With links to the mythical bunyip, the enigmatic and elusive Australasian bittern is a fascinating feature of Western Austalia's south-west. Now, thanks to a collaboration between BirdLife WA and Parks and Wildlife, we're getting a more comprehensive picture of how and where these birds live, and how we can better protect them.

by Robyn Pickering, Alan Clarke, Sarah Comer, Deb Sullivan and John Graff

Big brown boomers

The Australasian bittern

Imagine you're camping alone near a remote, rushy swamp in late spring. You lie quietly in your tent, fighting for sleep against a deafening chorus of frog calls, when a deep, eerie, booming from the swamp reverberates through the darkness. Suddenly, sleep is the furthest thing from your mind as you sit up in your tent, senses heightened. Your mind goes to warnings from the local settlers and Aboriginal people about the bunyip, a malevolent swamp beast, and you feel a rising sense of fear. Fortunately for you, this booming denizen of the swamp is not a bunyip. In fact, you're hearing the booming call of the Australasian bittern (*Botaurus poiciloptilus*), a wetland bird species, whose calls comprise two to five deep, fog-horn like booms, each preceded by a gasp. However, if you're fortunate enough to have heard an Australasian bittern, it's easy to understand why their calls were sometimes thought to be made by the mythical bunyip!

MYTHICAL BUNYIPS

Australasian bitterns are large, mottled-brown waterbirds which inhabit vegetated wetlands. They are shy and unobtrusive, preferring wetlands with large areas of sedges and rushes. They are a top-order predator that eats a variety of wetland animals such as insects, fish, gilgies, frogs and even small birds. The species is highly cryptic and it is often only their calls that give away their whereabouts. With a global population of fewer than 2500 individuals, they are listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* in Australia, and globally on the IUCN Red List of Threatened Species.

The population of Australasian bitterns in Australia has waned following the loss and decline of wetlands across the country. For the past 38 years, Parks and Wildlife and its predecessors have been monitoring water depth and chemistry at more than 100 significant wetlands as part of the South West Wetlands Monitoring Program (SWWMP). This monitoring has shown that a number of wetlands in the south-west have declining water levels and increasing salinity and acidity. This long-term monitoring is important in assessing the status and condition of important bittern wetlands.

WHERE ARE THE WESTERN AUSTRALIAN 'BUNYIP' BIRDS?

In Western Australia, Australasian bitterns live mainly in coastal or near-coastal wetlands from Perth to Cape Arid, east of Esperance on the south coast. Unfortunately, their original distribution largely corresponded to the areas of the State which have had the highest level of housing, agriculture and industry development.

Many suitable wetlands in south-western Australia have been lost or degraded through clearing, salinisation and acidification, and available bittern habitat is diminishing. The *State of the Environment Report: Western Australia 2007* found that there was a loss of 80 per cent of wetlands on the Swan Coastal Plain which means those remaining are of high conservation significance. Unsurprisingly, few Australasian bitterns are found in this largely developed environment. In fact, Australasian bitterns could be considered to be the endangered frogs of the bird world – highly susceptible to environmental changes and a strong indicator of wetland health.

Today most Australasian bitterns are found on the south coast and in the Muir-Unicup wetlands, east of Manjimup. These areas have more wetlands of conservation significance than the Swan Coastal Plain and Wheatbelt, where Australasian bittern numbers have declined more significantly.

Main Australasian bitterns are well camouflaged but have a loud, booming call.
Photo – Peter O'Connell/Parks and Wildlife
Inset Parks and Wildlife officer Ian Wheeler examines broken egg shells from an Australasian bittern nest.
Photo – Alan Clarke/Parks and Wildlife

"... in order to find wetlands where bitterns are present and to learn more about them, BirdLife WA and Parks and Wildlife embarked on a collaborative partnership. A variety of survey methods and equipment have been employed to achieve this goal."

Left An Australasian bittern flies over West Sister Swamp Nature Reserve.
Photo – Robyn Pickering

Above A camera trap provides footage of an Australasian bittern.
Photo – Alan Clarke/Parks and Wildlife

Important Bird Areas (IBAs), including wetlands, have been identified by BirdLife WA as sites of international significance for bird conservation. In WA, noteworthy IBAs for Australasian bitterns include Benger Swamp, the Muir-Unicup Wetlands, Owingup and Boat Harbour Swamps, the Lake Pleasant View System, and wetlands in the Two Peoples Bay and Mount Manypeaks areas. Recent surveys indicate that one other wetland complex north of Cape Le Grand National Park is also highly significant. Most wetlands with Australasian bitterns present are protected by the nature reserves and national park system managed by Parks and Wildlife. But there are still a number of bittern wetlands that aren't formally protected. Some landowners are lucky enough to have wetlands that support bitterns on their doorsteps, and working with them is critical for long-term protection of these areas.

