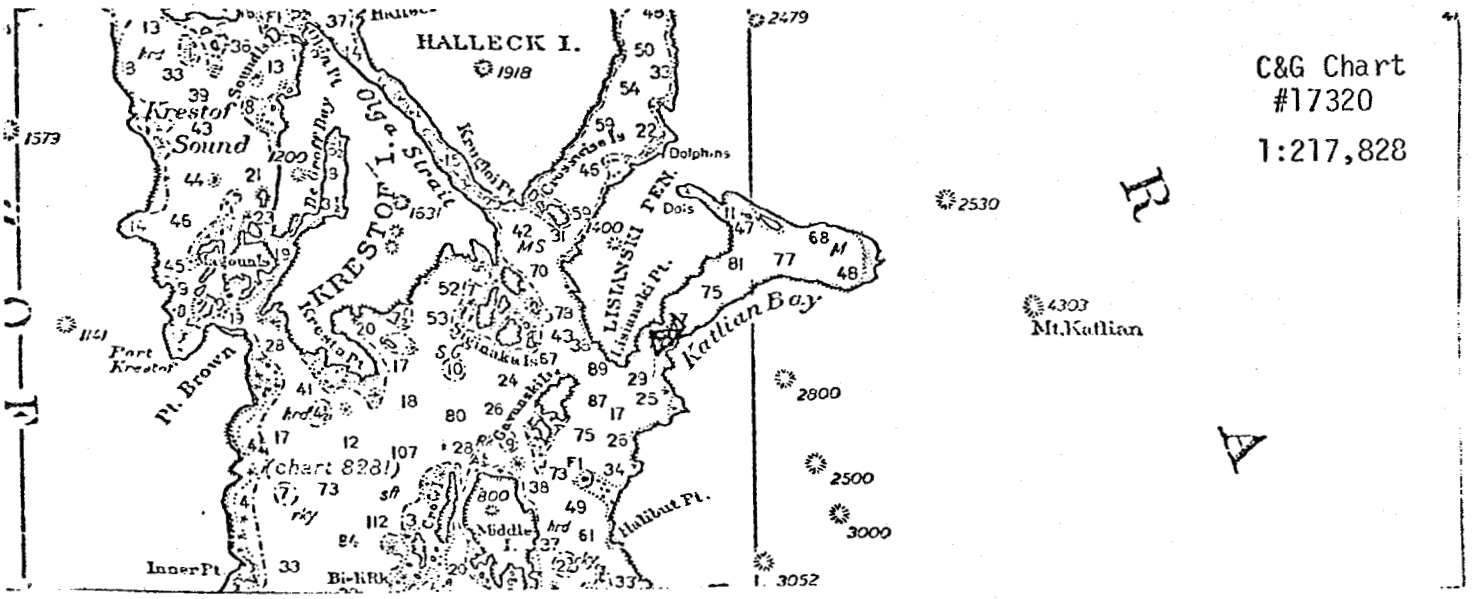



Area Katlian Bay Date 2/23/80 Vessel Kittiwake Run # 1

Gain 5.0 Attenuated -12dB Operators Blankenbeckler, Larson, McLeod

Time of Survey: Start 1711 End 1724 Tide 2/3 flood; series of small tides.

COMMENTS: Fish distributed in small moving groups.



Appendix 1 continued.

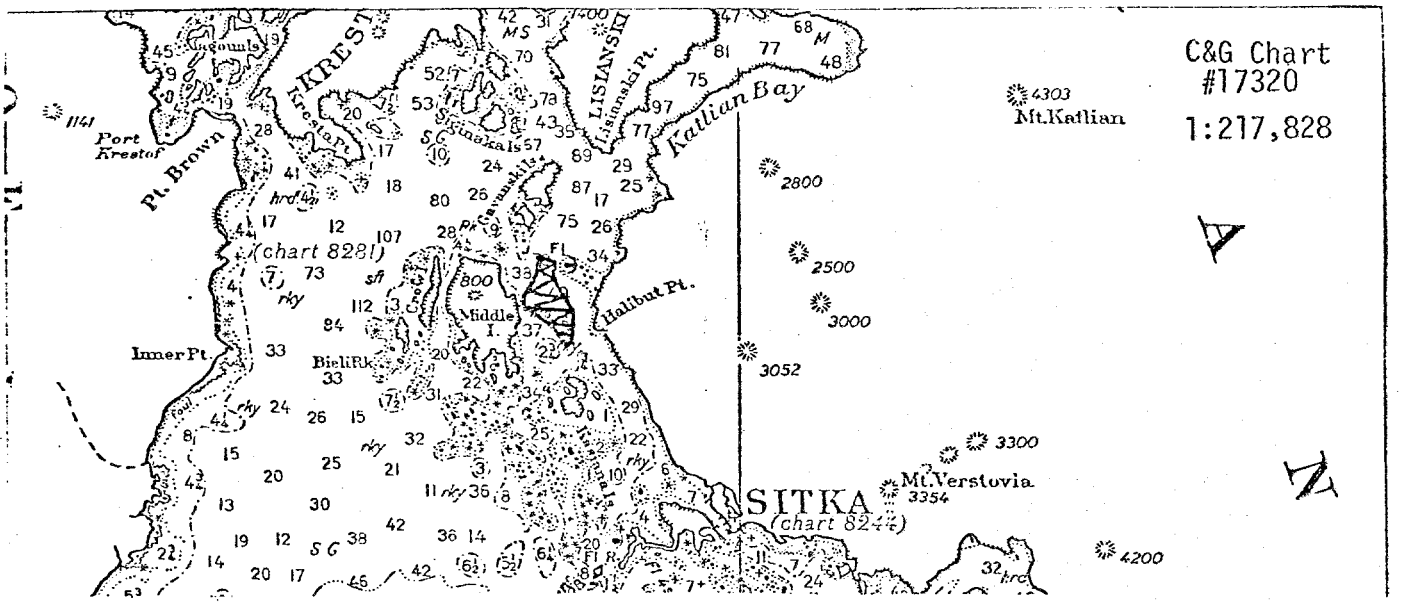
## ACOUSTICAL SURVEY SUMMARY

Area Sitka (Black Can) Date 2/23/80 Vessel Kittiwake Run # 1

Gain 3.0 Attenuated -12dB Operators Blankenbeckler, Larson, McLeod

Time of Survey: Start 1819 End 1900 Tide High, small tide range

COMMENTS: Fifty sea lions on these fish with several hundred gulls and 35 eagles.

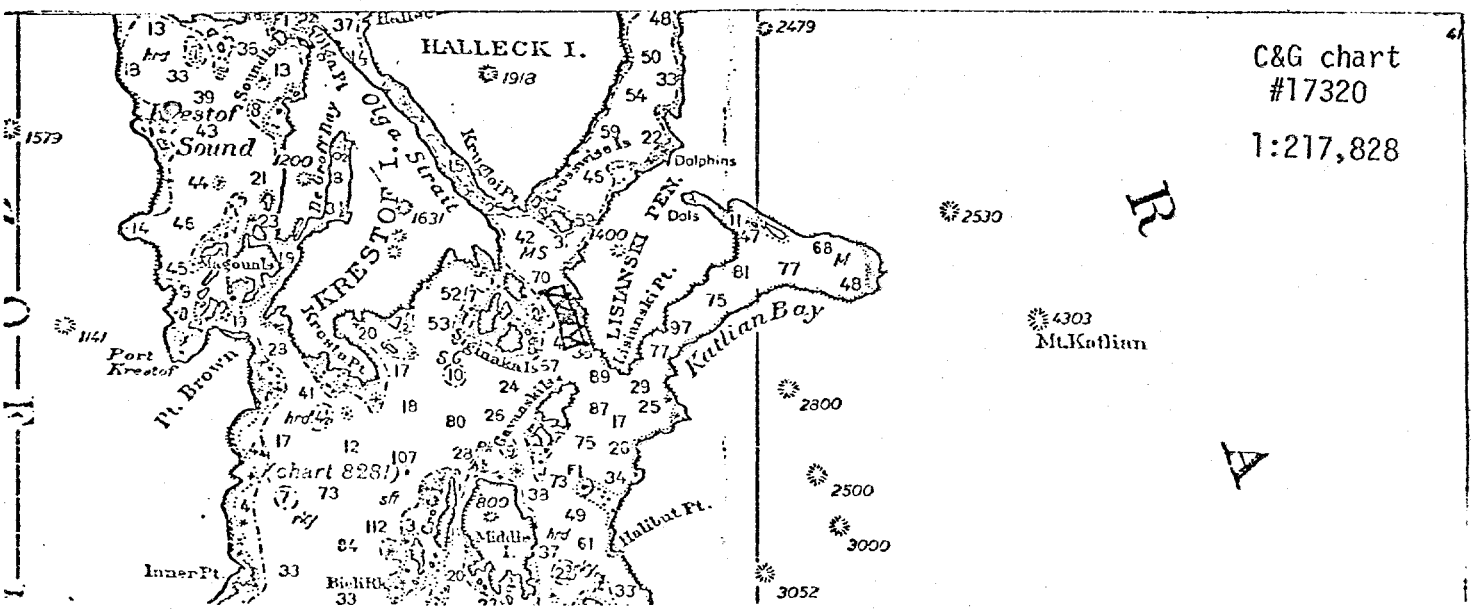



Area Olga Straits Date 2/23/80 Vessel Kittiwake Run # 1

Gain 5.0 Attenuated -12dB Operators Blankenbeckler, Larson, McLeod

Time of Survey: Start 1740 End 1756 Tide 3/4 flood

COMMENTS: Slight saturation; spikes only.



Appendix 1 continued.

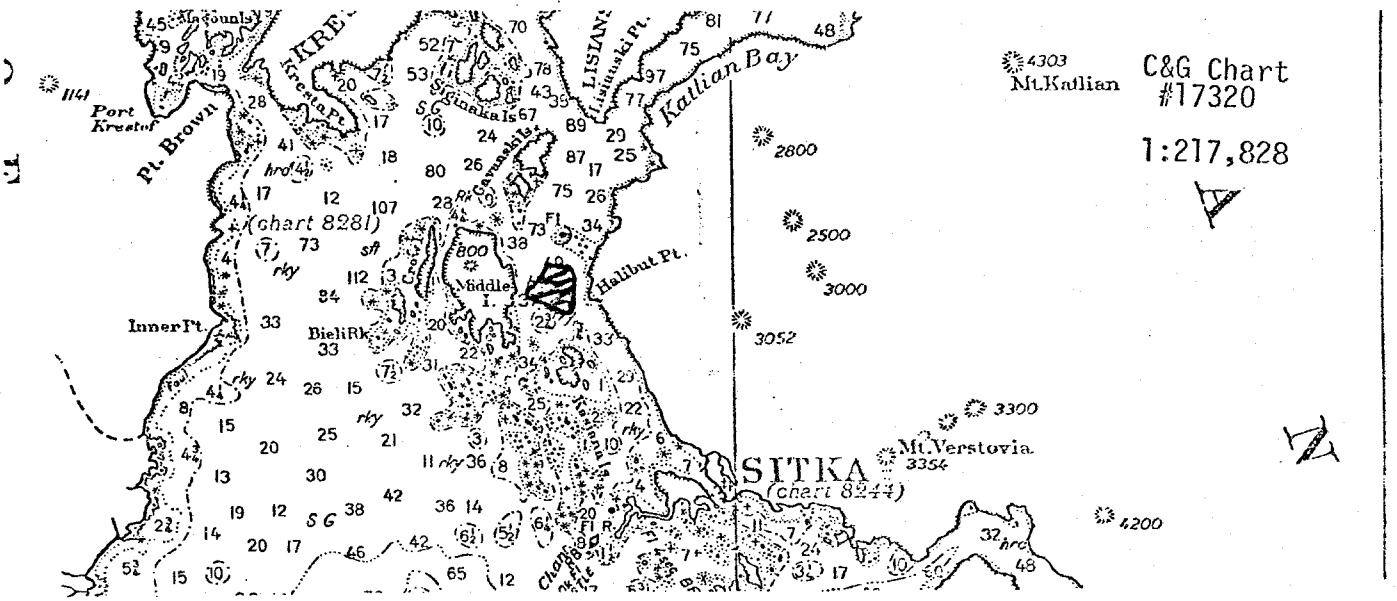
## ACOUSTICAL SURVEY SUMMARY

Area Sitka (Black Can) Date 2/24/80 Vessel Kittiwake Run # 1

Gain 3.2 Attenuated -12dB Operators Larson, Blankenbeckler, McLeod

Time of Survey: Start 1843 End 1918 Tide Series of small tides

COMMENTS: Weather: heavy overcast with 30 mph wind. No saturation noted. Rapid vertical movement. Approximately 1 hour time frame from the time they separate from the bottom to when they disperse at approximately 20 fathoms.

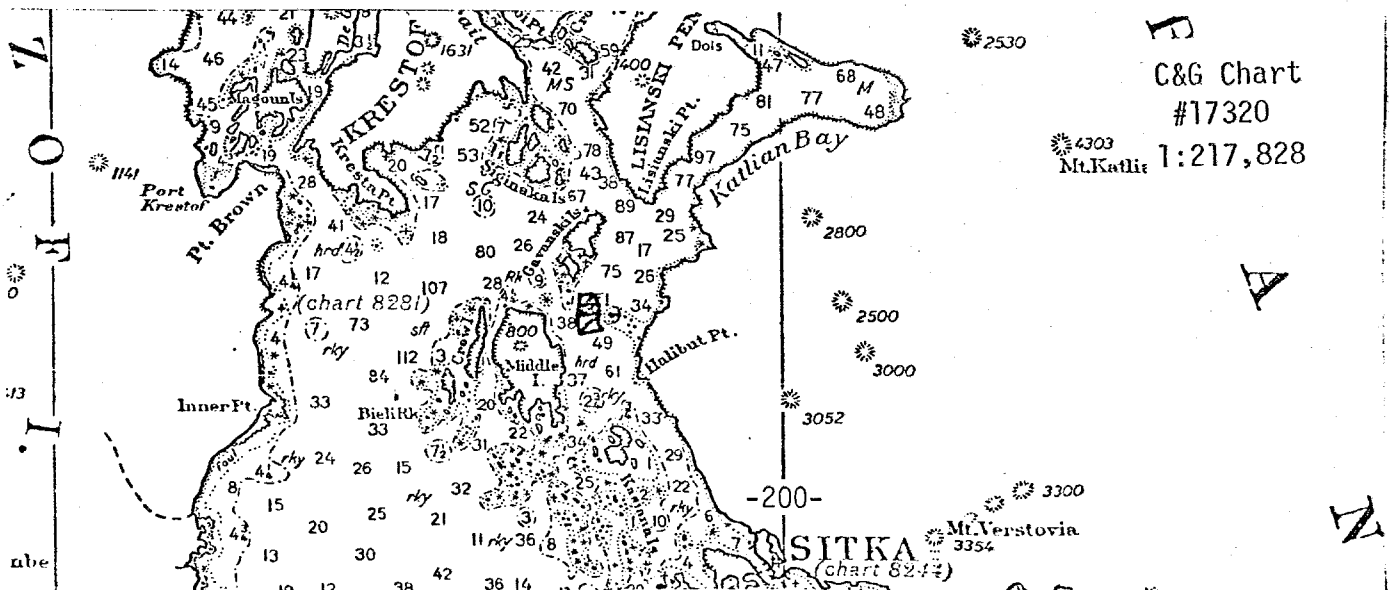



Area Sitka (Sitka Rocks) Date 2/24/80 Vessel Kittiwake Run # 2

Gain 3.2 Attenuated -12dB Operators Larson, Blankenbeckler

Time of Survey: Start 1930 End 1950 Tide

COMMENTS: Run could have been done at a higher gain setting since spreading is evident. Time limit and distribution critical in making surveys during this period.



Appendix 1 continued.

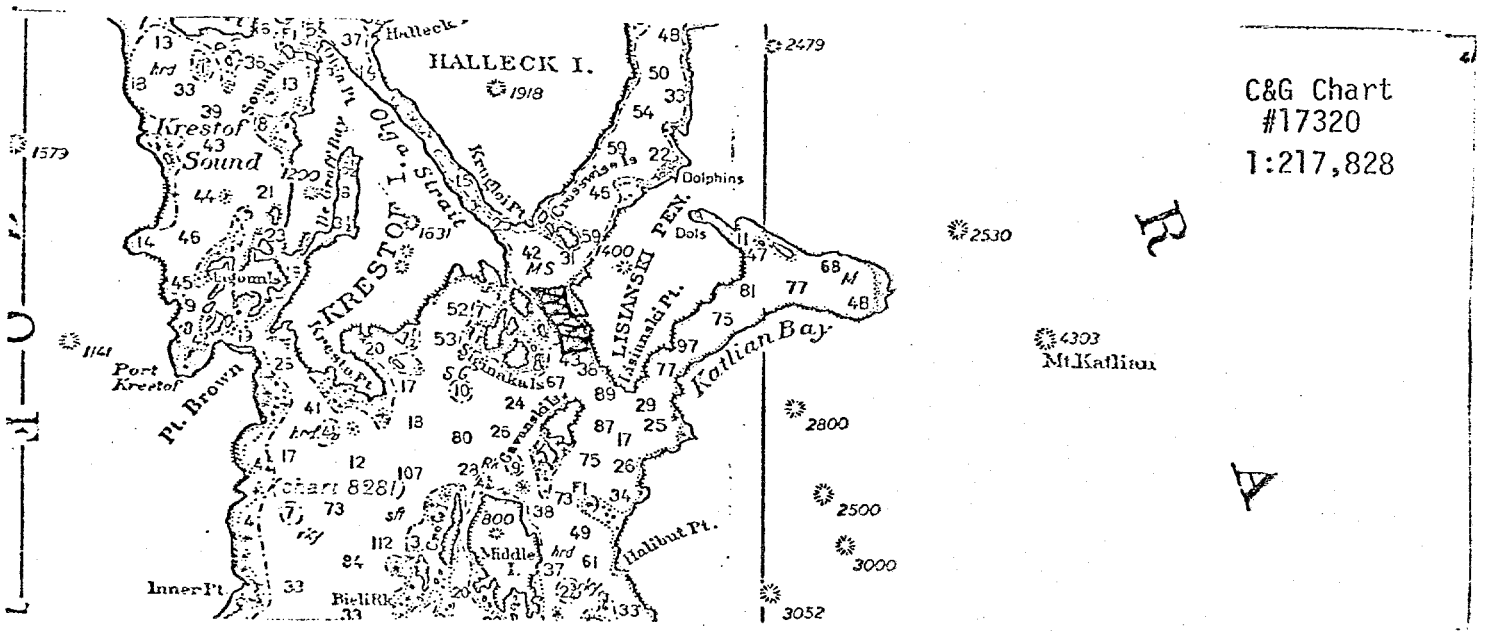
## ACOUSTICAL SURVEY SUMMARY

Area Olga Straits Date 2/24/80 Vessel Kittiwake Run # 1

Gain 4.0 Attenuated -12dB Operators Larson, Blankenbeckler, McLeod

Time of Survey: Start 0906 End 0937 Tide High

COMMENTS: Sea gulls and eagles in area - 25 sea lions. Overcast with 15 MPH wind.

