Revised 12/15/2000

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. 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 on recent (1991/93/96) summer/fall surveys, they were commonly sighted as far north as 42°N (Figure 1). Four strandings of common dolphins have been reported in Oregon and Washington since 1942 (B. Norberg, pers. comm.). Of these, three were not identified to the species level, and 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). 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.

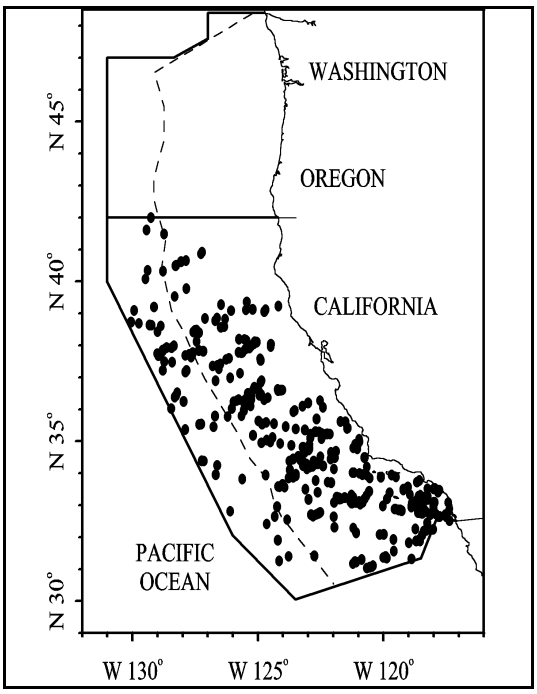

Figure 1. Short-beaked common dolphin sightings based on shipboard surveys off California, Oregon and Washington, 1991-96 (see Appendix 2, Figures 3-5, for data sources and information on timing and location of survey effort). No *Delphinus* sightings have been made off Oregon and Washington. Dashed line represents the U.S. EEZ, thick line indicates the outer boundary of all surveys combined.

POPULATION SIZE

Aerial line transect surveys conducted in winter/spring of 1991-92 resulted only in a combined abundance estimate of 305,694 (CV=0.34) animals for short-beaked and long-beaked common dolphins, because species-level identification was not possible from the air (Forney et al. 1995). Based on sighting locations, the majority of these were probably short-beaked common dolphins. A better, species-specific abundance estimate is available based on three summer/fall shipboard surveys that were conducted within 300 nmi of the coasts of California (in 1991 and 1993; Barlow and Gerrodette 1996) and California, Oregon and Washington (in 1996; Barlow 1997). 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 1991-96 weighted average abundance estimate for California, Oregon and Washington waters based on the three ship surveys is 373,573 (CV=0.19) short-beaked common dolphins (Barlow 1997).

Minimum Population Estimate

The log-normal 20th percentile of the 1991-96 weighted average abundance estimate is 318,795 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). The recent combined abundance estimate for the 1991-96 summer/fall surveys (Barlow 1997) is the highest and most precise to date. 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 is likely to reflect an increase in the abundance of short-beaked common dolphins. Heyning and Perrin (1994) have detected changes in the proportion of short-beaked to long-beaked common dolphins stranding along the California coast, with the 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 (318,795) 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 3,188 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. More detailed information on these fisheries is provided in Appendix 1. Mortality of common dolphins primarily has been observed in California drift gillnet fisheries (Julian and Beeson 1998; Julian 1997; Cameron and Forney 1999). Because of the difficulty in distinguishing short-beaked and long-beaked common dolphins in the field, tissue samples have been collected for most of the animals observed killed. These tissue samples have enabled positive identification using genetic techniques for all except two of the common dolphins killed (NMFS, unpublished data). Based on past patterns (Barlow et al. 1997), these two animals are likely to have been a short-beaked common dolphin, and they are included below for this species. 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 1999). However, because of interannual variability in entanglement rates additional years of data will be required to fully evaluate the effectiveness of pingers for reducing mortality of this species in the long term. Because of the changes in this fishery after implementation of the Take Reduction Plan, mean annual takes in Table 1 are based only on 1997-98 data. This results in an average estimate of 78 (CV=0.23) short-beaked common dolphins taken annually.