CRACKING THE SECRETS OF THE 'BUNYIP BIRD'

Finding Australasian bitterns and discovering how they live is a major challenge since it is estimated that there are fewer than 150 remaining in WA and they live in densely vegetated wetlands and usually only call during the breeding seasons. So in order to find wetlands where bitterns are present and to learn more about them, BirdLife WA and Parks and Wildlife embarked on a collaborative partnership. A variety of survey methods and equipment have been employed to achieve this goal.

Listening for the calls of the male bittern has been one of the primary survey methods for Australasian bitterns. They are usually most vocal during their breeding season in spring and early summer. Their deep booming call can carry for several kilometres when weather conditions are favourable, making this an efficient survey method for trained observers. Listening surveys usually involve standing or sitting at the edge of a wetland just after sunset for 20 minutes or more. Listening to the frog chorus as a wetland is bathed in the glow of sunset can be a very enjoyable task!

Between July 2007 and June 2012, more than 500 listening surveys were carried out by staff and volunteers. Many more have been conducted since then, but from 2013 these surveys have been increasingly replaced by the use of automated recording units (ARUs), which can be deployed to 'listen' in wetlands for weeks or months at a time during peak bittern activity (see 'Moggies on the marsh', *LANDSCOPE*, Spring 2014). Computer software programs are now able to scan these recordings to recognise bittern calls. At some wetlands the ARUs have been paired with continuous water depth loggers. The data can be used in combination to examine how calling activity is influenced by changes in water depth, and how this factor triggers or influences the breeding cycle of bitterns.

A second survey method was rather more strenuous. Volunteers, led by BirdLife WA or Parks and Wildlife staff, waded through well-vegetated wetlands to search for signs of Australasian bitterns such as moulted feathers, evidence of breeding and feeding platforms. And, when they spotted a bittern, they recorded details about its location and habitat, such as water depth and vegetation type and structure.

Initial data collected from these investigations suggests that the breeding

Right Volunteer John Blyth searching Frenchman's Peak Wetlands.

Below right Cape Le Grand National Park wetlands.
Photos – Sarah Comer/Parks and Wildlife

and associated feeding habitat preferences of the Australasian bittern in south-west WA are quite specific. Australasian bitterns require wetlands with a minimum amount of tall sedge, mainly jointed rush (*Baumea articulata*), at the right density and structure in which to build their nests, together with associated areas of low, fine sedge at suitable feeding depths. As large top-order predators they require a steady supply of prey to eat and sustain their growing young. They are in competition with the more numerous purple swamphens and other opportunistic heron species, so unsurprisingly they seem to prefer large wetlands. These specific requirements result in few wetlands supporting breeding activity in any given year. Then, to add greater challenge to their plight, once the birds have bred in late spring and early summer and the water in these wetlands is receding, the young are vulnerable to attack from native predators such as swamp harriers and, when feeding in shallow water, terrestrial predators like feral foxes and cats. These predators have been regularly seen on remote cameras deployed in feeding areas at this time of year.

In recent years, a number of Australasian bittern nests have been discovered by Parks and Wildlife researcher Alan Clarke assisted by volunteers. Information has been collected on nest structure, water depth and vegetation at these nest sites. Further work will be required to find more nests so that we can better understand the habitat requirements for successful breeding.

IMPORTANT FIRST STEPS IN CONSERVING THE BUNYIP BIRD

Over the past eight years, work by BirdLife WA and Parks and Wildlife staff has significantly increased our understanding of the Australasian bittern, enabling an estimate of the size of the population in WA. The last time that a clear indication of the population of this cryptic species was obtained was in the early 1980s when BirdLife WA with the then Department of Fisheries and Wildlife conducted waterbird surveys throughout the south-west. Comparison of both data sets suggests that the population in WA has declined by 25 to 50 per cent since the 1980s. It is estimated that there are now fewer than 150 adult Australasian bitterns remaining in WA. Little wonder bitterns have become more difficult to find!

Information from surveys conducted in the late 2000s resulted in the conservation status of the species in WA being reassessed, and in August 2010 it was uplisted from Vulnerable to Endangered due to the alarmingly low population size. With similar work being done in other parts of Australia, the species was also listed as Endangered nationally in March 2011. These listings are an important step in recognising that the species is in need of action to ensure its future.

