

Project Completion Report Rocky Mountains Cooperative Ecosystem Studies Unit (RM-CESU)

Project Title: Orthorectification of Aerial Photography for Glacier National Park, Montana

Project Code (such as UMT-72 and/or the “P” number): P12AC10324 / UCOB-94

Type of Project (Research, Technical Assistance or Education): Research

Funding Agency: National Park Service

Partner University: University of Colorado

NPS Agreement Technical Representative (with complete contact information):

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Start Date of Project: 04/01/2012

End Date of Project: 12/31/2013

Funding Amount: \$23,042.00

Project Summary.

This work was conducted in support of the multiyear-project “Ice Patches as Sources of Archeological and Paleoecological Data in Climate Change Research in Glacier National Park.” This project completion report describes the efforts of Dr. William Manley and Leanne Lestak at the Quaternary GIS Laboratory (QGISL) at INSTAAR to scan high resolution diapositives (essentially large format 10” x 10” slide film) obtained by the USGS in September 1998 during aerial reconnaissance of Glacier National Park. Using a variety of state-of-the-art tools and concepts, QGISL orthorectified and georeferenced the overlapping images into mosaics for viewing in a GIS or other software package. Project partners at the Confederated Salish and Kootenai Tribes (CSKT) used the orthorectified images to create area polygons in ArcGIS. For the immediate purposes of our field efforts, this enabled us to load the polygons—as well as the orthorectified images—into our GPS units and to thereby assess in real-time the ice extents we encountered during the field survey relative to the historic ice minimums. The polygons proved to be of additional use in helping us place our ice coring equipment over areas of

“old ice” at the Siyeh Pass ice patch. As the larger project concludes, we’ll compare the area polygons created from the 1998 imagery with the project’s in-field GPS measurements of ice patch extents (as well as other sources of imagery) to quantify change in Glacier National Park ice patches through time. Note: The diapositives were returned to the USGS 10/24/2012 along with 2 DVDs containing the 1998 scans and 1 DVD containing the orthorectified mosaics and FGDC metadata. CSKT received copies of the digital media at the same time.

Number of students participating in this project: undergraduates, graduate students, degrees conferred.

Rachel Reckin, MA (University of Wyoming) assisted with project.

Lessons Learned from this project:

One of the major, painful lessons learned from this project was that digital media is not a failsafe mechanism for archiving data. Prior to the orthorectification work described above, the USGS had already orthorectified the diapositives in ca. 2001. They saved the orthorectified images on ca. 150 writable CDs, all of which had become corrupted. Thankfully, the USGS retained the prints, negatives and diapositives thereby allowing us to rescan a small subset for use in our project - “Ice Patches as Sources of Archeological and Paleoecological Data in Climate Change Research in Glacier National Park.”

Other RM-CESU agencies or research partners who participated in this project:

Partners involved in the over-arching project, but not funded under this agreement, include University of Wyoming, Salish Kootenai College, and Northern Rocky Mountain Science Center