ACCESS NUMBER: **RU-592**

STUDY TITLE: Summer Distribution and Numbers of Fin, Humpback and Gray Whales in the Gulf of Alaska.

REPORT TITLE: Summer Distribution and Numbers of Fin, Humpback and Gray Whales in the Gulf of Alaska.

CONTRACT NUMBER(S): BLM: IA1-10; MMS: 14-12-0001-29182; Research Unit No. 592.

SPONSORING OCS REGION: Alaska.

APPLICABLE PLANNING AREA(S): Gulf of Alaska; Kodiak; Cook Inlet; Shumagin.

FISCAL YEAR(S) OF PROJECT FUNDING: 1980; 1981.

COMPLETION DATE OF REPORT: March 1981.

COST(S): FY 1980: $311,850; FY 1981: $294,150; CUMULATIVE PROJECT COST: $606,000.

PROJECT MANAGER(S): Outer Continental Shelf Environmental Assessment Program (OCSEAP).

AFFILIATION: National Oceanic and Atmospheric Administration.

ADDRESS: 701 C Street, Box 56, Anchorage, Alaska 99513.

PRINCIPAL INVESTIGATOR(S)*: D. Rice (National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northwest and Alaska Fisheries Center).

KEY WORDS: Gulf of Alaska; Kodiak; Cook Inlet; Shumagin; Alaska; endangered species; marine mammals; cetaceans; whales; seasonality; abundance; distribution; census; shipboard observations; photographs; tagging; radiotelemetry; Balaenoptera; fin whale; humpback whale; Megaptera; right whale; Balaena; gray whale; Eschrichtius; dolphins; porpoises; seals; Phoca; Callorhinus; sea otter; Enhydra; sperm whale; Physeter; Steller sea lion; Eumatopias; Prince William Sound; Yakutat; Shelikof Strait; Aleutian Islands; Alaska Region.

BACKGROUND: Seven of the ten species of baleen whales are known to occur in the Gulf of Alaska. Six of these species, including the blue (Balaenoptera musculus), fin (B. physalus), minke (B. acutorostrata), sei (B. borealis), humpback (Megaptera novaeangliae), and right whale (Balaena glacialis), have historically used the gulf as a major feeding area from spring to fall. The seventh species, the gray whale (Eschrichtius robustus), is known to migrate along the Gulf of Alaska coast twice each year. All of these whales, with the exception of the minke, were classified as endangered. The Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973 required that studies be done to determine if proposed habitat impacts would adversely affect populations, and to determine what measures should be done to mitigate such impacts. With proposed outer continental shelf (OCS) lease sales in the Gulf of Alaska (i.e., Lease Sale Nos. 48 and 55), it was determined that baseline studies were needed on whales in these areas. The present study was initiated to determine the summer distribution and population size of fin, humpback, and gray whales in Gulf of Alaska. Prior to this study, there were few accurate data on the total numbers of whales in Gulf of Alaska. This study was conducted as part of the Outer Continental Shelf Environmental Assessment Program of the National Oceanic and Atmospheric Administration (NOAA). Funding was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM; now the Minerals Management Service) through an interagency agreement with NOAA.

OBJECTIVES: (1) To determine the spatial and temporal distribution of humpback and fin whales in the Gulf of Alaska between Shumagin Islands to Fairweather Grounds, including Prince William Sound; (2) To define patterns of summer (June through August) movements and important habitat areas for gray, fin, and humpback whales; (3) To increase the accuracy of humpback and fin whales population estimates in Gulf of Alaska during summer months; (4) To follow radio-tagged gray whales, as part of the BLM/NMFS project; and (5) To conduct exploratory acoustic monitoring studies to determine if whales that were not visually observed, could be acoustically detected.

DESCRIPTION: The study was completed between June and August 1980. Censusing was conducted from the charter fishing vessel U.S. DOMINATOR. The study area comprised the waters of the proposed lease sites over the continental shelf and slope, and immediate offshore areas of Gulf of Alaska from 156°W to 138°W Long. For statistical purposes, the study area was divided into 24 quadrants, each one degree of latitude (i.e., 60 nmi) by two degrees of longitude (i.e., 58 to 69 nmi) in width. In addition to the primary study area, other adjacent areas were also investigated. These consisted of: (1) offshore waters from Seattle, WA to Cape Fairweather, AK; (2) Icy Straits and Cross Sound (southeast Gulf of Alaska); (3) Yakutat Bay (northeast Gulf of Alaska); (4) Prince William Sound (northern Gulf of Alaska); (5) Shelikof Strait (northwest Gulf of Alaska); and (6) coastal waters from Dutch Harbor east to Chirikof Island in the Aleutians Islands.

Whale censusing was done using a line-transect method. During the first half of the cruise (17 June to 20 July), 15 transects (each 1° Long apart) were completed within the proposed lease areas. Outside the lease areas, transects were spaced further apart (2° Long). During the remainder of the cruise, nine transects were run (each 1° Long apart). Additionally, three shorter transects (each 30' Long apart) were completed near the Middleton and Barren Islands. During the survey, the vessel maintained a constant speed. Three observers watched over a 360° arc from the bridge. When a whale was sighted beyond 0.5 km of the tractline, the boat altered course and closed in on the whale until it was identified. Photographs of the underside of humpback flukes were taken to aid in identification of individual whales. Photos were entered into the National Marine Mammal Laboratory, Photographic Identification Storage and Retrieval system for comparison with extensive photographic collection of humpback flukes. Each time a whale was observed, the angle from the vessel's heading and the distance to the whale were recorded. Distances were estimated by three methods: (1) visual; (2) time duration for vessel to reach whale; and (3) Loran-C positions from vessel to position where whale was sighted. During the second half of the cruise, a radio receiver was used to listen for radio-tagged whales. Also, acoustic studies were completed, on an opportunistic basis, to listen for underwater phonations of whales.

