

**Department of the Environment preliminary assessment of the application to add  
Leggett's Rainbowfish (*Glossolepis leggetti*) to the EPBC Act *List of Specimens taken  
to be Suitable for Live Import***

**Purpose of proposed import**

Mr David Wilson of Aquagreen Pty Ltd is seeking to amend the '*List of Specimens taken to be Suitable for Live Import*' to include *Glossolepis leggetti*: *Melanotaeniidae* (Leggett's rainbowfish) for ornamental fish breeding and trade purposes. Aquagreen is a Northern Territory government approved commercial aquaculture facility. It is proposed by the applicant to import up to one hundred live specimens of *G. leggetti* to establish a breeding colony in Australia. It is proposed that the progeny of the original imports will then be offered to the ornamental fish trade through the wholesale Aquarium supply system. However, if this species is approved for inclusion on the Live Import List, it may be imported, bred and distributed throughout Australia by any person wishing to possess this species.

Adult *G. leggetti* are a small fish ranging in size between 51 to 93mm (Fishbase, 2016). *G. leggetti* is only known to occur in one location in the Wapoga River and three locations in the Tiawiwa River, in the west of the province of Papua near the border with West Papua, Papua New Guinea. Despite a lack of specific information about the breeding ecology of *G. leggetti*, rainbowfishes, as a group, are generally able to breed from six months of age and are reported to live for approximately four years in their natural habitat, and up to eight years in captivity.

Based upon the conditions at these four sites, this species is believed to have a narrow tolerance for pH (6.0 to 8.4), temperature (26.2 to 30.7 °C) and no tolerance for salinity as this species is only found in fresh water habitats with a salinity of <1 part per thousand. However, due to a lack of data on this species, it cannot be stated without qualification that this species does not have broader tolerances than those represented by the conditions at these sites.

The specific diet of *G. leggetti* was not recorded but the diets of other members of the rainbowfish genus are well recorded. All rainbowfish species studied are omnivores, eating a variety of small aquatic and terrestrial creatures and plant matter. rainbowfish have villiform teeth that extend outside their mouth around their lips to enable them to scrape algae from submerged hard surfaces. The diet of rainbowfishes includes algae, ants, aquatic insect larvae and small crustaceans (Allen, 1991).

This species has not been introduced into the wild anywhere outside of its natural range. However, three members of this genus are already present in the aquarium industry in Australia and there are no known records of these species establishing a feral population within Australia or in any other country.

This species is not listed on any of the CITES Appendices (CITES, 2016) or the IUCN Red List (IUCN, 2016).

This species is not currently listed on the '*List of Specimens taken to be Suitable for Live Import*' although a similar species, *G. incisus* or red rainbowfish is currently listed on Part 1 of the list.

## **Risk assessment**

### ***Establishment risk***

The establishment risk of *G. leggetti* has been assessed through the *Risk assessment model for the import and keeping of exotic freshwater and estuarine finfish* (Bomford, 2008).

*G. leggetti* was rated as having an overall moderate establishment risk, as a result of a moderate climate match to Australia; a nonexistent overseas range apart from in captivity; low taxonomic risk score; and a low likelihood of introduction success. This species has not been introduced into the wild outside of its natural range (Fishbase, 2016). It must be noted that due to the limited number of sites that this species has been found in the wild, that this may affect the accuracy of the climate match assessment for this species.

The climate match scores derived from CLIMATCH are likely to overestimate the suitable climates for these species in Australia as CLIMATCH is based on air temperatures and other atmospheric conditions which is not as directly transferrable for aquatic species. It does not take into account other abiotic factors of the habitat (such as waterway flow, depth, oxygenation, and salinity) as well as biotic factors. As a result of these requirements, the likelihood of this species being able to complete their lifecycle and establish self-sustaining populations in Australia, if accidentally or deliberately released, is considered to be moderate.

Suitable climates and conditions for *G. leggetti* to establish in the wild would likely be limited to very specific areas with suitable conditions for this species in North Queensland, the north of Western Australia and Northern Territory as these are the only areas of Australia's climate that match that of the natural range of this species in Papua.