In early 2013, an interim recovery plan was drafted by the Australasian Bittern Working Group (with members from both Parks and Wildlife and BirdLife WA) for the species in WA. The draft plan is

Challenging research is uncovering more secrets

Recently, Parks and Wildlife researcher Alan Clarke deployed remote cameras on feeding platforms and other places of interest in order to collect more information about these enigmatic birds. Heavily-vegetated swamps are challenging places to conduct observational studies, especially on the secretive and well-camouflaged Australasian bittern. Remote cameras provide an opportunity to record the activity of these birds and some of the challenges they face.

Trials have been carried out to assess the value of using cameras in such difficult conditions. The cameras are surrounded by water and in soft mud, while masses of tall, fine sedges waft across the target area in the slightest breeze, easily triggering cameras! Techniques were developed and tested for setting cameras to have the best chance of capturing the Australasian bittern. It took some time before there were any successes but in recent trials cameras have shown their potential for providing a window into the secretive world of the bittern.

The cameras have also recorded foxes and even a cat patrolling through water 15cm deep in areas where Australasian bitterns have been seen. One camera also captured a fox with an adult purple swamphen between its jaws. Given that bitterns are a similar size to the swamphen, this suggests that foxes can prey upon both adult and juvenile bitterns.

Remote cameras have already provided images of important bittern behaviour. More intensive studies using cameras will be carried out to investigate feeding behaviour, diet, food supply and the relationship between water levels and vegetation in sustaining chicks, recently fledged young and adults. Cameras will also be used to study the density and effects of introduced and native predators at various life cycle stages. This information can be used to determine recovery actions that will help to increase the breeding success and long-term recovery of the Australasian bittern.

Top right A fox captured on a camera trap in bittern habitat. **Middle** A swamp harrier collecting nest material. **Right** A camera trap installed to learn more about Australasian bitterns and other swamp inhabitants.
Photos – Alan Clarke/Parks and Wildlife

currently being finalised, and summarises key actions that can be implemented to protect and improve the conservation status of Australasian bittern.

This collaborative work has also discovered important wetlands for bitterns that are not currently protected in the reserve system. These wetlands can now be targeted for better protection where possible, to give Australasian bitterns the best chance for survival.

For wetlands that have been identified as important for bittern breeding, Parks and Wildlife has undertaken associated hydrological studies. This work has involved the monitoring of water levels and rainfall by means of continuous recording equipment. This data will be used to model the filling–drying cycles of these key sites under conditions of declining rainfall, as currently forecast.

BirdLife WA has collected information on the amount of available vegetation habitat and chemistry data for more than 100 wetlands in south-west WA. This is important baseline information to enable characterisation of wetlands that Australasian bittern use, and will enable changes to be monitored into the future. Vegetation mapping has also been conducted by botanists at five important bittern wetlands. This information, together with the data from the remote cameras, ARUs and nest habitat data, contributes to our understanding of the general wetland preferences of the species.

THE PRESENT

Other work has been conducted by John Graff, an honours student from The University of Western Australia, who aimed to investigate calling patterns of Australasian bitterns and to test whether calls can be used to identify individual bitterns, and then to track their movements from one year to the next. The results of this work suggest that Australasian bittern calls do vary subtly

"These wetlands can now be targeted for better protection where possible, to give Australasian bitterns the best chance for survival."

between individual bitterns; however, further work is required to determine whether long-term re-identification of individuals is possible. Several technical challenges need to be overcome in order to use vocal individuality as a practical method of ongoing identification of individual bitterns. The research also indicated that although bitterns call throughout the night during the breeding season, the peak period for calling activity occurs during the last hour or so before sunrise.

BirdLife WA and Parks and Wildlife are continuing to collaborate and work towards goals of protecting the species and wetland habitat and securing and increasing the Australasian bittern population. Specifically, members of the team are working together to raise the profile of the species, learn more about its habitat preferences to guide wetland protection and restoration, and document the important life history characteristics and ecological processes that will, in the longer term, assist with understanding how to conserve this iconic bird.

Above Tony Bush has contributed hundreds of volunteer hours and significant expertise to bittern research. He is pictured here at the site of a recently discovered Australasian bittern nest.

Above right Australasian bittern eggshells in a typical flat-structured nest.
Photos – Alan Clarke/Parks and Wildlife

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The work conducted since 2007 could not have been completed without the hard work of Alan Clarke, Robyn Pickering and more than 140 volunteers, and the great support given by BirdLife Western Australia and Parks and Wildlife. Significant funding has also been provided by Lotterywest and South Coast Natural Resource Management Inc.
The support of the Australasian Bittern Working Group in steering coordinated conservation efforts for this species in Western Australia is also gratefully acknowledged.

See remarkable footage of an Australasian bittern

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