

### SPECIES KEPT AND RELEASED TRIP RECORD

Date	Div.	Set #	Swordfish				Bluefin				Bigeye				Yellowfin				Atlantic White Marlin		Blue Shark				
			Kept	Released Alive	Released Dead	Kept	Released Alive	Released Dead	Kept	Released Alive	Released Dead	Kept	Released Alive	Released Dead	Kept	Released Alive	Released Dead	Kept	Released Alive	Released Dead	Kept	Released Alive	Released Dead		
97/08/11	5z	1	# 4	1	1																		8	23	16
			Kg 141	9	14																		256	920	575
97/08/12	5z	2	# 15				1																4	17	7
			Kg 500			34																	136	594	191
97/08/12	5z	3	# 11	2	3																		2	12	2
			Kg 473	22	35																		60	395	65
97/08/14	4x	4	# 10	1	2		1																3	9	3
			Kg 411	15	30		39																90	270	90
97/08/15	4x	5	# 14	1																			1	11	2
			Kg 693	27																			30	330	60
97/08/16	4x	6	# 4																						
			Kg 166																						
97/08/17	4x	7	# 1		1																		1		
			Kg 136		14																		20	18	
97/08/18	5z	8	# 11				2																4	71	35
			Kg 639				227																120	2130	1050
97/08/19	5z	9	# 11		2																		2	80	29
			Kg 532		27																		60	2400	870
97/08/20	5z	10	# 1	1																			5	1	35
			Kg 36	12																			150	30	750
97/08/22	5z	11	# 11		2																		1	4	3
			Kg 577		18																		23	27	20
			# 413	6	11																				
			Kg 4304	85	138																				
TRIP																									
TOTALS																									

Figure 8: Sample from an observer report of species kept and discarded by a longline vessel in 1997. On this trip, 15 species were caught: 3 species of tuna, 4 species of shark, 6 species of pelagic fish (including swordfish) and marine turtles (six individuals caught and released alive, species not identified). One hundred and fifty-six swordfish were kept, 12 were released alive and 19 were discarded dead. Two hundred and eighty-seven blue sharks were released alive, 29 were kept, and 148 blue-sharks were discarded dead.

If there was no longlining, you would have individual harpooners because you don't need to have money [to harpoon]. Longlining a dozen swordfish wouldn't pay for nothing. When I was sticking with the old man there was 100-150 sticking boats on the banks. - Respondent #36

One of these fishermen thought the fishery both harpooning and longlining should be stopped to allow the stocks to recover: "I can do without the sport for two or three years when I think of our children coming up, not seeing a swordfish ..." (Respondent #17).

Another criticism of longlining is that it tends to encourage large-scale operations, thereby excluding smaller enterprises from the fishery.

No, I can't say longlining is sustainable, unless you limit the number of boats, and I don't agree with that. A young man can't afford half a million dollars for a license... Now who's he going to fish for? The millionaire that can afford the license. - Respondent #17

I wouldn't mind seeing it come back so smaller boats could go out.. - Respondent #2

While some questioned the viability of a modern harpoon fishery (Respondent #31, 20), others interviewed pointed out that the harpoon industry did provide a reliable source of income in the past. Small-scale operations could employ more people and the price of swordfish might increase because of decreased supply (Respondent #36, 14).

## 8.2 Climate

*We all know there's a lot of swordfish caught on that trawl racket, but the temperature of the water's got a lot to do with it, temperature has a lot to do with sticking [harpooning] and trawling. - Respondent #30*

It is common knowledge amongst swordfish fishermen that the distribution of swordfish in Canadian waters is highly dependent on temperature. Harpooners look for water that is approximately 60°F or 15°C, where fish are known to come to the surface. The harpooners also need a number of clear, calm days or "greasers" in the summertime so that fish can be spotted when they fin.

Longliners try to target "the edge" or the transition between warm water of the Gulf Stream and the colder Scotian Shelf water. Setting gear in water that is too warm results in catching smaller fish. Setting in water that is too cold can result in getting "sharked up." Because swordfish distribution is highly dependent on temperature, it seems probable that changes in the path of the Gulf Stream and in ocean temperatures could produce changes in the distribution and number of swordfish observed off of our coasts.

Fifteen of the fishermen interviewed thought that changes in the abundance of swordfish off of Cape Breton could be caused by changes in climate:

There used to be better weather then; you'd wish for a blowy day. - Respondent #14

The weather, that's bad too, we haven't got calm days for 8 to 10 years...last year there wasn't a day when you could go look for them – Respondent #13

One hypothesis is that the water warms up too quickly off of Cape Breton for the fish to fin; swordfish remain in the area, but are too deep for the traditional harpoon fishermen to see them (Respondent #7). This hypothesis is supported by the fact that longliners continue to target the banks off of Cape Breton (Stone and Porter, 1999). Others noted that coastal areas don't seem to get as cold in the winter as they remember. Another change noticed by two retired Cape Breton fishermen was that there were fewer south or southeast gales during the summertime than in the past:

We don't get no storms. We used to get storms every week, we used to have to haul up the boats, it's be blowing southeast or south,... My goddy b'y, we never had a storm yet this summer. – Respondent #30

Others interviewed were skeptical that climate and ocean temperatures had changed consistently off of Cape Breton for the past 35 to 45 years:

All them years there was plenty of them, and every year, the temperature must have been changing then too. - Respondent #13

If they're not taking this route [because of climate change], then they've been doing it for a long time – Respondent #2

Years ago, there was more calm days ... It don't seem like we get them now. But then, we'd get 15-20 knots of wind and we'd still get fish, when it was hardly fit to get in a dory and play them. No, I don't think they're [i.e. the swordfish] there. – Respondent #16

In light of these varied and often conflicting reports, a brief survey of the existing scientific observations of ocean climate on the Scotian Shelf is included here. Climate in the North Atlantic is believed to be highly dependent on the atmospheric pressure gradient between high latitudes (low pressure) and low latitudes (high pressure; Drinkwater et al. 1999). Fluctuations in the pressure gradient are referred to as the North Atlantic Oscillation (NAO). When the pressure difference between high and low latitudes is great, oceanographers predict that there will be increased westerly winds and that the Gulf Stream will tend to flow further northward. Water temperatures on the Scotian Shelf also tends to be influenced by cold, Arctic water flowing southward from the Gulf of St Lawrence and the south coast of Newfoundland. The amount of this water flowing onto the Scotian Shelf is also influenced by the NAO. During periods when the pressure gradient is weak, there is a greater flow of Arctic water onto the Scotian Shelf because atmospheric forcing of currents in a northward direction is weak (Drinkwater, pers. comm.).

Although accurate records of the path of the Gulf Stream have only been kept since the 1980's, Figure 9 shows that there was a tendency for the Gulf Stream to be further south from the late 1970's to the early 1980's (Figure 9). From 1984 onward, there has been a northward movement of the Gulf Stream. However, the data available do not indicate any consistent movement in the path of the Gulf Stream over the past 30 years.

