

# FROG CALL

THE FROG AND TADPOLE STUDY GROUP NSW Inc.

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NEWSLETTER No. 180 AUGUST 2022

Image by Michelle Toms *Litoria citropa* Blue Mountains Tree Frogs  
FATS Frog-O-Graphic competition 2017 Darkes Forest



*You are invited to our FATS meeting. It's free. Everyone is welcome.*

Arrive from 6.30 pm or a 7pm start.

**Friday 5<sup>th</sup> August 2022**

**FATS meets at the Education Centre,  
Bicentennial Pk, Sydney Olympic Park**

Easy walk from Concord West Railway Station and straight down Victoria Ave.

Take a torch in winter.

By car: Enter from Australia Ave at the Bicentennial Park main entrance, turn off to the right and drive through the park. It's a one way road. Turn right into P10f car park.

Or enter from Bennelong Rd/Parkway. It's a short stretch of two way road. Turn left.

Park in P10f car park, the last car park before the Bennelong Rd. exit gate.

**HAVE YOU SUBMITTED YOUR FROG-O-GRAPHIC ENTRIES?**  
**The FATS competition closes 31/8/2022 Fabulous prizes!**

## FATS MEETING 7PM FRIDAY 5<sup>TH</sup> AUGUST 2022

**6.30 pm** Lost frogs seeking forever homes: Please bring your membership card and \$50 cash donation. Sorry, we don't have EFTPOS. Your NSW NPWS amphibian licence must be sighted on the night. Adopted frogs can never be released. Contact us before the night and FATS will confirm if any frogs are ready to rehome.

**7.00 pm** Welcome, AGM and announcements.

**8.00 pm** Main speaker Grant Webster presenting "Anstisia and the ground frogs of Western Australia"  
Jilli Street talking about "Cuban Tree Frogs in America"  
Kathy Potter speaking about "Flash Colours in Frogs"

**9.30 pm** Show us your frog images. Tell us about your frogging trips or experiences. Guessing competition, frog adoptions continue, supper, relax and chat with frog friends and experts.

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## FATS FROG-O-GRAPHIC COMPETITION

The FATS members Frog-O-Graphic competition closes on the 31<sup>st</sup> August 2022.

### Categories:

Best Frog Image,  
Best Pet Frog Image,  
Most Interesting Image and  
People's Choice.

Winners are decided by a panel of judges.

**People's Choice** is voted for by everyone present at the October FATS meeting. Alternate arrangements will be made if we can't meet in October.

All entries are by email to [photos@fats.org.au](mailto:photos@fats.org.au)

### Please state:

- \* your name,
- \* confirm that you are a financial member,
- \* identify the frog species preferably by scientific name (in the file name) and location, if known,
- \* whether the image is a pet frog and
- \* your contact phone number

Max 6 entries per person

Max attachment size 6 MB

Fabulous prizes awarded. Entries must be original and your own work. They don't have to be recent images. The entries may appear in FrogCall, FATS Facebook, our web site and other FATS publications. **Arthur White**



Dr Marion Anstis Photo Carly Earl The Guardian

## FROGS THAT LAY EGGS ON LAND – NEW WA GENUS NAMED AFTER TEACHER WHOSE LAB WAS A CAMPERVAN

**A**nstisia biological group named after Dr Marion Anstis, who wrote an acclaimed book on amphibians after retiring as a music teacher. Four frog species in [Western Australia](#) that lay their eggs on land have been identified as a new genus and named after a retired high school music teacher-turned-scientist.



*Geocrinia laevis* eggs laid on land. Photo Marion Anstis

Researchers have classified the frogs into the distinct biological group *Anstisia*. Their tadpoles develop entirely on land and never contact the water of a creek or pond before becoming adults. Instead, they swim around in a jelly-like pool created by laid eggs and are nourished by yolk reserves.

The genus has been named in honour of Marion Anstis, who worked as a high school teacher for 31 years before cataloguing virtually all known frog species on the Australian continent. "Her book, *Tadpoles and Frogs of Australia*, is one of the best publications on frogs out," said Grant Webster at the University of New England, one of two scientists who classified the genus. "She looked at the life history and tadpole development of basically every species of frog in Australia. That's over 200 species."

## FATS AGM NOTICE FRIDAY 5 AUGUST 2022

The FATS AGM will be held on Friday 5/8/2022, commencing 7pm. FATS meets at the Education Centre, Bicentennial Park, Sydney Olympic Park.

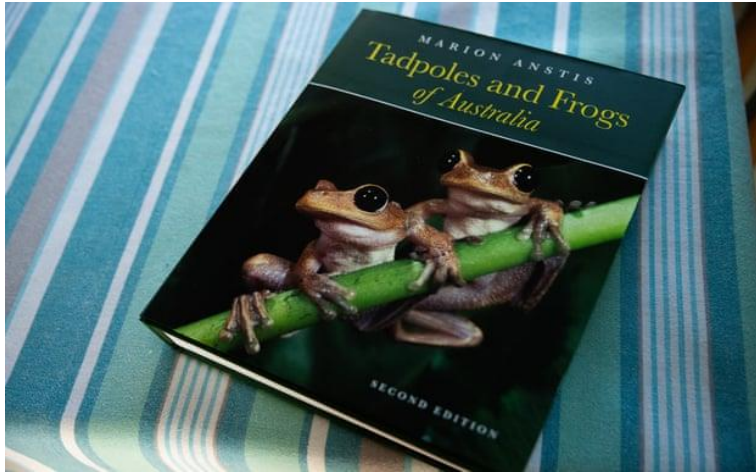
If you would like to ask any questions about joining the FATS committee, please give us a call. Contact our President Arthur White at least two weeks before the meeting for further information or to submit items. We appreciate fresh ideas and new members on our committee. No experience required. The committee meets 6 times a year. No task commitments or time expected of committee members, other than what you are able to spare. See contacts details on page 11.

