

**Proceedings of the 2014 Federal Columbia River Power
System Cultural Resource Program
Systemwide Meeting
November 4 – 6, 2014
Clearwater Casino and Resort
Suquamish, WA**

The Power of Water



Sponsored by:

**U.S. Army Corps of Engineers
Bonneville Power Administration
Bureau of Reclamation**

Hosted by:

Suquamish Tribe of Indians





Proceedings of the 2014 Federal Columbia River Power System Cultural Resource Program Systemwide Meeting

The Federal Columbia River Power System (FCRPS) Cultural Resource Program 2014 Systemwide Meeting was held at the Clearwater Casino Resort in Suquamish, Washington, from November 4-6, 2014. The theme of this meeting was The Power of Water, referring both to the electricity generated by hydroelectric dams in the region, and to the cultural importance of the river to Native American tribes that participate in the FCRPS Cultural Resource Program. Approximately 97 individuals representing Federal, Tribal, and State agencies attended the Systemwide Meeting (Attachment A). The meeting was made possible through contributions of the meeting planning committee (acknowledged below), sponsored by the U.S. Army Corps of Engineers (USACE), and funded by Bonneville Power Administration (BPA) and the Bureau of Reclamation (Reclamation).

The conference opened with a Tribal Elder's dinner, during which elders from various tribes across the Pacific Northwest (PN) generously shared their thoughts and memories of the river, emphasizing the importance of maintaining cultural practices through fishing and other activities. This event was followed by a plenary session, and 2 days of breakout sessions that addressed topics ranging from rock image documentation and management to Traditional Cultural Property (TCP) identification and evaluation.

Meeting participants represented a variety of backgrounds and a diversity of views. The views expressed by any individual or organization should not be construed to represent a common understanding or agreement between parties on a particular view, and are not necessarily the views of the USACE, BPA, or Reclamation.

Requests for additional information about topics presented and discussed at the conference should be directed to session facilitators. General inquiries about the FCRPS Cultural Resource Program should be addressed to one of the following Federal Agency Program Managers:

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- Kristen Martine, FCRPS Cultural Resource Program Manager, BPA, kdmartine@bpa.gov
- Sean Hess, Regional Archeologist, Pacific Northwest (PN) Region, Reclamation, shess@usbr.gov



Acknowledgements

The 2014 FCRPS Cultural Resource Program Systemwide Meeting would not have been possible without the generous commitment of time, energy, and resources made by numerous individuals and organizations. We want to extend a special thank you to our gracious host, the Suquamish Tribe of Indians, whose members and staff contributed to conference planning and facilitation. Special thanks to their Honor Guard, who welcomed our group to the Elders Dinner.

The Conference Planning Committee members also deserve recognition for their work to develop the conference agenda and locate a host facility. Conference planners included Brenda Covington of the Confederated Colville Tribes (CCT), Derek Beery from Reclamation, James Harrison and John Matt with the Spokane Tribe of Indians, John Pouley with the Oregon State Historic Preservation Office (SHPO), Johnson Meninick with the Yakama Nation, Baird with the Nez Perce Tribe, Kevin Lyons with the Kalispel Tribe, Vaness Van Der Borg with the USACE Portland District, and Scott Hall with the USACE Walla Walla District.

Finally, thanks to our conference presenters and panel participants Nancy Brown and Tom McCulloch from the Advisory Council on Historic Preservation (ACHP); Paul Loether from the National Park Service (NPS); Ethan Morton of the Idaho SHPO; John Pouley of the Oregon SHPO; Rob Whitlam of the Washington State Department of Archaeology and Historic Preservation; Pat Baird, Tribal Historical Preservation Officer (THPO) for the Nez Perce Tribe; Guy Moura, Tribal Historical Preservation Officer for the CCT; Brent Hicks of Heritage Research Associates (HRA); Alan Marshall, Emeritus, Lewis-Clark State College; Tim Randle of Reclamation; Mary Mellema of Reclamation; Robyn MacKay of BPA; William Proctor of USACE; Mark DeLeon of the Grant County Public Utility District (PUD); Mark Willis of Sacred Sites Research; Jon Harman of DStretch; Karen Steelman of the University of Arkansas; Evelyn Billo and Robert Mark of Rupestrian Cyberservices; and, Claire Dean of Dean and Associates. We also thank the staff from the USACE, BPA, and Reclamation who volunteered their time and expertise to facilitate breakout sessions and serve as note takers.



Notes on the Identification of Participants

Meeting notes are not meant to be a verbatim transcription. Note takers attempted to capture and summarize discussion content as accurately as possible. Individual speakers are identified by their general affiliation as “Tribal Speaker” or “Tribal Staff member,” along with tribal affiliation if known. Others are indicated by agency affiliation.



**Proceedings of the 2014 Federal Columbia River Power System
Cultural Resource Program Systemwide Meeting
Tuesday, November 4, 2014
Elders Dinner**

Emcee Welcome

Procession of the Suquamish Tribal Honor Guard

Welcome

Johnson Meninick, Confederated Tribes and Bands of the Yakama Nation

Randy Lewis, Confederated Tribes of the Colville Reservation (CCT)

The Elders Dinner was attended by over 90 Federal, State, and Tribal program participants and elders. Elders spoke about how the river connects all tribes to each other, and to natural and cultural resources. Some shared memories of fishing at Celilo and Spokane, and explained that culture persists because elders continue to teach youth to fish. People also noted that fish are returning to the rivers, but their tribal ancestors went without fish, and tribes above dams with no fish passage are not able to fish today.

