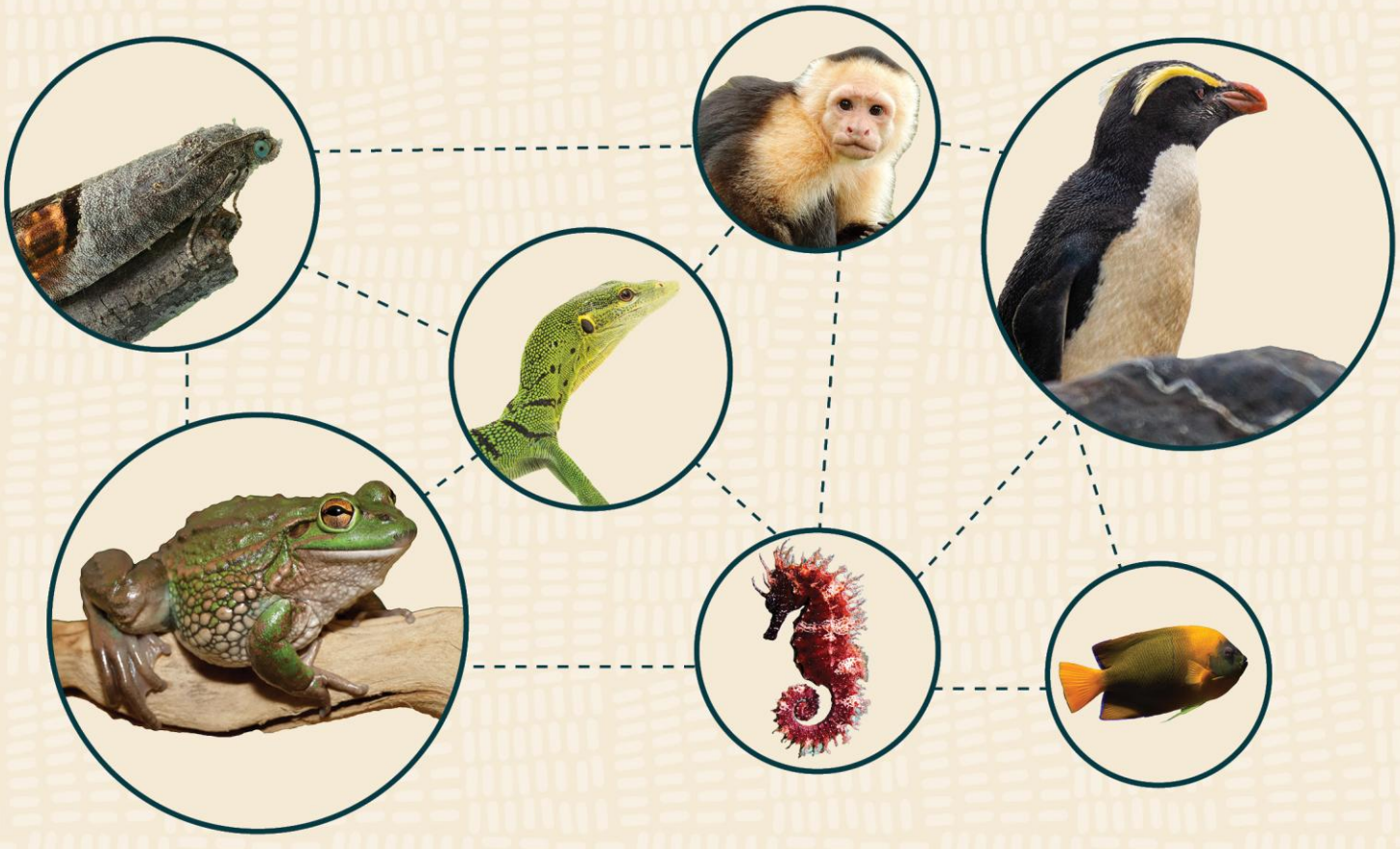
Australian Government
Department of Climate Change, Energy, the Environment and Water

Assessment of the Potential Impacts of *Synodontis eupterus* (featherfin catfish) on the Environment

Consideration of an application under the *Environment Protection and Biodiversity Conservation Act 1999* to amend the List of Specimens taken to be Suitable for Live Import

September 2024



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Acknowledgement of Country

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

Executive summary

An application was submitted to the Department of Climate Change, Energy, the Environment and Water to amend the List of Specimens taken to be Suitable for Live Import (Live Import List) to include *Synodontis eupterus* (featherfin catfish). The applicant proposes to import this species for the ornamental freshwater fish trade in Australia. After a public consultation period the applicant was provided with the opportunity to respond to the feedback received by amending their draft assessment report addressing the Terms of Reference (ToR).

A risk assessment of *Synodontis eupterus* (*S. eupterus*) was undertaken to evaluate the likelihood of its establishment and spread in Australia, and the potential consequences of these impact(s) on the Australian environment. Several factors were considered during the assessment, including, but not limited to, available scientific evidence, biological and ecological traits of the species, environmental conditions for establishment (current and potential distribution of the species), conservation status, and potential impacts in the event of the establishment or spread of the species.

S. eupterus is one of the most popular and common mochokid, a family of African catfishes, fish in the aquarium trade due to their attractive reticulated patterning and their role as cleaner fish. Based on all available information and the results from the Bomford model, *S. eupterus* poses a moderate risk to the Australian environment, and possesses several characteristics known to increase the risk of establishment and spread. *S. eupterus* is a large (up to 30 cm) fish known to be capable of feeding on small fish as well as invertebrates and can display aggressive behaviour to other fish; thus, having a high behavioural potential for impact on native species. They spawn multiple times throughout the year with up to 20,000 eggs per spawn and have wide environmental tolerances that indicate a broad potential geographic range. This species is hardy, able to tolerate a wide range of environmental conditions, and evidence indicates it can survive much cooler waters than once thought, potentially indicating it could establish in more temperate areas, further south than suggested by the climate match.

If this species were to establish in Australia, it may potentially compete with native species (and fin-nip), increase disease risk for aquatic species and health risk to handlers or the general public and cause injury from its sub-orbital spines.

After critically examining and reviewing all available evidence and information, and cognisant of the difficulties in differentiating between *Synodontis eupterus* and *Synodontis nigriventris* at the border, DCCEEW does not recommend including *Synodontis eupterus* on the Live Import List for commercial trade, but **recommends** listing *Synodontis eupterus* on Part 2 of the Live Import List with the conditions:

- For identification purposes only. High security facilities only.

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1 Introduction

1.1 Purpose of the proposed import

An application was submitted by the Aquarium Industry Association of Australia (AIAA) to amend the Live Import List to include *Synodontis eupterus* (featherfin catfish). The applicant proposes to import this species for the ornamental freshwater fish trade in Australia.

1.2 Background on the Act

Under section 303EC of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the responsible minister may amend the List of Specimens taken to be suitable for live import (Live Import List) by, relevantly, including a specimen on the list. Section 303EB of the EPBC Act dictates two parts to the Live Import List:

- Part 1 comprises specimens that can be imported without a permit under the EPBC Act. Part 1 must not include any organism listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and
- Part 2 comprises specimens that require a permit under the EPBC Act to be imported. For each specimen included in Part 2 of the list there is to be a notation regarding whether the inclusion is subject to restrictions or conditions. Restrictions or conditions may relate to a quantitative limit, the circumstances of import, the source of the specimen or the circumstances in which it was taken. Additional conditions may also be applied when the permit for import is issued.

Before amending the Live Import List, the minister must consult with appropriate State, Territory and Commonwealth ministers and other persons, and consider a report assessing the potential environmental impacts of the proposed amendment (s 303EC of the EPBC Act). When submitting an application to DCCEEW to amend the Live Import List, all applicants are required to provide an accompanying draft report that addresses specific terms of reference published on DCCEEW's website.

DCCEEW undertakes a risk assessment of the potential environmental impacts of the proposed amendment using the information in the applicant's draft report and any other sources of relevant information. DCCEEW also considers comments and information received through the public consultation process (including states and territories). The application and accompanying draft report addressing the terms of reference for the proposed import of *S. eupterus* (featherfin catfish) was released for public comment between 27 October and 25 November 2021. This risk assessment report on the potential environmental impacts of listing the species was prepared in accordance with sections 303EE(3) and 303EF of the EPBC Act. Under s303EC(5)(a) the minister must consider this report before amending the list. Under section 391(1) of the EPBC Act, the minister must take account of the precautionary principle in making decisions to include items on the Live Import List.

2 Biology and ecology

2.1 Taxonomy

S. eupterus is one of the most popular species of catfish from the genus *Synodontis*, colloquially known as 'Synos', for aquarium hobbyists. The genus *Synodontis* is the largest of the family Mochokidae, with 133 recorded species. Common names for *S. eupterus* include the featherfin catfish and featherfin squeaker, upside down catfish.

Kingdom:	Animalia
Phylum:	Chordata
Superclass:	Osteichthyes
Class:	Actinopterygii
Infraclass:	Teleostei
Order:	Siluriformes
Family:	Mochokidae
Subfamily:	Danioninae
Genus:	*Synodontis*
Species:	*Synodontis eupterus* (Boulenger 1901)
Synonym:	*Synodontis macrepipterus* (Pellegrin 1922)

2.2 Description

S. eupterus is a species of catfish, also known as squeakers due to their ability to make stridulatory sounds through their pectoral fin spines when handled or disturbed. The species has a prominent dorsal fin, with each hard ray extending into long filaments which can vary in different individuals, hence the common name, feather fin.

S. eupterus can grow to 30 cm total length (TL). Mature fish from the River Rima in Nigeria were recorded to grow up to 17.5cm TL (female) and 17.3 cm TL (male) (Shinkafi and Daneji 2011). The species is usually offered for sale as a small juvenile (1-3 cm TL, Seriously Fish 2023).

Paugy and Roberts (2003) record *S. eupterus* with gill slits that do not extend ventrally beyond pectoral-fin insertions; humeral process never bearing backwards-pointing spines; maxillary barbels unbranched, longer than head with a well visible, broad membrane; post-orbital length at least 60% of snout length (SL); caudal-fin lobes not black-edged; at least 3 dorsal-fin rays prolonged into filaments; dorsal-fin spine smooth anteriorly, except for a few apical denticles; spots present on body and fins; eye large, its diameter 23-34.5% of head length and 48-75% of SL; humeral process not keeled; and outer mandibular barbels with long and rather thin ramifications.

S. eupterus has a brown body with small round black spots and fins; the tail spots are confluent and form transverse lines (**Error! Reference source not found.**). Juveniles have spots arranged in an irregular pattern of tiger-like stripes (Shinkafi and Daneji 2011); maxillary barbels (including membranes) are black; fin filaments are darker than the fins (Froese and Pauly 2022).

Figure 1 Adult *Synodontis eupterus*

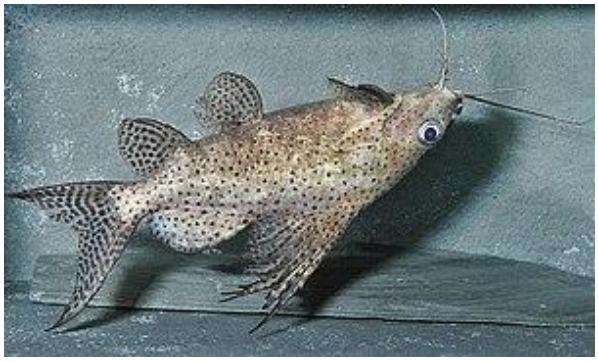


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S. eupterus can vary in colour and patterning and are frequently confused with similar *Synodontis* species; for this reason, they are often sold as a different species (Tropical FishKeeping 2015). Juveniles are often misidentified with *Synodontis nigriventris* (Tropical FishKeeping 2015).

