

# **Project Completion Report**

## **Rocky Mountains Cooperative Ecosystem Studies Unit (RM-CESU)**

**Project Titles:** NPS Northern Great Plains Network Herbarium Imaging Project, *Phase 1*  
Digital Imaging of Plant Specimens for Fort Laramie National Historic Site

**Project Code:** UWY-150 (P11AC90695) /UWY-163 (P12AC10395)

**Type of Project:** Technical Assistance and Education

**Funding Agency:** National Park Service

**Partner University:** University of Wyoming

### **NPS Agreement Technical Representatives:**

#### **UWY-150**

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#### **UWY-163**

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### **Principal Investigators:**

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### **Co-Investigators:**

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**Start Date of Project:** July 1, 2011 (UWY-150)/ June 1, 2012 (UWY-163)

**End Date of Project:** December 31, 2013 (UWY-150)/ March 31, 2014 (UWY-163)

**Funding Amount:** \$13,086 (UWY-150)/ \$1821 (UWY-163)

**Project Summary, including descriptions of products, work accomplished and/or major**

**results. If the information is restricted (e.g. location of endangered species or cultural resources), indicate the title and location of the final report. Also add web sites where project-related information may be found.**

The purpose of the agreement was to increase park and public access to herbarium specimens that are managed by the National Park Service by creating a virtual herbarium of northern Great Plains area NPS specimens. The investigators acquired high-resolution images of plant specimens in the co-located herbaria of Mount Rushmore National Memorial and Devils Tower National Monument/Jewel Cave National Monument, the herbarium at Wind Cave National Park, and the herbarium at Fort Laramie National Historic Site. The total number of plant specimens imaged was 3,287. The images were processed at the Digital Collections Lab, University of Wyoming Libraries and served through their Digital Research Collections website and that of the Rocky Mountain Herbarium. A set of images was also provided to the National Park Service. A searchable database of all the images is now available to the parks and public at the Rocky Mountain Virtual Herbarium: <https://www-lib.uwyo.edu/digitalherbaria/index.php>.

**Number of students participating in this project:** One graduate student and five undergraduate students assisted in the imaging, databasing and georeferencing processes. Georeferencing of the specimens took place after all the database work was completed as funding allowed.

**Lessons Learned from this project:**

- The publically available digital images of herbarium specimens have been well-received by the parks. The Northern Great Plains Inventory & Monitoring Program has found the images and corresponding database very useful for verifying park species lists and assisting with plant identification.
- Zane Martin, the museum/herbaria curator at Mount Rushmore National Park and Randy Weiss, Wind Cave NP museum/herbarium technician, have been able to add the low resolution images provided by Schmidt to park museum catalog software.
- Specimen labels needed to be checked for current nomenclature, species information, phenology, and common names. This process was done by students at the University of Wyoming in consultation with Ron Hartman and Ernie Nelson (Rocky Mountain Herbarium).
- It is possible to georeference all specimens using the original locations provided on the specimen labels. Schmidt was able to start this process and will continue working on it as the database is refined. Georeferencing takes time and depends on the amount of information provided on the specimen label for the relative precision of the location. There are now specialized tools available to aid in georeferencing of natural history collections.
- With the NSF funded [iDigBio](#) initiative there are opportunities for education on best practices for imaging specimens from natural history collections and also information on best practices for georeferencing.
- Specimen labels and records did not have a uniform data schema. Prior to incorporating the specimens into the Rocky Mountain Virtual Herbarium, undergraduate students worked to make sure that specimen information was clear and consistent.
- There were cases where specimens had very little data associated with them. A standard for minimum requirements for inclusion in the database may need to be developed. For instance, if the record does not contain a collector, date or location

should it be included as minimal historical information is on the sheet other than the plant and the species.

- The Rocky Mountain Virtual Herbarium is not meant to be a static product. NPS staff and other qualified individuals (such as Bonnie Heidel, Wyoming Natural Diversity Database and botanist working on Devils Tower NM herbarium) will be able to update the virtual herbaria collections to incorporate new additions. Currently Hollis Mariot is adding and editing records to the Devils Tower NM collection so we will have a good test case for how to handle changes to the digital herbaria can be handled in the future.