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# Acoustic Backscatter of Herring along the West Coast of Newfoundland (NAFO Division 4R) in November from 1989 to 1993

by

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## Abstract

In 1989, the first hydroacoustic survey of 4R herring was conducted to develop a fishery-independent relative index of stock abundance. The results from the 1989, 1991 and 1993 fall hydroacoustic surveys are described. Survey results revealed that areas of herring concentrations vary from year to year within the survey area, both in intensity and expanse. Large herring schools were present in the northern strata in 1989. All surveys showed important abundances of herring in the Bonne Bay/Bay of Islands area, although they were much more spread out in 1993. Few herring were seen in the southern strata, i.e. St. George's Bay and Port-au-Port Bay in the years that these strata were surveyed (1989 and 1993). These distributions showed good agreement with the commercial fishing data. Technical problems prevented the reliable estimate of stock biomass from the 1989 survey, although distributional information was obtained. The total biomass estimate in 1991 indicated the presence of approximately 127,000 t of herring in 4R (70,000 t of spring spawners and 57,000 t of autumn spawners). The majority were concentrated around Bonne Bay. In 1993, the total biomass estimate was 66,000 t (31,000 t of spring spawners and 35,000 t of autumn spawners). These herring were much more dispersed than in 1991. The significant reduction in the biomass estimate between 1991 and 1993 is most likely due to two problems encountered during the 1993 survey: (1) according to commercial fishing logbooks, significant amounts of herring were known to be present in at least one of the un-surveyed strata at the northern end of the survey area and (2) software problems caused the loss of herring backscatter at the ends of numerous transects.

# Résumé

En 1989, le premier relevé hydroacoustique du hareng de 4R fut conduit afin de développer un indice relatif de l'abondance du stock indépendant de la pêcherie. Les résultats des relevés acoustiques d'automne de 1989, 1991 et 1993 sont décrits. Les résultats des relevés révèlent que les aires de concentrations du hareng varient d'année en année à l'intérieur de la zone du relevé, à la fois en intensité et en étendu. De grands bancs de hareng furent présents dans la strate du nord en 1989. Tous les relevés démontrent l'abondance importante du hareng dans les régions de Bonne Bay et Baie des Iles. Peu de hareng furent aperçus dans une strate du sud, c'est-à-dire aux Baies St-Georges et Port-au-Port aux années où les strates furent échosondées (1989 et 1993). Ces distributions démontrent une bonne concordance avec les données de pêche commerciale. Lors du relevé de 1989, des problèmes techniques ont empêché une estimation fiable de la biomasse du stock, quoique de l'information sur la distribution fut obtenue. L'estimation de la biomasse totale de 1991 indique la présence d'environ 127,000 t de hareng dans 4R (70,000 t de frayeurs de printemps et 57,000 t d'automne). La majorité était concentrée autour de Bonne Bay. En 1993, l'estimation de biomasse totale était de 66,000 t (31,000 t de frayeurs de printemps et 35,000 t d'automne). Ces harengs étaient plus éparses qu'en 1991. La réduction significative dans l'estimation de biomasse entre 1991 et 1993 est le plus probablement due à deux problèmes survenus durant le relevé de 1993: (1) selon les données des journaux de bord des pêcheurs commerciaux, des quantités significatives de hareng étaient présentes dans au moins une des strates non-sondées de l'extrémité nord de l'aire du relevé et (2) des problèmes de logiciel ont causé la perte d'échos de hareng à la fin de nombreux transects.

# Introduction

Abundance indices have been routinely estimated for the spring- and autumn-spawning herring stocks in NAFO division 4R from commercial gillnet data and index fisherman logbooks (McQuinn and Lefebvre 1993). Extensive analyses have been performed on these data to remove certain biases (McQuinn 1987) and to standardize them for multiplicative effects such as fishing area and season (Gavaris 1980). However, the reliability of the resulting catch rates as indicators of stock abundance is limited due to their restricted geographic coverage and other biases which are presently unaccounted for. Other catch and effort data are available from the purse seine fishery, however catch rates from purse seines are difficult to interpret and do not appear to follow abundance trends (Powles 1981).

Doubts about the reliability of the commercial gillnet data and even about the future of the gillnet fishery in western Newfoundland underlined the need to develop an index independent of the fishery to follow trends in stock abundance. Traditional research trawl surveys, such as those for groundfish based on catch per tow, are not suitable for highly-gregarious pelagic species such as herring, where the entire water column must be sampled. Over the past few decades, hydroacoustic technology has become a popular tool for surveying fish stocks, and particularly pelagic species, and hydroacoustic surveys have been conducted on herring stocks in eastern Canada since the early 1980's (Shotton and Randall 1982, Buerkle 1985). This technology overcomes a major limitation of trawl surveys by enabling the surveyor to sample the entire pelagic zone rather than only the height of the trawl opening, which is essential for estimating the abundance of pelagic species.

In 1989, the Quebec Region of Fisheries and Oceans embarked on a program of hydroacoustic surveys for pelagic fish stocks. The short term objective of the program was to acquire the necessary equipment and competence to conduct such surveys. The medium term goal was to develop a fishery-independent relative index of stock abundance for the 4R herring, including other stocks as the techniques and resources improved. This document summarizes the results from the 1989 to 1993 4R herring hydroacoustic research surveys.

#### Study Area and Fish Distribution

The west coast of Newfoundland is characterized by a long (800 km), straight coastline with a few, relatively large bays, i.e. St. George's Bay, Port-au-Port Bay, Bay of Islands, Bonne Bay and St. John's Bay (Figure 1). Historical fishing patterns suggest that in the late fall/early winter, the herring move to the nearshore to concentrate in dense schools in and around several of these bays. In 1982 and from 1984 to 1987 observers aboard two of the commercial purse seiners recorded the areas searched for herring, positions where herring schools were observed and the locations of successful sets from October through December (Figure 2-4). These data suggested that during this period, large, relatively stationary herring schools concentrated nearshore (approximately within the 100 m isobath) around the Bay of Islands, Bonne Bay and occasionally in St. John's Bay. Other concentrations may also exist along the coast in areas which were not searched i.e. St. Georges Bay, although presumably these too would be within the 100 m depth contour at this time of year. The relatively even coastline, along with the apparently stable distribution of herring schools in the late fall, made the west coast of Newfoundland a promising location for conducting acoustic surveys.

#### **Material and Methods**

#### The 1989 Survey

This survey was conducted from November 15 to December 3 aboard the R/V *E.E. Prince* (P392). The hydroacoustic equipment used for this survey was a DATASONICS DFT-210 multifrequency, 2 channel scientific transceiver connected to a DATASONICS 120 single-beam transducer. This transducer was calibrated using a hydrophone at the Defence Research Establishment Atlantic (DREA) in July, 1987 and again in August, 1991 (Table 1a). The resonant frequency of this transducer was determined to be 112.2 kHz, therefore the DATASONICS was adjusted to this frequency for the calibrations and for conducting the survey. It was later determined that this change in resonant frequency from 120 to 112.2 kHz was due to one or more bad elements in the transducer. Further to this problem, the two calibrations conducted in 1987 and 1991 did not yield similar measurements for the source level and receive sensitivity. Due to the poor performance of the transducer and the incertitude as to the proper calibration parameters, the data from this survey has been analysed only as a relative measure of abundance between strata and for distributional information.

The two channels of the echosounder were adjusted for TVG functions of 100 and 200 m, respectively. Several TVG calibrations were conducted before and during the survey following the procedures of Buerkle (1984). When adjustments were made to the input attenuation, the bandwidth or the TVG function itself, the TVG was recalibrated (Table 2).

During the survey, analog echo signals were digitized by a SIMRAD QX525 A/D converter and stored on disk in real-time by the FEMTO hydroacoustic data processing system (HDPS model J8618), all generously loaned to us by Dr. Udo Buerkle at the St. Andrews Biological Station (SABS). The raw analog signal was also stored on digital audio tape (DAT) as a backup.

The transducer was deployed over the starboard side of the vessel in a winged tow-fish. Towfish stability (pitch and roll) were measured continuously with potentiometers installed in the towed body. Although pitch was found to be relatively stable ( $\pm 2^{\circ}$  C), roll was found to vary considerably ( $\pm 10^{\circ}$  C) depending on conditions such as current and swell. Cable length and vessel speed (from 5-8 knots) were therefore adjusted to restrain the roll of the towed-body to < 5° C.

The survey was intended to cover the entire west coast of Newfoundland from Cape Ray to the northern end of the Strait of Belle Isle approximately within the 10 m and 100 m isobaths (7800 km<sup>2</sup>). The survey design was a stratified-random sample of parallel transects as suggested by Jolly and Hampton (1987) and as recommended by the CAFSAC Pelagic subcommittee (O'Boyle and Atkinson 1989). The stratification allowed an intensification of sampling effort and a reduction of the variance of the population estimate in those strata where herring were most likely to be encountered. The survey area was stratified based in the major physical features along the coastline and from data on known herring concentrations obtained from the observer data for November (Figure 3).

The orientation of the transects within each stratum was determined by drawing a baseline parallel to the coastline and selecting transects perpendicular to the line. The transects were then chosen by dividing the baseline into 200 m wide units, and selecting randomly among the units (Figure 5). The strata were rated either 1 or 2 according to the proposed sampling intensity, strata with a rating of 1 having twice the sampling intensity of strata with a 2 rating. The higher sampling intensity was given to strata where herring were known to concentrate from Figure 3 and from fishermen's reports. The total number of transects was determined by the available ship time minus 30% for down-time (poor weather, equipment failure, etc.). Surveying was conducted 24 h per day. Due to insufficient vessel time, frequent bad weather and equipment adjustments and the slow speed required to keep the tow-fish level, not all strata were covered (Figure 5).

Biological sampling of observed schools has often been the weak point of herring acoustic surveys (Shotton and Randall, 1982, Wheeler 1991), and this survey was no exception. Of the 9 sets attempted by the R/V *E.E. Prince* with an Engel midwater trawl (EMT), only 4 sets captured more than 50 herring (Table 3). However, biological information was augmented in stratum 5 by a sample obtained from a purse seiner operating in the same area at the same time as our survey.

## The 1990 Survey

The 1990 survey was conducted on the CSS *Alfred Needler* (N145) from November 20 to December 4. The transceiver and transducer were the same as in 1989, although the tow-fish was a FATHOM torpedo type and a longer cable was used. Data acquisition was achieved using a FEMTO HDPS J9001 system for digitization and storage.

Transects were determined using the same methodology as in 1989 although the number and size of strata, as well as the sampling intensity were modified according to the distribution of the herring schools from the previous years' survey. Unlike the previous year, all strata were covered although surveying was conducted only during night-time hours (~15:00-07:00) to avoid differences in target strength between day and night (Buerkle 1983, Foote 1987). A juvenile cod survey was conducted during daylight hours with a Western 2A bottom trawl.

During this survey, very few schools were observed, even when surveying in the same areas where the purse seine fleet was operating. Because of differences in both the vessel and the equipment used from the previous year, we were not able to determine with certainty the cause for the lack of significant school detections although two main causes are suspected. It is possible that fish detection was hampered by a poor signal/noise ratio or that the herring were frightened off by the vessel. In the first case, it was noted that acoustic noise was significantly higher than in 1989 and that the received signal was weaker. Although the same transducer was used as in 1989, the 1991 calibration showed a deterioration of the source level between 1987 and 1991 (Table 1b) and, as stated earlier, this transducer was later found to be defective. In addition, the two-way losses for the longer cable used in this survey were measured at 5.2 dB.

Typically, herring schools are very dense at this time of the year and should be easily detectable in spite of the poorer S/N ratio. Indeed, some herring schools were recorded, showing that fish detection by the acoustic equipment was possible. However, schools were rarely insonified even when surveying in areas of known dense herring concentrations. In fact, while surveying Bonne Bay Bank on a night where five purse seiners were actively fishing, no herring schools were detected. This led us to suspect that significant vessel noise was causing an avoidance behaviour by the fish. Recent vessel noise measurements conducted by the Department of National Defence (McKeown 1995) gives noise spectra for the CSS *Alfred Needler* close to our survey speed (7 knots). This report showed that the CSS *Alfred Needler* produces noise peaks of over 160 dB within the sensitive frequency spectrum for herring (20 Hz-1200 Hz). This value is 30 dB over the suggested limit of 132 dB for research vessel noise determined by a recent ICES study group and well above the reaction threshold for herring at less than 100 m range (Anon 1994). It is most probable that this vessel simply scared herring away from its path in the relatively shallow waters (<100 m) along western Newfoundland. This problem has been observed with other "noisy" vessels in relation to a variety of species (Anon 1994) including herring (Olsen *et al* 1983, Misund 1990).

Bottom- and midwater-trawl sets during the cod juvenile survey did capture herring at various sites along the coast (Table 3). Length frequencies from these data showed a mixture of adult and juvenile herring. These biological data will be discussed later, however as it was unlikely that the acoustic data from this survey would produce interpretable results, the acoustic data were not analysed.

#### The 1991 Survey

The 1991 survey was conducted on the R/V *E.E. Prince* (P423) from November 22 to December 1. The hydroacoustic equipment used was essentially the same as in 1990 (e.g. DATASONICS DFT-210 echosounder, J9001 digitizer, DAT recorder), with the exception of the cable, which was the same as in 1989, and a new SIMRAD 120 kHz single beam transducer. The two channels of the echosounder were adjusted for TVG functions of 100 and 200 m, respectively. Several TVG calibrations were conducted before, during and following the survey using the HDPS software and following the procedures of Buerkle (1984). Besides the factory specifications, the transducer was also post-calibrated using a hydrophone at DREA in July 1992 (Table 1b). With this transducer/cable combination, the echo signal was much improved compared with previous years and much more backscatter from herring schools was detected.

The transducer was deployed over the starboard side of the vessel in the FATHOM tow-fish. Tow-fish stability (pitch and roll) were measured continuously with potentiometers. Again pitch was found to be relatively stable ( $\pm 2^{\circ}$  C) although roll was found to vary considerably ( $\pm 8^{\circ}$  C) depending on conditions such as current and swell. Cable length and vessel speed (from 7-10 knots) were therefore adjusted to restrain roll > 5° C.

The survey area and design was the same as in 1990 and was intended to cover the entire west coast of Newfoundland from Cape Anguille to the southern end of the Strait of Belle Isle approximately within the 10 m and 100 m isobaths. Again, surveying was conducted only during night-time hours (17:00-07:00). Due to insufficient allocated vessel time and considerable down-time due to bad weather, not all strata were covered (Figure 6). The missed strata were mainly in the south (strata 1-3) where few herring were observed during the 1989 survey and where no commercial fishery occurs at this time of the year.

Biological sampling aboard the R/V *E.E. Prince* was again inadequate to properly describe the biological characteristics of all the major herring concentrations surveyed acoustically (Table 3). Of the 7 sets attempted on the R/V *E.E. Prince* with an EMT, only 3 captured herring, and of those, only 2 had samples sizes greater than 50 (Table 3). However, as in 1989, biological information was augmented in certain strata by samples obtained from purse seiners operating in the same area at the same time as our survey.

## The 1993 Survey

The hydroacoustic work for this survey was conducted from November 10 to November 27 aboard the NSC *Frederick G. Creed* while the STD profiling and biological sampling were carried out aboard the R/V *E.E. Prince*. The echosounder used was the SIMRAD EK500 which powered a 120 kHz hull-mounted, split-beam transducer. The equipment was calibrated both before and after the survey (Table 1c) using a copper sphere of known target strength and following the procedures specified by SIMRAD (SIMRAD EK500 Instruction Manual). The copper sphere was placed in the beam using a computer-controlled motorized positioning system developed at the Maurice Lamontagne Institute (MLI).

The NSC Frederick G. Creed proved to be an excellent hydroacoustic platform, both for its stability (pitch= $\pm 2^{\circ}$  C; roll= 0° C) and for its surveying speed (12-14 knots). The NSC Frederick G. Creed is a small (20 m) aluminum Small Waterplane Area Twin Hull (SWATH) vessel capable of working comfortably in heavy seas (4 m waves). The vessel's small size has the added advantages of generating less vessel noise and of being highly manoeuvrable, thereby facilitating nearshore surveying. In addition to acquiring a superior hydroacoustic platform, having two relatively small vessels to conduct this survey enabled us to use the acoustic survey time much more efficiently, allowing the R/V *E.E. Prince* to concentrate on the oceanographic profiling and biological ground truthing.

Again random-parallel transects were run during night-time hours only (17:00-07:00) covering the same planned strata as in 1990 and 1991. Sampling was increased in strata of suspected high density (5,6,8,10). However, despite having sufficient vessel time allotted for the survey, poor weather conditions (mainly anomalously high winds of 50 to 70 knots and freezing spray) reduced surveying time by 60%. For this reason, the northern strata (9,10) were not surveyed (Figure 7). In addition, herring backscatter was lost from several files due to a problem with the logging software which was detected half way through the survey. Unfortunately, as there is no analog signal output by the EK500, no DAT backup recording was made. The effects of this data loss on the biomass estimate will be discussed later.

Given the rather poor biological sampling results during previous surveys, several measures were taken to improve the pelagic fishing capabilities of the R/V *E.E. Prince*. A pelagic mackerel trawl (MT) designed for MLI for use on a small (20 m) vessel was installed aboard the R/V *E.E. Prince* and several practice sets were made before surveying began. We were also equipped with a Scanmar Sonar System on the trawl, and had an experienced fishing master aboard. The fishing master and this improved equipment allowed us to significantly increase our sampling success and most of the major concentrations of herring were adequately sampled (Figure 7, Table 3).

#### Data Analyses

Data treatment and analysis was standard for all surveys. Recorded echo signals were edited using the FEMTO HDPS software to eliminate backscatter other than herring schools (e.g. surface noise, bottom signal, other species). The species composition of some schools was unconfirmed by biological sampling because we were unable to catch them with the research vessel or there was no fishing activity in the area. In these cases, gross form and density were considered to judge whether or not they were to be included in the analyses. Most fish schools recorded were considered to be herring. Herring schools at this time of the year show a relatively limited range of characteristic shapes, from candle shaped, to dense domes on the bottom, to large aggregations 10's of meters thick.

Estimates of area backscatter and biomass were calculated following the procedures of Buerkle (1990) and as recommended by CAFSAC (O'Boyle and Atkinson 1989). The conversion of backscatter to biomass was accomplished using target strength estimates per unit length determined from the equation suggested by Foote (1987) for clupeoids:

$$TS_{cm} = 20 \log 1 - 71.9$$
 (1)

where l is the mean total fish length (cm), and converting to target strength per unit weight:

$$TS_{kg} = TS_{cm} + 10 \log w^{-1}$$

where w is the mean weight of an individual (kg). The mean lengths and weights were calculated for each transect from the samples most closely associated with each school. Total biomass of spring and autumn spawners was calculated using an estimate of the percent weight of each spawning stock corresponding to each sample (Table 4).

Equation 1 is a general algorithm applicable for all clupeoids but does not consider the effects of several factors such as fish behaviour (e.g. tilt angle), physiology and depth on the parameters (Ona 1990). As such, the TS values estimated from this equation should be considered as approximations. Although certain measures were taken to reduce interannual variability in TS, i.e. surveying at night only, there may still be inherent biases from the general formula due to the local conditions in 4R which affect the aforementioned factors.

