

COMMON BOTTLENOSE DOLPHIN (*Tursiops truncatus truncatus*): California/Oregon/Washington Offshore Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Bottlenose dolphins are distributed worldwide in tropical and warm-temperate waters. In many regions, including California, separate coastal and offshore populations are known (Walker 1981; Ross and Cockcroft 1990; Van Waerebeek et al. 1990; Lowther 2006). On surveys conducted off California, offshore bottlenose dolphins have been found at distances greater than a few kilometers from the mainland and throughout the Southern California Bight. They have also been documented in offshore waters as far north as about 41°N (Figure 1), and they may range into Oregon and Washington waters during warm-water periods. Sighting records off California and Baja California (Lee 1993; Mangels and Gerrodette 1994) suggest that offshore bottlenose dolphins have a continuous distribution in these two regions. There is no apparent seasonality in distribution (Forney and Barlow 1998). Offshore bottlenose dolphins are not restricted to U.S. waters, but 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). Therefore, the management stock includes only animals found within U.S. waters. For the Marine Mammal Protection Act (MMPA) stock assessment reports, bottlenose dolphins within the Pacific U.S. Exclusive Economic Zone are divided into seven stocks: 1) California coastal stock, 2) California, Oregon and Washington offshore stock (this report), and five stocks in Hawaiian waters: 3) Kauai/Niihau, 4) Oahu, 5) 4-Islands (Molokai, Lanai, Maui, Kahoolawe), 6) Hawaii Island and 7) the Hawaiian Pelagic Stock.

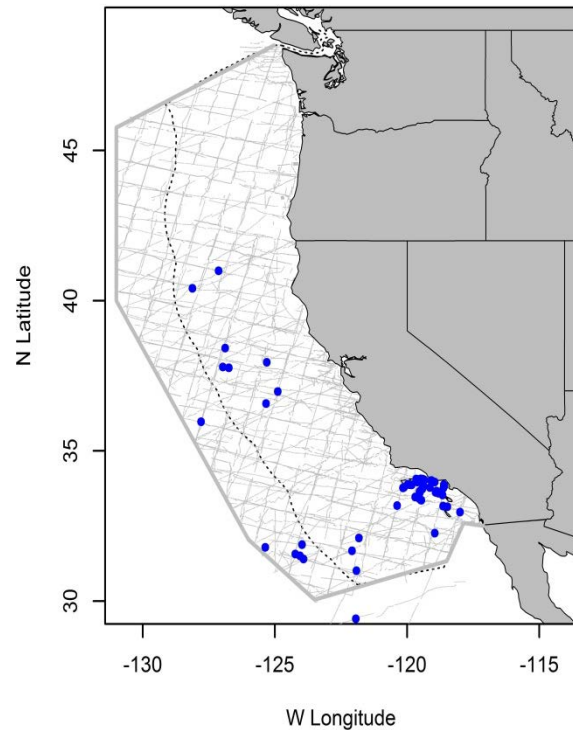


Figure 1. Offshore bottlenose dolphin sightings based on shipboard surveys off California, Oregon, and Washington, 1991-2014 (Barlow 2016). Dashed line represents the U.S. EEZ, thin gray lines indicate completed transect effort of all surveys combined.

POPULATION SIZE

The most recent estimate of bottlenose 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, 1,924 (CV=0.54) 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 geometric mean abundance estimate is 1,255 offshore bottlenose dolphins.

Current Population Trend

Trend analyses for this stock have 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

No information on current or maximum net productivity rates is available for this population of offshore bottlenose dolphins.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (1,255) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.45 (for a species of unknown status with fishery mortality CV between 0.6 and 0.8; Wade and Angliss 1997), resulting in a PBR of 11 offshore bottlenose dolphins per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

A summary of known fishery mortality and serious injury for this stock of bottlenose dolphin is shown in Table 1. The estimate of mortality and serious injury for bottlenose dolphin in the California drift gillnet fishery for the five most recent years of monitoring, 2010-2014, is 6.9 (CV=0.74) individuals, or an average of 1.4 per year (CV=0.74) (Carretta *et al.* 2017). One bottlenose dolphin was seriously injured in the limited entry fixed gear sablefish fishery during 2009, but no other deaths or injuries were reported in West Coast groundfish fisheries for the period 2009-2013 (Jannot *et al.* 2011). 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. 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 bottlenose dolphins (California/ Oregon/Washington Offshore Stock) in commercial fisheries that might take this species (Carretta *et al.* 2016, 2017; Jannot *et al.* 2011). Coefficients of variation for mortality estimates are provided in parentheses; n/a = not available.

