

Bridging the Gap to Further Reptile and Amphibian Conservation



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INTRODUCTION:

The science of animal husbandry is constantly evolving as new methods, research and observation are being discovered and documented. These revelations often lead to improved husbandry practices and further research and interest. Although animal keepers are the front line of animal care and in unique positions to observe animal behavior, they are sometimes under-utilized when animal conservation and research programs are designed and implemented. The Department of Herpetology at the Smithsonian's National Zoological Park is excited about bridging the gap between animal husbandry, conservation, and research. Forging relationships, both within the Smithsonian and with organizations outside the Smithsonian, the Department of Herpetology is collaborating to further reptile and amphibian conservation. These mutually beneficial relationships facilitate animal husbandry, fieldwork, research, and networking opportunities that can prove invaluable to those involved.

COLLABORATIONS WITH CONSERVATION ORGANIZATIONS:

Over the past two years the Department of Herpetology has participated in several field-related projects. The Orianne Society is a wildlife conservation organization working to save the threatened eastern indigo snake, *Drymarchon couperi*. RDC initiated a mutually beneficial relationship with this conservation organization in 2010. NZP supports keeper staff from all departments within the Zoo to assist field biologists with their surveys of eastern indigo snake habitat in Georgia. This is an excellent opportunity for keepers to help capture, pit-tag, weigh, measure, and collect DNA samples from wild snakes. The information learned in Georgia aided RDC staff with designing the exhibit and implementing husbandry protocols for this species at the zoo.

The Smithsonian National Zoological Park also partners with several other institutions forming the Panama Amphibian rescue and Conservation Project (PARC). This initiative's mission is to rescue and establish assurance colonies of amphibian species that are in extreme danger of extinction throughout Panama. Additionally, this project focuses efforts and expertise on developing methodologies to reduce the impact of the amphibian *chytridiomycosis* (Bd) so that one day captive amphibians may be reintroduced to the wild. RDC staff travel to Panama and assist with facility set up, frog collection, and staff training.

Additionally, the Smithsonian has a unique relationship with George Mason University, having formed the Smithsonian-Mason School of Conservation in 2011. This facility, housed at the Smithsonian Conservation Biology Institute arm of the Zoo in Front Royal, VA connects professors and students with zoo staff creating an excellent opportunity for networking and collaborating. Dr. Thomas Akre, an adjunct professor from Longwood University, has been studying wood turtles, *Glyptemys insculpta*, in Virginia. His research site is approximately 45 minutes from the zoo, making this collaboration inexpensive and easy to facilitate. Reptile keeper staff travel out to Dr. Akre's field sites and assist with radio tracking and processing nesting wood turtles in the spring. RDC staff also occasionally assist with class instruction at the Front Royal campus and host students for behind-the-scene tours of the Reptile Discovery Center.

COLLABORATIONS WITH SCIENTISTS:

The Reptile Discovery Center collaborates with several amphibian scientists including Smithsonian Postdoctoral fellow Anna Savage, who is conducting research on lowland leopard frogs, *Lithobates yavapaiensis*, and the immunological



Reptile Keeper Barbara Watkins working with the Orianne Society. She is pictured here using a burrow camera to look deep inside a gopher tortoise burrow in Georgia.

and genetic correlates of *chytridiomycosis* susceptibility. Her experimental design uses a combination of field and laboratory approaches and her ultimate goal is to understand genomic adaptation to disease and identify resistance genes to mitigate the impacts of this deadly pandemic. RDC staff accompanied Dr. Savage into the field to collect lowland leopard frog eggs in Arizona. The eggs were shipped back to Washington, D.C., where staff hatched and reared the tadpoles. Once metamorphosed, the frogs were moved to a quarantine facility where Dr. Savage could conduct her research. In this partnership RDC staff assisted with animal husbandry and in return learned about Dr. Savage's experimental design and field techniques.

RDC's exciting new Appalachian Salamander lab hosts David H. Smith Conservation Research Fellow Dr. Kimberly Terrell who studies the effects of climate change on the Eastern hellbender, *Cryptobranchus alleganiensis*. Her research assesses the physiological impacts of projected climate change on hellbenders and utilizes an *ex situ* research population of hellbenders housed in RDC's salamander lab. Hellbenders are maintained in extremely specific environmental parameters, and Dr. Terrell's research animals are meticulously cared for by RDC staff. In return, RDC staff accompanies Dr. Terrell in the field and learns her research techniques.

PhD student Gina DellaTogna is currently working on cryopreservation in Panamanian Golden frogs, *Atelopus zeteki*. Her research involves isolating and freezing Panamanian Golden Frog sperm. The animals are maintained in a temperature and humidity-controlled room within RDC. Panamanian Golden Frogs are a species RDC works intensively with, also housing an assurance population in an adjacent room. RDC staff members are responsible for the husbandry of these frogs and also assist Dr. DellaTogna with frog handling when needed. In return RDC staff gain experience handling frogs for injections and can observe Dr. DellaTogna's research.

