



### In this issue...

|   |    |
|---|----|
| Project Palaka update .....   | 2  |
| Update from Port Moresby Nature Park, Papua New Guinea .....                                | 4  |
| Amphibian Ark Conservation Grants – We're calling for proposals!.....                       | 7  |
| Recent updates from the La Banderita marsupial frog conservation program in Argentina ..... | 8  |
| Amphibian Assisted Reproductive Technologies webinar series .....                           | 10 |
| Check out our Amphibian Ark t-shirts, hoodies and sweatshirts!.....                         | 10 |
| AArk Husbandry Document library .....   | 11 |
| Population Viability Assessment of Lake Junin giant frog .....                              | 12 |
| Pool frog workshop.....   | 14 |
| Amphibian Ark donors, January 2021 - March 2022.....  | 16 |



**Amphibian Ark**  
c/o Conservation Planning Specialist Group  
12101 Johnny Cake Ridge Road  
Apple Valley MN 55124-8151  
USA

[www.amphibianark.org](http://www.amphibianark.org)

Phone: +1 952 997 9800  
Email: [info@amphibianark.org](mailto:info@amphibianark.org)

[www.amphibianark.org](http://www.amphibianark.org)





## Project Palaka update

**Norman Greenhawk, Director, Project Palaka, The Philippines**

On January 23rd, my team of six and I left Laguna province in the Philippines for a thirty-seven-day field work session in Gigantes to continue our work with Gigante wrinkled ground frog (*Platymantis insulatus*). I was joined in the field by Jero Manulat, Jayson Madlao, Angie Carsola and Jozette Hisu-an (all students) and Dr. Leticia Afuang from the University of the Philippines, Los Banos (UPLB), who is one of my in-country partners. This was the longest field expedition I have ever led and we faced many challenges, including sharp karst, rough waves (one group capsized while exploring Gigantes Sur), and the intense heat of the dry season.

This time, we were able to survey not only Gigantes Sur, but the island of Gigantes Norte as well. As of the time of writing this update, we have established four long-term monitoring sites: Pawikan Cave, Waling-Waling Cave, John-John's Cave, and Bakwitan Cave. At each site, we have established three permanent monitoring transects. In addition to surveying frogs along these transects, we have measured forest data, such as canopy cover, foliage/understory structure, size and location of large trees, and identification of the dominant plant species in each transect. This will allow us to study how these forest communities change over time, especially as we have determined that there are no forests on the islands that are not utilized by the local people, to some degree or another. In fact, when we arrived to conduct our first frog count at Bakwitan Cave, we found that the first seven meters of one transect had been cleared of all bamboo and trees, for use in charcoal production.

During our time in Gigantes, we also conducted three community outreach sessions for local teachers, Kagawads (community

One of the Gigante wrinkled ground frogs (*Platymantis insulatus*) in captivity in the Hortorium at the University of the Philippines, Los Banos. Photo: Jero Manulat.



Sam Arcillo performing the daily frog check in the *ex situ* facilities for Gigante wrinkled ground frog. Photo: Janna Nora.







councilors/advisors), and other community leaders. Project Palaka entered into a commitment with local teachers to provide educational material during each of our field work visits. We began by developing a poster about the Gigante wrinkled ground frog for teachers to use in the classroom to educate students about the frog. Lastly, we collected an additional fifty-two live frogs for our captive breeding colony. On February 28, we arrived at Batangas Port, and made the long journey back to the hortorium building of the University of the Philippines, Los Banos, Museum of Natural History. As of the writing of this update, all the frogs are safely in quarantine, and we now house over seventy Gigante wrinkled ground frogs in our captive-breeding facility.

We made interesting observations while in the field. Alas, it seems that the amount of available habitat for this species covers even less land area than was previously thought. Gigantes Sur is only

(Back to front): Jero Manulat, Sam Arcillo, Jayson Madlao, Dr. Leticia Afuang, Janna Nora, and Angie Carsola. Janna and Sam work at the hortorium with the captive collection, everyone else is the field team. Jero works in both capacities.  
Photo: Norman Greenhawk.

Project Palaka team member Jozette Hisu-an weighing and measuring a frog collected for the *ex situ* project.  
Photo: Norman Greenhawk.

approximately 50% karst; Gigantes Norte even less so. Furthermore, the karst hill on Gigantes Norte runs in a north-south direction; and despite intensive surveys, we found no frogs on the entire west side of the karst, only the eastern half. There are several factors that could be the cause of this, including a lack of crevices in the limestone, a near 90 degree sheer cliff, and intense heat and low humidity from the afternoon sun that is not mitigated by vegetation. These findings underscore the need to continue conservation measures for the frog.

As always, we are thankful for our supporters, including the Amphibian Ark, Mandai Nature, Synchronicity Earth, the IUCN Asian Species Action Partnership, Stiftung Artenschutz, my 2021 National Geographic Explorer Award, the Center for Environment and Society at Washington College, and individual donors: J. Seidel, J. LaGarde, R. Holland, C. Dudzic, and F. Jarvis. Their support makes our ongoing efforts possible.





## Update from Port Moresby Nature Park, Papua New Guinea

**Ryan Reuma, Port Moresby Nature Park, Papua New Guinea; and Chris Banks, Zoos Victoria, Australia**

The AArk Newsletter has previously reported on the Papua New Guinea (PNG) Frog Project at the Port Moresby Nature Park, supported by Zoos Victoria in Australia (in issue 42 in March 2018 and issue 48 in December 2019).

Despite the impacts of the coronavirus pandemic on the Nature Park, efforts to maintain the frog project have continued over 2020/21, albeit at a reduced level due to reduced staff numbers and significantly disrupted staff schedules and finances. As intended in the project's long-term plan, two additional species have been brought into the captive program to continue to build staff experience and expertise – Yule Island tree frog (*Litoria congenita*) and water or wood frog (*Papurana daemeli*). These have different husbandry needs to the previously-maintained and well known green tree frog (*Litoria caerulea*) and white-lipped tree frog (*Litoria infrafrenata*). Although both are common species and listed as Least Concern in the IUCN Red List, captive management and breeding of both is poorly-known, and the Yule Island tree frog is much smaller than the two green tree frogs while the water frog is a very active terrestrial species.

