



# **9<sup>TH</sup> HELLBENDER SYMPOSIUM**

**JUNE 17 – 20, 2019**

**BLACKSBURG, VIRGINIA**

THANK YOU TO OUR EVENT SPONSORS!



FRALIN LIFE SCIENCES INSTITUTE  
VIRGINIA TECH.

GLOBAL CHANGE CENTER  
AT VIRGINIA TECH



DEPARTMENT OF  
**GAME & INLAND  
FISHERIES**  
CONSERVE. CONNECT. PROTECT.



9<sup>th</sup> Hellbender Symposium logo art created by Mark Mandica,  
Founder, Executive Director of The Amphibian Foundation, Atlanta GA

## SPONSOR SPOTLIGHTS

### Hellbender Brewing Company

Hellbender Brewing Company has been fermenting craft beer in Washington, DC since 2014. These guys were the first brewery on the east coast to incorporate a mash filter in to their brewing system. The mash filter increases efficiency by allowing them to brew faster while using 30% less water and 15% less grain each batch to achieve the same results as a traditional brewhouse – very cool!

Ben Evans, head brewer and CEO of Hellbender Brewing Company, comes from a career in microbiology and neuroscience research. He's been fascinated by hellbenders since youth and felt that promoting awareness for the species through their business name aligned perfectly with his ambition to incorporate sustainable and environmentally conscious techniques in the brewing process. Big thanks to Hellbender Brewing Company for sponsoring the canned beer selection served at Tuesday evening's poster session and social during the symposium!

<https://www.hellbenderbeer.com>



### Independent Distilling Company

Independent Distilling Company was established in 2014 to produce small-batch handcrafted spirits that focus on local and quality ingredients in Georgia. Using a 100-gallon Copper Pot Still and a passion for spirits, co-founder Michael Anderson has honed his craft over the past years making traditional southern soulful spirits. The first product released was Hellbender Corn Whiskey made from locally sourced corn from Riverview Farms in Ranger, GA.

Much gratitude to the IDC crew for providing their Hellbender Corn Whiskey and Hellbender Bourbon Whiskey for a tasting offered at Tuesday evening's poster session and social!

<http://www.independentdistilling.com>



## Mark Mandica, The Amphibian Foundation

Mark Mandica is the co-founder and executive director of The Amphibian Foundation – an Atlanta-based nonprofit that leads one-of-a-kind conservation programs to address threats to amphibians and their habitat in the southeastern United States and across the globe.

Mark is a life-long amphibian conservationist and leads novel conservation strategies focused on endangered species. He is also a biologist, scientific illustrator, musician, and most importantly, a father and a husband. Thank you to Mark for once again honoring the Hellbender Symposium by creating an awesome illustration for this 9<sup>th</sup> biennial event!

<https://www.amphibianfoundation.org/>



**amphibian**foundation

## Oskar Blues Brewery

In Fall 2018, The Pisgah Conservancy in North Carolina teamed up with Oskar Blues Brewery to craft a limited-release batch of Hellbender Helles. Sales from the special brew and feature events have benefited conservation initiatives of The Pisgah Conservancy that improve watershed habitat and outreach efforts for the hellbender.

Oskar Blues generously sponsored a portion of the 9<sup>th</sup> Hellbender Symposium branded steel pint cups that we hope will help us keep waste to a minimum at this event and for your future use – we appreciate their support and environmental stewardship!

<https://www.oskarblues.com>



## KEYNOTE SPEAKER

### Dr. Thomas K. Pauley

**Professor Emeritus of Biological Sciences, Marshall University**

Dr. Thomas Pauley has been studying amphibians and reptiles in the Central Appalachians since 1966, with a focus on salamander ecology in the West Virginia subalpine forest for over forty years. His major research species in these high elevations is the Cheat Mountain Salamander (*Plethodon nettingi*). Research highlights from his work with the Cheat Mountain Salamander include a study for the U.S. Forest Service on its range and distribution, a 31-year study of the effects of a ski slope on a population, a study on a transplanted population, numerous surveys for timber harvests and various types of rights-of-way, and several studies for the WVDNR, USFS, and USFWS.

Other studies have included the effects of diflubenzuron on forest terrestrial and stream salamanders, effects of Gypcheck and Bt on forest terrestrial and stream salamanders, effects of acid deposition on forest terrestrial and stream salamanders, potential effects of ultraviolet radiation on pond-dwelling amphibians, use of artificial road-rut pools by amphibians, and amphibian and reptile inventories in National Parks — New River Gorge National River, Bluestone Scenic River, Gauley National Recreational River, Harpers Ferry National Historic Park, and Capitol Region Parks.