S. eupterus produces electric and acoustic signals using its swim bladder-related elastic spring system (Kever et al. 2020); electric activity is recorded when the species is being aggressive for defensive interactions (Orlov et al. 2017). They also produce sound when the pectoral spines are abducted and adducted when handled or disturbed (Friel et al. 2006). *S. eupterus* naturally swims upside down (Figure 2) to consume plankton and fine detritus from the bottom surfaces of rocks and plants.

Figure 2 Upside down swimming behaviour in *Synodontis eupterus*



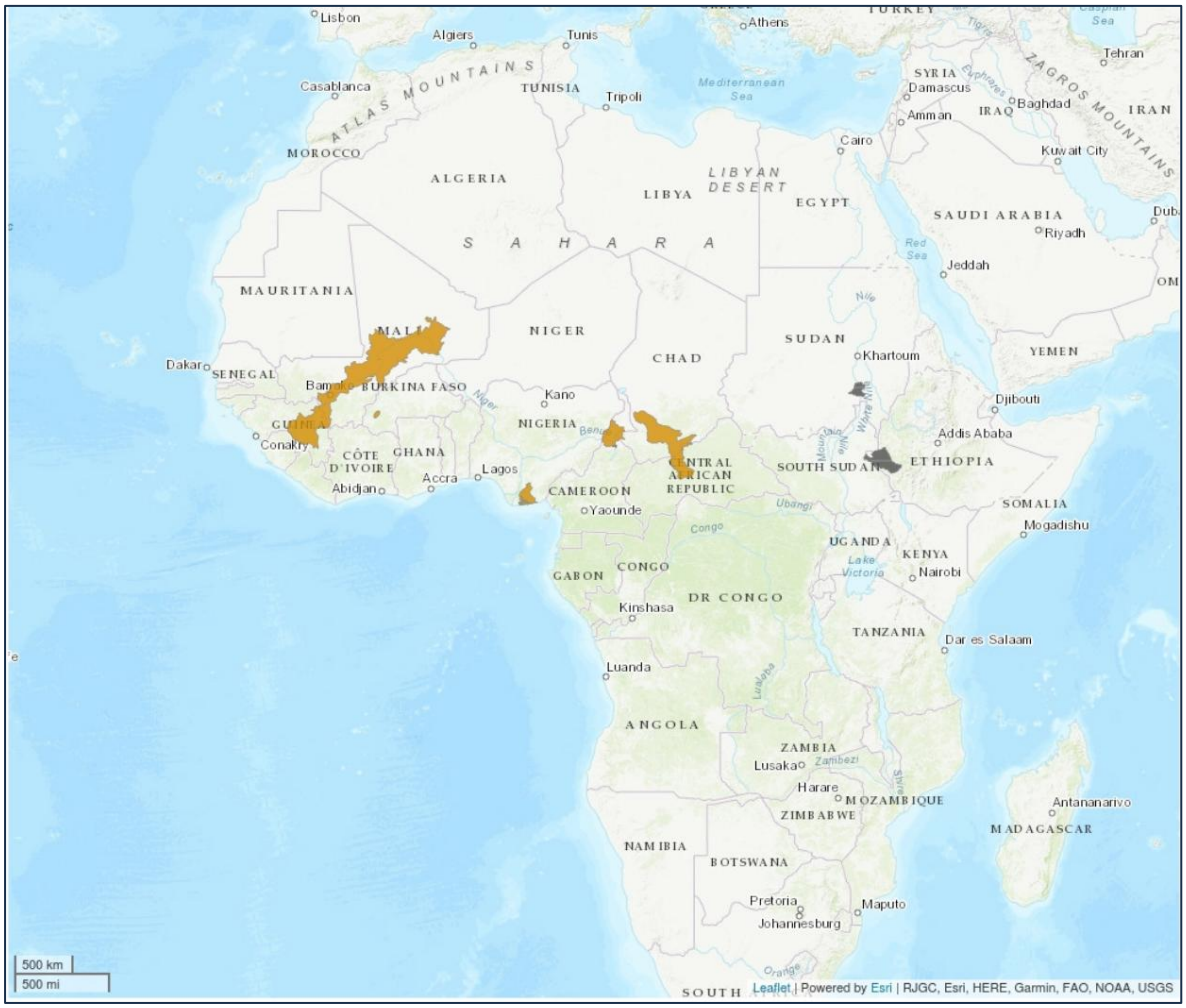
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2.3 Geographic distribution

S. eupterus is found in varying biotopes across the basins of the White Nile, Volta and Niger Rivers and the Chad Basin, from Guinea, Mali, Nigeria, Cameroon, Chad and Central African Republic (Awaïss et al. 2020). Its presence in Sudan and Ethiopia needs confirmation (Figure 3). The Chad basin covers approximately 8% of Africa and 2,500,000 km^2 (Mahmood et al. 2019), the White Nile

basin 1,800,000 km^2, the Volta basin 400,000 km^2 (Global Water Partnership 2011), and Niger Basin over 2,000,000 km^2 (FAO Fisheries and Aquaculture 1997).

Figure 3 Geographic distribution of *Synodontis eupterus*



Source: Google Earth, Awaïss et al. (2020)

2.4 Habitat

S. eupterus live in small groups near the bottom of moderately fast flowing muddy or rocky bottomed rivers in blackwater streams, rivers and swamps (Awaïss et al. 2020).

2.5 Diet

S. eupterus is a nocturnal benthic omnivore that feeds mainly on insect larvae, algae, plankton and detritus (Shinkafi et al. 2010). Most *Synodontis* species are considered to be able to subsist on a wide variety of foods, which enables them to cope with seasonal changes in food abundance and habitat change (Koblmüller et al. 2006). Their feeding regime broadens their food niche and gives them a better ability to colonise different habitats as compared to more specialized fish species such as many lake-adapted cichlids.

2.6 Reproductive biology

S. eupterus is oviparous and forms distinct pairs when breeding. They have an extended spawning period and breed in areas of seasonal flooding that are rich in micro-organisms (Shinkafi and Mamman 2012). They are highly fecund egg scatterers and exhibit no parental care.

S. eupterus spawns on multiple occasions year-round, with a peak during the flood season between July and September in their native range with 103-20,319 eggs per spawn (Shinkafi and Daneji 2011).

S. eupterus has been reported to live for approximately 10 years but has been recorded to live up to 15 years (Seriously Fish 2022).

S. eupterus is capable of doubling its population in 1.4-4.4 years (Froese and Pauly 2022).

S. eupterus are commercially bred with the aid of hormones, but to date, they have not been successfully bred in an aquarium environment (Seriously Fish 2022).

2.7 Environmental tolerances

Found in blackwater streams, rivers, and swamps of central Africa, these fish are hardy and can tolerate a wide range of water conditions (Froese and Pauly 2022, Table 1). Aquarium industry websites cite ideal water conditions: 22-27°C, water hardness dH range of 8-20, pH 6.0-7.5 (Seriously Fish 2022).

An adult specimen was found in Croatia in 13.7°C water, with a salinity of 0.8 PSU (Dulčić et al. 2018) indicating the fish may survive cooler conditions, suggesting that environmental ranges provided by Froese and Pauly (2022) are not tolerance limits, but rather preferred ranges.

Table 1 Preferred and tolerable ranges of environmental parameters

Water quality factor	Preferred range [a]	Tolerable ranges
Temperature	22 –27°C	13.7°C - unknown
pH	6.0 – 7.5	Unknown
dH (hardness)	8 – 20	Wide range
Alkalinity	Unknown	Wide range
Carbon dioxide	Unknown	Unknown
Dissolved oxygen	Unknown	Unknown

a Seriously Fish (2022)

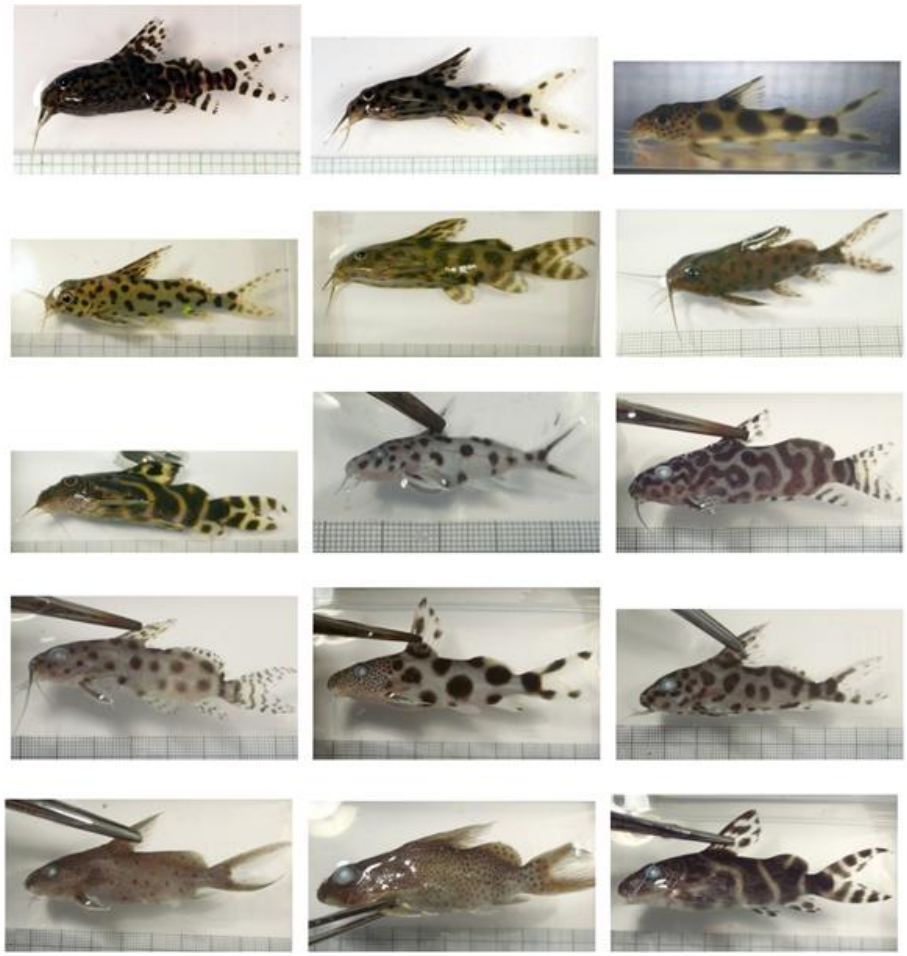
2.8 Hybridisation

When two individuals from separate species reproduce the offspring are known as hybrids. Fish hybrids between closely related species can generally live to adulthood, and some are fertile, producing functioning gametes and a viable second generation (Endoh et al. 2020). Hybrid produced between distantly related species from different genera, families and orders often do not survive, and even if they do, hybrid offspring may lack reproductive ability; nevertheless, successful hybridisation has been known to occur (Wang et al. 2022). Interspecific hybrids have long been used in the aquaculture industry to transfer desirable traits such as increased growth rate or environmental tolerances (Bartley et al. 2000). These hybrids may be selected for aesthetic reasons,

growth rate, or even to be fraudulently passed off as species with a high market value (Ng 2010). There is also the possibility of accidental, indiscriminate breeding of hybrids at farms.

