amphibian ark

Keeping threatened amphibian species afloat

Newsletter

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In this issue...










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Recovering the northern pool frog – England's rarest amphibian

Ben King, Emily Jordan and John Baker, Pool Frog Recovery Project, Amphibian and Reptile Conservation Trust, United Kingdom

The northern clade of the pool frog (*Pelophylax lessonae*) is a unique form restricted to England, Scandinavia and Estonia. Genetically distinct from its continental counterparts, the English population was declared extinct in the mid-1990s following long-term habitat loss and conservation neglect owing to its previously presumed status as a non-native. More recently the species has been determined as native to England (Beebee et al., 2005) and a reintroduction has been undertaken. The Amphibian and Reptile Conservation (ARC) Trust helped to write a comprehensive reintroduction strategy (Buckley and Foster, 2005), which has guided implementation, with help from a range of partners.

An adult female northern pool frog (*Pelophylax lessonae*) basking at the pond edge. Photo: Katie Garrett.

The first reintroduction

Adults, juveniles, tadpoles and spawn were collected from Sweden between 2005 and 2008, after gaining permissions from the Swedish authorities (Foster et al., 2018). They were screened for health conditions, before being brought to England and released at an undisclosed location in Norfolk. Disease risk analysis and post-release health surveillance have been, and continue to be, carried out for the species reintroduction through regular health examinations in the field (Sainsbury et al., 2017). To date, no significant health or disease problems have been detected.

Initial indications are encouraging, with the frogs breeding and surviving over several generations. However, northern pool frogs have specific habitat requirements, meaning that frogs from this reintroduced population are unlikely to disperse beyond the reintroduction site naturally.

The second reintroduction – Thompson Common, Norfolk

In 2015, northern pool frogs were released at a second site in Norfolk, Thompson Common. This was the last known place in England where pool frogs occurred before becoming nationally extinct. Thompson Common is now a nature reserve and a Site of Special Scientific Interest managed by project partner, Norfolk Wildlife Trust. To re-establish frogs here, tadpoles were head-started. The aim of head-starting is to protect vulnerable early life stages (in the case of the pool frog: spawn; hatchlings; and larvae [e.g. Baker, 2018]) to increase the reproductive output of a population. Practically, this saw spawn being collected from the first reintroduction location, under licence from the state agency Natural England, so that tadpoles could be reared in captivity, protected from predators, hence boosting the numbers surviving

Pool frogs have been reintroduced to Thompson Common, their last known English location before they went extinct in the 1990s. Photo: Helen Maxwell.

to become froglets for release at Thompson Common. Initially, pool frogs were head-started and released at Thompson Common in 2015 and 2016.

Recent developments

The Amphibian and Reptile Conservation Trust fundraised for a dedicated, bio-secure head-starting facility to accelerate population establishment at Thompson Common. The Trust is grateful to all the organisations, including Amphibian Ark, whose support enabled the Trust to design, establish and equip such a facility, which operated throughout summer 2019, with the potential for repeated use in future years. One hundred and fifty head-started tadpoles were released into three pingo ponds (formed by periglacial repeated freezing and thawing) at Thompson Common.

Currently, the Pool Frog Recovery Project is the latest stage in ARC's long-term work to reintroduce the northern pool frog to England, with government funding through the Green Recovery Challenge Fund giving further vital support to this species' conservation. This is a short-term fund intended to kick-start environmental renewal whilst creating and retaining a range of jobs in England. The Pool Frog Recovery Project aims to:

- head-start spawn/tadpoles for release at Thompson Common;
- assess the status of the reintroduced populations;
- train volunteers in monitoring pool frogs;
- engage volunteers in head-starting tadpoles;
- restore habitat for pool frogs;
- make plans for the next steps in the reintroduction.

2021 head-starting and translocation

No head-starting occurred in 2020 during the coronavirus pandemic. In 2021, however, the head-starting facility was re-commissioned and volunteers were recruited and mentored in pool frog husbandry once more.

Collection and transportation of spawn

Spawn searches were conducted in conjunction with breeding surveys during May. Spawning is associated with several days of hot, sunny weather with mild night temperatures. Spawn is usually laid amongst vegetation around the sunniest aspects of breeding ponds. A female deposits several loose aggregations of tens of eggs over several days. On 31st May, twenty spawn clumps were found across multiple breeding ponds at the first reintroduction location, the most ever found on a single day. Seven of these spawn clumps were collected and transported to the head-starting facility.

Captive management of spawn and tadpoles

Spawn was acclimated to the conditions in head-starting aquaria and allowed to hatch undisturbed. Hatchlings initially clung to spawn and then tank surfaces. After six days, the hatchlings were free swimming.

The head-starting facility was attended to at least once daily. After entering the facility, taking all biosecurity precautions, the appearance of all stock was checked. Temperature data were recorded daily and water tests and changes performed as necessary (up to two 10% water changes per day). The tadpoles were fed at least once daily and their behaviour observed. A random sample of tadpoles was periodically measured and photographed to monitor development and establish release readiness.

Transportation and release of tadpoles

Between 14th and 22nd July, late-stage tadpoles and metamorphs were released at the reintroduction sites. Tadpoles were transported in fish bags, which had rounded edges to prevent animals becoming trapped. Metamorphs, which easily drown, were transported in boxes. Animal transport containers were then packed into cooler boxes to prevent rapid temperature changes during transit.

A dedicated, bio-secure facility has been designed, established and equipped to head-start northern pool frogs. Photo: Ben King.

Finally, animals were acclimated and released. At the reintroduction sites, fish bags were floated in pond margins, out of direct sunlight. Over thirty to sixty minutes, pond water was added into the bags to equilibrate temperature and pH. The animals were then gently tipped into the pond.

The target to release 300 captive-reared tadpoles was exceeded, with a total of 542 late-stage tadpoles/metamorphs being released. 311 animals were released at Thompson Common across five ponds and the remaining 231 animals were released back to the first reintroduction location, as compensation for spawn removed for head-starting purposes. This was the fourth year that pool frogs were head-started and translocated to Thompson Common, bringing the total to 1,051 animals released at this second reintroduction location. ARC's experience with amphibian introductions is that three or four years of translocations are required to ensure a natural population structure is created. Demographic monitoring data provide favourable early indications of an established and growing population.

As well as head-starting, the frogs have had a successful breeding season, with tens of wild metamorphs emerging from all the breeding ponds across both sites. Thompson Common has had a particularly successful year with metamorph counts being the highest seen since the frog's reintroduction there.

ARC is currently making plans for the next steps in the pool frog reintroduction to England, which includes a workshop being planned later this year to address

upscaling of head-starting. ARC wants to spread northern pool frogs to additional sites within the former historic range of the East Anglian Brecks and Fens, to ensure a sustainable future for this Critically Endangered English species.

Acknowledgements

Amphibian Ark and other donors provided funding to establish the head-starting facility in 2019. The Pool Frog Recovery Project in 2021 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.

We would like to thank our team of volunteers for assistance with head-starting and field survey and Helen Maxwell for aerial photography. We are also grateful to Jim Foster, Karen Haysom and Yvette Martin (Amphibian and Reptile Conservation) and our partners Chris Michaels and Tammy Shadbolt (Zoological Society of London) and Jon Preston (Norfolk Wildlife Trust).

