Revised 10/15/2009

HUMPBACK WHALE (*Megaptera novaeangliae*)

IUCN Oceania subpopulation – American Samoa Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The humpback whale has a global distribution. Humpback whales migrate long distances between their feeding grounds at mid- to high latitudes and their calving and mating grounds in tropical waters. The Oceania subpopulation (as defined by the IUCN Red List process, see Childerhouse *et al*. 2008) ranges throughout the South Pacific, except the west coast of South America, and from the equator to the edges of the Antarctic ice. Humpback whales have been recorded across most of the lower latitudes of the South Pacific from approximately 30°S northwards to the equator during the austral autumn and winter. Although there have been no comprehensive surveys of this huge area, humpback whale densities are known to vary extensively from high densities in East Australia to low densities at many island groups. Many regional research projects have documented the presence of these whales around various island groups, but they are also found in open water away from islands (SPWRC 2008). Movements of individual whales between the tropical wintering grounds and the Antarctic summer feeding grounds have been documented by a variety of methods including Discovery tagging, photo-identification, matching genotypes from biopsies or carcasses, and satellite telemetry (Mackintosh 1942; Chittleborough 1965; Dawbin 1966; Mikhalev 2000; Rock *et al*. 2006, Franklin *et al*. 2007, Robbins *et al*. 2008). However, migratory routes and specific destinations remain poorly known. Unlike the other humpback stocks found in U. S. waters, the IUCN Oceania subpopulation is defined by structure on its calving grounds (Garrigue *et al*. 2006b, Olavarria *et al*. 2006, 2007) rather than on its feeding grounds. The Oceania subpopulation consists of breeding stocks E (including E1, E2 and E3) and F recognized by the International Whaling Commission (IWC). It is found in the area defined by the following approximate boundaries: 145°E (eastern Australia) in the west, 120°W (between French Polynesia and South America) in the east, the equator in the north, and 30°S in the south (Childerhouse *et al*. 2008).

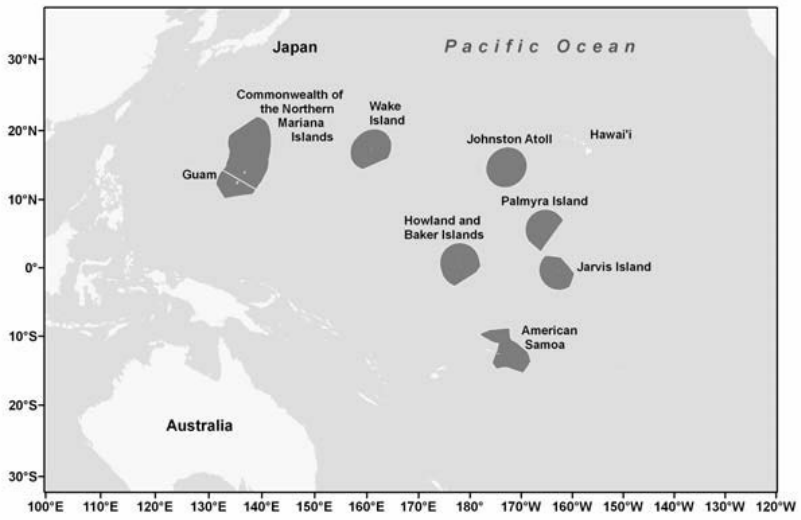

Figure 1. Western Pacific Exclusive Economic Zones for selected U.S. territories, including American Samoa. Information on the American Samoa stock of humpback whales in this report is derived from survey work conducted within the American Samoa EEZ, although animals range well outside this area (see text).

