INCIDENTAL ENTRAPMENTS OF MARINE MAMMALS BY INSHORE FISHING GEAR REPORTED IN 1992, SOME RESULTS OF BY-CATCH MONITORING AND TESTS OF ACOUSTIC DETERRENTS TO PREVENT WHALE COLLISIONS IN FISHING GEAR.

A PRELIMINARY REPORT TO THE DEPARTMENT OF FISHERIES AND OCEANS CANADA - NEWFOUNDLAND REGION, AND THE NEWFOUNDLAND AND LABRADOR DEPARTMENT OF FISHERIES

by

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EXECUTIVE SUMMARY

There were several components to the by-catch program of the Whale Research Group during 1992

Entrapment Assistance Program: This is the fourteenth season that the Entrapment Assistance Program has operated. Assistance was provided to fishermen who incidentally caught cetaceans and other marine animals in their fishing gear. Animals were removed as quickly as possible to minimize gear damage and animal mortality. Marine mammals reported stranded were also examined.

Incidental catches of large whales were relatively low. The cod and capelin moratorium implemented served to reduce the number of entrapments in the latter part of the season. A total of 60 humpback whales were incidentally caught in fishing gear in 1992 with a mortality rate of 10%. Seven minke whales were reported entrapped in fishing gear; at least three of these animals died as a result of their entanglement. Other species reported caught included Atlantic white-sided dolphins, harbour porpoise, basking sharks and marine turtles. Ice entrapments and strandings of cetaceans were also reported.

Phone Survey of By-catch by Inshore Fishermen: Chairmen of fishermen's committees throughout Nfld./Lab. were telephoned to request information on their fishing effort, catches and by-catch during 1991. A similar survey was completed in 1989. Total catches were estimated by target species/by-catch ratios for our sample; total catches for fishing areas were obtained from DFO. Results indicate very high by-catches of harbour porpoise and harp seals. During 1989 we estimate that approximately 45,000 harp seals and 2,800 harbour porpoise were incidentally caught in inshore fishing operations.

Acoustic Deterrents to Prevent Collisions: In addition to tests on codtraps in Newfoundland, alarms were also tested on shark nets in Australia and sink groundfish gillnets off New England. Results on codtraps were similar to past years with alarms minimizing collisions. The cod moratorium disrupted tests so that fewer codtraps participated in the experiments. Shark nets in Australia inadvertently catch and kill several marine mammals including dugong, dolphins and humpback whales as well as marine turtles. In alarm protected nets no marine mammals were caught. Alarms, however, appeared to also effect shark catches. Harbour porpoise are caught accidentally in the New England sink gillnet fishery. No harbour porpoise were caught in alarm protected nets. Alarms also appeared to non-significantly lower catches of seabirds.

Survey of Humpback Whales: A first year of surveys of humpback whales in eastern Canadian waters was completed. A total of 717 individual humpbacks were photo-identified and 220 biopsies were obtained.

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INTRODUCTION

There were several different aspects to the cetacean by-catch program of the Whale Research Group. These include: (1) the Entrapment Assistance Program, (2) a survey of by-catch, (3) tests of acoustical deterrents to by-catch, (4) a population survey of humpback whales, and finally, (5) production of a video for fishermen.

This report will summarize work on each of these in turn.

(1) The Entrapment Assistance Program:

The Entrapment Assistance Program operated for its 14th year during 1992 to provide help to fishermen in removing large whales from their gear. Throughout the province the program has also served to respond to reports of stranded whales.

METHODS

Reports of fishing gear entrapments, ice entrapments and strandings of cetaceans and other marine animals were received via a 24 hour toll-free telephone line. Several agencies, including the Department of Fisheries and Oceans, the Newfoundland and Labrador Department of Fisheries, the Canadian Coast Guard and the Royal Canadian Mounted Police, referred reports of cetaceans to the entrapment and stranding network. A full description of the network is available in Lien (1992).