Ben King, ARC's Pool Frog Recovery Project Officer, collecting spawn for head-starting. Photo: John Baker.

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Croak - A book of fun for frog lovers

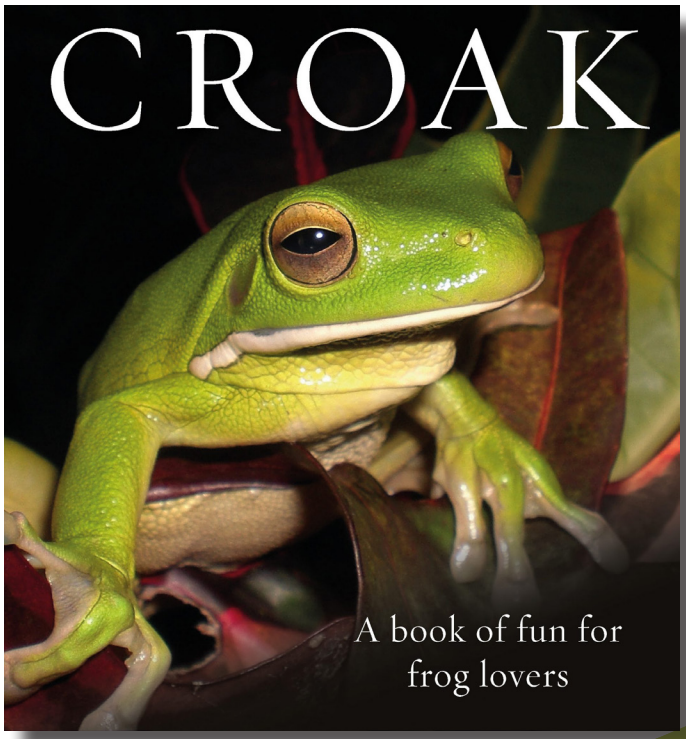
Croak is a collection of delightful quotes and gorgeous photographs celebrating the underappreciated beauty of frogs. Many of the stunning, colourful images were taken by author Phil Bishop on his travels around the world. They showcase frogs in their natural habitats, paired with quotes from famous faces such as Cameron Diaz and John Steinbeck as well as historical figures and members of the amphibian conservation community. Simultaneously amusing and illuminating, this perfect coffee table book is a celebration of one of the most varied and vibrant species on earth.

Phil's passing early in 2021 is a loss keenly felt by the international scientific community. This book now serves as a tribute to a life spent at the forefront of conservation as he sought to deepen our understanding of these vitally important creatures.

Phil has been widely published, with three previous books about frogs, several book chapters, and over 100 ground-breaking scientific papers. He was an editor of FrogLog, the world's most popular online amphibian conservation magazine. Phil won many awards for his teaching and conservation efforts, including the University of Otago Lifetime Achievement Award 2018 and the National Conservationist of the Year Award 2018 by Auckland Zoological Park Recognising Excellence.

Hardback | 225 x 203mm / 8.75 x 8in | 160 Pages | Full Colour

https://exislepublishing.com/product/croak/



AmphibiaWeb links to AArk's Conservation Needs Assessments

Kevin Johnson, Taxon Officer, Amphibian Ark

AmphibiaWeb (www.amphibiaweb.org) is a website run by the University of California Berkeley's Museum of Vertebrate Zoology, which is an ongoing collaboration between citizen scientists, students, and researchers around the world. Its origin was sparked by an amphibian declines seminar led by David Wake in 1998.

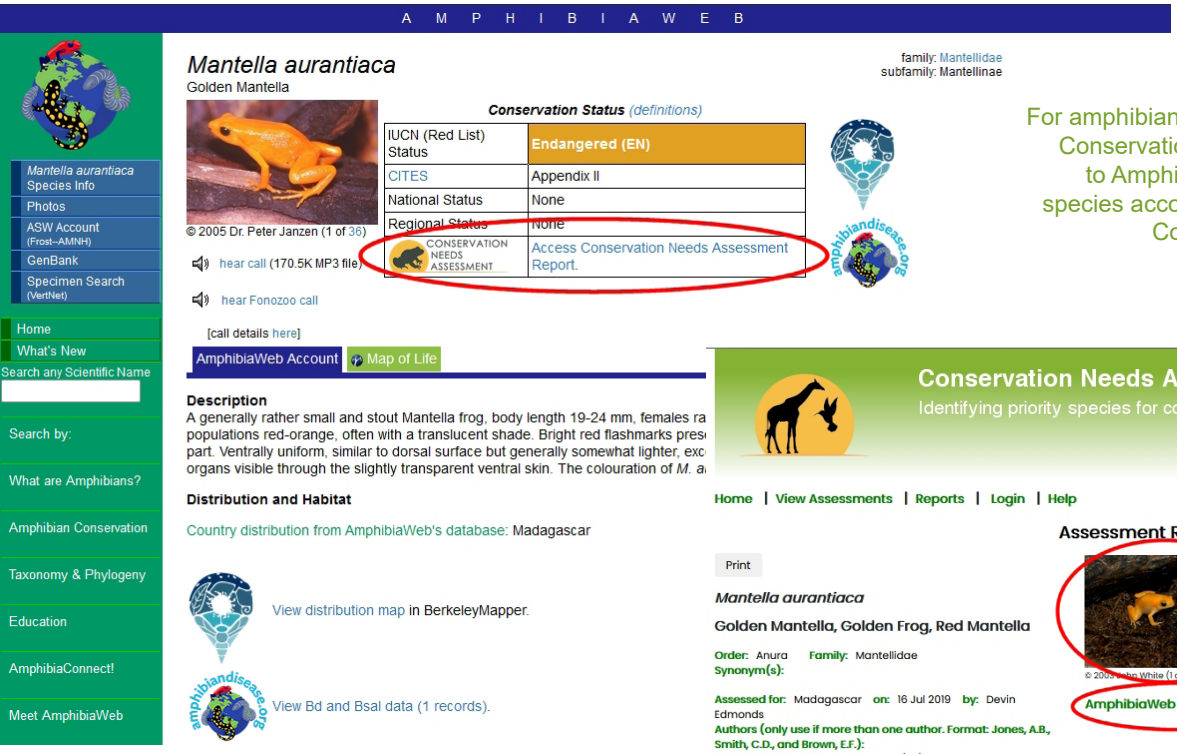
Following its vision of a healthy future which must include amphibians, AmphibiaWeb believes "the means to conserve amphibians is to enable and facilitate better research and education with an accessible, consolidated, and curated information system for all amphibian species". It offers easy access to taxonomic and biological information for every recognized species of amphibian in the world (8,381 species, as of 5th September 2021). A species page has been created for all known amphibian species, which includes species descriptions, life history information, conservation status, literature references, photos and range maps for many species, and they now features a link to the Conservation Needs Assessment Report if available.

AmphibiaWeb currently hosts 3,441 species accounts for 2,746 species, 7,954 literature references, 819 sound files, 120 video files, and 41,943 photos of 4,745 different amphibian species.

