WHALE AND SHARK ENTRAPMENTS IN INSHORE FISHING GEAR DURING 1983; A PRELIMINARY REPORT TO FISHERIES AND OCEANS CANADA

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ABSTRACT

Aid in releasing entrapped whales and sharks and minimizing damage to fishing gear was given to inshore fishermen and also damage to gear in Newfoundland and Labrador was monitored, during 1983.

Reported entrapments of humpback whales were about the same as the past two years, substantially lower than entrapment numbers in 1979-1980. On the island, entrapments were most serious in the St. Vincent's Peter's River area to Portugal Cove South and in Southern Labrador. Reported entrapments of smaller cetaceans were also at low levels of previous years. Incidental catch of basking sharks was markedly higher than the 1982 catch and entrapment occurred earlier in the summer causing disruption of the salmon fishery on the South Coast. Damage to fishing gear, reported on a card reporting system and through surveys, appears up slightly from 1982 but still is considerably less than record high levels in 1979-1980. Checks for under reporting and continuing receipt of damage reports from fishermen make these conclusions tentative.

Analysis of damage trends shows that decreased damage to fishing gear in the period from 1981-1983 is due to decreased abundance of whales, especially humbacks. This decrease is highly correlated with capelin biomass on the North East Coast.

Recommendations for future work are given and include a pilot project on basking shark marketing on the South Coast, a permit system for non-fishermen whale release and research on entrapped whales and modified continuance of the whale and shark release program.

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INTRODUCTION

As in past years, the whale research group at Memorial University of Newfoundland has monitored whale interaction with inshore fishing effort in Newfoundland and Labrador. Since 1978, with Fisheries and Oceans Canada, gear damage due to whales and large sharks has been monitored and assistence offered to fishermen who have animals entrapped in their gear.

Whale and shark collisions with inshore fishing gear are not a new problem for our inshore fishermen. There is much anecdotal and historical evidence indicating that inshore gear damage has always occured at a low, irregular level. During the mid-seventies, there was a substantial increase in the amount of damage reported and whales and sharks were more commonly entrapped in gear made of stronger modern materials (Lien, 1980).

When a collision occurs, the animal is caught in the gear in about 25-30% of collisions. The trapped animal, alive or dead, because of its size presents a difficult task in retrieving the gear with a minimum of damage so fishing can be resumed. The longer the animal remains entrapped in gear, the greater the damage to the gear and fish losses due to down time. Whales that partially free themselves and swim off towing gear constitute an additional hazard to other gear and boats.

Because fishermen have difficulty in coping with whales and large sharks in gear, methods have been developed to aid them with releasing the animals and retreiving their gear (Lien, 1980). The purpose of the present project is to make these methods available to fishermen who have problems with entrapped animals and to continue monitoring the collision problem in Newfoundland's inshore fishery.

METHODS

Fishermen report whale and shark damages by an entrapment phone line, by using gear damage report cards or to on-site observers (Lien et al, 1982). These reporting systems have been used since 1979 and did not change from 1982 methods.

As required, help was sent to the fishermen within 24 hrs. of their request usually within hours. Tools and procedures used in releasing the animals have been previously described (Lien, 1980). In every case an effort was made to teach fishermen and local people including fishery officers as much as possible about release procedures.

RESULTS

Results will be presented as follows. First, data on the animals reported will be presented. As stranded whales are also reported, these data will be presented. Data on changes in whale abundance and changes in damages over the years will be presented. Finally data from surveys of fishermen will be given.

Entrapments

Lists of animals reported entrapped in fishing gear are presented in Tables 1-6 and totals of entrapped animals in 1983 presented in Table 7. Locations of entrapments by species are presented in Figures 1-4. A total of 198 entrapment reports were received.

Basking Sharks

A total of 147 basking sharks were reported entrapped during 1983. This compares with 35 in 1982; 126 in 1981, and 66 in 1980. It is unlikely that we received reports of all basking sharks caught as there were serious problems in marketing the animals which discourage fishermen from cooperating. Although serious under-reporting is expected, we have not yet been able to determine its extent.

Basking sharks occurred first on the South West Coast, about three weeks earlier than normal. The first animal was caught on 27 May. The inshore movement of basking sharks is correlated with elevation of surface temperatures to 8 degrees (Lien & Aldrich, 1982b) and satelite imaging of surface temperatures in the area indicate early warming of water on the South West Coast. The early occurrance of basking sharks inshore disrupted the salmon fishery on the South West Coast earlier than normal.

Nearly all basking sharks were caught in salmon nets (84%) although some were caught in codtraps (8%) and few in gillnets (8%).

While more animals than usual were caught on the South West Coast, compartively few animals were captured on the North East Coast. Intermediate numbers of basking sharks were taken in Placentia Bay.

Misc. Sharks

A list of misc. sharks reported in 1983 is presented in Table 2. A total of 11 animals were reported, most of them porbeagles but blues were also taken. Under-reporting of the incidental take of these animals is high with only very few of the animals taken actually reported.

Humpback Whales

Table 3 lists humpback whales entrapped in gear and Fig. 2 depicts locations of catches. A total of 35 humpbacks were caught. Of these, 30 were released alive, 5 died; entrapment mortality was thus 14%.

Most humpbacks were caught in either codtraps (68%), salmon nets (17%) or gillnets (11%). Catches occurred earlier than other years, beginning in May on the South Coast. Most entrapments occurred in June around the Avalon Pennisula. On the island, entrapments were most common from St. Vincent's/Peter's River to Portugal Cove South. On the North East Coast, areas of White Bay also had a number of entrapments. In Labrador, areas from Rigolet south had several reported entrapments. Because of the pressures of time, only two of the dead humpbacks were examined.

One entrapped humback was tagged with a satellite tag (Mate et al 1983). On release immediately it rapidly moved offshore a considerable distance.

Minke Whales

A total of 11 minke whales were reported entrapped this summer (Table 4). Mortality due to entrapment was 36%. There were 4 minke entrapments in the Lawn-St. Lawrence area; otherwise catch seems scattered around the island (Fig. 3). Most minkes were caught in codtraps (73%), several in gillnets (18%) and one in a salmon net.

Unknown Species of Whales

On occasion a whale collides with gear, is held for a time and self releases or is released by fishermen, and the species is not determined. In 1983 large whales of undetermined species were entrapped a total of 15 times.(1). Most of these entrapments occurred in Labrador where reporting and our response time are poor. In contrast to entrapped animals that stay caught because of the strength of a codtrap, whales in this category most often are caught in salmon gear (53%) or gillnets (20%).

Misc. Species of Animals Reported

Fishermen call the entrapment phoneline to report animals other than whales and sharks. In 1983 this included two leatherback turtles and one tuna (Table 6).

Total Entrapments in 1983 and Comparison with Previous Years

Of a total of 208 entrapment reports received in 1983, 61 involved whales. Whale entrapment calls are summarized in Table 7. Humpbacks (69%) and minkes (22%) were most commonly involved. As squid were scarce in 1983, few potheads were sighted inshore and none were reported entrapped. Few fin whales have ever been entrapped.

Numbers of entrapments during 1983 are compared with entrapments reported in previous years since 1979 in Table 8. Mean humpback entrapments reported in 1979-1980 was 55 compared with a mean rate of 33.7 during 1981-1983. Estimated numbers of humpback entrapments (Lien, 1980) comparing these periods indicate a more entrapments (Lien, 1980) comparing these periods indicate a more dramatic decrease in entrapments. Mortality has also decreased from about 27% in 1979-1980 to 12% in 1982-1983.

