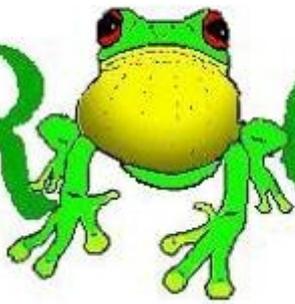


FROG CALL



THE FROG AND TADPOLE STUDY GROUP NSW Inc.

Facebook: <https://www.facebook.com/groups/FATSNSW/>

Email: fatsgroupnsw@fats.org.au

PO Box 296 Rockdale NSW 2216

Frogwatch Helpline 0419 249 728

Website: www.fats.org.au

ABN: 34 282 154 794

NEWSLETTER No. 163 OCTOBER 2019

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

Litoria fallax Alstonville Photo by Veronica Silver



Arrive from 6.30 pm for a 7pm start.

Friday 4 October 2019

FATS meet at the Education Centre,
Bicentennial Pk, Sydney Olympic Park

Easy walk from Concord West railway
station and straight down Victoria Ave.

Take a torch.

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.

Or enter from Bennelong Rd / Parkway.
It is a short stretch of two way road.

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

FATS meeting, Friday 4th October 2019

6.30 pm Lost Green Tree Frogs *Litoria caerulea* frogs and "friends" seeking forever homes: Priority to new pet frog owners. Please bring your membership card and cash \$50 donation. Sorry, we don't have EFTPOS. Your NSW NPWS amphibian licence must be sighted on the night. Adopted frogs can never be released. Please contact us first if you plan to adopt a frog. We will confirm what frogs are ready to rehome.

7.00 pm Welcome and announcements

7.45 pm Our main speaker is Chad Beranek from Newcastle Uni. "Frogs and Fish: Unraveling the Aquatic Competition". The Frog-O-Graphic, People's Choice winner will be voted on by everyone at the meeting.

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.

CONTENTS

PAGE

- Last meeting main speakers
Henry Cook, Grant Webster and
Arthur White 2
- Jodi Rowley and team Eureka
Award
- The first FATS newsletter 1991 3
- This dance is taken 4
- Frogs change it up 5
- Deadliest pathogen ever
Mass amphibian extinctions 6-9
- FATS meeting map 9
- Field trips (continued on P12) 10
- FATS contacts and information 11
- Field trips information continued 12



Green Tree Frog *Litoria caerulea* in Alstonville
Photo by Veronica Silver

LAST FATS MEETING 2 AUGUST 2019

Our main speaker was Henry Cook, talking about a novel way to help threatened species. Grant Webster spoke about a possible New Zealand population of *Litoria castanea*, Yellow-spotted Tree Frog. Arthur White talked about the impact of feral horses on *Pseudophryne corroboree* Corroboree Frog habitat in Kosciuszko National Park.

JODI ROWLEY WON THE SCIENCE AWARD FOR INNOVATION AND CITIZEN SCIENCE IN THE EUREKAS THIS YEAR.

On 28 August, the FrogID Team attended the 2019 Australian Museum Eureka Prizes. As a team, we were excited for FrogID to be a finalist alongside Zika Mozzie Seeker and Virtual Reef Diver for the Department of Industry, Innovation and Science Award for Innovation in Citizen Science. We are excited to report, FrogID was announced the overall WINNER for the category.



Roth's Tree Frog *Litoria rothii* photo by Jodi Rowley

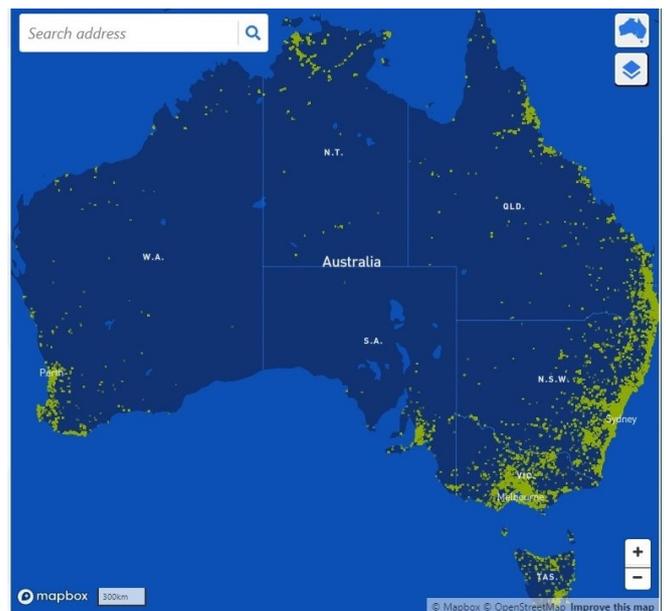
In a little over 18 months, the FrogID community has managed to submit more than 70,000 recordings through the FrogID app. If we put all those recordings back to back, it would take you more than 2 weeks to listen to them all. We thank all the citizen scientists across Australia for playing such a significant role in this great achievement. There are still nearly 40 species of

frog we haven't recorded yet. Remember, regular recordings of your local frogs give our research team insight into how Australia's frogs are responding to a changing environment, so please keep those recordings coming!



