

Project Title: Eleven Point River Streambank Erosion Assessment

Project Summary: The project seeks to formally assess streambank erosion along the Eleven Point River in Arkansas, where sedimentation from streambank erosion is threatening extirpation of the endangered Ozark Hellbender. The assessment would include an investigation into historical land uses, a Bank Erosion Hazard Index survey and Near Bank Shear Stress survey to assess bank conditions and predict erosion rates. These actions would identify areas of greatest concern impacting a Species of Greatest Conservation Need within a priority watershed. The resulting data and information will be crucial to implementing conservation activities necessary to ensure long-term survival of the Ozark Hellbender.

Project Leader:

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Project Partners:

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Project Budget:

SWG amount request: \$21,660
Match provided: \$11,727
Total project costs: \$33,386

FY 2017 State Wildlife Grant Project Proposal

Need: The endangered Ozark Hellbender is a large, strictly aquatic salamander endemic to streams of the Ozark Plateau in southern Missouri and northern Arkansas. Due to the species' specialized habitat and diet requirements, changes to the aquatic environment have led to a significant reduction in hellbender populations. The Eleven Point River is a priority watershed in the Arkansas Wildlife Action Plan (AWAP) and is considered to be the last viable population of Ozark Hellbenders in the state.

As noted in the AWAP, land use within the Eleven Point River watershed is rapidly changing and actions to survey physical habitat conditions within the watershed are needed to identify major threats and support conservation actions. Sediment inputs from land use activities significantly contribute to habitat degradation for a number of Species of Greatest Conservation Need in the Eleven Point River. Degraded riparian conditions and unpaved roads are presumably the two largest sources of sediment loading in the Eleven Point River.

Since 2005, USFWS and Arkansas Game and Fish Commission have documented changes to habitat quantity and quality in the Eleven Point River due to sedimentation. Cover rocks necessary for Ozark Hellbenders have been embedded or completely buried at numerous sites. During monitoring efforts, artificial nest boxes have been documented to fill with fine sediment in less than three months, thereby hindering recovery efforts. This rapid siltation potentially provides insight into recruitment failure if similar siltation occurs under native cover rocks when egg clutches and larvae are present. While empirical data to document loss of cover rocks due to sedimentation are lacking, biologists with both agencies have visually observed increased fine sediments filling interstitial spaces and embedding (with fines and gravel) cover rocks at numerous sites occupied by Ozark Hellbender between the Missouri/Arkansas state line and Arkansas Highway 90.

The effects of sedimentation become increasingly prominent as the Eleven Point extends downstream. An initial desktop review of historical and current aerial photography confirms channel widening due to stream bank erosion at over thirty sites between the state line and Arkansas Hwy 90. As the river channel widens and shallows, water velocity slows, leading to greater sedimentation and the shallow, slow moving water then warms. Biologists also have observed increases in aquatic macrophytes and large deposits of gravel near the confluence of tributaries following storm events, both indicators of bank erosion and resulting sedimentation throughout the reach.

Purpose and Objectives: Identify and prioritize impaired reaches for potential streambank restoration in the Arkansas portion of the Eleven Point River with suitable habitat for Ozark Hellbender. This will be accomplished by completing a reconnaissance level survey of stream bank conditions, accompanied by validation of predicted erosion rates/sediment loads. A Bank Erosion Hazard Index (BEHI) survey will be conducted, which involves collecting streambank characteristics and conditions which affect bank erosivity. Near Bank Shear Stress (NBSS) will be estimated for each bank and, in conjunction with BEHI data, used to predict annual erosion rates for each impaired reach. Lateral erosion rates will be measured over a one-year period at the highest ranking reaches to validate the predicted values.

Geographic location: The Eleven Point River starting at the Arkansas/Missouri line and extending down river approximately 23 river miles to Arkansas Highway 90 (suitable habitat reach). See attached map.

Approach: Record BEHI and NBSS data using a mapping grade GPS. This involves recording measurements of bank heights, angles, materials, presence of soil layers, rooting depth, rooting density, and percent of bank protection. These variables will be used to develop a streambank erodibility index and create a map using ESRI’s ArcGIS. On this map, the attribute values of each section of stream are assigned an output risk rating from 1 to 10 indicating corresponding adjective values of risk as very low, low, moderate, high, very high, and extreme potential erodibility. A NBSS estimation will also be completed to predict total bank erosion, based on stream bank erodibility curves.

The project would be expected to start in October 2017 with a reconnaissance level assessment, followed by BEHI and NBSS surveys in winter 2017/2018. Lateral erosion at high-risk reaches will be measured over the following year. All objectives should be accomplished within 2 years of start date, depending on flow characteristics.

