

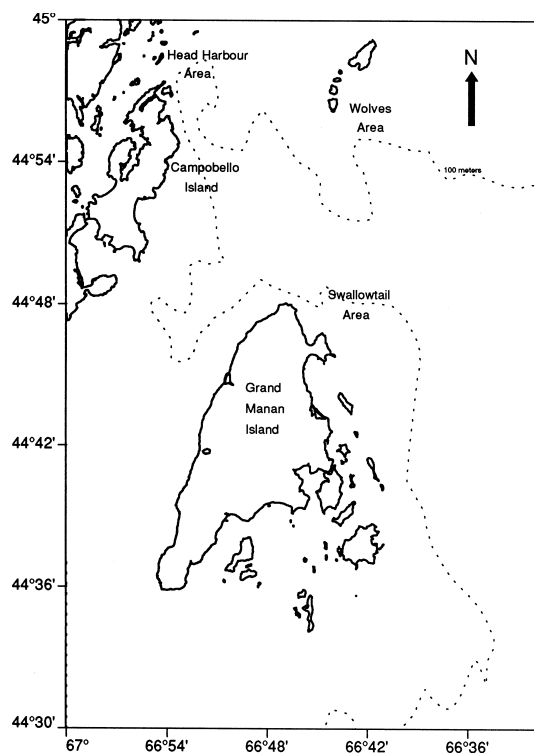


Harbour Porpoise By-catch in the Lower Bay of Fundy Gillnet Fishery

Background

Harbour porpoise are captured as by-catch in the U.S. and Canadian demersal gillnet fisheries in the Bay of Fundy, Gulf of Maine, and U.S. mid-Atlantic coast. Annual by-catch estimates have been made by the U.S. since 1990 for the Gulf of Maine and since 1995 for the mid-Atlantic coast. Canada has made by-catch estimates in the Bay of Fundy since 1993. Concerns have been raised that the combined mortality levels by gillnetters in the two countries are high enough to be considered unsafe for the long-term sustainability of this transboundary population. Although population structure is not well understood, this population is assumed to have only limited contact with individuals from other parts of the species range.

To reduce porpoise mortalities, time-area closures of U.S. gillnet activity commenced in 1994 in accordance with Amendment 5 of the New England Groundfish Fisheries Management Plan. U.S. experimental gillnet fisheries using acoustic pingers to reduce by-catch commenced in 1995. In 1996, the National Marine Fisheries Service established a Gulf of Maine Harbour Porpoise Take Reduction Team. Its goal was to develop a take reduction plan for New England gillnet fisheries so as to approach zero mortality levels by April 30, 2001, as stipulated under amendment to the U.S. Marine Mammal Protection Act (Section 118). This transboundary population is considered by the Committee of the Status of Endangered Wildlife in Canada to be threatened. The DFO Maritimes Region developed a Harbour Porpoise Conservation Strategy for the Bay of Fundy which limited the annual Canadian by-catch to 110 porpoises, commencing in 1996. Based on considerations of population size and birth rate, this level of Canadian by-catch is considered to be non-threatening to the sustainability of the population. Canada began field testing of acoustic pingers in 1996.



Summary

- Harbour porpoise by-catch estimates in the Bay of Fundy gillnet fishery were 20, 43 and 10 animals in 1996, 1997 and 1998, respectively.
- Gillnets equipped with acoustic pingers reduced porpoise by-catch rates by 77%.
- The Canadian by-catch of harbour porpoise in each of 1996-98 represented <0.1% of population size and is considered to be non-threatening to the sustainability of the population.

By-catch in the Fishery

Harbour porpoise estimated by-catch in the **U.S. groundfish gillnet fishery**:

Year	Estimate	95% Confidence Interval
<i>Gulf of Maine</i>		
1990	2,900	1,500-3,800
1991	2,000	1,000-3,800
1992	1,200	800-1,700
1993	1,400	1,000-2,000
1994	2,000	1,400-2,900
1995	1,400	800-2,500
1996	1,200	800-1,400

Year	Estimate	95% Confidence Interval
<i>Mid Atlantic</i>		
1995	103	11-254
1996	310	162-567

Harbour porpoise estimated by-catch in the **Canadian groundfish gillnet fishery** in the Bay of Fundy:

Year	Estimate ^{1,2}
1994	101
1995	87
1996	20
1997	43
1998	10

¹ 95% confidence intervals are not routinely available but are considered to be low.

² A 1993 estimate of 424 porpoises is not considered to be as accurate as later estimates.

In the Bay of Fundy, the three key geographical areas of by-catch spanned 24 km² at Swallowtail, Grand Manan Island, 7 km² at the Wolves Islands, and 3 km² at Head Harbour, Campobello Island. This represented 95-100% of the observed Bay of Fundy by-catch. Data on fishing effort and the observed porpoise by-catch per vessel trip were used to estimate annual by-catch. Observed trips were made from July - September.

In 1996, 105 trips were monitored in the Swallowtail area and reported 7 porpoise mortalities. One trip was monitored to the Wolves and reported no mortalities and the one trip monitored to Head Harbour reported one mortality. Approximately 90% of trips were monitored to the Swallowtail area, whereas the latter two areas received 10% coverage. After accounting for total fishing effort, the estimated by-catch for Bay of Fundy in 1996 was 20 animals. The fishery was closed to the majority of the gillnet fleet from July 20-31 and August 16-31, 1996 due to reduced groundfish quotas.

