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**Brief Species Description:**

Morphology of this species can be quite variable. Colonies may be any combination of encrustations, plates, knobs, and branches. *Montipora dilatata* is a glabro-favoleate type that is characterized by a very smooth surface lacking papillae and verrucae (Vaughan 1907). Veron (2000) describes the species as follows: “Colonies are encrusting to submassive and up to 0.3 meters across, with irregular branch-like upgrowths up to 100 millimeters (mm) thick which become flattened near their ends. Coenosteum papillae are inconspicuous. Corallite walls are well defined.” Studer (1901) originally described the species as a coral that builds horizontally expanding thin sheets that are often leaflike and 0.6 inches (15 mm) thick. This species requires calm water in subtidal environments. Colonies are usually purple or brown and reach 3 feet (1 m) in diameter. The species is easily broken into fragments by storms or natural bioerosional processes, with the fragments readily growing into new colonies.

This species occurs in lagoons and bays and appears to be restricted to shallow, low-water motion environments. This species is presently very rare in Kaneohe Bay, but at one time was more abundant and occurred in large patches on some of the reef flats. Jokiel et al. (1983) encountered areas of up to 20 feet (6 m) with scattered heads of this species. A histocompatibility grafting technique within and between four isolated patches of *Montipora dilatata* was used to determine which corals were asexually derived by fragmentation from a common ancestor. The “within patch” compatibility rate was 100% for *M. dilatata*, but only five percent for the closely related coral *Montipora verrucosa* (= *M. capitata*) over the same distance of separation, showing that the *M. dilatata* were all derived from the same ancestor. Grafts between corals from different patches of *M. dilatata* were incompatible, and hence there were only 4 genotypes involved. The restricted distribution of *M. dilatata* makes this species vulnerable to elimination by storm floods such as the 1988 event (Jokiel et al. 1993) which killed much of the shallow water coral within 1 m of the surface.

**KEY INFORMATION**

**Areas of Concern**

Main Hawaiian archipelago, in Kaneohe Bay, Oahu, and in the Northwestern Hawaiian Islands (NWHI) at Midway Atoll, Pearl and Hermes Atoll, Lisianski Island, Laysan Island, Maro Reef, and French Frigate Shoals.

**Year Identified as “Species of Concern”**  
2004

**Factors for Decline**

- Habitat degradation
- Coral bleaching
- Freshwater kills
- Pollution
- Alien and invasive algae
- Limited distribution

**Conservation Designations**

IUCN: Not Evaluated  
Species of Greatest Conservation Need: HI

*Montipora dilatata* is very sensitive to thermal stress and was the first species to bleach during the 1996 event in Kaneohe Bay (Jokiel and Brown 2004) and the last to recover; and did so with a high rate of



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mortality (Jokiel, unpublished). It is likely that much of the decline observed in this species is due to the fresh water flood event and warming trend that is pushing the limits of tolerance for this species.

### Rationale for “Species of Concern” Listing:

#### **Demographic and Genetic Diversity Concerns:**

The species has not been recorded in any transect surveys, but it has been found to be uncommon in other extensive surveys. In Kaneohe Bay, where it formerly was abundant, extensive surveys during 2000 identified only three colonies. Two other species, *M. turgescens* (*M. dilatata* cited by Dana 1971 at Kure Atoll in the NWHI is probably *M. turgescens*) and *M. cf. dilatata* (recorded at one site out of 30 sites surveyed at Maro Reef in 2000-2002) are similar, and genetic analysis should be done to confirm their separation into distinct species (see Figure 1 for locations). If the Kaneohe Bay and Maro Reef species are the same, then the argument could be made that they are still rare enough to be listed as threatened or endangered under the ESA since only a single site with several colonies was reported at Maro Reef. But if the so-called *M. turgescens* is the same as the *M. dilatata* of Kaneohe Bay, then there may be little justification for listing except that it is rare in the main Hawaiian Islands (but prolific in the distal NWHI).

#### **Factors for Decline:**

The main threats include: 1) vulnerability to coral bleaching (Figure 2) due to high temperatures (as observed in 2002 at Midway, Kure, and Pearl and Hermes atolls); 2) fresh water kills and exposure at extreme low tide; 3) habitat degradation and modification as a result of sedimentation, pollution, alien alga species (*Gracilaria salicornia*, *Kappaphycus/Eucheuma* spp. algae) and invasive green alga (*Dictyosphaeria cavernosa*) (Kaneohe Bay); 4) a limited distribution; and 5) damage by anchors, fish pots, swimmers, and divers.



Figure 2. Bleached *Montipora dilatata*, Kaneohe Bay, Sept. 1996. Photograph © Paul Jokiel.