#### Results

#### Distribution

The fall 4R herring acoustic surveys conducted in 1989, 1991 and 1993 revealed that areas of herring concentrations vary from year to year within the survey area, both in intensity and expanse (Table 5-7). Although the results of the 1989 survey did not yield useful biomass estimates due to technical problems (Table 8), we were nonetheless able to confirm the presence of large herring schools in the northern strata in that year (Figure 5). All of the surveys showed important abundances of herring in the Bonne Bay/Bay of Islands area (Figures 5-7), although they were much more spread out in 1993 (Figure

7). Few herring were seen in the southern strata, i.e. St. George's Bay and Port-au-Port Bay in the years that these strata were surveyed (1989 and 1993). These distributions are in good agreement with the observer data (Figure 3) which showed herring mainly concentrated in the Bonne Bay/Bay of Islands area with some schools found towards the northern peninsula.

# Size Composition

Several patterns can be discerned from the length frequency data collected from these surveys. The large 1987 spring-spawning and 1986 autumn-spawning year-classes were observed in St. John's Bay (4Ra) in 1989 as 2 and 3 year-olds, respectively, but only appeared in the Bonne Bay area (4Rb) a year later as mature 3 and 4 year-olds (Figures 8 and 9). These have been the dominant year-classes for their respective stocks since then. The 1989 spring-spawning year class was also poorly represented in 4Rb at age 2 in 1991 and at age 4 in 1993, but was a strong component in 4Rc in (Figure 8).

The autumn-spawning size composition suggests that the 1988 and 1990 year-classes have shown good recruitment to the Bonne Bay area over the past four years, although the relative strength of each has varied from year to year (Figure 9). In particular, the 1988 year-class appeared promising at age 2 in 1990, less so in 1991, but was a strong component of the 1993 survey in both 4Rb and 4Rc. Although the samples from 4Ra and 4Rc are admittedly limited, the data also suggests a segregation according to size between Bonne Bay, St. John's Bay and Bay of Islands (4Rc), the older individuals being found mainly in Bonne Bay. This interannual and interzonal variability in relative year-class strength suggests a substructure among areas which may be related to the interannual variability seen in their distribution (Figures 5-7).

## Abundance

The total biomass estimate indicated the presence of approximately 127,000 t of herring in 4R in 1991 (70,000 t of spring spawners and 57,000 of autumn spawners), with 96% being found in strata 6 and 8 (Table 9). These herring were thus highly concentrated around Bonne Bay and appeared to be quite stationary as the purse seine fleet continued to fish in this area until mid-December.

In 1993, the total biomass estimate was 66,000 t, of which 31,000 t were spring spawners and 35,000 t were autumn spawners (Table 10). The herring in the Bonne Bay area were much more dispersed in 1993, and were apparently on the move, as they had left the area a week after our survey. This represents a significant reduction in the biomass estimate from two years previous. However, the 1993 estimate must be considered an underestimate for several reasons. Firstly, fishing was taking place in the northern, un-surveyed strata, confirming the presence of additional herring schools in these areas, as in 1989 (Figure 5). Secondly, as mentioned earlier, software problems caused the loss of herring backscatter at the ends of numerous transects during this survey. In particular, the density estimates for strata 5 and 6 where the majority of herring were seen were affected in this way. For these reasons, the 1993 biomass estimate is biased downward and is not directly comparable to the 1991 estimate, although at least 66,000 t of spring and autumn spawners were estimated in the southern strata.

#### Discussion

Results from the surveys conducted in 1989, 1991 and 1993 showed some variability in the distribution of herring acoustic backscatter between years, although the range in distribution appears to be at least within the study area. No herring schools have been detected during several exploratory transects conducted outside the study area, particularly in deeper waters. Continued exploration outside the survey area will remain an important measure to insure that the bulk of the stock complex is being assessed.

Size composition data showed that recruiting year-classes eventually congregate in the Bonne Bay/Bay of Islands area from October to December, where they become the object (along with older yearclasses) of the traditional purse seine fishery. With the approach of winter, these schools migrate out of this area into the deeper waters of the Esquiman Channel (McQuinn and Lefebvre 1995). The October-December period thus appears to be the best time to survey these stocks. Generally, these herring schools are relatively stable and predictable, as witnessed by both the fishery and acoustic survey data. Surveying difficulties are generally related to operating too late in the year, when windy and icy weather conditions reduce efficiency. Moving the survey to October will alleviate many of these problems, although the timing of the arrival of these schools in the nearshore area then becomes an important factor (Figure 2).

The 1991 survey produced the most reliable biomass estimate, although before this value can be considered in absolute terms, confirmation of its accuracy must be made by other means (i.e. from fishery related data or future acoustic surveys). The value of 127,000 t in 1991 seems reasonable as a total biomass estimate for these stocks although insufficient biological sampling, some un-surveyed strata, as well as assumptions associated with the TS values used adds uncertainty to the estimate. An evaluation of 66,000 t of herring in 1993 should be considered a minimum estimate given the aforementioned caveats concerning the known biases in this survey.

Since the first 4R herring acoustic survey in 1989, there has been a considerable evolution in both the equipment used for these surveys as well as our ability to conduct them. Our lack of experience in the early years prevented the generation of reliable biomass estimates from the 1989 and 1990 surveys, although useful data on herring distribution and school composition was collected. An expansion in the use of hydroacoustics at MLI along with our technical expertise has allowed us to development many more hardware and software tools which should considerably increase the reliability of future surveys. Measures have been taken for the 1995 survey to avoid the problems encountered in previous years. The most important areas of improvement are the timing of the survey (see above), and concerning our ability to catch relatively small schools with a pelagic trawl, as well as the reliability and precision of data acquisition. A co-operative research project has been proposed with industry to acquire the use of a commercial pelagic trawler for the collection of biological samples. In addition, a PC-based software package developed at MLI will also be used for data storage allowing a more complete exploitation of the EK500 data output.

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Parameter	1987	1991
-3 dB Beam Width (deg):	6.0	6.0
Directivity Index (dB):	29.6	29.6
Equivalent 2-way beam angle (dB):	-22.07	-22.62
Transmitting Response (dB re 1 µPa/A): - (112.2 kHz)	208.6	208.5
Source Level (dB re 1 $\mu$ Pa): - (120 kHz)		
a) Full power: b) -10 dB:	-	210.3 202.5
- (112.2 kHZ) a) Full power: b) -10 dB:	222.2	217.5 <b>209.7</b>
Receiving Sensitivity (dB re 1 V/µPa): (112.2 kHz)	-189.6	-184.6

Table 1a. Specifications for the DATASONICS 120 kHz single-beam tranducer from DREA hydrophone calibrations conducted in 1987 and 1991 (parameter estimates in **bold** were used in the analyses).

Table 1b. Specifications for the SIMRAD 120 kHz single-beam tranducer from factory calibration conducted in August 1991 and from DREA hydrophone calibration conducted in July 1992 (parameter estimates in **bold** were used in the analyses; doubtful estimates are in *italics*).

Parameter	SIMRAD	DREA
-3 dB Beam Width (deg):	9.5	9.5
Directivity Index (dB):	25.6	25.7
Equivalent 2-way beam angle (dB):	-18.1	-18.1
Transmitting Response: - (dB re 1 μPa/V) - (dB re 1 μPa/A)	177.0 213.2	176.5 211.0
Source Level: - measured (dB re 1 µPa) - estimated (a) dB re 1 µPa/V (b) dB re 1 µPa/A	<b>225.1</b> 225.1	222.5 224.6 222.9
Receiving Sensitivity (dB re 1 V/µPa): - loaded - unloaded	-182.4	<b>-183.3</b> -182.7

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Parameter	11/11/93	28/11/93
-3 dB Beam Width (deg):	7.4	-
- Longitudinal offset	0.04	-
- Transversal offset	0.03	
Directivity Index (dB):	28.1	28.1
Equivalent 2-way beam angle (dB):	-20.2	-20.2
Transmitting Response:		
- $(dB re 1 \mu Pa/V)$	184.3	184.3
- (dB re 1 $\mu$ Pa/A)	209.7	209.7
Receiving Sensitivity (dB re 1 $V/\mu$ Pa):		
- unloaded	-186.0	-186.0
Transceiver Gain (dB):		
- 20 log r	25.0	25.1
- 40 log r	25.2	25.0

Table 1c. Specifications for the SIMRAD 120 kHz split-beam tranducer from target-sphere calibrations conducted before and after the 1993 survey (parameter estimates in **bold** were used in the analyses).

Table 2. TVG calibration parameters for various settings used in 1989 herring acoustic survey.

Model fitting results for: C392010 (14/11/89)

Independent variable	coefficient	std. error t-	value sig.level
Fixed Gain Log Coefficient Alpha Coefficient Linearity	-35.953881 -22.104176 -0.067223 1.116066	0.533161 -67 0.561582 -39 0.00172 -39 0.008155 136	.4353 0.0000 .3605 0.0000 .0916 0.0000 .8553 0.0000
R-SQ. (ADJ.) = 0.9988 SE=	0.262518 MAE	S= 0.197334	DurbWat= 1.095

138 observations fitted, forecast(s) computed for 0 missing val. of dep. var.

Model fitting results for: C392018 (17/11/89)

Independent variable	coefficient	std. error	t-value	sig.level
Fixed Gain Log Coefficient Alpha Coefficient Linearity	-66.382979 -15.176252 -0.076966 1.083575	0.165756 0.283651 0.002037 0.004419	-400.4868 -53.5032 -37.7757 245.1921	0.0000 0.0000 0.0000 0.0000
R-SQ. (ADJ.) = 0.9989 SE=	0.207989 MA	E= 0.15	52990 DurbWa	t= 1.052

108 observations fitted, forecast(s) computed for 0 missing val. of dep. var.

Model fitting results for: C392026 (20/11/89)

Independent variable	coefficient	std. error	t-value	sig.level
Fixed Gain Log Coefficient Alpha Coefficient Linearity	-52.168959 -21.790533 -0.038176 1.06864	0.31244 0.453176 0.002515 0.01146	-166.9725 -48.0841 -15.1787 93.2497	0.0000 0.0000 0.0000 0.0000
R-SQ. (ADJ.) = 0.9978 SE=	0.325100 MAE	S= 0.23	0536 DurbWat	= 1.255

103 observations fitted, forecast(s) computed for 0 missing val. of dep. var.

Model fitting results for: C392032 (22/11/89)

Independent variable	coefficient	std.error t	-value sig.level
Fixed Gain Log Coefficient Alpha Coefficient Linearity	-62.317467 -21.279318 -0.051314 1.071155	0.185255 -33 0.314517 -6 0.002237 -2 0.004743 22	6.3870   0.0000     7.6571   0.0000     2.9365   0.0000     5.8256   0.0000
R-SQ. (ADJ.) = 0.9989 SE=	0.210932 MAE	= 0.161638	DurbWat= 1.225

108 observations fitted, forecast(s) computed for 0 missing val. of dep. var.

Table 3. Date, gear type, stratum, set number, sample number, position and sample size of biological samples from the 4R herring acoustic surveys from 1989 to 1993.

Survey	Date	Gear	Stratum	Set	Sample #	Position	N
P392	171189	ЕМТ	2	1	500001	482841 582841	32
(1989)	171189			2	500002	483025 583375	149
	251189		5	2	500004	493500 580000	115
	021289			1	500008	483500 584450	6
	261189	Seine		s	544038	493500 580100	144
	251189	ЕМТ	7	1	500003	493350 575650	67
	261189		8	1	500005	502290 573600	10
	271189		9	1	500006	504300 572600	23
	271189			1-2	500007	505120 571500	96
N145	031290	ЕМТ	1	P24		482790 583240	1
(1990)	031290	Western	2	38	500042	482600 585020	10
	031290			39	500043	482760 585550	50
	021290		3	35	500041	484300 591420	32
	021290			36	500049	483910 590780	1
	021290		4	32	500040	484240 585260	10
	011290			P02	500050	484100 584300	65
	231190		6	7	500033	494490 580620	16
	231190			10	500034	493650 581290	3
	301190			25	500038	500260 574820	1
	011290	EMT		P23	500039	493220 580520	232
	261190	Western	9	18	500036	502000 573500	177
	301190	24		24	500037	500490 574620	1
	_261190		10	16	500035	503310 572610	20
	261190			17	500046	503250 572800	2
	281190			19	500047	510780 570360	1
	291190			22	500048	511520 565550	2
P423	241191	ЕМТ	5	2	500004	491914 582700	2
(1991)	241191			3		493183 575542	0
	301191		6	5	500003	493713 580205	_243
	241191	Seine		s	544018	G072	186
	231191	ЕМТ	7	1	-	490922 581434	0
	261191		8	4	500002	493111 575488	52
	011291	Seine		s	544020	G073	175
C452	121193	мт	5	1	500054	492300 582250	46
(1992)	121193			2	500055	492290 582270	108
	121193		6	3	500056	492870 581440	284
	141193	EMT		4	500057	493780 580090	42
2	141193	мт		5	500058	493920 580000	253
	151193			6	500059	495630 575100	274

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Table 4. Percent spring spawners (by weight) from the biological samples collected during the 1991 and 1993 4R herring acoustic surveys.

Survey	Sample Number	% Spring Spawners	
P423	2	66.2	
(1991)	3/18	55.0	
C452	54/55	49.7	
(1993)	56	66.1	
	57/58	44.0	
	59	43.1	

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Stratum	Transect	Transect	Transect	Target	Sa - Area	Total	Biomass	Total	Sample
	Number	Length	Area	Strength	Scattering	Scattering	Density	Biomagg	Number
	HUNDEL	(m)	(1-2)	(dp/kg)	(/ar)	/m2/or/	$(V_{\alpha}/m^2)$	(t/trang)	Munifer
		()	(Kui-)	(ub/kg/	(/81)	(/SI)	(Kg/m-)	(L/LIANS)	
ST1	2	3705	37.76	-32.9	0.000000	0	0.0000	0.000	
	3	8967	91.39	-32.9	0.00000	0	0.0000	0.000	
Cape	4	8120	82.75	-32.9	0.000000	0	0.0000	0.000	
Anguill	e 5	8263	84 21	-32.9	0.000000	0	0 0000	0 000	
		6779	69 09	-32.9	0.000000	ň	0.0000	0.000	
	0	0//0	09.00	-32.9	0.000000	0	0.0000	0.000	
	/	/821	/9./1	-32.9	0.000000	0	0.0000	0.000	
ST2	8	7858	27.98	-36.7	0.000000	0	0.0000	0.000	
	9	7449	26.52	-36.7	0.000000	0	0.0000	0.000	
Bay St.	10	10772	38.36	-36.7	0.000000	0	0.0000	0.000	
Georges	11	12036	42 85	-36 7	0 000001	40	0 0043	195 193	1/2
(acuth)	, 11	10000	30.54	- 30.7	0.000001	40	0.0043	105.103	1/2
(south)	12	10826	38.54	-36.7	0.000000	U	0.0000	0.000	
	13	11235	40.00	-36.7	0.000000	0	0.0000	0.000	
	14	11745	41.82	-36.7	0.000000	0	0.0000	0.000	
	15	11588	41.26	-36.7	0.000000	0	0.0000	0.000	
	16	11077	39 44	-36 7	0 000000	ň	0 0000	0,000	
	17	10700	20 41	-30.7	0.000000	11	0.0000	0.000	1 /0
	17	10/88	38.41	-36.7	0.000000	11	0.0013	50.470	1/2
	18	10534	37.51	-36.7	0.000000	0	0.0000	0.000	
	19	11115	39.57	-36.7	0.000000	0	0.0000	0.000	
	20	10943	38.96	-36.7	0.000000	0	0.0000	0.000	
	21	9295	33.10	-36.7	0.00000	Ó	0 0000	0 000	
	22	11120	20 62	36.7	0.000000	ő	0.0000	0.000	
	22	11120	39.02	-30.7	0.000000	U	0.0000	0.000	
	23	9652	34.37	-36.7	0.000000	0	0.0000	0.000	
	24	9962	35.47	-36.7	0.000000	0	0.0000	0.000	
	25	9591	34.15	-36.7	0.000000	0	0.0000	0.000	
	26	8608	30.65	-36.7	0.000000	0	0.0000	0.000	
	27	9445	33 63	-36 7	0.000000	ő	0.0000	0.000	
	27	0021	33.03	-30.7	0.000000		0.0000	0.000	
	28	983T	35.00	-36.7	0.000000	U	0.0000	0.000	
	29	9071	32.30	-36.7	0.00000	0	0.0000	0.000	
	30	9254	32.95	-36.7	0.000000	0	0.0000	0.000	
	31	8318	29.62	-36.7	0.000000	0	0.0000	0.000	
	32	8500	30 27	-36 7	0 000000	ň	0 0000	0 000	
	33	9171	20.27	-36 7	0.000000	ŏ	0.0000	0.000	
	33	01/1	29.09	-30.7	0.000000	0	0.0000	0.000	
	34	8232	29.31	-36.7	0.000000	0	0.0000	0.000	
	35	7736	27.55	-36.7	0.000000	0	0.0000	0.000	
	36	7212	25.68	-36.7	0.000000	0	0.0000	0.000	
	38	7162	25.50	-36.7	0.000000	0	0.0000	0.000	
	39	5018	17 87	-36 7	0 000000	ñ	0 0000	0,000	
	10	4545	16 10	36.7	0.000000	ő	0.0000	0.000	
	40	4545	10.10	-30.7	0.000000	U	0.0000	0.000	
	41	4008	14.27	-36.7	0.000000	U	0.0000	0.000	
	42	3838	13.66	-36.7	0.000000	0	0.0000	0.000	
	43	4093	14.57	-36.7	0.000000	0	0.0000	0.000	
	44	3555	12.66	-36.7	0.000000	0	0.0000	0.000	
	45	4716	16 79	-36 7	0 000000	ň	0 0000	0.000	
	45	6145	21.00	-30.7	0.000000	0	0.0000	0.000	
	40	6145	21.88	-36.7	0.000000	U	0.0000	0.000	
ST3	47	2136	4.82	-36.7	0.000000	0	0.0000	0.000	
	48	3886	8.77	-36.7	0.000000	0	0.0000	0.000	
Bay St.	49	7406	16.72	-36.7	0.000000	0	0.0000	0.000	
Georges	50	10529	23 77	-36 7	0 00000	ň	0 0000	0 000	
(north)	. 53	11045	24 92	-26 7	0.000000	ŏ	0.0000	0.000	
(nor cm)	55	14045	24.33	-30.7	0.000000	Ŭ,	0.0000	0.000	
	54	14333	32.35	-36.7	0.000000	U	0.0000	0.000	
	57	5461	12.33	-36.7	0.000000	0	0.0000	0.000	
	58	11980	27.04	-36.7	0.000000	0	0.0000	0.000	
	59	11802	26.64	-36.7	0.000000	Ō	0 0000	0 000	
	62	13090	21 59	-26 7	0.000000	ő	0.0000	0.000	
	64	14000	31.50	-30.7	0.000000	Ŭ,	0.0000	0.000	
	64	14909	33.65	-36.7	0.000000	0	0.0000	0.000	
	66	15084	34.05	-36.7	0.000000	0	0.0000	0.000	
	68	14385	32.47	-36.7	0.000000	0	0.0000	0.000	
	69	14558	32.86	-36.7	0.000000	0	0.0000	0.000	
	70	14914	33 67	-36 7	0 000000	ň	0 0000	0.000	
	100	14050	23.0/	- 30.7	0.000000	0	0.0000	0.000	
	120	14700	33.19	-30./	0.000000	Ŭ	0.0000	0.000	
	199	TP030	36.18	-36.7	0.000000	0	0.0000	0.000	
	200	15835	35.74	-36.7	0.000000	0	0.0000	0.000	
	201	16063	36.26	-36.7	0.00000	0	0.0000	0.000	
	202	16508	37.26	-36.7	0.000000	ō	0.0000	0 000	
	203	16424	37 07	-36 7	0 000000	ő	0.0000	0.000	
	203	17010	37.07	-30.7	0.000000	0	0.0000	0.000	
	204	1/213	38.85	-36.7	0.000000	U	0.0000	0.000	
	205	15504	35.00	-36.7	0.000000	0	0.0000	0.000	

Table 5. Backscatter and biomass per transect for P392 (1989).

