HARBOR PORPOISE (*Phocoena phocoena*): Gulf of Maine/Bay of Fundy Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

This stock is found in U.S. and Canadian Atlantic waters. The distribution of harbor porpoises has been documented by sighting surveys, strandings, and takes reported by NMFS observers in the Sea Sampling Program. During summer (July to September), harbor porpoises are concentrated in the northern Gulf of Maine and southern Bay of Fundy region, generally in waters less than 150 m deep (Gaskin 1977; Kraus *et al.* 1983; Palka 1995a, b). During fall (October-December) and spring (April-June), harbor porpoises are widely dispersed from New Jersey to Maine, with lower densities farther north and south. They are seen from the coastline into the middle of the Gulf of Maine (>200 m deep). During winter (January to March), intermediate densities of harbor porpoises can be found in waters off New Jersey to North Carolina, and lower densities are found in waters off New York to New Brunswick, Canada. There does not appear to be a temporally coordinated migration or a specific migratory route to and from the Bay of Fundy region. Though, during the fall, several satellite tagged harbor porpoises did favor the 92m isobath, which is consistent with observations of high rates of incidental catches in this depth range (Read and Westgate 1997). There were two stranding records from Florida (Smithsonian strandings data base).

Gaskin (1984, 1992) proposed that there were four separate populations in the western North Atlantic: the Gulf of Maine/Bay of Fundy, Gulf of St. Lawrence, Newfoundland and Greenland populations. Recent analyzes involving mtDNA (Wang *et al.* 1996), organochlorine contaminants (Westgate *et al.* 1997), heavy metals (Johnston 1995), and life history parameters (Read and Hohn 1995) support Gaskin's proposal. In particular, there is a suggestion that the Gulf of Maine/Bay of Fundy females are different than Gulf of St. Lawrence females, but males were statistically indistinguishable (Palka *et al.* 1996). Research on microsatellites, a potentially powerful genetic tool, is currently being conducted to re-analyze existing genetic data and analyze new samples in order to resolve the larger scale stock structure question. This report follows Gaskin's hypothesis on harbor porpoise stock structure in the western North Atlantic; Gulf of Maine and Bay of Fundy harbor porpoises are recognized as a single management stock separate from harbor porpoise populations in the Gulf of St. Lawrence, Newfoundland, and Greenland.

POPULATION SIZE

To estimate the absolute population size of harbor porpoises aggregated in the Gulf of Maine/Bay of Fundy region, three line-transect sighting surveys were conducted during the summers of 1991, 1992 and 1995 (Table 1; Figure 1).

The population sizes were 37,500 harbor porpoises in 1991 (CV = 0.29, 95% confidence interval (CI) = 26,700-86,400) (Palka 1995a), 67,500 harbor porpoises in 1992 (CV = 0.23, 95% CI = 32,900-104,600), and 74,000 harbor porpoises in 1995 (CV=0.20, 95% CI = 40,900-109,100) (Palka 1996). The inverse variance weighted-average abundance estimate (Smith *et al.* 1993) was 54,300 harbor porpoises (CV = 0.14, 95% CI = 41,300-71,400). Possible reasons for inter-annual differences in abundance and distribution include experimental error and inter-annual changes in water temperature and availability of primary prey species (Palka 1995b).