If a fisherman required assistance with an entrapped animal, a crew was sent to remove the animal as quickly as possible. Locally reliable authorities were contacted to investigate ice entrapment and stranding reports and supply additional information.

RESULTS

Humpback Whales:

As in previous years, humpback whales were the mostly frequently entrapped large whale. A listing of incidentally entrapped humpback whales in 1992 is shown in Table 1 and locations of the accidents are shown in Figure 1.

There were a total of 60 reported humpback whale entrapments in 1992. Seven (10.0%) of these animals died as a result of their entrapment. Twenty-five animals (42.4%) released themselves from the fishing gear before assistance arrived; this figure includes animals that were simply observed towing gear since a fishing gear collision of some type must have occurred previously. Twenty-three animals (39.0%) were released alive with only two of these animals

(3.4%) taking significant amounts of gear with them. The fates of four whales (6.8%) were unknown.

Over half (54.2%) of the entrapped humpbacks were caught during July, with most of the remaining accidents occurring in May, June, August and September (Figure 2). This year was different from previous years in that the northern cod fishery was closed in July. The effect of the moratorium was probably to reduce the number humpback entrapments after this date.

Humpbacks were commonly caught in codtraps, gillnets, lumpfish nets and salmon nets, with additional entrapments reported for capelin traps and crab pots (Figure 3).

Minkes:

A total of seven minke whales were incidentally entrapped in fishing gear in 1992 (Table 2). Two were observed towing gear and one was found dead with a rope on its tail. At least three of the minke whales (42.8%) died as a result of their entrapment; one was released alive. Minkes were caught in codtraps, flounder nets and gillnets. Most of the entrapments appeared to occur in July (57.1%).

Other Cetacean Entrapments:

One Atlantic white-sided dolphin and one harbour porpoise were reported entrapped in fishing gear in 1992 (Table 3). Both of these animals died as a result of their entrapment. In addition, two animals of unknown species collided with codtraps; both animals released themselves from the gear before being identified.

Strandings and Ice Entrapments of Cetaceans:

There were three ice entrapments of cetaceans in 1992, all occurring in early February in Trinity Bay (Table 4). These involved either white-beaked dolphins or harbour porpoise. Approximately half of the entrapped animals escaped while the others disappeared and were presumed dead.

There were 12 reported cetacean strandings in 1992 (Table 5). Nine of the strandings involved animals that had been dead for some time; the remaining three strandings involved live animals. A live humpback whale that came ashore at Lord's Cove could not be refloated and was humanely killed. A live juvenile blue whale and a harbour porpoise were returned to the water; their ultimate fates were not determined.

Sharks Reported:

Basking sharks were the most commonly reported sharks caught in fishing gear (Table 6). They were caught most often in codtraps.

Marine Turtle Sightings and Entrapments:

Four sightings of leatherback turtles were reported in 1992; three of these animals were entrapped in fishing gear while the fourth was observed "just swimming around" (Table 7). Two of the three animals died as a result of entrapment.

Figure 4 shows the number of humpback whales reported entrapped in inshore fishing gear between 1979-1992 and the outcome of those entrapments.

TABLES AND FIGURES

Table 1a. Humpback whales reported entrapped in fishing gear during 1992.