### *Litoria congenita*

The Yule Island tree frog occurs in the southern New Guinea mainland, the Aru Islands and Yule Island in Central Province north-west of Port Moresby and a naturally-occurring population in Port Moresby. It occupies a range of habitats including moist savannah and intermittent freshwater marshes, as well as rural gardens, and heavily degraded former forests. Adults reach a maximum length of 45 mm and have a thin pale stripe down the middle of the back, with broken green or brown stripes and speckles against a paler or darker background.



An adult Yule Island tree frog, (*Litoria congenita*).  
Photo: Brett Smith.

Two 20-30 mm long frogs were collected by hand in the Nature Park at night. They were on the ground actively jumping and calling. They were kept in a holding tank in a separate building for two weeks before being moved to the rest of the collection. Here, they were placed in a 30 x 20 x 20 cm terrarium with gravel substrate and small branches; vegetation included creeping charlie (*Pilea nummulariifolia*) and rock weed (*P. microphylla*). This was later changed to philodendron and pothos plants and lengths of PVC piping cut in half to provide more cover and shelter. The tank had small holes in the base and lower sides to facilitate good hygiene and ease of cleaning when hosing surface debris and feces.



A young wood frog (*Papurana daemeli*) – one of two additional species which have been brought into the captive program to continue to build staff experience and expertise.

Photo: Port Moresby Nature Park.

The temperature was 23-27 °C and the humidity 26-74%. Moisture was provided via a sprinkler system and a hand-held spray bottle and illumination by Co Tech lights (T% 39 watt 240V 50Hz) in a portable fitting.

The frogs actively used all of the tank interior. A range of insects was offered, but they preferred and readily ate fruit-flies and grasshopper nymphs. The two frogs have settled well and have presented no husbandry challenges to date. Additional specimens will be collected with the aim of breeding this species.

### *Papurana daemeli*

The wood frog occurs in far north-eastern Australia, and a disjunct population in the Northern Territory, and is widespread through southern New Guinea as well as north-east PNG and New Britain. It is a lowland semi-aquatic frog, found in a wide range of forest and woodland habitats near streams, pools and swamps, and has been recorded in disturbed habitats such as rural gardens. Breeding occurs in the southern hemisphere summer and spring (August/September to the following March/April).

Groups of 300-400 eggs or tadpoles were collected by dip-net from a small creek and pond in one of the cassowary enclosures in the Nature Park between November 2020 and November 2021 – mostly between November 2020 and April 2021, with single col-





Ryan collecting wood frog (*Papurana daemeli*) tadpoles from a natural pool in the Port Moresby Nature Park.  
Photo: Port Moresby Nature Park.

lections in July and November 2021. After every rain event, Park staff walk around the cassowary enclosure and check for frog spawn in the pond. Spawn usually floats on the water surface in a large mass making it easy to scoop it out. Once collected, each group was placed in a 45 x 30 x 20 cm glass tank, with 10-15 cm depth clean water, a filter, pump and air-stones. Other tanks (30 x 20 x 20 cm) had 20-25 cm depth water and 2-4 cm of substrate.

Eggs hatched after 2-7 days, depending on developmental stage at the time of collection.

Temperatures, humidity, lighting and moisture provision were as for the Yule Island tree frogs. Similarly for cleaning and tank landscaping, although gravel substrate, rocks and plants were provided for metamorphs and young frogs, which were housed in 30 x 20 x 20 cm tanks.

Although all the groups of eggs were allowed to develop, many did not hatch and almost 50% of the tadpoles had disappeared after 20-30 days. Tadpoles of some species can cannibalise siblings, which may have occurred here, or smaller or weaker siblings were eaten due to insufficient food supply. Some of the large groups of eggs were separated into smaller groups, but tadpoles still disappeared (presumed eaten).

Tadpoles usually swam and stayed at the bottom of the tank, sometimes hiding under the gravel substrate and appeared to be idle, but moved at lightning speed when disturbed. Their suckers appeared to be smaller than that of green tree frog tadpoles.

Kangkong (water spinach) was the tadpoles' preferred food once it softened after being provided frozen. Dead crickets were offered initially but later stopped to remove the risk of tadpoles eating siblings when food was low. Exo Terra Aquatic Juvenile Turtle floating pellets were offered when kangkong wasn't available; some tadpoles nibbled immediately readily and others when the

pellets were soft. Dulce flakes (seaweed) was offered but this was not eaten. Lately, we have reduced using the pellets and flake products and adopted a more natural diet of kangkong only, and cabbage if kangkong is not available.

To investigate if the presence or absence of substrate in the tanks, including other organisms, was a factor in tadpole deaths, one group of tadpoles was divided into two sets of tanks, one with gravel and sand substrate collected within the Park, and the other without substrate. Survival rate was the same until after four weeks, when a noticeable decline in tadpoles started in the tanks containing substrate. This may have been due to the presence of other organisms in the substrate, such as mosquito larvae, maggot fly larvae, dragon fly larvae (observed hatching in the substrate) and freshwater snails, which were also caught in the nets. Shortage of observation time prevented this being examined more closely, but it is an issue that will be pursued carefully in the future. The use of substrate was discontinued as it became too difficult to see the tadpoles when the substrate was disturbed.

Tadpoles that did not move or eat, looked thin, or briefly floated upside down were immediately removed to another tank to prevent them being eaten by siblings, and to reduce the risk of disease transmission to healthy tadpoles. The latter was precautionary, and no disease was apparent. Tadpoles that were close to death became transparent as their darker colour faded.

Sixty-seven frogs metamorphosed. They weighed less than 1 g as newly-emerged frogs and had increased to 2 g one month later. All



metamorphosing tadpoles were placed in a separate tank and then moved to holding tanks once they fully absorbed their tails. The average period from start to end of metamorphosis was fifteen days, and hatching to adult frog was 8-13 weeks.

