

Independent peer review of bumphead parrotfish (*Bolbometopon muricatum*) status review

Executive summary

Summary of findings and recommendations

The bumphead parrotfish (*Bolbometopon muricatum*) status review was compiled by a biological review team (BRT) in response to a petition submitted by WildEarth Guardians to list the species as endangered or threatened under the U.S. Endangered Species Act (ESA). The biological review team assess whether the species can be listed as having “distinct population segments” (DPS), concluding that it can due to population segments being delimited by international governmental boundaries with differing levels of exploitation, habitat management, conservation status and regulatory mechanisms. The team assesses what a “significant portion of its range” (SPOIR) means for this species and defines what is meant by extinction risk.

The life history and ecology of the species is comprehensively reviewed by the team drawing on a wide range of literature. There are very important discussions of the habitat use of the species, detailing why the abundance of the species may vary naturally within its range. Critically, this is a species with an extremely large geographic range size and a pelagic larval phase in its life history which facilitates high connectivity among locations and re-seeding of locations from which the species may have been depleted. Abundance data from various sources are presented, which range from the species being absent to very large populations in locations such as Wake Atoll in the Pacific, Rowley Shoals in western Australia and the Seychelles in the Indian Ocean. Critical in this section on abundance, is that although the species is clearly very vulnerable to fisheries exploitation, there are numerous pockets of high abundance across its entire range, and many more examples of medium levels of abundance. The bumphead parrotfish grows very large and can live until ages of 40 years. It is a mobile species, however aggregated sleeping sites make the species vulnerable to exploitation at night. The bumphead parrotfish is a very generalist feeder. Although live coral makes up some of its diet, it is only a facultative corallivore, and thus is not threatened by live coral loss. The BRT present a useful table of potential drivers of carrying capacity for this species, identifying adult sleeping

habitat, juvenile habitat, settlement/ recruitment habitat and human harvest as the most likely factors influencing carrying capacity.

The BRT go on to assess current population abundance. Abundance estimates are highest at locations that are remote, uninhabited or protected from fishing. The highest abundance of adults was reported for Wake Atoll in the Pacific. Data on abundance of juveniles are sparser. The BRT use a bootstrap randomization framework to estimate a global population estimate with the data available. This analysis estimated a global population of at least 3.1 million adult bumphead parrotfish, or a worst case scenario of 750 thousand. Two examples of time series data show declining abundance in Palau from 1986 to 1990, and an increase in abundance at Wake island from 2005 to 2009.

Finally the BRT use a plausibility point system to assess the most likely level of extinction risk for this species for 2 windows into the future: 40 years (maximum longevity of the species) and 100 years. The greatest certainty was given to the species not being at risk of extinction now or to both time windows, although the strength of the certainty was stronger for the 40 year window.

Is science reviewed the best scientific info available?

The BRT have utilised an impressive body of scientific and gray literature to compile their review. They have conducted a very professional and thorough assessment of the species' life history, ecology and threats. Using the best data available, they demonstrate that abundances have declined dramatically where the species is heavily exploited, but remain high in many other locations, and that these patterns do not reflect a loss across a significant portion of the species range. The science reviewed and compiled is comprehensive and the best that is available.

Background

The bumphead parrotfish is a charismatic species, which is vulnerable to exploitation due to its large body size, and relatively late maturation. WildEarth Guardians filed a petition on 4th January 2010 to the U.S. Secretary of Commerce, to list the bumphead parrotfish as threatened or endangered under the U.S. Endangered Species Act (ESA). They cited information on life history traits, exploitation levels, documented declines in abundance, increasing human population sizes in coastal zones and reliance on coral for food as reasons to list the species. The National Marine Fisheries Service (NMFS) reviewed the petition and decided that listing the species may be warranted. A 30 day public comment period was therefore opened, after which a biological review team conducted a formal status review of the bumphead parrotfish. This status review is now being peer reviewed by three independent experts.

Description of the Individual Reviewer's Role in the Review Activities

The individual reviewer's role, as detailed in appendix 2, was to deliver an independent peer review of the bumphead parrotfish status review. This was a desk review of the various documents listed in appendix 1, and an assessment of the scientific and grey literature available on this species, also listed in appendix 1. The peer review specifically addressed a list of terms of reference, as detailed below.

Summary of Findings for Each ToR:

Evaluate the adequacy, appropriateness and application of data used in the Status Review document. Describe weaknesses and strengths.

- 1. In general, does the Status Review include and cite the best scientific and commercial information available on the species, its biology, stock structure, habitats, threats, and risks of extinction?**

Yes, the BRT have compiled an extremely comprehensive list of information from scientific sources, grey literature, raw datasets and anecdotal evidence. They comprehensively review the biology, habitat use, threats and risks of extinction using this information. Due to the low abundance and high mobility of the species, the quantitative data available are sparse, limiting the ability to conduct detailed stock assessments. However, the use of multiple sources of information, which all support the fact that the species is still very abundant in multiple locations spread across its range, lend robust support to the final plausibility points assessment.

- 2. Are methods used valid and appropriate?**

Given the sparse nature of the available data, the methods used are commendable. The bootstrap randomization framework to provide an estimate of the global population size is carefully conducted, incorporating a worst case scenario to reflect the uncertainty with the data. The use of time series and harvest data also lend support to the overall picture. The BRT have done a good job of incorporating information from various sources.

- 3. Are the scientific conclusions factually supported, sound, and logical?**

Yes, the scientific conclusions are grounded in solid scientific literature, and sound, logical analyses, given the data available. The plausibility points system is entirely appropriate given the information available.