Agency executives from the USACE, Reclamation, and BPA thanked elders for sharing their concerns and stories. Agencies were represented by Lieutenant Colonel Andrew Park, USACE; Coleman Smith, Grand Coulee Power Office Manager, and Tino Tafoya, Special Assistant to the Regional Director for Reclamation, PN Regional Office; and Lorri Bodi, Vice President for Environment, Fish, and Wildlife with BPA.



Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
APE	Area of potential effects
BLM	Bureau of Land Management
BOEM	Bureau of Ocean Energy Management
BPA	Bonneville Power Administration
CCT	The Confederated Tribes of the Colville Reservation
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
DAHP	Department of Archaeological and Historic Property
DOE	Determination of Eligibility
FAQ	Frequently asked questions
FCRPS	Federal Columbia River Power System
FERC	Federal Energy Regulatory Commission
HALS	Historic Indian Landscape Survey
HPMP	Historic Properties Management Plan
HPRCSIT	Historic Properties of Religious and Cultural Significance to Indian Tribes
HRA	Heritage Research Associates
Keeper	Person tasked with maintaining the National Register of Historic Places
MAF	million acre feet
MPD	Multiple Property Determination
NAGPRA	Native American Graves Protection and Repatriation Act
NHPA	National Historic Preservation Act
NP	Nez Perce Tribe
NPS	National Park Service
NRHP	National Register of Historic Places
PA	Programmatic Agreement
PN	Pacific Northwest
PUD	Public Utilities District
Reclamation	U.S. Bureau of Reclamation
SHPO	State Historic Preservation Office
SWPA	FCRPS Systemwide Programmatic Agreement
SWRD	Systemwide Research Design
TCP	Traditional cultural properties
THPO	Tribal Historic Preservation Officer
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service



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Plenary Session

Preserving Cultural Landscapes: Past/Present/Future

Presenter: Nancy Brown, ACHP presented information

Facilitator: Paul Cloutier, Tribal Liaison, USACE, Northwest Division

Note-taker: Katherine Pollock, Archaeologist/Project Manager, BPA

Welcome and Opening Invocation

Aggie Pratt, Suquamish Tribe offered an invocation to start the meeting.

The goals of this presentation were to provide background information about cultural landscapes in historic preservation, learn about methods for defining and evaluating cultural landscapes, discover how cultural landscapes fit into the National Register and Section 106 processes, and consider cultural landscapes as we look to the future.

History of Landscape Preservation in the U.S.

Cultural landscapes have been recognized since time immemorial, with certain sites revered and protected by certain groups. People started documenting historic landscapes, such as gardens and estates, in response to large construction projects, such as dams. The National Historic Preservation Act (NHPA), passed in 1966, introduced the concept of districts and created the National Register of Historic Places (NRHP), but cultural landscapes were not mentioned in this or other early legislation.

Methods for documenting cultural landscapes were formed in the 1980s and in the 1990s NPS bulletins for identifying, documenting, and evaluating TCPs, Rural Historic Landscapes, and America's Historic Battlefields, all of which offer some cultural landscape guidance, were published. Cultural landscapes were recognized by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 1992, and in 1996 the Secretary of Interior wrote guidance/standards for recording cultural landscapes.

Cultural Landscapes Defined: The NPS defines a cultural landscape as a geographic area (including cultural and natural resources, and the wildlife or domesticated animals therein) associated with a historic event, activity, or person; or exhibiting other cultural or aesthetic values. A landscape can include people, buildings, animals, etc., and must demonstrate tangible evidence of the activities and habits of people who occupied and shaped the landscape to serve human needs.



There are four types of cultural landscapes: Designed historic landscapes (gardens, cemeteries); Vernacular historic landscapes (developed over time with use); Ethnographic landscapes; and Historic sites (battlefields). Character defining features for all types of cultural landscapes can include:

1. Natural systems and features such as topography
2. Spatial organization – vertical and horizontal limitations
3. Land use – how the land is used (a cow barn may be placed close to a house to make early morning work easier)
4. Cultural traditions – basket making, burial practices (orientation, particular plants, ceremonies)
5. Circulation – trails, paths, roadways
6. Vegetation – native and introduced
7. Building and structures – a piece of the cultural landscape, places of habitation, shelter, dams, irrigation, etc.
8. Views and vistas – a range of vision. Can be natural like the Grand Canyon, or created, such as a tree lined driveway to focus the view on the house
9. Water features – man made or natural
10. Small scale features – signs, light poles
11. Archaeological sites – surface and subsurface evidence of the past that help with the understanding of the cultural landscape.

National Register Evaluation: A cultural landscape must meet at least one of the four National Register evaluation criteria (a, b, c, and d) to be listed on the NRHP, and retain integrity. Cultural landscapes are generally listed on the NRHP as historic districts or sites, but can also be a contributing factor to a district or an individual landscape. They can also be TCPs. Eligibility is generally determined by the SHPO/THPO, land managers, federal agencies, and the person tasked with maintaining the NRHP (Keeper). ACHP generally passes eligibility questions on to the Keeper.

A cultural landscape must have a defensible boundary; however, boundaries do not need to be as well defined as archaeological site boundaries. Features that define boundaries can include historic or legal boundaries, boundary demarcations (stone fences, stone cairns, mature hedge rows), right-of-ways (roads, highways, canals), natural features (rivers, lakeshores, ridges, contour elevations), long-standing vegetation, lines drawn along or between fixed points, changes in development or spatial organization (flat farming area vs. wooded or rocky hillside, property lines), and edges of new development.