Gear Damage Reports

Card Report System

A total of 191 damage instances involving sharks were reported on cards; 52 reports of whale damage were received (Table 9). On damage card reports, whales collided equally with codtraps and salmon nets (22% each), 13% of collisions occurred with groundfish gillnets. The mean reported gear loss per collision was $497.; total losses reported were $25,834. In general collisions with codtraps were the most expensive in lost gear. Locations of reports on the card system are presented in Fig. 5.

(1) Ten of these were reported on damage cards and were not called in at the time. The delay of reporting, in past, results in our inability to identify species.

Basking shark collisions reported on damage cards typically occurred with salmon nets (95%) and were less expensive on average ($161.). Total gear losses due to sharks reported on the card system were $30,710.

Total losses reported on the card system in 1983 were $66,544. compared to $28,242. to the same time in 1982, $48,763. in 1981. There were 10 reports of entrapped whales and 17 additional basking shark entrapments reported on damage cards that were not reported by phone.

Other Damage Reports

Damage reports were also received from phone calls concerning entrapments and by on-site reporters. One reporter traveled throughout Southern Labrador. Details of this report will be presented elsewhere. A second reporter covered the area from St. Vincent's/Peter's River and Portugal Cove South. A summary of total damage reports received (to Sept. 15) in 1983 is presented in Table 10. Dollar values for on-site reporters and entrapment calls are not available at the date of this report. A total of 387 damage reports were received during the summer; of these reports 208 were known to involve basking sharks.

A comparison of damage reports from all sources and estimated damages based on correcting volunteered information are presented in Table 10. Since 1980, basking shark damages have been solicited and tabulated separately; prior to that date shark damage was not solicited. Basking shark damage reports totalled 2 in 1979; 66 in 1980; 125 in 1981; 35 in 1982 and 191 in 1983. Frequency of damage reports excluding shark damage is also presented in Table 11.

Strandings

Stranded whales reported during 1983 (to Sept. 20) are listed in Table 12. Ice entrapped whales are reported in Table 13 and locations of these entrapments are presented in Fig. 6.

With the vast amount of ice on the North East Coast during the spring of 1983, there were many ice entrapments (N=17) involving several hundreds of animals. Extensive behavioral work was conducted on entrapped animals and autopsies performed on dead whales available. Results of this work will be presented elsewhere.

Inshore Whale Abundance

An inshore whale sighting program has been maintained since 1978 and the sighting program continued in 1983. These data have now bee analized for abundance trends and are available elsewhere (Lynch, 1983). Transects have been monitored in several locations in Newfoundland and Labrador (Whitehead et al, 1983; Whitehead et al, 1980; Whitehead & Lynch 1981; Glass & Whitehead, 1982). Results of some of this work is summarized in Tables 14-16 and in Figure 7.

Transects on the North East Coast between 1973 and 1983 indicate remarkable variation in humpback sightings (Table 14) as does capelin biomass (Carscadden et al, 1981). Table 15 presents correlations between estimates of capelin biomass estimates and humpback sightings. The humpback counts are significantly negatively correlated with the immature capelin biomass of the Newfoundland and Labrador stock. When humpback counts were high on the North East Coast, the immature capelin biomass off the Labrador coast was lowest. Results of a stepwise regression analysis are shown in Table 16. The first variable used was immature Newfoundland and Labrador biomass which accounted for 80% of the variance. Next came the mature Newfoundland and Labrador biomass which significantly reduced the variance, but was positively related to the counts. With greater mature biomass, which represents the capelin spawning along the North East Coast there was a higher count. Finally the regression used the South East Shoal stock which was negatively related to the humpback counts. When the South East Shoal stock was high, humpback counts were low. This also significantly reduced the variance, with the three dependent variables together accounting for 93% of the variance in the humpback counts. Results of this work are presented in detail elsewhere (Whitehead and Lien and J. Carscadden, 1983).

Surveys

During 1983, two surveys of fishermen were completed. The first resurveyed fishermen who in 1978 had retrospectively reported gear damage due to whales from 1974 (Lien, 1980). These individuals were again questioned in 1983 and asked to report gear damage from 1979-1982. Because damage reports, no matter how solicited, are volunteered data, they are liable to distortion. There is a "Fishermen's Broadcast" phenomenon where fishermen are alarmed about what was last on the radio. Such trends in the fishermen's

feelings are well known and could seriously bias the likelihood of reporting whale and shark damages in any year. By annual checks on the tendency of volunteer fishermen damage reports it is known that they tend to under-report frequency and over-report seriousness and cost (Lien, 1980; Lien et al, 1982). This survey was designed to investigate by retrospective reports gear damages from 1974-1982. Results are presented in Fig. 8.

Damages reported by fishermen retrospectively vary greatly; from 5-29% of fishermen in any one year report damage. The damage peaks in 1978-1980 and then falls to about one-third of levels in those years in 1981-1982.

A second survey was made in 1983 of 43 fishermens committees to understand their views on the whale and shark problem. Of 43 fishermens committees, 26 replied for a response rate of 62%. A summary of the attitudes fishermen expressed is presented in Table 17.

Study of Basking Sharks

When called to an entrapment that involves sharks or whales, if the animal dies we attempt to gain as much information by autopsy as possible. Time available severely limits this activity. However during 1983 a total of 21 basking sharks were autopsied, 4 females and 17 males. Sizes of the males were smaller then females. Age, morphometric, parasite and stomach content information were collected. Most surprising was the discovery of a female that had recently copulated. The reason for inshore activity by basking sharks was hypothesized to be based on food and reproductive activity (Lien and Aldrich, 1981) but this is the first direct proof of inshore sexual activity. These data will be completely presented in other reports.

DISCUSSION

Have whale damages decreased?

Early work in 1978-1980 (Lien, 1980) suggested that a variety of factors appeared to have precipitated an increase in reports of inshore fishing gear damage including increased whale numbers, increased fishing effort, changes in gear and attitudes and depletion of capelin (Lien, 1980). In some areas, variation in basking shark damage, reported as whale damage, could also have effected damage increases (Lien and Aldrich, 1981b).

Retrospective reports of damage by fishermen are available for 1974-1982 and indicate peak damage occurred between 1978-1980 and has fallen since. Other surveys used retrospective reports of basking shark catches from 1974 and although there was substantial year to year variation in catch per effort, there was no significant increases in catch until 1981 when markets first appeared for liver and oil. This increase in catch per effort since 1981 has been related to functional changes in effort: prior to a market South West Coast fishermen removed salmon nets from the water when basking sharks arrived; with the development of a market they kept fishing even when basking sharks were in the area (Lien and Aldrich, 1981b). Thus from retrospective reports, whale damages have decreased; basking shark catches, although showing considerable year to year variation, have not significantly changed.

Damage reports received and estimated damages (Table 11) show a high in 1979-1980 and lower rates from 1981-1983. This trend is especially noticable when basking shark variation in reported damages is removed. Entrapments in general show a similar trend (Table 8).

Overall damages due to whales appear to have decreased in the period from 1981-1983 and this relates to lower numbers of humpback whales sighted inshore (Lynch, 1983; Whitehead and Lien, 1982; Whitehead, 1983; Whitehead et al 1983).