**Arthur White**

One of the newly reclassified species, *Anstisia vitellina*.  
Photo: Grant Webster / University of New England



Webster said he had met Anstis when he was 11 or 12, at The Frog and Tadpole Study Group (FATS). “She’s been a bit of a mentor to me for the last couple decades,” he said.



‘One of the best publications on frogs out.’ Photo Carly Earl

Anstisia was the first frog genus in Australia to be named after a person, Webster said. “It does happen a lot in plants, like Banksia, for example, after Joseph Banks. “Usually, a frog scientist of such prestige and contribution will get a frog species named after them eventually. She’d never had anything named after her.”



Marion 9yo in her home garden, with containers of tadpoles

**Lifelong fascination** Anstis herself described six new species of frog. She developed an interest in amphibians at an early age, and in her teaching years spent her free time studying them. After retiring from teaching in 2001, she spent a decade travelling around Australia in a campervan and four-wheel drive, doing the research that would form the basis of Tadpoles and Frogs of Australia and a PhD thesis at the University of Newcastle. “The campervan was my laboratory whenever I stopped at caravan parks,” Anstis said. “I would set up my microscope in that and study the tadpoles and eggs when I got them.” Now 73, Anstis is a research associate at the Australian Museum and continues to carry out fieldwork. She recalled being “a bit embarrassed” when Webster suggested naming the genus after her. “I think it’s jolly good of Grant to give the recognition and not something at all that I expected,” she said.

**Different lifecycles** Fittingly, Anstis has studied the frogs in her namesake genus. One of the species, *Anstisia alba*, is listed as critically endangered and occupies a total area of less than 2.5 sq km. *Anstisia lutea* is considered near threatened, while *Anstisia vitellina* is vulnerable and *Anstisia rosea* is listed as being of least concern.

The four species had previously been classified as belonging to the *Geocrinia* genus, which has three other species of frog. *Geocrinia* frogs also lay their eggs on land but rely on rain to wash their tadpoles into bodies of water. They also have a biphasic call while *Anstisia* frogs have a monophasic call, according to Webster. Anstis had previously documented the differences between *Anstisia* and *Geocrinia* tadpoles, he added. While these differences have long been known, it took longer for the evolutionary distinctions to be established.

One strict rule for a genus is something called monophyly – the requirement that all the species within it must share a single common ancestor. Webster said research showed *Anstisia* and *Geocrinia* were both “monophlytic groups that could be partitioned into two genera” – they have two distinct ancestors that, if you go back further in the phylogenetic tree, share a common ancestor. “That genetic data is what really upholds the entire proposal.”

Tim Beshara, manager of policy and strategy at the Wilderness Society, said WA had some of the most unique lifeforms on the planet. “To have an entire new genus, part of an already Australian endemic frog family, really shows how isolated this part of the world was from the rest of Australia,” he said. “It’s good that we’re seeing things like the abatement of native forest logging in WA and governments starting to look to what the conservation future is for the area more broadly. “We’d like to see the Western Australian and the Australian government really put a microscope over whether the national heritage system has captured all of the special Australian natural values appropriately.” by Donna Lu 27 Jun 2022 The new genus was described in a paper published in the journal Zootaxa. [https://www.theguardian.com/australia-news/2022/jun/27/frogs-that-lay-eggs-on-land-new-genus-named-after-wa-teacher-whose-lab-was-a-campervan?fbclid=IwAR1mEteb\\_vJgrDnJzPOBvyV2mURXmCLBMMppwAaa-rixy0qD-kKTgzUBioQ](https://www.theguardian.com/australia-news/2022/jun/27/frogs-that-lay-eggs-on-land-new-genus-named-after-wa-teacher-whose-lab-was-a-campervan?fbclid=IwAR1mEteb_vJgrDnJzPOBvyV2mURXmCLBMMppwAaa-rixy0qD-kKTgzUBioQ)



Newly hatched *Anstisia rosea* tadpoles Photo Marion Anstis



George Madani June 2022 Photo by Phillip Grimm

### LAST MEETING 3 JUNE 2022



Marion Anstis, Tim Cutajar and George Madani

**T**hank you to our speakers George Madani who spoke about megafires and the Golden-tipped Bat and Tim Cutajar from the UNSW and Aust. Museum who discussed Can bugs do it better? Early success and future research using DNA from parasites to find frogs.



Tim Cutajar Both photos above by Phillip Grimm

### FATS EXHIBITIONS

**R**ecently completed FATS events were Berowra Fauna Fair and the Sydney Royal Easter Show. Both well attended and the FATS display was complimented at both.

**Upcoming events: Science Week**  
 Sat 13 August Mt Annan Botanic Gardens  
 Sun 14 Aug Science in the Scrub Westn Sydney Parklands.  
 Mon 15 to Sat 20 August Australian Museum.  
 Saturday will be open day to the public.  
 Sun 21 August Science in the Swamp Centennial Park.  
**Kathy Potter**

### FATS DONATIONS

**F**ATS recently donated \$500 to Taronga Zoo after a request for help about its frog conservation program. FATS has donated a third time to the Cairns Frog Hospital, which includes Frog Safe run by Deborah Pergolotti. This time \$240 was donated towards the \$2,000 cost to convert their website to a different authoring program so that the display issues can be fixed. Previous donations to the Cairns Frog Hospital were \$1,000 just before October 2002. On 3/10/2003 FATS held a second fundraiser for the Frog Hospital. There followed a \$1,400 donation.

