Bridging the gap between research and education at Mammoth Cave National Park: The Mammoth Cave International Center for Science and Learning

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Mammoth Cave International Center for Science and Learning's website: www.wku.edu/mcicsl

Abstract

This year's theme is "Enhancing Ecological Thought by Linking Research and Education." But how ***do*** you link research and education? That question can be hard to answer, even for a national park with active resource management, interpretation, and environmental education divisions. For Mammoth Cave National Park, the answer included partnering with Western Kentucky University (WKU) to form the Mammoth Cave International Center for Science and Learning (MCICSL). MCICSL is part of a national network of research learning centers located within the National Parks. The goals of MCICSL are to facilitate research, to encourage science informed decision making, and to educate a variety of audiences about the research happening at Mammoth Cave National Park.

MCICSL's educational efforts serve a variety of internal and external audiences. The methods employed to reach such diverse audiences include workshops, internships, research-focused field opportunities, educational presentations, and internal and external research summaries. All of this has been accomplished with 1.5 full-time employees and the support, cooperation, and assistance of WKU and Mammoth Cave staff; showing that a large number of additional staff is not necessarily required to link research and education.

Geoscience-Teachers-in-the-Park (GTIP) Internship

The GTIP internship is a summer internship program funded by the National Association of Geoscience Teachers. Every summer, 2-3 local teachers gain hands-on experience working with researchers at Mammoth Cave National Park. The teachers work on projects as diverse as cave cricket monitoring, collecting GPS coordinates for cave entrances, and monitoring water quality inside the caves. The exact projects they participate in depends on their interests and the needs of the researchers.

Geoscience-Teachers-in-the-Park assist scientists by recording the GPS coordinates for a cave entrance.

Advantages:

- Increases teachers' knowledge of geosciences and Mammoth Cave.
- Teachers share new knowledge and experiences with students; often increases students' interest in science and Mammoth Cave.
- Past interns encourage and assist other teachers in learning more about Mammoth Cave National Park's resources.
- Researchers gain extra help collecting data.

Challenges:

- Must have research projects with which the teachers can assist.
- Must take into account the different interests and abilities of each teacher.

Geoscience-Teachers-in-the-Park prepare to survey springs along the Green River.

Research Summaries (Internal & External)

We create two types of research summaries. The first is a bulleted internal research summary that is used primarily by the interpretive guide force. The guides indicated that they preferred bulleted summaries that could be quickly reviewed immediately prior to a tour. The second type of research summary we produce is written in paragraph form with pictures and graphs to help explain the topic. These research summaries are posted as pdf files on our website and are used primarily by external audiences. Each research summary is reviewed by the primary investigator before being released either internally or externally.

Advantages:

- Reaches more people than we could reach directly.

Challenges:

- Limited time and an endless list of summaries that we could created.

Example of a research summary created for the interpretive guide force.

Example of a research summary created for the general public and posted to the MCICSL website.

Karst Field Studies Program

The Karst Field Studies Program offers week-long, intensive, field-based courses that can be taken as workshops or for college credit. The courses are taught by world-renowned experts in their fields, many of whom are currently doing research at Mammoth Cave. We are beginning to also offer weekend workshops in addition to the week-long workshops. This program is coordinated in cooperation with WKU's Hoffman Environmental Research Institute's Center for Cave and Karst Studies.

Karst Field Studies students learn cave surveying techniques.

Karst Hydrology students participate in a dye tracing exercise to learn how water flows through the karst ecosystem.

Advantages:

- Reaches a broad audience including students, scientists, teachers, and recreational cavers.
- Provides first-hand access to experts currently working in the field.
- Increases knowledge and stewardship of park resources.

Challenges:

- Coordination and marketing of program can be time consuming.
- Must maintain good communication with instructors, park staff, and university staff so that everyone understands and respects the others' needs.

Field-based Opportunities for College Classes

MCICSL offers individualized field-based opportunities for college classes related to Mammoth Cave's resources. Due to the strong geological component of the park, many of the classes focus on geology topics; however, some classes have also focused on other topics.

Ohio State University students measure scallops on the cave walls to determine the speed and direction of the prehistoric rivers that formed Mammoth Cave.

A Northern Kentucky University student learns cave mapping techniques and their importance as a scientific tool.

Advantages:

- Students gain hands-on experience and connections that they wouldn't get from sitting in a classroom.
- Usually upper level classes with students planning careers in resource-based fields – we're training the resources' future caretakers and researchers.
- Depending on the class, students can sometimes provide valuable information for the park.

Challenges:

- Can be time consuming to plan and conduct classes.
- Can only work with a limited number of classes.

Teacher workshops

MCICSL has offered two teacher training workshops. The first was funded by an NIH grant and focused on the important role that landscape plays in influencing the history and culture of a place. Using Mammoth Cave National Park as an example, 40 community college teachers learned how to use historic places to teach humanities. The second was funded by a grant from Central Kentucky Pride and introduced 12 local primary and middle school teachers to national citizen science projects they can participate in with their students.

Teachers learn how to involve their students in national citizen science projects while using their schoolyard as an outdoor laboratory.

Teachers practice techniques they will use while participating in citizen science projects with their students.

Advantages:

- Efforts are multiplied because teachers share what they've learned with their students.

Challenges:

- Can be very time consuming to prepare and conduct.
- Must find funding if going to offer participants supplies to use with their students.

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