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FIN WHALE (*Balaenoptera physalus*): Northeast Pacific Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Within the U.S. waters in the Pacific, fin whales are found seasonally off the coast of North America and Hawaii, and in the Bering Sea during the summer (Fig. 35). Recent information on seasonal fin whale distribution has been gleaned from the reception of fin whale calls by bottommounted, offshore hydrophone arrays along the U.S. Pacific coast, in the central North Pacific, and in the western Aleutian Islands (Moore et. al. 1998; Watkins et al. 2000). Moore et al. (1998) and Watkins et al. (2000) both documented high levels of fin whale call rates along the U.S. Pacific coast beginning in August/September and lasting through February, suggesting that this may be an important feeding area during the winter.

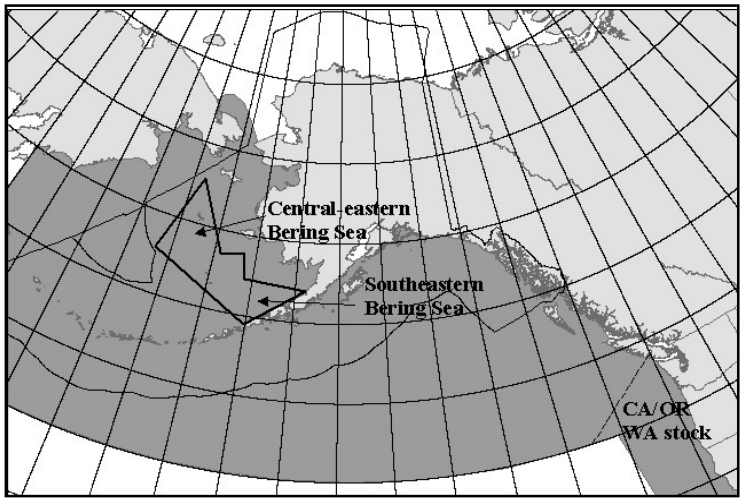

Figure 35. Approximate distribution of fin whales in the eastern North Pacific (shaded area). Enclosed area indicates general location of the 1999 and 2000 pollock surveys in the Bering Sea from which regional estimates of the fin whale population was made.

While peaks in call rates occurred during fall and winter in the central North Pacific and the Aleutian Islands, there were also a few calls recorded during the summer months. While seasonal differences in recorded call rates are generally consistent with the results of aerial surveys which have documented seasonal whale distribution, it is not known whether these differences in call rates reflect true seasonal differences in whale distribution, differences in calling rates, or differences in oceanographic properties (Moore et al. 1998). Fin whale calls have also been well-documented off of Hawaii during the winter (McDonald and Fox 1999), although aerial and shipboard surveys have found relatively few animals in Hawaiian waters (Mobley et al. 1996).

Recent surveys in the central-eastern and southeastern Bering Sea in 1999 and 2000 resulted in new information about the distribution and relative abundance of fin whales in these areas (Moore et al. 2000; 2002). Fin whale abundance estimates were nearly five times higher in the central-eastern Bering Sea than in the southeastern Bering Sea (Moore et al. 2002), and most sightings in the central-eastern Bering Sea occurred in a zone of particularly high productivity along the shelf break (Moore et al. 2000).

The following information was considered in classifying stock structure based on the Dizon et al. (1992) phylogeographic approach: 1) Distributional data: geographic distribution continuous in winter, possibly isolated in summer; 2) Population response data: unknown; 3) Phenotypic data: unknown; and 4) Genotypic data: unknown. Based on this limited information, the International Whaling Commission considers fin whales in the North Pacific to all belong to the same stock (Mizroch et al. 1984), although the authors cited additional evidence that supports the establishment of subpopulations in the North Pacific. Further, Fujino (1960) describes an eastern and a western group, which are isolated though may intermingle around the Aleutian Islands. Tag recoveries reported by Rice (1974) indicate that animals wintering off the coast of southern California range from central California to the Gulf of Alaska during the summer months. Fin whales along the Pacific coast of North America have been reported during the summer months from the Bering Sea to as far south as central Baja California (Leatherwood et al. 1982). As a result, stock structure of fin whales is considered equivocal. Based on a conservative management approach, three stocks are recognized: 1) Alaska (Northeast Pacific), 2) California/Washington/Oregon, and 3) Hawaii. The California/Oregon/Washington and Hawaii fin whale stocks are reported separately in the Stock Assessment Reports for the Pacific Region.

POPULATION SIZE

Reliable estimates of current and historical abundance for the entire Northeast Pacific fin whale stock are currently not available. Ranges of population estimates for the entire North Pacific prior to exploitation and in the early 1970s are 42,000 to 45,000 and 14,620 to 18,630, respectively (Ohsumi and Wada 1974), representing 32% to 44% of the precommercial whaling population size (Braham 1984). These estimates were based on population modeling, which incorporated catch and observation data. These estimates also include whales from the California/Oregon/Washington stock for which a separate abundance estimate is currently available.

Two recent studies provide some information on presence of fin whales, although they do not provide estimates of population size. A survey conducted in August of 1994 covering 2,050 nautical miles of trackline south of the Aleutian Islands encountered only 4 fin whale groups (Forney and Brownell 1996). However, this survey did not include all of the waters off Alaska where fin whale sightings have been reported, thus, no population estimate can be made. Passive acoustics were used off the island of Oahu, Hawaii, to document a minimum density estimate of 0.081 fin whales/1000km^2 from peak call rates during the winter (McDonald and Fox 1999). This density estimate is well below the population density of 1.1 animals/1000km^2 documented off the coast of California (Barlow, 1995; Forney et al. 1995), but does indicate that Hawaii is used seasonally by fin whales.

