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# MINKE WHALE (*Balaenoptera acutorostrata*): California/Oregon/Washington Stock

## STOCK DEFINITION AND GEOGRAPHIC RANGE

The International Whaling Commission (IWC) recognizes 3 stocks of minke whales in the North Pacific: one in the Sea of Japan/East China Sea, one in the rest of the western Pacific west of 180°N, and one in the "remainder" of the Pacific (Donovan 1991). The "remainder" stock only reflects the lack of exploitation in the eastern Pacific and does not imply that only one population exists in that area (Donovan 1991). In the "remainder" area, minke whales are relatively common in the Bering and Chukchi seas and in the Gulf of Alaska, but are not considered abundant in any other part of the eastern Pacific (Leatherwood et al. 1982; Brueggeman et al. 1990). In the Pacific, minke whales are usually seen over continental shelves (Brueggeman et al. 1990). In the extreme north, minke whales are believed to be migratory, but in inland waters of Washington and in central California they appear to establish home ranges (Dorsey et al. 1990). Minke whales occur year-round in California (Dohl et al. 1983; Barlow 1995; Forney et al. 1995) and in the Gulf of California (Tershy et al. 1990). Minke whales are present at least in summer/fall along the Baja California peninsula (Wade and Gerrodette 1993). Because the "resident" minke whales from California to Washington appear behaviorally distinct from migratory whales further north, minke whales in coastal waters of California, Oregon, and Washington (including Puget Sound) will be considered as a separate stock. Minke whales in Alaskan waters are considered in a separate stock assessment report for the Alaska Region.

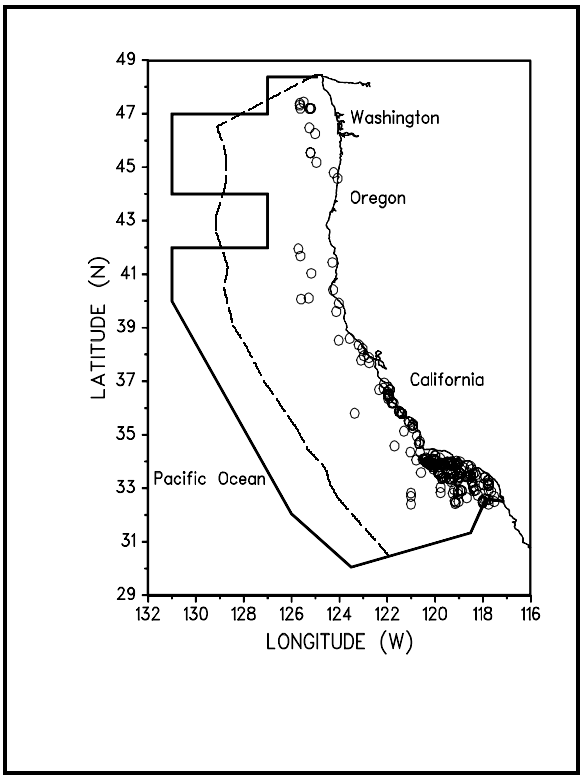


**Figure 8**. Minke whale sighting locations based on aerial and shipboard surveys off California, Oregon, and Washington, 1975-94 (see Barlow et al. 1997, Appendix 2 for data sources and information on timing and location of surveys). Dashed line represents the U.S. EEZ; bold line indicates the outer boundary of all surveys combined.

## POPULATION SIZE

No estimates have been made for the number of minke whales in the entire North Pacific. The number of minke whales is estimated as 631 (CV = 0.45) based on ship surveys in 1991, 1993, and 1996 off California and in 1996 off Oregon and Washington (Barlow 1997.). Forney et al. (1995) estimate at total of 73 (CV=0.62) in California based on an aerial survey, but this estimate is negatively biased because it excludes diving whales. In addition, Green et al. (1992) report 4 sightings of minke whales in aerial surveys of Oregon and Washington, but they did not estimate population size for that area.

### Minimum Population Estimate

The minimum population estimate for minke whales is taken as the lower 20th percentile of the log-normal distribution of abundance estimated from the summer/fall ship surveys in California, Oregon, and Washington waters (Barlow 1997) or approximately 440. More sophisticated methods of estimating minimum population size would be available if a correction factor (and associated variance) were available to correct the aerial survey estimates for missed animals.

### Current Population Trend

There are no data on trends in minke whale abundance in waters of California, Oregon and/or Washington.

## CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

There are no estimates of the growth rate of minke whale populations in the North Pacific (Best 1993).

## POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (440) times one half the default maximum net growth rate for cetaceans (1/2 of 4%) times a recovery factor of 0.45 (for a stock of unknown status and a mortality CV = 0.67), resulting in a PBR of 4.0.

## HUMAN-CAUSED MORTALITY

### Historic Whaling

The estimated take of western North Pacific minke whales by commercial whalers was approximately 31,000 from 1930 to 1987 (C. Allison, IWC, pers. comm.). Minke whales were not harvested commercially in the eastern North Pacific: none were reported taken by shore-based whaling stations in central or northern California between 1919 and 1926 (Clapham et al. 1997) or between 1958 and 1965 (Rice 1974). Reported aboriginal takes of minke whales in Alaska totalled 7 between 1930 and 1987 (C. Allison, IWC, pers. comm.).

### Fishery Information

Minke whales may occasionally be caught in coastal set gillnets off California, in salmon drift gillnets in Puget Sound, Washington, and in offshore drift gillnets off California and Oregon. A summary of known fishery mortality and injury for this stock of minke whales is given in Table 1. Detailed information on this fishery is provided in Barlow et al. (1997, Appendix 1). The average fishery mortality is estimated to be 3.6 (CV=0.67) minke whales per year for the five most recent years of monitoring (1992-96). Total fishery mortality for minke whales was not estimated for the 1980-86 California Department of Fish and Game set and drift gillnet observer program, but based on the 2 observed deaths in 1% of the total sets, the total mortality during this time may have been on the order of 200 minke whales or 40 per year.

**Table 1.** Summary of available information on the incidental mortality and injury of minke whales (CA/OR/WA stock) for commercial fisheries that might take this species (Pierce et al. 1996; Julian 1997, Julian and Beeson, in press).

| Fishery Name | Year(s) | Data Type | Percent Observer Coverage | Observed Mortality | Estimated Mortality (CV in parentheses) | Mean Annual Takes 1992-96 (CV in parentheses) |
|---|---|---|---|---|---|---|
| **CA/OR thresher shark/swordfish drift gillnet fishery** | 1992<br>1993<br>1994<br>1995<br>1996 | observer data | 13.6%<br>13.4%<br>17.9%<br>15.6%<br>12.4% | 0<br>0<br>1<br>0<br>1 | 0<br>0<br>6 (0.91)<br>0<br>12 (0.96) | 3.6 (0.67) |
| **WA Puget Sound Region salmon drift gillnet fishery (areas 7 and 7A)** | 1994 | observer data | 7% | 0 | 0 | 0 |
| **CA angel shark/halibut and other species large mesh (>3.5") set gillnet fishery** | 1992-96 | observer data | 10-18% | 0,0,0,0,0 | 0,0,0,0,0 | 0 |
| **Total annual takes** | | | | | | 3.6 (0.67) |

Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may take animals from the same population. Quantitative data are available only for the Mexican swordfish drift gillnet fishery, which has increased from two vessels in 1986 to 29 vessels in 1992-(Sosa-Nishizaki et al. 1993). The total number of sets in this fishery in 1992 can be estimated from data provided by these authors to be approximately 2,700, with an observed rate of marine mammal bycatch of 0.13 animals per set (10 marine mammals in 77 observed sets; Sosa-Nishizaki et al. 1993). This overall mortality rate is similar to that observed in California driftnet fisheries

during 1990-95 (0.14 marine mammals per set), but species-specific information is not available for the Mexican fisheries. The number of set gillnets used in Mexico is unknown.

**Ship Strikes**

Ship strikes were implicated in the death of one minke whale in 1977 and 2 unidentified whales (possibly minke whales) in 1990 (J. Heyning and J. Cordaro, pers. comm.). Additional mortality from ship strikes probably goes unreported because the whales do not strand or, if they do, they do not always have obvious signs of trauma.

**STATUS OF STOCK**

There were no known commercial whaling harvests of minke whales from Baja California to Washington. Minke whales are not listed as "endangered" under the Endangered Species Act and are not considered "depleted" under the MMPA. The greatest uncertainty in their status is whether entanglement in commercial gillnets and ship strikes could have reduced this relatively small population. Because of this, the status of the west-coast stock should be considered "unknown". For the past five years, the annual mortality due to fisheries and ship strikes (3.6) is less than the calculated PBR for this stock (4.0), so they are not considered a "strategic" stock under the MMPA. Fishery mortality alone is greater than 10% of the PBR; therefore, total fishery mortality is not approaching zero mortality and serious injury rate. There is no information on trends in the abundance of this stock. The increasing levels of anthropogenic noise in the world's oceans has been suggested to be a habitat concern for whales, particularly for baleen whales that may communicate using low-frequency sound.

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