

PANTROPICAL SPOTTED DOLPHIN (*Stenella attenuata*): Hawaiian Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Pantropical spotted dolphins are primarily found in tropical and subtropical waters worldwide (Perrin and Hohn 1994). Much of what is known about the species in the North Pacific has been learned from specimens obtained in the large directed fishery in Japan and in the eastern tropical Pacific (ETP) tuna purse-seine fishery (Perrin and Hohn 1994). These dolphins are common and abundant throughout the Hawaiian archipelago, particularly in channels between islands, over offshore banks (e.g. Penguin Banks), and off the lee shores of the islands (see Shallenberger 1981). Recent sighting locations from aerial surveys around the main Hawaiian Islands (Mobley et al. 2000) are shown in Figure 1. Nitta (1991) only documented three strandings of this species in Hawaii. Morphological differences and distribution patterns have been used to establish that the spotted dolphins around Hawaii belong to a stock that is distinct from those in the ETP (Perrin 1975; Dizon et al. 1994; Perrin et al. 1994b). Their possible affinities with other stocks elsewhere in the Pacific have not been investigated. For the Marine Mammal Protection Act (MMPA) stock assessment reports, there is a single Pacific management stock including only animals found within the U.S. Exclusive Economic Zone (EEZ) of the Hawaiian Islands. Spotted dolphins involved in eastern tropical Pacific tuna purse-seine fisheries are managed separately under the MMPA.

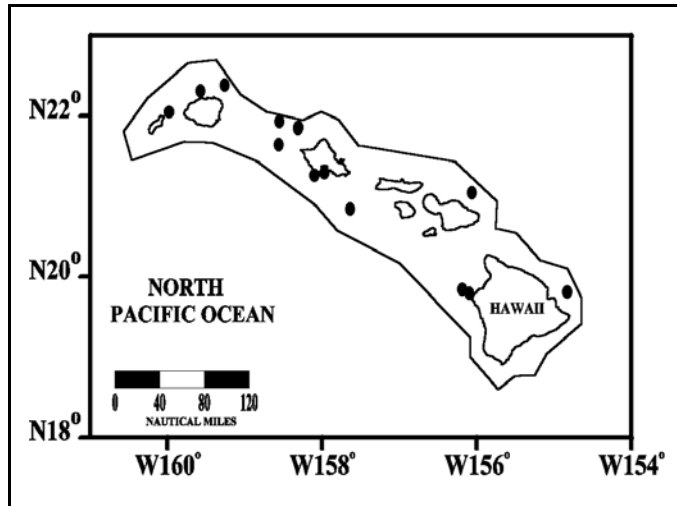


Figure 1. Pantropical spotted dolphin sighting locations during 1993-98 aerial surveys within about 25 nmi of the main Hawaiian Islands (see Appendix 2 for details on timing and location of survey effort). Outer line indicates approximate boundary of survey area.

POPULATION SIZE

Population estimates are available for Japanese waters (Miyashita 1993) and the eastern tropical Pacific (Wade and Gerrodette 1993). As part of the Marine Mammal Research Program of the Acoustic Thermometry of Ocean Climate (ATOC) study, a total of twelve aerial surveys were conducted within about 25 nmi of the main Hawaiian Islands in 1993, 1995 and 1998. An abundance estimate of 2,928 (CV=0.45) pantropical spotted dolphins was recently calculated from the combined survey data (Mobley et al. 2000). This abundance underestimates the total number of pantropical spotted dolphins within the U.S. EEZ off Hawaii, because areas around the Northwest Hawaiian Islands (NWHI) and beyond 25 nautical miles from the main islands were not surveyed. A line-transect vessel survey of the Hawaiian archipelago EEZ was completed in 2002 and is expected to provide a more comprehensive estimate of abundance for Hawaiian pantropical spotted dolphins in the near future.

Minimum Population Estimate

The log-normal 20th percentile of the combined 1993-98 abundance estimate is 2,040 pantropical spotted dolphins. As with the best abundance estimate above, this includes only areas within about 25 nmi of the main Hawaiian Islands and is therefore an underestimate.

