SHORT-BEAKED COMMON DOLPHIN (*Delphinus delphis 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. The abundance of this species off California has been shown to change on both seasonal and inter-annual time scales (Dohl et al. 1986; Barlow 1995; Forney et al. 1995). Historically, they were reported primarily south of Pt. Conception (Dohl et al. 1986), but have been commonly sighted as far north as 42°N during 1991-2008 NMFS line-transect vessel surveys (Figure 1). Four strandings of common dolphins have been reported in Oregon and Washington since 1942 (B. Norberg, pers. comm.), but three of these could not be identified to species. One animal, which stranded in 1983, was identified as a short-beaked common dolphin (J. Hodder, pers. comm.). 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). Their distribution is continuous southward into Mexican waters to about 13°N (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).
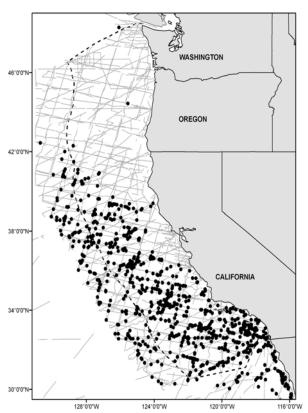

Figure 1. Short-beaked common dolphin sightings based on shipboard surveys off California, Oregon, and Washington, 1991- 2008 (see Appendix 2, for data sources and information on timing and location of survey effort). Dashed line represents the U.S. EEZ, thin lines indicate completed transect effort of all surveys combined.

The less abundant long-beaked common dolphin has only recently been recognized as a different species (Heyning and Perrin 1994; Rosel et al. 1994), and much of the available information has not differentiated between the two types of common dolphin. 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 (e.g. gillnet fisheries). 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.

POPULATION SIZE

The most recent estimates of abundance estimates are based on two summer/fall shipboard surveys that were conducted within 300 nmi of the coasts of California, Oregon and Washington in 2005 (Forney 2007) and 2008 (Barlow 2010.). 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 2005-2008 geometric mean abundance estimate for California, Oregon and Washington waters based on the two ship surveys is 411,211 (CV= 0.21) short-beaked common dolphins .

Minimum Population Estimate

The log-normal 20th percentile of the 2005-2008 abundance estimate is 343,990 short-beaked common dolphins.

Current Population Trend

In the past, common dolphin abundance has been shown to increase off California during the warm-water months (Dohl et al. 1986). Surveys conducted during both cold-water and warm-water conditions in 1991 and 1992 (Barlow 1995, Forney et al. 1995) resulted in overall abundance estimates (for both types of common dolphins combined) which were considerably greater than historical estimates (Dohl et al. 1986). Environmental models (Forney 1997) and seasonal comparisons (Forney and Barlow 1998) have shown that the abundance of short-beaked common dolphins off California varies with seasonal and interannual changes in oceanographic conditions. An ongoing decline in the abundance of 'northern common dolphins' (including both long-beaked and short-beaked common dolphins) in the eastern tropical Pacific and along the Pacific coast of Mexico suggests a possible northward shift in the distribution of common dolphins (IATTC 1997) during this period of gradual warming of the waters off California (Roemmich 1992). The majority of this shift would likely be reflected in an increase in short-beaked common dolphin abundance. Heyning and Perrin (1994) have detected changes in the proportion of short-beaked to long-beaked common dolphins stranding along the California coast, with short-beaked common dolphin stranding more frequently prior to the 1982-83 El Niño (which increased water temperatures off California), and the long-beaked common dolphin more commonly observed for several years afterwards. Thus, it appears that both relative and absolute abundances of these species off California may change with varying oceanographic conditions.

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 (343,990) <u>times</u> one half the default maximum net growth rate for cetaceans (½ of 4%) <u>times</u> 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 3,440 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. Mean annual takes in Table 1 are based on 2004-2008 data. This results in an average estimate of 64 (CV=0.29) short-beaked common dolphins taken annually. More detailed information on these fisheries is provided in Appendix 1. Mortality estimates for the California drift gillnet fishery are included for the five most recent years of monitoring, 2004-2008 (Carretta et al. 2005, Carretta and Enriquez 2006, 2007, 2009a, 2009b). After the 1997 implementation of a Take Reduction Plan, which included skipper education workshops and required the use of pingers and minimum 6-fathom extenders, common dolphin entanglement rates in the drift gillnet fishery dropped considerably (Barlow and Cameron 2003). Since the initial pinger experiments in 1996, short-beaked common dolphin entanglement rates have remained below pre-pinger levels, even though a time/area closure in 2001 shifted fishing effort south of Point Conception, California, where common dolphin densities are highest (Figure 2). Prior to the use of acoustic pingers in the fishery, short-beaked common dolphin were observed entangled at a rate of 6.7 animals per 100 sets (125 entanglements in 1,848 sets) in sets south of Point Conception. In the same region, sets with twenty or more pingers have an entanglement rate of 4.4 animals per 100 sets (137 entanglements in 3,104 sets). The difference between the two entanglement rates is statistically significant (Poisson probability < 0.002).

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. All entanglements resulted in the death of the animal. Coefficients of variation for mortality estimates are provided in parentheses; n/a = not available. Mean annual takes are based on 2004-2008 data unless noted otherwise.