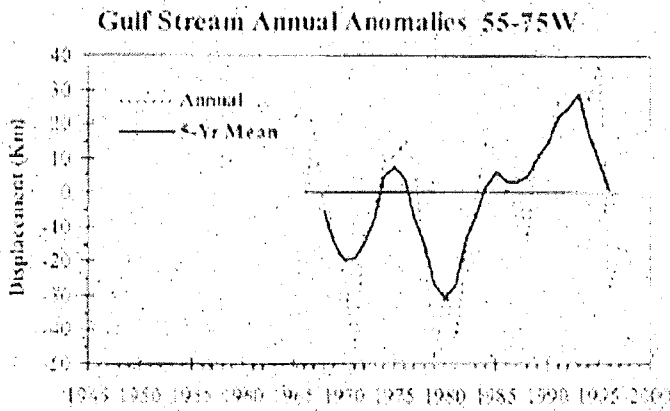
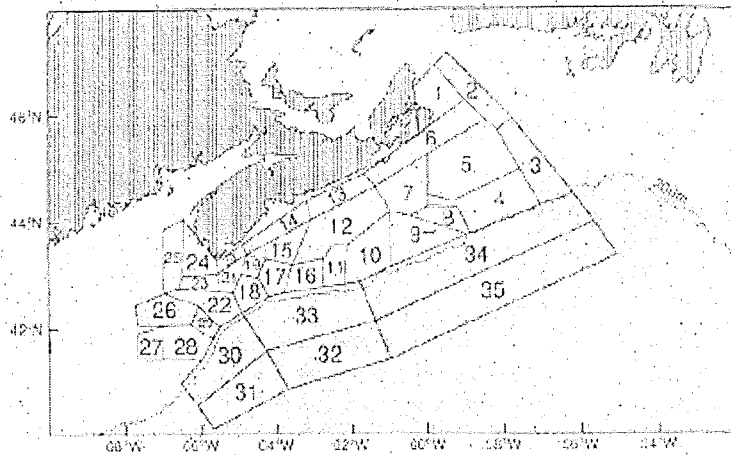


Figure 9: Displacement of the Gulf Stream front relative to its average position (55°-75°W) for the years 1973-1997. The dashed line indicates the difference in the annual position of the front relative to the average position. The solid line indicates the difference between the five-year average position of the front relative to the average position. (Source: Drinkwater et al. 1999, p. 72)

Surveys of water temperature on the Scotian Shelf show that water temperatures were above normal throughout the water column during the 50's, very cold in the 60's, with a gradual increase in temperature up until the late 80's. Figure 11 shows this trend in temperature for the Emerald Basin only (Area 12 in Figure 10), but it is believed that this trend was observed throughout most of the Scotian Shelf, from the Laurentian Channel to New York Bight, and was caused by an influx of cold Labrador sea water during this period of low atmospheric forcing in the North Atlantic.

Figure 10: Areas in which monthly means of water temperature were estimated for oceanographic assessments (Source: Drinkwater et al. 1999, p. 60)



**Emerald Basin 250 m**

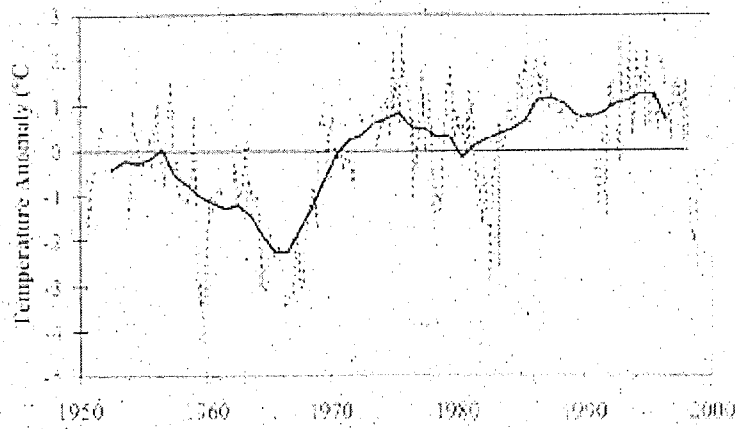


Figure 11: Difference between the monthly (dashed line) and five year (solid line) average water temperature and the long-term average temperature calculated for the years 1961-1990. This graph indicates data collected at 250 metres depth in the Emerald Basin (Area 12 in Figure 10; Source: Drinkwater et al. 1999, p. 59)

However, on the Misaine Bank (Area 5 in Figure 10) and Sydney Bight (Area 1), a slightly different pattern in water temperature was observed. Whereas the water became colder in the 1960's this trend was not as dramatic as that observed on other areas of the Scotian Shelf. In the mid-1980's, water in this area cooled off and remained cooler than normal until 1999 (Figure 12).

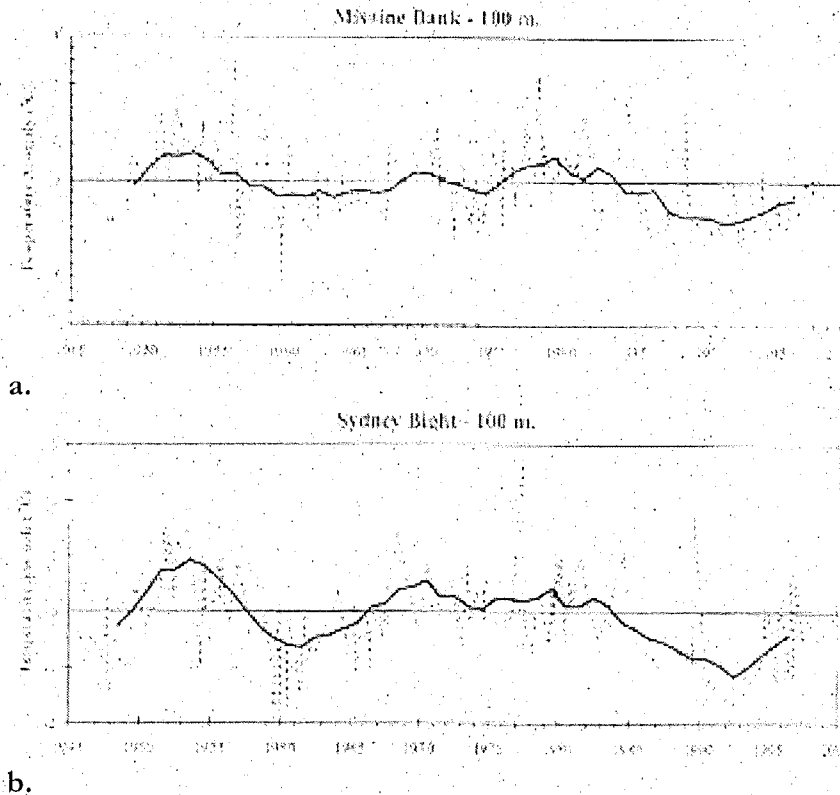


Figure 12: Difference between the monthly (dashed line) and five year (solid line) average water temperature and the long-term average temperature calculated for the years 1961-1990. a. Water temperature anomalies at 100 m depth on the Misaine Bank (Area 5 in Figure 10). b. Water temperature anomalies at 100 metres depth in Sydney Bight (Area 1 in Figure 10); Source: Drinkwater et al. 1999, pp. 61-62)

The decline in the fishery off of Cape Breton during the late 50's and early 60's does seem to coincide with a cooling trend in the water column. However, the decline in temperature off of Cape Breton was less severe than the rest of the Scotian Shelf, where catches of swordfish were increasing from 1945 to the early 1960's. Analysis of the temperature of the water off of Cape Breton (Area 6 in Figure 10) showed no consistent trend over the last fifty years (Ken Drinkwater, pers. comm).

A complete analysis of climate and weather patterns off of Cape Breton and its relationship with the number of fish landed was beyond the scope of this study. However, the lack of a consistent change in ocean temperatures over time suggests that factors other than climate may have been influencing swordfish abundance.

### 8.3 Breaking Up the Schools

*They were out there on the Banks, catchin' 'em up. - Respondent #13*

*I don't believe the younger people will see them back yet...they're getting fished outside of here. - Respondent #1*

Landing records before the advent of 1960 indicate that catches off of Cape Breton were declining before longlining began (Figure 7). From 1945 onward, there was an increase in the number of larger boats targeting the edges of the fishing banks from Block Island, Rhode Island, to the Grand Banks (Tibbo et al. 1961). This lends credence to the hypothesis put forward by several fishermen that fishing offshore can cause declines in inshore catches, either by "breaking up the schools" or by decreasing abundance so that fish were no longer seen at the periphery of their migratory route.

In general, fishermen who cited offshore fishing effort as the cause of declines in inshore catches were referring to longlining. However, the decline witnessed before Canadian longlining began could have been due to over-fishing in the harpoon fishery. This hypothesis is contrary to the belief of many harpoon fishermen, who stated that "you could never clean them up harpooning... they made their own law, they had to come up so we could see them... the fish made their own quota" (Respondent #37).