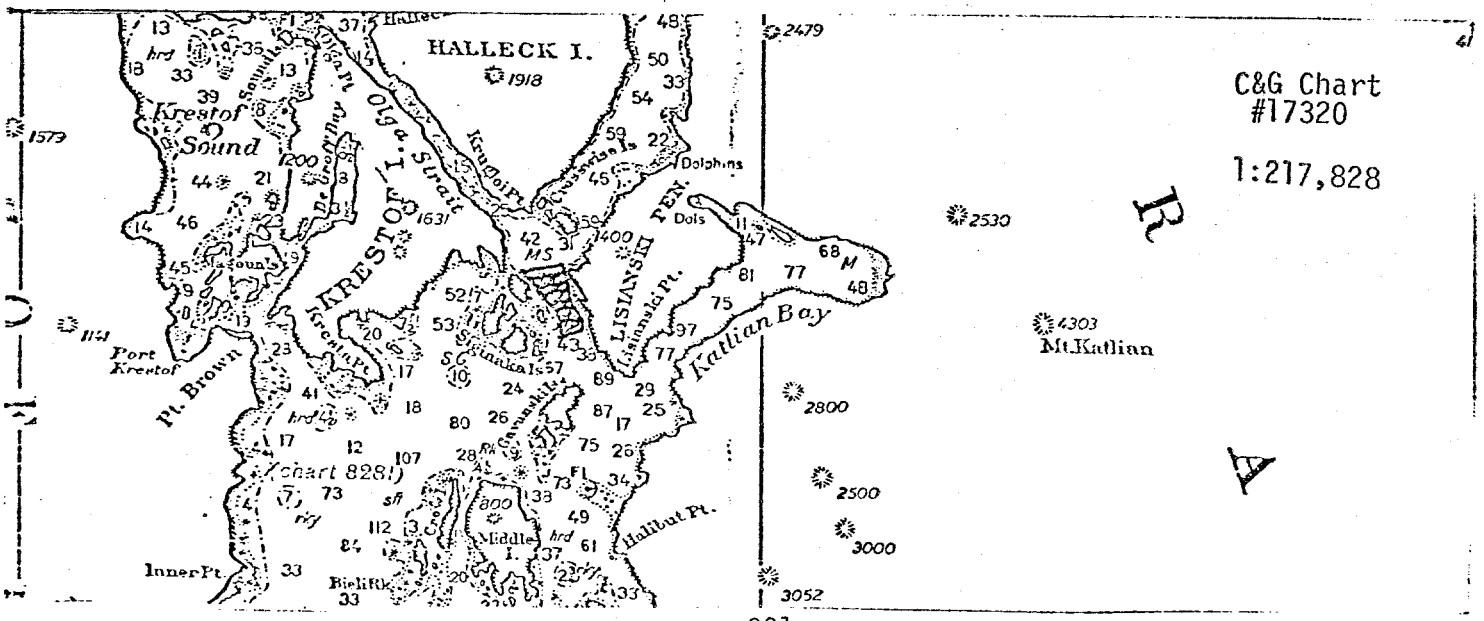



Area Olga Straits Date 2/24/80 Vessel Kittiwake Run # 2

Gain 4.0 Attenuated -12dB Operators Larson, Blankenbeckler, McLeod

Time of Survey: Start 0945 End 1016 Tide High

COMMENTS: Fish distributed well for daylight survey.



Appendix 1 continued.

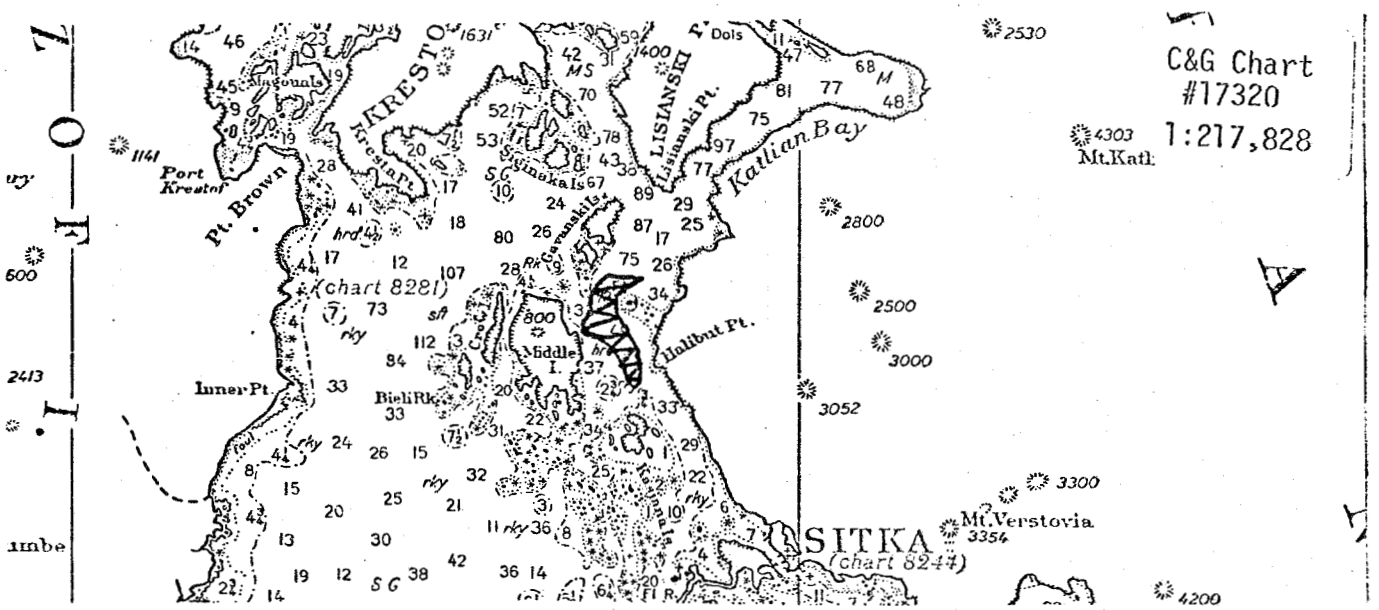
## ACOUSTICAL SURVEY SUMMARY

Area Sitka (Black Can) Date 2/25/80 Vessel Kittiwake Run # 1

Gain 3.2 Attenuated -12dB Operators Blankenbeckler, Larson

Time of Survey: Start 1847 End 1936 Tide

COMMENTS: No saturaiton noted. Survey started when herring were just moving off bottom.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

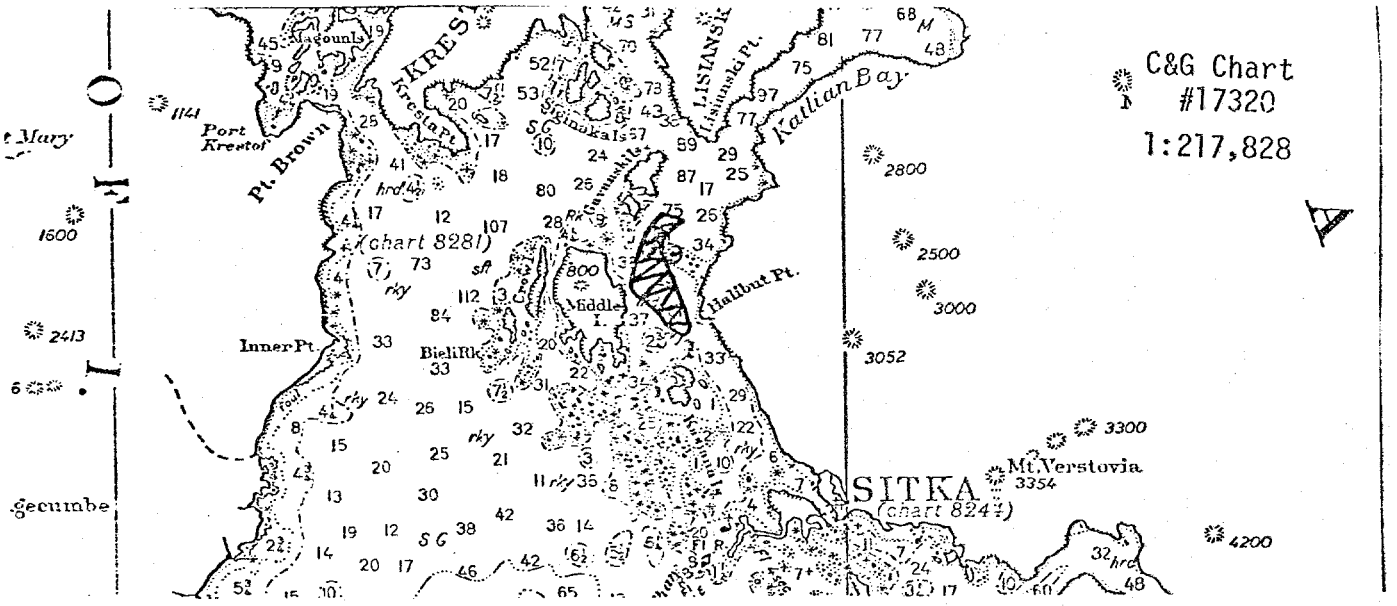
## ACOUSTICAL SURVEY SUMMARY

Area Sitka (Black Can) Date 2/25/80 Vessel Kittiwake Run # 2

Gain 4.4 Attenuated -12dB Operators Blankenbeckler, Larson

Time of Survey: Start 1951 End 2041 Tide Series of small tides

COMMENTS: Similar survey as Run #1. Herring have moved up to 20 fathoms and are dispersing which requires a higher gain setting.

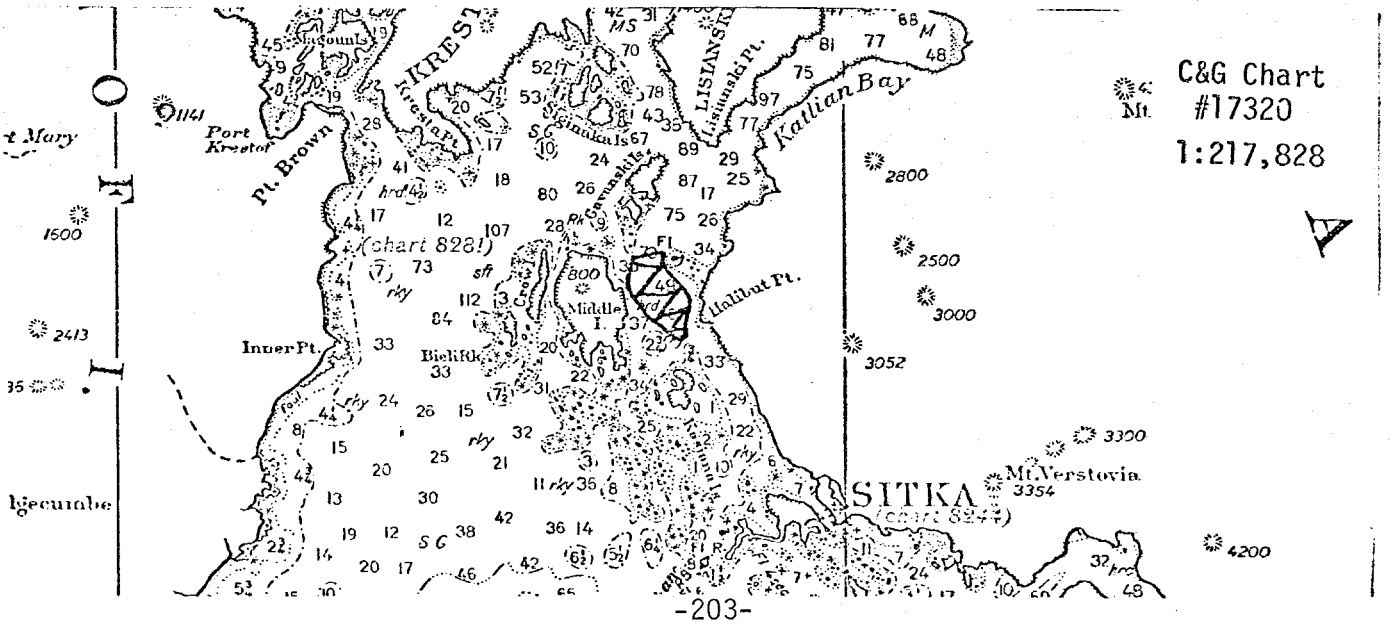



Area Sitka (Black Can) Date 3/11/80 Vessel Kittiwake Run # 1

Gain 3.5 Attenuated -12dB Operators Larson, McLeod

Time of Survey: Start 1853 End 1930 Tide Low at 1544 hrs. of 2.3 ft.

COMMENTS: Kittiwake followed the Steller by 2 legs.



Appendix 1 continued.

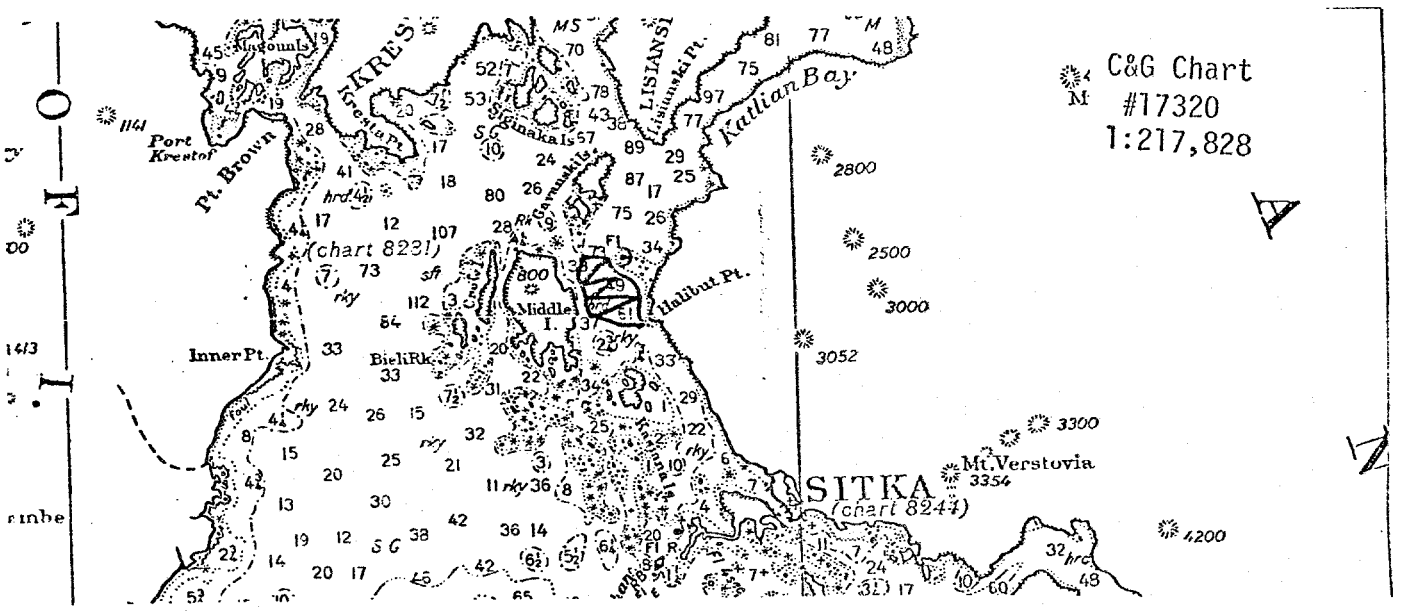
## ACOUSTICAL SURVEY SUMMARY

Area Sitka-Black Can Date 3/11/80 Vessel Kittiwake Run # 2

Gain 3.5 Attenuated -12dB Operators Larson, McLeod

Time of Survey: Start 1943 End 2005 Tide

COMMENTS: Legs #1 and #2 dropped from Run #1. Kittiwake led Steller by two legs.

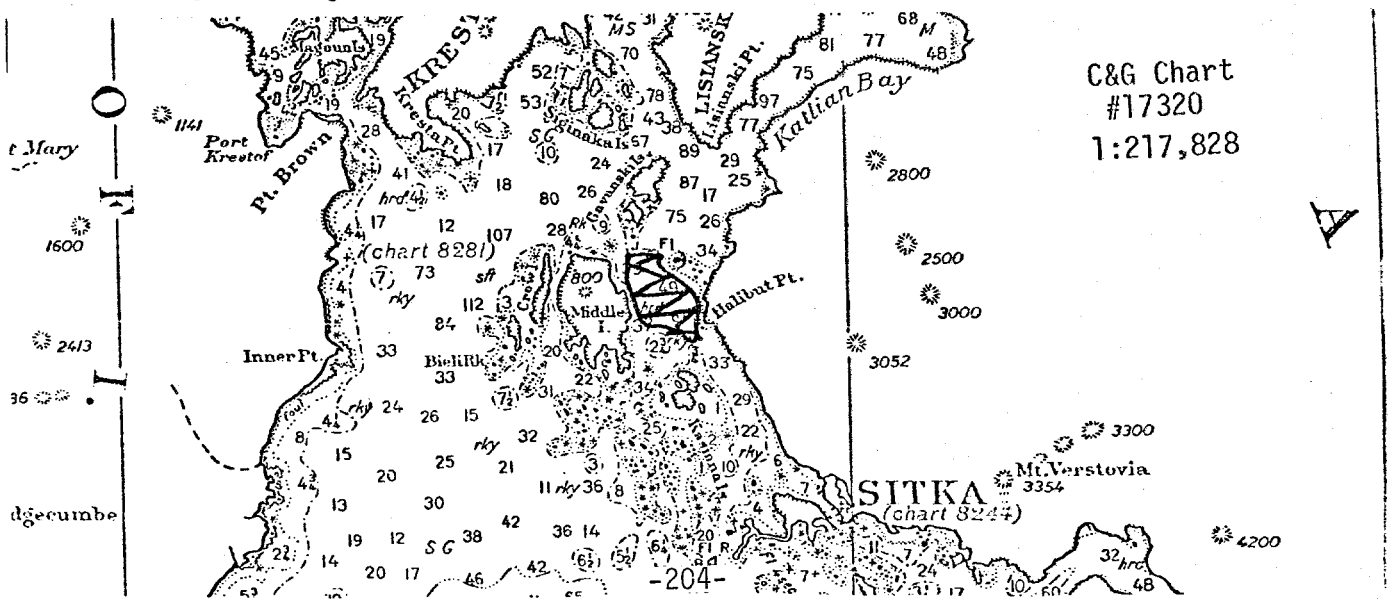



Area Sitka-Black Can Date 3/11/80 Vessel Steller Run # 1

Gain 3.5 Attenuated -12dB Operators Blankenbeckler, Loveless

Time of Survey: Start 1842 End 1916 Tide Series of small tides

COMMENTS: Herring are moving rapidly towards the surface and Middle Island. Some herring are near the bottom on Run #1. Steller led Kittiwake by two legs.