\* transects where samples were taken

Table 5. (con't).

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Stratum T	ransect	Transect	Transect	Target	Sa - Area	Total	Biomass	Total	Sample
	Number	Length	Area	Strength	Scattering	Scattering	Density	Biomass	Number
		(m)	(km²)	(dB/kg)	(/sr)	(m²/sr)	(Kg/m²)	(t/trans)	
ST5	104	11120	44.06	-36.7	0.00000	4	0.0005	20.343	4/38
	105	9124	36.15	-36.7	0.00000	0	0.0000	0.000	
Port-au-	106	9477	37.55	-36.7	0.00000	0	0.0000	0.000	
Port	107	11462	45.42	-36.7	0.000000	0	0.0000	0.000	
Bay of	108	8152	32.30	-36.7	0.00000	0	0.0000	0.000	
Islands	109	7468	29.59	-36.7	0.00000	0	0.0000	0.000	
(Gulf)	110	4070	16.13	-36.7	0.000000	0	0.0000	0.000	
Bonne Bay	111	14480	57.38	-36.7	0.000000	0	0.0000	0.000	
Bank	112	12360	48.97	-36.7	0.00000	0	0.0000	0.000	
	113	11848	46.95	-36.7	0.00000	0	0.0000	0.000	
	114	13219	52.38	-36.7	0.000000	10	0.0009	46.799	4/38
	115	12537	49.68	-36.7	0.000000	0	0.0000	0.000	
	116	10063	39.87	-36.7	0.000000	0	0.0000	0.000	
	118	8969	35.54	-36.7	0.000000	0	0.0000	0.000	
	120	12242	48.51	-36.7	0.000000	0	0.0000	0.000	
	121	17603	69.75	-36.7	0.000000	0	0.0000	0.000	
	131	7882	31.23	-36.7	0.000000	0	0.0000	0.000	
	132	8391	33.25	-36.7	0.000000	0	0.0000	0.000	
	133	8190	32.45	-36.7	0.000000	0	0.0000	0.000	
	134	8930	35.38	-36.7	0.000000	0	0.0000	0.000	
	135	10059	39.86	-36.7	0.000000	0	0.0000	0.000	
	136	19679	77.98	-36.7	0.000008	659	0.0394	3069.125	* 4/38
	137	17944	71.10	-36.7	0.000003	197	0.0129	917.397	* 4/38
	138	15359	60.86	-36.7	0.000000	0	0.0000	0.000	
	139	10706	42.42	-36.7	0.000000	0	0.0000	0.000	
	140	10853	43.01	-36.7	0.000000	0	0.0000	0.000	
	141	11162	44.23	-36.7	0.000000	0	0.0000	0.000	
	143	4674	18.52	-36.7	0.000000	0	0.0000	0.000	
	144	11590	45.92	-36.7	0.000000	0	0.0000	0.000	•
	145	1437	5.70	-36.7	0.000000	0	0.0000	0.000	
	168	12977	51.42	-36.7	0.000000	0	0.0000	0.000	•
	169	12969	51.39	-36.7	0.000000	0	0.0000	0.000	
	170	13213	52.35	-36.7	0.000000	0	0.0000	0.000	
	171	14038	55.62	-36.7	0.000000	0	0.0000	0.000	
	173	13240	52.46	-36.7	0.000000	0	0.0000	0.000	
	174	4874	19.31	-36.7	0.000000	0	0.0000	0.000	
	175	4698	18.62	-36.7	0.000000	0	0.0000	0.000	
	176	2392	9.48	-36.7	0.000000	0	0.0000	0.000	
	1//	/221	28.61	-36.7	0.000000	0	0.0000	0.000	
	1/8	3683	14.59	-36.7	0.000000	0	0.0000	0.000	
	179	3567	14.13	-36.7	0.000000	0	0.0000	0.000	
	180	65//	26.06	-36.7	0.000000	0	0.0000	0.000	
	181	7/38	30.66	-36.7	0.000000	0	0.0000	0.000	
	182	7471	29.60	-36.7	0.000000	U	0.0000	0.000	
	183	7824	31.00	-36.7	0.000000	0	0.0000	0.000	
	184	/8/9	31.22	-36.7	0.000000	10	0.0000	0.000	4/20
	185	/48/	29.67	-36.7	0.000001	18	0.0027	81.515	4/38
	186	0042	26.32	-36.7	0.000000	4	0.0007	19.183	4/38
	100	3439	13.71	-36.7	0.000000	0	0.0000	0.000	
	100	3962	15.78	-30.7	0.000000	0	0.0000	0.000	
	109	4401	10.00	-36.7	0.000000	0	0.0000	0.000	
	101	2075	10.60	-36.7	0.000000	0	0.0000	0.000	
	191	2403	3.04	-30.7	0.000000	0	0.0000	0.000	
	192	2607	10.72	-36.7	0.000000	0	0.0000	0.000	
	195	2007	10.33	-36.7	0.000000	ů č	0.0000	0.000	
	107	4344	17 20	-36.7	0.000000	0	0.0000	0.000	
	206	4340	15 07	-36.7	0.000000	0	0.0000	0.000	
	200	4624	19 32	-36.7	0.000000	0	0.0000	0.000	
	209	3950	15 26	-36.7	0.000000	0	0.0000	0.000	
	200	4003	15.20	- 36.7	0.000000	0	0.0000	0.000	
	203	3040	15.00	-30.1	0.000000	0	0.0000	0.000	
	210	4670	18 50	-36.7	0.000000	0	0.0000	0.000	
	211	5094	20.30	-30./	0.000000	0	0.0000	0.000	
	212	3020	15 30	-36.7	0.000000	0	0.0000	0.000	
	214	2024	11 67	-36.7	0.000000	0	0.0000	0.000	
	2/15 215	2794	11 01	-36.7	0.000000	0	0.0000	0.000	
	216	2162	8 57	-36 7	0.000000	0	0.0000	0.000	
	210	2104	0.3/ 7 AE	- 26.7	0.000000	0	0.0000	0.000	
	21/ 210	2007	1.75	-30./	0.000000	0	0.0000	0.000	
	210	47/1 1001	2.13	-30.7	0.000000	0	0.0000	0.000	
	220	1544	6 1 2	-36 7	0 000000	0	0.0000	0.000	
	221	2260	8.95	-36 7	0.000000	0	0 0000	0.000	
	222	2471	9,79	-36 7	0.000000	0	0.0000	0.000	
			2.12		0.000000	5	0.0000	0.000	

Table 5. (con't).