It makes sense that targeting "brood stock" females could cause dramatic declines in the reproductive potential of the entire population. If too much effort was exerted by the harpoon fishery, it may have caused declines in stock abundance. Many fishermen noted that fish on George's and Brown's declined after the mercury ban of the 1970's, when both harpooners using spotter planes and longliners were targeting these fish in an essentially unregulated fishery. Seven fishermen believed that the decline in the abundance of fish off of Georges and Brown's was due to overfishing:

Thirteen boats and 15 planes, they fished that hole in the back of Browns...there hasn't been 15 fish stuck up there in 15 years. - Respondent #36

The harpooners fished it out. ...When they were fishing using spotter planes, they caught more fishing a day than longliners would...In a deep hole off of Georges [Bank] where they fished with a spotter plane, they cleaned them out...they've never seen them there since. - Respondent #20.

When we had spotter planes, we were as bad as the longliners. - Respondent #21

The change in abundance of fish on Georges and Browns illustrates that neither type of fishing is completely benign. Both harpoon and longlining could be responsible for decreasing the number of fish seen inshore. Both methods of fishing can have a negative impact on swordfish stock abundance.

More recently, overfishing in the Emerald Basin is believed to be responsible for causing declines of swordfish in the area. The Emerald Basin, off of Sambro (Figure 1; Area 12, Figure 10), was known as a place where large, "brood stock" females were found. The area was traditionally known as a "sticking place," and longliners did not fish there. Approximately four or five years ago, longliners fished in the basin, bringing in large catches of 300 to 400 pound fish. Apparently, catches were so huge that there was a glut in the market: "they would keep bringing them in, even though they couldn't get nothing for them" (Respondent #39). Since this incident, longliners have voluntarily agreed that this area will be closed to longlining in the fall of the year (Figure 2). Harpooners in the area

noted that the area was “cleaned out” and few fish had been stuck there since it was over-fished (Respondents #38,39,9).

There is a pattern of over-fishing in one area having long-term implications for fish abundance in future years. If an area is over-fished, there are local declines in abundance that may persist for many years. This suggests that fish return to the same areas year after year. This hypothesis must be modified slightly to account for the fact that fish of different sizes are found in different areas, implying that as fish grow, they change their migratory path. Thus, while the fish in a particular area may not be the same individuals from year to year, perhaps the prevailing oceanographic conditions in an area cause the same size of fish to be found there from year to year. If an area is “fished out,” fish of the size or age class that would tend to return to that area would be removed from the population. It would take time for a new group of fish to become return visitors to the area.

## 8.4 Foreign Fishing Effort

*If Canada thinks we can replenish the swordfishery by stopping us [longliners], then good – but they are only going to put a bunch of Nova Scotians out of work. – Respondent #5*

*I don't know what we took, but it's a drop in the bucket compared with what other countries done. – Respondent #16*

Today, Canada catches 10% of the ICCAT quota for North Atlantic swordfish. Because of our relatively low contribution to the international fishing effort on this stock, some fishermen thought it was futile to change Canada's current fishing practices, and that for the stocks to recover, there must be changes in the way the ICCAT rules are enforced by other nations. One fisherman remarked that “the fish are being caught up where they are born” in southern latitudes and, unless something was done to prevent this, it was futile to impose restrictions on Canadian fishermen (Respondent #3).

Canadian swordfish fishermen also reported feeling frustrated by the fact that they are “regulated to the teeth” by dockside monitoring, size limits, observer coverage, and time-area closures while foreign fishing vessels operating outside the 200 mile limit are essentially unregulated.

The lack of monitoring and enforcement of the ICCAT rules and the number of non-ICCAT fishing vessels targeting large pelagic species is a major obstacle to the recovery of the swordfish stocks. One fisherman reported that he had observed one of these large vessels hauling back their gear: “they hauled back as fast as we could steam...their working place [area where landed fish are cleaned and sorted] was two or three times the size of our boat...they had eight feet of solid fish piled up by their rails and along the edge of the rails was shark's fins” (Respondent #29). Many fishermen expressed frustration that other nations could be fishing in such a reckless fashion while Canadian fishermen are asked to foot the bill for increased observer coverage and monitoring.

## 8.5 Changes in Bait Pattern

*That's what's hurt our fishery, it's people who fished the bait chain up. – Respondent #7*

*There's no fish because the habitat is ruined. – Respondent #4*

Several harpooners commented that swordfish are often found in areas where there is concentration of bait and “life,” such as porpoises and whales, feeding upon that bait.

*The whale is our best friend, we're great buddies with whales...we look for whales because they indicate bait and bait indicates swordfish...you'd hear people say there's lots of 'life' out here. – Respondent #29*

Some fishermen also believed that swordfish may have stopped returning to Cape Breton because “there's not enough bait” such as herring and mackerel: “[y]ears ago, there used to be mackerel in them. Now the mackerel isn't there” (Respondent #29). Another fisherman pointed out that changes in the ocean bottom due to dragging could have been detrimental to swordfish abundance: “draggers dragged the bottom up, ruined the bottom so there was nothing for swordfish to eat” (Respondent #32). Another fisherman pointed out that the waters off of Louisbourg Harbour were now four fathoms deeper because dragging had picked up all of the soft substrate “like a bulldozer” (Respondent #33).

On the other hand, some interviewees argued that there was still enough bait to draw whales to the area, so perhaps there might be other reasons for the decline in swordfish landings. Because swordfish feed on a variety of species, the population may be quite resilient to changes in the abundance of some of their food types.

## 8.6 Changes in Knowledge and Technology

*Electronics ruined all of swordfishing. Trawling swordfish was the hardest kind of work. You didn't have radar or sonar buoys to tell you where the trawl was when it got bit off. ..Now, they know where they were and they can go back to that spot. Anyone now can take a boat as eats breakfast. – Respondent #37*

Most of the older fishermen I spoke with remarked upon the changes in navigation aids that had occurred since the days when they started fishing. The first boats that traveled to Cape Breton used a compass, a sounding lead, and “a little judgement” to navigate. Without radar, many a foggy night was spent “waiting for someone to run you down.” Before the fishermen used temperature gauges to locate fish, the log books of older fishermen and “certain marks” on charts were an essential source of information on where to find swordfish finning. Old logbooks are still used by fishermen today to provide clues as to where to look for fish (Figure 13), but the ability to navigate precisely within the optimum temperature and depth range greatly improves the modern fisherman's likelihood of finding fish.

After the Second World War, many boats acquired Loran A, which was the beginning of the switch to electronic navigational aids. Today's fishermen use satellite technology to



TRIP NO. 1 SWORD FISHING

1941

JUNE A.P. TEMP	TIME OF DAY	SURFACE TEMPERATURE	WIND SPEED DIRECTION	SURFACE CONDITION	CLOUD CONDITION	LOCATION (LORAN)	DEPTH	CAUGHT- SEEN
	24	57	S. 2	GOOD	SUN FOG	2435-3	100	—
48%	25	60	SW. 2	GOOD	clear INTERVALS	2575-3 1145-2 2545-3	—	7 — 9
	26	59	SW. 3	GOOD	cloudy	3440-3 3620-2	100	3 — 3
48%	27	60	E. 3	GOOD	RAIN AND MIST	3745-3 1438-5	—	3 — 3
43%	28	61	N. E. 5	GOOD	MIST	3745-3	140	1 — 2
48%	29	44	N. 2	GOOD	FOG	3740-3 3550-3	1/2 over	2 — 3
44%	30	57	S.W. 15	ROUGH	clear INTERVALS	3415-3 1141-2	—	2 — 3
55%	1	54.5	N.W. 12	ROUGH	clear	2390-3	—	3 — 4
44%	2	57	W. 3-5.7	GOOD	overcast	1155-2 2145-3 1180-2 1170-2	—	5 — 6
43%	3	53	SW 20	ROUGH	overcast FOG	2150-3 1170-2	DID NOT FISH	
58%	4	53.5	NW. 7	GOOD	OVERCAST	2100-3 2350-3 1170-2	—	0 — 1
48%	5	55	S. 2	SMOOTH	OVERCAST	1180-2 2335-3 1160-2 2415-3	—	10 — 11
45%	6	57	E. 2	"	OVERCAST	1150-2 2440-3	—	6 — 7
43%	7	57	E. 3-4	"	"	1160-2 2440-3 1150-2 2385-3 1155-2	—	2 — 5
LEFT FOR IN. WITH 44 FISH							2088 lbs. at 484	
TOTAL CAUGHT FOR TRIP							44	
TOTAL SEEN FOR TRIP							56	
AVERAGE WEIGHT							190.9 LBS.	
TOTAL VALUE							3,877.24	

(AVERAGE WEIGHT WOULD INCREASE BY SEASON END TO 230 LBS EACH.)

