



**COLORADO RIVER MANAGEMENT PLAN
ANNUAL REPORT
FOR FISCAL YEAR 2013**



Project Number 133023

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Contributions by:

Lane Cameron, Biologist

Jen Dierker, Archaeologist

Brandon Holton, Wildlife Biologist

Dave Loeffler, River District

Cory Mosby, Wildlife Biologist

Jeremy Pribyl, Archaeologist

Vanya Pryputniewicz, Recreation Planner

Charlie Webber, Archeologist

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Executive Summary

The 2006 Colorado River Management Plan (CRMP) and associated Record of Decision (ROD) prescribed a multi-resource monitoring and mitigation program to focus on areas affected by river recreation where the integrity of natural and cultural resources may be at risk and where visitor experience may be negatively affected. The ROD also prescribed a site-specific restoration program to address campsite impacts, trails, and campsite maintenance and mitigations.

The CRMP Mitigation Program was initiated in November 2006. Projects were identified, planned, and implemented by an interdisciplinary team that includes river rangers, backcountry rangers, resource management specialists, trails specialists, and others. The fieldwork is conducted in partnership with the Grand Canyon River Outfitters Association (GCROA).

In coordination with Northern Arizona University (NAU), Grand Canyon staff developed a monitoring plan to examine long-term trends in changes to campsites resulting from recreational use. The campsite monitoring program was designed to document changes to vegetation, avifauna, and general impacts from visitation during low- and high-use periods. The monitoring program was implemented in April 2007 and continued through September 2010.

In FY 2013, NPS teams completed two CRMP mitigation river trips. Details of each trip are outlined in the appendices of this report. Visitor experience monitoring was conducted at one location during representative times of the river use season, and data were collected from administrative trips. The objectives, projects, and outcomes of each project are summarized below.

Mitigation Program

Lees Ferry to Diamond Creek Mitigation (November/December 2012)

The 2012 CRMP mitigation trip closely followed a high flow release from Glen Canyon Dam of 43,000 cfs occurring on November 18, 2012. The National Park Service (NPS) collaborated with research staff from the Grand Canyon Monitoring and Research Center (GCMRC) to accomplish key monitoring objectives in the Marble Canyon reach assessing the effects of the recent high flow. Mitigation treatments were completed at seven campsites. Archaeologists completed condition assessments, photo documentation, and stabilization efforts at 16 cultural resources sites.

Lee's Ferry to Diamond Creek Mitigation (February 2013)

In partnership with the GCROA, guides from Grand Canyon Whitewater joined the NPS interdisciplinary team to conduct site rehabilitation and maintenance projects at campsites and attraction sites. Mitigation treatments were completed at six campsites. Archaeologists completed national register eligibility testing at 3 cultural resources sites, and condition assessments, photo documentation, and stabilization efforts at 8 cultural resources sites

Monitoring Program

Natural Resources Campsite Monitoring

In 2013, program managers hired a GS-11 term biologist position to serve in the role of CRMP Technical Specialist for the purpose of revising the CRMP monitoring program based on the findings of the analysis completed by NAU during FY 2012-13. The incumbent has worked with interdisciplinary SRM staff to clarify management questions, identify key resource indicators, modify the study design, refine survey methods, document protocols, and guide implementation of an annual monitoring program. Elements of

the revised monitoring program were field tested in FY2013, and full implementation of the CRMP monitoring program is expected to resume by the end of FY2014.

Cultural Resources Monitoring

The primary goal of this monitoring program is to determine whether or not impacts have adversely affected archaeological resources along the river corridor. Results from monitoring activities provide information used to make decisions about treatments of impacts. A total of 86 archaeological sites were visited during three separate field sessions. Site condition records were updated for all these sites.

Visitor Experience Monitoring

Visitor use data collection occurred in the Lower Gorge near Quartermaster Canyon. Staff recorded information on a variety of river activities including pontoon tours, jet boat traffic, and Hualapai River Runner one-day whitewater trips. In addition, data on the number of helicopter tours in the area were documented; these data were shared with overflights planners.

Administrative Trip Log Data

Administrative trip log data were collected from 14 different administrative river trips, including Science and Resource Management, Grand Canyon Youth, and river trip patrols. A total of 298 database entries documented campsite use by commercial, non-commercial, and administrative trips. These data were used in the CRMP integrated resource monitoring analysis.

River Site History Project

The purpose of the site history project is to digitally archive thousands of photographs and reports documenting management actions within Grand Canyon National Park since the early 1980's. The resulting database will provide an organized, accessible resource for park planners to obtain site specific information about past mitigation and monitoring actions to inform future mitigation, monitoring and adaptive management actions.

Introduction

This report documents the accomplishments associated with the CRMP monitoring and mitigation program. In FY 2013, the NPS teams completed two CRMP campsite and trails mitigation river trips; one in November and one in February. Visitor experience monitoring occurred in the Lower Gorge, data were collected using river trip logs, and legacy data pertaining to river management actions were catalogued and entered into a site history database.

This report provides an overview of the programs and recommendations for future actions. Details of the work accomplished are documented in the individual trip reports included in the Appendices.

Purpose and Need

The purpose of this report is to provide an overview of the CRMP monitoring and mitigation activities in 2013.

The updated CRMP was implemented in 2007 following a 2006 Record of Decision. Major changes to recreation and resource management include the establishment of a launch-based system of distributing use (to ensure capacity standards were met), a decrease in maximum group size (from 44 to 32), and an increase in use during the spring, fall, and winter months (due primarily to an increase in non-commercial launch opportunities).

The CRMP management objectives emphasize managing river recreation to minimize impacts to resources while providing a quality visitor experience. To ensure these objectives are met the NPS must determine, through a research-based monitoring and mitigation program, what impacts are occurring, how these impacts alter resource condition, and how adverse impacts can be effectively mitigated. The objectives of the CRMP monitoring and mitigation program include:

- Determine status and condition trends of selected resources.
- Establish reference points and provide data to compare resource condition.
- Understand and identify meaningful resource condition change associated with visitor use.
- Understand effects of use patterns on visitor experience quality.
- Provide early warning of deteriorating resource conditions that trigger mitigation (management action toward restoration).
- In response to monitoring results, identify appropriate changes to management practices.
- Assess efficacy of management actions and restoration methods.
- Develop an effective approach to impacted-site mitigation and restoration.

Mitigation Program

Background

The 2006 Record of Decision document requires that park staff mitigate the adverse effects of visitation and management activities along the Colorado River corridor. Mitigation activities include delineating trails to decrease social trailing, obliterating trails that cause damage to natural resources or archaeological sites, actively planting vegetation in highly degraded campsites, and soil stabilization and erosion control in campsites, archaeological sites, and along trails. Grand Canyon National Park staff cooperates with various partners to perform restoration activities to mitigate the effects of concentrated human impacts along the river corridor. The interdisciplinary CRMP mitigation team is comprised of a recreation planner, restoration biologist, trails supervisor, archaeologist, and a river ranger. This core team conducts site assessments, prioritizes treatment sites, implements mitigation actions, and conducts follow-up monitoring. Representatives from each discipline participate in up to two mitigation river trips each year, typically in February and November.

CRMP mitigation program treatments are first prescribed through an assessment system and are then completed according to priority ranking and available resources. Attraction sites, research sites, rapid scouts, and other heavily impacted areas also fall under the assessment system. The CRMP mitigation team evaluates priorities for treatment sites using the CRMP mitigation assessment and monitoring form. This form records the site condition at the time of the initial site assessment, prescribes in detail the recommended actions, labor hours, and materials needed to accomplish the action, and monitors the effectiveness of mitigation and restoration actions. Once a site is assessed, it enters into a cyclical schedule for further assessment based on the severity of impacts at the site.

At the time a mitigation action is completed, the team uses a mitigation data form and establishes photo points to document the work. Once a site has been assessed, prioritized, and restored, it is placed into the cyclic reassessment phase. If the team determines that additional mitigation treatment is required upon reassessment, the site goes back in the queue for restoration or maintenance work.

Through reassessments and long-term photo points, the team can determine if the methods are effective. If a method is not proving effective, the team has the flexibility to try something new. New methods for restoration are being explored with each restoration effort. Each site is unique, and each requires

creativity and interdisciplinary consensus to formulate a mitigation plan that is appropriate for that particular site.

The assessment and reassessment process through the CRMP mitigation program should not be confused with the CRMP monitoring program. The CRMP monitoring program collects data on long-term impacts to vegetation, wildlife, and visitor experience at campsites and attraction sites due to visitor use, while the CRMP mitigation program focuses on specific impacts at a local scale. As more data are collected and analyzed through the CRMP monitoring program, these long-term trends can be used to adjust priorities for future mitigation actions to be conducted under the CRMP mitigation program.

Two river trips from Lees Ferry to Diamond Creek were conducted in FY 2013 to assess and mitigate damage to campsites: one from November 25 - December 12, 2012 (*See Appendix A for details*), and one from February 16 - March 6, 2013 (*See Appendix B for details*).

Objectives

General Mitigation Objectives:

- Continue to perform mitigation actions according to the priorities established through the CRMP mitigation assessment process.
- Continue reassessments at previous restoration sites and maintain documentation as prescribed in mitigation assessment forms.
- Expand stakeholder involvement with river corridor restoration under the CRMP by actively seeking volunteer participation on park trips.
- Expand outreach and education efforts by conducting lectures and orientations for park staff and stakeholder groups, publishing articles in river journals, and distributing site bulletins to the public.
- Begin to establish a link between the CRMP long-term resource monitoring program and the CRMP mitigation program.

Objectives for Both November 2012 and February 2013 River Trips:

- Complete mitigation treatments (such as obliteration of social trails, excess tent pads, and cyclic pruning and maintenance) at campsites, attraction sites, and access trails within the Colorado River corridor.
- Conduct monitoring (and stabilization treatment if appropriate) at several cultural sites.
- Complete campsite assessments and prescriptions for future mitigation work.
- Monitor and retake photopoints of past treatment areas to evaluate effectiveness of treatment methods.
- Assess and maintain backcountry composting toilet facilities.
- Continue to offer cross-training opportunities for interdisciplinary NPS staff, and offer volunteer opportunities for the public in resource management activities.

