FLORA & FAUNA GUARANTEE

NOMINATION NO. **884**
TAXON ID 5136

FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE

PRELIMINARY RECOMMENDATION ON A NOMINATION FOR LISTING

Ornithorhynchus anatinus Shaw 1799 - Platypus

File No.: FF/54/3795

Dates of consideration: 25 June, 8 October, 12 November 2018; 21 January, 4 March, 6 May, 8 August, 22 October, 5 December 2019; 6 February, 6 March, 13 May, 19 June, 8 July 2020

Validity: The nomination is for a valid item.

Prescribed Information: The prescribed information was provided.

Name of the Nominator is adequately provided.

Name of the Item is adequately provided.

The nominated taxon is accepted by the Scientific Advisory Committee (SAC) as a valid taxon because it has been formally described and is accepted as a valid taxon by Museum Victoria.

Current conservation status

The nominated taxon is not currently regarded as rare or threatened in Victoria.
The nominated taxon was listed as 'Near Threatened' in Australia by the International Union for Conservation of Nature (IUCN) in 2016 (Woinarski & Burbidge 2016).

Eligibility for listing as a taxon under the Flora and Fauna Guarantee Act 1988

The Scientific Advisory Committee has assessed the eligibility of this nomination based on its extinction risk within Victoria in accordance with Section 16C(4)(c) of the *Flora and Fauna Guarantee Act 1988* (the Act) and notes that it is now over two years since the nomination was received.

This nomination was made to the Committee on 31 May 2018 in accordance with the Act and Flora and Fauna Guarantee Regulations 2011 and was accepted as a nomination by the Committee on 25 June 2018.

Amendments to the Act came into operation on 1 June 2020 and the Flora and Fauna Guarantee Regulations 2011 have since been replaced by the Flora and Guarantee Regulations 2020.

The SAC is required to consider this nomination in accordance with the Act as amended and the criteria for determining eligibility for listing prescribed in the Flora and Fauna Guarantee Regulations 2020. In its application of the relevant eligibility criteria, the SAC has had regard to the *IUCN Red List Categories and Criteria (Version 3.1)* and the Guidelines for Using the *IUCN Red List Categories and Criteria.*

Species information

Description and Life History
The platypus is semi-aquatic and has a streamlined, dorso-ventrally flattened body and a broad, flat tail, all covered in dense waterproof fur. It has short limbs with webbed feet and is easily distinguished by a rubbery bill. Typically males are 400-630 mm long and weigh 1000-3000g, while females are 370-550mm long and weigh 600-1700g.

Platypuses are seasonal breeders with courtship and mating generally occurring in early spring, and independent juveniles emerging from burrows in late summer. The breeding season varies slightly from north to south across their range (Grant 2007). In Victoria, the mating season is from August to the end of November, with young emerging from their nest and weaning in late summer. During the breeding season males become highly territorial and will fight for access to areas and mates. Males and females undergo a complex courtship, engaging in non-contact and contact behaviours prior to mating (Thomas et al 2018a). Females may not breed every year, which may be due to their body condition and available nutrition.

During pregnancy, females construct a complex underground burrow with multiple tunnels, chambers and dead ends, and a nesting chamber where the female makes a nest from vegetation to house her eggs and care for her young. (Thomas et al 2018b). The female lays 1-3 eggs (generally 2) after an estimated gestation of ~16 days (Thomas 2018). At hatching, after ~10 days incubation, platypus hatch - they are unfurred and ~15mm in length. The female will suckle the young for 3-4 months prior

to their emergence from the burrow. Like other monotremes, platypus provides milk through areola, rather than teats. The female's energy intake more than doubles that of a non-lactating female during the final month of lactation, suggesting an extremely high energetic load on the mother during lactation (Thomas 2018). At emergence, juveniles are up to 67% of the adult weight and ~80% of the adult length (Grant & Temple-Smith 1998).