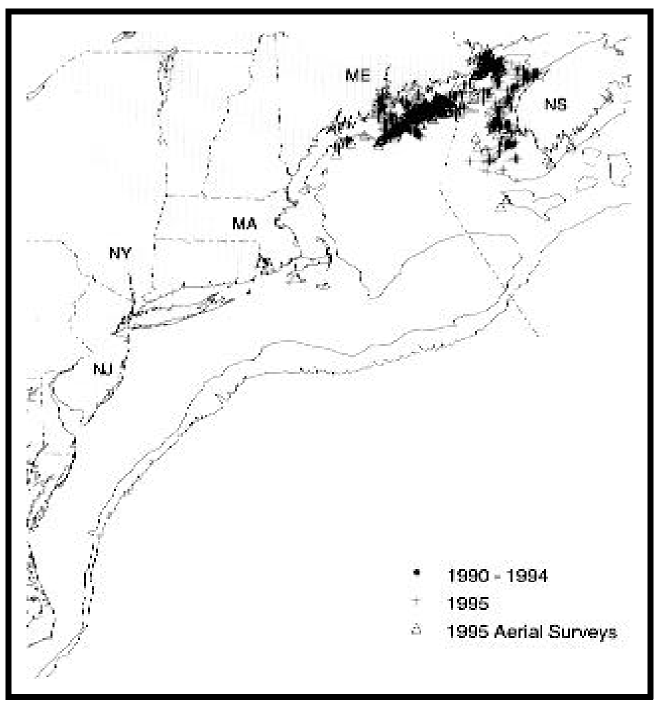

Figure 1. *Distribution of harbor porpoise sightings from NEFSC shipboard and aerial surveys during the summer in 1990-1995. Isobaths are at 100 m and 1,000 m.*

The shipboard sighting survey procedure used in all three surveys involved two independent teams on one ship that searched using the naked eye in non-closing mode. Abundance, corrected for g(0), the probability of detecting an animal group on the track line, was estimated using the direct-duplicate method (Palka 1995a) and variability was estimated using bootstrap re-sampling methods. Potential biases not explicitly accounted for are ship avoidance and time of submergence. During 1995 a small section of the region was surveyed by airplane while the rest of the region was surveyed by ship, as in previous years. An abundance estimate including g(0) was estimated for both the plane and ship (Palka 1996). During 1995, in addition to the Gulf of Maine/Bay of Fundy area, waters from Virginia to the mouth of the Gulf of St. Lawrence were surveyed and no harbor porpoises were seen except in the vicinity of the Gulf of Maine/Bay of Fundy.

Table 1. Summary of abundance estimates for the Gulf of Maine/Bay of Fundy harbor porpoise. Month, year, and area covered during each abundance survey, and resulting abundance estimate (N_{best}) and coefficient of variation (CV).

Month/Year	Area	N_{best}	CV
Jul-Aug 1991	N. Gulf of Maine & lower Bay of Fundy	37,500	0.29
Jul-Sep 1992	N. Gulf of Maine & lower Bay of Fundy	67,500	0.23
Jul-Sep 1995	N. Gulf of Maine & lower Bay of Fundy	74,000	0.20
Inverse variance-weighted average of above 1991, 1992 and 1995 estimates		54,300	0.14

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normally distributed best abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The best estimate of abundance for harbor porpoises is 54,300 (CV=0.14). The minimum population estimate for the Gulf of Maine/Bay of Fundy harbor porpoise is 48,289 (CV=0.14).

Current Population Trend

There are insufficient data to determine the population trends for this species. Previous abundance estimates for harbor porpoises in the Gulf of Maine/Bay of Fundy are available from earlier studies, (e. g. 4,000 animals, Gaskin 1977, and 15,800 animals, Kraus *et al.* 1983). These estimates cannot be used in a trends analysis because they were for selected small regions within the entire known summer range and, in some cases, did not incorporate any estimate of g(0) (NEFSC 1992).

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Although current population growth rates of Gulf of Maine/Bay of Fundy harbor porpoises have not been estimated due to lack of data, several attempts have been made to estimate potential population growth rates. Barlow and Boveng (1991), who used a re-scaled human life table, estimated the upper bound of the annual potential growth rate to be 9.4%. Woodley and Read (1991) used a re-scaled Himalayan tahr life table to estimate a likely annual growth rate of 4%. In an attempt to estimate the potential population growth rate which incorporated many of the uncertainties in survivorship and reproduction, Caswell *et al.* (1998) used a Monte Carlo method to calculate a probability distribution of growth rates, which indicated that the median estimate for the potential annual rate of increase is approximately 10%. This analysis underscored the considerable uncertainty that exists regarding the potential rate of increase in this population. For the purposes of this assessment, the maximum net productivity rate, R_{max} was assumed to be 0.04, consistent with values used for other cetaceans for which direct observations of maximum rate of increase are not available. The 0.04 value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive life history (Barlow *et al.* 1995). Given the three available estimates for the potential productivity rate, the value for R_{max} is currently being re-evaluated.