Photo: The FrogID Team with the trophy (L-R) Paul Flemons, Adam Woods, Jodi Rowley, Christopher Portway and Megan Lawrence.

Update 20/9/2019: 100,000 frog records and counting... You did it! FrogID has amassed a whopping 100,000 frog records!



<https://www.frogid.net.au/>



This is the 1st newsletter



Frog and tadpole study group

The first meeting was held on Tuesday 10 December 1991 in the Biological Sciences building (Blg E) of Sydney Technical College. About 40 meeting information sheets were sent out (including 10 interstate), 15 apologies were received, and the following came to the meeting: Harald Ehmann, Noelene Gabelish, George Hassaplidakis, Steven Kum Jew, David Millar, Barry Nilsson, Martyn Robinson, Lothar Voigt and Dan Wotherspoon. We each introduced ourselves by outlining our interests in frogs.

We looked at and briefly discussed letters from Australian National Parks and Melbourne Zoo, as well as several leaflets and books that were tabled.

The meeting was quite informal, with a lot of group discussion about a range of frog topics, including:

1. Frog declines and cause(s), and Frog-watch.
2. Frog breeding techniques and some practical demonstrations.
3. The scope of current frog and tadpole research in Australia.
4. Inbreeding problems with captive frogs.
5. Potential problems with releases to the wild.
6. The protected status of some frogs in NSW.
7. Parasite identification and control.
8. Frog calls and their meanings.
9. A contact list was prepared for circulation.

We also watched a crash-edited 15 minute video of the Marsupial Frog including lengthy but naturally slow sequences of the tadpoles entering the male's pouches.

We decided to defer a decision on a more formal group structure to a later date.

Light refreshments were available throughout the meeting.

NEXT MEETING

The next meeting will be held on Tuesday 4 February at 7:30pm in Building E, Sydney Technical College (corner of Thomas and Harris Street Ultimo). The venue is an eight minute walk from Central Railway Station. There will be notices in the foyer and corridors to assist you in finding the meeting place. We may have a guest speaker. For further information phone me on 2173290 during work day afternoons after Tuesday 28 January 1992.

Please invite anyone who may be interested.

*And may you have a Happy Christmas
and New Year !!*

Harald Ehmann
Convenor

20.12.91

THIS DANCE IS TAKEN:

Hundreds of Male Frog Species Found To Change Colours During Mating Season
Smithsonian Scientist Teams Up With International Collaborators To Understand Why These Male Frogs Are ‘Blushing’ When It Comes to Sex
Some of nature’s most vibrant colours occur in frogs, who peek out from rainforests and marshes in startling shades of blue, yellow and red. But for hundreds of species, only males flaunt flashy colours—and sometimes only for a few hours, days or weeks each year.

In the Sept. 20 issue of the [Journal of Evolutionary Biology](#), scientists from the Smithsonian’s National Museum of Natural History and Macquarie University in Australia report that the males of at least 178 species of frogs undergo a temporary colour change during their breeding season. These frogs spend most of the year in drabber colours—browns or greens that blend discreetly in with their surroundings—but take on vibrant hues when it is time to mate.

Temporary colour changes have been recognized in some frogs, and biologists have been investigating the phenomenon in detail in a handful of species. But since the bright hues do not last long, they can be easy to miss, and no one knew just how many species have males who change colour for the breeding season.

Now, after searching for evidence of such a colour change in thousands of frog species, [Rayna Bell](#), a research zoologist and curator of amphibians and reptiles at the museum, said the phenomenon is surprisingly widespread: “It’s not just a few species—it’s a lot of frogs all over the world.”

Before now, scientists have mostly been aware of three well-studied examples of frogs switching colours. Bell said she first learned that some male frogs switch colours for the breeding season while exploring male and female colour differences across the frog tree of life. The temporary colour changes had also caught the attention of Associate Professor Martin Whiting and undergraduate honors student Grant Webster at Macquarie University, who had uncovered many examples of the phenomenon in Australian frogs. After Bell published a review article on the topic, the two Australian scientists contacted her and proposed they work together to broaden the search.

The three scientists teamed up to find as many examples of temporary colour changes in male frogs as they could. Some had already been documented, and Webster had noted many in his own field work. But generally, scientists have not paid much attention to the role of colour in communication between frogs, focusing instead on their vocal communications, Bell said.

She and her collaborators examined a wide array of frog photos looking for evidence of colour change. To

evaluate each species, the team compared photos of males engaging in breeding behaviour—either actively calling for a mate or in a mating posture with a female—to photos of males outside the breeding season and to females.