The applicant did not supply information regarding the potential for hybridisation in this species. The literature suggests that, as hormonal breeding techniques are becoming more accessible to breeders, the aquarium trade is now producing increasing numbers of novel hybrid *Synodontis* (Ng 2010, Collins 2012). The increasing prevalence of hybrid *Synodontis* species results in increased challenges in the identification of fish for import (Figure 4) and potential illegal entry and trade of non-permitted specimens in Australia.

Figure 4 *Synodontis* hybrids in the aquarium trade



Source: Collins (2012)

3 Current status in Australia

3.1 History in Australia

S. eupterus is not reported to have established self-sustaining populations in the wild in Australia (Corfield et al. 2008), though the applicant states it has been bred and traded domestically in Australia for more than 40 years, in volumes in the order of 1.5 million fish per year.

Transported specimens of *S. eupterus* bear a resemblance to other species, including *Rasbora trilineata* which is listed in Part 1 of the Live Import List and its import is therefore unregulated. These 2 species were flagged by the then Department of the Agriculture (DoA), as particularly challenging to differentiate by officers who inspect fish at the border. Whilst healthy adult specimens of a certain size can be distinguished, transportation induces physiological stress requiring prolonged recovery, and stress-induced changes in skin or eye colour are reported, making accurate identification even more challenging (Hungtingford et al. 2006). DoA has identified that having specimens available post transport for taxonomy, photographs and Artificial Intelligence (AI) equipment training tools may reduce its misidentification at the border.

It should be noted that as the specimen is not listed in the Live Import List it is an offence under section 303GN of the EPBC Act for any person to possess an illegally imported specimen and the progeny of such specimens.

The introduction of new aquatic species is inherently difficult to monitor as, unlike land-based spread of an invasive species, alien fish often have the advantage of proliferating significantly before being detected (Ebner et al. 2020). The detection of invasive species is further hindered in remote, infrequently visited areas like northern Australia, where regular flooding events in the wet season assist the spread of alien species.

3.2 Related Live Import List listings

There are 3 *Synodontis* species listed on Part 1 of the Live Import List (Table 2).

Table 2 Non-endemic *Synodontis* species on the Live Import List

Taxon	Common name
Synodontis decorus of minimum length 10 cm SL	clown squeaker catfish
Synodontis multipunctatus	cuckoo catfish, African catfish
Synodontis nigriventris	upside down catfish, blotched upside down catfish

3.3 Related threat category listings

Within its native range, *S. eupterus* is not considered a pest. This species is not considered invasive or a pest on the National Priority List of Exotic Environmental Pests, Weeds and Diseases.

3.4 Conservation status

3.4.1 Convention on International Trade in Endangered Species (CITES)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species.

S. eupterus is not CITES-listed.

3.4.2 IUCN Red List of Threatened Species

Established in 1964, the International Union for Conservation of Nature (IUCN)'s Red List of Threatened Species is the world's most comprehensive information source on the global extinction risk status of animal, fungus and plant species.

S. eupterus was assessed by Awaïss et al. (2020) on 2 September 2019 as Least Concern with an unknown population trend. This was justified by its wide distribution, with no known major widespread threats.

3.4.3 Conservation of Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals is an environmental treaty of the United Nations. It provides a global platform for the conservation and sustainable use of migratory animals and their habitats.

S. eupterus is not listed on the Convention on the Conservation of Migratory Species of Wild Animals.

4 Risk assessment

4.1 The Bomford risk assessment model

Modelling is used to assesses the risk of *S. eupterus* establishing and spreading in Australia, and any likely impacts on the Australian environment.

The likelihood of *S. eupterus* establishing was assessed under the Bomford Risk Assessment Model (Bomford 2008 - Chapter 4. Freshwater Fish) in accordance with the 5 key risk factors:

- Climate match
- Overseas Range Score
- Establishment Overseas
- Introduction Success
- Taxa Risk

Using information compiled from research into the above factors for *S. eupterus*, the potential impacts of the establishment of feral populations can be estimated.

4.1.1 Climate match

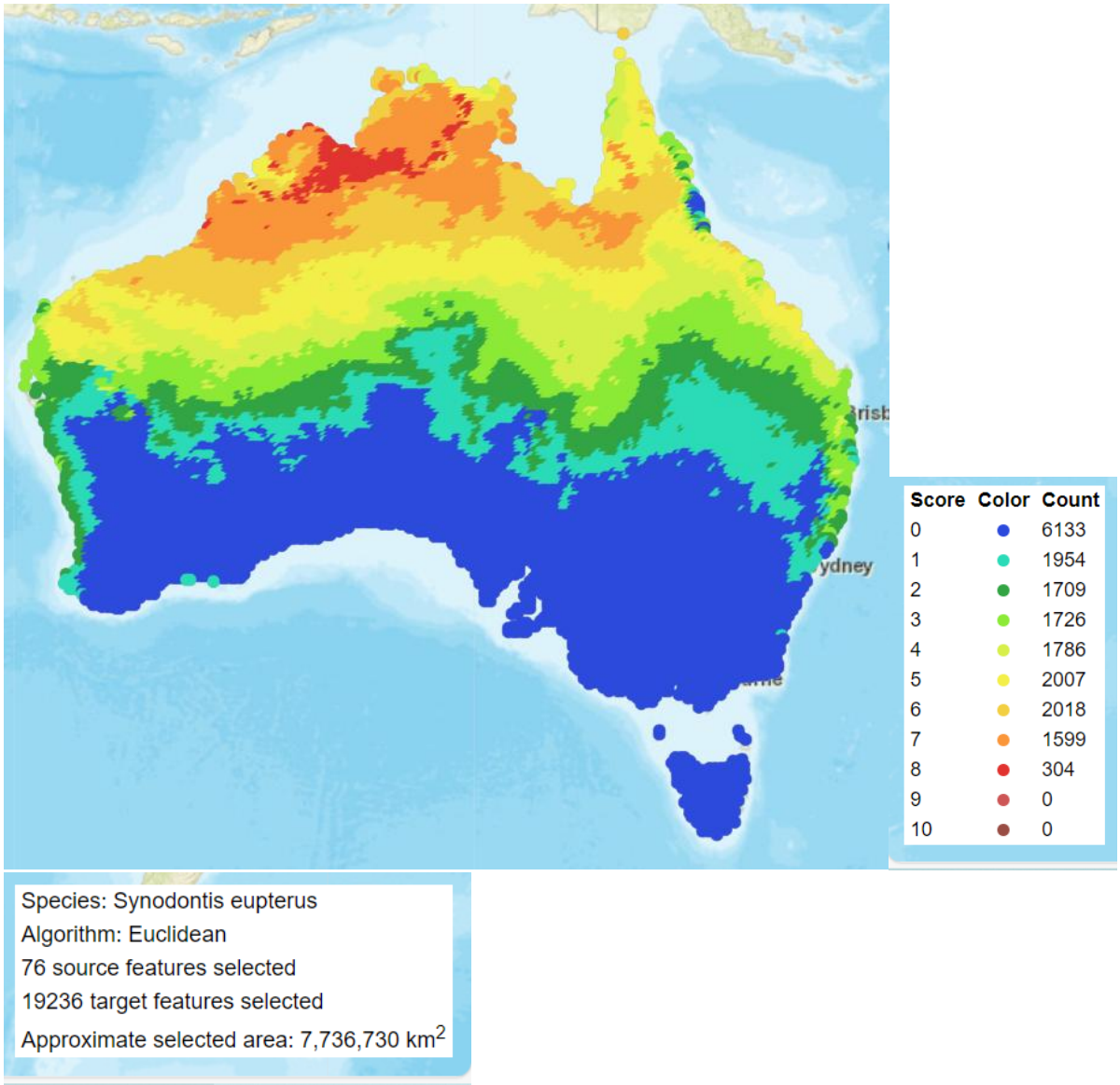
Climatch v2.0 software is used to generate a map of the area with a climate that closely matches that of *S. eupterus* original range. Climatch calculated the level of climate matching at Euclidian Sum Level 5 to be 5928, equating to a climate match **score of 5, moderate**. The Climatch map for this species generated from the distribution cited in Awaïss et al (2020) indicates a moderate climate match with the northern part of Australia being a more suitable match (

Figure 5).

However, it is of note that Climatch is based on terrestrial climate data and the target species is a freshwater fish, therefore the generated map is not a completely accurate indicator of possible inhabitation. Arthington et al. (1999) considered that water temperature is the most limiting environmental factor in Australia's freshwater that affects exotic finfish establishment. The discovery of a specimen in Croatia indicates it may survive cooler temperatures of 13.7°C (Dulčić et al. 2018). As *S. eupterus* may be able to survive in colder waters, it could establish in more temperate areas, further south than suggested by the Climatch map.

There is a wide diversity of habitat types for freshwater fish in Australia, including rivers, lakes, streams, estuaries, billabongs, wetlands, brackish lakes, floodplains and thermal springs. *S. eupterus* inhabits flowing rivers on a muddy substrate and breeds in areas with seasonal flooding, so would find suitable environments throughout northern Australia.

Figure 5 Australian climate-matching map for *Synodontis eupterus*



Source: Climatch (ABARES 2020)

4.1.2 Overseas range

The distribution map was overlaid onto Google Earth to enable a count of the number of grid squares (1° latitude x 1° longitude) in which an occurrence of the species is recorded. *S. eupterus* is found across an area that is most effectively shown in 5°x5° grid squares (Figure 6). The estimated number of 1° latitude x 1° longitude is greater than 31 resulting in an overseas range **score of 4**.

Figure 6 Overseas range for *S. eupterus*, with distribution over 5°grid squares. Presence in Sudan and Ethiopia needs confirmation so is not included here.



Source: Google Earth

4.1.3 History of establishment elsewhere

A proven history of establishing exotic populations may indicate that a species has attributes that increase the risk of it successfully establishing in other areas (Bomford 2008). To date, there are no records in FishBase of previous successful establishments of *S. eupterus* outside its natural range (Froese and Pauly 2022). However, the literature reports a single specimen found in Croatia, with no establishment reported (Dulčić et al. 2018). Many species that are potential exotics have not been transported to and released in new environments, so they have not had the opportunity to demonstrate their establishment potential. Hence, caution should be applied when using a history of establishment elsewhere to predict a species' establishment potential in Australia if the species being assessed has little or no history of previous introductions (Bomford 2008).

A moderate risk rank **score of 1**, **never introduced**, is given where there are no recorded introductions, although a precautionary approach could warrant a higher risk score (Bomford 2008).

4.1.4 Introduction success

There have been no documented introductions of *S. eupterus* worldwide (Froese and Pauly 2022), resulting in an introduction success **score of 2**, **never introduced**.

4.1.5 Taxonomic group history of invasiveness

For fish species with a history of introductions to new areas, or with relatives in the same genus or family with such a history, previous establishment success rates should be considered a key predictor of future establishment success.

Genus *Synodontis*

There are 133 recognised species in the genus *Synodontis,* 15 of which are traded internationally (Froese and Pauly 2022). There have been very few reported introductions of this genus. Of the 15 traded species, 3 species (20% of traded species) of *Synodontis* have been introduced outside their natural range (Table 3**Error! Reference source not found.**). FishBase cites the success of 2 of these establishments as 'unknown' (Froese and Pauly 2022); the other was a single specimen in Croatia (Dulčić et al. 2018) and so establishment would not have been possible without additional individuals.