Cultural Landscapes in Section 106: Good documentation is critical to understanding the historic property's significance, evaluating adverse effects, and developing appropriate



mitigation measures. Archaeological sites, buildings, and structures are usually well defined. Spatial organization, topography, land use patterns, circulation, cultural traditions, and views are less well easily defined.

Confidentiality of information can be an issue. In the past, sensitive information for eligible cultural landscapes could be kept confidential by the Keeper (the only person with access to it) or the federal agency with access to the confidential information. In some cases a summary paper was written.

A number of different types of effects need to be addressed during evaluation. These include direct, indirect and cumulative effects, as well as cultural and spiritual effects described by tribal partners.

Three examples of cultural landscapes include Cave Rock, Nevada, where rock climbing was determined to be an adverse cultural and spiritual effect; Bighorn Medicine Wheel, Wyoming, where the original boundary of the cultural landscape included a single wheel and has now been expanded to 4,000 acres encompassing gathering areas, hunting areas, spiritual areas, and archaeological sites; and Snoqualmie Falls, Washington, which is listed on the National Register as both a TCP and an archaeological site.

Cultural Landscapes in the Future: ACHP has an initiative underway to develop policy statements and guidance for cultural landscapes that will encourage more and earlier tribal involvement and that more clearly defines tribal roles in evaluation. ACHP has also developed a Q and A paper, which will be posted on their web-site.

NPS is reworking Bulletin 38, and may add cultural landscapes as a National Register property type (would appear on the NPS 10-900 form). Types of cultural landscapes that are being discussed include maritime landscapes and indigenous cultural landscapes.

Guidance, resources, and cultural landscape evaluation examples include:

1. The NPS
2. The Historic American Landscape Survey (HALS)
3. Historical landscape architects, ethnographers, anthropologists, and tribal experts
4. Submerged Paleo cultural landscape project – Narragansett Indian Tribe, Bureau of Ocean Energy Management (BOEM), and University of Rhode Island
5. Wyoming and Colorado SHPOs cultural landscape workshops
6. Characterizing Tribal Cultural Landscapes Analysis Guide – BOEM, National Oceanic and Atmospheric Administration National Marine Fisheries Service, Makah Tribe, Confederated Tribes of the Grand Ronde of Oregon, and the Yurok Tribe
7. Maritime Cultural Landscape Summit in Wisconsin in October 2015



Question and Answer Session:

Q (CCT) Everything sounds good on paper but one of the main issues in the Northwest is that salmon are so important and it seems obvious that the Columbia Basin should be listed, but it has not been brought up because of land ownership and management.

A ACHP is struggling with this too because land managers can only list their lands. NPS is trying to provide the best guidance it can

Q (Umatilla) Ancestors were hunters and gathers that wandered. There is a burial site that has changed because it is now a cattle field and the landowner is absent. The burial sites are outside the recognized tribal areas. The problem is that the landowner will not allow people on the land.

A Private landowners are a difficult problem that they are trying to work with. They cannot force the landowner to allow access or to list the site on the NRHP. Federal lands are now more open to cultural landscapes and hopefully that will pass onto private landowners later.

A (Umatilla) It would be good to see a cultural landscape policy to help protect cultural resources and the native perspective needs to be taken into account, rather than just the white man's research. Native people have lost areas that are culturally important and it is frustrating to see the Washington Department of Transportation destroy resources.



FCRPS Cultural Resource Program Accomplishments and Updates

Presenter: **Kristen Martine**, FCRPS Cultural Resource Program Manager, BPA
Sean Hess, Regional Archaeologist, PN Region, Reclamation;
Gail Celmer, Regional Archaeologist, Northwest Division, USACE

Facilitator: **Paul Cloutier**, Tribal Liaison, USACE, Northwest Division

Note-taker: **Katherine Pollock**, Archaeologist/Project Manager, BPA

Building Blocks

The building blocks of the FCRPS Cultural Resource Program are the NHPA of 1966, the Energy Policy of 1992, the System Operations Review of 1997, and the Systemwide Programmatic Agreement of 2009.

FCRPS Undertaking

The FCRPS undertaking is the operation and maintenance of the 14 FCRPS dams and reservoirs covered by the System Operation Review. Operation of one dam affects all other dams and reservoirs in the system. The FCRPS Cultural Resource Program is responsible for asset management, including managing about 3,500 archaeological sites and the built environment (standing structures and dams).

FCRPS Accomplishments in 2013 and 2014

1. Three new signatories on the Systemwide Programmatic Agreement (SWPA) – CCT, Department of Archaeological and Historic Properties (DAHP), and Pacific West Region NPS:
2. 85,000 acres of survey at USACE projects, and 19,000 acres of survey at Reclamation projects. At least 400,000 acres still need to be inventoried.
3. The agencies determine what properties are eligible for the NRHP, in consultation with the tribes, state/tribal historic preservation offices, and sometimes the Keeper of the National Register. Over 2,500 sites still require Determination of Eligibility (DOE).
 - a. The ultimate goal of the FCRPS Cultural Resource Program is to resolve adverse effects. Resolution of adverse effects is done through physical mitigation at cultural resource sites, and through alternative forms of mitigation. Shoreline stabilization work in 2014 included placement of fiber mats revegetation at Chief Joseph, placement of riprap and fiber encapsulated pillows at Lower Granite Reservoir, and installation of gabion baskets and fiber encapsulated pillows along the shoreline followed by revegetation at Lake Roosevelt). Alternative mitigations implemented in 2014 were the Skolaskin Church restoration project,



where a deteriorating church that had been moved from an inundated village site was restored at Lake Roosevelt; cultural resource protection brochures distribution; removal of graffiti from several rock images at the John Day project; installation of cultural resource protection signs at several reservoirs; and oral history and ethnographic research were conducted at several projects.

