

Project Completion Report

Rocky Mountains Cooperative Ecosystem Studies Unit (RM-CESU)

Project Title: Implementation of water resources monitoring at Bighorn Canyon NRA

Project Code: MSU-238 *Task Agreement P11AC90711 (formally P11AT10660)*

Type of Project : Technical Assistance

Funding Agency: National Park Service

Partner University: Montana State University

NPS Agreement Technical Representative:

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Start Date of Project: July 15, 2011

End Date of Project: March 31, 2013

Funding Amount: \$27,138

Project Summary:

This task agreement enabled the Greater Yellowstone Network and Montana State University to measure discharge and water quality in Bighorn Canyon National Recreation Area during calendar years 2011 and 2012. Monitoring activities during this reporting period included the installation of continuous stage monitoring instrumentation in four springs and one stream and the chemical, biological, and discharge monitoring of springs, streams, and rivers within the recreation area. Results presented in the final report include annual and long-term discharge summaries for the Bighorn and Shoshone Rivers, chemical characters and discharge of monitored springs, and an evaluation of chemical and biological conditions of rivers and streams relative to state and federal water quality standards.

Deliverables:

Ray, A. M., K. Kleehammer, and W. A. Sigler. 2013. Water quality data summary report for Bighorn Canyon National Recreation Area: Preliminary analysis of 2011 and 2012 data.

Natural Resource Data Series NPS/GRYN/NRDS—2013/482. National Park Service, Fort Collins, Colorado. *Available at:*
https://irma.nps.gov/App/Reference/DownloadDigitalFile?code=468683&file=NPS_GRYN_NRDS_482_Water_Quality_BICA_2011-2012_nrss.pdf.

Sigler, W. A. 2012. Bighorn Canyon Spring Continuous Monitoring Pilot Project Summary. April 2012. *Unpublished report*.

Kleehammer K. and Sigler, W. A. 2013. Bighorn Canyon 2011-2012 Spring and stream flow assessments. March 2013. *Unpublished report*.

Number of students participating in this project: One graduate student working on a PhD.

Lessons Learned from this project: We learned that the water depth and temperature loggers installed at Lockhart Stockpond Spring, Mason-Lovell Spring, Layout Spring, and Layout Creek is an effective way to measure water depth. Using data collected via this agreement, water depth/stage discharge relationships were established for each of the above sites using water depth/stage estimates and field discharge measurements. Modeled discharge closely tracked field discharge measurements at Layout Creek, Layout Spring, and Mason-Lovell Spring.