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LONG-BEAKED COMMON DOLPHIN (*Delphinus capensis*): California Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Long-beaked common dolphins were recognized as a distinct species in the 1990s (Heyning and Perrin 1994; Rosel *et al.* 1994). Along the U.S. west coast, their distribution overlaps with that of the short-beaked common dolphin. Long-beaked common dolphins are commonly found within about 50 nmi of the coast, from Baja California (including the Gulf of California) northward to about central California (Figure 1). Along the west coast of Baja California, long-beaked common dolphins primarily occur inshore of the 250 m isobath, with very few sightings (<15%) in waters deeper than 500 meters (Gerrodette and Eguchi 2011). Stranding and sighting records indicate that the abundance of this species off California changes both seasonally and inter-annually (Heyning and Perrin 1994, Forney and Barlow 1998, Barlow 2016). Although long-beaked common dolphins are not restricted to U.S. waters, cooperative management agreements with Mexico exist only for the tuna purse seine fishery and not for other fisheries which may take this species (e.g. gillnet fisheries). For the MMPA stock assessment reports, there is a single Pacific management stock including only animals found within the U.S. Exclusive Economic Zone off California.

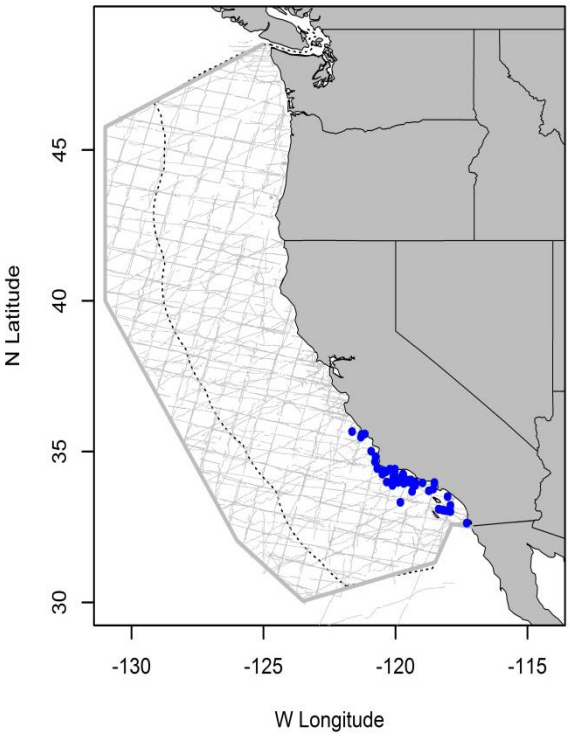

Figure 1. Long-beaked common dolphin sightings based on shipboard surveys off California, Oregon, and Washington, 1991- 2014 (Barlow 2016). Dashed line represents the U.S. EEZ, thin gray lines indicate completed transect effort of all surveys combined.

POPULATION SIZE

The distribution and abundance of long-beaked common dolphins off California varies inter-annually and seasonally (Heyning and Perrin 1994). As oceanographic conditions change, long-beaked common dolphins may move between Mexican and U.S. waters, and therefore a multi-year average abundance estimate is the most appropriate for management within the U.S. waters. The geometric mean abundance estimate for California, Oregon and Washington waters based on two ship surveys conducted in 2008 and 2014 (Barlow 2016) is 101,305 (0.49) long-beaked common dolphins. This estimate includes new correction factors for animals missed during the surveys. Although Carretta *et al.* (2011) also estimated abundance of this stock from a 2009 survey, that estimate did not include the correction factors and had high imprecision for one of the geographic strata, so it is not included in the multi-year average.

Minimum Population Estimate

The log-normal 20th percentile of the weighted 2008-2014 abundance estimate is 68,432 long-beaked common dolphins.

Current Population Trend

California waters represent the northern limit for this stock and animals likely move between U.S. and Mexican waters. While no formal statistical trend analysis exists for this stock of long-beaked common dolphin, abundance estimates for California waters from vessel-based line-transect surveys have been greater in recent years as water conditions have been warmer (Barlow 2016). The ratio of strandings

of long-beaked to short-beaked common dolphin in southern California has varied, suggesting that the proportions of each species present change as ocean conditions vary (Heyning and Perrin 1994, Danil *et al.* 2010). During a 2009 ship-based survey of California and Baja California waters, the ratio of long-beaked to short-beaked common dolphin sightings was nearly 1:1, whereas during previous surveys conducted from 1986 to 2008 in the same geographic strata, the ratio was approximately 1:3.5 (Carretta *et al.* 2011). There appears to be an increasing trend of long-beaked common dolphins in California waters over the last 30 years, but a trend analysis for this stock has not been performed to date, while other stocks with more urgent conservation concerns are analyzed (e.g., Moore and Barlow 2011, 2013).

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

There are no estimates of current or maximum net productivity rates for long-beaked common dolphins.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (68,432) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.48 (for a species of unknown status with a mortality rate CV of 0.3 to 0.6 ; Wade and Angliss 1997), resulting in a PBR of 657 long-beaked common dolphins per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