FCRPS Cultural Resource Program Funding

BPA, Reclamation, and the USACE all contribute funding to the program. BPA funds about 88%, and USACE and Reclamation fund about 12% through Congressional appropriations. Funding levels increased from \$7.6 million in FY 2013, to \$8.5 million in FY 2014, and \$10 million in FY 2015. Comparison with other comparable programs in the U.S. (Mississippi River, Colorado River, and Tennessee Valley Authority) shows that the FCRPS Cultural Resource Program is unique terms of partnership, funding, and resources being managed. It is one of the best supported reservoir cultural resource programs in the nation.

2015 and Beyond

The FCRPS Cultural Resource Program is conducting a 5-year review of the SWPA. The agencies invited consulting parties to comment on whether the SWPA terms are being met. Comments are due December 1, 2014 and will be included in the FY 2014 Annual Report. A plan for addressing comments will be shared later in the year.

The Systemwide Research Design (SWRD) will be finalized in FY 2015. A draft was completed in October 2011. Program participants commented on that draft, and a contractor is addressing these comments as part of their revision.

Long-term program goals include completing archaeological and historic site inventory within the area of potential effects (APE) at the 14 projects by the end of FY 2017, and finishing TCP inventory by the end of FY 2018; completing DOEs at the 10 highest priority sites at each project by the end of FY 2015; and implementing one mitigation and planning for another at each project annually.

The DOE target was met at Grand Coulee several years ago, and the USACE plans to finish in FY 2015. DOE work on the Hungry Horse trails multiple property document DOE continues. The agencies continue to concentrate on treatment and mitigation of all types of historic properties.

Planning for future mitigation includes a large site (over 100 acres) on the Spokane Arm of Lake Roosevelt, which is affected by a braided, wandering, seasonal creek that has dramatic and damaging spring runoff/floods. The site is also affected by the raising and lowering of the water in Lake Roosevelt and by looting. This is a complex project that will likely be phased over multiple years.



National Register Eligibility Panel Discussion: Documentation Requirements, Consultation Procedures, and Streamlining Processes

- Panelists:** **Paul Loether**, National Register Chief, NPS
 John Pouley, Assistant State Archaeologist, Oregon SHPO
 Rob Whitlam, State Archaeologist, Washington SHPO
 Ethan Morton, Archaeologist, Idaho SHPO
 Pat Baird, THPO, Nez Perce Tribe
 Guy Moura, THPO, CCT
- Facilitator:** **Gail Celmer**, USACE
- Note-taker:** **Susan Tracey**, Administrative Assistant, BPA

This session reviewed documentation requirements for completing the DOE process, and how that varies by state and THPO. The session facilitator posed the following question to the panel: how do DOE documentation requirements differ for listing a site and for consensus determinations or determinations from the Keeper of the National Register?

John Pouley stated that in Oregon, site eligibility is treated in several ways: 1) if a site form containing enough information on eligibility is provided, they will concur; 2) if a report containing enough information about eligibility is provided, they will concur; and 3) mitigation can move forward at sites even if no eligibility determination has been made. The State of Oregon also encourages the evaluation of traditional cultural significance for sites. Listing a site is a very formal process and it could take up to a year to complete the process.

Ethan Morton said that Idaho has two site forms, an archaeological site form and a site inventory form. They may be doing away with the inventory form. They do not require use of NPS 10-900 forms in Idaho.

Pat Baird stated that the Nez Perce Tribe is very informal about their documentation for DOEs. Site forms are accepted, but it is very difficult for non-tribal people to characterize eligibility for things that are on the landscape. They rely on their tribal staff to look at other people's work to determine if there is something there. TCP eligibility always comes from their staff and not from an outside agency.

Guy Moura stated that it is hard to find places that are not significant to the CCT. For the CCT, it is really a question of making the DOE process as simple as possible. If we are presented with satisfactory documentation in a site form or report, then they would concur with the DOE.



Rob Whitlam responded to this question with a PowerPoint with background on the various types of historic properties: building, districts, sites, structures and objects; and integrity considerations: design, setting, materials, workmanship, feeling, association, and location. The quality of integrity is the ability of a property to convey its significance, and essential physical features must be present. You must determine which are visible, and compare it with similar properties.

He listed four eligibility criteria using a pit house as an example. He stated that it is eligible as a structure as well as under criterion D. There are many different kinds of resources, like a matched set of spear points or modified trees. A property can be eligible under several different criteria, not just one.

Dr. Whitlam spoke at length about TCPs stating that in Washington, there are 29 federally-recognized tribes and more in Canada (First Nations) that have a stake in Washington. Snoqualmie Falls is an example of a TCP, and figures greatly in the creation story of the Snoqualmie people. Mt. St. Helens has been nominated to the National Register because of historic geologic events that took place there (eruptions and changes to the landscape of the mountain). There is a TCP inside a building in Seattle that represents the Latin American community as well as one for the African American community. All tribes in the State and Cultural Resource staff are involved in cultural committees and identifying TCPs.