Fishery Name	Data Type	Year(s)	Percent Observer Coverage	Observed Mortality (and Serious Injury)	Estimated Mortality and Serious Injury (CV)	Mean Annual Takes (CV in parentheses)
CA/OR thresher shark/swordfish drift gillnet fishery	observer	2010	12%	1	6.8 (0.75)	1.4 (0.74)
		2011	20%	0	0.1 (7.6)	
		2012	19%	0	0 (n/a)	
		2013	37%	0	0 (n/a)	
		2014	24%	0	0 (n/a)	
CA halibut / white seabass and other species set gillnet fishery	observer	2010-2014	9%	0 0 0 0	0	0
California yellowtail, barracuda, and white seabass drift gillnet fishery	observer	2010-2012	~4%	0	0	0
CA lobster trap/pot	At-sea disentanglement	2008	n/a	0 (1)	1 (n/a)	0.2 (n/a)
Limited entry fixed gear (longline) sablefish fishery	At-sea disentanglement	2005	0.5%	0 (1)	1 (n/a)*	0.2 (n/a)
		2006	1.5%			
		2007	3.4%			
		2008	1.5%			
		2009	2.4%			
Minimum total annual takes						≥1.6 (0.74)

*No estimate of bycatch was derived from the one observation of a bottlenose dolphin released injured from sablefish gear (Jannot *et al.* 2011).

STATUS OF STOCK

The status of offshore bottlenose dolphins in California relative to OSP is not known, and there are insufficient data to evaluate trends in abundance. 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. Because average annual fishery takes (1.6 /yr) are less than the calculated PBR (11), offshore bottlenose dolphins are not classified as a "strategic" stock under the MMPA. The total fishery mortality and serious injury for this stock is less than 10% of the PBR and, therefore, can be considered to be insignificant and approaching zero.

REFERENCES

- Barlow, J. 2016. Cetacean abundance in the California current estimated from ship-based line-transect surveys in 1991-2014. Southwest Fisheries Science Center, Administrative Report, LJ-2016-01. 63 p.
- Carretta, J.V., J.E. Moore, and K.A. Forney. 2017. Regression tree and ratio estimates of marine mammal, sea turtle, and seabird bycatch in the California drift gillnet fishery: 1990-2015. NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-568. 83 p.
- Carretta, J.V., M.M. Muto, S. Wilkin, J. Greenman, K. Wilkinson, M. DeAngelis, J. Viezbicke, and J. Jannot. 2016. Sources of human-related injury and mortality for U.S. Pacific west coast marine mammal stock assessments, 2010-2014. U.S. Department of Commerce, NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-554. 102 p.
- 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.
- Jannot, J., Heery, E., Bellman, M.A., and J. Majewski. 2011. Estimated bycatch of marine mammals, seabirds, and sea turtles in the US west coast commercial groundfish fishery, 2002-2009. West Coast Groundfish Observer Program. National Marine Fisheries Service, NWFSC, 2725 Montlake Blvd E., Seattle, WA 98112.
- Lee, T. 1993. Summary of cetacean survey data collected between the years of 1974 and 1985. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-SWFSC-181. 184 pp.
- Lowther, J. 2006. Genetic variation of coastal and offshore bottlenose dolphins, *Tursiops truncatus*, in the eastern North Pacific Ocean. M.S. Thesis, University of San Diego, San Diego, California, USA. 126 p.
- 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 Tech. Memo. NMFS, NMFS-SWFSC-211. 88 pp.
- Moore, J.E. and J. Barlow. 2011. Bayesian state-space model of fin whale abundance trends from a 1991-2008 time series of line-transect surveys in the California Current. *Journal of Applied Ecology* 48:1195-1205.
- Moore, J.E., Barlow J.P. 2013. Declining abundance of beaked whales (family Ziphiidae) in the California Current large marine ecosystem. *PLoS ONE* 8(1):e52770. doi:10.1371/journal.pone.0052770.
- NWFSC (Northwest Fisheries Science Center), Fisheries Resource Analysis and Monitoring Division, Fisheries Observation Science Program, 2725 Montlake Boulevard East, Seattle, WA 98112 (<http://www.nwfsc.noaa.gov/research/divisions/fram/observation>).
- Reeves, R. R. and S. Leatherwood. 1984. Live-capture fisheries for cetaceans in USA and Canadian waters, 1973-1982. *Rep. Int. Whal. Commn.* 34:497-507.
- Ross, G. J. B. and V. G. Cockcroft. 1990. Comments on Australian bottlenose dolphins and the taxonomic status of *Tursiops aduncus* (Ehrenberg, 1832). *In: The Bottlenose Dolphin* (eds. S. Leatherwood and R. R. Reeves). pp. 101-128. Academic Press, 653pp.
- 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*. Van Waerebeek, K., J. C. Reyes, A. J. Read, and J. S. McKinnon. 1990. Preliminary observations of bottlenose dolphins from the Pacific coast of South America. *In: The Bottlenose Dolphin* (eds. S. Leatherwood and R. R. Reeves). pp. 143-154 Academic Press, 653 pp.
- Walker, W. A. 1975. Review of the live-capture fishery for smaller cetaceans taken in Southern California waters for public display, 1966-77. *J. Fish. Res. Board. Can.* 32:1197-1211.

- Walker, W. A. 1981. Geographical variation in morphology and biology of bottlenose dolphins (*Tursiops*) in the eastern North Pacific. Admin. Rep. LJ-81-03C. Southwest Fisheries Science Center, National Marine Fisheries Service, La Jolla, CA 92038. 52p.
- 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.