Date	Location	Type of gear	Comments
Jan 19	St. Thomas, C.B.	unknown	whale in gear, not found
Apr 26	Bellevue Beach, T.B.	gillnet	self release
May 18	Chance Cove, F.B.	codtrap	dead
May 20	Port du Grave	crab pots	dead
May 24	Bonavista	codtrap	released alive
May 25	Sunnyside, T.B.	codtrap	self release
May 26	Sunnyside, T.B.	gillnets	self release
May 27	Bellevue, T.B.	codtrap	self release
May 30	Dildo, T.B.	codtrap	released alive
June 4	Nippers Harbour	gillnet	self release, towing gear
June 5	Greens Harbour, T.B.	lumpfish net	released alive, towing gear
June 13	Southport, T.B.	gillnet	released alive
June 16	Harbour Grace	codtrap	released alive
June 16	Upper Island Cove	lumpfish net	self release, towing gear
June 19	Sally's Cove	codtrap	released alive
June 23	Chance Cove, T.B.	lumpfish net	unknown
June 25	White's Arm, Hare Bay	lumpfish net	self release, towing gear
June 27	L'Anse Amour	salmon net	self release
June 29	Port de Grave, C.B.	cod trap	released alive
July 1	Southern Harbour	unknown	self release
July 5	Sally's Cove	codtrap	released alive
July 6	Chance Cove	cod trap	dead
July 6	Red Island	gillnet	whale towing gear
July 7	Chance Cove	gillnet	released alive
July 7	Bay de Verde	gillnet	whale towing gear
July 8	Tors Cove	codtrap	self release
July 8	Harbour Grace	lumpfish net	unknown
July 9	Fox Cove, Labrador	salmon net	self release

July 10	Fox Cove, Labrador	salmon net	self release
July 13	Pt. Lance	codtrap	released alive
July 13	Red Harbour, P.B.	gillnet	self release
July 13	Bay Verte	capelin trap	dead
July 15	Queen's Cove	gillnet	whale towing gear
July 15	Pt. May	codtrap	dead
July 15	Fox Harbour	gillnets	released alive
July 16	Harrington Harbour	gillnet	released alive
July 16	Trinity	gillnet	whale towing gear
July 16	Cape Bonavista	codtrap	released alive
July 16	Lower Island Cove	unknown	whale towing gear
July 16	Terranceville	codtrap	self release
July 16	Long Beach, T.B.	unknown	unknown
July 19	Mobil Bay	gillnet	whale towing gear
July 20	Burin	gillnet	released alive
July 20	Jackson's Cove	capelin trap	released alive
July 22	Port aux Basques	unknown	whale towing gear
July 22	Burin	codtrap	dead
July 24	St. Anthony	salmon net	towed gear off
July 25	Main Brook	gillnet	released alive
July 25	Green Island, Lab.	gillnet	released alive
July 30	Cape Broyle	codtrap	released alive
July 30	St. Thomas, C.B.	unknown	towing moorings, released
Aug 1	Pt. Lance	gillnet	partially released
Aug 8	Tors Cove	unknown	ropes on pectoral fins
Aug 9	Jackson's Arm	capelin trap	released alive
Aug 10	Heart's Desire, T.B.	gillnets	released alive
Aug 12	Prouston, P.B.	gillnet	towed gear off
Aug 15	Burin	gillnet	released alive
Aug 18	Burin	lumpnet	released alive
Sept 1	Rocky Harbour	unknown	whale towing ball
Sept 5	Lanse au Loup	unknown	whale towing gear

Table 2. Minke whales reported entrapped in fishing gear during 1992.

Date	Location	Type of gear	Comments
June 29	Rocky Harbour	unknown	found dead with rope on tail
July 6	Bay Bulls	gillnet	whale towing gear
July 16	Random Island	gillnet	whale towing gear
July 16	Old Perlican, T.B.	gillnet	released alive
July 22	Lord's Cove	codtrap	dead
Aug 8	Little Bell Island	flounder nets	dead
Aug 15	Little Harbour	gillnets	dead

Table 3. Other cetacean species reported entrapped in fishing gear during 1992.

Date	Location	Species	Type of gear	Comments
June 14	St. Mary's	unknown	codtrap	self release
June 27	Terra Nova	w.s.d.	"nets"	dead
June 26	Southern Harbour	harbour porp.	"nets"	dead
July 5	Gaskiers, S.M.B.	unknown	codtrap	self release

Table 4. Ice entrapments of cetacean species during 1992.

Date	Location	Comments
Feb 2	Turk's Cove	8-12 dolphins, all escaped
Feb 5	Heart's Delight	4 white-beaked dolphins, presumed dead
Feb 7	Dildo, T.B.	5 w.b.d., 2 harbour porp's, presumed dead

Table 5. Strandings of cetacean species during 1992.

