
FROGFACTS

No. 3



Frog and Tadpole Study Group:
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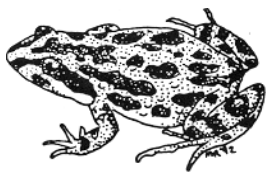
ESTABLISHING FROG HABITATS ON YOUR PROPERTY

Important

1. Frogs are an indicator of the biological health of your property, as they are particularly sensitive to many chemical pollutants. They also play a useful part in controlling insect pests.
2. Frog numbers of some species are declining alarmingly, with several formerly common species now possibly facing extinction. You can play an important role by providing frog refuges on your property.
3. Don't bring in frogs or tadpoles from other areas. You could infect your property with a new frog disease, the Amphibian Chytrid Fungus. Also, moving frogs around is not legal in most States – and they are very unlikely to stay anyway. Be prepared to wait for frogs in your local area to recolonise areas that you have modified.

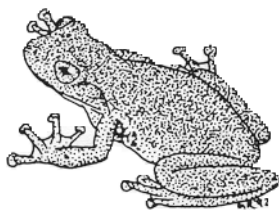
Summary

To re-establish or extend breeding grounds for local frog species on your property, you will need to provide dams that in part contain shallow zones and adequate vegetation cover, with protection from polluted runoff, from predatory fish and if possible from direct access by stock. You will also need to protect creeks from agricultural pollutants, where necessary in conjunction with your neighbours. There are also benefits to frogs and other wildlife if you can link up dams to existing wildlife corridors via vegetation strips, or if you can create corridors along creek lines and ponds.



The Spotted Grass Frog (Limnodynastes tasmaniensis, 45 mm, left) is widespread throughout eastern Australia and is amongst the first frogs to colonise new dams and ditches. During the day it shelters under logs or rocks near water. The male's call sounds like a soft version of a machine gun.

Peron's or Emerald-spotted Tree Frog (Litoria peronii, 50 mm, right) occurs throughout NSW and adjoining areas. It has a loud rattling call (like a spinning coin coming to rest on a table).



Breeding Requirements

Some Australian frog species require permanent still water for breeding, others breed in transient pools, some need running water, some merely damp soil and hiding places. Others have very specialised or unknown requirements. It is therefore best to provide as great a variety of wetland areas as you can.

Wildlife Corridors

Rivers, creeks and irrigation ditches, with vegetation along the banks and with occasional adjacent ponds, are ideal breeding grounds as well as dispersal routes for many frog species. They help frogs in colonising your breeding sites and in moving from there to further areas. (Well-vegetated banks also prevent erosion, which may justify fencing out a section of a creek.)

Other potential dispersal corridors are remnant woodlands, windbreaks, shelterbelts, forest plantations, travelling stock reserves, unused road reserves and, perhaps most importantly, the extensive network of timbered and overgrown roadside verges. A series of small darns or gullies alongside these otherwise usually dry corridors can assist frog populations greatly.

Try also to interest your neighbours in creating frog breeding sites, in linking their dams to wildlife corridors and in linking pockets of native vegetation.

Sensitivity to Pesticides and other Chemicals

Frogs have permeable skins. Their eggs have no protective shells and tadpoles undergo a complex developmental phase during which they are susceptible to pollutants. Although sensitivity between species varies, frogs are useful indicators of the well-being of the land: where they do well, chemical pollutants and other environmental problems are more likely to be under control.

Avoid the use of any chemicals within at least 20 metres of water bodies or frog feeding areas. Also, avoid as much as possible the application of chemicals on land from which runoff to water bodies could occur.

Sensitivity to Manure and Synthetic Fertilisers

Tadpoles are particularly sensitive to ammonia. Manure and many other fertilisers release ammonia. During wet weather, some of the nitrate in waterlogged soil is also converted into ammonia (by anaerobic bacteria). Unfortunately, as frogs tend to breed during such waterlogged periods, nitrate fertilisers affect their offspring during a critical stage.

To a lesser but still significant degree, nitrate itself as well as other salts will retard or prevent the development of tadpoles.

It also appears that following a drought, the concentration of accumulated soluble additives in the front zone of runoff can be extremely high, creating a "toxic wave".

Run-off should be prevented from gaining access to frog breeding grounds, and the application of fertilisers in their vicinity should be avoided or minimised.



Here fallen trees protect the walls and spillway of a dam against erosion by livestock and protect at the same time a frog habitat. A wide but screened overflow pipe just below the spillway will reduce tadpole losses and spillway erosion. Non-clogging screening is achieved by attaching a full length of perforated agricultural pipe (with the far end closed off) to the pipe's intake side.

Stock Access to Dams

Livestock not only pollute the water but also damage the surrounding vegetation cover.

Wherever possible, fence dams and supply stock with pumped or siphoned water. If this is not possible, consider establishing an additional small dam out of reach of livestock, or at least a small sector of a dam with a section containing fallen logs and shrubs.