From the limited information available on this species *G. leggetti* seem to have fairly specific water quality and temperature requirements. rainbowfish are known to have a broad diet including small crustaceans, aquatic insects, terrestrial insects and algae. This diet would allow *G. leggetti* to survive in most suitable freshwater habitats. The breeding requirements of this species are not known as this species has not been studied extensively in the wild.

The application states that this species would be less likely to establish in Australian freshwater environments due to the presence of predatory fish species such as Barramundi (*Lates calcarifer*) predated upon them. However, it is considered unlikely that this would preclude the establishment of this species in the wild as Barramundi are present throughout Papua New Guinea, amongst many other predatory fish species including Papuan black bass (*Lutjanus goldiei*) and spot-tailed bass (*Lutjanus fuscescens*) both of which have been identified from the Wapoga River system (Mack et al., 2000) from where *G. leggetti* originates.

The spread of this species would likely be similar to other rainbowfishes via upstream and downstream migrations mainly in times of greater flow during wet season floods. However, physical barriers, such as waterfalls, would likely prevent the upstream migrations of rainbowfish. Leggett's rainbowfish would likely require high quality habitat similar in composition to their natural range in order to establish a feral population.

This species is intended for use in the ornamental aquarium trade and would therefore be sought after by customers of this industry.

Leggett's rainbowfish adults display a distinctive coloration and morphology and would not be easily mistaken for other aquarium fish. Juveniles of this species however, would be more difficult to distinguish from other species. Due to this characteristic, a minimum length of four centimetres for fish of this species has been proposed to allow for positive identification of this species at the border.

In summary, *G. leggetti* was determined to have a low likelihood of establishing a feral population in Australia due to the following points:

- *G. leggetti* has a moderate climate match score for Australia (noting that this model usually overestimates the range that an aquatic species can occupy due to the use of atmospheric temperatures and conditions as part of the model) with matches to the tropical parts of Western Australia, the Northern Territory and Queensland.
- *G. leggetti* requires water conditions that are quite specific including moderate water temperatures, neutral pH levels and no appreciable salinity. This would restrict the potential distribution of this species within the above mentioned areas to waterways that match these criteria.
- *G. leggetti* has not established a feral population anywhere outside its natural range. Additionally, a very similar species, *Glossolepis incisus* (red rainbowfish) has been allowed for import into Australia for over 10 years and is prevalent within the ornamental fish trade in Australia for this period without a feral population establishing. This would infer that the establishment of *G. leggetti* is also unlikely.

### **Potential impact/pest risk**

- Competition for resources – As *G. leggetti* is similar in many respects to native rainbowfish species (such as the ornate rainbowfish- *Rhadinocentrus ornatus*) and would likely occupy a similar habitat. There is potential for competition with native species should *G. leggetti* establish in the wild.
- Predation risk from *G. leggetti* is highly unlikely as this species is not known to be predatory to other fish species. However, this species is omnivorous and may have some impact on macroinvertebrate species in any waterway it is introduced into.
- Habitat disturbance and food web effects – this species is believed to occupy mid water habitats and is not a benthic feeder. Therefore it is unlikely that this species will significantly disturb habitats it may establish in. As to food web effects; this species occupies a similar niche to native rainbowfish species and is therefore most likely to have minimal food web effects as it would act as another prey species for native predatory species.
- *G. leggetti* could act as disease carriers and reservoirs if they are allowed to escape into the wild. However, the current sanitary requirements in place at the border (DAWR, 2016) for live freshwater aquarium fish should be sufficient to minimise the risk of this species entering the country with any novel pathogens.
- *Glossolepis* spp. are not known to hybridise with other species within their genus nor with any other fish species.
- This species has not been introduced into the wild anywhere outside of its natural range. Other members of this genus are present in the aquarium industry in Australia (*G. incisus*) and there are no known records of these species establishing a feral population within Australia.
- This species is not listed on the National Noxious Fish List or the Grey List (<http://www.pestsmart.org.au/wpcontent/uploads/2010/03/National%20noxious%20fish%20list.pdf>)

## **Mitigation**

The applicant has suggested a range of measures to ensure that there is virtually no impact on the native members of this family or chances of *G. leggetti* escaping from aquariums and establishing feral populations. The issue of identification at the border and consignment contamination with undesirable fish species is also addressed.