The mortality rate of the young frogs was high, with about 10% almost eight months old at the time of writing. Most died during the first 5-7 weeks, with hygiene and food availability being considered as the main factors:

- Hygiene: when frogs were provided with food, the uneaten dead insects and other organic material accumulated on the surface and also within the gravel substrate. Thus, the only way to thoroughly clean the enclosures was to keep the frogs in a separate tank while servicing their tanks after feeding. This was done once or twice weekly, but mortality was still high. Some deaths were also caused by ants, which were attracted into the frog enclosures by dead insects.
- Food availability: slaters and cricket nymphs were initially offered, but these insects burrowed or hid under/within the

gravel substrate, preventing frogs feeding on them. Moreover, when these insects died, they created poor hygiene within their enclosures. At one point we were losing a lot of newly metamorphosed frogs that weighed less than 1 g. The young frogs were mainly fed with fruit flies placed inside the enclosure, but as they have grown, they are now fed by hand with small grasshoppers and crickets. The latter requires keepers to be very careful and stealthy to avoid disturbing the frogs, but it is proving successful. Crickets are no longer just left in the enclosures.

Adding these two species of frogs to the program has been very valuable for highlighting the need for detailed observations, taking one step at a time, and learning very important lessons along the way. The factors behind the problems raising the wood frog tadpoles and metamorphs have been identified and will be addressed as the project continues.

Ryan servicing frog tanks at the Nature Park. Photo: Brett Smith.



## Amphibian Ark Conservation Grants – We're calling for proposals!

Amphibian Ark is pleased to announce the 11th annual call for proposals for its grants program. Some new guidelines and requirements for grant recipients have been included, so please be sure to read these guidelines carefully. Download the complete guidelines from [www.amphibianark.org/grants/AArk-Conservation-Grants.pdf](http://www.amphibianark.org/grants/AArk-Conservation-Grants.pdf).

While applications are welcomed from all countries, this year we are especially keen to see applications to work with species identified for *ex situ* rescue during the recent Conservation Needs Assessments in Argentina and Brazil. We are also keen to see applications for extension grants from any existing *ex situ* amphibian conservation program.

We will be accepting Project Outline funding applications (see below) for the following types of grants from 15th March 2022:

- **Start-up grants** – initial funding to help newly-launched projects get started at the very beginning of their life, to help them attract larger and/or long-term funding for the duration of the program. We will not fund projects that are already well-established or have significant funding, although we will consider projects with funding in place for complementary components (such as fieldwork or education). One-time grants of up to US\$5,000 are available. Recipients are able to apply for second and third year extension grants.
- **Start-up grant extensions** – additional funds are available to provide continued support for existing *ex situ* amphibian conservation programs that a) have met their stated objectives for previous years, and b) can demonstrate that additional supplemental funds have been secured since the original AArk grant was provided. All existing programs are eligible to apply for these extensions however it is expected that husbandry guidelines and a species action plan have been completed. Second-year grants of up to US\$4,000 and third-year grants of up to US\$3,000 are available.
- **Workshop attendance** – partial funding to assist attendance at *ex situ* amphibian conservation-related workshops, especially those which focus on amphibian husbandry, planning and reintroduction. Applicants must have already secured partial funding to attend the workshop. You must already be actively involved in an amphibian conservation project or have well-developed plans and funding in place to implement a new program. Grants of up to US\$750 are available.
- **Mentorship grants** – support for organizations which have previously received an AArk seed or start-up grant, to bring in a designated outside expert to assist with an aspect of their amphibian conservation efforts (e.g. veterinary training, environmental control etc.). Grants up to US\$1,500 are available.

**All applicants are required to submit a brief Project Outline, prior to submitting a full application.** Ideally, your Project Outline should be in English or Spanish, but it can be submitted in any language. Your Project Outline should be less than 400 words in length and should contain information under the following headings: Species, Organization, Project Manager, Previous amphibian experience, Goals, Proposed Outcomes and Other funding Sources (both requested and received) and the status of a Species Action or Recovery Plan for the species (including authors of the plan). Project Outlines for start-up grants from institutions with limited amphibian expertise must include a copy of the report from the Institutional Program Implementation Tool ([www.amphibianark.org/program-implementation-tool/](http://www.amphibianark.org/program-implementation-tool/)) for the

species at your institution. Your final application should address any shortfalls highlighted within the tool. Project Outlines will be reviewed, and successful applicants will then be invited to submit a full application. **Full applications will not be accepted without a Project Outline having been submitted, reviewed and approved by the review committee.**

Our grants are intended to support conservation projects for amphibian species that cannot currently be saved in the wild, with a focus on *ex situ* actions, and in partnership with appropriate field activities. Preference will be given to projects for species which have been assessed as in need of *ex situ* rescue or research work, either as a recommendation from a Conservation Needs Assessment ([www.conservationneeds.org](http://www.conservationneeds.org)) or a similar, national assessment process.

Start-up grants and start-up extension grants are **not** intended to fund:

- Workshops
- Educational exhibits
- Project overhead or indirect costs
- Field projects without a strong *ex situ* component.

All applications must reflect AArk values. Please pay careful attention to the grant guidelines, ([www.amphibianark.org/grant-guidelines/](http://www.amphibianark.org/grant-guidelines/)), and address all of the appropriate items.

### Need some help?

AArk staff are available if you need assistance in formulating your proposal. Please do not hesitate to contact us with any questions. Each year several proposals have been rejected due to issues that could have been prevented with a little extra guidance! We also have several past seed grant recipients who are willing to act as mentors, to help with your application – please let us know if you would like us to put you in contact with one of them. Email us at [grants@amphibianark.org](mailto:grants@amphibianark.org).

### Important dates

- **Project Outline deadline: 12 April 2022**
- Applicants notified about review of Project Outlines: 29 April 2022
- **Grant application deadline: 30 May 2022**
- Grant decision/notification date: 3 June 2022
- Successful applicants must provide bank account details, signed MOU and 3-4 photos of species and/or facilities by: 17 June 2022
- Grant payment date: 30 June 2022
- Initial progress report and species action plan provided by 1 January 2023
- Final progress report, species action plan and husbandry guidelines due 30 June 2023.