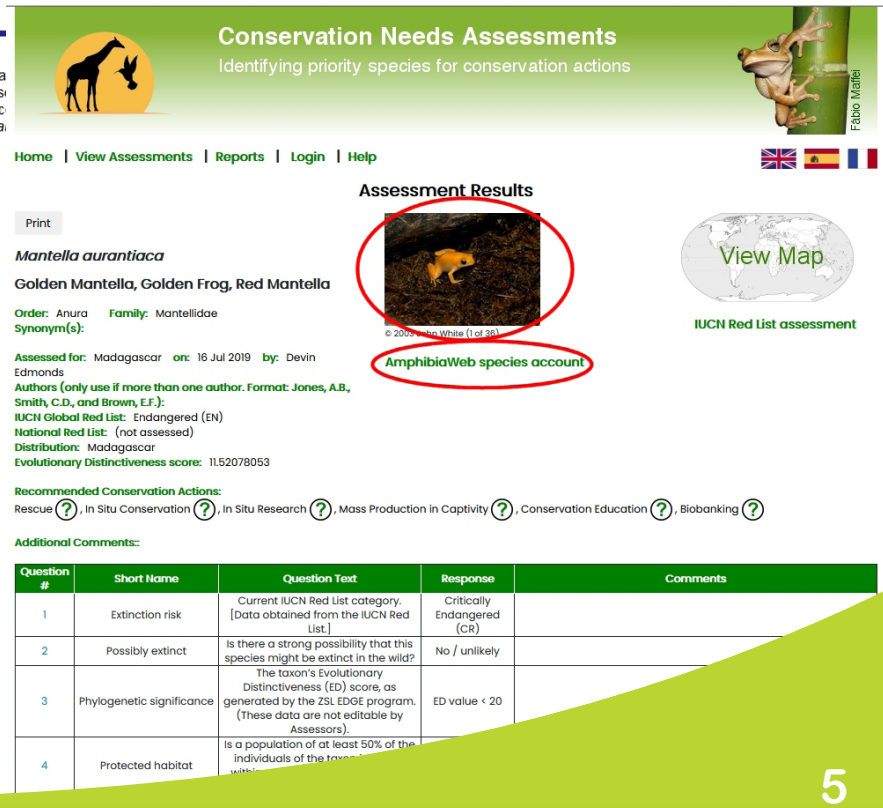
In 2020, AmphibiaWeb and AArk staff began discussions about linking to AArk's Conservation Needs Assessments from the AmphibiaWeb species accounts. Earlier this year, modifications were made to the AmphibiaWeb site, and to the Conservation Needs Assessments database to allow the links to function, and now, for species which have completed assessments, visitors to AmphibiaWeb can click a lick on each species account, direct to the corresponding Conservation Needs Assessment. If multiple assessments exist, a list of available assessments is presented.

All amphibian Conservation Needs Assessments include a link to the corresponding species account on AmphibiaWeb, if one exists, along with a link to images in the CalPhotos library (https://calphotos.berkeley.edu). CalPhotos is a collection of 740,110 photos of plants, animals, fossils, people, and landscapes from around the world. CalPhotos is also a project of the Berkeley Natural History Museums at the University of California Berkeley. Links are also provided from amphibian Conservation Needs Assessments to the corresponding IUCN Red List assessment.

Providing links between online amphibian databases is vital to sharing knowledge and expertise, and to support further research and conservation of amphibians.



For amphibian species which have completed Conservation Needs Assessments, visitors to AmphibiaWeb can click a lick on each species account, direct to the corresponding Conservation Needs Assessment.



A Conservation Needs Assessment for Golden Mantella (*Mantella aurantiaca*), showing links to the associated AmphibiaWeb species account.

Private donation supports seven amphibian programs

Kevin Johnson, Taxon Officer, Amphibian Ark

Thanks to another very generous private donation, we are pleased to be able to provide just over US $24,000 in support to seven *ex situ* conservation programs in South America. The donor has provided funding over the past few years, which has been made available to existing programs that have already shown great progress towards their goals. A number of program managers were asked how they would use some additional funding to support their work, and the following programs were successful with their requests.

Fundação Parque Zoológico de São Paulo, Brazil - Cybele Lisboa

Species: *Aparasphenodon pomba*

This is a very rare species and field researchers believe it will be extinct in a few years if nothing is done. It is among the twenty-five Brazilian species with highest priority to develop a captive breeding program, and so far, this is the only amphibian in this list. Also, this species was evaluated by the Conservation Needs Assessments process, and it is one of the high priority amphibian species for conservation in Brazil. During the last two years, we were able to collect four males and two juveniles to begin the *ex situ* population, but we have not yet found any females. To solve this problem, we are planning to hire a field assistant and an intern to spend a month going into the field daily to increase our search efforts, and to rent a car for field trips. The funding received will also help cover field trip expenses, accommodation, food, and one equipped aquarium to host additional frogs in the lab.

Conservation Center for Amphibians-Amaru, Ecuador - Fausto Siavichay

Species: Azuay stubfoot toad (*Atelopus bomolochos*), *Atelopus exiguous* and Pebas stubfoot toad (*Atelopus spumarius*)

Some of our previously formed alliances, such as “Proyecto PARG - “Conservación de Anfibios y Recursos Genéticos PARG” spearheaded by the Ministry of the Environment in Ecuador and funded by the UNDP, have now come to an end. As such, we were unable to retain some of our veterinary staff, and matching funds for the upkeep of our breeding facilities, as these were fully supported by PARG. Likewise, some of the local funding provided by the City of Cuenca was halted due to the covid pandemic. We have not been able to sustain the same level of support and have been forced to reduce budget costs, reduce staff hours, and limit the purchase of supplies and carrying out some activities. The funding will be used to obtain needed materials to improve our laboratory and our breeding program for high elevation *Atelopus* species (*Atelopus nanay*, *A. exiguus* and *A. bomolochos*), such as chillers, terrariums, and UV lamps. We will also replace some of the damaged and deteriorated infrastructure in our quarantine room, mainly doors and ceilings and our used water treatment containers. We will also purchase a stereoscope, microtubes, sterile swabs, testing tubes, and gloves.

National University of the Centre of Buenos Aires Province, Argentina - Igor Berkunsky

Species: Darwin’s blackish toad (*Melanophryniscus nigricans*)

Our project was initiated two years ago. Since then, we started a solid Amphibian Ark initiative in terms of government authorization permits and support from our local university and community. We successfully maintained adults in captivity during the past two years, and we successfully produced tadpoles from collecting eggs from the wild. We also conducted an experimental translocation of twelve adults, which has not yet been evaluated. We had problems feeding juvenile toads, as the juveniles are tiny (between 0.4 and 0.6mm), and we have had issues finding arthropods of the correct size. We are now about to start breeding Collembola as a food source. We need to move our Amphibian Ark from the original site assigned for the Amphibian Ark Project in the University to a new one (also in the University). The new place is an independent facility, much larger than our previous site (i.e., a room in a building). We will need to invest in some repairs and conditioning of the new facility. We will use the funds received to buy some shelves, terrariums, and containers for breeding Collembola. We also need to replace the filter on the fish tank we use for tadpoles, and we will use some funds to initiate repairs and conditioning of the new Amphibian Ark facility. We hope to cover at least the necessary maintenance that will allow us to move the breeding pairs to the new facility. We will also finish the conditioning of the new Amphibian Ark facility, and we will use the remaining funds to produce safe habitat for Darwin’s blackish toad: we will fence and restore one wild pond where we plan to reintroduce the juveniles, which we plan to produce during the 2021-22 summer.