SIGNIFICANT CONCLUSIONS: More than 6,900 individuals of 13 species of marine mammals were observed in coastal and offshore waters of Gulf of Alaska. These included Dall porpoise, fin whale, goose-beaked whale, harbor porpoise, harbor seal, killer whale, humpback whale, minke whale, North Pacific white-sided dolphin, northern fur seal, sea otter, sperm whale, and Steller sea lion. It was estimated that 300 humpback whales and 160 fin whales summered in the study area. The total absence of some whales (e.g., blue, gray, right, and sei) and the low numbers of others clearly demonstrated that their populations were severely depleted. With the numbers of whales already so low, adverse effects of OCS development should be kept to the minimum to prevent further harm to these species. The presence of site fidelity in humpbacks suggested that OCS-related activities should be avoided in areas known to be frequented by this species. Further research on distribution patterns of baleen whales in Gulf of Alaska was recommended. A single season of field work was deemed inadequate because whales tend to be nomadic in offshore waters during summer when they form temporary aggregations in food-rich areas.

STUDY RESULTS: Over 3,300 miles were logged in the systematic census tracts. From this census effort, 1,230 marine mammal sightings were made totaling 7,000 individuals belonging to 13 species. Species identified during the study effort included Dall porpoise (Phocoenoides dalli), fin whale, goose-beaked whale (Ziphius cavirostris), harbor porpoise (Phocoena phocoena), harbor seal (Phoca vitulina), killer whale (Orcinus orca), humpback whale, minke whale, North Pacific white-sided dolphin (Lagenorynchus obliquidens), northern fur seal (Callorhinus ursinus), sea otter (Enhydra lutris), sperm whale (Physeter macrocephalus), and Steller sea lion (Eumatopias jubatus).

Dall porpoise was observed more than any other species and accounted for the second largest numbers of individuals seen. Six hundred forty-one sightings of Dall porpoise were made totalling 2,150 animals. Steller sea lion was the most numerous marine mammal, accounting for 41% of the individuals observed. Most of these were observed during the second half of the cruise. The third most abundant

species was the North Pacific white-sided dolphin which represented 13% of the total marine mammals observed.

Six species of whales were observed, including goose-beaked, fin, humpback, killer, minke, and sperm whales. Of these, the humpback and killer were most abundant, represented by 191 and 133 animals, respectively. Fin, minke, and sperm whales were represented by 30 to 37 animals each, while only seven individuals of the goose-beaked whale were noted.

Humpbacks were the most abundant baleen whales observed in the study area. They were thinly scattered over the entire study area. Small aggregations were found during both halves of the cruise in four areas: (1) Yakutat Bay; (2) Cape St. Elias to Middleton Island; (3) Barren Islands; and (4) Prince William Sound. Humpback whales were most abundant in the Barren Islands where some 20 individuals were observed. Only 25 individual humpbacks were observed during the census transect surveys. Assuming an "effective transect width" of 2 miles (i.e., one mile on each side of the ship), an estimated 300 humpbacks occurred within the 76,000 mi^2 study area. Average density was estimated to be one whale per 250 mi^2. Fin whales were sighted on 13 occasions, with a total of 19 individuals being observed. Based on these few sightings, there was an estimated 160 fin whales in the study area. Average density was estimated to be one whale per 4,000 mi^2.

Photographs of 36 humpback whales were taken. Repeated observation of four of these animals, at intervals of from 2 to 27 days, were made within the general areas where they were first observed. Two of these whales were observed previously in 1977, and one in 1978, all in the same areas. These data suggested that humpbacks may return each year to the same summertime feeding area.

No gray whales were observed within the study area even though a thorough search was made for them in suitable nearshore habitats. This suggested that they did not summer in this region. Sperm whales were spotted on six occasions, with at least 36 individuals being observed. They were mostly observed over deep water beyond the continental shelf where they feed on midwater squid. No blue, right, or sei whales were observed during this study . Prior to the 1960s, the immediate offshore waters of the study area were an important summer ground for blue whales. Right whales, being near extinction, previously used the region south of Kodiak Island. Sei whales tended to use waters further offshore than most whales, and thus, possibly were outside the census study-area. The total absence of some whales (e.g., blue, gray, right, and sei) and the low numbers of others, clearly demonstrated that they were severely depleted by hunting. With the numbers of whales already so low, adverse effects of OCS development should be kept to the absolute minimum to prevent further harm to these species. The presence of site fidelity in humpbacks suggested that OCS-related activities should be avoided in areas known to be frequented by this species.

Data on distribution patterns of baleen whales were based on a single season of field work. Such an analysis was thought to be inadequate because in offshore waters whales tended to be nomadic in summer when they form temporary aggregations in food-rich areas. Further studies were recommended to better document their abundance and distribution in the Gulf of Alaska.

STUDY PRODUCT(S): Rice, D. W. and A. A. Wolman. 1981. Summer Distribution and Numbers of Fin, Humpback and Gray Whales in the Gulf of Alaska. A final report by the Northwest and Alaska Fisheries Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration for the U.S. Department of the Interior, Bureau of Land Management Alaska OCS Office, Anchorage, AK and the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, OCS Environmental Assessment Program, Anchorage, AK. Contract No. 14-12-0001-29182; Research Unit No. 592. 46 pp.

ACCESS NUMBER: **RU-592**

The report(s) cited above has/have been included within the report series entitled "Environmental Assessment of the Alaskan Continental Shelf, Final Reports of Principal Investigators," Volume 20 (December 1983), pp. 1-46 (NTIS No. PB85-201226/AS).

*P.I.'s affiliation may be different than that listed for Project Manager(s).