Table 3 *Synodontis* species introduced outside their native range

Scientific name	Common name	Total number of introductions	Number of successful introductions[1]
Synodontis angelicus	angel squeaker	1	Unknown
Synodontis nigriventris	blotched upside-down catfish	1	Unknown
Synodontis eupterus	featherfin catfish	1	Unknown
TOTAL		**3**	**0**

[1] Where introduction has occurred, but establishment is 'Unknown', it is not counted as a successful introduction.
Source: Froese and Pauly (2022), Dulčić et al. (2018), DPIRD WA (reported in response to public consultation).

Family Mochokidae

Given that there are less than 4 reports of introductions at the genus level, it is appropriate to assess the risk at the Family level (Bomford 2008). There are 9 genera and 223 species in the family Mochokidae, all freshwater species originating from Africa. None of these species have any introduction history in addition to that listed in Table 3. Where there are no recorded introductions, or where sample sizes are small, a moderate family risk score is given, although a precautionary approach could warrant a higher family risk score (Bomford 2008), resulting in a taxa risk **score of 2**, **moderate.**

4.2 Bomford model results

Results from the Bomford model (2008) for *S. eupterus* are presented in Table 4**Error! Reference source not found.**. An exotic finfish species' establishment risk core is calculated from the sum of the 5 scores as detailed in section 4.1. This risk assessment and its results should be evaluated with additional information and data when it becomes available.

Table 4 Bomford exotic freshwater fish model results for *Synodontis eupterus*

Scores	Value	Explanation
A. Climate Match Score (1–8)	5	Moderate
B. Overseas Range Score (0–4)	2	11–20 grid squares
C. Establishment Score (0–3)	1	Never introduced
D. Introduction Success Score (0–4)	2	Success rate of >0.25 ≤ 0.5 OR never introduced
E. Taxa Risk Score (0–5)	2	Moderate
Establishment Risk Score	**12**	**Moderate**

Table 1.2 of the Bomford Risk assessment models for the establishment of exotic vertebrates in Australia and New Zealand (Bomford 2008) (reproduced as Table 5) shows that 23-38% of species with a moderate Establishment Risk Rank, assessed in that report, succeeded in establishing an exotic population.

Table 5 Establishment success rates for risk assessment models from Bomford (2008)

Establishment Risk Rank	Species success rates*
Low	0–6%
Moderate	23–38%
Serious	56–77%
Extreme	82–100%

* Percentage of introduced species with this risk ranking that succeeded in establishing an exotic population for the eight models presented in this report.

4.3 Consequences for the environment

The magnitude and type of impacts by alien taxa vary greatly among ecosystems, and many of these impacts only become obvious or influential after the onset of invasion. Moreover, many impacts remain or are difficult to redress even if the alien taxa of concern are removed or controlled (Havel et al. 2015). In several ecosystems, spread, and/or impacts of non-native species occur several years or even decades following their introduction (Havel et al. 2015). Such time lags create difficulties for predicting their impacts.

Aquarium releases, either intentional or accidental, are commonplace events. Worldwide, these releases have led to the establishment of over 150 species, many on the 'worst invasive species' list (Padilla and Williams 2004). Biological invasions of freshwater ecosystems have many known and potential impacts on community structure and ecosystem function.

As Bomford (2008) does not model the environmental impacts of freshwater fish, DCCEEW uses a model adapted from Kumschick et al. (2012) and Nentwig et al. (2016) to assess impact (Appendix A). In each of the 11 impact categories, the magnitude of impact is quantified with levels ranging from Minimal to Critical (Minimal, Minor, Moderate, Major, Critical). The impact results are based on published evidence as detailed throughout this report (**Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.**). Note that for most of these impacts, the scientific knowledge is sparse and for freshwater fish is often inadequate to allow reliable predictions.

Table 6 Significance of impacts from the potential establishment of *Synodontis eupterus* populations in Australia

Type of impact	Assessment	Rating
ENVIRONMENTAL IMPACTS		
Herbivory e.g., grazing, bark stripping, antler rubbing, feeding on algae, uprooting of aquatic macrophytes, restrictions in establishment, pollination, or seed dispersal of native species.	*No impact known or detectable; or very low level of herbivory.* No damage documented.	Minimal

Type of impact	Assessment	Rating
Competition e.g., competition for nutrients, food, water, space or other resources. May outcompete native species due to higher reproduction, resistance, longevity. In the beginning, might be slow change in species abundance but might lead to the local/global disappearance of a native species. Includes behavioural changes in outcompeted species and ranges from	*Causes changes in community composition – reversible if alien species is removed.* *S. eupterus* would compete with native fish for food and resources. It may compete for benthic invertebrates with other small tropical benthic fish, typically in habitats with muddy or rocky substrates. These niche species could include bottom feeders such as eel tailed catfishes (*Neosilurus* spp., *Porochilus* spp.), as well as some juvenile fish such as golden perch and grunters. It may also compete for shelter. *S. eupterus* hides under rocks, logs or driftwood, so would compete with native species for similar refugia. Other impacts can result from the establishment of invasive fish, including changes to the behaviour and growth rates of native fish. For example, chub (*Lotichthys phlegethontis*) responded to aggression from the introduced western mosquitofish (*Gambusia affinis*) by remaining stationary for long periods, or increasing their time spent in refuge sites, both of which reduced their foraging opportunities, and resulted in a six-fold reduction in growth rate (Mills et al. 2004). The applicant states they are not territorial or aggressive, but fish keeping websites claim they are territorial (Seriously Fish 2022) and 'semi-aggressive' (Live Aquaria 2022). These websites also comment on this species' aggression towards other catfish. The small native *Plotosidae* (eeltail catfish) or juvenile *Ariidae* (fork tail catfish) of northern Australia are found within the possible invasion range and so may be vulnerable to aggressive and territorial behaviours by this species. Given its large size and territorial behaviours, the impacts on native species could be considerable if populations were to establish.	Major
Predation e.g., predation, parasitism, or intoxication, measurable as reductions in reproduction, survival, growth, or abundance. These impacts range from population decline to population loss, including minor changes in the food web.	*Predators directly or indirectly resulting in a decline of populations size of at least one native species but no changes in community composition.* Omnivores can have large impacts on aquatic communities. For example, even when introduced to sites where native fishes already live, introduced fish have had large direct and indirect effects on stream invertebrates (Simon and Townsend 2003); and even tiny fish (e.g., *Gambusia* spp.) have reduced densities of native invertebrates and outcompeted native fishes (Pyke 2008). As a generalist omnivore feeding primarily on benthic invertebrates, the species is expected to find food sources. These fish are known to become aggressive and eat smaller fish when they are not properly fed (Hooked on Catfish 2022, Seriously Fish 2022). If released, small native species in the receiving waters may be vulnerable to aggression and predation by this species. This species can cope with seasonal changes in food abundance and habitat change (Koblmüller et al. 2006).	Moderate
Habitat and ecological community e.g., changes in nutrient pools, increased water turbidity, modification of soil or water body properties, changes in hydrology, erosion, ecosystem functions, or other physical or structural changes. Includes modification of successional processes that may lead to reduced suitability (e.g., shelter)	*Moderate change in chemical, physical and/or structural characteristics, affecting fitness of native individuals without decline of their populations.* No information is available on natural predators, but it is possible they would provide prey for larger native predatory freshwater fish species although the large adult	Minor

Type of impact	Assessment	Rating
for native species, thus causing their disappearance.	size of this species is likely to preclude predation by the majority of Australian native fish species. Being benthic feeders, they are likely to disturb the substrate during feeding, resulting in potential declines in water quality.	
Hybridisation Hybridisation with native species, leading to a reduced or lost opportunity for reproduction, sterile or fertile hybrid offspring, gradual loss of the genetic identity of a species, and/or disappearance of a native species, i.e., extinction.	*No hybridisation between alien species and native species observed in the wild, may be possible in captivity.* Hybridisation not reported in the wild, however in controlled conditions, they are reported to hybridise with other *Synodontis* species readily and easily. There are no native *Synodontis* species in Australia.	Minimal
Disease transmission Host or alternate host for native or alien diseases (viruses, fungi, protozoans or other pathogens) or parasites, impacts by transmission of diseases or parasites to native species.	*Parasites or pathogens directly or indirectly resulting in local or population extinction of at least one native species leading to changes in community composition, but changes are reversible when introduced species is removed.* Live aquarium fish are the greatest risk group for introducing aquatic animal diseases in Australia (Corfield et al. 2008). Aquarium fish led to the spread of the goldfish ulcer disease that was introduced into Australia via infected goldfish, and which subsequently spread to native fish such as *Bidyanus bidyanusa* (silver perch) (Corfield et al., 2008). Introduced fish are also the source of the Asian fish tapeworm (*Bothriocephalus acheilognathi*), which has caused substantial mortalities in *Hypseleotris klunzingeri* (Western carp gudgeon) in the Canberra region (Dove et al. 1997). This parasite has the potential to be a significant source of mortality for native fish species.	Major
Agriculture and forestry Damage to crops, pastures or plantations, horticultural and stored products, forests or forest products. Include direct feeding damage, seed dispersal, browsing on young trees, bark gnawing or stripping and antler rubbing, felling trees, defoliating them for nesting material.	*None, or only occasional damage or yield loss to crops or plantations (e.g., orchards), damage similar to native species, no change to forest structure or regeneration. No adverse impacts on crops, plantations or forestry would be expected.* If it became established in Australia, it is unlikely to have any negative impacts on agriculture.	Minimal
Animal production Competition with livestock, transmission of diseases or parasites, predation, affecting livestock health, weakening or injuring livestock, pollution by droppings on farmland which domestic stock are then reluctant to graze, reduction of livestock accessibility to grazing land.	*None, or occasional competition with, or loss of yield in livestock or animal production.* If it became established in Australia, it is unlikely to have any negative impacts on animal production.	Minimal
Infrastructure Damage to human infrastructure, roads, buildings, dams, docks, fences, electricity cables (e.g., by gnawing or nesting on them) or through pollution (e.g., by droppings), digging activities.	*None or biological traits and lifestyle suggest potential damage to infrastructure (e.g., potential to increase soil erosion and decrease road stability, physical damage to property and infrastructure, disruption to transport and communications) but not yet reported.* If it became established in Australia, it is unlikely to have any negative impacts on infrastructure.	Minimal
Human health Injuries (e.g., bites, stings, scratches, rashes, accidents), transmission of diseases and parasites to humans. Impacts might affect	*None, or host of one or more harmless diseases with the possibility of infecting humans, not yet reported.* Not considered a threat to humans. There are no reported zoonoses, and no risk if injury or harm from this species.	Minimal

Type of impact	Assessment	Rating
human safety and cause traffic accidents. Via health costs, impacts usually lead to economic costs due to medication and treatments costs, as well as the consequences in productive losses from these impacts on workforce.		
Social impacts Impact on human wellbeing. Noise disturbance, pollution of recreational areas, damage by trampling and overgrazing, restrictions in accessibility to habitats or landscapes of recreational value. Restrictions or loss of recreational activities, aesthetic attraction, touristic value, or employment possibilities, aesthetic values and natural or cultural heritage	*Regular small disturbance, or occasional larger disturbance.* If this species were to establish in the wild in Australia, there may be impacts to fishing activities (whether directly through changes to fish structures through competition, or indirectly e.g., closures due to eradication or management activities). Disease introduced to wild populations could also impact on recreational pursuits. Significant mortality and morbidity can be experienced by native fish. The distribution, abundance and impacts on other fish species are hard to predict. The economic costs of eradication could be significant. For example, an estimate carried out for aquatic ecosystems of the US showed an approximate annual cost of US$5.4 billion associated with damages caused introduced fish and their control (Pimentel et al. 2005). The Australian Government has committed $15.2 million to develop a control strategy for invasive carp. There have been no studies of the economic consequences of previous introduction of similar species elsewhere in the world.	Moderate
TOTAL ECONOMIC IMPACTS Cost to control/eradicate, cost to natural resources and amenity, cost to agriculture, fisheries and forestry industries, cost to potential export markets, cost to tourism	*Possible economic impacts associated with control and eradication; and loss of recreational/tourism resulting from disease transmission.* Once established, it is often impossible to eradicate an alien species, and control efforts are time-consuming and expensive (Kolar and Lodge 2001). Invasive alien fish have cost at least US$37 billion globally, and US$215 million in Oceania alone, since the 1960s (Haubrock et al. 2022).	Unknown

Source: Adapted from Kumschick et al. (2012), Nentwig et al. (2016)

The consequences for the environment may be predominantly from competition for resources, disease transmission and predation.