A new facility, much larger than the previous site will be built within the National University of the Centre of Buenos Aires Province in Argentina for the Darwin’s blackish toad (*Melanophryniscus nigricans*) conservation breeding program. Photo: Gabriela Soler.

Delegación Sur de Parques Nacionales, Argentina - Federico Kacoliris

Species: Patagonia frog (*Atelognathus patagonicus*)

Between 2010 and 2016, an unusually prolonged and severe drought desiccated the lagoons in the volcanic tablelands of north-western Argentinean Patagonia, increasing the estimated population decline of the species from 50% to more than 90%. Our most significant accomplishment to date was the successful establishment of the *ex situ* survival colony of this species within the Laguna Blanca (White Lagoon) National Park. We also identified sites to create limnocorrals within the White Lagoon and already have permits from the National Park Agency to conduct activities to help the species to re-establish core populations in the White Lagoon. The funding received will be used for acquiring new UV filters for the main aquariums as well as for covering tests for *Bd* and bacteria prior to releasing captive-bred frogs in the wild. We also cover a year stipend for a part-time technician ($120 per month) to help us in the maintenance of the frogs inside the *ex situ* facilities. This will allow us to increase our efforts with the frogs and

to gather more precise data related to *ex situ* maintenance of this species (this will also be useful for related species in Argentina). We will also use some of the funds to cover fieldwork for translocating froglets born in captivity to restored habitats, and for monitoring them until they become fully re-established in the wild.

Instituto de Ecorregiones Andinas (INECOA, UNJu-CONICET), Argentina - Mauricio Akmentins

Species: La Banderita marsupial frog (*Gastrotheca gracilis*)

To date, and despite our efforts, we were unable to rediscover the lost populations of La Banderita marsupial frog in the northern range of the geographic distribution. We consider there is a need to increase the search effort to detect this species to discard the possibility of a local extinction event. During the past two years, our main accomplishments were the successful release of froglets for the population supplementation of La Banderita marsupial frog in Los Sosa provincial reserve (Tucumán province, Argentina) for a second consecutive year in 2020. We also obtained founder animals for the first captive breeding attempt of *Gastrotheca gracilis* in 2021. This additional funding will be helpful to continue upgrading the *ex situ* facilities, to continue the *in situ* conservation activities and to expand our conservation education program. There is an urgent need to include a physical and biological filtering system to ensure a reliable water source for the frogs. We also need to improve the treatment and disposal of wastewater to increase biosecurity, and to create a conditioned room to raise the live food supply for the frogs. We hope to obtain additional field data about the environmental conditions, particularly air and water temperatures in the reproductive habitats used by marsupial frogs.

Additional funding will be used to continue the upgrading of the *ex situ* facilities at the Instituto de Ecorregiones Andinas (INECOA, UNJu-CONICET) in Argentina for the La Banderita marsupial frog (*Gastrotheca gracilis*). Photo: Mauricio Akmentins.

La Plata University, Argentina - Federico Kacoliris

Species: El Rincon stream frog (*Pleurodema somuncurense*)

With just a handful of isolated populations remaining in the wild, the El Rincon stream frog (*Pleurodema somuncurense*) is the most Critically Endangered frog living in Patagonia and the only one in Argentina listed among the Top 100 EDGE amphibians worldwide. Since 2013, with help from Amphibian Ark and the Amphibian Survival Alliance, we have been working on the recovery of this unique species. The action plan for this frog has a clear goal, ensuring the long-lasting survival of the El Rincon stream frog by doubling its distributional range and its population size. With these activities, we expect to continue increasing suitable and protected habitats for frogs and to help to recover relict populations of El Rincon stream frog working together with the local community. Unfortunately, we have had some delays with permits from environmental authorities, and the biggest delay was related to the management of trout and translocation of frogs that were born in captivity to restored habitat. We are talking about delays of two years to get the required permits. However, it is worth mentioning that thanks to our previous achievements, future permits to conduct these same managements will be obtained faster than before. The funding we have received will be used for acquiring new UV filters for the main aquariums as well as for covering tests for *Bd* and bacteria prior to releasing frogs in the wild. We will also cover a year stipend for a part-time technician ($120 per month) to help us in the maintenance of the frogs inside the *ex situ* facilities.

Centro K'ayra de Investigación y Conservación Anfibios Amenazados de Bolivia (Museo de Historia Natural Alcide d'Orbigny), Bolivia - Teresa Camacho Badani

Species: *Telmatobius gigas*, sucre water frog (*Telmatobius simonsi*), Titicaca water frog (*Telmatobius culeus*), *Telmatobius hintoni* and Sehuencas water frog (*Telmatobius yuracare*)

For the first time, we have created conservation action plans for two species that we maintain at the K'ayra Center (Titicaca water frog and Sehuencas water frog) that include *in situ* work and *ex situ* management actions, which we have begun to implement. As part of the Sehuencas water frog Action Plan, we have planned the use of assisted reproduction technologies which could not be executed due to the border closures brought on by the Covid-19 pandemic. A new container has been implemented for cloud forest frogs (including Sehuencas water frogs), also Titicaca water frogs from all the localities that we maintain in the *ex situ* program have reproduced. We are working on a binational population monitoring project at Lake Titicaca and I am leading the genetic work in Peru and Bolivia to determine the taxonomic identity. One of the biggest challenges has been to maintain funds for the maintenance of the frogs and our keepers. Zoos that have helped us in the past now need help to support themselves and their own staff.

During the Covid restrictions there were many power cuts, and the containers stopped working, with the temperature sensor in one container being damaged. To solve this, we have included energy stabilizers in the containers and now we are installing sensors to be able to monitor the temperature remotely. The purchase of this equipment increased our budget a lot, but we know that they were absolutely necessary, especially since we couldn't go to the K´ayra Center every day (depending on the restrictions). Now we are fine, and we hope we do not have any more unexpected events!

The use of assisted reproduction technologies is planned for Sehuencas water frogs (*Telmatobius yuracare*) at the K'ayra Center for Research and Conservation of Threatened Amphibians of Bolivia (Alcide d'Orbigny Natural History Museum). Photo: D. Alarcón-D. Grunbaum.

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

AArk has offered grants since 2009 and in the past, these have been predominantly seed grants, for newly created *ex situ* programs for species that have been assessed as in need of urgent *ex situ* rescue.

In 2018 our grants program was expanded, to include a wider range of programs types that are eligible for funding, as well as some new guidelines and requirements for grant recipients. Download the complete guidelines from www.amphibianark.org/grants/AArk-Conservation-Grants.pdf.

We will be accepting Project Outline funding applications (see below) for the following types of grants from 1st September 2021:

- **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 AArk seed or start-up grant projects 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 past recipients of AArk seed or start-up grants 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. Your Project Outline should be less than 200 words in length and should contain information under the following headings: Species, Organization, Project Manager, Goals, Proposed Outcomes and Other funding Sources (both requested and received). 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 or a similar, national assessment process.

