Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Riparian Forest Age Structure and Past Hydroclimatic Variability
Discipline: Interdisciplinary
Type of Project: Research
Funding Agency: National Park Service
Other Partners/Cooperators: University of Colorado at Boulder
Effective Dates: 9/1/2005 - 2/1/2007
Funding Amount: $11,000
Investigators and Agency Representative:

NPS Contact: Alexa Roberts, Superintendent, Sand Creek Massacre NHS, P.O. Box 249, 910 Wansted, Eads, CO 81036, 719-438-5916, alexa_roberts@nps.gov

Investigator: Connie Woodhouse and Jeff Lukas, Institute of Arctic and Alpine Research, University of Colorado – Boulder, 303-735-8101, Lukas@Colorado.edu

Project Abstract:

Sand Creek Massacre National Historic Site (SAND) was created to preserve, protect, interpret, and memorialize the site of a large Cheyenne and Arapaho village that was attacked by troops of the Colorado Cavalry, on November 29, 1864. The authorizing legislation calls for the NPS to protect "the cultural landscape of the site in a manner that preserves, as closely as practicable, the cultural landscape of the site as it appeared at the time of the Sand Creek Massacre." The riparian cottonwood forests at Sand Creek were, and remain, a critical element of this cultural landscape, providing shelter, timber, firewood, forage, and wildlife habitat. In addition, individual cottonwood trees along Sand Creek, both living and dead, have cultural and spiritual significance because of their association with the Indian encampments and the massacre itself.

These riparian ecosystems appear to have changed significantly over the 140 years since the massacre. Photographs of Sand Creek as late as the 1930s show many fewer trees than are now present. Management of the riparian ecosystems at Sand Creek will require better understanding of the site's environmental history, current conditions, changes that have occurred over time, and possible causes of those changes. Thus, the main objectives of the proposed research are (1) to describe the age structure of the cottonwood stands, targeting in particular trees that may have been alive in 1864 (Parts 1 & 2, below) and (2) to identify the hydroclimatic factors (e.g. floods, drought) that have influenced development of the stands (Part 3). By providing information on the ages of the trees, particularly the very oldest ones, the proposed research will assist the park in managing the trees as a cultural resource, including the gathering and use of ceremonial firewood from the site, implementing culturally and environmentally appropriate fuel reduction strategies, and other issues.

Bent's Old Fort National Historic Site is approximately 100km southwest of Sand Creek NHS and also has riparian cottonwood forests with significant resource values. There are a number of cottonwoods with deep fire scars. The dating of these scars (Part 4) would add to the knowledge of the area's fire history for the park's Fire Management Plan and perhaps impact the use of fire as a management tool. Some of the data collected for Part 3 will also be relevant to Bent's Old Fort NHS.

Outcomes with Completion Dates:

A.The final report will at minimum include an introduction including the rationale for the project, discussion of methodology, results, including a synopsis of dates, timing and special patterns of cottonwood communities, and hydroclimatic context of Sand Creek ecosystem changes, and recommendations for additional research needs. The completion of the report will require at least one visit to each site, in order to become knowledgeable about the site resources, to take samples, and to consult with park personnel.
B.The Principal Investigator/Researcher will submit the first draft report to NPS for review. The NPS will have 30 days to review the draft. The draft copy will include any associated maps and/or photographs (including xerographic copies of historic photographs). The Principal Investigator/Researcher will prepare the final report to reflect the review comments provided by NPS. The Principal Investigator will prepare a brief report abstract (suitable for public distribution) and two hard copies and an electronic version (PDF format) of the final report to be provided to the park
C.The Principal Investigator will complete the NPS Investigator's Annual Report (1 – 2 pp.) due about March 15 each year in the format to be provided by NPS staff.
D.Report fire scar dates for trees from Bent's Old Fort National Historic Site.
E.Return all materials collected, specifically fire scar slab cuttings, to Sand Creek Massacre NHS and Bent's Old Fort NHS.

Keywords: riparian forest, age structure, cottonwoods, dendrochronology, hydroclimatic variability, Univeristy of Colorado at Boulder, Sand Creek Massacre NHS, Bent's Old Fort NHS, cultural landscape

For Administrative Use Only:

Date Annual Report Received:
Date Final Report Received:

Publications, etc. on file: