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Youth Engagement in Public Health at Mammoth Cave National Park: A Pilot Alternative Spring Break Program

Laura Shultz
Student Conservation Association, Mammoth Cave National Park, laurashultz2013@u.northwestern.edu

David Wong
Epidemiology Branch, National Park Service Office of Public Health

Amy E. Thomas
Mammoth Cave National Park

Rick Toomey
Mammoth Cave International Center for Science and Learning, Mammoth Cave National Park, rick_toomey@nps.gov

Shannon Trimboli
Mammoth Cave International Center for Science and Learning, Ogden College of Science and Engineering, Western Kentucky University, shannon.trimboli@wku.edu

Youth Engagement in Public Health at Mammoth Cave National Park: A Pilot Alternative Spring Break Program

Laura Shultz[1], David Wong[2], Amy E. Thomas[3], Rick Toomey[4], and Shannon Trimboli[5]

[1] Student Conservation Association, Mammoth Cave National Park
[2] Epidemiology Branch, National Park Service Office of Public Health
[3] Mammoth Cave National Park
[4] Mammoth Cave International Center for Science and Learning, Mammoth Cave National Park
[5] Mammoth Cave International Center for Science and Learning, Ogden College of Science and Engineering, Western Kentucky University

Abstract

Each year, students from over 200 colleges and universities participate in Alternative Spring Breaks (ASBs) — volunteer, service-oriented missions that empower youth to become active citizens. Since 2000, at least 25 National Park Service (NPS) units have hosted ASBs where students volunteered to build trails, remove invasive plants, and provide other needed services (Nelson 2016). While such programs successfully connected youth with parks, particularly those interested in conservation, ASBs are also an opportunity to introduce students to the myriad and diverse career paths within NPS.

Description of Pilot Alternative Spring Break Program

During February 28 - March 4, 2016, Mammoth Cave National Park (MACA) and the Mammoth Cave International Center for Science and Learning partnered with the NPS Office of Public Health to host a pilot ASB program focused on public health. Through direct, hands-on service, seven students and one professor from Alma College in Michigan spent a week learning about park-specific public health issues, including rabies, rodent-borne diseases, and recreational water quality. Issues were framed using a One Health perspective, which recognizes that the health of people, animals, and our environment are inter-connected and are best addressed using an inter-disciplinary approach.

ASB activities included monitoring bat populations on tour routes to better understand risk for bat-human contacts; performing rodent exclusion on seasonal housing; collecting and testing cave water for *E. coli* contamination; and building and setting traps for ticks and Asian lady beetles. For more information on each activity, see Figure 1. Students received 1-1.5 hours of lecture/training each day, interacted with park staff from multiple divisions, and learned about career opportunities in NPS, public health, or both. Proper personal protective equipment (PPE) was used during all activities.

Benefits to the National Park Service

In *A Call to Action*, the NPS commits to "*strengthen the Service as an education institution and parks as places of learning that develop American values, civic engagement, and citizen stewardship.*" Partnering with the ASB program at Alma College is a natural extension of this idea.

This pilot program capitalized on both education and service to truly impact the participating students. By engaging in participatory learning and fostering transformative experiences as outlined in *Achieving Relevance in our Second Century, A Five-year Strategy for Interpretation, Education, and Volunteers as We Enter the Second Century of the National Park*

Service, we are using proven techniques that are primed to propel the Service forward.

The students worked with three divisions collaboratively (Resource Management, Interpretation, and Maintenance) and were exposed to multiple One Health disciplines, including environmental studies, public health, entomology, and hydrology. By participating in hands-on data collection and solutions to public health risks (such as implementing rodent exclusion), students were able to take away a sense of pride in their accomplishments that connected them more strongly to their public lands and their contributions as citizen stewards.