A visual survey for cetaceans was conducted in the central-eastern Bering Sea in July-August 1999 and in the southeastern Bering Sea in June-July 2000 in cooperation with research on commercial fisheries (Moore et al. 2002). The survey included 1,761 km and 2,194 km of effort in 1999 and 2000, respectively. Aggregations of fin whales were often sighted in 1999 in areas where the ship's echosounder identified large aggregations of zooplankton, euphausids, or fish (Moore et al. 2000). One aggregation of fin whales which occurred during an off-effort period involved greater than 100 animals and occurred in an area of dense fish echosign. Results of the surveys in 1999 and 2000 in the centraleastern Bering Sea and southeastern Bering Sea provided provisional estimates of 3,368 (CV = 0.29) and 683 (CV = 0.32), respectively (Moore et al. 2002). These estimates are considered provisional because they have not been corrected for animals missed on the trackline, animals submerged when the ship passed, and responsive movement. However, the provisional estimate for fin whales in each area is expected to be robust as previous studies have shown that only small correction factors are needed for this species. The Moore et al. (2002) estimate for 1999 is different than that of Moore et al. (2000) because it covers the south-eastern Bering Sea as well as the central-eastern Bering Sea. Additionally, the region covered by Moore et al. (2000) did not have consistent effort and thus could be inaccurate. This estimate cannot be used as an estimate of the entire Northeast Pacific stock of fin whales because it is based on a survey in only part of the stock's range.

Minimum Population Estimate

At this time, it is not possible to produce a reliable estimate of minimum abundance for this stock, as a current estimate of abundance is not available.

Current Population Trend

Reliable information on trends in abundance for the Northeast Pacific stock of fin whales are currently not available. There is no indication whether recovery of this stock has or is taking place (Braham 1992; Perry et al. 1999).

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

A reliable estimate of the maximum net productivity rate is currently unavailable for the Northeast Pacific fin whale stock. Hence, until additional data become available, it is recommended that the cetacean maximum net productivity rate (R_{MAX}) of 4% be employed for this stock (Wade and Angliss 1997).

POTENTIAL BIOLOGICAL REMOVAL

Under the 1994 reauthorized Marine Mammal Protection Act (MMPA), the potential biological removal (PBR) is defined as the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor: $PBR = N_{MIN} \times 0.5R_{MAX} \times F_R$. The recovery factor ($F_R$) for this stock is 0.1, the recommended value for cetacean stocks which are listed as endangered (Wade and Angliss 1997). However, because a reliable estimate of minimum abundance is currently not available, the PBR for this stock is unknown.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fisheries Information

Prior to 1999, there were no observed or reported mortalities of fin whales incidental to commercial fishing operations within the range of this stock. However, in 1999, one fin whale was killed incidental to the Bering Sea/Aleutian Island groundfish trawl fishery (Table 28). This single mortality results in an estimate of 3 mortalities in 1999, and an average 0.6 (CV =.0.8) mortalities over the 5-year period from 1997 to 2001. Although there have been a few strandings of fin whales recorded in recent years (2 and 1 in 1998 and 1999, respectively; NMFS unpublished data), none of these have been noted as having evidence of fishery interactions.

Table 28. Summary of incidental mortality of fin whales (Northeast Pacific stock) due to commercial fisheries from 1997 to 2001 and calculation of the mean annual mortality rate.

Fishery name	Years	Data type	Range of observer coverage	Observed mortality (in given yrs.)	Estimated mortality (in given yrs.)	Mean annual mortality
Bering Sea/Aleutian Is. (BSAI) groundfish trawl	97-01	obs data	27-32%	0, 0, 1, 0, 0	0, 0, 3, 0, 0	0.6 (CV = 0.8)
Estimated total annual mortality						0.6 (CV = 0.8)

The total estimated mortality and serious injury incurred by this stock as a result of interactions with commercial fisheries is 0.6 (CV = 0.8).

Subsistence/Native Harvest Information

Subsistence hunters in Alaska and Russia have not been reported to take fin whales from this stock.

Other Mortality

Between 1946 and 1975, 46,032 fin whales were reported killed throughout the North Pacific (International Whaling Commission BIWS data, unpublished), although newly revealed information about illegal Soviet catches indicates that the Soviets over-reported catches of about 1,200 fin whales, presumably to hide catches of other protected species (Doroshenko 2000). In 2000, a fin whale was struck by a vessel in Uyak Bay. Assuming this was the only ship strike which occurred during the 5-year period from 1997 to 2001, the average number of ship strikes per year is 0.2. Thus, the total estimated mortality and serious injury incurred by this stock is 0.8.

STATUS OF STOCK

The fin whale is listed as "endangered" under the Endangered Species Act of 1973, and therefore designated as "depleted" under the MMPA. As a result, the Northeast Pacific stock is classified as a strategic stock. Reliable estimates of the minimum population size, population trends, PBR, and status of the stock relative to its Optimum Sustainable Population size are currently not available. The estimated annual rate of human-caused mortality and serious injury seems minimal for this stock; however, because of the estimated annual take of 0.6 animals, the minimum estimated mortality and serious injury cannot be considered to be insignificant and approaching a zero mortality and serious injury rate. There are no known habitat issues that are of particular concern for this stock.

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