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SHORT-BEAKED COMMON DOLPHIN (*Delphinus delphis*): California/Oregon/Washington Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Short-beaked common dolphins are the most abundant cetacean off California, and are widely distributed between the coast and at least 300 nmi distance from shore (Figure 1). The abundance of this species off California has been shown to change on both seasonal and inter-annual time scales (Dohl *et al.* 1986; Forney and Barlow 1998; Barlow 2016). Significant seasonal shifts in the abundance and distribution of common dolphins have been identified based on winter/spring 1991-92 and summer/fall 1991 surveys (Forney and Barlow 1998). The distribution of short-beaked common dolphins is continuous southward into Mexican waters to about 13ºN (Perrin *et al.* 1985; Wade and Gerrodette 1993; Mangels and Gerrodette 1994), and short-beaked common dolphins off California may be an extension of the "northern common dolphin" stock defined for management of eastern tropical Pacific tuna fisheries (Perrin *et al.* 1985). However, preliminary data on variation in dorsal fin color patterns suggest there may be multiple stocks in this region, including at least two possible stocks in California (Farley 1995). Although short-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. Under the Marine Mammal Protection Act (MMPA), short-beaked common dolphins involved in tuna purse seine fisheries in international waters of the eastern tropical Pacific are managed separately, and they are not included in the assessment reports. For the MMPA stock assessment reports, there is a single Pacific management stock including only animals found within the U.S. Exclusive Economic Zone of California, Oregon and Washington.

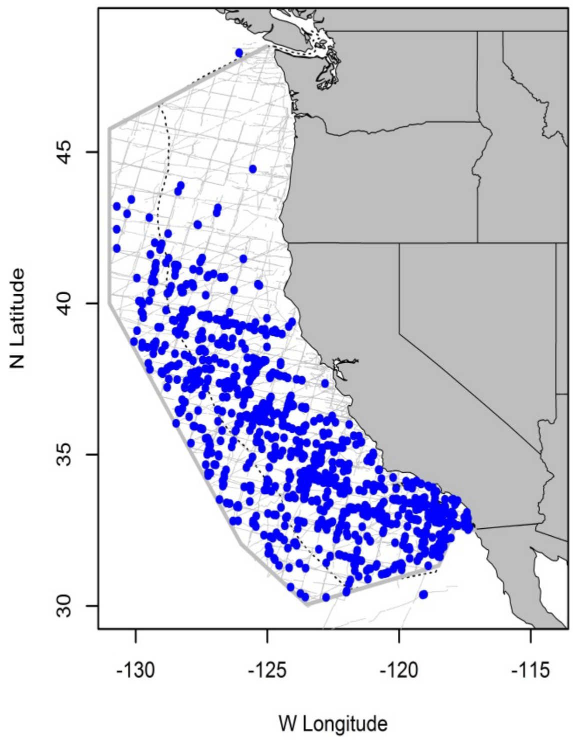

Figure 1. Short-beaked common dolphin sightings based on shipboard surveys off California, Oregon, and Washington, 1991-2014 (Barlow 2016). Dashed line represents the U.S. EEZ, thin gray lines indicate completed transect effort of all surveys combined.

POPULATION SIZE

The distribution of short-beaked common dolphins throughout this region is highly variable, apparently in response to oceanographic changes on both seasonal and interannual time scales (Heyning and Perrin 1994; Forney 1997; Forney and Barlow 1998). As oceanographic conditions vary, short-beaked common dolphins may spend time outside the U.S. Exclusive Economic Zone, and therefore a multi-year average abundance estimate is the most appropriate for management within U.S. waters. The most recent estimate of short-beaked common dolphin abundance is the geometric mean of estimates from 2008 and 2014 summer/autumn vessel-based line-transect surveys of California, Oregon, and Washington waters, 969,861 (CV = 0.17) animals (Barlow 2016). This estimate includes new correction factors for animals missed during the surveys.

Minimum Population Estimate

The log-normal 20th percentile of the 2008-2014 average abundance estimate is 839,325 short-beaked common dolphins.

Current Population Trend

Short-beaked common dolphin abundance off the U.S. West Coast is known to increase during warm-water periods (Dohl *et al.* 1986, Forney and Barlow 1998, Barlow 2016). The most recent 2014 survey was conducted during extremely warm ocean conditions (Bond *et al*. 2015) and resulted in the largest abundance estimate since large-scale surveys began in 1991. The increase in short-beaked common dolphin abundance is likely a result of northward movement of this transboundary stock from waters off Mexico (Barlow 2016).