For the Marine Mammal Protection Act (MMPA) stock assessment reports, there is need for only one South Pacific Island region management stock of humpback whales, the American Samoa stock. American Samoa lies at the boundary of breeding stocks E3 and F. Surveys have been undertaken annually at the primary island of Tutuila since 2003. A total of 150 unique individuals were identified by fluke photographs during 58 days at sea, 2003-2008 (D. Mattila and J. Robbins, unpublished data). Individuals have been resighted on multiple days in a single breeding season, but only three inter-annual re-sightings have been made to date (two based on dorsal fin photographs) (D. Mattila and J. Robbins, unpublished data). Breeding behavior and the presence of very young calves has been documented in American Samoa waters. One whale that was sighted initially without a calf was re-sighted later in the season with a calf. Individual exchange has been documented with Western Samoa (SPWRC 2008), as well as Tonga, French Polynesia and the Cook Islands (Garrigue *et al*. 2007). Although the feeding range of American Samoan whales has not yet been defined, there has been one photo-ID match to the Antarctic Peninsula (IWC Antarctic Area I, Robbins *et al*. 2008). Whales at Tonga have exhibited exchange with both Antarctic Area V (Dawbin 1959) and Area I (Brown 1957, Dawbin 1956) and so whales from American Samoa may have a similarly

wide feeding range.

On-going photographic studies indicate a higher frequency of certain types of skin lesions on humpback whales at American Samoa as compared to humpback whale populations at Hawaii or the Gulf of Maine (Mattila and Robbins, 2008). However, the cause and implications have yet to be determined. Some similar skin lesions on blue whales in Chilean waters have been observed (Brownell *et al*. 2008).

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Historic whaling

Southern Hemisphere humpback whales were hunted extensively during the last two centuries, and it is thought that populations have been reduced to a small percentage of their former levels (Chapman 1974). After correcting catch records for illegal Soviet whaling, (Clapham & Baker 2002) estimated that over 200,000 Southern Hemisphere humpback whales were killed from 1904 to 1980. Humpback whales were protected from commercial whaling in 1966 by the IWC but they continued to be killed illegally by the Soviet Union until 1972. Illegal Soviet catches of 25,000 humpback whales in two seasons (1959/60 and 1960/61) precipitated a population crash and the closure of land stations in Australia and New Zealand, including Norfolk Island (Mikhalev 2000; Clapham *et al*. 2005).

POPULATION SIZE

There is currently no estimate of abundance for humpback whales in American Samoan waters. The South Pacific Whale Research Consortium produced a number of preliminary mark-recapture estimates of abundance for Oceania and its subregions (SPWRC, 2006). A closed population estimate of 3,827 (CV 0.15) was calculated for eastern Oceania (breeding stocks E3 and F) for 1999-2004 and this may be the most relevant of those currently available, given observed exchange between American Samoa, Tonga, the Cook Islands, and French Polynesia (Garrigue *et al.* 2006a). However, the extent and biological significance of the documented interchange is still poorly understood.

Minimum Population Estimate

The minimum population estimate for this stock is 150 whales, which is the number of individual humpbacks identified in the waters around American Samoa between 2003-2008 by fluke photo identification (J. Robbins, personal communication). This is clearly an underestimation of the true minimum population size as photo ID studies have been conducted over a few weeks per year and there is also evidence of exchange with other areas in Oceania. There are also insufficient data to estimate the proportion of time Oceania humpback whales spend in waters of American Samoa.

Current Population Trend

No data are available on current population trend.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No estimates of current or maximum net productivity rates are available for this species in Samoan waters. However, the maximum plausible growth rate for Southern Hemisphere humpback whale populations is estimated as 10.6% (Clapham *et al*. 2006).

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) for this stock is calculated as the minimum population size (150) times one half the estimated maximum growth rate for humpback whales in the Southern Hemisphere (1/2 of 10.6%) times a recovery factor of 0.1 (for an endangered species with a total population size of less than 1,500), resulting in a PBR of 0.8. This stock of humpback whales is migratory and thus, it is reasonable to expect that animals spend at least half the year outside of the relatively small American Samoa EEZ. Therefore, the PBR allocation for U.S. waters is half of 0.8, or 0.4 whales.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

No human-related mortalities of humpback whales have been recorded in American Samoan waters. Human-related mortality of humpback whales due to entanglements in fishing gear and collisions with ship have been reported elsewhere in the Southern Hemisphere. Entanglement of humpback whales in pot lines has been reported in both New Zealand and Australia but there are no estimated rates available. There is little information

from the rest of the South Pacific but a humpback mother (with calf) was reported entangled in a longline in 2007 in the Cook Islands (N. Hauser, reported in SPWRC 2008).