Date	Location	Species	Comments
March	Rose Blanche	blue whale	dead
Apr 16	Crabbes River	2 blue whales	dead several weeks
Apr 20	Off Cape Ray	blue whale	dead
May 8	Norris Point	humpback (?)	dead, old
May 11	Fortune	humpback (?)	dead
May 16	Stephenville	humpback (?)	dead, towed off
June 30	Carbonear, C.B.	harbour porpoise	reported trying to strand
Sept 29	Brooklyn, B.B.	blue whale	towed off alive
July 1	Venzins Island, Lab.	narwhal	found floating, old
Aug 8	Lord's Cove	humpback	live stranding, 3 animals 1 killed
Aug 10	Labrador	narwhal (?)	dead

Table 6. Incidental shark catches reported during 1992.

Date	Location	Species	Gear type
June 24	Baine Harbour	basking shark	codtrap
June 25	Little Bay East	basking shark	unknown
June 25	Harbour Grace	basking shark	lumpfish net
June 29	Lawn	basking shark	codtrap
July 2	Leading Tickles	12' shark (spp ?)	unknown
July 2	Heart's Desire	2 toothed sharks (?)	unknown
July 6	Carbonear	basking shark	unknown
July 22	Burin	basking shark	codtrap
Aug 5	Kelligrews	basking shark	unknown
Sept 15	Rose Blanche	basking shark	gillnet
Sept 25	Port Saunders	basking shark	unknown

Table 7. Marine turtle sightings and entrapments during 1992.

Date	Location	Gear type	Comments
July 8	Lord's Cove	unknown	released alive
Aug 14	Point Lance	crab pots	dead
Sept 22	Wreck Cove	gillnet	dead
Sept 10	St. Mary's Bay	none	"just swimming around"

(2) Phone Survey of By-Catch during 1991:

Reports of fisheries by-catches are obtained from fishermen by various methods (Lien et al, 1992a) and often presented without evaluating the reliability of the reports. In cooperation with the Department of Fisheries and Oceans and the Canadian Wildlife Service we developed a method of obtaining estimates of small cetacean and seal by-catch fishermen in Newfoundland and Labrador. This survey was first done for 1989.

During 1992 fishermen were phoned and questioned about incidental catches during 1991.

To estimate total by-catch, a "productivity ratio" was made. This was based on target species fish catches by the fishermen in our phone sample compared to overall fish catches reported in their fishery statistical area. Total by-catch in a fishery statistical area was then estimated based on this ratio for each statistical area. Total catches were estimated for each gear type by adding together the estimates for all Nfld./Lab. fishery statistical areas.

METHODS

Three hundred and fifty fishermen from Newfoundland and Labrador were phoned in May-June, 1992 and asked about incidental catches during the immediately previous (1991) fishing season. Fishermen were selected randomly from a list of chairmen of local "fishermens' committees"; such individuals are typically among the most successful fishermen and are active in organizing local fishery-related activities.

Each fisherman was asked to describe the types of gear they used in 1989 and for each gear type to summarize information on fishing effort (amount used and duration of fishing). Questions were asked on fish catches and on incidental catches of non-teleost species (cetaceans, pinnipeds, birds, sharks and turtles) in each type of gear. The various local names fishermen used for non-target species were collapsed into unified categories: "seals", "small cetaceans", "whales" and "seabirds".

To estimate total by-catch, a "productivity ratio" was constructed which compared total target fish species catches by the fishermen interviewed to total fish catches by all fishermen in their fishery statistical area (DFO, Economics Branch). Total by-catch in a fishery statistical area were then estimated by this ratio. Total fish catch data were not available for the islands west coast or for lumpfish gillnets.

RESULTS

Estimated by-catch for 1991 was about 2,800 porpoises and dolphins. Most of these were harbour porpoise, however, fishermen during interviews often were not clear as to species. About 45,000 seals are estimated as by-catch. Again, fishermen often were not certain about species, but we believe most were harp seals. Seabirds caught include murres, puffins and shearwaters primarly; about 22,000 are estimated caught (Table 8).