We would like to acknowledge the generous support of **AArk funders** and **donors** who have helped to establish and support these grants.





## Recent updates from the La Banderita marsupial frog conservation program in Argentina

**Mauricio Sebastián Akmentins and Martín Boullhesen, INECHO, CONICET-UNJu, Argentina; Elena Correa, Walter Javier González Raffo, Gabriel Federico Rodríguez and Juan Pablo Juliá, Reserva Experimental Horco Molle, UNT, Argentina**

In 2021, the captive breeding program for La Banderita marsupial frog (*Gastrotheca gracilis*) in Argentina received additional funding from a private donor, via the Amphibian Ark. The additional funding will be used to continue upgrading the *ex situ* facilities in the Reserva Experimental Horco Molle (Universidad Nacional de Tucumán) for captive breeding La Banderita marsupial frog, to expand our conservation education program and to continue the *in situ* conservation actions for the species.

The main improvement we wanted to make to the *ex situ* facilities was to ensure a safe water supply, with a physical and biological filtering system and to support a conditioned room to raise the live food for frogs. We have now finished the upgrade works in the *ex situ* facilities, and these included the installation of a complementary biological/chemical/physical filtering system for a safe water supply; a fully equipped room for raising live food; new container shelving; and a UV illumination system for the frog containers.

The *ex situ* facilities were incorporated into a conservation education program for visitors to Reserva Experimental Horco Molle.

Artistic mural on the facade of the *ex situ* facilities of the Reserva Experimental Horco Molle (UNT). Photo: Elena Correa.



An adult La Banderita marsupial frog (*Gastrotheca gracilis*) housed in the *ex situ* facilities of the Reserva Experimental Horco Molle (UNT), Tucumán province, Argentina. Photo: Mauricio Akmentins.



This program is focused on the unique life history of La Banderita marsupial frog and the importance of protecting this distinctive species which is strictly endemic of Yungas Andean forests of Northwestern Argentina. We finished the artistic modifications to the facade of the *ex situ* facilities, with a realistic mural painted by local artist Laura García and with an entrance door decal featuring the project and partner institutions' logos. This is a great improvement to the visitors' experience when they visit the facilities.

Our main partner, the Reserva Experimental Horco Molle, is fully committed to the project and has supported us in the improvement of the *ex situ* facilities by providing labor and materials. The National Parks Administration continues supporting our conservation actions in Parque Nacional Aconquija and the government authorities of Tucumán province are continuing with their support to our project, and they gave us permission to collect specimens from the wild.

For the *in situ* conservation actions, we aim to establish a long-term monitoring program of environmental variables to assess the effect of the extreme climate events due to the global climate crisis on the marsupial frogs' populations, and to gather valuable data to improve the *ex situ* housing conditions for the captive frogs. In this monitoring program we will measure water





Upgrade works in the *ex situ* facilities of the Reserva Experimental Horco Molle (UNT), Tucumán province, Argentina. A) External water filter; B) Biological/physical/chemical water filter system; C) Conditioned room for live food raising; D) UV light system; E) Frog container shelving. Photo: Elena Correa.

quality parameters (conductivity, pH, percentage of dissolved oxygen and total dissolved solids) and environmental water variables (water temperature, air temperature and relative air humidity).

In January and February this year, we obtained two cohorts of tadpoles for the *Gastrotheca gracilis* population supplementation program in Reserva Provincial Los Sosa. Over the coming months we will continue with the population supplementation program in the Reserve. In December 2021 we deployed two data loggers (model HOBO MX2201) in two La Banderita marsupial frog reproductive sites to measure water temperature and two data loggers (model HOBO MX2301) to measure relative air humidity/air temperature.

In December 2021 and February 2022, we also made two field surveys to assess the water quality parameters of the reproductive sites used by the frogs in the Reserva Provincial Los Sosa and Parque Nacional Aconquija, using the equipment acquired with the funds from Amphibian Ark. We measured conductivity/total dissolved solids (Lutron PCD-431), pH (Lutron PH-222) and percentage of dissolved oxygen (Lutron PDO-519), and we will continue with the long-term monitoring program of environmental variables to assess the effect of extreme climate events as a result of the global climate crisis on marsupial frog populations.

We plan to invite the National Parks Administration to join us in this project and to establish a rescue/supplementation program of *Gastrotheca gracilis* in the Parque Nacional Aconquija, in particular, at the type locality of the species in "La Banderita". We will continue with our captive breeding attempts and will hopefully obtain the first cohort of *ex situ* raised individuals of La Banderita Marsupial Frog in 2022.



Assessment of water quality parameters and environmental variables of the reproductive sites used by marsupial frogs in the Reserva Provincial Los Sosa and Parque Nacional Aconquija, Tucumán province, Argentina. Photo: Mauricio Akmentins.



## Amphibian Assisted Reproductive Technologies webinar series

**Luis Carrillo, Training Officer, Amphibian Ark**

The IUCN SSC Amphibian Specialist Group's (ASG's) Amphibian Conservation Action Plan (ACAP) has identified a range of different actions to help halt the decrease of amphibian populations or their extinction. One of those actions is a focus on the use of captive breeding programs as a conservation tool and as part of this, the use of Assisted Reproductive Technologies (ARTs) to help those amphibian species which would benefit from increased reproductive rates or which have proven to be very difficult to breed.

To help those imperiled species that cannot currently be protected in the wild, more and more conservation breeding programs have been established but unfortunately it is not always easy to achieve their successful reproduction. The development and application of ARTs could be an important tool for amphibian conservation. To do so, it is important to ensure that appropriate skills exist, especially in range countries with high priority species. Given the establishment and refinement of techniques for the collection and storage of amphibian genetic material and to support capacity building, Amphibian Ark approached the ASG Biobanking Working Group to design and organize a series of webinars covering different topics related to ARTs and their use in amphibian conservation.