The team evaluated 2,146 different frog species and identified 179 whose males temporarily change colour when it is time to breed, with most turning a bright yellow. Like the three best-studied species of colour-changing frogs, most are species that breed in large, chaotic groups, where the males’ distinct coloration may improve the chances of successful pairings.

The breeding season is often short and frenzied for these frogs, with hundreds of individuals descending on ponds or puddles that may exist only in the days or weeks after a storm to lay their eggs. Amongst the pandemonium, a bright, sex-specific colour can signal which frogs are suitable partners.



Mating *Litoria wilcoxi* Photo by Grant Webster

Bell said research on two colour-changing species suggests that the males’ bright colour is not about attracting a mate, but acts instead as a signal to other males. “It’s useful to communicate ‘I’m a male, and I’ve got my female—stay away from her,’ or ‘I’m another male, don’t grab onto me,’” she said. “It’s an innovative evolutionary solution to one of the many challenges associated with reproducing successfully.”

Now that Bell and her colleagues have documented hundreds of examples of colour-changing frogs, much work remains to determine exactly how and why males take on their temporary hues. Bell plans to begin investigating frog vision, in part to learn how the animals might perceive colour differences at nighttime, when many species are most active.

Funding for this study was provided by the University of California and Macquarie University in Australia. September 20, 2017 Ryan Lavery (202) 633-2950 laveryr@si.edu Randall Kremer (202) 633-2950 kremerr@si.edu <http://newsdesk.si.edu/releases/dance-taken-hundreds-male-frog-species-found-change-colors-during-mating-season>



<https://www.mq.edu.au/newsroom/2017/09/21/oh-this-old-thing-frogs-change-it-up-when-it-comes-to-mating/>

OH THIS OLD THING?

FROGS CHANGE IT UP WHEN IT COMES TO MATING

Male frogs slip into bright colours when in breeding season. The bright-yellow change is temporary and is to enhance their breeding chances. A number of these ‘chameleon’ frogs are located in Australia.

According to new scientific research, hundreds of species of frog have been found to change into bright colours for a short period of time to enhance their breeding chances.

This research, published today in the *Journal of Evolutionary Biology*, found that the males of at least 178 species of frogs undergo a temporary colour change during their breeding season. The frogs spend most of the year in more subdued colours to blend in with their surroundings but take on vibrant hues when it’s time to mate.

The researchers evaluated 2146 different frog species and identified a number of species whose males temporarily change colour when it is time to breed, with most turning a bright yellow. Interestingly, it is the treefrog family that really stands out – of the recognised 355 species, 95 are capable of dynamic colour change, and a disproportionate number occur in Australia. “Imagine being a frog during the chaos of the breeding season and navigating the gathering crowds around the pond. How do you know who might be a suitable mate let alone whether they are male or female? One solution is to use colour, and this is what we have found that many frogs do all over the world,” said [Associate Professor Martin Whiting](#) from the Department of Biological Sciences.

Litoria revelata (above and below) Photos by Grant Webster



“Female frogs don’t bother to do this because they are the choosy sex, hence the term dynamic sexual dichromatism, and it turns out that frogs around the world have evolved this ability independently,” said Grant Webster, a postgraduate student working on the project. If one sex, typically males, is able to turn on some bright colour that not only clears up any confusion about sex identity but also may signal something about male quality.

“While bright displays are common in the animal kingdom, they come at a cost because they also draw the unwanted attention of predators. One solution to this problem is dynamic colour change whereby an animal can switch between conspicuousness and camouflage, a phenomenon that is well known in animals such as chameleons, octopus and cuttlefish, but much less studied in frogs,” said Associate Professor Whiting.

Macquarie researchers collaborated with Dr Rayna Bell of the Smithsonian’s National Museum of Natural History to conduct this study. The researchers examined a wide range of frog photos looking for evidence of colour change. To evaluate each species, the team compared photos of males engaging in breeding behaviour, either actively calling for a mate or in a mating posture with a female, to photos of males outside the breeding season, as well as females.

“Most are species that breed in large groups, where the males’ distinct colouration may improve the chances of successful pairings. In the hustle and bustle of a large breeding season, being able to quickly identify the opposite sex and choose a suitable mate is made a lot easier with a bit of bright colour,” concluded Associate Professor Whiting. **Bell RC., Webster GN., Whiting MJ. [Breeding biology and the evolution of dynamic sexual dichromatism in frogs.](#) *Journal of Evolutionary Biology*. September 2017. doi: 10.1111/jeb.13170 21/9/2017**

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THE CASE OF THE MISSING FROGS THE DEADLIEST PATHOGEN EVER KNOWN IS WIPING OUT OUR FROGS. CAN IT BE STOPPED?