All impact types listed in Table 6 are weighted equally and the ratings given are estimates, as the impacts are mostly unknown. A precautionary approach is therefore adopted and, considering the information above including 2 Major ratings an overall risk rating of **moderate** for the environmental consequences if the species were to establish in Australia is appropriate.

4.4 Risk rating

The establishment risk score is the chance or probability that establishment will occur (Bomford 2008). Based on the risk assessment, the likelihood of *S. eupterus* establishing a viable wild population in Australia are **moderate.** Based on the impacts assessment in Table 5, the potential consequences of *S. eupterus* establishing are **moderate**.

4.5 Consultation – concerns raised

The first consultation round seeking comment from the public, including state and territory government agencies, on the applicant's report was undertaken from 26 October to 25 November 2021.

Six submissions containing comments to be addressed were received. The specific comments are at Appendix B. A number of industry stakeholders cited the economic benefit for the aquarium industry as the price and ready availability will make *S. eupterus* extremely popular ensuring the industry stays economically strong.

General concerns raised include:

- **A moderate to high risk of establishment**: the species rates highly on risk factors for invasiveness, including a wide native distribution, environmental tolerances for abiotic conditions, and establishment would pose risks to native fish and ecosystems.
- **Available water temperature tolerance data** for *S. eupterus* is insufficient to ensure a rigorous risk assessment, as evidence suggests it may have a wider temperature/ environmental tolerance than used in the risk assessment. The distribution covers a considerable portion of Africa and a large range of climatic conditions, and so the provided temperature ranges are unlikely to represent actual environmental tolerances.
- **Animal welfare:** scientific evidence demonstrates that fish have the capacity for nociception and pain (Sneddon 2018). The importation of any species of live animal, including fish, poses animal welfare risks. These particularly relate to transportation stressors and, due to large numbers of fish being imported at any one time, mortalities are often considered as being an 'acceptable' part of doing business. However, this does not consider the responsibility to prevent suffering of individual fish. In general, the more animals imported in a consignment, the greater the number of individuals placed at risk, even if the mortality rate is considered by industry to be low or reasonable.
- **Costs of incursion(s) and eradication:** costs and impacts of control measures to contain an outbreak of either an exotic disease or an incursion of invasive fish, are substantial. Unlike agricultural industries which contribute to biosecurity programs to help combat exotic disease outbreaks, it is unclear as to what financial support is available from the ornamental fish industry should an incursion occur.
- **Risk of introduction of pathogens to native populations:** Australia has many endemic native freshwater fish and ecosystems that can be impacted by introduced diseases and pests. Should an exotic disease infect native species in our waterways, the impact could be devastating both in terms of biodiversity and conservation.
- **Consequences to the environment, economy or socio-cultural values** are not adequately considered if *S. eupterus* were to establish.
- **Minimal benefits to importing another aquarium species:** there are already 1800 species of aquarium fish available in Australia, so there is little economic benefit to be gained by addition of another species, especially given the moderate risk to the environment this species poses.

- **Lack of mitigation and control measures:** given the possibility of introduction from the aquarium trade, there are insufficient mechanisms in place to detect and manage feral incursions.
- **An increased propagule pressure:** if importation of these species is permitted, the increasing numbers of fish available will increase the likelihood of feral populations being established, either from accidental or deliberate disposal of aquarium fish in local waterways.
- **Identification issues with other *Synodontis* species**: this species looks very similar to other *Synodontis* species, creating a challenge of identification at the border. A minimum size limit should be considered to prevent further cases of mistaken identity if the fish were allowed to be imported.
- **Size, longevity and behaviour may increase risk of deliberate release:** this species may grow to a large size, is relatively long lived (up to 15 years) and can be territorial and aggressive, all of which greatly increase the risk of deliberate release from hobby aquariums.
- **Species present in Australia:** *S. eupterus* is not on the Live Import List, so specimens in Australia may be from illegal imports. Including it on the Live Import List would diminish the intent of the list due to the potential perception that it is possible to circumvent the legalities by applying retrospectively.

The applicant's updated report addressing the Terms of Reference and DCCEEW's environmental risk assessment report were circulated to relevant state and territory government agencies for comment between 31 May and 28 June 2023. DCCEEW's report included the recommendation that *S. eupterus* not be included for the commercial pet trade but be included on Part 2 of the Live Import List for identification purposes. The South Australian Government responded with comments supporting the amendment. The Western Australian Government responded supporting the findings and recommendations (Appendix B).

4.6 Risk mitigation

In response to the comments received during the consultation rounds, the applicant provides some additional information on potential risks and risk mitigation measures.

The applicant suggested that possible control measures to reduce impact to the environment if it was to be released include:

- Listing as a noxious species
- Eradication or control programs
- Education campaigns

Proposed restrictions by the applicant included the current biosecurity arrangements administered under the *Biosecurity Act 2015* to prevent the importation of pests that may directly or indirectly impact the environment.

5 Discussion

The global aquarium trade is arguably the greatest biosecurity threat to freshwater ecosystems (Ebner et al. 2020., Clavero et al. 2023). Over 550 species of freshwater fish have established self-sustaining populations outside their native ranges across the globe (Clavero et al. 2023). Ornamental fish present a significant risk to aquatic systems in Australia and have the potential to trigger or contribute to a future major aquatic animal pest or disease incursion, particularly in freshwater habitats (Moore, Marton and McNee 2010). Ebner et al. (2020) highlighted the numerous existing and potential pathways for incursions from the aquarium trade into freshwater ecosystems in tropical Australia, encompassing the lands and waterways north of the Tropic of Capricorn. The lack of consolidated information relevant to tropical Australia in terms of biotic incursion of even the better documented taxa (e.g., freshwater fishes) and a lack of information on most taxa in the aquarium trade (e.g., diseases in the wild) creates a major biosecurity risk (Ebner et al. 2020).

One of the factors affecting establishment success is propagule pressure – successful species are introduced more times than unsuccessful species. The number of fish that escape or are released is likely to increase if more species are kept, in higher numbers, and in more locations. As a result, propagule pressure can be minimised by limiting the species that are kept in Australia, the number of collections that hold a species, the number of individuals held in each collection, and the security circumstances in which species are kept (Bomford 2008). It is likely that permitting the importation of this species will increase its trade within Australia, and as a result increase propagule pressure. *S. eupterus* is one of the most popular and common mochokid fish in the aquarium trade due to their attractive reticulated patterning and their role as cleaner fish. In the absence of invasive and establishment data on this species, results from the Bomford model show that *S. eupterus* has a moderate establishment risk**.**

The Climatch map for this species indicated a moderate climate match, particularly with the northern part of Australia. However, Climatch is based on terrestrial climate data and therefore is unlikely to be a true indicator of the potential range of non-endemic aquatic species. This species is hardy, able to tolerate a wide range of environmental conditions, and evidence indicates it can survive much cooler waters than once thought.

In the absence of any history of invasiveness and establishment and a moderate climate match, results from the Bomford model show that *S. eupterus* has a moderate establishment risk. Bomford (2008) ranks the moderate risk of establishment at 23-38%. success rate which represents an unacceptable level of risk.

In addition to the factors assessed under the Bomford model, several other characters that are most frequently cited as being associated with successful fish invasions include exhibiting high physiological tolerance (Moyle and Marchetti 2006), r-selected life history strategies (high fecundity, rapid growth, early maturity) (Moyle and Marchetti 2006, Bomford 2008, Corfield et al. 2008, Chan et al. 2021), aggressive behaviour (Corfield et al. 2008), moderate size (Moyle and Marchetti 2006, Bomford 2008, Corfield et al. 2008), and dietary preferences (Moyle and Marchetti 2006). Therefore, in consideration of a recommendation for this species, DCCEEW considered the available information on this species, as summarised in Table 7.

Table 7 Considerations when forming a Live Import List recommendation for *Synodontis eupterus*

Consideration	Comments
Establishment risk	Moderate (23-38%) as per Bomford Risk Assessment
Impact analysis	Moderate impacts on Australian environment
Climate match	At least moderate, likely high
Physiological tolerances	Broad environmental tolerances: hardy and able to tolerate a wide range of environmental conditions. Available information indicates it can survive cooler waters than assumed.
Fecundity	High fecundity: up to 20,000 eggs per spawn
Spawning	Frequent spawning over a long-life span, this species spawns multiple times throughout the year and longevity of 10 years.
Aggressive behaviour	Territorial and can be aggressive - fish keeping websites claim they are territorial and 'semi-aggressive'. These websites also comment on this species' aggression towards other catfish.
Body size	Max size 30cm TL - which can increase the chances of intentional release from aquariums
Dietary preferences	Omnivorous - This species is omnivorous and has a feeding regime that enables them to cope with seasonal changes in food abundance and habitat change

The applicant, in addressing the Terms of Reference, undertook a risk assessment using the SARDI model (Deveney 2018). This model was produced to facilitate the development of management strategies for the 'grey list' of ornamental fish already present in Australia. As stated by the author, the SARDI model is '*inappropriate to assess risks associated with importation of new species.'* New species under consideration for import have a different interpretation of acceptable level of risk that reflects the difference posed by a new exotic species compared to a species already present. The model accepts that establishment had already occurred, so only species in which establishment has resulted in significant impacts rate as high risk.

The SARDI model states that data deficiencies do not mean the risk posed by a species is increased or decreased, and unknown answers are scored neutrally rather than conservatively; and so, the framework does not comply with the precautionary principle, which must be considered by the minister when making a decision to include the item in the Live Import List. Furthermore, the economic, social and commercial benefit of the species of the model are assessed on the trade of the specimen not the social, cultural and economic impact to the environment if it were to become established.

6 Conclusion

DCCEEW has reviewed the application to amend the Live Import List to include *Synodontis eupterus* and undertaken an environmental risk assessment. During this process, DCCEEW independently reviewed all available information on *S. eupterus* and sought consultation from Commonwealth, state and territory agencies, the public and other experts, as is required under the *Environment Protection and Biodiversity Conservation Act 1999.*

Based on all available information, and the results from application of the Bomford model for freshwater fish, *S. eupterus* poses a moderate risk to the Australian environment. This risk corresponds to an establishment success rate of 23-38%, which poses an unacceptable level of risk to the Australian environment. *S. eupterus* possesses several characteristics known to increase the risk of establishment and spread: they can grow to a large size (30 cm SL), have been shown to be capable of feeding on small fish as well as invertebrates and can display aggressive behaviour to other fish, thereby having a high behavioural potential for impact on native species. S. eupterus spawn multiple times per year with up to 20,000 eggs per spawn and have wide environmental tolerances that indicate a broad potential geographic range.

