Update on the Cultural Monitoring Research & Development Project

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TWG Meeting, Phoenix, AZ
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Monitoring Protocol R&D Objectives

- objectively document where and how much has eroded/deposited/changed
- provide accurate measurements & direct comparisons of change over time
- find methods that are cost effective, efficient, culturally sensitive, relatively low impact
Evaluation of Monitoring Tools

Weather stations

Terrestrial lidar

Total station

RTK GPS
Change Measured between 2006-2007:
4 sites w/ significant change, 2 sites with very minor change (< .1 cubic m), 3 with no measurable change

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Area w/ measured erosion (m²)</th>
<th>Area w/ measured deposition (m²)</th>
<th>Total % site area modeled w/ topo change</th>
<th>Average, maximum height of erosion (cm)</th>
<th>Average, maximum height of deposition (cm)</th>
<th>Volume of erosion (-) and deposition (+) (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ:C:13:006</td>
<td>12.0</td>
<td>260</td>
<td>21.3</td>
<td>15, 30</td>
<td>15, 35</td>
<td>-0.7/+26.9</td>
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<td>0.9</td>
<td>0.1</td>
<td>0, 0</td>
<td>12, 15</td>
<td>0/+0.1</td>
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<td>19</td>
<td>3.9</td>
<td>12, 20</td>
<td>12, 15</td>
<td>-0.8/+2.3</td>
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<td>AZ:C:13:099 playa area</td>
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<td>&lt;0.1</td>
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<td>0, 0</td>
<td>0, 0</td>
<td>0/0</td>
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</table>
FY2010 Objective: Complete Phase I

- Complete instrument evaluations (Lidar, RTK GPS)
  - Evaluate capability of new lidar instrument (Riegl Z420i)
  - Can we improve change detection measurement accuracy from 8cm to less than ~5cm?
  - Can newest lidar technology quantify other key indicators of site stability – e.g., artifact movement, biocrust cover, architectural stability?

- Develop random sample for future pilot program

- Conduct workshops
  - Tribal monitoring protocol integration workshop
  - Geomorphic workshop
FY2010 Accomplishments

- NPS permitted GCMRC to complete Phase I field work in 2010 – conducted April and September 2010

- GCMRC hired independent consultant (NAU) to analyze existing data & select random sample for future pilot program – in progress now

- Geomorphic workshop planned for summer 2010 to review geomorphic data & discuss conceptual model to guide future monitoring - deferred

- Workshop to explore integration of tribal monitoring protocols deferred due to EA & SDM workshops

- 2 Reports published, 3 in progress
Weather Stations in FY2010

- 11 weather stations operating consistently at 9 sites in 2010

- 2007-2009 Data Reports completed & published; 2010 report in progress

- Data review/reformatting completed in FY2010

- Draft Technical Manual
FY2011 Plan

- Propose CRAHG meeting – winter 2011
  - Review FY2010 accomplishments
  - Review Preliminary Phase I results
  - Discuss tribal monitoring integration
- Analyze FY2010 data, prepare report-winter/spring 2010-2011
- Prepare pilot monitoring plan – spring/summer 2011
- Geomorphic Workshop – winter 2011?
- Implement pilot monitoring program – spring 2011
FY2012-2013 Plan

- Continue pilot monitoring 2012-2013
- PEP review of pilot results – fall/winter 2013
- Refine monitoring program; prepare core monitoring report for TWG review – winter 2013-2014
- Implement core monitoring - spring 2014
Questions?