Corroboree frog. Picture: Nick Cubbin

At 7am on January 13, 1984, ranger Keith McDonald was driving along a dirt road deep in the rainforest of Eungella National Park, 80km west of Mackay, when one of the most implausible events in the natural world occurred on the passenger seat beside him.

Inside a container of water, a female frog he had collected from a stream the night before opened her mouth and spat out a fully formed juvenile frog. Over the next half-hour, 14 more froglets were born through their mother's mouth. As any child will tell you, frogs don't give birth through their mouth. They don't give birth at all. They lay eggs, which hatch into tadpoles and metamorphose into frogs underwater. It was the first and last time anyone would see the unique birthing approach of the northern gastric-brooding frog. By March of 1985 the frogs, endemic to this one area on Earth, were gone, never to be seen again.

It wasn't the only species to go. Since 1979, scientists had reported that frogs in south-east Queensland were declining. The Mount Glorious day frog was the first to go missing in action, and the southern gastric-brooding frog — like its northern cousin, it gestated young in its stomach and gave birth through the mouth — vanished in 1981, just seven years after its discovery. It wasn't just Australia. Once abundant frogs of South, Central and North America were vanishing. More worryingly, no one could figure out why.



Gastric-brooding frog. Picture: Michael J Tyler

Worse was to come. In 1993, suspecting that whatever was killing the frogs was marching north, McDonald engaged the services of a pioneering wildlife veterinarian, Rick Speare, and the pair raced to the Atherton Tablelands near Cairns. "We had a bad feeling about what we'd find," says

McDonald. But it was more what they didn't find. The rainforest streams didn't croak at night with the calls of frogs anymore. Once plentiful species of frogs had disappeared. "We couldn't do anything about it — it was gut-wrenching. We didn't know what was going on."

There was no obvious cause. Nothing appeared to have changed in the environment. Rainfall was average, the streams were pristine and other animals bountiful. It was a complete mystery. Determined to find the answer, McDonald and Speare assembled what would prove to be a remarkable and groundbreaking wildlife research team. Speare had noticed that the pattern of sudden decline in Queensland was consistent with what you'd expect from an infectious disease. In 1997 his PhD student, Lee Berger, finally identified the culprit as an insidious fungus that attacked the skin of frogs. The fungus was named *Batrachochytrium dendrobatidis*, or chytrid fungus. Others call it the doomsday fungus.

Berger cracked the case by approaching it as you would a disease outbreak. In a CSIRO lab in Geelong, Victoria, healthy frogs were infected with the fungus and swiftly died. A few months after that experiment, Berger received news of another mass frog die-off, this time in Panama. She received a fax. It was their fungus. They knew then that it was global. During the mid-2000s, Panama would lose two-fifths of its amphibian species. Other outbreaks have devastated populations in Africa and Europe. Some experts are now calling chytrid fungus the "worst pathogen in the world".



Lee Berger and Lee Skerratt. Picture: Andrew Rankin

The fungus is a finely tuned killer that targets a biological weak spot. Amphibians' permeable skin performs a vital role in sustaining water balance, by moving sodium and potassium back and forth. Once the skin is damaged, the frogs lose potassium and their hearts fail, leading to death. Some species fare better than others, and not all frogs die. But what makes it catastrophic on a global scale is the unusually broad number of amphibian species that are susceptible to it. A close relative of the pathogen has decimated salamander species in north-west Europe.

Chytrid fungus is an ancient organism that has thrived in the modern world. It's thought to have originated in Asia, where it co-evolved to live benignly with native frogs that had developed resistance to it over millions of years. Its spread from the 1970s onwards coincided with the advent of mass air-travel and globalisation. Frogs became accidental stowaways, or were shipped overseas

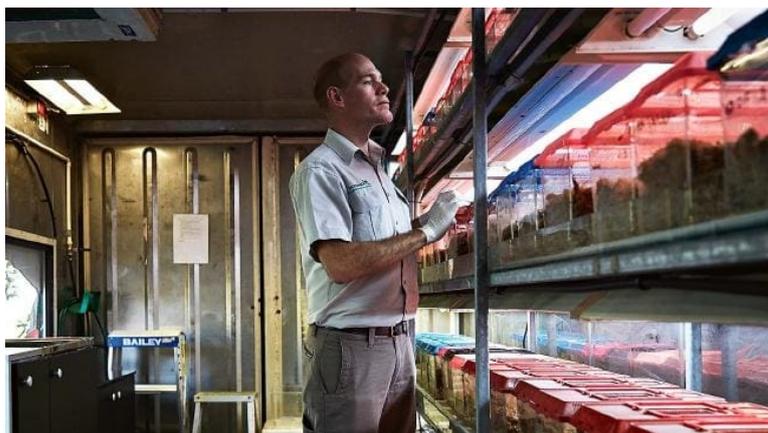
as part of the lucrative pet trade. The fungus hopped on for the ride, likely arriving in Brisbane in 1978; once loose, it spread quickly through amphibian populations that had no inbuilt resistance to it. It favours wet, cool temperate or subtropical climates; stream-dwelling frogs are particularly vulnerable, while resistant frog species can become reservoirs of the disease, hastening its spread.