Please find an abridged version about tadpole containers and ponds, on pages 6 to 9 of our FrogCall 180 edition. The complete version is on the Frog Safe website.

### THE CAIRNS FROG HOSPITAL

**P**lease consider donating to the Cairns Frog Hospital and Frog Safe website. From Jan to Dec 2021, the Frog Hospital received 124 frogs at their facility. Since Jan 2022, they have received 37 frogs (not including ones which escaped or died before transport). Most of the frogs treated require an average of 6 months before they can be released so they generally have 30 to 40 in care at any one time. Before the wet season starts, they can have over 60 in care waiting for the weather to improve for release. The hospital has assisted 133 contacts, 50 of which were outside the FNQ region, 34 calls were for assorted frog/toad matters and the other 99 were for sick/injured frogs.

The property they are renting is a small acreage which had been neglected before they took it over. They have made enough progress to have the property listed under the Humane Society's Wildlife Land Trust program as a wildlife sanctuary. The property is called Bunjinuu Reserve after the amazing and very slow growing Lepidozamia (rainforest cycad) trees that pepper the property. The larger ones on this property range from 100 to 300 years old.

There have been a lot of repairs needed on the house. The team have made the smaller ones but the big stuff is the responsibility of the owner and he has run out of money. If he decides to sell, they would have to move - NOT a good outcome in the current market. They are keeping an eye on the market but hope it does not come to that.

This property is a forested acreage which backs directly onto a World Heritage Area. They have installed five medium and large frog ponds along the forest edges and four species of local frogs made good use of them this year. Lots of other wildlife use the property as well (cassowaries, wallabies, goannas, long-nosed bandicoots, heaps of birds, a few snakes and lots of interesting invertebrates including scorpions!). The hospital finally have its own video channel - something they've been trying to get off the ground for years. There are only three videos to start but there are plans for many more. Our videographer has a lot on his plate but we're trying to get a new one up every couple months. **Frog Safe, Inc.**  
<https://www.frogsafe.org.au>

## IT'S CSI – FROGS EDITION AND WE NEED YOU!



A Green Tree Frog *Litoria caerulea* being attacked by mosquitos. Image: Lachlan Pettit

**C**heck your frog photos for frog-biting flies and [submit them to our study](#)

[https://unsw.au1.qualtrics.com/jfe/form/SV\\_cFNoRD4Jd51HbRY](https://unsw.au1.qualtrics.com/jfe/form/SV_cFNoRD4Jd51HbRY) to help us develop a new, DNA based frog detection method. Rare frogs can be very hard to find during traditional scientific expeditions, and it turns out the best way to detect some species might be through their parasites. Recently I [published an experiment](#) in which I did just that. I need your help to keep developing this new technique. Specifically, I need you to go through your frog photos, and keep your eyes peeled next time you see a frog!

Understanding how species are distributed is important for informing biodiversity conservation, but for some species, it can be the biggest hurdle. Species that are rare or cryptic can be easily missed by searching biologists. Recently, I attempted to increase the detectability of frog species by enlisting the help of frog-biting flies – tiny, bloodsucking parasites that follow the sound of frogs' calls. I played frog calls to attract flies, sequenced the DNA in their blood meals (coined invertebrate-derived DNA, or iDNA), and forensically established that threatened frogs were in the area through the DNA sequences more effectively than when searching for frogs directly.



A frog-biting midge *Corethrella* sp. with visible frog blood meal. Image: John Martin

iDNA has the potential to become a standard frog survey technique and help in the discovery of new species or even the rediscovery of species thought to be extinct, so I want to continue developing techniques for frog iDNA surveys. However, there is still so much we don't yet know about how frogs and flies interact. It's unlikely that all frogs are equally parasitised. Some frogs have natural insect repellents, while others can swat flies away. The flies themselves can be choosy about the types of sounds they're attracted to, and probably aren't evenly abundant everywhere. Because of this, what makes a good candidate frog species for detection through iDNA is, for now, anyone's guess.

I plan to home in on what combinations of characteristics make a frog species a likely target for frog-biting flies. To do this, I will comb through photographs of frogs everywhere from iNaturalist to Google Images, looking for interactions between frogs and frog-biting flies. As these flies are so small, people tend not to realise they've even photographed one, so not many are published and most published examples are simply incidental.

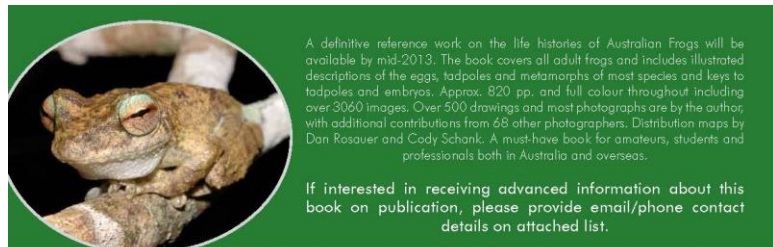
### THAT'S WHERE YOU COME IN

If you've photographed frogs in Australia and are over 18, I'd love for you to closely examine your pictures, looking for any frogs that have flies, midges, or mosquitos sitting on them. If you find flies, midges or mosquitos in direct



Moth fly *Sycorax* sp. 'sampling' DNA from a common mist frog *Litoria rheocola*, an endangered species. Photo Jakub Hodáň

contact with frogs in any of your photos, please share them by submitting the photo and answering a few questions about it [here](#). It doesn't matter if it's a rare frog on a mountain or a common one in your backyard – every observation will help! If you're going out taking new photos, it's good to remember there's no need to touch or disturb the frog to get a useful shot – in fact, any parasites would likely fly away if disturbed! The power of collective action can be amazing for science, and with your help, we can kickstart a new era of improved detection, and therefore conservation, of our amazing amphibian diversity. **Timothy Cutajar, PhD Candidate, Herpetology; UNSW Sydney, Australian Museum Research Institute and University of Copenhagen. More information: Cutajar, T.P. and Rowley, J.J.L. (2020) Surveying frogs from the bellies of their parasites: invertebrate-derived DNA as a novel survey method for frogs. *Global Ecology & Conservation*. e00978. <https://doi.org/10.1016/j.gecco.2020.e00978>**



