Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Mountain pine beetle altered forest fuel influences on wildfire in Glacier National Park

Discipline: Natural Resources
Type of Project: Research
Funding Agency: National Park Service
Other Partners/Cooperators: Colorado State University
Effective Dates: June 1, 2010 – December 31, 2012
Funding Amount: $40,000

Investigators and Agency Representative:
NPS Contact: Tara Carolin, Crown of the Continent Research Learning Center, Glacier National Park, P.O. Box 128, West Glacier, MT 59936; (406) 888-7863; tara_carolin@nps.gov

Investigator: Jason Sibold, Department of Anthropology, Colorado State University, Fort Collins, CO 90523; 970/491-4801; Jason.sibold@colostate.edu

Project Abstract: Climate change impacts on forest ecosystems will be most significantly related to altered patterns of natural disturbance regimes (Overpeck *et al.* 1990), which will create challenging scenarios for ecosystem management. Minimizing climate change surprises will be critical to assist management decision making. In the context of the fire dominated subalpine forests of the Rocky Mountains, altered climate will directly influence natural patterns of fire through increased frequency and severity of extreme fire-weather events. However, indirect influences of climate change on fire resulting from bark-beetle altered forest fuel conditions could play a critical role in shaping patterns of fire. Whereas it is unlikely that beetle-altered fuel conditions will surpass drought as the primary driver of fire in the subalpine zone (Bessie and Johnson 1995; Schoennagel *et al.* 2005; Sibold *et al.* 2006; Sibold and Veblen 2006), altered fuels will undoubtedly influence fire probability, spread, and severity even under extreme fire-weather scenarios (Turner and Romme 1994). In the context of Glacier National Park, understanding the relative roles of insect-altered forest fuels in contrast to climate in shaping recent patterns of fire spread and severity is important for fire management planning. Specifically, identifying the drivers of the recent period of burning in Glacier NP will help managers understand if climate change is already influencing fire in Glacier NP and if the recent decades are representative of the future fire regime of the park.

This study will investigate the role of the extensive 1970s MPB outbreak in Glacier NP (McGregor 1982) on patterns of large-scale wildfires that have occurred in the park in eight of the past 20 years. To investigate MPB-fire interactions, spatially-explicit modeling techniques within a geographic information system (GIS) environment will be used to identify the relative importance of MPB outbreak severity, as compared to biotic, abiotic, and climate influences on the probability, spread and severity of wildfire events in Glacier NP.

Outcomes with Completion Dates: May 31, 2012

Keywords: climate change, forest ecosystems, mountain pine beetle, fuels, wildfires, Glacier National Park, Colorado State University