



Australian Government
**Department of Agriculture,
Water and the Environment**

Review of the 2017 decision to not include Leggett's Rainbowfish on the 'List of Specimens that are taken to be Suitable for Live Import' (Under section 303EJ of the *Environment Protection and Biodiversity Conservation Act 1999*).

June 2020.

THE REVIEW

Under section 303EJ of the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) the Minister may review a decision to include or refuse to include a species on the List of Specimens taken to be Suitable for Live Import (Live Import List) within five years of the decision being made. This review is the result of a letter to the then Minister for the Environment, received on 28 November 2018, from Mr Ray Leggett requesting a review of the decision to not list Leggett's Rainbowfish (*Glossolepis leggetti*). The Minister agreed to commence a review of the decision on 4 April 2019.

The assessment officer tasked with delivering this review was not directly involved with the previous assessment. The officer has tertiary qualifications in science and has broad experience with various aspects of the assessment and conservation provisions of the EPBC Act.

In conducting this review, the Department has reconsidered the principal identified risks of amending the Live Import List to include the species, through an additional investigation of the scientific and grey literature (materials and research unpublished or published outside of the traditional scientific system). This review should be considered in conjunction with the Department's original risk assessment report presented to the former Minister for the Environment and Energy, the Hon Josh Frydenberg MP, in March 2017 (Attachment B to MS20-000919).

The Legislative Basis to the Live Import List

The Live Import List is a list of species allowed to be imported into Australia (EPBC Act s303EB). If a species is not on the list, it is illegal to import or possess that species (s303GN). In deciding to amend the list to include a new species (s303EC), the Minister must consider a report (s303EC (5)(a)) which assesses the potential impacts on the environment of the proposed amendment (s303ED (2)). Decisions made under s303EC must also consider the precautionary principle (s391). [Also see discussion on the use of the precautionary principle on pg. 2-3]

Only species contained in the List can be imported into Australia. It is therefore critical that any species placed on the Live Import List be fully assessed and the potential risks identified before listing occurs. The scientific literature demonstrates that once an introduced species has established in the wild, eradication can be extremely costly and is unlikely to succeed, therefore, the best management strategy is to not allow high risk species into Australia.

A risk assessment report, prepared by the Department under s303ED (2), allows for the potential impacts on the environment to be identified before listing occurs. The Department considers the risk score derived from applying the appropriate risk assessment model, in this instance that for freshwater fish (Bomford, 2008), the climatic suitability of Australia for the species (Climatch, ABARES) along with information on the species' biology and ecology in relevant scientific and grey

literature, and then determines an overall risk that the species may have to Australia's environment.

In the case of this review, prepared under EPBC Act s303EJ, the Department derived a low risk score from the Bomford 2008 model and this, combined with the species' information, led to the Department's conclusion that the risk to the environment of importing Leggett's Rainbowfish into Australia was low.

Science Underpinning the Leggett's Rainbowfish Decision.

Leggett's Rainbowfish is poorly described in the scientific literature with knowledge on the species' environmental requirements being based on where the species had been collected in a single trip in 1998. This means the species may have a wider environmental tolerance than has been reported. The species is also uncommon in aquariums meaning tolerances from captive populations are of limited value in determining the species' possible environmental requirements.

The applicant's report and additional information, as well as the Department's report, drew on the ecological requirements of other members of the *Glossolepis* genus as representatives for the assessment of the possible risks of listing Leggett's Rainbowfish and how they may respond if released into the wild in Australia.

The Department does not support adding species to the Live Import List unless it can be demonstrated that the risk to the environment is low or that risks can be adequately mitigated through listing conditions, such as 'restricting import for non-commercial purposes' or 'for import to secure quarantine facilities only'. The paucity of scientific knowledge on the biology of Leggett's Rainbowfish in the wild or in captivity may have resulted in an increased perception of risk.

Potential reasons for not listing Leggett's Rainbowfish

In the decision brief sent to the then Minister in March 2017, the Department recommended that the species be added to Part 1 of the Live Import List. Following consideration of the information supplied, the Minister refused to add Leggett's Rainbowfish to the List. The actual reasons for the Minister's refusal decision are unknown to the Department.