Objectives Specific for the November 2012 River Trip:

- Visit the Granite-Monument pilot stewardship project to evaluate site design and consider opportunities for proactive visitor use management.
- Retrieve bighorn sheep GPS collar that had come off a ewe near Kanab Creek in November 2012; observe and record bighorn sheep in the lower canyon and download collars if feasible.
- GCMRC objectives:
 - Sandbar surveys at several locations in Marble Canyon.
 - Downloading data cards from several remote camera stations in Marble Canyon.
 - NAU photopoints at select locations.
 - Retake of adopt-a-beach photos at select locations.

Objectives Specific for the February 2013 River Trip:

- Visit the Granite-Monument pilot stewardship project to retrieve equipment and water recent plantings.
- Retrieve bighorn sheep GPS collar that automatically released near Fern Glen, collect sheep pellet samples for population estimates, and monitor status of 5 additional collared bighorns.
- Exchange Romtec and effect repairs to privacy screening at Tanner backpacker's campsite.
- Training and orientation for new hire Rachel Brady, visitor and resource protection ranger, river district.
- Cultural resource objectives:
 - Ensure cultural resources were not adversely impacted by the mitigation measures conducted by the CRMP team.
 - Conduct National Register eligibility testing at C:06:0006, C:13:341 and B:10:0262.
 - Assess graffiti located at C:09:0088.
 - Conduct stabilization work at B:10:0223 and A:16:0001.
 - Conduct condition assessments at all sites visited.

Results and Observations

Lees Ferry to Diamond Creek, November 25 – December 12, 2012

The launch of the 2012 CRMP mitigation trip was postponed until after the completion of a high flow release from Glen Canyon Dam of 43,000 cfs for 24 hours occurring on November 18, 2012. The timing of the launch presented a unique opportunity for the NPS to accommodate research staff from the GCMRC on the trip in order to accomplish key monitoring objectives in the Marble Canyon reach assessing the effects of the recent high flow.

Planned treatments were completed at Soap Creek, Little Nankoweap, Main Nankoweap, Tanner, Hance, Whitmore, and 202-mile campsites. The planned work at Deer Creek was deferred until the February trip in order to have more time to find the bighorn collar and to complete the assessment and temporary stabilization at Whitmore. A total of 23 sites were assessed, and mitigation monitoring photopoints were retaken at 11 sites. Composting toilets were maintained at Tanner.

Archaeologists completed condition assessments and photo documentation at 12 sites, and minor stabilization efforts at 4 cultural resources sites. Cultural resources work is documented in a separate report available through the cultural resources program manager.

Additional tasks and accomplishments:

- Retrieved bighorn sheep collar near Kanab Creek.
- Located via radio telemetry 6 of 7 collared bighorn sheep.
- Observed 29 bighorn sheep along the river between Soap Creek and Indian Canyon.
- Delivered and exchanged tools and ammo cans in support of the Granite project.
- Transported crew member from Phantom to Granite in support of the Granite project.
- Gathered river corridor images for the science and resource management outreach coordinator.
- Provided opportunities for cross-training of park and interagency staff.
- Utilized 458 hours of volunteer labor.

Problems Encountered and Solutions

The addition of three independent projects for GCMRC and the associated logistics to an already full agenda within two weeks of the launch date was a steep challenge. It is a testament to the experience, leadership, and professionalism of NPS, USGS, and NAU boatmen and staff that they were able to plan

for and safely accomplish all priority objectives within a short timeline and a demanding on-river schedule. Following is an email from Paul Grams of USGS:

“I just wanted to write to say thanks to everyone for making the trip work so smoothly. Everything went great on our end. We were able to get to all of our cameras, survey a few sandbars and take lots of extra photos. Below, I’ve pasted some links to locations where you can access the photos. I hope we can do it again sometime.” (See Appendix A for links)

One of the rafts developed a leak inside the belly of the right tube. After considering a variety of options, including exchange of the raft via helicopter, the crew elected to attempt a large compression patch to stabilize the affected area. This was accomplished during a scheduled layover at Main Nankowep campsite and was effective for the remainder of the trip.

Lees Ferry to Diamond Creek, February 16 – March 6, 2013

Planned treatments were completed at Soap Creek, Tanner backpacker’s camp, Hance, Deer Creek, and Whitmore. A total of 19 sites were assessed, and mitigation monitoring photopoints were retaken at 8 sites. Composting toilets were maintained at three remote backcountry sites.

Archaeologists completed national register eligibility testing at 3 cultural resources sites, and condition assessments, photo documentation, and stabilization efforts at 8 cultural resources sites. Cultural resources work is documented in a separate report available through the Cultural Resources program manager.

Additional tasks and accomplishments:

- Successfully retrieved bighorn sheep collar and downloaded data. Monitored presence of 5 radio-collared sheep, and opportunistically observed sheep and collected pellet samples.
- Visitor contacts
 - Conducted numerous informal presentations on resource management areas of concern to guide trip participants and visitors.
 - Contacted 14 private permitted trips, a GCMRC trip, a USGS-science trip and a NPS science trip.
 - Contacted 6 permitted hiking groups (9 people total).
- Bucket watered 37 trees and backhauled some equipment in support of Granite project.
- Provided opportunities for cross-training of park staff.
- Developed a framework for a wilderness monitoring and mitigation assessment program and conducted a pilot survey at Deer Creek.
- Utilized 90 hours of volunteer labor.

Problems Encountered and Solutions

The professional guides supplied by Grand Canyon Whitewater under our CRCP program made this trip run very smoothly. Park staff received feedback from the outfitter that it might be better timing to run these trips in early spring rather than the late fall-early winter time slot of November in order to get interest from GCROA. It is recommended that the program continue to work through the CRCP agreement to outfit at least one mitigation trip per year. The late winter/early spring timeframe should become the default timing for co-op requests to ensure the greatest likelihood of getting a wide range of outfitters to participate.

Monitoring Program

Background

The CRMP Record of Decision (2006) called for a resources monitoring program that focuses on areas affected by river recreation where visitor experience may be negatively affected and where the integrity of natural and cultural resources may be at risk. The primary components of the CRMP monitoring program include an integrated natural resources monitoring program to establish baseline conditions and to monitor long-term trends in campsite condition, an archeological site monitoring program to document and monitor archeological resources that may be affected by visitation along the Colorado River corridor, and a visitor experience monitoring program to assess how current management of daily trip launches, group size, trip length, and other river trip attributes affect the quality of the visitor experience. Until 2011, campsite monitoring trips were conducted twice each year to monitor conditions in April following a low-use period, and in September, following the high-use period. Archeological site monitoring is scheduled every two years.

Natural Resources Campsite Monitoring

Background

The natural resources campsite monitoring program measures recreation use effects by documenting standard human impact variables and measuring and monitoring vegetation and avifauna in the river corridor's new and old high water zones. Using aerial photographic maps, the team also documents changes to the campsite boundary and campable area polygons. A collection of campsite maps and a database documenting all previous campsite inventories, termed a campsite atlas of maps, was developed for all campsites from Lees Ferry to Diamond Creek in coordination with GCMRC beginning in 2007. The vegetation and avifauna monitoring plan (2007) described a sampling framework to ensure that a variety of campsite sizes, locations, and levels of use were represented. In 2011, following a program review, program managers decided to suspend campsite monitoring data collection in order to focus on analysis of data collected during the previous four years. An agreement with NAU was sought and funded, and data were prepared for analysis.

During FY 2012, NPS program managers and staff worked closely with NAU staff on the analysis and interpretation of the data in order to design a new monitoring program. It was important for NPS staff to help the NAU staff understand the "on the ground" protocols and applications, and how and why the management questions were formulated. The specific conclusions and recommendations for vegetation, recreation, and avifauna monitoring are outlined in the NAU final report and were more closely examined by a NPS natural resource specialist hired in FY 2013. In general, analysis showed that most of the response variables measured for vegetation and recreation monitoring had strong associations with visitor use levels, including hiker accessibility, while physical attributes of the river corridor (river mile and volume) had weaker associations with response variables. Also, there were few differences between data collected in the spring (post-low-use) and in the fall (post-high-use season). For the avifauna component, it was determined that the sample size was inadequate to draw conclusions. Park staff had previously conceded that this monitoring program may have weak associations with recreational use and was considering ceasing monitoring efforts in 2011, but it had agreed to move forward with the analysis.

In FY 2012, program managers and their staff refined protocols and documented deficiencies in the methods and the overall program. In September 2012, NAU delivered a draft report which was reviewed by program managers and staff. Prior to delivery of the final report, program managers agreed to move forward with hiring a one-year term natural resource specialist to develop a revised monitoring plan based on several of the recommendations in the report. The final report from NAU was received in the second quarter of FY 2013. The entire report is available upon request from the division of science and resource management). Objectives and preliminary results for FY 2013 are summarized below.

Objectives

The overall objects for the CRMP campsite monitoring program are to determine resource condition trends for campsites by examining changes to vegetation and avifauna, and to determine impacts from human use of campsites. Given the objectives of the overall program and the need to more closely review the data, the NPS employed the services of the NAU lab of landscape ecology and conservation biology. The primary goals of the analyses were to 1) analyze and interpret monitoring datasets to help answer key management questions, 2) use data from 2007-2010 to qualitatively and quantitatively assess the current study design and monitoring indicators, and 3) analyze and interpret the avifaunal data within the broader framework of the CRMP data analysis. A new term natural resource specialist was hired in FY 2013 for a one-year period to design a new monitoring program. The specialist will review the NAU final report and determine how to incorporate recommendations. A new monitoring program may include other resources and possibly incorporate research and monitoring conducted by GCMRC.

