The Minister's delegate approved this Conservation Advice on 18 January 2019

Conservation Advice

Botaurus poiciloptilus

Australasian Bittern

Conservation Status

The Australasian Bittern is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (TSSC 2011).

The Australasian Bittern was assessed in 2011 and found eligible for listing under the following categories:

Criterion 1: A2(a) Endangered

Criterion 3: C1 Endangered

Criterion 4: Vulnerable

See listing advice for more detail on the listing assessment:

http://www.environment.gov.au/biodiversity/threatened/species/pubs/1001-listing-advice.pdf

The Australasian bittern is also listed as:

- Endangered in Western Australian under the *Wildlife Conservation Act 1950*
- Endangered New South Wales *under the Biodiversity Conservation Act 2016*
- Vulnerable in South Australia under the *National Parks and Wildlife Act 1972*
- Threatened in Victoria under the *Flora and Fauna Guarantee Act 1988*

For more information on the listing status of this species under relevant state or territory legislation see http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Species Information

Description

The Australasian Bittern is a large, stocky, thick-necked, heron-like bird. The species grows to a length of 66-76 cm and has a wingspan of 1050-1180 cm. The average male weighs approximately 1400 g and the average female weighs approximately 900 g (Marchant & Higgins 1990). The upper-parts of the body are brown and dark brown to black, mottled and buff, in complex patterns that aid the bird's concealment in swamp vegetation. The under-parts of the body are streaked and scalloped, brown and buff. The species has a prominent black-brown stripe running down the side of the neck, the eyebrow is pale, and the chin and upper throat are white. The bill is straight, pointed and straw yellow to buff in colour with a dark grey ridge. The legs and feet are pale green to olive and the eyes are orange-brown or yellow (Marchant & Higgins 1990; Pizzey & Knight 1997). Darker and paler variants of the plumage have been observed in adults. Juveniles are generally paler than adults and have heavier buff flecking on the back (Marchant & Higgins 1990; Pizzey & Knight 1997).

Distribution

In Australia, the Australasian Bittern occurs from south-east Queensland to south-east South Australia as far as the Adelaide Region, southern Eyre Peninsula, Tasmania and in the south-west of Western Australia (Marchant & Higgins 1990; Garnett et al. 2011). Vagrants have also been recorded from northern Australia, including one record from Argyle Downs in the extreme north–east of Western Australia (Marchant and Higgins 1990). The population can be divided into two sub-populations, the south-eastern and south-western sub-populations. The Australasian Bittern also occurs in New Zealand and New Caledonia (Marchant & Higgins 1990).

In Queensland, the species occurs as far north as Yeppoon and west to Wyandra. In the southeast there is habitat remaining on Fraser Island, the Fraser Coast, North Stradbroke Island, Redlands and out into the Lockyer Valley. Key areas in Queensland where the species has been reliability seen in the past include the flood plains south of Byfield State Forest, Garnett's Lagoon and Lake Clarendon.

In New South Wales, it occurs along the coast and is also frequently recorded in the Murray-Darling Basin, notably in floodplain wetlands of the Murray, Murrumbidgee, Lachlan, Macquarie and Gwydir Rivers.

In Victoria, it is recorded mostly in the southern coastal areas and in the Murray River region of central northern Victoria.

In Tasmania, the species was formerly more widespread, however it is now absent from some major wetlands that have dried out (Marchant & Higgins 1990; Garnett & Crowley 2000). It occurs most commonly in the coastal regions in the north-east, the east coast and on the islands of Bass Strait. It also commonly occurs in the upper Derwent River estuary and Lakes Crescent and Sorell in central Tasmania (R. Gaffney 2018. pers comm).

In South Australia, it is confined to the south-east, ranging north to the Murray River corridor and the Adelaide region, and west to the southern Eyre Peninsula and Kangaroo Island.