A definitive reference work on the life histories of Australian Frogs will be available by mid-2013. The book covers all adult frogs and includes illustrated descriptions of the eggs, tadpoles and metamorphs of most species and keys to tadpoles and embryos. Approx. 820 pp. and full colour throughout including over 3060 images. Over 500 drawings and most photographs are by the author, with additional contributions from 68 other photographers. Distribution maps by Dan Rosauer and Cody Schank. A must-have book for amateurs, students and professionals both in Australia and overseas.

If interested in receiving advanced information about this book on publication, please provide email/phone contact details on attached list.

# Tadpoles and Frogs OF Australia

Marion Anstis



“

The scope and depth of this study is exceptional. Its extensive use of colour illustrations, prolific information on development and considerable information on ontogenetic and likely geographic variation makes it far outstrip all others and sets the bar at a position that probably will never be surpassed. Knowledge of Australian frogs will likely always stand above that of faunas from all other sites.....The publisher, too needs some accolades also – to publish this many colour photographs and voluminous text!

Ronn Alfig



“

This book could remain quite possibly the most outstanding single contribution ever made to the knowledge of Australian frogs. It is highly original, extremely thorough, beautifully presented, makes a massive contribution to knowledge in the area, and is extremely appropriate for publication. I very much enjoyed reading it and look forward to seeing the final version in print.

Ross Alford



“

It would be remiss of a reviewer not to commend the author on the outstanding quality of the illustrations, especially that of her line drawings of the eggs and larval stages. These have been beautifully executed and go far beyond aesthetics by contributing greatly to the reader's interpretation and understanding of the character states illustrated. Similarly her photographs of eggs and tadpoles are the best and most comprehensive suite of images of a continental frog fauna anywhere in the world.

Hal Cogger

“Tadpoles and Frogs of Australia” by Marion Anstis is a “must have” reference book.

## RAISING TADPOLES IN CONTAINERS & PONDS (extracts)

**C**aring for a few tadpoles and watching them metamorphose into frogs is a fascinating and rewarding activity. It is also becoming more useful for scientific reasons. There are still many things we don't know about frogs. Many species worldwide are disappearing. If you are in an area where mosquito-borne diseases like Dengue and Ross River Fever occur, you MUST ensure that your tadpole enclosures do not breed any mosquitos.

Tadpoles are generally easy to keep **IF** you have them set up correctly. You might need to spend some money for food and you will need sufficient rainwater for the entire time of their development or water ager from the pet shop.

Roughly, no more than 2 tadpoles per litre of water.

Tadpoles need sufficient oxygen eg an aquarium aerator and airstone to soften the bubbles and dampen the noise or the right plants and a little sunshine. Keep a watchful eye during metamorphosis. If the tads have come from somewhere else, they will need to go back so make sure they don't escape. If you have rescued a ground dwelling frog, they will need help to get out at the right time because they can't climb out like the tree frogs do.

Previously, **in Queensland**, it was legal to collect and keep tadpoles until they have turned into frogs and you did not need a licence or permit to **KEEP** tadpoles but you needed a permit to **MOVE** / rescue tadpoles. See the Keeping section - QLD regulations page at the Frog Safe webpage for more details. If you have a Queensland Recreational Licence to **KEEP** frogs in captivity, you cannot have any tadpoles at all. In Queensland, if the tads were collected on your own property and kept in containers on your own property, then this is not "moving" them. The safest thing about keeping tadpoles is to check your state's environment department website for the latest regulations.

**The best containers** are shorter and wider. Not metal, coated with enamel or porcelain. Glass is good but consider the weight of it when the container has to be moved or cleaned. Broccoli boxes ie styrofoam are good but make sure they are washed well first. Plastic moulded kiddie pools are ok but they are plastic which means they need to be in shade so that the sun doesn't cause them to leach chemicals into the water.

Food grade plastic is ok but don't use a bucket that has already been used to hold any cleaning products or other chemicals. The 36cm plastic 'small critter tanks' sold in pet shops are also a very good choice but only for a small number of tadpoles.: They have snap-on ventilated lids to keep the tadpoles in and other things out, you can sit and watch the tadpoles easily, you can move the tank to where it will get limited sunlight sometime during the day, the snap-on lid will be useful when the tadpoles metamorph and another of the same type of tank can be setup for the little frogs until you are ready to release them.

**Sand** on the bottom of your chosen container can be very useful for tadpoles but we have noticed in tropical Australia that mozzies seem to be more attracted to tanks with sand on the bottom. Tadpoles like to forage in the sand looking for microbials but sand will make it harder to clean. Beach sand is great but you must make sure that every trace of salt is removed from it before it can be used. To leach beach sand, you need to wash it thoroughly until the water comes out clear. Then divide up the sand into several containers such as plastic ice cream containers. Fill with sand halfway and then fill with water to the top, stir, then leave sitting for a day. Drain and rinse and refill. Repeat this procedure until you have done about 6 or 7 water changes. By then, all the salt should have reverse-osmosed out of the sand.

To save the hassle of leaching salt, use river sand instead from a section of river that is not tidal but check first for what is upstream. If there are houses or any kind of agriculture that is not organic, that sand could have chemical residues in it. Quarry sand can be used but it should be soaked the same way as the beach sand for at least one or two water changes. Aquarium gravel is only recommended if it is the tiny, very round pebbles. Avoid the glass or other sharp edged gravels or larger pebbles.