It is conceded that *S. eupterus* is in Australia; the applicant stating in his application 'small numbers of *S. eupterus* already exist in the domestic hobby having been regularly bred & traded in Australia over the last 40 years – although these are not large commercial numbers of fish, these populations have not led to the establishment of feral populations in Australia', and several members of the public raised it during the consultation period. A suggested mechanisms for the species' entry into Australia was suggested by South Australia. This is that juvenile *S. eupterus* may bear a resemblance to other species, including *Synodontis nigriventris* which is listed in Part 1 of the Live Import List and may be freely imported.

Biosecurity officers inspecting consignments of aquarium fish at the border have indicated that *Synodontis eupterus* and *Synodontis nigriventris* are particularly challenging to differentiate. Whilst healthy adult specimens of a certain size can be distinguished from each other transportation induces physiological stress requiring prolonged recovery, and stress-induced changes in skin or eye colour are reported, making accurate identification even more challenging (Hungtingford et al. 2006).

Feedback received during consultation supports this position, several correspondents raising issues relating to the introduction of *S. eupterus* seeking advice of the likely pathways through which these fish species have arrived in Australia, particularly in the period following the publication of the Bureau of Rural Sciences (BRS) 'grey list' in 2008 or suggesting that the species was illegally imported.

DCCEEW has formed the view that there is value in allowing limited import to facilitate improved identification of this species at the border. This might take the form of *inter alia*:

- post transport photographs
- taxonomy and
- training of AI tools to enhance computer identification at the border.

After critically examining and reviewing all available evidence and information, DCCEEW, recognising the difficulties in differentiating between *Synodontis eupterus* and *Synodontis nigriventris* at the border because:

- *S. eupterus* is known to be difficult to identify when they are stressed and/or
- juveniles/specimens of small size are difficult to differentiate from unregulated specimens (DoA).

DCCEEW recommends listing *Synodontis eupterus* on Part 2 of the Live Import List with the conditions:

> For identification purposes only. High security facilities only.

Appendix A: Impacts assessment scoring criteria

Impacts assessment scoring criteria adapted from Kumschick et al. (2012) and Nentwig et al. (2016)

Impact	Description	Minimal	Minor	Moderate	Major	Critical
Herbivory	Can cause changes in reproduction, survival, growth, and abundance of plants in the invaded community, e.g., herbivory, grazing, bark stripping, antler rubbing, feeding on algae, or uprooting of aquatic macrophytes. Result in restrictions in establishment, pollination, or seed dispersal of native species. Range from population decline to population loss and include minor changes in the food web.	No impact known or detectable; or very low level of herbivory, no major damage reported.	Herbivory affecting several native species, without significant impact on affected species or decline of their populations.	Herbivory affecting several native species, at least one native species declining.	Herbivory affecting many native species, several declining in population size, recorded community change is reversible.	Herbivory or toxicity affecting native threatened species, decline of these species, replacement or even extinction of species, recorded community change is irreversible.
Competition	Concern at least one native species, e.g., by competition for nutrients, food, water, space or other resources. May outcompete native species due to higher reproduction, resistance, longevity. In the beginning, might be slow change in species abundance but might lead to the local/global disappearance of a native species. Includes behavioural changes in outcompeted species and ranges from population decline to population loss.	No effect on fitness of native species.	Causes reductions in individual fitness but no declines in native populations densities.	Causes declines in populations densities, but no changes in community composition.	Causes changes in community composition – reversible if alien species is removed.	Causes at least local extinction of species and irreversible changes in community composition.

Impact	Description	Minimal	Minor	Moderate	Major	Critical
Predation	May concern single animal species or a guild, e.g., through predation, parasitism, or intoxication, measurable as reductions in reproduction, survival, growth, or abundance. These impacts range from population decline to population loss, including minor changes in the food web. These impacts concern only free-living animals in the wild.	Negligible level of predation.	Predation on several abundant species, without significant impact on affected species or decline of their populations.	Predators directly or indirectly resulting in a decline of populations size of at least one native species but no changes in community composition.	Predators directly or indirectly resulting in local or population extinction of at least one native species, leading to changes in community composition, but changes are reversible when introduced species removed.	Predators directly or indirectly resulting in extinction of one or more native species (i.e., species vanish from communities at sites where they occurred before alien arrival), changes in community composition are irreversible.
Habitat and ecological community	Impacts on characteristics of an ecosystem, its nutritional status (e.g., changes in nutrient pools, increased water turbidity, faecal droppings), modification of soil or water body properties, and disturbance regimes (changes in hydrology, erosion or soil compacting), changes in ecosystem functions (e.g., pollination or decomposition rates), or other physical or structural changes. Includes modification of successional processes that may lead to reduced suitability (e.g., shelter) for native species, thus causing their disappearance. The application of pesticides to control impacts might have side effects on non-target organisms.	Change in chemical (e.g., eutrophication, nutrient-cycling), physical (e.g., soil compaction, structure, hydrology) and/or structural (e.g., felled trees, burrows, disturbance dynamics) characteristics detectable, with no reduction of fitness of native individuals.	Moderate change in chemical, physical and/or structural characteristics, affecting fitness of native individuals without decline of their populations.	Major change in chemical, physical and/or structural characteristics, change in fauna and flora and/or successional processes, reversible.	Severe changes in chemical, physical and/or structural characteristics, decline of species and/or change in species composition, resulting in local extinction of at least one native species, leading to changes in community composition, but change are reversible when introduced species is removed.	Massive changes in chemical, physical and/or structural characteristics, endemic species and/or threatened species affected, decline of species and/or change in species composition, loss of habitat characteristics, damage of sites of conservation importance, irreversible.

Impact	Description	Minimal	Minor	Moderate	Major	Critical
Hybridisation	Impacts are through hybridisation with native species, usually closely related to the alien taxon, leading to a reduced or lost opportunity for reproduction, sterile or fertile hybrid offspring, gradual loss of the genetic identity of a species, and/or disappearance of a native species, i.e., extinction.	No hybridisation between alien species and native species observed in the wild, may be possible in captivity.	Hybridisation is observed in the wild but rare; hybrids weak, do not reach maturity, no decline of native populations.	Hybridisation is regularly observed in the wild; hybrids are vigorous but sterile, local decline of pure native populations but pure native species persists.	Hybridisation is common in the wild; F1 hybrids are vigorous and fertile, however offspring of F1 hybrids are weak and sterile; individuals of introduced species and hybrids discernible from pre natives, pure native populations can be recovered by removing the introduced species and hybrids.	Hybridisation is common in the wild; hybrids are vigorous and fertile, pure native populations cannot be recovered by removing the introduced species and hybrids resulting in local extinction of native species.
Disease transmission	Host or alternate host for native or alien diseases (viruses, fungi, protozoans or other pathogens) or parasites, impacts by transmission of diseases or parasites to native species.	Not a host of diseases transmissible to native species, or very low level of transmission; reduction of fitness of native individuals is not detectable.	Parasites or pathogens directly or indirectly affecting fitness of native individuals without declines of their populations.	Parasites or pathogens directly or indirectly resulting in a decline of populations size of at least one native species but no changes in community composition.	Parasites or pathogens directly or indirectly resulting in local or population extinction of at least one native species leading to changes in community composition, but changes are reversible when introduced species is removed.	Parasites or pathogens directly or indirectly resulting in local or population extinction of at least one native species, community changes are irreversible.

Impact	Description	Minimal	Minor	Moderate	Major	Critical
Agriculture and forestry	Damage to crops, pastures or plantations, horticultural and stored products, forests or forest products. Include competition with crops by weeds, direct feeding damage, seed dispersal, reduced accessibility, usability or marketability through contamination and cosmetic changes. Impacts might affect forest regeneration through browsing on young trees, bark gnawing or stripping and antler rubbing. Damage includes felling trees, defoliating them for nesting material. Includes the need for applying pesticides which involve additional costs, reducing market quality. Impacts usually lead to an economic loss.	None, or only occasional damage or yield loss to crops or plantations (e.g., orchards), damage similar to native species, no change to forest structure or regeneration.	Damage or yield loss to crops common, damage or yield loss similar to native species, minor effect on forest growth, impact on seed dispersal. Some trade disruptions.	Regular damage or yield loss similar to native species through feeding on crops or through competition, occasional threat to stored food, constrains forest regeneration through browsing on young trees, damage to plantations, gnawing of bark, losses exceed impact of the native fauna, sometimes reaching high levels. Moderate trade disruptions.	Regular high damage or yield loss in fields or to stored food, fruit consumption; moderate to strong damage to mature forest through seed consumption, bark stripping or antler rubbing, death of trees by felling or flooding. Killing trees by defoliating them for nesting material. High trade disruptions.	Complete loss of yield or destruction of fields or plantations (e.g., orchards), or of stored food by consumption and contamination; very strong damage to mature forest through seed consumption, bark stripping. Massive trade disruptions.
Animal production	Competition with livestock, transmission of diseases or parasites, predation, affecting livestock health, weakening or injuring livestock, e.g., by stinging or biting, pollution by droppings on farmland which domestic stock are then reluctant to graze, reduction of livestock accessibility to grazing land, the need for applying pesticides which involve additional costs, reducing market quality. Impacts usually lead to an economic loss. This category refers to livestock, poultry, game animals, fisheries and aquaculture.	None, or occasional competition with, or loss of yield in livestock or animal production.	Competition with, or loss of yield in livestock or animal production, transmission of diseases to livestock or production animals in the native area, but not yet reported from the area of introduction. Little operational obstruction or removal/control cost. Some trade disruptions.	Competition more frequent with several livestock or production animal species, transmission of diseases reported, but infection rates low. Pollution by droppings on farmland which domestic stock are then reluctant to graze. Moderate trade disruptions.	Transmission of economically important diseases or hybridization with economically important game animals, fatalities uncommon. Large trade disruptions.	For animals, transmission of harmful diseases to or hybridization with livestock or production animals, fatalities reported. Massive trade disruptions.