Results and Observations

The CRMP campsite monitoring program underwent a rigorous review by an interdisciplinary team of natural resource specialists, with oversight from the park senior ecologist. An outline for a revised CRMP monitoring program was completed in September 2014. The revised monitoring program will reflect the findings of the NAU data analysis, and consists of a sampling approach that allows:

1. Rapid assessment of the condition of vegetation communities at campsites and attraction sites along the river,
2. Track general campsite condition through repeated condition estimates of the core campable area available for visitors at campsites,
3. Document visitor impacts (i.e. campfires, trash, and human waste).
4. Acquire data on impacts to fragile soils and vegetation immediately upland of the active river flood zone and its associated riparian community,
5. Capture information on the distribution of selected wildlife along the river
6. Evaluate water quality at selected attraction features vulnerable to pollutants from natural or anthropogenic sources.

Recommendations for the Future

Complete integrated resource monitoring protocols. Establish and describe the relationship between the natural resource monitoring program and rehabilitation and restoration activities conducted under the CRMP mitigation program.

Cultural Resources Monitoring

Background

The river corridor archaeology program scope encompasses 277 miles of the Colorado River and adjacent side canyons with over 674 recorded archeological sites. Site types include both temporary and long-term use and date from 7,000 years ago to the historic era. The project methods and protocols for monitoring are contained in the CRMP monitoring protocol (Dierker, 2011). The program is intended to be responsive to condition data. Program methods will continue to be refined and updated as needed.

Objectives

The primary goal of this monitoring program is to determine whether or not impacts have adversely affected archaeological resources located within the project area. Results from monitoring activities provide information used to make decisions about treatments of impacts. The program is also intended to inform managers about when new mitigation may be necessary and the appropriateness of preservation

measures previously implemented. Disturbance thresholds determine when to implement mitigation treatments to prevent resource or integrity loss.

NPS cultural program objectives focus on the identification of processes affecting national register integrity. Cultural resource monitoring results in the identification of observed processes and disturbance levels and the assessment of the potential threats associated with a site and identification of the time interval when a site threat may become a disturbance. The observed threats and disturbances are assessed to determine what the effects on integrity are, and which aspects of integrity are affected. Treatment (mitigation) recommendations are made during the monitoring observation.

Program management objectives for cultural resources include the maintenance of site integrity with site stability and preservation as the desired state. If site stability cannot be maintained and preservation is not viable, minimizing effects to site integrity is required. Preservation of historic property significance and integrity are keys to continued access by traditionally associated American Indian tribal members.

Field visits consist of reviewing previous site forms including condition data, maps, and photographs. A walkover of the entire site ensures a complete observation of disturbances. For each scheduled site visit, a field packet is assembled consisting of a printed site form containing all previous condition and monitoring information, photos of each feature and site, and maps. Black and white film is used to document current condition as these negatives are currently the only stable photographic medium meeting NPS documentation standards. Updated site records, monitoring forms, and photographic documentation are all entered into the Grand Canyon archaeological sites database upon return from the field.

Results

A total of 86 archaeological sites were visited during three field sessions. Site condition records were updated for all these sites. All paperwork and photographs were entered into the Grand Canyon archaeological sites database. Cultural resources work is documented in a separate report available through the Cultural Resources program manager.

Visitor Experience Monitoring

Background

The 2006 CRMP modified several aspects of river trips (e.g. launch scheduling, trip length, group sizes) that are expected to change use patterns and impacts on visitors' experiences. A visitor experience monitoring plan (Shelby, Whittaker, Oregon State University, 2007) proposed several methods to monitor the effects of the plan on visitor experience, including 1) annual use information report, 2) researchers documenting observations on trips, 3) post-trip surveys, 4) non-commercial post-trip contacts, 5) attraction site observations and on-site interviews, 6) administrative trip logs, and 7) search and rescue analysis.

During FY 2013, methods used to monitor visitor experience were attraction site observations conducted at Quartermaster Canyon, river mile 262, and administrative trip log data documenting campsite use. Attraction site observations measured use levels at the attraction site to focus on how encounters with other trips affect river runners' experiences. Administrative trip logs consisted of participants collecting information on all observed trips between Lees Ferry and Diamond Creek. Information included trip type, number of boats, number of people, locations where trips had stopped, and what activities trip participants were engaged in at each location (for example, scout, hike, camp, lunch, project work, etc.).

Objectives

- Gather data in the Quartermaster area to provide information to park management regarding the frequency and number of helicopter flights and pontoon boat tours operating in this area.
- Determine frequency of use by different types of trips at Colorado River campsites from Lees Ferry to Diamond Creek.

Results and Observations

Attraction Site Observations

Staff was present at Quartermaster canyon on July 15-17 and August 4-6 to measure visitor use levels during the peak season in the Quartermaster area. Observers collected detailed information on the tours including number of tours, number of people on each pontoon tour, duration of tour, arrival and departure times, and number of helicopter flights.

Table 1. Pontoon Boat Tour Activity near Quartermaster Canyon (River Mile 262) during observation periods.

DATE	7/14	7/15	7/16	7/17	8/4	8/5	8/6
Number of hours observed	3	10	10	10	10	10	10
Number of pontoon tours	15	105	97	96	73	107	112
Total number of people on tours (including guides)	115	1060	971	941	672	1152	1206
Average group size (including guides)	7.6	10.1	10	9.8	9.2	10.7	10.7
Duration of tour (in minutes)	14.9	16	16.9	16.6	16.2	15.9	14.6

The 2006 CRMP set a standard for visitor experience that the maximum number of daily pontoon boat passengers would be 480, with an allowable increase to 600 passengers per day based on favorable performance reviews and resource monitoring data. The data show that actual use levels far exceed the standard set by the CRMP, with more than 1000 passengers on some days.

Administrative Trip Log Data

Administrative trip diary data were collected from 14 different administrative river trips, including science and resource management, Grand Canyon Youth, and river trip patrols. A total of 298 database entries documented campsite use by commercial, non-commercial, and administrative trips. In addition, several of the commercial outfitters provided trip leader logs, which represented a total of 1037 entries documenting campsite use by commercial trips. These combined sources of data provided information on campsite occupancy levels for use in the analysis of the CRMP Integrated Resource Monitoring data.

Recommendations for the Future

- Conduct data analysis and program review of the visitor experience monitoring program in FY 2014.
- Explore other methods of obtaining visitor experience data such as remote cameras and surveys.
- Establish relationships with other visitor use data sources such as search and rescue statistics.
- Conduct monitoring at attraction sites as needed.
- Continue to work with partners in the commercial guiding community to obtain trip logs and provide a better picture of actual campsite occupancy rates.

River Site History Project

River and backcountry recreation impacts at Grand Canyon National Park have been managed through different mitigation and monitoring programs since the early 1980's. These programs were documented through reports, supporting documents, slides, and photographs. The objectives of the river site history project are to digitally archive thousands of photographs and reports documenting management actions within Grand Canyon National Park, and to provide a database for park planners and management to obtain site-specific information about past mitigation and monitoring actions.

The site history database summarizes management actions. The information in the database was taken from the original files of current and former employees. The documents date from the late 1970's to the early 2000's. These files contain trip reports, planning documents, data, correspondences, and other supporting documents for management actions along the river and backcountry areas. The initial focus of the project is on a selection of river campsites that have a history of mitigation projects and monitoring programs since the late 1970's. The original reports will be scanned and linked to the site history database when the project is completed.

Summary of Partnerships and Cooperation

- The CRMP projects and river trips were accomplished in cooperation with several internal and external partners. Partnership projects ranged from hands-on campsite mitigation and trails maintenance to data collection and on-site consultations.
- Grand Canyon interdisciplinary teams included staff from the river district, canyon district, trails, backcountry & river permits office, resources management, and concessions.
- Grand Canyon staff cooperated with GCMRC to achieve monitoring objectives following the November 2012 high flow. GCMRC provided logistical support and labor for the November mitigation trip.
- The cooperative resource conservation program was conducted under a cooperative agreement with the Grand Canyon River Outfitters Association. Grand Canyon Whitewater, the host outfitter, provided logistical support and labor for the February mitigation trip.
- Grand Canyon staff partnered with Grand Canyon Youth and GCMRC to pilot campsite monitoring methods.

Overall Recommendations

- Finalize protocols for the vegetation, recreation, and avifauna monitoring programs and resume long-term monitoring.
- Develop protocols for a rapid assessment.
- Establish a relationship between the CRMP monitoring and mitigation programs and the design and implementation of the backcountry management plan.
- Draft a five-year synthesis report incorporating all elements of CRMP monitoring and mitigation programs. This technical report will be peer reviewed and published through the NPS natural resources publications program.

Appendix A - November Mitigation Trip Report

Trip Dates November 25 – December 12, 2012

Trip Objectives

The main objectives of this trip were as follows:

- Complete mitigation treatments (such as obliteration of social trails, excess tent pads, and cyclic pruning and maintenance) at campsites, attraction sites, and access trails within the Colorado River corridor.
- Conduct monitoring (and stabilization treatment if appropriate) at several cultural sites.
- Complete campsite assessments and prescriptions for future mitigation work.
- Monitor and retake photopoints of past treatment areas to evaluate effectiveness of treatment methods.
- Assess and maintain backcountry composting toilet facilities.
- Continue to offer cross-training opportunities for interdisciplinary NPS staff, and offer volunteer opportunities for the public in resource management activities.
- Visit the Granite-Monument pilot stewardship project to evaluate site design and consider opportunities for proactive visitor use management.
- Retrieve bighorn sheep GPS collar that had come off a ewe near Kanab Creek in November 2012; observe and record bighorn sheep in the lower canyon and download collars if feasible.

Treatment sites planned for the November/December 2012 trip were Soap Creek, Little Nankoweap, Main Nankoweap, Tanner backpacker's camp, Hance, Deer Creek, and 202 Mile camps.

Additional Objectives

The launch of the 2012 CRMP mitigation trip was postponed until after the completion of a high flow release from Glen Canyon Dam of 43,000 cfs for 24 hours occurring on November 18, 2012. The timing of the launch presented a unique opportunity for the NPS to accommodate research staff from the GCMRC on the trip in order to accomplish key monitoring objectives in the Marble Canyon reach assessing the effects of the recent high flow. Objectives for the USGS and NAU were as follows:

- Sandbar surveys at several locations in Marble Canyon.
- Downloading data cards from several remote camera stations in Marble Canyon.
- NAU photopoints at select locations.
- Retake of adopt-a-beach photos at select locations.