In 1987, Dr. Pauley co-authored a book entitled “Amphibians and Reptiles in West Virginia”, published by the University of Pittsburgh Press. This is the only book published on amphibians and reptiles in the state. He is currently working on the second edition of this book and a companion volume entitled “An Atlas of Amphibians and Reptiles in West Virginia”. Additionally, he is working on a book about his experiences with amphibians and reptiles in the Central Appalachians, anticipated for publication in 2020.

Dr. Pauley was a professor of biology at Marshall University from 1987 to 2013, preceded by 21 years of college teaching at Salem College in West Virginia and the University of Pittsburgh at Bradford, PA. While at Marshall University, he was the major professor of over 90 graduate students whose research dealt with amphibians and reptiles of West Virginia, Pennsylvania, and Ohio. Dr. Pauley currently serves on several graduate student committees at Marshall University and West Virginia University.



# AGENDA & PRESENTATIONS

## JUNE 17 – JUNE 20, 2019

### Monday, June 17

<b>3:00 – 5:00 p.m. Registration &amp; Check-In</b>		Hyatt Place Hotel
5:00 – 5:45	Social/mixer Live music by Chloé and Stewart Scales	Holtzman Center Terrace
5:45 – 6:00	Opening remarks	Holtzman Center General Assembly Hall
<b>6:00 – 7:00</b>	<b>Keynote Address: Fifty-two years searching hollows, ridges, and rivers in West Virginia</b> Dr. Thomas Pauley, Professor Emeritus of Biological Sciences, Marshall University	
7:00 – 9:30	Dinner & Keynote Reception Live music by New Standard Bluegrass	Holtzman Center Terrace

### Tuesday, June 18

6:30 – 9:00 a.m.	Complimentary breakfast for hotel guests	Hyatt Place Hotel
9:00 – 9:10	Welcome & Logistics	Hyatt Place Meeting Room
<b>9:10 a.m. – 12:00 p.m. SESSION I: SURVEYS, MOVEMENT, AND STATUS ASSESSMENTS</b>		
<i>Moderator: Paul Hime, University of Kansas</i>		
9:10 – 9:30	<b>The Bumpy Road to Recovery of the Eastern Hellbender in Ohio</b> Gregory Lipps, Ohio State University	
9:30 – 9:50	<b>Ongoing Restoration of an Eastern Hellbender Population in the Upper Susquehanna River Watershed</b> Michelle Herman ( <b>Grad</b> ), State University of New York	
9:50 – 10:10	<b>Spatial ecology of Hellbender Salamanders prior to translocation</b> Bradley Nissen ( <b>Grad</b> ), Tennessee State University	
10:10 – 10:30	<b>Behavioral analysis of electroshocked post-metamorphic juvenile <i>Cryptobranchus alleganiensis bishopi</i> and subadult <i>Cryptobranchus alleganiensis alleganiensis</i></b> Stephanie Morrison ( <b>Grad</b> ), Missouri State University	
<b>10:30 – 10:50</b>	<b>Break</b>	

*Moderator: William Hopkins, Virginia Tech*

10:50 – 11:20 **A Species Status Assessment and 12-month petition finding for the Eastern Hellbender (*Cryptobranchus a. alleganiensis*)**

Jeromy Applegate, US Fish & Wildlife Service

11:20 – 12:00 Discussion: Species Status Assessment

**12:00 – 1:20 Break for Lunch (on own)**

**1:20 – 2:40 p.m. SESSION II: JAPANESE GIANT SALAMANDER; PUBLIC ENGAGEMENT**

*Moderator: Mizuki Takahashi, Bucknell University*

1:20 – 1:40 **Long term comparison in the estimated population and the structure of Japanese giant salamander in Matsuzai stream, Kita-Hiroshima-Cho, Hiroshima, Japan**

Yuki Taguchi, Asa Zoo, Hiroshima, Japan

1:40 – 2:00 **Effectiveness of the giant salamander bypass slopes at small dams in a small tributary stream, Tottori Prefecture, western Honshu, Japan**

Sumio Okada, Hanzaki Research Institute of Japan

2:00 – 2:20 **Engaging North Carolina's Trout Anglers and Other Stakeholders to Help Conserve Eastern Hellbenders**

Lori Williams, NC Wildlife Resources Commission

2:20 – 2:40 **Positive Perceptions About an Enigmatic Animal Follows the Conservation Biology Era: Content Analysis from 153 Years of Print and Online Media**

Shem Unger, Wingate University

**2:40 – 3:00 Break**

*Moderator: Rod Williams, Purdue University*

**3:00 – 5:00 EXHIBITION SESSION: Education & Outreach Materials** Hyatt Place Meeting Room & Foyer

5:30 – 6:00 Poster presentation set-up Lane Stadium South End Zone Club Room

6:00 – 9:30 Dinner & Poster Session Reception; State Updates Lane Stadium South End Zone Club Room  
Music DJ Bobby Parker