Yet when Berger published her paper in 1998 postulating the fungus as the cause of the declines, her idea was largely dismissed. It wasn't thought possible that a disease could be responsible for such catastrophic declines, scientific convention being that environmental forces such as climate change or habitat degradation must be the main drivers. Twenty years after her discovery, Berger — who is currently the Frank Fenner Life Scientist of the Year for solving the mystery of frog extinctions — now thinks she may be onto another major breakthrough in saving the frogs from chytrid fungus, this time using tools from animal breeding. And again, she says, Australia is looking the other way.

In March this year, Australian scientists revealed just how devastating this fungus has been on a world scale. It is now known to have decimated global biodiversity more than any other pathogen ever recorded, implicated in the extinction of more than 90 amphibian species worldwide and the severe decline of at least 400 more. In Australia, up to seven species of frogs are thought to be extinct due to the fungus and 43 more are in decline — nearly a fifth of all our native amphibians. Six species — the northern and southern corroboree frog, the Baw Baw frog, the spotted tree frog, the kroombit tinker frog and the armoured mistfrog — are in critical danger of extinction.

Wildlife disease is only now beginning to be accepted as a global problem. “People didn't want to know,” says Berger of her initial discovery. “It took 10 years after our discovery to stop arguing about it. People had invested so much in looking at the environment that they weren't going to stop just because some young woman from Australia said the most likely thing was a disease.”

“If you're on to a novel thing in science people typically don't believe it,” says Berger's husband Lee Skerratt, a leading wildlife epidemiologist and head of the research group that published the paper detailing the extent of the carnage. “Anything that challenges a prior belief, scientists will find ways to reject.”



Michael McFadden at Taronga Zoo. Photo: Nick Cubbin

The northern and southern corroboree frogs living in the sphagnum moss of Kosciuszko National Park were once so plentiful there are reports of fishermen using them as bait. Today there are fewer than 50 in the wild. Michael McFadden is supervisor of herpetofauna at Sydney's Taronga Zoo. Here, the highly susceptible frogs have been given a lifeline in the form of a captive assurance breeding colony. The only reason these frogs exist in the wild at all is because they're continually released from this colony, and similar ones at Tidbinbilla Nature Reserve near Canberra, Melbourne Zoo and Melbourne's Healesville Sanctuary. If it wasn't for them, these frogs would already be extinct.

McFadden pulls at the heavy door of a converted shipping container; we don sterile gumboots and step inside a bland room crawling with colour. There are 350 southern corroboree frogs in this container. Frogs can divide opinion but everyone who sees a corroboree frog immediately falls in love. They are adorably small — about 3cm long — with bright yellow stripes the shade of crime scene barricade tape. McFadden holds one in his glove and it lethargically crawls round, looking vaguely helpless but hypnotically beautiful.

The eggs of the corroboree frogs bred here are released into fenced enclosures within Kosciuszko National Park, designed to keep out other species of frogs that transmit the disease. Within these artificial arks the frogs thrive, but they don't stand much chance in the wild until they can cope with chytrid fungus. It's not going anywhere so the frogs need to find a way to live with it. That's where gene resistance technology comes in.

Kyall Zenger, deputy director of the Australia Research Council's Research Hub for Advanced Prawn Breeding and a professor at Townsville's James Cook University, has been enlisted by Skerratt and Berger to investigate whether selective breeding technology used in aquaculture is transferable to frogs, to breed chytrid-resistant genes into vulnerable species. “Basically I'm an animal breeder,” says Zenger. “In my game you try to identify animals that carry favourable genes — disease resistance for example — and select those animals to breed. That way you end up with the healthiest and most resilient animals. It's the same with crops. They've been doing this for hundreds of years. What has changed is the technology to speed it up.” Zenger thinks we may be able to use genomic technology to identify certain genes in frogs that are resistant to the effects of chytrid fungus, then use selective breeding to build a sustainable, healthy population and release those frogs back into the wild, where their offspring would carry the same disease resistance, and so on through future generations. “We're doing it across prawns, barramundi, pearl oysters, a whole variety of animals,” says Zenger.

It's hardly groundbreaking science; selective breeding is a standard, proven methodology used all over the world. But this approach has never been used for wildlife conservation, and so has not received anywhere near the same amount of funding. Across aquaculture in Australia the private sector has poured money into breeding disease-resistant animals, often teaming with

and government. But when it comes to wildlife, Skerratt and Berger say they're hitting a brick wall. They've seen one grant application after another turned down. It's a different story in the US and Canada, where substantial grants have recently been awarded to work on genetic modification of frogs and RNA interference technology for controllers of chytrid.