Current Population Trend

No data are available on current population trend.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No data are available on current or maximum net productivity rate.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (2,040) times one half the default maximum net growth rate for cetaceans ($\frac{1}{2}$ of 4%) times a recovery factor of 0.50 (for a species of unknown status with no known fishery mortality within the U.S. EEZ of the Hawaiian Islands; Wade and Angliss 1997), resulting in a PBR of 20 pantropical spotted dolphins per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

Information on fishery-related mortality of cetaceans in Hawaiian waters is limited, but the gear types used in Hawaiian fisheries are responsible for marine mammal mortality and serious injury in other fisheries throughout U.S. waters. Gillnets appear to capture marine mammals wherever they are used, and float lines from lobster traps and longlines can be expected to occasionally entangle whales (Perrin et al. 1994a). In Hawaii, no mortality of pantropical spotted dolphins has been observed in inshore gillnets, but these fisheries are not observed or monitored. Regulations governing the use of nearshore gillnets (lay nets) are currently under review by the State of Hawaii.

Interactions with cetaceans have been reported for all Hawaiian pelagic fisheries (Nitta and Henderson 1993). Between 1997 and 2001, one pantropical spotted dolphin was observed killed in the Hawaiian longline fishery (Figure 2), with approximately 4-23% of all effort observed each year. Although this animal was killed, not all interactions result in the death or serious injury of cetaceans. Cetaceans may ingest a hook, become hooked in the mouth or other body part, or become entangled in fishing line, causing varying levels of injury. Following the guidelines of a 1997 Serious Injury Workshop (Angliss and DeMaster 1998), small cetaceans that ingest a hook, are hooked in the mouth or head, are swimming abnormally, or are entangled and released trailing gear are considered seriously injured (defined under the MMPA as likely to result in mortality). The estimate of serious injury or mortality for pantropical spotted dolphins in the entire fishery during the five most recent years for which data are available (1997-2001) is 12 (95% CI = 1-55), or an average of 2.3 dolphins per year (NMFS, unpublished data, Kleiber 1999). Within the Hawaiian Islands EEZ, the annual rate of serious injury or mortality for pantropical spotted dolphins in the Hawaiian longline fishery during 1997-2001 is zero. One additional unidentified cetacean that may have been a pantropical spotted dolphin was hooked and injured outside the Hawaiian Islands EEZ. The inclusion of this take would not increase the annual rate of serious injury or mortality for pantropical spotted dolphins within Hawaiian waters.

Interaction rates between dolphins and the NWHI bottomfish fishery have been estimated based on studies conducted in 1990-1993, indicating that an average of 2.67 dolphin interactions, most likely involving bottlenose and rough-toothed dolphins, occurred for every 1000 fish brought on board (Kobayashi and Kawamoto 1995). Fishermen claim interactions with dolphins who steal bait and catch are increasing. It is not known whether these interactions result in serious injury or mortality of dolphins, nor whether pantropical spotted dolphins are involved.

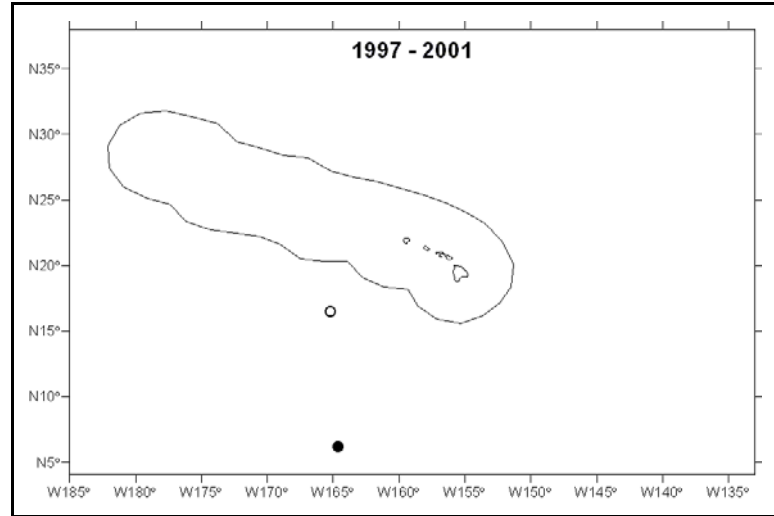


Figure 2. Locations of observed pantropical spotted dolphin interactions (●) and possible interactions with this species (○) in the Hawaiian longline fishery, 1997-2001. The solid line surrounding the Hawaiian Islands represents the U. S. Exclusive Economic Zone (EEZ).