On reviewing the information used for the assessment of the species the Department considered several possible reasons for the refusal and has undertaken further investigations.

The Department considers the following may have influenced the refusal decision:

1. The precautionary principle under s 391 of the EPBC Act;
2. Some states not supporting the listing;
3. The length of time taken to finalise the assessment;
4. Impacts to native fish or hybridisation with Australian native Rainbowfish species.

1. Use of the precautionary principle

The EPBC Act outlines the manner in which the precautionary principle is considered and to which decisions it is applied. Section 391 of EPBC Act states:

Minister must consider precautionary principle in making decisions

Taking account of precautionary principle

- (1) *The Minister must take account of the precautionary principle in making a decision listed in the table in subsection (3), to the extent he or she can do so consistently with the other provisions of this Act.*

Precautionary principle

- (2) *The **precautionary principle** is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.*

Decisions in which the precautionary principle “must be considered” includes Section 303EC – amending the Live Import List.

In developing both the original and this risk assessment report, the Department has considered the scientific information available and, where information could not be fully substantiated with evidence, whether the precautionary principle should be considered.

To trigger the precautionary principle there needs to be an expectation of a threat or potential damage to the environment from the listing. The Western Australian responses during the initial assessment process suggested that, in the absence of scientific information about Leggett’s Rainbowfish, the precautionary principle should be applied, and the listing refused.

The risk assessment report considered the known information for the species, genus and family and the Department determined that there was no evidence to suggest the listing of Leggett’s Rainbowfish would pose any environmental risk. No further information since the refusal decision has come to light to change this position.

Conclusion: The risks of Leggett’s Rainbowfish establishing and posing an environmental risk in Australia are very low and does not warrant applying the precautionary principle.

2. State and Territory Governments support.

During the assessment and consultation process for Leggett’s Rainbowfish all state and territory Governments except Western Australia supported the listing. Western Australia opposed the listing citing concerns with import and transmission of disease, questioning the need for another aquarium species in Australia and impacts to native species and ecosystems.

The Department considered the concerns in their risk assessment report (Attachment B to MS20-000919) noting that disease risks from the species are managed under the *Biosecurity Act 2015*. Western Australia could ban the species from entering Western Australia under state legislation if the risk to that state is unacceptable.

The Department was unable to identify any evidence to suggest the species is likely to establish a wild population or could potentially impact native species and ecosystems. The question of the need to import a new aquarium species is not a legal consideration under the EPBC Act.

Conclusion: All state and territory governments except Western Australia supported adding Leggett’s Rainbowfish to the Live Import List. The department does not think the concerns of Western Australia are sufficient to prevent the listing of the species.

3. Length of the assessment process.

The initial application was received in January 2006 and the decision to refuse listing was made in August 2017. This protracted timespan was due to several factors, one being the limited scientific information available on Leggett's Rainbowfish and other rainbowfish in Australia and worldwide. Initial requests to the applicants to provide additional information was hampered by this lack of information which caused substantial delays in the assessment. A full assessment of the environmental risks requires a thorough assessment of the relevant literature, as this was not available the process was delayed. Additional literature available to the Department since the refusal decision has reinforced that *Glossolepis* species pose minimal risks to the environment.

The fact that the applicants and other interested parties sought clarification of why the species had not been listed and made a request to review the decision demonstrates that the applicants remain keen to have Leggett's Rainbowfish added to the Live Import List.

Conclusion: The protracted assessment time frame reflected the initial paucity of scientific information on the species and allowed further information to come to light indicating the species poses minimal environmental risks.

4. Hybridisation with Australian rainbowfish.

The family Melanotaeniidae (rainbowfishes) represents the largest monophyletic group of freshwater fishes found in Australia and New Guinea. The family, consisting of seven genera and a total of 109 species, is one of the most abundant and widespread families in Australia and New Guinea (Unmack *et al.* 2013, Hammer *et al.* 2018).

