

all greater than 30 feet in length. Furthermore, in all cases the gray whales have appeared to be passive participants in the interaction.

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MFR PAPER 1057

Aerial Observations of Gray Whales During 1973

PAUL N. SUND and JOHN L. O'CONNOR

During their annual southward migration California gray whales, *Eschrichtius robustus*, were observed between Monterey Bay and Point Sur, Calif. (Figure 1) from an aircraft during the period 15-23 January 1973. An aerial survey was initiated in response to recommendations of the Joint Naval Undersea Center—National Marine Fisheries Service (NMFS), Southwest Fisheries Center Gray Whale Workshop (held in La Jolla, California in August 1972), that the accuracy of the annual NMFS shore census taken near Yankee Point be checked. The survey was designed to compare shore observers' estimates of numbers with those of aerial observers; to test the estimate that 95 percent of the gray whales migrating

by Yankee Point pass within 1.9 km (1.2 miles) of the shore (Rice and Wolman, 1971); and to provide observations of gray whale behavior and associations with other marine mammal species. The utility of aerial surveys in cetacean research has been demonstrated by Levenson (1968) and Leatherwood (1974a,b). This paper reports on simultaneous shore and aircraft observations and discusses the problems inherent in each method.

METHODS

Five flights, totaling 13.6 hours, were made between Monterey Bay and Point Sur, Calif. (Figure 1) in a Cessna 172 flown by a professional spotter-pilot at altitudes ranging from 150 m (500 ft) to 900 m (3,000 ft).

Radio communications with shore observers permitted coordination of observational efforts. Time, location, numbers of whales, and behavior observations were noted for the sightings and photographs were attempted on occasion.

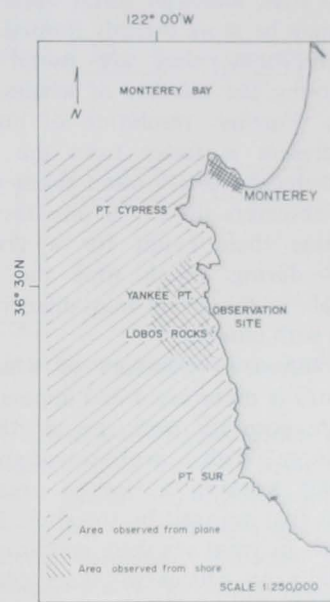


Figure 1.—The area off California observed for gray whales, 15-23 January 1973.

RESULTS AND CONCLUSIONS

From the aerial observations made in the sector scanned by shore observers, the following points were determined: Of 24 paired observations (individuals or groups observed by both air and ground personnel), initial visual contact was made by a ground observer in eight instances and by an airborne observer in ten instances. Hence, ground and aircraft observers apparently were equally adept at initially sighting whales. Of the 24 paired sightings, the aerial observers were able to correct the

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numbers recorded by the shore observers six times. In three instances of poor (white caps and 4-6 foot swells) sea state conditions, on the other hand, the aerial observers were unable to confirm groups or individuals sighted by the shore observers. These data suggest that, although aerial observations may be more directly limited by sea conditions, they are useful in quantifying the number of whales in groups. Further, resolution of numbers present is faster from the air than from shore. (It often takes the shore observers up to 30 minutes to determine their count for a given group—during which time the individuals in the group may dissociate or join with others.)

Resolution of numbers of whales in groups is more rapid and apparently more accurate from the air than from shore. With a professional spotter pilot working a limited area—such as that scanned by the shore observers—in good sea state conditions, essentially no whales will pass unnoticed. “Misses” by the aerial observers were due to leaving the area prematurely in order to accomplish other tasks; had the aircraft been consistently in the shore observers’ area (and immediately outside to prevent unnoticed passage of individuals offshore) none would have gone unrecorded.

The aerial observers made 50 observations of whales involving 149 animals. All these observations occurred within 7 miles of the shoreline, even though the area surveyed extended to 25 miles seaward. Of these sightings, 98 percent were within 5 miles of shore, 96 percent within 3 miles, and 94 percent within 1 mile. Distances were estimated by making timed runs at constant speed from positions offshore to the coastline. The observations of this study tend to confirm Rice and Wolman’s statement that 95 percent of the whales pass within 1.9 km (1.2 miles) of the shore near the Yankee Point site.

Gray whales have been reported interacting with other marine mammals by Leatherwood (1974b), but

during this study no other marine mammals were observed “associating” directly with gray whales. Feeding behavior was observed on two occasions. A calf was seen accompanied by an adult. These two latter observations are of particular note and the senior author intends to publish the details elsewhere.¹

¹ Sund, P. N. Manuscript. Evidence of feeding during migration and of an early birth of the California gray whale.

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MFR PAPER 1058

Telemetry of Temperature and Depth Data From a Free Ranging Yearling California Gray Whale, *Eschrichtius robustus*

W. E. EVANS

ABSTRACT

In 1968 the author initiated a series of studies using radio transmitters to follow the movements and study the diving behavior of small toothed whales. This paper describes the modifications of this equipment necessary to use this technique on larger whales, in this case a yearling California gray whale, Eschrichtius robustus. In addition to the transmission of positional data, i.e. azimuth and depth of dive, the instrumentation package used in this study was designed to transmit environmental data (temperature-at-depth). The animal used in this study, a female E. robustus, was captured on 13 March 1971, in Scammon's Lagoon, Baja California Sur, Mexico, by Sea World, Inc., San Diego, and released on 13 March 1972, at lat. 32°41.5'N, long. 117°20.5'W (off Point Loma, San Diego, Calif.) by the Naval Undersea Center (NUC), San Diego. Radio contact was maintained with the animal until 5 May 1972. Depth of dive and temperature-at-depth data were continuously monitored for a 24-hour period.

INTRODUCTION

The present study is an extension of a 6-year research program designed to evaluate the feasibility of using medium-sized to large cetaceans, instrumented with a combination data collection and transmission system,

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to measure physical oceanographic parameters at various depths, and to evaluate the relationship of these parameters to cetaceans’ movement patterns and secondary productivity (Evans, 1970, 1971, in press).

Because of the impending release of a yearling California gray whale