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State Lamber     L		Tropest	Tresses	mwawaaat	Towert		Totol	Diamage		
Handler     Lites     Scrapping     October (1/2)     Scrapping     Scrapping     Handler     Handler       876     73     866     2.07     -36.7     0.000000     0     0.0000     0.0000       876     75     1439     3.45     -36.7     0.000000     0     0.0000     0.0000       1slands     75     1439     3.45     -36.7     0.000000     0     0.0000     0.0000       77     1134     2.72     -36.7     0.000000     0     0.0000     0.0000     0.0000       80     3488     8.36     -36.7     0.000000     0     0.0000     0.0000     0.0000       81     1977     26.29     -36.7     0.000000     0     0.0000	Stratum	Number	Transect	Transect	Target	Sa - Area	Total	Biomass	Total	Sampie
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		Number	(m)	(km²)	(dB/kg)	(/sr)	(m <sup>2</sup> /sr)	(Ka/m²)	(t/trans)	Number
876     73     866     2.07     -36.7     0.000000     0     0.0000     0.0000       Bay of     75     1439     3.45     -36.7     0.000000     0     0.0000     0.0000       Bay of     75     1439     3.45     -36.7     0.000000     0     0.0000     0.0000       77     1134     2.72     -36.7     0.000000     0     0.0000     0.0000     0.0000       78     64.3     1.54     -36.7     0.000000     0     0.0000     0.0000     0.0000       81     1037     7.38     -36.7     0.000000     0     0.0000     0.0000     0.0000       82     2489     5.96     -36.7     0.000000     0     0.0000     0.0000     0.0000       84     10977     26.3     0.000000     0     0.0000     0.0000     0.0000     0.0000       85     2465     4.71     -36.7     0.000000     0     0.0000     0.0000     0.0000       87 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>										
74     789     1.89     -36.7     0.000000     0     0.0000     0.0000       Islands     76     1439     3.45     -36.7     0.000000     0     0.0000     0.0000       71     114     2.72     -36.7     0.000000     0     0.0000     0.0000       78     643     1.54     -36.7     0.000000     0     0.0000     0.0000       80     3486     6.36     -36.7     0.000000     0     0.0000     0.0000       81     2495     5.96     -36.7     0.000000     0     0.0000     0.0000       84     10977     26.29     -36.7     0.000000     0     0.0000     0.0000       85     2489     5.96     -36.7     0.000000     0     0.0000     0.0000       86     2604     6.24     -36.7     0.000000     0     0.0000     0.0000       87     9679     23.17     -36.7     0.000000     0     0.0000     0.0000       91	ST6	73	866	2.07	-36.7	0.000000	0	0.0000	0.000	
Bay of 75 1419 3.45 -36.7 0.00000 0 0.0000 0.0000 0.000 Islands 76 2999 7.16 -36.7 0.000000 0 0.0000 0.0000 0.000 77 1134 2.72 -36.7 0.000000 0 0.0000 0.0000 0.000 78 643 1.54 -36.7 0.000000 0 0.0000 0.0000 0.000 83 3079 7.38 -36.7 0.000000 0 0.0000 0.0000 0.000 84 10979 26.29 -36.7 0.000000 0 0.0000 0.0000 0.000 85 2489 5.96 -36.7 0.000000 0 0.0000 0.0000 0.000 86 2604 6.24 -36.7 0.000000 0 0.0000 0.0000 0.000 87 9679 23.19 -36.7 0.000000 0 0.0000 0.0000 0.000 87 9679 23.19 -36.7 0.000000 0 0.00000 0.0000 0.000 87 9679 23.19 -36.7 0.000000 0 0.0000 0.0000 0.000 87 9679 23.19 -36.7 0.000000 0 0.0000 0.0000 0.000 89 14226 34.17 -36.7 0.000000 0 0.0000 0.0000 0.000 91 1402 33.76 -36.7 0.000000 0 0.0000 0.0000 0.000 93 1761 4.22 33.7 -36.7 0.000000 0 0.0000 0.0000 0.000 94 286 6.91 -36.7 0.000000 0 0.0000 0.0000 0.000 95 3038 7.28 -36.7 0.000000 0 0.0000 0.0000 0.000 95 3038 7.28 -36.7 0.000000 0 0.0000 0.0000 96 4170 9.99 -36.7 0.000000 0 0.0000 0.000 97 4470 10.71 -36.7 0.000000 0 0.0000 0.000 98 7012 16.80 -36.7 0.000000 0 0.0000 0.000 99 6820 16.34 -36.7 0.000000 0 0.0000 0.000 99 6820 16.34 -36.7 0.000000 0 0.0000 0.000 91 14095 5.0 0.35.7 0.000000 0 0.0000 0.000 91 2000 0.000 92 711 2 16.80 -36.7 0.000000 0 0.0000 0.000 93 712 12 16.80 -36.7 0.000000 0 0.0000 0.000 94 246 4.36.7 0.000000 0 0.0000 0.000 95 4170 9.99 -36.7 0.000000 0 0.0000 0.000 97 4470 10.71 -36.8 0.000000 0 0.0000 0.000 97 4470 10.71 -36.8 0.000000 0 0.0000 0.000 97 4470 10.71 -36.8 0.000000 0 0.0000 0.000 97 4470 10.72 -36.8 0.000000 0 0.0000 0.000 97 147 123 98 4.4 -36.7 0.000000 0 0.0000 0.000 128 1600 3.77 -36.8 0.000000 0 0.0000 0.000 129 129 120 5 3.05 -36.8 0.000000 0 0.0000 0.000 120 127 125 3.05 -36.8 0.000000 0 0.0000 0.000 128 1600 3.77 -36.8 0.000000 0 0.0000 0.000 129 129 120 7 6.64 -36.7 0.000000 0 0.0000 0.000 130 1474 3.47 -36.8 0.000000 0 0.0000 0.0000 0.000 144 1239 93 4.4 -36.7 0.000000 0 0.0000 0.0000 0.000 156 1387 3104 55 -34.9 0.000000 0 0.0000 0.0000 0.0000 166 1387 322 92 4		74	789	1.89	-36.7	0.00000	0	0.0000	0.000	
Tailands     76     2989     7.1.6     -36.7     0.00000     0     0.0000     0.0000     0.0000       78     643     1.54     -36.7     0.00000     0     0.0000	Bay of	75	1439	3.45	-36.7	0.000000	0	0.0000	0.000	
77     1134     2.72     -36.7     0.00000     0     0.0000     0.0000       78     643     1.54     -36.7     0.00000     0     0.0000     0.0000       80     3488     8.36     -36.7     0.00000     0     0.0000     0.0000       82     2280     5.46     -36.7     0.00000     0     0.0000     0.0000       84     1977     26.23     -36.7     0.00000     0     0.0000     0.0000       86     3654     -36.7     0.00000     0     0.0000     0.0000       86     1365     4.71     -36.7     0.00000     0     0.0000     0.000       91     14026     34.17     -36.7     0.00000     0     0.0000     0.0000       92     1764     4.22     -36.7     0.000000     0     0.0000     0.0000       93     2213     5.30     -36.7     0.000000     0     0.0000     0.0000       94     2885     6.91 <t< td=""><td>Islands</td><td>76</td><td>2989</td><td>7.16</td><td>-36.7</td><td>0.00000</td><td>0</td><td>0.0000</td><td>0.000</td><td></td></t<>	Islands	76	2989	7.16	-36.7	0.00000	0	0.0000	0.000	
78     643     1.54     -36.7     0.00000     0     0.0000     0.000       80     3488     8.36     -36.7     0.00000     0     0.0000     0.0000       83     3079     7.38     -36.7     0.00000     0     0.0000     0.0000     0.0000       83     3079     7.38     -36.7     0.00000     0     0.0000     0.0000     0.0000       85     2489     5.66     -36.7     0.00000     0     0.0000     0.0000     0.0000       86     2604     6.24     -36.7     0.00000     0     0.0000     0.0000     0.0000       81     14265     34.17     -36.7     0.00000     0     0.0000 </td <td></td> <td>77</td> <td>1134</td> <td>2.72</td> <td>-36.7</td> <td>0.000000</td> <td>0</td> <td>0.0000</td> <td>0.000</td> <td></td>		77	1134	2.72	-36.7	0.000000	0	0.0000	0.000	
79     551     1.32     -36.7     0.00000     0     0.0000     0.0000       82     2280     5.46     -36.7     0.00000     0     0.0000     0.0000       82     2280     5.46     -36.7     0.00000     0     0.0000     0.0000       84     19977     26.29     -36.7     0.00000     0     0.0000     0.0000       85     2489     5.96     -36.7     0.00000     0     0.0000     0.0000       86     2604     6.24     -36.7     0.00000     0     0.0000     0.0000       85     14265     4.77     -36.7     0.00000     0     0.0000     0.0000       91     14022     33.76     -36.7     0.000000     0     0.0000     0.0000     0.0000       93     2213     5.30     -36.7     0.000000     0     0.0000     0.0000     0.0000       94     2885     6.91     -36.7     0.000000     0     0.0000     0.0000     0.0000<		78	643	1.54	-36.7	0.000000	0	0.0000	0.000	
80     3488     8.36     -36.7     0.00000     0.0000     0.0000       82     22280     5.46     -36.7     0.00000     0.0000     0.0000       83     3079     7.38     -36.7     0.00000     0.0000     0.0000       84     10379     26.29     -36.7     0.00000     0.0000     0.0000       86     26.04     6.24     -36.7     0.00000     0.0000     0.0000       87     9679     23.19     -36.7     0.00000     0.0000     0.0000       89     14265     34.17     -36.7     0.00000     0.0000     0.0000       91     1402     33.75     -36.7     0.00000     0.0000     0.0000       93     1764     4.22     -36.7     0.00000     0.0000     0.0000       94     2365     6.31     -36.7     0.00000     0.0000     0.0000       94     2365     6.34     -36.7     0.00000     0.0000     0.0000       95     4170     9.9<		79	551	1.32	-36.7	0.000000	0	0.0000	0.000	
82     2280     5.46     -36.7     0.00000     0     0.0000     0.0000       84     10977     26.29     -36.7     0.00000     0     0.0000     0.000       85     2489     5.96     -36.7     0.00000     0     0.0000     0.0000       86     2464     5.24     -36.7     0.00000     0     0.0000     0.0000       87     9579     23.19     -36.7     0.000000     0     0.0000     0.0000       91     1265     4.71     -36.7     0.00000     0     0.0000     0.0000       92     1764     4.22     -36.7     0.00000     0     0.0000     0.0000       93     2213     5.30     -36.7     0.00000     0     0.0000     0.0000     0.0000       94     2885     6.91     -36.7     0.00000     0     0.0000     0.0000     0.0000       95     4170     9.9     -36.7     0.00000     0     0.0000     0.0000     0.0000		80	3488	8.36	-36.7	0.000000	0	0.0000	0.000	
83     3079     7.38     -36.7     0.00000     0.0000     0.0000       84     1077     26.29     -36.7     0.00000     0.0000     0.0000       85     2489     5.96     -36.7     0.00000     0.0000     0.0000       86     2604     6.24     -36.7     0.00000     0.0000     0.0000       87     9679     23.19     -36.7     0.00000     0.0000     0.0000       89     14266     34.17     -36.7     0.00000     0.0000     0.0000       91     14092     33.76     -36.7     0.00000     0     0.0000     0.0000       93     2213     5.30     -36.7     0.00000     0     0.0000     0.0000       94     2885     6.91     -36.7     0.00000     0     0.0000     0.0000       95     333     7.28     -36.7     0.000000     0     0.0000     0.0000       96     4170     9.9     -36.7     0.000000     0     0.0000		82	2280	5.46	-36.7	0.000000	0	0.0000	0.000	
84     10977     26.29     -36.7     0.00000     0     0.0000     0.0000       85     2489     5.36     7     0.00000     0     0.0000     0.0000       86     2604     6.24     -36.7     0.00000     0     0.0000     0.0000       89     14266     34.17     -36.7     0.00000     0     0.0000     0.0000       91     14092     33.76     -36.7     0.00000     0     0.0000     0.0000       92     1764     4.22     -36.7     0.00000     0     0.0000     0.0000     0.0000       93     2213     5.30     -36.7     0.00000     0     0.0000		83	3079	7.38	-36.7	0.000000	0	0.0000	0.000	
85     2469     5.96     -36.7     0.00000     0     0.0000     0.0000       87     9679     23.19     -36.7     0.00000     0     0.0000     0.0000       88     14266     34.17     -36.7     0.00000     0     0.0000     0.0000       91     14262     33.76     -36.7     0.00000     0     0.0000     0.0000       92     1764     4.22     -36.7     0.00000     0     0.0000     0.0000       93     2213     5.30     -36.7     0.00000     0     0.0000     0.0000     0.0000       94     2885     6.91     -36.7     0.00000     0     0.0000     0.0		84	10977	26.29	-36.7	0.000000	0	0.0000	0.000	
86     2604     6.24     -36.7     0.00000     0     0.0000     0.0000       88     1965     4.71     -36.7     0.00000     0     0.0000     0.0000       91     14092     33.76     -36.7     0.00000     0     0.0000     0.0000       91     14092     33.76     -36.7     0.00000     0     0.0000     0.0000       93     2213     5.30     -36.7     0.00000     0     0.0000     0.0000       94     2885     6.91     -36.7     0.00000     0     0.0000     0.0000     0.0000       95     3038     7.28     -36.7     0.00000     0     0.0000     0.0000     0.0000       96     4170     9.9     -36.7     0.00000     0     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 <td< td=""><td></td><td>85</td><td>2489</td><td>5.96</td><td>-36.7</td><td>0.000000</td><td>0</td><td>0.0000</td><td>0.000</td><td></td></td<>		85	2489	5.96	-36.7	0.000000	0	0.0000	0.000	
87     9679     22.19     -36.7     0.00000     0     0.0000     0.0000       89     14266     34.17     -36.7     0.00000     0     0.0000     0.0000       91     14262     33.76     -36.7     0.00000     0     0.0000     0.0000       92     1764     4.222     -36.7     0.00000     0     0.0000     0.0000       93     2213     5.30     -36.7     0.00000     0     0.0000     0.0000       94     2885     6.91     -36.7     0.00000     0     0.0000     0.0000       95     3038     7.28     -36.7     0.00000     0     0.0000     0.0000     0.0000       96     4170     10.71     -36.7     0.00000     0     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.00000     0.00000		86	2604	6.24	-36.7	0.000000	0	0.0000	0.000	
88     1965     4,71     -36.7     0.00000     0     0.0000     0.0000       91     14092     33.76     -36.7     0.00000     0     0.0000     0.0000       92     1764     4.22     -36.7     0.00000     0     0.0000     0.0000       93     2213     5.30     -36.7     0.00000     0     0.0000     0.0000       94     22855     6.91     -36.7     0.00000     0     0.0000     0.0000       95     3038     7.28     -36.7     0.00000     0     0.0000     0.0000       97     4470     10.71     -36.7     0.00000     0     0.0000     0.0000       98     7012     16.80     -36.7     0.00000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.000000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.000000     0     0.0000     0.0000       123     3754		87	9679	23.19	-36.7	0.000000	0	0.0000	0.000	
89     14266     34.17     -36.7     0.00000     0     0.0000     0.0000       92     1764     4.22     -36.7     0.00000     0     0.0000     0.0000       93     2213     5.30     -36.7     0.00000     0     0.0000     0.0000       94     2885     6.91     -36.7     0.00000     0     0.0000     0.0000       95     3038     7.28     -36.7     0.00000     0     0.0000     0.0000       96     4170     9.99     -36.7     0.00000     0     0.0000     0.0000       97     4470     10.71     -36.7     0.00000     0     0.0000     0.0000       103     9211     2.07     -36.7     0.000000     0     0.0000     0.0000       123     3754     8.64     -36.8     0.000005     41     0.0247     199.668     * 3       124     2689     6.33     -36.8     0.00000     0     0.0000     0.0000       125		88	1965	4.71	-36.7	0.00000	0	0.0000	0.000	
91     14092     33.76     -36.7     0.00000     0     0.0000     0.0000       92     1764     4.22     -36.7     0.00000     0     0.0000     0.0000       93     2213     5.30     -36.7     0.00000     0     0.0000     0.0000       94     2885     6.91     -36.7     0.00000     0     0.0000     0.0000       95     3038     7.28     -36.7     0.00000     0     0.0000     0.0000       97     4170     10.71     -36.7     0.00000     0     0.0000     0.0000       99     6820     16.34     -36.7     0.00000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.00000     0     0.0000     0.0000       877     122     3438     8.10     -36.8     0.000001     6     0.0321     23.331     * 3       125     585     1.38     -36.8     0.00000     0     0.0000     0.0000		89	14266	34.17	-36.7	0.00000	0	0.0000	0.000	
92     1764     4.22     -36.7     0.00000     0     0.0000     0.0000       94     2885     6.91     -36.7     0.00000     0     0.0000     0.0000       95     3038     7.28     -36.7     0.00000     0     0.0000     0.0000       96     4170     9.99     -36.7     0.00000     0     0.0000     0.0000       97     4470     10.71     -36.7     0.00000     0     0.0000     0.0000       99     6820     16.34     -36.7     0.00000     0     0.0000     0.0000       102     8539     20.46     -36.7     0.00000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.00000     0     0.0000     0.0000       123     3754     8.84     -36.8     0.000007     42     0.0331     28.825     * 3       Bonne Bay     124     2689     6.33     -36.8     0.00000     0     0.0000     0.0000 <t< td=""><td></td><td>91</td><td>14092</td><td>33.76</td><td>-36.7</td><td>0.000000</td><td>0</td><td>0.0000</td><td>0.000</td><td></td></t<>		91	14092	33.76	-36.7	0.000000	0	0.0000	0.000	
93     2213     5.30     -36.7     0.00000     0     0.0000     0.0000       94     2885     6.91     -36.7     0.00000     0     0.0000     0.0000       95     3038     7.28     -36.7     0.00000     0     0.0000     0.0000       96     4170     10.71     -36.7     0.000000     0     0.0000     0.0000       98     7012     16.80     -36.7     0.000000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.000000     0     0.0000     0.0000       113     9211     22.07     -36.7     0.00000     0     0.0000     0.0000       123     3754     8.84     -36.8     0.00000     0     0.0000     0.0000     0.0000       124     2689     6.33     -36.8     0.00000     0     0.0000     0.0000     0.0000       125     1103     2.60     -36.8     0.00000     0     0.0000     0.0000     0.		92	1764	4.22	-36.7	0.00000	0	0.0000	0.000	
94     2885     6.91     -36.7     0.000000     0     0.0000     0.0000       96     4170     9.99     -36.7     0.000000     0     0.0000     0.0000       97     4470     10.71     -36.7     0.000000     0     0.0000     0.0000       98     7012     16.80     -36.7     0.000000     0     0.0000     0.0000       102     8539     20.46     -36.7     0.000000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.000000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.00000     0     0.00000     0.00000		93	2213	5.30	-36.7	0.00000	0	0.0000	0.000	
95     3038     7.28     -36.7     0.00000     0     0.0000     0.0000       97     4470     10.71     -36.7     0.000000     0     0.0000     0.0000       98     7012     16.80     -36.7     0.00000     0     0.0000     0.0000       99     6420     16.34     -36.7     0.00000     0     0.0000     0.0000       102     8539     20.46     -36.7     0.00000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.00000     0     0.0247     199.868     * 3       103     9211     22.07     -36.8     0.000007     42     0.0321     203.331     * 3       125     585     1.38     -36.8     0.000000     0     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.00000     0.00000		94	2885	6.91	-36.7	0.00000	0	0.0000	0.000	
96     4170     9.99     -36.7     0.00000     0     0.0000     0.0000       97     4470     10.71     -36.7     0.00000     0     0.0000     0.0000       98     7012     16.80     -36.7     0.00000     0     0.0000     0.0000       102     8539     20.46     -36.7     0.000000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.000005     41     0.0247     199.868     * 3       123     3754     8.84     -36.8     0.000007     42     0.0321     203.331     * 3       125     585     1.38     -36.8     0.00000     0     0.0000     0     0.0000       126     103     2.60     -36.8     0.00000     0     0.0000     0     0.0000       128     1600     3.77     -36.8     0.000000     0     0.0000     0     0.0000       129     1295     3.05     -36.8     0.000000     0		95	3038	7.28	-36.7	0.000000	0	0.0000	0.000	