Variation in whale sightings can show considerable, apparently random, yearly variation but the variation shown on the North East Coast shows significant relation to the amount of capelin biomass. As capelin are the major food of the humpback such a relationship between predator and prey would not be unusual. (Whitehead and Lien, 1982)

However there are two areas where whale damages increased in 1983 over 1980-1982 levels; St. Vincent's/ Peter's River to Portugal Cove and Southern Labrador. Southern Labrador has shown considerable fluctuation in whale damages in the past and this may be due to a variety of factors. St. Vincent's/Peter's River damage appears less now compared to highs in 1979-1980. In 1980 for example there were about 55 codtrap collisions; in 1983 there were about 15 collisions. However part of this decline results from a change in fishing effort. Fishermen have decided not to use high whale risk berths in the St. Vincent's/Peter's River area and some crews have actually shifted out of the area. Humpback whales first arrive in Newfoundland and cause some damage to gear in Hermitage Bay

while feeding on spring krill blooms. They then appear to move in an easterly direction and arrive in Placentia and St. Mary's Bay about the time of capelin spawning. For a time additional dispersion of the animals ends and they stay, especially in the St. Vincent's/Peter's River where oceanographic factors can influence capelin to stay in the area over an extended period. Whatever factors account for the variation, it seems that damages in the St. Vincent's/ Peter's River area and Southern Labrador deserve additional study.

Basking Sharks

It is now known that basking sharks account for a substantial percentage of inshore fishing gear damage. Similar situations have occurred in other areas of the world (Lien and Aldrich, 1981b). The market that developed for liver and fins has largely offset damages inflicted by these animals. However in 1983 only about 46 animals were marketed. An average shark liver weighed 738 kg and at .55/kg earned $406. Fins from an average shark weighed 81 kg. and at $1.90/kg. netted $154 per animal.

Early in June the market for basking sharks disappeared and a buying arrangement was not successfully established until early July. The lack of immediate markets and confusion resulted in less than 25% of entrapped sharks being marketed.

In late August with the South West Coast Development Association we sponsored a meeting of South West Coast fishermen. There is high interest in developing a stable market and a predictable marketing method. The result of the meeting was to recommend that the Fishermen's Union attempt to establish a basking shark marketing pilot project on the South West Coast. At the meeting there was interest expressed in developing a hunt. Market potential of basking sharks is good; new markets for the skin and meat as well as the cartilage are possible.

The Entrapment Assistance Program

Results of the 1983 survey indicated very favorable reactions by fishermen to the whale release help provided through the present contract. Although a higher percentage of fishermen are now releasing animals themselves our on sight activity still continues to be of help. Of the entrapment calls received we traveled to the location in about 2/3 of the cases. In every event we discussed with fishermen the ways of minimizing down time and gear damage in releasing the animal from the gear. This year whale

entrapment calls were received mostly from individuals that we had not worked with previously. Frequently, fishermen that we worked with on an entrapment in previous years, simply called to report his damage after freeing the animal himself.

There still seems to be a useful role for the release program but several modifications seem necessary. Because one of the entrapment centers occurred in Labrador this year it was difficult and expensive for us to respond promptly although in every case help reached the fishermen within 24 hrs. of his call. Next year establishing a trained entrapment crew in Labrador would be a better and cheaper method of handling the problem.

Basking sharks now constitute the largest part of our entrapment work load. This centers on the South West Coast in June. In conjunction with the pilot project on marketing these animals, it would be useful to establish an entrapment crew on this coast with two responsibilities; (1) aiding fishermen in releases, and (2) to more extensively utilize incidental catch for basic biological studies.

Labrador Studies

As mentioned previously an on-site observer was maintained in Southern Labrador this summer. In addition to cross-checking damage reports the observer also collected information on harbor propoise by-catch (Lien, 1983) and whale shooting. There is a limited hunt for white-beaked dolphins (Alling, 1982) and a significant harbor propoise catch which warrant additional study. There is also an additional problem which was observed this summer. Shooting of large baleen whales is extremely common. Such activity may in fact contribute to the likelihood of a whale colliding with gear and does little good in keeping whales away from fishing areas (Lien, 1980). If such activity is as common as appears it may also be of conservation concern. This will require additional study and probably needs to be remedied by an educational program (Lien et al, 1983).

RECOMMENDATIONS

(1) The entrapment release program and monitoring of whale and shark damages be continued next year with some modifications.

(2) Entrapment releases by non-fishermen and research programs of entrapped whales be conduted under a permit system administered by Fisheries and Oceans Canada.

(3) A pilot project on basking sharks be established on the South West coast to insure efficient marketing of incidentally caught animals. In conjunction with this pilot project basic biological studies should be done.

(4) Additional study is needed for damage patterns in Southern Labrador and on the island in the St. Vincent's/ Peter's River areas.

(5) Increased ability to respond to whale problems experienced by Labrador fishermen.

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Table 1 Basking sharks reported entrapped during 1983.

Date	Location	Date	Location	Date	Location
27 May	Isle aux Mort	20 June	Burnt Island	5 July	Lord's Cove
1 June	Isle aux Mort	21	Rose Blanche	5	LaPoile
7	Isle aux Mort	21	Burnt Island	7	Francois
8	Isle aux Mort	21	Isle aux Mort	7	St. Juliene
8	Rose Blanche	21	Harbor Brenton	7	Triton
10	Burgeo	22	Marystown	7	Francois
10	Rose Blanche	22	Burgeo	9	Portugal Cv
10	Rose Blanche	23	Burgeo	9	Portugal Cv
11	Burgeo	23	Francois	11	St. Lawrence
12	Burgeo	23	Burgeo	11	Marystown
13	Rose Blanche	24	Burgeo	11	Twillingate
14	Rose Blanche	24	Burgeo	13	Marystown
14	Petites	24	Burgeo	15	Lawn
14	Burnt Islands	24	Burnt Islands	15	Gaskiers
15	Burgeo	24	Grand Bruit	18	Bay Bulls
15	Burnt Islands	25	St. Lawrence	18	Pouch Cove
15	Burgeo	25	Burgeo	19	Boyd Arm
15	Burnt Islands	25	Grand Bruit	19	Twillingate
16	Petites	25	Burgeo	19	Brent's Cv.,WB
16	Burnt Islands	25	Hermitage	20	Croc
17	Isle aux Morts	25	Burnt Islands	20	Bay Bulls
17	Rose Blanche	26	Lawn	21	Bragg Is.,BB
17	Grand Bay	27	Red Harbor,PB	21	Change Is.
17	Isle aux Morts	27	Grand Bruit	22	Newtown
17	Isle aux Morts	27	Lawn	22	Petti Forte
18	Rose Blanche	27	Burgeo	22	Ferryland
18	Rose Blanche	27	Burgeo	22	Lamaline
18	Rose Blanche	27	Rose Blanche	23	Hooping Hbr.
18	Rose Blanche	28	Isle aux Morts	25	Pt. Rexton
18	Rose Blanche	28	Grand Bruit	25	Braggs Is.BB
18	Grand Bruit	28	Hermitage	26	Bryant's Cv.
18	Rose Blanche	28	Hermitage	1 Aug	Portugal Cv.
18	Rose Blanche	29	Petites	3	Summerville
18	Burnt Islands	29	Rushoon	3	Badgers Quay
18	Little Bay W.,FB	29	Parkers Cv.PB	9	Change Is.
19	Rose Blanche	29	Hermitage	7 Sept	Sunnyside
19	Rose Blanche	29	Grand Bay	8	Rocky Hbr.
19	Isle Aux Mort	30	Lord's Cove	8	Rocky Hbr.
19	Francois	30	Rose Blanche	8	Rocky Hbr.
19	Rose Blanche	30	Isle aux Morts	8	Rocky Hbr.
19	Grand Bruit	30	Great Brehat	8	Rocky Hbr.
20	Rose Blanche	1 July	Hermitage	8	Anticosti Is.
20	Rose Blanche	1	Hermitage		
20	Francois	1	St. Stephen's		
20	Grand Bruit	2	Marystown		
20	Grand Bruit	4	Little Hbr. E.		
20	Rose Blanche	4	Burgeo		
20	Burgeo	4	Hermitage		
20 June	Francois	4	Grand Bay		
		5	Greenspond		
		5	Hermitage		
		5	Hermitage		
		5	Hermitage		
		5 July	Hermitage		

Table 2. Misc. Sharks reported entrapped during 1983.