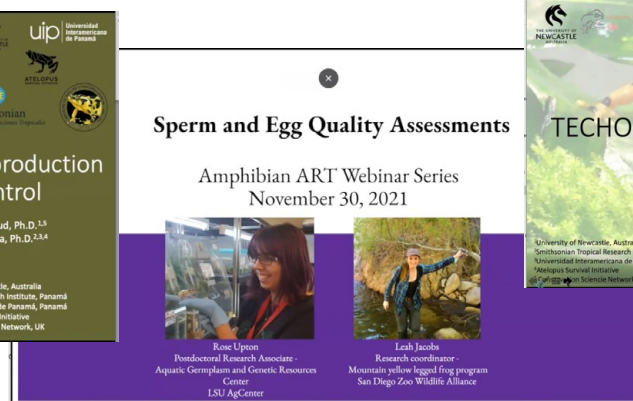
Eleven webinars were delivered between August 2021 and February 2022. Topics covered during the series were Introduction, Endocrinology, Reproduction in anurans and caudata, Hormonal stimulation for sperm and egg collection, Ultrasound use, Sperm and egg viability and quality assessment, Gamete cryopreservation, *In situ* sperm collection and artificial fertilization, and Using IVF for genetic management.

Fifteen researchers developed and presented this webinar training series, where a total of 70 students from around the globe participated.

We believe that this type of collaboration between ASG and AArk is fundamental for achieving some of the goals embodied in the ACAP and to help amphibian conservation worldwide.

Videos from this webinar series are available on our web site at [www.amphibianark.org/art-videos/](http://www.amphibianark.org/art-videos/).

We'd like to thank Natalie Calatayud and Gina Della Togna, Co-Chairs of the ASG Biobanking Working Group, for their time and help in organizing the webinar subjects and presenters.



## Check out our Amphibian Ark t-shirts, hoodies and sweatshirts!



We're continuing to help support amphibian conservation programs for threatened species by raising awareness and resources, with the sale of AArk clothing. Please join us and check out our new T-shirt designs featuring some of your favourite frog species, or show your support by proudly wearing our new AArk Rescue Team t-shirts.

We've recently added many different designs and colors, in men's women's and children's sizes.

Some of the items feature species from our partners' breeding programs, and all profits from these shirts will go directly to supporting amphibian conservation programs.

Head to the AArk clothing store at [www.amphibianark.org/AArk-products.htm](http://www.amphibianark.org/AArk-products.htm) and check out our clothing items!

**Your continued support is helping to save the most threatened amphibians!**





## AArk Husbandry Document library

The Husbandry Document library on the AArk web site ([www.amphibianark.org/husbandry-documents](http://www.amphibianark.org/husbandry-documents)) currently has over 290 documents in it, with additional documents being added regularly. A new search engine has recently been installed on the Husbandry Documents page, which can now search for particular words or phrases within all pdf files. This provides much more accurate results when searching the document library for particular topics.

Six new documents have been added recently:

### Husbandry guidelines: *Pleurodema somuncurens* (Spanish)

Husbandry guidelines for the Critically Endangered El Rincon stream frog (*Pleurodema somuncurens*) in Argentina.

**Authors:** Federico Kacolis, Melina Velasco, María Luza Arelano, Tomás Martínez Aguirre, María Eugenia Arnaudo, Facundo Leonel de Los Santos, Paula Ettlin, Matias Arrigazzi, Sebastián Leotta, Luis Mazzola, Carolina Iacchetti and Borja Baguette Pereiro

**Publication:** Version 2, December 2021

[www.amphibianark.org/wp-content/uploads/2022/02/Protocolo-de-manejo-ex-situ-de-Pleurodema-somuncurens.pdf](http://www.amphibianark.org/wp-content/uploads/2022/02/Protocolo-de-manejo-ex-situ-de-Pleurodema-somuncurens.pdf)

### *Cruziohyia* captive husbandry guidelines (English)

Notes on the captive husbandry of *Cruziohyia*.

**Author:** Andrew Gray

**Publication:** Frog Blog Manchester Museum

<https://frogblogmanchester.com/about/costa-rican-frogs-2/cruziohyia-captive-husbandry-guidelines/>

### Dusky Gopher Frog Controlled Propagation and Reintroduction Plan (English)

The purpose of this document is to provide guidelines for dusky gopher frog (*Rana sevosa*) captive propagation and population restoration efforts in accordance with the Policy Regarding Controlled Propagation of Species Listed Under the Endangered Species Act (65 FR 56916) jointly published by the U.S. Fish and Wildlife Service (Service) and the National Marine Fisheries Service. This policy addresses the role of controlled propagation in the conservation and recovery of Federally-listed species (U.S. Fish and Wildlife Service and National Marine Fisheries Service 2000). This plan is also intended to facilitate coordination among all parties involved in captive propagation and population restoration efforts supporting recovery of the dusky gopher frog and to ensure those efforts are based on sound science.

**Author:** Linda LaClaire

**Publication:** U.S. Fish and Wildlife Service, Jackson, Mississippi, June 2017

[www.fws.gov/mississippi/\\_pdf/2017\\_06\\_23\\_Dusky%20Gopher%20Frog%20Propagation%20Plan%20FINAL.pdf](http://www.fws.gov/mississippi/_pdf/2017_06_23_Dusky%20Gopher%20Frog%20Propagation%20Plan%20FINAL.pdf)

### Husbandry, general care, and transportation of *Xenopus laevis* and *Xenopus tropicalis* (English)

Maintenance of optimal conditions such as water parameters, diet, and feeding is essential to a healthy *Xenopus laevis* and *Xenopus tropicalis* colony and thus to the productivity of the lab. Our prior husbandry experience as well as the rapid growth of the National *Xenopus* Resource has given us a unique insight into identifying and implementing these optimal parameters into our husbandry operations. Here, we discuss our standard operating procedures which will be of use to both new and established *Xenopus* facilities.

