Australian Grayling

# *Prototroctes maraena*

TASMANIAN THREATENED FAUNA LISTING STATEMENT

Image by Ron Mawbey

**Scientific name:** ***Prototroctes maraena*** Günther, 1864.

**Order / Family:** **Salmoniformes / Prototroctidae**

**Status:** *Threatened Species Protection Act 1995*: **vulnerable**

*Environment Protection and Biodiversity Conservation Act 1999*: **Vulnerable**

Tasmanian NRM Regions: **Cradle Coast, North and South**

Regional Forest Agreement: **Listed**

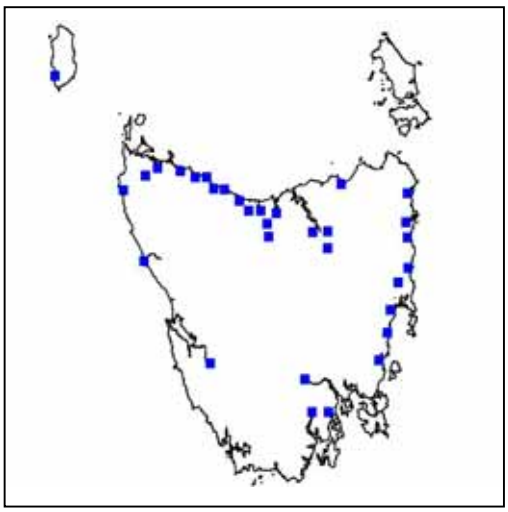

**Figure 1**. Known distribution of *Prototroctes maraena* in Tasmania

**Figure 2.** *Prototroctes maraena* Image by Ron Mawbey

## DESCRIPTION AND ECOLOGY

The Australian grayling is a silvery, streamlined fish, growing to approximately 30 cm in length. It has a distinctive cucumber smell and is sometimes known as the cucumber herring or cucumber mullet. The dorsal fin is positioned just behind the base of the pelvic fin, there is a small adipose fin, forked tail, thin scales and no lateral line. The body shape is slender and compressed, with a small head, large eyes and bluntly pointed snout. Colour may vary with age, from silvery with olive-grey back and whitish belly, to olive green-brown on the back with a darker side streak and silvery-yellow belly (McDowall 1996).

The biology of this species is not well known. Spawning occurs in freshwater around autumn-winter (Bishop and Bell 1978b, Jackson and Koehn 1988), although the timing apparently varies between rivers and years (Jackson and Koehn 1988, R. Faragher pers. comm.). Recent work in Victoria indicates that grayling may require an increase in flow above a critical level to trigger spawning (J. O'Connor pers. comm.). Spawning behaviour and exact spawning habitat are unknown. Females produce a very large number (approximately 40,000-50,000) of small, amber coloured eggs (Berra 1982), which are non-adhesive, and probably scatter on the riverbed.

After hatching the larvae are buoyant and swim actively towards the surface and are swept to sea (Bacher and O'Brien 1989). The diadromous migration appears to be an obligatory aspect to the life history (Crook *et al.* 2006) and juveniles return upstream after four to six months to spend the rest of their life in freshwater. Grayling spawn at two years of age although some males may mature within one year. The migrating juveniles are sometimes found amongst whitebait or elver runs (J. Diggle pers. comm.). Adults are occasionally observed in large schools in rivers.

Graylings are omnivorous, feeding on a mixed diet of small aquatic insects, crustaceans and algae (Berra *et al.* 1987). They may live for up to six years (R. Faragher pers. comm.) although most reach only two to three years (Bishop and Bell 1978b).

## DISTRIBUTION AND HABITAT

The Australian grayling occurs in coastal streams and rivers around Tasmania and in south-eastern Australia from western Victoria to southern New South Wales as far north as the Shoalhaven River. It may occur in any coastal stream without barriers to upstream juvenile migration.