---

## Wednesday, June 19

6:30 – 9:00 a.m. Complimentary breakfast for hotel guests Hyatt Place Hotel

9:00 – 9:10 a.m. Welcome & Logistics Hyatt Place Meeting Room

**9:10 – 11:50 a.m. SESSION III: DISEASE AND PHYSIOLOGY**



*Moderator: Amy McMillan, SUNY Buffalo State*

- 9:10 – 9:30      **Associations between land cover and corticosterone profiles of free-ranging eastern and Ozark hellbenders from Missouri**  
Cathy Bodinof Jachowski, Clemson University
- 9:30 – 9:50      **Neutrophil: lymphocyte ratios as a measure of chronic stress in populations of the hellbender (*Cryptobranchus alleganiensis*) across a habitat quality gradient**  
Allison Litmer (GRAD), University of Arkansas
- 9:50 – 10:10    **Assessing Presence and Concentration of Herbicides and Heavy Metals at Current and Historical Hellbender (*Cryptobranchus alleganiensis*) Sites**  
Jeronimo Silva, Tennessee State University
- 10:10 – 10:30   **Captivity-induced changes in the skin microbial communities of hellbenders (*Cryptobranchus alleganiensis*)**  
Obed Hernandez-Gomez, University of California Berkeley
- 10:30 – 10:50   Break**
- 10:50 – 11:10   **Lesion Severity and Associated Skin Health Parameters in Endangered Ozark Hellbender**  
Rebecca Hardman (GRAD), University of Tennessee
- 11:10 – 11:30   **Release of captive-raised Eastern hellbenders (*Cryptobranchus alleganiensis alleganiensis*) to test the success of a chytrid vaccine and cage release method**  
Megan Kocher (GRAD), Buffalo State College
- 11:30 – 11:50   **Some Skin Secretions of Hellbender Salamanders: A Review**  
Max Nickerson, University of Florida
- 11:50 – 1:20    Break for Lunch (on own)**
- 1:20 – 2:40 p.m. SESSION IV: ARTIFICIAL SHELTERS**

*Moderator: Lorie Stroup, USDA Forest Service*

- 1:20 – 1:40      **Use of Artificial Shelters (Nest Boxes) to Supplement Breeding Habitat for Hellbenders (*Cryptobranchus alleganiensis*)**  
Jeff Briggler, Missouri Department of Conservation
- 1:40 – 2:00      **Resiliency of Artificial Shelters to Dynamic Stream Conditions in North Carolina**  
Lauren Diaz (GRAD), Clemson University
- 2:00 – 2:20      **Improving the efficacy of artificial shelters as tools for studying eastern hellbenders: lessons learned over 5+ years of shelter deployment**  
Sky Button (GRAD), Virginia Tech
- 2:20 – 2:40      **Detection of Hellbenders (*Cryptobranchus alleganiensis*) occupying artificial shelters using remote passive integrated transponder (PIT) tag scanning technology**  
Brian Case (GRAD), Virginia Tech



**2:40 – 3:00      Break**

*Moderator: William Hopkins, Virginia Tech*

**3:00 – 5:00      EXHIBITION SESSION: Artificial Shelters** Hyatt Place Foyer

6:00 – 10:00      Dinner & Social; Best Graduate Student Platform Presentation Award Rising Silo Brewery  
Live music by Clover Hollow

---

## Thursday, June 20

6:30 – 9:00 a.m. Complimentary breakfast for hotel guests Hyatt Place Hotel

8:55 – 9:00 a.m. Welcome Hyatt Place Meeting Room

**9:00 – 10:20 a.m. SESSION V: NON-INVASIVE MONITORING; CAPTIVE PROPAGATION**

*Moderator: Michael Freake, Lee University*

9:00 – 9:20      **Development of an Instream Tag Monitoring System for the Eastern Hellbender Salamander**  
Peter J. Petokas, Lycoming College

9:20 – 9:40      **Site occupancy and concentrations of hellbender environmental DNA in a large river**  
Mizuki Takahashi, Bucknell University

9:40 – 10:00      **A Review of a Long-Term Program to Develop Reproduction Technologies for Eastern Hellbenders (*Cryptobranchus a. alleganiensis*) at the Nashville Zoo**  
Sherri Reinsch, Nashville Zoo

10:00 – 10:20      **Comparing the effects of environmental conditioning on survivorship of captive-reared hellbenders**  
Nick Burgmeier, Purdue University

**10:20 – 10:40      Break**

**10:40 – 12:00      Follow-up Discussions and Planning for 10<sup>th</sup> Hellbender Symposium**

12:00 p.m.      Adjourn

1:30 – 8:00      Social & picnic on the New River

---

# POSTER PRESENTATIONS

(Listed in alphabetical order by presenter; presenter underlined)