A photographic-based scar study of the humpback whales of American Samoa has been initiated and there is some indication of healed entanglement and ship strike wounds, although perhaps not at the levels found in some Northern Hemisphere populations (D. Mattila and J. Robbins, unpublished data). However, the sample size to date is insufficient for robust comparison and the study is ongoing.

STATUS OF STOCK

The status of humpback whales in American Samoan EEZ waters relative to OSP is unknown and there are insufficient data to estimate trends in abundance. However, humpback whale populations throughout the South Pacific were drastically reduced by historical whaling and IUCN classifies the Oceania subpopulation as "Endangered" (Childerhouse *et al.* 2008). Worldwide humpback whales are listed as "endangered" under the Endangered Species Act (1973) so the Samoan stock is automatically considered a "depleted" and "strategic" stock under the MMPA. There are no habitat concerns for the stock.

Japan has proposed killing 50 humpback whales as part of its program of scientific research under special permit (scientific whaling) called JARPA II in the IWC management areas IV and V in the Antarctic (Gales *et al.* 2005). Areas IV and V have demonstrated links with breeding stock E. Japan postponed their proposed catch in the 2007/08 and 2008/09 seasons but have not removed them from their future whaling program. The JARPA II program has the potential to negatively impact the recovery of humpbacks in Oceania.

REFERENCES

Brownell, R. L., Jr., C. A. Carlson, B. Galletti Vernazzani, and E. Cabrera. 2008. Skin lesions on blue whales off southern Chile. Paper SC/60/SH25 presented to the Scientific Committee of the International Whaling Commission, Santiago, Chile.

Chapman, D.G. 1974. Status of Antarctic rorqual stocks. Pages 218-238 *in* W.E. Schevill, (ed.), The whale problem. Harvard University Press, Cambridge.

Childerhouse, S., J. Jackson, C. S. Baker, N. Gales, P. J. Clapham, and R. L. Brownell, Jr. 2008. Megaptera novaeangliae, Oceania subpopulation. IUCN Red List of Threatened Species (http://www.iucnredlist.org/details/132832).

Chittleborough, R.G. 1965. Dynamics of two populations of humpback whales, *Megaptera novaeangliae* (Borowski). Aust. J. Mar. and Freshw. Res. 16:33-128.

Clapham, P. J. and C. S. Baker. 2002. Modern whaling. Pages 1328-1332 *in* W.F. Perrin, B. Würsig and J.G.M. Thewissen, (eds.) Encyclopedia of Marine Mammals. Academic Press, New York.

Clapham, P., Yu. Mikhalev, W. Franklin, D. Paton, C. S. Baker, and R. L. Brownell, Jr. 2005. Catches of humpback whales in the Southern Ocean, 1947-1973. Paper SC/57/SH6 presented to the Scientific Committee of the International Whaling Commission, Uslan, Korea.

Clapham, P., P. Wade, and A. Zerbini. 2006. Plausible rates of population growth in humpback whales revisited. SC/58/SH4 presented to the Scientific Committee of the International Whaling Commission, St. Kitts & Nevis.

Dawbin, W.H. 1966. The seasonal migratory cycle of humpback whales. Pages 145-171 *in* K.S. Norris (ed.), Whales, dolphins and porpoises. University of California Press, Berkeley.

Franklin, T., F. Smith, N. Gibbs, S. Childerhouse, D. Burns, D. Paton, W. Franklin, C. S. Baker, and P. Clapham. 2007. Migratory movements of humpback whales (*Megaptera novaeangliae*) between eastern Australia and the Balleny Islands, Antarctica, confirmed by photo-identification. Paper SC/59/SH18 presented to the Scientific Committee of the International Whaling Commission Annual Meeting 2007, Anchorage, Alaska.

Garrigue, C., C. S. Baker, R. Constantine, M. Poole, N. Hauser, P. Clapham, M. Donoghue, K. Russell, D. Paton, and D. Mattila. 2006a. Interchange of humpback whales in Oceania (South Pacific), 1999 to 2004. Paper SC/A06/HW55 presented to IWC Comprehensive Assessment of Southern Hemisphere Humpback whales 2006, Hobart, Australia.

