

Impacting students through interactive interpretation regarding a relatively unknown state endangered species, the Eastern hellbender

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Abstract

*The Columbian Park Zoo developed a partnership with a local school district to provide an interactive, interpretive program to all sixth grade students (11-12 years) focused on Eastern hellbenders (*Cryptobranchus alleganiensis*). This program was aligned to Indiana state academic standards in science and targeted watershed conservation and human impact on the environment. The program employed many interpretive learning tools as well as a live animal encounter with a comparable salamander species facing similar threats. Five hundred underserved, urban youth were reached and students demonstrated an increase in knowledge and awareness of hellbenders from a pre/post-test format. This program sought to leave students with a higher level of awareness and knowledge to aid hellbenders in the wild.*

Introduction

In late 2014, the Columbian Park Zoo embarked on a partnership with Purdue University in an effort to strengthen a head-start program for the state endangered Eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*). This partnership joined an already existing project that was geared to head-start captive-hatched (from wild-collected eggs) hellbenders. This unprecedented opportunity was met with eager excitement from Zoo staff, and spurred the Zoo's newly formed Conservation Committee to design a robust conservation education campaign surrounding the newly arrived hellbenders.

Eastern hellbenders are a species of giant salamander and were historically found throughout Southern Indiana, USA, in rivers and streams surrounded by woodlands. Over the last several decades, there have been drastic population declines throughout the state attributed to increased pollution and negative effects from human land usage surrounding their natural habitats (Nickerson and Mays, 1973 & Briggler et al., 2007). This species is now localized to one small area in the Blue River in Southern Indiana and has been documented as having one of the lowest population densities in state history (Burgmeier, et al., 2011). Since Lafayette Indiana is part of the extended Blue River watershed, the Zoo's conservation efforts were heightened and focused to aid this species.



Zoo staff presenting to one class of 6th grade students & interpretive interactive demonstrates cumulative effects of discarding trash and debris



Columbian Park Zoo accepted three juvenile Eastern hellbenders into its collection in 2015. These juveniles were to be reared in the safety of the Zoo and monitored by Zoo staff for later release back into the wild. Because of space limitations, these animals were housed behind-the-scenes without opportunity for public display. The logistics of this presented a hurdle for the members of the Conservation Committee, whom were now designing an education and outreach campaign tailored to this species. The main challenge was how to best educate the local community about an animal that is not naturally found in the local ecosystem and an animal that is not on exhibit at the Zoo.

As logistical problems were being tackled, an education and outreach plan was formulated. It was determined that many of the key points in the plan were to focus on the hellbender habitat and watershed quality. A “big idea” message for the program was adopted to guide any outreach and education efforts henceforth. The “Healthy yards lead to healthy hellbenders” message allowed the Zoo to connect local community members to this species that many have never heard of or seen. The main goal was to guide the community in realizing that their actions at home and around the city do impact organisms in other locations through the processes of the watershed. Conservation behavior outcomes were designated that supported the big idea message and began to shape what events and programs that the Zoo was going to host.

The main headlining event for the hellbender conservation program was “Help the Hellbender Day” at the Zoo. This was a community event where local community conservation partners joined forces with Zoo staff to educate patrons on the importance of water quality and watershed management. Partner booths were highly interactive and geared toward young children and families. This event also gave the community an opportunity for guided behind-the-scenes tours to view the Zoo’s resident Eastern hellbenders.

The “Help the Hellbender Day” event was highly successful, but the conservation committee aimed to reach even more of the local community. A partnership was developed with the local school district. Zoo Education staff designed a presentation to be delivered to all sixth grade students in the partner district in November 2015. A generous gift from Tri Kappa – Lafayette Delta Eta Chapter made this outreach program possible and the Zoo staff was able to reach 500 local students that would not otherwise have received this messaging. The challenge was designing an interactive interpretive presentation that connected students to a relatively unfamiliar animal and its conservation story. This new program

needed to be designed to impact students’ knowledge, awareness, and attitudes regarding hellbenders and their conservation, while complimenting existing state academic standards for science.

