Theme: Fauna

The Gippsland Lakes is recognised as a Wetland of International Importance under the Ramsar Convention, largely due to its role in supporting fauna. The site meets seven of the current listing criteria, six of which are related to fauna:

- Supports threatened species
  - Australasian bittern (*Botaurus poiciloptilus*)
  - Australian fairy tern (*Sternula nereis nereis*)
  - Curlew sandpiper (*Calidris ferruginea*)
  - Eastern curlew (*Numenius madagascariensis*)
  - Hooded plover (*Thinornis rubricollis rubricollis*)
  - Green and golden bell frog (*Litoria aurea*)
  - Growling grass frog (*Litoria raniformis*)
  - Australian grayling (*Prototroctes maraena*)
- Supports animal species in critical life stages of breeding, migration and drought refuge
- Supports > 20,000 waterbirds
- Supports > 1% of the population of three waterbird species:
  - Australian fairy tern
  - Chestnut teal
  - Little tern
- Provides important habitat for native fish, including nursery areas
- Supports > 1% of the population of the Burrunan dolphin (*Tursiops australis*)
- The fauna of the Gippsland Lakes provide social, cultural and economic benefits to a wide variety of people. The lakes are an important commercial fishery with 10 Gippsland Lakes Fishery Access Licences and a further nine Gippsland Lakes (Bait) Fishery Access Licence holders. The site is also an important recreational fishery. Tourism for the Gippsland Lakes and broader East Gippsland region is estimated at $267 million annually (Worley Parsons 2013).

Waterbirds

Indicators and thresholds

There are Limits of Acceptable Change (LAC) and Resource Condition Targets (RCT) for waterbird diversity and abundance.

LAC = The number of standard 20 minute searches (within any ten year period) where waterbird abundance is less than 50 individuals will not fall below 50 per cent of the 'baseline' value (based on Birds Australia count data – 1987-2010), for the following species:

- black swan = 15 percent of surveys
- chestnut teal = 10 percent of surveys
- Eurasian coot = 11 percent of surveys

RCT = Total diversity of waterbirds across the site remains above 86. The site supports greater than 20 000 waterbirds in three out of five years.

The LAC for waterbird abundance is based on three species and a specific method, for which there was insufficient data to assess against as number of surveys and survey lengths are often not recorded for waterbird data. Thresholds based on indicator species of functional groups benchmarked for the period 1987 to 1991 (when regular count data were available) has been established for the GLER as follows:

Waterbird abundance benchmarks: Mean maximum counts (calculated over a minimum of five years) will not drop below the following population thresholds (Hale unpublished):

- Black swan = 0.3%
- Chestnut teal (ducks) – 2.5%
- Eurasian coot (coots & rails) – 0.15%
- Fairy tern (terns) – 1.5%
- Little tern (terns) – 0.5%

- Little black cormorant (fishers) – 0.01%
- Straw-necked ibis (large wading) – 0.05%

Thresholds for waterbird condition are as follows:

- Good = meets RCT
- Fair = between RCT and benchmark
- Poor = exceeding benchmark

Locations

The various programs aimed at assessing waterbirds collect data across all the mega habitats of the Gippsland Lakes including the main Lakes as well as the fringing wetlands. In this instance, waterbird abundance and diversity has been pooled across the site.

Results

Indicator	Status and trends				Summary
	Unknown	Poor	Fair	Good	
Waterbird abundance	Total abundance, black swan, chestnut teal, Eurasian coot, fairy terns, little terns, little black cormorant, straw-necked ibis **Data quality:** Fair **Data custodian:** BirdLife East Gippsland				The Gippsland Lakes supports a diversity and abundance of waterbirds across all the habitats and wetlands. Due to the large area covered by the Lakes, there are very few total waterbird counts. Condition is assessed on the basis of diversity (species richness) and abundance of indicator species that represent different functional groups (fish eating species, ducks, herbivores and waders). Total abundance of waterbirds over the past five years has exceeded 20,000 annually and this achievement of the RCT is indicative of "good" condition. In addition, numbers of each of the seven indicator species were within the LAC.
Waterbird diversity	**Data quality:** Fair **Data custodian:** BirdLife East Gippsland				Data from multiple sources indicates that over 90 wetland dependent bird species have been recorded across the Gippsland Lakes in the past five years. This includes rare and threatened species such as the Australasian bittern. This is an achievement of the Resource Condition Target and indicates "good" waterbird diversity. There is limited data upon which trend can be assessed with variation in survey effort from year to year. Available data, however, do not indicate any short term trends.