Figure 13: A page from swordfish harpooner's logbook. (Courtesy of Wallace D'Entremont.)

navigate and to locate fish. The switch from the use of dead reckoning and experience to a more technology-based style of fishing was given as a reason for the declines in fish abundance:

Technology murdered fishing. They murdered themselves. You used to need to know navigation when we went. We had a fisherman's clock and a compass, no sounder up until 1960, no sextant... We'd put grease on the sounding lead, or butter, and the skipper would look at it to see if we was over sand or gravel or mud. – Respondent #29

Essentially, fishermen who think changes in technology were the source of declines in the fishery believe that technology enables fishing effort to increase and this increase in effort is not taken into account by the managers of the fishery. Most longliners pointed out that there was a continual learning process involved in this fishery and that "you learned something ever trip" about where fish were located and how to catch them. Canadian longlining boats are also making use of information gleaned from other fleets, such as the Japanese and the Americans, about techniques used target swordfish and other pelagic species such as tuna. Understanding how knowledge and technology are changing in the present fishery is important because these changes must be included in estimates of fishing effort.

## 8.7 The Causeway

The Canso Causeway between Cape Breton and mainland Nova Scotia was completed in 1955. This physical barrier was cited as causing changes in the migration of the fish species such as mackerel and tuna. It was suggested that this change might have disturbed the migratory path of the swordfish.

A lot blamed it on the Causeway ... there should have been a pathway for them to get through ... tuna used to be off Canso; everything went through there. – Respondent #28

The causeway caused major changes. Herring stocks used to always come up the gut... if there's a change in the bait pattern, then that could change where the fish are. – Respondent #9

They blocked off the Canso Causeway... the tide used to run through there... the fishery declined: mackerel, swordfish, dogfish – they used to be numerous, you could hardly set a trawl. Tuna used to go through. Now they go around. – Respondent #33

The building of the Causeway may have caused many changes in the marine ecology of Cape Breton Island. However, Figure 5 shows that swordfish landings in Cape Breton were fairly stable for four years after the Causeway was built. Also, longliners continue to target the waters off of Cape Breton, so swordfish must continue to migrate to the area (Respondent #7; Stone and Porter, 1999). The decline of the Cape Breton swordfish fishery may have been due to long-term changes in oceanographic conditions brought on by the building of the Causeway. However, most of those interviewed thought that there were other explanations for the decrease in swordfish seen off of Cape Breton.

## 9.0 Summary

*We could never fish them out. They're getting thicker, coming in one behind the other.* – Respondent #7

*As far as I'm concerned, they're going to make 'em practically extinct.* – Respondent #28







*Human beings has done the same thing to swordfish as when they destroyed the buffalo.* – Respondent #36


*I'll be dead and gone before the fish come back.* – Respondent #19


The results of my research indicate that there was an economically viable, small-scale harpoon fishery in Cape Breton from 1909 until 1959. The number of swordfish found off of Cape Breton drew workers from other industries and fishermen from around the province to join in this fishery. Because of the unique, hunt-like qualities of this fishery, it was surrounded by a rich cultural tradition (see Appendix A). The fishery began to change in the mid-1940's, when the mostly inshore fleet was supplemented by larger, offshore vessels. Declines in catches between 1959 and the early 1960's may have been the result of over-fishing by this offshore harpoon fleet. Other explanations for this decline could be changes in climate or over-fishing by foreign nations, who began pelagic longlining in the North Atlantic in the mid 1950's (Anon. 1998a). When longlining began in 1962-63, there was a huge increase in the landings of the Canadian fleet, followed by a decline (Figure 7). Because longliners caught so many fish and so many juvenile fish, longlining was cited as the main reason for the decline of the Cape Breton swordfish fishery.


Fishermen who had observed the changes in the fishery over the years expressed the belief that changes in swordfish abundance are highly dependent on oceanographic conditions. Many observed that over-fishing a particular region could result in long-term declines in abundance in the area that was over-fished. Fishermen also pointed out that there have been dramatic changes in technology and knowledge over the years. These changes increased the level of effort that was exerted on the stock, and understanding these changes was an important factor when trying to understand the level of fishing pressure being exerted. Other reasons given for changes in swordfish abundance included the building of the Canso Causeway in 1955 and changes in food fish species brought upon by over-fishing in other fisheries. There was considerable frustration expressed that largely unregulated foreign fishing effort may have caused declines in the Canadian swordfish fishery.

## 10.0 Recommendations

-  Because of the number of fish caught, bycatch of small fish, and the incidental catch of other pelagic species, longlining has far-reaching impacts on the ocean's pelagic ecosystem. The industry must be regulated in a way that takes the non-selective nature of this gear type into account. Longlining should be managed as a multi-species fishery, and swordfish fishing effort must be co-ordinated with fisheries for other large pelagic species.
-  The harpoon fishery catches a small portion of the Canadian swordfish quota. If the swordfish stocks recover, it is expected that greater abundance will result in higher catches for this fleet. Because the fleet has little to no bycatch and a rich cultural tradition, increased catches in the harpoon fishery should be encouraged. There is also a growing demand in the US market for swordfish caught by the more selective harpoon fishery. Measures that might help to protect the harpoon fishery might include buying back longlining licenses, time-area closures to longliners, and seasonal closures that allow harpooners to get first crack at the fish during the summer months.
-  Closing areas to fishing may be an effective means of allowing the abundance of swordfish to increase. However, very little is being done to monitor the effectiveness of time-area closures. Surveys of these areas could also prove useful in determining the migratory patterns of swordfish, including patterns based on age and sex.
-  Scientific understanding of the migration of swordfish is inadequate for this fishery to be managed effectively. Since relative stock abundance is estimated by catch per unit effort, it is essential that Canadian scientists understand what factors (other than effort) determine the number of fish caught in this fishery.
-  The results of the research conducted in this study indicate that the unregulated effort of the early 1960's had an impact on swordfish stocks. Longliners currently fishing reported that they are always learning new ways to target different bodies of fish. Managers must continually monitor the changing effort in this fleet so that the impacts of increased knowledge and technology are incorporated in catch per unit effort estimates of swordfish abundance.
-  Decreasing the number of swordfish harpoon licenses may make the swordfish fishery easier to manage. However, because of the low impact of this gear type, a reduction in the number of swordfish harpoon licenses will not result in a more sustainable fishery. If the number of swordfish harpoon licenses is to be reduced, this must be done in a way that is fair to those regions that have traditionally fished for swordfish (such as Cape Breton) but have seen a decline in their fishery because of changes in fishing patterns and over-fishing by fleets from other areas of Nova Scotia.

 Recent observer programs have been criticized because they are not representative of the fishing effort of the longline fleet (Porter et al. 1999). A concerted effort must be made by the Department of Fisheries and Oceans (DFO) to make sure that DFO regulations are enforced and that dock-side monitoring and observer programs provide managers and scientists with adequate, representative data which they can use to make wise management decisions. If DFO shouldered some or all of the costs of observer and monitoring programs, rather than the fishing fleet, these programs might be carried out more effectively. Better co-ordination between DFO scientists, managers, and enforcement officers would also improve the monitoring of this fishery.

 An effective means of reducing the number of immature fish caught by the longline fleet would be to close areas to longlining where the numbers of these fish exceed what is considered acceptable by fisheries scientists. Of course, representative observer coverage of the longline fleet would be required to monitor the catch of immature fish and to close areas as required.

 For migratory species such as swordfish, it is in the best interests of nations involved in the fishery to enforce ICCAT rules. If ICCAT nations made the conservation of migratory species a priority, satellite monitoring and the co-operation of naval forces could make illegal fishing practices the exception rather than the rule.