Arrange the sand along the bottom until it is about half an inch/15mm deep. Then carefully add the rain water. Let

the tank sit for a few minutes so that the sand settles and the water clears. Then you can add plants and tadpoles. If you are caring for a batch of tadpoles which has turned out to be diseased, don't bother with the sand as it will make the frequent water changes more difficult. If you are in the tropics, the sand will actually attract more mozzies to lay eggs in that water so avoid the sand.

Are you in an area that suffers from acid rain or are you downwind of a coal-fired power plant? Are you in an area of drought? Then you will need other sources of **water**.

distilled, Nobles Pure, or reverse osmosis	you can purchase distilled water or purify your own with a reverse osmotic filter	ready to use but you will need to add some minerals
spring water	source can be questionable. check with local consumer agency for any information about the supplier and source of the water	ready to use for your tads
tap water WITH fluoride	can only be used if you have a reverse osmosis or special water filter which specifically removes fluoride	do not use unless the fluoride is removed
tap water without fluoride	must be prepared before using for tads	leave in open containers in the sun for a few days to allow chlorine to leach out or use an aquarium ager, stir and wait an hour
ionized water	do not use for tads	do not use for tads

Many houses have old copper pipes and no amount of aging will remove the copper from the water. If this is the situation in your home, it is far better to collect rain water for your tadpoles. It's easier and cleaner and it falls free out of the sky. When collecting rain water, it would be better to avoid water coming off the roof if your roof is metal. Arrange a series of food grade plastic containers on the lawn instead to collect the rain and then seal the containers. Unless you live in an area of acid rain, local industry, or heavy geoeengineering, rainwater is the best possible water for tadpoles.

Regular additions of fresh water is crucial for the tadpoles. If you have regular rainfalls, you can let the tank sit under a tree or shrub in the garden and allow the rainfall to refresh your tank. You just need to watch the level to make sure it doesn't overflow and wash away some of your tadpoles. You can scoop out some water when it is too close to the top. If there is more than a five day gap in the rainfall, then you can add some of your already stored water. If the water is not refreshed often enough, it will start to go off and the

tadpoles won't look as good. Watch for cloudiness or any sort of buildup of sediment in the tank. The water doesn't have to be "crystal clear" but you should be able to see the bottom. If you can't, then you can change over about half of the water at least once a week. It is a very good idea to buy an ammonia test kit from the pet shop so that you can monitor ammonia levels. If the ammonia levels get too high, it will kill the tadpoles. A pH test kit is also a good idea. The pH kits that use colours to match the water sample are not accurate. Some of the food we recommend can also turn the water green so use sparingly.

**When tadpoles are not doing well** - whether because of poor setup conditions, a contaminant getting into the water, or the tadpoles are diseased - they will change the appearance of the water. A common event is for the water to turn a cloudy yellowish-white. There might be a slimy series of bubbles along the top of the water's edge and around the edges of plants which touch the surface. This is not a good sign. You might need to sacrifice these by sending them to a veterinary diagnostic lab or a frog researcher so that they can do pathology to see if there is an explanation. You should also handle such tanks with disposable gloves and not use anything that has been used on that tank (such as nets, cups, etc.) for any other tanks you might have.

If you have been refreshing the water at least once a week, then conditions should look good. If it has gone longer than that or if you have a large number of tadpoles in the tank (say 10 tads per litre of water), you might need to do a 50% or even a 90% water change. Carefully scoop out the water and refill slowly so that the tadpoles and any material on the bottom does not get churned up. You can also use a slightly wider version of aquarium tubing to siphon off the sediment from the bottom of the tank before your water change. This will help reduce the percentage of water that needs to be refreshed. Be careful not to siphon up the tadpoles!

If the tank has been left too long and the water is so bad that tadpoles are looking poorly, then a complete water change is needed. The easiest way is to set up from scratch another container with fresh rain water in it and gently scoop up the tadpoles using a soft net to shift them into the new tank. Be careful not to bump or scratch the tadpoles. They have soft skin and damage during handling can result in death or deformities when the tadpoles turn into frogs. Dump the old water down the toilet and scrub the old tank. Rinse very well, rinse the sand thoroughly if you have used it, then put aside for a future water change.

According to the calls we get, **lack of oxygen** seems to be one of the most common mistakes in raising tadpoles. If you are raising tadpoles collected from a stream, it is best to have an aerator running gently. If they are from stagnant water such as a puddle or a wetland, aeration might be disruptive and stressful so underwater aquatic plants will be essential for providing oxygen. These plants also provide some shelter and hiding areas for the tadpoles and the tads might also eat algae from the surface of the leaves.

Many people choose decorative plants such as water lilies, reeds or floating ferns but these do not provide enough oxygen for the tadpoles and, the amount of the water's surface they interfere with may actually reduce the amount of oxygen available. Leafy plants suspended in the water column are the best type of plants to use. A small amount of floating fern can be used but this should not be allowed to cover over more than 25% of the surface. Even pest weeds such as combomba are okay so long as they are removed from the wild and NOT dumped back to the wild when you're finished with the tadpoles. If the leaves have some algae growing on them, the tadpoles will eat the algae.

In Queensland, Elodea is commonly available in the shops and grows well so you can start with a bunch and spread it around the container. The tadpole droppings will fertilise it so you'll have more of it by the time the season ends. In the southern states, however, Elodea is a declared pest and not allowed. Whatever plant you use, you want something that is entirely under the water, has a long, stringy growing habit, and lots of small leaves along the length of the stem. Don't put too much plant in your container or it will actually remove some of the oxygen at night. Ten litres of water (about 2-1/2 gallons) only needs two lengths of plant. Another option to ensure good oxygen supply at night is to use an aquarium aerator with air stone at night and turn it off during the day.

