January 2016 Ref. No. FD 60
File No. FSC 00/10

FINAL DETERMINATION

***Notopala sublineata* – Darling River Snail as a Critically Endangered Species**

The Fisheries Scientific Committee, established under Part 7A of the *Fisheries Management Act 1994* (the Act), has made a final determination to omit *Notopala sublineata* – River Snail from Part 1 of Schedule 4 of the Act (Endangered Species), and insert *Notopala sublineata* – Darling River Snail into Part 1 of Schedule 4A of the Act (CRITICALLY ENDANGERED SPECIES).

The listing of Critically Endangered Species 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 16, Division 1 of the *Fisheries Management (General) Regulation 2010* (the Regulation) has found that:

Background

1) Two river snails belonging to the live-bearing freshwater genus Notopala from New South Wales were each described as distinct species, *viz. N. sublineata* Conrad, 1850 and *N. hanleyi* Frauenfeld, 1864. A third, related taxon *N. alisoni* Brazier, 1879 occurs outside New South Wales. In recent years these three taxa have sometimes been considered to be subspecies of a single species for which *N. sublineata*, the earliest available name, is the species-level name. Although *N. alisoni* was indeed synonymised with another species *N. waterhousei* Adams and Angas, 1864 by Stoddart (1982), there has not been a formal publication synonymising *N. hanleyi* and *N. sublineata*. Consequently the species must be regarded as distinct, as listed by Iredale (1943) and Smith (1992). A fourth taxon, *Notopala kingi suprafasciata* (Billabong Banded Snail) is also present in the Murray-Darling Basin but is largely confined to billabongs/ponds and off-channel habitats (Jones 2011).

2) Genetic analyses combining the data of Carini and Hughes (2006) and Holmes *et al*. (2013) strongly suggest that *N. hanleyi* and *N. alisoni* are distinct species (Holmes *et al*., 2013). Genetic data are not available for *N. sublineata*. Morphological analyses (Sheldon and Walker, 1993; Holmes *et al*., 2013) show that the shells of the taxa can be distinguished conchologically, supporting their status as distinct species.

3) *Notopala sublineata* was once common and widely distributed in the Darling River and its tributaries. Australian Museum collections show 76 historical records of the species from this distribution.

4) The family Viviparidae is characterised by females brooding their young to a crawl-away stage, so *N. sublineata* has limited dispersal abilities. The closely related *N. hanleyi* principally grazes on the bacterial biofilms that occur on hard substrates in free flowing bodies of water, such as rivers (Sheldon and Walker, 1997).

5) In view of the above, the Committee considers that *Notopala sublineata* is a valid, recognised taxon and is a species as defined in the Act.

Criteria – reduction in abundance, geographic distribution or genetic diversity (Regulation clause 271)

1) *Notopala sublineata* populations rapidly declined in the 1960-70s and by the 1980s were reduced to a handful of locations. The most recent verifiable record of a living specimen

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(from water pipes at Brewarrina) dates from 1996 but this was not found in the species natural habitat.

2) Comprehensive recent surveys in the lower Darling River (9 sites), upper Darling/Barwon River (5 sites) and Namoi River (5 sites) (Mitchell 2005), and Pilliga Outwash and Pilliga subregions (88 aquatic sites) (Murphy and Shea, 2013) and along the Darling River (27 sites) (Holmes *et al*., 2013) failed to find living *N. sublineata*. Old *N. sublineata* shells were found near Bourke, Brewarrina and Walgett. Apparently, "fresh" shell fragments were recovered by flushing from Brewarrina's town water pipelines; although none were found in the Bourke pipelines (Holmes *et al*., 2013).

3) The lack of recent records of *N. sublineata* in New South Wales and the absence of living specimens in recent surveys indicate that the species has undergone extremely large reductions in population size and geographic distribution.

4) In determining the extent of the reduction in the abundance of the species, the Fisheries Scientific Committee has had particular regard to the implications of the species' highly restricted habitat which exposes it to a very high risk of extinction through recruitment failure (Regulation clause 271 (2) (d) (i)) and the pressures imposed by the use and management of the habitat (Regulation clause 271 (2) (e) (ii)) for town water supplies.

Criteria – threatening processes (Regulation clause 272)

1) The causes of decline in *N. sublineata* may include changes to benthic biofilm biomass as a consequence of river regulation (principally weir and dam building) that reduces flow variability (Walker and Thoms, 1993) and favours the growth of algal substrates instead of bacterial substrates. This has been suggested as a cause of the decline in the related species *N. hanleyi* (Sheldon and Walker, 1997) who propose that it is not able to thrive on the relatively low nutrient content provided by algae.

2) The decline in the species occurred around the time of the incursion of Common Carp into the Darling River system and may be associated with predation by these fish or habitat degradation caused by them (Sheldon and Walker, 1993; Mitchell, 2005; Holmes *et al.* 2013).

3) The species is also threatened by deliberate removal (using flushing with chemicals) from the habitats where it may still survive (e.g. town water supply pipelines on the Darling River).

Conclusion pursuant to section 220F(2) of the Act

In the opinion of the Fisheries Scientific Committee, *Notopala sublineata*, Darling River Snail is facing an extremely high risk of extinction in New South Wales in the immediate future, as determined in accordance with the criteria prescribed by the regulations as discussed above.

The species is eligible to be listed as a CRITICALLY ENDANGERED SPECIES.

Sources and Links

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