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

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

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (839,325) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.50 (for a species of unknown status with a mortality rate CV< 0.30; Wade and Angliss 1997), resulting in a PBR of 8,393 short-beaked common dolphins per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

A summary of recent fishery mortality and injury for short-beaked common dolphins is shown in Table 1. The summed estimate of mortality and serious injury for short-beaked common dolphin in the California drift gillnet fishery for the five most recent years of monitoring, 2010-2014, is approximately 100 individuals, or an average of 20 (CV=0.18) per year (Carretta *et al*. 2017) (Table 1). No takes were documented by observers during the most recent five years of monitoring for other gillnet and purse seine fisheries that have interacted with short-beaked common dolphins in the past. However, two short-beaked common dolphins stranded with evidence of fishery interaction with an unidentified gillnet fishery. 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 two stranded short-beaked common dolphins yields a minimum estimate of 8 fishery-related dolphin deaths.

Table 1. Summary of available information on the incidental mortality and injury of short-beaked common dolphins (California/Oregon/Washington Stock) in commercial fisheries that might take this species (Carretta *et al*. 2016b, 2017). All entanglements resulted in the death of the animal. Coefficients of variation for mortality estimates are provided in parentheses; n/a = 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	Percent Observer Coverage	Observed Mortality (and Serious Injury)	Estimated Mortality and Serious Injury	Mean Annual Takes (CV in parentheses)
CA/OR thresher shark/swordfish drift gillnet fishery	observer	2010 2011 2012 2013 2014	12% 20% 19% 37% 24%	3 2 5 6 6	21.2 (0.53) 15.2 (0.46) 21.3 (0.41) 16.5 (0.25) 23.5 (0.31)	20 (0.18)

Fishery Name	Data Type	Year	Percent Observer Coverage	Observed Mortality (and Serious Injury)	Estimated Mortality and Serious Injury	Mean Annual Takes (CV in parentheses)
CA squid purse seine	observer	2004 2005 2006 2007 2008	unknown 1.1% unknown <5% <5%	0 1 0 (1) 0 0	0 87 (0.98) ≥ 1 (n/a)0 0	18 (0.98)
CA halibut / white seabass and other species set gillnet fishery	observer	2010-2014	9%	0	0	0 (n/a)
Hawaii Shallow Set Longline fishery	observer	2010-2014	100%	0 0 (1) 0 0 0 (1)	0 (2)	0.4 (n/a)
Unidentified gillnet fishery	Stranding	2010-2014	-	2	≥8	≥1.6 (0.46)[1]
Minimum total annual takes (includes correction for unobserved beach strandings)						≥ 40 (0.45)

The California squid purse seine fishery has not been observed since 2008. Between 2004 and 2008, there were 377 sets observed in the squid purse seine fishery and one short-beaked common dolphin mortality was observed in 2005, with a resulting mortality estimate of 87 (CV=0.98) animals (Carretta and Enriquez 2006). It is likely, due to the low observer coverage that year (~1%), combined with a relatively rare entanglement event, that this estimate is positively-biased (Carretta and Moore 2014). In addition, there was one squid purse seine set in 2006 where 8 unidentified dolphins were encircled. Seven were released alive and the eighth was seriously injured. For purposes of this stock assessment report, it is assumed that the unidentified seriously injured dolphin was a short-beaked common dolphin, due to its high abundance within the fishing area and a previous record of this species having been killed in the fishery.

Two short-beaked common dolphins were reported released injured from the Hawaii shallow set longline fishery (one each in 2011 and 2014 with 100% observer coverage, Table 1). These interactions occurred outside of the U.S. EEZ just west of the California Current and likely involved dolphins from the CA/OR/WA stock of short-beaked common dolphins (NOAA Pacific Islands Regional Office 2017).

Other Mortality

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 in recent decades (IATTC 2015). 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). Although it is unclear whether these animals are part of the same population as short-beaked common dolphins found off California, 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 short-beaked common dolphins in Californian waters relative to OSP is not known. The observed increase in abundance of this species off California probably reflects a distributional shift

[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.

(Anganuzzi *et al.* 1993; Forney and Barlow 1998, Barlow 2016), rather than an overall population increase due to growth. No habitat issues are known to be of concern for this species. They are not listed as "threatened" or "endangered" under the Endangered Species Act nor as "depleted" under the MMPA. The average annual human-caused mortality in 2010-2014 (40 animals) is estimated to be less than the PBR (8,393), and therefore they are not classified as a "strategic" stock under the MMPA. The total estimated fishery mortality and injury for short-beaked common dolphins is less than 10% of the calculated PBR and, therefore, can be considered to be insignificant and approaching zero mortality and serious injury rate.

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