In regard to forms, he advised that Washington has 3 different forms: 1) site forms, 2) National Register forms (NPS 10-900); and 3) Underwater Aircraft and Ship forms. They have developed a template for documenting TCPs. The TCP template includes information that different tribes consider important in defining TCPs. The DAHP digitizes all records and has some in GIS. They do not share this information.

Paul Loether named three methods by which they handle nominations:

1. National Register nominations can be submitted for listing by SHPO or THPO. If these properties are on private land, NPS consults with the landowners. If landowners object to listing the property, NPS can determine it eligible, but not list it. NPS has 45 days to complete their review and they will consult with all interested parties.
2. Federal agencies can submit nominations and the same process are followed. Again, NPS has 45 days to review and make a determination.
3. If parties do not agree on National Register eligibility during the Section 106 process, documentation is sent to the Keeper for a determination. NPS discusses the DOE with all interested parties to inform their determination. NPS does not require entities to submit DOE requests on Form 10-900 unless they want the property listed. The form is preferred for any DOE, but if enough information is provided, an eligibility determination can be made. The same process is used for all sites,



including TCPs. Site boundaries must be defined. Significance and integrity are considered when evaluating eligibility. Landscapes can overlap with each other.

Question and Answer Session:

Q A federal agency staff said that the FCRPS Cultural Resource Program could improve eligibility determinations by looking at criterion other than d. The program is considering the use of multiple property determinations. Is it possible to complete multiple property determinations (MPDs)?

A Paul answered no, not really, but they generally like to have one property that falls into the criteria.

Q A federal agency staff asked if information could be shared regarding how NPS is identifying TCPs in MPDs?

A NPS is looking at stone features for inclusion in a MPD. Ceremonial stone structures are relatively new to the TCP types.

Q Tribal member asked if the content of the stone feature MPD would be public knowledge? Will the public know where these features are located?

A NPS works with the tribes to determine what information is sensitive. Section 304 does provide the legal authority to withhold location and other sensitive information. That is an issue that has been raised in regards to TCPs over the years. NPS prefers that tribes withhold sensitive information if they are concerned about its inadvertent release. The downside is that if no one knows about the space then it might be damaged. The Register is a tool. Tribes should make decisions about what information they do and do not share.

Q A Tribal member asked what influence the NPS had over impacts to significant sites on private lands that may be under development.

A NPS and the federal government have very little control over private property. A representative from DAHP also explained that in Washington, there are very strict laws about private property, and archaeological sites and TCPs that might be on private property.

A tribal member from the Yakama Nation noted that tribes do not have full control over management of cultural resources on private lands, even in Washington. A landowner can hire an archaeologist to excavate, and then once all questions are answered, the artifacts go into a museum. So although they are protected sites, the Tribes do not have full control over them.

Q A federal agency representative asked if there is a permit system for TCPs in Washington

A DAHP staff answered that there is no permit system for TCPs. The local authority needs to step up and enforce their jurisdiction. A Nez Perce cultural program staff stated that the FCRPS Cultural Resource Program, at least along the Columbia, does a good job of agreeing that things are eligible.



- Q** A CCT cultural program staff asked the DAHP staff how monumental or legendary sites that are not necessarily archaeological can be protected under state law. They could be considered objects under NHPA. Does the state have the ability to enforce the non-disturbance parts of the law on private property? A Reclamation staff asked if there was an opportunity to protect such places under the National Environmental Policy Act.
- A** The DAHP staff answered that yes there is an opportunity. You have a checkered landscape here and you have problems with jurisdiction. NPS responded that the Wampanoag Tribe is present for work done on Martha's Vineyard, but whether or not they can do anything is unclear. They have presence, but there isn't enough authority to act in some cases. The private property aspect is a place that you will continue to hit walls.
- Q** A U.S. Forest Service (USFS) representative asked if private landowners with TCPs on their property in Washington had to be contacted.
- A** The DAHP representative affirmed that they did for TCPs. We will see how this pans out in the new legislation. NPS stated that you have to have enough documentation to satisfy the public venue. It depends on the site type and sensitivity
- Q** A federal agency staff stated that one Cooperating Group worked for 3 years on a TCP evaluation and struggled with the boundary because of the private landowner notification issue. Under State law, do we have to notify the private landowners of the TCP?
- A** The DAHP representative answered yes.



The Systemwide Research Design: A Programmatic Approach to NRHP Evaluation of Cultural Resources

Presenter: Brent Hicks, Vice President, Cultural Resources Management Division Manager, HRA, Inc.

Facilitator: Eric Petersen, FCRPS Cultural Resource Program Project Manager, BPA

Note-taker: Vanessa van der Borg, Archaeologist, USACE, Portland District

Brent Hicks gave a history of the SWRD development and stated the SWPA requires production of a draft SWRD. Originally, it was prepared by three agency staff members participating in the FCRPS Cultural Resource Program, while others in the program either participated or provided input. It was originally thought of as a set of best practices, specifically aimed at archaeology. However in 2011, a draft SWRD was sent to Cooperating Groups and hundreds of comments were received. The comments stated the document was too focused on archaeological resources and their evaluation under criterion (d) of the NRHP, and that all National Register criteria should be covered. The agencies sought out a contractor help to complete the SWRD. HRA is currently refining context sections and reorganizing the document.

The SWRD will aid National Register eligibility determinations for all types of resources and all evaluation criteria. It will define broad themes, study domains and historic contexts that span the region, identify types of information needed to address research questions, define best practices/methods for collecting information, and identify audiences for information generated under the SWRD.

They are currently looking for input from the tribes on how to make the document useful to them. HRA realizes it will be used by other entities, but wants to focus on making it useful to the tribes.