Appendix 1 continued.

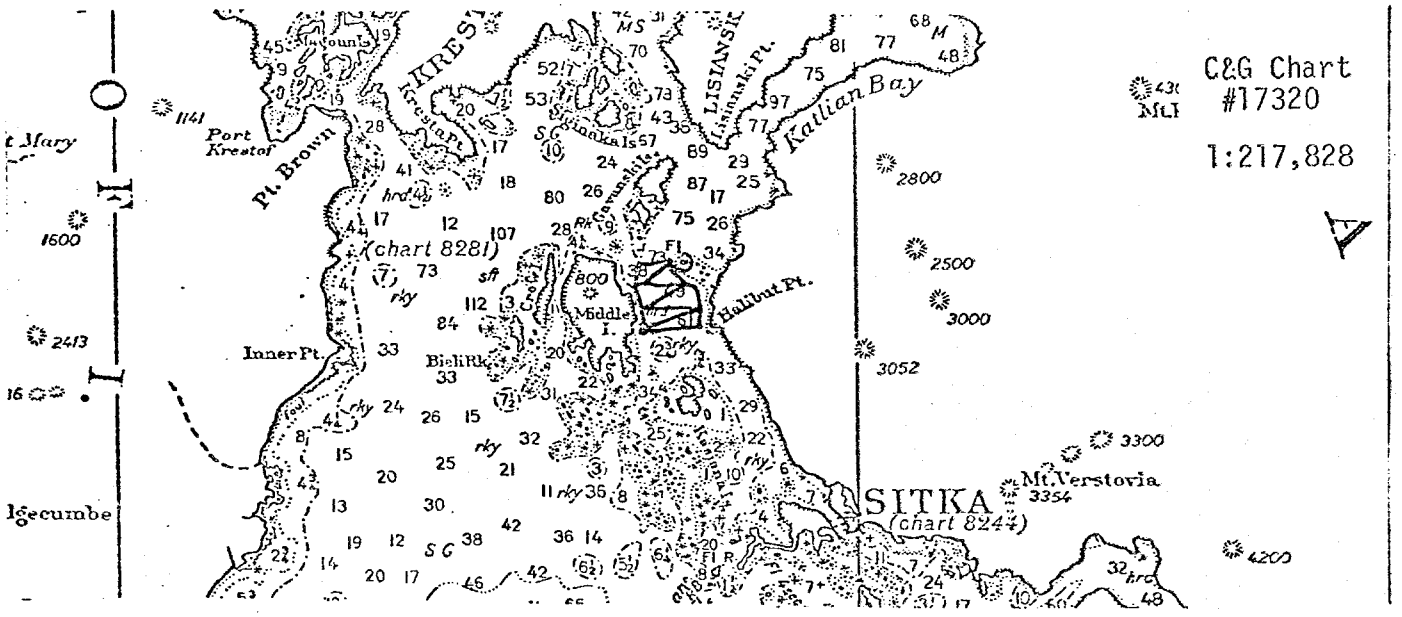
## ACOUSTICAL SURVEY SUMMARY

Area Sitka-Black Can Date 3/11/80 Vessel Steller Run # 2

Gain 3.5 Attenuated -12dB Operators Blankenbeckler, Loveless

Time of Survey: Start 1949 End 2011 Tide Currently a series of small tides

COMMENTS: Steller followed Kittiwake on this run by two legs.

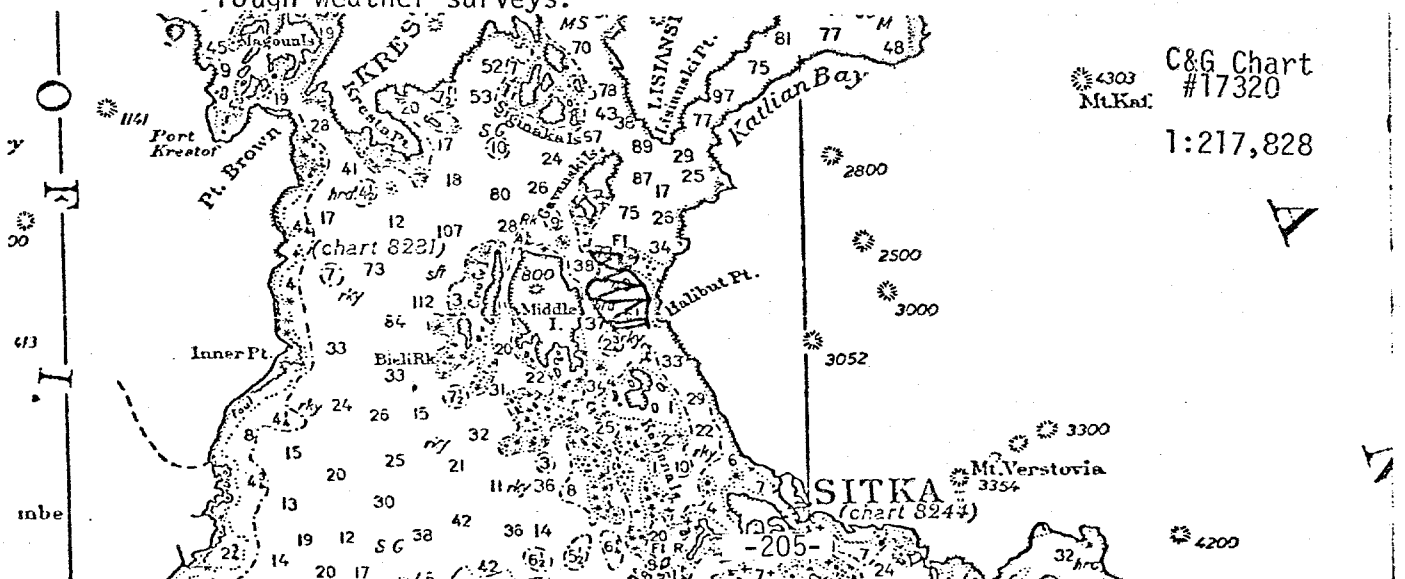



Area Sitka-Black Can Date 3/15/80 Vessel Kittiwake Run # 1

Gain 3.5 Attenuated -12dB Operators Blankenbeckler, McLeod

Time of Survey: Start 1931 End 2013 Tide Building tides

COMMENTS: No saturation problems. Kittiwake following Steller for duplicate run. This is a good run. Herring rising fast off the bottom so vessels had to be relatively close to obtain similar results. No wake interference observed on oscilliscope and only one trace on echogram, similar to rough weather surveys.



Appendix 1 continued.

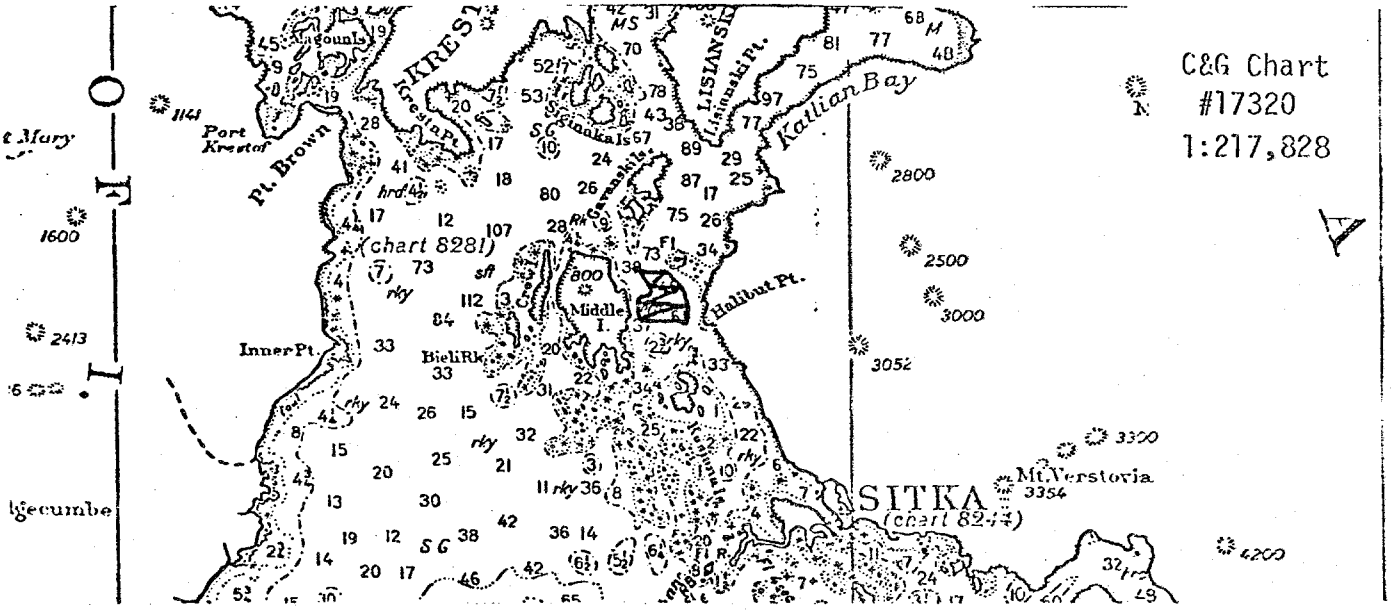
## ACOUSTICAL SURVEY SUMMARY

Area Sitka-Black Can Date 3/15/80 Vessel Kittiwake Run # 2

Gain 3.5 Attenuated -12dB Operators Blankenbeckler, McLeod

Time of Survey: Start 2021 End 2051 Tide Building

COMMENTS: This run should have been done at higher gain do to dispersion. Kittiwake leading Steller on this run. Vessels relatively close together to obtain similar results.

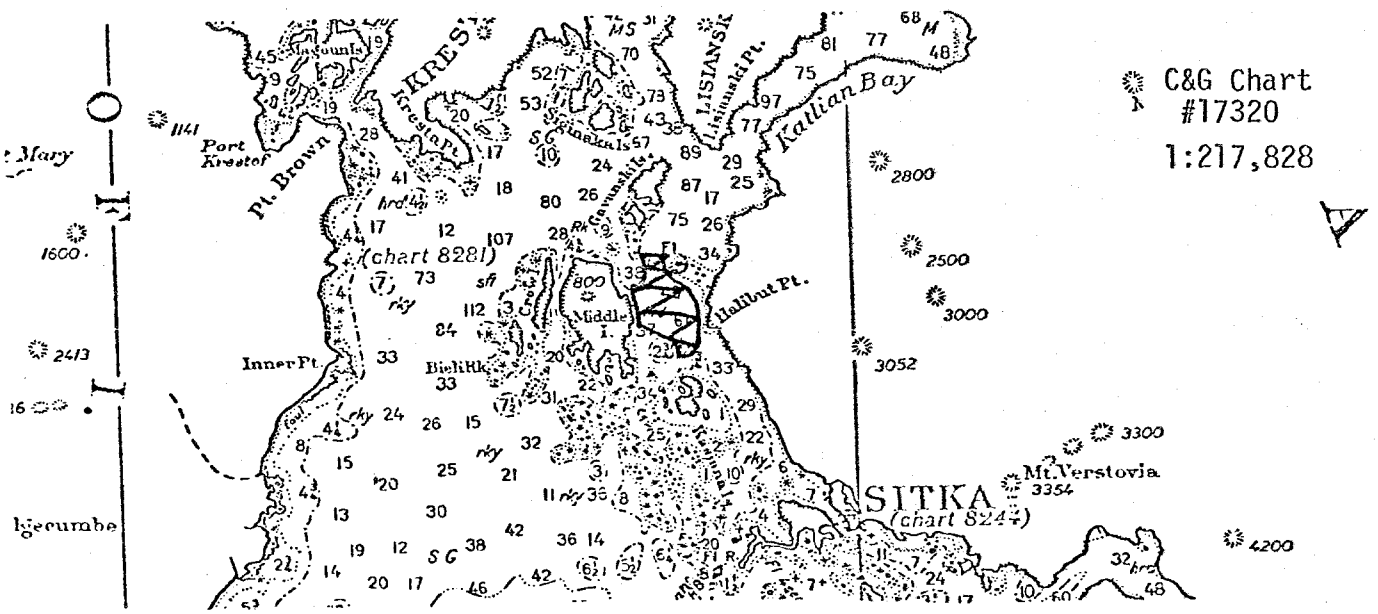



Area Sitka-Black Can Date 3/15/80 Vessel Steller Run # 1

Gain 3.5 Attenuated -12dB Operators Larson, Loveless

Time of Survey: Start 1918 End 1958 Tide

COMMENTS: Steller leading Kittiwake on this run.



Appendix 1 continued.

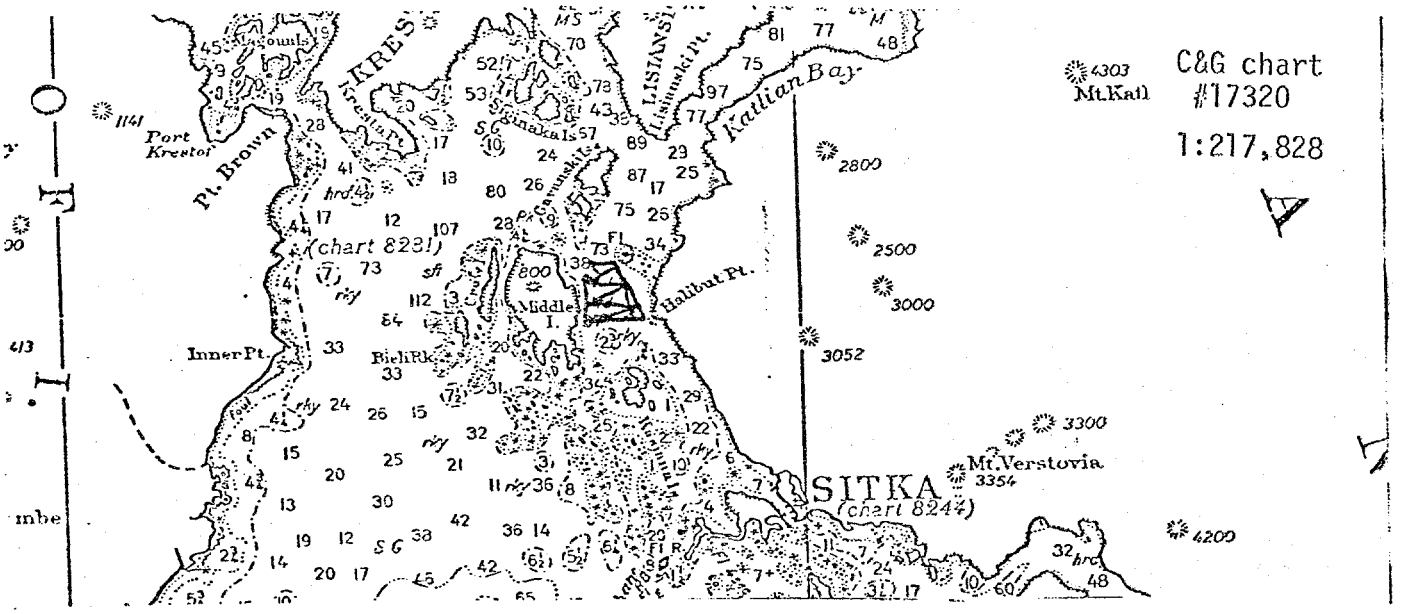
## ACOUSTICAL SURVEY SUMMARY

Area Sitka-Black Can Date 3/15/80 Vessel Steller Run # 2

Gain 3.5 Attenuated -12dB Operators Larson, Loveless

Time of Survey: Start 2013 End 2043 Tide

COMMENTS: Steller followed Kittiwake this run.

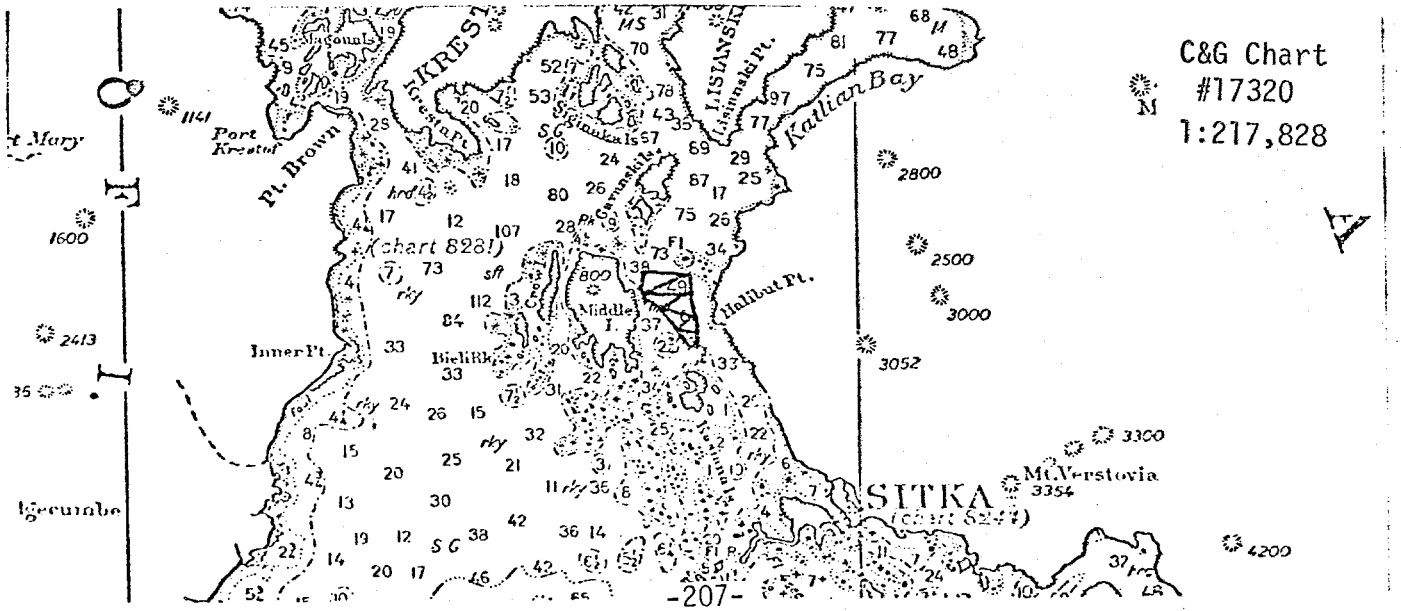



Area Sitka-Black Can Date 3/16/80 Vessel Kittiwake Run # 1

Gain 3.5 Attenuated -12dB Operators Larson, McLeod

Time of Survey: Start 1938 End 2015 Tide Low at 1942 hrs. of -1.5 feet

COMMENTS: Kittiwake following Steller by 2 1/2 legs.



