ATTRACTING FROGS

ATTRACTING AND KEEPING FROGS IN YOUR NEW POND

The habitat Council has provided for you is specifically designed to attract many of the local tree-frog species that spawn in still or slow moving water away from the pressures which have contributed to their decline, such as predatory fish and chemical pollutants.

The habitat should be topped up with a few rocks and/or branches from your garden to provide some protection from frog predators such as Kookaburras. It is also important not to introduce tadpoles or frogs that don't occur naturally in your area; they may introduce frog diseases or be of the wrong species. Please avoid using any chemicals around the habitat as they may well have an adverse effect on your frog population.

The habitat you have received is specifically designed for tree frogs. The success of this project will depend on the ability of it to exclude the Striped Marsh Frog (*Limnodynastes peronii*). The Striped Marsh Frog constitutes over 90% of all frogs recorded in Sydney. This frog is a ground dwelling frog and is a notoriously bad climber which is why your habitat is raised on Besser blocks. Although native to the Ku-ring-gai area, Striped Marsh frogs thrive in urban areas, to the detriment of other frog species.

LOCATION…LOCATION…LOCATION…

An ideal place is part sunny, part shady, in an spot where the ground or lawn stays damp for a while after rain. Locate it a reasonable distance from areas which are hot and dry, such as brick walls or foundations.

Ideally, a range of bog plants should be planted around the sides of the habitat and a compost heap could be located close by, creating a ready source of insects for your froggy inhabitants. Also, some rocks from around your garden or fallen logs around the base of the pond help will also provide cover for frogs as well as providing them with a hunting area.

AQUATIC PLANTS AND YOUR NEW WATER GARDEN

Council can provide you with a range of native aquatic plants for your habitat for the benefit of tree frogs and aquatic fauna. The list below includes appropriate species which will provide important habitat as well as enhancing your backyard.

Free Floating Species
Azolla pinnata (Ferny Azolla)
Spirodela punctata (Duckweed)
Wolffia australiana (Tiny Duckweed)

Fully Aquatic Species (submerged)
Myriophyllum variifolium (Water Milfoil)
Utricularia gibba (Yellow Bladderwort)
Ceratophyllum demersum (Hornwort)
Triglochlin rheophilum (Water ribbons)
Hydrilla verticillata (Water thyme)

Floating Leaved Plants (centre of pond)
Marsilea mutica (Smooth Nardoo)
Nymphoides montana (syn. N geminata) (Yellow Marshwort)
Ottelia ovalifolia (Ottelia)
Potamogeton tricarinatus (Floating pondweed)

Bog Zone Plants (for planting around the edges)
Lomandra longifolia (Mat Rush)
Lomandra fluviatilis
Isolepsis nodosa

THE FIRST COLONISERS

Gradually, you will notice your pond becoming home to a number of invertebrate species before the frogs begin spawning., Bloodworms are usually the first to arrive creating little piles of dirt and sludge all over the submerged rocks and sides of the barrel. They are followed by mosquito larvae or ‘wrigglers’.. This is an important stage in the pond’s development and there is no need for concern. Many of these mosquito species do not feed on human blood and so will not affect the surrounding area of your garden or your enjoyment of it. However, if large numbers of larvae appear to be present, it is possible the water may have a high organic content, most likely because of decaying vegetation. If this is the case, removing the majority of organic matter will alleviate the problem. If the problem persists, please call Council’s WildThings Officer for advice about the most appropriate form of treatment.

Once the wrigglers have occupied the pond, they will probably attract mosquito predators such as dragonfly or beetle larvae which will greatly reduce the number of wrigglers in your habitat.

THE FROGS HAVE ARRIVED!

It shouldn’t be to long before the first local frogs discover the water source. How long this takes will vary, but typically tree frogs tend to spawn in the warmer months of the year, during rain events.

The time required for tadpoles to metamorphose into fully developed frogs varies from species to species. Don’t be discouraged if not all species appear. It is uncommon for a large range of species to inhabit a small body of water. Probably only one to three species will take up residence.