Logistics and Personnel

Table 1. Participant List

Name	Affiliation	Role
Dave Loeffler	NPS V+RP River	NPS Trip Leader/Boatman
Michael Harris	V+RP River Crew (NPS)	Boatman/Laborer
Jake Blackwell	V+RP River Crew (NPS)	Boatman/Laborer
Jake Skeen	V+RP River Crew (VIP)	Boatman/Laborer
Jerry Cox	USGS/GCMRC	Boatman/Laborer
Linda Jalbert	S+RM Wilderness Program Manager	Laborer (Upper)
Vanya Pryputniewicz	S+RM Recreation Planner	Project Lead/Laborer
Kassy Skeen	S+RM Restoration Biologist	Vegetation Lead/Laborer
Jeremy Pribyl	S+RM Cultural Resources Specialist	Archaeologist/Laborer
Kelly Rowell	S+RM Rec Staff(VIP)	Laborer (Upper)
Todd Chaudhry	S+RM Watershed Ecologist	Laborer (Upper)
Paul Grams	USGS	Cameras (Upper)
Aaron Borling	USGS	Sandbar Surveys (Upper)
Karen Koestner	NAU	Sandbar Surveys (Upper)
Matt Kaplinsky	NAU	Cameras (Upper)
Rob Ross	USGS	Sandbar Surveys (Upper)
Brandon Holton	S+RM Wildlife Biologist	Bighorn Research (Lower)
Laura Williams	S+RM Rec Staff(VIP)	Photography

In addition, volunteers and staff hiked in to meet the trip at Tanner backpacker's camp and Hance rapid campsite to assist with mitigation projects:

Tanner:

Pete Pettengill, Rec Planner S+RM

Anastasia Roy, Interpretation (VIP)

Hance

Marybeth Garmoe, Vegetation S+RM

Jed Dryer, (VIP)

Matt Frisette, (VIP)

Table 2. Trip Itinerary

Date	Day	River Mile	Work Location	Project Details	Campsite Name
11/25/2012	-2		South Rim	Paperwork/, tool gathering	
11/26	-1		Flag/South Rim	Food buy/pack	
11/27	1	2.5R, 8R, 8.9R	Lees Ferry	Drive, launch: GCMRC stops (survey and camera) NPS assessment Jackass.	Soap
		11.3	Soap Creek	Project orientation, photopoints and mitigation monitoring camp Soap.	
11/28	2	16.6R, 22L, 30L, 32L		GCMRC stops (survey and camera). Assessment at Hot Na Na.	South
		31.9	South Canyon	Transit to South. Beach cleanup with crew, photopoints/scoping with arch, social trail obliteration.	
11/29	3	41.4L, 43.4R, 44R, 45R, 47L 50L, 51R	Eminence Exchange	GCMRC stops (camera and survey) Grams and Borling out; Kaplinski and Ross in at Eminence. Assessments at Nautiloid, Martha's, Bert's Beach, Eminence.	Nankoweap
		53.4	Nankoweap Complex	Transit to Nanko. Project scoping and photopoints at Little & Main. CRMP orientation for new crewmembers.	
11/30	4	53.4	Nankoweap Complex	Project orientation, pruning, social trail obliteration all camps. Rock trail to granaries.	Nankoweap
12/1	5	55.8L, 65.1L 65.8L		GCMRC stops (camera and survey), NPS photopoints and assessment at Kwagunt, assessment at Lava Canyon.	
		68.7	Tanner	Transit to Tanner; Hikers in (x2 Roy and Pettengill) Toilet maintenance, project scoping, photopoints, discussion of BMP.	Tanner
12/2	6	68.7	Tanner	Hikers out Tanner (x3 Kaplinski, Borling, Koestner) Campsite delineation, social trail obliteration, photo doc. (Tanner L&R)	Tanner
12/3	7	71.6	Cardenas	Hikers out Tanner(x3 Pettengill, Roy, Chaudhry) Photopoints, mitigation monitoring Cardenas. Assessments at Basalt, upper Nevills	

		77.1	Hance	Hikers in (x3 Garmoe, Fissette, Dryer). CRMP orientation project overview.	Hance
12/4	8	77.1	Hance	Social trail obliteration, Tonto West trail work	Hance
12/5	9			Hikers out Hance (x3 Dryer, Fissette, Garmoe) Transit to Phantom Assessment due Grapevine	
		93.8	Granite	Phantom Exchange (x3 Rowell, Jalbert, Skeen out; x2 Williams, Holton in.	Trinity
12/6	10	119.5	Transit	Transit, rephotography(AAB)	119.5
12/7	11	146	Transit	Transit, rephotography. Photopoints/AAB @ Owl Eyes. Locate bighorn collar ~RM 143R	146
12/8	12	171.6	Transit	Assessment /AAB at National	Stairway
12/9	13	188.4	Transit	Monitoring/stabilization @ Whitmore Panel, pruning access to attraction site.	Whitmore
12/10	14	202	202 Mile	Social trail obliteration/trail delineation @ 202.	202 Mile
12/11	15	225.9	Transit	Assessment at 221 mile.	Diamond
12/12	16		South Rim	De-rig	

Results and Observations

The following is a list of the major work completed during the course of this trip:

Soap Creek

- 1 social trail obliterated (15 m2)
- 1 excess OHWZ tent pad obliterated (170 m2)
- 3 NHWZ tent pads re-delineated after inundation from high flow
- Installed 20 live plants
- Collected FUNCYN seed

Little Nankoweap

- 5 social trails obliterated (23 m2)
- 1 OHWZ tent pad obliterated (10 m2)

Nankoweap

- 1535 m pruned (intercamp connecting trails and trails to attraction site)
- 5 NHWZ social trails obliterated (16 m2)
- 4 OHWZ social trails obliterated (100 m2)
- 3 excess OHWZ tent pads obliterated (49 m2)
- 1 check step installed (attraction site trail)

Tanner

- 14 social trails obliterated (212 m2)

Pruned 682 m intercamp connecting trails
7 m of liner rock installed
2 log checks installed
1 NHWZ tent pad delineated (10m2)
Switchback delineated (5 m2)

Hance

12 OHWZ social trails obliterated (131 m2)
Pruned 350 m intracamp connecting trails and scout trail

Tonto Trail

390 m2 social trails obscured (rock and gravel)
228 m new trail delineated (8 m liner rock, 6 check steps)
750 m trail tread rocked, debris removed and trail delineated

Whitmore

48 meters of trail pruned and delineated to attraction site
Erosion of cultural feature temporarily addressed with emplacement of one log check and ~60 gallons of sterile sand and gravel.

202 Mile Camp

2 OHWZ trails obliterated (4.5 m2)
Pruned 90 m in central camp area
Scarified 50 meters of undesired social trail at attraction site
6 rock cairns emplaced along desired route to attraction site

Picked up major trash and cleaned fire rings at

Jackass
Soap Creek
Hance

Photopoint monitoring completed at

Soap Creek Camp
South Canyon Camp
Little Nankoweap Camp
Main Nankoweap Camp
Nankoweap Point Camp
Kwagunt Camp
Tanner Backpacker Camp
Cardenas
Hance Camp
Owl Eyes Camp
202 Mile Camp

Completed assessments at:

Jackass Camp
Soap Creek
Hot Na Na
Shinumo Creek
South Canyon

Nautiloid
Bert's Beach
Eminence
Little Nankoweap Camp
Main Nankoweap Camp
Nankoweap Point Camp
Kwagunt
Lava Canyon Camp
Carbon
Basalt
Tanner Backpacker's Camp
Cardenas Camp
Upper Nevills
Galloway Camp
Owl Eyes Camp
Tuckup
Lower National Camp

Stirred and completed toilet maintenance at:
Tanner Backpacking Camp

Additional tasks and accomplishments included:

- Delivery and exchange of tools and four ammo cans in support of the Granite project.
- Transportation of one crew member from Phantom to Granite in support of the Granite project.
- Gathering of river corridor images for the S+RM outreach coordinator.
- Provide opportunities for cross-training of park and interagency staff.
- This trip utilized 458 hours of volunteer labor.

Cultural Program

Conducted condition assessments at 12 sites.
Minor mitigation and stabilization efforts at 4 sites.

Problems Encountered and Solutions

The addition of three independent projects for GCMRC and the associated logistics to an already full agenda within two weeks of the launch date was a steep challenge. It is a testament to the experience, leadership, and professionalism of NPS, USGS, and NAU boatmen and staff that we were able to plan for and safely accomplish all priority objectives within a short timeline and a demanding on-river schedule.

Following is an email from Paul Grams of USGS:

I just wanted to write to say thanks to everyone for making the trip work so smoothly. Everything went great on our end. We were able to get to all of our cameras, survey a few sandbars and take lots of extra photos. Below, I've pasted some links to locations where you can access the photos. I hope we can do it again sometime. (*See below for links*).

One of the rafts developed a leak inside the belly of the right tube. After considering a variety of options, including exchange of the raft via helicopter, we elected to attempt a large compression patch to stabilize the affected area. This was accomplished during a scheduled layover at Main Nankoweap camp, and was effective for the remainder of the trip.

Follow- up Actions

In the future, interagency collaboration on CRMP mitigation trips should require having the scope of proposed work, number of personnel, equipment, site visits and expected time required on site available to NPS River district trip leader and project leader(s) at least 120 days in advance of the launch date (i.e. during the planning stage of the trip).

The presence of cultural resources staff for the duration of this trip allowed the CRMP mitigation team to fully exercise their ability to address significant resource impacts encountered at a variety of sites. The benefit of experienced leadership and crew for these trips and continued participation from a variety of disciplines cannot be overstated.

It is likely that the SOTAR raft we patched during the trip will need to be retired from service.

Management may wish to review and clarify current policy for equipment repair and replacement to ensure that the NPS River District fleet is maintained to a level and standard adequate to support the needs of the park.