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

- Workshops
- Educational exhibits
- Project overheard 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, 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.

Important dates

- **Project Outline deadline: 27 September 2021**
- Applicants notified about review of Project Outlines: 4 October 2021
- **Grant application deadline: 1 November 2021**
- Grant decision/notification date: 15 November 2021
- Successful applicants must provide bank account details, signed MOU and 3-4 photos of species and/or facilities by: 29 November 2021
- Grant payment date: 6 December 2021
- Initial progress report and species action plan provided by 1 June 2022
- Final progress report, species action plan and husbandry guidelines due 1 December 2022.

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

Field trip to collect founders for the Gigante wrinkled ground frog conservation program

Norman A Greenhawk, Principal Investigator, Project Palaka, Philippines

In spite of the Covid-19 pandemic continuing to disrupt conservation efforts around the world and here in the Philippines, we are happy to report that Project Palaka is finally up and running. From mid-July to mid-August of 2021, our field team - Jero Manulat, Jayson Madlao, and myself - traveled to Gigantes Sur to survey populations of Gigante wrinkled ground frog (*Platymantis insulates*), as well as to conduct habitat and threat assessments, and to organize for future educational outreach programs at local schools. We also met with Barangay officials from all four Barangays (local political units) of the Gigantes Islands.

Lastly, we laid groundwork for an even more intensive field work session in November 2021, when we intend to bring a team of nine people to thoroughly survey both Gigantes Sur and Gigantes Norte, in addition to as many of the smaller satellite islands as possible.

The Gigante wrinkled ground frog is a direct-developing frog that lives in karst caves and outcrops, as well as the surrounding forests. It is the only amphibian species in the Philippines that has been listed by the IUCN as Critically Endangered.

Project Palaka's team was able to survey seven caves. We also conducted several transect surveys of forest habitat. We chose one area, Pawikan Cave, as a long-term population monitoring site, and we collected canopy cover, vegetation, and environmental data.

One of the twenty-one Gigante wrinkled ground frog (*Platymantis insulates*) which were collected on the Gigantes Islands, to become founder animals for a conservation breeding program on the University of the Philippines campus. Photo: Norman Greenshank.

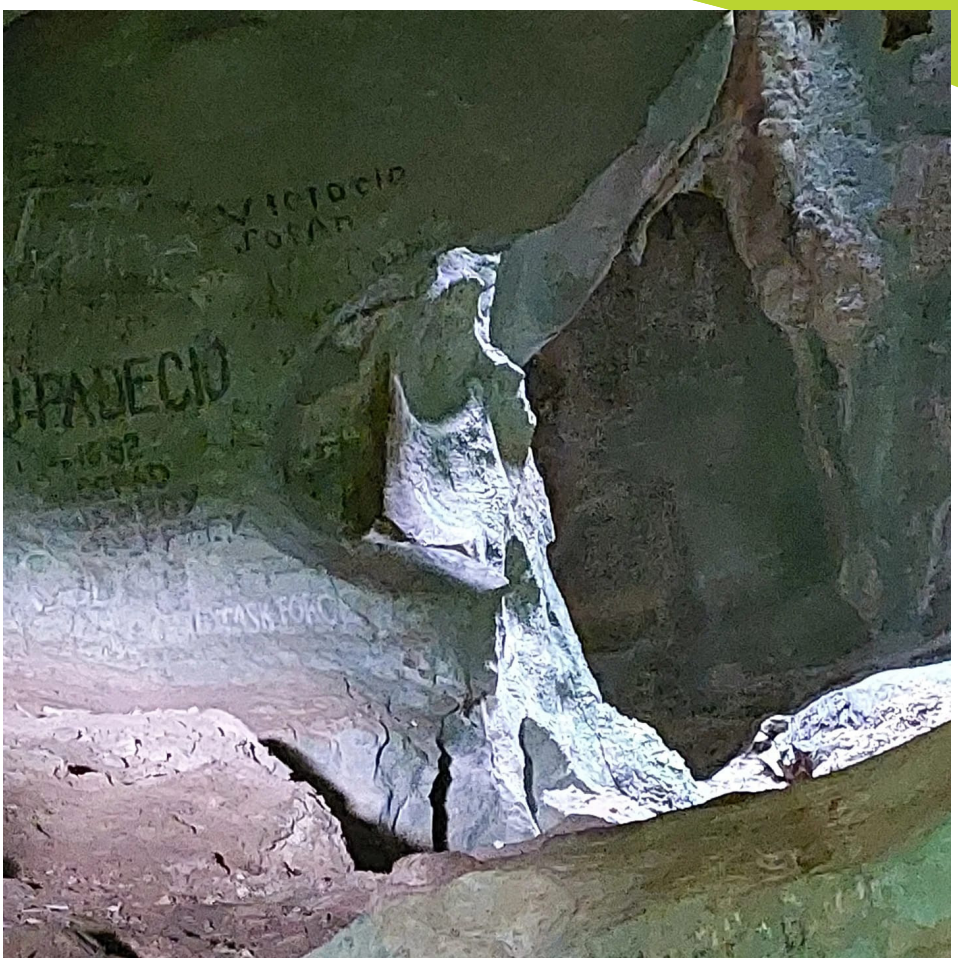
We observed several threats and potential threats to Gigante wrinkled ground frogs including:

- **Ongoing vandalism of several caves.** Vandalism and graffiti of the limestone caves are common, as it seems to be a long-standing tradition to mark your visit to the caves by painting or scratching on the cave wall. One piece of graffiti that we photographed was dated 1940! We even encountered a young couple scratching their names into the walls of Pawikan Cave while we were actively searching for frogs. Aside from aesthetic harm to the caves - something that is likely of little concern to the frogs - little is known about the impact that these activities have on the physical structure of the caves. Not all limestone is created equal - we observed that Gigante wrinkled ground frogs are more common in limestone features with crevices that allow for hiding, compared to limestone formations that are perfectly smooth. Physical and chemical (via the paint) alteration of the limestone may impact the natural erosion processes of the cave, though more research is needed.
- **Significant destruction of cave walls for treasure hunting, limestone mining, and guano collection.** Some of the more easily accessible caves are used as sources of limestone and guano, resulting in the alteration of the physical structure of the caves to a much larger extent than the vandalism. Additionally, there is a popular urban legend that encourages the destruction of the caves. According to the legend, during the end of WWII, when the Japanese Army realized that the American Army would be successful in wrestling control of the Philippines from the Imperial Army, they hid a significant amount of gold in the caves of Gigantes. This story is a lure both to tourists and locals hoping to find a fortune; we observed extensive excavations in some caves.
- **Ipil-Ipil monocultures.** *Leucaena leucocephala*, known locally as Ipil-Ipil, is a small, fast-growing tree native to Mexico, Belize, and Guatemala. It has been included on the list of 100 worst invasive species by the Invasive Species Specialist Group of the IUCN Species Survival Commission. Leaf litter of the species inhibits the germination of other plant species, resulting in monocultures. We spoke to several local community members who informed us that native forest is cleared for timber and charcoal needs, and then Ipil-Ipil is encouraged to grow, as it is a fast-growing source of high-quality charcoal. We did find Gigante wrinkled ground frogs in Ipil-Ipil monocultures, however, our preliminary observations suggest that frogs in the monocultures do not venture as far from the limestone as frogs in native forest.