**Authors:** Sean McNamara, Marcin Wliza and Marko E. Horb

**Publication:** Methods Mol Biol. 2018

[www.ncbi.nlm.nih.gov/pmc/articles/PMC6421069/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC6421069/)

### Giant Salamanders Husbandry Guidelines (English)

The husbandry guidelines for the giant salamanders are produced in the hope that this will contribute to saving these impressive amphibian species from dying out in the wild as well in the zoological gardens. There are many efforts made in the countries of origin in order to establish a solid captive population. In the majority of European zoos there are currently roughly 22 specimens kept mostly as separate single specimens. However, the European population in the zoological gardens seems to be in a very poor condition and additionally aging without any promising breeding prospects. It seems to be essential to consider purposefulness of importing new founders and starting to display the *Andrias* species in the proper breeding facilities. This could also become a great educational task, as *Andrias* which is a magnificent amphibian representative can play a role of a considerable flag species in the protection of amphibians in the wild.

**Author:** Aleksander Niwelinski, Zoological Garden in Plock, Poland on behalf of the EAZA Amphibian and Reptile Taxon Advisory Group

**Publication:** 2007

[https://andriasconsulting.com/files/Andrias%20sp%20Husbandry%20Manual%20\(EAZA\).pdf](https://andriasconsulting.com/files/Andrias%20sp%20Husbandry%20Manual%20(EAZA).pdf)

### General Husbandry of Terrestrial (Fossorial) Caecilians in Captivity (English)

Caecilians are a rather strange group of limbless, worm-like, and annulated amphibians of the Order Gymnophiona. They have no external ear openings (a stapes is present in some, but not others; Wever and Gans, 1976; Exbrayat, 2006), and their eyes are tiny and covered by skin and/or bone (Duellman and Trueb 1986; Wake 1994). While some caecilians are aquatic (e.g., Typhlonectes), the majority of the approximately 34 genera and ca. 165-200 species (Jenkins and Walsh, 1993; Duellman and Trueb 1986; Wilkinson et al., 2011) are terrestrial spending most of their lives underground burrowing in soil or plant litter.... After keeping terrestrial caecilians in my live animal lab for several years, I have developed a general husbandry protocol that may prove useful to others. Keep in mind that the information presented here is what has worked for me over the years, and to be honest, is the result of trial-and-error and information gained from corresponding with other "caecilian keepers" in the academic and hobby arenas.... While certain species may require modifications to the general husbandry techniques I purpose here, these methods and products have worked well for me over the years. The proper enclosure, substrate, temperature and moisture regime, and food are the most important needs that must be met to promote good health and long term maintenance of caecilians in captivity.

**Author:** Dennis Parmley, Georgia College & State University, Biology Department, Milledgeville, GA, USA

**Publication:** July 2013

[www.caudata.org/cc/articles/caecilian\\_care\\_Parmley.pdf](http://www.caudata.org/cc/articles/caecilian_care_Parmley.pdf)



## Population Viability Assessment of Lake Junin giant frog

**Luis Castillo and Roberto Elías, Grupo RANA; Federico Bolaños, University of Costa Rica; Matt Herbert, Denver Zoo, USA; and Jorge Rodríguez Matamoros and Yolanda Matamoros, Fundación Pro Zoológicos / IUCN Conservation Planning Specialist Group Mesoamérica, Costa Rica**

The Lake Junín giant frog (*Telmatobius macrostomus*) is one of the largest fully aquatic frogs in the world. In the past it was abundant and was at the top of the food chain of Lake Junín and other bodies of water in the regions of Junín and Pasco in central Peru. The species was so abundant that it has been a food resource for the human community since pre-Columbian times. However, the harvest of individuals without any control, together with other human activities that have affected the size and environmental quality of water bodies, has contributed to the species' current listing as Endangered (EN), according to the IUCN. Major threats to the species include invasive species (rainbow trout), diseases (chytridiomycosis), and water pollution.

In 2013, the Conservation Planning Specialist Group, Mesoamerica Resource Center (IUCN SSC CPSG Mesoamerica) collaborated with Denver Zoo, USA, Junín's National Service of Natural Areas Protected by the State (SERNANP, by its acronym in Spanish), the Peace Corps and Universidad Peruana Cayetano Heredia, to develop a Conservation Strategy for the Lake Junín giant frog. This first meeting included thirty-three participants from twenty-six different institutions and was attended by thirty-two observers representing twenty-one institutions in the Junín – Pasco region.

One recommendation of this Conservation Plan was to do a Population and Habitat Viability Assessment (PHVA) which was scheduled for 2020, but because of the pandemic, it was resolved to do a Population Viability Analysis (PVA) using the virtual tools available online. The PVA meetings were held in six virtual sessions between February 17 and March 24, 2021, with an approximate duration of 1-3 hours and with the participation of fifteen people.

The PVA shows that the Lake Junin giant frog is a resilient species, even when different threats have made it difficult to observe today. Even so, if the threats persist over time or increase in intensity, the frog could become extinct in the near future. The baseline model that represents our best estimates of the current situation

Tadpoles of the Lake Junín giant frog can be around 8 inches (20 cm) when they are metamorphosing.

Photo: Luis Castillo Roque.



The Lake Junín giant frog (*Telmatobius macrostomus*) is one of the largest fully aquatic frogs in the world.  
Photo: Luis Castillo Roque.

suggests the probability of extinction within 100 years is 64% with a mean time to extinction of thirty-six years.

The giant frog could recover and probably in a short time given its high fertility potential, but only if management actions aimed at mitigating threats to the habitat and the survival of individuals, especially females, are implemented.

For more information, please see the report *Taller Análisis de Viabilidad Poblacional (PVA) de la rana gigante del lago Junín (Telmatobius macrostomus)* [www.cpsg.org/sites/cbsg.org/files/documents/Junin%20Giant%20Frog%20PVA\\_rev.pdf](http://www.cpsg.org/sites/cbsg.org/files/documents/Junin%20Giant%20Frog%20PVA_rev.pdf).