Links to GCMRC post high flow monitoring photos

Table-based photo viewer:

<http://www.gcmrc.gov/gis/silverimage1.aspx>

Map-based viewer:

<http://www.gcmrc.gov/gis/silvermap1.aspx>

We have also prepared a powerpoint that has pre/post flood comparisons for the same sites. Below are links to versions at two different resolutions.

<https://docs.google.com/open?id=0B7lcByloNF0IbWIZV3MwM2x4RWc>

<https://docs.google.com/open?id=0B7lcByloNF0IeIhrSjNHWkI2RGM>

Appendix B – February Mitigation Trip Report

Trip Dates February 16 – March 6, 2013

Trip Objectives

The main objectives of this trip were as follows:

- Complete mitigation treatments (such as obliteration of social trails, excess tent pads, and cyclic pruning and maintenance) at campsites, attraction sites, and access trails within the Colorado River corridor.
- Complete campsite assessments and prescriptions for future mitigation work.
- Monitor and retake photopoints of past treatment areas to evaluate effectiveness of treatment methods.
- Assess and maintain backcountry composting toilet facilities.
- Continue to offer cross-training opportunities for interdisciplinary NPS staff, and offer volunteer opportunities for the public in resource management activities.
- Visit the Granite-Monument pilot stewardship project to retrieve equipment and water recent plantings.
- Retrieve bighorn sheep GPS collar that automatically released near Fern Glen, collect sheep pellet samples for population estimates, and monitor status of 5 additional collared bighorns.
- Cultural resource objectives:
 - Ensure cultural resources were not adversely impacted by the mitigation measures conducted by the CRMP team.
 - Conduct National Register eligibility testing at C:06:0006, C:13:341 and B:10:0262.
 - Assess graffiti located at C:09:0088.
 - Conduct stabilization work at B:10:0223 and A:16:0001.
 - Conduct condition assessments at all sites visited.

Treatment sites planned for the February/March trip were Soap Creek, Tanner backpacker's camp, Hance, Deer Creek, and Whitmore.

Additional Objectives

- Exchange Romtec and effect repairs to privacy screening at Tanner backpacker's campsite.
- Training and orientation for new hire Rachel Brady, visitor and resource protection ranger, river district.

Logistics and Personnel

Table 1. Participant List

Name	Affiliation	Role
Dave Loeffler	NPS V+RP River	NPS Trip Leader/Boatman
Jake Blackwell	V+RP River Crew (NPS)	Boatman/Laborer
Rachel Brady	V+RP River Crew (NPS)	Trainee/Laborer
Brock DeMey	GCW	Boatman/Laborer
Brie Short	GCW	Boatman/Laborer
Tim Snyder	GCW	Boatman/Laborer
Davis Sherman	GCW	Boatman/Laborer
Thea Lander	GCW	Boatman/Laborer
Kenneth Gough	GCW	Boatman/Laborer
Vanya Pryputniewicz	S+RM Recreation Planner	Project Lead/Laborer
Charlie Webber	S+RM Cultural Resources Specialist	Archaeologist/Laborer
Jeremy Pribyl	S+RM Cultural Resources Specialist	Archaeologist/Laborer
Stephanie Sutton	Interpretation	Laborer (Upper)
Cory Mosby	S+RM Wildlife Biologist	Bighorn Research (Lower)
Kate Lacey	S+RM (VIP)	Laborer (Lower)

In addition, volunteers and staff hiked in to meet the trip at Tanner backpacker's camp and Hance rapid campsite to assist with mitigation projects:

Hance

Pete Pettengill, Rec Planner S+RM

Sarah Sterner, Vegetation S+RM

Phantom

Kate Lacey, S+RM VIP

Table 2. Trip Itinerary

Date	Day	River Mile	Work Location	Project Details	Campsite Name
2/16/ 2013	-2		South Rim	Paperwork/, tool gathering, river gear checkout: all personal gear to boatshop	
2/17	-1	0	Lee's Ferry	Boatmen drive and rig, meet GCW crew. Dinner on your own.	Lees Ferry
2/18	1	11.3	Lees Ferry	NPS staff drive to LF. Introductions, safety briefing on the ramp. Transit to Soap; Crew orientation and project work@ Soap. Arch test pits.	Soap
2/19	2	35	Transit	Transit	Little Redwall
2/20	3	53.4	Lower Dam site, Nankoweap Complex	Graffiti removal at Lower Dam Site, 39.7L. Photopoints at Little & Main.	Nankoweap
2/21	4	68.7	Lava Canyon Tanner Left	Transit to Tanner, toilet maintenance, photopoints.	Tanner
2/22	5	68.7	Tanner Left	Campsite delineation, social trail obliteration, photo doc and mitigation monitoring, arch test pit, toilet exchange.	Tanner
2/23	6	77.1	Unkar Delta, Hance	Pruning and cyclic trail maintenance at Unkar Delta. Transit to Hance. Hikers in (x2 Pgil, Sterner)	Hance
2/24	7	77.1	Hance	Project orientation, social trail and tent pad obliteration. Arch test pits	Hance
2/25	8	93.8	Exchange/Transit	Phantom Exchange (Sutton out, Mosby, Lacey in) Transit to Granite	Granite
2/26	9	119.9	Transit	Transit	Blacktail
2/27	10	137.2	Transit	Transit. Check toilets Deer and Tapeats. Eligibility testing	Backeddy
2/28	11	159.0	Transit	Transit. Social trail obliteration at Ledges	159 mile R
3/1	12	178.9	Transit	Transit. Look for bighorn collar vicinity of Fern Glen.	Above Lava
3/2	13	188.4	Transit	Transit, arch/mit team assessment at Whitmore	Whitmore
3/3	14	188.4	Whitmore panel	Stabilization of midden, cyclic trail maintenance.	Whitmore
3/4	15	209.1	202 Mile	Photopoint and monitoring @ 202. Transit to Granite Park	Granite Park
3/5	16	225.9	Transit	Transit. Camp Diamond	Diamond
3/6	17		South Rim	Early takeout DC, Derig south Rim	

Results and Observations

The following is a list of the major work completed during the course of this trip:

Soap Creek

2 social trails obliterated (8m²)

Installed 25 live plants

Little Nankoweap:

5 social trails obliterated (23 m²)

1 OHWZ tent pad obliterated (10 m²)

Nankoweap

1535 m pruned (intercamp connecting trails and trails to attraction site)

5 NHWZ social trails obliterated (16 m²)

4 OHWZ social trails obliterated (100 m²)

3 excess OHWZ tent pads obliterated (49 m²)

1 check step installed (attraction site trail)

Tanner:

5 social trails obliterated (57 m²)

Pruned 460 m intracamp connecting trails

202 m of liner rock installed

Hance

10 OHWZ social trails obliterated (42 m²)

2 OHWZ tent pads obliterated (75m²)

Pruned 46 m intracamp connecting trails and scout trail

Tonto Trail:

164 m of rock lining

12 rock checks installed

1 rock staircase(2mx1.5m)

1 rock waterbar installed

Whitmore

48 meters of trail pruned and delineated to attraction site

Erosion of cultural feature temporarily addressed with emplacement of one log check and ~60 gallons of sterile sand and gravel.

Picked up major trash and cleaned fire rings at:

Jackass

Soap Creek

Hance

Completed photopoint monitoring

Soap Creek Camp

Saddle Canyon Camp

Little Nankoweap Camp

Main Nankoweap Camp
Nankoweap Point Camp
Tanner Backpacker Camp
Hance Camp
Deer Creek

Completed assessments

Soap Creek
Upper Saddle Camp
Little Nankoweap Camp
Main Nankoweap Camp
Nankoweap Point Camp
Tanner Backpacker's Camp
Cardenas Camp
Hance Rapid Camp
Granite Camp
Football Field
Above Lava

Stirred and completed toilet maintenance

Tanner Backpacking Camp
Tapeats Creek
Deer Creek

Cultural Program

Archaeologists completed national register eligibility testing at 3 cultural resources sites, and condition assessments, photo documentation, and stabilization efforts at 8 cultural resources sites.

Site Information

C:06:0006. The site consists of a very sparse prehistoric artifact scatter located northwest of the Soap Creek restoration project. The site was visited on February 18, 2013. One artifact was noted with the site area. A 50cm by 50cm test unit was excavated to 50cm below the surface to test for sub-surface deposits. No cultural material was located within the test unit. Given these facts the site should not be eligible to the National Register. A condition assessment was conducted while on site.

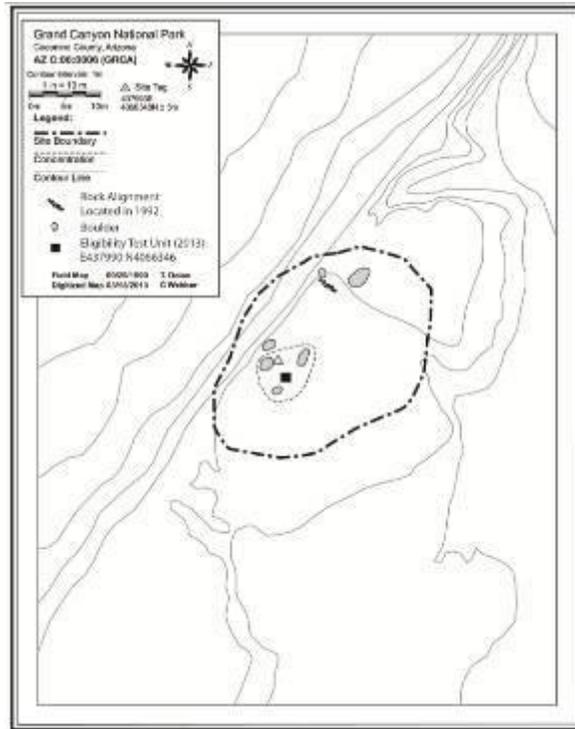


Figure 2: Site map of C:06:0006 showing location of National Register eligibility test unit.

