Threatened Species Assessment

Sternula nereisnereis
Fairy Tern

Taxonomy

Sternula nereis nereis (Gould, 1843)

The Fairy Tern has previously been found in the genus of *Sterna* (terns and gulls) and was listed under the *Flora and Fauna Guarantee Act 1988* as *Sterna nereis nereis*. Current taxonomic research using mitochondrial DNA (Bridge et al. 2005) supported the subdivision of *Sterna* and recognized the genus *Sternula* for the Little Terns, which includes Fairy Tern and Little Tern (*S. albifrons sinensis*) (Christidis and Boles 2008).

Current conservation status

Listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* as *Sterna nereis nereis* (SAC 1991).

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

Proposed conservation status

Critically Endangered in Victoria

Criterion C2a(ii)

Species Information

Description and Life History

The Australian Fairy Tern is a small piscivorous tern species weighing around 50 g. Separate subspecies occur in New Caledonia and New Zealand in extremely low numbers (Higgins and Davies 1996; Baling 2008; Dutson 2011). An estimated 120-150 pairs breed in Victoria. Fairy Terns are considered to be a relatively long-lived species, living for up to 14 years (Paton and Rogers 2009). Fairy Terns are usually sighted at known nesting areas during late August to September (Higgins and Davies 1996). Scrape-making and egg laying may not occur until some days or weeks after arrival. Fairy Terns participate in various courtship behaviours including aerial chasing, fish wiping and mate-feeding. In Victoria, the laying month can vary from year to year (F. Bedford pers. comm. 2017) but is thought to be more synchronous than for the Little Tern. Clutches of one or two (rarely three) cream, brown-blotched eggs are laid and incubated by both parents. Hatching usually occurs after 21 days. Fairy Terns are protective of their eggs and chicks and will leave their nests to dive bomb, swoop and defecate on any intruders that enter or move around the colony (Higgins and Davies 1996). Approximately 21 days later, the young fledge and, when strong enough, depart the natal area with their parents and head to quieter, non-breeding habitats. Departure times will vary depending on when the birds lay, but generally sites are deserted around February to March. The migration patterns of Fairy Terns have not been studied, however they are known to be absent during the non-breeding season at breeding sites in Gippsland (F. Bedford pers. comm. 2017). Over the last 30 years, Fairy Terns appear to have experienced a reduction in their Victorian breeding range, breed more irregularly and had an extremely low breeding success (Minton et al., 2001).

Generation Length

The generation length of the Fairy Tern is estimated to be 8 to 11 years. This is based on Fairy Tern information in the 2011 Bird Action Plan (Garnett et al. 2011, p. 213). There is evidence of some birds living up to 18 years (BirdLife International 2018).

Distribution

The taxon occurs in Australia (subspecies *nereis*), New Zealand (subspecies *davisae*) and New Caledonia (subspecies *exsul*) (Higgins and Davies 1996). In Australia, Fairy Terns are found along the Western Australian coastline from near Esperance to Dampier and along coastlines in South Australia, Victoria, southern New South Wales and Tasmania (Higgins and Davies 1996). Four geographic locations containing key breeding sites are identified in Victoria: Western Port (French Island), south Gippsland (Corner Inlet), East Gippsland (Gippsland Lakes and Lake Tyers) and far-east Gippsland (Marlo, Sydenham and Mallacoota) (Bedford and Bramwell unpublished data). Prior to the early 1980s, breeding was recorded at ten sites in western Port Phillip Bay including Edwards Point, Duck Island, Corio Bay, Little River, Avalon and Altona Bay with annual breeding occurring at The Spit Nature Conservation Reserve, Sand Island and Mud Islands until 1988 (Lane 1981; Lacey and O'Brien, 2015). Breeding commenced again in Port Phillip Bay in 2003, albeit over a narrower spatial range: Edwards Point, Moolap saltworks and Mud Islands (Minton et al., 2003; Hewish, 2004; 2006; Lacey and O'Brien, 2015; J. Newman, pers. comm.). Fairy Terns have also attempted to breed almost annually in Western Port on French Island for the past 30 years, but numbers have been decreasing and most nesting attempts have failed in recent years (Lacey and O'Brien 2015).