To help keep frog populations viable in Ku-ring-gai, it is extremely useful to plot frog species diversity. Council’s WildThings Officer on 9424 0000 and let us know of any frog species that colonise your habitat. As mentioned earlier, external conditions such as weather changes can result in species decline or expansion and the information you provide will help to better understand frog ecology in the Ku-ring-gai area.

Also, if a certain species becomes present in an area where it was previously unrecorded, it is helpful for us to know, so we can develop strategies to further enhance the species range or distribution throughout the area.

NATIVE FISH

If you would like to have fish in the habitat, Council can also provide you with suitable species.

It is important the species are sourced locally, as use of exotic fish has caused many enviromental problems over the years. White Cloud Mountain Minnows, for example, are from China and have begun to establish feral populations in Australian waters. They should be avoided.

Fish of all species will eat many newly hatched tadpoles and frog spawn, however some are more effective predators than others. Tadpoles will survive if there is enough protective habitat in the pond. Alternatively, you can collect the spawn and keep the tadpoles in a separate container until they are 15mm long.

Australian Smelt (*Retropinna semoni*)
Endemic to coastal South-East Australia, the smelt grows up to 7cm. A very fast swimming species, it is excellent for controlling mosquito larvae in backyard ponds. It is suggested they can co-exist with tadpoles, but this is unlikely in a small water source such as your pond.

Pacific Blue-Eye (*Pseudomugil signifier*)
Blue-Eyes are a beautiful species that are also suitable for aquariums. They breed readily in backyard ponds and grow to around 5cm. These are genuinely tadpole friendly and are an excellent choice for if you want to maximise tadpole numbers. Unfortunately they are not the most robust of fish and are sometimes difficult to establish.

Firetail Gudgeon (*Hypseleotris galii*)
Gudgeon are more agressive than Blue-Eyes. If these are introduced to your habitat they will breed in great numbers. Interestingly, they are well regarded as one of the best fish for mosquito larvae control (much better than the introduced mosquito fish) and will quickly decimate a wriggler population.

MOSQUITO FISH

Gambusia holbrooki (Mosquito Fish) are an introduced menace which now dominates many of Ku-ring-gai's creeks to the detriment of many frog species. These days it is rare to find a permanent pond or water source free from these troublemakers. They give birth to live young and are voracious feeders from the day they are born.

The main problem seems to occur between the time the frogs spawn and the tadpoles hatch. The spawn is an instant source of protein for the Mosquito fish and its consumption has a severe impact on frog viability.

There is a need for more study of the precise impacts and long term problems caused by introduced fish such as Gambusia. Stream breeding tree-frogs such as *Litoria phyllochroa* and *Litoria lesueri* are without doubt significantly reduced throughout Ku-ring-gai as a consequence of this predator. If you are lucky enough to attract these tree-frogs you will contribute to their survival in this precious part of Sydney.

FROGS AS BIO-INDICATORS

Freshwater bio-indicators are animals and plants which can be used to determine the state of health of freshwater habitats. Some creatures are very sensitive to water-borne pollutants while others less so. Changes in the abundance and diversity of these animals can be used as a measuring tool to determine water quality. Bio-indicator organisms typically live in freshwater and so are subject to changes in the pollutant load. They are often more effective than laboratory based measuring tools as they are able to escape the effects of the pollutants, are more sensitive than most meters and are cheaper to use. One of the biggest problems in using laboratory probes or taking water samples is that water quality is not static: it changes constantly and pollution loads may vary from high to immeasurably low. Water meters can only record water quality at one point in time and often fail to assess fluctuations in water quality.

The most widely used organisms are aquatic insects and other aquatic invertebrates; these soft bodied animals are collectively referred to as 'macro-invertebrates'. Many insects have juvenile stages that are fully aquatic and some of these insects and aquatic arthropods were found to be sensitive to specific pollutants allowing scientists to test easily for specific contaminants. Frogs have been used as bio-indicators, but their use is not widespread. It is known that frogs (and especially tadpoles) are sensitive to a range of water-borne substances making them suitable candidates as bio-indicators. However, relatively few species occur at each freshwater site and so statistical models have not yet been developed. Despite this, frogs have been used in Australia to measure environmental pollutants.