97     4470     10.71     -36.7     0.00000     0     0.0000     0.0000       98     7012     16.80     -36.7     0.00000     0     0.0000     0.0000       102     8539     20.46     -36.7     0.00000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.00000     0     0.0000     0.0000       123     3354     8.10     -36.8     0.000001     6     0.0321     23.331     * 3       Bonne Bay     124     2699     6.33     -36.8     0.000001     0     0.0000     0     0.0000       126     1103     2.60     -36.8     0.000000     0     0.0000     0     0.000       127     6666     15.70     -36.8     0.000000     0     0.0000     0     0.000       129     1295     3.05     -36.8     0.000000     0     0.0000     0     0.000       129     1295     3.05     -36.8     0.000000		96	4170	9.99	-36.7	0.000000	0	0.0000	0.000	
98     7012     16.80     -36.7     0.000000     0     0.0000     0.0000       99     6820     16.34     -36.7     0.000000     0     0.0000     0.0000       103     9211     22.07     -36.7     0.00000     0     0.0000     0.0000       23     3754     8.84     -36.8     0.000005     1     0.0247     199.668     * 3       Bonne Bay     124     2689     6.33     -36.8     0.000007     42     0.0321     203.31     * 3       Bonne Bay     124     2689     6.33     -36.8     0.00000     0     0.0000     0.0000       126     1103     2.60     -36.8     0.00000     0     0.0000     0.0000     0.0000       128     1600     3.77     -36.8     0.00000     0     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.00000     0.00000     0.00000 <td></td> <td>97</td> <td>4470</td> <td>10.71</td> <td>-36.7</td> <td>0.00000</td> <td>0</td> <td>0.0000</td> <td>0.000</td> <td></td>		97	4470	10.71	-36.7	0.00000	0	0.0000	0.000	
99     6820     16.34     -36.7     0.000000     0     0.0000     0.0000       102     8539     20.46     -36.7     0.000000     0     0.0000     0.0000       ST7     122     3438     8.10     -36.8     0.00001     6     0.033     28.825     * 3       Bonne Bay     124     2689     6.33     -36.8     0.00000     0     0.0000     0.0000       125     585     1.38     -36.8     0.00000     0     0.0000     0.0000       126     1103     2.60     -36.8     0.00000     0     0.0000     0.0000       129     1295     3.05     -36.8     0.00000     0     0.0000     0.0000       130     1474     3.47     -36.8     0.00000     0     0.0000     0.0000       130     1474     3.47     -36.3     0.00000     0     0.0000     0.000       130     147     12399     93.44     -36.3     0.00000     0     0.0000 </td <td></td> <td>98</td> <td>7012</td> <td>16.80</td> <td>-36.7</td> <td>0.00000</td> <td>0</td> <td>0.0000</td> <td>0.000</td> <td></td>		98	7012	16.80	-36.7	0.00000	0	0.0000	0.000	
102     8539     20.46     -36.7     0.00000     0     0.0000     0.0000       ST7     122     3438     8.10     -36.8     0.000005     41     0.0247     199.868     * 3       Bonne Bay     124     2609     6.33     -36.8     0.00001     6     0.033     28.825     * 3       Bonne Bay     124     2609     6.33     -36.8     0.00000     0     0.0000     0.0000       125     585     1.38     -36.8     0.00000     0     0.0000     0.0000       124     1600     3.77     -36.8     0.00000     0     0.0000     0.0000       123     1400     3.77     -36.8     0.00000     0     0.0000     0.0000       124     1600     3.77     -36.8     0.00000     0     0.0000     0.0000       123     1474     3.47     -36.8     0.00000     0     0.0000     0     0.000       130     1474     12399     3.44     -36.3 </td <td></td> <td>99</td> <td>6820</td> <td>16.34</td> <td>-36.7</td> <td>0.000000</td> <td>0</td> <td>0.0000</td> <td>0.000</td> <td></td>		99	6820	16.34	-36.7	0.000000	0	0.0000	0.000	
103     9211     22.07     -36.7     0.00000     0     0.0000     0.0000       ST7     122     3438     8.10     -36.8     0.000001     6     0.0247     199.868     * 3       Bonne Bay     124     269     6.33     -36.8     0.000001     6     0.0321     203.331     * 3       125     585     1.38     -36.8     0.00000     0     0.0000     0.0000       126     1103     2.60     -36.8     0.00000     0     0.0000     0.0000       127     6666     15.70     -36.8     0.00000     0     0.0000     0.0000       129     1295     3.05     -36.8     0.00000     0     0.0000     0.0000       130     147     3.47     -36.8     0.00000     0     0.0012     382.298     \$ 5/6       St.     John's     148     10079     75.9     6     -36.3     0.00000     0     0.0000       Bay     149     937     74.89		102	8539	20.46	-36.7	0.000000	0	0.0000	0.000	
ST7     122     3438     8.10     -36.8     0.000005     41     0.0247     199.868     * 3       Bonne Bay     123     3754     8.84     -36.8     0.000001     6     0.0333     28.825     * 3       Bonne Bay     124     2689     6.33     -36.8     0.00000     0     0.00000     0.00000     0.		103	9211	22.07	-36.7	0.000000	0	0.0000	0.000	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	ST7	122	3438	8.10	-36.8	0.000005	41	0.0247	199.868	* 3
Bonne Bay     124     2689     6.33     -36.8     0.000007     42     0.0321     203.331     * 3       125     585     1.38     -36.8     0.00000     0     0.0000     0.0000       126     1103     2.60     -36.8     0.00000     0     0.0000     0.0000       127     6666     15.70     -36.8     0.00000     0     0.0000     0.0000       128     1600     3.77     -36.8     0.00000     0     0.0000     0.0000       130     1474     3.47     -36.8     0.00000     0     0.0000     0.0000       ST9     146     1229     92.64     -36.3     0.00000     0     0.0000     0.0000       Bay     149     937     74.89     -36.3     0.00000     0     0.0000     0.0000       151     8316     62.67     -36.3     0.000000     0     0.0000     0     0.000       152     8986     67.72     -34.9     0.000000     0 </td <td></td> <td>123</td> <td>3754</td> <td>8.84</td> <td>-36.8</td> <td>0.000001</td> <td>6</td> <td>0.0033</td> <td>28.825</td> <td>* 3</td>		123	3754	8.84	-36.8	0.000001	6	0.0033	28.825	* 3
125     585     1.38     -36.8     0.00000     0     0.0000     0.000       126     1103     2.60     -36.8     0.00000     0     0.0000     0.000       127     6666     15.70     -36.8     0.00000     0     0.0000     0.0000       128     1600     3.77     -36.8     0.00000     0     0.0000     0.0000       129     1295     3.05     -36.8     0.00000     0     0.0000     0.0000       130     1474     3.47     -36.8     0.00000     0     0.0042     396.698     * 5/6       St.     John's     148     10079     75.96     -36.3     0.00000     0     0.0000     0.0000       Bay     149     9937     74.89     -36.3     0.000000     0     0.0000     0.0000     0     0.0000     151     8316     62.67     -36.3     0.00000     0     0.0000     0     0.0000     151     152     8986     67.72     -34.9     0.000	Bonne Ba	y 124	2689	6.33	-36.8	0.000007	42	0.0321	203.331	* 3
126     1103     2.60     -36.8     0.00000     0     0.0000     0.000       127     6666     15.70     -36.8     0.00000     0     0.0000     0.000       128     1600     3.77     -36.8     0.00000     0     0.0000     0.0000       129     1295     3.05     -36.8     0.00000     0     0.0000     0.0000       130     1474     3.47     -36.3     0.00000     0     0.0010     0.0000       147     12399     93.44     -36.3     0.00000     0     0.0042     396.698     * 5/6       St. John's     148     10079     75.96     -36.3     0.00000     0     0.0000     0.0000       Bay     149     9937     74.89     -36.3     0.000000     0     0.0000     0.0000       151     8316     62.67     -36.3     0.000000     0     0.0000     1.50     0.0000     1.50     0.0000     0     0.000     1.50     1.51     1.51		125	585	1.38	-36.8	0.000000	0	0.0000	0.000	
127     6666     15.70     -36.8     0.00000     0     0.0000     0.000       128     1600     3.77     -36.8     0.00000     0     0.0000     0.000       129     1295     3.05     -36.8     0.00000     0     0.0000     0.0000       130     1474     3.47     -36.8     0.00000     0     0.0000     0.0000       ST9     146     12292     92.64     -36.3     0.00001     93     0.0413     3823.298     * 5/6       147     1239     93.4     -36.3     0.00000     0     0.0000     0.0000       Bay     149     9937     74.89     -36.3     0.000000     0     0.0000     0.0000       150     9240     69.64     -36.3     0.000000     0     0.0000     0.0000     1.50       151     8316     62.67     -36.3     0.000000     0     0.0000     1.50     1.53     1.53     1.424     1.827     -34.9     0.000000     0 <t< td=""><td></td><td>126</td><td>1103</td><td>2.60</td><td>-36.8</td><td>0.000000</td><td>0</td><td>0.0000</td><td>0.000</td><td></td></t<>		126	1103	2.60	-36.8	0.000000	0	0.0000	0.000	
128     1600     3.77     -36.8     0.00000     0     0.0000     0.000       129     1295     3.05     -36.8     0.00000     0     0.000     0.000       ST9     146     12292     92.64     -36.3     0.000010     896     0.0413     3823.298     * 5/6       147     12399     93.44     -36.3     0.00000     0     0.000     0.000       Bay     149     9937     74.89     -36.3     0.000000     0     0.0000     0.0000       150     9240     69.64     -36.3     0.000000     0     0.0000     0     0.000       151     8316     62.67     -36.3     0.000000     0     0.0000     0     0.000       153     2424     18.27     -34.9     0.000000     0     0.0000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000<		127	6666	15.70	-36.8	0.00000	0	0.0000	0.000	
129     1295     3.05     -36.8     0.00000     0     0.0000     0.0000       30     1474     3.47     -36.8     0.00000     0     0.0000     0.000       ST9     146     12292     92.64     -36.3     0.00001     896     0.0413     3823.298     * 5/6       147     12399     93.44     -36.3     0.00000     0     0.0002     396.698     * 5/6       St. John's     148     10079     75.96     -36.3     0.00000     0     0.0000     0.0000     0.0000       Bay     149     9937     74.89     -36.3     0.00000     0     0.0000     0.		128	1600	3.77	-36.8	0.000000	0	0.0000	0.000	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		129	1295	3.05	-36.8	0.000000	0	0.0000	0.000	
ST9   146   12292   92.64   -36.3   0.000010   896   0.0413   3823.298   * 5/6     147   12399   93.44   -36.3   0.000001   93   0.0042   396.698   * 5/6     St. John's   148   10079   75.96   -36.3   0.00000   0   0.0000   0.000     Bay   149   9937   74.89   -36.3   0.00000   0   0.0000   0.0000     150   9240   69.64   -36.3   0.00000   0   0.0000   0.0000     151   8316   62.67   -36.3   0.00000   0   0.0000   0.0000     152   8986   67.72   -34.9   0.00000   0   0.0000   0.0000     153   2424   18.27   -34.9   0.00000   0   0.0000   0.0000     155   5405   40.73   -34.9   0.000000   0   0.0000   0.0000     156   13873   104.55   -34.9   0.000000   0   0.0000   0.0000     157   13257   99.91		130	1474	3.47	-36.8	0.00000	0	0.0000	0.000	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	ST9	146	12292	92.64	-36.3	0.000010	896	0.0413	3823.298	* 5/6
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		147	12399	93.44	-36.3	0.000001	93	0.0042	396.698	* 5/6
Bay     149     9937     74.89     -36.3     0.00000     8     0.0005     34.222     5/6       150     9240     69.64     -36.3     0.00000     0     0.0000     0.0000       151     8316     62.67     -36.3     0.00000     2     0.0001     7.367     5/6       152     8986     67.72     -34.9     0.00000     0     0.0000     0.000       153     2424     18.27     -34.9     0.00000     0     0.0943     2343.910     * 7       154     3296     24.84     -34.9     0.000000     0     0.0000     0     0.0000       155     5405     40.73     -34.9     0.000000     0     0.0000     0     0.0000       156     13873     104.55     -34.9     0.000000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.00000	St. John	's 148	10079	75.96	-36.3	0.00000	0	0.0000	0.000	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Bay	149	9937	74.89	-36.3	0.000000	8	0.0005	34.222	5/6
151   8316   62.67   -36.3   0.00000   2   0.0001   7.367   5/6     152   8986   67.72   -34.9   0.00000   0   0.0000   0.000     153   2424   18.27   -34.9   0.00000   115   0.0196   357.932   * 7     154   3296   24.84   -34.9   0.00000   0   0.0000   0   0.000     155   5405   40.73   -34.9   0.00000   0   0.0000   0   0.000     156   13873   104.55   -34.9   0.000000   0   0.0000   0   0.000     156   13873   104.55   -34.9   0.000000   0   0.0000   0   0.000     157   13257   99.91   -34.9   0.000000   0   0.0000   0   0.000     160   10576   79.70   -34.9   0.000000   0   0.0000   0   0.0000     161   11654   87.83   -34.9   0.000000   0   0.0000   0   0.0000     162	-	150	9240	69.64	-36.3	0.000000	0	0.0000	0.000	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		151	8316	62.67	-36.3	0.00000	2	0.0001	7.367	5/6
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		152	8986	67.72	-34.9	0.000000	0	0.0000	0.000	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		153	2424	18.27	-34.9	0.00006	115	0.0196	357.932	+ 7
155   5405   40.73   -34.9   0.000000   0   0.0000   0.0000     156   13873   104.55   -34.9   0.000000   8   0.0002   24.199   7     157   13257   99.91   -34.9   0.00000   0   0.0000   0.0000     158   16617   125.23   -34.9   0.00000   0   0.0000   0.0000     160   10576   79.70   -34.9   0.000000   0   0.0000   0.0000     161   11654   87.83   -34.9   0.000000   0   0.0000   0.0000     161   11654   87.83   -34.9   0.000000   0   0.0000   0.0000     161   11654   87.83   -34.9   0.000000   0   0.0000   0.0000     162   4858   36.61   -34.9   0.000000   0   0.0000   0.0000     163   11843   89.25   -34.9   0.000000   6   0.0002   19.999   7     165   15273   115.1   -34.9   0.000000   7		154	3296	24.84	-34.9	0.000030	752	0.0943	2343.910	* 7
156   13873   104.55   -34.9   0.00000   8   0.0002   24.199   7     157   13257   99.91   -34.9   0.00000   0   0.0000   0.0000     158   16617   125.23   -34.9   0.00000   0   0.0000   0.0000     160   10576   79.70   -34.9   0.000000   0   0.0000   0.0000     161   11654   87.83   -34.9   0.000000   0   0.0000   0.0000     161   11654   87.83   -34.9   0.000000   0   0.0000   0.0000     162   4858   36.61   -34.9   0.000000   0   0.0000   0.0000     163   11843   89.25   -34.9   0.000000   0   0.0000   0.0000     164   16526   124.54   -34.9   0.000000   7   0.0002   19.999   7     165   15273   115.10   -34.9   0.000000   7   0.0002   22.561   7     166   14042   105.83   -34.9   0.000000   <		155	5405	40.73	-34.9	0.000000	0	0.0000	0.000	
157   13257   99.91   -34.9   0.000000   0   0.0000   0.000     158   16617   125.23   -34.9   0.00000   0   0.0000   0.000     160   10576   79.70   -34.9   0.00000   0   0.0000   0.000     161   11654   87.83   -34.9   0.000001   86   0.0031   269.643   7     162   4858   36.61   -34.9   0.000000   0   0.0000   0.0000     163   11843   89.25   -34.9   0.000000   0   0.0000   0.0000     164   16526   124.54   -34.9   0.000000   6   0.0002   19.999   7     165   15273   115.10   -34.9   0.000000   7   0.0002   22.561   7     166   14042   105.83   -34.9   0.000000   0   0.0000   0.0000     167   6761   50.95   -34.9   0.000000   0   0.0000   0.0000		156	13873	104.55	-34.9	0.000000	8	0.0002	24.199	7
158     16617     125.23     -34.9     0.000000     0     0.0000     0.000       160     10576     79.70     -34.9     0.000000     0     0.0000     0.0000       161     11654     87.83     -34.9     0.000001     86     0.0031     269.643     7       162     4858     36.61     -34.9     0.000000     0     0.0000     0.0000       163     11843     89.25     -34.9     0.000000     0     0.0000     0.0000       164     16526     124.54     -34.9     0.000000     6     0.0000     0.0000       164     16526     124.54     -34.9     0.000000     7     0.0002     19.999     7       165     15273     115.10     -34.9     0.000000     7     0.0002     22.561     7       166     14042     105.83     -34.9     0.000000     0     0.0000     0.0000       167     6761     50.95     -34.9     0.000000     0     0.0000 <td></td> <td>157</td> <td>13257</td> <td>99.91</td> <td>-34.9</td> <td>0.000000</td> <td>0</td> <td>0.0000</td> <td>0.000</td> <td></td>		157	13257	99.91	-34.9	0.000000	0	0.0000	0.000	
160     10576     79.70     -34.9     0.000000     0     0.0000     0.000       161     11654     87.83     -34.9     0.000001     86     0.0031     269.643     7       162     4858     36.61     -34.9     0.000000     0     0.0000     0.0000       163     11843     89.25     -34.9     0.000000     0     0.0000     0.0000       164     16526     124.54     -34.9     0.000000     6     0.0002     19.999     7       165     15273     115.10     -34.9     0.000000     7     0.0002     22.561     7       166     14042     105.83     -34.9     0.000000     0     0.0000     0.0000       167     6761     50.95     -34.9     0.000000     0     0.0000     0.0000		158	16617	125.23	-34.9	0.00000	0	0.0000	0.000	
161     11654     87.83     -34.9     0.000001     86     0.0031     269.643     7       162     4858     36.61     -34.9     0.00000     0     0.0000     0.000       163     11843     89.25     -34.9     0.00000     0     0.0000     0.0000       164     16526     124.54     -34.9     0.00000     6     0.0002     19.999     7       165     15273     115.10     -34.9     0.000000     7     0.0002     22.561     7       166     14042     105.83     -34.9     0.000000     0     0.0000     0.0000       167     6761     50.95     -34.9     0.000000     0     0.0000     0.0000		160	10576	79.70	-34.9	0.000000	0	0.0000	0.000	
162     4858     36.61     -34.9     0.00000     0     0.0000     0.000       163     11843     89.25     -34.9     0.00000     0     0.0000     0.000       164     16526     124.54     -34.9     0.00000     6     0.0002     19.999     7       165     15273     115.10     -34.9     0.000000     7     0.0002     22.561     7       166     14042     105.83     -34.9     0.000000     0     0.0000     0.000       167     6761     50.95     -34.9     0.000000     0     0.0000     0.000		161	11654	87.83	-34.9	0.000001	86	0.0031	269.643	7
163     11843     89.25     -34.9     0.00000     0     0.0000     0.000       164     16526     124.54     -34.9     0.00000     6     0.0002     19.999     7       165     15273     115.10     -34.9     0.00000     7     0.0002     22.561     7       166     14042     105.83     -34.9     0.000000     0     0.0000     0.000       167     6761     50.95     -34.9     0.000000     0     0.0000		162	4858	36.61	-34.9	0.000000	0	0.0000	0.000	
164     16526     124.54     -34.9     0.000000     6     0.0002     19.999     7       165     15273     115.10     -34.9     0.000000     7     0.0002     22.561     7       166     14042     105.83     -34.9     0.000000     0     0.0000     0.0000       167     6761     50.95     -34.9     0.000000     0     0.0000     0.0000		163	11843	89.25	-34.9	0.00000	0	0.0000	0.000	
165     15273     115.10     -34.9     0.000000     7     0.0002     22.561     7       166     14042     105.83     -34.9     0.000000     0     0.0000     0.0000       167     6761     50.95     -34.9     0.000000     0     0.0000     0.0000		164	16526	124.54	-34.9	0.000000	6	0.0002	19.999	7
166     14042     105.83     -34.9     0.000000     0     0.0000     0.000       167     6761     50.95     -34.9     0.000000     0     0.0000     0.0000		165	15273	115.10	-34.9	0.00000	7	0.0002	22.561	7.
<b>167 6761 50.95 -34.9 0.000000 0 0.000 0.000</b>		166	14042	105.83	-34.9	0.000000	0	0.0000	0.000	
		167	6761	50.95	-34.9	0.000000	0	0.0000	0.000	