## Hawaiian Reef Coral SOC Range

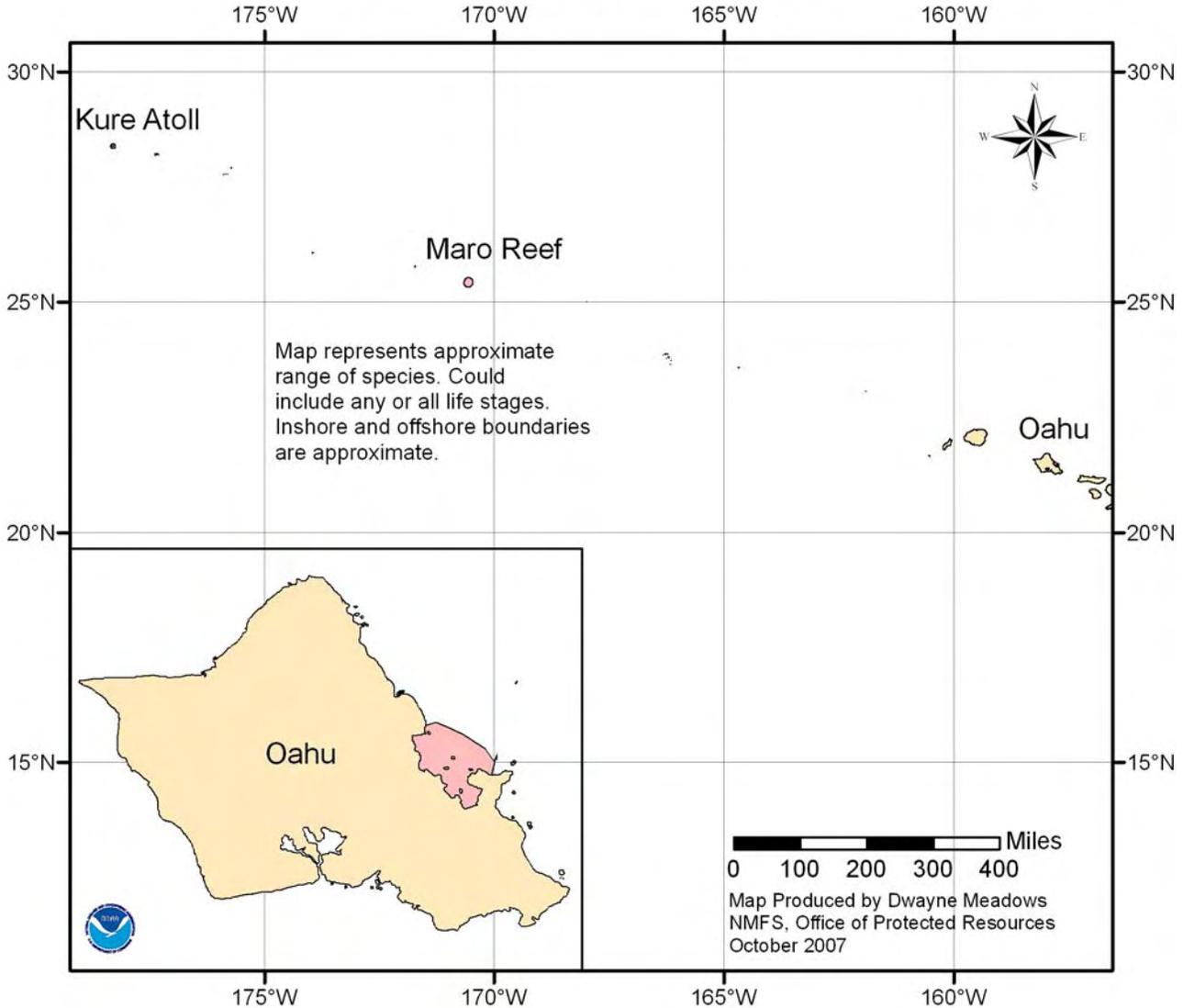


Figure 1. Locations for possible Hawaiian reef coral species of concern populations.

### Status Reviews/Research Underway:

In August 2006, the National Marine Fisheries Service (NMFS) Pacific Islands Regional Office (PIRO) Protected Resources Division held its first Species of Concern workshop in Honolulu, Hawaii, for species in the Pacific Islands Region. The purpose of the workshop was to gather pertinent researchers and resource managers to share their knowledge or research, thereby providing overall information on the species, their habitat, threats, research, or conservation ideas. After the open discussion on the species, threats were prioritized, recovery actions/conservation efforts addressing each threat were identified, and data and research needs for each species were identified. These



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efforts will ultimately lead to the development of a conservation action plan for the species. This conservation action plan will be a living document which will aid NMFS PIRO to identify, prioritize, and fund conservation and research projects over the coming years.

