Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Sustainable Operations and Facility Adaption, Yellowstone National Park

Discipline: Interdisciplinary
Type of Project: Technical Assistance
Funding Agency: National Park Service
Other Partners/Cooperators: Montana State University
Effective Dates: 9/1/2014 – 3/30/2016
Funding Amount: $35,043

Investigators and Agency Representative:
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Project Abstract: This project will complete phase one of a sustainable building strategy where energy assessments will be performed for Yellowstone buildings prioritized for energy performance improvements. Yellowstone National Park and Montana State University personnel will work together to access facilities in order to better understand energy use and opportunities for improvement including ways to calculate return on investment. Installation of energy monitoring equipment as it pertains to electricity, heating fuels, and water will take place at the facilities identified by Yellowstone staff and MSU personnel. Energy use information will be evaluated against 2003 baseline values to determine energy consumption and progress toward goals, as well as to develop building energy load profiles for predicting energy consumption for renovation projects. An energy dashboard will be developed for Yellowstone so that energy managers can monitor system performance and staff and visitors can track actual energy use as well as learn about best practices for energy conservation in a user friendly and educational manner.

The benefits of this project will include significantly improved energy monitoring at select Yellowstone facilities where no accurate metering presently exists. For this phase of the project we would like to assess and provide recommendations for energy improvements and energy and water tracking and modeling for high use buildings at YNP HQ that presently share electric meters and have no metering for propane and fuel oil - heating and HVAC applications, as well as buildings at the historic Lamar Buffalo Ranch to contribute to phase 2 of the Lamar Sustainability Initiative. These buildings include but are not limited to: in Mammoth - the administration building, supply center, canteen and Albright VC, at Lamar, the Bunkhouse and Buffalo Keeper's House and bathhouse. The supply center is currently being renovated with improvements to heating, insulation and windows so it is very timely to research and recommend opportunities for energy tracking and test the results of energy models. The Buffalo Ranch will receive some automated energy tracking in the fall of 2014. Experience from these building can then be used for similar models and analysis on the other buildings.

MSU will develop energy tracking systems and models for cost/benefit "hierarchy" for alternative energy retrofits and weatherization for the buildings listed. MSU will provide technical expertise for energy conservation improvements including building envelope and energy systems. They will research and provide recommendations for improvements such as unit design, heat recovery opportunities, existing underground supply and return hot water lines, heat storage potential, supplemental heat at buildings, central vs. individual units. YNP and MSU will work together to create clear energy management systems that work for Yellowstone staff. The PI will work directly with the YNP coordinator to ensure deadlines are met and specific elements of the project are communicated and act as the technical expert providing guidance to student work.

Research will primarily be at Yellowstone National Park Headquarters in Mammoth, Wyoming or Montana State University in Bozeman, Montana. MSU students and interns will be able to use Yellowstone as a site for developing models and best practices in energy tracking in a real world environment where specific goals for energy reduction are already in place. Park staff will work directly with students to work through unique challenges and processes such as modeling for historic buildings that contribute to National Historic Landmarks and historic districts and sharing data in accordance with federal information technology protocols. Students, MSU and Yellowstone staff will work together to identify opportunities for energy reduction through modeling, monitoring and tracking.

YNP staff will provide blue prints, guidelines, standards and building history as needed as well as future building functions, occupancy and use patterns and any restrictions and specific goal to ensure that the technical research carried out by MSU is relevant and identifies optimum applications.

YNP staff will provide ongoing review and guidance regarding as well as physical installation of equipment and technical design assistance for visual interface applications.

Outcomes with Completion Dates:
Draft Final Report –31st July 2015
Final Report –31st Aug 2015

Keywords: sustainability, operations and facility, Yellowstone National Park, Montana State University