Wild females have been known to live as long as 21 years (Grant 2004; Bino et al. 2015) and a wild male caught in Melbourne (which had been micro chipped) was 20 years old (Herald Sun, 2015) However, 15 years is the usual longevity given for wild platypus (pers comms, 2018, Dr Marissa Parrott, Reproductive Biologist, Zoos Victoria).

In captivity, males breed from 2 years old to at least 11 years. Females can breed at 2 years of age and into at least their mid-teens, but it is thought some females do not breed until they are 4 years old in the wild. (Pers. comms, 2018, Dr Marissa Parrott, Reproductive Biologist, Zoos Victoria).

Generation Length

The generation length of *Ornithorhynchus anatinus* is estimated to be 9 to 12 years, as reported by (Woinarski et al. 2012), with generation time assumed to be ~ 10 years (Furlan et al. 2012). Given this it is estimated that between 2 and 15 years is their potential breeding age (pers. comms., Dr Marissa Parrott, Reproductive Biologist, Zoos Victoria, 2018).

Distribution

The species' distribution is largely based on historical records and anecdotal sightings. Taking this into account, the platypus appears to have been relatively widely distributed in waterways throughout Victoria (apart from the drier northwest region, Mornington Peninsula and Wilsons Promontory). There is currently no evidence the species has or does occur on Mornington Peninsula or Wilson's Promontory (Grant 1992).

This species broad geographical distribution in Victoria does not seem to have changed significantly since European settlement, except for the lower Murray River downstream of Echuca, where it no longer exists (Menkhorst 1995). This broad distribution however fails to depict localised declines or localised extinctions and reduced abundance.

Habitat

The platypus is semiaquatic and entirely dependent on aquatic ecosystems. It occurs in a variety of water bodies including rivers, creeks, lakes, as well as man-made dams and reservoirs. Accordingly, it occupies diverse habitats with reliable surface water. Habitat characteristics considered favourable for platypuses are generally those associated with stable banks for burrowing, the presence of benthic invertebrate prey, intact riparian vegetation, complex benthic substrate (including large woody debris), and reliable flow regimes.

Habitat variables demonstrated to be associated with platypus occurrence or foraging activity include reliable surface flow, undercut banks, steep banks >0.5m high, cobbled substrate, riparian vegetation overhanging the water and pool depth between 1m and 3m (Ellem et al. 1998, Grant & Bishop 1998, Serena et al. 1998, Serena et al. 2001, Bethge et al. 2003, Grant 2004).

Platypuses are largely solitary, and when not foraging they normally occupy a resting or nesting burrow in earth banks (although some individuals have been found resting in accumulated stream debris or in low dense vegetation). The species is seldom observed moving on land in mainland Australia, but is frequently seen out of the water in Tasmania, where a main predator, the fox (*Vulpes vulpes*), has been introduced only relatively recently.

Threats

The primary threat to platypuses appears to be reduction in surface water and flows due to drought, altered flow regimes and water extraction for domestic, industrial and agricultural purposes. Importantly, reliability of surface flows and subsequent degradation of aquatic systems is predicted to increase under future climate change scenarios and increasing human population.

Habitat modification due to bank erosion and stream sedimentation (as a result of poor land management practices in agriculture, forestry, and urbanization) is also of great concern (Woinarski and Burbidge 2016), as these changes threaten platypus nesting and foraging habitats. Modified land-use for agriculture and urbanization, and widespread clearing of native vegetation along waterways has led to degradation of platypus habitat

Fragmentation of populations due to in-stream structures (i.e. vertical weir walls, poorly designed culverts), reduced surface water, or poor habitat quality results in small, isolated populations that are prone to loss of genetic diversity and thus a much higher risk of extinction due to stochastic events.