### Data Deficiencies:

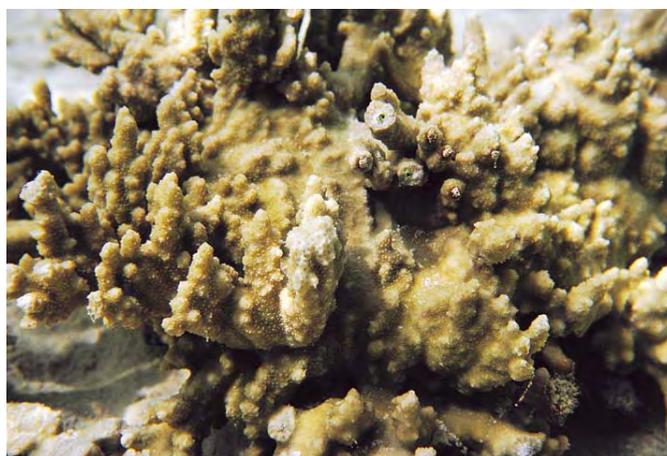
Current and future needs include: 1) a quantitative survey of Kaneohe Bay to systematically map the species and determine population size; 2) comprehensive surveys of the NWHI to determine location and population size; 3) genetic work with molecular markers to determine if: A) fragments collected in 2000 from Kaneohe Bay; B) current colonies in Kaneohe Bay; and C) colonies from multiple sites in the NWHI are all in fact *M. dilatata*, or a hybrid species, or another species of *Montipora*; 4) determine if reintroducing the species to Kaneohe Bay is feasible and if so, begin test reintroductions; and 5) confirm species presence/absence in Ambon, Indonesia and Japan.

### Existing Protections and Conservation Actions:

Coral collection is not allowed in the State waters of Hawaii without a research permit from the Department of Land and Natural Resources. However, Midway Atoll is outside of state waters and *M. cf. turgescens* is very common there in shallow lagoon back reef habitats. Existing conservation actions include: 1) continued captive propagation of the species at the Waikiki Aquarium in Honolulu, Hawaii; and 2) mass removal of invasive algae in Kaneohe Bay.



J. Charles Delbeek, Waikiki Aquarium



Jim Maragos, USFWS

### References:

- Dana, T. F. 1971. On the reef corals of the world's most northern atoll (Kure: Hawaiian Archipelago). *Pacific Science* 25:80-87.
- Fenner, D. 2005. *Corals of Hawaii*. Mutual Publishing. Honolulu, HI.
- Jokiel, P. L., W. H. Hildemann and C. H. Bigger. 1983. Isoclonal population structure of two sympatric species of the reef coral *Montipora*. *Bulletin of Marine Science* 33:181-187.



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- Jokiel, P. L., C. L. Hunter, S. Taguchi and L. Watarai. 1993. Ecological impact of a fresh water "reef kill" in Kaneohe Bay, Oahu, Hawaii. *Coral Reefs* 12:177-184.
- Jokiel, P. L. and Eric K. Brown. 2004. Global warming, regional trends and inshore environmental conditions influence coral bleaching in Hawaii. *Global Change Biology* 10:1627-1641.
- Maragos, J.E. 1977. Order Scleractinia: p. 158-241. In: D.M. Devany & L.G. Eldredge, eds., Reef and shore fauna of Hawaii. Section 1. Bishop Museum Press Special Publication 64. Honolulu, HI.
- Maragos, J., D. Potts, G. Aeby, D. Gulko, J. Kenyon, D. Siciliano and D. VanRavenswaay. 2004. 2000-2002 rapid ecological assessment of corals on the shallow reefs of the Northwestern Hawaiian Islands. Part 1: Species and distribution. *Pacific Science* 58:211-230.
- Studer, T. 1901. Madreporarier von Samoa, den Sanwich-Inseln und Laysan. *Zoologische Jahrbücher Systematik* 14(5): 388-428.
- Vaughan, T.W. 1907. Recent Madreporaria of the Hawaiian Islands and Laysan. Washington, U.S. National Museum. Bulletin 59.
- Veron, J.E.N. 2000. *Corals of the World*. Vol. 1. Australian Institute of Marine Science, Townsville.

### **Point(s) of contact for questions or further information:**

For further information on this Species of Concern, or on the Species of Concern Program in general, please contact NMFS, Office of Protected Resources, 1315 East West Highway, Silver Spring, MD 20910, (301) 713-1401, [soc.list@noaa.gov](mailto:soc.list@noaa.gov); <http://www.nmfs.noaa.gov/pr/species/concern/>, or Krista Graham, NMFS, Pacific Islands Regional Office, 1601 Kapiolani Blvd., Suite 1110, Honolulu, HI 96814, (808) 944-2238, [Krista.Graham@noaa.gov](mailto:Krista.Graham@noaa.gov); or John Henderson, NMFS, Pacific Islands Fishery Science Center, 1601 Kapiolani Blvd., Suite 1110, Honolulu, HI 96814, (808) 944-2173, [John.R.Henderson@noaa.gov](mailto:John.R.Henderson@noaa.gov).