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Table 6.	Backscatter	and	biomass	per	transect	for	P423	(1991).	

Stratum Transect Transect Transect Strength (Mer)     Sa - Area (Scattering)     Total (Mer)     Biomas (Construction)     Sample       874     148     8205     61.86										
Number     Length     Area     Strength     Scattering     Density     Biomass     Number       374     148     8497     58.90     -36.6     0.00000     0     0.0000     0.0000       Port-au     140     8926     61.84     -36.6     0.00000     0     0.0000     0.0000       154     6831     47.35     -36.6     0.00000     0     0.0000     0.0000     0.0000       156     6214     43.07     -36.6     0.00000     0     0.0000     0.0000     0.0000       156     5700     39.51     -36.6     0.00000     0     0.0000     0.0000     0.0000       156     6707     43.6     0.00000     0     0.0000     0.0	Stratum	Transect	Transect	Transect	Target	Sa - Area	Total	Biomass	Total	Sample
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		Number	Length	Area	Strength	Scattering	Scattering	Density	Biomass	Number
S74     148     8497     58.90     -36.6     0.00000     0     0.000     0.000       Port-au     149     8925     61.86     -36.6     0.00000     0     0.000     0.000       Port     151     10216     71.74     -36.6     0.00000     0     0.0000     0.0000       155     621.4     43.6     0.00000     0     0.0000     0.0000     0.0000       156     5700     39.51     -36.6     0.00000     0     0.0000     0.0000     0.0000       156     6726     69.56     -36.6     0.00000     0     0.0000     0.0000     0.0000       151     13122     70.95     -36.6     0.00000     0     0.0000     0.0000     0.0000       161     7567     40.91     -36.6     0.00000     0     0.0000     0.0000     0.0000       161     7567     40.91     -36.6     0.00000     0     0.0000     0.0000     0.0000       162     132.2			(m)	(km²)	(dB/kq)	(/sr)	$(m^2/sr)$	(Kq/m²)	(t/trans)	
874     148     8497     58.90     -36.6     0.000000     0     0.0000     0.0000       Port-au     150     10206     70.74     -36.6     0.000000     0     0.0000     0.0000       Port     152     10719     74.30     -36.6     0.000000     0     0.0000     0.0000       154     6831     47.35     -36.6     0.00000     0     0.0000     0.0000       158     6023     41.75     -36.6     0.00000     0     0.0000     0.0000     0.0000     0.0000       158     6023     41.75     -36.6     0.00000     0     0.0000     0.0000     0.0000       159     613129     70.99     -36.6     0.00000     0     0.0000     0.0000     0.0000       161ands     7     11332     62.37     -36.6     0.00000     0     0.0000     0.0000     0.0000       161ands     7     756.1     -36.6     0.00000     0     0.0000     0.0000     0.0000 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>										
149     8925     61.86     -36.6     0.000000     0     0.0000     0.0000       Port-au     152     10719     74.30     -36.6     0.000000     0     0.0000     0.0000       154     68.31     47.35     -36.6     0.000000     0     0.0000     0.0000       155     6214     43.07     -36.6     0.000000     0     0.0000     0.0000       156     6214     43.07     -36.6     0.000000     0     0.0000     0.0000       875     1286     69.56     -36.6     0.000000     0     0.0000     0.0000       151     1307     64.38     -36.6     0.000000     0     0.0000     0.0000     0.0000       (Gulf)     15     11907     64.38     -36.6     0.000000     0     0.0000     0.0000     0.0000     0.0000       34     10212     55.21     -36.6     0.000000     0     0.0000     0.0000     0.0000       35     11917     53.6     0.	ST4	148	8497	58.90	-36.6	0.000000	0	0.0000	0.000	
Port-au     150     10206     70.74     -36.6     0.000000     0     0.0000     0.0000       Port     154     6631     47.35     -36.6     0.000000     0     0.0000     0.0000       155     6224     43.07     -36.6     0.000000     0     0.0000     0.0000       156     6232     41.75     -36.6     0.000000     0     0.0000     0.0000       157     4     15526     81.945     -36.6     0.000000     0     0.0000     0.0000       161     7567     40.3526     81.945     -36.6     0.000000     0     0.0000     <		149	8925	61.86	-36.6	0.000000	0	0.0000	0.000	
Port     152     10719     74.30     -36.6     0.000000     0     0.0000     0.0000       155     6214     43.07     -36.6     0.000000     0     0.0000     0.0000       156     5700     39.51     -36.6     0.000000     0     0.0000     0.0000       875     4     15526     83.94     -36.6     0.000000     0     0.0000     0.0000       Bay of     6     13129     70.95     -36.6     0.000000     0     0.0000     0.0000       (Gulf)     15     11907     64.38     -36.6     0.000000     0     0.0000     0.	Port-au	150	10206	70.74	-36.6	0.00000	0	0.0000	0.000	
154     6681     47.35     -736.6     0.000000     0     0.0000     0.0000       155     6224     43.07     -35.6     0.000000     0     0.0000     0.0000       875     4     1556     63.56     0.000000     0     0.0000     0.0000       875     4     15526     63.56     -35.6     0.000000     0     0.0000     0.0000       875     5     12865     63.56     0.000000     0     0.0000     0.0000     0.0000       15     113129     70.35     -36.6     0.000000     0     0.000	Port	152	10719	74.30	-36.6	0.000000	0	0.0000	0.000	
155     5214     43.07     -36.6     0.00000     0     0.0000     0.0000       875     4     1552     83.94     -36.6     0.00000     0     0.0000     0.0000       875     12865     69.55     -36.6     0.00000     0     0.0000     0.0000       1slands     7     11532     62.35     -36.6     0.00000     0     0.0000     0.0000       1slands     7     11532     62.35     -36.6     0.00000     0     0.0000     0.0000     0.0000       1s     11907     64.88     -36.6     0.00000     0     0.0000     0.0000     0.0000       35     10371     59.3     1.36.6     0.00000     0     0.0000 <t< td=""><td></td><td>154</td><td>6831</td><td>47.35</td><td>-36.6</td><td>0.000000</td><td>0</td><td>0.0000</td><td>0.000</td><td></td></t<>		154	6831	47.35	-36.6	0.000000	0	0.0000	0.000	
156     5700     39.51     -36.6     0.00000     0     0.0000     0.0000       875     4     15526     83.94     -36.6     0.00000     0     0.0000     0.0000       Bay of     6     13129     70.99     -36.6     0.00000     0     0.0000     0.0000       (Gulf)     15     1907     64.33     -36.6     0.00000     0     0.0000     0.0000       (Gulf)     15     1907     64.38     -36.6     0.00000     0     0.0000     0.0000       34     10212     55.21     -36.6     0.00000     0     0.0000     0.0000       35     1971     55.11     -36.6     0.00000     0     0.000     0.000       57     9832     17.81     -36.6     0.00000     0     0.000     0     0.000       57     9835     17.81     -36.6     0.00000     0     0.000     0     0.000       60     9829     17.80     -36.6     0.000000		155	6214	43.07	-36.6	0.000000	ō	0.0000	0.000	
158     6023     41.75     -36.6     0.00000     0     0.0000     0.0000       ST5     12865     69.56     -36.6     0.00000     0     0.0000     0.0000       Bay of     6     1332     70.56     0.00000     0     0.0000     0.0000       (Gul1)     15     11302     62.35     -36.6     0.00000     0     0.0000     0.0000       34     10212     55.21     -36.6     0.000000     0     0.0000     0.0000       35     10971     59.31     -36.6     0.000000     0     0.0000     0.0000       31     10271     59.31     -36.6     0.000000     0     0.0000     0.0000       51     11265     60.30     -36.6     0.00000     0     0.0000     0.0000       53     112.1     -36.6     0.00000     0     0.0000     0.0000       54     11702     63.27     -36.6     0.00000     0     0.0000     0.0000       875 <t< td=""><td></td><td>156</td><td>5700</td><td>39.51</td><td>-36.6</td><td>0.000000</td><td>õ</td><td>0.0000</td><td>0.000</td><td></td></t<>		156	5700	39.51	-36.6	0.000000	õ	0.0000	0.000	
ST5     1     15226     03.94     -36.6     0.00000     0     0.0000     0.0000       Bay of     6     13129     70.99     -36.6     0.00000     0     0.0000     0.0000       (Gulf)     15     1366     65.5     -36.6     0.00000     0     0.0000     0.0000       (Gulf)     15     1307     64.38     -36.6     0.00000     0     0.0000     0.0000       34     10212     55.21     -36.6     0.000000     0     0.0000     0.0000       51     11257     64.38     -36.6     0.000000     0     0.0000     0.0000       52     11255     61.00     -36.6     0.00000     0     0.0000     0.0000       53     1125     61.31     -36.6     0.00000     0     0.000     0.0000       54     3131     1.6     67     36.6     0.00000     0     0.000     0.000       54     3313     1.7     -36.6     0.000000     0		158	6023	41.75	-36.6	0.000000	õ	0.0000	0.000	
Bay of     6     1285 c     65     66     0.00000     0     0.0000     0.0000       (Gulf)     15     11507     64.38     -36.6     0.00000     0     0.0000     0.0000       34     10212     55.21     -36.6     0.00000     0     0.0000 </td <td>ST5</td> <td>4</td> <td>15526</td> <td>83.94</td> <td>-36.6</td> <td>0 000000</td> <td>õ</td> <td>0.0000</td> <td>0 000</td> <td></td>	ST5	4	15526	83.94	-36.6	0 000000	õ	0.0000	0 000	
Bay of 6 Talanda 7 Talanda 7 (Gulf) 15 11323 62.35 - 36.6 0.00000 0 0.0000 1.000 (Gulf) 15 11907 64.38 - 36.6 0.00000 2 0.0002 10.106 3/18 16 7567 40.91 - 36.6 0.00000 0 0.0000 0.000 34 10212 55.21 - 36.6 0.00000 0 0.0000 0.000 52 14207 76.81 - 36.6 0.00000 0 0.0000 0.000 53 11265 60.9 - 36.6 0.00000 0 0.0000 0.000 54 11702 63.27 - 36.6 0.00000 0 0.0000 0.000 57 55 9331 416.7 - 36.6 0.00000 0 0.0000 0.000 57 9835 17.81 - 36.6 0.00000 0 0.0000 0.000 57 9833 17.81 - 36.6 0.00000 0 0.0000 0.000 57 9833 17.81 - 36.6 0.00000 0 0.0000 0.000 57 9833 17.81 - 36.6 0.00000 0 0.0000 0.000 50 0.000 0 0.000 0 0.000 51 11125 20.13 - 36.6 0.00000 0 0.0000 0.000 52 1121 20.13 - 36.6 0.00000 0 0.0000 0.000 52 1932 17.0 - 36.6 0.00000 0 0.0000 0.000 52 1933 17.01 - 36.6 0.00000 0 0.0000 0.000 52 1935 4 31.4 6.0 0.00000 0 0.0000 0.000 53 1126 63 18099 32.78 - 36.6 0.00000 0 0.0000 0.000 54 1819 33.54 - 36.6 0.00000 0 0.0000 0.000 59 19356 35.4 - 36.6 0.00000 0 0.0000 0.000 59 19356 34.48 - 36.6 0.00000 0 0.0000 0.000 59 19256 34.88 - 36.6 0.00000 0 0.0000 0.000 59 19356 35.49 - 36.6 0.00000 0 0.0000 0.000 59 19356 35.49 - 36.6 0.00000 0 0.0000 0.000 50 192 19705 35.69 - 36.6 0.00000 0 0.0000 0.000 50 100 1025 18.50 - 36.6 0.00000 0 0.0000 0.000 50 137 973 320 - 36.6 0.00000 0 0.0000 0.000 57 15416 27.92 - 36.6 0.00000 0 0.0000 0.000 57 15416 331.71 - 36.6 0.00000 0 0.0000 0.000 57 15418 12249 13.926 6.53 - 36.6 0.000000 0 0.0000 0.000 57 124 1242 11.78 -		5	12865	69.56	-36.6	0.000000	õ	0 0000	0 000	
Tálands     7     11532     62.35     -36.6     0.00000     0     0.0000	Bay of	6	13129	70 99	-36 6	0 000000	ň	0 0000	0 000	
(oulf)     15     13007     64 38     -36 6     0.00000     2     0.0002     10.106     3/18       16     7567     40 91     -36 6     0.00000     0     0.0000     0.0000       35     10971     59.31     -36 6     0.00000     0     0.0000     0.0000       53     11265     60.90     -36 6     0.00000     0     0.0000     0.0000       54     11702     63.27     -36 6     0.00000     0     0.0000     0.0000       57     5835     17.81     -36 6     0.00000     0     0.0000     0.0000       57     5835     17.81     -36 6     0.00000     0     0.0000     0.0000       60     9829     17.80     -36 6     0.00000     0     0.0000     0.0000       61     11115     20.13     -36 6     0.00000     0     0.0000     0.0000       61     11519     35.54     -36 6     0.00000     0     0.0000     0.0000	Tslands	7	11532	62 35	-36 6	0 000000	ů	0 0000	0.000	
Control     16 <t< td=""><td>(Gulf)</td><td>15</td><td>11907</td><td>64 39</td><td>-36 6</td><td>0.000000</td><td>2</td><td>0.0002</td><td>10 106</td><td>2/19</td></t<>	(Gulf)	15	11907	64 39	-36 6	0.000000	2	0.0002	10 106	2/19
14     1030     15     13     1030     0     0.0000     0     0.0000     0     0.0000       35     10971     59     31     -36     6     0.00000     0     0.00000     0     0.0000	(GUIL)	16	7567	40 91	-36 6	0.000000	0	0.0002	0 000	5/10
32     10971     25.31     -36.6     0.00000     0     0.0000     0.0000       52     14207     76.31     -36.6     0.000013     1015     0.0601     4616.055     3/18       53     11265     60.90     -36.6     0.00000     0     0.0000     0.0000       54     11702     63.27     -36.6     0.00000     0     0.0000     0.0000       56     932     17.81     -36.6     0.00000     0     0.0000     0.0000       Bank     59     9333     17.01     -36.6     0.00000     0     0.0000     0.0000       61     11115     20.13     -36.6     0.00000     0     0.0000     0.0000       61     11115     20.13     -36.6     0.00000     0     0.0000     0.0000       63     18099     32.78     -36.6     0.00000     0     0.0000     0.0000       91     19566     34.88     -36.6     0.00000     0     0.0000     0.0000		34	10212	55 21	-36.6	0.000000	ů	0.0000	0.000	
53     13267     76.81     -36.6     0.000013     1012     0.0601     4616.052     3/18       53     11265     60.90     -36.6     0.00000     0     0.0000     0.0000       54     11702     60.22     0.00000     0     0.0000     0.0000       Bonne Bay     56     9314     16.87     -36.6     0.00000     0     0.0000     0.0000       Bank     59     9333     17.01     -36.6     0.00000     0     0.0000     0.0000       60     9229     17.80     -36.6     0.00000     0     0.0000     0.0000       61     1115     0.13     -36.6     0.00000     0     0.0000     0.0000     0.0000     0.0000     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0 <td></td> <td>35</td> <td>10971</td> <td>59 31</td> <td>-36.6</td> <td>0.000000</td> <td>ő</td> <td>0.0000</td> <td>0.000</td> <td></td>		35	10971	59 31	-36.6	0.000000	ő	0.0000	0.000	
23     1125     60.30     136.6     0.000013     10.30     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0001     0.0000		55	14207	76 01	-30.0	0.000000	1015	0.0000	4616 055	2/10
35     11202     60.30     -36.6     0.00000     0     0.0000     0.0000       876     56     9832     17.81     -36.6     0.00000     0     0.0000     0.0000       Bonne Bay     58     9314     16.87     -36.6     0.00000     0     0.0000     0.0000       Bank     59     9333     17.01     -36.6     0.00000     0     0.0000     0.0000       61     11115     20.13     -36.6     0.000000     0     0.0000     0.0000       62     17510     31.72     -36.6     0.000000     0     0.0000     0.0000       64     18099     32.78     -36.6     0.000000     0     0.0000     0.0000       91     19566     35.44     -36.6     0.000000     0     0.0000     0.0000       91     19566     35.44     -36.6     0.000000     0     0.0000     0.0000       93     19689     35.66     -36.6     0.000000     0     0.0000		52	11265	60.01	-36.6	0.000013	1012	0.0601	4010.035	3/18
ST6     56     9832     17.81     -36.6     0.00000     0     0.0000     0.0000       S7     9835     17.81     -36.6     0.00000     0     0.0000     0.0000       Bank     59     9333     17.01     -36.6     0.00000     0     0.0000     0.0000       61     9829     17.80     -36.6     0.00000     0     0.0000     0.0000       61     11115     20.13     -36.6     0.000000     0     0.0000     0.0000       61     11115     20.13     -36.6     0.000000     0     0.0000     0.0000       62     17510     31.54     -36.6     0.000000     0     0.0000     0.0000       91     19566     35.44     -36.6     0.000000     0     0.0000     0.0000     0.0000       92     19705     35.69     -36.6     0.000000     0     0.0000     0.0000     0.0000       93     19689     35.66     -36.6     0.000001     17		55	11205	60.90	-30.0	0.000000	0	0.0000	0.000	
b16     56     57     9835     17.81     -36.6     0.00000     0     0.0000     0.0000       Bonne Bay     58     9314     16.87     -36.6     0.00000     0     0.0000     0.0000       Bank     59     9393     17.01     -36.6     0.00000     0     0.0000     0.0000       61     11115     20.13     -36.6     0.00000     0     0.0000     0.0000       62     17510     31.72     -36.6     0.000000     0     0.0000     0.0000       63     18099     32.78     -36.6     0.000000     0     0.0000     0.0000       90     19256     35.44     -36.6     0.00000     0     0.0000     0.0000       91     19566     35.44     -36.6     0.00000     0     0.0000     0.0000       93     19689     35.66     -36.6     0.00000     0     0.0000     0.0000       94     19969     34.36     -36.6     0.000073     2052     <	076	54	11/02	17 01	-30.0	0.000000	0	0.0000	0.000	
Bonne Bay     57     9935     17.81     -36.6     0.00000     0     0.0000     0.0000       Bank     59     9333     17.01     -36.6     0.00000     0     0.0000     0.0000       60     9829     17.80     -36.6     0.00000     0     0.0000     0.0000       61     11115     20.13     -36.6     0.00000     0     0.0000     0.0000       62     17510     31.72     -36.6     0.00000     0     0.0000     0.0000       64     18519     35.64     -36.6     0.00000     0     0.0000     0.0000       90     19256     34.48     -36.6     0.00000     0     0.0000     0.0000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0     0.000     0	810	20	9832	17.81	-30.0	0.000000	0	0.0000	0.000	
Bonne Bay 58 914 16.87 -36.6 0.00000 0 0.0000 0.000 Bank 59 9393 17.01 -36.6 0.000000 0 0.0000 0.000 61 11115 20.13 -36.6 0.000000 0 0.0000 0.000 62 17510 31.72 -36.6 0.000000 0 0.0000 0.000 64 18519 33.54 -36.6 0.000000 0 0.0000 0.000 90 19256 34.88 -36.6 0.000000 0 0.0000 0.000 91 19566 35.44 -36.6 0.000000 0 0.0000 0.000 92 19705 33.69 -36.6 0.000000 0 0.0000 0.000 93 19689 34.36 -36.6 0.000000 0 0.0000 0.000 94 18869 34.36 -36.6 0.000000 0 0.0000 0.000 95 1546 27.92 -36.6 0.00000 0 0.0000 0.000 96 19256 34.88 -36.6 0.000000 0 0.0000 0.000 97 19256 34.88 -36.6 0.000000 0 0.0000 0.000 98 19689 34.36 -36.6 0.000000 0 0.0000 0.000 99 19256 34.84 -36.6 0.000000 0 0.0000 0.000 99 19256 34.84 -36.6 0.000000 0 0.0000 0.000 99 10172 18.42 -36.6 0.000000 0 0.0000 0.000 99 10172 18.42 -36.6 0.000000 0 0.0000 0.000 99 10172 18.42 -36.6 0.000000 0 0.0000 0.000 135 9357 16.95 -36.6 0.000000 0 0.0000 0.000 135 9357 16.95 -36.6 0.000000 0 0.0000 0.000 136 9317 16.88 -36.6 0.000000 0 0.0000 0.000 137 9736 17.64 -36.6 0.000000 0 0.0000 0.000 141 8726 15.80 -36.6 0.000000 0 0.0000 0.000 142 9556 17.31 -36.6 0.000000 0 0.0000 0.000 144 10089 18.27 -36.6 0.000000 0 0.0000 0.000 144 12 9556 17.31 -36.6 0.000000 0 0.0000 0.000 144 12 9556 17.31 -36.6 0.000000 0 0.0000 0.000 144 12 9556 17.31 -36.6 0.000000 0 0.0000 0.000 142 9556 17.31 -36.6 0.000000 0 0.0000 0.000 144 10089 18.27 -36.6 0.000000 0 0.0000 0.0000 144 1951 18.50 -36.6 0.000000 0 0.0000 0.0000 144 10009 18.27 -36.6 0.000000 0 0.00	Donno Do	5/	9835	17.81	-36.6	0.000000	0	0.0000	0.000	
Bank     59     933     17.01     -36.6     0.00000     0     0.0000     0.0000       61     11115     20.13     -36.6     0.00000     0     0.0000     0.0000       62     17510     31.72     -36.6     0.00000     0     0.0000     0.0000       64     18519     33.54     -36.6     0.00000     0     0.0000     0.0000       90     19256     35.44     -36.6     0.00000     0     0.0000     0.0000       91     19566     35.44     -36.6     0.00000     0     0.0000     0.0000       92     19705     35.66     -36.6     0.00000     0     0.0000     0.0000       93     19689     35.66     -36.6     0.00005     1533     0.2033     6972.903     * 3/18       95     17833     32.30     -36.6     0.00000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0     0.0000     0<	Bonne Ba	y 58	9314	10.8/	-36.6	0.000000	Ű	0.0000	0.000	
60     9829     17.80     -36.6     0.00000     0     0.0000     0.0000       61     11115     20.13     -36.6     0.000000     0     0.0000     0.0000       62     17510     31.72     -36.6     0.00000     0     0.0000     0.0000       63     18099     32.78     -36.6     0.00000     0     0.0000     0.0000       90     19256     34.88     -36.6     0.00000     0     0.0000     0.0000       91     19566     35.44     -36.6     0.00000     0     0.0000     0.0000       92     19705     35.69     -36.6     0.00000     0     0.0000     0.0000       93     19689     34.36     -36.6     0.00005     22496     3.1689     102355.750     * 3/18       95     17833     32.31     -336.6     0.00000     0     0.0000     0     0.000       99     10172     18.42     -36.6     0.00000     0     0.0000     0	Bank	59	9393	17.01	-36.6	0.000000	0	0.0000	0.000	
61     11115     20.13     -36.6     0.00000     0     0.0000     0.0000       62     17510     31.72     -36.6     0.00000     0     0.0000     0.0000       64     18519     32.57     -36.6     0.00000     0     0.0000     0.0000       90     19256     34.88     -36.6     0.00000     0     0.0000     0.0000       91     19566     35.44     -36.6     0.00000     0     0.0000     0.0000       92     19705     35.69     -36.6     0.00000     0     0.0000     0.0000       93     19689     35.66     -36.6     0.00000     0     0.0000     0.0000       94     18969     32.30     -36.6     0.000073     2052     0.3343     9334.772     * 3/18       97     15416     27.92     -36.6     0.00000     0     0.0000     0.0000       99     10172     18.42     -36.6     0.00000     0     0.0000     0.0000		60	9829	17.80	-36.6	0.000000	0	0.0000	0.000	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		61	11115	20.13	-36.6	0.000000	0	0.0000	0.000	- 1
