

# Review of non-native ornamental fish species grey listed in Australia



**Josh Fredberg and Dale McNeil**

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**SARDI Aquatic Sciences  
PO Box 120 Henley Beach SA 5022**

**August 2010**

**Report to the Ornamental Fish Management Implementation Group (OFMIG)**



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## EXECUTIVE SUMMARY

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The Ornamental Fish Management Implementation Group (OFMIG) was created in 2007 to address a number of recommendations made by the Department of Agriculture Fisheries and Forestry (DAFF) to minimise the potential risks posed by the importation of live fish associated with the ornamental fish industry. Subsequently, OFMIG developed the 'grey list', which contains potentially noxious non-native ornamental fish species. The Bureau of Rural Sciences (BRS) has subsequently developed a preliminary assessment process that involves the compilation of biological and ecological information and using these data to assess the overall risk that these 'grey listed' species may pose to Australian ecosystems.

A total of 780 non-native fish species are currently contained in the grey list, of which 447 have been assessed by BRS using the BRS review methodology. For the present report a further 234 non-native fish species contained in the grey list were assessed using the BRS methodology. As a result of this review, 139 (59.4%) species were classified as 'high risk', 48 (21%) 'low risk' and 46 (19.7%) 'borderline'.

To assess consistency between the BRS and SARDI reviewing process, the results of the review for 15 randomly selected fish species were compared. It was revealed that 7 out of the 15 species (46%) resulted in the same overall score, with 11 out of the 15 fish species (73%) having been allocated a 'high risk' level by both agencies. The remaining 4 species differed by 1 to 2 score points, however these differences were confined to either 'low' or 'borderline' risk scores. The main factors driving such scoring inconsistencies are assumed to be driven by reduced occurrence of 'unknown' matrix scores in the SARDI matrix. This may be due to the additional use of peer-reviewed literature during the review by SARDI.

The grey list review methodology appears to be a useful tool to rapidly assess a large number of species and allocate risk levels. However, it is recommended, that reviewed grey listed species, which have been allocated a 'high risk' or 'borderline' score, undergo a more rigorous and scientifically based risk assessment. This will ensure a more comprehensive understanding of these associated potential risks, and is important for the management of ornamental fish species in Australia.

# 1 INTRODUCTION

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Worldwide, the importation of live fish for the aquarium trade is considered as a major source for the potential introduction of non-native invasive species (DAFF 2006; McDowall 2004). The Australian aquarium industry is estimated at \$65Million (DAFF 2006). An estimated 12 to 14% of the Australian population are aquarium hobbyist's (DAFF 2006; Patrick 1998). Approximately 1,500 retailers (aquariums and pet shops) across Australia trade in aquarium fish, with around 1000 of these estimated to be located in NSW. According to the Pet Industry Association of Australia (PIAA) approximately 60% of aquarium fish are supplied domestically by local breeders; while 40% are imported (DAFF 2006; ABARE 2004). In recent studies conducted by Lintermans (2004), it was suggested that approximately 34 non-native freshwater species have established populations in Australia; 22 of these species are thought to have been through introduction via the aquarium trade of ornamental fish (DAFF 2006).

Potential threats to Australian ecosystems from introduced non-native fish species threats are varied. To minimise the bio-security risk from the ornamental fish trade in Australia, a strategic approach to the management of ornamental fish was outlined by DAFF (2006). Subsequently, the Ornamental Fish Management Implementation Group (OFMIG) was established in 2007 and consists of members from all state and territory governments. It also includes industry and hobbyist representatives. A key role of OFMIG is to review the status of 'grey list' species that require further scientific and technical consideration through a risk assessment process (OFMIG 2008). The grey list currently contains approximately 780 non-native ornamental fish species that may pose a risk to Australian ecosystems.

The Bureau of Rural Science (BRS) under the Department of Agriculture, Fisheries and Forestry (DAFF) developed a matrix to enable the categorisation of ornamental fish species into as 'high', 'borderline' or 'low risk' using a series of scores and ratings (Grey list species review process, 2008; see also Appendix 1 for detail).

The aims of the current project were:

- 1) to review up to 331 species of non-native fishes contained in the grey list, using the BRS review methodology compiled by BRS; and
- 2) to compare the results of the review of 15 fish species from the grey list between BRS and SARDI Aquatic Sciences review process.



## 2 METHODS

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The grey list species review method was developed in April 2008 (Appendix 1; OFMIG/DAFF 2008). This review method is represented by a matrix which contains a series of pivot tables with either a 'yes', 'no', or 'unknown' answer options. Each answer is allocated a representative score to enable calculation of a final total score or rating (Appendix 2). Based on the final score each species can be categorised as:

- 1) 'high risk' ( $\geq 13$ );
- 2) 'low risk' ( $\leq 12$ ); or
- 3) 'borderline' (between 12 and 13).

During the 'SARDI' grey list review, additional information was added to benefit the outcomes of the process and this included the consultation of additional sources of data such as the Institute for Scientific Information (ISI-Web of Knowledge) and peer-reviewed scientific literature. When these additional sources were consulted, they were then recorded in the matrix as a separate column, and are expected to allow verification of confidence in interpretation.

To assess consistency between the BRS and SARDI reviewing process, the results of the review for 15 randomly selected fish species were compared. This was done by utilising the 17 questions asked in the grey list species review method (2008), with the inclusion of the above SARDI amendments. (The inclusion of these amendments was only used in the 15 species reviewed by SARDI and not BRS).

### 3 RESULTS

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#### 3.1 Review of Grey Listed Species (SARDI)

A total of 234 grey listed non-native fish species were reviewed by SARDI (Appendix 2 contains the review matrix), using the SARDI review method. Of the 234 species; 139 (59.4%) were allocated 'high risk', 48 (21%) 'low risk' and 46 (19.7%) 'borderline' ratings. Details of the sub-scores and resulting final scores are presented in Appendix 2.

#### 3.2 BRS and SARDI Grey List Review Comparison

The comparison between the BRS and SARDI review of 15 grey listed species revealed that 7 species (46%) reviewed by both agencies had the same overall risk score (Table 1). Eleven fish species (73%) were allocated a 'high risk' rating by both, BRS and SARDI, with estimates differing 1-2 points for the same species. As for the remaining species, *Leiarius pictus* was given an overall score of 10 by BRS and 8 by SARDI (both 'low risk'), *Leiarius arekaima* and *Eleotris amblyopsis* were given an overall score of 13 by BRS ('borderline') and 11 by SARDI ('low risk'), whilst, *Lucania goodie* was deemed 'high risk' by BRS (14), and 'borderline' (13) by SARDI (Table 1).

Unknowns (precautionary principles/expressed as a decimal point number e.g. 4.1 or 2.1) are used within the review matrix when no or limited information/ sources is available for the particular question. BRS had considerably more overall unknowns (38) when compared to that of the SARDI review process, which had only 23 (Table 1). However, for species such as *Lepisosteus osseus*, *Helicophagus waandersii*, *Helicophagus leptorhynchus* and *Dormitator lebretonis* equal amounts of unknowns were found by both agencies presumably due to information regarding the species' biological and ecological traits being generally limited.

**Table 1.** A comparison of the total threshold risk and number of unknowns (precautionary principles) used within the risk analysis score for 15 grey listed fish species, reviewed by both BRS and SARDI Aquatic Sciences. 'High risk' (score > 13), 'Low risk' (score < 12), 'Borderline' (score 12-13) (Grey list Review Method, 2008).