# FrogLog

## CONTENTS



Volume 28, number 2. Issue 123 (December 2021) [www.amphibians.org/resources/library/froglog/](http://www.amphibians.org/resources/library/froglog/)

### Remembering Phil Bishop

- |  |   |
|--|---|
| 4 The Amazing Frog-Fingered Phil Bishop          | 15 Memories of Phil Bishop              |
| 6 Memories of Phil From his Time in South Africa | 15 Fond Memories of Phil                |
| 7 Memories of Good Times with Phil Bishop        | 16 Thanks, Phil, for Everything         |
| 10 Phil Bishop Tribute                           | 17 The Gift of Opening Minds            |
| 11 Counting You In                               | 17 Remembering Phil Bishop              |
| 11 Phil, Bishop of the Frogs                     | 18 The Bishops in Borneo                |
| 13 Tribute to Phil                               | 21 Treasure Hunting with Legends        |
| 14 In Memory of Phil Bishop                      | 22 Remembering Professor Phil Bishop    |
| 14 Phil in Madagascar                            | 23 In Memory of an Inspiration and Hero |
| 15 Remembering Phil                              |   |

### News From the Amphibian Community

- |   |   |
|---|---|
| 25 Croak: A Book of Fun for Frog Lovers     | 29 David Wake, a Prominent Herpetologist Who Warned of Amphibian Declines, Dead at 84 |
| 26 Amphibian Conservation Needs Assessments | 31 Rainer Schulte (1948-2021)   |

### News From the IUCN SSC Amphibian Specialist Group (ASG)

- |  |  |
|--|--|
| 32 More Than 40 Organizations From 13 Countries Come Together to Protect and Restore Harlequin Toads | 35 Action Plan for the Conservation of Mantella cowanii Launched in Antananarivo, Madagascar |
| 34 Amphibian Reintroduction Guidelines Are Here!   | 36 Open Consultation on Draft ACAP Status Review Opening Soon                                |
| 34 Reconstitution of the ASG Membership for the 2021-2025 IUCN Period                                |  |

### News From the Amphibian Survival Alliance (ASA)

- |   |   |
|---|---|
| 37 Thank you Phil. We Will Miss you so Much   | 45 Conservation Efforts with Local People to Protect Frogs in Peru                          |
| 38 AmphibiaWeb Celebrates Students  | 46 Zero Extinction Status Makes Atewa No-Go Area for Mining                                 |
| 38 Exciting Discoveries During the First Amphibian Survey of One of Madagascar's Smallest Protected Areas | 47 The Giant of the Pampas: Conserving Amphibians in a Global Pandemic Context              |
| 40 2021 World Press Photo of the Year   | 48 Meet ASA Future Leader of Conservation James Watuwa                                      |
| 41 Protecting the Endemic and Threatened Frogs of the Western Cape, South Africa                          | 49 Pakistan's Amphibians Need More Research Efforts and Better Protection                   |
| 42 Lunar Landings: Research Shows That Toad and Frog Migrations Peak at a Full Moon!                      | 50 Pedro Peloso is a 2021 Awardee of the Maxwell/Hanrahan Individual Award in Field Biology |
| 43 The Amphibian Conservation Fund – Catalysing Support for Amphibians                                    | 51 Instructions to Authors  |
| 44 Science and Art Come Together to Reveal Amphibians and Reptiles from Southwestern Angola               |   |



## Pool frog workshop

**Jim Foster, Ben King and John Baker, Amphibian and Reptile Conservation Trust, United Kingdom**

On November 12 last year, the Amphibian and Reptile Conservation (ARC) Trust held an online workshop to investigate methodologies to scale up the reintroduction of northern pool frogs (*Pelophylax lessonae*) to England. This was part of a long-term program to reintroduce the northern pool frog to England (King et al., 2021). The workshop was part of ARC's project Recovering the Pool Frog – England's Rarest Amphibian, funded by the Government's Green Recovery Challenge Fund.

After relatively recent extinction from England, in the 1990s, the northern pool frog has been reintroduced at two locations. Due to the specific habitat requirements of the species and anthropogenic modification and fragmentation of habitat throughout much of southern England, it is unlikely that the northern pool frog will colonise new sites unaided. Additional populations, which are urgently needed to secure the species, can only be established by further intervention. The small size of the newly established populations means that head-starting has been adopted to produce stock for new populations. The workshop focused on the issue of increasing the rate of site introductions, in particular to gain an understanding of the options for scaling up production of pool frog founders for future reintroductions.

Participants were invited on the basis of their involvement with European amphibian reintroductions and conservation, especially those with experience of the northern clade pool frog.

### Process

Prior to the workshop, seven approaches were identified as having potential application to the restoration of the northern pool frog in England. These were translocation, either within the UK or internationally; *in situ* and *ex situ* head-starting; *in situ* and *ex situ* captive breeding; and assisted reproductive technologies.

The workshop was held online, using the Microsoft Teams communication platform, and lasted for approximately four and a half hours. After introductions, a summary of the current state of pool

frog recovery in England was given and the seven approaches were introduced. Participants were invited to suggest additional approaches, but none was proposed.

Information contributed to the workshop was gathered by entry into an Excel spreadsheet. This was shared online, with a separate 'sheet' for each participant. The spreadsheet was made available prior to the workshop, to allow participants to become familiar with its format, and held open for a further six days afterwards to allow review or the entry of additional information.

Participants were asked to record their views on the advantages and disadvantages of each approach and invited to submit comments and examples of other projects using that particular approach. They were also asked to estimate financial costs of setting up and operating each approach and to rate each for its likelihood of success in the case of recovery of the northern pool frog in England. The seven potential approaches were evaluated within the workshop, with participants working through each as a group. Approximately ten minutes were allocated to each approach, during which time participants responded to the evaluation questions and entered comments on the shared spreadsheet.