"This is a blue sky scientific program," says Zenger. "The really exciting thing for me is, all this technology is proven over decades. We know it works, we know the statistics, we know what we need to do. We've got the genomic tools and we can really make a difference to conservation now." It's a question of who is going to pay. For direct conservation action Skerratt and Berger estimate \$15 million will be needed to fund recovery interventions for the six most endangered frog species. "It's simple, really," says Skerratt. "Procrastination will lead to more extinction."

The house movers are descending on the couple's Townsville home. Unable to secure funding to continue their gene resistance work at James Cook University, they're packing up their possessions and their three children and moving to Victoria, where Melbourne University has taken the opportunity to acquire their research group. For Berger, who had to wait a decade for her initial discovery of chytrid fungus to gain wide acceptance, leaving James Cook University is frustrating, but she remains hopeful. After having six grant applications in a row rejected, they're pinning their hopes on a \$1 million Future Fellowship grant with the ARC being successful later this year.

"This shouldn't be our responsibility," she says. "It should be government co-ordinating the action. But they're not, so we have to do it ourselves." "It's a great idea," says Taronga Zoo's McFadden. "If we can identify where resistant genes are and selectively breed for that in captivity, or if we can utilise those genes through gene editing, then that could definitely work not just here but all over the world. If we can breed frogs that are resistant then I have no doubt we'll be able to get them back up there in their former numbers."



Jodi Rowley and green tree frog. Picture: Jonathan Ng

Up in the New England Tablelands of northern NSW, near the town of Glen Innes, Jodi Rowley, curator of amphibian and reptile conservation biology at the Australian Museum, is in the midst of a search almost certain to end in disappointment. She's trying to find a frog that hasn't been sighted since the 1970s and is believed by some to be

extinct due to chytrid fungus: the peppered tree frog. Being about the size of a fingernail and coloured mottled brown, Rowley admits it's the ultimate needle in the haystack. So why bother? Because, she says, the richness of life is worth fighting for. Every species lost punches another hole in the ecosystem. Often we don't know what we're losing, or what we could stand to gain. "Frogs are actually beneficial to crops and farming, but that's a lot harder to quantify for your average Joe," she admits.

Past experience has taught Rowley you can't always write off a frog. In October 2017 she was surveying a stream near here in the dead of night when her torch lit up a clutch of brown frogs sitting on a rock. It was a species Rowley had never seen before but she knew only too well what it was: the Booroolong frog, not seen in the area for more than 40 years. It wasn't the only species to be rediscovered. Back in 2008, the northern Queensland armoured mist frog was spotted after not being seen since 1991. A year later the yellow spotted bell frog was rediscovered in NSW's Southern Tablelands, all areas where chytrid is present. The discoveries have given Rowley hope.

"Now we've found where the Booroolong frog can survive we're hoping maybe in some of these places we may also find the peppered tree frog hanging in there. I'm not ready to give up just yet." Rowley says about 20 per cent of Australia's frogs are undescribed. "It's kind of insane! For a lot of frogs we don't have any records, don't know where they're distributed or how many species we have."



The Booroolong Frog is critically endangered.

To combat that knowledge gap, while at the same time engaging the public, Rowley has led an Australian Museum initiative through a smartphone app called FrogID. Launched in 2017, the app gives the public a chance to contribute to the scientific database by recording frog calls, which are then GPS location-stamped and uploaded to be identified and scrutinised by experts. "It's a citizen science tool," she says. "I've listened to tens of thousands from across the country because of FrogID." Without public engagement Rowley knows there is less chance of obtaining meaningful funding. Part of her job is to get people enthused about frogs. "This one app has made such a difference. People say they've never seen or heard or even thought about a frog before, and now it's all they see and hear." Data collected from FrogID recently confirmed the decline of Sydney's green tree frog, the once common

backyard frog that's now effectively gone. In this case the culprit is probably human manipulation of suburban landscapes; we're inadvertently destroying suitable breeding habitat by building gutters and efficient drainage, eliminating the areas of natural flooding favoured by the frogs.

FrogID has also revealed some species moving far outside their natural range, such as the eastern dwarf tree frog, detected 400km away from its native range on the NSW-Victoria border. Rowley says FrogID has been a real success in providing previously unknown data on threatened frog species such as the Black Mountain boulder frog and the southern bell frog. In just 18 months the app has generated nearly 20 per cent of total frog records ever collected in Australia.

Rowley admits chytrid fungus is the new reality and says disease is one of the biggest threats to our native species, but she's cautious about endorsing research into gene resistance as a priority. "Habitat loss is still the biggest threat facing amphibians around the world," she says. "I think this gene resistance technology could be beneficial for a few species but it's not practical on a world scale and certainly not in the time frame we are going to need it. It's a trade-off and we have to make some horrible decisions. Unless there's more funding for biodiversity we're going to be constantly competing. But there's no doubt that not having Lee [Berger] working in the field is a massive blow for the frogs."

