

Final Report

2008 Discovery Pool Grant

Multi-Spectral Imaging Project, Canyonlands National Park

National Park Service, Southeast Utah Group

by:

Bud F. Turner, Principal Investigator

Chris Goetze, SEUG Cultural Resource Program Manager

Research Need and Questions Addressed:

The Primary Research Need for the Multi-Spectral Imaging Project in calendar year 2008 was to create a baseline photographic record in the visible and infrared spectrums for each Barrier Canyon Style pictograph panel in the Salt Creek Archeological District. These images can then be used for research, management, and interpretive programs including an ongoing effort to monitor any changes to the panels through time.

Methodology and Personnel:

Due to the distance and rugged terrain, Discovery Pool Grant funds were used to rent a helicopter to fly the Principal Investigator, Bud F. Turner, and Pat Flanigan, Canyonlands National Park Exhibit Specialist, into the remote area of Middle Salt Creek near the Upper Jump to document the pictograph panels in that locality. Mr. Turner and Mr. Flanigan spent eight days from September 25, 2008 to October 2, 2008 locating and documenting thirteen separate sites and their associated pictograph panels in visible and infrared wavelengths using digital cameras, and on black and white film utilizing a 35mm film camera.

Discovery Pool Grant funds were also used to produce Resource Monitoring Image (RMI) books to be utilized by Park Service personnel on regular resource monitoring patrols. These books contain the complete photographic record of each pictograph panel, and are designed to be used to rephotograph the panels from the same camera position and direction as the original, baseline survey images. This will allow the park to determine the amount and rate of change to each panel, and will help prioritize and determine future preservation and restoration efforts as needed.

Number and Names of Staff Utilized Throughout the Project:

A total of three personnel were utilized during the MSI Project documentation in Middle Salt Creek. They were:

- Bud F. Turner, Principal Investigator
- Chris Goetze, National Park Service, Southeast Utah Group, Cultural Resource Program Manager
- Pat Flanigan, Canyonlands National Park Exhibit Specialist

Projected Results:

The ultimate goals of the Multi-Spectral Imaging Project in Canyonlands National Park are to provide a baseline photographic survey of all pictograph panels in Canyonlands National Park in visible and infrared wavelengths, as well as in 35mm black and white film for archival purposes. These baseline survey images,

plus the Resource Monitoring Images, will help determine the amount and rate of change to the panels and aid in prioritizing any future preservation and restoration efforts.

Actual Results:

Due to the heavy equipment required for the project, the remote location, and the difficult logistics of accessing Middle Salt Creek in Canyonlands National Park, the Project opted to pay helicopter rental expenses for ferrying the Project Team and their equipment into the area. Because of the expense of this mode of travel, the Project was able to afford only one flight into Middle Salt Creek. Despite maximizing their time and accomplishing work at thirteen locations in Middle Salt Creek, an additional Discovery Pool Grant request will be needed to complete the Multi-Spectral Imaging Project in calendar year 2010.

Resource Monitoring Image Books were created for all documented pictograph panels in the Needles District and were distributed to appropriate National Park Service staff to use on Resource Monitoring patrols.

Conclusions and Application of Research Results to Future Educational or Interpretive efforts:

In addition to creating a baseline photographic survey of all Barrier Canyon style pictograph panels in Canyonlands National Park, the Multi-Spectral Imaging Project has provided an increased understanding about the creation of these panels and how human or natural processes later modified them. Infrared imaging has proven to be a valuable tool in visualizing these ancient images, often bringing out details lost in visible light due to vandalism or natural erosion and sedimentation.

As far as can be determined, this is the first time multi-spectral imaging in visible and infrared wavelengths has been utilized to document pictograph panels in a comprehensive manner. When the entire project is completed, the results will be published in an appropriate peer review professional publication, and the process documentation, including methods, naming standards, and equipment utilized will be made available to other agencies for use in documenting their rock art. The images themselves will be made available to qualified current and future researchers to study the original application methods and the changes brought about by time and the elements.