POTENTIAL BIOLOGICAL REMOVAL

Potential Biological Removal (PBR) is the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 48,289 (CV=0.14). The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.5 because this stock is of unknown status. PBR for the Gulf of Maine/Bay of Fundy harbor porpoise is 483.

ANNUAL HUMAN-CAUSED MORTALITY

Fishery Information

Gulf of Maine/Bay of Fundy harbor porpoise takes have been documented in the U.S. New England multispecies sink gillnet, Mid-Atlantic coastal gillnet, and Atlantic pelagic drift gillnet fisheries, and in the Canadian Bay of Fundy sink gillnet fishery and herring weir fishery. The average annual mortality estimate of harbor porpoises for 1992 to 1996 from the above U.S. fisheries is 1,667 (CV=0.09).

USA

Recent data on incidental takes in U.S. fisheries are available from several sources. In 1986, NMFS established a mandatory self-reported fishery information system for large pelagic fisheries. Data files are maintained at the Southeast Fisheries Science Center (SEFSC). The Northeast Fisheries Science Center (NEFSC) Sea Sampling Observer Program was initiated in 1989, and since that year several fisheries have been covered. From late 1992, the SEFSC provided observer coverage of pelagic longline vessels fishing off the Grand Banks (Tail of the Banks) and south of Cape Hatteras.

New England Multispecies Sink Gillnet

Most of the harbor porpoise takes from U.S. fisheries are from the New England multispecies sink gillnet fishery. In 1984 the New England multispecies sink gillnet fishery was investigated by a sampling program that collected information concerning marine mammal by-catch. Approximately 10% of the vessels fishing in Maine, New Hampshire, and Massachusetts were sampled. Among the eleven gillnetters who received permits and logbooks, 30 harbor porpoises were reported caught. It was estimated, using rough estimates of fishing effort, that a maximum of 600 harbor porpoises were killed annually in this fishery (Gilbert and Wynne 1985, 1987).

In 1990, an observer program was started by the NMFS to investigate marine mammal takes in the New England multispecies sink gillnet fishery. There have been 362 harbor porpoise mortalities related to this fishery observed between 1990 and 1996 and one was released alive uninjured. In 1993, there were approximately 349 full and part-time vessels in the New England multispecies sink gillnet fishery, which covered the Gulf of Maine and southern New England (Table 2). An additional 187 vessels were reported to occasionally fish in the Gulf of Maine with gillnets for bait or personal use; however, these vessels were not covered by the observer program (Walden 1996) and their fishing effort was not used in estimating mortality. Observer coverage in terms of trips has been 1%, 6%, 7%, 5%, 7%, 5%, and 4% for years 1990 to 1996, respectively. By-catch in the northern Gulf of Maine occurs primarily from June to September; while in the southern Gulf of Maine by-catch occurs from January to May and September to December. Annual estimates of harbor porpoise by-catch in the New England multispecies sink gillnet fishery reflect seasonal distribution of the species and of fishing effort. By-catch estimates include a correction factor for the under-recorded number of by-caught animals that occurred during unobserved hauls on trips with observers on the boat, when applicable. Need for such a correction became evident following re-analysis of data from the sea sampling program indicating that for some years by-catch rates from unobserved hauls were lower than that for observed hauls. Further analytical details are given in Palka (1994), CUD (1994), and Bravington and Bisack (1996). These revised by-catch estimates replace those published earlier (Smith *et al.* 1993). These estimates are still negatively biased because they do not include harbor porpoises that fell out of the net while still underwater. This bias cannot be quantified at this time. Estimated annual by-catch (CV in parentheses) from this fishery during 1990-1996 was 2,900 in 1990 (0.32), 2,000 in 1991 (0.35), 1,200 in 1992 (0.21), 1,400 in 1993 (0.18) (Bravington and Bisack 1996; CUD 1994), 2100 in 1994 (0.18), 1400 in 1995 (0.27) (Bisack 1997a), and 1200