In order for the plants to survive and produce oxygen for the tadpoles, they will need some sun each day. The tadpoles also need sunlight to obtain vitamin D which in turn helps them process calcium. Position the tadpole containers where they can get an hour or two a day of sun but no more than that if you live in a tropical or equatorial area. Too much sun will heat the water too much and cook your tadpoles!

Tadpoles have a long, coiled intestine which is designed for eating plant matter but they love protein when they can get it in the same way that we love chocolate cake. If you can find a clean creek in an unpolluted area, you can collect some leaves from the bottom which have algae growing on them and throw them in the tadpole tanks but not too many. These leaves will settle to the bottom and the tadpoles can hide in them as well. You can also use young paw paw (papaya) leaves which have been frozen first. If you are going to purchase food, any green variety of lettuce (not iceberg or Cos) or baby spinach will be suitable. Rinse well first and then freeze. Organically grown is better so you can be sure it hasn't been sprayed with harmful chemicals before you buy it. Do not use celery leaves or silverbeet (adult spinach).

There's a saying: "if in doubt, leave it out". If you are not sure if something could be toxic (say a plant in your yard), don't risk it on the tadpoles. You can use other green items for the tadpoles such as sliced up zucchini, green grapes sliced in half, peas (crush slightly to break the outer skin), broccoli (frozen first and thawed), green capsicum (green pepper). Just feed small amounts of these until they are gone before adding any more. We also supplement with spirulina algae discs which can be bought at the pet shop but these do turn the water green. We used to recommend spirulina flakes as an alternative but upon examining the container, have learned that a lot of unwanted additives have been added. If

you can find a brand that is only spirulina with no other additives, then that should be okay. Otherwise, just stick to the discs and use them only before you plan to do a water change. A combination of food types is good. Once a week, you can add other types of frozen fish food such as bloodworms and daphnia - it is an excellent protein for the tadpoles and the fish love it too.

**Tadpoles need calcium** and there are two ways you can add this. Next time you are at the beach, collect some of those cuttlebones. Rinse very thoroughly to remove salt and leave to soak in fresh water for a couple days before draining. Break up if they are large - for a container about 30cm (one foot) long, you can drop in a piece of cuttlebone about 4 or 5cm (2 inches) in length. Leave in for the entire time of tadpole development. This method might also deliver some other trace minerals for the tadpoles.

The second way is to buy liquid calcium. Whenever you have done a water change or there has been at least 10% new rainfall into the tank, you can add 2 drops of liquid calcium supplement per litre of water in the tank into the water. One drop per litre of liquid B complex also helps but check the ingredients on the label carefully. A lot of products marketed as 'health foods' contain nasty additives. We use the brand Grants of Australia, [www.lateralfood.com](http://www.lateralfood.com).

Do NOT feed your tadpoles fish flakes, cichlid granules, bread, any kind of meat product, turtle food, axolotl food, or pellets made for other animals such as chicken pellets. Tadpoles have a vegetarian intestinal tract; insect proteins (such as frozen bloodworms) are a better protein to use occasionally.

Feeding tadpoles requires small amounts of food frequently. You should only throw in a small amount of food which will be gone in about 8 hours. It is better to throw in food a couple times a day rather than once a day or every other day. Don't put a couple days' worth of food in to save time - this will instantly foul the water and you'll have to spend a lot more time doing a partial or full water change. A tadpole's whole life is to eat constantly so keep an eye on the tank and add more food as soon as the last lot is gone.

When you see **front legs** (arms) on your tadpoles, they are fast approaching the delicate stage of turning into a frog. This is an amazing stage in a frog's life where the sort of special effects that you see in some movies actually take place in real life. At this time: the mouthparts completely change, gills stop functioning and lungs start to work, the intestinal track changes from the long intestine of a plant eater to the short intestine of a protein eater (insects are almost entirely protein and fibre), the skin changes from the smooth, slimy skin of an underwater dweller to porous skin which allows air and water through, limbs containing a skeleton grow out of a body which had no limbs or bones and the tail muscle and fin deteriorates and is reabsorbed by the body.

When your new **frogs leave the water**, they might still have a full tail but they can jump. The tail will shrink and be gone in one or two days. Each species is different so



leave the water with the tail almost gone. Although most of the tadpoles I've kept simply shimmy or climb up the side of the tank when they leave the water, not all tadpoles will do this. You should put something in the container which the metamorphs can climb onto. It should start under the water and stick out of the top and it should be fixed so it doesn't move. This could be a fat stick or a rock - whatever you can find, so long as it is not made of metal. Water hyacinth is excellent for this but it is a pest (in Australia) so don't dump it back into the wild when you're finished with it! Floating ferns are also good.

Some species are unable to climb out of the water at all, even with a rock. The Ornate Burrowing frog for example lays its eggs in flooded grassy areas and has a fast developing tadpole. Ideally, the tadpoles are ready to leave the water by the time the puddle dries up. They simply wait for the water to drain away. This doesn't happen in a tank or pond so the metamorph floats on the surface for a day and then drowns. If you are keeping a ground species, you need to fetch the metamorphs out of the water as soon as their tail is about half its original length. The tail will start to crinkle up and this is a sign that it's time to go!

Another way to allow ground dwelling frog metamorphs to leave the water safely is to setup a separate "tilt" tank which is a typical tank propped up at one end by a brick. Pour the water so that it only reaches about 3/4 of the way up along the tilted floor. Add some underwater plant for oxygen and just shift any tadpoles into this tank as soon as their front limbs have popped out. They will not be eating much after this point so only a very tiny amount of food needs to be put in the tilt tank (just in case). Once in the tilt tank, the metamorph will simply 'walk' out of the water when it is ready and sit in the dry section. Drape a towel over the "dry" end of the tank so that the metamorphs have shelter until you move them to a proper habitat tank setup.