### Spreadsheet fields used in workshop

| Field/evaluation             | Response options  |
|------------------------------|---|
| Advantages                   | Open response   |
| Disadvantages                | Open response   |
| Comments                     | Open response   |
| Example projects             | Open response   |
| Costs of setup and operation | Low / moderate / high / very high                               |
| Likelihood of success        | Highly successful / successful / partially successful / failure |
| Suitability                  | Rank order, 1 (best) to 7 (worst)                               |



Captive breeding was one of the approaches to future reintroductions of the northern pool frog (*Pelophylax lessonae*) favoured by workshop participants. Photo: Kristofer Försäter.





*In situ* head-starting of northern pool frog tadpoles in Norway.  
 Photo: Tina Haagensen, Kristiansand Dyrepark.

Following a break, workshop leaders reviewed the spreadsheet responses to facilitate discussion of the seven approaches. Then participants were asked to rank the suitability of each approach for pool frog recovery in England.

### Conclusion

*Ex situ* head-starting and *ex situ* captive breeding were judged as the approaches most likely to succeed in the case of the northern pool frog reintroduction to England. Both of these approaches were recognised as being relatively costly to set up and operate, and *ex situ* captive-breeding was judged as the most expensive option. Wild-to-wild translocation, the method selected for the original translocation from Sweden, was regarded as the least costly methodology, but it was also rated as one of the least likely to succeed at the current stage. Assisted reproductive technologies were regarded as having high costs and also the least likely to succeed, given the limited application to this species to date.

Northern pool frog restoration is currently reliant on *ex situ* head-starting. Demonstrable success of this, albeit on a small scale, is one of the reasons that it was rated highly in the workshop. In spite of this, spindly leg syndrome has been observed within head-starting and this remains an issue to be addressed. Future reintroduction work will also consider the development of *ex situ* captive breeding.

The workshop report is available from ARC's website [www.arc-trust.org/technical-reports](http://www.arc-trust.org/technical-reports).

### Acknowledgements

The workshop was funded by the UK Government's Green Recovery Challenge Fund, delivered by The National Lottery Heritage Fund in partnership with Natural England, the Environment Agency and Forestry Commission.

Amphibian and Reptile Conservation is grateful to workshop leaders and participants: Johan Auwerx (Research Institute for Nature and Forest), Helene Axelsen, (Kristiansand Dyrepark), John Baker (Amphibian and Reptile Conservation), Lars Briggs (Amphi-Consult), John Buckley, Ilze Duncce, Kristofer Försäter (Nordens Ark), Jim Foster (Amphibian and Reptile Conservation), Gerardo Garcia, (Chester Zoo), Richard Griffiths (Amphibian and Reptile Conservation & Durrell Institute of Conservation and Ecology), Matt Goetz (Durrell Wildlife Conservation Trust), Tina Haagensen (Kristiansand Dyrepark), Ben King (Amphibian and Reptile Conservation), Yvette Martin (Amphibian and Reptile Conservation), Christopher Michaels (Zoological Society of London), Tony Sainsbury (Institute of Zoology, Zoological Society of London), Tammy Shadbolt, (Institute of Zoology, Zoological Society of London), Jeroen Speybroeck (Research Institute for Nature and Forest), Loïc van Doorn (Research Institute for Nature and Forest).

### Reference

King, B., Jordan, E. & Baker, J. (2021). Recovering the northern pool frog – England's rarest amphibian. Amphibian Ark Newsletter 55, 2-4.



## Amphibian Ark donors, January 2021 - March 2022

The work of AArk is possible due to the generous support of the following individuals and institutions:

### Up to \$50,000

Anne Baker and Robert Lacy,  
in memory of George Rabb

Bernard and Nancy Karwick

Synchronicity Earth

The George and Mary Rabb  
Fund for Conservation

### Up to \$10,000



### Up to \$5,000

Aquazoo – Löbbecke Museum  
Cleveland Metroparks Zoo  
Ronna Erickson  
Kansas City Zoo  
Nordens Ark  
Rosamond Gifford Zoo  
Saint Louis Zoo  
Singapore Zoological Gardens  
Taipei Zoo  
Alistair Ward

Ron and Joanne Lane  
Elizabeth Lisiecki  
Richard Melsheimer  
Sasha Meyerowitz  
Madeleine Murphy  
Grant Rutherford  
George Sommer  
Randolph Stadler  
Brendan Wenzel  
Georgianne Wilcox  
Brett Williams

Laura and Jay Cody  
In memory of Adelaide Ellis  
Leonard Epstein  
Ramona Fenner  
Valrie Fingerman  
Elaine Goldman  
Kaley Kriminger  
David Mitchell  
Taj Mumma  
Stephan Schwinn  
Douglas Widener

### Up to \$1,000

Jacob E.  
Jessee Gift Fund  
Lee Richardson Zoo  
Minnesota Zoo  
Philadelphia Zoo  
Raymond Picciano  
Lynn Rust  
Nathan Spaun  
Twardy Family Charitable Fund  
Woodland Park Zoo

### Up to \$100

Rachel Anderson  
Beastly Threads  
Roman Bodinek  
David Corsini  
Richard Cox  
Janine Crane  
Eithan Dudnik  
Ben Durham  
Marvin Goldberg  
Torey Haas  
Susan Handa  
James Hanken  
Tomas Kraus  
Kevin Mitchell  
Michelle Rand  
Claire Rosser  
Andrew Smith  
Georgette Taylor  
Brian Ugurlu  
Thodd & Lori Van Allen  
Bruce Weber

### Up to \$25

Melissa Dunham  
Scott Edelen  
Alexia Greenwood  
Eric Johnson  
Richard Lawson  
Chad Segur  
Troy Woodruff

### Up to \$500

William Aukschun  
David Barnard  
Casimir Borowski Jr  
Davis Breen  
Buffalo Zoo  
Charles Burnette  
Rachael Creager  
Fahim Dhalla  
Jessica Finberg  
Cassandra Giannousis  
Traci Hartsell  
Julia Hertl  
Da-Shih Hu

### Up to \$50

Joseph Allen  
Jonathan Brater

### Up to \$10

Artem Alexeev  
Mark Flores  
Laura Jaenicke  
Terry Keiser  
Marian McCain  
Kathryn Norman  
Alexis Rathburn  
Axl Rose  
Savy Som