



Protecting and restoring green and golden bell frog habitat



Department of Environment & Climate Change NSW



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Introduction

As Sydney has developed, much original native vegetation has been cleared or disturbed. As a result, many native plants and animals have become extinct in certain areas or are living in isolated communities.

The Department of Environment and Climate Change (DECC) and Sydney Metropolitan Catchment Management Authority are working with other government agencies and the community to protect endangered remnants of native vegetation in Sydney and the threatened species that depend on them.

This brochure explains how you can help preserve the endangered green and golden bell frog (*Litoria aurea*).

For example, you could create green and golden bell frog habitat in your backyard, find out more about frogs by walking through Sydney Olympic Park, or join a bushcare group.

This brochure also lets you know about the valuable work that is occurring in Sydney Olympic Park to conserve and enhance green and golden bell frog habitat.



Green and golden bell frog

Photo: Martin Schulz



Emergent aquatic plants

Photo: Cheyne Ramsay



The green and golden bell frog has an electric blue splash on the groin and back of the thighs

Photo: Sharron Marks

You can obtain other threatened species brochures at www.environment.nsw.gov.au/threatenedspecies or contact the Environment Line on 131 555.

About the green and golden bell frog

The green and golden bell frog is a large, plump amphibian ranging from approximately 4.5 to 10 cm in length. The colour of the frog varies, but is commonly a pea-green with brassy brown or golden splotches.

Living in both ponds and the grassy and rocky areas around them, the preferred habitats of these frogs include waterbodies that:

- are unshaded and free of predatory fish
- have grassy areas and shelters nearby.

The green and golden bell frog has gone from being one of the most commonly found frogs, present in vast numbers along the east coast of Australia, to one of the most threatened.

The known range of the species has declined and become fragmented over the past 30 years, with many local populations either becoming extinct or being at risk of extinction.

The frog is listed as an endangered species under the NSW *Threatened Species Conservation Act 1995*, and as a vulnerable species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Why is the green and golden bell frog endangered?

The green and golden bell frog has declined due to habitat loss or alteration, predation from introduced fish such as the plague minnow (*Gambusia holbrooki*) and the frog chytrid fungus.

Why is the green and golden bell frog so important?

- The green and golden bell frog is an endemic species found only on the east coast of Australia.
- The green and golden bell frog was traditionally used as a food item by Aboriginal people in the Sydney area.
- Unlike most *Litoria* species, bell frogs do not live in trees.
- It plays an important role in ecosystem food webs. Adult frogs often provide a tasty meal for wading birds and reptiles. Tadpoles are often eaten by giant water bugs. Throughout their life cycle, green and golden bell frogs feed on plants, other frogs and insect populations, helping to keep them at natural levels. As tadpoles, green and golden bell frogs feed on algae and plant matter. As adults, they consume mainly insects such as crickets, and also may eat other, smaller frog species.
- Some insect species play a role in several stages of the green and golden bell frog life cycle. Diving beetles eat frog tadpoles, but are eaten by adult frogs in return.



Crickets are a favourite food item for green and golden bell frogs

Photo: Sydney Olympic Park Authority



Waterdragons prey on green and golden bell frogs

Photo: Martin Schulz



Sydney Olympic Park
Brickpit

*Photo: Sydney Olympic
Park Authority*

Bell frogs at Sydney Olympic Park

The green and golden bell frog is one of seven native frog species at Sydney Olympic Park. The park's population of green and golden bell frogs is one of the largest in NSW. The population was discovered in 1993 during the development of the area for the 2000 Olympic Games.

The green and golden bell frog has become the subject of a major conservation program at Sydney Olympic Park which has already had very positive results. Not only has the original population been conserved, but two new self-sustaining sub-populations have emerged in newly-built habitats, which have significantly influenced the park's design and management.

The frog is now found at the Brickpit, Narawang Wetland, Kronos Hill and Wentworth Common, and can also be seen in other parts of the park and the surrounding community.



Green and golden bell frog

Photo: Sharron Marks

Frog habitat at Sydney Olympic Park

Green and golden bell frogs will occupy ponds, bare ground, turf, long grass, weeds, deep mud cracks, reeds, rubble piles, rocks and logs at some stage in their life cycle.

