BLUE WHALE (*Balaenoptera musculus*): Western North Atlantic Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The distribution of the blue whale, *Balaenoptera musculus,* in the western North Atlantic generally extends from the Arctic to at least mid-latitudes. Blue whales are most frequently sighted in the waters off eastern Canada, with the majority of recent records from the Gulf of St. Lawrence (Sears *et al.* 1987). The species was hunted around Newfoundland in the first half of the 20th century (Sergeant 1966). The present Canadian distribution, broadly described, is spring, summer, and fall in the Gulf of St. Lawrence, especially along the north shore from the St. Lawrence River estuary to the Strait of Belle Isle and off eastern Nova Scotia. The species occurs in winter off southern Newfoundland and also in summer in Davis Strait (Mansfield 1985). Individual identification has confirmed the movement of a blue whale between the Gulf of St. Lawrence and western Greenland (R. Sears and F. Larsen, unpublished data), although the extent of exchange between these two areas remains unknown.

The blue whale is best considered as an occasional visitor in USA Atlantic Exclusive Economic Zone (EEZ) waters, which may represent the current southern limit of its feeding range (CETAP 1982; Wenzel *et al.* 1988). All of the five sightings described in the foregoing two references were in August. Yochem and Leatherwood (1985) summarized records that suggested an occurrence of this species south to Florida and the Gulf of Mexico, although the actual southern limit of the species' range is unknown.

Using the U.S. Navy's SOSUS program, blue whales have been detected and tracked acoustically in much of the North Atlantic, including in subtropical waters north of the West Indies and in deep water east of the USA EEZ (Clark 1995). Most of the acoustic detections were around the Grand Banks area of Newfoundland and west of the British Isles. Sigurjónsson and Gunnlaugsson (1990) note that North Atlantic blue whales appear to have been depleted by commercial whaling to such an extent that they remain rare in some formerly important habitats, notably in the northern and northeastern North Atlantic.

POPULATION SIZE

Little is known about the population size of blue whales except for in the Gulf of St. Lawrence area. Here, 308 individuals have been catalogued (Sears *et al.* 1987), but the data were deemed to be unusable for abundance estimation (Hammond *et al.* 1990). Mitchell (1974) estimated that the blue whale population in the western North Atlantic may number only in the low hundreds. R. Sears (pers. comm.) suggests that no present evidence exists to refute this estimate.

Minimum Population Estimate

The 308 recognizable individuals from the Gulf of St. Lawrence area which were catalogued by Sears *et al.* (1987) is considered to be a minimum population estimate for the western North Atlantic stock.

Current Population Trend

There are insufficient data to determine population trends for this species. Off western and southwestern Iceland, an increasing trend of 4.9% a year was reported for the period 1969-1988 (Sigurjónsson and Gunnlaugsson 1990), although this estimate should be treated with caution given the effort biases underlying the sightings data on which it was based.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. For purposes of this assessment, the maximum net productivity rate was assumed to be 0.04. This 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).

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 308 (CV=unknown). 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 0.10 because the blue whale is listed as endangered under the Endangered Species Act (ESA). PBR for the western North Atlantic blue whale is 0.6.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There are no confirmed records of mortality or serious injury to blue whales in the USA Atlantic EEZ. However, in March 1998 a dead 20-m (66-ft) male blue whale was brought into Rhode Island waters on the bow of a tanker. The cause of death was determined to be ship strike. Although it appears likely that the vessel concerned was responsible, the necropsy revealed some injuries that were difficult to explain in this context. The location of the strike was not determined; given the known rarity of blue whales in USA Atlantic waters, and the vessel's port of origin (Antwerp), it seems reasonable to suppose that the whale died somewhere to the north of the USA EEZ.

Fishery Information

No fishery information is presented because there are no observed fishery-related mortalities or serious injury.

STATUS OF STOCK

The status of this stock relative to OSP in the USA Atlantic EEZ is unknown, but the species is listed as endangered under the ESA. There are insufficient data to determine population trends for blue whales. The total level of human-caused mortality and serious injury is unknown, but it is believed to be insignificant and approaching a zero mortality and serious injury rate. This is a strategic stock because the blue whale is listed as an endangered species under the ESA. A Recovery Plan has been published (Reeves *et al.* 1998) and is in effect.

REFERENCES

Barlow, J., S. L. Swartz, T. C. Eagle and P. R. Wade. 1995. U.S. Marine Mammal Stock Assessments: Guidelines for preparation, background, and a summary of the 1995 assessments. NOAA Technical Memorandum NMFS-OPR-6. U.S. Department of Commerce, Washington, D.C. 73 pp.

CETAP. 1982. A characterization of marine mammals and turtles in the mid- and north Atlantic areas of the U.S. outer continental shelf. Cetacean and Turtle Assessment Program, University of Rhode Island. Final Report #AA551-CT8-48 to the Bureau of Land Management, Washington, DC, 538 pp.

Clark, C. W. 1995. Application of U.S. Navy underwater hydrophone arrays for scientific research on whales. *Rep. int. Whal. Commn.* 45: 210-212.

Hammond, P. S., R. Sears and M. Bérubé. 1990. A note on problems in estimating the number of blue whales in the Gulf of St Lawrence from photo-identification data. *Rep. int. Whal. Commn.,* Special Issue 12: 141-142.

Mansfield, A. W. 1985. Status of the blue whale, *Balaenoptera musculus*, in Canada. *Canadian Field Naturalist* 99(3): 417-420.

Mitchell, E. 1974. Present status of northwest Atlantic fin and other whale stocks. Pages 108-169 *in* W. E. Schevill (ed), The whale problem: A status report. *Harvard University Press*, Cambridge, Massachusetts, 419 pp.

Reeves, R. R., P. J. Clapham, R. L. Brownell, Jr. and G. K. Silber. 1998. Recovery Plan for the blue whale (*Balaenoptera musculus*). Office of Protected Resources, National Marine Fisheries Service, Silver Spring, MD 20910. 39 pp.

Sears, R., F. Wenzel and J. M. Williamson. 1987. The blue whale: a catalog of individuals from the western North Atlantic (Gulf of St. Lawrence). Mingan Island Cetacean Study, St. Lambert, Quebec, Canada, 27 pp.

Sergeant, D. E. 1966. Populations of large whale species in the western North Atlantic with special reference to the fin whale. *Fish. Res. Board. Canada Circular* No. 9, 30 pp.

Sigurjonsson, J. and T. Gunnlaugsson. 1990. Recent trends in abundance of blue (*Balaenoptera musculus*) and humpback whales (*Megaptera novaeangliae*) off west and southwest Iceland, with a note on occurrence of other cetacean species. *Rep. int Whal. Commn.* 40: 537-551.

Wade, P. R. and R. P. Angliss. 1997. Guidelines for assessing marine mammal stocks: Report of the GAMMS Workshop, April 3-5, 1996, Seattle, Washington. NOAA Technical Memorandum NMFS-OPR-12. U.S. Dept. of Commerce, Washington, D.C. 93 pp.

Wenzel, F., D. K. Mattila and P. J. Clapham. 1988. *Balaenoptera musculus* in the Gulf of Maine. *Mar. Mammal Sci.* 4(2): 172-175.

Yochem, P. K. and S. Leatherwood. 1985. Blue whale. Pages 193-240 *in:* S. H. Ridgeway and R. Harrison (eds), *Handbook of Marine Mammals*, Vol. 3: The Sirenians and Baleen Whales. *Academic Press*, New York.