In Western Australia, the Australasian Bittern was formerly widespread in the south-west, ranging north to Moora, east to near Mount Arid, and inland possibly as far as the Toolibin Lake area. However, following range declines throughout the 1900s, it is now likely that it only occurs on the western coastal plain between Lancelin and Busselton, in the southern coastal region from Augusta to the east of Albany and inland to some wetlands in the Jarrah forest belt, with small, isolated populations in swamps from west of Esperance eastwards to near Cape Arid.

Abundance

The Action Plan for Australian Birds 2010 (Garnett et al. 2011) suggested there were less than 1000 mature Australasian Bitterns within the Australian population, and that the population was likely declining. The area of occupancy of the Australasian Bittern in Australia is thought to have declined by seventy percent between 1977 and 2008. These declines are considered to have led to a comparable decline in the size of the adult population. The declines are primarily linked to the clearing or modification of wetlands for urban and agricultural development, as well as the extraction of water from wetlands for irrigation (TSSC 2011)**.**

Relevant biology/ecology

The Australasian Bittern is generally solitary, but sometimes occurs in pairs or dispersed aggregations of up to 12 birds. While the Australasian Bittern was previously thought to be largely sedentary, recent tracking studies have shown extensive movements (over hundreds of kilometres) between wetlands in southeast Australia (Bitterns in Rice Project 2016). Occasional

movements to inland areas have also been recorded during extensive flooding events (Marchant & Higgins 1990).

The Australasian Bittern occurs mainly in freshwater wetlands and, rarely, in estuaries or tidal wetlands (Marchant & Higgins 1990). It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. *Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus*) or cutting grass (*Gahnia*) growing over a muddy or peaty substrate (Marchant & Higgins 1990). The diet of the Australasian Bittern includes aquatic animals such as small fish, frogs, freshwater crayfish, spiders, insects and small reptiles.

The Australasian Bittern breeds from October to February in solitary pairs. However, sometimes several nests may be placed in close proximity to each other (Marchant & Higgins 1990). The species nests adjacent to relatively deep, densely vegetated freshwater swamps and pools, building its nests under dense cover over shallow water (Marchant & Higgins 1990). The species prefers to nest in vegetation that is up to 2.5 m tall and the nests are placed about 30 cm above the water level (Marchant & Higgins 1990). The nest is a shallow structure of dry or green reeds, within a clump of reeds in water or a swamp and is built on a platform of bent-over reeds. Several females will nest within one male's territory (Birdlife Australia 2018). In rushes, it may avoid breeding in the densest areas (Marchant & Higgins 1990). If population densities are high, it may resort to open wetlands for nesting, such as in stunted Acacia swamps (Marchant & Higgins 1990). Clutch size is usually four or five, but ranges from three to six (Marchant & Higgins 1990).

The Australasian Bittern appears to be capable of moving between habitats as suitability changes. For example, tracking data from three individuals shows substantial movements between wetlands of New South Wales, South Australia and Victoria, including multiple movements of several hundred kilometres (Bitterns in Rice Project 2016). The species can occur in high densities in temporary or infrequently filled wetlands during exceptionally wet years, and will also use ephemeral wetlands when moving from areas that are drying out (Garnett et al. 2011). The species also frequently utilises artificial habitats such as rice fields. For example, during the 2014-2015 breeding season Birdlife Australia recorded 86 birds across 34 rice farms in New South Wales (Birdlife Australia 2015). Annual surveys conducted by the Bitterns in Rice Project since 2012 suggest that approximately 500-1000 Bitterns may breed in rice crops of the New South Wales' Riverina each year (Bitterns in Rice Project 2018).

The age of maturity of the Australasian Bittern is estimated to be one year and the life expectancy is estimated to be 11 years. These figures are based on figures for the Eurasian Bittern (*Botaurus stellaris*). The generation length for the species is estimated to be 5.5 years (Garnett et al. 2011).

Habitat critical to the survival of the species

Given that the Australasian Bittern is presumed to have undergone a severe reduction in numbers, based on historic habitat loss and degradation across the core part of its range, all natural habitat (including constructed wetlands with suitable habitat) in which the Australasian Bittern is known or likely to occur should be considered critical to the survival of the species.

