

The effects of whale watching on the reproductive fitness of humpback whales

TWENTY-FIVE YEARS (1980–2005) OF OBSERVATIONS OF

humpback whales (*Megaptera novaeangliae*) in the southern Gulf of Maine—primarily around Stellwagen Bank (east of Boston and north of Cape Cod) and Jeffreys Ledge (off the coast of Gloucester, Massachusetts, and north to New Hampshire and Maine)—show no negative effects of whale-watching exposure on the long-term calving rate of female whales, the likelihood that a female will have a calf in a given year, or the likelihood that the calf will survive until at least 2 years of age (Weinrich and Corbelli 2009). Gulf of Maine waters serve as feeding grounds for humpback whales from April to December and as popular whale-watching sites. National Park System units adjacent to the Gulf of Maine are Cape Cod National Seashore (Massachusetts) and Acadia National Park (Maine). Although other species of whales and dolphins are “watched” in New England, humpback whales are the primary focus of wildlife tourism in this area. Investigators wanted to determine whether whale watching, which began in New England in 1975, was affecting the health of these animals, and selected reproductive fitness as an indicator of health. With a life expectancy of 50 years, some of these animals were alive when whale watching started.

Notably, this study did not cover adult males, other whale species or other populations of humpback whales, or behavioral indicators of disturbance. Furthermore, the study focused on calf production and calf survival, but did not include other forms of reproductive activity such as communication and mating displays. For comparison, results published in the spring 2009 issue of *Park Science* indicate that boat noise affects the spatial-acoustic behavior of vocally active male humpback whales in Abrolhos Marine National Park, Brazil (Sousa-Lima and Clark 2009). These males produce “songs”—long, patterned sequences of sounds—presumably as a reproductive display on breeding grounds. In the Brazilian study, 77.8% of “singing” male humpback whales moved away from the oncoming boat, with 66.7% of these initiating movement at 2.5 miles (4.0 km) distance; 44.5% stopped singing for at least 20 minutes.

In the Gulf of Maine study, observers went onboard whale-watching vessels of two to four operators, some of which had multiple boats, out of Gloucester, Salem, Boston, and Provincetown, Massachusetts. Observers made “control” sightings in the Great South Channel, a relatively remote, offshore habitat used by the same population of whales but which receives little, if any, whale-watching traffic; however, the vessels from which these observations were made were not fundamentally different from the whale-watching vessels. During each sighting event, observ-

ers photographed the whales' dorsal fins and fluke pigmentation patterns for individual identification. Investigators identified the whales using a catalog maintained by the Whale Center of New England in Gloucester, Massachusetts, which contains records for 346 female humpback whales. Observers recorded females at least 8 years old (the age of maturity) or seen with at least one calf. The catalog contains 283 sexually mature, female humpback whales. Calves born after 2003 were excluded from the survival analysis. Observers also recorded the total number of exposure minutes and the total number of interactions per sighting. One approach and one departure equaled one "interaction." If more than one boat was "watching" at the same time, then each boat counted as an interaction, but the total number of exposure minutes was not multiplied by the total number of boats. The greatest number of sightings occurred in 1999 with 13,891 sightings during 873 trips, covering 191 days. Mean cumulative exposure time was 1,746.8 minutes (range 1–13,746 minutes), and the mean number of interactions was 89.8 (range 1–614). In reality, these numbers represent only a fraction of the total number of whale-watching exposure that each animal received. Given the high exposure level of the study population, the lack of deleterious effects from whale watching on the reproductive health of these animals is indeed notable. The authors suggest that "management efforts may, at times, be best concentrated on issues in which progress may be more difficult but ultimately may have greater conservation benefits" (Weinrich and Corbelli 2009, p. 2938). These issues include not only acoustic disturbance, as documented by Sousa-Lima and Clark (2009), but also entanglements, collisions with commercial shipping traffic, pollution, and the loss of important habitats.

References

- Sousa-Lima, R. S., and C. W. Clark. 2009. Whale sound recording technology as a tool for assessing the effects of boat noise in a Brazilian marine park. *Park Science* 26(1):59–63.
- Weinrich, M., and C. Corbelli. 2009. Does whale watching in southern New England impact humpback whale (*Megaptera novaeangliae*) calf production or calf survival? *Biological Conservation* 142(12):2931–2940.

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