HARBOR SEAL (*Phoca vitulina*): Western North Atlantic Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The harbor seal is found in the western North Atlantic, from the eastern Canadian Arctic and Greenland south to southern New England and New York, and occasionally to the Carolinas (Boulva and McLaren 1979; Katona et al. 1993). Although the stock structure of the western North Atlantic population is unknown, it is thought that harbor seals found along the eastern U.S. and Canadian coasts represent one population (P. M. Payne, personal communication, 1989).

Harbor seals are year-round inhabitants of the coastal waters of eastern Canada and Maine (Katona et al. 1993), and occur seasonally along the southern New England and New York coasts from September through late May (Schneider and Payne 1983). Scattered sightings and strandings have been recorded as far south as Georgia (NMFS unpublished data). A general southward movement from the Bay of Fundy to southern New England waters occurs in autumn and early winter (Rosenfeld et al. 1988; Whitman and Payne 1990). A northward movement from southern New England to Maine and eastern Canada occurs prior to the pupping season, which takes place from mid-May through June along the Maine Coast (Wilson 1978; Whitman and Payne 1990). No pupping areas have been identified in southern New England (Payne and Schneider 1984). The overall geographic range throughout coastal New England has not changed significantly during the last century (Payne and Selzer 1989).

The majority of animals moving into southern New England waters are juveniles. Whitman and Payne (1990) suggest that the age-related dispersal may reflect the higher energy requirements of younger animals.

POPULATION SIZE

Since passage of the MMPA in 1972, the number of seals along the New England coast has increased nearly five-fold. Summer aerial survey haul-out counts along the Maine Coast totaled 28,810 animals (Kenney and Gilbert 1994). This number is considered to be a minimum abundance estimate because it is uncorrected for animals in the water or outside the survey area. Increased abundance of seals in the northeast region has also been documented during aerial and boat surveys of overwintering haul-out sites in southern New England and eastern Long Island (Payne and Selzer 1989; V. Rough, personal communication). Canadian scientists counted 3,600 harbor seals during an August 1992 aerial survey in the Bay of Fundy (Stobo and Fowler 1994), but noted that the survey was not designed to obtain a population estimate.

Minimum Population Estimate

A minimum population estimate is 28,810 seals, based on uncorrected total counts along the Maine coast in 1993.

Current Population Trend

Based on 1981, 1982, 1986, and 1993 surveys conducted along the Maine coast, Kenney and Gilbert (1994) estimated a 8.7% annual rate of increase in Maine coastal waters. Possible factors contributing to this increase include MMPA protection and increased prey. There are no indications that population growth has slowed or that it is at or near its potential maximum level. The rapid increase observed during the past two decades may reflect past reduction of the population by historical bounty hunting, possibly to a very low level.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are not known for this stock. The maximum net productivity rate was assumed to be 0.12 for purposes of this assessment (Anon. 1994).

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal (PBR) was specified as the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) (Anon. 1994). The recovery factor was set at 1.0 because the stock size is known to be increasing. PBR for this stock is 1,729 harbor seals.

ANNUAL HUMAN-CAUSED MORTALITY

Harbor seals, were bounty hunted in New England waters until the late 1960's. This hunt may have caused the demise of this stock in U.S. waters (Katona et al. 1993).

Researchers and fishery observers have documented incidental mortality in several fisheries, particularly within the Gulf of Maine (see below). An unknown level of mortality also occurs in the mariculture industry (i.e., salmon farming), and by deliberate shooting (NMFS unpublished data).

An unknown number of harbor seals have been taken in Newfoundland and Labrador, Gulf of St. Lawrence and Bay of Fundy groundfish gillnets, Atlantic Canada and Greenland salmon gillnets, Atlantic Canada cod traps, and in Bay of Fundy herring weirs (Read 1994). Furthermore, some of these mortalities (e.g., seals trapped in herring weirs) are the result of direct shooting. The Canadian government has recently implemented a pilot program that permits mariculture operators to use acoustic deterrents or shoot problem seals. The success of this program will be evaluated in April 1995 (J. Conway, Can. Dept. Fish. & Oceans, personal communication).

Average annual estimated fishery-related mortality and serious injury to this stock in the U.S. Exclusive Economic Zone (EEZ) during 1990-1993, based on observed fishery interactions, was 476 harbor seals (CV = 0.46). 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 determination cannot be made for specific fisheries until the implementing regulations for Section 118 of the MMPA have been reviewed by the public and finalized.

Fisheries Information

Incidental takes of harbor seals have been recorded in groundfish gillnet, herring purse seine, halibut tub trawl, and lobster fisheries (Gilbert and Wynne, 1985 and 1987). A study conducted by the University of Maine reported a combined average of 22 seals entangled annually by 17 groundfish gillnetters off the coast of Maine (Gilbert and Wynne 1987). All seals were young of the year and were caught from late June through August, and in early October. Interviews with a limited number of mackerel gillnetters indicated only one harbor seal entanglement and a negligible loss of fish to seals. Net damage and fish robbing were not reported to be a major economic concern to gillnetters interviewed (Gilbert and Wynne 1987).

