



FLORA & FAUNA  
GUARANTEE

NOMINATION NO. **884**  
TAXON ID 5136

**FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE**  
**FINAL RECOMMENDATION ON A NOMINATION FOR LISTING**

*Ornithorhynchus anatinus* Shaw 1799 - Platypus

File No.: FF/54/3795  
DOCID107-417469679-742

**Date of receipt of nomination:** 31 May 2018

**Date of preliminary recommendation:** 16 July 2020

**Date of final recommendation:** 7 October 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Amendments to the Act came into operation on 1 June 2020 and the Flora and Fauna Guarantee Regulations 2011 have since been replaced by the Flora and Fauna Guarantee Regulations 2020.

The SAC is therefore required to consider this nomination in accordance with the Act as amended and the criteria for determining eligibility for listing as prescribed in the Flora and Fauna Guarantee Regulations 2020. In its application of the relevant eligibility criteria, the SAC has, as required by the nationally adopted Common Assessment Method, 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 (version14, 2019)*.

**Species information**

**Description**

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).

### Life history - Generation Length

Wild females have been known to live as long as 21 years (Grant 2004a; 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 considered to be the usual longevity given for wild platypuses (pers. comm., 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 (op.cit.).

The generation length (GL) of *Ornithorhynchus anatinus* has been variously estimated to be approximately 10 years (Furlan et al. 2012), 9 to 12 years (Woinarski et al. 2014) and 6.5 years in Melbourne creeks (Serena et al., 2014). Until the GL can be resolved for urban and non-urban populations, and following the precautionary principle for threat evaluation, three generation lengths in the platypus has been conservatively taken to be 25 – 30 years.

### Distribution

The species' distribution is largely based on historical records and anecdotal sightings. Taking these into account, the platypus appears to have been relatively widely distributed in waterways throughout Victoria (apart from the drier northwest region, Mornington Peninsula and Wilson's Promontory). There is currently no evidence that the species has ever inhabited 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). However, this broad distribution fails to depict localised declines, localised extinctions and reduced abundance. For example, eDNA data collected over recent years (2019/20) provide substantial additional information on a broader spatial scale confirming their extirpation in the Curdies system, virtual extinction in the upper Campaspe, as well as low abundance, fragmented populations in the Upper Barwon, Upper Glenelg and Coliban systems (pers. comm., Dr. J Griffiths, cesar).

The impact of the recent fires on eastern platypus populations has yet to be completed. However, the Platypus Conservation Initiative (PCI, UNSW) has undertaken surveys in areas impacted by the 2019/20 bushfires and compared captures rates and demographics to an adjacent control catchment unaffected by fire. Preliminary surveys indicate an impact of the fires to platypuses, with relatively low capture rates on the fire affected rivers and a sex bias towards males.

Based on existing platypus observations, PCI research shows evidence of almost 30% decline in area of occupancy across their distribution and that declines were greater than 30% in more than a third of the species' known range. Population viability analysis, which integrates key threatening processes across the species' entire range, predicts, under current climate changes and other threats, declines of 47-66% and 22-32% in abundance and population occupancy, respectively, resulting in extinction of local populations across about 40% of the range (Bino et al. 2020).

### 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 2004b).

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

Threats to platypus populations are widespread and synergistic, including land clearing, bank erosion, sedimentation, urbanization, river regulation and fragmentation, fishing by-catch, predation, pollution, and climate change (Bino et al.

2019). 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, decreased reliability of surface flows and subsequent degradation of aquatic systems are 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 past poor land management practices in agriculture, forestry, and urbanization) has been of great concern (Woinarski & Burbidge 2016), as these changes impede platypus nesting and foraging. Modified land-use for agriculture and urbanization, and widespread clearing of native vegetation along waterways has led to degradation of platypus habitat. Downstream of dams, rivers with altered flow regimes supported fewer platypus numbers compared to upstream sections and adjacent free flowing rivers (Hawke et al. 2020, in press).

Recent improvements in agricultural and land management practices by Catchment Management Authorities, Landcare and Victorian Government programs have improved environmental waters flows and promote practices that should improve 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.

Ongoing monitoring of platypus populations around Melbourne has shown that some populations have become isolated and others extinct. 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 & Pettigrove 2005) and entanglement in or ingestion of plastic, rubber and metal litter (Woinarski & Burbidge 2016, FFG SAC, 2010). A negative influence of stormwater on platypus and aquatic macroinvertebrate occurrence (their food source) 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 & 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 2008a; Griffiths et al. 2017; Griffiths & Weeks 2017) has found that approximately 10% of all platypuses captured have current or previous evidence of litter entanglement. In some urbanized areas this rises to up to 50% of all individuals caught. Also, agricultural fence entanglements were noted as a potentially threatening process for the platypus (and other species) by the FFG SAC in 2010 (FFG SAC, 2010).

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 are 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 sub-criteria is satisfied.

### **Primary criterion 5.1**

As per the definition of 'vulnerable' in the FFG Act, the taxon of flora or fauna is assessed as being 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 – sub-criteria 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 is 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. Recent data (2019/20) confirm their loss from the Curdies system, virtual extinction in the upper Campaspe, and low abundance, fragmented populations in the Upper Barwon, Upper Glenelg and Coliban systems. 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 many threats impacting on platypus habitats, resulting in habitat degradation, fragmentation and loss. Most of 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 subpopulations, supported by eDNA results (Griffiths, van Rooyen, & Weeks 2017), whose long-term survival through climate change events are consequently 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.

#### **Advertisement for public comment**

In accordance with the requirements of Section 16D of the *Flora and Fauna Guarantee Act 1988*, the preliminary recommendation (PRR) was advertised for a period of at least 30 days.

The preliminary recommendation was advertised in:

- Herald Sun [Public Notices] on 19 August 2020
- Weekly Times [Public Notices] on 19 August 2020
- Victorian Government Gazette on 20 August 2020
- DELWP website

Public submissions closed on 21 Sept 2020.

#### **Additional Information considered by the Scientific Advisory Committee**

Following publication of the PRR, the SAC received six submissions, the majority of which supported the recommendation. Some questions were raised about certain aspects of the PRR. In investigating these, the SAC also consulted with experts who provided additional recent research data.

In formulating its Final Recommendation on this item, the SAC has considered in detail both the submissions and the new information available. It is not aware of any compelling evidence to warrant a change to the preliminary recommendation that the nominated taxon is eligible for listing.

#### **Final Recommendation of the Scientific Advisory Committee**

The Scientific Advisory Committee concludes that the nominated item 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.

On the evidence available the nominated item is eligible for listing as Vulnerable in Victoria because Primary criterion 5.1 – sub-criteria 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 final 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**



**Emeritus Prof Barbara Evans  
Convenor**

**16 October, 2020**

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