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KEY INFORMATION

Areas of Concern

Throughout the Indo-Pacific including the Red Sea and East Africa to the Line Islands and Samoa; north to Taiwan and Yaeyama Islands (Japan), south to the Great Barrier Reef and New Caledonia; Palau, Caroline, Marshall, and Mariana Islands in Micronesia. In the U.S. it occurs in Guam, American Samoa, CNMI & Wake, Howland, and Jarvis Islands, and Palmyra Atoll, but not Hawaii or Johnston Atoll.

Year Identified as “Species of Concern”
2004

Factors for Decline

- Fishing
- Night spearfishing
- Habitat degradation

Conservation Designations

IUCN: Not Evaluated

Brief Species Description:

Bumphead parrotfish is the largest of all parrotfishes, growing to 4 feet (1.3 m) in length and 100 lbs (46 kg) in weight. Adults are a dull green, with the front of the head pale yellowish to pink; juveniles are greenish to brown with five vertical rows of small whitish spots (Randall 2005). This species does not display sex-associated patterns of color change. Adults develop a bulbous forehead and their teeth plates are exposed (only partly covered by lips). The species is slow growing and long-lived (up to 40 years), with delayed reproduction and low replenishment rates (Choat and Robertson 2002; Hamilton 2003).

Bumphead parrotfish appear to recruit at low levels throughout the year but are not very selective about which habitats they settle into. They live in coral reef habitats from 3 to 100 feet (1-30 m) depth in the central and western Pacific and Indo-Pacific (Figure 1). They occur in barrier and fringing reefs during the day, but rest in caves or shallow sandy lagoon flats at night (Donaldson and Dulvy 2004). Juveniles (Figure 2) are found in seagrass beds inside lagoons while adults are more commonly found in outer lagoons and seaward reefs. This species is gregarious and usually occurs in small aggregations, but group size can be quite large (> 75) on seaward and clear outer lagoon reefs. They sleep in large groups, thus rendering them highly vulnerable to exploitation by spearfishers and netters at night (Myers 1999).

Bumphead parrotfish is primarily a corallivore, but also eats benthic algae. They use their large head to ram corals and break them into pieces that are more easily ingested (each fish ingests over 5 tons of structural reef carbonates per year), contributing significantly to the bioerosion of reefs (Bellwood et al. 2003). Aggregations of this species are important coral sand producers on reefs and may be important in maintaining ecosystem resilience (Bellwood et al. 2003).

They spawn **pelagically** during a lunar cycle near the outer reef slope or near promontories, gutters, or channel mouths (Donaldson and Dulvy 2004), and utilizes spawning aggregations sites (Johannes 1981, Gladstone 1986). Courtship and spawning has been reported to occur in early morning (Gladstone 1986) although it may occur at other times (Johannes 1981).



Rationale for “Species of Concern” Listing:

Demographic and Genetic Diversity Concerns:

These species has a very wide range, but population sizes have been declining throughout their range due to overexploitation. The species has nearly disappeared from Guam’s reefs. Populations have been rare since the mid-1970s in American Samoa and were only rarely encountered at a few islands of American Samoa during intensive diver surveys on research cruises by NMFS Pacific Islands Fisheries Science Center in 2002, 2004, and 2006 (Brainard, personal communication). This was also true in the U.S. Line and Phoenix Islands during these same years. Of the U.S. PRIAs, only at Wake Atoll were they observed to be relatively common, though large individuals were rare (Brainard, unpublished data). The species is still abundant in parts of the Marshall Islands, Australia (present the full length of the Great Barrier Reef but abundances decline toward the south), Papua New Guinea, Micronesia, the Solomon Islands, Red Sea, and New Caledonia, but are virtually absent in Fiji and East Africa (Donaldson and Dulvy 2004, Aswani and Hamilton 2004). During a global survey of over 300 reefs in 31 countries and territories, no bumphead parrotfish were recorded at 67% of sites in the Indo-Pacific (Hodgson 1999). They also have a vulnerable life-history with slow growth and delayed reproduction that makes them susceptible to stressors (Donaldson and Dulvy 2004).