Herring purse seiners have reported accidentally entrapping seals off the mid-coast of Maine, but indicated that the seals were rarely drowned before the seine was emptied (Gilbert and Wynne 1985). Capture of seals by halibut tub trawls are rare. One vessel captain indicted that he took one or two seals a year. These seals were all hooked through the skin and released alive, indicating they were snagged as they followed baited hooks. Infrequent reports suggest seals may rob bait off longlines, although this loss is considered negligible (Gilbert and Wynne 1985).

Incidental takes in lobster traps in inshore waters off Maine are reportedly rare. Captures of approximately two seal pups per port per year were recorded by mid-coastal lobstermen off Maine (Gilbert and Wynne 1985). Seals have been reported to rob bait from inshore lobster traps, especially in the spring, when fresh bait is used. These incidents may involve only a few individual animals. Lobstermen claim that seals consume shedding lobsters.

The Atlantic Canadian and Greenland salmon gillnet fishery is seasonal, with the peak from June to September, depending on location. In southern and eastern Newfoundland, and Labrador during 1989, 2,196 nets 91 m long were used. There is no effort data available for the Greenland fishery. However, the fishery was terminated in 1993 under an agreement between Canada and North Atlantic Salmon Fund (Read 1994).

The Canadian Atlantic groundfish gillnet fishery is important and widespread. Many fisherman hold groundfish gillnet licenses but the number of active fishermen is unknown. In 1989, approximately 6,800 licenses were issued to fishermen along the southern coasts of Labrador, and northeast and southern coast of Newfoundland. In the Gulf of St. Lawrence, there were about 3,900 licenses issued in 1989, while in the Bay of Fundy and southwestern Nova Scotia 659 licenses were issued.

There were 3,121 cod traps operating in Newfoundland and Labrador during 1979, and about 7,500 in 1980 (Read 1994). This fishery was closed at the end of 1993 due to collapse of Canadian groundfish resources.

Herring weirs are also distributed throughout the Bay of Fundy; it has been reported that 180 weirs were operating in the Bay of Fundy in 1990 (Read 1994).

Data on current incidental takes in U.S. fisheries are available from several sources. In 1986, NMFS established a mandatory logbook 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 by the program. In late 1992 and in 1993, the SEFSC provided observer coverage of pelagic longline vessels fishing off the Grand Banks (Tail of the Banks) and provides observer coverage of vessels fishing south of Cape Hatteras.

There are approximately 349 vessels (full and part time) in the New England multispecies sink gillnet fishery (Walden, in review). Observer coverage in terms of trips has been 1%, 6%, 7. 5%, and 5% for 1990 to 1993, respectively. The fishery has been observed in the Gulf of Maine and in Southern New England. There were 71 harbor seal mortalities, excluding three animals taken in the 1994 pinger experiment (NMFS unpublished data), observed in the New England multispecies sink gillnet fishery between 1990 and 1993. The estimated annual mortalities (CV in parentheses) in this fishery were 602 in 1990 (0.68), 231 in 1991 (0.22), 373 in 1992 (0.23), and 698 in 1993 (0.19). Average annual estimated fishery-related mortality and serious injury to this stock attributable to this fishery during 1990-1993 was 476 harbor seals (CV = 0.46). The stratification design used is the same as that for harbor porpoise (Bravington and Bisack, in review). The by-catch occurred in Massachusetts Bay, south of Cape Ann and west of Stellwagen Bank during January-March. By-catch locations became more dispersed during April-June from Casco Bay to Cape Ann, along the 30 fathom contour out to Jeffreys Ledge, with one take location near Cultivator Shoal and one off southern New England near Block Island. Incidental takes occurred from Frenchman's Bay to Massachusetts Bay during July-September. In inshore waters, the takes were aggregated while offshore takes were more dispersed. Incidental takes were confined from Cape Elizabeth out to Jeffreys Ledge and south to Nantucket Sound during October-December.

Other Mortality

Small numbers of harbor seals regularly strand during the winter period in southern New England and mid-Atlantic regions (NMFS unpublished data). Sources of mortality include human interactions (boat strikes and fishing gear), storms, abandonment by the mother, and disease (Katona et al. 1993; NMFS unpublished data). In 1980, more than 350 seals were found dead in the Cape Cod area from an influenza outbreak (Geraci et al. 1981).

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 seals, relative to OSP, in the U.S. EEZ is unknown, but the population is increasing. The species is not listed as threatened or endangered under the Endangered Species Act. In Canada seals are protected from harassment and unauthorized killing under current Marine Mammal Regulations. Kenney and Gilbert (1994) estimated a 8.7% annual rate of increase of this stock in Maine coastal waters based on 1981, 1982, 1986, and 1993 surveys conducted along the Maine coast. The population is increasing despite the known fishery-related mortality. This is not a strategic stock because fishery-related mortality and serious injury does not exceed PBR.

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