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# MINKE WHALE (*Balaenoptera acutorostrata scammoni*): 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 180ºN, 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; Forney et al. 1995; Barlow 1997) 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) are considered as a separate stock. Minke whales in Alaskan waters are considered in a separate stock assessment report.

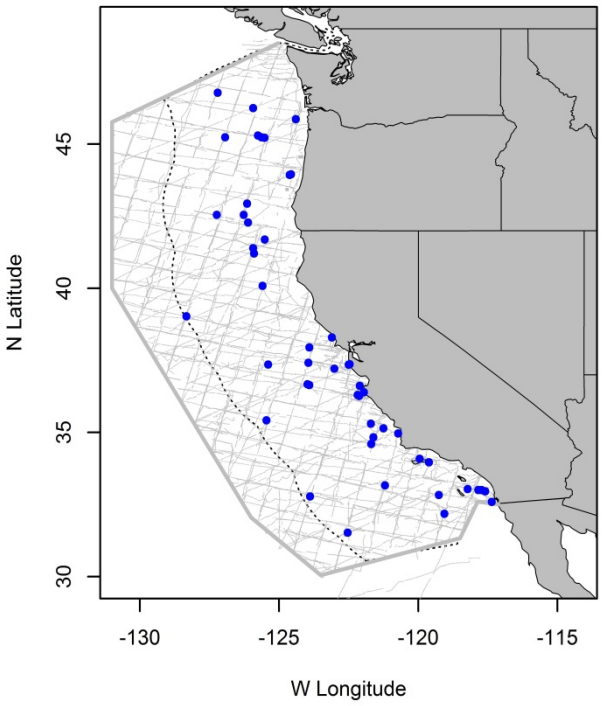


**Figure 1.** Minke whale sighting locations based on shipboard surveys off California, Oregon, and Washington, 1991-2014. Dashed line represents the U.S. EEZ; thin lines indicate completed transect effort of all surveys combined.

## POPULATION SIZE

No estimates have been made for the number of minke whales in the entire North Pacific. The most recent abundance estimate for this stock is based on the geometric mean of estimates obtained from ship line transect surveys in summer and autumn in 2008 and 2014, or 636 (CV=0.72) whales (Barlow 2016).

### 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 2008 and 2014 summer/fall ship surveys in California, Oregon, and Washington waters (Barlow 2016) or approximately 369 whales.

### 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 (369) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.48 (for a stock of unknown status with a mortality estimate CV > 0.30 and < 0.60), resulting in a PBR of 3.5 whales.

## HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

**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 (Carretta *et al.* 2016a). Mean annual takes are based on 2010-2014 data.

| Fishery Name | Year(s) | Data Type | Percent Observer Coverage | Observed mortality (and serious injury) | Estimated mortality (CV) | Mean annual takes (CV) |
|---|---|---|---|---|---|---|
| **CA/OR thresher shark/swordfish drift gillnet fishery** | 2010-2014 | observer | 22% | 1[1] | 4.5 (0.58) | 0.9 (0.58) |
| **CA halibut and other species large mesh (>3.5") set gillnet fishery** | 2010-2014 | observer | 9% | 0 | 0 | n/a |
| **Unidentified fisheries** | 2010-2014 | Sightings and strandings | n/a | 1 (0.75) | 1.75 (n/a) | ≥ 0.35 (n/a) |
| **Total annual takes** | | | | | | ≥1.3 (0.58) |

### Fishery Information

Minke whales may occasionally be caught in coastal set gillnets off California, in salmon drift gillnet in Puget Sound, Washington, and in offshore drift gillnets off California. Four minke whales were observed entangled (2 dead, 2 released alive) between 1990-2014 in the California swordfish drift gillnet fishery from over 8,600 monitored fishing sets (Carretta *et al.* 2016a). One animal 'released alive' in 1999 occurred in a set with a large hole in the net from which a skin sample was collected and positively-identified as a minke whale with genetic sequencing. It is unknown whether or not gear remained on the whale. The estimate for the drift gillnet fishery in Table 1 (4.5 whales / 5 years = 0.9 annually) currently reflects total bycatch, regardless of animal condition (Carretta *et al.* 2016a). Two additional minke whale fishery interactions were recorded during 2010-2014: an entangled whale sighted at sea with rope and net material (=0.75 serious injury) and a live stranding of an animal that later died and appeared to have been previously entangled in unknown cable material (Carretta *et al.* 2016b). The mean annual mortality and serious injury of minke whales from this stock during 2010-2014 is 1.3 animals (Table 1).

### Ship Strikes

No ship strikes of minke whales were reported during the most recent 5-year period of 2010-2014. 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

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,

[1] One minke whale was observed entangled in this fishery during the 2010-2014 period. The entanglement occurred in 2011 (Carretta *et al.* 2016a).

the status of the west-coast stock is considered "unknown". The annual mortality and serious injury due to fisheries (1.3/yr) and ship strikes (0.0/yr) is less than the calculated PBR for this stock (3.5), so they are not considered a "strategic" stock under the MMPA. Fishery mortality is not less 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. Harmful algal blooms are a habitat concern for minke whales and at least one death along the U.S. west coast has been attributed to domoic acid toxicity resulting from the consumption of northern anchovy prey items (Fire *et al.* 2010). Increasing levels of anthropogenic sound 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 (Croll *et al*. 2002). Behavioral changes associated with exposure to simulated mid-frequency sonar, including no change in behavior, cessation of feeding, increased swimming speeds, and movement away from simulated sound sources has been documented in tagged blue whales (Goldbogen *et al*. 2013), but it is unknown if minke whales respond in the same manner to such sounds.

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