Evaluation

Participating students were asked to complete a self-administered survey that assessed the effectiveness of both program

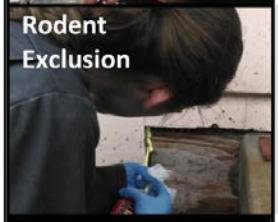
Activity	Public Health Risks	Summary of Actions	Impact of Actions
Asian Lady Beetle Light Traps 	Mental health of the employees in the afflicted offices as well as allergy concerns	Students built and placed light traps throughout park structures to eliminate invasive Asian lady beetles from work environments.	These were the first set of light traps to systematically attempt to eliminate the Asian lady beetle from park offices to be used by park employees.
Bat Monitoring Along Toured Cave Routes 	Bat-Human contacts and the potential for exposure to rabies	Students walked each of five tour routes each day in separate groups and monitored the bat population and activity on each route to assess risk of contacts.	This data collection assisted in park monitoring and understanding of bat behavior along routes of potential human exposure.
Coliform Samples 	Exposure to *E.coli* bacterium through water sources in the park	Students split into groups and collected, processed, and analyzed water samples throughout the park for a snapshot of *E.coli* conditions.	This snapshot of *E.coli* load throughout the park gives the park a better knowledge of water quality conditions.
Rodent Exclusion 	Potential exposure to rodent borne diseases, including hantavirus	Students performed building maintenance tasks to close rodent entry-points and exclude them from residential structures.	Rodent Exclusion work directly improved seasonal housing and decreased the risk of exposing residents to rodent-borne diseases.
Tick Collection with CO_2 Traps 	Exposure to Tick-borne diseases including lime disease, rocky mountain spotted fever, etc.	Students built and placed CO_2 traps throughout the park to monitor populations and collect samples for testing.	This was the first tick monitoring during the winter at Mammoth Cave, adding to the park's knowledge of tick population and behavior throughout the year.

Figure 1: Alma College students participating in the public health Alternative Spring Break program assisted the park with five monitoring and abatement projects focused on public health issues. This chart summarizes those activities and their results. Proper PPE was used during all activities.

implementation and impact. The survey was administered at the beginning of the program prior to the planned activities and at the end before the group's departure.

Initial analysis of the evaluations indicates a high level of success. The average level of student satisfaction with the training, facilities, diversity of projects, and relevance of the completed projects all rated between 4.75 and 4.88 on a 1.00 to 5.00 scale, with 5.00 being the highest. When asked about several specific knowledge, skills, and abilities taught throughout the programming, there was an overall 40% increase in comfort level across the various projects and their related tasks in the post-program responses compared to the pre-program responses.

In one question, students were asked to rank the likelihood of considering a career in the NPS; compared to the pre-program responses, there was a 31.6% increase in the post-program responses. There was an 8.9% increase in the post-program responses when asked if the students would consider a career in public health; however, the responses were relatively high in both cases, increasing from an average likelihood of 3.88 to 4.25 on the same scale.

This pilot program successfully showcased the breadth of public health activities conducted in parks, highlighted the potential for ASBs to introduce youth to new career opportunities within federal agencies, and set a foundation for subsequent programs in the future.

Several students agreed as evidenced by the following quotes:

> *"… a once in a lifetime experience… [I] am considering a career in the NPS now thanks to this trip."*

> *"This was the most interesting and memorable break I've ever had, and I'm truly inspired to learn more about the parks, public health, public service, etc."*

> *"This experience changed my outlook on my career path and made me realize what is and is not important. I learned so much and wouldn't trade this experience. Your passion is so inspiring."*

Summary

Traditionally, student internships, such as NPS Academy and Centennial Volunteer Ambassadors, have been the primary tools for engaging youth with national parks. This pilot demonstrates that, with dedicated staff and effective programming, week-long ASBs can provide students with immersive experiences that highlight the diversity of park resources, all while introducing them to career opportunities. We plan to share the lessons learned from this pilot with other parks and other public health agencies. Similar career-specific ASBs could be developed at other NPS units and with other colleges.