HRA is expanding the context statement to include TCP and the Historic Properties of Religious and Cultural Significance to Indian Tribes (HPRCSITS). They are looking at it in two ways:

1. Research Themes (Program Level): Broad overarching domains, expansive areas that mean looking at and entire whole water shed and tributaries.
2. Research Questions (Project Level): These narrow into the 14 projects in the FCRPS.
 - a. Archaeological research questions that address the data gaps.
 - b. Types of information that will answer the research questions.
 - c. Best practices/methods for collecting that information.



- d. Movement towards questions not only address for the archaeological resources but the other criteria as well.

During the TCP subcommittee meeting, all of the tribes present expressed a desire to be involved. There was particular interest shown in sections that will contribute to evaluations of TCPs, cultural landscapes, and HPRCSIT.

The group discussed that understanding the value of the outcomes the SWRD will contribute to is important for tribes.

HRA is trying to identify the desired end of the process, including steps to achieve the end result. They are identifying how tribes want to participate in each step.

The value of the SWRD for agencies is that it provides a basis for evaluating resources' National Register eligibility, which is a necessary step to justify expenditures for potential mitigation. The value of the SWRD for the tribes is that it assists the process of reaching the goal of protection of important resources.

With help from the tribes, the agencies will be able to identify questions that can help resolve TCP management issues and mitigation.

Important questions are:

- What are the resources?
- What are its spatial limits and what is included within them?
- What is the Tribe's connection to the resource and the cultural value(s) that makes it important?
- Does the resource retain integrity (for criterion A and D)?
- How is the Project affecting what makes it an important resource?

A Confederated Tribes of the Umatilla Indian Reservation (CTUIR) cultural program staff stated that on the "type of information" slide from the CTUIR archeologist appears to be inventory, evaluation, and determinations of effect. The slide makes it look like you are talking about individual properties. This type of evaluation takes substantial time and alarms people into thinking it will never get to mitigation. The topics need to be broader.

Question and Answer Session:

- Q** Will these themes and questions be for individual properties or for broad classes of TCPs?
- A** Classes and broad categories initially, but it will eventually need to address specific properties. Some of this work has already been done. Most the TCP info is held in confidence with the Tribes and agencies, and researchers and contractors do not



have access to them. HRA is not sure where the tribes are individually or how they want to evaluate TCPs. When asked by BPA, some tribes are okay with sharing information but most are not.

Q Why not have the tribes write the research designs since they have been collecting and gathering information. They are the experts so why not have them do it?

A We understand that which is why we are asking for the tribes help.

Q Will funds be available now that they are saying they need elders to give information?

A Funding will be made available to the tribes for them to determine how best to gather the information from elders

Q Who is the audience?

A We know the main target audience is the agencies and tribes working in the FCRPS program but we hope it will be helpful to researchers in the region; we know the TCP information is confidential and will be kept as so.

Q How do you plan to tie together the individual contributions by the tribes into the SWRD? By theme, region, resource types?

A We have not thought of that yet. Some ideas:

1. Arrange Cooperating Group meetings focused on specific topics and/or writing tasks.
2. Arrange separate meetings focused on specific topics and/or writing tasks.
3. Tribes can write content independently and submit to agencies to fold into the Research Design document.
4. Tribes can collaborate/share information with agencies' contractor in writing parts of the document.
5. Tribes can review and comment on document prepared by agencies' contractor.
6. Others?

Each tribe has a different approach and how much information they are willing to share. We will have to have a certain level of trust between the agencies and tribes.

Q Have the agencies asked the tribes what type of information they are willing to share?

A It is not the agencies' place to ask the tribes for information, it is their culture. It is up to the tribes to tell us what is important to the tribe, what they are and are not willing to share, and how they want to share the information.

A Tribal Elder stated that the generation now running the council is young people. They do not know anything and refuse to call in elders who give information. Not



all are like that but they don't always listen. Push elders out.

An agency staff stated that they are not sure if that is something for the SWRD, or something the Tribal Councils need to work out.

A Spokane Tribal Elder stated that there are younger children in council but they do not have an understanding of the traditional values to tribes. Do not listen to elders. Used to have the elders gather and take a while to make decisions. They would have to go with what the elders decided but now they are not willing to listen.

Q Will the discussions and how to evaluate under criteria A-C be incorporated in the Section 106 training?

A There have not been any plans made to do so.

Q A statement was made that when the tribes brought up evaluating under criteria A-C, they (archeologists? other tribal members?) were a little dumbfounded. They always trained to evaluate under criterion D. Having no tribal members interpret tribal values doesn't really work. We need to have training and how far would it reach? Few tribal members are archaeologists. It is a continuing issue. So is how tribal members reach across generations.

A Agreed, trainings provided by the federal government do not address our (PN) very well. It is a beginning to a larger discussion.

Q A statement was made that there are differences between one tribe and another. How the tribe gets the information across to the council, elders, and archaeologist.

A A non-tribal archaeologist stated that some of the information being requested is at the heart of the issue on what type of information the non-tribal archaeologists feel comfortable giving, most defer to the tribal members. They wondered how to create a training program to have the tribal members talk to the agencies for the info that they want, as a non-tribal member does not feel comfortable giving info they request.

A tribal cultural program staff stated that the Spokane Tribe did have a cultural committee they brought stuff to. It dissolved and became difficult to get elders. He's concerned that time lines won't permit important input from elders. When they see that an outside management person who doesn't know the needs of the Tribes, the landscape and how it changes, they resisting giving anything to the document. The Spokane Tribe would rather produce their own document.