Although this suggests that, as a family, rainbowfish could potentially establish in Australia rainbowfish are split into several distinct lineages that are regionally specific. Leggett's rainbowfish are part of the Northern Linage (Unmack *et al.* 2013) or Clade IV (Kadariusman *et al.* 2012) which correlate to the region north of the Central Highlands of New Guinea. Rainbowfish endemic to Australia belong to Clade III and form part of the Southern or Australis lineages. All members of the *Glossolepis* genera are confined to Clade IV with no members of this genera occurring in southern New Guinea or Australia (Kadariusman *et al.*, 2012).

Only two rainbowfishes, the Threadfin Rainbowfish (*Iriatherina wernerii*) and McCulloch's Rainbowfish (*Melanotaenia maccullochi*) are found in both Australia and New Guinea (Unmack, 2013) with both species being confined to the region around the Fly River system in southern New Guinea (Rainbowfish on-line, 2019).

The genetics suggest that Leggett's Rainbowfish is extremely unlikely to breed with other rainbowfish from different Clades or Lineages (Unmack *et al.*, 2013). In captivity, the genera *Melanotaenia*, *Chilatherina* and *Glossolepis* are known to hybridise. A female rainbowfish deposits eggs in vegetation which is then fertilised by the male. In a tank containing more than one species of rainbowfish it is possible that cross fertilisation may occur, resulting in hybrid fish. In the wild only two individual F1 hybrids have ever been identified (*Melanotaenia affinis* x *Chilatherina campsi*) out of the 36 species belonging to the Northern lineage or Clade IV (Unmack *et al.*, 2013). There are no reports of any wild hybrids in other rainbowfish lineages or clades.

The applicant cites a situation where two rainbowfish species were deliberately bred to produce a new 'breed' for sale, however all the offspring were infertile (applicant).

Conclusion: Despite being a common genus of fish in Australia and New Guinea with many areas containing several species of rainbowfish, hybridisation has only been observed once in the wild. There is no evidence to suggest that if Leggett's Rainbow fish was released into the wild that it would hybridise with native Australian rainbowfish or other fish species.

Establishment

Scientific literature demonstrates exotic fish have a higher establishment rate (71 percent) if introduced into climatically similar areas to their home ranges (Bomford *et al*, 2010). The Bomford 2010 paper also concluded "...a species may be able to establish in an area not predicted to have a suitable climate".

While Leggett's Rainbowfish is poorly described in the literature, other members of the genus and family are well described. Three New Guinea Rainbowfish are on the Live Import List with the most recent, *Glossolepis incisus* (Red Rainbowfish) being added in 2005. There are no records of any of these species establishing feral populations in Australia despite being available in the aquarium trade for many years.

Worldwide rainbowfish are common in the aquarium trade with none having been reported as establishing feral populations (EASystems 2006) or having any negative impacts.

The ecological requirements for Leggett's Rainbowfish in the wild are not well understood. The species has only been recorded in a remote area of New Guinea. Information on the species' biology is limited to observations from the initial discovery and collection. Leggett's Rainbowfish, like many New Guinea Rainbowfish, have a very limited natural range which infers they have a narrow range of environmental requirements that prevent them from colonising new areas.

The *Glossolepis* genus are found in still waters of lakes and backwaters of major rivers and are restricted to the northern parts of New Guinea (Coates, 1990). This further suggests the genus are specialists rather than generalists in terms of their habitat. Four species of New Guinea rainbowfish from the related *Melanotaeniid* genus were introduced into Australia before 1963 with no reports of them forming feral populations (Kailola, 2004).

In Australia, rainbowfish are a common freshwater fish found in most waterways, excluding the southernmost regions and the extremely arid regions (Unmack *et al*. 2013). These native rainbowfishes may provide competition pressure to any exotic rainbowfish resulting in the exotic fish being unable to establish a viable population due the ecological niche being fully exploited (Davis *et al*. 2000).

The applicant's application included a copy of the Bomford model which gave the species an establishment score of 8 which equated to a moderate risk of establishment. The Department notes that the model used was an older version of the Bomford model and that a few of the criteria were rated higher than the literature supports.