Bumphead Parrotfish SOC Range

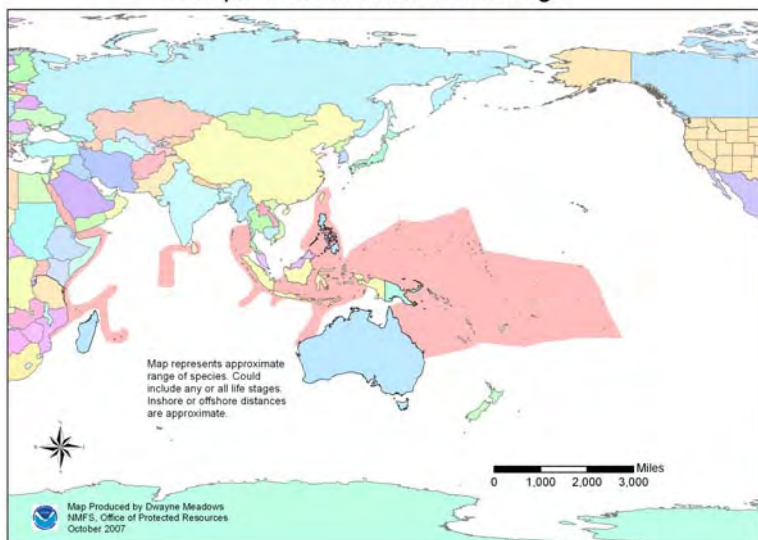


Figure 1. Geographical range of the bumphead parrotfish *Bolbometopon muricatum*.



Figure 2. Juvenile, New Caledonia. Photo Credit: © John E. Randall, B.P. Bishop Museum.



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Factors for Decline:

The main threats are 1) overexploitation (especially the taking of sleeping adults at night with spears or nets); 2) destructive fishing techniques including sodium cyanide and dynamite; and 3) degradation and loss of coral reef habitats.

The bumphead parrotfish is one of the most vulnerable species to fishing pressure (Donaldson and Dulvy 2004). Quantitative and anecdotal data show that catches have declined dramatically over the past few decades (Dulvy and Polunin 2004). The catch declines are attributed primarily to declines in stock size as a result of commercial and subsistence fishing, including spearfishing and the use of cyanide and dynamite, which have severely reduced populations of this once moderately abundant species. Its life history traits render it particularly susceptible to overexploitation. In addition to slow growth and late maturity, this species sleeps on the reef at night making it vulnerable to spearfishing by divers. Spearfishing, the use of nets, and the use of "bangsticks" (a device used to both fend off sharks and take large individual fish) for taking bumphead parrotfish are recognized as major problems. This species is also highly prized by certain subsistence and artisanal communities and was often captured for ceremonial events, suggesting this species has a high cultural significance (Dulvy and Polunin 2004).

Status Reviews/Research Underway:

In August 2006, 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 have researchers and resource managers share their knowledge and research in order to compile updated information on the species, their habitat, threats, research, and 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 efforts will contribute to the development of a NMFS PIRO 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 in the U.S. for each Pacific Islands Region Species of Concern over the coming years.

Data Deficiencies:

Needs include: 1) continue monitoring in all U.S. areas of occurrence; 2) determine the extent of the species' home range (how far individuals normally travel); 3) identify individual populations using DNA sampling; 4) characterize and determine locations of spawning aggregations and their usage patterns; 5) understand the importance of the bioerosion of this species to reef ecology, since the loss of a keystone species may have adverse effects on overall reef health; 6) collect creel, artisanal, and commercial fisheries data throughout its U.S. range; 7) determine if this species makes sound; and 8) if it makes sound, understand when and why the sound is made and use acoustic monitoring to assess population parameters such as presence/absence, spatial distribution, and temporal patterns of occurrence.

Existing Protections and Conservation Actions:

The bumphead parrotfish is listed as a Management Unit Species (MUS) in the Coral Reef Ecosystems Fishery Management Plan for the Western Pacific. In fisheries management, MUS typically include those species that are caught in quantities sufficient to warrant management or



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specific monitoring by NMFS and the Western Pacific Regional Fishery Management Council in U.S Pacific areas.



Churaumi Aquarium Ocean Expo Park, Okinawa, Japan.
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Solomon Islands.

Spearfishing while on SCUBA was banned in American Samoa in 2001, but enforcement is limited. The waters surrounding Wake Island, Johnston Atoll, and Palmyra Atoll from the shoreline out to 50 fathoms are protected as a low-use marine protected area, which means that any person of the United States fishing for, taking, or retaining coral reef ecosystem MUSs must have a special permit. Also, MUSs may not be taken by means of spearfishing with SCUBA gear from 6 p.m. to 6 a.m. in the U.S. Exclusive Economic Zone waters around Wake Island, Johnston Atoll, or Palmyra Atoll. Palau's population of the bumphead parrotfish is now protected by an export ban and a national minimum size restriction of 25 inches.

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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; <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; 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.