Salinity

If your property is affected by salinity and you are embarking on a regeneration programme, you can attempt a "holding operation" to retain some of the frog species in your area. Establish one or more small artificial ponds using an unaffected water supply (e.g. roof water). Line the pond with UV-resistant plastic liner and create a shallow marsh zone with ample bog plant cover. (Details in *FrogFacts* No.2: Keeping Frogs in Your Garden)

Vegetation Cover

Part of your dam, creek or other water body should be bordered by bog plants, grasses, bushes and trees. Native plants, especially local native plants, are generally preferable to exotics because they tend to attract a greater variety of insects - including useful predatory ones - and other local wildlife. Marsh plants leading up to remnant native bush is an ideal habitat for many frog species. In areas with burrowing frogs, leave part of the water's edge bare of vegetation.

A replanting strategy that is intended to establish agriculturally sound healthy ecosystems will benefit also local frog populations. See literature below for suitable native tree and bush species. Waterside plants, marginal plants and aquatic plants are best obtained from your local area. Avoid rampant floating plants, though, and any plants listed as noxious.

Shade cover to help reduce algal bloom can be provided by e.g. growing water lilies in moderately still water or by trees bordering creeks and irrigation ditches.

Other Cover

Many frog species prefer flat rocks and logs near the water as hiding places. These provide cover in sunny and in shady positions.

As the mortality of very young frogs during dry periods is high, assist if possible by preventing the area surrounding the dam from drying out.

Where a dam's water level fluctuates too much to support marginal plants, a tethered floating island can be constructed. Place flowerpots into the raft and plant them with rushes and trailing bog plants. Ensure the island's sides are not too steep for non-climbing frog species.

Feeding

Frogs mostly eat live insects, whereas tadpoles mostly eat algae and other plant matter. Usually no supplementary feeding is required.

Fish and Mosquitoes

Fish control mosquito larvae but also decimate frog spawn and tadpoles. Therefore, don't introduce fish if mosquitoes are not a

problem. This is even more important if you have rare or endangered frog species in your area. (An absence of fish will result in a larger frog population, which also reduces mosquito numbers to some extent.)

The introduced Plague Minnow (*Gambusia holbrooki*) is particularly destructive to tadpoles and is no better at eating mosquito larvae than many native fish. It was formerly called "mosquito fish" and is now listed in NSW as a Key Threatening Process. Very small local native fish, especially those that swim in the top layers, tend to be more efficient at catching mosquito larvae than at catching tadpoles and may not eat the larger tadpoles at all.

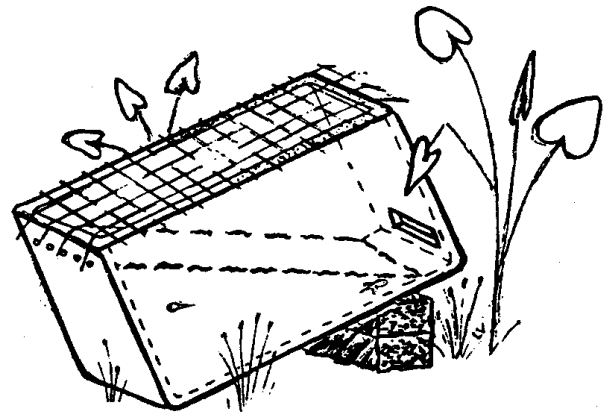
The following fish breed readily in dams, are efficient mosquito eaters and are believed to be reasonably compatible with tadpoles other than very young ones:

- **Australian Smelt** (*Retropinna semoni*, coastal S.E. Aust., southern Qld., transport with care!);
- **Pacific Blue-eye** (*Pseudomugil signifer*, coastal eastern Australia);
- **Fire-tail Gudgeon** (*Hypseleotris galii*), eastern Australia;
- **Soft-spined Rainbowfish** (*Rhadinocentrus ornatus*), coastal northern NSW and southern Qld.
- **Fly-specked Hardyhead** (*Craterocephalus stercusmuscarum*, eastern Australia);

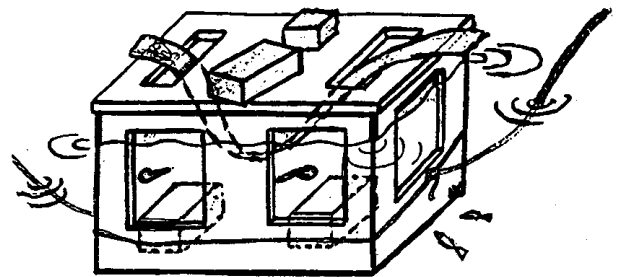
However, select only species that occur in your watershed area, to prevent escape of translocated species into the environment during floods.

