

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Mass Balance of Sperry Glacier, Glacier National Park, Montana
Type of Project: Research
Project Discipline: Natural
Funding Agency: USGS
Other Partners/Cooperators:
Effective Dates: 2/1/2007 9/30/2007
Funding Amount: 30,000
Investigators and Agency Representative: Investigator: Joel Harper, Dept. of Geosciences, U. of Montana, 32 Campus Drive #1296, Missoula, MT 59812, 406-243-5867 Agency Rep. Dan Fagre USGS Northern Rocky Mountain Science Center c/o Glacier National Park, West Glacier, MT 59936-0128
Project Abstract: This cooperative research project will involve researchers from UM and the U.S. Geological survey in an investigation of the mass balance of Sperry Glacier, Glacier National Park. Glacier recession in the northern Rocky Mountains has been well-documented by use of maps, remote sensing and aerial photography. However, these techniques provide only the area of the ice and do not address the depth, mass, dynamics of accumulation and ablation or account for inputs such as snow avalanches that add mass to a glacier. To achieve a more realistic understanding of the rate of glacier recession, these factors must be addressed. Sperry Glacier will be used as an index glacier for intensive study and will represent other area glaciers. Two additional glaciers will have margins measured each year (i.e. end of summers 2007 and 2008).
Outcomes with completion dates (reports, publications, workshops, videos, etc.): <ul style="list-style-type: none"> • Plan and arrange for glacier measurement field campaigns for 2007 and 2008. This will include obtaining equipment, programming instruments, designing measurement systems (e.g. layout of ablation stakes), ensuring that fieldwork meets statistically appropriate standards, planning for safe glacier travel and arranging for field assistants as necessary. • Conduct fieldwork, to include: measurement of winter snow accumulation; measurement of snow density; mapping of avalanche debris, exposed rock outcroppings and other significant features affecting mass balance measurements; monitor local climate conditions during ablation season, take repeat photographs for documentation, measure ablation and map glacier margin. • Analyze data to provide a mass balance for Sperry Glacier from existing and new data for 2005, 2006 and 2007 by December 31, 2007. Produce a map(s) that shows the current glacier margin and in relation to past margins by December 31, 2007. Produce a map(s) that shows the

spatial distribution of accumulation and ablation by December 31, 2007.

- Produce a draft of a scientific manuscript for potential publication that reports the results of the Sperry measurements by May 31, 2008. Complete the analysis of the 2008 field data and incorporate into the draft scientific manuscript by December 31, 2008.

Keywords:

Glaciers, mass balance, climate change