<i>Species</i>	<b>Total Risk Scores</b>		<b>No. of Unknowns</b>	
	<b>BRS</b>	<b>SARDI</b>	<b>BRS</b>	<b>SARDI</b>
<i>Tinca tinca</i>	20	21	2	1
<i>Rutilus rutilus</i>	20	20	1	0
<i>Lepisosteus osseus</i>	16	16	1	1
<i>Lepisosteus oculatus</i>	17	17	2	1
<i>Helicophagus waandersii</i>	15	15	3	3
<i>Helicophagus leptorhynchus</i>	15	15	3	3
<i>Leiarius pictus</i>	10	8	3	2
<i>Leiarius arekaima</i>	13	11	4	3
<i>Lucania goodie</i>	14	13	1	0
<i>Lucania parva</i>	17	17	3	1
<i>Osteoglossum ferreirai</i>	16	18	5	2
<i>Scleropages formosus</i>	16	14	3	2
<i>Eleotris amblyopsis</i>	13	11	2	1
<i>Eleotris sandwicensis</i>	14	14	3	2
<i>Dormitator lebretonis</i>	17	16	2	2

## 4 DISCUSSION

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### 4.1 Review of Grey Listed Species (SARDI)

The results from the review of the grey listed fish species (Appendix 2) revealed that 59.4% were found to be of 'high risk'. Much of this result may be attributed to the climate match score contained in the review matrix (1-8) (BRS, 2008). Whereby, if a species is given a high climate match score ('climatch' score between 5 and 8), the total score will be placed within the 'high risk' category, regardless of its biological and ecological traits (e.g. herbivore, sensitive to water quality), and this may contribute an amount of bias to the dataset.

Another factor elevating risk scores disproportionately is the presence of unknown's or the 'precautionary principle' used in the risk categories where information is limited. Using the 'precautionary principle' score, which is either 2.1 or 4.1 (the latter only for climate match), results in a 'high' total score for each category to which it is applied. The precautionary principle is applied in cases where information is lacking with the intent to minimise the 'unknown' risk associated with the respective species.

During the review process it became apparent that risk may be applied at family or genus level rather than species level only. For example, members of the Anabantidae family possess an accessory respiratory organ, which enables the fish to obtain atmospheric oxygen. This adaptation enables this family group to live in waters which are oxygen-poor or sustain life outside of the water for extended periods of time (Sterba 1973). Hence, it could be assumed that all members of this family group are extremely robust and hardy, even if there is limited information on a specific species. This in turn reduces the use of utilising precautionary principles.

### 4.2 BRS and SARDI Grey List Review Comparison

The comparison of the results from the SARDI and BRS reviews using 15 randomly selected species revealed some differences in the total scoring. This was largely due to the increased use of 'unknown' classifications in the BRS

analysis, with inconsistencies largely related to the 'impacts' column in the matrix (see Appendix 1).

Differences in total scoring results between the reviews by SARDI and BRS are largely related to differences in the sources of information used during the review. The use of scientific databases and peer-reviewed literature to obtain biological and ecological information during the review of species rather than non-research or non-peer reviewed articles and summaries is expected to increase the robustness and accuracy of the total score of the grey list review.

Due to the use of peer-reviewed literature for this component of the review process (SARDI), it can safely be said that using this method has improved the rigor and integrity of the entire risk assessment. This will be highlighted in the future progress of this assessment, whereby less fish will have to undergo a further, more rigorous risk assessment of high risk species, which has been previously suggested by The Ornamental Fish Policy Working Group (OFPWG), due to less unknown's, therefore lower overall risk scores.

### **4.3 Conclusion/Recommendations**

The assessment of grey listed ornamental fish species for Australia, derived from the BRS methodology, is a suitable tool to allocate risk levels to non-native ornamental fishes for subsequent prioritisation to more robustly assess the potential risk associated with the respective species. As such, it is recommended that a more rigorous and thorough risk assessment be applied to the 'borderline'/'high risk' species resulting from the grey list review, in order to obtain a more comprehensive result for all stakeholders involved. This process will provide much needed information on which to base decisions as regards to the management of ornamental fish species in Australia.

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## 6 APPENDICES

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### 6.1 APPENDIX 1 - Grey list species review method

This document outlines the grey list review method as developed following OFMIG's meeting in April 2008 and through consultation with the Australian Centre for Excellence in Risk Assessment (ACERA).

#### **Review Process**

The review matrix and how it would be applied was discussed and accepted in principle at the 3rd OFMIG meeting in April 2008, as a screening method to apply to the grey list and as an alternative to more costly risk assessment of individual species.

Representatives of DEWHA, BRS and ACERA have worked together to develop the approach and matrix for collating information to allow a transparent review of species on the grey list. The approach could be used for species that may require review in the future. The review matrix has been refined to include an appropriate threshold score to determine potentially high and low risk species and to address further comments provided by OFMIG members (WA and PIAA) and as a result of suggestions from an expert workshop to review grey listed species held 16 October 2008.

The review matrix uses climate matching (as used in the Bomford risk assessment models (Bomford 2006)), the assessment criteria considered in the original noxious list assessment, and other criteria. A criterion for hardiness was added following suggestions at the expert workshop in October 2008. The criteria are grouped according to the key policy areas relevant to government consideration of the potential pest and invasiveness of a species: biodiversity; impacts; and trade. The definitions section below provides explanations of the terms for categories used in the matrix. BRS has populated the matrix with information for grey list species with the exception of several genera which were considered by an expert group based on 'example' species. The expert workshop involved nominated experts and members of the aquarium industry.

The outputs of each tranche are reported to OFMIG for consideration and review at its regular meetings. OFMIG then reports these outcomes to MACC, who develops recommendations for additions to the noxious list. These are provided to the NRMSC who consider and endorse any additions to the national noxious list.

Species classified as low risk through this process could be considered for further assessment as species suitable for live import into Australia under Federal legislation and processes e.g. if the Industry chose to make an application to amend the live import list for individual species. A requirement of this legislated process is for a comprehensive environmental assessment of the proposed amendment on the Australian environment. The Bomford risk assessment model for freshwater fish would be applied in this process to contribute to the environmental assessment and information for the decision. The work done in reviewing the grey list under the OFMIG process could be used as an initial source of information if a live import list amendment application was made.

The review matrix and method as outlined provide a repeatable process for reviewing further species that may be added to the grey list for the purpose of recommending whether they be considered potentially noxious in Australia. To ensure consistent and repeatable results, future users outside this process will need to be mindful to apply the review matrix in an appropriate context using relevant and reliable information sources.

### **Review matrix categories**

- Climate match
- Biodiversity
  - o Established in Australia
  - o Eradication effort
  - o Established beyond natural range
  - o CITES listing
  - o Hardiness
  - o Resilience
- Impact
  - o Current noxious status in Australia
  - o Impact on habitat
  - o Impact on other species
  - o Genetic risk to native species
  - o Genetic risk of non-native hybridisation
  - o Known carrier of high risk disease
  - o Direct threat to humans
- Trade
  - o Restricted trade elsewhere
  - o Multiple use species
  - o Captive status in industry

### **Review matrix definitions**

#### **Climate Match and impacts**

A two staged approach was utilised to assess the outputs of the risk matrix. If a species received a moderate to high climate match using the software package 'Climatch' (four or above) and was assigned the highest score (score of two or 2.1) for any of the 'impact' categories apart from 'current noxious status in Australia' or 'genetic risk of non-native hybridisation', then it was automatically deemed high risk. If it did not meet both of these criteria, the scores for each category were summed to give a relative risk score (see Application of the Threshold Score below). The relative risk score was calibrated against exotic species known to be present and established in Australia to determine a threshold score.

The threshold score of 12 as the threshold for potentially high risk species has been determined by calibrating the matrix with a number of fish species known to have established in Australia and have been shown to have clear impacts on other species or habitats. These species include European carp and Gambusia. A similar system has been used widely in New Zealand and Great Britain. The ranking criteria have



been applied to differentiate between those species that are high risk (to be considered for addition to the noxious list) and those that are lower risk.

As a result of difficulties in securing sufficient resources to undertake individual risk assessment OFMIG agreed to the involvement of a small group of experts to consider borderline species, or species evaluated as having insufficient information. Borderline species are those species that have scores of 11 or 12. Species evaluated as not having sufficient information have a lack of information on 3 or more criteria.

### ***Application of the Threshold Score***

The review matrix has been used to identify grey listed species that are high risk (relative risk score >13), and species that are low risk (relative risk score <12). Any species considered borderline (relative risk score 12 or 13) were deemed to warrant expert technical input at the review workshop, as were species where information is limited (more than 3 criteria do not have sufficient supporting literature).