LOCAL RELATIONSHIPS

In addition to the collaborations outlined above, Herpetology staff also work closely with several local organizations. Staff have surveyed and collected salamanders in the Shenandoah National Park with United States Geological Survey, hosted Virginia Herpetological Society meetings at RDC and presented at the venomous snake workshops hosted by Catcotin Zoological Park and Preserve. In making these connections staff can expand on their experiences, meeting new colleagues and creating opportunities for future scientific collaborations. The last and most easily attainable

partnership for RDC staff is participation in Herp Happy Hour. Once a month all the herpetologists in the DC area get together for drinks to discuss projects and potential collaborations.

HOW TO FORM THESE PARTNERSHIPS

All of these collaborations are relationships that had to be initiated through staff connections and nurtured along the way to ensure mutual cooperation and benefit. These relationships are formed through veteran staff connections, following up with peers from conferences and other networking opportunities as well as reaching out to local organizations and universities. The benefits of veteran staff members are numerous and in this capacity irreplaceable. The herpetological community, especially in North American zoos, is a small familiar group. Any keeper who has worked in zoo herpetology for a decade or more knows many animal professionals from other facilities. These connections are vital to making collaborations work. RDC Curator, Jim Murphy, has been working in zoo herpetology for over 50 years. His connections and friends are greatly responsible for many of RDC's collaborations.

Conferences are an amazing resource for all keepers. Not only are they great learning experiences, but they are also a great place to meet other animal professionals. Animal keepers must take these introductions seriously, being sure to get people's contact information and follow up with peers - collaboration could always be possible in the future. As an example, recently RDC staff attended the venomous snake workshop where an employee of Herpetological Associates, a reptile and amphibian survey group, was also presenting. RDC staff became interested in Herpetological Associate's work and their staffer and our curator began discussing a working relationship. As a result Herpetological Associates has agreed to take keepers into the field this summer to survey the New Jersey Pine Barrens.

An important way that zoo units can create mutually beneficial partnerships is to make the department useful. Offer assistance by providing a benefit to the collaborator. For example, when working with scientists, RDC staff offer their animal expertise to assist with captive research animals. This helps ensure greater control when conducting experiments - a very desirable trait when participating in research.

CHALLENGES

There were several challenges to overcome when RDC began forming all of these relationships. The major challenges to consider are staffing when keepers are in the field, increased work load when taking in additional animals for research and communication amongst staff and researchers. When forming a field-based partnership it is imperative to maintain the appropriate staffing within the zoo while still offering opportunities in field research. It is often difficult to coordinate staff vacations with conference dates and field surveys that are time sensitive. At RDC a year-at-a-glance calendar is used to help staff foresee potential short-staffed days and avoid overlapping vacations with field work opportunities.

Partnering with researchers generally means increasing the size of the collection. When considering taking on a research project it is important to analyze the potential workload. Often at RDC we can compensate for extra work with internship positions. These can either be interns assigned to a project that work under the researcher and a designated keeper, or be a general Keeper's Aid or volunteer. Additionally, animals brought into the collection for research purposes generally must follow the same collection



Making space in the Reptile Discovery Center to host an amphibian research project

management guidelines as other animals in the collection and researchers must be made aware of these practices.

Communication is a vital part of any relationship and can make or break a partnership. When working with scientists, RDC staff has to communicate daily about the care and status of the research animals. Additionally, if the researcher wants to make changes to the animals' husbandry, this must be communicated and approved by animal staff. It is extremely important that everyone is clear on their role in this research and that mutual respect is given. At RDC a keeper is always designated for each research project to be the point person. This helps clarify who will be absorbing most of the husbandry work as well as communicating with the researcher.

CONCLUSION

The benefits to RDC staff from these partnerships are innumerable. First, stepping out of the zoo setting and experiencing animals in the wild is an educational experience that rekindles an animal keeper's excitement and love of wildlife. Secondly, getting to partake in scientific research is a valuable experience that sharpens one's observational and record keeping skills. Additionally, RDC staff members are co-authors on any publication resulting from collaborations with scientists which is a good learning experience, as well as an opportunity to build their resumes. Additionally, through motivating staff to initiate their own research projects within the zoo, these experiences can help further the department's connection and commitment to conservation. Animal professionals are in a unique position, working very closely with a large number of specimens, and this position should not be taken lightly. We owe it to these animals to utilize their lives in captivity to the fullest extent and learning how to properly conduct research is an important step.

These opportunities and experiences help RDC staff better connect zoo visitors to wildlife conservation. Four of our collaborations are easily viewed within RDC (lowland leopard frogs, Panamanian frogs, hellbender lab, and eastern indigo snakes), and through these exhibits we are conveying this overall picture of conservation to them daily. The Appalachian salamander lab displays hellbender science, field work and husbandry. The Panamanian frog rescue exhibit displays species from Panama, as well as graphics on the Smithsonian's work *in situ*. Staff also utilize the Zoo's website, volunteer meetings, and the internal volunteer publications to write blogs, give talks, and publish articles about the field work and science going on in RDC. We have a strong group of volunteers that interpret our exhibitions to our public. Keeping them up to date on our collaborations helps them convey our message to the visitors and paint a picture of the multifaceted approach we are taking to conserve reptiles and amphibians. 🐸



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