Ponds

Seventy ponds have been constructed at Sydney Olympic Park specifically as frog habitat. These ponds are of different sizes and have been made with different materials – some are small and made of fibreglass, some are large and lined with clay or rubber.

Vegetation

The Sydney Olympic Park Authority aims to maintain a balance between plants and open water in its green and golden bell frog ponds (maximum 80% reed coverage to 20% open water). Emergent vegetation such as rushes and sedges has been planted in the ponds to allow the frogs to bask and to hide from predators. Corridors of unshaded, tall grasses link ponds to allow frogs to move between habitats. Vegetation is provided for foraging and shelter.

Underpasses

Eleven road underpasses have been built at Sydney Olympic Park to allow the frogs to safely move between habitats while avoiding road traffic.

Frog fencing

Six kilometres of frog fencing have been installed to guide frogs through underpasses and prevent them from hopping onto the roads in the park.



Constructed frog pond at Sydney Olympic Park

Photo: Sydney Olympic Park Authority



Frog-friendly vegetation at Sydney Olympic Park

Photo: Sydney Olympic Park Authority



The Brickpit Ring Walk

Photo: Sydney Olympic Park Authority.



Green and golden bell frog

Photo: Glenn Muir, Australian Museum Business Services

Visiting Sydney Olympic Park

In the park, there are many ponds and plants, and signs giving information about the history, habitats and habits of the frog. Some of the best places to view green and golden bell frogs are at:

The Brickpit Ring Walk

The Ring Walk is an elevated circular walkway with birds-eye views of frog habitats. You can learn more about the frogs from the informative signs while listening to them call. Afterwards, you can continue into Wentworth Common and Kronos Hill to see frog fencing and tunnels, and more ponds. The Ring Walk is 550 m in circumference on a mainly level surface, and is suitable for all ages and levels of fitness. It is wheelchair accessible.

Narawang Wetlands boardwalk

Meander along this reed-fringed boardwalk adjacent to frog habitat ponds and listen for calling frogs. You may even see one if you are lucky.

This boardwalk is part of a walking/cycling path network which can be accessed by wheelchair, on a bicycle or on foot. The network is 6.3 km long and car-free.

Getting there

The main entrance to Sydney Olympic Park is via Australia Avenue. Sydney Buses 533 from Chatswood, 525 from Strathfield and 401 from Lidcombe go to the park, as does the privately-run 450 from Hurstville. Trains run to Olympic Park Station from Central Station and suburban stations on the Olympic Park train line.

Once at Sydney Olympic Park, visit the visitor centre at 1 Showground Rd for maps and information on what to see and do. Park maps are also available at www.sydneyolympicpark.com.au.



Bell frog walks at Sydney Olympic Park

Graphic: DECC



Juvenile green and golden bell frog

Photo: Stuart Cohen



Green and golden bell frogs have successfully bred in this pond in Riverstone, which is made from an inflatable wading pool

Photo: Lance Jurd

Green and golden bell frogs in your backyard

Green and golden bell frogs will colonise suitable habitats of many types. Why not create frog habitat in your backyard? Frogs might move in permanently or use your backyard as a staging place when moving to other habitat nearby. Your backyard may be an important part of the local network to help green and golden bell frogs survive. Suburbs within bell frog corridors include Arncliffe, Avoca, Bombo, Davistown, Greenacre, Hammondville, Hexham, Kurnell, Merrylands, Minumurra, Mt DrUITT, North Ryde, North Wyong, Port Kembla, Port Macquarie, Riverstone, Rosebery, St Marys and Woonona.

Frogs are great to have around the garden. Most frogs eat house flies, maggots, cockroaches and even spiders.

How to create your own bell frog habitat

The first step in creating bell frog habitat is to put in a pond. Ponds can be made in many ways and with many materials; your choice will depend on what is suitable for your backyard. The size of your backyard need not prevent you from building a pond. Even small areas can accommodate one or two plastic tubs that can be made suitable for bell frogs.

Location

- Make sure the pond will receive sunlight for a large part of the day. Bell frogs love to bask in the sun.
- It is better to place the pond well away from trees. Bell frogs prefer unshaded ponds, and some trees have leaves that will leach poisons if they fall into water.

