

KILLER WHALE (*Orcinus orca*): Northern Gulf of Mexico Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The killer whale is distributed worldwide from tropical to polar regions (Leatherwood and Reeves 1983). Sightings of these animals in the northern Gulf of Mexico occur primarily over the deeper waters off the continental shelf [Southeast Fisheries Science Center (SEFSC) unpublished data]. Killer whales were seen only in the summer during recent seasonal GulfCet aerial surveys of the northern Gulf of Mexico during 1993-1995 (Hansen *et al.* 1996) and in the late spring during vessel surveys (SEFSC unpublished data). Different stocks have been identified in the northeastern Pacific based on morphological, behavioral, and genetic characteristics (Bigg *et al.* 1990; Hoelzel 1991). There is no information on stock differentiation for the Atlantic population, although an analysis of vocalizations of killer whales from Iceland and Norway indicated that stocks from these areas may represent different stocks (Moore *et al.* 1988).

POPULATION SIZE

Estimates of abundance were derived through the application of distance sampling analysis (Buckland *et al.* 1993) and the computer program DISTANCE (Laake *et al.* 1993) to sighting data collected during 1991-1994 spring-summer, visual sampling, line-transect vessel surveys of the northern Gulf of Mexico (Hansen *et al.* 1995), which includes data collected as part of the GulfCet program (Hansen *et al.* 1996). These surveys were conducted throughout the area from approximately the 200 m isobath along the U.S. coast to the seaward extent of the U.S. Exclusive Economic Zone. The seasonal GulfCet aerial surveys included only a small portion of the stock range and these data were not used for abundance estimation. Estimated killer whale abundance by survey year [coefficient of variation (CV) in parentheses] was zero in 1991, 138 in 1992 (0.96), 641 in 1993 (0.50), and 193 in 1994 (1.12) (Hansen *et al.* 1995). Survey effort-weighted estimated average abundance of killer whales for all surveys combined was 277 (CV = 0.42) (Hansen *et al.* 1995).

Minimum Population Estimate

The minimum population size was estimated from the average estimated abundance which was 277 killer whales (CV = 0.42) (Hansen *et al.* 1995). The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normally distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The minimum population estimate is 197 killer whales.

Current Population Trend

The abundance estimates were highest during 1993; however, there were no observations of this species during 1991, and the 1992-1994 estimates were not significantly different using the criteria of no overlap of log-normal 95% confidence intervals. The apparent differences in abundance estimates may have been caused by lower sampling effort during 1991, and by low sampling intensity relative to population size (Hansen *et al.* 1995) or by inter-annual variation in distribution patterns or spatial sampling patterns, rather than changes in population size. Preliminary analysis of

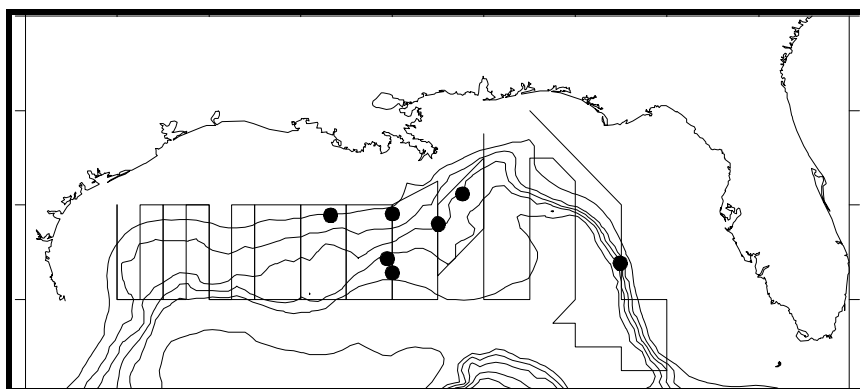


Figure 1. Distribution of killer whale sightings during NOAA Ship Oregon II marine mammal surveys during 1991-1994. The straight lines show transects during two surveys and are examples of typical survey transects. Isobaths are in 183 m (100 fm) intervals.

existing photo-identification data shows that some individual whales have been seen during more than one survey (SEFSC unpublished data).

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are not known for this stock. 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 the minimum population size, one half the maximum net productivity rate, and a “recovery” factor (Wade and Angliss 1997). The “recovery” factor, which accounts for endangered, depleted, and threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.5 because this stock is of unknown status. PBR for this stock is 2.0 killer whales.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

The level of past or current, direct, human-caused mortality of killer whales in the northern Gulf of Mexico is unknown. Available information indicates there likely is little, if any, fisheries interaction with killer whales in the northern Gulf of Mexico. There have been no logbook reports of fishery-related mortality or serious injury and no fishery-related mortality or serious injury has been observed.

There were no documented strandings of killer whales in the northern Gulf of Mexico during 1987-1994 which were classified as likely caused by fishery interactions or other human-related causes. Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured may wash ashore, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interaction.

Fisheries Information

Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. Total longline effort for the Gulf of Mexico pelagic fishery, including OCS edge, continental slope, and Mexican territorial waters, based on mandatory logbook reporting, was 4,400 sets in 1991, 4,850 sets in 1992, and 3,260 sets in 1993 (Cramer 1994). This fishery has been monitored with about 5% observer coverage, in terms of trips observed, since 1992. There were no reports of mortality or serious injury of killer whales by this fishery.

Pair trawl fishing gear has the potential to capture marine mammals, but there have been no reports of mortality or serious injury to marine mammals in the Gulf of Mexico. This fishery has not been observed by NMFS observers, and there are no other data available as to the extent of this fishery in the Gulf of Mexico. It is assumed that it is very limited in scope and duration.

STATUS OF STOCK

The status of this stock relative to OSP is unknown and there are insufficient data to determine population trends. This species is not listed under the Endangered Species Act. The total known fishery-related mortality and serious injury for this stock is less than 10% of the calculated PBR and, therefore, can be considered insignificant and approaching zero mortality and serious injury rate. The total level of human-caused mortality and serious injury is unknown, but it is believed to be insignificant relative to PBR; therefore, this is not a strategic stock.

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