## APPENDIX A: Some Facets of the Culture Swordfish Fishing

### A.1 Danger at Sea

Like most types of fishing, harpooning and longlining can be dangerous occupations. Fishermen related stories of breakdowns, storms, accidents, and being lost in a dory while hauling a swordfish. Often skill, perseverance, or just plain luck came to the rescue of fishermen in danger.

He just went out on the stand and stuck a fish. The rope [attached to the harpoon dart] went around his neck. He tried to pull it off, his hand blistered with pulling the rope. If [his shipmate] never came out on the stand to get him clear, his head would have come clear off. After that, he said, 'Take the pole.' He never went striker after that. – Respondent #34

Every year, almost, there's an accident. This year someone lost his thumb. You have to haul back the gear at 8 or 9 knots. It's coming at you fast, and he was taking the clips off the line. The gear got caught and they didn't hit the brake and it tore the thumb right off. – Respondent #7

One fella went overboard. It was mid-March, and he got a hook in the back ... We put the boat into reverse from full forward...I grabbed him by the scruff of the neck but he had a heavy coat on and with the extra weight I went down with him ... They got the life ring and I put it over him. I made sure they hauled him in first. – Respondent #12

The fog was thick as mud and we was going on a swordfish. [My crewmates said], 'You go in the dory, we'll keep track of you.' Well, I got him [the fish] up, but he must have seen the bottom of the dory because he took off and kept going. Then, I could hear the engine to the north of me. Then they stopped. I had a horn, but there was water in the bottom of the dory and it got wet. I put it in my hair to try to dry it, but that didn't work. Then I got the fish up, and there comes a big shark. I thought: 'Here comes trouble.' He came in to bite and I give it to him [jabbed him with an oar]. I tried to haul in the fish, but I couldn't, so I tied him to the dory. All night, I could hear the sharks going back and forth. In the morning, I had just the sword and bones left.

At half past ten the next morning, I seen the sun. It was going to clear up. And I thought, 'Someone will find me.' I started to bail out and then I heard a 'wubwub' beside me. I looked up and here come a crowd of coloured people ... It was the "Christine Dan" out of Woods Hole. I still had the tail tied on the dory. They gave me something to eat and they put me in a bunk – boy was it clean down below: it was all varnished - ... Before they cast me off again, they gave me a watermelon and a bottle of American beer. When I got along side my boat again, they said, chuck up that watermelon. By the time I got to the stern, they had hacked it up and

ate it. I gotta laugh. There I was, tied in a dory all night and I never even got a watermelon out of it. – Respondent #11

We had stuck a few swordfish and we were getting greedy, getting a little rushy. Well, it got rough and the spar came down in three pieces. We were under in the rigging and the boat was going ahead. [They] shut the engine off, but still, when we was underwater for 40-50 seconds we could hear the propeller. They hauled us aboard. It was blowing hard and we had the stand on with no support, and the stand smashed off. Then we lashed the stand and the spar aboard. What a mess. – Respondent #23

The alarm bell went off one night at 1 o'clock, the water alarm bell in the bilge. We had a sword through the boat, 13 inches through the boat. We were in a gale of wind and we were sinking up to the floor in the engine room. I went underneath and plugged the hole up... The crack in the plank was a couple of feet. That son of a gun must have been coming fast. They say they do that to whales sometimes. The US Coast guard came aboard and asked if we needed help, but we didn't think they could do it any better that we had done. – Respondent #25

## A.2 War Years

*In 1939, we was going by St. Paul's when the old man declared war. [Name] opened the throttle. He said you guys are going to drop like flies. – Respondent #3*

Fishing continued during the hostilities of the First and Second World Wars. One diehard fisherman remarked that although he was in the army, he was allowed to take an “unofficial” leave of absence to go fishing for swordfish. For some boats, fishing during the war years was worth the risk because “you had the banks to yourself” (Respondent #21). Technology, such as the Loran A navigational equipment and even boats used during the war were adopted by fishing vessels after the war was over. One fisherman bought a 75-foot government troop carrier and converted it for fishing. The seats that were inside were used in the local theatre (Respondent #36).

In the summer of 1918, a German submarine surfaced among the United States and Canadian fishing fleets working the offshore banks. The skippers were given a warning to launch their dories whereupon the fishing vessels were sunk by gunfire or demolition – eighteen were sent to the bottom, all were schooners, most being swordfishermen. Twenty-four years later, in another war, a motorized swordfish schooner was sunk by U-boat shellfire (Carson, 1998, p. 11).

During the war, we didn't dare go on the outer banks... One night, by Jesus, we heard some shots and fire. We put the dory out and loaded it with food and we waited, but we were never fired upon. – Respondent #10

The last time I was out during the War was in '42. ... We went out on Georges and one night we drifted through lifeboats and an oil slick. We sailed one day, trying to get clear of the slick. No one was in the lifeboats. Then we heard a rumble. It was a sub charging his battery. He took us for a buoy ... We said, let's turn in. He never bothered us... We landed our fish in Lockport, and [another fishermen said] 'Did you know one of our buddies is gone?' It was the "Lucille M." A sub fired on a fishing boat. They rowed into Cape Island in dories. No one was lost, but one fella got shot in the arm. – Respondent #3

I seen a thing shining on the water... this was after the war. The next day, I seen the same thing. When we got closer, [we could see it was a body]. Arms were gone; legs were gone to the knees. We could see the teeth in his mouth. The sun was shining on the chain around his neck... Why didn't we take the chain so they could notify the cops? It could have been my own brother (he was torpedoed off of Newfoundland). We made a mistake. When we ironed a fish and he was going to pull me down that way [i.e. towards where they found the body] I hauled him. He wasn't going to pull me that way – Respondent #11

### A.3 It Wasn't All Work

Sometimes fishing crews would take a break from a hard day's fishing for a little lighthearted fun. One musical family was known to play their instruments during the evenings and "broadcast" their concerts over the marine radio for other vessels to hear.

One thing they used to like to do was put me underwater [when I was out on the stand]. I lost many a cap [a long-billed cap worn by the striker to shield his eyes from the glare]. Sometimes when they'd chase a swordfish, they wouldn't look at anything but the fish, and then when I came out of the waves, I wouldn't see nothing but teeth [the crew was all smiling]. We broke many a pole that way, but it was fun. – Respondent #25

My father was the cook and he baked bread. He was getting older, he was around 65, but he always used to want to get in the dories [to haul the fish]. That morning he got in the dory, and after a while we saw he had an oar up [the signal that there was trouble]. We gave her full power and made haste to get along side. We called out, 'What's wrong?' and he said, 'Have a look at my bread in the oven.' If ever you wanted to kill your father... I thought a swordfish had stuck his dory. I read him a full chapter of the riot act. – Respondent #12

We used to blow [the ship horn] for swordfish. Two blows was to starboard and one blow to port. A short blow was straight ahead. Once, I was out in the dory with a fella hauling. I was having a smoke. Then we heard them blowing and coming up on us. We looked and the mastheadman said, 'I thought the bow of that boat was on fire.' – Respondent #36



We would make dummies. We'd save the fins from a swordfish and we'd make a 'swordfish' with a board. ... I always had a dummy ready to go... I let it go on the opposite side of [the other boat] so that they wouldn't see me. I looked at the other boat, and one got up on the hatch, he was pointing, one in the pilot house, one on the mast and one on striker and smoke came out [of the exhaust]; they was going on the fish. Then they saw it was a dummy. The smoke stopped. They picked it up. They came along side, and I thought that I had had it. But they were laughing. – Respondent #25

## A.4 Superstitions

With so many factors beyond their control, such as weather conditions and annual variations in fish abundance; sometimes the only thing a fisherman could count on was luck. I have observed swordfish harpooners changing the highflier attached to the warp line on the dart after an unsuccessful trip, in hopes that with a new buoy, their luck will change.