Table 8: Estimated total 1991 by-catch of cetaceans, seals and sea birds.

Gear Type	Marine Area (DFO)	Target fish spp. (tons)	Estimated by-catch				
			Whales	Dolphins	Seals	Seabirds	Sharks
Codtrap	7c	21,050	225	38	173	3064	8
	4	0	0	0	0	0	0
	5	7,016	102	9	46	65	9
	8,9	1,883	68	29	52	361	6
	10,11,12	18	0	0	0	0	0
	all areas	29,967	395	76	271	3,489	22
Gillnets	7c	2,882	4	242	8,786	746	57
	4	60	0	60	1,920	240	0
	5	3,575	118	251	6,205	12,483	59
	8,9	7,786	80	2,213	27,811	5,120	1,013
	10,11,12	0	0	0	0	0	0
	all areas	14,303	202	2,766	44,722	18,589	1,129

(3) Tests of Acoustical Deterrents:

Adding noise to codtraps appears to be a help in minimizing by-catch of cetaceans (Lien et al, 1990a) There were three field tests of acoustical deterrents on fishing gear during 1992 including: (1) codtraps in Newfoundland, (2) shark meshes in Queensland, Australia, and (3) sink groundfish gillnets off New Hampshire. Tests this year, (2 & 3), attempted to extend acoustic deterrent technology developed for codtraps to gillnets.

Newfoundland Codtrap:

In 1991, tests using alarms (Guigne et al, 1991a; 1991b) to protect codtraps indicated they could minimize the number of whale collisions which occurred (Lien et al, 1992b). Tests planned for 1992 were to investigate the number of alarms required to achieve maximum protection for the gear. However, this plan was disrupted due to the northern cod moratorium and 1992 tests simply replicated the 1991 experiment.

METHODS

Fishermen were asked to provide information on their cod traps and the berths where the traps were set. They were registered for whale alarm tests only if their berths had regular whale collisions over the past three years. Only these high-risk berths, approximately 10% of available berths in an area, were included in the experiment. Registered high-risk traps in an area were randomly assigned to either alarm (experimental) or no alarm (control) groups. Fishermen in all communities were told that the experiment in their community would proceed only if whales were plentiful.

Commonly, fishermen selected for the experiment had two high-risk berths. When this occurred the fisherman was given the opportunity to designate on which berth he would use the alarms. In the past, fishermen typically chose to protect their most risky and best-fishing berth, regardless of our experimental assignment. Systematically permitting this choice insured that the experiment was biased against alarms, that is, fishermen always chose to put alarm devices on the traps they felt were at greatest risk.

Fishermen participating in the experiment began monitoring cod trap berths in early spring, as soon as was practical. The northern cod moratorium precluded many fishermen who were initially involved in the experiment from deploying their gear. We scrambled, and managed to recruit some additional fishermen. However, the total effort of both experimental and control traps was low.

RESULTS

Only 586 experimental trap days and 702 control trap days occurred due to the fishery moratorium which closed trap fishing in many areas. A total of 3 collisions occurred with experimental traps; 15 occurred with control

traps. Probability of a collision per trap day was .005 on experimental traps and .02 on control traps (Table 9).

TABLES

Table 9: Summary of alarm tests on codtraps in Nfld./Lab. - 1992.

Type of trap	Experimental	Control
N of fishermen	22	13
N traps fished	24	23
Days fished	586	702
N of Collisions	3	15
% of traps hit	12.5	22.0
P of collision/trap day	.005	.02
Total fish caught	385,500	496,000
Fish/trap day	665	706

Tests of Acoustical Deterrents on Shark Meshes:

To protect swimmers at beaches from large sharks, a program of shark meshing was begun by the Queensland Government in 1964. Along the eastern coast of Australia, humpback whales migrate in near shore waters between feeding and calving areas. Historically there are no recorded entrapments of humpbacks in shark nets, but during the fall of 1992 four animals were known to collide with the nets and become entrapped (Baden Lane, pers. comm.). Entrapments of dugongs in shark nets has been observed throughout the period of the shark meshing program. Such mortality, along with that from commercial fisheries, may significantly impact local populations. Other small cetaceans are also occasionally taken in the shark nets.