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. The observer program for the set gillnet fishery was discontinued during 1994. Coefficients

of variation for mortality estimates are provided in parentheses; n/a = not available. Mean annual takes are based on 1994-98 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 data	1994 1995 1996 1997 1998	17.9% 15.6% 12.4% 23.0% 20.0%	26 36 27 21 9	146 (0.18) 231 (0.29) 319 (0.23) 105 (0.30) 51 (0.33)	(includes prorated) 78 (0.23)[1]
CA angel shark/ halibut and other species large mesh (>3.5in) set gillnet fishery	observer data	Common dolphins, species not determined 1994 1995-98	 7.7% 0%	 0 n/a	 0 n/a	n/a
	MMAP self-reporting	1995 1996 1998	- - -	1 1 2	$1 $1 $2	$0.8 (n/a)
Undetermined	strandings	1994-98	2 common dolphins (species not determined) stranded with evidence of fishery interactions			$0.4 (n/a)
Minimum total annual takes						79 (0.23)

[1]Only 1997-98 mortality estimates are included in the average because of gear modifications implemented within the fishery as part of a 1997 Take Reduction Plan. Gear modifications included the use of net extenders and acoustic warning devices (pingers). Following these changes in the fishery, entanglement rates of short-beaked common dolphin declined.

Additional common dolphin mortality has been reported for set gillnets in California (Julian and Beeson 1998); however, because of a 1994 ban on gillnets in nearshore areas of Southern California, the size of this fishery decreased by about a factor of two (see Appendix 1), and the observer program was discontinued. No observer data are available for the set gillnet fishery after 1994, but Marine Mammal Authorization Permit (MMAP) fisher self-reports for 1994-98 indicate that at least four common dolphins (type not specified) were killed between 1995 and 1998. Although these reports are considered unreliable (see Appendix 4 of Hill and DeMaster 1998) they represent a minimum mortality for this fishery.

Two common dolphins (type not specified) stranded with evidence of fishery interaction (NMFS, Southwest Region, unpublished data); one animal had a hook and line in its mouth and a slit ventrum, and the other animal had its flukes cut off. 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, probably take short-beaked common dolphins from the same 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. There are currently efforts underway to convert the Mexican swordfish driftnet fishery to a longline fishery (D. Holts, pers. comm.).

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 1994 and 1998, annual mortality of northern common dolphins (potentially including both short-beaked and long-beaked common dolphins)

ranged between 9 and 261 animals, with an average of 91 (IATTC, in prep). 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 over the last decade 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. Including driftnet mortality only for years after implementation of the Take Reduction Plan (1997-98), the average annual human-caused mortality in 1994-98 (79 animals) is estimated to be less than the PBR (3,188), 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.

REFERENCES

Anganuzzi, A. A., S. T. Buckland, and K. L Cattanach. 1993. Relative abundance of dolphins associated with tuna in the eastern tropical Pacific Ocean: analysis of 1991 data. Rep. Int. Whal. Commn 43:459-465.

Barlow, J. 1995. The abundance of cetaceans in California waters. Part I: Ship surveys in summer and fall of 1991. Fish. Bull. 93:1-14.

Barlow, J. 1997. Preliminary estimates of cetacean abundance off California, Oregon and Washington based on a 1996 ship survey and comparisons of passing and closing modes. Administrative Report LJ-97-11, Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038. 25p.

Barlow, J. and G. A. Cameron. 1999. Field experiments show that acoustic pingers reduce marine mammal bycatch in the California drift gillnet fishery. Paper SC/51/SM2 presented to the International Whaling Commission, May 1998 (unpublished). 20pp.

Barlow, J., K. A. Forney, P. S. Hill, R. L. Brownell, Jr., J. V. Carretta, D. P. DeMaster, F. Julian, M. S. Lowry, T. Ragen, and R. R. Reeves. 1997. U.S. Pacific Marine Mammal Stock Assessments: 1996. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-SWFSC-248. 223p.

Barlow, J. and T. Gerrodette. 1996. Abundance of cetaceans in California waters based on 1991 and 1993 ship surveys. NOAA Technical Memorandum NMFS, NOAA-TM-NMFS-SWFSC-233.

Dohl, T. P., M. L. Bonnell, and R. G. Ford. 1986. Distribution and abundance on common dolphin, *Delphinus delphis*, in the Southern California Bight: A quantitative assessment based upon aerial transect data. Fish. Bull. 84:333-343.

Farley, T. D. 1995. Geographic variation in dorsal fin color of short-beaked common dolphins, *Delphinus delphis*, in the eastern Pacific Ocean. Administrative Report LJ-95-06, Available from National Marine Fisheries Service, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, California, 92038.