Results or benefits expected: The data produced from this study will identify the most critical reaches contributing sediment to the Arkansas portion of the Eleven Point River containing populations of the Ozark Hellbender. This data will help guide future streambank restoration priorities for improving riparian and instream conditions.

Budget narrative: The total requested amount for this project is \$21,660. TNC will provide match through supplies. Additional match will be provided by AGFC through staff time and travel to assist with the project. The combined match sources will provide \$11,727, for a total project cost of \$33,836. See Table 1 for estimated budget.

| Table 1: ESTIMATED BUDGET | |
|----------------------------------|------------------|
| Category | |
| Salaries and Benefits | \$13,250 |
| Travel | \$4,328 |
| Supplies | |
| Other | \$0 |
| Subtotal | \$ 17,578 |
| Indirect Cost * | \$4,082 |
| TOTAL | \$21,660 |

* TNC's indirect cost rate in its FY 18 NICRA is 23.22%. TNC's indirect rate is negotiated annually, and TNC will charge indirect at the federally approved rate each year.

Staff Qualifications:

John Chapman, TNC - Watershed Restoration Program Director

Responsible for overseeing the project. He is a graduate of the University of Arkansas at Monticello with a B.S. in Spatial Information Systems. He specializes in watershed and geomorphic assessments and design and implementation of stream restoration projects using natural channel design techniques. He has completed four intensive courses in “Applied Fluvial Geomorphology” and “Natural Channel Design” led by instructor Dave Rosgen, Ph.D., conducted numerous geomorphic surveys, and worked to implement stream restoration projects on the West Fork of the White River, Kings River, and Little Osage Creek. He also has 15 years of experience in the Geographic Information Systems (GIS) field.

Chas McCoy, TNC – Stream Restoration Technician

Chas will provide support for various aspects of the project. He has a B.S. in Environmental Science from the University of Portland, Oregon and 8 years of experience in watershed management and stream restoration. He has completed Introduction to Applied Fluvial Geomorphology (Rosgen 1) by Dave Rosgen, Ph.D., and coursework in river restoration processes and design from Portland State University to receive a River Restoration Certificate. Chas has conducted BEHI and NBSS assessments in the Kings River watershed and is knowledgeable about stream processes.

Dr. Melissa Lombardi, USFWS – Endangered Species Biologist

Dr. Lombardi is a veterinarian with the U.S. Fish and Wildlife Service. Her education includes: M.Sc. Fisheries and Wildlife Science, Arkansas Tech University (2014); DVM, Louisiana State University School of Veterinary Medicine (2000); B.A., Hendrix College (1995). Dr. Lombardi has worked with the Ozark hellbender at the St. Louis Zoo Ron Goellner Center for Hellbender Conservation and in interagency surveys and habitat enhancement projects on the Eleven Point River in Arkansas.

Sean Saunders

Sean Saunders graduated from the University of Arkansas at Little Rock in 2008 with a B.S. in Wildlife Management with an Emphasis on Fisheries. Upon graduation he worked as an intern for the AGFC under Stream Team Coordinator Stephen O’Neal where he began his training in stream restoration. When the internship ended Sean took a position with the AGFC at the Jim Hinkle Spring River Hatchery and volunteered his free time to work with now retired Stream Team Coordinator Dave Evans and the Trout Habitat Manager Tim Burnley to increase his knowledge in stream restoration. In 2012 he took a position with the Arkansas Department of Environmental Quality (ADEQ) as a Water Inspector. This position allowed him to receive vast training and knowledge in water regulations and erosion. In 2015 Sean left ADEQ and took a Stream Team Coordinator position with the AGFC. Since returning to the AGFC as the Stream Team coordinator Sean has gone through Dr. Newbury’s riffle training and Dr. Dave Rosgen’s Level 1-3 training with plans to attend level 4 in September 2017.

Kelly Irwin, AGFC - Herpetologist

Kelly Irwin began work as the first herpetologist for the Arkansas Game & Fish Commission in 2000. He is responsible for the conservation and management of the ~130 species of native amphibians and reptiles of Arkansas. In 2005, he initiated a long-term monitoring program on the Ozark Hellbender population in the Eleven Point River. Since 2012, he has been involved in the construction and maintenance of artificial shelters/ nest boxes in the river as a means to augment habitat and provide a possible source of egg clutches for captive propagation efforts at the St Louis Zoo Hellbender Conservation Center.

Eleven Point River Assessment Project Area