(0.25) in 1996. Average estimated harbor porpoise mortality and serious injury in the New England multispecies sink gillnet fishery during 1992-1996 was 1,460 (0.10).

There appeared to be no evidence of differential mortality in U.S. or Canadian gillnet fisheries by age or sex in animals collected before 1994, although there was substantial inter-annual variation in the age and sex composition of the by-catch (Read and Hohn 1995). However, with a larger sample, from harbor porpoises examined by necropsy or from tissues received from sea sampling observers (n=171 between 1989 and 1997), the sex ratio is now 58 females and 113 males (A. Read, pers com). Investigations are currently underway to determine spatial-temporal patterns in the sex ratio.

Two preliminary experiments, using acoustic alarms (pingers) attached to gillnets, that were conducted in the Gulf of Maine during 1992 and 1993 took 10 and 33 harbor porpoises, respectively. During fall 1994 a controlled scientific experiment was conducted in the southern Gulf of Maine, where all nets with and without active pingers were observed (Kraus *et al.* 1997). In this experiment 25 harbor porpoises were taken in 423 strings with non-active pingers (controls) and two harbor porpoises were taken in 421 strings with active pingers. In addition, 17 other harbor porpoises were taken in nets with pingers that were not in the experiment (Table 2). During 1995 to 1996, experimental fisheries were conducted where all nets in a designated area used pingers and only a sample of the nets were observed. During November-December 1995, the experimental fishery was conducted in the southern Gulf of Maine (Jeffreys Ledge) region, where no harbor porpoises were observed taken in 225 pingered nets. During April 1996, three other experimental fisheries occurred. In the Jeffreys Ledge area, in 88 observed hauls using pingered nets nine harbor porpoises were taken. In the Massachusetts Bay region, in 171 observed hauls using pingered nets two harbor porpoises were taken. And, in a region just south of Cape Cod, in 53 observed hauls using pingered nets no harbor porpoises were taken. All takes from pingered nets were added directly to the estimated total bycatch for the rest of that year in the rest of the fishery.

U.S. Atlantic Coastal Gillnet

Before an observer program was in place, Polacheck *et al.* (1995) reported one incidental take in shad nets in the York River, Virginia. Then in July 1993, an observer program was initiated in the U.S. Atlantic coastal gillnet fishery by the NEFSC Sea Sampling program. Twenty trips were observed during 1993. During 1994 and 1995 221 and 382 trips were observed, respectively. This fishery, which extends from North Carolina to New York, is actually a combination of small vessel fisheries that target a variety of fish species, some of which operate right off the beach. The number of vessels in this fishery is unknown, because records which are held by both state and federal agencies have not been centralized and standardized. Observer coverage, expressed as percent of tons of fish landed, was 5% and 4% for 1995 and 1996 (Table 2). No harbor porpoises were taken in observed trips during 1993 and 1994. During 1995 and 1996, respectively, 6 and 19 harbor porpoises were observed taken (Table 2). During 1995 and 1996, observed fishing effort was concentrated off NJ and scattered between DE and NC from 1 to 50 miles off the beach. All documented by-catches during 1995 and 1996 were from January to April. By-catch estimates were determined using methods similar to that used for by-catch estimates in the New England multispecies gillnet fishery (Bravington and Bisack 1996; Bisack 1997a). Using the observed takes, the estimated annual mortality (CV in parentheses) attributed to this fishery was 103 (0.57) and 311 (0.31) for 1995 and 1996, respectively. However, because the spatial-temporal distribution of observer coverage did not cover all types of gillnet fisheries in the mid-Atlantic region during all times of the year, it is likely that the estimated numbers are under-estimates. Average estimated harbor porpoise mortality and serious injury from the Mid-Atlantic coastal gillnet fishery during 1995 and 1996 was 207 (CV=0.27) (Table 2).