Garrigue, C., C. Olavarría, C. S. Baker, D. Steel, R. Dodemont, R. Constantine and K. Russell. 2006b. Demographic and genetic isolation of New Caledonia (E2) and Tonga (E3) breeding stocks. Report SC/A06/HW19 for consideration of the Inter-sessional Workshop for the Comprehensive Assessment of Southern Hemisphere humpback whales. Scientific Committee of the International Whaling Commission. Hobart, Australia.

Garrigue, C., T. Franklin, K. Russell, D. Burns, M. Poole, D. Paton, N. Hauser, M. Oremus, R. Constantine, S.

Childerhouse, D. Mattila, N. Gibbs, W. Franklin, J. Robbins, P. Clapham, and C. S. Baker. 2007. First assessment of interchange of humpback whales between Oceania and the east coast of Australia. Paper SC/59/SH15 presented to the Scientific Committee of the International Whaling Commission Annual Meeting 2007, Anchorage, Alaska.

Gales, N. J., Kasuya, T., Clapham, P. J. and Brownell, R. L., Jr. 2005. Japan's whaling plan under scrutiny. Nature 435:883-884.

Mackintosh, N.A. 1942. The southern stocks of whalebone whales. Disc. Rep. 22:197-300.

Mattila, D.K. and J. Robbins. 2008. Incidence of raised and depressed ovoid skin lesions on humpback whales of American Samoa. Paper SC/60/DW3 presented to the Scientific Committee of the International Whaling Commission, Santiago, Chile.

Mikhalev, Y.A. 2000. Biological characteristics of humpbacks taken in Antarctic Area V by the whaling fleets *Slava* and *Sovietskaya Ukraina*. Paper SC/52/IA presented to the Scientific Committee of the International Whaling Commission, Adelaide, Australia.

Olavarría, C., M. Anderson, D. Paton, D. Burns, M. Brasseur, C. Garrigue, N. Hauser, M. Poole, S. Caballero, L. Flórez-González, and C. S. Baker. 2006. Eastern Australia humpback whale genetic diversity and their relationship with Breeding Stocks D, E, F and G. Paper SC/58/SH25 presented to the Scientific Committee of the International Whaling Commission , St Kitts & Nevis.

Olavarría, C., C. S. Baker, C. Garrigue, C., M. Poole, N. Hauser, S. Caballero, L. Flórez-González, M. Brasseur, J. Bannister, J. Capella, J., P. Clapham, R. Dodemont, M. Donoghue, C. Jenner, M. Jenner, D. Moro, M. Oremus, D. Paton, and K. Russell. 2007. Population structure of humpback whales throughout the South Pacific and the origins of the eastern Polynesian breeding grounds. Marine Ecology Progress Series 330:257-268.

Robbins, J., L. Dalla Rosa, J. M. Allen, D. K. Mattila, and E. R. Secchi. 2008. Humpack whale photo-identification reveals exchange between American Samoa and the Antarctic Peninsula, and a new mammalian distance record. Paper SC/60/SH5 presented to the Scientific Committee of the International Whaling Commission, Santiago, Chile.

Robbins, J. and D. K. Mattila. 2006. Summary of humpback whale research at American Samoa, 2003-2005. Paper SC/58/SH5 presented to the Scientific Committee of the International Whaling Commission, St. Kitts & Nevis.

Rock, J., L. A. Pastene, G. Kaufman, P. Forestell, K. Matsuoka, and J. Allen, 2006. A note on East Australia Group V Stock humpback whale movement between feeding and breeding areas based on photo-identification. Journal of Cetacean Research and Management 8: 301-305.

South Pacific Whale Research Consortium (C. S. Baker, C. Garrigue, R. Constantine, B. Madon, M. Poole, N. Hauser, P. Clapham, M. Donoghue, K. Russell, T. O'Callahan, D. Paton and D. Mattila). 2006. Abundance of humpback whales in Oceania (South Pacific), 1999 to 2004. Unpublished report to the IWC Inter-sessional workshop for the Comprehensive Assessment of Southern Hemisphere Humpback Whales. Hobart, Australia.

South Pacific Whale Research Consortium. 2008. Report of the Annual Meeting of the South Pacific Whale Research Consortium, Auckland, 5-8 February 2008. South Pacific Whale Research Consortium, P.O. Box 3069, Avarua, Rarotonga, Cook Islands. 36 pp.