Forney, K. A. 1997. Patterns of variability and environmental models of relative abundance for California cetaceans. Ph.D. Dissertation, Scripps Institution of Oceanography, University of California, San Diego.

Forney, K. A. and J. Barlow. 1998. Seasonal patterns in the abundance and distribution of California cetaceans, 1991-92. Mar. Mamm. Sci. 14:460-489.

Forney, K. A., J. Barlow and J. V. Carretta. 1995. The abundance of cetaceans in California waters. Part II: Aerial surveys in winter and spring of 1991 and 1992. Fish. Bull. 93:15-26.

Heyning, J. E. and W. F. Perrin. 1994. Evidence for two species of common dolphins (Genus *Delphinus*) from the eastern North Pacific. Contr. Nat. Hist. Mus. L.A. County, No. 442.

Hill, P. S. and D. P. DeMaster. 1998. Alaska Marine Mammal Stock Assessments, 1998. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-97. 166pp.

Hodder, J. Oregon Institute of Marine Biology, Charleston, OR, 97420.

Holts, D. Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038.

Holts, D. and O. Sosa-Nishizaki. 1998. Swordfish, *Xiphias gladius*, fisheries of the eastern North Pacific Ocean. *In*: I. Barrett, O. Sosa-Nishizaki and N. Bartoo (eds.). Biology and fisheries of swordfish, *Xiphias gladius*. Papers from the International Symposium on Pacific Swordfish, Ensenada Mexico, 11-14 December 1994. U.S. Dep.

Commer., NOAA Tech. Rep. NMFS 142, 276 p.
IATTC. 1997. Annual Report of the Inter-American Tropical Tuna Commission, 1995, La Jolla, California.
IATTC. (in prep). Annual Report of the Inter-American Tropical Tuna Commission, 1998, La Jolla, California.
Joseph, J. 1994. The tuna-dolphin controversy in the eastern Pacific Ocean: biological, economic and political impacts. Ocean Dev. Int. Law 25:1-30.
Julian, F. 1997. Cetacean mortality in California gill net fisheries: Preliminary estimates for 1996. Paper SC/49/SM02 presented to the International Whaling Commission, 1997 (unpublished). 13 pp.
Julian, F. and M. Beeson. 1998. Estimates of mammal, turtle and bird mortality for two California gillnet fisheries: 1990-1995. Fish. Bull. 96:271-284.
Mangels, K. F. and Gerrodette, T. 1994. Report of cetacean sightings during a marine mammal survey in the eastern Pacific Ocean and Gulf of California aboard the NOAA ships *McARTHUR* and *DAVID STARR JORDAN* July 28 - November 6, 1993. NOAA Technical Memorandum NMFS, NOAA-TM-NMFS-SWFSC-211.
NMFS, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038-027.
NMFS, Southwest Region, 501 West Ocean Blvd, Long Beach, CA 90802-4213.
Norberg, B., NMFS, Northwest Region,.7600 Sand Point Way NE, BIN C15700,Seattle, WA 98115-0070.
Perrin, W. F., M. D. Scott, G. J. Walker and V. L. Cass. Review of geographical stocks of tropical dolphins (*Stenella* spp. and *Delphinus delphis*) in the eastern Pacific. NOAA Technical Report NMFS 28. Available from NMFS, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, California, 92038. 28p.
Roemmich, D. 1992. Ocean warming and sea level rise along the southwest U.S. coast. Science 257:373-375.
Rosel, P. E., A. E. Dizon and J. E. Heyning. 1994. Population genetic analysis of two forms of the common dolphin (genus *Delphinus*) utilizing mitochondrial DNA control region sequences. Marine Biology 119:159-167.
Sosa-Nishizaki, O., R. De la Rosa-Pacheco, R. Castro-Longoria, M. Grijalva Chon, and J. De la Rosa Velez. 1993. Estudio biologico pesquero del pez (*Xiphias gladius*) y otras especies de picudos (marlins y pez vela). Rep. Int. CICESE, CTECT9306.
Wade, P. R. and R. P. Angliss. 1997. Guidelines for Assessing Marine Mammal Stocks: Report of the GAMMS Workshop April 3-5, 1996, Seattle, Washington. U. S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-12. 93 pp.
Wade, P. R. and T. Gerrodette. 1993. Estimates of cetacean abundance and distribution in the eastern tropical Pacific. Rep. Int. Whal. Commn 43:477-493.