Pelagic Drift Gillnet

One harbor porpoise was observed taken during the 1991-1996 Atlantic pelagic drift gillnet fishery. The estimated total number of hauls in the Atlantic pelagic drift gillnet fishery increased from 714 in 1989 to 1,144 in 1990; thereafter, with the introduction of quotas, effort was severely reduced. Fifty-nine different vessels participated in this fishery at one time or another between 1989 and 1993. In 1994, 1995, and 1996 there were 11, 12, and 10 vessels, respectively, in the fishery (Table 2). The estimated number of hauls in 1991, 1992, 1993, 1994, 1995 and 1996 were 233, 243, 232, 197, 164, and 149 respectively. Observer coverage, expressed as percent of sets was 8% in 1989, 6% in 1990, 20% in 1991, 40% in 1992, 42% in 1993, 87% in 1994, 99% in 1995, and 64% in 1996. The decline in observer coverage in 1996 is attributable to trips made by vessels that were deemed unsafe (size/condition) for observers. Fishing effort was concentrated along the southern edge of Georges Bank and off Cape Hatteras. Examination of the species composition of the catch and locations of the fishery throughout the year suggested that the drift gillnet fishery be stratified into two strata, a southern or winter stratum, and a northern or summer stratum. Estimates of the total by-catch, for each year from 1989 to 1993, were obtained using the aggregated (pooled 1989-1993) catch rates, by strata (Northridge 1996). Estimates of total annual by-catch for 1994, 1995, and 1996 were estimated separately for each year by summing the observed caught and the product of the average by-catch per haul and the number of unobserved hauls as recorded in logbooks. Variances were estimated using bootstrap re-sampling techniques (Bisack 1997b). The one observed by-catch was notable because it occurred in continental shelf edge waters adjacent to Cape Hatteras (Read *et al.* 1996). Estimated annual fishery-related mortality (CV in parentheses) attributable to this fishery was 0.7 in 1989 (7. 00), 1.7 in 1990 (2.65), 0.7 in 1991 (1.00), 0.4 in 1992 (1.00), 1.5 in 1993 (0.34), and 0 for 1994 to1996. Average estimated harbor porpoise mortality and serious injury in the Atlantic pelagic drift gillnet fishery during 1992-1996 was 0.4 (CV=0.34) (Table 2).

North Atlantic Bottom Trawl

One harbor porpoise mortality was observed in the North Atlantic bottom trawl fishery between 1989 and 1996. Vessels in this fishery, a Category III fishery under the MMPA, were observed in order to meet fishery management needs, rather than marine mammal management needs. An average of 970 (CV = 0.04) vessels (full and part time) participated annually in the fishery during 1989-1993. This fishery is active in New England waters in all seasons. The one take occurred in February 1992 east of Barnegatt Inlet, New York at the continental shelf break. The animal was clearly dead prior to being taken by the trawl, because it was severely decomposed and the tow duration of 3.3 hours was insufficient to allow extensive decomposition; therefore, there is no estimated by-catch for this fishery.

CANADA

Bay of Fundy Sink Gillnet

During the 1980's, Canadian total harbor porpoise by-catch in the Bay of Fundy sink gillnet fishery was thought to be low, based on casual observations and discussions with fishermen. The estimated harbor porpoise by-catch in 1986 was 94-116 and in 1989 it was 130 (Trippel *et al.* 1996). The Canadian gillnet fishery occurs mostly in the western portion of the Bay of Fundy during the summer and early autumn months, when the density of harbor porpoises is highest. Polacheck (1989) reported there were 19 gillnetters active in 1986, 28 active in 1987, and 21 in 1988.