It is recommended to:

- Take no specific measures against mosquitoes in flowing water (in particular, don't introduce the Plague Minnow!).
- Remove any predatory fish from dams intended as frog refuges, by draining and drying, and if mosquitoes are a concern, by introducing a more suitable locally occurring native fish.
- Create an extensively planted shallow water area to help protect very young tadpoles from fish. Another useful refuge for tadpoles is a thin layer of dead leaf litter (which is often too low in oxygen for fish to utilise).
- Try to keep the fish population low. For example, you could introduce only male Pacific Blue-eyes and add a few more every year or two. (Adult males of this species are colourful and look very different from not only their females but also from any Plague Minnows that could be in the by-catch.
- If you collect local fish from the wild, you should check whether you need a permit. You must also identify them correctly. (Baby Plague Minnows look very similar to baby native fish, and they frequently occur together!)
- Initially, until your frogs are well established, try to collect some of the spawn from your dam; to raise the tadpoles in a container for two weeks after which time they are less likely to be eaten by the fish. Use a large plastic container; keep it semi-shaded, feed very small quantities of fish food and boiled lettuce. Also include some leaf litter or detritus from the darn. Release the tadpoles very gradually back into the darn - equalising the water composition and temperature over about one hour.



A polystyrene broccoli box for raising very young tadpoles out of reach of fish. Use dam water and no more than one spawn clump per box. Note the wire mesh lid against predators and the overflow holes. The slope allows for up to twenty tadpoles to be retained in the box until they turn into frogs, without them drowning. If there is a slit in the box, level with the top of the land area, and if the box is placed adjacent to the dam, then the young frogs can leave the box when they are ready.



A similar box that is tethered and floats in the dam. It has flyscreen glued into cutouts in its sides to allow for fresh water. Tadpoles can then also be released into the dam without acclimatising. Note the bricks to partly submerge the box: and the ventilation holes cut into the lid. A wide strip of flyscreen through the lid allows for up to forty tadpoles to complete their development in the box and then to escape. (Alternatively, a lidless box with vegetation growing out of it will also allow non-climbing frog species to get out.)

Cane Toads

If you live in a cane toad area, your native frogs and other wildlife will possibly be decimated by them, and it is then especially important to provide a refuge for at least some frog species.

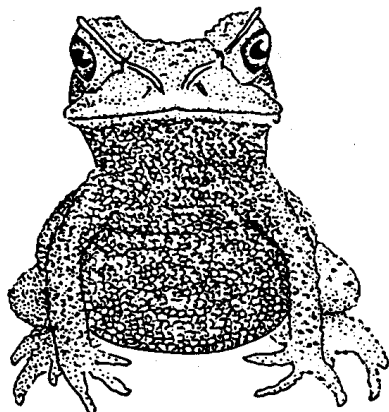
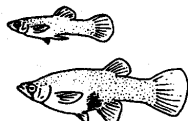
If you have a dense wooded area, create a water hole in its middle and plant up any open access to it. Cane toads avoid dense forests and may not establish themselves there.

Cane toads cannot scale a 70cm high wall surrounding a pond but many tree frog species can. (A no longer used above-ground swimming pool, with non-chlorinated water and bog plants in raised containers, will also do.)

If the wall surrounding the pond has small holes at the base (e.g. 20mm gaps between bricks), it will keep adult cane toads out but will allow most native ground dwelling frogs access for breeding. Young cane toads entering the pond must be removed manually. Be sure you can tell a cane toad from other large

brown warty frogs: Half-grown and adult cane toads have two bony ridges running from between the nostrils to above the eye. Juveniles have the same bearing and shape but without the ridges.

Cane toad spawn consists of very long gelatinous strands. (See M. Anstis or *FrogFacts* No. 6 for an image.) These strands should be removed and left to dry whenever encountered.



Two introduced destructive pests: The Cane Toad (*Bufo marinus*). 150mm, with high bony ridges running up from between the nostrils, and the Plague Minnow (*Gambusia holbrooki*), male 35 mm with a pointed anal fin, female 60mm with a black spot above the vent.

Other Predators

Keep chickens, ducks and cats away from frog breeding grounds. If tortoises are numerous on your property, provide extra dense bog plant cover and consider a small walled pond as an additional frog breeding refuge. Frog- and tadpole-eating birds can probably be warded off by a suspended profile of a flying hawk.

Further Reading

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Further information

- The postal address of the FATS Group is: P.O. Box 296, Rockdale NSW 2216. When requesting *FrogFacts*, please send a small donation for photocopying and postage.
- FATS Group meetings: Every first Friday of every even month, 7 pm for a 7:30 start, at Newington Armoury, Bldg. 22, northern end of Jamieson St., Homebush Bay. Parking at boom gate.
- FATS Group Web site (with links to other frog groups): www.fats.org.au
- Frog Hygiene Protocol on NSW DEC web site: www.npws.nsw.gov.au/wildlife/licence/frog.html
- Frogwatch Helpline: 0419 249 728, (02) 9599 1161, (02) 9371 9129



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