

Inclusion of Banggai Cardinalfish *Pterapogon kauderni* in Appendix II

Proponent: European Union

Summary: The Banggai Cardinal Fish *Pterapogon kauderni* is a small marine fish endemic to the Banggai Archipelago off Central Sulawesi, eastern Indonesia. It has a natural range of ca. 5500km² and occurs in isolated small populations in the shallow waters of 34 islands, primarily in sea grass beds and on coral reefs. The total area of potential habitat within the range is estimated at around 23km². There are also a few introduced populations in a restricted area outside the species natural area of occurrence, which account for a very small proportion of the total¹. *P. kauderni* is a benthic, site-attached species with a generation time estimated at about two years. It exhibits relatively low fecundity, often with reduced fertility, direct development and extended parental care. There is no planktonic phase so dispersal and potential to colonise or re-colonise areas are very limited.

Harvesting for international trade is considered by most experts to be the principal factor affecting the species; it is believed to have led to substantial population declines and local extinctions within its natural range. The species is also adversely affected by habitat loss and deterioration through loss of coral cover, primarily as a result of destructive fishing methods, and declines in abundance through harvest of sea urchins, anemones and anemone-like corals on which it is dependent. The extent, if any, to which the species can adapt to severely altered habitats is unknown, but believed likely to be limited.

Live individuals for the aquarium market are the only product in trade. The majority are exported to the USA, Europe and Asia. The export fishery started in the mid-1990s, and by 2007 the annual harvest was estimated at some 900,000 fish.

There is an estimated mortality rate of 25 to 50% between actual harvest and compilation of trade/import figures. In 2015, holding nets containing thousands of *P. kauderni* were recorded on several islands, indicating that collection pressure may not have decreased.

A new shipping method, with increased use of “public” transportation (small and medium size boats, and speed boats) for shipping *P. kauderni* directly out of the Archipelago, has meant that captures are not being reported to the local (Banggai) fisheries/quarantine office, and assessment of trade volumes and shipping mortality has become more challenging.

There have been many studies of this species by different authors, and some areas and populations have been tracked over 15 years with data available for 2001, 2002, 2004, 2007 and 2015. The overall consensus is that the population is declining. Information on population levels before exploitation started is lacking. Studies in 2002 and 2004 of a population that was not then exploited estimated it to have a density of ca. 0.6 individuals per m².

Censuses conducted between 2001 and 2004 covering the entire range produced mean densities of between 0.07 to 0.08 fish per m² and an overall population estimate of 2.4 million fishes, based on 34km² of suitable habitat. A more restricted survey in 2011 to 2012 found a mean density of 0.05 fishes per m² indicating overall abundance of around 1.7 million fishes. Seven of the major sites surveyed in 2001 to 2004 and in 2011 to 2012 showed declines in mean density and overall abundance, presumed to be due to over-exploitation. In 2015, no population was found with a density near to 0.6 individuals per m². At sites where fishing intensity is high, the mean number of groups per census site declined by 27% from 2007, and the mean group size of censused populations in 2015 showed a ca. 40% reduction from the mean size group of 2007.

Extirpation of local populations ascribed to exploitation has been documented in several islands. Research suggests that once population densities decline to ca. 0.02 individuals per m², they may be unable to recover. Temporary local recovery of populations has been recorded at sites where fishing has been stopped, although in two documented cases these populations subsequently collapsed.

In Indonesia, a Banggai Cardinalfish Action Plan (BCF-AP) was drawn up for the period 2007 to 2012, and included the establishment of the Banggai Cardinalfish Centre (BCFC) to coordinate conservation and management actions. Trade quotas were proposed by local stakeholders in 2010 but were not continued, mainly due to a lack of legal support. By 2012, there was reportedly still no effective long-term conservation, management or monitoring system in place. A marine protected area was established in 2007 in part to help

conserve the species, but there has been no evidence of implementation or management of the area, and a large part of the protected area falls outside the range of the species.

The species can be bred relatively easily in captivity although wild-caught fish are currently cheaper. An NGO captive-breeding facility has just opened in Indonesia and sent its first exports to the UK²; other commercial captive-breeding facilities are reportedly exporting, according to internet sites, but details are not available.

The species was categorised as Endangered by IUCN in 2007.

Since *P. kauderni* are harvested from nearshore environments within the Indonesian Exclusive Economic Zone (EEZ), “introduction from the sea” is not an issue for this species.

Analysis: *Pterapogon kauderni* is a marine species with a very restricted range whose biological characteristics make it vulnerable to overexploitation. It has been harvested in large numbers since the mid-1990s for the international aquarium fish trade, with exploitation continuing. Available evidence indicates that this has led to significant and continuing reductions in population density and overall population size. The species is also affected by habitat loss and degradation. There appears to be no effective long-term management in place. It would appear that the species meets the criteria for inclusion in Appendix II in Annex 2 a of Res. Conf. 9.24 (Rev. CoP16) in that regulation of harvest is required to ensure that the wild population does not become threatened through continued harvesting or other influences.

Reviewers: A. Vagelli, K. Carpenter and E. Wood.

References:

Information not referenced in the Summary section is from the Supporting Statement.

¹ Vagelli, A. (2016) *In litt.* to the IUCN/TRAFFIC Analysis Team, Cambridge, UK.

² Pearce, S. (2016) Captive-bred Banggai cardinalfish on the way.

<http://www.petbusinessworld.co.uk/news/feed/captive-bred-banggai-cardinalfish-on-the-way>. Viewed on 1st July 2016.