Methods

Two Zoo staff members were responsible for delivering the presentations. These specific staff members were the two primary animal care staff managing Eastern hellbenders on-site. Both individuals were well-versed, had personal interest in hellbender conservation and had training in the zoo education field. The program introduced the hellbender and discussed some of its natural history including morphology, habitat requirements, factors of endangerment and the reasons behind the necessity of salamanders and other amphibians in ecosystems. Since hellbenders are fully-aquatic and very sensitive animals, a model of an adult animal was used for any and all discussions, rather than live hellbender specimens. The program was designed as a 20 minute interpretive presentation that included engaging demonstrations, interactive learning opportunities and a live animal encounter with a similar species, the Eastern tiger salamander (*Amybystoma tigrinum*). Visuals and interactive demonstrations were included that allowed students to understand and see representations of several abiotic factors that are negatively impacting hellbenders, including increased sedimentation, pollution, and debris from runoff in storm drains. One such interactive was a miniature replica of a street with a storm water drain. This interactive allowed students to take one piece of trash each (one piece they thought wasn’t a big deal to toss on the street) and toss it onto the street and see the cumulative effect of their entire class. The highlight of the program for students was the live animal encounter with the Eastern tiger salamanders. Students learned that many of the same threats hellbenders are facing also impact these more common salamanders. The program culminated



with discussion pertaining to good environmental behaviors students should be demonstrating to save these amphibian species. Since many of these local students reside in urban areas, action steps included both private yard care and responsible use of public green spaces.

This program was offered over the period of three consecutive days and students were brought to the presentation with their science classes during the regular school day. This schedule resulted in classes rotating every 30 minutes for a 20 minute presentation. Teachers were asked to have their students complete a pre-test prior to the start of the first program and a post-test after their classes completed the program. These evaluations were completed on-line via students' school iPads. Of the 500 students that participated in the program, 281 students completed both the pre- and post-tests.

The student evaluations had a combination of knowledge-assessment items and Likert-scale items (to assess attitudes) for a total of 12 items. Five knowledge items focused on habitat requirements and general watershed information. These items were designed as True/False items to accommodate students with a variety of learning styles and reading levels. The seven Likert-scale items were focused on attitudes and awareness regarding human impacts on the environment, specifically hellbenders, and were evaluated on a five-point scale.

Results

According to the pre- and post-test knowledge scores, students were able to increase their knowledge by approximately two letter grades. On average, students scored 64% on the pre-test and 83% on the post-test which yielded a 45% score increase. These scores were only tabulated from students that completed both the pre- and post-tests. Students that completed only one of the assessments were excluded in the data analysis.

The Zoo staff was most keenly interested in how these interpretive presentations were going to impact students' attitudes and awareness regarding hellbender conservation. It appears that the majority

of students were undecided on many of the items on the pre-test as many of the averages were between 2 (Agree) and 4 (Disagree) and relatively close to 3 (Undecided). After students' completed the program, the assessment averages started leaning away from Undecided. The pre-and post-test averages per item and the associated percent changes in scores are outlined in the table.

Throughout all of the scheduled programs, students appeared very receptive and most were actively engaged during the interpretive presentations. Presenters, school staff and students were all pleased with the quality of the programs and were excited about exploring potential similar partnerships in the future.

Discussion

This project was successful in developing a unique community partnership that provided Columbian Park Zoo with an opportunity to further meet its mission and allowed local sixth grade students an interactive learning opportunity that otherwise would not have been afforded. As an explorative study, it does appear that a short 20-minute interpretive presentation was able to impact students more than was expected. It appeared that prior to participating in the program, students had relatively little knowledge and awareness about hellbenders and their conservation. This was not unexpected because, even though the Eastern hellbender is a state native species, it is not native to the geographic area in which the project took place. After completing the program, students demonstrated more awareness of their conservation.

Even though this project saw impacts to students' knowledge, attitudes, and awareness, it was one snap shot in time. In the future, it would be interesting to determine if these types of programs are impactful on a longer timeframe after the program. It is unknown if these 20-minute interpretive presentations were really able to impact students' behaviors or long-term attitudes towards Eastern hellbender conservation.

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Likert-Scale Item	Pre-Test Average*	Post-Test Average*	Percent Change
I think hellbenders are in trouble in Indiana.	2.584	1.761	-31.85%
Amphibians like hellbenders and other salamanders are important to protect.	2.046	1.461	-28.59%
There are things I can do to help hellbenders	1.888	1.334	-29.34%
Things in my yard can affect habitats in other places.	2.361	1.617	-31.51%
My actions don't impact hellbenders.	3.198	4.116	28.71%
It doesn't matter if amphibians like hellbenders and other salamanders go extinct.	3.189	4.2	31.71%
Hellbenders are doing fine in Indiana.	3.715	4.144	11.55%