DATE	LOCATION	SPECIES	GEAR
15 June	St. Brides	Porbeagle	gillnets
24 June	St. Brides	Porbeagle	gillnets
5 Aug	Stephenville	Porbeagle	trawl
5 Aug	Summerside PEI	Great White?	gillnet
8 Aug	Port aux Choix	Porbeagle	gillnet
8 Aug	Port Saunders	Porbeagle	gillnet
17 Aug	Grand Bank	Blue	trawl
19 Aug	Cowhead	Blue	gillnet
15 Sept	Middle Arm	Porbeagle	gillnet
16 Sept	Boat Hbr., P.B.	Porbeagle	gillnet
19 Sept	St. Mary's	Porbeagle	gillnet

Table 3 Humpback whales reported entrapped during 1983.

DATE	LOCATION	GEAR	LENGTH	STATUS
24 May	Hermitage	salmon net	none	alive
10 June	ODonnells	salmon net	9-10m	alive
13 June	Admirals Beach	codtrap	9m	dead
14 June	Harbor Deep	codtrap	9m	alive
17 June	Admirals Beach	codtrap	9m	dead
18 June	Portugal Cv. S.	codtrap	none	alive
18 June	L'Anse au Loup	codtrap	none	alive
18 June	Trepassey	codtrap	none	alive
19 June	Portugal Cv. S.	codtrap	none	alive
20 June	Portugal Cv. S.	codtrap	none	alive
21 June	Tors Cove	codtrap	none	alive
23 June	Pouch Cv.	codtrap	none	alive
25 June	Renews	codtrap	none	alive
25 June	St. Vincents	codtrap	none	alive
27 June	Gaskiers	codtrap	none	alive
27 June	Musgrave Hbr.	codtrap	none	alive
27 June	Peter's River	codtrap	none	alive
29 June	Indian Cv. Lab.	salmon net	9m	dead
29 June	St. Julienes	salmon net	none	alive
30 June	Petty Hbr. Lab.	codtrap	none	alive
30 June	Aquaforte	codtrap	none	alive
30 June	Mary's Harbor	salmon net	7.6m	alive
30 June	Conche	codtrap	10m	dead
2 July	Newtown	gillnets	none	alive
5 July	Ferryland	codtrap	none	alive
8 July	Musgrave Hbr.	codtrap	none	alive
10 July	St. Vincent's	gillnet	none	alive
10 July	Rigolet	salmon net	8m	alive
10 July	Musgrave Hbr.	gillnet	none	alive
10 July	Cartwright	salmon net	none	alive
11 July	Brigus So.	codtrap	none	alive
15 July	Fishot Is.	codtrap	9m	alive
19 July	Cape Broyle	codtrap	10.3m	dead
20 July	Bonavista	gillnet	none	alive
26 July	St. Vincent's	codtrap	none	alive

Table 4 Minke whales reported entrapped during 1983.

DATE	LOCATION	GEAR	LENGTH	STATUS
14 June	English Hbr.W.	gillnet	none	dead
20 June	Portugal Cove S.	codtrap	none	alive
22 June	Lawn	codtrap	none	alive
25 June	Lords Cv.	codtrap	none	alive
28 June	St. Lawrence	codtrap	none	alive
28 June	Admiral's Beach	codtrap	4.6m	dead
29 June	St. Julienes	salmon net	none	alive
2 Aug	Cape Broyle	codtrap	none	dead
2 July	Admiral's Beach	gillnet	5.2m	dead
7 July	St. Lawrence	codtrap	none	alive
14 Sept	Croc	codtrap	none	alive

Table 5 Unknown species of whales entrapped in fishing gear during 1983

DATE	LOCATION	GEAR	STATUS
10 June	Conche	gillnet	alive
17 June	Pinware	gillnet	alive
20 June	L'Anse au Loup	codtrap	alive
20 June	Battle Hbr.	salmon net	alive
22 June	Mary's Hbr.	salmon net	alive
25 June	Riverhead	gillnets	alive
1 July	Port-aux-choix	codtrap	alive
7 July	Cartwright	salmon net	alive
8 July	Cartwright	salmon net	alive
9 July	Cartwright	salmon net	alive
9 July	Old Perlican	salmon net	dead
10 July	Musgrave Hbr.	codtrap	alive
9 Aug	Cartwright	salmon net	alive
23 Aug	Cartwright	codtrap	alive

Table 6 Misc. species of animals reported entrapped during 1983.

LEATHERBACK TURTLES			
25 July	St. Brides	gillnet	alive
14 Aug	Lumsden	gillnet	dead
TUNA			
6 July	Musgrave Hbr.	codtrap	dead

Table 7 Total species reported entrapped in fishing gear during 1983.

Species	Alive	Dead	Total
Whales			
Humpback	30	5	35
Fin	0	0	0
Minke	7	4	11
Pothead	0	0	0
Other	14	1	15
Sharks			
Basking Sharks	44	147	191
Misc Species	--	11	11

Table 8 Whales reported entrapped in fishing gear (1979-1982) and status on release.

Whale Species	Status at Release	Year 1979	1980	1981	1982	1983
	Alive	34	44	23	31	30
	Dead	13	17	8	4	5
	Alive	4	1	0	0	0
	Dead	3	2	1	0	0
	Alive	1	3	3	4	7
	Dead	9	9	8	5	4
	Alive	0	3	6	7	0
	Dead	4	3	37	5	0
	Alive	6	8	5	7	14
	Dead	1	1	12	10	1

Table 9 Total frequency and cost of damage reports by card system and entrapment calls by type of gear during 1983 (to Sept. 15).

	Gear Involved				Gear Loss	
Cause	Codtrap %	Gillnet %	Salmon net %	Other %	Total	$\bar{X}$ (in $)
Whale	43	13	43	1	25,834	497
Shark	3	1	95	1	30,710	161
Total	11	3	85	1	66,544	266

Table 10 Total fishing gear damages reported by card system, phone calls and on site reporters during 1983 (to Sept. 15). Cross checking of reports for duplication and compilation of damage losses is incomplete at the time of this preliminary report. Frequency will not change much when this is finished; cost will be considerably higher.

Total F	Total Reported Cost
387	66,544

Table 11 Totals of damage reports received estimated damage and frequency of damage excluding known basking shark damage from 1979-1983. (1) Based on corrections of volunteer information - see Lien, 1980; Lien and Aldrich 1982; Lien et al 1982) (2) In 1979 shark damages were solicited from fishermen. Beginning in in 1980 shark damages were solicited and tabulated separately. (3) Estimated damages for 1983 are not complete at the time this report was written.

Year	Total Reported Damage		Estimated Damage (1)		N Basking Shark Damages Reports(R)	Damage report frequency excluding shark damage
	F	Cost (in $)	F	Cost (in $)		
1979	327	323,730	490	500,000		490
1980	562	288,868	813	380,000	66	747
1981	238	79,574	276	97,954	124	152
1982	174	70,000	231	94,600	35	196
1983	387	66,544	387	NA.(3)	191	196

Table 12 Stranded whales reported during 1983 (to Sept. 20).

Date	Location	N	Species
20 May	Pt. Lance	7	White-beaked dolphins
7 June	Pt. Lance	1	Pothead
4 Aug	Hibernia	1	Minke
31 Aug	Brance	1	12 m unknown
19 Sept	L'Anse-aux-Loup	1	12 m unknown

Table 13 Ice strandings and entrapments of whales reported during 1983.