Status

There is a lack of data on abundance across the Gippsland Lakes with comprehensive aerial counts of waterbirds mostly lacking. Data pooled from multiple sources suggests that the benchmarks have been met for all target species (Table 1). Whether the decline in the abundance of chestnut teal reflects conditions at the site, a broader population decline or simply a change in sample effort (from the benchmark established 1987 to 1991, when there were comprehensive regular monitoring) is not known.
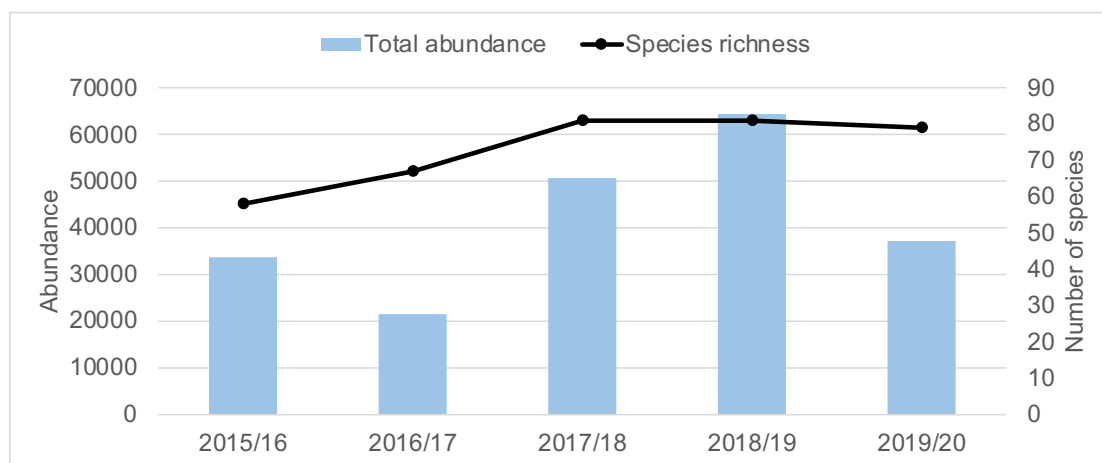
Table 1: Maximum counts of indicator species (data from GLCC BirdLife Monthly Counts, Field and Game Australia, Atlas of Living Australia, DELWP unpublished).

Species	Threshold	Five-year average of

		maximum count
Black swan = 0.3%	3000	3003
Chestnut teal (ducks) – 2.5%	2500	2622
Eurasian coot (coots & rails) – 0.15%	1500	9091
Fairy tern (terns) – 1.5%	20	101
Little tern (terns) – 0.5%	50	138
Little black cormorant (fishers) – 0.01%	100	1526
Straw-necked ibis (large wading) – 0.05%	500	2151

Total waterbird abundance, calculated as the sum of the maximum abundance of each species, ranged from 21,494 in 2016/17 to over 64,000 in 2017/18. The 20,000 threshold was met each year in the five years from 2015/16 to 2019/20.

A total of 91 "waterbird" species have been recorded in the Ramsar site over the past five years (2015 – 2020; Appendix 3), which is an achievement of the Resource Condition Target indicating "good" condition with respect to diversity. Annual species richness ranged from 58 to 81 species (Figure 1).

Figure 1: Maximum annual count (all species) and diversity (species richness) in the Gippsland Lakes from 2015/16 to 2019/20 (data from GLCC BirdLife Monthly Counts, Field and Game Australia, Atlas of Living Australia, DELWP unpublished).