Adult grayling have been found in deep, slow flowing pools (Bishop and Bell 1978b) and in clear, gravel-bottomed streams with moderate flow and alternating pools and riffles (Berra 1982) as well as muddy waters (Jackson and Koehn 1988). The freshwater spawning habitat is unknown, as is the marine juvenile habitat. Dispersal distances in both the marine and freshwater habitat are also not known, although in Victoria they have been recorded more than 100 km upstream from the sea (Jackson and Koehn 1988).

## HISTORICAL DISTRIBUTION

*Prototroctes maraena* was widespread in coastal rivers from the Grose River west of Sydney throughout New South Wales, Victoria and eastern South Australia (Wager and Jackson 1993). This species occured throughout Tasmania, including King Island.

## AREA CURRENTLY OCCUPIED

*Prototroctes maraena* is patchily distributed throughout the former range, in reduced numbers. Large populations apparently remain in a few rivers (Wager and Jackson 1993, Faragher pers. comm.). It may have disappeared from some rivers (Bell *et al.* 1980).

**TABLE 1: IMPORTANT RIVER LOCATIONS**

| | | |
|---|---|---|
| Ansons | Ettrick | Meredith |
| Apsley | Forth | Mersey |
| Arthur | George | North Esk |
| Blythe | Gordon | North West Bay |
| Cam | Great Forester | Pieman |
| Derwent | Huon | Prosser |
| Detention | Inglis | Rubicon |
| Don | Leven | Scamander |
| Douglas | Lisdillon | Sulphur |
| Duck | Little Swanport | |

**RESERVATION STATUS**

In Tasmania the habitat of the Australian grayling is reserved in the south-west National Park, where some entire catchments are undisturbed. The only record of the species from this area is from the Gordon River downstream of the Franklin River. Other rivers around the coast are on private or State forest land, or have only part of the catchment reserved, for example the Douglas-Apsley National Park.

**POPULATION ESTIMATE**

Unknown

**CONSERVATION ASSESSMENT**

*Prototroctes maraena* is the only surviving member of the family Prototroctidae (Southern graylings). A closely related species from New Zealand (*Prototroctes oxyrhynchus*) became extinct by the 1930s for reasons that are unclear (Bell *et al*. 1980). The Australian grayling has declined in numbers although is still quite widespread (Fulton 1990). It was once common and often taken by anglers but is now rarely seen. Berra (1982) suggested that large fluctuations in grayling populations might be a natural result of variation in recruitment from year to year.

*Prototroctes maraena* is listed as **vulnerable** on the Tasmanian *Threatened Species Protection Act 1995* (TSP) and **Vulnerable** on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC). There has been a decline in numbers resulting in rarity over much of its former range (Fulton 1990) and there are ongoing threats from habitat degradation particularly barriers to migration between the sea and freshwater (McDowall 1996) and removal of riparian vegetation.

**THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES**

The species is threatened by various types of habitat degradation:

- Barriers such as dams, weirs and culverts prevent upstream movement of juveniles and downstream movement of adults. These movements are essential for completion of the species' life cycle.
- River regulation by dams and water extraction causes loss of dry weather flows and minor floods. Sudden cessation of flows below a dam has killed many grayling in New South Wales (Bishop and Bell 1978a).
- Removal of floods by river regulation may reduce opportunities for spawning.
- Loss of riparian vegetation through clearing or dieback results in degradation of the aquatic habitat, such as siltation from catchment erosion.
- Channel damage can occur from sand and gravel extraction.
- Exotic fish such as trout and redfin perch may predate on the larvae and juvenile stages and compete for adult habitat (Jackson and Koehn 1988).
- Risk of infection by introduced parasites and diseases. A copepod parasite probably originating on carp and redfin has been found on grayling in Victoria (Hall 1983). Mass mortalities and decline of grayling reported in the 1880s (references in Jackson and Koehn 1988) coincide with introduction of trout to Tasmania (in 1864), and they may have brought a disease fatal to grayling (Cadwallader 1996).
- Lack of knowledge of habitat requirements, recruitment processes and how the threatening processes operate. It is not known whether populations are maintained by spawning in only a few rivers from which the juveniles disperse to other rivers (Jackson and Koehn 1988). Constraints on removal of barriers, for example cost of weir removal, are limiting, as is lack of knowledge of what is required to provide effective passage over remaining barriers. Management of water use to maintain a natural flow regime is an important issue.