Date	Location	Species	N
19 Feb	Chapel Arm	Harbour Porpoise	12-15
		White beaked dolphin	3
		Humpback	1
22 Feb	Bareneed	White beaked dolphin	5-8
24 Feb	Western Bay	White beaked dolphin	20-30
25 Feb	Ochre Pit Cove	White beaked dolphin	20-30
26 Feb	Adams Cove	White beaked dolphin	1
3 March	Sunnyside	White beaked dolphin	3-4
6 March	Old Shop	White beaked dolphin	8
8 March	Whiteway	white beaked dolphin	8-10
24 March	Fairhaven	White beaked dolphin	15-20
24 March	Mt. Carmel	White beaked dolphin	4
25 March	Pt. Verde	White beaked dolphin	125-160
25 March	Pt. Verde	Minke	1
25 March	Little Barasway	White beaked dolphin	4
25 March	Black Point/Pt.Verde	White beaked dolphin	20-30
25 March	Pt. Verde	White beaked dolphin	80-100
27 March	Little Barasway	White beaked dolphin	1
30 March	Topsail	Orca	1

Table 14 Mean humpback count on transects between St. John's and St. Anthony and established capelin biomass for Nfld/Lab immature capelin, Nfld./ Lab mature capelin, and Grand Banks capelin. * = No data. (ref. Carscadden et al, 1981).

Year	Mean Humpback Count	Nfld/Lab Imm. Biomass	Nfld/Lab Mat. Biomass	Grand Banks Biomass
73	0	1.56	4.31	3.11
74	20	2.10	4.86	3.68
75	17.5	3.41	4.65	2.16
76	8.75	3.31	3.45	5.29
77	54	2.23	1.89	4.83
78	64	1.53	1.20	3.57
79	111	0.68	0.62	1.67
80	*	0.58	0.57	1.50
81	3	0.37	2.23	3.02
82	10	*	*	*
83	4	*	*	*

Table 15 Correlations between estimates of capelin biomass estimates, logarithmically transformed, and humpback counts.

Stock	Correlation with Humpback count	Significance
Nfld/Lab Imm.	-0.892	0.01
Nfld/Lab Mat.	-0.234	n.s.
Grand Banks	-0.423	n.s.

Table 16 Summary of stepwise regression analysis of humpback counts on capelin biomass estimates, logarithmically transformed.

	Nfld/Lab Imm.	Nfld/Lab Mat.	Grand Banks
Order entered in Regression	1	2	3
% of Variance Accounted For	79.5	88.5	92.7
Change in Variance	79.5	9.0	4.2
Coefficient	-1.04	0.43	-0.23
F (Degress of Freedom)	23.3 (1,6)	19.3 (2,5)	16.9 (3.4)
Significance	0.005	0.005	0.01

Question	Responses	N Comments	%
1. What is your impression the general seriousness of the whale/shark problem in the past two years in your area?	Serious Problem	8	31
	Less serious than earlier	16	62
	More serious than earlier	1	4
	Not a serious problem	9	35
	Sharks more serious problem than whales	7	27
	No Response	4	15
2. What, in general, do the fishermen in your area feel about the present seriousness of the compared to other problems in the fishery?	whale/shark problem #1	1	4
	w/s problem a main problem	5	19
	w/s problem a main problem	9	20
	w/s problem not too serious	5	19
	w/s problem very low	5	19
	Don't Know	1	4
	No R	1	4
3. If you can, rank problems in the inshore fishery in your area in term of seriousness	w/s problem #1	3	12
	#2	4	15
	#3	3	12
	#4	2	8
	#5	1	4
	#6	1	4
	very low	1	4
	Not in ranks at all	9	35
	Don't Know	2	8

Question	Responses	N Comments	%
4. What do you think of our whale release program? Is it valuable, necessary, still needed? How important is it for us to continue? What could we do better?	excellent	2	8
	valuable	16	62
	good	1	4
	some help	1	4
	still needed	21	81
	Provides safety for fishermen	3	12
	Saves gear	8	31
	No information	1	4
	No response	1	4
	Kill the whales on release	3	12
5. What do you think about our work in getting markets for sharks, especially basking sharks? Should we continue? What could we do better?	excellent	5	19
	valuable	3	12
	helpful	11	42
	Continue	18	69
	Get more buyers	1	4
	Get better prices	2	8
	sell whales too	3	12
	No R.	3	12
6. What do you think of the codtrap depot program operated by Nfld, Dept. of Fisheries? What might make it better	Don't know about it	13	50
	Good Idea	2	8
	Very good idea	1	4
	Not a good idea	2	8
	Quality of gear	3	12
	Govt. should pay	2	8
	No response	6	23
7. How important is the problem of compensation for gear losses due to whales and sharks? How about a general gear insurance program?	Compensation	16	62
	Insurance	13	50
	No Insurance	2	8
	No Compensation	1	4
	Very important	13	50
	Important	6	23
	Various comments on proper management of programs	12	46

Question	Responses	N Comments	%
8. What do you think about alarms for the prevention of collisions? Should we continue trying to develop these?	Continue	19	73
	Discontinue	1	4
	Alarms work	8	31
	Partial success	7	27
	Don't work	3	12
	Don't know	3	12
	Govt. should pay	5	19
	No response	5	19
9. Any advice on how we can maintain a year to year damage reporting system? (We would like to avoid using the damage cards but we haven't developed a better system	Fishing Officers	4	15
	Union Committees	7	27
	Fish Plants	3	12
	Use same	4	15
	Mentioned accuracy problems	2	8
	No response	9	35
10. How have the caplin been in your area recently compared to 1978-1980?	Very Plentiful	10	38
	Improved	5	19
	Improved but still less than normal	8	31
	Little change	3	12
	Scarce	2	8
	Plentiful but not coming to shore	4	15
	No response	1	4
11. Can you pass any comments on our work generally? The behavior of our crews, promptness? Any other comments or advice?	Positive to program	23	88
	Deal with other fishery problems	2	8
	Reduce numbers of whales	2	8
	Expand education program	2	8
	Hold more meetings with fishermen	2	8
	Positive to crews	22	85
	Negative to crews	1	4

Table 17 Responses to questionnaires sent to 42 fishermens' committees for discussion, 26 replied. Response rate, 62%