Habitat

Fairy Terns occupy a variety of habitats during their stay in Victoria. The selection of suitable nesting, roosting and foraging sites may be primarily driven by factors including food availability, predator pressures, human interference and climatic conditions. Some breeding sites are located in highly dynamic environments such as estuary sandbanks that form barriers between the ocean and the estuary systems of rivers and are strongly affected by changes in river and tidal flows, storm surges, erosion and sand movement. Breeding sites located on islands can be influenced by tidal movements and seasonal rainfall.

Four key nesting habitat types have been identified as being used by Fairy Terns during the November to March breeding season: beaches, islands, islands supplemented with dredged sand spoil and estuary sandbanks (Bedford and Bramwell unpublished). All sites are basically flat or gently undulating. In all cases Fairy Terns nest above the high water mark and on sites where the substrate is sandy and the vegetation low. Birds often seek shelter from the elements and predators beside and under clumps of low growing vegetation. The nest is typical of the Sternidae family and consists of a shallow scrape in the sand which may be lined with small shells or pieces of vegetation. Both sexes make scrapes and many may be excavated before a suitable one is selected for egg laying. In general, they nest a few metres apart. As the Fairy Tern and Little Tern regularly use the same habitat, they often form one colony on site. When disturbed, both species will jointly chase off predators as a single flock. Fairy Tern partners may roost inside the colony or nearby on adjoining spits.

The winter habitat of Fairy Terns also consists largely of sheltered coastlines, both on the mainland and offshore islands, and includes beaches, harbours, estuaries, lagoons, bays and inlets (Higgins and Davies 1996) or seagrass (Lacey and O'Brien 2015). Fairy Terns will also inhabit freshwater or saline wetlands including salt ponds and lakes. It is thought these habitats may be important for post-breeding flocks to teach juvenile birds important skills such as hunting.

Roosting sites consist of sheltered sandy beaches or exposed sandy features such as sand banks, spits, bars, including in salt evaporation pans, and dredge-spoil islands (Higgins and Davies 1996).

Threats

Fairy Terns face numerous threats during the breeding season including predation and disturbance by avian and mammalian species (e.g. Silver Gull (*Chroicocephalus novaehollandiae*), ravens, raptors, Cat (*Felis catus*), Dog (*Canis lupus familiaris*), Red Fox (*Vulpes vulpes*), rats); indirect and direct human disturbance through beach use (e.g. walkers, off-leash dogs, swimmers, sun bathers, horse riders, fishermen, boats, land vehicles); habitat loss through degradation, modification and land development; vegetation encroachment which can prevent nesting at an entire site; inappropriate water regimes at saltworks (e.g. long periods of site exposure, increased salinity); depletion of food sources close to breeding sites; and stochastic environmental factors including tides (e.g. storm and high tides) and weather (e.g. extreme hot or cold temperatures).

Fairy Tern breeding occurs along beaches and islands during spring and summer and, as a result, often places the birds in direct contact with people pursuing recreational activities such as fishing, swimming, boating and dog walking. Recreational activities can lead to the trampling of the well camouflaged chicks and eggs. However, just

the presence of humans, dogs, foxes and predatory birds (e.g. raptors, ravens) near a colony can cause incubating birds to become agitated and unsettled and, as a consequence, lift from their nests. Exposed eggs and chicks are then vulnerable to being covered in wind swept sand or to becoming chilled or heat stressed. Unsupervised dogs can enter colonies, chase brooding birds and trample eggs.

Foxes and predatory birds may have similar effects on a colony. The Red Fox is known to cause the abandonment of an entire colony due to its presence on a site (F. Bedford pers. comm. 2010). Avian predators such as Silver Gulls and Pacific Gulls (*Larus pacificus*) may take advantage of the disturbance and take eggs and chicks from the colony. Many species of raptors are regularly seen flying over breeding sites in east Gippsland and have been reported entering colonies and killing adults and chicks. In the 1993/4 season, an Australian Hobby (*Falco longipennis*) persistently harassed a mixed colony of Fairy Terns and Little Terns at Lake Tyers. Ravens (*Corvus coronoides*) took advantage of the disturbance, moved in and consumed dead and dying chicks after the site was abandoned.