He'd make a sign of the cross on the waves if you saw a sea coming ...but he'd be the last guy to look at the Pope, even if he was standing on the wharf. – Respondent #29

I had a pretty good friend, and they'd haul 29 fish every goddamned time they went out...they had a good streak of luck ... Another fella, 20 miles from Ingonish, they claimed he was hoodooed or witched. [My Friend], he passed this old fella and the old fella waved to him. I said 'The old fella wants ya.' [My friend said] ' I don't want nothing to do with him.' The old fella waved to him. They went 20 days and never saw a fish.... To the southwest, if you turn the hatch upside down, it's very bad luck... you'd see the colour change in their face when they went aboard and saw that. Don't say the word 'pig' and anybody whistling ... well, you'd rather get hit in the foot with an axe; you just don't do it. ... We'd take a fish fork and throw fish on deck [onto the wharf from the boat]. If small fish get caught in the scuppers, then you're supposed to throw them overboard – Respondent #29

We got three [fish] in one day, then we missed seven. The pole was jinxed; we broke it off and tried another. Then we got three 300-350 pound fish, so maybe it was jinxed. – Respondent #14

## A.5 Moving Offshore

Moving offshore meant that boats could no longer make an easy run for land if an accident occurred or if the weather turned nasty. A dory from one vessel that was lost was identified because of the plate that had been placed in the hull to repair a hole where a swordfish had pierced the boat (Respondent #3). Most fishermen interviewed recalled two misadventures that had become legendary amongst swordfish fishermen throughout Nova Scotia.

### A.5.1 The Hurricane of 1950

An excellent and touching account of the experiences of the Wood's Harbour boats caught in the hurricane of 1950 is contained in A Sea Tragedy: Wood's Harbour – 1950 (Amiro et al. 1977). The hurricane struck Georges Bank with little warning to the 55-foot vessels that were out there fishing. The *Sir Echo*, a swordfish fishing boat, and her crew of five were lost in the hurricane.

#### *The Experience Aboard the Nickerson*

It was an awful mistake. We had made a decent sum working in the *Nickerson*. We had ice, plenty of fuel and water. We decided to make another trip. The weather was fine, lovely. We got 14 swordfish in four or five days, so Clifford [Nickerson, the captain of the *Nickerson*] said, 'We'll be going home.' Then Sheldon [Goreham] of the *Sir Echo* (the one that was lost) came along and him and Clifford talked and they made a bad decision ... Ben D'Entremont got 12 that day to the west of where we was, so they decided to stay until the next day and then come in. We listened to the weather report from St. John's and they gave 20 knots. Then we listened to the ball game on the radio. Then we heard there was a storm off of Cape Hatteras, travelling 20 miles an hour.

Unfortunately, the crew believed that the storm was approaching too slowly to be of much concern. By the following morning, the boats were caught in the heavy seas of the approaching storm. The *Nickerson* tried to keep in touch with the *Sir Echo*, which apparently broken a backstay and lost their aerial and could receive but not transmit messages on the marine radio. The *Nickerson* "laid to" the first night of the storm. On the following day, they had to take measures to make the boat turn into the waves rather than being hit prevent the boat from being broadside:

A wave that was 30 foot high was only a breaker. We took four auto tires and chucked them over the side and just paid off ... we was laying to ... it never hit us hard enough to sink us. The stand came off and we thought it would drive a hole in us. I don't know how I got the strength to haul the stand, but I got it up and I lashed it. ... A sea hit us and the glass broke in all the windows. I cut an artery in my lip. On top of the engine it was all red ... Johnny [Aliston Adams] asked if we was going to make it. I said, 'We may as well shake hands, son, we'll never make it.'



Chesley Nickerson recalls the songs and stories of days gone by.

Two boats, the American ship the *Cook Inlet* and the *Vagabond Prince* of Yarmouth, set out to assist the boats caught in the storm. The *Cook Inlet* stayed with the *Nickerson* until the *Vagabond Prince* arrived the following morning:

The *Vagabond Prince*, Lawrence Sweeney's boat, came and towed us. They didn't have to tow us; we could have made it in. ... We went aboard the *Vagabond Prince* and I couldn't sleep. Tension was bothering me; I was overtired. The *Vagabond Prince* couldn't get the engine to go. 'This is going to look good. He come out and saved us and the wharf was full of people, and we might have to tow him in.' ... The *Vagabond Prince* got the engine to go and we tied on I went up the harbour on my own.

- Chesley Nickerson

### *The Experience Aboard the Emma Marie*

The crew of the *Emma Marie* was also out fishing when the hurricane hit. They heard that the hurricane was coming from another fishermen the morning before the storm hit. The other fisherman asked them if they "were tired of living? If not, they had better scratch for land" (Amiro et al. 1977, p. 31). They began to head in, but the storm hit and they were caught in the full brunt of the hurricane by the early hours of the following morning.

She went headfirst and snapped that stand off and one more good one and she would have opened us up like a barrel. I had the nails and the hammer out and we were going to nail Wordlow's [Goreham, who was at the wheel] shoes to the deck... We couldn't put our oilskins on in case the wind flapped up and blew us overboard. And raining! Was it raining!

Another wave hit and the stovepipe hit me. Water came into the cud. When that sea struck us, I was in the bedroom for I'd say a minute. I could see her [his wife, Claris] in bed, and my daughter, Karen lying like this [with her head cupped in her hands], the curtain blowing, the clock ticking. For that minute, I wasn't aboard that boat.

I could swear we was going under and all I could hear was the wind howling through the rigging. I went up on deck and Wordlow was there with his arms around the wheel. 'I'm - hub hub - drowning,' he said. There was water and blood all over his face. We knew we had to get the water out of the boat. One more wave and we'd've had it. Three of us took to pumping; we had to get the engine clear of water.

The men stayed up all night pumping by hand because the engine had been flooded with water and they had no power for their pump. Eventually, they chopped up kindling and made a fire to dry parts of the engine. They got the engine started, but pins holding the shaft kept breaking because of the force of the heavy seas. Everett took a hatchet and cut pins out of galvanized spikes by pounding them against the anchor. At some point in the night, the *Emma Marie's* stand was broken off and Wordlow Goreham was lowered over the bow by his ankles, chopping the stays so that the stand could be secured aboard. By the following dawn, the men spotted Duck Island, off of Wood's Harbour.

We got to Duck Island and she [the shaft] began to shake. We were all out of spikes to hold her. If we could get by Roseberry Island, we could let the wind take us to shore. I found a steel punch and we drove her down in there and we made it to the wharf.

When we was coming in, we never saw a living thing. Then, this gull kept coming over the boat, and I said to myself, 'what's this gull doing here?' He's been following us a long ways. When we got close to land, I saw him go in amongst the trees. Why would that gull follow us all that way? That was a little angel. He didn't fly away. A little gust of wind made him float up, light, over the houses. I didn't think we'd make it. I didn't think we'd see green sod again...when you're down in a valley in waves like mountains and there was foam like soapsuds flying... Claris [his wife] knows that after that storm, if I dreamed of it, there'd be sweat pouring off of me.

Everett's father, Everett Goreham, Sr., had five sons and three grandsons out in the storm of 1950:

My father took it hard. He lost one son in the war ... and [when he heard they were out in a hurricane] he took to his bed. 'I've lost all me boys,' he said. Skink, [Sylvester Goreham, captain of the *Asenath* another boat caught in the storm] when he came in he went up to see father. My father said, 'Thank the Lord you're home. Where's the rest of the boys?' Skink lied, he said we were coming round the wharf. Father wanted to go down to the wharf to meet us and Skink tried to stall him, get him a cup of tea, but he wanted to go. They drove down and we was just coming around the wharf. Papa looked at him and shook his head – he knew that he lied.

I came home and Dr. Wilson looked at my feet. They was soaked ringing wet. I lost the bill of my cap and I didn't even know it. I looked like a Chinaman. The doctor said, 'You'll always have trouble with your feet in the winter.' I still get the feeling when they get cold; I stood so long in salt water...

When we went to clean up the boat, there was a sword's handle on a string. I took one up and made a handle for it out of [a piece] an old organ. Then I put my daughter's name on it.

They found the *Sir Echo* eight days later, on the 20<sup>th</sup> of September and towed her in to Meteghan. When they drained the water out, the first thing to come out was Captain Shelton's Bible. We always though he was down in the cud, reading to them.

