



# Life in the Rocks



*The Newsletter of the Arkansas Game and Fish Commission Nongame Aquatics Program*

## The Fight to Save the World's Amphibians Continues

*By Kelly Irwin, Herpetologist*



*Dr. Atsushi Tominaga meets his first Alligator Snapping Turtle at AGFC's Joe Hogan State Fish Hatchery in Lonoke.*

Amphibian populations around the world are under attack due to a variety of reasons (contaminants, habitat loss, etc.) but, in particular, a disease chytridiomycosis caused by the chytrid fungus *Batrachochytrium dendrobatidis*, referred to as Bd, has been directly linked to worldwide amphibian extinctions and severe population declines. The presence and threat posed by Bd, and other emerging amphibian infectious diseases, to both local and global amphibian populations

has become increasingly well documented over the past decade. Bd has been previously reported in Arkansas amphibians [see Irwin, K. 2004. Amphibians: are they here to stay? Global and local perspectives. *Life in the Rocks*, October – December 2004, Vol. 7.04, pp. 4-6]. My ongoing collaboration with the Missouri Department of Conservation's herpetologist to conserve the regionally endemic aquatic salamander, the Ozark Hellbender (*Cryptobranchus alleganiensis*

bishopi), has produced research showing the presence of Bd in Arkansas and Missouri hellbender populations [see Briggler, J. T, K. A. Larson, and K. J. Irwin. 2008. Presence of the amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) on hellbenders (*Cryptobranchus alleganiensis*) in the Ozark Highlands. *Amphibian Chytridiomycosis Geographic Distribution, Herpetological Review*, 39(4):443–444.] I continued to collect skin swab samples during the biennial population monitoring survey in 2009 for further testing of the presence of Bd in Arkansas hellbenders.

Research on various aspects of this amphibian disease is being conducted by workers on all continents and, in early November 2008, I received an email from Dr. Atsushi Tominaga, of the National Institute of Environmental Studies, located in Tsukuba, Japan. I was referred to Dr. Tominaga by my friend, and fellow giant salamander researcher, Dr. Sumio Okada, whom I have previously hosted here in Arkansas. Dr. Okada has been conducting ecological research on the Japanese Giant Salamander (*Andrias japonicus*) for the past seven years. The Japanese Giant and Chinese Giant (*A. davidianus*) salamanders are the only living relatives of the hellbender, family *Cryptobranchidae*. Dr. Tominaga contacted me to see if I would be willing to host and assist him in collecting samples for his research investigating the distribution and genetic variation of Bd. Previous studies by Dr. Tominaga and his colleagues revealed that Bd detected in Japanese amphibian populations has high genetic variation, some of which are endemic genotypes. Based on their observations of an absence of fungal infections in native Japanese amphibian populations, they wanted to test the hypothesis that “Bd originated in Asia.” In order to do this, Dr. Tominaga needed to determine the genetic divergence of Bd in other countries. His

research subjects in Japan were the Japanese Giant Salamander and populations of the introduced American Bullfrog (*Lithobates catesbeianus*), so he needed samples from our native hellbender and bullfrog populations to compare with the Bd genotypes present in his samples from Japan. Dr. Tominaga also asked if I could assist him by facilitating contact with a hellbender researcher in the eastern U.S., so he could obtain samples from the Eastern Hellbender (*C. a. alleganiensis*). I succeeded in putting him in touch with a professor working in the Appalachian Mountains of southeastern Tennessee.

Due to a late arrival of his flight into San Francisco, Dr. Tominaga missed his scheduled flight to Arkansas on Saturday evening. Thanks to the airlines, he did not arrive until 11:00 p.m. Sunday evening, August 2. We left the Little Rock Airport around 11:45 p.m., and arrived in Pocahontas about 2:00 a.m. After a few hours of sleep we began our busy week of field work, with two days of diving (assisted by AGFC Malacologist, Bill Posey) on the Eleven Point River, in Randolph County, to collect samples from hellbenders. We then headed south for a daytime tour, so that Atsushi could see his first wild American Alligator, and a late evening of collecting bullfrogs on Grassy Lake, in Hempstead County. We finished our field work on Thursday evening, collecting bullfrogs, with the assistance of hatchery manager, Jason Miller, at the AGFC State Fish Hatchery, in Lonoke.

On a side note, this was the first time Dr. Tominaga had visited the U.S., and we were able to introduce him to some classic American foods: southern style BBQ ribs with all the side dishes, Mexican food, and USDA certified sirloin steak on the grill. We all had a good laugh when we teased him about being a classic Japanese tourist, because he photographed the food—whether in a restaurant, or at our home.