There are signs that certain frog species are developing a level of resistance themselves. The alpine tree frog that lives in the southern alps of NSW and Victoria was found to be maturing quicker, in order to churn out more offspring at a faster rate, to replace the adult population dying of chytridiomycosis. A study from Panama has shown that some wild frogs are producing skin secretions that ward off the fungus. Certain rainforest stream species in northern Queensland are beginning to bounce back, too, moving back upstream to the cooler climates where they were knocked out by chytrid fungus years ago. Often the reason for the recoveries isn't clear.

Rowley says that's all the more reason to focus attention on protecting those habitats, so that the frogs have somewhere to live as they learn to tackle the disease themselves. One thing all experts agree on is that more effort is needed if we're to have any chance of stopping the rot.

"Unless there's massive overhaul in political will and public engagement then we'll continue to lose biodiversity in Australia," says Rowley. "We've got a terrible track record. We're not

looking after this country and its wildlife like we can."

There's one last frog I feel I need to visit. It's destined to spend eternity in a jar on a shelf at the Australian Museum, in the aptly named spirit room. Herpetology technical officer Stephen Mahony carefully passes me a jar containing a specimen of *Rheobatrachus vitellinus*, the northern gastric-brooding frog. It lies on its back in a formalin solution like it's floating in space, the unmistakable crook of frogs' legs splayed out, mouth slightly open, bulging eyes fixed on nothing. This frog is special to Mahony, and not just because it's probably the most special frog to ever exist on our planet. Mahony's father Michael discovered it on New Year's Eve 1983, less than two weeks before Keith McDonald saw that most astounding regurgitation. I ask the young Mahony what he feels when he sees this frog. He pauses with emotion. "Yeah... a lot of things. We don't really know what could or couldn't have been done."

Maybe the frogs have a right to exist regardless of their value to us. Or maybe they have value we'll never see. The frog in this jar is a Gondwanaland relic that evolved in Australian streams over more than 30 million years, with reproductive biology not seen anywhere else in the animal kingdom, an animal far more outlandish in design than even the platypus. We'll never know how it turned its stomach into a uterus, or why, and what we could learn from that.

Mahony replaces the jar on the shelf. We leave the aisle of amphibian archives and he spins a wheel to roll the rack along. His father's frog is swallowed among the 180,000 other amphibian and reptile specimens that will float forever here in the spirit room. The last thing I notice is a new order of empty jars awaiting filling, and plenty of room on the rack.

<https://www.theaustralian.com.au/weekend-australian-magazine/why-are-our-frogs-disappearing-and-is-it-too-late-to-save-them/news-story/3497ecc586c1f2e24b8d7db27e50d885?fbclid=IwAR1Ljg-iYezdAOckkmiEXSJ8PwHgzXp8dZes5PkybSOPpGFxncCuiqdk9UM> The Weekend Australian Magazine 8/6/2019 By RICKY FRENCH Forwarded by Josie Styles

FATS MEET AT THE EDUCATION CENTRE BICENTENNIAL PARK SYDNEY OLYMPIC PARK





Smiths Lake 2010
Photo from Andre Rank's video



Photo Josie Styles Smiths Lake 2016
Saltuarius swaini Leaf tailed Gecko



Smiths Lake
Photo by Riona Twomey Tindal

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.

26 October 7 pm

The Watagans

Leader: Grant Webster

Please note our new meeting point for this fieldtrip!

Meet at McDonalds, Morisset. Only 400m from our previous meeting point. Take the freeway north. After approx. 83km, take the Morisset/Cooranbong exit. Turn right and travel approx. 2.5 km to the corner of Mandalong Rd and Ourimbah St, Morisset. McDonalds is on the corner. Meet in the carpark.

Wetlands are amongst our most threatened group of habitats. Few realise they include a bewildering variety of forms including lakes, swamps, mudflats, mangrove forests, saltmarshes, rivers, creeks, overflows, anabranches, irrigation channels, bogs and ditches. In fact, just about any water body, permanent or ephemeral ("*ee-fem-er-al*" – *temporary, subject to drying out*), may be considered a wetland. In the sandstone areas around Sydney, small, seemingly insignificant "soaks" are often overlooked, but are often home to important frog species and are important wetland types. Unfortunately, many wetlands historically were considered to be a wasteland as they were not "productive" and were converted to more "useful" purposes. Tonight we will look at a variety of wetlands and we will try to determine why certain species of frogs prefer a particular type of wetland habitat.

Grant has spoken at a number of our meetings. He has made a great contribution to the understanding of the taxonomy of the *Pseudophryne* complex, and is highly skilled at teasing out the most cryptic and reclusive of frog species. Of course, he has a particular fondness for the Barred Frogs, all of which, are rather impressive. The Watagans is one of the very few sites where we can compare all three of the Sydney-based "Barred Frogs".