If these cetacean entrapments, like those of feeding humpbacks in Newfoundland are accidents, add-on sound devices which make the net more noticeable may reduce entanglement. The purpose of this investigation was to assess the effectiveness of adding alarms to shark meshes to reduce their capture of cetaceans.

METHODS

The acoustical alarm developed to minimize humpback collisions with codtraps (Guigne et al, 1991a; 1991b) was used to add sounds to 22 in. mesh shark gillnets. The housing was adapted so that it could be placed on the head rope. Alarms were made negatively buoyant by adding .8 kg of lead weights around the battery port. The alarm was lowered into the net on a 2 m 3/8 in. poly rope, and attached to the head rope by an O clip.

Nets off Surfers Paradise on the Gold Coast and off Caines were selected for testing.

In Surfers Paradise. three nets were fitted with no alarms; 3 with 9 alarms at 25 m intervals; 3 with 5 alarms at 50 m intervals. Nets selected for alarms were nets that had previously caught humpback whales.

Nets off Caines typically began catching dugongs in mid-October through December; 3-6 animals were typically caught each year during this period in the 5 shark nets which were fished in the area. Most were taken in a single net at one location. Three 60 m nets in the most likely locations for catching dugongs were fitted with 10 alarms each; two other nets were fished with no alarms.

RESULTS

For nets in Cairns the overall shark catch during the period that whale alarms were attached to nets was significantly lower than the 10 year average shark catch for that period and below the 10 year trend in shark catches for the period. Fewer sharks were caught in nets fitted with whale alarms compared to control nets, but numbers were too low to be conclusive. No dugong were taken in the nets.

At the Gold Coast, the overall shark catch during the period that whale alarms were attached to nets was significantly lower than the 10 year average shark catch for that period. However, the catch was not significantly different statistically from the 10 year trend in catches. No humpbacks were taken in either control or experimental nets. No small cetacean by-catch occurred in alarm nets.

As the fishing effort for this experiment was low, and numbers of by-catch and target species caught were small no conclusion is possible about the effectiveness of alarms in this application until further data analysis is completed and additional experimentation is done.

Acoustical Deterrents with Groundfish Sink Gillnets:

The entrapments of small cetaceans in gillnets is a common phenomena world-wide (Perrin and Donavan, 1992). In the western North Atlantic, off Canada and the United States, the by-catch of harbour porpoise is viewed as a serious problem (Marine Mammals Investigation, 1992; Fontaine et al, 1992; Lien et al, 1990b; Gaskin, 1984). Factors which lead to these entrapments are poorly understood. However, if entrapments of harbour porpoise in fishing gear are the result of accidents, add-on sound devices which make the net acoustically more noticeable may reduce entanglement.

METHODS

Acoustical alarms developed to minimize humpback whale collisions with codtraps (Lien et al, 1992a; Guigne et al., 1991a; 1991b) were used to add sounds to groundfish gillnets. The housing of the codtrap alarm was adapted so that it could be placed on the head rope of the nets. Alarms were made neutrally buoyant by adding .6 kg of chain around the battery port and then bagged in plastic bait mesh to minimize tangling in the webs. They were initially attached to the gillnet head rope by a single 3/8 in. poly rope, and a heavy swordfish line clip. This proved difficult to use and resulted in the loss of many alarms during the first two days of the experiment. The swordfish clips were therefore removed and replaced with heavy stainless steel clips.