Other Removals

At least 52 pantropical spotted dolphins were live-captured in Hawaii between 1963 and 1978 (Shallenberger 1981).

STATUS OF STOCK

The status of pantropical spotted dolphins in Hawaiian waters relative to OSP is unknown, 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 (1973), nor as “depleted” under the MMPA. Although information on pantropical spotted dolphins in Hawaiian waters is limited, this stock would not be considered strategic under the 1994 amendments to the MMPA because the estimated rate of fisheries related mortality or serious injury within the Hawaiian Islands EEZ is zero. However, there is no systematic monitoring of gillnet fisheries that may take this species, and the potential effects of interactions with the Hawaiian longline fishery in international waters are not known. Insufficient information is available to determine whether the total fishery mortality and serious injury for pantropical spotted dolphins is insignificant and approaching zero mortality and serious injury rate.

REFERENCES

- Angliss, R. P. and D. P. DeMaster. 1998. Differentiating Serious and Non-Serious Injury of Marine Mammals Taken Incidental to Commercial Fishing Operations: Report of the Serious Injury Workshop 1-2 April 1997, Silver Spring, Maryland. U. S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-13. 48 pp.
- Dizon, A. E., W. F. Perrin, and P. A. Akin. 1994. Stocks of dolphins (*Stenella* spp. and *Delphinus delphis*) in the eastern tropical Pacific: a phylogeographic classification. NOAA Tech. Rep. NMFS 119, 20 pp.
- Kleiber, P. 1999. Estimates of marine mammal takes in the Hawaiian longline fishery. (Unpublished). Southwest Fisheries Science Center, NMFS, 2570 Dole St, Honolulu, HI, 96822-2396.
- Kobayashi, D. R. and K. E. Kawamoto. 1995. Evaluation of shark, dolphin, and monk seal interactions with Northwestern Hawaiian Island bottomfishing activity: a comparison of two time periods and an estimate of economic impacts. Fisheries Research 23: 11-22.
- Miyashita, T. 1993. Abundance of dolphin stocks in the western North Pacific taken by the Japanese drive fishery. Rep. Int. Whal. Commn. 43:417-437.
- Mobley, J. R., Jr, S. S. Spitz, K. A. Forney, R. A. Grotefendt, and P. H. Forestall. 2000. Distribution and abundance of odontocete species in Hawaiian waters: preliminary results of 1993-98 aerial surveys Admin. Rep. LJ-00-14C. Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038. 26 pp.
- Nitta, E. 1991. The marine mammal stranding network for Hawaii: an overview. In: J.E. Reynolds III, D.K. Odell (eds.), Marine Mammal Strandings in the United States, pp.56-62. NOAA Tech. Rep. NMFS 98, 157 pp.
- Nitta, E. and J. R. Henderson. 1993. A review of interactions between Hawaii's fisheries and protected species. Mar. Fish. Rev. 55(2):83-92.
- Perrin, W. F. 1975. Variation of spotted and spinner porpoise (genus *Stenella*) in the eastern tropical Pacific and Hawaii. Bull. Scripps Inst. Oceanogr. 21, 206 pp.
- Perrin, W. F. and A. A. Hohn. 1994. Pantropical spotted dolphin *Stenella attenuata*. In: S. H. Ridgway and R. Harrison (eds.), Handbook of Marine Mammals, Vol.5: The First Book of Dolphins, pp 71-98. Academic Press, 416 pp.
- Perrin, W.F., G. P. Donovan and J. Barlow. 1994a. Gillnets and Cetaceans. Rep. Int. Whal. Commn., Special Issue 15, 629 pp.
- Perrin, W. F., G. D. Schnell, D. J. Hough, J. W. Gilpatrick, Jr., and J. V. Kashiwada. 1994b. Re-examination of geographical variation in cranial morphology of the pantropical spotted dolphin, *Stenella attenuata*, in the eastern Pacific. Fish. Bull. 92:324-346.
- Shallenberger, E.W. 1981. The status of Hawaiian cetaceans. Final report to U.S. Marine Mammal Commission. MMC-77/23, 79pp.
- 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.