## **The Reproductive Ecology of the Recently Described Species of Leech (*Placobdella appalachiensis*) that Infects Eastern Hellbenders**

A. Blumenthal<sup>1</sup>, W. Moser<sup>2</sup>, P. Marek<sup>3</sup>, C. Jachowski<sup>1</sup>, and W.A. Hopkins<sup>1</sup>

1. Dept of Fish and Wildlife Conservation, VA Tech; 2. Dept of Invertebrate Zoology, Smithsonian Institution; 3. Dept of Entomology, VA Tech

## **Historical Relationship Between American Eel and Eastern Hellbender in the Upper Susquehanna Watershed**

Boucher, S.E.<sup>1</sup>, Foster, R.L.<sup>1</sup>

1. Animal Behavior, Ecology, and Conservation, Canisius College

## **Investigating Habitat Selection Patterns of Larval Eastern Hellbenders in the Southern Appalachians**

Lauren Diaz<sup>1</sup>, Catherine M. B. Jachowski<sup>1</sup>, Lori A. Williams<sup>2</sup>, Shem D. Unger<sup>3</sup>

1. Dept. of Forestry and Environmental Conservation, Clemson University; 2. North Carolina Wildlife Resources Commission; 3. Carolina Headwaters LLC

## **Historical Insights on Conservation of the Eastern Hellbender (*Cryptobranchus alleganiensis*) in the Northeast**

Foster, R.L.<sup>1,3</sup>, McMillan, A.M.<sup>2</sup>, and Larsen, C.P.S.<sup>3</sup>

1. Animal Behavior, Ecology and Conservation, Canisius College; 2. Biology Dept, SUNY Buffalo State; 3. Evolution, Ecology and Behavior Program, SUNY Buffalo

## **A proteomics approach to quantifying vitellogenin in the eastern hellbender (*Cryptobranchus alleganiensis*)**

Frazier, C.F.<sup>1</sup>, Ray, W.K.<sup>1</sup>, Galligan, T.M.<sup>2</sup>, Case, B.F.<sup>2</sup>, Hopkins, W.A.<sup>2</sup>, Helm, R.F.<sup>1</sup>

1. Dept. of Biochemistry, Virginia Tech; 2. Dept. of Fish and Wildlife Conservation, Virginia Tech

## **Changes in circulating steroid hormone profiles before breeding in the eastern hellbender (*Cryptobranchus alleganiensis*)**

Galligan, T.M.<sup>1</sup>, Helm, R.F.<sup>2</sup>, Case, B.F.<sup>1</sup>, Bodinof Jachowski, C.M.<sup>3</sup>, Frazier, C.L.<sup>2</sup>, and Hopkins, W.A.<sup>1</sup>

1. Dept. of Fish and Wildlife Conservation, Virginia Tech; 2. Dept. of Biochemistry, Virginia Tech; 3. Forestry and Environmental Conservation Department, Clemson University

### **Artificial shelters for juvenile and sub-adult hellbenders**

Groffen, J.<sup>1</sup> and Hopkins, W.A.<sup>1</sup>

1. Dept. of Fish and Wildlife Conservation, Virginia Tech, Blacksburg, Virginia 24061, USA

### **Are Cryptic Species Really Cryptic? Morphometric Variation in *Cryptobranchus***

Hime, P.M.<sup>1</sup>

1. Biodiversity Institute, University of Kansas

### **Chytrid and ranavirus prevalence in Eastern Hellbenders in Southeast Tennessee Streams**

Emily Nolan<sup>1</sup>, Brad Nissen<sup>1</sup>, Rebecca Hardman<sup>2</sup>, Michael Freake<sup>3</sup>, and Bill Sutton<sup>1</sup>

1. Tennessee State University, Department of Agricultural and Environmental Sciences, 3500 John A. Merritt Blvd., Nashville, TN 37209; 2. University of Tennessee, Center for Wildlife Health, 2431 Joe Johnson Dr., Knoxville, TN 37996; 3. Lee University, Department of Natural Sciences and Mathematics, 1120 N. Ocoee St., Cleveland, TN 37311

### **Landowner Perspectives Regarding Science, Conservation, and the Eastern Hellbender**

Rebecca O'Brien<sup>1</sup>, Ashley Dayer<sup>1</sup>, and Bill Hopkins<sup>1</sup>

1. Department of Fish and Wildlife Conservation, Virginia Tech, Blacksburg, Virginia 24061, USA

### **Estimating allelic diversity through hellbender eDNA sampling**

Spear, S.F.<sup>1</sup>, and Pelle, M.<sup>1</sup>

1. The Wilds

### **Detection of Japanese giant salamanders (*Andrias japonicus*) in first-order streams using environmental DNA**

Bjordahl, B.<sup>1</sup> and Takahashi, M.K.<sup>1</sup>

1. Dept. of Biology, Bucknell University