Frogs have been shown to be sensitive primarily to agricultural pesticides, herbicides, fungicides and heavy metals. In Sydney, the development of expansive urban settlements has resulted in stormwater entering many creeks and river systems which contain household chemicals, detergents and grease.
In Ku-ring-gai, we can use the species composition each pond attracts as a mechanism to help determine the environmental water quality of our local catchments.

Many frog species are threatened by forest losses, urban sprawl, altered fire regimes, draining of swamps, changes to the water table with resultant salinity, erosion, water pollution and changing of flow regimes. In short, they have an inability to adapt to human induced changes. Agricultural sprays such as herbicides, fungicides and pesticides are all contributing to declines, primarily at the embryo and tadpole level immediately after hatching. With the majority of population growth along the east coast focused on South East Queensland and Sydney, we still need to understand what frog species still occur in these heavily populated areas and what habitat requirements they require to help safeguard their future survival.

High Tolerance Species
Striped Marsh Frog (*Limnodynastes peronii*)
Common Eastern Froglet (*Crinia signifera*)

Medium Tolerance Species
Bleating Tree Frog (*Litoria dentata*)
Peron's Tree Frog (*Litoria peronii*)
Whistling Tree Frog (*Litoria verreaxii*)

Low Tolerance Species
Leaf Green Tree Frog (*Litoria phyllocroa*)

CONSERVATION ISSUES

Throughout the seventies and eighties, scientists around the world noticed a sudden decline in previously healthy populations of frogs and other amphibians. At first, they thought these reductions were local variations and of little significance. What was harder to explain was the decline and extinction of some species in seemingly pristine natural settings in national parks and nature reserves. Slowly, a pool of information was compiled and a number of reasons were uncovered.

Frogs by their own design are more vulnerable to changes in the environment than many other terrestrial vertebrates because most species are exposed to both aquatic and terrestrial habitats during their normal life cycles, and their skins are highly permeable to both airborne gases and waterborne liquids. Australian frogs, like so many others throughout the world are being adversely affected by a variety of factors which is leading to a decline of a large number of species. Eight Australian frogs have become extinct in the last 25 years and several more are seriously threatened. There appear to be a number of key factors threatening frogs, particularly on the east coast and these are mainly attributed to human and urban impacts.

Scientists think the decline and disappearance of some frogs species in Australia and overseas may be partly due to a disease caused by a Chytrid fungus.
The fungus attacks the parts of a frog's skin that have keratin in them. Since frogs use their skin in respiration, this makes it difficult for the frog to breathe. The fungus also damages the nervous system, affecting the frog's behaviour.

A sick frog may:

· have discoloured skin
· be sloughing, or peeling, on the outside layers of its skin. This can vary from obvious peeling of skin (particularly on the feet), to a roughness of the frog's skin that you can barely see
· sit out in the open, not protecting itself by hiding
· be sluggish, and have no appetite
· have its legs spread slightly away from itself, rather than keeping them tucked close to its body. In more extreme cases, the frog's body will be rigid, and its back legs will trail behind it.

Chytrid fungus is probably transferred by direct contact between frogs and tadpoles, or through exposure to infected water. The disease may not kill frogs immediately, and they can swim or hop to other areas before they die, spreading fungal spores to new ponds and streams.

Wet or muddy boots and tyres, fishing, camping, gardening or frog-survey equipment may also be contributing to the spread of the disease.

In Sydney the Chytrid fungus is well established and Ku-ring-gai’s frogs’ greatest chance of long term survival probably depends on natural selection, ie frogs naturally developing resistance to this fungal scourge. The time for quarantine unfortunately has passed.

CANE TOADS

Current evidence shows that whilst Cane toad numbers are increasing, they have, over time, a relatively small effect on native fauna, including frog populations. Research by Professor Rick Shine has shown that their impact is not as severe as first feared. In fact no extinction has been found to be caused by this pest in the 70 odd years since their misguided introduction. Female Cane toads may lay up to 25,000 eggs at once and the tadpoles are known to school, dominating the areas where they breed. Fortunately Cane Toads prefer specific types of ponds, typically scrapes in disturbed areas and avoid more natural many ponds and waterways that native frogs use to breed.

Currently, Cane toads occur no further south than Port Macquarie, but occasionally one of two turn up in Sydney (normally as inadvertent hitch-hikers).