- **Clear cutting and burning of forest.** As mentioned above, both native forests and Ipil-Ipil monocultures are cut for timber and charcoal production. We did not extensively survey the clear cut areas, but our team did not observe any frogs in those areas that we did search.
- **Solid waste management/litter.** Nearly every cave we surveyed contained some level of litter, left there by both locals and tourists. The island itself has a solid waste management problem, as a planned trash disposal center fell through, and there is no mechanism to remove trash from the island. We identified three major dumping areas, one of which is in close proximity to a pair of caves that contain Gigante wrinkled ground frogs. The impact on the species is currently unknown.

Prior to our return to University of the Philippines, Los Baños (UPLB) campus, our team held a community outreach meeting with Barangay officials, local Kagawads (community leaders), and school teachers. Our team explained why the Gigante wrinkled ground frog is in need of conservation efforts, the history of our project, and our short- and long-term field work plans.

Lastly, we collected twenty-one frogs and returned them to our captive-breeding facility on the University of the Philippines campus. We will collect additional frogs in November 2021.



Vandalism and graffiti of the limestone caves on the Gigantes Islands are common, as it seems to be a long-standing tradition to mark your visit to the caves by painting or scratching on the cave wall. Photo: Norman Greenshank.

Transporting the frogs back to the UPLB campus was a challenge. Each frog was packed individually in a small plastic “Critter Carrier” terrarium, along with a substrate of sterilized, moistened coco peat and a plastic cup to serve as a temporary shelter. These carriers were stacked two deep in Styrofoam coolers. All travel was done early in the morning, or in a vehicle that provided constant air-conditioning to prevent overheating. We had to hire a private boat to take us and the frogs from Gigantes Sur to the town of Estancia on Panay Island. From there, we travelled by van to Roxas City, and took an overnight ferry from Roxas City to Batangas. Once in Batangas, our team travelled directly to the UPLB campus to place the frogs within their individual quarantine tanks in the UPLB hortorium building. We estimate that the trip was 660km in total distance, over land and sea.

All twenty-one individuals were officially placed in captivity on August 15th. The quarantine setup is “bare-bones”, consisting of a plastic hide, foliage, a water dish, and a substrate of moist paper towel. All the frogs are active and eating regularly, and they are currently scheduled to be moved into their permanent tanks on September 17th.

Project Palaka is grateful to our in-country partner, the University of the Philippines Museum of Natural History, which has provided the facility for our captive breeding efforts. Our project is supported by the Amphibian Ark, the Asian Species Action Partnership, Wildlife Reserves Singapore, Synchronicity Earth, Stiftung Artenschutz, and National Geographic.

Atelopus Survival Initiative launch

In an unprecedented effort, more than forty organizations from thirteen countries come together to protect and restore harlequin toads, the jewels of South and Central America, hard hit by a deadly amphibian disease. With the first-ever action plan in place for harlequin toads, the Atelopus Survival Initiative (ASI, www.atelopus.org) is bringing together resources, decades of expertise and passion to save one of the world's most imperilled groups of amphibians.

With the formation of the ASI - a new alliance of more than forty organizations from thirteen countries - comes a new day for harlequin toads, a group of amphibians hardest hit by the deadly chytrid fungus *Batrachochytrium dendrobatidis* (*Bd*).

While amphibian researchers and conservationists have worked for many years to save harlequin toads (which make up the *Atelopus* genus) and groups of species in individual countries, the ASI is bringing them together for the first time to pool the resources, decades of experience and knowledge necessary to prevent the extinction of the entire genus of harlequin toads across the region where these species still survive.

"As an incredibly diverse group of amphibians facing a number of threats, harlequin toads require innovative solutions coming from a diverse group of individuals and organizations with different expertise, knowledge and capacities," said Lina Valencia, ASI founder, co-coordinator of the IUCN SSC Amphibian Specialist Group Atelopus Task Force and Andean countries coordinator for Re:wild, one of the primary ASI conveners. "More than ever before, we need a constellation of champions working together to bring harlequin toads back from the brink of extinction. The ASI underscores the vital need to implement on-the-ground conservation actions that will mitigate the main threats to this beautiful group of amphibians."

Over the past few decades, many harlequin toad species have suffered severe population declines and extinctions throughout their range. Today, of the ninety-four harlequin toad species that have been assessed by the IUCN, eighty-three percent are threatened with extinction, while about forty percent of *Atelopus* species have disappeared from their known homes and have not been seen since the early 2000s, despite great efforts to find them. Four harlequin toad species are already classified as Extinct, according to the IUCN Red List of Threatened Species, but this number is likely higher.

The fungus *Batrachochytrium dendrobatidis* (*Bd*) causes the lethal disease chytridiomycosis, which has resulted in amphibian declines all around the world, including in South and Central America, Australia and the western United States. Although *Bd* may likely be the primary driver of these declines, a number of other threats are exacerbating the precipitous drops in population numbers. This includes habit destruction and degradation (as the result of animal agriculture, logging, mining and infrastructure development), the introduction of invasive species such as the rainbow trout that prey on harlequin toad tadpoles, pollution, illegal collection for the pet trade, and the effects of climate change.

The ASI and its members, including governments, local communities and Indigenous peoples, will collaboratively address each of

Harlequin toads (*Atelopus* spp.) are the jewels of South and Central America's forests and creeks and a group of amphibians hardest hit by the deadly chytrid fungus *Batrachochytrium dendrobatidis* (*Bd*). Photo: Jaime Culebras / Photo Wildlife Tours.

A member of the Fundación Atelopus team swabs *Atelopus carrikeri* in Colombia to test for chytrid.
Photo: Jaime Culebras/Photo Wildlife Tours.

these threats - and new ones as they arise - across the genus's full range, taking into account the social, political and cultural realities of each of the eleven countries where harlequin toads are found.

"With their beautiful songs and unique lifestyles, amphibians are among the most extraordinary animals on Earth, and among them, harlequin toads stand out for their amazing colors," said Luis Fernando Marin da Fonte, coordinator of the ASI and director of partnerships and communications for the Amphibian Survival Alliance (ASA). "But these colorful and delicate jewels are becoming increasingly rarer. Harlequin toads must be protected not only because of their beauty and uniqueness, but also because of their intrinsic value and biological, ecological and even cultural importance."

The initiative's newly developed Harlequin Toad (*Atelopus*) Conservation Action Plan (HarleCAP,) provides the roadmap for conserving and restoring harlequin toads as a genus and their habitat. The action plan's goals, which ASI aims to achieve by 2041 (the 200th anniversary of the description of the genus *Atelopus*), include:

- developing and implementing innovative methods to mitigate chytrid's impacts on harlequin toad populations and better understanding why some species are less susceptible to the effects of chytrid;
- protecting and restoring harlequin toads' forests and watersheds;
- creating and maintaining conservation breeding programs;
- searching for species that are lost to science and filling in other gaps in scientific knowledge about harlequin toads;
- sharing stories that will transform harlequin toads into symbols of hope for the region and the world and a flagship for conservation success, and demonstrate a commitment to the conservation of harlequin toads;
- ensuring the *Atelopus* conservation network has the technical, logistical, and financial support to secure the long-term conservation of harlequin toads.