Figure 1

Locations of Basking Shark entrapments
during 1983

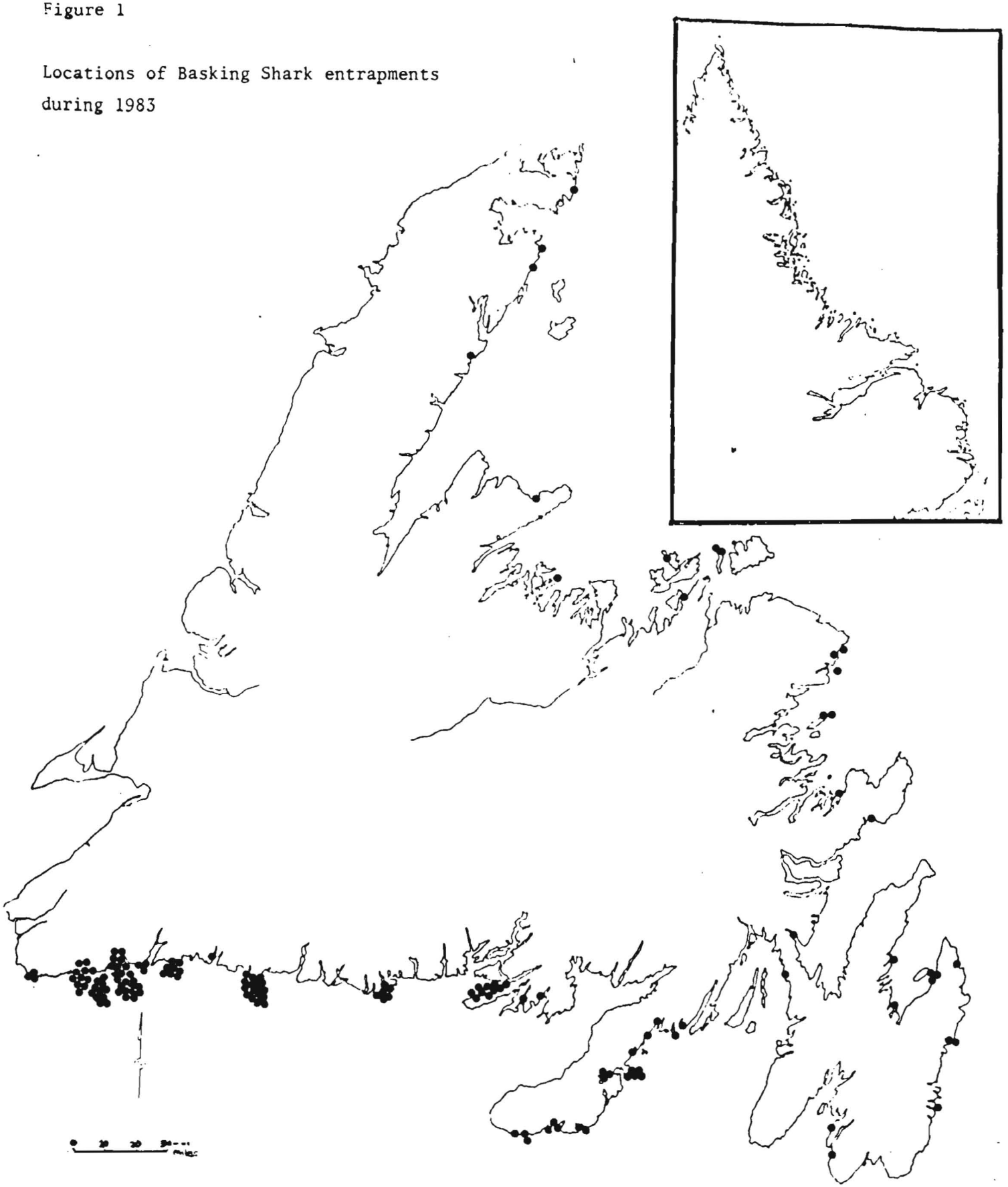

FIGURE 2

Locations of Humpback whale entrapments during 1983.

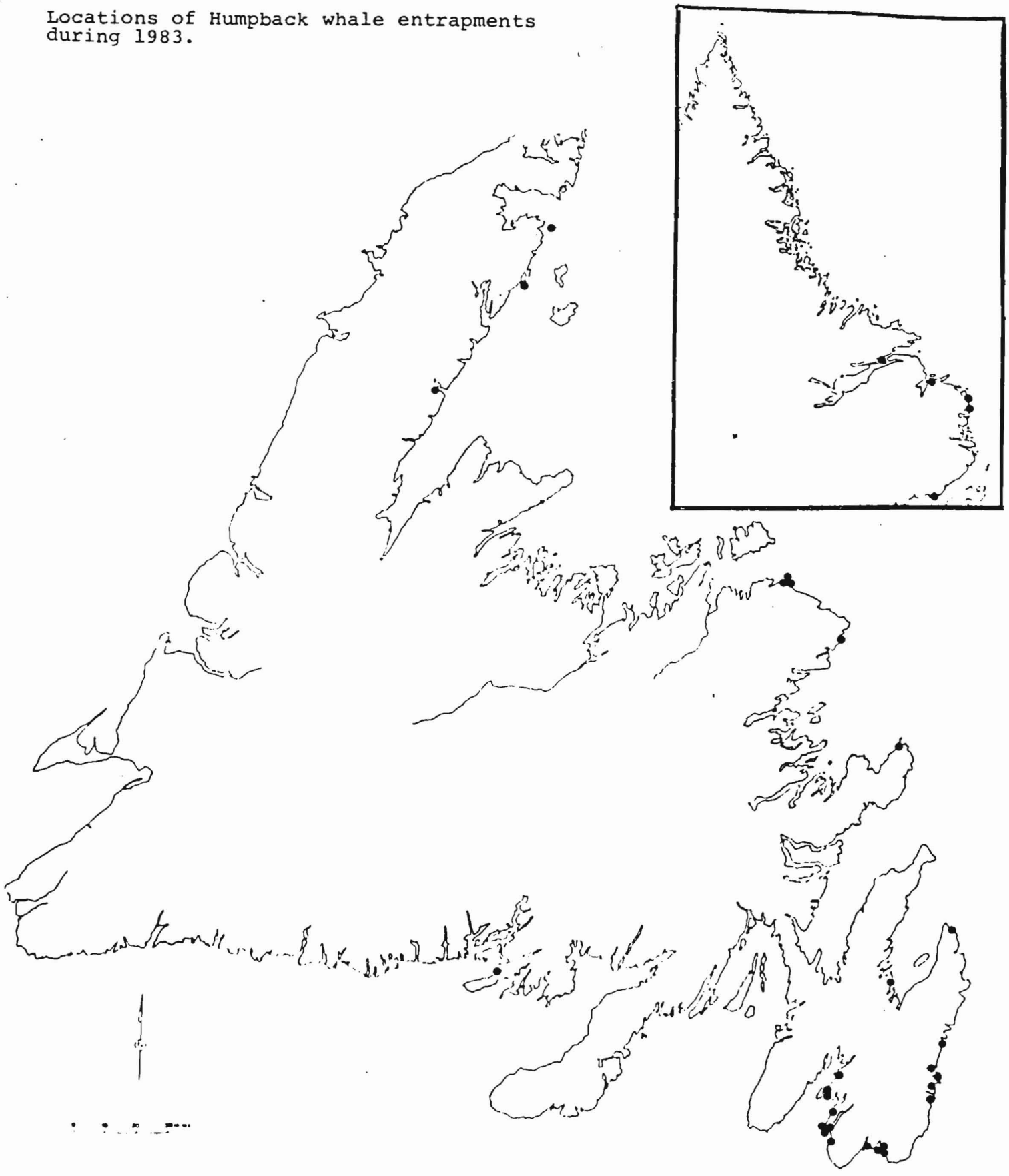

FIGURE 3

Locations of Minke whale entrapments during 1983.