Impact	Description	Minimal	Minor	Moderate	Major	Critical
Infrastructure	Damage to human infrastructure, roads, buildings, dams, docks, fences, electricity cables (e.g., by gnawing or nesting on them) or through pollution (e.g., by droppings), digging activities on watersides, roadside embankments and buildings which may affect flood defence systems, traffic infrastructure or stability of buildings. Includes the need for applying pesticides and performing management and eradication programmes, their development and further administration costs, as well as costs for research and control. Impacts usually lead to an economic loss.	None or biological traits and lifestyle suggest potential damage to infrastructure (e.g., potential to increase soil erosion and decrease road stability, physical damage to property and infrastructure, disruption to transport and communications) but not yet reported.	Occasional damage with minor economic losses, e.g., damage to fences, impact through pollution, accumulations of droppings, minor increases in soil erosion.	Damage to fences and/or plantations, gnawing electricity cables, causing road accidents, nesting on current conductions. Moderate increase in soil erosion, moderate damage to property, buildings and infrastructure, frequent obstruction of waterways.	Considerable damage to property and infrastructure, with considerable economic costs, damage through burrowing or nesting in buildings. Major obstruction of waterway.	Considerable damage to flood defence systems or other critical infrastructure, major soil erosion, danger to human safety, threat to transport safety.
Human health	Injuries (e.g., bites, stings, scratches, rashes, accidents), transmission of diseases and parasites to humans, bioaccumulation of noxious substances, health hazard due to contamination with pathogens or parasites (e.g., through contaminated water, soil, food, or by faeces or droppings). Impacts might affect human safety and cause traffic accidents. Includes the need for applying pesticides which due to their low selectivity and/or residues might have side-effects on humans. Via health costs, impacts usually lead to economic costs due to medication and treatments costs, as well as the consequences in productive losses from these impacts on workforce.	None, or host of one or more harmless diseases with the possibility of infecting humans, not yet reported.	Host of several harmless diseases, indirect transmission or possibility of direct transmission, but only a small percentage of the human population at risk, health hazard from soil and water contamination caused by droppings, few cases reported.	Direct infection with one or more harmless diseases, occasional health threat through bites or other attacks, moderate number of cases reported.	Direct transmission of several diseases. Health threat through bites or other injuries happen more often, rarely fatal.	Vector of harmful diseases to humans and/or many diseases frequently transmitted. Health threat through bites or other injuries happen frequently, more often fatal.

Impact	Description	Minimal	Minor	Moderate	Major	Critical
Social impacts	Impact on human wellbeing. Noise disturbance, pollution of recreational areas (water bodies, rural parks, golf courses or city parks), fouling, eutrophication, damage by trampling and overgrazing, restrictions in accessibility to habitats or landscapes of recreational value. Restrictions or loss of recreational activities, aesthetic attraction, touristic value, or employment possibilities, aesthetic values and natural or cultural heritage.	None, or biological traits and lifestyle suggest potential for disturbance in recreational or residence areas (e.g., by noise, pollution).	Occasional small disturbance, only small percentage of human population affected.	Regular small disturbance, or occasional larger disturbance.	Regular larger disturbance. Recreational value of a habitat or a landscape strongly affected.	Massive disturbance; complete loss of recreational value of a habitat or a landscape.

Appendix B: Comments received on the proposal to include the *Synodontis eupterus* on the Live Import List

Round 1

Consultation with the general public, stakeholders and state and territory government agencies on the applicants' report was undertaken from 26 October to 25 November 2021. Six submissions containing comments to be addressed were received (Table 8) and seventeen email responses supporting the proposal were received from members of the pet and aquarium industry. These raised no issues requiring additional information. A number of industry stakeholders cited the economic benefit for the aquarium industry as the price and ready availability of *S. eupterus* will make them extremely popular ensuring the industry stays economically strong.

Table 8 Comments received during public consultation and response from applicant

Respondent	Major comments	Further information requested	Applicant response
NSW Department of Primary Industries (DPI)	NSW DPI supports the amendment to add this species to the Live Import List, provided the following conditions are met: The proponent should provide more specific information on the species that are similar enough to *S. eupterus* to allow their inadvertent importation in the past. A minimum size limit should be considered to prevent further cases of mistaken identity if the fish were allowed to be imported.	Please provide details of a suitable size limit to allow positive identification, with supporting evidence.	The updated ToR did not address this request but the applicant states 'This issue is outside of the terms of reference for the application. Under the current import conditions, fish specimens that cannot be identified as the species stated in import documentation (including health certification) are not released on inspection by DAWE. Size and sex limits have never been the responsibility of the applicant, but rather something that DAWE operations would usually handle. Over the years industry have worked with DAWE on mechanisms to ensure identification is easy, but size and sex should not impact an 'environmental' review as to whether the species can be added to the list. We will be happy to work with the relevant department when this species is approved on implementation of an appropriate size limit should it be deemed necessary.'
RSPCA Australia	Scientific evidence demonstrates that fish have the capacity for nociception and pain (Sneddon 2018). The importation of	Are there any financial mechanisms in place for the aquarium industry to	The updated ToR did not address this request.

any species of live animal, including fish, pose animal welfare risks. These particularly relate to transportation stressors and due to large numbers of fish being imported at any one time, mortalities are often considered as being an 'acceptable' part of doing business. However, this does not consider the responsibility to prevent suffering of individual fish. In general, the more animals imported, the greater the number of individuals placed at risk, even if the mortality rate is considered by industry to be low or reasonable.

With an increasing focus on maintaining a very high standard of biosecurity, particularly in relation to protecting our precious natural environment and ecosystems, it is paramount that our import requirements reflect this commitment. It is concerning that every application refers to the structured risk assessment based on the methodology of Bomford (2008) which concludes an estimated 'moderate' risk, generally consistent with the risk that would be posed by most of the species currently permitted live importation to Australia. It is very concerning that a 'moderate' risk is considered acceptable, particularly since the importation of these species is primarily for personal benefit and/or financial gain. One could argue that neither of these reasons provide legitimate justification to pose a 'moderate' risk to our environment. The other assumption is that because a 'moderate' risk has been acceptable for other species currently permitted to be imported, then it is logical that the species nominated in these applications should also be accepted.

Some exotic diseases may not be apparent in imported fish and so may enter Australia undetected. Should an exotic disease infect native species in our waterways, the impact could be devastating both in terms of biodiversity and conservation (Corfield 2008) as well as animal welfare. In addition to negative ecological disruption, costs and impacts of control measures to contain an outbreak of either an exotic

assist with feral incursions of imported species?

	disease or an incursion of invasive fish, is substantial (including animal welfare impacts). Unlike agricultural industries which contribute to biosecurity programs to help combat exotic disease outbreaks, it is unclear as to what financial mechanisms are available from the ornamental fish industry should an incursion occur. Given that multiple ornamental fish species and varieties are currently available to enthusiasts it would be prudent to curtail further importations. Furthermore, in terms of the industry collaboration there is the opportunity to explore the potential for locally breeding fish species that are currently being imported. This strategy would help reduce the biosecurity risks associated with importation significantly. Otherwise, if importation is to continue, then perhaps consideration should be given to establishing an industry scheme to secure funding to respond to any incursions. The RSPCA urges the federal government to consider a moratorium on allowing further importation of new species of ornamental fish and to reconsider the biosecurity and animal welfare risks posed by current importation of permitted fish species.		
South Australian Department of Environment and Water (DEW)	Aquarium fish can have infections of serious pathogens. A greater level of health certification should be required for exemptions to the import list, to provide adequate protection from the introduction of disease. There is a risk of escape and establishment of these species. Freshwater aquarium fish are released from time to time and have established populations (e.g., goldfish, fighting fish, speckled livebearer) and pose risks to native fish and ecosystems. Given there are already many species of aquarium fish available in Australia, the benefit of importing these species is not made clear in the application. Importing live animals, even	1. Please review your comments that have been made without support from scientific literature. 2. What evidence is there that one new species will have significant economic benefit?	1. The updated ToR did not address this request. No further scientific references have been provided in the applicant's final report. 2. The updated ToR did not address this request, but the Applicant does state (in response to 'What evidence is there that one new species will have significant economic benefit or should be added?') that 'issue is outside of the terms of reference for the application and is not relevant. Philosophical objections to adding more species to the permitted import list are not valid and need to be disregarded in any assessment. This notwithstanding, it must be understood that fundamental to all hobbies of this nature, is the importance of variety and new species. It is this variety and availability of new species that sustains the

	with mitigating measures, poses significant risks and sound justification would be required. Australia has many endemic native freshwater fish and ecosystems that can be impacted by introduced diseases and pests. There is little scientific literature information for all these species, and the applications are instead based on aquarium information. There should be accurate information to inform granting exemptions to the import list as the consequences of a new pest species being introduced and established is serious. Scientific information for similar species would be a worthwhile step to bolster the case for allowing importation.		ornamental fish hobby and the industries that support the hobby. Any new consumer item creates greater interest in those products, which is why the fashion industry is constantly releasing new colours in clothes and shoes. With a digital global economy, Australians are seeing new emerging international trends, which includes new varieties of fish as techniques allow species that had not been able to be bred, now available. Furthermore, it is good policy to permit the legal import of species that meet the required criteria addressed within the TOR. To reject them simply continues to provide an environment where smugglers are allowed to profit as they satisfy the consumer demand in these species in place of the legitimate industry.'
WA Department of Primary Industries and Regional Development (DPIRD)	DPIRD does not support the inclusion of *S. eupterus*, as: - The applicant states "Small numbers of *S. eupterus* already exist in the domestic hobby having been regularly bred and traded in Australia over the last 40 years", yet it is not on either the white or grey list, suggesting it could be from Illegal imports, therefore on principle it should not be included on the white list. To include it now, diminishes the intent of the white list as it may be seen by others that you can get around the legalities by applying after the fact. - *S. eupterus* has been determined to have an establishment risk greater than low (i.e., moderate). Whilst there may be other species of moderate risk on the white list this should not set a precedent for inclusion. There is a sufficient number of species available within the aquarium industry that any proposed inclusions to the permitted import list should be of very low to low risk only. - Available water temperature tolerance data for *S. eupterus* is insufficient to ensure a rigorous risk assessment as it is only based on information available from hobby and aquarium-centred websites. It is likely that *S. eupterus* may have a wider temperature/ environmental tolerance than used in the applicant's risk assessment. The applicant should consider funding independent upper/lower lethal temperature tolerance	1. Please provide peer reviewed references which support the information provided in relation to the environmental requirements of the species. 2. Please reference fish biological information based on scientific literature – can the species survive outside the industry recommended tolerances as seems to be evidenced by their natural range. 3. Please update the report to include a risk assessment with peer reviewed references, including the potential impact on the environment, economy and socio-cultural values if this species were to establish.	1. As with most aquarium species, much of the information about the ecology, including environmental requirements, of *S. eupterus* is not available in the peer reviewed scientific literature. 2. The updated ToR did not address this request. No further information provided. 3. Applicant provided further information using the SARDI risk assessment model. 4. The updated ToR did not address this request. No specific measures provided (but applicant makes reference to control/eradication programs that could be applied in Australia if the species was released or escaped: listing as a noxious species; eradication or containment programs (including movement controls) or broader education/awareness building campaigns such as labelling aquarium fish bags with messaging). 5. The updated ToR did not address this request, but the applicant still states in their report that 'the species is not aggressive and compatible to keep in aquaria with other most other tropical species' and under ecology of the species, that 'Territorial and aggressive behaviours: None recorded. Some aquarist websites promote them as a community tank species.' 6. SARDI model submitted by applicant states that 'scientific database and internet search engine searches on the search

