

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Climate Change Scenario Planning: Four Species of Concern in Southwestern Utah Parks/Monuments

Discipline: Natural Resources
Type of Project: Technical Assistance
Funding Agency: National Park Service
Other Partners/Cooperators: Montana State University
Effective Dates: September 15, 2010 - December 31, 2012
Funding Amount: \$75,200

Investigators and Agency Representative:

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Project Abstract: This study proposes to explore potential effects of climate change on critical natural resources and develop a range of responses at the National Park/Monument level. Over the long-term recent climate change will likely be expressed by changes in overall vegetation type. In the short term, that expression may be seen primarily in plant productivity and vigor, rather than ecotype. Satellite-based measures of vegetation productivity (e.g., normalized difference vegetation index or NDVI) will be used to identify recent spatial and temporal trends in existing types. This is a one year study, using existing data and local specialist input, but spanning three NPS units that encompass a broad range of elevations, ecotypes, and species. Areas where NDVI trends overlap with target species habitat are candidates for early management response. Identifying the intersection of climate-induced change in vegetation and critical habitat should determine location, magnitude and direction of change expected if climate trends continue. Management opportunities in these areas will be explored using the integrated spatial/temporal data as part of an adaptive scenario planning process.

1. Develop Habitat Models for Target Species: Develop spatially-explicit models of selected species habitat for the study area Parks/National Monuments. Extant, proven models may be adapted for use in this project. These models predict location of potential habitat for each species within and near the study area. Literature and consultation are used to determine relevant landscape factors. In cooperation with subject matter specialists spatial models are built using these factors to map probable habitat. Data from existing monitoring programs will inform the models. (September/October/November 2010)

2. Climate-related Vegetation Change: Determine trends in greenness and productivity of the dominant vegetation types that occur within and around the study area. Isolate climate-induced change by combining normalized difference vegetation index (NDVI) trends with landscape data to isolate change from disturbance or land use- related change. Use I&M processed MODIS satellite NDVI to identify spatial and temporal trends in vegetation change over the last eight years. Produce fine-resolution climate surfaces for study area using existing I&M climate station histories. Augment and compare climate results with NVDI results. Determine phenology metrics for the study area. (October/November/December 2010)

3. Climate-related Habitat Change: Identify intersection of spatially coincident areas of target species habitat and climate-related change in vegetation. Model and estimate potential effects of these spatial changes on target species habitat present in the study areas. Estimate potential change or addition of habitat within or near administrative boundaries, given the inferred effects of climate change by feeding results from activity 2 into activity 1. (February/March/April 2011)

4. Develop Management Opportunities: Describe the location and extent of potential reduction or increase in habitat for target species. Describe alternatives for managing NPS resources to adapt to these effects using scenario planning. Scenario planning will involve analysis generated from this project to consider a variety of possible futures, with the goal of reducing risk of species loss to an uncertain future resulting from changing climate. Interaction with local managers and interested public via a series of workshops will determine effective ways to deliver conservation results and their value. (April/May/June/July 2011)

Outcomes with Completion Dates:

Draft report and Preliminary Findings - January 31, 2011

Database and Maps Provided to Park Management - July 31, 2011

Draft Final Report - January 28, 2012

Keywords: climate change, scenario planning, species of concern, Southwestern Utah
Parks/Monuments, Zion National Park, Bryce Canyon National Park, Cedar Breaks National Monument,
Montana State University