Gillnet fishermen from the Portsmouth Fishermen's Cooperative, who reported frequent harbour porpoise catches, volunteered to place alarms on groundfish gillnets. Initially, each fishermen was asked to place alarms on one string of 10 nets which were fished in 30-50 ftm. of water. They were asked to fish experimental nets in the areas where they were catching, or believed they would catch, the most harbour porpoise. Other strings, used by these fishermen, served as controls.

Observers from the NMFS Sea Sampling Program, operated by Manomet Bird Observatory, collected data from each of the four fishing operations each fishing day. They recorded catches of cod, pollack and marine mammals in relation to the alarm positions. The number of individual fish caught in alarm and regular nets were recorded to insure that nets fitted with alarms were fishing properly. Additionally, particular attention was paid to seal-damaged fish in nets.

RESULTS

Control nets, without alarms, were fished a total of 5,562 days. Experimental nets, with alarms, were fished for a total of 2,468 days. Fishermen had difficulties affixing the alarms to the nets; this resulted in the loss of 20% of the alarms during the experiment. Pollock and cod catches were somewhat lower in alarm nets but not significantly so. Only a few harbour seals were caught during the fishing period; there appeared to be more seal damage to fish in alarm nets. There were more instances of bird catches and more individual birds caught in control nets than alarm protected nets. A total of 10 harbour porpoise were caught in control nets; 0 were caught in alarm protected nets (Table 10 & 11).

TABLES

Fishing Condition	Total Days of Fishing Effort	Catches				
		N Pollock	N Cod	N Seals	N Porpoise	N Birds
Control Nets N nets = 275	5,562	6,505	2,290	3	10	127
Experimental Nets N nets = 94	2,468	1,108	693	1	0	18

Table 10: Effort and catches in groundfish gillnets with whale alarms and in control nets fished off Portsmouth, N.H. in November/December, 1992.

Fishing Condition		Average N Individuals Caught per net day				
		Pollock	Cod	Seals	Porpoise	Birds
Control Nets	Mean	1.4800	0.4670	0.0008	0.0024	0.0236
	S.D.	1.615	0.997	0.0081	0.0151	0.1025
Experimental Nets	Mean	1.1780	0.5750	0.0368	0.0000	0.0170
	S.D.	0.996	0.261	0.0083	0.0000	0.0851

Table 11: Average number of individual animals caught per net day (CPUE) in groundfish gillnets with whale alarms and in control nets fished off Portsmouth, N.H. in November/December, 1992. Calculation of catch per effort for each string was made each time it was hauled. CPUE is the average of these.

(4) A Photo-identification Census of Humpback Whales:

Humpback whale collisions with inshore fishing gear have been increasing over the past several years (see Figure 4). It is possible that recovery of this population has ocurred over the past few years. Although the humpback off North America is a relatively well studied whale species, there is inadequate current information on its numbers.

The purpose of this work was to assess the present state of humpback whale populations in the NW Atlantic, especially eastern Canada, based on a mark/recapture survey using photo-identification of individual whales. Biopsies, to examine genetic relationships, were also taken. This work was conducted as part of a coordinated survey of humpbacks throughout the North Atlantic, Project YoNAH.

METHODS

The sampling strategy was developed in consultation with Fisheries and Oceans survey designers.

Initially, ocean waters off Eastern Canada were divided into convenient sections based on location of interested workers or availability of survey vessels. These were: 1. inshore Newfoundland; 2. offshore Newfoundland; 3. inshore and offshore Labrador; 4. Gulf of St. Lawrence, and 5. Scotia/Fundy. Because of reports of sightings during the summer of 1992 an additional section was added - 6. the Canadian Arctic. Effort was then assigned to each area based on informed estimates of the number of humpbacks likely to be encountered in a section in a "typical" year (Table 12).

Survey effort actually accomplished was modified from planned activities by several factors: 1. the tardiness of actual receipt of funds and/or authorization to spend them; 2. vessel availability; and 3. unique distributions of humpbacks off Eastern Canada.