A total of 41 samples were collected from six species of frogs and Ozark Hellbenders. Of the 41 samples, only two tested positive for Bd, and those were from Ozark Hellbenders. Dr. Tominaga later identified the genotype of the Bd from the Arkansas samples as one that has been found on other continents, and hypothesized that it is not native, but an invasive form to North America. Research such as this is critical to answer questions about the origin and nature of this insidious and deadly disease. It also has the potential to provide information that could be applied toward managing, or treating, Bd in our native amphibians. If academic and natural resource managers do not work collaboratively on both a national and international scale, to address this problem, we could lose many of our native

amphibian species. Amphibians are important elements within the world's ecosystems, and they add richness to our lives as colorful and interesting components of our local and global biodiversity. In the end, if our amphibians go extinct, it would not only be an intrinsic loss of biota, but an aesthetic loss, as well. A warm spring evening without the song of chorusing frogs in the distance is not something I want to leave as a legacy for future generations.

Acknowledgements – I would like to thank my AGFC colleagues, Bill Posey and Jason Miller, for their invaluable assistance in the field. A special “thanks” to Bucky and Diane Sharpe for their gracious hospitality and providing access for collecting.



*Bullfrogs sometime have genetic mutations that cause a lack of pigment in their skin. In this case, a lack of yellow results in a nice blue color. Bullfrogs have also been found without any pigment, resulting in albinos with pink eyes, and totally yellow frogs lacking in blue pigment.*

## Pebbles...

(Quick notes on what we've been up to...)

- Bill, Kelly, and Brian attended a staff meeting at the Crooked Creek Conservation Education Center.
- Christopher Nettles is the newest addition to the Nongame Aquatics crew, having started in July as an extra-labor technician working primarily with Brian. Christopher comes here from Indiana, where he earned a Bachelor's Degree from Purdue University.
- Brian attended a USFWS project leaders workshop, where he learned more about the federal grant processes and their administration.
- Kelly gave a presentation on the herpetological program and vertebrate paleontology to the Hot Springs Gem, Mineral, and Fossil Club.
- Brian and Bill helped aid AGFC Enforcement Division personnel with revisions to the AGFC Code of Regulations.
- Two interns from Hendrix College worked this summer on computerizing data reported to AGFC by scientific collectors. They made a small dent in the files, and Christopher continues working on this mass of data in his spare time.
- Brian is working with Mark Oliver, Steve Filipek, Darrell Bowman, Chris Racey, and others on plans to host the American Fisheries Society 2013 meeting in Little Rock.
- Kelly worked with the AGFC "Watchable Wildlife" coordinator, Kirsten Bartlow, to prepare (collection of live animals) and present an "Underwater Arkansas" program at Lake Ouachita.
- Brian and Christopher worked with AGFC biologist, Stan Todd, and National Park Service personnel to begin crayfish sampling in the Buffalo River basin.
- Kelly spent 20 days conducting field work, during August and the first week of September, primarily working on the biennial Ozark Hellbender monitoring program.
- Kelly and his wife, Lisa, participated in the co-sponsored AGFC Stream Team *Ouachita River Clean-Up* at the Grigsby Ford access, near Malvern
- Brian is working with a small team of AGFC Fisheries and GIS Division personnel on an online fishing & outdoor recreation mapping website.

## *Pebbles (cont.) . . .*

- Kelly gave a presentation on regional amphibians and reptiles as part of the Crooked Creek Ecosystem Teachers Workshop. Brian gave a crayfish presentation and assisted with fish sampling presentations at the same workshop.
- Christopher attended defensive driving training.
- Brian continues work on the Arkansas Aquatic Nuisance Species Management Plan.
- Kelly acted as guide and boat driver while the USFWS endangered species biologist, Chris Davidson, mapped problem areas, such as eroding streambanks on 20 miles of the Eleven Point River, in Randolph County.
- Brian attended a meeting of a team working on AGFC's stream sampling protocol.
- Brian and Christopher helped AGFC assistant chief, Steve Filipek, with preparation for fish habitat surveys on the South Fork Little Red River in AGFC's Gulf Mountain Wildlife Management Area. These surveys will provide a baseline for assessing impacts from gas drilling in the area.
- Brian represented Arkansas at a meeting of the Mississippi River Basin Panel on Aquatic Nuisance Species assistance in Pittsburg, Pennsylvania.





*An underwater portrait of an adult Ozark Hellbender, one of many amphibians discussed in feature article.*

---

---



Arkansas Game & Fish Commission  
Nongame Aquatics Program  
915 E. Sevier Street  
Benton, AR 72015