

## *Biziura lobata* Musk Duck

### Taxonomy

*Biziura lobata* (Shaw, 1796)

### Current conservation status

Categorised as Vulnerable in the 2013 Advisory list of threatened vertebrate fauna in Victoria (DSE 2013).

### Proposed conservation status

Vulnerable in Victoria

Criterion C1

### Species Information

#### Description and Life History

A large, heavy, highly aquatic duck, the Musk Duck is seldom seen flying or on shore; it swims or dives when potential danger is perceived. The duck can, however, fly long distances at night. Adults are sedentary in some wetlands, but many individuals are likely to be short-range migrants, making regular movements from vegetated inland sites where nesting occurs in spring to large water bodies (often near-coastal) in autumn and winter. The ducks are also capable of long-range dispersive movements to water bodies as isolated as Lake Eyre. They occur in fairly low densities and can be seen in loose flocks but tend to spread out in wetlands rather than gathering in dense congregations. They forage (mainly for large invertebrate prey) by diving in wetlands. Males are territorial, especially when breeding when they undertake flamboyant courtship displays and often fight with other males. After mating females carry out all incubation and chick-raising duties. Unusually among ducks, the ducklings are often fed by the female (Frith 1982, Marchant and Higgins 1990).

#### Generation Length

The generation length of the Musk Duck is inferred to be 6 to 8 years. The taxon is most closely related to ducks in the genus *Oxyura* in which generation length has been estimated at 6 years (IUCN 2018). In terms of size, aggressive courting behaviour and slow development of secondary sexual characters in males (Marchant and Higgins 1990). Musk Duck has some similarities to the Steamer Ducks (genus *Tachyeres*) of South America, in which the generation length is estimated at 7.8 years (IUCN 2018).

#### Distribution

The birds are widespread in south-eastern and south-western Australia. Dispersive movements to inland wetlands such as Lake Eyre can be made in exceptionally wet conditions. Numbers are higher in wetter parts of southern Australia and, in Victoria, the taxon seemingly occurs statewide, except in uplands and uncleared mallee where there are no suitable wetlands. No sub-speciation of geographical variation is known to occur in Musk Duck, but its distribution suggests there are three subpopulations: one in south-eastern mainland Australia, one in south-western Australia, and one in Tasmania. Birdlife International (2018) gave rounded population estimates for these subpopulations as SE mainland Australia: (1) 10,000 to 25,000, (2) SW Australia: 1- 25,000, and (3) Tasmania 1-10,000.

### Habitat

The taxon is almost entirely aquatic, preferring deep wetlands with abundant aquatic flora. In the breeding season they are dispersed in freshwater swamps, lakes and billabongs with a combination of areas of clear open water (where adults forage and display) and dense emergent or fringing vegetation where nests are hidden (especially in *Typha*, sedges, lignum and *Melaleuca*). In winter, loose flocks gather on large open bodies of water, either fresh or saline. In addition to using large lakes and reservoirs, flocks can gather in sheltered coastal waters, such as estuaries, inlets and bays. In such settings, Musk Ducks prefer deeper waters far from shore.

### Threats

Given its dependence on fairly deep water, the taxon is likely to survive at sewage treatment farms and not many other places. It is likely to be most threatened by habitat changes in breeding areas, including diversion of water for agriculture, habitat degradation by fish, reduced inflows and increased salinity associated with climate change. Birds are often captured or killed in fish nets in lakes and estuaries where netting is permitted.

Small numbers might be killed during the Victorian duck season, but Musk Ducks are not a targeted species, as they are not on the game list, their reluctance to fly offers poor sport for hunters, and they are barely edible to the human palate.

### IUCN Criteria

Criterion A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>based on any of the following:</p> <ul style="list-style-type: none"> <li>(a) direct observation [except A3]</li> <li>(b) an index of abundance appropriate to the taxon</li> <li>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</li> <li>(d) actual or potential levels of exploitation</li> <li>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</li> </ul>			

### Evidence:

#### Ineligible under Criterion A

The past population reduction does not meet the threshold for eligibility under criterion A2, and the future population reduction does not meet the threshold for eligibility under criterion A3.

Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy)			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

## Evidence:

### Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 223,357 km<sup>2</sup> and the Area of Occupancy (AoO) is estimated to be 7,820 km<sup>2</sup>, both of which exceed the thresholds for criterion B.

Criterion C. Small Population size and decline				
	Critically Endangered	Endangered	Vulnerable	
Number of mature individuals	< 250	< 2,500	< 10,000	
AND at least one of C1 or C2				
C1	An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2	An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions:			
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b)	Extreme fluctuations in the number of mature individuals			

## Evidence:

### Eligible under Criterion C1

It is estimated that there are 2,000 to 10,000 (midpoint 6,000) mature individuals. IUCN (2018) estimates a global population of 13,000 to 33,000 mature adult Musk Duck. The Victorian population is poorly known, with abundant count data yet to be analysed. Maximum counts per site, summed annually, come to 2000 - 6000 in the years since 1980 (estimated with rough filters to exclude duplicate records, but more complete data-cleaning process required).

This gives an approximation of numbers occurring in Victoria, but it could underestimate numbers by as much as 50%, as records in the VBA are dominated by summer counts when Musk Ducks are dispersed over many wetlands. Winter counts are likely to be a better measure of Victorian population, because in winter Musk Duck gather in a smaller number of wetlands that are easier to count. Regular surveys at the Western Treatment Plant have shown Musk Duck to reach peak numbers at that site in winter, when they are 2-3 times more numerous than they are in summer.

The taxon is estimated to have a continuing decline of 5 to 10% within three generations. Musk Ducks occur in low densities at scattered wetlands across Victoria. Population declines are likely to continue with the ongoing threat of a drying climate and reduced wetland areas (Porter et al. 2018). BirdLife's Index of Australian Birds has documented evidence of significant, wide-scale long and medium-term (21 year) decline in Musk Duck populations nationally. These declines are also reflected in regional trends from the Murray Darling Basin and on broader inland and coastal scales (Clemens et al 2019). If used as a surrogate for Victorian populations these trends exceed thresholds for decline under this criterion.

Criterion D - Very small or restricted population <sup>a</sup>			
	Critically Endangered <sup>a</sup>	Endangered <sup>a</sup>	Vulnerable <sup>a</sup>
Number of mature individuals (observed or estimated) <sup>a</sup>	<50 <sup>a</sup>	<250 <sup>a</sup>	<1,000 <sup>a</sup>
D2: Only applies to the VU category <sup>¶</sup> Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time. <sup>a</sup>	– <sup>a</sup>	– <sup>a</sup>	D2: Typically: <sup>¶</sup> AoO < 20 km <sup>2</sup> or number of locations ≤ 5 <sup>a</sup>

## Evidence:

### Ineligible under Criterion D

It is estimated that there are 2,000 to 10,000 (midpoint 6,000) mature individuals.

**Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.**

## References

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