- Everett Goreham

### **A.5.2 The Loss of the *Angela B Mills***

The heroic story of the *Angela B Mills* has become a legend amongst swordfish fishermen throughout Nova Scotia. Harold Henneberry, who is also known as "The King of the Swordfishermen", captained the boat. Mr. Henneberry is a man of few words, and it was difficult to get him to relay the story of his adventures. The details of this story were derived from his written account of the ordeal entitled "One Long Pull to Shore." The *Angela B Mills* was swordfish fishing on the Grand Banks, waiting out a hurricane that was passing to the west of them, when disaster struck:

I was just about to go to sleep when one of the crew shook me awake and was yelling in my ear 'We're sinking', and I heard the rest of the men running around the deck. Then, the first thing to do was get at the

pumps in the engine room. When I got down there, I knew there was not much hope as the water was over the pumps and half way up the cylinders of the engines. Well, we got one engine started and the pump going, but the starboard engine pump was too far underwater to get at so it was useless to try it.

Harold tried to call for help, but there wasn't much time because the batteries would soon be covered with water, and the radio would be dead.

After calling for about ten minutes, and not getting an answer, I knew nobody would hear us as the lights were getting dim and the batteries were underwater. When everything went dark, I grabbed a flashlight and went outside to find both pumps plugged, I guess with dirt out of the bilge, and the crew had three of our dories over the side and were in them, or two of them. The first one had got under the stern, another [dory] had pushed it under, so we lost it and all the food and water the boys managed to get.

There was nothing left to do now but to try and get a few things together for the dories as we were about two hundred and forty miles from the nearest land and might not get picked up as all the fishing boats had gone in and we were there alone. So, we went down in the forecabin to try and get some more food and water. Well, when I climbed down the ladder, the water was running over the sink only about three inches under the fresh water taps. By the light of the flashlight, which Charlie Burke was holding, I managed to get the teapot and teakettle off the stove and fill them about three parts full of water, which was half salt as the sea was rolling us about and splashing the salt water in too.

With the boat quickly filling with water, Harold and Charlie Burke managed to get two kettles full of water, a few cans of food, two loaves of bread, a carton of cigarettes, a few quarts of whisky, some matches, an automatic pistol and bullets, and some blankets. By this time, "the crew was yelling for us to get off as the boat was settling bad and might go down anytime. ..."

[T]here was one dory left on deck for Roy Marryatt and I. I went in and tore the compass out of the binnacle, grabbed the crank horn, and at the last, two car tires ... to make a drag, or sea anchor in case it blew too hard for us to row...

There we were, out in the dories, almost two hundred and fifty miles from the nearest land. It was getting daylight, so we counted up our food, which was a small bit for seven eaters like us. We had twenty-three cans of mixed can goods, some of it juices, three small packages of sweet biscuits, about a gallon or so of water, half salt, our whisky, and two slices of bread left from the two loaves. ...

We laid around the boat until about seven o'clock [the following] evening ... It was still rough, but we decided to row toward land ...

Well, it wasn't long until our boat, with the sails still up on her with a bad list to windward and the sea breaking over her, faded into the fog. There

was a lump in our throats, and I guess maybe a tear or two as we knew we'd never see her again. ...

The seven men in the dories persevered through rain and fog, rigging up a sail from one of the blankets. "We tried to keep our sprits up by talking and doing little things, making a thole-pin<sup>8</sup> once in a while as we broke quite a few of them and trying to figure how fast we were going." Things began to look grim for the men and spirits began to sink after a ship passed by and did not spot them. Navigation was made even more difficult at night, when they couldn't read the compass easily. Food began to get low.

The best I ever tasted, Charlie Burke came along side our dory and tossed in a can of pineapple telling us it was our breakfast. That juice was really good, but we could only eat a slice each in order to make it last all day. We were getting hungry that afternoon, we decided to try and shoot a seabird to eat. The very first one I shot at I killed; so we had a little fresh meat, which was no trouble to eat raw...

All night long it blew about thirty miles an hour or more, and Roy and I sat huddled down with the blanket pulled down over the stern, and when we'd hear a large breaker coming, about the time it would strike, we'd throw up the blanket which would throw some of the water off and then we'd bail the rest out... Once when I was bailing, I saw something in the bailer; and it was our last slice of pineapple, which we were saving for the next morning. I picked it up, gave Roy half of it and ate mine. It still tasted real good ...

August 24. This morning we started to row before daylight. It got so cold we could not stand it any longer, so we started to row to warm us up ... Some of the boys would not get up and move at first; but when they got moving, they soon felt better again.

We were all so hungry now. The boys were coaxing me to shoot another bird; but the weather was so bad and I was so cold and shaky, I fired at quite a few and never got one ...

Every once in a while, someone would row up and say, 'Do you think we'll make it, Harold?' I'd say sure we'll find the land if it don't blow too hard and sink our dories, so they'd kind of grin and still keep rowing. All the crew was great for what they put up with, cold and wet all the time. Now I was sore where my legs set on the dory thwart. The skin was chafed off. Roy had a sore arm, Charlie Marrayatt had salt-water boils over his arms and Charlie Burke had such a cold we just could hear him talk; but we kept rowing....

Sometimes now when we'd lay down to rest while the other fellow was rowing, we'd be dreaming. Although we would not be asleep, most all of us did the same. It seemed that when someone would start talking of home and getting everyone nervous, there was another fellow trying to cheer him up.

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<sup>8</sup> Two thole-pins placed in the gunwale of a boat form an oarlock.

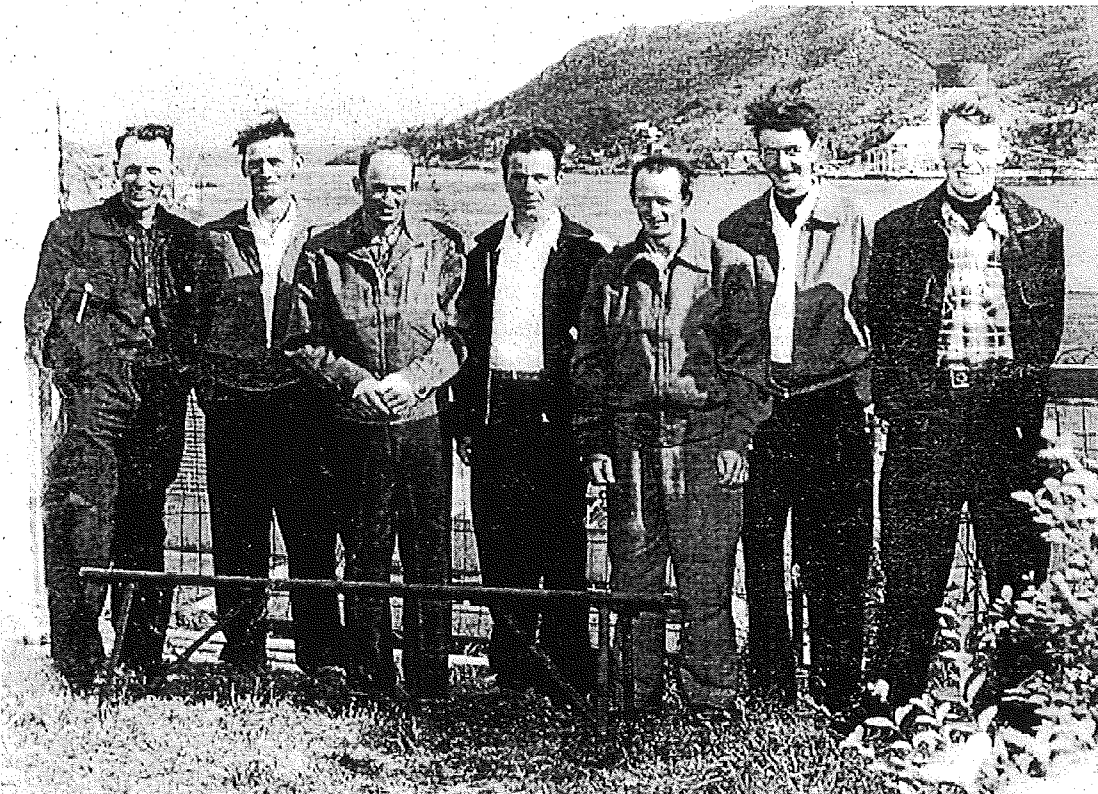
That night it rained, nearly sinking the dories, so the men had to bail, but now we had lots of drinking water, which was a godsend. The heavy rain storm took the good out of all of us, and I know some of the boys would not stand another night exposed to something like that, with nothing over our heads and soaking wet ...

