

FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE  
FINAL RECOMMENDATION ON A NOMINATION FOR LISTING

**Deliberate or accidental introduction of live fish into public or private waters within a Victorian river catchment in which the taxon to which the fish belongs cannot reliably be inferred to have been present prior to the year 1770 AD.**  
(Potentially Threatening Process)

Date of receipt of the nomination: 17 October 1991  
Date of preliminary recommendation: 18 October 1991  
Date of final recommendation: 10 March 1992

File No.: 91/5684

**Validity:**

The nomination is for a valid item and the prescribed information was provided. The nominated process was adequately defined and described.

The nominated process includes both the deliberate and accidental introductions of freshwater fish species from overseas, and also the introduction of native fish to waters outside the range in which they occurred prior to European settlement.

At least nine exotic species have been introduced deliberately, eight to create new fisheries and one for the purposes of biological control. Accidental introductions have been caused by liberations of estuarine species, presumably in discharged ballast water, and by escape or disposal of aquarium species.

Six native species have been deliberately introduced to drainage basins in which they did not naturally occur, to support recreational or commercial fisheries.

The process has occurred and is continuing to occur in most Victorian river catchments. The process has led to alteration to aquatic habitats, and effects on native freshwater fauna of competition, exclusion, predation, and introduction of diseases.

The range of flora or fauna affected or potentially affected was adequately stated in the nomination.

Significance of the threat which the potentially threatening process poses or has the potential to pose was adequately stated in the nomination.

**Eligibility for listing as a potentially threatening process under the Flora and Fauna Guarantee**

The nominated item satisfies at least one criterion of the set of criteria prepared and maintained under Section 11 of the *Flora and Fauna Guarantee Act 1988*, and stated in Schedule 1 of the *Flora and Fauna Guarantee Regulations 1990*.

**Evidence that criteria are satisfied:**

**Criterion 5.1** *The potentially threatening process, in the absence of appropriate management, poses or has the potential to pose a significant threat to the survival of a range of flora or fauna.*

**Evidence:**

Eight species deliberately introduced from overseas have established self-maintaining populations in Victorian inland waters. These are *Salmo trutta* (Brown Trout), *Onchorynchus mykiss* (Rainbow Trout), *Cyprinus carpio* (European Carp), *Carassius auratus* (Goldfish), *Tinca tinca* (Tench), *Rutilus rutilus* (Roach), *Perca fluviatilis* (English Perch or Redfin) and *Gambusia holbrooki* (Mosquitofish). *Onchorynchus tshawytscha* (Chinook Salmon) is maintained through constant re-stocking. Aquarium species that have escaped or been disposed of in the wild, and have also established self-maintaining populations, are *Misgurnus anguillicaudatus* (Oriental Weather Loach) and three cichlids (*Heros nigrofasciata*, *Cichlasoma octofasciatum* and *Tilapia mariae*). *Acanthogobius flavimanus* (Yellow-fin Goby) has presumably been introduced in discharged ballast water and has also established populations.

Exotic fish affect native aquatic species in several ways - by predation, spread of diseases, competition, harassment and habitat disturbance.

The effects of Brown Trout on native fish are well documented. Clear evidence is available (Jackson & Williams 1980, Koehn & Morison 1990) to show that *Galaxias olidus* (including the rare *G. o. var. fuscus*) has disappeared from several locations after invasion by trout. Evidence is also available to indicate that trout compete with and prey on galaxiids (Fletcher 1978, Jackson & Williams 1980, Tilzey 1976). *Galaxias brevipinnis*, *G. truttaceus* and *G. maculata* have been found in trout digestive systems (unpubl. data, DCE Freshwater Ecology Branch). In the opinion of the SAC, the introduction of trout has also probably contributed to the decline of *Macquaria macquariensis* (Trout Cod) and evidence has been presented to suggest predation on other small species. Trout are known to predate upon tadpoles and small frogs, and have been implicated in the disappearance of *Litoria spenceri* (Spotted Tree Frog) from parts of its range (Watson *et al.* 1991).

Harassment by introduced *Gambusia holbrooki* (mosquitofish) is a threat to native fish, as mosquitofish are known to eat the eggs and nip the fins of other species, and can endure sub-optimal conditions in a variety of habitats. Breen *et al.* (1989) have expressed concern at the likely effects of *Gambusia* if they were to colonise *Galaxiella pusilla* habitat.

At least one pathogenic disease has been introduced. Epizootic haematopoietic necrosis virus (EHNV) is known to affect *Bidyanus bidyanus* (Silver Perch), *Macquaria australasica* (Macquarie Perch) and *Galaxias olidus* (Langdon 1989) and may have contributed to the disappearance of Macquarie Perch from Lake Eildon (Langdon 1990).

*Maccullochella peelii* (Murray Cod), *M. macquariensis* (Trout Cod), *Macquaria australasica* (Macquarie Perch), *M. ambigua* (Golden Perch), *Bidyanus bidyanus* (Silver Perch), *Tandanus tandanus* (Freshwater Catfish) have been artificially propagated and introduced into drainage basins in which they did not naturally occur. The effect of this is unknown, but it is likely to result in introduction of diseases, and predation by large species upon smaller ones such as galaxiids.

**Criterion 5.2** *The potentially threatening process, in the absence of appropriate management, poses or has the potential to pose a significant threat to the evolutionary development of a range of flora or fauna.*

**Evidence:**

The SAC was satisfied that the nominated process can cause general decline and local extinctions of aquatic fauna and can change the species composition of streams. The process leads to reductions in the range and sizes of fish populations, fragments and isolates populations and causes reductions in the numbers of differing year classes. This can cause loss of genetic variation and hence reduce the species' ability to adapt to environmental change.

**Background Information:**

- A draft proposal to introduce eels into waters north of the Great Dividing Range (DCE 1991) is of particular concern.
- Of the taxa known or believed to be affected by the nominated process, ten have been listed on Schedule 2 of the FFG Act: Murray Cod, Trout Cod, Australian Grayling, Macquarie Perch, *Galaxias olidus var. fuscus*, *Nannoperca variegata* (Ewens Pygmy Perch), *Edelia obscura* (Yarra Pygmy perch), *Galaxiella pusilla* (Dwarf Galaxias), *Galaxias cleaveri* (Tasmanian Mudfish) and Spotted Tree Frog.

**Advertisement for public comment**

In accordance with the requirements of Section 14 of the *Flora and Fauna Guarantee Act 1988*, the preliminary recommendation was advertised for public comment for a period of at least 30 days.

The preliminary recommendation was advertised in:

"The Age" - on 13 November 1991

"The Weekly Times" - on 13 November 1991

*Government Gazette* - on 13 November 1991

Submissions closed on 16 December 1991.

**Further evidence provided:**

Submissions were received by the Scientific Advisory Committee, but no new evidence was provided to warrant a review of the Scientific Advisory Committee's preliminary recommendation that the potentially threatening process is eligible for listing.

**Documentation**

The published information and research data provided to the SAC have been assessed. To the best of their knowledge, the SAC believes that the data presented are not the subject of scientific dispute and the inferences drawn are reasonable and well supported.

### **Final Recommendation of the Scientific Advisory Committee:**

The Scientific Advisory Committee concludes that on the evidence available the nominated item is eligible for listing in accordance with Section 11 of the Act because primary criteria 5.1 and 5.2 are satisfied.

The Scientific Advisory Committee recommends that the nominated item be supported for listing on Schedule 3 of the *Flora and Fauna Guarantee Act 1988*.

### **Selected references:**

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