Appendix 1 continued.

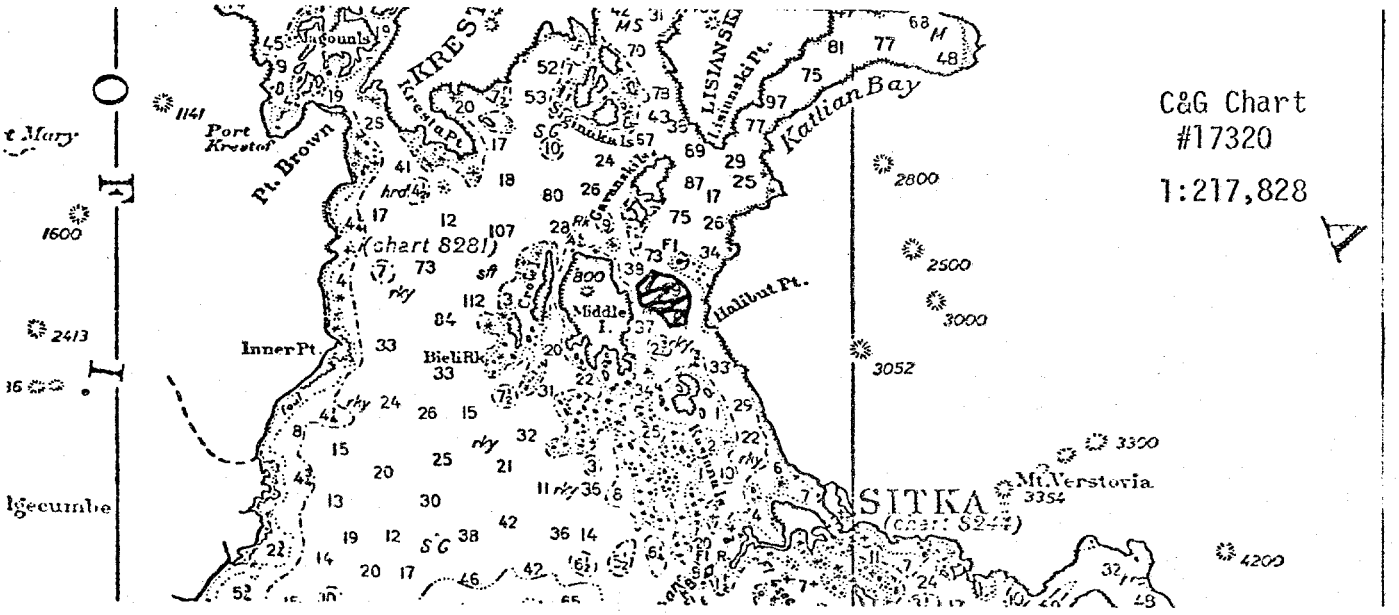
## ACOUSTICAL SURVEY SUMMARY

Area Sitka-Black Can Date 3/16/80 Vessel Kittiwake Run # 2

Gain 5.0 Attenuated -12dB Operators Larson, McLeod

Time of Survey: Start 2024 End 2101 Tide 1942 hrs. - -1.5'

COMMENTS: Duplicate of Run #1. Kittiwake leading Steller. Good fish signals with little saturation.

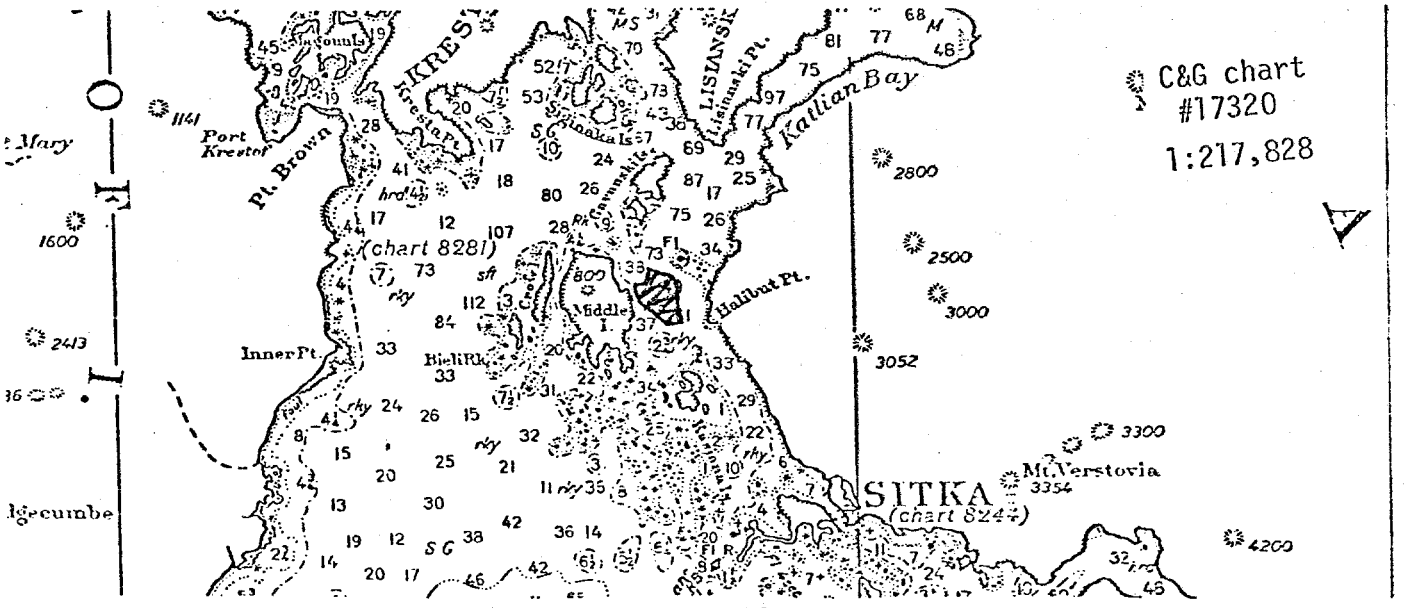



Area Sitka-Black Can Date 3/16/80 Vessel Steller Run # 1

Gain 3.5 Attenuated -12dB Operators Blankenbeckler, Loveless

Time of Survey: Start 1940 End 2015 Tide

COMMENTS: Steller leading Kittiwake. Only occasional spikes of saturation.



Appendix 1 continued.

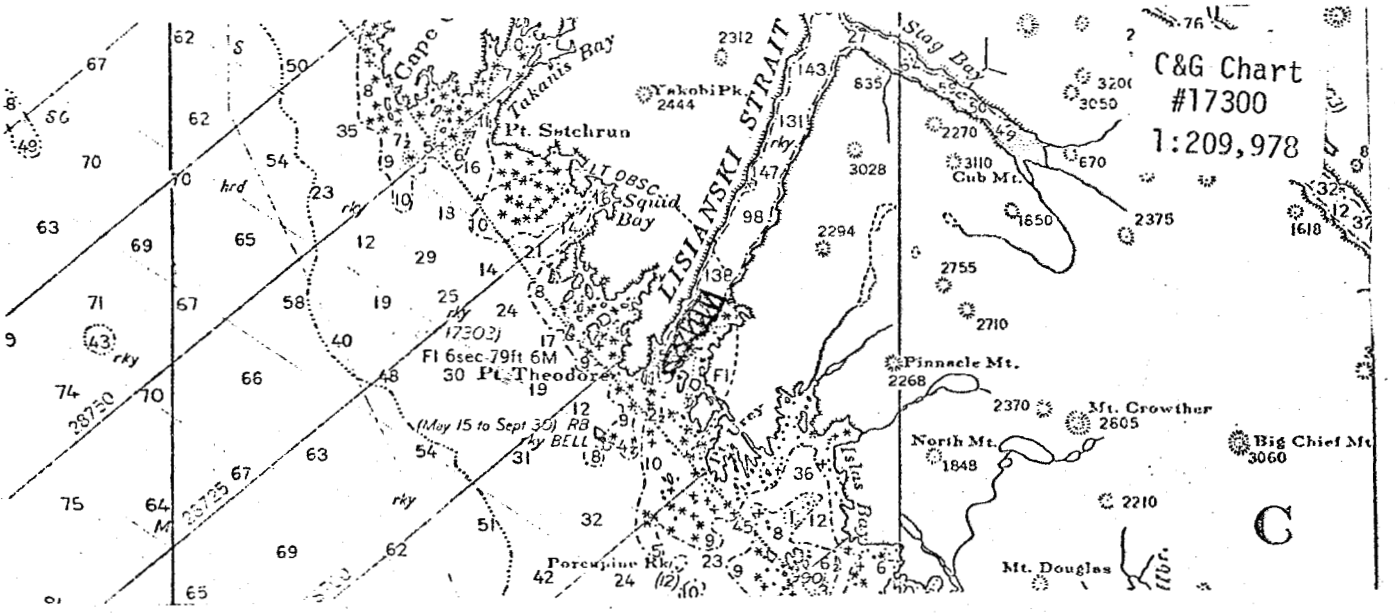
## ACOUSTICAL SURVEY SUMMARY

Area Lisianski Straits Date 12/13/79 Vessel Kittiwake Run # 1

Gain 5.0 Attenuated -12dB Operators Blankenbeckler

Time of Survey: Start 1604 End 1623 Tide

COMMENTS: Fish distributed deep but movement noted between runs. Herring outside survey area estimated at 1.0 x $10^6$ lbs.

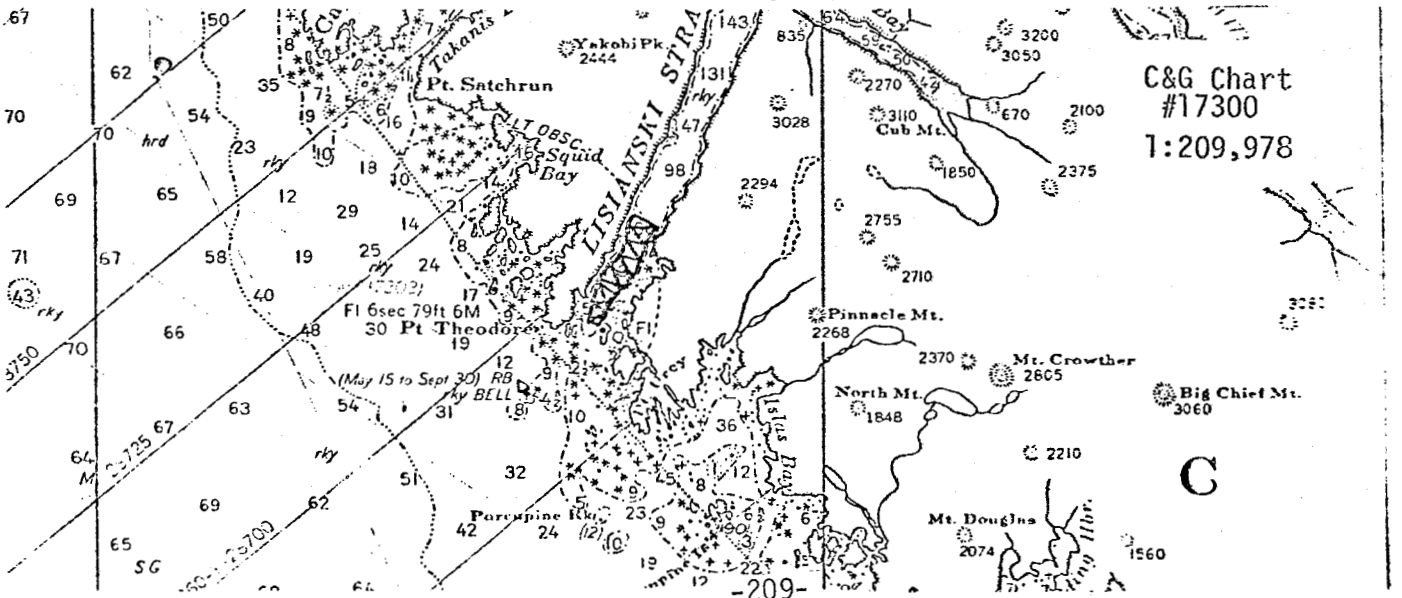



Area Lisianski Straits Date 12/13/79 Vessel Kittiwake Run # 2

Gain 5.0 Attenuated -12dB Operators Blankenbeckler

Time of Survey: Start 1629 End 1700 Tide

COMMENTS: No saturation observed. Sea lions and birds in the area of the herring schools. Herring outside survey area estimated at 1.0 x $10^6$ lbs. An additional 1.0 x $10^6$ lbs. in Stag Bay.



Appendix 1 continued.

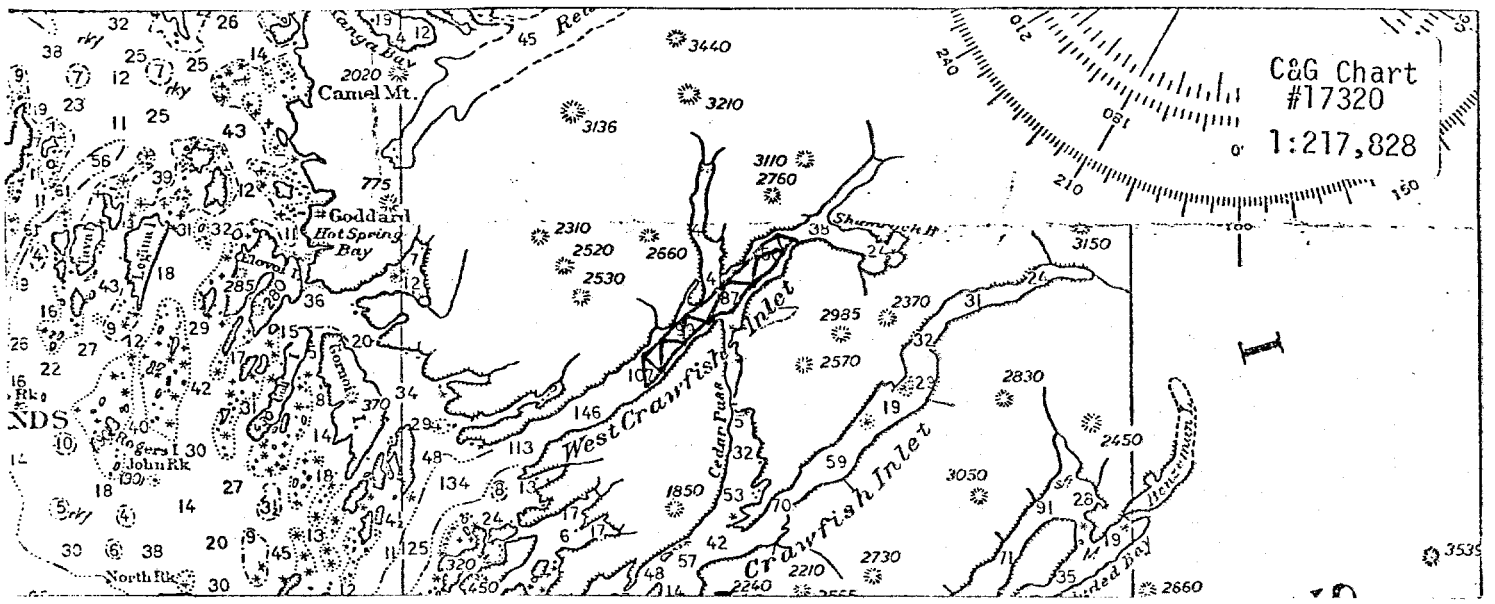
## ACOUSTICAL SURVEY SUMMARY

Area West Crawfish Date 11/5/77 Vessel J.N. Cobb Run # 1

Gain 8.0 Attenuated -12 dB Operators Krieger

Time of Survey: Start 06:46 End 07:30 Tide

COMMENTS: Vessel speed: 7.5 knots. Did not get on outside of fish at the beginning of the survey. The scattered fish extended for another 2 miles beyond Transect #1.

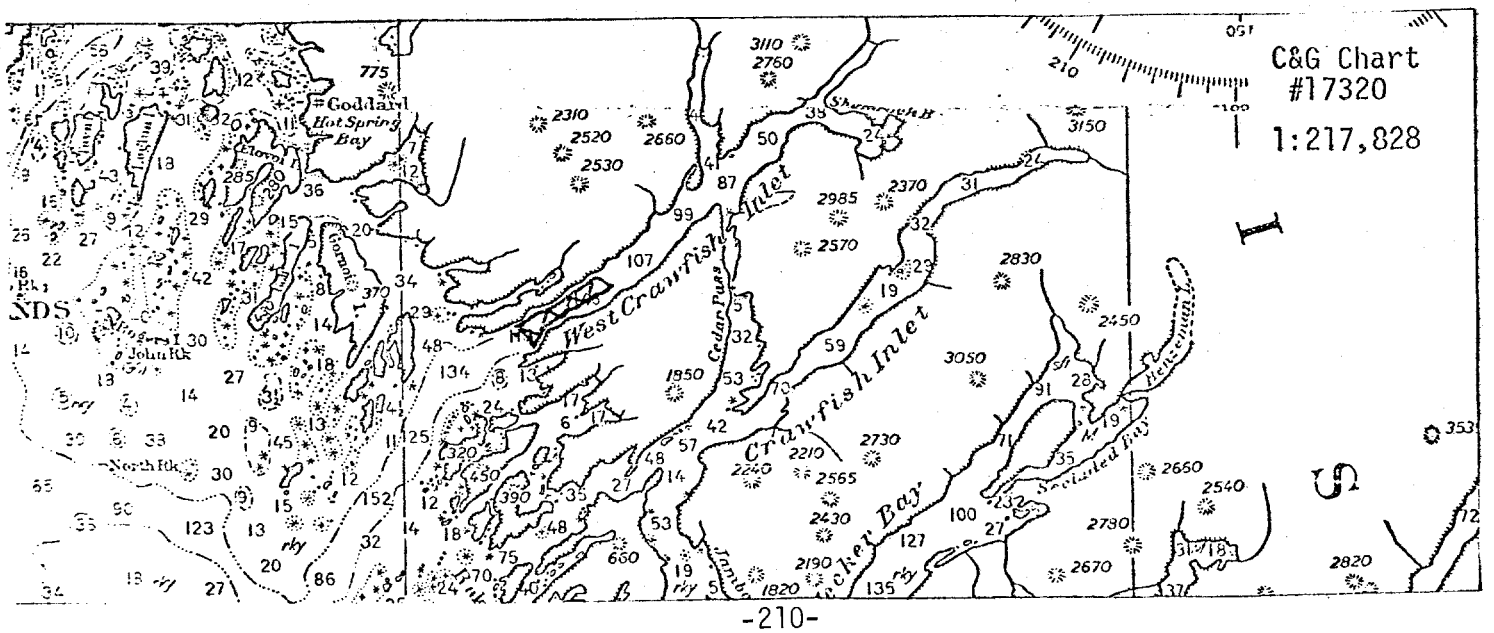



Area West Crawfish Date 1/30/78 Vessel J.N. Cobb Run # 1

Gain 5.0 Attenuated -12 dB Operators Krieger, Copeland

Time of Survey: Start 08:27 End 09:03 Tide

COMMENTS:



Appendix 1 continued.

