Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Hydrological Analysis and Pilot Restoration of Artificially-Drained Wet Meadows at Florissant Fossil Beds National Monument, Colorado

Discipline: Natural
Type of Project: Technical Assistance
Funding Agency: National Park Service
Other Partners/Cooperators: Colorado State University
Effective Dates: 3/1/2012 – 12/31/2014
Funding Amount: $31,113

Investigators and Agency Representative:
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Project Abstract: Florissant Fossil Beds National Monument (FLFO) was established on land that had been homesteaded in the 1870's and used as cattle ranches. The ranches included small dams and reservoirs to hold water for livestock watering, and store seasonal flows for summer irrigation to produce hay. The land homesteaded for ranching contained large, natural groundwater-fed wet meadows (wetlands) dominated by sedges and rushes. However, several streams influenced by flows from these small dams have incised deeply (more than 6 feet in many areas) during the 20th century, and have drained the meadows, allowing upland exotic plants to invade the former wet meadows.

The public is interested in viewing FLFO's cultural and natural landscapes as they appeared and functioned in the late 1800's (homestead era). These cultural and natural features are being degraded by effects of artificial drainage, including the rapid pace of non-native plant invasion in the degraded meadows. The erosion and gullying continues to deepen and widen the channels, threatening entire meadow complexes.

FLFO will work with wetland ecologist Dr. David Cooper (Colorado State University) to conceptualize and implement a pilot restoration project that could lead to larger-scale restoration efforts of channels and meadows.

To achieve these goals the following tasks are proposed:
(1) Analyze all available air photographs to identify the historic and modern site conditions and to develop a time sequence of channel incision and vegetation changes. Review the General Land Office records from the period of settlement to determine if they contain information on site conditions at the time of settlement.
(2) Install and monitor a network of shallow ground water monitoring wells, piezometer nests, and stream and ditch staff gauges for the Hornbek Homestead area meadows and channel.
(3) Install a denser well and staff gauge network near the incised channel where a pilot hydrologic restoration project would be implemented.
(4) Establish wells in nearby undisturbed (unincised) reference meadows to collect data on water levels that support natural wet meadows with healthy populations of meadow plants.
(5) Conduct detailed topographic mapping and analyses of all dams, channels and meadow areas (reference and disturbed). Develop cross sections to characterize channel widths and depths, calculate volumes of available fill (from dams) and volumes of incised channels, and develop topographic maps of disturbed meadows and undisturbed reference meadows. Determine the elevations of all well casings.
(6) Establish vegetation plots at all well locations for the purpose of relating hydrologic conditions to plant communities.
(7) Design and implement a pilot restoration at the end of the first year that could include the movement of fill from the earthen dams into the existing incised channels and the restoration of a sheet flow meadow hydrologic system within a portion of the Hornbeck Ranch site. Monitor well networks and vegetation plots in the growing season following the pilot restoration.
(8) Analyze all data and produce a report that documents the results and conclusions from steps 1-7 above. The report would include recommendations for larger-scale wet meadow restorations in this area of the park.

Outcomes with Completion Dates:
Submit final report and data files to NPS - December 2014

Keywords: restoration, wetland ecology, hydrology, Florissant Fossil Beds National Monument (FLFO), California, Colorado State University