In 1997, 46 trips were monitored in the Swallowtail area and reported 11 porpoise mortalities. Twelve trips were monitored to the Wolves and reported no mortalities. Seventeen trips were monitored to Head Harbour and reported 8 porpoise mortalities. All porpoise entanglements occurred during August 1-15. After accounting for total fishing effort, the estimated by-catch for Bay of Fundy in 1997 was 43 animals. The fishery was closed to the majority of the gillnet fleet from July 18-31 and August 16-31, 1997 due to reduced groundfish quotas. A time-area closure to reduce porpoise by-catch in the Swallowtail area occurred from September 1-7, 1997.

In 1998, the number of vessels fishing was appreciably lower than in previous years due to very poor groundfish catch rates. Seventeen trips were monitored in the Swallowtail area and reported 1 porpoise mortality. Fishers independently reported another 4 porpoises. The Wolves and Head Harbour area fishing activity comprised 7 trips in July and did not receive coverage. A total by-catch for Bay of Fundy in 1998 was estimated at 10 porpoises. The fishery was open through July - September.

Acoustic Pinger Testing

Acoustic pingers were tested in 1996 and 1997 as a possible mitigative measure to reduce by-catch in the Bay of Fundy. Fishers typically made 4-5 trips per week, and commonly set 4-5 strings of gillnet per trip, each string being comprised of three webs, and each web being approximately 100 m in length and 3 m in height. In experimental strings, pingers were attached to the float line at the end of each string, and at each bridle (connection between webs). One string of three webs would therefore have four pingers attached (one every 100 m). Pingers produced a 0.3 sec pulse at 10-12 kilohertz every 4 sec at a level of 133-145 decibels re 1 micropascal at 1 m (manufacturer: Dukane Corporation, Netmark 1000 version). **Nets equipped with pingers reduced porpoise by-catch rates by 77%** over those without alarms in the Swallowtail area during field testing in August 1996 (68% reduction) and 1997 (85% reduction) (both years combined 3 porpoises in 249 alarmed nets versus 14 porpoises in 267 non-alarmed nets).

In 1998, fishers assisted in testing a different form of experimental gear. These nets did not require pingers and were made of a unique kind of mesh that was manufactured

to be more “noticeable” to porpoises than standard monofilament gillnet. Unfortunately, the statistical power of the trial test was too low to be considered significant, though in 17 sets no porpoises were captured. Further testing is required to properly evaluate this gear with regard to porpoise by-catch and fish catches.

Population Considerations

The U.S. National Marine Fisheries Service has estimated the abundance of harbour porpoise in the Bay of Fundy/Gulf of Maine in 1991, 1992, and 1995. These estimates were made during cetacean sighting surveys conducted during August that were stratified based on water depth and previous knowledge of porpoise densities.

Year	Abundance	95% Confidence Interval
1991	37,500	26,700-86,000
1992	67,500	32,900-104,600
1995	74,000	40,900-109,100

Canadian by-catch of harbour porpoise in each of 1996-98 represented <0.1% of the population size of harbour porpoises. The maximum potential population growth rate estimate for this species is approximately 4%. Therefore, the Canadian by-catch has not been a limiting factor to the population's growth potential.

The reduction in Canadian by-catch in recent years is likely due to (i) within season fishery closures due to low groundfish quotas, (ii) fewer vessels fishing, (iii) testing of pingers, and (iv) reduced porpoise abundance in the Bay of Fundy which is in part related to lower regional herring abundance, a preferred food.

Use of Pingers to Reduce By-catch

Pingers appear to be a suitable method to reduce the rate of porpoise entanglement without restricting fishing effort. Properly deployed, pingers can reduce by-catch by 77%. However, several factors may influence the effectiveness of this potential mitigative measure: (i) durability of pingers, (ii) effects on non-target species and (iii) impact on porpoise habitat.

(i) Pinger durability might limit their life expectancy and thus reduce their utility as a dependable mitigative measure. It should be noted that operable battery life when in continuous use is approximately 45 days (four 1.5V AA batteries). Pingers used were \$65 each.

(ii) Catch rates of cod and pollock were not significantly different in alarmed and non-alarmed nets (except in one season when pollock were caught in lower numbers in alarmed nets). Further examination of the effects of pingers on pollock catch rates is warranted. No significant difference occurred in herring catch rates between alarmed and non-alarmed gear.

(iii) Porpoises likely detected the sounds of the pingers and avoided the alarmed gear. In conditions of no rain and low wind (Sea State 0-2), the alarms were presumed to be clearly audible to porpoises at ranges of 100-600 m. There is the possibility of a reduction in porpoise habitat due to their avoidance of gillnets with pingers. A gillnet fleet outfitted with pingers amounts to 284 pingers or 10.5 pingers/km² in the Swallowtail area and 162 pingers or 27 pingers/km² in the Wolves area. Observers noted that porpoises did not avoid areas in which nets with pingers were set, however

the exact reactive distance to pingers is not known.

Management Considerations

Management options exist to maintain by-catch below the level of mortality set by the Harbour Porpoise Conservation Strategy. These include (i) enforcement of pinger utilization on all gillnets in the Swallowtail, Wolves and Head Harbour areas, (ii) closure to gillnetting of these areas during part or all of August. Reduced groundfish catch rates may be sufficient to limit gillnet activity such that no management action is required.

Whether these measures will be effective in every year is unknown, as a number of factors are likely to influence the annual level of harbour porpoise by-catch. These include the seasonal distribution and amount of fishing effort, the local distribution and abundance of porpoise, and the interannual changes in the abundance and arrival of prey such as herring. The ecological factors which affect local abundance of harbour porpoise are poorly understood. Thus, current estimated by-catch levels in the gillnet fishery could change and management measures that are effective today may need to be modified in the future.

For More Information

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