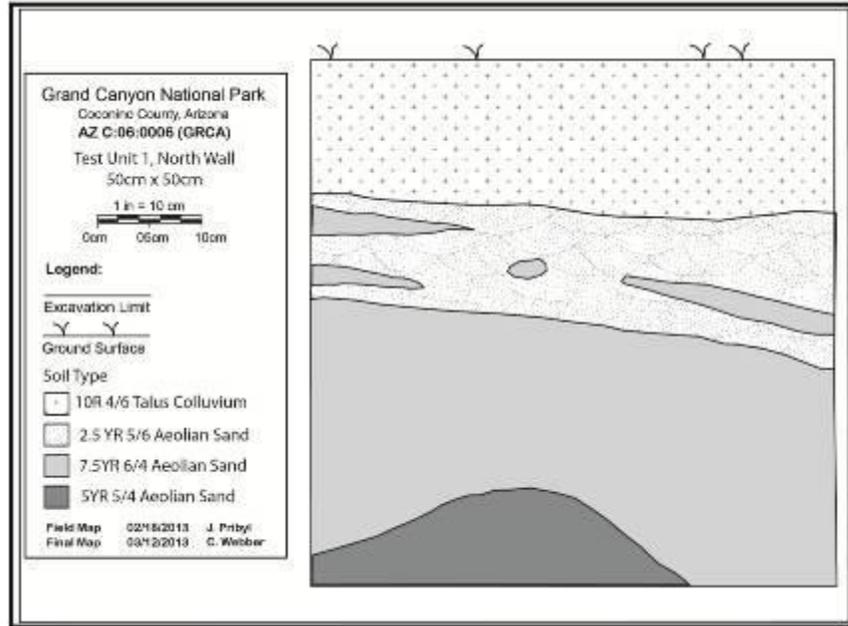


Figure 3: Profile drawing of the north wall of TU 1 at C:06:0006.

C:09:0088. The site consists of several historic features associated with the proposed Marble Canyon Dam. The site was visited on February 18, 2013. During the visit J. Pribyl and C. Webber attempted to remove the graffiti reported near one of the historic adit. Lemon juice and several styles of abrasive scrubbing pads and brushes were utilized to remove the graffiti with limited success. The paint appears to be more latex based rather than wax based. A harsher chemical is required to completely remove the graffiti. Before and after photos were taken of the graffiti. A condition assessment was conducted while on site.

C:13:0341 The site consists of a series of prehistoric structures and artifact scatter located on the eastern terrace immediately adjacent to the confluence of Tanner Wash and the Colorado River. The site was visited on February 21, 2013. Very little cultural material noted on surface. One Desert Side Notched projectile point, one metate fragment, and a Hopi Yellow Ware ceramic sherd were located on the surface. A 1m by 1m test unit (TU1) and a 50cm by 50cm test unit (TU2) were excavated to test for sub-surface deposits. TU1 yielded a cultural lens approximately 35-40cm below the existing surface. TU2 yielded one utilized flake within 5cm of the existing ground surface. It appears the site contains a substantial pre-ceramic cultural lens located below extensive flood deposits. Given these facts it is recommended that the site be considered eligible to the National Register. It is recommended that a new site map be generated showing the extensive impacts caused by park management and backpacker use. A condition assessment was conducted while on site.

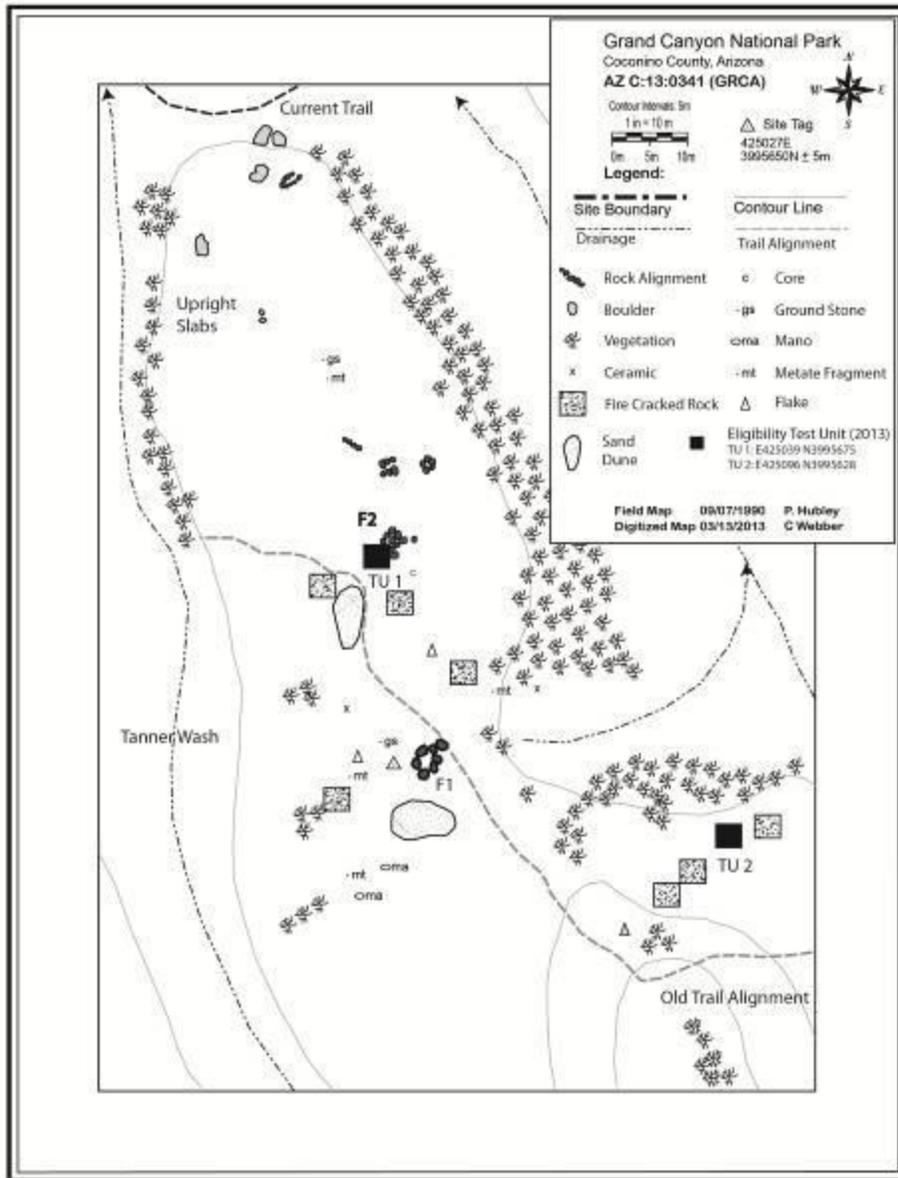


Figure 4: Site map of C:13:0341 showing the location of National Register eligibility test units.

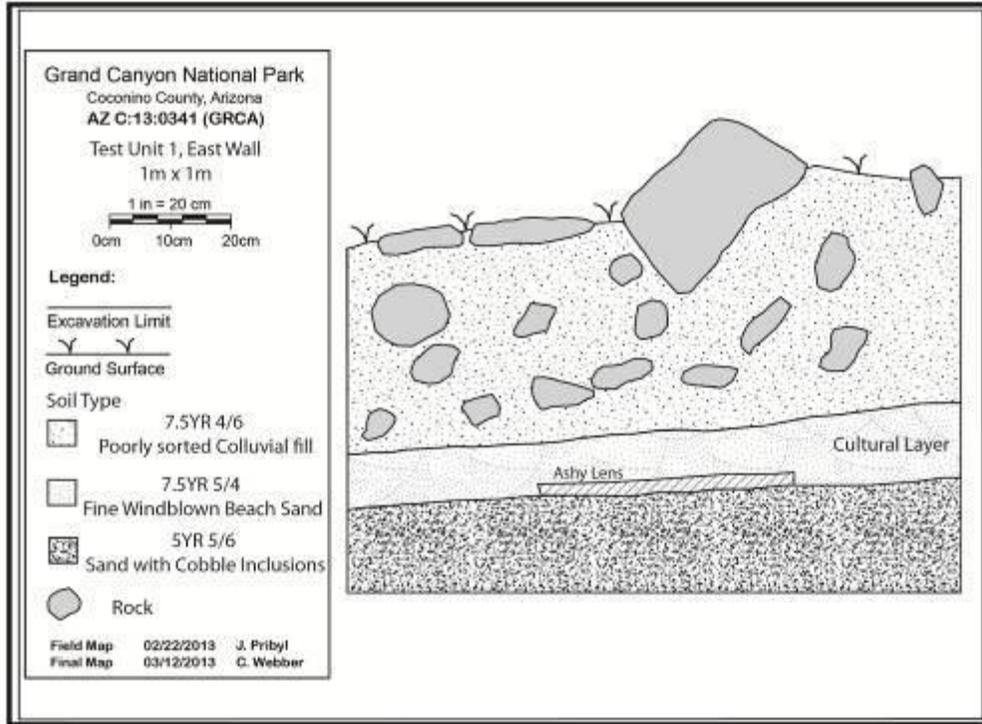


Figure 5: Profile drawing of TU 1 at C:13:0341. Note cultural layer below present ground surface.

