

**Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)**

**1. Name**

*Stiphodon semoni*

In Australia the species is now known as the Opal Cling Goby. It was formerly known as Allan's Cling Goby. Overseas it is commonly known as the Cobalt Blue Goby and the Neon Blue Goby. It is in the Family Gobiidae and the subfamily Sicydiinae.

**2. Reason for Conservation Assessment by the Committee**

This advice follows assessment of information provided by a public nomination to list the Opal Cling Goby. The nominator suggested listing in the endangered category of the list.

This is the Committee's first consideration of the species under the EPBC Act.

**3. Summary of Conclusion**

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 2 to make it **eligible** for listing as **critically endangered**.

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 3 to make it **eligible** for listing as **critically endangered**.

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 4 to make it **eligible** for listing as **critically endangered**.

The highest category for which the species is eligible to be listed is **critically endangered**.

**4. Taxonomy**

The species was described as *Stiphodon allen* Watson, 1996 but is now considered to be synonymous (Ebner and Thuesen, unpubl. data., 2010) with *Stiphodon semoni* Weber, 1895, a species known from Bali, Indonesia, northern Papua New Guinea and the Solomon Islands as well as north-east Queensland (Watson, 1996; Ebner, unpubl. data, 2009).

**5. Description**

In Australian habitats, the Opal Cling Goby is a small, slender fish with a maximum total length of 35 mm (Thuesen et al., unpubl. data, 2009). Males have a lateral band of bright structural colouration along the length of their bodies, ranging from vivid blue to green and pink depending on the light reflectance (Thuesen et al., unpubl. data, 2009). The dorsal and pectoral fins are transparent, the caudal fin is transparent with mottled dark spots on the rays and the anal fin is sooty in appearance with mottled blue flecks and a bright blue margin (Thuesen et al., unpubl. data, 2009).

Females are whitish-cream in colour with two horizontal black bands and a black spot on the caudal peduncle (Thuesen et al., unpubl. data, 2009). The species has disc-like fused pelvic fins which are used to 'cling' to rocky substrates in fast flowing runs in the streams that it inhabits (Thuesen et al., unpubl. data, 2009).

## 6. National Context

In Australia, the Opal Cling Goby is confined to a limited number of rainforest streams in far north-east Queensland (Ebner, unpubl. data, 2009). The species' distribution lies within the Wet Tropics World Heritage Area and the Wet Tropics Interim Biogeographic Regionalisation of Australia (IBRA) Bioregion. The Opal Cling Goby is not listed as threatened under the Queensland *Nature Conservation Act 1992*.

## 7. Relevant Biology/Ecology

In Australia, adult Opal Cling Gobies are found in pristine rainforest streams with significant flow and direct access to marine habitats (Thuesen et al., unpubl. data, 2009). Opal Cling Gobies 'cling' to rocky substrates in these fast flowing rainforest streams while feeding on benthic algae, microinvertebrates and small macroinvertebrates (Thuesen et al., unpubl. data, 2009).

Age at maturity and longevity of this species are not known, however other cling gobies live for between two and five years (Yamisaka and Tachihara, 2006). The generation length of this species is therefore estimated to be between two to three years.

Opal Cling Gobies are believed to spawn in their adult rainforest stream habitats. Research on other cling goby species indicates that females lay their eggs in interstitial spaces between submerged stream boulders, where they are fertilised by males and guarded until hatching. Hatching takes place rapidly (20–30 hours) and upon hatching, larvae immediately migrate to sea, where first feeding and growth takes place for a number of weeks. Cling goby larvae are very small (1–2 mm) and the potential for them to be transported long distances by ocean currents during the marine larval stage is quite high. After the marine larval stage, juveniles enter nearby rainforest streams to mature and live the rest of their lives (Ryan, 1991, Yamisaka and Tachihara, 2006; Ebner, pers. comm. 2009; McDowall, 2007, 2009).

This strategy of reproduction in freshwater, immediate migration of larvae to sea for first feeding and growth, and return of juveniles to freshwater habitats for maturation and adult life is a specialised migratory behaviour termed amphidromy and is widely present in Pacific island fish faunas, particularly gobies species (McDowall, 2007, 2009).

## 8. Description of Threats

The main threat to this species in Australia has been identified as collection for the aquarium trade, although this has not been quantified. Potential threats include loss of suitable habitat due to human development, water extraction, climate change and prolonged drought (Ebner, pers. comm., 2009). These threats are likely to alter the species' habitat through changes to water quality and flow regime. Construction of physical barriers, such as culverts and dams are also considered possible threats as these structures can prevent movement of the larvae out to sea and the subsequent return of juveniles (Ebner, unpubl. data, 2009). Due to the isolation of the species, stochastic events, such as severe floods or prolonged drought, in the area of habitat is likely to have a significant impact on the populations of this species.

Spotted Tilapia (*Tilapia mariae*) is an introduced fish species which has established populations around the Cairns area (ACTFR, 2007). The Spotted Tilapia may outcompete the Opal Cling Goby for food resources, and has the potential for piscivory (consuming eggs and larvae of other fish) (ACTFR, 2007).

## 9. Public Consultation

The nomination was made available for public exhibition and comment for 30 business days. No comments were received.

## 10. How judged by the Committee in relation to the criteria of the EPBC Act and Regulations

The Committee judges that the species is eligible for listing as **critically endangered** under the EPBC Act. The assessment against the criteria is as follows:

### Criterion 1: It has undergone, is suspected to have undergone or is likely to undergo in the immediate future a very severe, severe or substantial reduction in numbers

In Australia, the Opal Cling Goby is known from a few sites in a limited number of rainforest streams in the Wet Tropics region of far north Queensland. Significant survey effort has been undertaken since 2002 to locate additional individuals, with a survey in 2009 locating individuals and providing a population estimate of 10–30 individuals (Thuesen et al., unpubl. data, 2009).