The Department re-ran the Bomford model using current information on the species and obtained a score of 3 or a rank of low. The decrease in the score was primarily due to no records of the fish or the genus establishing anywhere outside its native range and having a very small native range. In the preliminary assessment scores were based on the criteria never introduced which under the precautionary approach gives a higher score.

The Department reran Leggett's Rainbowfish through the CLIMATCH program which showed most of Australia would be unsuited to the species with only a band along the east coast showing any

suitable areas with the most suitable habitat occurring along the coastline between Northern NSW and Brisbane (Figure 1). Bomford (2010) and Howeth (2016) have both shown a strong correlation between climate matching and establishment success; the low climate matching for the Leggett's Rainbowfish infers a low establishment probability.

The climate match score was determined at 1 suggesting the species is climatically not suited to Australia with only 6 matches in category 5 and none in any higher suitability categories. As a point of reference during the assessment for the successful listing of *Glossolepis incisus*, that species had 110 matches in categories 5 and above and a climate match score of 2.

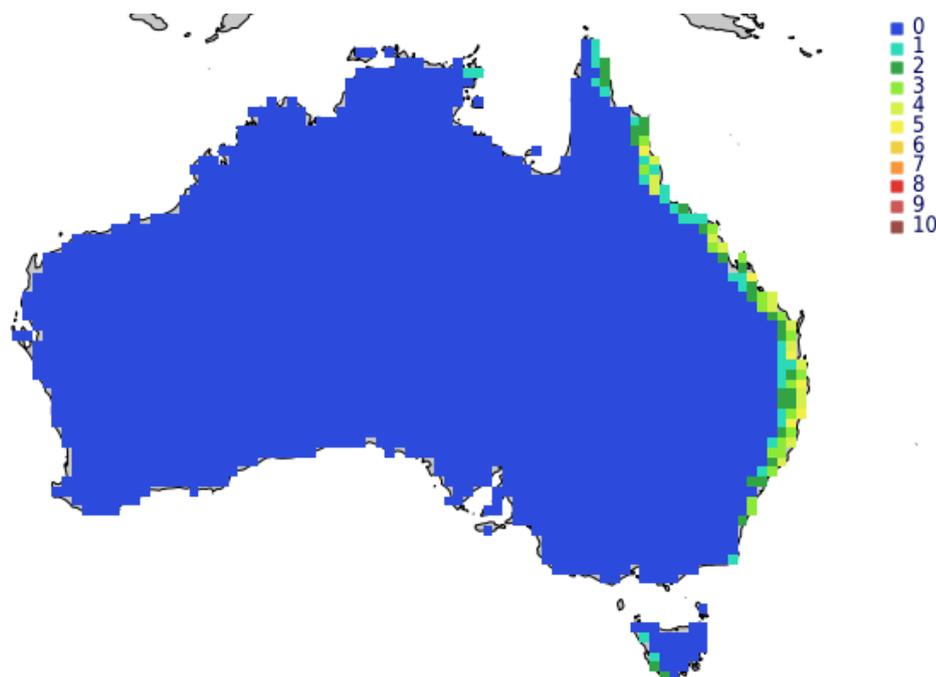


Figure 1: Climatch output for Leggett's Rainbowfish

Conclusion: Between the very low climatch score, no records of members of the genus establishing outside their native range and presence of native rainbowfish already exploiting possible suitable ecological niches there is a low probability of Leggett's rainbowfish establishing if released in Australia

Competition with native species for resources

The Western Australian government suggested that Leggett's rainbowfish may compete with native rainbowfishes for resources. Rainbowfish are generalist omnivores of algae and small invertebrates suggesting they may compete with native rainbowfish and other native fish for food. These native species may outcompete introduced rainbowfish for resources (Kailola, 2004). A search of the literature shows no evidence of the species impacting other fish in captivity or in the wild. The Department's risk assessment identified that if released Leggett's Rainbowfish would probably be predated by a range native fish

Conclusion: no change to the original risk assessment report conclusions. The species are unlikely to pose a risk to other species through competition or predation.