More recently, an observer program implemented in the summer of 1993 provided a total by-catch estimates of 424 harbor porpoises. No measure of variability was estimated. The observer program was expanded in 1994 and the by-catch was estimated to be between 80-120 harbor porpoises where the fishing fleet consisted of 28 vessels (Trippel *et al.* 1996). During 1995, due to groundfish quotas being exceeded, the gillnet fishery was closed during July 21 to August 31, 1995. During the open fishing period of 1995, 89% of the fishing trips were observed, all in the Swallowtail region. Approximately 30% of these observed trips used pingered nets. The estimated by-catch was 87 harbor porpoises (Trippel *et al.* 1996). No confidence interval was able to be computed due to lack of coverage in the Wolves fishing grounds. During 1996, the Canadian gillnet fishery was closed from August 20 to September 30, 1996. Preliminary estimates of by-catch from 1996 were in the range of 20-50 harbor porpoises.

Herring Fishing Weirs

Harbor porpoises takes have been observed in Canadian fishing weirs, though not in U.S. fishing weirs. However, no program has been set up to observer U.S. fishing weirs. In the Bay of Fundy, weirs are presently operating from May to September each year. Weirs are found along the southwestern shore of the Bay of Fundy, and scattered along the western Nova Scotia and northern Maine coasts. There were 180 active weirs in the western Bay of Fundy and 56 active weirs in Maine in 1990 (Read 1994). It is unknown how many herring weirs currently exist in U.S. and Canadian waters. Smith *et al.* (1983) estimated approximately 70 harbor porpoises become trapped annually and, on average, 27 died annually , and the rest were released alive. At least 43 harbor porpoises were trapped in Bay of Fundy weirs in 1990, but the number killed is unknown. In 1993, after a cooperative program between fishermen and Canadian biologists began, over 100 harbor porpoises were released alive and an unknown number died (Read 1994). Records from more current interactions are presently being audited and will be presented in the next report.

Table 2. Summary of the incidental mortality of harbor porpoise (*Phocoena phocoena*) by commercial fishery including the years sampled (Years), the number of vessels active within the fishery (Vessels), the type of data used (Data Type), the annual observer coverage (Observer Coverage), the mortalities recorded by on-board observers (Observed Mortality), the estimated annual mortality (Estimated Mortality), the estimated CV of the annual mortality (Estimated CVs) and the mean annual mortality (CV in parentheses).

Fishery	Years	Vessels	Data Type [1]	Observer Coverage [2]	Observed Mortality	Estimated Mortality	Estimated CVs	Mean Annual Mortality
New England Multispecies Sink Gillnet	92-96	1993=349	Obs. Data Weighout, Trip Logbook	.07, .05, .07, .05, .04	51[3], 53[3], 99[3],43[3], 52[3]	1200[3],1400[3], 2100[3],1400[3], 1200[3]	.21, .18, .18, .27, .25	1460 (.10)
Pelagic Drift Gillnet	92-96	1994=11[4] 1995=12 1996=10	Obs. Data Logbook	.40, .42, .87, .99, .64	0, 1, 0, 0, 0	0.4[5], 1.5[5], 0, 0, 0	1.00, .34, 0, 0, 0	0.4 (.34)
Mid-Atlantic Coastal Sink Gillnet	95-96[6]	NA[7]	Obs. Data Weighout	.05, .04	6, 19	103, 311	.57, .31	207 (0.27)
TOTAL								1667 (.09)

1 Observer data (Obs. Data) are used to estimate by-catch rates, and are collected by the Northeast Fisheries Science Center (NEFSC) Sea Sampling Program. NEFSC collects Weighout (Weighout) landings data. Total landings are used as a measure of total effort for the sink gillnet fisheries. Mandatory trip logbook (Trip Logbook) data are used to determine the spatial distribution of some fishing effort in the New England multispecies sink gillnet fishery. Mandatory logbook (Logbook) data are used to estimate total effort for the pelagic drift gillnet fishery, and are collected at the Southeast Fisheries Science Center (SEFSC).