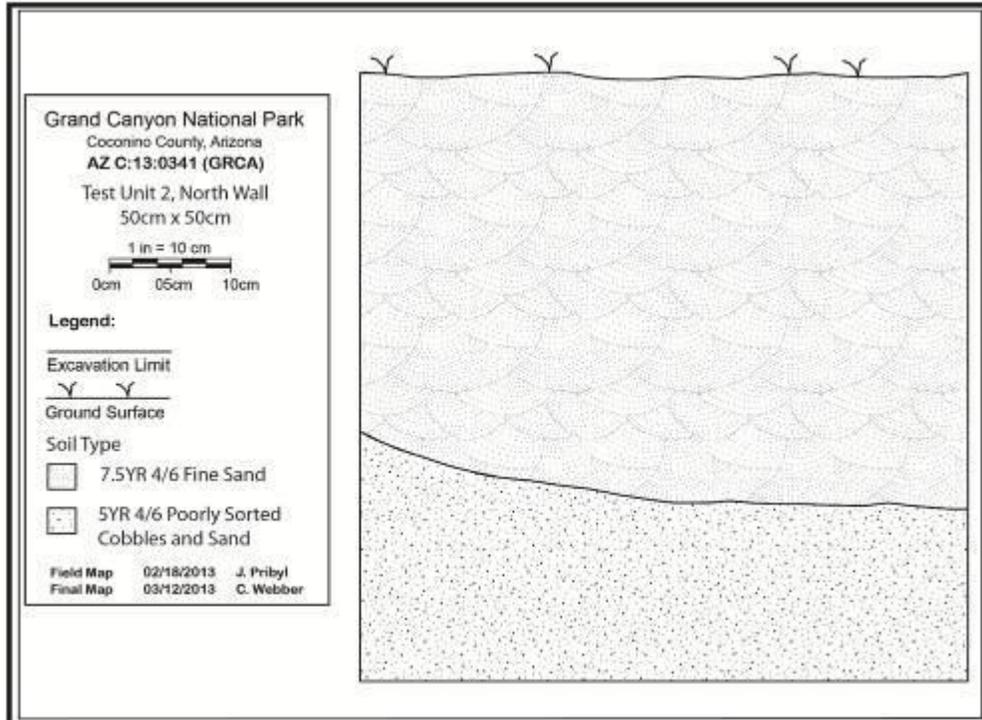


Figure 6: Profile drawing of TU 2 at C:13:0341.

C:13:0005 (Hance Scout Site.) The site consists of a series of prehistoric thermal features and associated artifact scatter. This site receives heavy visitation from river runners because it is also the location of the popular Hance Rapids scout. Several established backpacking tent pads are

also located within the site boundary. A brief tour of the site was presented to the CRMP mitigation crew showing several features along the established trail. The CRMP mitigation crew then improved and delineated several existing backpacker campsites located near the west/northwest extant of the site boundary. Minimum ground disturbing activities were conducted. No cultural material was located during the project. All trail work from 2007 is still in good condition.

B:16:0911. The site consists of a series of prehistoric features and associated artifact scatter located near Granite Rapids. The site was visited on February 25, 2013 to monitor the backfilled excavation area. The backfilled area showed no signs of deflation. A condition assessment was conducted while on site.

B:16:0262. The site consists of a series of prehistoric features and associated artifact scatter located near Football Field camp. Very little cultural material noted on surface. The site was visited on February 27, 2013. A 1m by 1m test unit (TU1) was excavated to test for sub-surface deposits. TU1 yielded in situ masonry architecture approximately 10cm below the existing ground surface. The cultural lens extends to approximately 40cm below ground surface. The test unit was excavated to bedrock. Given these facts it is recommended that the site be considered eligible to the National Register. A condition assessment was conducted while on site.

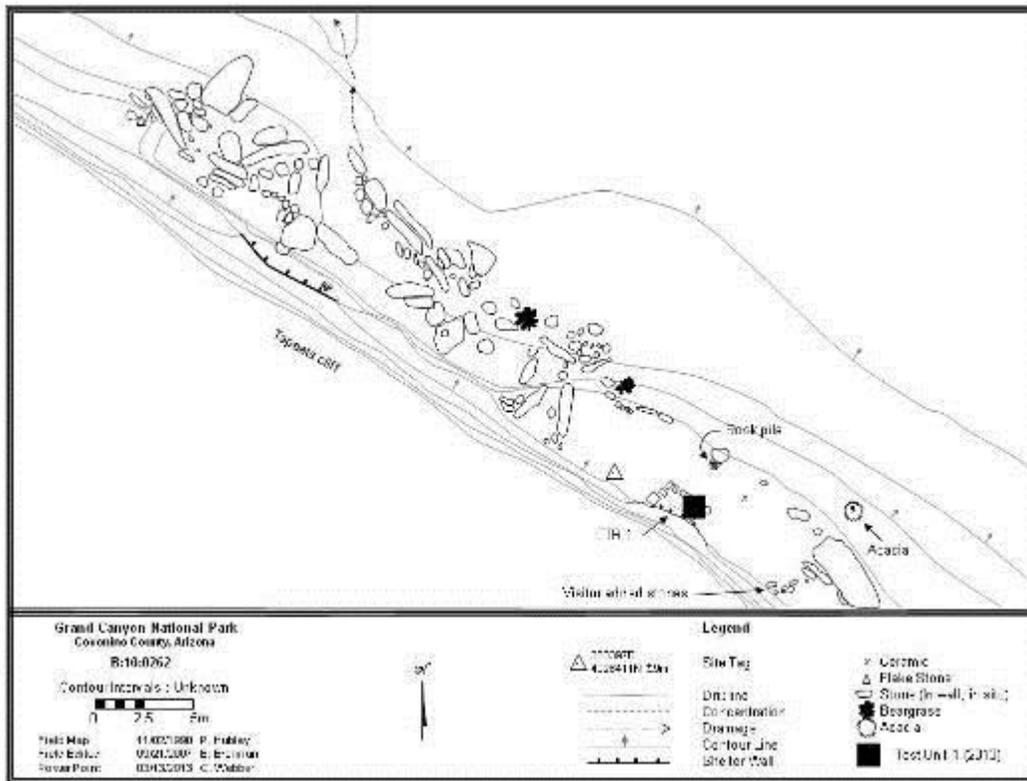


Figure 7: Site map for B:10:0262 showing the location of National Register eligibility test unit.

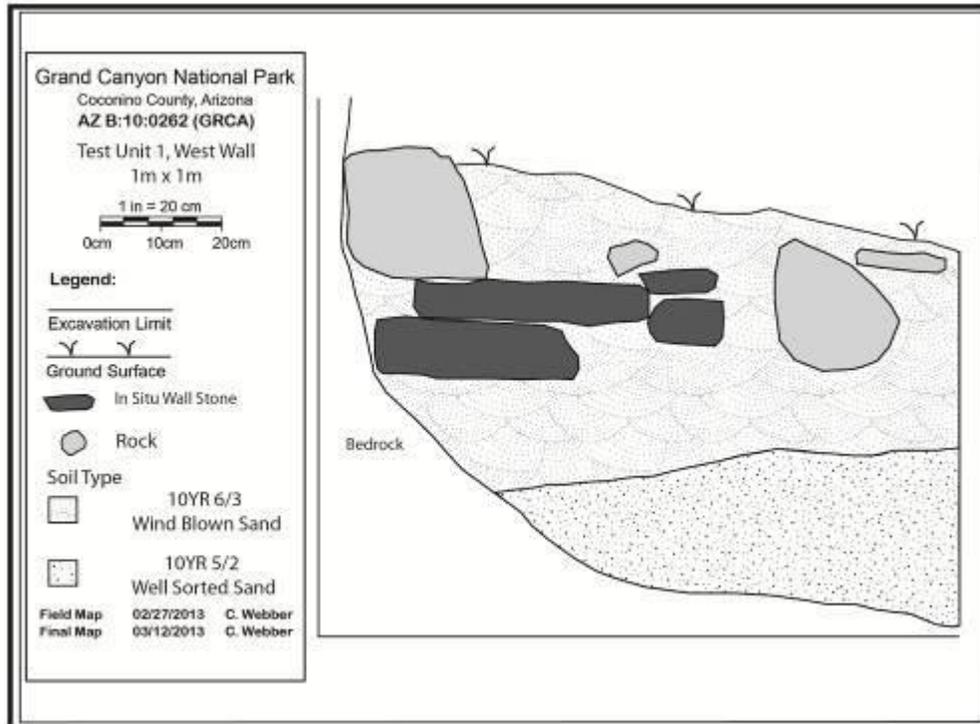


Figure 8: Profile view of the west wall of TU 1 at B:10:0262.

B:10:0223 (Ledges Camp Roaster.) The site consists of a series of prehistoric thermal features and associated rock alignments located immediately above Ledges Camp. The site was visited on February 28, 2013. The existing social trail bisecting feature 1 was nearly indistinguishable from the surrounding environment. It was determined that obliterating the social trail bisecting feature 1 would cause more harm than good. Photographs were taken of the social trail. A condition assessment was conducted while on site. No ground disturbing activities were undertaken while on site.

B:09:0201 (Shaman's Gallery.) Resource Update: Dave Loeffler encountered two private river trips that were issued overnight backpacking trip permits through the park's backcountry office for Tuckup Canyon. One of the groups called this a "Shaman's Gallery Permit." It was unclear where they received information about the location of B:09:0201 but multiple websites and blogs post the location information on the internet. Given this information it will be important to continue to monitor Shaman's Gallery for signs of overnight camping within the overhang and at other sensitive sites in the area. It might be possible to place an addendum in the permit that emphasizes that camping is not permitted in archeological sites – *especially protective overhangs where rock art is located.*

A:16:0001 (Whitmore Panel.) The sites consist of a prehistoric masonry structure, prehistoric midden, prehistoric rock art and historic inscription. The site is well known and open to visitation. The site receives heavy visitation throughout the year. The site was visited on March 3, 2013. Two test units were excavated to act as footings to extend the existing retaining wall. The test units were overlaid to match the 1984 excavation profile. Cultural material was located throughout the test units. No distinctive features were located during the excavation. The November 2012 emergency stabilization seems to have held through the winter.

More intensive stabilization work is required to ensure that the site won't be further impacted by water erosion which started during the 2012 monsoon season. The most immediate concern is the water erosion impacting the trail above the midden contained by the wall. In this area the trail has compacted creating a channel for water to run down. In the past year this channel has become more incised and erosion has accelerated. The area that was stabilized in 2012 is the natural drainage for this water to flow across. The best way to protect the midden down slope is to put a rock water bar across the trail in this location and reinforce the drainage leading off of the site. Due to the sensitive nature of the site area and the numerous artifacts located in the 2012 stabilization area, the only way to proceed with the water bar construction is to formally excavate the area in which the water bar will be placed and also excavate the area stabilized in 2012. The entire project was extensively photographed.

A condition assessment was conducted while on site.



Figure 9: Photograph showing the rehabilitated wall at A:16:0001 after stabilization work was completed.