### ***Precautionary Principle***

Many animal species (including fish) when assessed in terms of their potential impact on the environment or invasiveness may have limited scientific or other information to support views on their potential impacts or noxious status. It is accepted practice in Australia to apply a precautionary approach (e.g. the precautionary principle is taken into account in statutory decision making in some jurisdictions) when there is little or no scientifically based evidence or information, and where other information available is not science based. In circumstances where there was either conflicting information from reliable sources or no information available, the precautionary principle was used. To identify where the precautionary principle was used, 0.1 was added to the score for that category; for instance, instead of a score of 2 for 'impact on other species' it would be assigned 2.1. This does not impact on the final threshold score but allows easy identification of where the precautionary principle was used, and how many times it was used for any species or category.

## **BIODIVERSITY**

The following criteria relate to the distribution and abundance of a species. A species is more likely to establish itself in Australia if introduced if it is: widely distributed; can tolerate a wide range of climatic conditions; lives in a region with closely matching climatic conditions to Australia; or previously has established itself outside its natural range, either in Australia or elsewhere.

### ***Climate match***

The climate score is derived from the risk assessment climate matching model Climatch; the revised model used for previous risk assessments (e.g. Bomford, 2006).

Risk assessment models have been developed by BRS to assess the risk of exotic vertebrates establishing in Australia. An integral part of these models is climate matching between each species' natural geographic distribution and similar environments in Australia.

Species which have a high Climatch score show attributes which are likely to make them successful colonisers in Australia. Conversely species with a low climate score will have a lower probability of establishment. The climate match score ranges from 1-8 with the following scoring system:

**Table 1.** Climate match scoring system.

Climate match score	PC score	Climatch
1	0	
2	1-40	
3	41-150	
4	151-400	
5	401-1000	
6	1001-1500	
7	1501-2500	
8	>2500	

**NB:** where no geographical information is available, the species is assigned a precautionary score of 4.1 for the Climate Match category.

The Climate Match score is the single highest possible score in the review matrix, reflecting its importance as the key criteria in determining if a species is likely to establish itself in Australia if introduced. The 'World stations' database was generally used in Climatch for climate matching, however due to the paucity of data, it was sometimes necessary to use the 'Worldclim' dataset as this infers the likely climate in an area where there are no weather stations from which to take data. For some species there was no data available on distribution and in these cases a precautionary score of 4.1 was assigned based on the initial subsample of 132 species. It was agreed that these species were the most appropriate to use as a subsample as they represented species from over 80% of genera and 95% of families on the grey list and were therefore the most representative sample taken.

### ***Established in Australia***

Indicates if the species has previously established populations or currently has populations in Australia. This criterion is given a ranking score from 0-2, with the following scoring system:

- 0= Not established in Australia
- 1= Recorded occurrence in Australia
- 2= Reproducing population or widespread in Australia

### ***Eradication effort***

Indicates if there is, has been, or will be an eradication effort of any scale in Australia for the species. Accurate data for this category is difficult to obtain. For this reason this category is used for information purposes only and does not contribute to the overall score. This category has the following rating system:

- Ongoing- An eradication program is currently in place and eradication efforts are ongoing
- Eradicated- An eradication program has been implemented previously and the species has been successfully eradicated from Australia.

- Not at this time - An eradication program within Australia has yet to be implemented for this species.
- Not required - The species has not established in Australia and so an eradication effort is not currently contemplated or required for this species.

### ***Established internationally***

Indicates if the species has established populations outside their natural range in any other country. This information is taken primarily from FishBase (<http://www.fishbase.org/search.php>) and other web based fish sites (see website list section). This criterion is given a ranking score from 0-2, with the following scoring system:

- 0= No established populations outside their natural range
- 1= Limited distribution outside its natural range, typically in the same continental region
- 2= Widespread distribution outside its natural range
- 2.1= No information available (2.1 precautionary principle)

### ***CITES listing***

Indicates if the species is listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This criteria is of limited value in determining whether a species is likely to establish itself if introduced to Australia and so is used here for information purposes only and does not contribute to the overall relative risk score. It follows a simple yes/no scoring system. Listing information is gathered from CITES (<http://www.cites.org/>).

### ***Hardiness***

Hardiness is used as an indicator of the species' ability to tolerate, or survive, or adapt to a wide range of temperatures, pH, salt or freshwater aquatic environments, or the ability to survive out of water for periods of time. Information for this criterion was gathered from FishBase (<http://www.fishbase.org/search.php>), various ichthyological and aquarium sites (see website list section) and through an expert technical panel.

- 0= low
- 1= medium
- 2= high
- 2.1 = No information available (2.1 precautionary principle)

### ***Resilience***

Indicates rate of population doubling as an indicator of the rate of population growth. This is likely to be a good indicator of rate of population expansion once established. This attribute is also likely to provide an indication of the difficulty of eradication once established. FishBase (<http://www.fishbase.org/search.php>) lists a category on resilience for most species and provides information on population doubling. Information was also provided by an expert technical panel. This criterion is given a ranking score from 0-2, with the following scoring system:

- 0= Slow population growth
- 1= Moderate population growth
- 2= Fast population growth
- 2.1= Unknown rate of population growth (precautionary principle)

## **IMPACTS**

The following criteria relate to the environmental impact a species is likely to have if it successfully establishes in Australia. Possible impacts include habitat modification or disturbance, negative interaction with native species, particularly predation or aggression, the genetic risk to the gene pool of native species through hybridisation, the genetic risk of hybridisation with established noxious species and adopting some or all of the pest characteristics of that species or increasing hybrid vigor (heterosis) to bottlenecked populations, or the potential introduction of high risk diseases.

### ***Current noxious status in Australia***

Indicates if the species has noxious status in any Australian states or territories. Currently no distinction is made between being listed as noxious in a single state or territory and being listed as noxious in multiple states or territories.

- 0=Not listed in any jurisdiction
- 1=Yes listed in at least one jurisdiction

### ***Potential Impact on habitat***

Indicates if the species has potential to significantly modify or disturb habitats in which it establishes. Information on this criteria has been gathered from FishBase (<http://www.fishbase.org/search.php>), various ichthyological and aquarium internet sites (see website list section) and through an expert technical panel. This criterion is given a ranking score from 0-2, with the following scoring system:

- 0= No impact on habitat
- 1= Low impact on habitat
- 2= Medium or high impact on habitat
- 2.1= Unknown impact on habitat (precautionary principle)

### ***Potential Impact on other species***

Indicates if the species has characteristics or behaviour which could significantly impact other species in environments if it establishes. Strong negative impacts include predation and aggression which are likely to affect the distribution and abundance of other species in these areas. Information on this criteria has been gathered from FishBase (<http://www.fishbase.org/search.php>), various ichthyological and aquarium internet sites (see website list section) and through an expert technical panel. This criterion is given a ranking score from 0-2, with the following scoring system:

- 0= No impact on other species
- 1= Low impact on other species
- 2= Medium or high impact on other species
- 2.1= Unknown impact on other species (precautionary principle)

### ***Genetic risk to native species***

Indicates if the species poses a significant genetic risk to native fish species through hybridization and introgression. Hybridization with native species will alter and dilute the gene pool of native species and in extreme cases may lead to the genetic extinction of the native species, particularly in cases where the introduced species is abundant and the native species is rare. Introgression is the introduction, through hybridisation, of non-native genetic information into the native gene pool, which may alter the fitness of native species. This criterion is given a ranking score from 0-2, with the following scoring system:

- 0= Low or no risk of hybridisation. Introduced species shares no or only distant phylogenetic relationship with native species
- 1= Medium risk of hybridisation. Introduced species belongs to the same phylogenetic family as native species
- 2= High risk of hybridisation. Introduced species belongs to the same phylogenetic genus as native species
- 2.1= Unknown risk of hybridisation. Introduced species has an unresolved phylogeny but may have close ancestral relationship with native species (precautionary principle)