Important populations to long term recovery and survival of the species

Owing to the small total number of Australasian Bitterns and the significant observed declines in both total numbers and the species' extent of occurrence (Garnett et al. 2011), all populations should be considered important.

Cultural significance

The Narrungadera Wiradjuri people of New South Wales consider the Australasian Bittern to be a sacred bird and believe it to be a messenger of one of their spirits called Wawe ('One who travels on the wind'). In the Wiradjuri language the word for Bittern was 'Boom Boom' or 'Poon Poon' and the name for the Australasian Bittern in the Gunai language from the Gippsland region in south-east Victoria is 'Goir' (Wesson 2001). There are also links between the bunyip myth in several indigenous language groups and the sound of the booming male Australasian Bittern (Holden & Holden 2001). The Australasian Bittern is known to Aboriginal people of southwest Western Australia as *boordenitj*, but details of the significance of the species to Aboriginal people in Western Australia have not been documented (Birds of Australia 2018).

Threats

The Australasian Bittern has primarily been impacted by the loss of wetland habitat through the diversion of water away from wetlands; drainage of swamps; and clearing for urban and agricultural development. Habitat degradation due to factors such as reduced water quality, invasion by weeds, impacts from grazing animals and reduced water flows due to a changing climate are also impacting on Australasian Bittern survival and breeding success. Predation by introduced species may also be limiting survival but more research is required to determine the relative importance of this threat.

Table 1 - **Summary of threats**

Threat factor	Threat type and status	Evidence base
Habitat loss		
Habitat loss through water reductions	Known Current	The major factor in the decline of the Australasian Bittern population in Australia is the reduction in extent of available habitat due to the long-term diversion of water away from wetlands and floodplains to support irrigated agriculture and urban water supplies; and the permanent loss of wetlands through conversion to other purposes, such as agricultural and urban development (Marchant & Higgins 1990; Kingsford & Thomas 1995; Garnett et al. 2011; Kingsford 2000).
Transition from ponded rice to other farming systems	Known Current	Australasian Bitterns are known to nest in ponded rice crops, with estimates of 500-1000 birds breeding in the New Souths Wales Riverina each year (Bitterns in Rice Project 2018). Rice farmers are increasingly transitioning to crops with delayed permanent water and shorter season varieties in order to reduce the amount of water used per crop. This is emerging as a new threat as the contraction of the ponding period is reducing opportunities for successful Bittern breeding before harvest. There is also a trend among irrigators in the Riverina to transition from rice to cotton, as

		evidenced by the 2017-18 season being the first in southern New South Wales where more cotton was grown than rice. As cotton is only flooded with brief pulses of water, no aquatic ecosystem can develop and Bitterns cannot breed (M Herring 2018. pers. comm).
Habitat degradation		
Increased salinity, siltation and pollution	Known Current	Reduced water quality due to increased salinity, siltation and pollution is having an ongoing impact on wetland quality throughout Australia (Nielsen et al. 2003; Halse et al. 2004). Elevated salinity levels and a general decline in water quality may directly impact on Australasian Bittern survival and breeding success, and also affect food sources such as invertebrates, algae and macrophytes (Marchant & Higgins 1990; Halse et al. 2003).
Grazing by livestock and feral animals	Known Current	Grazing of wetlands by livestock (e.g., cattle and sheep) and feral animals (e.g., pigs, deer) has a range of environmental impacts, including water contamination, physical damage to soil and vegetation, and facilitating the spread of weeds (Jansen & Healey 2003).
Changes in abundance of plant species, (including native species and introduced weeds)	Suspected Current	Changes in abundance of certain plant species has the potential to reduce wetland productivity. For example, Phragmites is becoming more common across wetlands in South Australia (J. van Weenen 2018. pers comm), which may impact on the quality of foraging habitat and hence occupancy and breeding success of the Australasian Bittern at these sites.
Inappropriate fire regimes	Possible Current	Frequent or intense burning of wetland areas may reduce the dense vegetation that forms the core habitat of the Australasian Bittern, potentially resulting in reduced nesting success.
Urban wetland management	Possible Current	Urban wetlands can provide critical habitat during droughts. However, many of these wetlands are also used as a source of irrigation water. The uncharacteristic rapid fall in water levels due to extraction has the potential to impact on birds utilising such sites.
Climate change		
Changes in water availability	Suspected Current	There is strong evidence that rising temperatures caused by increased greenhouse gases is leading to reduced rainfall across southeast and southwest Australia, and to increased evaporation, leading to large declines in surface water runoff (CSIRO 2010). This will impact on Australasian Bittern habitat.