Experience is the best teacher when it comes to metamorphs and the species in your area. But the most important thing when a metamorph emerges from the water is that it should be removed from the tadpole tank immediately. If you are raising tadpoles which came from your yard or neighbourhood originally, then they can be allowed to simply take off on their own. Once the new frog has started using its lungs to breathe, it is often unable to use the gills anymore. This depends on the species. If the new frog falls back into the water, it could drown.

If you find that **large numbers of tadpoles are dying** in your containers, then something is wrong. Use this checklist to see if something needs to be fixed:

- Is the water clear or is it starting to go 'off'? Have you done an ammonia test?
- Has anyone put their hands in the water in the last 24 hours?
- Have any cane toads gotten into the container?
- Have any chemicals splashed into the water?
- Has anyone sprayed any room fresheners, carpet cleaners, bug sprays or other aerosols nearby?

- What sort of water did you use? Was it fluoridated tap water or water with algae in it?
- Did you use an old container of fish food (which might have gone mouldy)?
- Did you wash the lettuce leaves thoroughly before freezing?
- Is there enough oxygen in the water? Do the tadpoles spend any time hanging vertically from the water's surface? If yes, this means there's not enough oxygen.
- Are the tadpoles growing at very erratic rates - some are getting big while many others are still the same size they were when they were a week old? (This usually shows they are too overcrowded in the container.)
- Is the container getting too much sun? Adding an aquarium thermometer will help you monitor the temperature - above 32 degrees Celsius it's too high! 27 C is a good temperature.
- Are the tadpole deaths occurring at different times during their growth or are all the deaths occurring at very specific stages such as when rear legs are just starting or the tadpoles are ready to metamorph? Are any air bubbles, crimped tails, colour shifts to very pale or very dark, shrinking bodies, twisted legs, swimming in circles or rolling upside down present? Are only a few tadpoles dying or are most of them dying?
- Are the tadpoles okay while all the deaths are occurring only after they metamorph?
- Are the metamorphs getting enough food?
- Did you disinfect the tank and rinse it thoroughly since you used it for the previous batch of tadpoles? Was the frog tank disinfected and rinsed well before the metamorphs were set up in it?
- Was the bucket you used to refill their tank used for any cleaning products?

If you are in Australia and you are having problems with your tadpoles that can't be fixed by the checklist above, then please contact us to discuss it. If you live in FNQ, we might ask you to give us the remaining live tadpoles so that we can raise them ourselves to try to determine what the problem might be. If you are overseas, you need to find someone local to help you. Phone your nearest Fish and Wildlife office or a university that has a vet school or biology department to ask what labs are nearby to do disease testing. See if there might be a frog conservation group near you who is collecting information about others in your area who are having problems with tadpoles.

There are many details to cover when setting up tadpoles in containers, but if these are done properly, raising tadpoles will be very easy and not take up very much of your time. It's only when the setup is wrong that a lot of labour comes into it. Good luck with your tadpoles and enjoy the experience.

Please see <https://www.frogsafe.org.au/home/> for the complete article.

# BOLIVIAN AMPHIBIAN INITIATIVE



NEVER GIVE UP!

These days we are in the Bolivian Amazon with future biologists and conservationists from Universidad Amazónica de Pando. We are having fun, learning and reinforcing knowledge to work with amphibian conservation in Bolivia. We hope that very soon our future colleagues will make their contribution to the knowledge and conservation of amphibian biodiversity 🐸



The Bolivian Amphibian Initiative was founded in 2007 with the mission of preventing extinction of endangered species in Bolivia.

## FATS MEET AT BICENTENNIAL PARK



Synchronicity Earth

#Bolivia #Pando #Amphibian #Anura #Capacitation  
#Education #futurecollege Patricia Mendoza

<https://www.facebook.com/Bolivian-Amphibian-Initiative-119214331487496>



Image shared by Jilli Streit "Frosch"

The FATS meeting commences at 7 pm, (arrive from 6.30 pm) and ends about 10 pm, at the Education Centre, Bicentennial Park, Sydney Olympic Park, Homebush Bay. FATS meetings are usually held on the **first Friday of every EVEN month** February, April (except Good Friday), June, August, October and December. Call, check our web site, Facebook page or email us for further directions. We hold 6 informative, informal, topical, practical and free meetings each year. Visitors are welcome. We are actively involved in monitoring frog populations, field studies and trips, have displays at local events, produce the newsletter FROGCALL and FROGFACTS information sheets. FATS exhibit at many community fairs and shows. Please contact Events Coordinator Kathy Potter if you can assist as a frog explainer, even for an hour. No experience required. Encourage your frog friends to join or donate to FATS. Donations help with the costs of frog rescue, student grants, research and advocacy. All expressions of opinion and information in FrogCall are published on the basis that they are not to be regarded as an official opinion of the FATS Committee, unless expressly so stated.

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**FATS ON FACEBOOK:** FATS has about 4,220 Facebook members worldwide. Posts vary from husbandry, disease and frog identification enquiries, to photos and posts about pets, gardens, wild frogs, research, new discoveries, jokes, cartoons, events and habitats from all over the world. The page was created 11 years ago and includes dozens of information files – just keep scrolling to see them all. <https://www.facebook.com/groups/FATSNSW/>

**RESCUED FROGS** are at our meetings. Contact us if you wish to adopt a frog. A cash donation of \$50 is appreciated to cover care and feeding costs. Sorry we have no EFTPOS. FATS must sight your current amphibian licence. NSW pet frog licences, can be obtained from the NSW Department of Planning, Industry and Environment (link below). Please join FATS before adopting a frog. This can be done at the meeting. Most rescued frogs have not had a vet visit unless obviously sick. Please take you new, formerly wild pet to an experienced herpetological vet for an annual check-up and possible worming and/or antibiotics after adoption. Some vets offer discounts for pets that were rescued wildlife.