### ***Genetic risk from hybridisation with established noxious species***

Indicates if the species poses a significant genetic risk through hybridization with established noxious species and adopting some or all of the characteristics of the noxious species or through hybrid vigor (heterosis) to bottlenecked populations. Established noxious species are defined as those listed on the national noxious fish list. This criteria is given a ranking score from 0-2, with the following scoring system:

- 0= Low or no risk of hybridisation. Introduced species shares no or only distant phylogenetic relationship with established noxious species
- 1= Medium risk of hybridisation. Introduced species belongs to the same phylogenetic Family as established noxious species
- 2= High risk of hybridisation. Introduced species belongs to the same phylogenetic Genus as established noxious species
- 2.1= Unknown risk of hybridisation. Introduced species has an unresolved phylogeny but may have close ancestral relationship with established noxious species (precautionary principle)

### ***Known carrier of high risk disease***

Indicates if the species is a known carrier of high risk disease that could pose a significant risk to native fish species. High risk disease is defined here as those listed on Australia's National List of Reportable Diseases of Aquatic Animals (2007) and included in the Import Risk Analysis on live Ornamental Finfish (1999). Information on this criterion has been gathered from FishBase (<http://www.fishbase.org/search.php>), various ichthyological and aquarium internet sites (see website list section) and through an expert technical panel. This criterion is given a ranking score with the following scoring system:

- 0= Not know to carry high risk disease

- 1= May carry high risk disease
- 2= Is known to carry high risk disease
- 2.1= Unknown disease risk (precautionary principle)

## **TRADE**

The following criteria relate to how international trade in a species might influence escape and establishment of that species, or its potential impact if it escapes. If trade in a species has been restricted elsewhere, it suggests that this species has been recognised by that country as a potential threat, for one reason or another, and so may pose a similar threat if introduced to Australia. If a species has multiple uses across sectors this relates to how widely spread the species is likely to become if it is introduced to Australia and thus how many different pathways exist to escape into the wild.

The more widespread a species is spread across activities or industries, the greater and more varied the risk of the species escaping captivity and establishing in the wild. However some pathways to escape pose a greater risk than others. For example those species commonly kept in ponds and dams are far more likely to escape than those restricted to strict research facilities. Thus the extent and type of industry use will also be a determining factor of the likelihood of escape. Together these two factors can be considered as the breadth and depth of risk of escape into the wild due to industry trade.

### ***Restricted trade elsewhere***

Indicates if the importation or movement of the species has been limited to or within other countries. If trade in a species has been restricted elsewhere, it suggests that this species has been recognised by that country as a potential threat, for one reason or another, and so may pose a similar threat if introduced to Australia. This information is difficult to ascertain and is likely available only for a handful of countries. For this reason this category is currently used for information purposes only and does not contribute to the overall relative risk score. However, this category could help inform the decision process where the review ranking is borderline. This category has a simple rating system of yes trade in this species is restricted elsewhere, no trade in this species is not restricted elsewhere, or trade in this species is unknown.

### ***Multiple use species***

Indicates the use and benefits of the species across various sectors, including recreational fishing, aquaculture, the aquarium industry, or religious/ethnic activities. If a species has multiple uses across sectors this relates to how widely spread the species is likely to become if it is introduced to Australia and thus how many different pathways exist to escape into the wild. The more widespread a species is spread across industries, the greater and more varied the risk of the species escaping captivity and establishing in the wild. Information on this criterion has been gathered from FishBase (<http://www.fishbase.org/search.php>), various ichthyological and aquarium internet sites (see website list section) and through an expert technical panel. This criterion can be considered as the breadth of risk due to industry use. This criterion is given a ranking score of 1 or 2, with the following scoring system:

- 1= Used in ≤ one industry
- 2= Used in > one industry

- 2.1= Breadth of use of this species is unknown (precautionary principle)

The score cannot equal zero because that would imply no use for this species and therefore no reason to bring it into the country.

### ***Captive status in industry***

Indicates how widely the species is kept within an industry and under what conditions. Some pathways to escape pose a greater risk than others. For example those species commonly kept in ponds and dams are far more likely to escape than those restricted to strict research facilities. Thus the extent and type of industry use will also be a determining factor of the likelihood of escape. Information on this criterion has been gathered from FishBase (<http://www.fishbase.org/search.php>), various ichthyological, aquarium internet sites (see website list section) and through an expert technical panel. This criterion can be considered as the depth of risk due to industry use. This criterion is given a ranking score from 0-2, with the following scoring system:

- 0= Use is restricted to a limited purpose or highly contained
- 1= Use is not restricted or contained but the species is not widely kept
- 2= Use is not restricted or contained and the species is widely kept
- 2.1= Depth of use of this species is unknown (precautionary principle)

### ***Useful websites consulted for this review***

<http://animal-world.com/encyclo/fresh/fresh.htm>

<http://aquatic-hobbyist.com>

<http://aquaticpredators.com>

<http://aquaworld.netfirms.com>

<http://fisc.er.usgs.gov/afs/>

<http://fish.mongabay.com>

<http://fpcs.fish.govt.nz/>

[www.amonline.net.au/fishes/index.cfm](http://www.amonline.net.au/fishes/index.cfm)

[www.aquariacentral.com](http://www.aquariacentral.com)

[www.aquarticles.com](http://www.aquarticles.com)

[www.aquaticcommunity.com](http://www.aquaticcommunity.com)

[www.arcbc.org.ph/arcbcweb/pdf/vol2no4/12-](http://www.arcbc.org.ph/arcbcweb/pdf/vol2no4/12-)

[15\\_sr\\_invasive\\_aquatic\\_animals.pdf](http://www.arcbc.org.ph/arcbcweb/pdf/vol2no4/12-15_sr_invasive_aquatic_animals.pdf)

[www.cites.org/](http://www.cites.org/)

[www.defra.gov.uk](http://www.defra.gov.uk)

[www.fishbase.org](http://www.fishbase.org)

[www.fishprofiles.com](http://www.fishprofiles.com)

[www.geocities.com](http://www.geocities.com)

[www.liveaquaria.com](http://www.liveaquaria.com)

[www.nanfa.org](http://www.nanfa.org)

[www.planetcatfish.com](http://www.planetcatfish.com)

[www.pond-life.me.uk](http://www.pond-life.me.uk)

[www.scotcat.com](http://www.scotcat.com)

[www.seriouslyfish.com](http://www.seriouslyfish.com)

[www.theaquariumwiki.com](http://www.theaquariumwiki.com)

[www.thetropicaltank.co.uk](http://www.thetropicaltank.co.uk)

[www.tropicalfishfinder.co.uk](http://www.tropicalfishfinder.co.uk)

[www.wcs.org/globalconservation/Africa/madagascar/freshwaterfishconservation](http://www.wcs.org/globalconservation/Africa/madagascar/freshwaterfishconservation)

[www.wetwebmedia.com](http://www.wetwebmedia.com)



## 6.2 APPENDIX 2 – Grey List Review

**Table 3. Results for the review of 234 non-native ornamental fish species following the BRS grey list review methodology (Grey List Review Method, 2008).** Indicating the 233 grey listed species (Whereby, **CM**=Climate match, **EA**=Established in Australia, **EE**=Eradication Effort, **EI**=Established Beyond Natural Range Internationally, **CT**=Cites Listed, **Ha**=Hardiness, **Re**=Resilience, **Nx**=Noxious Status in Australia, **IH**=Impact on Habitat, **IS**=Impact on other Species, **GN**=Genetic Risk to Native Species, **GI**=Genetic Risk to Invasive Species, **DS**=Known Carrier of Disease, **TH**=Direct Threat to Humans, **RT**=Restricted Trade Elsewhere, **MU**=Multiple use Species, **CS**=Captive Status in Industry, **TT**=Threshold Total (risk score), **UK**=Unknown's, **RC**=Risk Category, **HR**=High Risk, **LR**=Low Risk & **B**=Borderline, **Ref**=References). References can be seen in numerical order can be found in section 6.3.

Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref
Acipenseridae	<i>Acipenser baerii</i>	1	0	no	1	yes (cites 2)	1	0	0	2	0	0	0	2.1	0	yes	2	1	10	1	LR	1
Acipenseridae	<i>Acipenser oxyrinchus</i>	4	0	no	0	yes (cites 2)	1	0	0	2.1	2.1	0	0	2.1	0	yes	2	0	13	3	B	2
Anabantidae	<i>Anabas testudineus</i>	6	1	no	2	no	2	2	1	2.1	2	0	0	2	0	no	2	1	23	1	HR	3
Anabantidae	<i>Ctenopoma ansorgii</i>	5	1	no	2	no	2	2.1	1	1	1	0	0	2.1	0	no	1	1	19	2	HR	4
Anabantidae	<i>Ctenopoma ashbysmithi</i>	3	0	no	0	no	2	2	0	0	2.1	0	0	2.1	0	no	1	1	13	2	B	5
Anabantidae	<i>Ctenopoma breviventrale</i>	4.1	0	no	2.1	no	2	2	0	2.1	2.1	0	0	2.1	0	no	1	1	18	5	HR	6
Anabantidae	<i>Ctenopoma garuanum</i>	4	0	no	0	no	2	2	0	2.1	2.1	0	0	2.1	0	UK	1	1	16	3	HR	8
Anabantidae	<i>Ctenopoma houyi</i>	5	0	no	0	no	2	2	0	2.1	2.1	0	0	2.1	0	no	1	1	17	3	HR	9
Anabantidae	<i>Ctenopoma machadoi</i>	4	0	no	0	no	2	2	0	2.1	2.1	0	0	2.1	0	no	1	1	16	3	HR	10
Anabantidae	<i>Ctenopoma maculatum</i>	4	0	no	0	no	2	1	0	2.1	2.1	0	0	2.1	0	no	1	1	15	3	HR	11
Anabantidae	<i>Ctenopoma nanum</i>	5	1	no	2	no	2	2.1	1	2.1	1	0	0	2.1	0	no	1	1	20	3	HR	12
Anabantidae	<i>Ctenopoma nebulosum</i>	2	0	no	0	no	1	2	0	2.1	2.1	0	0	2.1	0	no	1	1	13	3	B	13
Anabantidae	<i>Ctenopoma pellegrini</i>	4	0	no	0	no	2	2	0	2.1	2	0	0	2.1	0	UK	1	2.1	17	3	HR	14
Anabantidae	<i>Ctenopoma petherici</i>	6	0	no	1	no	2	1	0	2.1	2	0	0	1	0	UK	1	1	17	1	HR	15
Anabantidae	<i>Ctenopoma riggerbachi</i>	3	0	no	0	no	2	2	0	2.1	2.1	0	0	2.1	0	UK	1	1	15	3	HR	16

Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref
Anabantidae	<i>Ctenopoma togoensis</i>	5	0	no	0	no	2	2	0	2.1	2.1	0	0	2.1	0	UK	1	1	17	3	HR	17
Anabantidae	<i>Microctenopoma damasi</i>	4	0	no	0	no	2	2	0	2.1	2.1	0	0	0	0	no	1	1	14	2	HR	18
Anabantidae	<i>Microctenopoma intermedium</i>	6	0	no	0	no	2	2	0	2.1	2.1	0	0	0	0	UK	1	1	18	2	HR	19
Anabantidae	<i>Microctenopoma nigricans</i>	4	0	no	0	no	2	2	0	2.1	2.1	0	0	0	0	UK	1	1	14	2	HR	20
Anabantidae	<i>Microctenopoma ocellifer</i>	4.05	0	no	0	no	2	2	0	2.1	2.1	0	0	0	0	UK	1	1	14	2	HR	21
Anabantidae	<i>Microctenopoma pekkolai</i>	5	0	no	0	no	2	2	0	2.1	2.1	0	0	0	0	UK	1	1	15	2	HR	22
Anabantidae	<i>Microctenopoma uelense</i>	2	0	no	0	no	2	2	0	2.1	2.1	0	0	0	0	UK	1	1	12	2	LR	23
Characidae	<i>Astyanacinus moorii</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	3	HR	24
Characidae	<i>Astyanax abramis</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	25
Characidae	<i>Astyanax altiparanae</i>	4	0	no	0	no	1	2	0	1	1	0	0	2	0	UK	2	1	14	0	HR	26
Characidae	<i>Astyanax angustifrons</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	27
Characidae	<i>Astyanax anterior</i>	1.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	11	2	LR	28
Characidae	<i>Astyanax aramburui</i>	8	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	18	2	HR	29
Characidae	<i>Astyanax argyrimarginatus</i>	4.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	2	1	15	2	HR	30
Characidae	<i>Astyanax asuncionensis</i>	6	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	15	1	HR	31
Characidae	<i>Astyanax atratoensis</i>	3	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	32
Characidae	<i>Astyanax biotae</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	0	12	2	LR	33
Characidae	<i>Astyanax bockmanni</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	14	1	HR	34
Characidae	<i>Astyanax brachypterygium</i>	2.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	12	2	LR	35
Characidae	<i>Astyanax caucanus</i>	3	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	36
Characidae	<i>Astyanax chaparae</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	37
Characidae	<i>Astyanax cordovae</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	38
Characidae	<i>Astyanax correntinus</i>	6	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	16	2	HR	39
Characidae	<i>Astyanax daguae</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	14	1	HR	40
Characidae	<i>Astyanax depressirostris</i>	4.1	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	3	HR	41

Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref
Characidae	<i>Astyanax eigenmanniorum</i>	7	0	no	0	no	1	2	0	1	1	0	0	2	0	UK	1	1	16	0	HR	42
Characidae	<i>Astyanax elachylepis</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	43
Characidae	<i>Astyanax endy</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	44
Characidae	<i>Astyanax erythropterus</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	1	0	UK	1	1	16	1	HR	45
Characidae	<i>Astyanax fasslii</i>	2	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	12	2	LR	46
Characidae	<i>Astyanax festae</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	47
Characidae	<i>Astyanax filiferus</i>	3	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	48
Characidae	<i>Astyanax gisleni</i>	3	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	49
Characidae	<i>Astyanax goyacensis</i>	2.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	12	2	LR	50
Characidae	<i>Astyanax gracilior</i>	2.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	12	2	LR	51
Characidae	<i>Astyanax guianensis</i>	4	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	52
Characidae	<i>Astyanax gymnogenys</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	53
Characidae	<i>Astyanax henseli</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	54
Characidae	<i>Astyanax integer</i>	1.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	11	2	LR	55
Characidae	<i>Astyanax ita</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	56
Characidae	<i>Astyanax janeiroensis</i>	4.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	57
Characidae	<i>Astyanax kompi</i>	1.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	11	2	LR	58
Characidae	<i>Astyanax kullanderi</i>	4.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	59
Characidae	<i>Astyanax lacustris</i>	4	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	60
Characidae	<i>Astyanax laticeps</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	61
Characidae	<i>Astyanax lineatus</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	62
Characidae	<i>Astyanax longior</i>	2.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	12	2	LR	63
Characidae	<i>Astyanax maculisquamis</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	64
Characidae	<i>Astyanax marionae</i>	6	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	16	2	HR	65
Characidae	<i>Astyanax maximus</i>	1.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	11	2	LR	66
Characidae	<i>Astyanax megaspilura</i>	3	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	67
Characidae	<i>Astyanax microlepis</i>	2	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	12	2	LR	68
Characidae	<i>Astyanax microschemos</i>	4.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	69

Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref
Characidae	<i>Astyanax mutator</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	70
Characidae	<i>Astyanax myersi</i>	1.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	11	2	LR	71
Characidae	<i>Astyanax nasutus</i>	2.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	12	2	LR	72
Characidae	<i>Astyanax nicaraguensis</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	73
Characidae	<i>Astyanax ojiaira</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	74
Characidae	<i>Astyanax orbignyanus</i>	6	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	16	2	HR	75
Characidae	<i>Astyanax orthodus</i>	6	0	no	1	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	76
Characidae	<i>Astyanax paraguayensis</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	77
Characidae	<i>Astyanax parahybae</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	78
Characidae	<i>Astyanax paranae</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	79
Characidae	<i>Astyanax paranahybae</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	80
Characidae	<i>Astyanax pedri</i>	4.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	81
Characidae	<i>Astyanax pelecus</i>	4	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	82
Characidae	<i>Astyanax poetzschkei</i>	2.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	12	2	LR	83
Characidae	<i>Astyanax potaroensis</i>	1.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	11	2	LR	84
Characidae	<i>Astyanax pynandi</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	85
Characidae	<i>Astyanax ribeirae</i>	4	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	86
Characidae	<i>Astyanax rivularis</i>	6	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	16	2	HR	87
Characidae	<i>Astyanax ruberrimus</i>	4	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	88
Characidae	<i>Astyanax saguazu</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	89
Characidae	<i>Astyanax saltor</i>	4.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	90
Characidae	<i>Astyanax scabripinnis</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	91
Characidae	<i>Astyanax scintillans</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	92
Characidae	<i>Astyanax stenothalinus</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	93
Characidae	<i>Astyanax superbus</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	94
Characidae	<i>Astyanax symmetricus</i>	1.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	11	2	LR	95
Characidae	<i>Astyanax taeniatus</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	96
Characidae	<i>Astyanax triethropterus</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	97

Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref
Characidae	<i>Astyanax troya</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	98
Characidae	<i>Astyanax tupi</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	99
Characidae	<i>Astyanax turmalinensis</i>	5	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	15	2	HR	100
Characidae	<i>Astyanax utiarii</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	101
Characidae	<i>Astyanax venezuelae</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	102
Characidae	<i>Bryconops alburnoides</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2	0	UK	1	1	13	1	B	103
Characidae	<i>Bryconops colanegra</i>	2.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	12	2	B	104
Characidae	<i>Bryconops collettei</i>	3.05	0	no	0	no	2	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	105
Characidae	<i>Bryconops disruptus</i>	1.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	11	2	LR	106
Characidae	<i>Bryconops gracilis</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	107
Characidae	<i>Bryconops imitator</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	108
Characidae	<i>Bryconops magoi</i>	3.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	13	2	B	109
Characidae	<i>Bryconops transitoria</i>	1.05	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	11	2	LR	110
Characidae	<i>Ctenobrycon hauxwellianus</i>	4	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	14	2	HR	111
Characidae	<i>Ctenobrycon multiradiatus</i>	7	0	no	0	no	1	2	0	2.1	1	0	0	2.1	0	UK	1	1	17	2	HR	112
Ctenoluciidae	<i>Boulengerella cuvieri</i>	3.05	0	no	0	no	1	2.1	0	1	2	0	0	2.1	0	UK	2	1	14	2	HR	113
Ctenoluciidae	<i>Boulengerella lucius</i>	4.05	0	no	0	no	1	2.1	0	1	2	0	0	2.1	0	UK	2	1	15	2	HR	114
Ctenoluciidae	<i>Boulengerella xyrekes</i>	4.05	0	no	0	no	1	2.1	0	1	2	0	0	2.1	0	UK	2	1	15	2	HR	115
Dasyatidae	<i>Himantura chaophraya</i>	6	2	no	0	no	1	0	0	1	2	2	0	2.1	1	yes	2	1	20	1	HR	116
Dasyatidae	<i>Himantura fai</i>	7	2	no	0	no	0	0	0	1	2	2	0	2.1	1	no	2	1	20	1	HR	117
Dasyatidae	<i>Himantura granulata</i>	5	2	no	0	no	2	0	0	1	2	2	0	2.1	1	no	2	1	20	1	HR	118
Dasyatidae	<i>Himantura jenkinsii</i>	6	2	no	0	no	2	0	0	1	2	2	0	2.1	0	UK	2	1	20	1	HR	119
Dasyatidae	<i>Himantura toshi</i>	7	2	no	0	no	0	0	0	1	2	2	0	2.1	0	UK	2	1	19	1	HR	120
Dasyatidae	<i>Himantura uarnak</i>	7	2	no	0	no	2	0	0	1	2	2	0	2.1	1	UK	2	1	22	1	HR	121
Dasyatidae	<i>Himantura undulata</i>	7	2	no	0	no	0	2.1	0	1	2	2	0	2.1	1	UK	2	1	22	2	HR	122
Eleotridae	<i>Eleotris acanthopoma</i>	6	2	no	0	no	2	2	0	0	2	2	0	2.1	0	UK	1	1	20	1	HR	123
Eleotridae	<i>Eleotris andamensis</i>	6	0	no	0	no	2	1	0	0	2	1	0	2.1	0	UK	1	1	16	1	HR	124
Eleotridae	<i>Eleotris annobonensis</i>	4	0	no	0	no	2	2	0	0	2	1	0	2.1	0	UK	1	1	15	1	HR	125

Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref
Eleotridae	<i>Eleotris aquadulcis</i>	2	0	no	0	no	1	1	0	0	2	1	0	2.1	0	UK	1	1	11	1	LR	126
Eleotridae	<i>Eleotris ballia</i>	4	0	no	0	no	2	1	0	0	2	1	0	2.1	0	UK	1	1	14	1	HR	127
Eleotridae	<i>Eleotris brachyurus</i>	3	0	no	0	no	1	1	0	0	2	1	0	2.1	0	UK	1	1	12	1	LR	128
Eleotridae	<i>Eleotris deganensis</i>	6	0	no	0	no	2	2	0	0	2	1	0	2.1	0	UK	1	1	17	1	HR	129
Eleotridae	<i>Eleotris fasciatus</i>	3	0	no	0	no	2	1	0	0	1	1	0	2.1	0	UK	1	1	12	1	LR	130
Eleotridae	<i>Eleotris feai</i>	3	0	no	0	no	2	1	0	0	2	1	0	2.1	0	UK	1	1	13	1	B	131
Eleotridae	<i>Eleotris fusca</i>	8	2	no	0	no	2	1	0	0	2	1	0	2	0	UK	2	2	22	0	HR	132
Eleotridae	<i>Eleotris lutea</i>	6	0	no	0	no	2	2	0	0	1	1	0	2.1	0	UK	1	1	16	1	HR	133
Eleotridae	<i>Eleotris macrocephala</i>	2	0	no	0	no	1	1	0	0	1	1	0	2.1	0	UK	1	1	10	1	LR	134
Eleotridae	<i>Eleotris macrolepis</i>	2	0	no	0	no	1	1	0	0	1	1	0	2.1	0	UK	1	1	10	1	LR	135
Eleotridae	<i>Eleotris margaritacea</i>	6	2	no	0	no	2	1	0	0	1	1	0	2.1	0	UK	1	1	17	1	HR	136
Eleotridae	<i>Eleotris mauritanus</i>	5	0	no	0	no	2	1	0	0	2	1	0	2.1	0	UK	1	1	15	1	HR	137
Eleotridae	<i>Eleotris melanosoma</i>	6	2	no	0	no	2	1	0	0	2	1	0	2	0	UK	2	1	19	0	HR	138
Eleotridae	<i>Eleotris melanura</i>	4	0	no	0	no	1	1	0	0	2	1	0	2.1	0	UK	1	1	13	1	B	139
Eleotridae	<i>Eleotris oxycephala</i>	5	0	no	0	no	2	2	0	0	2	1	0	2.1	0	UK	1	1	16	1	HR	140
Eleotridae	<i>Eleotris pallegrini</i>	2	0	no	0	no	2	1	0	0	2	1	0	2.1	0	UK	1	1	12	1	LR	141
Eleotridae	<i>Eleotris perniger</i>	3	0	no	1	no	2	1	0	0	1	1	0	2.1	0	UK	1	1	12	1	LR	142
Eleotridae	<i>Eleotris picta</i>	7	0	no	1	no	2	1	0	0	2	1	0	1	0	UK	1	1	17	0	HR	143
Eleotridae	<i>Eleotris pisonis</i>	6	0	no	1	no	2	1	0	0	2	1	0	1	0	UK	1	1	16	0	HR	144
Eleotridae	<i>Eleotris pseudacanthopomus</i>	3	0	no	0	no	1	1	0	2.1	2.1	1	0	2.1	0	UK	1	1	14	3	B	145
Eleotridae	<i>Eleotris senegalensis</i>	6	0	no	0	no	2	2	0	0	2	1	0	2.1	0	UK	1	1	17	1	HR	146
Eleotridae	<i>Eleotris soaresi</i>	7	0	no	0	no	1	2	0	0	1	1	0	2.1	0	UK	1	1	16	1	HR	147
Eleotridae	<i>Eleotris tecta</i>	4	0	no	0	no	2	2	0	0	1	1	0	2.1	0	UK	1	1	14	1	B	148
Eleotridae	<i>Eleotris tubularis</i>	2	0	no	0	no	1	1	0	0	1	1	0	2.1	0	UK	1	1	10	1	LR	149
Eleotridae	<i>Eleotris vittata</i>	5	0	no	0	no	2	1	0	0	2	1	0	2.1	0	UK	1	1	15	1	HR	150
Eleotridae	<i>Eleotris vomerodentata</i>	3	0	no	0	no	1	2	0	0	1	1	0	2.1	0	UK	1	1	12	1	LR	151
Fundulidae	<i>Fundulus albolineatus</i>	2	0	no	0	extinct	1	2	0	0	1	0	0	2.1	0	no	1	1	10	1	LR	152
Fundulidae	<i>Fundulus auroguttatus</i>	4	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	2	13	1	B	153

Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref
Fundulidae	<i>Fundulus bermuda</i>	3	0	no	0	no	2	1	0	0	1	0	0	2.1	0	UK	1	1	11	1	LR	154
Fundulidae	<i>Fundulus bifax</i>	5	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	1	13	1	B	155
Fundulidae	<i>Fundulus blairae</i>	6	0	no	0	no	1	2	0	0	1	0	0	1	0	UK	1	1	13	0	B	156
Fundulidae	<i>Fundulus catenatus</i>	5	0	no	0	no	1	2	0	0	1	0	0	1	0	yes	1	2	13	0	B	157
Fundulidae	<i>Fundulus cingulatus</i>	5	0	no	0	no	1	2	0	0	1	0	0	2.1	0	yes	1	2	13	1	B	158
Fundulidae	<i>Fundulus confluentus</i>	7	0	no	0	no	2	2	0	0	1	0	0	2.1	0	UK	1	2	17	1	HR	159
Fundulidae	<i>Fundulus diaphanus</i>	4	0	no	0	no	2	2	0	0	1	0	0	2.1	0	UK	2	2	15	1	HR	160
Fundulidae	<i>Fundulus diaphanus menona</i>	3	0	no	0	no	1	2	0	0	1	0	0	2.1	0	yes	1	2	12	1	LR	161
Fundulidae	<i>Fundulus dispar</i>	6	0	no	0	no	1	2	0	0	1	0	0	2.1	0	yes	1	2	15	1	HR	162
Fundulidae	<i>Fundulus escambiae</i>	3	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	2	12	1	LR	163
Fundulidae	<i>Fundulus eurizonus</i>	2	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	2	11	1	LR	164
Fundulidae	<i>Fundulus grandis</i>	7	0	no	1	no	2	2	0	0	1	0	0	1	0	yes	1	2	17	0	HR	165
Fundulidae	<i>Fundulus grandissimus</i>	4.05	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	1	12	1	LR	166
Fundulidae	<i>Fundulus heteroclitus</i>	6	0	no	2	no	2	2	0	2.1	2	0	0	2.1	0	yes	1	2	21	2	HR	167
Fundulidae	<i>Fundulus heteroclitus macrolepidotus</i>	4	0	no	0	no	2	2	0	2.1	1	0	0	2.1	0	yes	1	2	16	2	HR	168
Fundulidae	<i>Fundulus jenkinsi</i>	4	0	no	0	no	2	2	0	0	1	0	0	2.1	0	UK	1	1	13	1	B	169
Fundulidae	<i>Fundulus julisia</i>	3	0	no	0	no	1	2	0	0	1	0	0	2.1	0	yes	1	1	11	1	LR	170
Fundulidae	<i>Fundulus kansae</i>	6	0	no	0	no	1	2	0	0	1	0	0	1	0	UK	1	1	13	0	B	171
Fundulidae	<i>Fundulus lima</i>	7	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	1	15	1	HR	172
Fundulidae	<i>Fundulus lineolatus</i>	4	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	1	12	1	LR	173
Fundulidae	<i>Fundulus luciae</i>	4	0	no	0	no	2	2	0	0	1	0	0	2.1	0	UK	1	2	14	1	HR	174
Fundulidae	<i>Fundulus majalis</i>	7	0	no	0	no	2	2	0	0	1	0	0	2.1	0	yes	1	2	17	1	HR	175
Fundulidae	<i>Fundulus notatus</i>	4	0	no	0	no	1	2	0	0	1	0	0	2.1	0	yes	1	2	13	1	B	176
Fundulidae	<i>Fundulus notti</i>	5	0	no	0	no	1	2	0	0	1	0	0	2.1	0	yes	1	2	14	1	HR	177
Fundulidae	<i>Fundulus olivaceus</i>	7	0	no	0	no	2	2	0	0	1	0	0	2.1	0	UK	1	2	17	1	HR	178
Fundulidae	<i>Fundulus parvipinnis</i>	7.05	0	no	0	no	2	2	0	0	1	0	0	2.1	0	UK	1	2	17	1	HR	179
Fundulidae	<i>Fundulus persimilis</i>	4.05	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	1	12	1	LR	180
Fundulidae	<i>Fundulus pulvereus</i>	7	0	no	0	no	2	2	0	0	1	0	0	2.1	0	UK	1	1	16	1	HR	181

Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref	
Fundulidae	<i>Fundulus rathbuni</i>	3	0	no	0	no	1	2	0	0	0	1	0	0	2.1	0	UK	1	1	11	1	LR	182
Fundulidae	<i>Fundulus relictus</i>	3.05	0	no	0	no	1	2	0	0	0	1	0	0	2.1	0	UK	1	2	12	1	LR	183
Fundulidae	<i>Fundulus rubrifrons</i>	3.05	0	no	0	no	1	2	0	0	0	1	0	0	2.1	0	UK	1	2	12	1	LR	184
Fundulidae	<i>Fundulus saguanus</i>	5	0	no	0	no	1	2	0	0	0	1	0	0	2.1	0	UK	1	2	14	1	HR	185
Fundulidae	<i>Fundulus sociadicus</i>	5	0	no	0	no	1	2	0	0	0	1	0	0	2.1	0	UK	1	1	13	1	B	186
Fundulidae	<i>Fundulus seminolis</i>	5	0	no	1	no	1	2	0	0	0	1	0	0	2.1	0	UK	2	2	15	1	HR	187
Fundulidae	<i>Fundulus similis</i>	7	0	no	0	no	1	2	0	0	0	1	0	0	2.1	0	UK	1	2	16	1	HR	188
Fundulidae	<i>Fundulus stellifer</i>	5	0	no	0	no	1	2	0	0	0	1	0	0	2.1	0	UK	1	1	13	1	B	189
Fundulidae	<i>Fundulus waccamensis</i>	3	0	no	0	no	1	2	0	0	0	1	0	0	2.1	0	UK	1	2	12	1	LR	190
Fundulidae	<i>Fundulus zebrinus</i>	7	0	no	1	no	2	2	0	0	0	1	0	0	2.1	0	UK	1	2	18	1	HR	191
Fundulidae	<i>Lucania interioris</i>	7	0	no	0	no	1	2	0	0	0	1	0	0	2.1	0	UK	1	2	16	1	HR	192
Lebiasinidae	<i>Lebiasina chucuriensis</i>	3	0	no	0	no	2	2.1	0	2.1	1	0	0	0	2.1	0	UK	1	1	14	3	HR	193
Lebiasinidae	<i>Lebiasina floridablancaensis</i>	3	0	no	0	no	2	2.1	0	2.1	1	0	0	0	2.1	0	UK	1	1	14	3	HR	194
Lebiasinidae	<i>Lebiasina intermedia</i>	4.1	0	no	0	no	2	2.1	0	2.1	1	0	0	0	2.1	0	UK	1	1	15	4	HR	195
Lebiasinidae	<i>Lebiasina multimaculata</i>	2	0	no	0	no	2	2.1	0	2.1	1	0	0	0	2.1	0	UK	1	2	14	3	HR	196
Lebiasinidae	<i>Lebiasina narinensis</i>	3	0	no	0	no	2	2.1	0	2.1	1	0	0	0	2.1	0	UK	1	1	14	3	HR	197
Lebiasinidae	<i>Lebiasina provenzanoi</i>	2.05	0	no	0	no	2	2.1	0	2.1	1	0	0	0	2.1	0	UK	1	1	13	3	B	198
Lebiasinidae	<i>Lebiasina uruyensis</i>	3.05	0	no	0	no	2	2.1	0	2.1	1	0	0	0	2.1	0	UK	1	1	14	3	HR	199
Lebiasinidae	<i>Lebiasina yunantensis</i>	3.05	0	no	0	no	2	2.1	0	2.1	1	0	0	0	2.1	0	UK	1	1	14	3	HR	200
Mastacembelidae	<i>Mastacembelus alboguttatus</i>	5	0	no	1	no	1	2	0	1	1	0	0	0	2.1	0	UK	1	1	15	1	HR	201
Mastacembelidae	<i>Mastacembelus albomaculatus</i>	4.05	0	no	0	no	1	2	0	1	1	0	0	0	2.1	0	UK	1	1	13	1	B	202
Mastacembelidae	<i>Mastacembelus ansorgii</i>	5.05	0	no	0	no	1	2	0	1	1	0	0	0	2.1	0	UK	2	1	15	1	HR	203
Mastacembelidae	<i>Mastacembelus aviceps</i>	4	0	no	0	no	1	2	0	0	1	0	0	0	2.1	0	UK	2	1	13	1	B	204
Mastacembelidae	<i>Mastacembelus batesii</i>	2	0	no	0	no	1	2	0	1	1	0	0	0	2.1	0	UK	2	1	12	1	LR	205
Mastacembelidae	<i>Mastacembelus brachyrhinus</i>	4	0	no	0	no	1	2	0	0	1	0	0	0	2.1	0	UK	2	1	13	1	B	206



Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref
Mastacembelidae	<i>Mastacembelus breviceauda</i>	2	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	2	1	12	1	LR	207
Mastacembelidae	<i>Mastacembelus brichardi</i>	4	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	2	2	14	1	HR	208
Mastacembelidae	<i>Mastacembelus catchpolei</i>	2.05	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	2	1	14	1	HR	209
Mastacembelidae	<i>Mastacembelus congificus</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	14	1	HR	210
Mastacembelidae	<i>Mastacembelus crassus</i>	4	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	2	1	13	1	B	211
Mastacembelidae	<i>Mastacembelus cryptacanthus</i>	3	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	2	1	13	1	B	212
Mastacembelidae	<i>Mastacembelus cunningtoni</i>	4	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	2	1	15	1	HR	213
Mastacembelidae	<i>Mastacembelus dayi</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	14	1	HR	214
Mastacembelidae	<i>Mastacembelus decorsei</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	2	1	15	1	HR	215
Mastacembelidae	<i>Mastacembelus ellipsifer</i>	4	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	2	1	14	1	HR	216
Mastacembelidae	<i>Mastacembelus favus</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	14	1	HR	217
Mastacembelidae	<i>Mastacembelus flavidus</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	2	1	15	1	HR	218
Mastacembelidae	<i>Mastacembelus flavomarginatus</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	14	1	HR	219
Mastacembelidae	<i>Mastacembelus frenatus</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	14	1	HR	220
Mastacembelidae	<i>Mastacembelus goro</i>	2	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	11	1	LR	221
Mastacembelidae	<i>Mastacembelus greshoffi</i>	4	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	1	12	1	LR	222
Mastacembelidae	<i>Mastacembelus kakrimensis</i>	3	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	12	1	LR	223
Mastacembelidae	<i>Mastacembelus latens</i>	4.05	0	no	0	no	1	2	0	0	1	0	0	2.1	0	UK	1	1	12	1	LR	224
Mastacembelidae	<i>Mastacembelus liberiensis</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	14	1	HR	225
Mastacembelidae	<i>Mastacembelus loennbergii</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	14	1	HR	226
Mastacembelidae	<i>Mastacembelus marchi</i>	4	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	1	1	13	1	B	227
Mastacembelidae	<i>Mastacembelus marmoratus</i>	3.05	0	no	0	no	1	2	0	1	1	0	0	2.1	0	UK	2	1	13	1	B	228

Family	Species	CM	EA	EE	EI	CT	Ha	Re	Nx	IH	IS	GN	GI	DS	TH	RT	MU	CS	TT	UK	RC	Ref
Mastacembelidae	<i>Mastacembelus mastacembelus</i>	4	0	no	0	no	1	2	0	1	1	0	0	2	0	0	1	1	13	0	B	229
Mastacembelidae	<i>Mastacembelus micropectus</i>	4	0	no	0	no	1	2	0	1	1	0	0	2.1	0	0	2	1	14	1	HR	230
Mastacembelidae	<i>Mastacembelus moeruensisi</i>	4.05	0	no	0	no	1	2	0	1	1	0	0	2.1	0	0	1	1	13	1	B	231
Mastacembelidae	<i>Mastacembelus moorii</i>	4	0	no	0	no	1	2	0	1	1	0	0	2.1	0	0	2	1	14	1	HR	232
Mastacembelidae	<i>Mastacembelus niger</i>	4	0	no	0	no	1	2	0	1	1	0	0	2.1	0	0	1	1	13	1	B	233
Mastacembelidae	<i>Mastacembelus nigromarginatus</i>	5	0	no	0	no	1	2	0	1	1	0	0	2.1	0	0	1	1	14	1	HR	234

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118. <http://www.fishbase.org/summary/speciessummary.php?id=12589>  
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(once again this species is native to Northern Australia??)
119. <http://www.fishbase.org/Summary/SpeciesSummary.php?ID=15487>  
(This species is totally marine and native to Australian waters (tropical)?? Therefore climate match and reasons for being on the greylis is questionable
120. <http://www.fishbase.org/summary/SpeciesSummary.php?id=5507>  
(This species is native to Australian waters (tropical)?? Therefore climate match and reasons for being on the greylis is questionable
121. <http://www.fishbase.org/Summary/SpeciesSummary.php?id=12584>  
(This species is totally marine and native to Australian waters (tropical)?? Therefore climate match and reasons for being on the greylis is questionable
122. <http://fishbase.mnhn.fr/summary/Speciessummary.php?id=11794>  
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149. <http://fishbase.sinica.edu.tw/Summary/SpeciesSummary.php?id=61530>

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151. <http://fishbase.org.cn/summary/speciessummary.php?id=10015>
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187. [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6T4D-4W3PT48-1&\\_user=10&\\_coverDate=08%2F01%2F2009&\\_rdoc=1&\\_fmt=high&\\_orig=search&\\_sort=d&\\_docanchor=&view=c&\\_searchStrId=1316873743&\\_rerunOrigin=google&\\_acct=C000050221&\\_version=1&\\_urlVersion=0&\\_userid=10&md5=cb404294819557a5cd6b997e66ad23fa](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6T4D-4W3PT48-1&_user=10&_coverDate=08%2F01%2F2009&_rdoc=1&_fmt=high&_orig=search&_sort=d&_docanchor=&view=c&_searchStrId=1316873743&_rerunOrigin=google&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=cb404294819557a5cd6b997e66ad23fa)  
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208. <http://www.fishbase.gr/summary/SpeciesSummary.php?id=10078>
209. <http://www.fishbase.gr/summary/speciessummary.php?id=10079>
210. <http://www.fishbase.gr/summary/speciessummary.php?id=10056>
211. <http://www.fishbase.gr/summary/speciessummary.php?id=10080>
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233. <http://fishbase.org.cn/Summary/SpeciesSummary.php?id=10063>
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