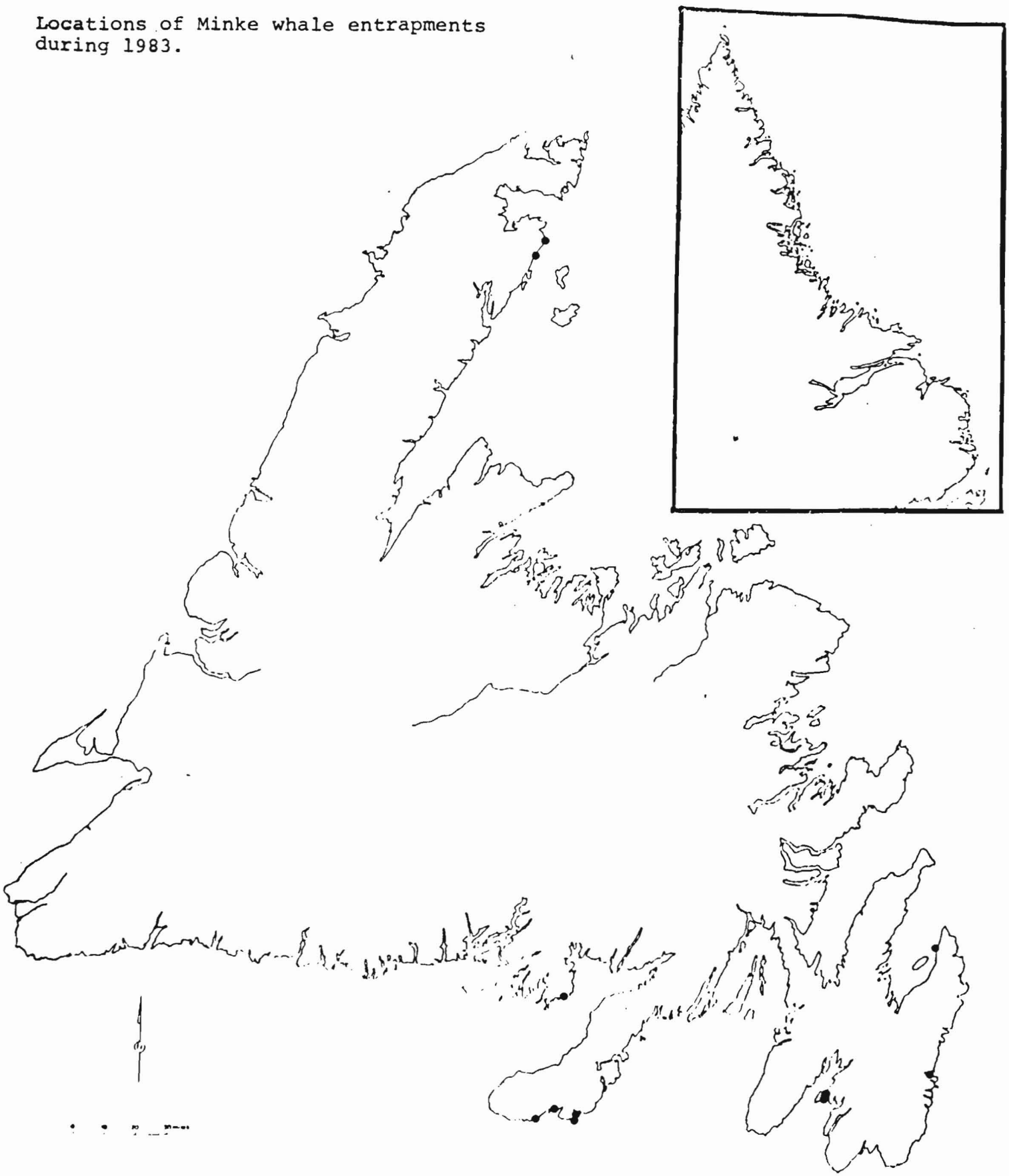

FIGURE 4

Locations of unknown species of whale entrapments during 1983.

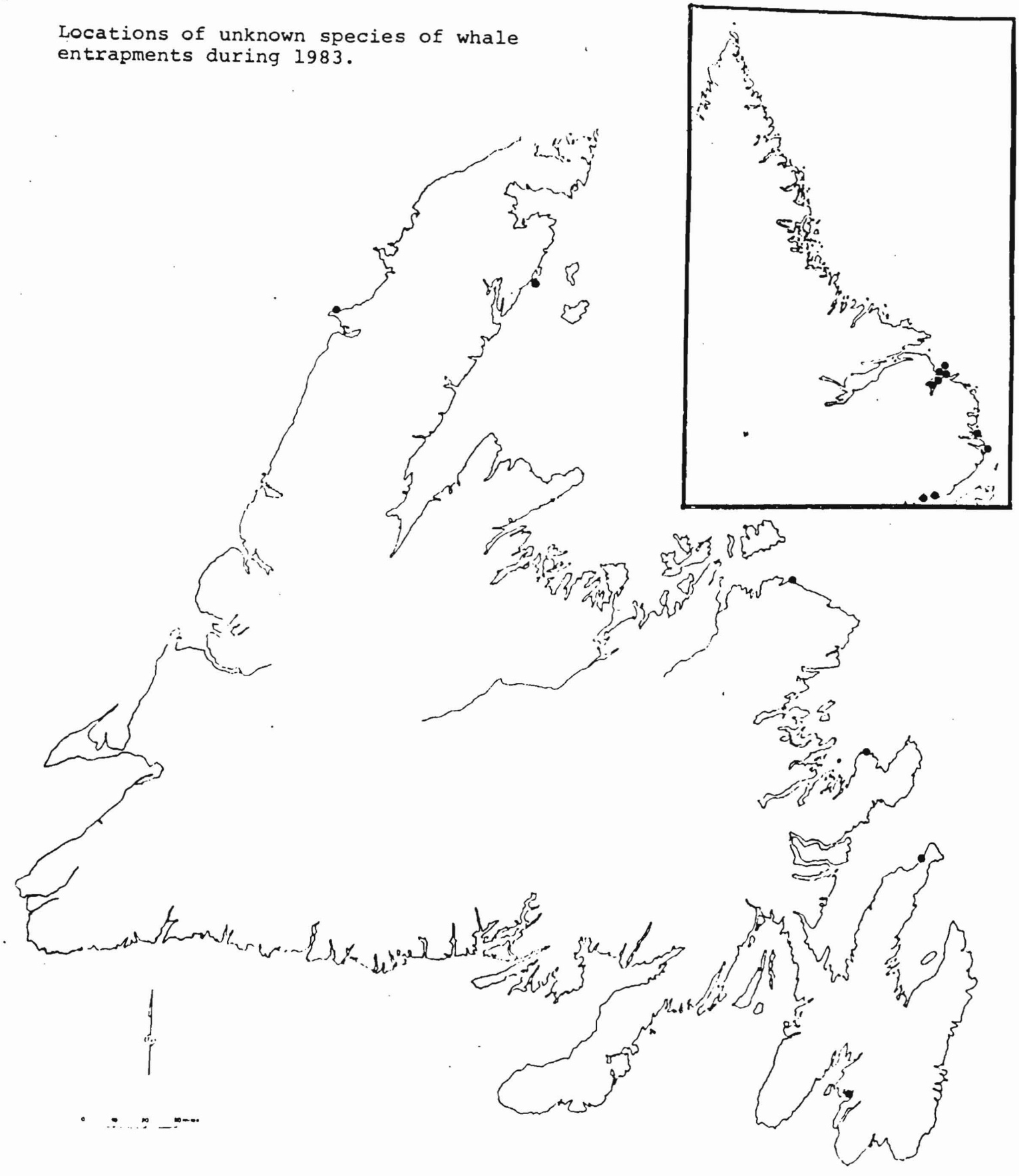

FIGURE 5

Locations of gear damage due to whales and sharks reported on card reporting system during 1983.