Changes in fire regimes	Suspected Current	A drying climate in southeast and southwest Australia will likely lead to more frequent and intense wildfires (Hughes & Steffen 2013). Fires within the key wetlands will likely reduce habitat quality for the Australasian Bittern.
Salinisation of coastal wetlands	Suspected Current	Coastal freshwater wetlands are under increasing threat from rising sea levels, particularly as they are unable to retreat in many regions due to urban infrastructure (e.g., roads, housing etc); and because infrastructure can act as a barrier which limits salt water flushing after a coastal wetland has been inundated by saltwater through a combination of high tides and storm action (White and Kaplan 2017).
Infrastructure		
Inappropriate placement of infrastructure	Possible Current	The inappropriate placement of infrastructure (i.e. fence lines; powerlines) in or adjacent to suitable wetlands increases the likelihood of possible collision incidents with birds hitting wires or getting snagged on barbed wire.
Urban development	Known Current	Urban development along the margins of wetlands can impact on water quality and increase levels of disturbance, particularly from domestic pets.
Introduced animals		
Predation by introduced species	Possible Current	Foxes and cats are known to prey upon wetland birds (O'Donnell et al. 2014). However, the extent to which these species impact on the Australasian Bittern is unknown at this stage.

Conservation Objective

The objective of this conservation advice is to provide guidance for actions that will expand the range and the number of Australasian Bitterns in Australia.

The key strategies to achieve this objective are:

- Identify the key sites where Australasian Bitterns occur throughout their range and establish a baseline measure of abundance. This baseline will then be used to track change over time.

- Manage key sites to ensure habitat is suitable for Australasian Bitterns. This will require measures that primarily target adequate water flow and quality, and measures to ensure weed species and grazing animals do not compromise wetland structure and function.

- Improve understanding of foraging and breeding behaviour, in order to better design recovery actions.

- Engage community and stakeholders in Australasian Bittern conservation.

Criteria for success

This Conservation Advice will be deemed successful if, within 10 years, the following have been achieved:

- The abundance of Australasian Bitterns has increased from baseline counts.

- The number of sites supporting Australasian Bitterns has increased from baseline counts, and the quality of the sites has improved, as measured against a range of key indicators.

- Understanding of the species' ecology has increased, in particular knowledge of movement patterns and habitat use.

- There is participation by key stakeholders and the public in recovery efforts and monitoring.

Conservation Actions

Conservation and management priorities

Identification of priority sites

- Collate all recent location data to establish a list of priority sites for monitoring and for protection and management. Such a list should be updated as new sites are created or found and as knowledge is improved.

Habitat loss / habitat increase

- Work with key water managers (e.g., Australian, state and local government, water corporations, irrigators) to ensure adequate water flows into known Australasian Bittern habitat, both natural and artificial (e.g., rice paddies, urban ponds etc).

- Ensure environmental water allocations are targeted to sustain Australasian Bittern habitat and known populations.

- Prevent further vegetation clearance in wetlands, ponds and associated marshy areas known to support Australasian Bitterns.
- Where appropriate, develop new wetlands with suitable habitats for Australasian Bitterns.

- Where possible, create suitable habitats for Australasian Bitterns in existing wetlands.

- Where appropriate, develop incentives for rice growers to manage crops with a sufficient period of inundation to facilitate successful breeding before harvest.

- Consideration given to strategic land purchases to aid in the protection and better management of Australasian Bittern habitat.

Habitat degradation/ habitat improvement

- Monitor and manage agricultural and urban runoff into wetlands known to support Australasian Bitterns in order to maintain water quality.