Ponds

- Raised ponds are the best for bell frogs as they can exclude ground frogs which may compete with or prey on bell frog eggs and tadpoles. The ponds should have sides at least 35 cm high and preferably a lip that turns outwards. An inward-turning lip may prevent frogs from getting out of the water and cause them to drown.
- By not digging the pond into the ground and maintaining its steep edges, its effectiveness at keeping out other frog predators is improved. While bell frogs may use in-ground ponds, breeding may not be successful if ground frogs are present.
- Raised ponds can be made out of old bath tubs or laundry tubs, plastic pools, stock troughs, styrofoam boxes or plastic tubs.
- Tap water contains enough chlorine to harm tadpoles, so the water in the pond may need to stand for some time before it is colonised by frogs. Alternatively, water conditioner can be added to age the water immediately. Use rain water to refill the pond whenever possible.
- A pond previously used for fish can be converted into a frog pond if fish and spawn are removed. Make sure you drain and dry out any pond that has previously been used for fish. Fish could be placed in an indoor aquarium. Refill the pond and develop the frog habitat features described in the next section.
- Contact your local council to find out if there are any local regulations you must comply with when building a frog pond.

Remember that it is illegal to move frogs or tadpoles. Moving frogs can spread disease and destroy local frog populations. Be patient and frogs will find you eventually. It can take up to two years for frogs to establish in a garden.



Raised pond with an out-turning lip at Sydney Olympic Park

Photo: Sydney Olympic Park Authority



Green and golden bell frog habitat

Photo: Sydney Olympic Park Authority



Green and golden bell
frog pond at Sydney
Olympic Park
*Photo: Sydney Olympic
Park Authority*



Green and golden bell
frogs love to bask on logs
Photo: Sharron Marks

Frog habitat

- Include some submerged waterplants in the pond for tadpole food and hiding places, and to prevent water stagnation.
- Vegetation that emerges out of the water, such as reeds, or surrounds the pond allows bell frogs to bask in the sunlight and can improve water quality. Rock piles are also good places for bell frogs to bask and shelter, and hollow logs, roof tiles laid on the ground or thick, low vegetation such as grasses and sedges can also provide good sheltering sites.
- Provide both open water and vegetated areas in the pond to allow adult frogs to hunt and hide.
- Bell frogs prefer grasses and plants with fleshy leaves. In established gardens, bell frogs have been found in bromeliads and elkhorns.
- Encourage insects into your garden for frog food, by installing a low garden lamp or a compost heap.



Green and golden bell frog tadpoles
Photo: Lance Jurd

Frog protection

- Backyard threats to frogs may come from predatory birds, fish, garden poisons or household pets.
- Garden sprays containing poison and fertilisers should be avoided near ponds.
- Pets should be discouraged from entering the part of the garden containing ponds.
- Hanging streamers above your pond can deter predatory birds.
- Never introduce exotic fish such as goldfish, carp or plague minnow into frog ponds.
- Avoid replacing more than a third of the water in the pond at any one time, to prevent increasing the chlorine content of the water. Increased chlorine levels can harm tadpoles.
- Never chase or try to touch any frogs you see. Handling frogs can help spread the frog chytrid fungus from one frog to another.



Green and golden bell frog

Photo: Sharron Marks



Plague minnow

*Photo: The Sydney Olympic
Park Authority*

Other ways to get involved

- Report your green and golden bell frog sightings. Visit www.environment.nsw.gov.au/surveys/bellfrogonlineform.htm.
- Join your local bushcare group and help restore native ecosystems. Visit your local council bushcare website to find the location of your nearest group.
- Join the Frog and Tadpole Study Group to participate in frog surveys at Sydney Olympic Park. Visit www.fats.org.au.
- Help prevent the spread of the frog chytrid fungus. Visit www.environment.nsw.gov.au/plantsanimals/threatstofrogs.htm



Green and golden bell frog

Photo: Narawan Williams

Further information

Department of Environment and Climate Change:

- www.environment.nsw.gov.au/threatenedspecies
- www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10483 (green and golden bell frog profile)
- www.environment.nsw.gov.au/recovery/GreenGoldBellFrogRecoveryplanDraft.htm (Draft recovery plan for the green and golden bell frog (*Litoria aurea*))

Department of Environment, Water, Heritage and the Arts – www.environment.gov.au.

Frogs Australia – www.frogsaustralia.net.au.

Sydney Olympic Park – www.sydneyolympicpark.com.au/biodiversity.

The Frog and Tadpole Study Group – www.fats.org.au.

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