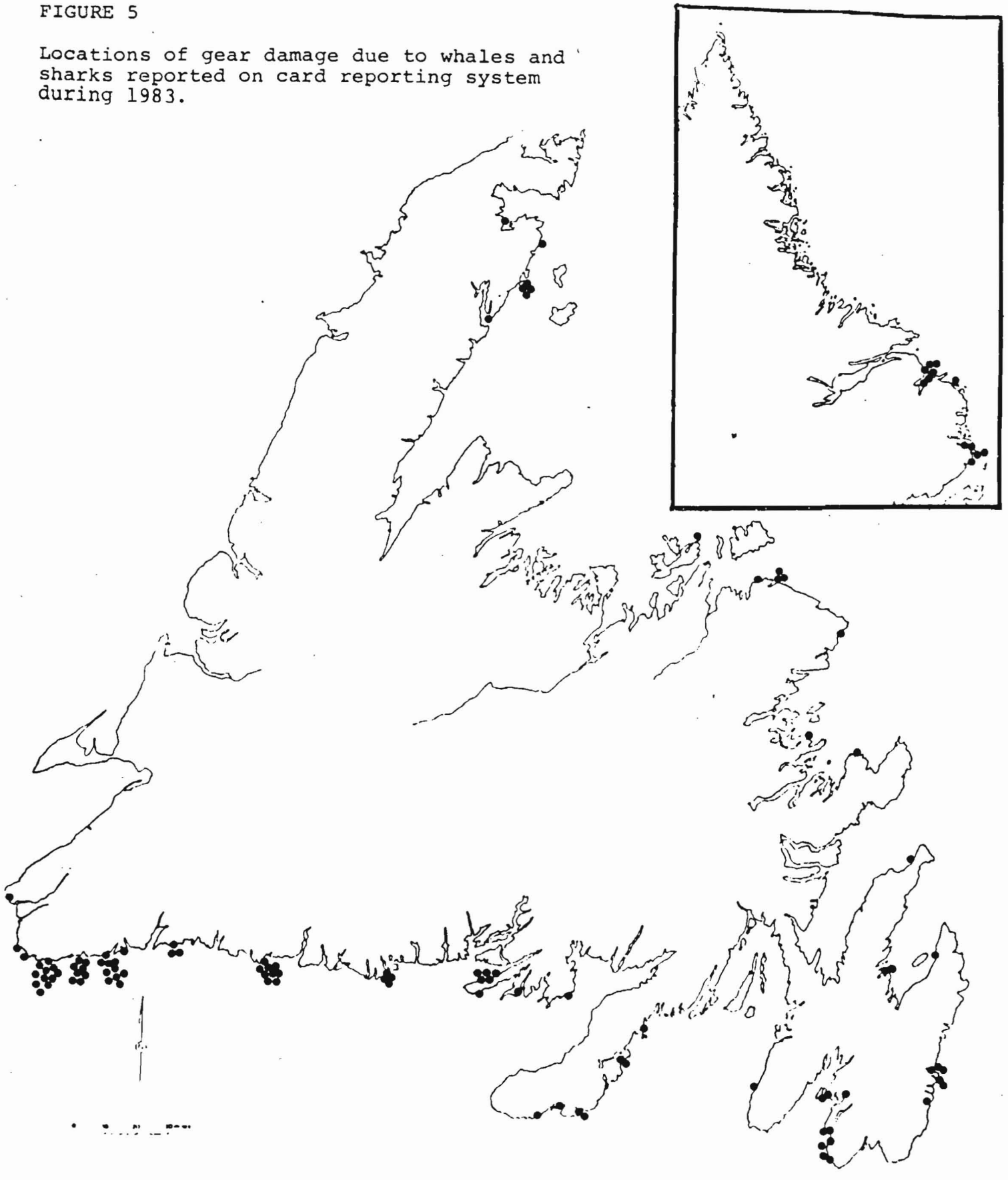

FIGURE 6

Locations of ice strandings during 1983.

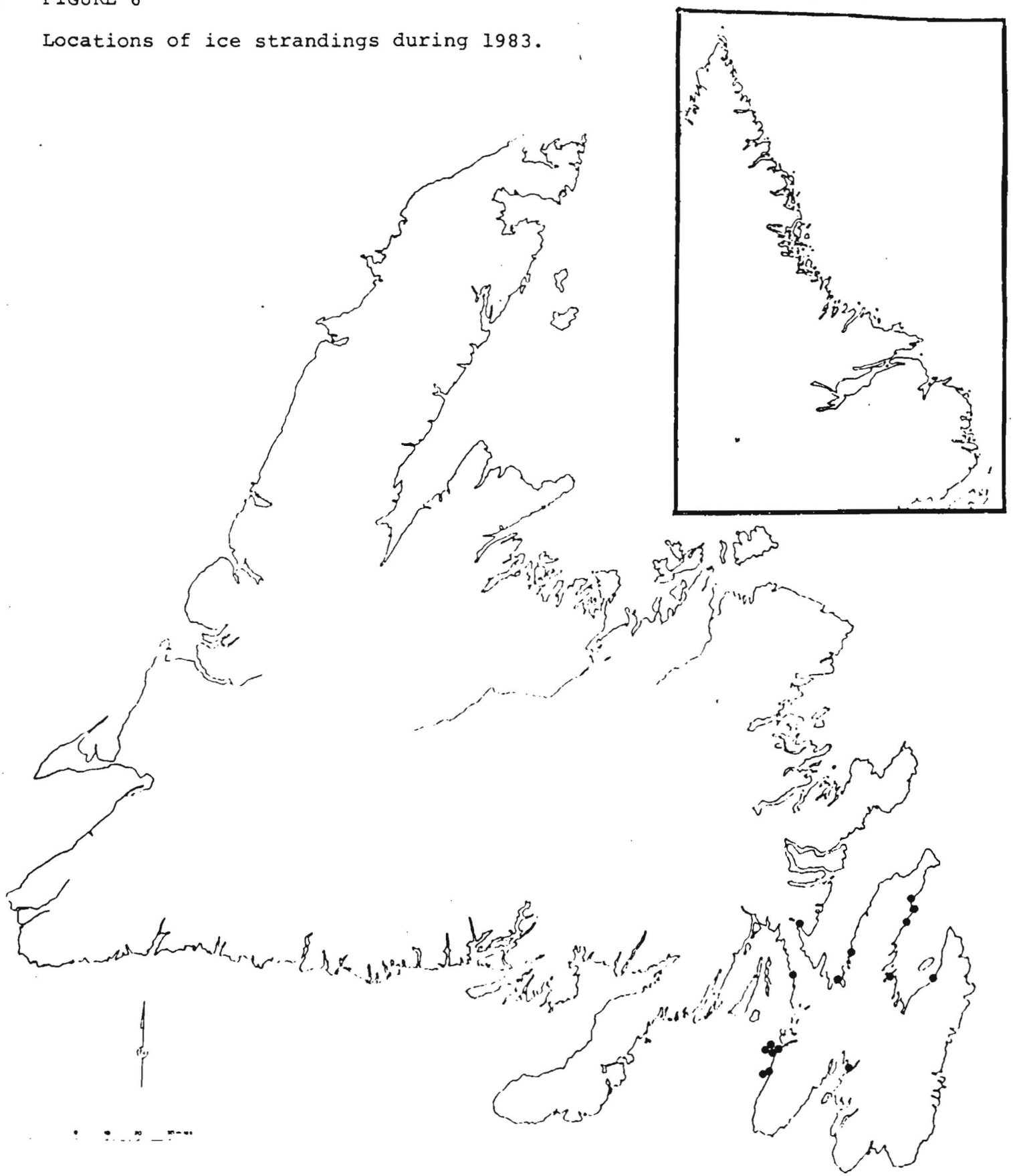

Fig. 7 Humpback whale sightings on the NE Coast of Newfoundland 1973-1983 (Whitehead & Lien 1983).

Fig. 8 Results of retrospective surveys of fishermen on gear damage. Survey 1 was conducted in Fall of 1978 and reported on the period 1974-1978 (Lien, 1980). Survey 2 was conducted of these same fishermen in 1983 (n = 560) and covers the years 1979-1982. In 1983, a total of 586 fishermen on who retrospective damage estimates from 1974-1978 had previously been volunteered; 159 replies giving the 1979-1982 retrospective data were received (return rate = 19%).