A summary of recent fishery mortality and injury for long-beaked common dolphins is shown in Table 1. More detailed information on these fisheries is provided in Appendix 1. The estimate of mortality and serious injury for long-beaked common dolphin in the California drift gillnet fishery for the five most recent years of monitoring, 2010-2014, averages 2.0 (CV=0.99) per year (Carretta *et al.* 2017). One interaction with the halibut set gillnet fishery was observed during 2010-2014, resulting in an estimate of 7 (CV=1.17) dolphins (Carretta and Enriquez 2012). No mortality or serious injury has been documented by observers during the most recent five years of monitoring for the small mesh gillnet fishery, which has interacted with long-beaked common dolphins in the past. However, 36 long-beaked common dolphins stranded with evidence of interaction with unidentified fisheries. Human-caused mortality and injury documentation is often based on stranding data, where raw counts are negatively-biased because only a fraction of carcasses are detected. Carretta *et al.* (2016a) estimated the mean recovery rate of California coastal bottlenose dolphin carcasses to be 25% (95% CI 20% - 33%) and stated that given the extremely coastal habits of coastal bottlenose dolphins, carcass recovery rates for this stock represented a maximum, compared with more pelagic dolphin species in the region. Therefore, in this stock assessment report and others involving dolphins along the U.S. West Coast, human-related deaths and injuries counted from beach strandings along the outer U.S. West Coast are multiplied by a factor of 4 to account for the non-detection of most carcasses (Carretta *et al.* 2016a). Applying this correction factor to the 36 stranded long-beaked common dolphins yields a minimum estimate of 144 fishery-related dolphin deaths, or an average of 29 per year. Gillnets have been documented to entangle marine mammals off Baja California (Sosa-Nishizaki *et al.* 1993), but no recent bycatch data from Mexico are available.

Table 1. Summary of available information on the incidental mortality and serious injury of long-beaked common dolphins (California Stock) in commercial fisheries that might take this species (Carretta *et al.* 2016b, 2017). All observed entanglements resulted in the death of the animal. Coefficients of variation for mortality estimates are provided in parentheses, when available. n/a = information not available. Human-caused mortality values based on strandings recovered along the outer U.S. West Coast are multiplied by a correction factor of 4 to account for undetected mortality (Carretta *et al.* 2016a).

Fishery Name	Data Type	Year(s)	Percent Observer Coverage	Observed (or self-reported)	Estimated Annual Mortality (CV)	Mean Annual Takes (CV

Fishery Name	Data Type	Year(s)	Percent Observer Coverage	Observed (or self-reported)	Estimated Annual Mortality (CV)	Mean Annual Takes (CV
CA thresher shark/swordfish drift gillnet fishery	observer	2010 2011 2012 2013 2014	12% 20% 19% 37% 24%	1 1 0 0 0	1.9 (1.1) 5.1 (1.3) 0 (n/a) 0.2 (2.2) 2.8 (1.4)	2.0 (0.99)
CA small mesh drift gillnet fishery for white seabass, yellowtail, barracuda, and tuna	observer	2010-2012	~4%	0	0	0 (n/a)
CA halibut/white seabass and other species set gillnet fishery	observer	2010-2014	9%	1	7 (1.17)	1.4 (1.17)
Unidentified fishery interaction	Strandings	2010-2014	-	36	≥144	≥29 (0.46)[1]
Minimum total annual takes (includes correction for unobserved beach strandings)						≥32 (0.42)

Other Mortality

Three long-beaked common dolphins died near San Diego in 2011 as the result of blast trauma associated with underwater detonations conducted by the U.S. Navy. Three days later, a fourth animal stranded approximately 70 km north of that location with similar injuries (Danil and St. Leger 2011). One long-beaked common dolphin was incidentally killed during fishery research during 2013 (Carretta *et al*. 2016b). Stranding records from 2010-2014 include three additional human-related long-beaked common dolphin deaths, including one animal that was struck by a vessel, one animal that had ingested marine debris, and one animal that had been cut in half (Carretta *et al*. 2016b). Applying the minimum correction factor to account for undetected mortality (Carretta *et al*. 2016a), this yields an estimated 12 human-caused long-beaked common dolphin deaths. From all sources combined, this results in a total of 17 non-fishery human-caused deaths between 2010 and 2014, or an average of 3.4 dolphins per year.

'Unusual mortality events' of long-beaked common dolphins off California due to domoic acid toxicity have been documented by NMFS as recently as 2007. One study suggests that increasing anthropogenic CO_2 levels and ocean acidification may increase the toxicity of the diatom responsible for these mortality events (Tatters *et al*. 2012).

In the eastern tropical Pacific, 'northern common dolphins' have been incidentally killed in international tuna purse-seine fisheries since the late 1950's and are managed separately under a section of the MMPA written specifically for the management of dolphins involved in eastern tropical Pacific tuna fisheries. Cooperative international management programs have dramatically reduced overall dolphin mortality in these fisheries (Joseph 1994). Between 2007 and 2014, annual fishing mortality of northern common dolphins (potentially including both short-beaked and long-beaked common dolphins) ranged between 35 and 124 animals, with an average of 75 (IATTC 2015). The distributions of both of the species that comprise the 'northern common dolphins' appear to shift into U.S. waters during certain oceanographic conditions (IATTC 2006).

STATUS OF STOCK

The status of long-beaked common dolphins in California waters relative to OSP is not known, and there are insufficient data to evaluate potential trends in abundance. Exposure to blast trauma resulting from underwater detonations is a local concern for this stock, but population level impacts from such activities are unclear. In response to the 2011 event, the U.S. Navy has implemented new training protocols to reduce the probability of blast trauma events occurring (Danil and St. Leger 2011). Long-

[1] The coefficient of variation (CV) for corrected carcass counts was derived from the results of Carretta *et al*. (2016a), who estimated that 25% (95% CI = 20% - 33%) of all available carcasses were recovered / documented.

beaked common dolphins are not listed as "threatened" or "endangered" under the Endangered Species Act nor as "depleted" under the MMPA. The average annual human-caused mortality from commercial fisheries (≥32 dolphins /year) and other sources (3.4 dolphins/year) is 35.4 long-beaked common dolphins. This does not exceed the PBR (657), and therefore they are not classified as a "strategic" stock under the MMPA. The average total fishery mortality and injury for long-beaked common dolphins (32/yr) is less than 10% of the PBR and therefore, is considered to be insignificant and approaching zero mortality and serious injury rate.

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