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FINAL DETERMINATION

Gadopsis marmoratus – river blackfish population in the Snowy River catchment

The Fisheries Scientific Committee, established under Part 7A of the *Fisheries Management Act 1994* (the Act), is has made a final determination to insert the Snowy River population of *Gadopsis marmoratus* – river blackfish into Part 2 of Schedule 4 Endangered Populations of the Act. The amendment of the threatened species lists is provided for by Part 7A, Division 2 of the Act.

The Fisheries Scientific Committee, with reference to the criteria relevant to this species, prescribed by Part 11B of the *Fisheries Management (General) Regulation 2002* (the Regulation) has found that:

Background

1. River blackfish – *Gadopsis marmoratus* (Richardson, 1848) is a valid, recognised taxon and is a species as defined in the Act.

2. *Gadopsis marmoratus* is a member of the family Percichthyidae, and is known by the common names river blackfish, freshwater blackfish, slippery, slimy, marbled river cod, greasy, taylor, Snowy River blackfish.

3. Morphological and genetic data suggest that *Gadopsis marmoratus* consists of two distinct geographical forms (Ovenden *et al.* 1988, Miller *et al.* 2004). These include a 'southern' form confined to the coastal drainages of Tasmania, Victoria and southern New South Wales, and a 'northern' form confined to the inland drainage of the Murray-Darling Basin (including South Australia). This northern form is the most easterly and northern population in Australia (Morris *et al.* 2001). Analysis of mitochondrial DNA suggest that the two forms may be genetically distinct, however, studies are to date inconclusive and the two forms are yet to be described as separate species (Miller *et al.* 2004). Even if the two forms are the same species, however, the populations in the Snowy River System (southern form) remain isolated or disjunct from all other populations of the species (Gilligan 2008). This population is therefore of conservation importance.

4. *Gadopsis marmoratus* in the north is a secretive benthic-dwelling fish found in habitats ranging from small snaggy streams (Lake 1971) and fast flowing rivers to murky sluggish streams and dams (Llewellyn 1983). The southern form may be more habitat-specific, preferring streams towards 'clear flowing streams'. *Gadopsis marmoratus* is essentially an insectivore, but also feeds on crustaceans, molluscs and small fishes (Lake 1971, Cadwallader & Backhouse 1983). It spawns from spring to early summer when temperatures exceed 16^{o}C (Morris *et al.* 2001). Fecundity is low and proportional to the size of the fish (Cadwallader & Backhouse 1983). Eggs are deposited in hollow logs or rock crevices and are guarded and cleaned by the male (Jackson *et al.* 1996). *Gadopsis marmoratus* is a non-migratory fish (Kahn *et al.* 2004).

Port Stephens Fisheries Centre, Locked Bag 1, Nelson Bay NSW 2315
Phone: (02)4982-1232 Fax: (02)4982-2265 Email:fsc@dpi.nsw.gov.au

5. *Gadopsis marmoratus* is currently protected in South Australia. It is not listed in any other state, nor is it listed by the Australian Society for Fish Biology (ASFB), the Environment Protection and Biodiversity Conservation (EPBC) Act 1999, or on the 2007 International Union for Conservation for Nature (IUCN) Red List of Threatened Species.

Criteria – reduction in abundance, geographic distribution or genetic diversity (Regulation clause 340I)

1. *Gadopsis marmoratus* was once widely distributed and highly abundant throughout the Snowy River System (Woodford 2006). This blackfish was important in the cultural diet of the Aboriginal people, and a significant dietary component for early Snowy pioneers. During the Great Depression it was reportedly possible to catch dozens of individuals in a single afternoon. It is believed the species is now restricted to the Delegate River and, despite extensive sampling by NSW DPI, it has only recently been found in 11 sites within a 50km area of the catchment (NSW DPI Freshwater Research Records). In surveys over recent years, the maximum catch for any one sample is 11 fish from approximately 45 minutes of electrofishing (Gilligan 2008).

2. In light of the above, the Fisheries Scientific Committee has found that the species has undergone a very large reduction in abundance and a very large reduction in geographic distribution within a time frame appropriate to the life cycle and habitat characteristics of the taxon; this meets the criteria of Endangered, but not Critically Endangered.

Criteria – threatening processes (Regulation clause 340J)

1. Habitat degradation caused by soil erosion and land clearing in the catchment (including historical clearing of riparian vegetation) is thought to have reduced the abundance of *Gadopsis marmoratus* in many of the upper tributaries where it was previously common (Lake 1971). It is especially sensitive to increased siltation (particularly from weir de-silting operations), which can smother eggs and kill juveniles (Jackson *et al.* 1996). Such barriers to fish passage pose substantial problems to this non-migratory species (Kahn *et al.* 2004). Coldwater pollution associated with dam construction, along with the removal of large woody debris, also negatively impact on reproductive success (Astles *et al.* 2003). The proliferation of willows within the snowy catchment has had a negative impact on the stream ecology in general, and do not form the appropriate hollows required for *Gadopsis marmoratus* spawning (Astles *et al.* 2003).

2. The introduction of trout and redfin (and possibly EHNV) in the reaches downstream of the current population of *Gadopsis marmoratus* in the Snowy Catchment may also have a detrimental effect. Accidental catches of *Gadopsis marmoratus* occur when fishing for the introduced species (NSW DPI Freshwater Research Records). Although differing in habitat preferences, the trout and *Gadopsis marmoratus* have similar diets (Jackson 1978). This could result in interspecific competition, with the more aggressive and territorial trout outcompeting *Gadopsis marmoratus* in degraded habitats. Moreover, it is probable that trout prey on juvenile *Gadopsis marmoratus*,

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but the extent of any predation is currently unknown (Gilligan 2008). It should be noted, however, that numbers of river blackfish and brown trout have increased over the last 13 years at a long-term monitoring site (NSW DPI Freshwater Research Records), suggesting that brown trout are unlikely to be the key threatening process.

3. The mean annual flow in the Snowy River downstream of Lake Jindabyne has declined by 99% since the completion of the Snowy Hydro scheme. This reduction in water flow is likely to be a primary cause of the decline of *Gadopsis marmoratus* that, in general, prefer habitats with flowing water (Lake 1971).

4. In light of the above, the Fisheries Scientific Committee has found that most of these threatening processes continue to operate throughout the geographic distribution of the species, and existing reserve systems or other forms of refuge do not protect the Snowy River population of *Gadopsis marmoratus*.

Conclusion pursuant to section 220FA(1) of the Act

In the opinion of the Fisheries Scientific Committee:

a. The Snowy River population of *Gadopsis marmoratus* is facing a very high risk of extinction in New South Wales in the near future, as determined in accordance with the criteria prescribed by the Regulation as discussed above; and

The species is eligible to be listed as an ENDANGERED POPULATION.

Sources and Links

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Assoc Prof Ron West
Chair
Fisheries Scientific Committee

Port Stephens Fisheries Centre, Locked Bag 1, Nelson Bay NSW 2315
Phone: (02)4982-1232 Fax: (02)4982-2265 Email:fsc@dpi.nsw.gov.au