HOODED SEAL (*Cystophora cristata*): Western North Atlantic Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The hooded seal occurs throughout much of the North Atlantic and Arctic Oceans (King 1983) preferring deeper water and occurring farther offshore than harp seals (Lavigne and Kovacs 1988). Hooded seals tend to wander far out of their range and have been seen as far south as Puerto Rico, with increased occurrences from Maine to Florida. These appearances usually occur between January and May. Although it is not known which stock these seals come from, it is known that during this time frame, the Northwest Atlantic stock of hooded seals are at their southern most point of migration in the Gulf of St. Lawrence. The worlds' hooded seal population is divided into three separate stocks, each identified with a specific breeding site (Lavigne and Kovacs 1988). One stock, which whelps off the coast of eastern Canada, is divided into two breeding herds which breed on the pack ice. The Front herd breeds off the coast of Newfoundland and Labrador and the Gulf herd breeds in the Gulf of St. Lawrence. The second stock breeds on the White Ice off eastern Greenland, and the third stock occurs in the Davis Strait.

Hooded seals are a highly migratory species. Breeding occurs at the same time in February for each stock. Adults from all stocks then assemble in the Denmark Strait to moult between June and August (King 1983), and following this, the seals disperse widely. Some move south and west around the southern tip of Greenland, and then north along the west coast of Greenland. Others move to the east and north between Greenland and Svalbard during late summer and early fall (Lavigne and Kovacs 1988). Little else is known about the activities of hooded seals during the rest of the year until they assemble again in February for breeding.

Hooded seals are rarely found in the U.S. Atlantic Exclusive Economic Zone. Small numbers of hooded seals at the extreme southern limit of their range occur in the winter and spring seasons. The Northeast Marine Mammal Stranding Network reports an average of seven hooded seals stranded annually from 1989-92. In 1993-94, strandings increased to between 19-24 a year and carcasses were recovered from Massachusetts, Connecticut, and New York (Rubinstein 1994). The increased number of strandings may indicate a possible shift in distribution or range expansion southward into U.S. waters; if so, fishery interactions may increase.

POPULATION SIZE

The number of hooded seals in the western North Atlantic is unknown. Seasonal abundance estimates are available based on a variety of methods including aerial surveys. These methods often include surveying the whelping concentrations and mathematically modeling the pup production. Hooded seal pup production between 1966 and 1971 was estimated between 27,000 and 41,000 annually (Benjaminsen and Oritsland 1975). Estimated pup production dropped to 26,000 hooded seal pups in 1978 (Winters 1978). Pup production estimates began to increase after 1978, reaching 62,000 by 1984 (Hay *et al*. 1985), and rose to 82,000 in 1990 (Hammill *et al*. 1992). No recent population estimate is available, but assuming a ratio of pups to total population of 1:5, pup production in the Gulf and Front herds would represent a total population of approximately 400,000-450,000 hooded seals (Stenson 1993). It appears that the number of hooded seals is increasing.

Minimum population estimate

Present data are insufficient to calculate the minimum population estimate for U.S. waters. It is estimated that there are approximately 400,000 hooded seals in Canadian waters.

Current population trend

The population appears to be increasing in U.S. Atlantic EEZ, judging from stranding records, although the actual magnitude of this increase is unknown. The Canadian population appears to be increasing but, because different methods have been used over time to estimate population size, the magnitude of this increase has not been quantified.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. The most appropriate data are based on Canadian studies. Pup production in Canada may be increasing slowly (5% per annum), but due to the wide confidence

intervals and lack of understanding regarding stock dynamics, it is possible that pup production is stable or declining (Stenson 1993).

For purposes of this assessment, the maximum net productivity rate was assumed to be 0.12. This value is based on theoretical modeling showing that pinniped populations may not grow at rates much greater than 12% given the constraints of their reproductive life history (Barlow *et al*. 1995).

POTENTIAL BIOLOGICAL REMOVAL

Potential Biological Removal (PBR) is the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor (Wade and Angliss 1997). The minimum population size is unknown. The maximum productivity rate is 0.12, the default value for pinnipeds. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) was set at 1.0 because it was believed that harp seals are within OSP. PBR for the western North Atlantic hooded seal is unknown because the minimum population size in U.S. waters is unknown.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There are no records of fishery-related mortality to hooded seals in the NEFSC 1989-1993 Sea Sampling database.

An unknown number of hooded seals have been taken in Newfoundland and Labrador groundfish gillnets (Read 1994). The following summary on the hooded seal fishery is taken from Stenson (1993). In Atlantic Canada, hooded seals have been commercially hunted at the Front since the late 1800's. In 1974 total allowable catch (TAC) was set at 15,000, and reduced to 12,000 in 1983 and to 2,340 in 1984. In 1991 the TAC was increased to 15,000. A TAC of 8,000 was set for 1992 and 1993. From 1974 through 1982, the average catch was 12,800 animals, mainly pups. Since 1983 catches ranged from 33 in 1986 to 6,321 in 1991, with a mean catch of 1,116 between 1983 and 1992.

Hunting in the Gulf of St. Lawrence has been prohibited since 1964. No commercial hunting of hooded seals is permitted in the Davis Strait.

The total fishery-related mortality and serious injury for this stock is very low relative to the population size, especially in Canadian waters.

Fishery Information

No hooded seals have been taken incidentally in U.S. waters.

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 coast of Labrador and the northeast and southern coasts of Newfoundland. There were about 3,900 licenses issued in 1989 in the Gulf of St. Lawrence, 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.

Hooded seals are being taken in Canadian lumpfish and groundfish gillnets and trawls; however, estimates of total removals have not been calculated to date.

STATUS OF STOCK

The status of hooded seals relative to OSP in U.S. Atlantic EEZ is unknown. They are not listed as threatened or endangered under the Endangered Species Act. In Canada they are protected from harassment and intentional killing is controlled under the Marine Mammal Regulations. This mortality can be considered insignificant and approaching zero mortality and serious injury rate. This is not a strategic stock because the level of human-caused mortality and serious injury is believed to be very low relative to overall stock size.

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