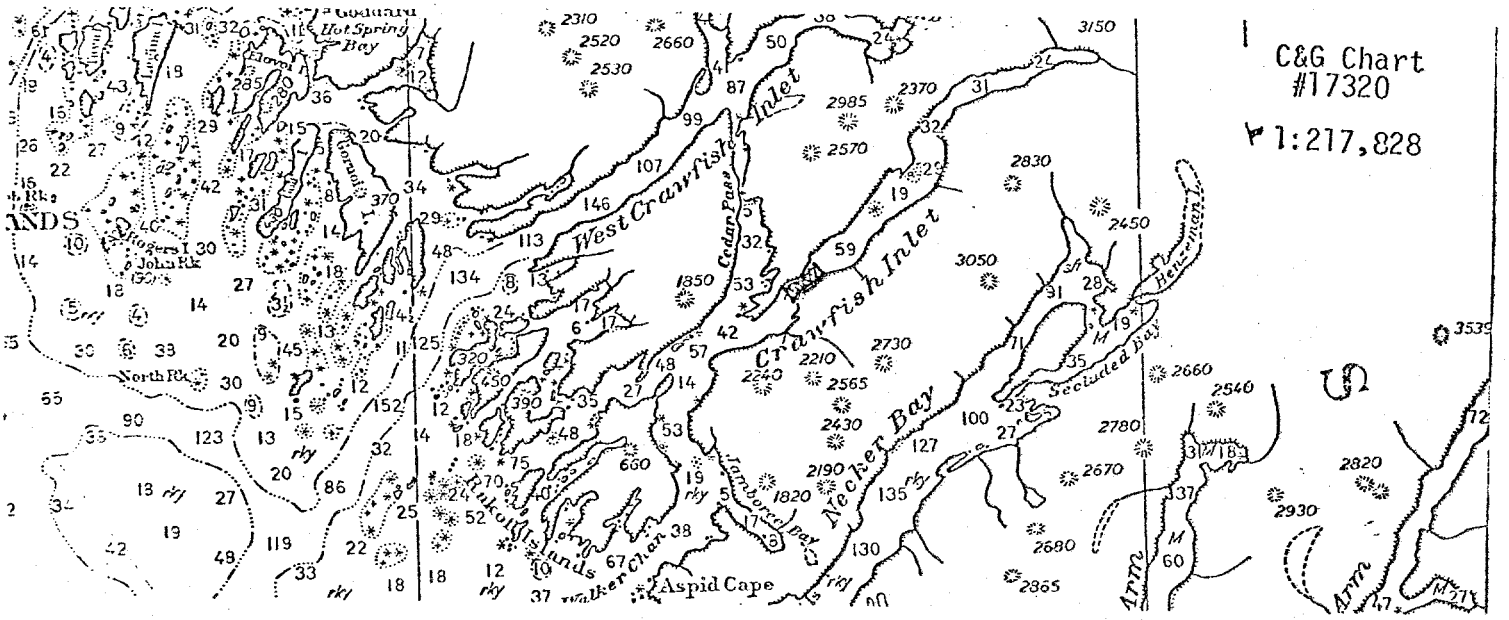
## ACOUSTICAL SURVEY SUMMARY

Area Crawfish Inlet Date 1/11/79 Vessel Kittiwake Run # 1

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1820 End 1842 Tide Large tides; low 7:00 pm

COMMENTS: No saturation noted. Fish were near shore making turns difficult. Survey started well after dark.

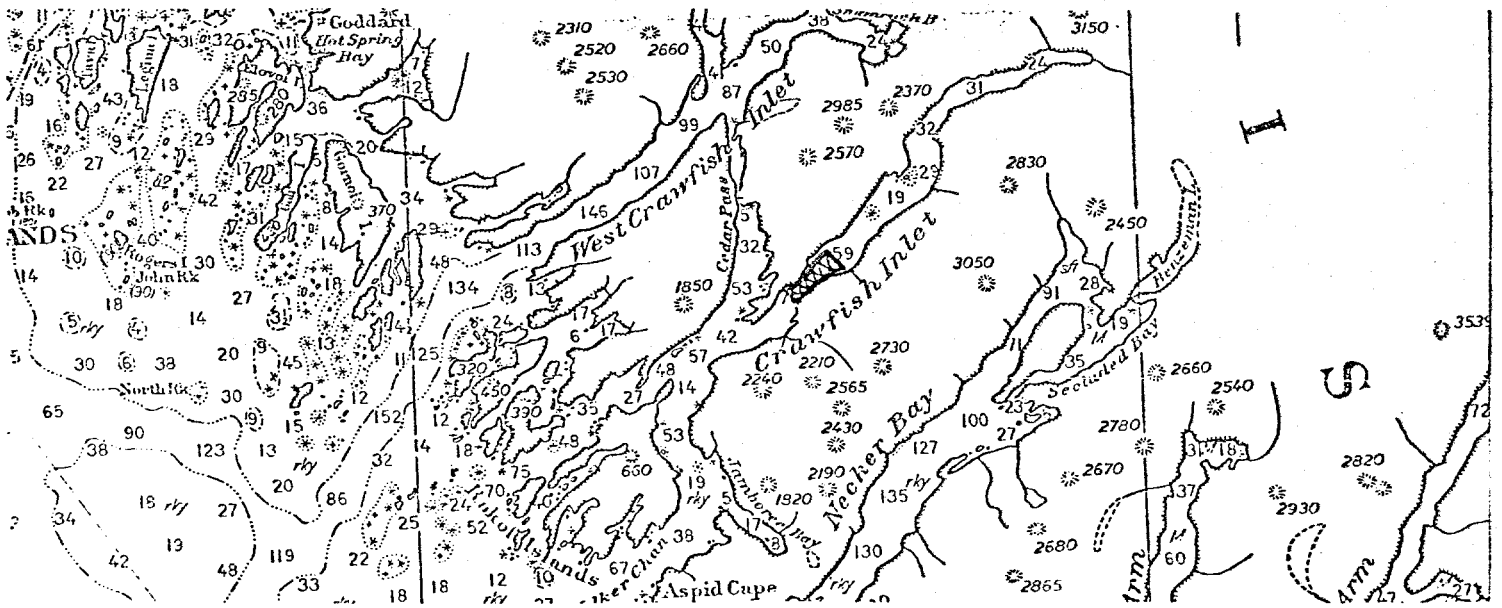



Area Crawfish Inlet Date 1/13/79 Vessel Kittiwake Run # 1

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1732 End 1755 Tide Large tides; full moon

COMMENTS: No saturation noted. No birds or predators in the area.



Appendix 1 continued.

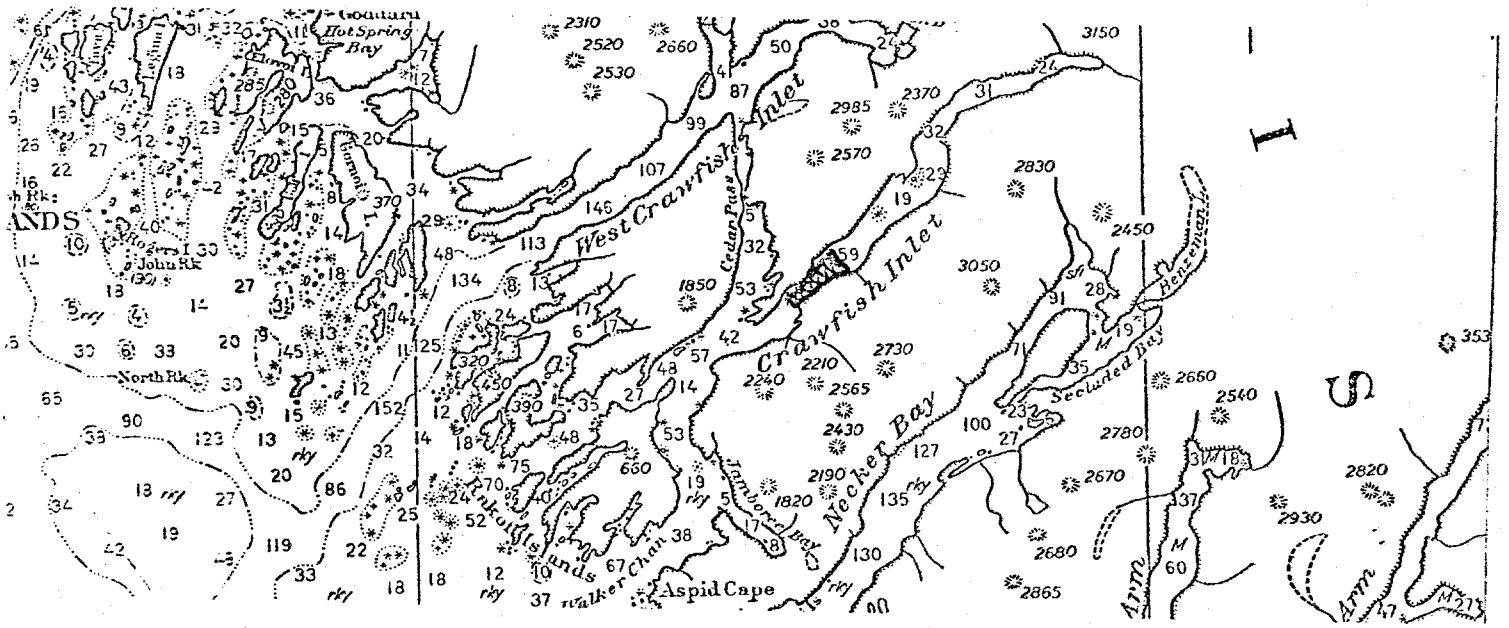
## ACOUSTICAL SURVEY SUMMARY

Area Crawfish Inlet Date 1/13/79 Vessel Kittiwake Run # 2

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1801 End 1823 Tide Large tides; full moon

COMMENTS: Good distribution. No problems with movement during survey. Survey conducted after dark.




Area _____ Date _____ Vessel _____ Run # _____

Gain _____ Attenuated _____ Operators _____

Time of Survey: Start _____ End _____ Tide _____

COMMENTS:

Appendix 1 continued.

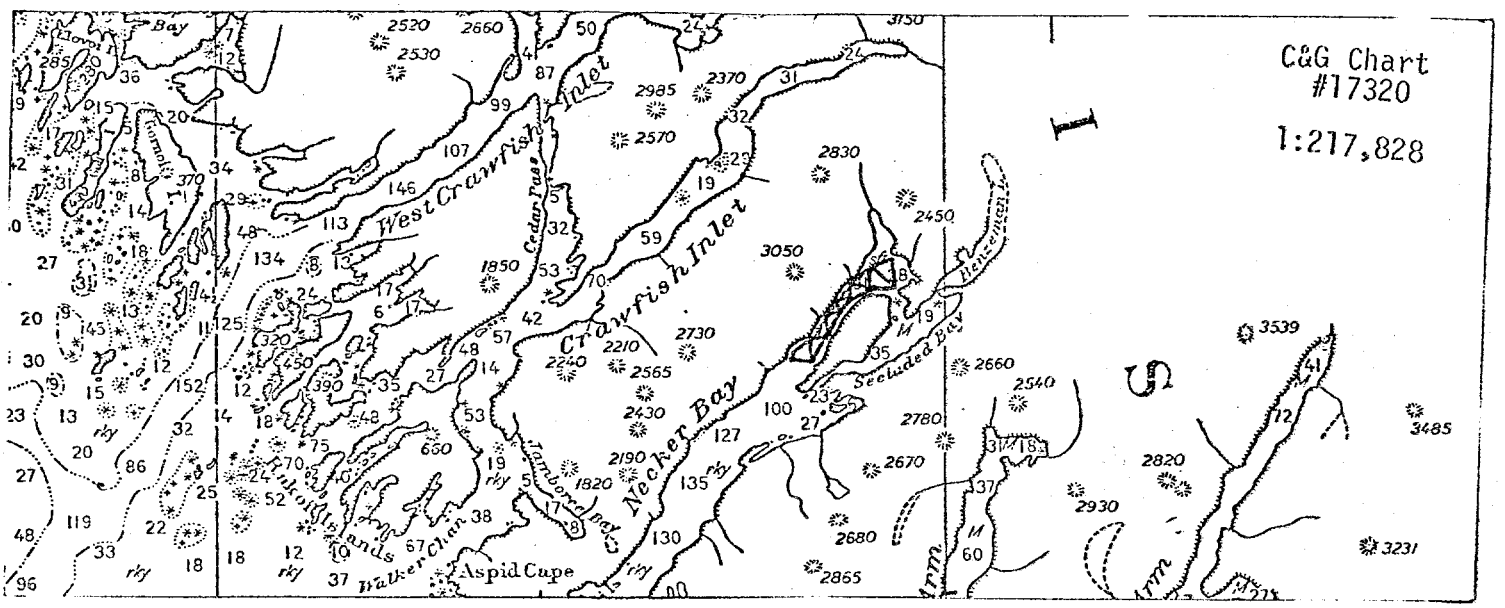
## ACOUSTICAL SURVEY SUMMARY

Area Necker Bay Date 11/4/77 Vessel J.N. Cobb Run # 1

Gain 6.0 Attenuated -12 dB Operators Krieger

Time of Survey: Start 17:17 End 17:54 Tide

COMMENTS: There are more fish in Necker Bay than what shows on the survey. The fish were close to the beach in the narrow part of the bay.

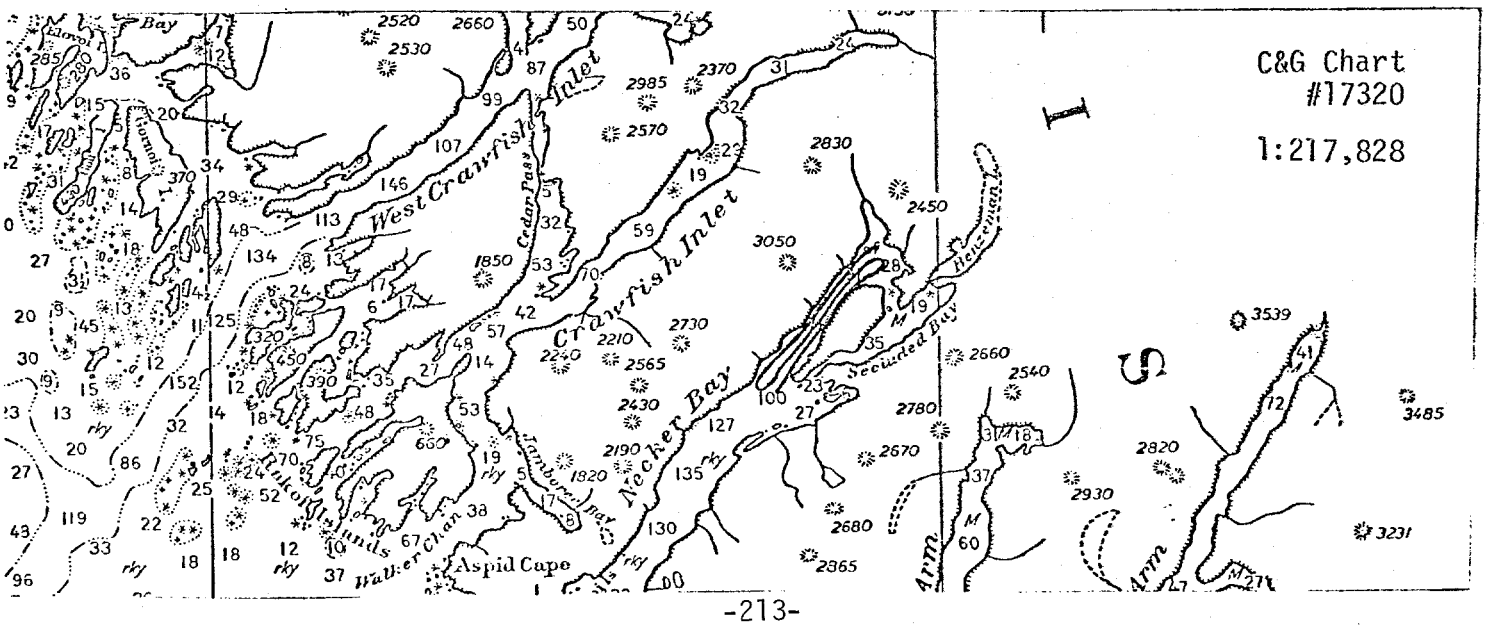



Area Necker Bay Date 11/4/77 Vessel J.N. Cobb Run # 2

Gain 6.5 Attenuated -12 dB Operators Krieger

Time of Survey: Start 18:36 End 19:46 Tide

COMMENTS: Once again we were not over fish very long because they were so close to shore.



Appendix 1 continued.