In the case of urban streams, platypus populations may be adversely affected by poor water quality (in the form of suspended solids and nutrient enrichment), contamination of sediment by heavy metals (Serena and Pettigrove 2005) and entanglement in or ingestion of plastic, rubber and metal litter (Woinarski and Burbidge 2016, FFG SAC, 2010). A negative influence of stormwater on platypus and aquatic macroinvertebrates (their food source) occurrence has also been established (platypusSPOT, 2018).

Across its range, the platypus is also subject to predation by the introduced red fox, dogs and cats (Woinarski & Burbidge 2016).

Accidental drowning in nets and traps set for fish and crustaceans has been shown to impact platypus distribution and abundance in all parts of its range, especially in small streams where populations may be critically small. (Woinarski and Burbidge 2016). The recently announced ban by the Victorian Government on the use and possession of enclosed yabby nets, such as Opera House Nets, in all waterways came into effect July 2019. All major retailers have withdrawn sales, which should eventually reduce this threat.

The Melbourne Water Urban Platypus Program (Serena & Williams 2008; Griffiths et al. 2017; Griffiths & Weeks 2017) has found that approximately 10% of all platypus captured have current or previous evidence of litter entanglement. In some urbanized areas this rises to up to 50% of all individuals caught. Additionally, agricultural fence entanglements were noted as a potentially threating process for platypus (and other species) by the FFG SAC in 2010 (FFG SAC, 2010).

Ongoing monitoring of platypus populations around Melbourne has shown that some populations have become isolated and others extinct.

Low population growth rate (even under optimal conditions) combined with increased mortality due to the other threatening processes listed above put the species at risk of further population decline.

Decision by the Scientific Advisory Committee

The eligibility of the nominated taxon (including the extinction risk and the category of threat that applies to the taxon) to be specified in the Threatened List must be determined in accordance with the eligibility criteria prescribed for the purposes of Division 2 of Part 3 of the Act.

The relevant eligibility criteria is prescribed in Schedule 1 of the Flora and Fauna Guarantee Regulations 2020, which provides that a taxon is at risk of extinction in a particular category of threat and is therefore eligible to be specified in the Threatened List in relation to that category if a primary criterion for that category is met. Where applicable, a primary criterion is met if any one of its subcriteria is satisfied.

Primary criterion 5.1

The taxon of flora is fauna is vulnerable.

Vulnerable, in relation to a taxon of flora or fauna, means that the taxon is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.

The taxon is assessed as being eligible for listing as Vulnerable under Criterion 5.1 – subcriteria 5.1.1 & 5.1.2 (a), (b)(i,ii,iii,iv).

The taxon was assessed as not eligible under Criteria 5.1.3, 5.1.4, 5.1.5 and 5.1.6.

Subcriterion 5.1.1

The taxon has undergone, is suspected to have undergone or is likely to undergo in the immediate future a substantial reduction in population size. (5.1.1 is equivalent to IUCN Criterion A)

Evidence provided:

While currently still widely distributed in Victoria, there is mounting evidence that platypus populations have reduced considerably in terms of abundance and distribution in the past 30 years due to multiple stressors that directly impact the species or degrade aquatic ecosystems. It widely accepted that 'platypus populations have declined in some river systems since European settlement'. They have been threatened by a range of human activities, primarily due to changes in land use and alteration of waterways.

The decline is not uniform. While platypus populations are relatively stable in the Grampians (e.g. McKenzie Falls) they have declined considerably around Melbourne. For example, there used to be a dense population, which no longer exists, in Toorourrong Reservoir and they have been lost from Cardinia Creek. The loss is even more drastic north of the dividing range where water is scarcer.

Difficulties in rigorously assessing population status and lack of historical data have limited systematic assessments of the population status of platypuses (and the relative impacts of threats). Expert opinions provided to the SAC differ in their acceptance on the degree of the decline and the impact of the threats across the range of the platypus. While some concerns have been raised about differences in data gathering methodologies used by various research groups, and that the modelling 'does not *convincingly* demonstrate that the platypus is likely to be doomed in the foreseeable future', the SAC does not believe that these concerns are sufficient to override clear conclusions about declining/loss of populations. It is clear that further data on platypus distribution and abundance is necessary. This is currently being undertaken in over 150 catchments across Victoria and southern NSW.