TCPs, Cultural Landscapes, and Bulletin 38

- Presenter:** **Paul Loether**, National Register Chief, NPS
Nancy Brown, ACHP Liaison to the Bureau of Land Management (BLM), ACHP
Alan Marshall, Professor Emeritus of Social Science, Lewis-Clark State College
- Facilitator:** **Paul Cloutier**, Tribal Liaison, USACE, Northwest Division
- Note-taker:** **Kelly Phillips**, Archaeologist/GIS Technician, BPA

Paul Cloutier welcomed the attendees, read the session description, and introduced the speakers.

Paul Loether began his discussion with how and when comments to Bulletin 38 will be addressed. He stated that there is 3-years' worth of comments and that Dr. Tom King was asked to help address the comments. The focus was primarily on practical application. The comments did not reflect the need for major updates; however, when updates do occur, they will now be available on the web. These links will also have nomination and DOE information.

He advised that currently we are delayed 3 months as a preliminary review that is co-partnered with ACHP still needs to take place. He predicts 2 months before the updated document will be available to the public. Currently, the third internal draft is being reviewed by solicitors and it will be 6 to 8 months before it is final. An email will be sent out when the next document is available for public comments.

He spoke about sacred sites versus TCPs. Sacred sites are TCPs, but not all TCPs are sacred sites. There are distinguishing questions surrounding boundaries which provides a tool for federal agencies to do their job better

Bulletin 38 is not a standalone document. It is being compared to other relevant documents to make sure it is consistent. The goal is to make it a consensus based document.

Q Frequently asked questions (FAQs) and Bulletin 38 update will be released at the same time?

A Yes. They need to come out together for the contextual framework to be understood.

Q Will the web-based PDF version of Bulletin 38 completely replace those that are mailed out?



- A No. The goal is to move toward a web based system, but the intention is not to exclude anyone who needs a hard copy mailed to them. The web is preferred because it makes addressing issues quicker and it is also easier and cheaper to distribute electronically.

Paul Loether then closes the discussion with an open invitation for further questions, now, or after the session. He also encourages phone calls as questions arise after the conference as well.

Panelists address questions outlined in session description:

Multiple Property and TCP Evaluations (Paul Loether):

1. Submit more than one nomination at the same time for sites that are related to each other. This sets up the framework for multiple properties; allows you to add more sites over time.
2. TCPs: originally used the terms “property” and “place” for TCPs, but really they should only be termed “place(s).” Calling a TCP a “property” is somewhat of a misnomer because TCPs are not a property type rather TCPs provide an overlay of significance given a particular type of significant resource.
 - a. Finalized boundaries are not always needed when there is a difference of opinion (e.g., Nantucket Sound). Boundaries can be technical and finite, like with archaeological sites, but when dealing with TCPs they are more flexible. Register nominations to require boundaries, and are preferred for DOEs, but it is understood that they are not always available.
 - b. How big can a TCP be? As big as is justifiable, but do not include water bodies, and be sure to address all 4 eligibility criteria.
 - c. Sensitive information is needed, but that information can be protected and returned. We do not need to know everything, but need to know enough to justify a TCPs protection under the law. The goal is to be up front in the beginning about what can and cannot be done. Once a decision has been made, it is sent to the tribe(s) for comment and this is when it should be specified what information should be redacted.
 - d. TCPs can still be TCPs without being eligible. The National Register is not designed to do everything. Will be flexible with DOEs and will work with the tribes when sensitive information is involved.
 - e. TCPs are eligible under more than just criterion D, all 4 should be addressed.
 - f. TCPs are tied to cultural group(s). The eligibility process is the same for historical properties but more flexible, the National Register was not initially designed to deal with TCPs.



3. Nancy Brown: With regards to distinguishing cultural landscapes, not all TCPs are going to be eligible, but we want to understand all of the aspects that make the landscape special. Bulletin 38 helps us understand how the property types fit.
4. TCPs can be multiple properties.

What is your Agency's role?

Paul Loether stated that the Keeper makes the final determination of eligibility if there are disagreements at the agency level. The Keeper provides formal, legal, and final authority for requests. Nancy Brown stated that if there is a dispute about eligibility the ACHP does not weigh in on the decision, they help get it to the Keeper so that a final determination can be made.

Working towards a Tribal perspective of Bulletin 38

Alan Marshall stated that it is difficult for the tribes to use Bulletin 38 to categorize their TCPs, because the options available are not always appropriate. We must understand that the frontier is not gone. TCPs are not resources; they are a way of life and part of the earth. Many ecologists are beginning to recognize this and are incorporating people back into the landscape. He is concerned with Bulletin 38 because it affects the tribal way of life, but the tribes are not the ones getting to make the decisions. Traditional knowledge does not always fit into Bulletin 38. There are some things that cannot be told and it should be the tribe's decisions to share their living traditions.

Question and Answer Session:

- Q** The field of anthropology/archaeology is dominated by Westerners? What is the best way to change this trajectory?
- A** The trajectory is already beginning to change: Look to this room, there is an active new generation of tribal cultural resource specialists among us. Listen. Listening is important, have patience. Learn the language, learn the culture. The old ways of archaeology are gone, which is a good thing. It is essential to recognize the sovereignty of the tribes. Treaties should be honored.
- Q** How is Bulletin 38 going to address this new reality?
- A** Try to listen and understand what the tribes are saying is of importance to them and interface tribal concerns within the modern system. There are limits, but we have to try. Critical point is partnership between the tribes and federal agencies toward reaching FRCPS programmatic PIs. Cooperating Groups work with multiple tribes who do not always share the same viewpoints. Federal agencies are here to help, but there are difficulties executing it on a broad scale.