In the mean time, Mr. Turner has provided numerous presentations about the project, its purpose and results, to potential technical and financial supporters, and to the general public, in a format that was both interesting and enlightening. During those presentations, the support of the Canyonlands Natural History Association has been gratefully acknowledged. The project will also be highlighted in a National Geographic Television program, "America's Wild Spaces: Canyonlands," scheduled to be aired on The National Geographic Channel Thanksgiving evening, November 26, 2009, at 8:00 pm Eastern time. A DVD of the program will be available after the television special airs.

Future Research Needs:

Because the Project had to pay ferry time for the aircraft from its home base on both flights in and out of Middle Salt Creek, there were insufficient funds to fly into Upper Salt Creek. An additional Discovery Pool Grant request for 2010 to complete this final segment of the Multi-Spectral Imaging Project will be submitted before the deadline on November 15, 2009.

Attachments:

Copies of all invoices for the Discovery Pool Grant are attached. These include:

- Helicopter Rental	\$ 8,502.00
- MSI equipment for extended stay in Salt Creek	763.79
- RMI Printer and Supplies	370.38
- RMI Production Costs	<u>5,363.83</u>
Total Expenses	\$15,000.00

Sample page of Resource Monitoring Images from the Four Faces pictograph panel in Middle Salt Creek is also attached. This was one of the sites documented during the eight-days the project team spent in Middle Salt Creek.

C816

DEPARTMENT OF INTERIOR
 AVIATION MANAGEMENT DIRECTORATE 208-433-5038 OR 433-5034 CONTROL NO 47
 AMD-2 OR AMD-23 FLEET DETAIL OF CHARGES AS OF PAGE NO. 1
 OCTOBER 15, 2008

BOISE REGION
 BILLER CODE 5270 NATIONAL PARK SERVICE
 BILL NO 108527E CANYONLANDS COMPLEX
 ALC 14-10-0099 2282 SW RESOURCE BLVD
 MOAB UT 84532-2995

AMD NUMBER	LN NO	AGREE NO	AIRC CTR-NO	AGENCY ORDER NUMBER	FLIGHT DATE	STATION FROM TO	ELAPSED TIME	AMOUNT BILLED	PAY ITEM	PAX	CARGO	-----AGENCY INFORMATION----- USE OTHER		
433292	01		0626	N626	09252008	61B PGA	4.00 HRS-TENTHS	3,520.00	DF	2	400	4A	C GOETZE DPG	2008
SUB-TOTAL								3,520.00						
AIRC SUB-TOTAL								3,520.00						
MONTHLY RATE							.00							
TOTAL FLIGHT HR							.00							
TOTAL CHARGES								3,520.00						

 * DO NOT PAY THESE CHARGES * THEY WILL BE PAID THRU THE IPAC SYSTEM ON : OCTOBER 17 2008 *

 DF=FLIGHT-NO-OAS-CREW-DRY

4982

- CNHA CUTS CHECK TO NPS
- MARK MY ATTENTION
- GIVE CHECK TO BAZIK FOR DEPOSIT 1340-7090-600
- BRIBBY ETS CHANGE TO THAT ACCT

RECLAMATION

Managing Water in the West

U.S. Department of the Interior
Bureau of Reclamation
Lower Colorado Region
P.O. Box 81470
Boulder City, NV 89006-1470
Confirmation Number Call:
Phone: (702) 293-8185 or
(702)-293-8393

Fax Cover

Date: 10/3/08
Pages including this cover: 2

Flight Operations

Fax: (702) 293-8041

To: CHRIS GOETZE

From: MARK SANTEE

Code: _____

E-mail: _____

Fax: 435-719-2300

Phone: 702-497-0347

Message:

2ND Helicopter Trip
5.3 hrs \$4982⁰⁰
@ \$940 PER

PER MARK SANTEE ON 12/8/08:
INVOICE WON'T COME UNTIL AFTER JAN 1ST

TRANSMISSION NOTICE: This fax is intended only for the addressee above. It may contain information that is privileged or otherwise protected from disclosure. Any use of this fax or its contents by persons other than the addressee is strictly prohibited. If you received this fax in error, please notify the sender immediately and mail the original back to the sender at the address above.

