NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the *Threatened Species Conservation Act* 1995 (the Act), has made a Final Determination to list the Western Sawshelled Turtle *Myuchelys bellii* (Gray, 1844) as an ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to *Myuchelys bellii* (Gray, 1844) from Part 1 of Schedule 2 (Vulnerable species) of the Act. Listing of Endangered species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. The Western Sawshelled Turtle *Myuchelys bellii* (Gray, 1844) (family Chelidae) is a medium-sized freshwater chelid turtle, reaching a maximum straight line carapace size of ~230 mm in males and ~300 mm in females (Cogger 2014; Chessman 2015). Cogger (2014) describes this species as "similar in most respect to [the Sawshelled Turtle *Myuchelys latisternum*] *Wollumbinia latisternum.* Like the latter it is brown above, whitish below, the two colours usually forming a sharply defined line on the side of the face and throat at the level of the angle of the jaws. Usually a distinct yellow stripe from the angle of the jaws, especially in the young. Shell above broadly oval, expanded posteriorly, with a serrated hind edge, except in larger specimens. Plaston moderate, nearly twice as long as broad, the front and rear lobes tapering from the bridge. Intergular shield as wide as or wider than each gular shield. Neck above with conspicuous sharp pointed tubercles. No alveolar ridge on the maxilla. Macrocephaly does not occur. 20 cm (shell length)". *Myuchelys bellii* is morphologically similar to the Sawshelled Turtle *M. latisternum,* Manning River Helmeted Turtle *M. purvisi* and Bellinger River Snapping Turtle *M. georgesi* (Cogger 2014) but is genetically distinct (Georges and Adams 1996; Fielder *et al.* 2012; Spinks *et al.* 2015).

2. The Western Sawshelled Turtle *Myuchelys bellii*, was previously known as *Phrynops bellii, Elseya bellii* and *Elseya latisternum bellii* (Georges and Thomson 2010). Based on fixed allelic differences, Georges and Adams (1996) established *M. bellii* as a distinct biological species from its nearest relative, *M. latisternum*, with which it is broadly parapatric (Georges and Thomson 2010). In addition, the genus name *Myuchelys* (Thomson and Georges 2009) is currently disputed, with *Wollumbinia bellii* used in some publications (Wells 2007; Wells 2009; Cogger 2014).

3. The Western Sawshelled Turtle is endemic to flowing rivers in northern New South Wales (NSW) and far south-eastern Queensland (Qld) within the temperate zone of Eastern Australia (Fielder *et al.* 2014). The Western Sawshelled Turtle is not found east of the Great Dividing Range. In NSW, all mature individuals of the Western Sawshelled Turtle have been recorded within a small number of locations. There are four separate sub-populations in the Namoi, Gwydir, Severn and Deepwater River systems of the Murray-Darling Basin (Chessman 2015; Fielder *et al.* 2015). The Severn and Deepwater Rivers are within the Border Rivers catchment which continues into Qld where a fifth population occurs. The species is largely aquatic and terrestrial movements are likely to be small, since this species is not capable of moving overland between rivers (Chessman 2015). Thus, the population is inferred to be severely fragmented.

4. Habitat of the Western Sawshelled Turtle consists of high elevation (600—1,100 m a.s.l.) permanent cold flowing streams with complex in-stream habitats (Fielder *et al.* 2014, 2015; Chessman 2015). Highest abundances of the species are reported in areas with lower average air temperature and greater mean annual water flow (Chessman 2015). Typical river morphology includes deep pools (2—3 m) which provide diurnal refuge and hibernation sites during colder periods of the year, boulder screes and bedrock with coarse granite sand deposits often covered in fine silt, algal or macrophytes (Cann 1998; Fielder *et al.* 2014, 2015; DoE 2016). Most records of the species are from narrow sections of rivers

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30—40 m wide (Wells 2002; Fielder 2010; OEH 2016a). Underwater caverns formed by granite boulders, large woody debris and overhanging banks are also common habitat features (Fielder *et al.* 2014, 2015). During the active months this species is crepuscular and forages in shallows and riffle zones (Fielder *et al.* 2015) and can sometimes be seen basking (Wells 2002). The species is omnivorous and its diet includes aquatic and terrestrial plant material and invertebrates (Fielder *et al.* 2014).

5. Nesting in the Western Sawshelled Turtle is terrestrial and occurs between October and mid-January, when females lay 8 to 23 (average 18.3) eggs (Cann 1998; Fielder *et al.* 2014). Hatchlings typically start to emerge in late January (Fielder *et al.* 2014). The few nests that have been reported are on riverbanks in sand or loam (Cann 1998; Fielder *et al.* 2014). Females lay a single clutch per year although Fielder *et al*. 2014 found that only 78% of females ovulate in any one season and estimated fecundity is 14.3 eggs per female per year. Like other chelid turtles, mortality of eggs and hatchlings is high, which when combined with modest fecundity makes the stability of turtle populations sensitive to changes in adult survivorship (Georges *et al.* 1993; Blamires *et al.* 2005; Blamires and Spencer 2013). The species' ability to recover from a catastrophic loss of adults is likely to be limited (NSWSC 2016).