The applicant has suggested that the distinctive colouration of this species and its likely popularity and expectant high price should together mitigate against any likelihood of accidental establishment of feral populations through the incorrect disposal of this species.

The applicant has mirrored the recommendations made by the then Tasmanian Department of Primary Industries and Water during the first comment period in 2010 that any of these fish imported should be a minimum length of four centimetres for ease of identification from other fish species at the border.

The applicant has also suggested that retailers or other traders of *G. leggetti* should be encouraged to engage in "best practice" and to provide relevant information brochures to buyers of this species. However, this is not something that can be imposed/introduced through the Live Import List process.

The Department considers that due to the already low risk that this species poses to the Australian environment, the proposed mitigation measures outlined will further reduce the risk posed by this species to an acceptable level.

## **Concerns raised and responses**

Eight state agencies provided comments during the consultation phase. Six agencies supported the proposed listing of Leggett's rainbowfish on the Live Import List, one agency opposed the listing and one requested further information. The applicant has amended their report to include the information requested.

The concerns raised were:

- The likelihood of this species establishing a feral population and thereby directly competing with threatened native fish.
- Whether this species could potentially act as a disease vector if released.
- The ability of this species to hybridise with other members of the family *Melanotaeniidae* of which there are 18 native species of in Australia.
- The import of this species should be subject to the conditions that all individuals be sourced from an accredited breeding facility to avoid both an impact upon the wild population of this species (whose status is not well understood) and to control the sanitary risk that the import of fish species from unaccredited sources can pose.
- Identification issues at the border.

The report was revised by the applicant and additional information included on the environmental conditions required by this species. The applicant suggested lowering the size limit of any individuals of this species imported to a minimum of four centimetres to ensure a positive identification at the border. The applicant has also addressed concerns regarding the disease and hybridisation risk posed by this species in Australia. The Department considers that due to environmental requirements, the risk of this species establishing and the subsequent risk to the environment is low. While the proposal to source specimens of this species from accredited sources is a positive one, as with the retailer best practice above, this measure is unenforceable through the Live Import List process.

## **Conclusion**

The Department has assessed the proposed amendment to the Live Import List to include *G. leggetti*. The Department has reviewed the available information, including the risk assessment report provided by the applicant, and prepared a risk analysis report on the potential environmental impacts. The report considers that the likelihood of *G. leggetti* establishing wild breeding populations in the Australian environment is low. Considering the specific habitat and climatic conditions for this species, it is considered that there is limited suitable habitat in Australia where this species would be able to establish.

The potential impact of these fish on the Australian environment, if they were to establish in the wild, is likely to be low. They are not aggressive and their diet, behaviour and small size suggest there is little likelihood that this species would become a significant predator in Australia. However, this species could be expected to compete generally with similar native species in suitable habitats and the impact of this competition could potentially be more significant where there are threatened species or communities present.

The Department considers that an unconditional listing of these species would be unlikely to pose a risk to the Australian environment, as similar species such as red rainbowfish (*G. incisus*), have been present in the aquarium trade in Australia for a decade without a feral population establishing.

This report has determined that *G. leggetti* poses a minor risk to the Australian environment if they were to establish a feral population, as they appear to be a fairly innocuous species which would have a minimal impact on the ecosystems suited to them in Australia. However, there is a risk that other fish species which may have a greater impact on the environment, such as tilapia, may be imported along with *G. leggetti* if these species are not able to be correctly differentiated at the border. The Department considers that this risk can be adequately mitigated by limiting imports of *G. leggetti* to specimens with a minimum length of four centimetres, which would allow for the correct identification to be made at the border. The use of the four centimetre restriction is considered to be a description rather than a specific condition and therefore would allow this species to be placed on Part 1 of the 'List of Specimens taken to be Suitable for Live Import' without requiring an import permit.

## **References**

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