Fishery Name	Data Type	Year	Percent Observer Coverage	Observed Mortality	Estimated Annual Mortality	Mean Annual Takes (CV in parentheses)
CA/OR thresher shark/swordfish drift gillnet fishery	observer	2004 2005 2006 2007 2008	20.6% 20.9% 18.5% 16.4% 13.5%	7 12 6 9 8	34 (0.49) 57 (0.30) 32 (0.52) 54 (0.41) 59 (0.43)	47 (0.19)
CA squid purse seine	observer	2004 2005 2006 2007 2008	unknown 1.1% unknown <5% <5%	0 1 0 0 0	0 87 (0.98) 0 0 0	17 (0.98)
CA halibut /white seabass and other species set gillnet fishery[2]	Self-report Self-report Observer Observer Observer	2004 2005 2006 2007 2008	- - - n/a n/a ~1% 17% not observed	1 0 0 0 0	≥1 0 0 0 0	≥1 (n/a)

Fishery Name	Data Type	Year	Percent Observer Coverage	Observed Mortality	Estimated Annual Mortality	Mean Annual Takes (CV in parentheses)
Unknown fishery	strandings	2004-2008			Two unidentified common and three short-beaked common dolphin stranded with evidence of fishery interactions. Evidence of fishery interactions included net marks and/or positive metal detector scans. None of the strandings could be linked to a specific commercial fishery. These strandings may have come from observed fisheries that already have bycatch estimates and thus are not included in the annual average to prevent double-counting of fishery mortality. Mean annual takes are therefore based on stranded animals only if the stranding can be attributed to a fishery lacking an observer program or cases where stranded animals represent the only documented fishery-related deaths in a given year.	≥ 0 (n/a)
Minimum total annual takes						64 (0.29)

[1]The set gillnet fishery was observed from 1991-94 and then only in Monterey Bay during 1999-2000, where 20-25% of the local fishery was observed. There are no estimates of common dolphin mortality in this fishery because of a lack of recent observer effort. Observer coverage in this fishery resumed in 2006 (12 sets observed) and continued into 2007 (248 sets observed).

Short-Beaked Common Dolphin Entanglement Rates
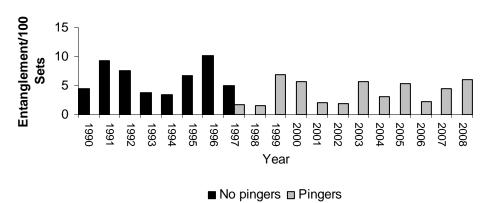
■ No pingers ▢ Pingers

Figure 2. Entanglement rates of short-beaked common dolphin per set fished in the California drift gillnet fishery for swordfish and thresher shark, 1990-2008. Entanglement rates include observations from pingered and unpingered sets. Pingers were not used from 1990-95 and were used experimentally in 1996 and 1997. In 1996, no short-beaked common dolphin were observed killed in 146 pingered sets. For the period 1998- 2008, more than 99% of all observed sets utilized pingers.

Common dolphin mortality has also been reported in halibut set gillnets in California (Julian and Beeson 1998). The fishery has been observed only four times since 1994 (in 1999, 2000, 2006, and 2007), at low levels of observer coverage (< 20% of fishing effort). No common dolphins were observed entangled in 2007, when the fishery had approximately 18% observer coverage (248 sets observed).

There were 377 sets observed in the squid purse seine fishery from 2004-2008. 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). 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.

One unidentified and three short-beaked common dolphin stranded with evidence of fishery interaction (NMFS, Southwest Region, unpublished data) between 2004-2008. It is not known which fisheries were responsible for these deaths.

Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may take animals from this population. Quantitative data are available only for the Mexican swordfish drift gillnet fishery, which uses vessels, gear, and operational procedures similar to those in the U.S. drift gillnet fishery, although nets may be up to 4.5 km long (Holts and Sosa-Nishizaki 1998). The fleet increased from two vessels in 1986 to 31 vessels in 1993 (Holts and Sosa-Nishizaki 1998). The total number of sets in this fishery in 1992 can be estimated from data provided by these authors to be approximately 2700, 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; Julian and Beeson, 1998), but species-specific information is not available for the Mexican fisheries.   Previous efforts to convert the Mexican swordfish driftnet fishery to a longline fishery have resulted in a mixed-fishery, with 20 vessels alternately using longlines or driftnets, 23 using driftnets only, 22 using longlines only, and seven with unknown gear type (Berdegué 2002).

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. Cooperative international management programs have dramatically reduced overall dolphin mortality in these fisheries during the last decade (Joseph 1994). Between 2000-2004, annual fishing mortality of northern common dolphins (potentially including both short-beaked and long-beaked common dolphins) ranged between 54 and 159 animals, with an average of 102 (IATTC, 2006). Although it is unclear whether these animals are part of the same population as short-beaked common dolphins found off California, they are managed separately under a section of the MMPA written specifically for the management of dolphins involved in eastern tropical Pacific tuna fisheries.

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 (Anganuzzi et al. 1993; Barlow 1995; Forney et al. 1995; Forney and Barlow 1998), 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 2004-2008 (64 animals) is estimated to be less than the PBR (3,440), 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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