The consultation process

The first consultation round was open to the public and government agencies, as required under the Live Import List provisions of the EPBC Act, between October and December 2010.

All states and the ACT responded; WA did not support listing the species while all other respondents were supportive of the amendment. There were no comments from the public.

A second round of consultation with states and territories was undertaken between May and June 2016 on the Department's draft risk assessment report and proposed listing recommendation. All states and territories except Tasmania responded. Again, all supported the amendment except WA.

The WA responses in both rounds were based their stance of no non-native fish species should be allowed into Western Australia which is not a consideration under the EPBC Act. The applicants provided a detailed response to the WA first round comments. The Department considered that the major concerns of the state were addressed, and that the species posed minimal risk to the environment. The data suggests that Western Australia is climatically unsuited to the species. The governments of the Northern Territory and Queensland both supported adding the species to the list despite both contain areas possibly climatically suited to the fish.

The WA responses suggested that in the absence of scientific information about Leggett's rainbowfish that the precautionary principle should be applied, and the listing refused. The risk assessment report considered the known information for the species, genus and family and determined that there was no evidence to suggest the listing of Leggett's Rainbowfish would pose any environmental risks, so the precautionary principle did not need to be applied. This is discussed in detail on pages two and three .

The second round of government agency consultation is not a statutory requirement under the EPBC Act, but one introduced in 2009 to increase consultation between the Commonwealth and state/territory agencies. The Department's assessment report and proposed decision was shared with state and Commonwealth agencies via the GovDex web system. This gives the agencies an opportunity to comment on the Department's final report and proposed decision. This step also ensured alignment of any potential listing with state legislation and allowed states, and other Commonwealth agencies, to provide relevant information to the Department that had not previously been identified or supplied. The process increases transparency between the levels of government and promotes open discussions between regulators.

Conclusion: All states and territories except Western Australia supported listing Leggett's Rainbowfish citing they considered it posed a low risk, climatch matching and the Bomford model outputs further supported this stance. The requirement for consultation under section 303EC (3) of the EPBC Act was met.

Differing interpretations of scientific literature and information

No rainbowfish species from New Guinea or Indonesia have ever been recorded as established in Australia or any other country. In their native range of North Western New Guinea Leggett's Rainbowfish are confined to a few water catchments but have not spread into other areas, reinforcing the species has narrow environmental requirements and low environmental plasticity.

Conclusion: – in the absence of any new scientific evidence that the rainbowfish family have any environmental impacts or have invasive tendencies the Department's interpretation of the scientific information available was valid.

SUMMARY

The Department holds the view that a species should not be added to the Live Import List unless it can be demonstrated that the environmental risks are low or that the risks can be adequately managed through listing conditions such as restricting import for non-commercial purposes or for import to secure quarantine facilities only. This may include listing the species for import to zoos or for research purposes only.

The information that was provided to former Minister Frydenberg in March 2017 as part of the decision package included a risk assessment report that concluded there was no evidence to refuse the listing on scientific or environmental grounds. The Department is unaware of the specific reasons for the Minister's refusal, therefore this review revisits key criteria for assessing invasion risk, with a view to determining if new information has come to light that may support or alter the recommendation of the original report.

No new information has emerged to suggest rainbowfish pose an establishment or environmental risk. Despite the lack of information on Leggett's Rainbowfish in the literature, the department is satisfied that sufficient information is available on the *Glossolepis* genus and more broadly the *Melanotaeniidae* family to conclude that the species poses a low risk to the Australian environment.

The Department notes that the original risk assessment report was sent to government agencies for comment as part of the second consultation period elicited support from all states and territories, except Western Australia, to list Leggett's Rainbowfish on the Live Import List. As this review has not identified any new evidence that would change the Department's original recommendation to list the species, it was considered unnecessary to request further comments.

The Department recommends that Leggett's Rainbowfish (*Glossolepis leggetti*) be added in Part 1 of the Live Import List.

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 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 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.

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Attachments

1: Departments Risk Analysis - *Glossolepis leggetti*. Original assessment and decision. MS20-000919 Attachment B - Departmental 2017 risk analysis - *Glossolepis leggetti*.docx