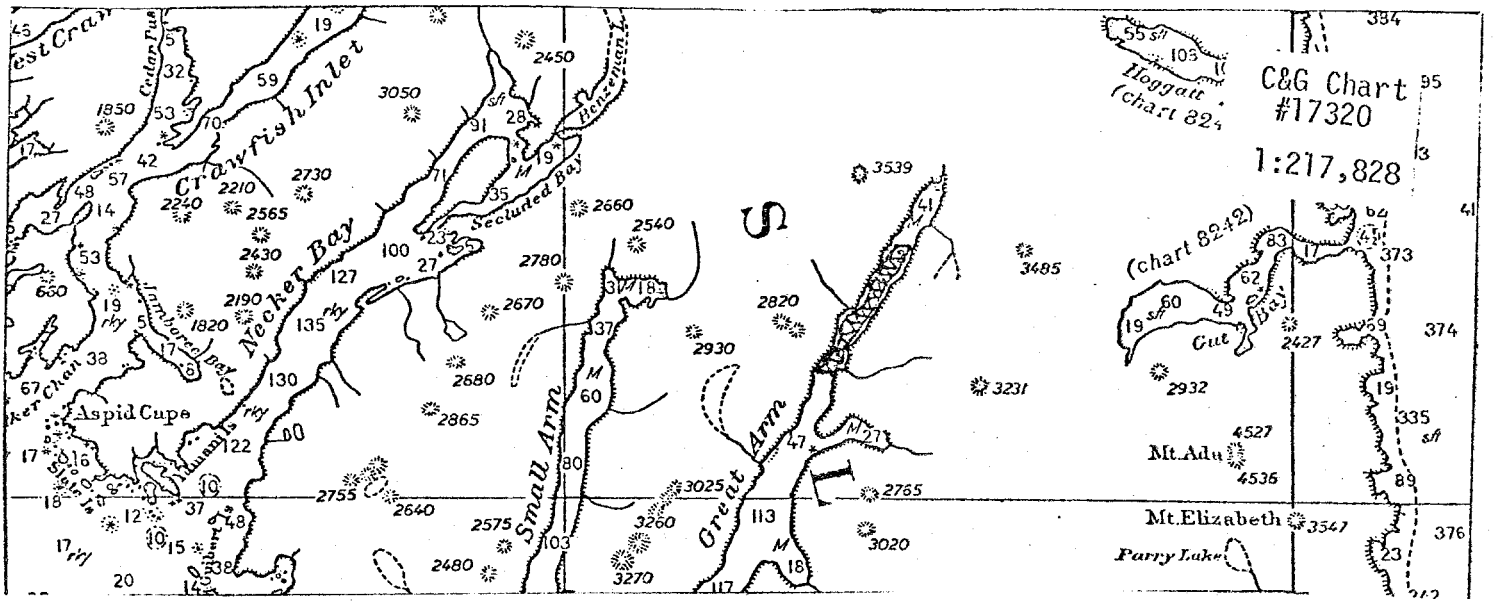
## ACOUSTICAL SURVEY SUMMARY

Area Whale Bay Date 11/4/77 Vessel J.H. Cobb Run # 1

Gain 7.7 Attenuated -12 dB Operators Krieger

Time of Survey: Start 07:19 End 08:07 Tide

COMMENTS: Majority of fish are on bottom by end of run.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Appendix 1 continued.

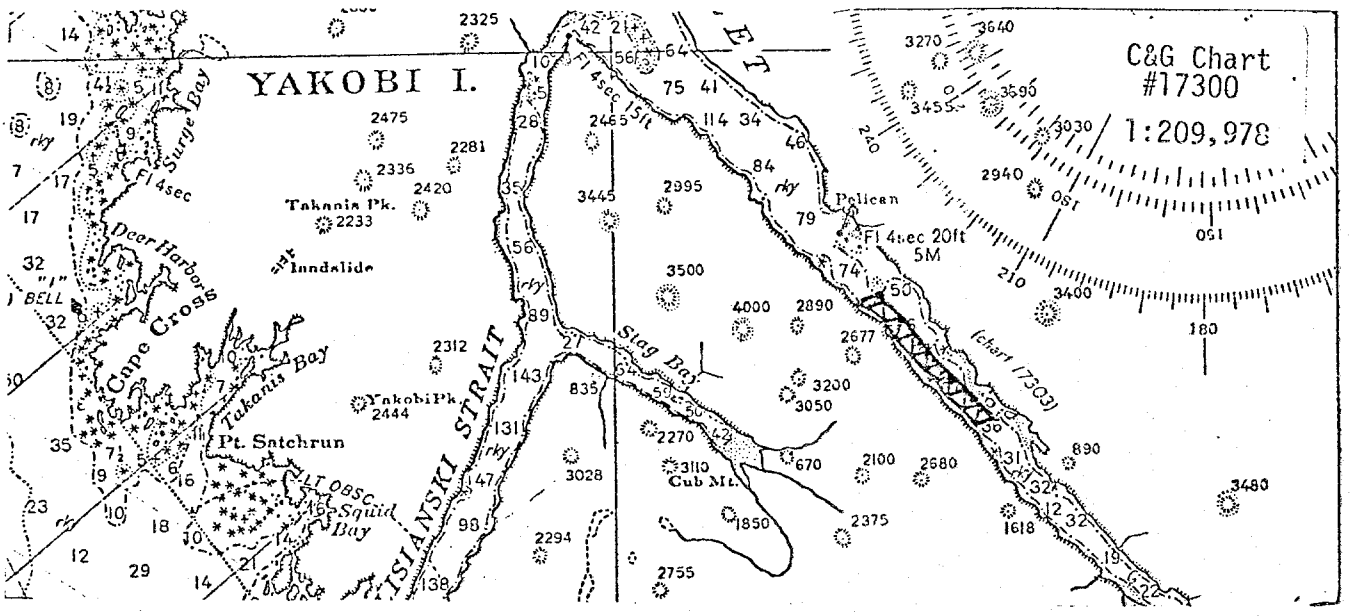
## ACOUSTICAL SURVEY SUMMARY

Area Lisianski Inlet Date 11/13/77 Vessel John N. Cobb Run # 1

Gain 5.5 Attenuated -12 dB Operators Dahlberg, Straty

Time of Survey: Start 18:14 End 19:15 Tide

COMMENTS: Sample trawling conducted in survey area.

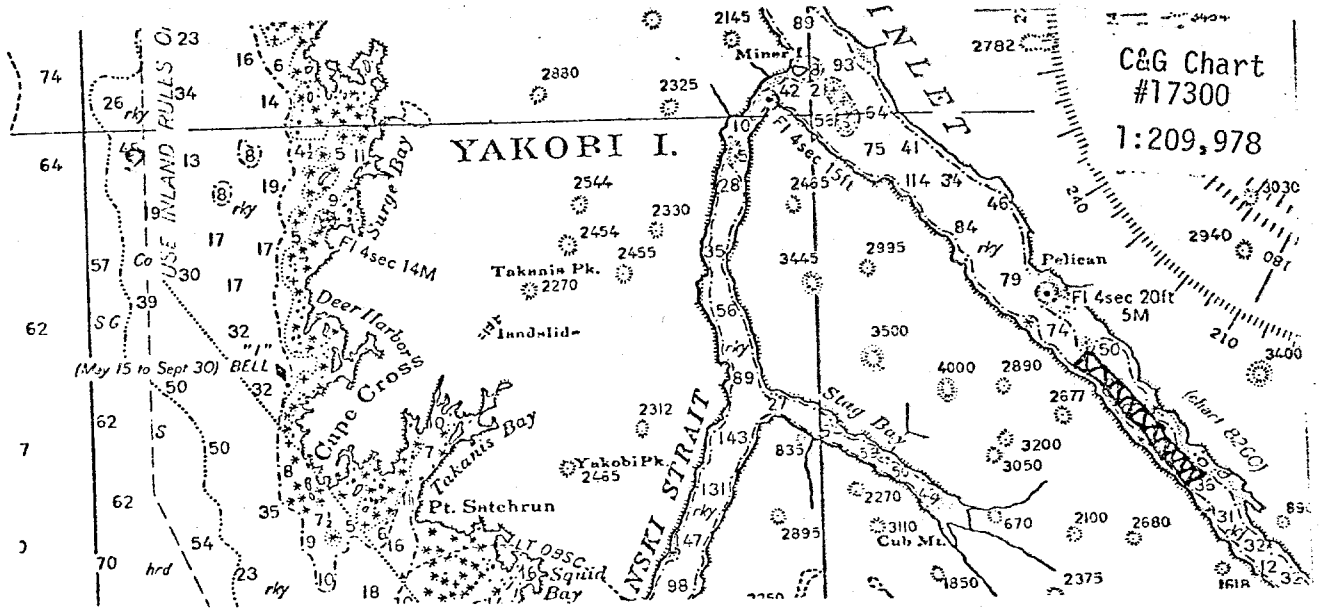



Area Lisianski Inlet Date 11/13/77 Vessel John N. Cobb Run # 2

Gain 5.0 Attenuated -12 dB Operators Dahlberg, Straty

Time of Survey: Start 19:43 End 20:45 Tide

COMMENTS:



Appendix 1 continued.

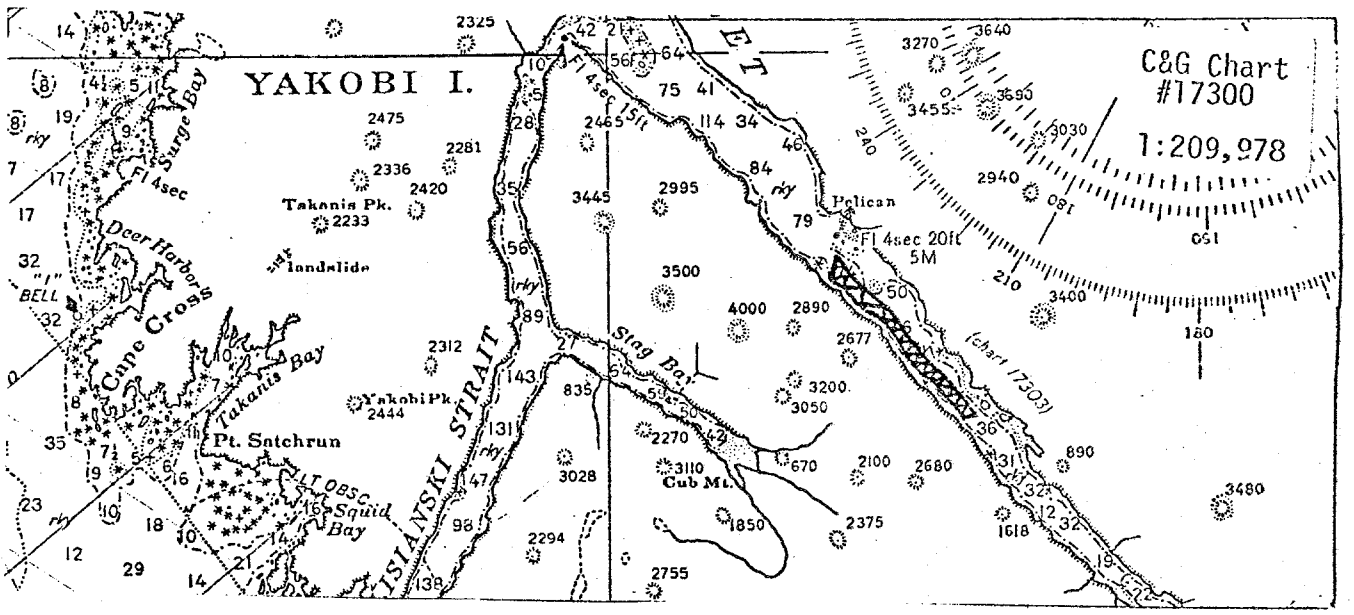
## ACOUSTICAL SURVEY SUMMARY

Area Lisianski Date 11/13/77 Vessel John N. Cobb Run # 3

Gain 5.0 Attenuated -12 dB Operators Dahlberg, Straty

Time of Survey: Start 21:13 End 22:08 Tide

COMMENTS: Trawling done in conjunction with survey - majority adult herring.

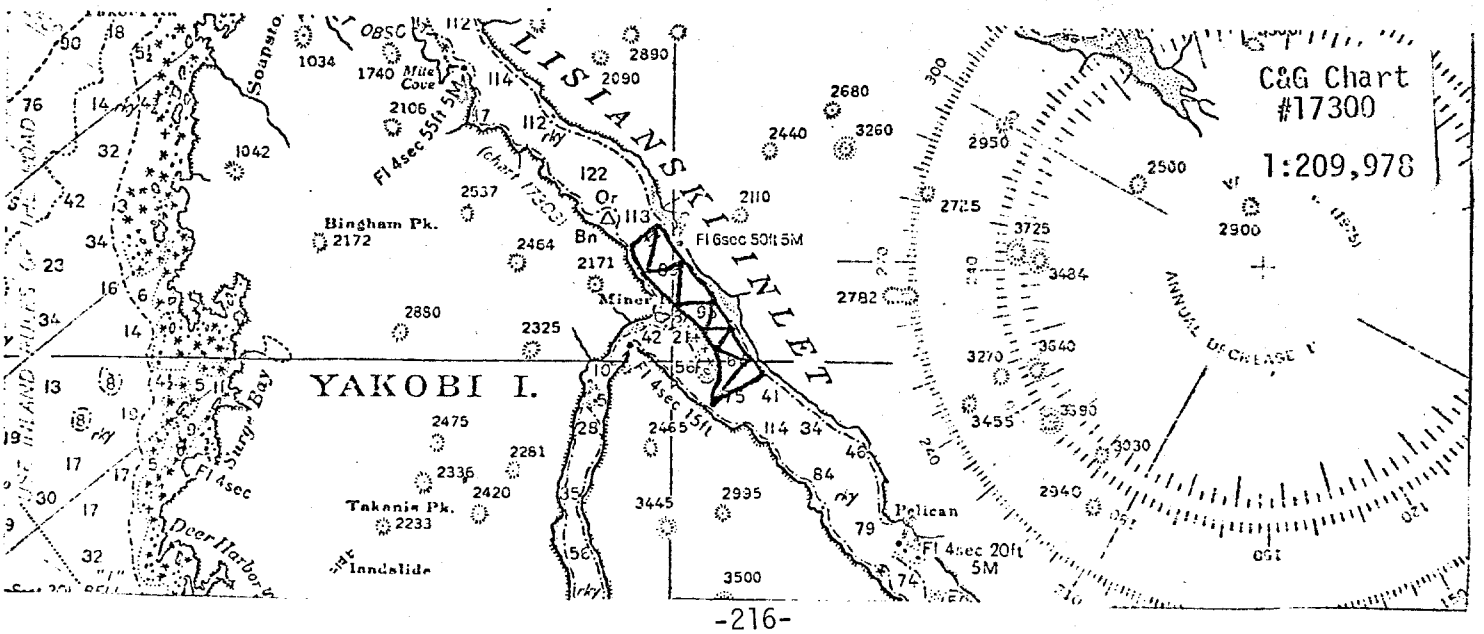



Area Lisianski Inlet Date 1/23/78 Vessel J.N. Cobb Run # 1

Gain 4.5 Attenuated -12 dB Operators Krieger, Blankenbeckler

Time of Survey: Start 20:14 End 20:57 Tide

COMMENTS: Slight saturation on one leg.



Appendix 1 continued.

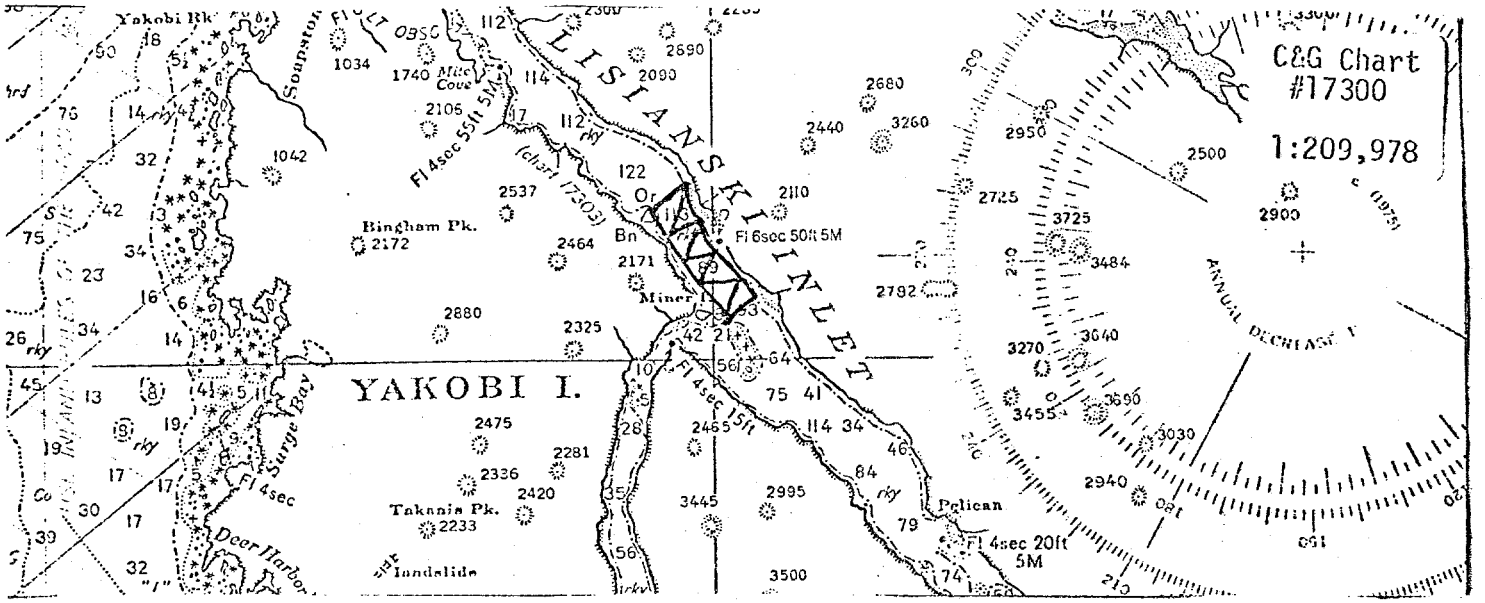
## ACOUSTICAL SURVEY SUMMARY

Area Lisianski Inlet Date 1/24/78 Vessel J.N. Cobb Run # 1

Gain 4.0 Attenuated -12 dB Operators Krieger, Blankenbeckler

Time of Survey: Start 21:00 End 21:30 Tide

COMMENTS:

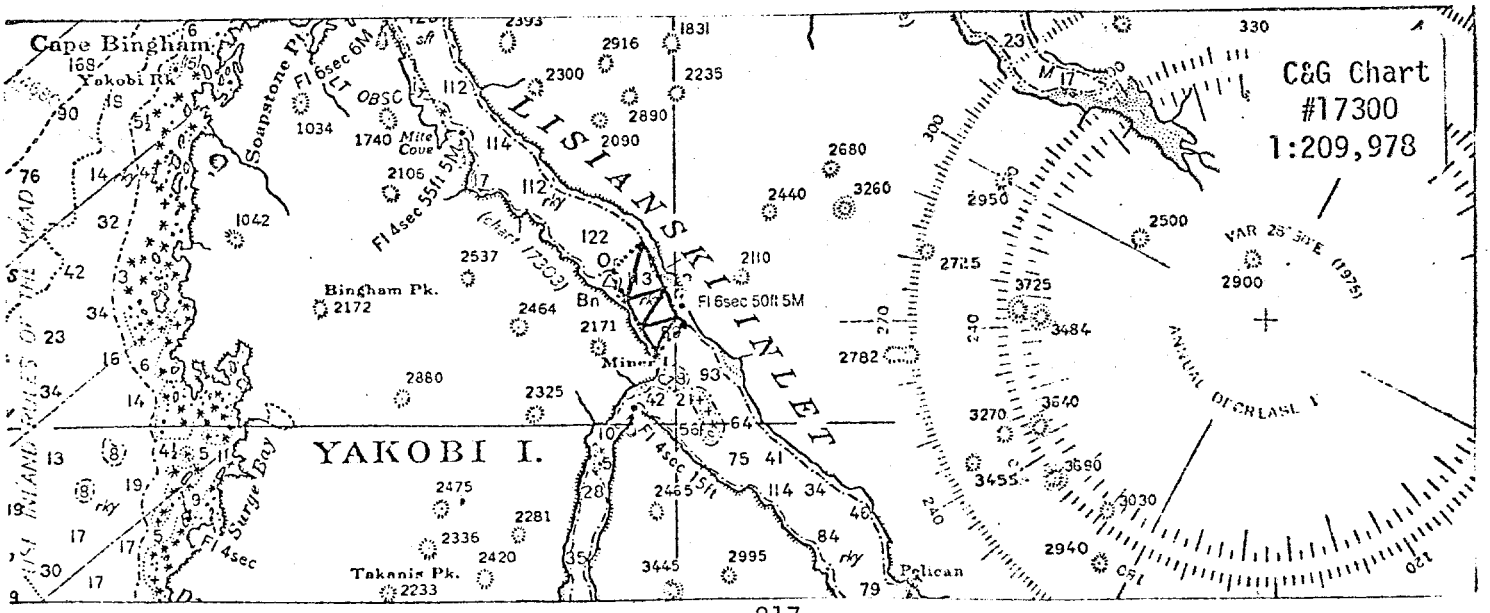



Area Lisianski Inlet Date 1/25/78 Vessel J.N. Cobb Run # 1

Gain 4.5 Attenuated -12 dB Operators Krieger

Time of Survey: Start 08:24 End 08:49 Tide

COMMENTS:



Appendix 1 continued.