63     18099     32.78     -36.6     0.00000     0     0.0000     0.0000       64     18519     33.54     -36.6     0.00000     0     0.0000     0.0000       90     12256     34.88     -36.6     0.00000     0     0.0000     0.0000       91     19566     35.44     -36.6     0.00000     0     0.0000     0.000       93     19689     35.66     -36.6     0.00000     0     0.0000     0.000       94     18969     34.36     -36.6     0.00000     0     0.0000     0.0000       94     18969     34.36     -36.6     0.00000     0     0.0000     0.0000       95     17833     32.30     -36.6     0.00000     0     0.0000     0.0000     0.0000       99     10172     18.42     -36.6     0.00000     0     0.0000     0.0000     0.0000       135     3357     16.95     -36.6     0.00000     0     0.0000     0.0000		62	17510	31.72	-36.6	0.000003	101	0.0145	460.276	3/18
64     18519     33.54     -36.6     0.00000     0     0.0000     0.0000       90     19256     34.88     -36.6     0.00000     0     0.0000     0.0000       92     19705     35.69     -36.6     0.00000     0     0.0000     0.0000       93     19689     35.66     -36.6     0.00000     0     0.0000     0.0000       94     18969     34.36     -36.6     0.000696     22496     3.1689     10235.750     * 3/18       97     15416     27.92     -36.6     0.00000     0     0.00000     0.00000		63	18099	32.78	-36.6	0.000000	0	0.0000	0.000	
90     19256     34.88     -36.6     0.00000     0     0.0000     0.0000       91     19566     35.44     -36.6     0.00000     0     0.0000     0.0000       92     19705     35.69     -36.6     0.00000     0     0.0000     0.0000       93     18689     35.66     -36.6     0.00005     1533     0.2030     6972.903     * 3/18       95     17833     32.30     -36.6     0.00000     0     0.000		64	18519	33.54	-36.6	0.000000	0	0.0000	0.000	
91   19566   35.44   -36.6   0.00000   0   0.0000   0.0000     92   19705   35.66   -36.6   0.00000   0   0.0000   0.0000     94   18969   34.36   -36.6   0.00005   1533   0.2030   6972.903   * 3/18     95   17833   32.30   -36.6   0.000073   2052   0.3343   9334.772   * 3/18     97   15416   27.92   -36.6   0.00000   0   0.0000   0.0000     99   10172   18.42   -36.6   0.000001   17   0.042   77.658   3/18     100   10215   18.50   -36.6   0.000000   0   0.0000   0.0000   0.0000     136   9317   16.95   -36.6   0.000000   0   0.0000   0.0000   0.0000   137   9736   17.64   36.6   0.00000   0   0.0000   0.0000   1318   1004   18.12   -36.6   0.00000   0   0.0000   0.0000   0.0000   141   13726   15.6   0.000000   0 </td <td></td> <td>90</td> <td>19256</td> <td>34.88</td> <td>-36.6</td> <td>0.000000</td> <td>0</td> <td>0.0000</td> <td>0.000</td> <td></td>		90	19256	34.88	-36.6	0.000000	0	0.0000	0.000	
92   19705   35.69   -36.6   0.00000   0   0.0000   0.0000     93   19689   35.66   -36.6   0.000000   0   0.0000   0.0000     94   18969   34.36   -36.6   0.00066   22496   3.1689   102355.750   * 3/18     95   17833   32.30   -36.6   0.00000   0   0.0000   0.0000   0.0000     99   10172   18.42   -36.6   0.00000   0   0.0002   28   0.0069   127.777   3/18     100   10215   18.50   -36.6   0.00000   0   0.0000   0		91	19566	35.44	-36.6	0.000000	0	0.0000	0.000	
93   19689   35.66   -36.6   0.00000   0   0.0000   0.0000     94   18869   34.36   -36.6   0.000045   1533   0.2030   6972.903   * 3/18     97   15416   27.92   -36.6   0.000073   2052   0.3343   9334.772   * 3/18     98   13091   23.71   -36.6   0.000000   0   0.000   0.0000     99   10172   18.42   -36.6   0.000001   17   0.0042   77.658   3/18     100   10215   18.50   -36.6   0.000000   0   0.0000   0.0000   0.0000     135   9357   16.95   -36.6   0.000000   0   0.000		92	19705	35.69	-36.6	0.00000	0	0.0000	0.000	
94   18969   34.36   -36.6   0.00045   1533   0.2030   6972.903   * 3/18     95   17833   32.30   -36.6   0.000696   22496   3.1689   102355.750   * 3/18     97   15416   27.92   -36.6   0.000073   2052   0.3343   9334.772   * 3/18     98   13091   23.71   -36.6   0.00000   0   0.0000   0.0000     99   10172   18.42   -36.6   0.000001   17   0.0042   77.658   3/18     101   10092   18.28   -36.6   0.00000   0   0.0000   0.0000   0.0000     135   9357   16.95   -36.6   0.00000   0   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   1.33   139   1305   18.66   -36.6   0.000000   0   0.0000   0.0000   0.0000   0.0000   1.44   1004   18.12   -36.6   0.000000   0   0.0000   0.0000   1.41   124   9556   17.31		93	19689	35.66	-36.6	0.000000	0	0.0000	0.000	
95   17833   32.30   -36.6   0.000696   22496   3.1689   102355.750   * 3/18     97   15416   27.92   -36.6   0.00000   0   0.0000   0.0000   0.0000     98   13091   23.71   -36.6   0.000000   0   0.0002   77.658   3/18     99   10172   18.42   -36.6   0.000000   0   0.0002   28   0.0669   127.777   3/18     101   10092   18.28   -36.6   0.000000   0   0.0000   0.0000     135   9357   16.95   -36.6   0.000000   0   0.0000   0.0000   0.0000     136   9317   16.88   -36.6   0.000000   0   0.00000		94	18969	34.36	-36.6	0.000045	1533	0.2030	6972.903	* 3/18
97   15416   27.92   -36.6   0.000073   2052   0.3343   9334.772   * 3/18     98   13091   23.71   -36.6   0.00000   0   0.0000   0.0000     99   10172   18.42   -36.6   0.000001   17   0.0042   77.658   3/18     100   10215   18.50   -36.6   0.000000   0   0.0000   0.000     135   9357   16.95   -36.6   0.000000   0   0.0000   0.000     136   9317   16.88   -36.6   0.000000   0   0.0000   0.000     137   9736   17.64   -36.6   0.000000   0   0.0000   0.000     138   1004   18.12   -36.6   0.000000   0   0.0000   0.0000     140   1089   18.27   -36.6   0.000000   0   0.0000   0.0000     141   8726   15.80   -36.6   0.000000   0   0.0000   0.0000     141   8726   17.31   -36.6   0.000000   0 <td< td=""><td></td><td>95</td><td>17833</td><td>32.30</td><td>-36.6</td><td>0.000696</td><td>22496</td><td>3.1689</td><td>102355.750</td><td>* 3/18</td></td<>		95	17833	32.30	-36.6	0.000696	22496	3.1689	102355.750	* 3/18
98     13091     23.71     -36.6     0.00000     0     0.0000     0.000       99     10172     18.42     -36.6     0.000001     17     0.0042     77.658     3/18       100     10215     18.50     -36.6     0.000002     28     0.0069     127.777     3/18       101     10092     18.28     -36.6     0.00000     0     0.0000     0.000       135     9357     16.95     -36.6     0.00000     0     0.0000     0.000       136     9317     16.88     -36.6     0.00000     0     0.0000     0.0000       137     9736     17.64     -36.6     0.00000     0     0.000     0.000       138     10004     18.12     -36.6     0.00000     0     0.000     0.000       140     10089     18.27     -36.6     0.00000     0     0.000     0.000       141     8726     15.80     -36.6     0.00000     0     0.000     0.000		97	15416	27.92	-36.6	0.000073	2052	0.3343	9334.772	* 3/18
99     10172     18.42     -36.6     0.000001     17     0.0042     77.658     3/18       100     10215     18.50     -36.6     0.000002     28     0.0069     127.777     3/18       101     10092     18.28     -36.6     0.00000     0     0.0000     0.000       135     9357     16.95     -36.6     0.00000     0     0.0000     0.0000       136     9317     16.88     -36.6     0.00000     0     0.0000     0.0000       137     9736     17.64     -36.6     0.00000     0     0.0000     0.0000       138     10004     18.12     -36.6     0.00000     0     0.0000     0.0000       140     10089     18.27     -36.6     0.00000     0     0.0000     0.0000       141     8726     15.80     -36.6     0.00000     0     0.0000     0.0000       142     9556     17.31     -36.6     0.00000     0     0.0000     0.0000		98	13091	23.71	-36.6	0.000000	0	0.0000	0.000	
100     10215     18.50     -36.6     0.000002     28     0.0069     127.777     3/18       101     10092     18.28     -36.6     0.00000     0     0.0000     0.0000       135     9357     16.95     -36.6     0.00000     0     0.0000     0.0000       136     9317     16.88     -36.6     0.00000     0     0.0000     0.0000       137     9736     17.64     -36.6     0.00000     0     0.0000     0.0000       138     10004     18.12     -36.6     0.00000     0     0.0000     0.0000       140     10089     18.27     -36.6     0.00000     0     0.0000     0.0000       141     8726     15.80     -36.6     0.00000     0     0.0000     0.0000       143     12249     22.19     -36.6     0.00000     0     0.0000     0.000       143     12249     22.19     -36.6     0.00000     0     0.0000     0.0000		99	10172	18.42	-36.6	0.00001	17	0.0042	77.658	3/18
101     10092     18.28     -36.6     0.00000     0     0.0000     0.0000       135     9357     16.95     -36.6     0.00000     0     0.0000     0.000       136     9317     16.88     -36.6     0.00000     0     0.0000     0.000       137     9736     17.64     -36.6     0.00000     0     0.0000     0.000       138     10004     18.12     -36.6     0.00000     0     0.0000     0.000       140     10089     18.27     -36.6     0.00000     0     0.0000     0.000       141     8726     15.80     -36.6     0.00000     0     0.0000     0.000       143     12249     22.19     -36.6     0.00000     0     0.0000     0.000       143     12249     22.19     -36.6     0.00000     0     0.0000     0.000       23     3472     11.78     -36.6     0.00000     0     0.0000     0.000       24     12342 <td></td> <td>100</td> <td>10215</td> <td>18.50</td> <td>-36.6</td> <td>0.000002</td> <td>28</td> <td>0.0069</td> <td>127.777</td> <td>3/18</td>		100	10215	18.50	-36.6	0.000002	28	0.0069	127.777	3/18
135   9357   16.95   -36.6   0.00000   0   0.0000   0.000     136   9317   16.88   -36.6   0.00000   0   0.0000   0.000     137   9736   17.64   -36.6   0.00000   0   0.0000   0.000     138   10004   18.12   -36.6   0.00000   0   0.0000   0.000     140   10089   18.27   -36.6   0.00000   0   0.0000   0.000     141   8726   15.80   -36.6   0.00000   0   0.0000   0.0000     143   12249   22.19   -36.6   0.00000   0   0.0000   0.0000     143   12249   22.19   -36.6   0.00000   0   0.0000   0.000     ST7   22   2132   7.23   -36.6   0.000000   0   0.0000   0.0000     Stands   26   9899   33.59   -36.6   0.000000   0   0.0000   0.0000     27   12693   43.07   -36.6   0.000000   0   0.0000		101	10092	18.28	-36.6	0.000000	0	0.0000	0.000	
136     9317     16.88     -36.6     0.00000     0     0.0000     0.000       137     9736     17.64     -36.6     0.00000     0     0.0000     0.0000       138     10004     18.12     -36.6     0.00000     0     0.0202     365.453     3/18       139     10305     18.66     -36.6     0.00000     0     0.0000     0.000       140     10089     18.27     -36.6     0.00000     0     0.0000     0.0000       141     8726     15.80     -36.6     0.00000     0     0.0000     0.0000       142     9556     17.31     -36.6     0.00000     0     0.0000     0.0000       142     9556     17.31     -36.6     0.00000     0     0.0000     0.0000       142     9556     17.31     -36.6     0.000000     0     0.0000     0.0000       23     3472     11.78     -36.6     0.000000     0     0.0000     0.0000     0.0000		135	9357	16.95	-36.6	0.000000	0	0.0000	0.000	
137     9736     17.64     -36.6     0.00000     0     0.0000     0.000       138     10004     18.12     -36.6     0.00004     80     0.0202     365.453     3/18       139     10305     18.66     -36.6     0.00000     0     0.0000     0.000       140     10089     18.27     -36.6     0.00000     0     0.0000     0.000       141     8726     15.80     -36.6     0.00000     0     0.0000     0.0000       142     9556     17.31     -36.6     0.00000     0     0.0000     0.0000       143     12249     22.19     -36.6     0.00000     0     0.0000     0.000       143     12249     22.19     -36.6     0.00000     0     0.0000     0.0000       143     12249     22.19     -36.6     0.00000     0     0.0000     0.0000       2132     7.23     -36.6     0.000000     0     0.0000     0.0000     0.0000		136	9317	16.88	-36.6	0.000000	0	0.0000	0.000	
138   10004   18.12   -36.6   0.000004   80   0.0202   365.453   3/18     139   10305   18.66   -36.6   0.00000   0   0.0000   0.0000     140   10089   18.27   -36.6   0.00000   0   0.0000   0.0000     141   8726   15.80   -36.6   0.000000   0   0.0000   0.0000     142   9556   17.31   -36.6   0.000000   0   0.0000   0.0000     143   12249   22.19   -36.6   0.000000   0   0.0000   0.0000     ST7   22   2132   7.23   -36.6   0.000000   0   0.0000     23   3472   11.78   -36.6   0.000000   0   0.0000   0   0.000     Bay of   24   12342   41.88   -36.6   0.000000   0   0.0000   0.0000   0   0.000   0   0.000   0   0.000   0   0.000   0   0.000   0   0.000   0   0.000   0   0.000   0		137	9736	17.64	-36.6	0.00000	0	0.0000	0.000	
139     10305     18.66     -36.6     0.000000     0     0.0000     0.0000       140     10089     18.27     -36.6     0.00000     0     0.0000     0.0000       141     8726     15.80     -36.6     0.00000     0     0.0000     0.0000       141     8726     15.80     -36.6     0.00000     0     0.0000     0.0000       142     9556     17.31     -36.6     0.00000     0     0.0000     0.0000       143     12249     22.19     -36.6     0.000000     0     0.0000     0.000       22     2132     7.23     -36.6     0.000000     0     0.0000     0.000       23     3472     11.78     -36.6     0.000000     0     0.0000     0.0000       Bay of     24     12342     41.88     -36.6     0.000000     0     0.0000     0.0000       27     12693     43.07     -36.6     0.000000     0     0.0000     0.0000     0.0000		138	10004	18.12	-36.6	0.00004	80	0.0202	365.453	3/18
140     10089     18.27     -36.6     0.00000     0     0.0000     0.000       141     8726     15.80     -36.6     0.00000     0     0.0000     0.000       142     9556     17.31     -36.6     0.00000     0     0.0000     0.000       142     9556     17.31     -36.6     0.00000     0     0.0000     0.000       143     12249     22.19     -36.6     0.00000     0     0.0000     0.000       23     3472     11.78     -36.6     0.00000     0     0.0000     0.000       Bay of     24     12342     41.88     -36.6     0.00000     0     0.0000       23     3472     11.78     -36.6     0.00000     0     0.0000     0.0000       Bay of     24     12342     41.88     -36.6     0.000000     0     0.0000       27     12693     43.07     -36.6     0.000000     0     0.0000     0.0000       29     14591 </td <td></td> <td>139</td> <td>10305</td> <td>18.66</td> <td>-36.6</td> <td>0.00000</td> <td>0</td> <td>0.0000</td> <td>0.000</td> <td></td>		139	10305	18.66	-36.6	0.00000	0	0.0000	0.000	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		140	10089	18.27	-36.6	0.000000	0	0.0000	0.000	
142     9556     17.31     -36.6     0.00000     0     0.0000     0.000       143     12249     22.19     -36.6     0.00000     0     0.0000     0.000       ST7     22     2132     7.23     -36.6     0.00000     0     0.0000     0.000       23     3472     11.78     -36.6     0.00000     0     0.0000     0.000       Bay of     24     12342     41.88     -36.6     0.00000     0     0.0000     0.0000       Bay of     24     12342     41.88     -36.6     0.000000     0     0.0000     0.0000       27     12693     43.07     -36.6     0.000000     0     0.0000     0.0000       28     1926     6.53     -36.6     0.000000     0     0.0000     0.0000       30     9540     32.37     -36.6     0.000000     0     0.0000       31     4941     16.77     -36.6     0.000000     0     0.0000       32		141	8726	15.80	-36.6	0.00000	0	0.0000	0.000	
143     12249     22.19     -36.6     0.00000     0     0.0000     0.000       ST7     22     2132     7.23     -36.6     0.00000     0     0.0000     0.000       23     3472     11.78     -36.6     0.00000     0     0.0000     0.000       Bay of     24     12342     41.88     -36.6     0.00000     0     0.0216     902.830     3/18       Islands     26     9899     33.59     -36.6     0.000000     0     0.0000     0.000       27     12693     43.07     -36.6     0.000000     0     0.0000     0.0000       28     1926     6.53     -36.6     0.000000     0     0.0000     0.0000       29     14591     49.51     -36.6     0.000000     0     0.0000     0.0000       30     9540     32.37     -36.6     0.000000     0     0.0000     0.0000       31     4941     16.77     -36.6     0.000000     0     0.		142	9556	17.31	-36.6	0.000000	0	0.0000	0.000	
ST7     22     2132     7.23     -36.6     0.00000     0     0.0000     0.000       Bay of     24     12342     11.78     -36.6     0.00000     0     0.0000     0.000       Bay of     24     12342     41.88     -36.6     0.000005     198     0.0216     902.830     3/18       Islands     26     9899     33.59     -36.6     0.000000     0     0.0000     0.000       27     12693     43.07     -36.6     0.000000     0     0.0000     0.0000       29     14591     49.51     -36.6     0.000000     0     0.0000     0.0000       30     9540     32.37     -36.6     0.000000     0     0.0000     0.0000       31     4941     16.77     -36.6     0.000000     0     0.0000     0.0000       32     9197     31.21     -36.6     0.000000     0     0.0000     0.0000       33     6425     21.80     -36.6     0.000000		143	12249	22.19	-36.6	0.00000	0	0.0000	0.000	
23     3472     11.78     -36.6     0.00000     0     0.0000     0.000       Bay of     24     12342     41.88     -36.6     0.000005     198     0.0216     902.830     3/18       Islands     26     9899     33.59     -36.6     0.00000     0     0.0000     0.000       27     12693     43.07     -36.6     0.000000     0     0.0000     0.0000       28     1926     6.53     -36.6     0.000000     0     0.0000     0.0000       29     14591     49.51     -36.6     0.000000     0     0.0000     0.0000       30     9540     32.37     -36.6     0.000000     0     0.0000     0.0000       31     4941     16.77     -36.6     0.000000     0     0.0000     0.0000       33     6425     21.80     -36.6     0.000000     0     0.0000     0.0000	ST7	22	2132	7.23	-36.6	0.00000	0	0.0000	0.000	
Bay of     24     12342     41.88     -36.6     0.000005     198     0.0216     902.830     3/18       Islands     26     9899     33.59     -36.6     0.00000     0     0.0000     0.0000       27     12693     43.07     -36.6     0.00000     0     0.0000     0.0000       28     1926     6.53     -36.6     0.000000     0     0.0000     0.0000       29     14591     49.51     -36.6     0.000000     0     0.0000     0.0000       30     9540     32.37     -36.6     0.000000     0     0.0000     0.0000       31     4941     16.77     -36.6     0.000000     0     0.0000     0.0000       32     9197     31.21     -36.6     0.000000     0     0.0000     0.0000       33     6425     21.80     -36.6     0.000000     0     0.0000     0.0000		23	3472	11.78	-36.6	0.00000	0	0.0000	0.000	
Islands     26     9899     33.59     -36.6     0.00000     0     0.0000     0.000       27     12693     43.07     -36.6     0.000000     0     0.0000     0.000       28     1926     6.53     -36.6     0.00000     0     0.0000     0.000       29     14591     49.51     -36.6     0.00000     0     0.0000     0.000       30     9540     32.37     -36.6     0.00000     0     0.0000     0.000       31     4941     16.77     -36.6     0.000000     0     0.0000     0.000       32     9197     31.21     -36.6     0.000000     0     0.0000     0.000       33     6425     21.80     -36.6     0.000000     0     0.0000     0.000	Bay of	24	12342	41.88	-36.6	0.000005	198	0.0216	902.830	3/18
27   12693   43.07   -36.6   0.000000   0   0.0000   0.000     28   1926   6.53   -36.6   0.000000   0   0.0000   0.000     29   14591   49.51   -36.6   0.00000   0   0.0000   0.000     30   9540   32.37   -36.6   0.00000   0   0.0000   0.000     31   4941   16.77   -36.6   0.00000   0   0.0000   0.000     32   9197   31.21   -36.6   0.000000   0   0.0000   0.000     33   6425   21.80   -36.6   0.000000   0   0.0000   0.000	Islands	26	9899	33.59	-36.6	0.00000	0	0.0000	0.000	
28     1926     6.53     -36.6     0.00000     0     0.0000     0.000       29     14591     49.51     -36.6     0.000000     0     0.0000     0.000       30     9540     32.37     -36.6     0.000000     0     0.0000     0.000       31     4941     16.77     -36.6     0.000000     0     0.0000     0.000       32     9197     31.21     -36.6     0.000000     0     0.0000     0.0000       33     6425     21.80     -36.6     0.000000     0     0.0000     0.000		27	12693	43.07	-36.6	0.00000	0	0.0000	0.000	
29     14591     49.51     -36.6     0.00000     0     0.0000     0.000       30     9540     32.37     -36.6     0.00000     0     0.0000     0.000       31     4941     16.77     -36.6     0.00000     0     0.0000     0.000       32     9197     31.21     -36.6     0.000000     0     0.0000     0.000       33     6425     21.80     -36.6     0.000000     0     0.0000     0.000		28	1926	6.53	-36.6	0.00000	Ō	0.0000	0.000	
30     9540     32.37     -36.6     0.00000     0     0.0000     0.000       31     4941     16.77     -36.6     0.000000     0     0.0000     0.000       32     9197     31.21     -36.6     0.000000     0     0.0000     0.000       33     6425     21.80     -36.6     0.000000     0     0.0000     0.000		29	14591	49.51	-36.6	0.00000	Ō	0.0000	0.000	
31   4941   16.77   -36.6   0.000000   0   0.0000   0.000     32   9197   31.21   -36.6   0.000000   0   0.0000   0.000     33   6425   21.80   -36.6   0.000000   0   0.0000   0.000		30	9540	32.37	-36.6	0.00000	Ō	0.0000	0.000	
32     9197     31.21     -36.6     0.00000     0     0.0000     0.000       33     6425     21.80     -36.6     0.000000     0     0.0000     0.000		31	4941	16.77	-36.6	0.00000	0	0.0000	0.000	
33 6425 21.80 -36.6 0.000000 0 0.0000 0.000		32	9197	31.21	-36.6	0.000000	Ō	0.0000	0.000	
		33	6425	21.80	-36.6	0.00000	Ō	0.0000	0.000	