6. The generation length of the Western Sawshelled Turtle is uncertain. This species has delayed age at first breeding with males maturing at nearly 10 years old and females approaching 20 years (Fielder *et al.* 2014), therefore the generation length is likely to be significantly greater than 20 years. Fielder *et al*. (2014) predicts that the lifespan exceeds 40 years.

7. The geographic distribution of the Western Sawshelled Turtle is estimated to be highly restricted. The extent of occurrence (EOO) is 16,350 km^2 based on a minimum convex polygon enclosing all mapped occurrences of the species in NSW (OEH 2016b, Georges 2016), the method of assessment recommended by IUCN (2014). The area of occupancy (AOO) is estimated to be 232 km^2, based on 2 × 2 km grid cells, the scale recommended for assessing AOO by IUCN (2014).

8. There is substantial evidence for continuing declines in habitat quality for the Western Sawshelled Turtle. The species is poorly represented in conservation reserves. Much of its habitat consists of rivers running through lands used for livestock grazing (DoE 2016; OEH 2016a) where it faces multiple threats including predation by introduced species, illegal collecting, habitat degradation, climate change, disease, and potentially competition and hybridisation with *Emydura macquarii*. The nests and nesting females of Western Sawshelled Turtles are preyed upon by the introduced Red Fox (*Vulpes vulpes*) and feral pigs (*Sus scrofa*) (Spencer and Thompson 2000; Blamires *et al.* 2005; Spencer *et al.* 2007; OEH 2016a). The nest predation rate of this species is unknown but, in *E. macquarii*, the rate exceeds 90% from foxes alone (Thompson 1983). Trampling and vegetation removal by livestock and other introduced herbivores in riparian areas may disturb nests (QLD DEHP 2016). Agricultural activities may also produce runoff containing pesticides, increase turbidity, introduce dams, increase sedimentation, and result in the removal of log jams and other simplifications to habitat complexity, all of which lower water quality and reduce the availability of nesting and foraging habitat (Bunn and Arthington 2002; Wells 2002; DoE 2016; OEH 2016a). As the species is confined to high-elevation permanent cold flowing streams, increasing temperatures and altered rainfall patterns associated with climate change (CSIRO 2011) are likely to have negative impacts on Western Sawshelled Turtle. An unidentified disease causing blindness affects 14% to over 50% of the population (depending on location). Affected individuals may have reduced foraging capacity, predator avoidance ability and reproductive capacity (Cann 1998; OEH 2016a; DoE 2016), though it is unclear whether this precludes long-term survival (Chessman 2015). In the closely related *Myuchelys georgesi*, recent catastrophic mortality has been associated with an un-described disease (NSW Scientific Committee 2016). The cause of this disease and the susceptibility of *Myuchelys bellii* to this disease is unknown. Hybridisation with and competition from *E. macquarii* downstream in NSW are potential threats (Chessman 2015;

OEH 2016a) and have been identified as significant threats to *M. georgesi* (Blamires *et al.* 2005; Spencer *et al.* 2007, 2014). 'Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands', 'Anthropogenic Climate Change', 'Clearing of native vegetation', 'Predation by the European Red Fox *Vulpes vulpes*' and 'Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)' are listed as Key Threatening Processes under the Act.

9. The Western Sawshelled Turtle *Myuchelys bellii* (Gray, 1844) is currently listed as a Vulnerable species under the *EPBC Act 1999* as Bell's Turtle *Wollumbinia belli.*

10. The Western Sawshelled Turtle *Myuchelys bellii* is not eligible to be listed as a Critically endangered species.

11. The Western Sawshelled Turtle *Myuchelys bellii* (Gray, 1844) is eligible to be listed as an Endangered species as, in the opinion of the Scientific Committee, it is facing a very high risk of extinction in New South Wales in the near future as determined in accordance with the following criteria as prescribed by the *Threatened Species Conservation Regulation 2010*:

Clause 7 Restricted geographic distribution and other conditions
The geographic distribution of the species is estimated or inferred to be:
(b) highly restricted,
and either:
(d) a projected or continuing decline is observed, estimated or inferred in the key indicator:
(b) the geographic distribution, habitat quality or diversity, or genetic diversity;
(e) the following conditions apply:
(i) the population or habitat is observed or inferred to be severely fragmented;
(ii) all or nearly all mature individuals are observed or inferred to occur within a small number of populations or locations.

Dr Mark Eldridge
Chairperson
NSW Scientific Committee

Exhibition period: 28/04/17 - 23/06/17 Proposed Gazettal date: 28/04/17

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