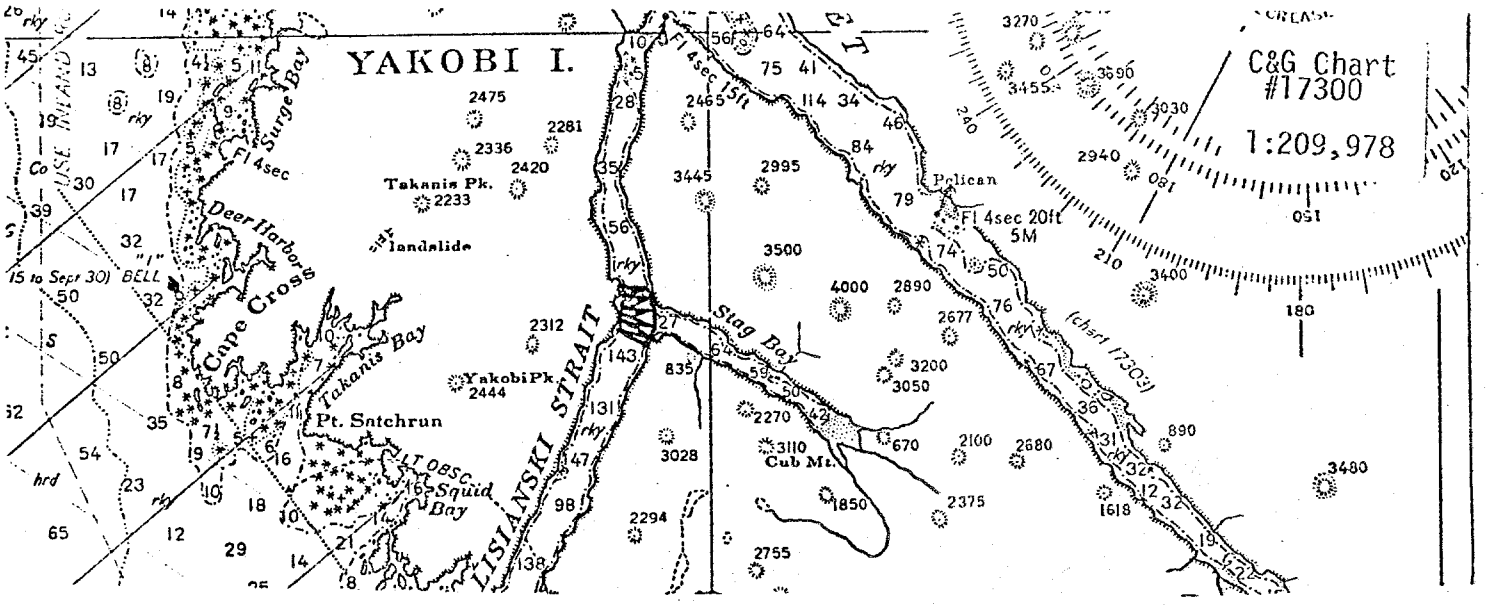
## ACOUSTICAL SURVEY SUMMARY

Area Lisianski Straits Date 11/11/78 Vessel Kittiwake Run # 1

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1900 End 1930 Tide Large, building tides

COMMENTS:

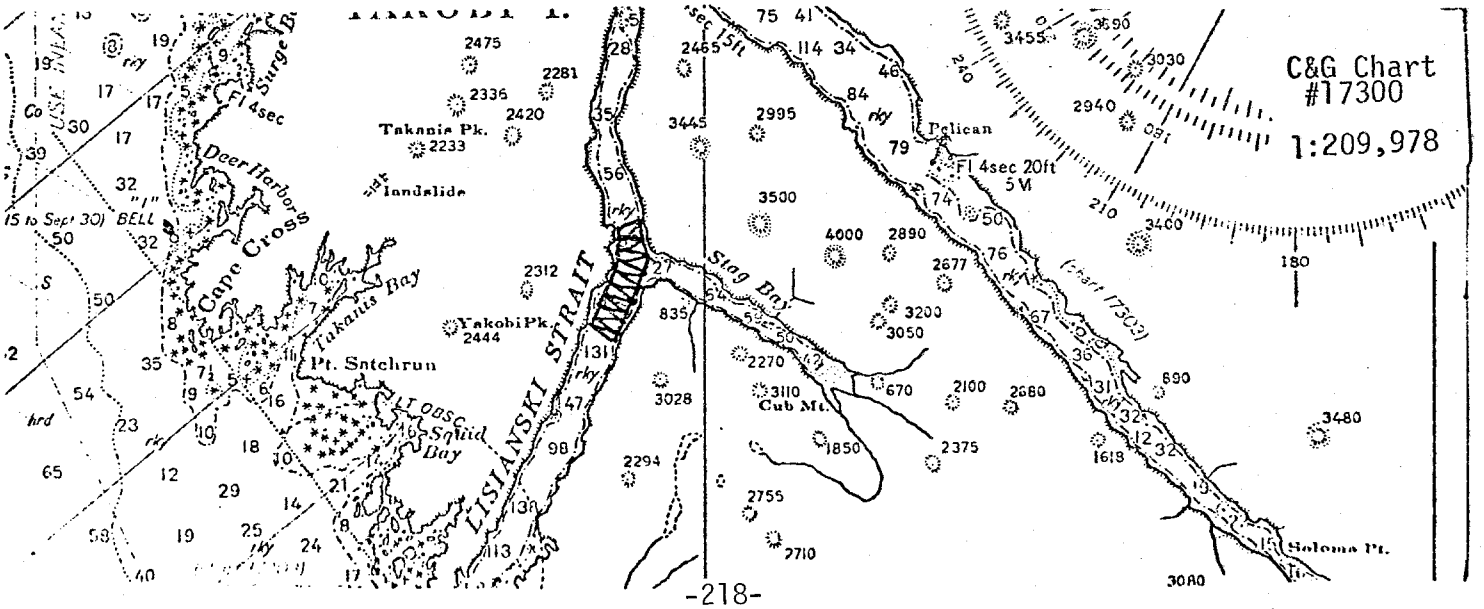



Area Lisianski Straits Date 11/11/78 Vessel Kittiwake Run # 2

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1750 End 1848 Tide Large, building tides

COMMENTS:



Appendix 1 continued.

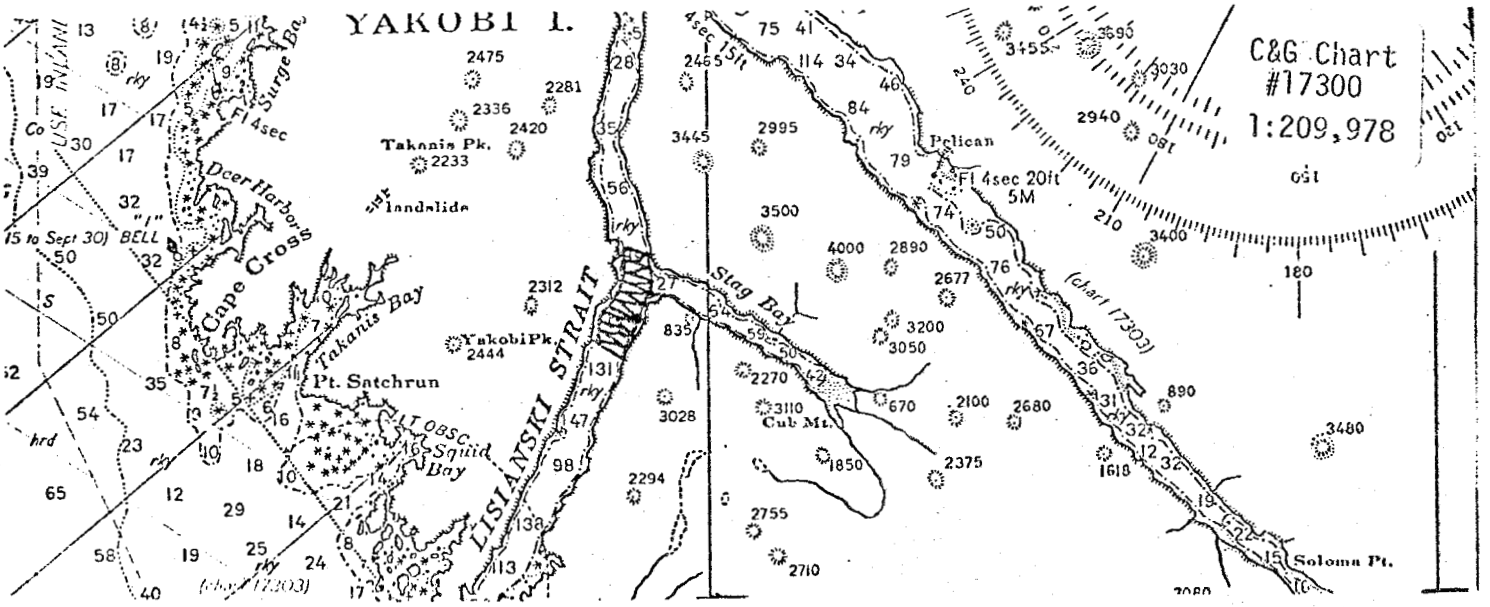
## ACOUSTICAL SURVEY SUMMARY

Area Lisianski Straits Date 11/11/78 Vessel Kittiwake Run # 3

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1615 End 1714 Tide Large, building tides

COMMENTS:

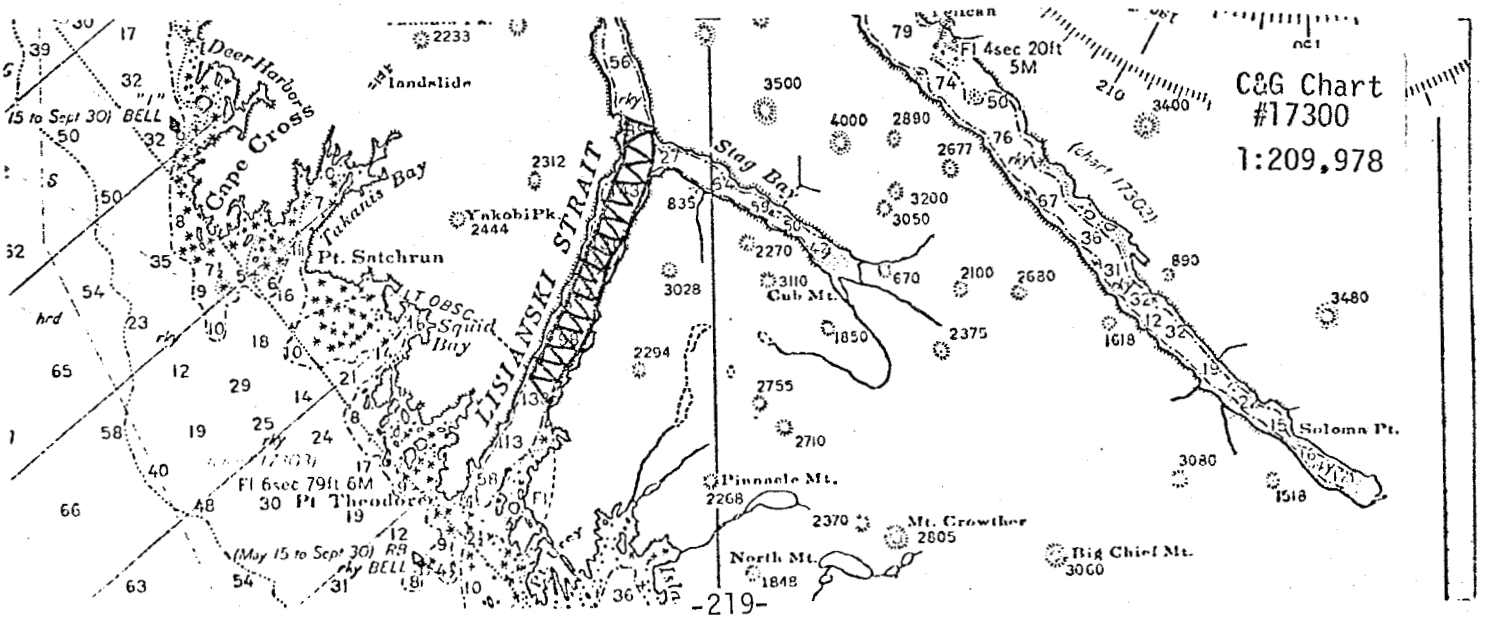



Area Lisianski Straits Date 11/12/78 Vessel Kittiwake Run # 1

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1830 End 1929 Tide

COMMENTS:



Appendix 1 continued.

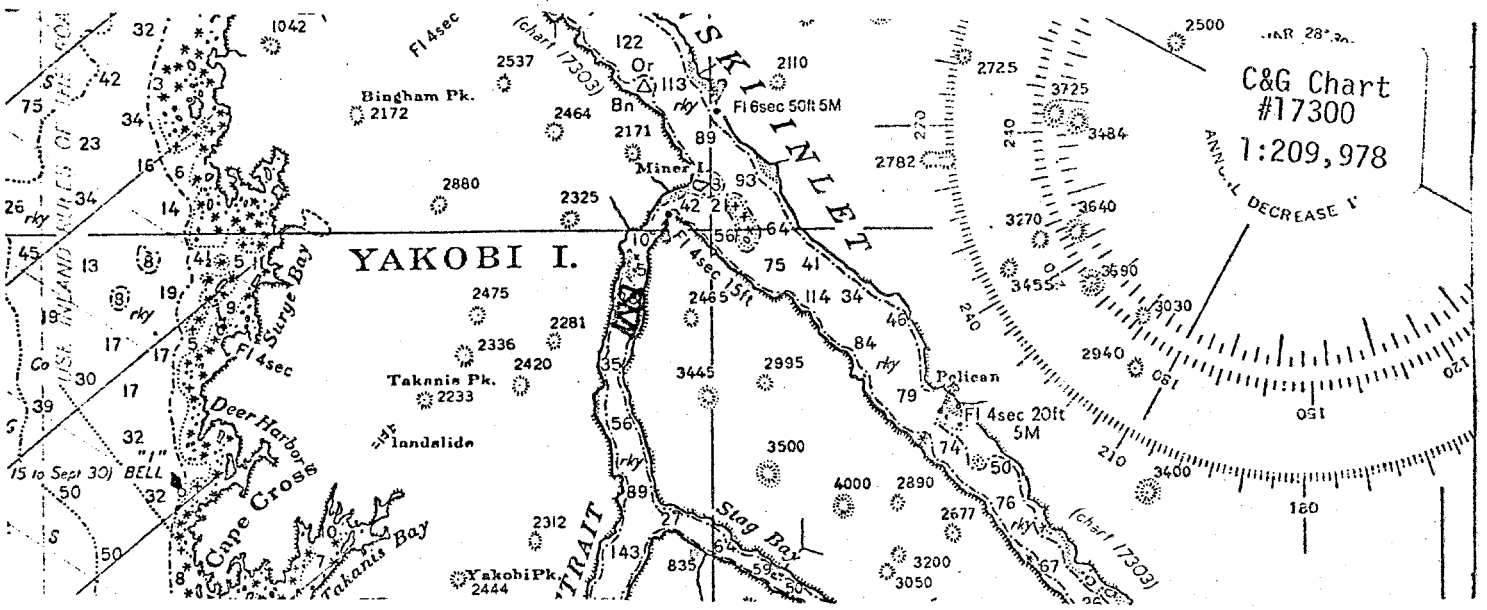
## ACOUSTICAL SURVEY SUMMARY

Area Lisianski Straits Date 11/12/78 Vessel Kittiwake Run # 2

Gain 5.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 2000 End 2020 Tide

COMMENTS:

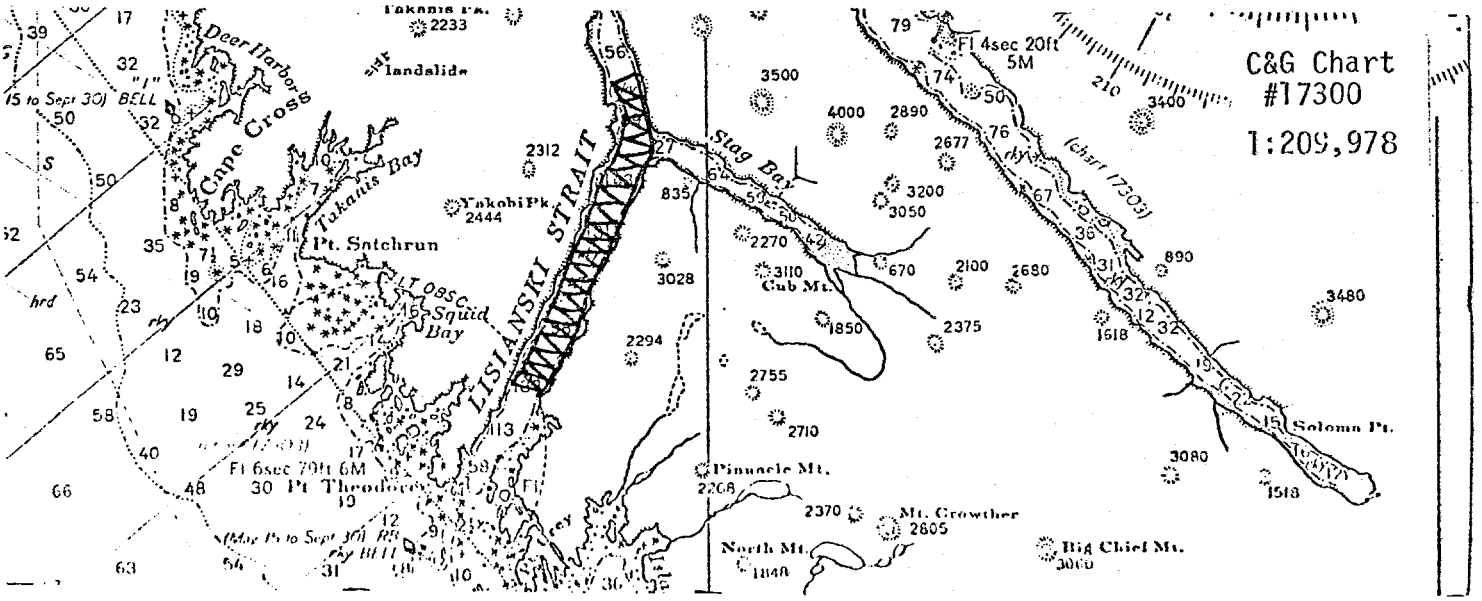



Area Lisianski Straits Date 11/12/78 Vessel Kittiwake Run # 3

Gain 4.5 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 2030 End 2126 Tide

COMMENTS:



Appendix 1 continued.