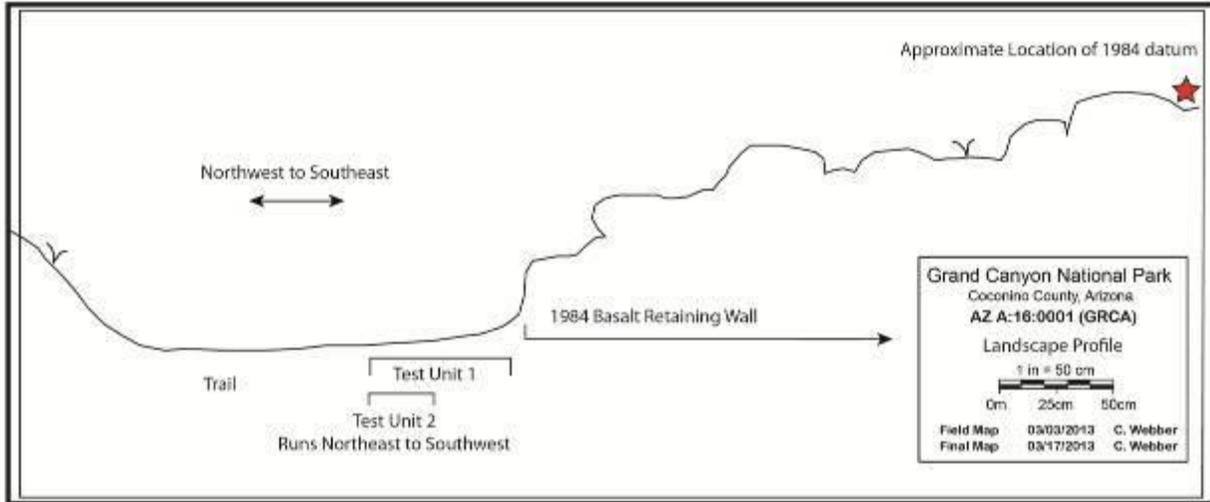


Figure 10: Profile view of the ground surface showing the relationship between the 1984 wall and the trail before stabilization work.

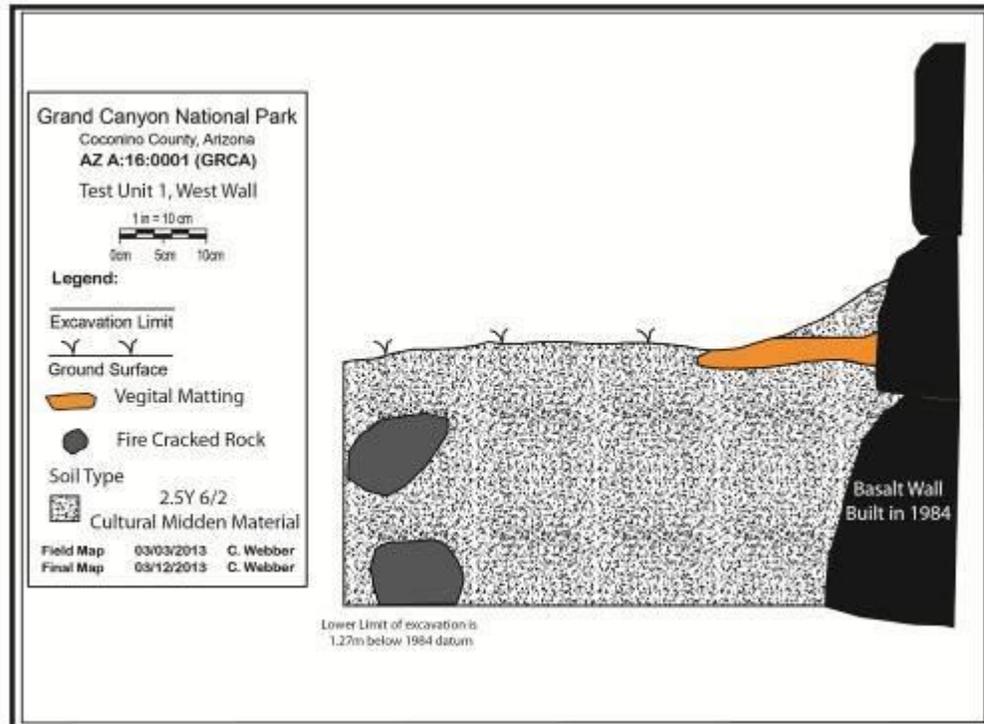


Figure 11: Profile of Test Unit 1.

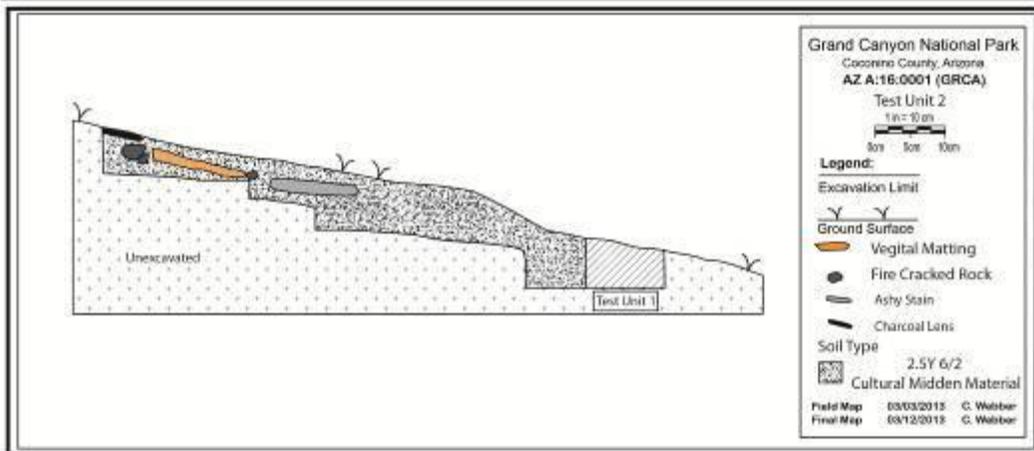


Figure 12: Profile of Test Unit 2.



Figure 13: This figure shows the November 2012 stabilization to the left of the signboard held in with a stone and log bar. The channeling along the trail above signboard has incised significantly in the last year. In order to protect the midden area to the right of the signboard a water bar needs to

be placed in the trail from the cliff face directly above the signboard into the area stabilized in 2012. Note that the area stabilized in 2012 is the natural drainage leading away from the trail and the midden. Due to the sensitivity of this area any ground disturbance associated with the construction of the water bar in and around the area stabilized in 2012 (which will be directly affected by the water runoff created by the water bar) will need to be formally excavated before any other work proceeds.

A:15:0005. The site consists of a of prehistoric rock art panel, thermal features, rock alignments and artifact scatter. The site is well known and receives heavy visitation throughout the year, information about how to access the rock art panel is published in a popular river guide. The Grand Canyon Whitewater guides said that they or other guides took clients to both the rock art panel and the thermal features at the site. The fact that guides were taking people specifically to the thermal features at the site, and not just to the rock art panel, was interesting to Park personnel and explains the difficulty the Park was having closing the social trails leading through the thermal features. A condition assessment and other work at the site were completed in November 2012; therefore the site was not revisited.

Wildlife Program

Staff successfully retrieved bighorn sheep collar and downloaded data. Then also monitored the presence of 5 radio collared sheep, and opportunistically collected pellet samples and visual observations.

General

Additional tasks and accomplishments include:

- Visitor contacts
 - Numerous informal presentations on resource management areas of concern to guide trip participants and visitors.
 - Contacted 14 private permitted trips, GCMRC, USGS-science trip and a NPS science trip.
 - Contacted 6 permitted hiking groups (9 people total)
- Bucket watered 37 trees and backhauled some equipment in support of Granite project
- Provided opportunities for cross-training of park staff
- Developed a framework for a Wilderness Monitoring and Mitigation Assessment Program and conducted a pilot survey at Deer Creek
- Utilized 90 hours of volunteer labor

Problems Encountered and Solutions

The professional guides supplied by Grand Canyon Whitewater under our CRCP program made this trip run very smoothly. We received feedback from the outfitter that it might be better timing to go for these early spring trips in order to get interest from GCROA, rather than the late fall-early winter time slot of November.

It was challenging to incorporate boat operator training for our new ranger into this ambitious work itinerary. Our need to minimize transit time (rowing downstream) between work projects

with the goal to make the trip as efficient and cost effective as possible was compromised by adding this training component.

We are still having problems communicating with the Hualapai rangers that these CRMP trips are NPS trips and that the outfitters should not be charged for tribal land access. Notifying the Hualapai prior to the trip could help. Notification too far in advance of the trip could be counter-productive.

Follow- up Actions

Continue to work through our CRCP agreement to outfit at least one mitigation trip per year. The late winter/early spring timeframe should become the default timing for our co-op requests to ensure the greatest likelihood of getting a wide range of outfitters to participate.

Seek ways to combine campsite mitigation assessment/and mitigation-monitoring work by accomplishing this on other trips throughout the year, so that the outfitter trips are fully dedicated to hands-on projects and transit days.

Work toward development of a comprehensive, integrated Backcountry/Wilderness Resource Monitoring and Mitigation Program that meets target range for desired resource conditions.

Continue seeking cost-effective hybrid options for accomplishing this work, such as greater volunteer involvement, continuing cross-training opportunities for other park staff and partners, and “surgical strikes” on hiker-accessible sites utilizing limited river support.

Complete cost-benefit analysis of Soap Creek project and Granite Pilot and develop “lessons-learned” to apply to future planning and funding efforts within the River Zone.

Appendix C. Photographs of CRMP monitoring and mitigation work

Visitor Experience monitoring:

Figure 1. Pontoons and passengers at Quartermaster Canyon.



Figure 2. Helicopter Operations at Quartermaster Canyon.



Mitigation:

Figure 3. Social trail obliteration at Hance – before and after.



Figure 4. Tent pad obliteration at Hance – before and after.



Figure 5. Tent pad delineation at Hance – before and after.



Figure 6. Trail delineation at Tanner – before and after.