"The genus *Atelopus* is among the most threatened groups of amphibians in the world," said Ariadne Angulo, chair of the IUCN SSC Amphibian Specialist Group (ASG). "By rallying behind a conservation strategy with collective input from key stakeholders, the Atelopus Survival Initiative is taking an essential step towards the conservation of these diverse and highly emblematic toads and the habitats that they live in."

Harlequin toads are found from Costa Rica in the north to Bolivia

Atelopus palmatus in Ecuador.
Photo: Jaime Culebras/Photo Wildlife Tours.

in the south, and Ecuador in the west and French Guiana to the east. They are known as the jewels of South and Central America in part because of their beautiful and varied colors, which range from orange, green, yellow, brown, black, red, and sometimes even purple. They are celebrated in a number of Latin American cultures, including Indigenous cultures, and across entire countries, like in Panama, where the national animal is the Panamanian golden toad.

Like other amphibians, harlequin toads support healthy ecosystems. Their tadpoles depend on clean water and, because of this, the presence of harlequin toads indicates better quality water in an ecosystem, while their decline or absence is often the first sign of an ecosystem in trouble.

"Protecting and restoring harlequin toads and their habitats will also benefit the species that share the ecosystems in which they live and that provide water to tens of millions of people, and ultimately all life on Earth," Valencia said. "And we're hoping that the ASI will be a successful model that conservationists can emulate for other groups of threatened species."

The ASI includes national and international conservation groups, zoos, captive breeding centers, academic institutions, governments and local communities. Its current members represent the following organizations: Amphibian Ark, Amphibian Survival Alliance, Asociación Pro Fauna Silvestre - Ayacucho, Bioparque Municipal Vesty Pakos, Bolivian Amphibian Initiative, Centre National de la Recherche Scientifique, Centro de Conservación de Anfibios AMARU, Centro Jambatu de Investigación y Conservación de Anfibios/Fundación Jambatu, CORBIDI, DoTS, El Valle Amphibian Conservation Center Foundation, Facultad Latinoamericana de Ciencias Sociales, Florida International University, Fort Worth Zoo, Fundación Atelopus, Fundación Zoológica de Cali, Universidad del Tolima (GHEE), Grupo de Trabajo Atelopus Venezuela, Image Conservation, Instituto Nacional de Pesquisas da Amazônia, Instituto Venezolano de, Investigaciones Científicas, Ministerio del Ambiente de Perú, MUBI (Museo de Biodiversidad del Perú), Parque Explora, Parque Nacional Natural Puracé, Photo Wildlife Tours, Pontificia Universidad Católica del Ecuador, Pontificia Universidad Javeriana, Re:wild, San Diego State University, Smithsonian Tropical Research Institute, Trier University, Universidad de Antioquia, Universidad de Costa Rica, Universidad de los Andes, Universidad del Tolima, Universidad del Magdalena, Universidade Federal do Pará, Universidad Nacional, Universidad Interamericana de Panamá, Universidad Nacional de Colombia, Universidad San Francisco de Quito, Universidade Estadual de Campinas, Universidade Federal do Oeste do Pará, University of Nevada, Reno, University of Notre Dame, University of Pittsburgh, WCS (Wildlife Conservation Society), WCS Colombia, Zoológico Cuenca Bioparque Amaru.

AArk Husbandry Document library

The Husbandry Document library on the AArk web site (www.amphibianark.org/husbandry-documents) currently has over 275 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.

Five new documents have been added recently:

Workshop to Establish a Conservation Strategy for the Lake Junín frog (*Telmatobius macrostomus*) (Spanish)

For the purposes of assessing existing information, identifying gaps, and developing a Conservation Strategy for the Lake Junín Frog, the office of The Peruvian Service for Natural Protected Areas (SERNANP) in Junin, Peru, with the support of Peace Corps, the Conservation Program of Denver Zoo, Universidad Peruana Cayetano Heredia, and CBSG Mesoamerica organized a workshop on 28-30 of October, 2013. The meeting was held at the House of Culture of Junin and Rescue Center of Junín frog - Huayre, with a participation of 33 people from 26 different institutions and also attended by 32 observers representing 21 institutions in the region Junín - Pasco.

Authors: Medrano, R., Elías, R., Behmke, S., Herbert, M., Rodríguez, J.E. & Matamoros, Y. (eds.)
Publication: Conservation Breeding Specialist Group (SSC/IUCN/CBSG Mesoamerica), 2015
www.amphibianark.org/wp-content/uploads/2021/06/Estrategia-de-Conservacion-de-la-de-Rana-de-Junin.pdf

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Best Practice Guidelines for the Mountain Chicken *Leptodactylus fallax* (English)

The information in these Best Practice Guidelines have come from a variety of sources including an extensive literature review, the experience of the authors, and direct observations of *Leptodactylus fallax* in the field. Much of the non-husbandry related information was lifted directly from the Species Action Plan for *L. fallax* (Adams et al. 2014), to which a number of the authors also contributed. Captive breeding of *L. fallax* is essential for the long-term survival of the species, ensuring the viability and growth of the *ex situ* population. This *ex situ* population represents the potential founder stock for reintroductions and translocations of *L. fallax*, as well as a resource for research on the species. As such, these Best Practice Guidelines form a key component of the global conservation effort for *L. fallax* in maximising the effectiveness of the captive management of the species.

Authors: Tom Jameson, Benjamin Tapley, Alberto Barbón, Matthias Goetz, Luke Harding, Javier López, Katy Upton and Gerardo García
Publication: Edition 1, 2019
www.eaza.net/assets/Uploads/CCC/BPG-new-version/2019-Mountain-chicken-frog-EAZA-Best-Practice-Guidelines-NV.pdf

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EAZA Amphibian Taxon Advisory Group Best Practice Guidelines for (striped) fire salamander (*Salamandra salamandra* (*terrestris*)) (English)

EAZA Best Practice Guidelines (Striped) fire salamander, *Salamandra salamandra* (*terrestris*) is the first version of the EAZA Best Practice Guidelines for this species. This guideline has evolved out of the growing concern for extinction of local fire salamander populations due to the introduction of the invasive chytrid fungus *Batrachochytrium salamandrivorans* (*Bsal*) into Europe. Multiple populations of *Salamandra salamandra* (*terrestris*) have collapsed in north-western Europe. Upon the discovery of *Bsal*, and associated mass mortalities, a captive assurance colony was established in the Netherlands at GAIA Zoo and later also in Rotterdam Zoo. A studbook is managed in ZIMS by GAIA Zoo. In the face of continuous spreading of *Bsal* into new areas within Belgium and Germany, both countries aim to develop similar *ex situ* programs. To ensure collaboration, shared goals and to effectively share knowledge and resources, the multidisciplinary 'Ex situ Salamandra Group' (ESG) was initiated by scientists, NGOs and zoos from the three bordering *Bsal* affected countries. Close collaboration and mutual commitment between all partners involved is the strength of this group.