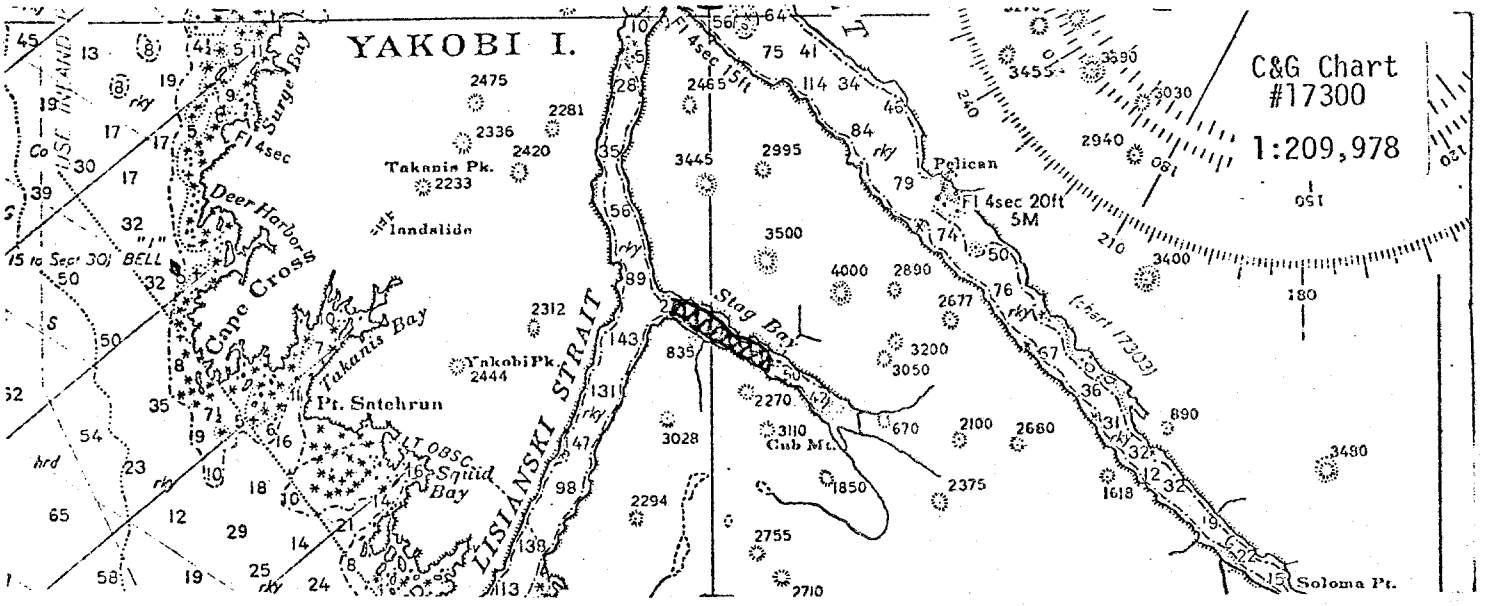
## ACOUSTICAL SURVEY SUMMARY

Area Lisianski (Stag Bay) Date 11/12/78 Vessel Kittiwake Run # 4

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 2200 End 2238 Tide

COMMENTS: Some saturation noted. Area larger with some problem with herring distributed near shore. Weather: poor; 30 knot winds; snow; dark evening. Birds and sea lions present.

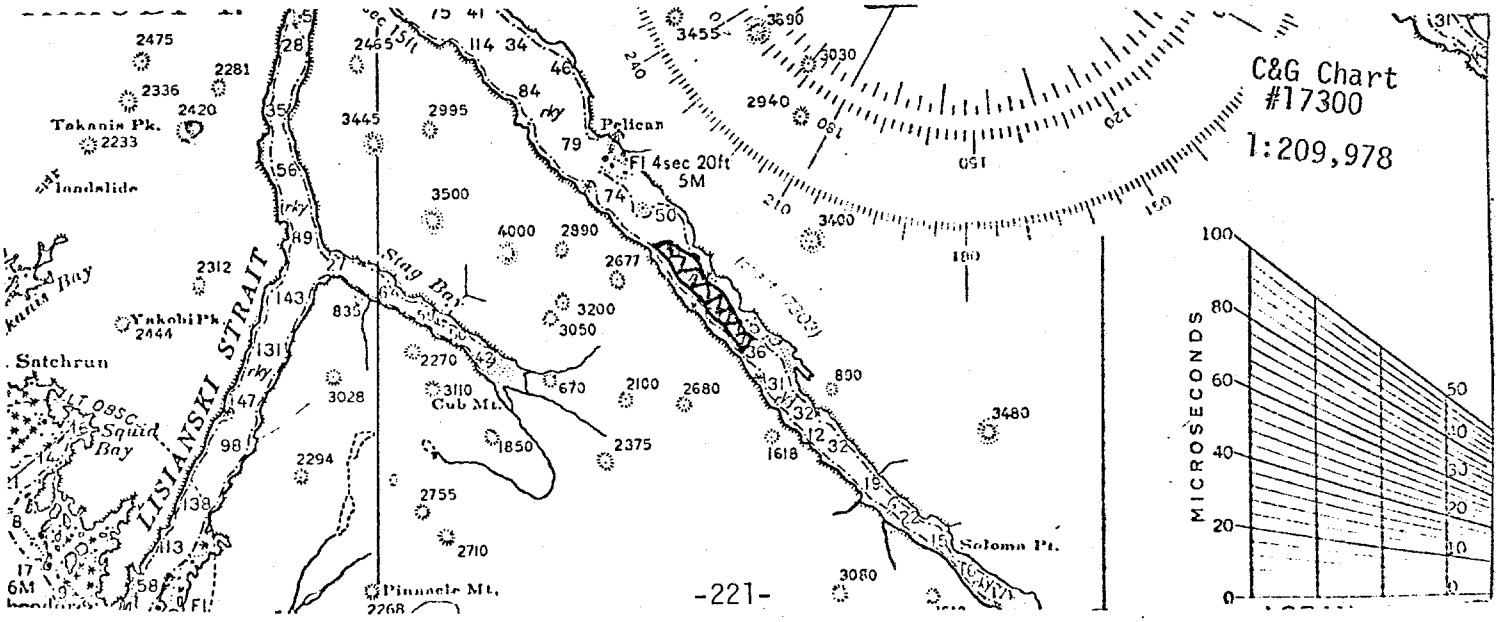



Area Lisianski Inlet Date 1/15/79 Vessel Kittiwake Run # 1

Gain 4.0 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1557 End 1629 Tide

COMMENTS:



Appendix 1 continued.

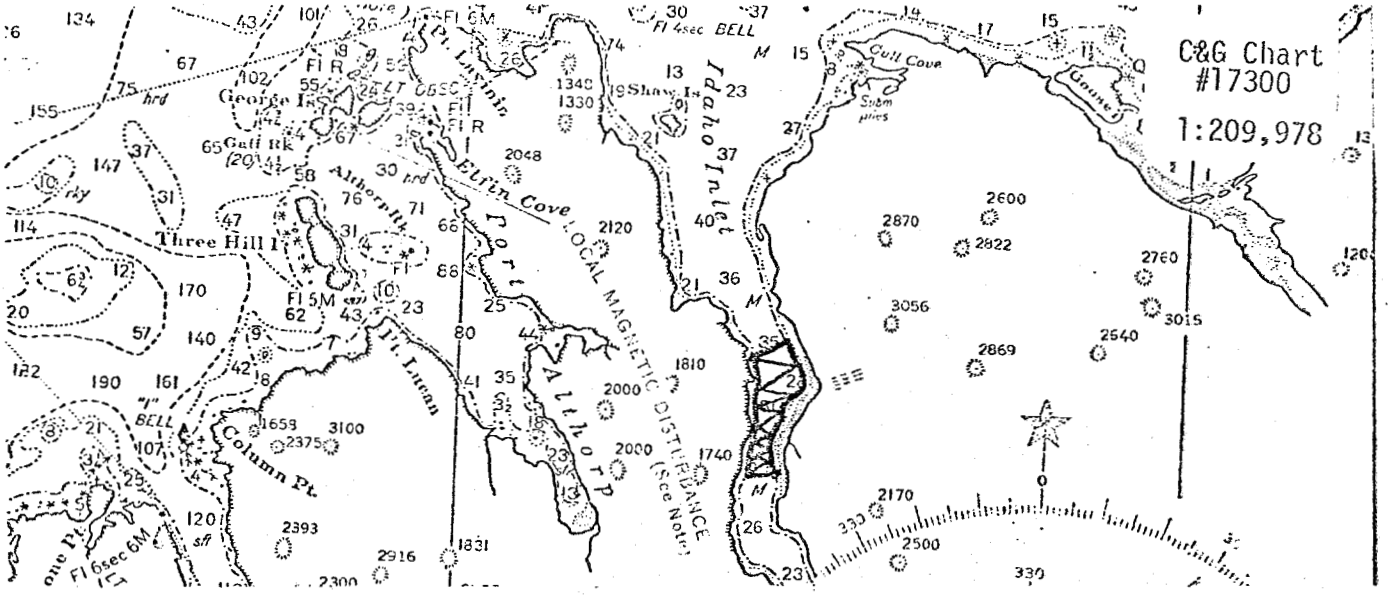
## ACOUSTICAL SURVEY SUMMARY

Area Idaho Inlet Date 12/6/78 Vessel Kittiwake Run # 1

Gain 3.4 Attenuated -12 dB Operators Ingledue, Strange

Time of Survey: Start 1243 End 1335 Tide Low

COMMENTS:

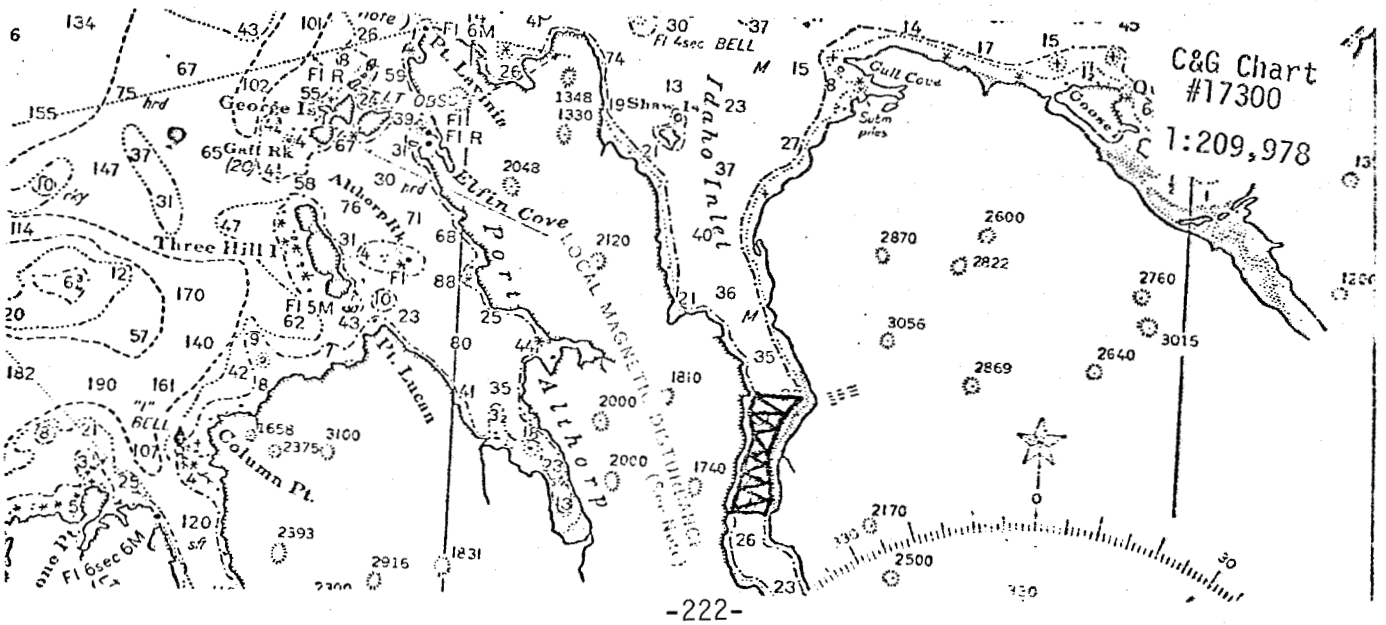



Area Idaho Inlet Date 12/6/78 Vessel Kittiwake Run # 2

Gain 3.4 Attenuated -12 dB Operators Ingledue

Time of Survey: Start 1340 End 1417 Tide Flooding

COMMENTS: Both diving birds and large gulls in the area.



Appendix 1 continued.

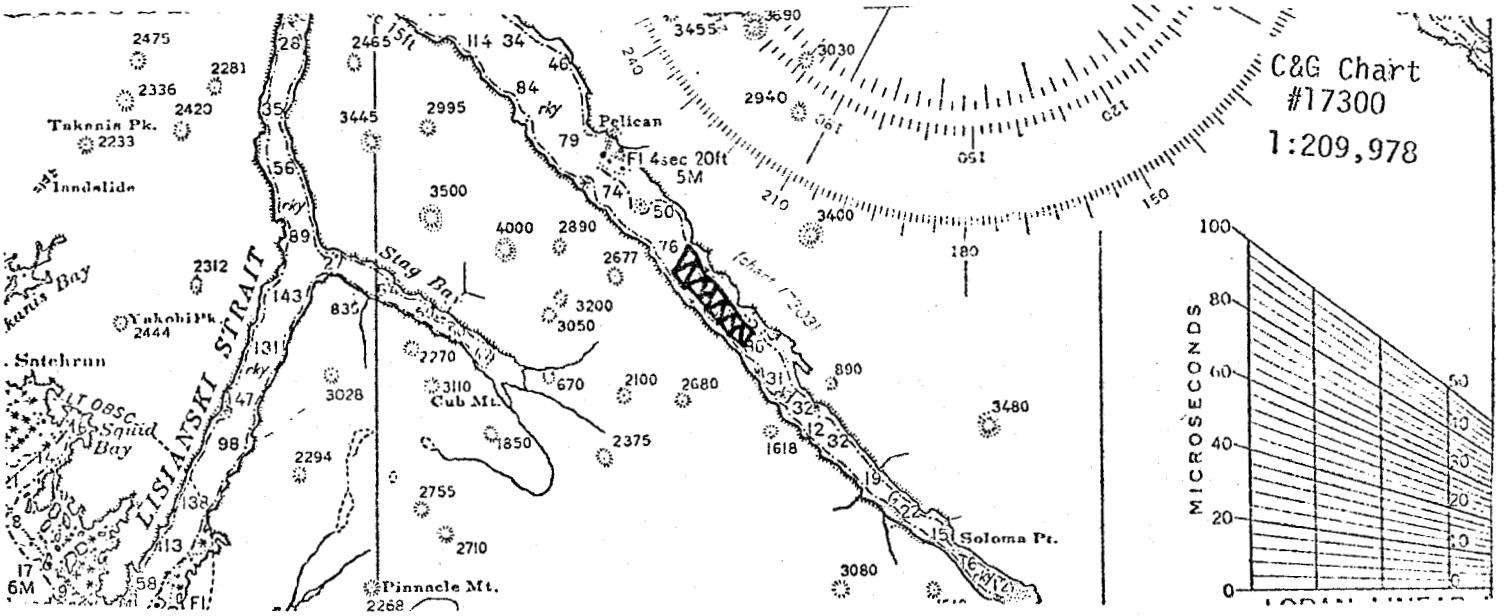
## ACOUSTICAL SURVEY SUMMARY

Area Lisianski Inlet Date 1/15/79 Vessel Kittiwake Run # 2

Gain 3.5 Attenuated -12 dB Operators Blankenbeckler

Time of Survey: Start 1645 End 1727 Tide

COMMENTS: No saturation noted. Area modified with tighter grid pattern. Searched Lisianski Straits, Stag Bay, and Lisianski Inlet. No other concentration of herring observed.




Area Date Vessel Run #

Gain Attenuated Operators

Time of Survey: Start End Tide

COMMENTS:

Because the Alaska Department of Fish and Game receives federal funding, all of its public programs and activities are operated free from discrimination on the basis of race, religion, color, national origin, age, sex, or handicap. Any person who believes he or she has been discriminated against should write to:

O.E.O.
U.S. Department of the Interior
Washington, D.C. 20240