Nesting out in the open, Fairy Tern is exposed to a range of dynamic climatic conditions. Nests can be inundated by high tides, wave wash and wind blown sand. Sea level rises and inundation from storm surges along the Ninety Mile Beach and Gippsland Lakes may cause traditional breeding and roosting sites to become unavailable. Multiple threats were evident at the majority of current and historic breeding sites in Western Port and Port Phillip Bay. The nesting failures of the breeding Fairy Tern colonies over recent years in these regions may partly be due to the inability of such small colonies to protect themselves from various threats especially if they occur simultaneously (BirdLife Australia 2017).

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%

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

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.

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*]

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.

based on any of the following:

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Evidence:

Eligible under Criterion A2 as Endangered

The population reduction over the past 24 to 33 years is estimated to be 50 %, based on (b), (c) and (e) above.

This percentage is expert opinion, as there has been no statewide survey of Fairy Terns. However, the Victorian population is now very small and in ongoing decline.

Eligible under Criterion A2 as Endangered

The population reduction over the next 24 to 33 years is projected to be 20 to 50 %, based on (b), (c) and (e) above.

Further reduction is likely as a result of the ongoing threats and very small population size. However a new statewide survey would be needed to confidently estimate what the future population may be. Overall, the population trend for all subspecies appears to be declining with some breeding colonies disappearing (BirdLife International 2018).

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 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²
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:

Eligible under Criterion B as Vulnerable

The Area of Occupancy (AoO) is estimated to be 1,053 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

There is estimated to be two locations. The Victorian population occurs over three main sites Port Phillip Bay, Western Port and Gippsland Lakes. Port Phiilip and Westernport are geographically close and are considered to be one location, since the known threats could rapidly affect the very small numbers of birds.

It has a continuing decline in (ii), (iii) and (v) above, based on documented declines, especially in southern states and small population in eastern Australia. Other than for Western Port and possibly the Gippsland Lakes areas, little effort has been made to accurately record the abundance of Fairy Tern in Victoria. Fairy Tern numbers have been grossly over-estimated in Victoria in the past (Willig 1982, Hill et al. 1988). Even relatively recent estimates (year 2000) of "200 pairs from 23 sites" (Garnett and Crowley 2000) appear to be an over-estimate compared to the known Victorian data (Lacey and O'Brien 2015). The low numbers of Fairy Tern in Victoria correspond to a global decline for the species which was listed as vulnerable on the IUCN Red List in 2008 and declined at the Coorong SA from 1500 birds in the 1980's to 500 in 2008 (Olsen 2008).

Historically, colonies of over 50 breeding pairs were observed within Western Port and Port Phillip Bay. Numbers began to drop in the late 1980s, with approximately 54 adults being observed within the two bays during the 2016/17 breeding season across three colonies. Two of these colonies were on islands (Rams Island and Mud Islands) while at least four individuals were suspected to be breeding at Moolap saltworks (BirdLife Australia 2017).

In Western Port the frequency of disturbance by humans at nest sites on French and Rams islands has likely increased over time (M.O'Brien pers. comm. June 2018). There are currently few records documenting successful breeding attempts over the last decade within Western Port (Lacey and O'Brien 2015) and Port Phillip Bay with observers agreeing that breeding success is quite poor. Of the confirmed 28 nests at the three sites in the bays (2017/18 data), ten chicks were known to have hatched, with at least two chicks subsequently dying. Nest and chick failure is largely thought to be attributed to predation (BirdLife Australia 2017).

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 C2 as Critically Endangered

It is estimated that there are 50 to 100 mature individuals. In Victoria, the Fairy Tern population was estimated to be at its maximum of an average of 150 breeding birds per year during 1990 to 1995. Their abundance has varied from an average of 51 breeding birds per year during 1985 to 1990 to 104 breeding birds per year during 2005 to 2010. The current population in Victoria is estimated to be 100 breeding birds (Bedford and Bramwell unpublished). Data collected and reviewed in 2010 suggested the south-east Australian Fairy Tern population to be a maximum of 1280 individual birds with approximately 360 to 600 individuals in South Australia, 24 to 80 individuals in New South Wales, 200 to 500 individuals in Tasmania and 100 breeding birds in Victoria (Woehler unpublished).

The number of mature individuals is projected to continue to decline, and the percentage of mature individuals in one subpopulation is 90-100 %.

Criterion D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)	<50	<250	<1,000
D2 Only applies to the VU category 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.	-	-	D2. Typically: AoO <20 km2 or number of locations ≤5

Evidence:

Eligible under Criterion D as Endangered

It is estimated that there are 50 to 100 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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