Bud F. Turner

INVOICE

WildLight Photography
375 South Main St. #132
Moab, UT 84532
Phone (707)688-0602 Fax (419)858-8702

DATE: 10/6/2008
INVOICE # 081006-001

Bill To:
Canyonlands Natural History Association
3031 South Highway 191
Moab, UT 84532

Reference:
Discovery Pool Grant Contract# 08-1-NPS

DESCRIPTION	Qty.	Price Each	AMOUNT
ASUS Eee PC 1000H 10" Laptop for Multi-Spectral Imaging Project to provide temporary image download and storage capacity in back country.	1	\$ 449.99	\$ 449.99
OCZ 2GB PC2-5400 RAM for ASUS Eee PC.	1	\$ 46.41	\$ 46.41
Canon LP-E4 Battery for Canon EOS-1D Mk III Digital Camera	1	\$ 119.95	\$ 119.95
Canon LP-E5 Battery for Canon EOS Rebel Xsi (IR) Digital Camera	2	\$ 54.95	\$ 109.90
Sanyo 2CR5 Lithium Battery for Canon EOS-3 Film Camera	1	\$ 6.46	\$ 6.46
Multi-Card Reader for Digital Image Media Cards	1	\$ 13.95	\$ 13.95
Note: These items were required to support extended, remote operations in back country of Canyonlands National Park to record visible & Infrared images of pictograph panels for the Multi-Spectral Imaging (MSI) Project. (Discovery Pool Grant Contract# 08-1-NPS)			
SUBTOTAL			\$ 746.66
Shipping & Handling			17.13
TOTAL			\$ 763.79

Make all checks payable to **WildLight Photography**
Total due in 30 days. Overdue accounts subject to a service charge of 1% per month.

Bud F. Turner

INVOICE

WildLight Photography
375 South Main St. #132
Moab, UT 84532
Phone (707)688-0602 Fax (419)858-8702

DATE: 12/1/2008
INVOICE # 081201-001

Bill To:
Canyonlands Natural History Association
3031 South Highway 191
Moab, UT 84532

Reference:
Discovery Pool Grant Contract# 08-1-NPS

DESCRIPTION	Qty.	Price Each	AMOUNT
Epson Stylus Photo Printer RX680 & Ink Cartridges	1	\$ 199.93	\$ 199.93
Epson 5x7" Photo Paper for Resource Monitoring Images (500 Sheets)	2	\$ 79.95	\$ 159.90
Production Costs for Resource Monitoring Image Booklets		\$ 3,000.00	\$ 3,000.00
Note: These items, plus the production costs, were required to create Resource Monitoring Image (RMI) booklets for the Multi-Spectral Imaging (MSI) Project for National Park Service personnel to use in rephotographing pictograph panels in Canyonlands National Park during Resource Monitoring Patrols to determine the amount and rate of change to the panels.			
SUBTOTAL			\$ 3,359.83
Shipping & Handling			10.55
TOTAL			\$ 3,370.38

Make all checks payable to **WildLight Photography**
Total due in 30 days. Overdue accounts subject to a service charge of 1% per month.

Bud F. Turner

INVOICE

WildLight Photography
375 South Main St. #132
Moab, UT 84532
Phone (707)688-0602 Fax (419)858-8702

DATE: 12/9/2008
INVOICE # 081209-001

Bill To:
Canyonlands Natural History Association
3031 South Highway 191
Moab, UT 84532

Reference:
Discovery Pool Grant Contract# 08-1-NPS

DESCRIPTION	Qty.	Price Each	AMOUNT
Production Costs for Resource Monitoring Image Booklets (FINAL)			\$ 2,363.83
Note: This invoice is for the FINAL Production Costs for creating Resource Monitoring Image (RMI) booklets for the Multi-Spectral Imaging (MSI) Project for National Park Service personnel to use in rephotographing pictograph panels in Canyonlands National Park during Resource Monitoring Patrols to determine the amount and rate of change to the panels.			
SUBTOTAL			\$ 2,363.83
Shipping & Handling			
TOTAL			\$ 2,363.83

Make all checks payable to **WildLight Photography**
Total due in 30 days. Overdue accounts subject to a service charge of 1% per month.