<https://www.environment.nsw.gov.au/licences-and-permits/wildlife-licences/native-animals-as-pets/frog-keeper-licences>

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FATS has student memberships for \$20 annually with electronic FrogCall (but no hard copy mail outs).

<https://www.fats.org.au/membership-form>

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Thank you to the committee members, FrogCall supporters, talented meeting speakers, Frog-O-Graphic competition entrants, event participants and organisers David, Kathy and Harriet Potter, Sarah and Ryan Kershaw. The FrogCall articles, photos, media and webpage links, membership administration and envelope preparation are greatly appreciated. Special thanks to regular newsletter contributors:

Robert Wall, Karen & Arthur White, Wendy & Phillip Grimm, Marion Anstis and Punia Jeffery.



**FROGWATCH HELPLINE 0419 249 728**

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## FIELD TRIPS

**Please book your place on field-trips. Due to strong demand, numbers are limited. Be sure to leave a contact number. Regardless of prevailing weather conditions, we will continue to schedule and advertise all monthly field-trips as planned. It is YOUR responsibility to re-confirm in the last few days, whether the field trip is proceeding or has been cancelled. Phone Robert on 02 9681 5308.**

**15 October 7-15 PM**

**Norah Head, Central Coast**

**Leader: Grant Webster**

Take the expressway north. After approx. 70km, take the Sparks Road exit towards Norah Head. The Bowling club is about 30mins away. Meet in the carpark at the Norah Head Bowling and Sports Club, at the end of Victoria Street, Norah Head.

One of the features of the coastal floodplains were the wetlands that formed in the swales of ancient sand dunes. This was the home of "Wallum" habitat. Wallum was originally the name given to species of Banksia by the traditional owners of the Sunshine Coast. Over time, this name was broadened to refer to the complex of swamps, heaths and woodlands growing on low sandy soils along the coastal strip. These wetlands grimly hang on in isolated pockets on the highly-urbanised coastal strip. Tonight, we will look at the coastal heathlands, particularly the Wallum habitat. We will look at some of the unique frog species that have adapted to the dark, tannin-stained, highly-acidic waters of these coastal heaths.

Grant's research takes him to many unusual frogging locations. Tonight, we are fortunate to once again have Grant lend his time and skills to show us another of his research sites. Grant has an unrivalled familiarity with Wallum habitat and coastal heathlands. With a little luck, we may even get a chance to see the elusive Wallum Froglet, as well as some of the other frogs of this unique habitat.

**11 – 13 November**

**Smiths Lake Camp-Out**

**Leaders: Karen and Arthur White**

Our Smith's Lake trip has become such a popular field trip destination that changes are needed to ensure that everyone gets a chance to go. Up until now, it has been first in, goes to the head of the list, but this approach has meant that the same people often get to go and newcomers miss out. In addition, we have people cancel late so their place goes unfilled. To overcome both of these problems we have changed the booking arrangements, which will include a **non-refundable** pre-payment for the booking. Most people will still be able to attend, this arrangement is in case we have too many people wanting to go on the field trip.

1. For the next field trip, you must email Karen White [white.kazzie@gmail.com](mailto:white.kazzie@gmail.com) by the 16 October and indicate that you (and others in your group) want to attend and what day you intend to arrive. Karen will then put your name on a list - if you attended the previous Smith's Lake field trip you will automatically go on the Reserve List.
2. Karen will send you a reply email to let you know which list you are on. If you are on the A list you must pay your accommodation by 26 October to confirm your booking. If you do not pay by this date you will be removed from the A list. You can pay electronically to the FATS account:- **Account Name: Frog and Tadpole Study Group - BSB 082 342 Account No. 285 766 885**. Cost is \$20.00 per person, per night.
3. Karen will send you confirmation of your booking when your payment has been received.
4. Karen will email people on the Reserve list, 2 weeks before the field trip dates (by 2 November). You will be told if there are spaces available for you or not. If are able to go, you will now need to forward your payment to guarantee your place. Payment must be received by the 6 November. If not, your place will be given to the next person on the list. We think that this will be the fairest way to ensure that everyone gets a chance to go to Smith's Lake.

**In the event of uncertain frogging conditions e.g. prolonged/severe drought, hazardous and/or torrential rain, bushfires etc., please phone 02 9681 5308. Remember! rain is generally ideal for frogging! Children must be accompanied by an adult. Bring enclosed shoes that can get wet (gumboots are preferable), torch, warm clothing and raincoat. Please be judicious with the use of insect repellent – frogs are very sensitive to chemicals! Please observe all directions that the leader may give. Children are welcome, however please remember that young children especially can become very excited and boisterous at their first frogging experience – parents are asked to help ensure that the leader is able to conduct the trip to everyone's satisfaction. All fieldtrips are strictly for members only. Newcomers are welcome to take out membership before the commencement of the fieldtrip. All participants accept that there is some inherent risk associated with outdoor fieldtrips and by attending agree to; a release of all claims, a waiver of liability and an assumption of risk.**

### OUTSTANDING AUSTRALIANS RECOGNISED IN QUEEN'S BIRTHDAY HONOURS



**FATS congratulates Professor Michael Mahony AM recipient of the Member of the Order of Australia for significant service to the life sciences, and to tertiary education.**