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Update on the Cultural Monitoring R&D Project

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U.S. Department of the Interior
U.S. Geological Survey

Project Background

- AMWG recommended funding project in August 2005
- Project included in FY 2006-2009 work plans
- Field work initiate in March 2006 (concurrent with Archaeological Treatment Planning work)
- Field work continued through September 2007
- 2008-2009 field work not permitted by NPS (2006-2007 field work was covered under other project permits)
- 2008-2009 focused on re-writing proposal in response to NPS concerns and writing up 2006-2007 results

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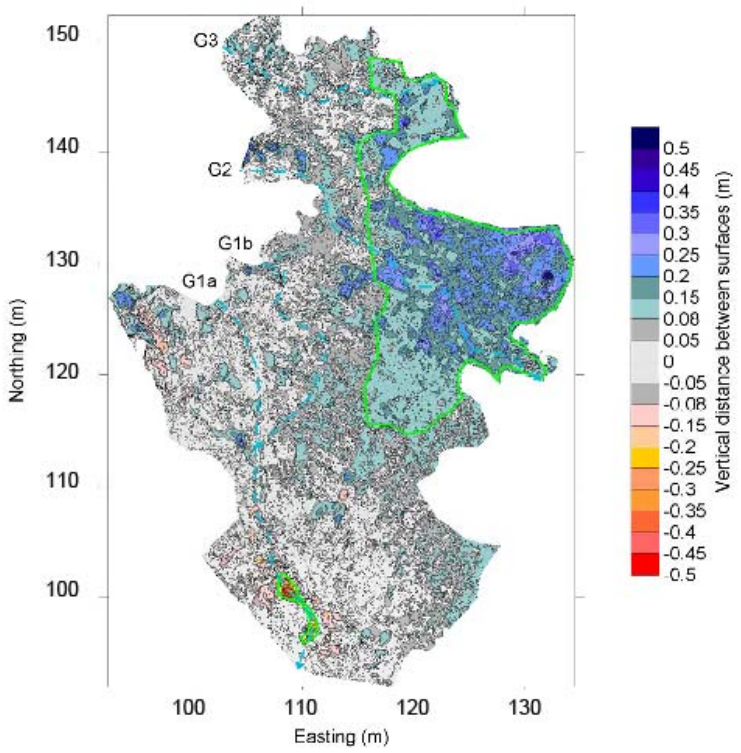
Primary Project Goal

To develop objective protocols for monitoring status & trends in archaeological site condition, by quantifying the physical changes occurring at sites that are tied to dam operation effects



Site AZ:C:13:006 — 10 cm gridded output showing erosion (red - negative) and deposition (blue - positive) from May 2006 to May 2007. Areas of definite change outlined in green.

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FY2006-2007 Accomplishments

- Submitted research proposals to NPS in Feb and July 2007 (also in July 2008 and again in February 2009) – 3 independent peer reviews - all positive/supportive
- Documented archaeological attributes at 232 archeo. sites and created database (Leap and others, n.d.)
- Documented geomorphic attributes at 232 sites and created data base (Obrien and Pederson, in review)
- Conducted check dam monitoring and effectiveness study at 6 sites (Obrien and Pederson, in review)
- Completed NPS legacy monitoring data review (Kintigh and others, 2007)

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FY2006-2007 Accomplishments, continued

- Compared accuracy, efficiency and impacts of total station surveys vs. lidar surveys at 9 sites (Collins and others, 2008)
- Installed weather stations at 9 sites to assess how weather affects sed. transport and site condition (Draut and others, in press)
- Completed repeat lidar surveys at 9 sites and reported results (Collins and others, in press)

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Current Project Status

- Phase I (evaluation of potential monitoring protocols) partially completed
- GCMRC proposes to wrap up Phase I work in June, 2009 (pending receipt of NPS permit)
- Phase II (pilot monitoring phase) dependent on completing Phase I
- Multiple publications on various aspects of Phase I work either completed or in progress

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Publications

- Collins, B.D., Brown, K.B., and Fairley, H.C., 2008, Evaluation of Terrestrial LIDAR for Monitoring Geomorphic Change at Archaeological Sites in Grand Canyon National Park, Arizona: U.S. Geological Survey, Open File Report 2008-1384, 60 p. [http://pubs.usgs.gov/of/2008/1384/].

- Collins, B.D., Minasian, D., and Kayen, R., (in press). Topographic Change Detection at Select Archaeological Sites in Grand Canyon National Park, Arizona, 2006-2007: U.S. Geological Survey, Scientific Investigations Report 2009-XXX.

- Draut, A. E. Andrews, T., Fairley, H. C., and Brown, C. R., (in press), 2007 Weather and Aeolian Sand-Transport Data from the Colorado River Corridor, Grand Canyon, Arizona; U.S. Geological Survey, Open-File Report 2009-XXX.

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Presentations (Nov. 2008 Symposium)

- Collins, B.D., Kayen, R., Minasian, D., and Fairley, H., 2008. Terrestrial Lidar Topographic Change Monitoring At Archaeological Sites Along The Colorado River Corridor Of Grand Canyon National Park, Arizona. Oral presentation at *Colorado River Ecosystem Conference*, November 19, 2008, Tempe, Arizona.

- * Draut, A. E. Hazel, J. E. Jr., Fairley, H. C., and Brown, C. R., 2008, Aeolian Reworking Of Sediment Deposits From The March 2008 Grand Canyon High-Flow Experiment. Poster presented at *Colorado River Ecosystem Conference*, November 19, 2008, Tempe, Arizona.

- * Fairley, H.C. and Sondossi, H., 2008, Applying an Ecosystem Framework to Evaluate Archaeological Site Condition along the Colorado River in Grand Canyon National Park, Arizona. Poster presented at *Colorado River Ecosystem Conference*, November 19, 2008, Tempe, Arizona.

- O'Brien, G. and Pederson, J., 2008, Soil infiltration, shear strength, and gully erosion measured along the Colorado River – what is responsible for the erosion of cultural sites? Poster presented at *Colorado River Ecosystem Conference*, November 19, 2008, Tempe, Arizona.

- *Science Symposium Proceedings article currently in review

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Final Reports/Pubs in progress

- O'Brien, G. and Pederson, J., n.d. (in review), Geomorphic Attributes Of 232 Cultural Sites Along The Colorado River In Grand Canyon National Park, Arizona. Final draft report dated November 15, 2008 by Department of Geology, Utah State University, Logan, to U.S. Geological Survey, Grand Canyon Monitoring and Research Center, Flagstaff.

- O'Brien, G. and Pederson, J., n.d. (in review), Gully Erosion Processes and Parameters at Six Cultural Sites Along the Colorado River in Grand Canyon National Park, Arizona. Final draft report dated November 23, 2008, submitted by Department of Geology, Utah State University, Logan, to U.S. Geological Survey, Grand Canyon Monitoring and Research Center, Flagstaff.

- Draut, A. E., Fairley, H. C., and Sondossi, H., (n.d.), 2008 Weather and Aeolian Sand-Transport Data from the Colorado River Corridor, Grand Canyon, Arizona; U.S. Geological Survey, Open-File Report 2009-XXX.

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Questions?