Trend

Assessing trend in waterbird abundance and diversity is difficult, due largely to inconsistent sampling effort between years. Annual maximum abundance of the target species does not indicate a significant trend for most species from 2015 to 2020, with the possible exception of Eurasian coot, which may have increased in the period (Figure 2).
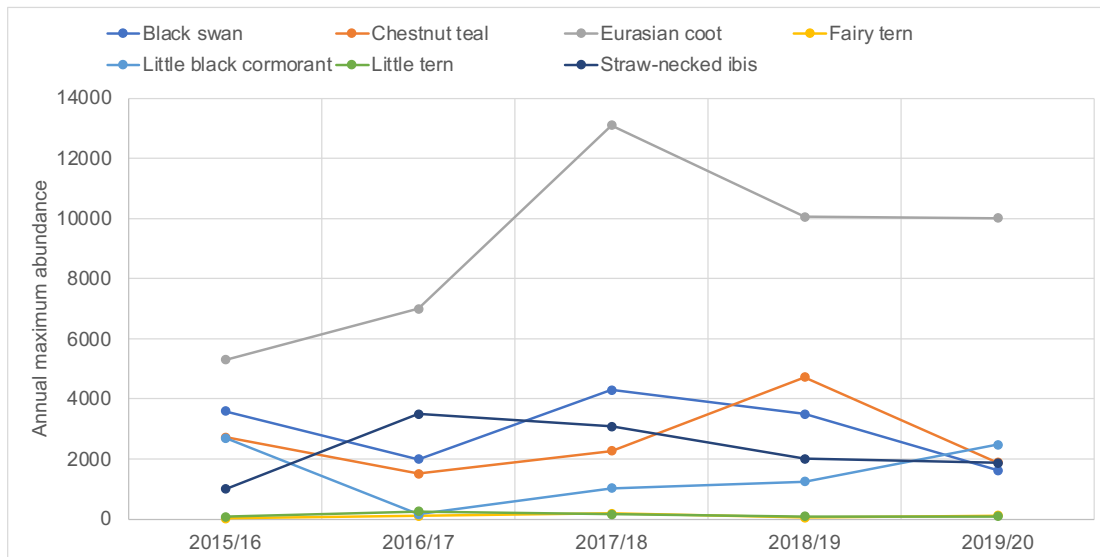
Figure 2: Maximum annual count of target species in the Gippsland Lakes from 2015/16 to 2019/20 (data from GLCC BirdLife Monthly Counts, Field and Game Australia, Atlas of Living Australia, DELWP unpublished).

Influencing factors and threats

Waterbirds in Australia have very large (often continental or international scale) distributions and so their presence and abundance at a particular location is influenced not only by conditions at the site, but of conditions elsewhere in their distributional range. For example, declines in international migratory shorebirds have been linked to the decline in habitat in staging areas, particularly in the Yellow Sea (MacKinnon et al. 2012, Murray et al. 2015). This loss of habitat is driven by land reclamation of tidal flats for industrial projects to support a growing population and economy (Yang et al. 2011). There is also evidence of a decline in food resources through the harvesting of invertebrates for other purposes (such as prawn farms); habitat degradation by pollution and impacts of hunting on shorebirds, particularly snipe (Melville et al. 2016). There is already evidence of this having a measurable effect on waterbird abundance of several species in Australia (Clemens et al. 2016).

With respect to the waterbirds at the Gippsland Lakes there has been no evidence of a decline that has been linked to site conditions, although several threats to waterbirds were identified in the management plan of the Gippsland Lakes Ramsar site, including: human disturbance, predation by foxes and cats, and habitat loss or decline due to climate change.

There is growing evidence that disturbance of waterbirds by human activities (walking, boating, vehicles) can have significant negative impacts on both feeding behaviour and habitat use. A database collated from a large number of scientific studies of flight initiation distances (FID), the distance between the activity and the bird talking flight, indicates that nesting birds can be disturbed by human activities at very short distances (e.g. mean FID for nesting pelicans was only 21 m and for ducks 32 m from pedestrians) (Livezey et al. 2016). FIDs for non-nesting species were typically greater (e.g. 60 metres for ducks from pedestrians). Birds are disturbed at closer distances by dogs and watercraft as opposed to pedestrians, but interestingly, non-motorised watercraft such as canoes and paddleboards had equal or smaller FIDs compared to motorised vessels (Glover et al. 2015, Livezey et al. 2016). The consequences for individuals and populations can be significant, with decreased time spent feeding, increased energy spent in flying away from disturbances, nest abandonment and ultimately population declines all cited as potential effects (Glover et al. 2011, Martín et al. 2015).

Waders and beach nesting birds are particularly vulnerable to sea level rise (Robinson et al. 2009) and any loss in intertidal habitat (mudflats, saltmarsh) would affect waterbird diversity and abundance within the lakes. This may include loss of intertidal feeding habitat and supratidal habitat needed for roosting and nesting.

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