Table 6. (con't).

Stratu	m Transect Number	Transect Length (m)	Transect Area (km²)	Target Strength (dB/kg)	Sa - Area Scattering (/sr)	Total Scattering (m²/sr)	Biomass Density (Kg/m²)	Total Biomass (t/trans)	Samp Numb	le er
ST8	65	1593	2.81	-36.0	0.000000	0	0.0000	0.000		
	66	2047	3.61	-36.0	0.00000	0	0.0000	0.000		
Bonne	Bay 67	2345	4.13	-36.0	0.00000	0	0.0000	0.000		
	68	1931	3.40	-36.0	0.00000	0	0.0000	0.000		
	70	1817	3.20	-36.0	0.00000	0	0.0000	0.000		
	71	1059	1.87	-36.0	0.000000	0	0.0000	0.000		
	72	969	1.71	-36.0	0.000000	0	0.0000	0.000		
	74	999	1.76	-36.0	0.000000	0	0.0000	0.000		
	75	629	1.11	-36.0	0.00000	0	0.0000	0.000		
	77	2427	4.28	-36.0	0.00000	0	0.0000	0.000		
	78	2318	4.08	-36.0	0.000000	0	0.0000	0.000		
	79	2071	3.65	-36.0	0.00000	0	0.0000	0.000		
	80	2211	3.89	-36.0	0.00000	0	0.0000	0.000		
	81	2353	4.15	-36.0	0.00004	18	0.0173	71.669	*	2
	82	2765	4.87	-36.0	0.000001	4	0.0029	14.171	*	2
	83	2685	4.73	-36.0	0.000091	429	0.3614	1709.343	*	2
ST10	103	21516	115.88	-36.0	0.00000	0	0.0000	0.000		
	104	20853	112.31	-36.0	0.00000	0	0.0000	0.000		
St. Jo	hn's 105	20751	111.76	-36.0	0.000000	0	0.0000	0.000		
Bay	106	21550	116.06	-36.0	0.000000	0	0.0000	0.000		
	108	17783	95.77	-36.0	0.000000	0	0.0000	0.000		
	109	11041	59.46	-36.0	0.000000	0	0.0000	0.000		
	110	11739	63.22	-36.0	0.000000	0	0.0000	0.000		
	111	12381	66.68	-36.0	0.00000	0	0.0000	0.000		
	113	13926	75.00	-36.0	0.000000	0	0.0000	0.000		
	115	17898	96.39	-36.0	0.00000	0	0.0000	0.000		
	117	5775	31.10	-36.0	0.00000	0	0.0000	0.000		
	118	4337	23.36	-36.0	0.00000	0	0.0000	0.000		
	119	13433	72.35	-36.0	0.000000	0	0.0000	0.000		
	120	8761	47.18	-36.0	0.00000	0	0.0000	0.000		
	121	7945	42.79	-36.0	0.00000	0	0.0000	0.000		
	122	5162	27.80	-36.0	0.00000	0	0.0000	0.000		
	123	24973	134.49	-36.0	0.00000	0	0.0000	0.000		
	125	7853	42.29	-36.0	0.000000	0	0.0000	0.000		
	127	8483	45.68	-36.0	0.00000	0	0.0000	0.000		
	128	9476	51.03	-36.0	0.00000	0	0.0000	0.000		
	129	8166	43.98	-36.0	0.00000	0	0.0000	0.000		
	130	14961	80.57	-36.0	0.00000	0	0.0000	0.000		
	132	15802	85.11	-36.0	0.000000	0	0.0000	0.000		

Table 7. Backscatter and biomass per transect for C452 (1993).

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Stratum	Transect	Transect	Transect	Target	Sa - Area	Total	Biomass	Total	Sample
	Number	Length	Area	Strength	Scattering	Scattering	Density	Biomass	Number
		(m)	(km²)	(dB/kg)	(/sr)	(m²/sr)	(Kg/m²)	(t/trans)	
ST1	119	7690	46.66	-35.1	0.00000	0	0.0000	0.000	
	120	5335	32.37	-35.1	0.00000	0	0.0000	0.000	
Bay St.	121	4728	28.69	-35.1	0.00000	0	0.0000	0.000	
Georges	122	5225	31.70	-35.1	0.00000	0	0.0000	0.000	
(south)	123	7380	44.78	-35.1	0.00000	0	0.0000	0.000	
	124	9635	58.46	-35.1	0.00000	0	0.0000	0.000	
	125	9781	59.34	-35.1	0.000005	309	0.0169	1003.377	54/55
	135	9719	58.97	-35.1	0.00000	0	0.0000	0.000	
	126	10311	62.56	-35.1	0.00000	0	0.0000	0.000	
	127	13455	81.64	-35.1	0.000000	Ō	0.0000	0.000	
	128	13531	82.10	-35.1	0.000000	õ	0.0000	0.000	
	129	13733	83.32	-35.1	0.000000	ō.	0.0000	0.000	
	136	4939	29 97	-35 1	0 000000	ő	0 0000	0.000	
	130	13623	82 66	-35 1	0.000000	0	0.0000	0.000	
	131	13693	83 02	-35 1	0.000000	ő	0.0000	0.000	
	131	15005	95.02	-35.1	0.000000	0	0.0000	0.000	
	132	15800	95.90	-35.1	0.000000	0	0.0000	0.000	
	133	15/5/	95.61	-35.1	0.000000	0	0.0000	0.000	
	134	16416	99.61	-35.1	0.000000	0	0.0000	0.000	
ST2	107	15528	96.34	-35.1	0.000000	0	0.0000	0.000	
	108	15225	94.46	-35.1	0.00000	Ö	0.0000	0.000	
Bay St.	109	15546	96.45	-35.1	0.000000	0	0.0000	0.000	
Georges	112	15720	97.53	-35.1	0.00000	0	0.0000	0.000	
(north)	113	15205	94.33	-35.1	0.00000	0	0.0000	0.000	
	114	12202	75.70	-35.1	0.000000	0	0.0000	0.000	
	115	7067	43.84	-35.1	0.000000	0	0.0000	0.000	
	116	5109	31.70	-35.1	0.000000	0	0.0000	0.000	
	117	2227	13.82	-35.1	0.00000	0	0.0000	0.000	
	118	3490	21.65	-35.1	0.00000	0	0.0000	0.000	
ST3	153	12907	73.24	-35.1	0.000000	0	0.0000	0.000	
	154	12373	70.21	-35.1	0.000000	7	0.0003	21.740	54/55
Port-au-	- 155	12023	68.22	-35.1	0.000000	0	0.0000	0.000	
Port	163	12143	68.91	-35.1	0.000000	Ō	0.0000	0.000	
(Gulf)	156	12784	72.54	-35.1	0.000000	õ	0.0000	0.000	
(/	157	11746	66.65	-35.1	0.000002	112	0 0055	364 798	54/55
	158	12195	69 20	-35 1	0 000010	660	0 0309	2140 628	54/55
	150	12297	69 77	-25 1	0.0000000	100	0.0051	253 575	54/55
	164	1100/	67 43	-35.1	0.000002	109	0.0031	552.575	34/33
	104	10101	67.43	-35.1	0.000000	0	0.0000	0.000	
	105	12101	69.12	-35.1	0.000000	0	0.0000	0.000	
	160	9001	51.08	-35.1	0.000000	U	0.0000	0.000	
	161	9005	51.10	-35.1	0.000000	0	0.0000	0.000	
	162	9375	53.20	-35.1	0.000000	U	0.0000	0.000	
ST4	139	3631	19.19	-35.1	0.000000	0	0.0000	0.000	
<b>.</b> .	141	9064	47.90	-35.1	0.000000	0	0.0000	0.000	
Port-au-	- 138	12689	67.06	-35.1	0.000000	0	0.0000	0.000	
Port	142	12498	66.05	-35.1	0.000000	0	0.0000	0.000	
	143	1722	9.10	-35.1	0.000000	0	0.0000	0.000	
	144	2594	13.71	-35.1	0.000000	1	0.0003	4.402	54/55
	145	1926	10.18	-35.1	0.000000	0	0.0000	0.000	
	146	2555	13.50	-35.1	0.000000	0	0.0000	0.000	
	147	7063	37.32	-35.1	0.00000	0	0.0000	0.000	
	148	8353	44.14	-35.1	0.00000	0	0.0000	0.000	
	149	1657	8.76	-35.1	0.00000	0	0.0000	0.000	
	150	5763	30.46	-35.1	0.00000	0	0.0000	0.000	
	151	5609	29.64	-35.1	0.00000	0	0.0000	0.000	
	152	7644	40.40	-35.1	0.00000	0	0.0000	0.000	
ST5	1	12243	52.89	-35.1	0.000000	0	0.0000	0.000	
	2	8975	38.77	-35.1	0.000000	Ō	0.0000	0.000	
Bay of	3	11555	49.92	-35.1	0.000000	4	0.0002	12.343	54/55
Islands	3 4	10044	43.39	-35.1	0.000000	ō	0,0000	0.000	,
(Gulf)	5	12413	53.62	-35.1	0.000000	26	0,0015	82.897	54/55
/	Ř	9656	41 71	-35 1	0 000000	20	0 0000	0 000	54/55
	7	10180	43 99	-35 1	0.000000	0	0 0000	0.000	
	, 0	70700	40.00	-22.T	0.000000	0	0.0000	0.000	
	0	0014	32.32	-35.1 -35 1	0.000000	U C	0.0000	0.000	
		3014	38.94	-35.1	0.000000	0	0.0000	0.000	/
	11	TTA52	51.51	-35.1	0.000001	55	0.0035	177.957	54/55
	13	T0026	43.44	-35.1	0.000001	45	0.0034	146.911	54/55
	14	8391	36.25	-35.1	0.000012	442	0.0396	1435.066	54/55
	16	7868	33.99	-35.1	0.000019	632	0.0603	2050.567	54/55
	17	8141	35.17	-35.1	0.000014	490	0.0452	1589.474	54/55
	18	12435	53.72	-35.1	0.000012	662	0.0400	2149.016	* 54/55
	19	10976	47.42	-35.1	0.000013	631	0.0432	2046.864	54/55

Table 7. (con't).

Stratum T	ransect	Transect	Transect	Target	Sa - Area	Total	Biomass	Total	Sample
1	Number	Length	Area	Strength	Scattering	Scattering	Density	Biomass	Number
		(m)	(km <sup>2</sup> )	(dB/kq)	(/sr)	$(m^2/sr)$	$(Kq/m^2)$	(t/trans)	
ST6	23	9322	21.19	-35.9	0.00008	176	0.0324	686.548	56
	24	9574	21.77	-35.9	0.000005	114	0.0204	444.292	56
Bonne Bay	26	10862	24.70	-35.9	0.000001	34	0.0053	131.371	56
Bank	27	8348	18 98	-35 9	0 000004	82	0 0169	319 967	56
June	30	8939	20.33	-35 9	0 000011	231	0 0442	899 189	* 56
	21	10055	20.33	- 25 9	0.000011	401	0.0442	1011 771	50
	31	14020	27.00	-35.9	0.000018	491	0.0000		50
	32	14030	31.90	-35.9	0.000005	150	0.0190	606.647	56
	33	15425	35.07	-35.9	0.000005	167	0.0185	649.906	56
	34	16865	38.35	-35.9	0.000004	157	0.0159	610.745	56
	35	16374	37.23	-35.9	0.000002	84	0.0088	325.903	56
	45	18309	41.63	-35.8	0.000014	592	0.0544	2265.905	57/58
	46	19717	44.83	-35.8	0.000005	219	0.0187	_ 838.293	57/58
	47	17239	39.20	-35.8	0.000009	358	0.0349	1369.321	57/58
	48	16289	37.04	-35.8	0.000004	148	0.0153	564.938	57/58
	50	18050	41.04	-35.8	0.000057	2337	0.2178	8939.599	* 57/58
	51	17404	39.57	-35.8	0.000048	1891	0.1828	7234 012	* 57/58
	52	13165	29 93	-35 8	0 000000		0 0000	0.000	57,50
	52	11257	25.55	-25 0	0.000000	2	0.0000	11 280	E7/E0
	53	11357	25.02	-35.0	0.000000	2	0.0004	11.280	57/50
	54	114/6	20.09	-35.0	0.000000		0.0000	0.000	<b>FR</b> / <b>FR</b>
	55	8529	19.39	-35.8	0.000003	57	0.0113	218.933	57/58
	77	6491	14.76	-36.3	0.000000	0	0.0000	0.000	
	78	6162	14.01	-36.3	0.000026	366	0.1102	1544.584	59
	80	6402	14.56	-36.3	0.000023	340	0.0986	1435.055	59
	81	5484	12.47	-36.3	0.000026	323	0.1094	1364.748	59
	82	5142	11.69	-36.3	0.000044	518	0.1869	2184.906	59
	83	6621	15.05	-36.3	0.00018	270	0.0758	1141.157	59
	84	7705	17.52	-36.3	0.000017	305	0.0734	1286.716	59
	85	6408	14.57	-36.3	0.000031	455	0.1318	1921.008	59
	86	4851	11.03	-36.3	0.000050	554	0.2122	2340 579	59
	87	6764	15 38	-36.3	0 000004	60	0 0165	254 088	+ 59
	00	5502	12 51	- 26 3	0.000004	245	0.0105	1034 916	50
	00	5502	12.51	- 30.3	0.000020	243	0.0027	1642 771	59
	0.9	5050	10.10	-30.3	0.000029	309	0.1227	1042.7/1	59
	90	5356	12.18	-36.3	0.000004	40	0.0161	196.299	59
	91	8715	19.82	-36.3	0.000000	6	0.0014	27.012	59
	92	7894	17.95	-36.3	0.000006	106	0.0249	447.665	59
	93	8524	19.38	-36.3	0.000001	14	0.0030	57.757	59
	94	8289	18.85	-36.3	0.00001	28	0.0062	116.456	59
	95	10058	22.87	-36.3	0.000009	197	0.0364	831.463	59
	96	8092	18.40	-36.3	0.000010	177	0.0407	748.091	59
	98	11728	26.67	-36.3	0.000011	286	0.0453	1206.816	59
	99	11627	26.44	-36.3	0.000008	202	0.0322	852.529	59
	100	10418	23 69	-36 3	0 000009	221	0 0393	931 530	59
	101	8421	10 15	-36.3	0.000000	22	0.0373	136 955	50
	101	0720	21 22	- 30.3	0.000002	116	0.0072	491 115	55
0.007	102	3330	21.23	-30.3	0.000005	110	0.0231	491.115	53
ST/	37	14118	/2.48	-35.1	0.000007	508	0.0227	1647.843	54/55
	39	11058	56.77	-35.1	0.000000	0	0.0000	0.000	
Bay of	40	12281	63.05	-35.1	0.000000	0	0.0000	0.000	
Islands	41	11434	58.70	-35.1	0.000000	0	0.0000	0.000	
	42	1135	5.82	-35.1	0.000000	0	0.0000	_0.000	
	43	2706	13.89	-35.1	0.000000	0	0.0000	0.000	
	44	4874	25.02	-35.1	0.000000	0	0.0000	0.000	
ST8	57	2449	5.32	-35.8	0.00000	0	0.0000	0.000	•
	58	2847	6.18	-35.8	0.000003	19	0.0115	71.366	57/58
Bonne Bay	60	2021	4 39	-35 8	0.000006	26	0.0224	98 427	57/58
_oo buy	61	2523	5 4 9	-35 8	0 000000	20	0 0000	0 000	57,55
	62	2500	5.40	-35.0	0.000000	0	0.0000	0.000	
	67	2000	0.43	-33.0	0.000000	0	0.0000	0.000	
	60	306	0.6/	-35.8	0.000000	U A	0.0000	0.000	
	64	T833	3.98	-35.8	0.000000	o	0.0000	0.000	
	65	1793	3.89	-35.8	0.000000	0	0.0000	0.000	
	67	2047	4.44	-35.8	0.00000	0	0.0000	0.000	
	69	2034	4.42	-35.8	0.00000	0	0.0000	0.000	
	71	2060	4.47	-35.8	0.000001	4	0.0032	14.105	57/58
	73	2099	4.56	-35.8	0.00000	0	0.0000	0.000	

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Table 8. Backscatter and biomass per strata for P392 (1989).

Stratum	Target Strength	Stratum Area	Area Scattering	Total So (m²/s	cattering sr)	Biomass Density	Total Biomass (t/stratum)			
	(dB/kg)	(km²)	(/sr)	Total	S.E.	(kg/m²)	Total	S.E.	c.v.	
ST1	-32.9	444.90	0.000000	0	0	0.0000	0	0		
ST2	-36.7	1157.35	0.00000	51	41	0.0002	236	191		
ST3	-36.7	665.81	0.00000	0	0	0.0000	0	0		
ST5	-36.7	2180.53	0.00000	892	685	0.0019	4154	3190		
ST6	-36.7	295.73	0.00000	0	0	0.0000	0	0		
ST7	-36.8	53.24	0.000002	89	54	0.0081	432	263		
ST9	-35.7	1640.29	0.000001	1973	1128	0.0045	7300	4340		
Total		6437.85	0.000003	3005	1321	0.0019	12122	5396	.45	
Total		6437.85	0.00003	3005	1321	0.0019	12122	5396	==	

Table 9. Backscatter and biomass per strata for P423 (1991).

Stratum	Target Strength	Stratum Area	Area Scattering	Total S (m²/a	cattering sr)	Biomass Density	Total Biomass (t/stratum)		
	(dB/kg)	(km²)	(/sr)	Total	S.E.	(kg/m²)	Total	S.E.	c.v.
ST4	-36.6	437.49	0.000000	0	0	0.0000	0	0	
ST5	-36.6	707.63	0.000001	1017	1014	0.0065	4626	4615	
ST6	-36.6	682.47	0.000039	26307	22500	0.1754	119695	102373	
ST7	-36.6	295.73	0.000001	198	198	0.0031	903	903	
ST8	-36.0	53.24	0.000008	451	428	0.0337	1795	1705	
ST10	-36.0	1640.28	0.00000	0	0	0.0000	0	0	
Total		3816.84	0.000049	27973	24140	0.0333	127019	102495	.81
Spring Autumn							70061 56958		
								==========	

Table 10. Backscatter and biomass per strata for C452 (1993).

Stratum	Target Strength	Stratum Area	Area Scattering	Total Sc (m²/s)	attering	Biomass Density	Total Biomass		
	(dB/kg)	(km²)	(/sr)	Total	S.E.	(kg/m²)	Total	S.E.	c.v.
ST1	-35.1	1157.35	0.000000	309	309	0.0009	1003	1003	
ST2	-35.1	665.82	0.000000	0	0	0.0000	0	0	
ST3	-35.1	850.62	0.000001	887	658	0.0034	2880	2134	
ST4	-35.1	437.40	0.00000	1	1	0.0000	4	4	
ST5	-35.1	707.63	0.000004	2987	1093	0.0137	9691	3546	
ST6	-36.0	1035.49	0.000012	12554	2901	0.0485	50223	11145	
ST7	-35.1	295.73	0.000002	508	508	0.0056	1648	1648	
ST8	-35.8	53.24	0.000001	48	30	0.0035	184	115	
Total		5203.28	0.000020	17294	3225	0.0126	65633	12045	.18
Spring							31002		
Autumn							34631		
=========		================			************		========		



Figure 1. Northeastern Gulf of St. Lawrence



Figure 2. Position (½ h intervals) of sonar observations (soundings), of herring school detections (fish recorded) and of successful fishing sets (sets) made from two purse seiners during October from 1982 to 1987.



Figure 3. Position (½ h intervals) of sonar observations (soundings), of herring school detections (fish recorded) and of successful fishing sets (sets) made from two purse seiners during November from 1982 to 1987.



Figure 4. Position (½ h intervals) of sonar observations (soundings), of herring school detections (fish recorded) and of successful fishing sets (sets) made from two purse seiners during December from 1982 to 1987.



Figure 5. Distribution of acoustic backscatter from herring schools along the west coast of Newfoundland in November, 1989 (stratum numbers and completed transects are indicated).



Figure 6. Distribution of acoustic backscatter from herring schools along the west coast of Newfoundland in November, 1991 (stratum numbers and completed transects are indicated).



Figure 7. Distribution of acoustic backscatter from herring schools along the west coast of Newfoundland in November, 1993 (stratum numbers and completed transects are indicated).



Figure 8. Length frequency distributions of spring—spawning herring from the late fall hydroacoustic surveys in subareas 4Ra to 4Rd from 1989 to 1993 (major year-classes are indicated).



Figure 9. Length frequency distributions of autumn-spawning herring from the late fall hydroacoustic surveys in subareas 4Ra to 4Rd from 1989 to 1993 (major year-classes are indicated).