Subcriterion 5.1.2

The taxon's geographic distribution is restricted and at least 2 of the following circumstances apply—

(a) the distribution of the population or habitat of the taxon is severely fragmented or restricted to a limited number of threat-based locations;

(b) there is a continuing decline or reduction in any one of the following—

(i) extent of occurrence;

(ii) area of occupancy;

(iii) area, extent or quality of habitat;

(iv) number of locations or subpopulations;

(v) number of mature individuals.

(c) there are extreme fluctuations in any one of the following—

(i) extent of occurrence;

(ii) area of occupancy;

(iii) area, extent or quality of habitat;

(iv) number of locations or subpopulations;

(v) number of mature individuals.

(5.1.2 is equivalent to IUCN Criterion B)

The SAC concludes that the taxon meets the circumstances described in 5.1.2 (a), and (b) parts (i), (ii), (iii) & (iv).

Evidence provided:

There are several threats impacting on platypus habitats, resulting in habitat degradation, fragmentation and loss. These threats are currently operating and are expected to continue. Threats to aquatic ecosystems are likely to increase due to climate change and human population growth in Victoria.

These threats include –

Drought/water lack – leading to changes in local habitat and population declines; for example, Wimmera populations have declined where creek disconnection and drying events increasingly occur. Platypus populations are highly dependent on water flow, which declines with drought and is under increasing demand for irrigation and towns.

Bushfires – resulting in loss of platypus from smaller rivers. After the Black Saturday fires, platypus populations have not returned to some affected areas.

Floods – which are more damaging to platypus habitat and population numbers than fires.

Erosion – causing siltation of waterways, destroying the preferred habitat and blanketing the substrate, damaging the invertebrate food sources that mainly constitute the platypus diet.

Habitat degradation – three important aspects of platypus habitat are native riparian trees, consolidated overhanging banks and low vegetation. Hence why flood has more impact on populations than fire.

Climate change - involving drought, extreme heat and weather events, and wildfire frequency.

Human activity - such as clearing of riparian vegetation and modification of waterways, dam construction and irrigation developments, which alter flows and thermal regimes of rivers and may act as barriers to movement.

The distribution of the platypus population is severely fragmented. The various threats impacting on platypus populations have resulted in habitat fragmentation with increasing loss of habitat, multiple barriers to dispersal and vulnerability to predators. This has disrupted the platypus metapopulation into genetically isolated sub-populations, supported by eDNA results (Griffiths, van Rooyen, & Weeks (2017), whose long-term survival through climate change events are threatened by loss of genetic diversity.

Documentation

The published information provided to and sourced by the SAC has 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.

Preliminary Recommendation by the Scientific Advisory Committee

Proposed conservation status (category of threat) - Vulnerable in Victoria

As outlined above, the nominated taxon satisfies at least one criterion of the set of criteria prepared and maintained under Division 2 of Part 3 of the Act and stated in Schedule 1 of the Flora and Fauna Guarantee Regulations 2020.

The Scientific Advisory Committee concludes that on the evidence available the nominated item is eligible for listing as Vulnerable in Victoria because Primary criterion 5.1 – subcriteria 5.1.1; 5.1.2 (a) and (b)(i),(ii),(iii),(iv) of the FFG Regulations 2020 - has been satisfied.

The Scientific Advisory Committee therefore makes a preliminary recommendation that the nominated taxon be supported for listing as Vulnerable under the *Flora and Fauna Guarantee Act 1988.*

Endorsement by the Convenor of the Scientific Advisory Committee **Date**

Barbara Evans

16 July 2020

Emeritus Prof Barbara Evans
Convenor

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