Editors: Sergé Bogaerts, Stefan Lötters, Annemarieke Spitzen-van der Sluijs, Kathleen Preiβler, Barbara Caspers, Pia Oswald, Christopher Michaels, Tjerk ter Meulen, Timm Reinhardt, An Martel and Frank Pasmans
Publication: 1st edition, July 2021
www.eaza.net/assets/Uploads/CCC/BPG-2021/2021-Fire-Salamander-EAZA-Best-Practice-Guidelines-Approved.pdf

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EAZA Amphibian Taxon Advisory Group Best Practice Guidelines for typhlonectid caecilians (English)

The information in this Best Practice Guideline has come from a variety of sources including a literature review, the experience of the authors and others in the captive husbandry of typhlonectid caecilians; a caecilian husbandry questionnaire that involved both zoological collections, aquariums and keepers from the private sector as well as direct observations of the species in the field. Amphibian husbandry is a rapidly evolving field and there are many aspects that require further research. The exact breeding triggers for typhlonectid caecilians are unknown and further research would be beneficial. Typhlonectid caecilians have also tested positive for *Batrachochytrium dendrobatidis* (*Bd*), the causative agent of the disease chytridiomycosis. Treatment of *Bd* infections in caecilians has had mixed success. Further research into the epidemiology of the disease in caecilians as well as treatment protocols also require further research.

Authors: Benjamin Tapley, David J. Gower, Christopher J. Michaels, Alberto Barbon, Matt Goetz, Javier Lopez, Adam Bland, Gerardo Garcia, Nathanial A. Nelson and Mark Wilkinson
Publication: Version 1, 2019
www.eaza.net/assets/Uploads/CCC/BPG-2019/2019-Typhlonectid-caecilians-EAZA-Best-Practice-Guidelines-Approved.pdf

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Harlequin Toad (*Atelopus*) Conservation Action Plan 2021 – 2041 (English)

With almost 100 species ranging across the Neotropics, from Costa Rica to Bolivia and east to French Guiana, harlequin toads (*Atelopus* spp.) are among the most threatened amphibians in the world. According to the IUCN Red List of Threatened Species, up to 90% of *Atelopus* species are threatened with extinction, with 40% of species thought to be possibly extinct in the wild and four species considered to be extinct. Over the past few decades, many *Atelopus* species have suffered severe population declines and extinctions throughout their range. The

most likely primary threat driving harlequin toad declines is the lethal disease chytridiomycosis, caused by the amphibian chytrid fungus, *Batrachochytrium dendrobatidis*. Disease-induced declines may be further exacerbated by anthropogenic threats such as habitat loss and degradation, the effects of climate change, and the inherent risks of having very small distributions. As of 2021, approximately 40% of *Atelopus* species have disappeared from their known localities and have not been seen since the early 2000s despite efforts to find them. However, recent rediscoveries of *Atelopus* species in the wild, species that were previously thought to be lost, give us hope that there is still time to bring harlequin toads back from the brink of extinction. This Action Plan stems from the concern expressed by stakeholders regarding the lack of coordination and poor communication to effectively develop collaborative participatory conservation efforts to bring *Atelopus* species back from the brink of extinction.

Authors: Lina M. Valencia and Luis F. Marin da Fonte.
Publication: Atelopus Survival Initiative, 2021
https://9a897f62-d7fd-4507-9900-81a1f5d50d28.filesusr.com/ugd/9db650_b66c5cadef314586b70f1baaf5752fe7.pdf

Bsal MOOC

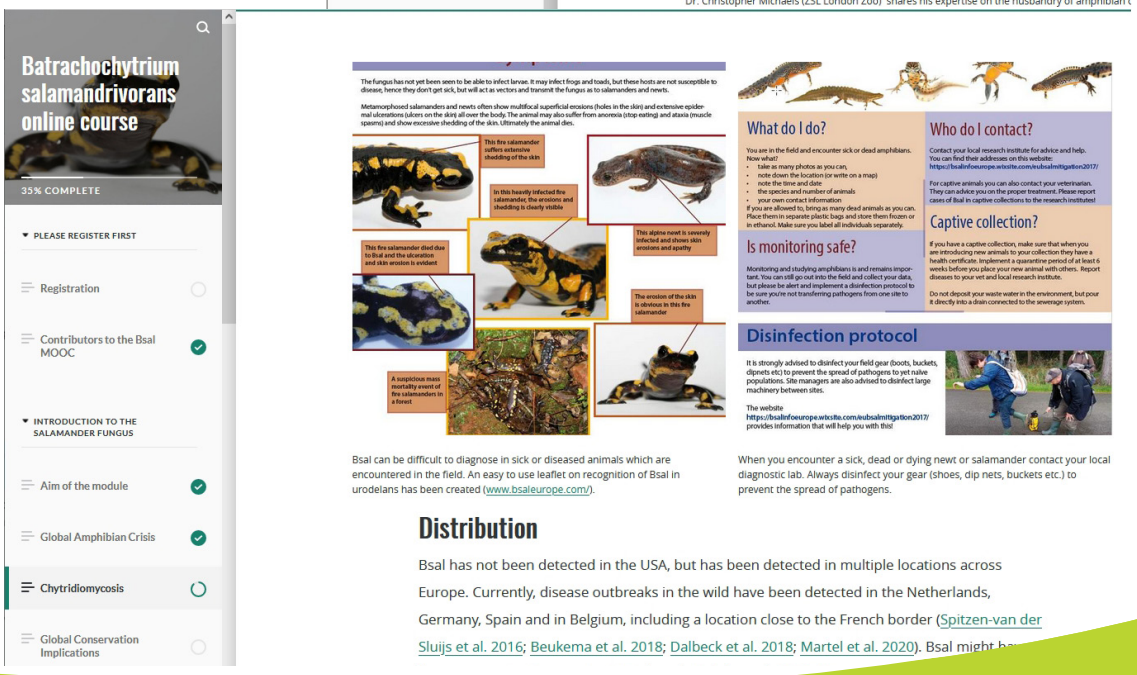
The European Association of Zoos and Aquaria (EAZA) proudly announces the launch of the Massive Open Online Course (MOOC) focused on *Batrachochytrium salamandrivorans* (*Bsal*).

This e-course, divided in four modules, allows participants to learn at their own pace about the epidemiology of the fungus, the veterinary aspects, prevention, as well as the *in situ* and *ex situ* conservation challenges:

1. *Bsal*: its origin, distribution, risk for biodiversity and mitigation actions
2. Veterinary measures: how to recognize *Bsal* in the lab and in the field and how to treat and prevent it
3. *Ex situ* conservation: when and how to initiate *ex situ* conservation, information on husbandry guidelines is provided and on chytrid conservation projects
4. Call to Action: How to make conservation management decisions with uncertainties, and which research questions can and should be addressed urgently?

If interested, please register at https://loom.ly/9oSCHBo and do not hesitate to contact bsal@eaza.net for any questions about the MOOC.

A grant to aid development of the MOOC was gratefully received from the Morris Animal Foundation.



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