2 The observer coverage for the sink gillnet fishery is expressed as a percentage of trips; for the pelagic drift gillnet fishery it is expressed as a percentage of sets, the unit of effort for this fishery; and for the Mid-Atlantic coastal sink gillnet fishery it is expressed as a percentage of fish landed, the unit of effort for this fishery.

3 Harbor porpoise taken on observed pinger trips were added directly to the estimated total by-catch for that year. There were 10, 33, 44, 0, and 11 observed harbor porpoise takes on pinger trips from 1992 to 1996, respectively. In addition, there were nine observed harbor porpoise takes in 1995 on trips dedicated to fish sampling versus marine mammals (Bisack 1997a).

4 1994 to 1996 are shown, other years were not available on an annual basis.

5 For 1991-1993, pooled by-catch rates were used to estimate by-catch in months that had fishing effort but did not have observer coverage (Northridge 1996). In 1994 to 1996, observer coverage increased substantially, and so by-catch rates were not pooled (Bisack 1997b).

6 Only 1995 and 1996 data are reported because the observed coverages in 1993 and 1994 were negligible during the times of the year when harbor porpoise takes were possible.

7 The number of vessels in the Mid-Atlantic coastal sink gillnet fishery is not available.

Other Mortality

There is evidence that harbor porpoises were harvested by natives in Maine and Canada before the 1960's, and the meat was used for human consumption, oil, and fish bait (NEFSC 1992). The extent of these past harvests is unknown, though it is believed to be small. Up until the early 1980's, small kills by native hunters (Passamaquoddy Indians) were reported. Although, in recent years it was believed to have nearly stopped (Polacheck 1989) until recent public media reports depicted a Passamoquoddy tribe member dressing out a harbor porpoise. Further articles describing use of porpoise products for food and other purposes were timed to coincide with ongoing legal action in state court.

Sixty-four harbor porpoise strandings were reported from Maine to North Carolina between January and June, 1993. Fifty of those harbor porpoises were reported stranded in the U.S. Atlantic region from New York to North Carolina between February and May. Many of the carcasses recovered in this area during this time period had cuts and body damage suggestive of net marking (Haley and Read 1993). Five out of eight carcasses and fifteen heads from the strandings that were examined showed signs of human interactions (net markings on skin and missing flippers or flukes). Decomposition of the remaining animals prevented determination of the cause of death. Earlier reports of harbor porpoise entangled in gillnets in Chesapeake Bay and along the New Jersey coast and reports of apparent mutilation of harbor porpoise carcasses, raised concern that the 1993 strandings were related to a coastal net fishery, such as the American shad coastal gillnet fishery (Haley and Read 1993).

Between 1994 and 1996, 107 harbor porpoise carcasses were recovered from beaches in Maryland, Virginia, and North Carolina. Only juvenile harbor porpoises were present in this sample. Of the 40 harbor porpoises for which cause of death could be established, 25 displayed definitive evidence of entanglement in fishing gear. In four cases it was possible to determine that the animal was entangled in monofilament nets (Cox *et al.*, 1998).

Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured may wash ashore, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interaction.

STATUS OF STOCK

The status of harbor porpoises, relative to OSP, in the U.S. Atlantic EEZ is unknown. The National Marine Fisheries Service has proposed listing the Gulf of Maine harbor porpoise as threatened under the Endangered Species Act (NMFS 1993). The total fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and, therefore, cannot be considered to be insignificant and approaching zero mortality and serious injury rate. This is a strategic stock because average annual fishery-related mortality and serious injury exceeds PBR.

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