RESULTS

Inshore Newfoundland:

YoNAH cruises were operated on the NE Coast of Newfoundland from June through August as weather allowed. A South Coast cruise was conducted in July and August. Humpback distribution was extremely patchy.

A total of 302 photo-identifications and 68 biopsies were obtained.

Offshore Newfoundland:

We planned the 1992 survey so that offshore Newfoundland waters would be covered by DFO research vessels. However, permission to use the vessels

was not received until August, 1992. Fall cruises were cancelled due to budget cuts.

Although this meant that offshore Newfoundland was completely unsampled, fishery observers and other opportunistic reports suggest that few humpbacks were seen on the Grand Banks this year, perhaps a response to altered bait availability.

Inshore and Offshore Labrador:

Reports of humpbacks in offshore Labrador also suggested extremely low abundance in offshore Labrador, especially Hamilton Bank. This, and the unavailability of DFO research vessels, resulted in no survey effort in offshore Labrador.

Survey work in inshore Labrador was inhibited somewhat by unavailability of gas and supplies. With the fishery moratorium some of the coastal fishing settlements simply "moved to town".

A total of 203 humpbacks were photo-identified and 77 were biopsied in inshore Labrador.

Gulf of St. Lawrence:

The Gulf survey consisted of a single trip between Mingan and the Straits of Belle Isle and opportunistic work around Mingan. A total of 130 animals were photo-identified and 60 biopsies were obtained, most in the Straits of Belle Isle off Southern Labrador.

Eastern Bay of Fundy (N.S. & N.B.):

A total of 80 photo-identifications and 25 biopsies were obtained.

Canadian Arctic:

No YoNAH survey work was carried on in the Canadian Arctic. However, workers from our lab found that hundreds of humpbacks summered near the edge of pack ice off Baffin Island this year. This is an unexpected, perhaps new, distribution and may reflect anomalous bait conditions off Eastern Canada in 1992. It could account for the somewhat lower than expected numbers found in other sections.

Total Results:

A total of 717 photo-identifications and 220 biopsies were obtained for Eastern Canada. These will be used as the basic matching catalogue for additional survey work to be conducted in the summer of 1993.

TABLES

Table 12: Estimated numbers of humpback whales in waters off eastern Canada and boat days survey effort.

Area	Est N	% Pop	Boat Days Effort (1) Trip	Hot Spots	Working	Contract	% Effort
Nfld. Inshore	1,500	32	31	49	80	160	34
St. John's-St. Anthony	600	13	10	20	30	60	15
St. John's-St. Pierre	500	11	8	15	23	46	10
St. Pierre-Port au Basq.	200	4	5	7	12	24	5
Port au Basq. St. Anthony	200	4	8	7	15	30	6
Labrador	1,500	32	21	36	53	151*	31
Straits	300	6	3	7	10	20	4
So. Lab.	300	6	5	5	10	20	4
Mid. Lab.	200	4	2	4	6	12	3
Hamilton Bk.	300	6	3	7	10	20	4
Gulf/Straits	200	4	4	5	9	18	4
Funk Is. Bk.	200	4	4	5	9	18	4
Grand Banks	1,000	21	30	30	60	90**	19
St. Pierre Bk.	300	6	3	5	8	16	4
SE Shoal	400	9	5	9	14	28	6
Grand Banks	300	6	3	5	8	16	4
Quebec	300	6	8	4	12	24	5
N.S.	200	4	9	3	12	24	5

N.S./N.B.	**200**	**4**	**9**	**3**	**12**	**24**	**5**

* Includes mother ship charter of 45 days
** Includes mother ship charter of 30 days

(5) Educational Video for Fishermen:

A 24 min. video entitled "Trouble with Whales: Help for the Fisherman" was produced to instruct fishermen on methods of releasing whales from their nets safely and to inform them about research on acoustical deterrents. Educational Television at Memorial University is presently preparing copies of the video for DFO offices and Newfoundland Public Libraries. Copies of the video may be obtained at these facilities or from ETV. It will be shown on CBC television in May, 1993.

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