	experiments to inform a revised assessment of potential invasive range. - The applicant only presents an assessment of establishment likelihood, not biosecurity risk, as they have not considered the consequence to the environment, economy or socio-cultural values if *S. eupterus* were to establish. - The species rates highly on risk factors for invasiveness, including a wide native distribution, environmental tolerances for abiotic conditions. - The provided distribution is extremely large and covers a wide range of climates and habitats. Wide geographic distributions are a risk-factor for invasive species (Bomford, 2008) as they may indicate flexible or generalist species. Presence in the distant White Nile further indicates this species may be a good disperser, another risk factor for invasive species. Alternatively, this could be evidence of human-mediated introductions and possible establishment of feral populations outside its native range. - It is unlikely *S. eupterus* will be predated upon more than the small native Plotosidae (eeltail Catfish) or juvenile Ariidae (fork tail Catfish) of northern Australia. Predation is unlikely to prevent establishment if that is what the proponent is inferring and relying upon the predation of an introduced species to prevent establishment is not a prevention strategy DPIRD would support. Moreover, the large adult size of this species is likely to preclude predation by the majority of West Australian native fish species. - Water temp range is likely to be preferred and not upper and lower tolerance limits. As previously stated, the given distribution covers a considerable portion of Africa and a large range of climatic conditions, and so the provided temperature ranges are unlikely to represent actual environmental tolerances. Moreover, there is evidence of this species surviving in cold water, meaning tolerances are likely cooler than the tropical classification used, increasing the possible establishment	4. Please provide further information from peer reviewed sources regarding the measures that will be taken to address the potential for the aquarium trade as a risk-pathway for introductions. 5. Correct the ToR to reflect the cited information on aggressive and territorial behaviour, and the likely impacts this may have on native fish. 6. Update the report to reflect information on likely predation risks. 7. Introduction values in the Bomford calculation should reflect available data, it is not appropriate to use unreferenced estimates for inadvertent or deliberate introductions. 20% of *Synodontis* species being traded have been detected and possibly established. Update the ToR to correct the introduction risk values used referenced data (FishBase), and the information cited by DPIRD. 8. Please update the report to reflect the territorial	date for Boolean terms including *Synodontis eupterus* "predator native species" did appear to provide an example where small fish would be seen as food https://www.seriouslyfish.com/species/Synodontiseupterus and also states the species has a history of preying on native species. But no mention of predation risks has not been updated in the body of the final report. 7. Introduction success score has not been updated (still 0.25) and FishBase/other scientific references have not been incorporated. 8. Applicant has not updated to include any reference to 'territorial behaviour' of *S. eupterus* or its impact on native species. 9. No proposals or offer of support provided by the applicant/aquarium industry to prevent aquarium releases and control measures (if needed). 10. No references provided to support the claims of the applicant on the financial and social benefits to allowing the species to be imported. 11. No specific information included on this species being prohibited in NT and QLD, however, applicant states 'This issue is outside of the terms of reference for the application and is not relevant. Philosophical objections to adding more species to the permitted import list are not valid and need to be disregarded in any assessment. It is further noted that the only mechanism for Industry to have the keeping of new species recognised in Jurisdictions such as NT, WAS and TAS is to have them listed as suitable for live import in the EPBC act.'

	range towards more temperate areas. Without adequate temperature tolerance data to determine potential invasive range the precautionary principle would suggest that climate match be disregarded in this case. - The applicant should consider funding independent upper/lower lethal temperature tolerance experiments to inform a revised assessment of potential invasive range if they wish to add this species to the import list. - Given the possibility of introduction from the aquarium trade, what is the applicant going to do to combat releases? In the event that the species is released and establishes will the applicant assist (fund) control measures if needed? - 20% of *Synodontis* species being traded having been detected and possibly established, this is likely a high-risk species group if released into suitable waters. - Currently approx. 1800 fish on white list so what proof is there of significant economic benefit by addition of 1 species? What proof of significant social benefit? When life returns to normal after COVID and people find they no longer have time to maintain an aquarium and dump the fish there is then an economic and social cost that the industry does not contribute towards managing. - The species is not listed on any state or federal pest or noxious species list, however, by default in NT and QLD, if a species is not listed on the white list, it is an offence to import it into those states regardless of whether they have it listed as noxious.	behaviour and how this may impact on native fish. 9. Given the possibility of introduction from the aquarium trade, what is the applicant going to do to combat releases? In the event that the species is released and establishes will the aquarium industry assist (fund) control measures if needed? 10. Please provide references to support the claims regarding financial and social benefits to allowing the species to be imported. 11. Please update to include that the species is prohibited in NT and QLD.	
De-identified	Information addressing the following points would help to clarify the risk assessment principles and frameworks that have been, or will be, applied to produce the final assessment reports for each species. The extent to which these six fish species are already present and domestically traded in Australia.	1. The extent to which these fish species are already present and domestically traded in Australia. 2. The likely pathways for the arrival of these species in Australia if they are already present and importation following the publication of the BRS 'grey list' in 2008.	1. It is further noted that this species has been present in Australia for at least 40 years (Jared Patrick, Premier Pet, pers. Comm. Applicant states that 'although these are not large commercial numbers of fish, these populations have not led to the establishment of feral populations in Australia.' Applicant also states 'Although small numbers of this species are known to be present in the Australia hobby, these are not available with the reliability or in sufficiently large commercial volumes needed by the industry.

The likely pathways through which these fish species have arrived in Australia, particularly in the period following the publication of the BRS 'grey list' in 2008.

The estimated demand in Australia for these species as aquarium fish

The capacity of current captive breeding techniques to supply this demand.

The potential source countries for these fish species, and the approval status of these countries to export live freshwater fish to Australia.

The potential effects on wild populations of these fish species in their natural range, should these populations be used to meet demand in Australia.

The absence of reported establishment or invasiveness of these species in other contexts seems to have been used to justify a low risk rating for Australian situations. This assumption needs to be more fully explained and captured in the risk assessment process applied e.g., Bomford (2008) recommends a precautionary approach where a moderate Introduction Success Score of 2 is given where there are no recorded introductions, noting a precautionary approach could warrant a higher Introduction Success Score.

3. The estimated demand for these species.
4. The capacity of current breeding techniques to supply this demand.
5. The potential source countries for this species.
6. The potential effects on wild populations in their natural range.
7. Introduction values in the Bomford calculation should reflect available data, it is not appropriate to use unreferenced estimates for inadvertent or deliberate introductions. Update the ToR to reflect referenced data.

Imported stock would provide reliable access to the numbers, range in sizes and varieties (such as new colour morphs) needed to meet Australian hobby demand.'

2. Applicant states 'It is unknown how the first individuals arrived in Australia – it is plausible that they may have been shipped to Australia inadvertently as they resemble some closely related species on the current Live Import List. It is further noted that the species has been present in Australia for at least 40 years (Jared Patrick, Premier Pet, pers. com.).'
3. Applicant states 'Internationally, the species is in high demand by hobbyists. New catfish species would be popular in Australia, adding variety to the species available to Australian hobbyists. This species has the added peculiarity along with others in the genus of sometimes swimming upside down, hence the name. The species is not aggressive and compatible to keep in aquaria with other most other tropical species. Two other Synodontis catfishes, *S. multipunctatus* and *S. nigriventris* are currently permitted for import to Australia; *S. eupterus* has the added attraction of feathery fins. Although small numbers of this species are known to be present in the Australia hobby, these are not available with the reliability or in sufficiently large commercial volumes needed by the industry. Imported stock would provide reliable access to the numbers, range in sizes and varieties (such as new colour morphs) needed to meet Australian hobby demand.'
4. Applicant states 'In commercial breeding conditions, females produce around 200 eggs about 8 times a year (Jared Patrick, Premier Pet, pers. com.).'
5. No further information provided by the applicant.
6. Applicant states 'There are no reports in the scientific literature of any ecological impacts as a result of the

			species establishing outside its natural range in other countries'. Applicant included new information 'A thorough review of all available literature showed that S. eupterus has no recorded impacts on any wild or farmed aquatic species outside its natural range. It is not a parasitic or migratory species, nor is there any novel or notifiable diseases in the literature, causes no known harm to humans and has no record of altering the function of ecosystems, nor does it outcompete or prey on any fish species, beyond its natural range. It also cannot hybridise with any Australian native fish. Furthermore, there is no evidence in any literature, worldwide, that the species has ever caused any deleterious environmental, social or economic impacts. (Sierp 2022).' 7. Similar to point 7 in previous concerns and information sought from applicant from: 'Introduction success score has not been updated (still 0.25) and FishBase/other scientific references have not been incorporated.
De-identified	I understand that small numbers of these species already exist in the domestic hobby market, having been regularly bred and traded in Australia over the past 40 years, and, although these are not large commercial numbers of fish, these populations have not led to the establishment of feral populations in Australia. There may be a different outcome, if importation of these species is permitted, as with the increasing numbers of fish available there is the more likelihood of feral populations being established, either from accidental or deliberate disposal of aquarium fish in local waterways. An added risk is that, when life returns to normal after Covid, those people who took up the hobby of aquarium fish keeping during the pandemic, when they were locked down and had time on their hands, will no longer have the time to attend to their hobby, and so 'dispose' of their fish by the simplest means possible.		

As well as the above, there is the risk that several species may grow too big for their aquarium, or become aggressive to smaller fish, and be 'disposed'.

I understand that one Featherfin synodontis, *Synodontis eupterus*, was found in a waterway in Croatia, at a temperature of 13.7ºC. It may well not have survived for long at that temperature, but it does tend to show that there is some risk that tropical fish could adapt to cooler water temperatures and form feral populations.

Unfortunately, Australia has an unhappy reputation of importing species that appear suitable/harmless, but now form feral populations of considerable size.

For example, some fish species:

Carp, *Cyprinus carpio*, Gambusia, *Gambusia Holbrook*, Mosquitofish, *Gambusia affinis*, Chinese weatherfish, Weatherloach*, Misgurnus anguillicaudatus*, Tilapia *Oreochromis mossambicus* and *T mariae*. There is also so the possibility that some restricted species might be inadvertently imported into Australia due to their resemblance to similar species permitted to be imported. Some comments on the species intended for live import, based on information from the application:

I note that all these species appear to be long lived in aquaria.

Round 2

The revised applicant's report against the ToR and DCCEEW's risk assessment report were circulated with relevant state and territory government agencies for comment between 31 May and 28 June 2023. The South Australian Government responded with comments supporting the amendment. The Western Australian Government responded supporting the findings and recommendations.

Table 9 Comments received during consultation with relevant state and territory government agencies.

Respondent	Major comments	Department's response
South Australian Government	The SA government supports the recommendations to not list 7 species, and to list 2 species under Part 2 with specific import conditions. The SA departments would also like to provide the following comments: • Supportive of listing *Synodontis eupterus* (featherfin catfish) in Part 2 of the Live Import List with the conditions: For identification only. High security facilities only. ○ Listing *Synodontis eupterus* with the condition for identification only will assist with differentiating between *Synodontis eupterus* and *Synodontis nigriventris*, a species listed on Part 1 of the Live Import List, at the border. ○ Housing in high security facilities will significantly reduce the risk of this species escaping or being introduced into the Australian environment. • It would be beneficial if the risk assessments undertaken by the applicants displayed the assessed risks against Australia's acceptable level of protection (ALOP), per the Animal Quarantine Policy Memorandum 1999/26. Being transparent as to when ALOP is not met is important for equivalence with other import processes.	Assessing risks against Australia's acceptable level of protection (ALOP), per the Animal Quarantine Policy Memorandum 1999/26 is outside the scope of assessments to amend the List of Specimens taken to be Suitable for Live Import under the *EPBC Act*.
Western Australian Government	The Western Australian Government notes and supports the recommendations and does not have any further comment.	

Glossary

Term	Definition
CITES	Convention on International Trade in Endangered Species
DAFF	Department of Agriculture Fisheries and Forestry
DAWE	Former Australian Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DoA	Former Australian Department of Agriculture
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
GISD	Global Invasive Species Database
IUCN	International Union for Conservation of Nature
mm	Millimetres
ppm	Parts per million
spp.	Species
SL	Snout length
TL	Total length

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