The Opal Cling Goby is also known from Bali, Indonesia, northern Papua New Guinea and the Solomon Islands. The species has a broad range extending into the Pacific and it is not clear whether the few individuals in Australia represent geographical vagrants rather than a catastrophic loss of a previously larger local adult population.

There is no information on the past abundance of this species in Australia and therefore there are no data available to judge whether the species has undergone, is suspected to have undergone or is likely to undergo a reduction in numbers. Therefore, as the species has not been demonstrated to have met sufficient elements of Criterion 1, it is **not eligible** for listing in any category under this criterion.

### Criterion 2: Its geographic distribution is precarious for the survival of the species and is very restricted, restricted or limited

In Australia the Opal Cling Goby is known only from a small population of 10–30 individuals in a limited number of rainforest streams in the Wet Tropics region of far north Queensland. The area of occupancy for the species is estimated to be approximately 10 km<sup>2</sup> and the Committee considers this is a very restricted geographic distribution. The Opal Cling Goby is also known from Bali, Indonesia, northern Papua New Guinea and the Solomon Islands. However the adult breeding habitats within Australia are considered to be the proper measure of the species' geographic distribution for the purposes of this criterion. Within Australia the Opal Cling Goby has a very isolated distribution which could be significantly impacted by stochastic events in the areas where the species occurs. Stochastic events, such as severe flooding or prolonged drought, have the potential to cause significant declines in the species' populations, therefore the distribution is precarious to the survival of the species.

The Committee considers that the Opal Cling Goby has a very restricted geographic distribution, which is precarious for its survival. Therefore, the species has been demonstrated to have met sufficient elements of Criterion 2 to make it **eligible** for listing as **critically endangered**.

**Criterion 3: The estimated total number of mature individuals is limited to a particular degree; and either**

**(a) evidence suggests that the number will continue to decline at a particular rate; or**

**(b) the number is likely to continue to decline and its geographic distribution is precarious for its survival**

The only known population of Opal Cling Goby in Australia comprises 10–30 individuals in a few sites in a limited number of rainforest streams in the Wet Tropics region of far north Queensland (Thuesen et al., unpubl. data, 2009). The Committee judges that the total number of mature individuals is very low for the purpose of this criterion and the geographic distribution is precarious for the survival of the species due its very isolated distribution and a range of threats which have the potential to cause significant declines in population.

Therefore, the species has been demonstrated to have met sufficient elements of Criterion 3, to be eligible for listing as **critically endangered** under this criterion.

**Criterion 4: The estimated total number of mature individuals is extremely low, very low or low**

The Opal Cling Goby was first recorded in Australia in 1987 after a single individual was collected from one site in the Wet Tropics (Watson, 1996). Subsequent freshwater fish surveys conducted at a regional and catchment scale failed to record further individuals until December 2009, when a number of individuals were located, providing a population estimate of 10–30 individuals (Thuesen et al., unpubl. data, 2009). The species is now known from a limited number of rainforest streams in the Wet Tropics region of far north Queensland. Considering the species exists in such low numbers, any adverse impact could be catastrophic for the species' persistence in Australia. The Committee considers that the estimated total number of mature individuals of the species is extremely low for the purpose of this criterion. Therefore, the species has been demonstrated to have met sufficient elements of Criterion 4 to make it **eligible** for listing as **critically endangered**.

**Criterion 5: Probability of extinction in the wild that is at least**

**(a) 50% in the immediate future; or**

**(b) 20% in the near future; or**

**(c) 10% in the medium-term future**

There are no data available to estimate a probability of extinction of the species in the wild over a relevant timeframe. Therefore, as the species has not been demonstrated to have met the required elements of Criterion 5, it is **not eligible** for listing in any category under this criterion.

## 11. CONCLUSION

### Conservation Status

*Stiphodon semoni* (Opal Cling Goby) was nominated for inclusion in the list of threatened species referred to in section 178 of the EPBC Act. The nominator suggested listing in the endangered category of the list. The Committee accepts that the species has a very restricted geographic distribution in Australia, which is precarious for its survival due to its isolation and stochastic threats. Therefore, the species has been demonstrated to have met sufficient elements of Criterion 2 and is **eligible** for listing as **critically endangered**. The Committee accepts that the estimated total number of mature individuals in Australia is 10–30, which is judged by the Committee to be very low for the purpose of Criterion 3, has the potential to decline significantly due to a range of threats, and the species' geographic distribution is precarious. Therefore the species has been demonstrated to have met sufficient elements of Criterion 3 and is **eligible** for listing as **critically endangered**. The Committee accepts that the estimated total number of mature individuals in Australia is 10–30, which is judged by the Committee to be extremely low for the purpose of Criterion 4. Therefore, the species has been demonstrated to have met sufficient elements of Criterion 4 and is **eligible** for listing as **critically endangered**.

The highest category for which the species is eligible to be listed is **critically endangered**.

### Recovery Plan

There should not be a recovery plan for the Opal Cling Goby as the approved conservation advice for the species provides sufficient direction to implement priority actions and mitigate against key threats.

## 12. Recommendations

- (i) The Committee recommends that the list referred to in section 178 of the EPBC Act be amended by **including** in the list in the **critically endangered** category:

*Stiphodon semoni*

- (ii) The Committee recommends that there should not be a recovery plan for this species.

Associate Professor Robert J.S. Beeton AM FEIANZ

Chair

Threatened Species Scientific Committee

### 13. References cited in the advice

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