Some of the boys felt pretty bad and layed down and wanted to stay, but we got them all sitting up and rowing for short times each.

I was going to nail my wallet and money to the side of the dory in case it would get picked up and someone might get some good out of it, but Roy said don't do it because we'll all know you're giving up hope and then we'll all be lost...

As soon as it got to be daylight, I began to look to the north for a sign of land which I thought for sure we'd see on this fine day and sure enough saw almost straight ahead what I thought was land but rowed a few minutes to make sure before telling the boys ... Now the cry was, 'We're going to make it.' So we drank our can of milk that we were saving and started our last quart of whisky...

[I]t was a welcome sight to see a small fishing boat ... I got the hand horn up and blew a few blasts which reached Mr. Allan Sutton and his crew...



Survivors of the sinking of the *Angela B Mills* pose for a photograph in St. John's, Newfoundland. **Left – Right:** Harold Henneberry, Roy Marrayatt, Charles Marrayatt, Melvin Grey, Herby Marrayatt, Keith Grey, and Charles Burke.

Well, we got alongside the boat and tumbled aboard Mr. Sutton's boat, just seven days and a half from the time we jumped in the dories on the southwestern tip of the Grand Banks. ... We figured that with our crooked rowing we had rowed about three hundred miles...

Everybody had just about given up hope of ever finding us alive. But we knew the Lord was with us because it seemed when the wind came just about hard enough for the dories to stand, it would die out and come around the other way to smooth down the sea. Also, the rain came to give us something to drink; and the last day it was fine to give us a chance to see the land and get to it before dark. The fog stayed away until we were aboard Mr. Sutton's boat.

The people of Trepassy treated us well. They gave us some dry clothes, a good supper and put us to bed; but we could not sleep, even after not having three hours of sleep in over a week, and had to get up again...

When we weighed ourselves, we found we had lost from six to seventeen pounds each in that few days. Some of the boys, when we were out swore they would not go to sea again. When asked by news reporters, all said they would try it again. I guess Charlie Marryatt and I felt worst because we had owned the boat, which took most of our savings for years to buy; but we got off with our lives and some day we hope to buy another one.

- Harold Henneberry



## APPENDIX B: List of Interview Topics/Questions

At the beginning of an interview, I introduced myself and explained that I had been hired by the Ecology Action Centre to produce a report on the swordfish fishery in Nova Scotia. I would state that the objectives of the report were to record fishermen's opinions and experiences in the swordfish fishery and to combine this knowledge with scientific information to formulate recommendations as to how the fishery could become more sustainable. I would also mention that the Cape Breton fishery (and what happened to it) was an area of particular interest to this study.<sup>9</sup>

- What is your name/address - so we can send you a copy of the report when it is published?
  - Would you agree to have your name put in the report or would you prefer to have your comments remain anonymous? In previous reports, we have published a list of the people we have interviewed at the back of the report, but comments or quotations in the report are not designated to a particular individual. (I would show the interviewee an example of this format to clarify.)
  - How long have you fished?
  - How long have you been fishing for swordfish?
  - What percent (approximately) of your income have you made/ do you make fishing for swordfish?
  - What type of gear have you used/do you use?
  - Was your family into the swordfish fishery? If not, how did you learn to swordfish?
  - What areas have you fished (Georges, Grand Banks, outside Canadian waters..etc.)?
  - Have you noticed any changes in size, abundance, or distribution of fish since you started fishing?
  - Have you noticed any changes in ocean climate since you started fishing?
  - Have you noticed changes in the abundance of any wildlife since you started fishing (i.e. more or less sightings of a certain type of fish etc.)?
  - What determines the distribution of fish (i.e. temperature, abundance, etc.)?
  - Have you had any 'adventures' swordfish fishing (i.e. tall tales about storms, big fish, wildlife ... etc.)?
  - Do you enjoy swordfish fishing? How does it compare with other types of fishing that you do?
- What other type of fishing do you do?
- Swordfish stocks are currently at below their maximum sustainable yield. How did this happen (i.e. environment change, over-fishing, foreign fishing fleets)?
  - How could the stock be allowed to recover to its full potential?

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<sup>9</sup> Please note: The interviews usually took the form of a conversation and did not follow the order of questioning outlined here. This list is meant to summarize the areas that I tried to cover during interviews. It was not uncommon for the interviewee to introduce new and interesting topics that I had not anticipated, but were of value to the report and were recorded.

- What do you know/ have you observed about the biology of swordfish? Have you seen spawn in them? Where do you think they migrate from? Do you think there is one stock in the North Atlantic and one stock in the South Atlantic? Have you observed any unusual behaviour? What do swordfish eat?
- What is the average size of the fish you catch now and in years gone by?
- What other species do you catch using longline?
- What regulations/ deregulations would you recommend for the Canadian fleet so that the swordfish fishery can become more profitable and sustainable in the future? What management regulations do you see as being ineffective?
- This report is concerned with the history of the swordfish fishery. In the past, fishermen travelled to Cape Breton to fish, and now swordfish are pretty scarce down there. Have you or your family ever fished off of Cape Breton? If so, why and when did you stop fishing there? Why do you think the fish got scarce in this area?
- Environmental groups and scientists have been looking into the catch of small swordfish and bycatch (i.e. sharks, tunas, turtles) in the longline fleet. Do you think discards are a problem in the longline fishery?
- Can harpooning damage the swordfish stocks? What other species (i.e. bycatch) have you caught using harpoon?
- I have heard that longlining involves extremely hard labour. What is a typical voyage like? How many fish or pounds of fish do you get on a typical trip or set? How many miles of line do you set? What type(s) of hook do you use? How long do you go out for? How many men are in your crew? What does each person on the boat do? How many months of the year do you swordfish?
- How many tonnes/ kg of fish do you get in a season? What was your best/worst season? Why do you think some seasons are good or some bad or are your landings fairly consistent?
- What type of research questions do you think scientists should be looking into to increase our knowledge of swordfish and perhaps be of benefit to fishermen?
- Have you observed foreign fishing vessels at the wharf or out at sea? When you are fishing, how many do you tend to see in a day? What have you observed of their operations?
- Do you have any interesting photos or documents that you would allow me to borrow and possibly publish in the report? (All photos and documents will be returned to their owners when the report is finished.)

APPENDIX C:  
List of fishermen, scientists, managers, and industry  
representatives contacted

Anonymous	Hickman Organ
Troy Atkinson	Julie Porter
William Banfield	Dale Richardson
Doug Bell	Larry Sears
David Belliveau	Herman Seymour
Heather Breeze	Heath Stone
Valerie Bradshaw	Arthur Wickens
Harold Briand	Thomas Wilcox
Kelson Briand	
John D. Burke	
Joseph J. Burke	
Frederick J. Chetwind	
Russell Clearly	
Letia Cousins	
Kenneth Cross	
Blair D'Entremont	
Fidelis D'Entremont	
Franklyn D'Entremont	
Leo D'Entremont	
Nathan D'Entremont	
Wallace D'Entremont	
Langille Dixon	
Ken Drinkwater	
Jim Ford	
Harold Fudge	
Joe Fiander	
Ivan Fricker	
Rex Garrison	
Everett Goreham	
Terry Goreham	
Victor Harpell	
Lindsay Hatcher	
F. A. Henneberry	
Harold Henneberry	
Marty Henneberry	
Terry Hynes	
Carlton Lunn	
Dan MacDougall	
Elmourne MacKinnon	
Anitina Marshall	
Lillian Beatrice Marshall	
S. C. R. Nickerson	
John C. Nickerson	

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