**MANAGEMENT STRATEGY**

- To protect high priority sites through formal and informal reservation, removing redundant stream weirs and culverts, and promoting streamside restoration.
- To gather more information about the ecology of the species to assist conservation management.

- Conduct additional surveys to determine the species' distribution and population status.

### *What has been done?*

There is currently no active conservation management or research directed at the species in Tasmania. A survey of New South Wales south coast rivers for the species was conducted in 1993-94 (R. Faragher pers. comm.). No specific management plan is in place in New South Wales except for a ban on fishing (R. Faragher pers. comm.).

The Australian grayling is fully protected under TSP and EPBC legislation and the Tasmanian *Inland Fisheries Act 1995*. It is prohibited to take or disturb the species. However, there has been little public education and enforcement to support the legislation. The grayling is protected in Victoria under the *Flora and Fauna Guarantee Act 1988*. A National Recovery Plan is being prepared.

Measures are being implemented to address habitat degradation in the long term, for example, the setting of environmental flows for regulated rivers and removing redundant weirs from coastal streams.

The species is included in the Forest Practices Authority *Threatened Fauna Manual for Production Forests* (2001) and the *Threatened Fauna Adviser* (2001). Any forest harvesting potentially affecting the species will be flagged through the threatened species notification process. Management recommendations in the *Threatened Fauna Adviser* provide management prescriptions to protect this species in conjunction with the Forest Practices Code (2000).

Captive breeding is considered as a 'last resort' tool for the conservation management of threatened species. It is not considered a necessary management action in the national *draft Recovery Plan for Australian Grayling* (Backhouse *et al.* 2006). The Australian grayling has a widespread distribution and projects directed at population monitoring and habitat management and restoration are considered to be a more efficient and effective use of resources.

### *What is needed?*

Recovery actions necessary to protect *Prototroctes maraena* include:

- Survey coastal rivers to determine the current distribution and habitat integrity of the species in Tasmania, including upstream geographic range.
- Determine status of the populations to better assess conservation status and develop benchmarks for species recovery.
- Determine habitat requirements needed for completion of the life cycle, including spawning cues.
- Identify rivers that are most important for recruitment so that these are a high priority for protection.
- Remove barriers to migration (eg redundant weirs).
- Protect riparian vegetation.
- Undertake a study of the population genetics of the species across its entire range to determine whether Tasmanian populations are distinct from mainland ones.

### ADVICE FOR LANDOWNERS/MANAGERS AND ANGLERS

The following actions will assist to conserve *Prototroctes maraena* in Tasmania:

- Remove redundant barriers such as dams, weirs and culverts that prevent upstream movement of juveniles and downstream movement of adults and facilitate fish passage where barriers to movement exist.
- Avoid any activities that may impact upon the species' habitat such as stock access to riparian vegetation or altering natural flow regimes.
- Release any grayling accidentally caught and report the record to the Inland Fisheries Service for monitoring purposes.

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**SPECIALIST ADVICE**

Inland Fisheries Service (IFS), 17 Back River Road, New Norfolk, Tasmania 7140.

**Prepared by:** Dr Jean Jackson (formerly of IFS)

**Updated by:** Robbie Gaffney, December 2006.

**Review Date:** When new information is received.

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**View:** http://www.dpiw.tas.gov.au and follow the links to Natural Environment, Threatened Species, then Threatened Species Lists.

**Contact details:** Threatened Species Section, Department of Primary Industries and Water, GPO Box 44, Hobart, Tasmania Australia 7001.

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**Permit:** It is an offence to collect, disturb, damage or destroy this species unless under permit.