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SIGHTINGS AND FEEDING OF GRAY WHALES IN THE NORTHERN GULF OF CALIFORNIA

BERNIE R. TERSHY AND DAWN BREESE

Moss Landing Marine Laboratories, P.O. Box 450, Moss Landing, CA 95039
Environmental Studies Department, University of California, Santa Cruz, CA 95064
Present address of BRT: Section of Neurobiology and Behavior, Seely G. Mudd Hall, Cornell University, Ithaca, NY 14853

Like those of many marine mammals, populations of the gray whale (*Eschrichtius robustus*) have fluctuated extremely in the past 150 years. Whaling, beginning in 1846, reduced the estimated aboriginal stock of 15,000–30,000 (Henderson, 1984; Scammon, 1874) to <4,000–5,000 (Ohsumi, 1976). The population began to recover near the turn of the century (Reilly, 1981), and in the past 15 years increased ca. 2.5%/year (Reilly, 1984) to 21,000 (International Whaling Commission, 1989). Concurrent with their recovery, gray whales recolonized areas of historical distribution such as the Gulf of California.

There are no estimates of the number of gray whales in the Gulf of California before exploitation. However, >220 gray whales were killed there from 1854 to 1874, and whalers sailed within 75 km of the mouth of the Colorado River to hunt them (Henderson, 1984).

Gray whales occasionally give birth to their young in the southern Gulf of California, off the coast of Sonora (Gilmore et al., 1967; O. Vidal, pers. comm.), but sightings in the northern Gulf of California rarely have been reported. The high primary productivity in the northern Gulf of California (Alvarez-Borrego, 1983), and the extensive areas of shallow, sediment-covered sea floor (Rusnak et al., 1964) suggest the presence of suitable habitat for prey (Oliver et al., 1983). Yet, there are no recent confirmed reports of gray whales feeding anywhere in the Gulf of California. Herein, we document presence of gray whales and an observation of feeding behavior in the northern Gulf of California.

From 1983 to 1986, we spent 2,760 h seeking and observing cetaceans from a 4.2-m skiff and a 30-m cliff in the Canal de Ballenas area of the northern Gulf of California (610 h from 25 May to 29 August 1983; 820 h from 3 April to 28 August 1984; 1,330 h from 6 April to 9 November 1985; 250 h from 14 January to 28 March 1986). We saw no gray whales in 1983 or 1984, although we spent >1,400 h in the field from April through August. During April–May 1985 and February–March 1986, 17 gray whales were sighted.

On 4 May 1985, we observed two ca. 9-m-long gray whales apparently feeding in water about 45 m deep. When first sighted at 1136 h, the two whales were within 30 m of each other, repeatedly surfacing and diving in an area ca. 100 m^2. They dove almost straight down as indicated by the steep angle of their flukes and peduncles, a behavior common to feeding gray whales (Nerini, 1984; Würsig et al., 1986).

On about one-third of the surfacings, muddy water streamed out both sides of their mouths as described by Nerini (1984). Many benthic amphipods were visible in these mud plumes. Two samples of ca. 30 ml of amphipods were collected from separate mud plumes with a hand-held plankton net (no estimate of amphipod density in the mud plumes was made because we could not accurately measure the volume of water sampled). Some of the amphipods were >7 mm long and most were 3–4 mm, well within the size range of smaller amphipods found in fecal samples of gray whales from the Bering Sea (Oliver et al., 1983). The amphipods were not identified to species, but tube-building Aoridae and Ampeliscidae, and burrowing Oedicerotidae were present. The samples were not analyzed quantitatively, but the Aoridae were most abundant in the sample, outnumbering the Ampeliscidae by ca. 100:1. The Oedicerotidae were least abundant. Outside of the mud plumes, no amphipods were seen and none was captured in repeated sweeps with the hand-held plankton net.

We recorded the respiration patterns of one of these whales. The mean ($\pm SD$) blow interval between dives was 18.6 ± 2.88 s (n = 33), mean dive duration was 4.56 min ± 1.82 (n = 10), mean duration at the surface between two dives was 0.94 ± 0.07 min (n = 10), and the mean number of blows between dives was 4 ± 0.0 (n = 11). This respiration pattern is similar to that reported for gray whales feeding at depths of 41–60 m in the northern Bering Sea (Würsig et al., 1986). At 1431 h, this whale stopped feeding and swam directly to the southeast. While traveling, it blew only three times between dives and, in contrast to its feeding dives, the flukes barely cleared the surface.

We combined our own sightings with published (Vidal et al., 1987; Wells et al., 1981) and unpublished sightings of gray whales in the Gulf of California above 28°00'N to get an indication of occurrence of gray whales there. From 1979 to 1989, 52 gray whales were recorded in 31 sightings. Of the 30 whales whose size was estimated, 18 (60%) were yearlings or subadults, 8 (27%) were adults, and 4 (13%) were females with calves. All sightings were between late December and mid-May, a period that spans their presence in the lagoons of western Baja California (Jones and Swartz, 1984). Forty-seven (90%) of the whales were sighted after mid-February when the number of single whales in the lagoons starts to decline (Jones and Swartz, 1984). The seasonality of sightings, and this observation of feeding, suggest that some gray whales visit the northern Gulf of California to exploit localized, but potentially rich, patches of prey.

These observations were made while studying *Balaenoptera* whales under Mexican Secretaria de Pesca permit numbers 1141, 3099, 1283, 0757, and 1960. The Los Angeles and Monterey Bay American Cetacean Society, Lerner-Grey Fund for Marine Research, and a Sigma Xi Grant-in-Aid of Research provided funding. D. Croll, C. Espinoza, D. McIntyre, A. Resendiz, G. Silber, and P. Turk provided unpublished data. E. Van Gelder assisted in the field and P. Slattery identified the amphipods. J. Heyning, J. Oliver, P. Slattery, O. Vidal, B. Würsig, and an anonymous reviewer appreciably improved the manuscript.

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