There are some camping options available at this site, although members will need to organise this independently. Contact the Field Trips Co-ordinator for further details.



Smiths Lake 2010 Photo from Andre Rank's video



Watagan frog Photo by Stephen Weir

Continued on page 12

FATS MEETINGS commence at 7 pm, (arrive from 6.30 pm) and end about 10 pm, at the Education Centre, Bicentennial Park, Sydney Olympic Park, Homebush Bay. They are usually held on the **first Friday of every EVEN month** February, April, 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 2,700 Facebook members from almost every continent. Posts vary from husbandry, disease and frog identification enquiries, to photos and posts about pets, gardens, wild frogs, research, new discoveries, jokes and habitats from all over the world. The page includes dozens of information files.
<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 \$30 - \$50 is required to cover care and feeding costs. Sorry we have no EFTPOS. FATS must sight your current amphibian licence. Licences can be obtained from NSW National Parks and Wildlife Service, Office of Environment and Heritage (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 ill. Please take you new, formerly wild pet to an experienced herp vet for an annual check-up and possible worming and/or antibiotics after adoption. Some vets offer discounts.

<http://www.environment.nsw.gov.au/wildlifelicences/GettingAnAmphibianKeepersLicence.htm>

FATS now has Student membership for \$ 20 annually with Electronic FrogCall (but no hard copy mail outs).
<https://www.fats.org.au/membership-form>



Thank you to the committee members, FrogCall supporters, talented meeting speakers, Frog-O-Graphic competition entrants, events 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, George Madani, Karen & Arthur White, Andrew and David Nelson, Josie Styles, Wendy & Phillip Grimm and Marion Anstis.



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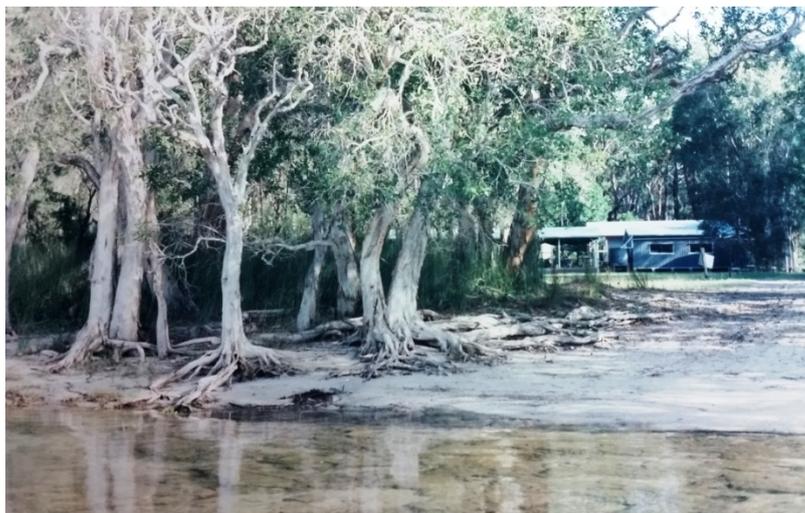
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15 – 17 November

Smiths Lake

Leaders: Karen and Arthur White

Smith's Lake 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 by the 16th February 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 the 16th February 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 \$17.50 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 (16th February). 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 23rd February. 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.

First Sunday in December? 1 December ph: (02) 4340 1022 admin@reptilepark.com.au

Please contact the Australian Reptile Park to confirm if there is an annual Christmas Herp Goups BBQ in December.

7 December 8.15 pm

Castlereagh Nature Reserve

Leader: Peter Spradbrow

Meet at the Shell Service Station, Richmond Rd, Berkshire Park (opposite Windsor Downs Estate). It is between St Marys Rd and Llandilo Rd.

Tonight we will re-visit the woodlands of the Cumberland Plain and look at the frogs of the shale country. These frogs have learned to endure quite different conditions to their cousins of the coastal sandstone. We will discuss these differences & also look at some of the threats that have led authorities to list the Cumberland Plain Woodlands as an endangered ecological community. Because of the highly restricted occurrence of these woodlands, many of the frog species are rarely encountered in the Sydney region.

Peter has lived and studied the wildlife of the Cumberland Plain for most of his life. He is an accomplished herpetologist, and has become an authority on the reptile and frog fauna of this region. Tonight he will discuss the changes that he has witnessed in the herpetological populations here. Castlereagh can be an exceptional frogging site, perhaps one of the finest in Sydney. With a little luck weather-wise, we should see some outstanding species tonight.

In the event of uncertain frogging conditions (e.g. prolonged/severe drought, hazardous and/or torrential rain, bushfires etc.), please phone 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 however, 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.