- Fence wetlands to exclude grazing animals.
- Develop and implement a management strategy for wetlands where Australasian Bitterns occur, with a focus on ensuring appropriate diversity and density of reeds and rushes. Management strategy may include measures such as controlled burns, slashing

when the wetland is dry and/or flooding to limit reed re-growth. Management strategy should be informed by research targeted at better understanding optimal habitat conditions.

- Ensure adequate water volume and quality at urban and peri-urban wetlands where Australasian Bitterns have been detected.
- Investigate opportunities to encourage state and local government and private landholders to undertake conservation of wetlands on their properties for the benefit of Australasian Bitterns, to include:
  - Provision of support to develop wetland / habitat management plans.
  - Implementation of formal conservation arrangements, management agreements or covenants for local government and private landholders.

Survey and monitoring priorities

- Agree on standard monitoring protocols that can be applied across the Australasian Bitterns' range. Protocols should include measures to:
  - Estimate presence/absence and abundance.
  - Behavioural observations, including evidence of breeding and presence of young.
  - Measurement of wetland condition (vegetation composition and structure; water level; water quality (salinity levels, pH etc).
  - Quantification of presence of threats (evidence of grazing pressure, evidence of feral animals, etc).
- Undertake regular and systematic monitoring at identified priority sites on an annual basis.
- Using information from monitoring program, identify population trends across the Australasian Bitterns' range.
- Investigate the use of predictive modelling to improve estimates of the number of mature individuals and to predict population trends and distribution.

Information and research priorities

- Research to determine critical habitat values being targeted by Australasian Bitterns, with differentiation of needs during different parts of the breeding cycle. Factors such as water quality, salinity, vegetation composition and fire history should be investigated.
- Determine prey availability in Australasian Bitterns habitat and identify methods for improving prey availability in order to improve the species breeding success.
- Undertake genetic analyses to determine Australasian Bittern population structure. If population structuring occurs, this information should be used to inform management strategies.
- Assess the relative importance for Australasian Bitterns occupancy and breeding success of:
  - introduced predators,
  - mortality associated with fixed structures, such as fence lines and towers,
  - grazing by introduced herbivores,

- fire regimes.

- Ensure processes to allow outcomes of research to influence ongoing management and monitoring programs, and to influence the development of new actions where required.

Stakeholder engagement and governance

- Develop broad promotional material to raise awareness about the Australasian Bittern, its status and the importance of protecting vegetated freshwater wetlands, and share this material with conservation groups and the general public.
- Develop targeted fact sheets for landholders to increase awareness of the Australasian Bittern, including advice regarding improved wetland management for the species, and provide an avenue for reporting sightings.
- Engage with private landholders, agricultural producers and public land managers responsible for land on which Australasian Bittern populations occur, and encourage them to contribute to the implementation of conservation management actions.
- Promote the important ecosystem functions of wetlands, and their aesthetic and recreational values, to increase the interest of conservation groups and general public in their protection and restoration.

Guidance for decision makers

A person must not take an action that has, will have or is likely to have a significant impact on any of the matters of national environmental significance without approval from the Australian Government Minister for the Environment and Energy (the Minister). Matters of national environmental significance include listed threatened species, such as the Australasian Bittern and Ramsar Wetlands.

Developments that are proposed in the immediate vicinity of natural wetlands that contain Australasian Bittern populations or within habitat critical to the survival of the Australasian Bittern, are likely to require referral under the EPBC Act.

An action is likely to have a significant impact where it may adversely affect the long-term recovery of the species. Actions may require approval under the EPBC Act where they:

- Clear or degrade known or likely habitat; and/or
- Result in the loss of any individuals or populations.

If any proposed activity is likely to have a significant impact on the Australasian Bittern, the proponent should contact the Department of Environment and Energy.

Further information about what may constitute a significant impact on endangered species can be found in the Significant Impact Guidelines - Matters of National Environmental Significance.

Further information

Further information on this species can be found in the Department of Environment and Energy's Species and Threats (SPRAT) Database.

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