Q Who are the historic properties being preserved for, the public, or for traditional use?

A Historic properties with tribal significance are meant to be preserved from the public. The goal is to protect cultural resources for the tribes with assistance from the federal agencies.



Reservoir Dynamics – The Human Influenced Processes Behind System Level and Flow and the Natural Processes of Impounded Rivers

- Presenter:** William (Bill) D. Proctor, Chief, Reservoir Control Center, USACE
Robyn MacKay, Manager of Operations Planning, BPA
Mary Mellema, River and Reservoir Operations, Reclamation
Dr. Tim J. Randle, Manager, Sedimentation and River Hydraulics Group, Reclamation
- Facilitator:** Derek Beery, Power Office Archaeologist, Bureau of Reclamation
- Note-taker:** Melanie Wadsworth, GIS Analyst, BPA

Operations Planning for the FCRPS

Presenters:

Mary Mellema – Reclamation
William D. Proctor (Bill) – USACE
Robyn MacKay – BPA
Tim Randle – Reclamation

Mary Mellema described the objectives for this session. There was discussion of complexity of operating reservoirs, including variables such as weather and runoff and how the system is run as a unit. Coordination between Reclamation, USACE, and BPA was explained. Reclamation and USACE are the owners of the projects; BPA markets the hydropower.

FCRPS facts and figures:

1. The uses of FCRPS are flood control, navigation, irrigation, power, and more.
2. There are 31 hydro projects and 1 nuclear plant in the FCRPS.
3. Additional facts and figures were presented on the slides (Attachment B).

An overview of hydrologic data was presented. Runoff amounts measured in million acre feet (MAF) were discussed. The average January to July runoff was 102 MAF for the years 1929-2008. The range of MAF was 54 to 159 MAF for the years 1929-2014. Storage capacity on the U.S. side of the system is 20 MAF. On the Canadian side of the system, storage capacity is 20.5 MAF. The Columbia River Basin is a storage limited system, which means only 30 percent of average annual runoff is stored when the U.S. system is empty. The Columbia River Basin has multiple uses. Some of the uses are hydropower, recreation, and irrigation.



These multiple uses are weighed when decisions are made about operations. Conflicts occur due to competing interests.

Annual planning process

1. Winter – Drawdown season dictated by flood risk (drafting) and expected runoff
2. Spring – Refill season is based on flood risk and salmon migration
3. Summer – Limited draft for summer fish migration
4. Fall – Base flows
5. Weather forecasting has a large impact on the planning process for operations

Bill Proctor presented regional precipitation monthly maps for the basin. Forecasts are made by reviewing monthly precipitation. He advised that you do not know what you are going to get. An example of a water supply forecast was shown for October 26, 2014, which is really early for a forecast. Best projections early in the season for this date were shown. Total maximum storage would be 20 MAF US, 20 MAF Canada. The Columbia River Basin is not like the Colorado or Missouri.

There is a large amount of variability because forecasts are difficult to predict early in season. The Water Supply Forecast can vary significantly throughout the year. Monthly flood control elevation values and associated storage needed values examples of graphs and figures were shown. Bill explained the Libby flood control storage reservation diagram and how water supply forecasts are affected by different variables. It is a balancing act for flood risk/storage dams. Drawing down as weather is rainier and through the season.

For example, with Grand Coulee Dam operations, refilling in May and June for snowmelt and refilling for chum in early November. Draft rate limit at Grand Coulee that goes to 1.5 feet/day.

There are many planning documents that help set operations. These are available online:

1. Biological Opinions
2. Flood Control Operating Plan
3. Detailed Operating plan
4. Fish Passage Plan
5. Water Management plan
6. Water Quality Plan
7. Summary of Columbia River Flood Control Data
8. Storage Reservations Diagrams
9. Technical Management Team meeting notes



Robyn MacKay presented other factors influencing system operations:

1. Water Quality Standards
2. Requests for special operations
 - a. Treaty fishing
 - b. Fish habitat restoration projects
 - c. Recreation events
 - d. Special navigation requests
 - e. Dam/reservoir modifications
 - f. Outages

A more detailed look at FCRPS annual operations takes into account additional factors. This includes details such as the chum operation minimum/maximum tailwater elevation for spawning in the fall. In the winter, operations need to maintain Priest Dam's minimum flow for Vernita Bar. In the spring it is necessary to be as full as possible by April 10 for Biological Opinion requirements. Many other details are also part of operations.

Operations planning for USACE, BPA, and Reclamation were discussed.

USACE Operations Planning-

- a. Flood risk management
- b. Owner/operator
- c. Setting flows at their projects
- d. Navigation coordination
- e. Implement Columbia River Treaty with BPA

Reclamation Operations Planning-

- a. Irrigation, 2.9 million acres
- b. Hungry Horse and Grand Coulee storage projects
- c. Grand Coulee power house units
- d. Notify non-federal entities such as tribal about operations

BPA Operations Planning-

- a. Power marketing
- b. Real time 24/7 duty schedulers to requestors of power generation
- c. Short-term/mid-term planning
- d. Hourly water operation

Operational Challenges:

1. Wind integration
2. Aging infrastructure
3. Managing total dissolved gas



Upcoming events:

1. Columbia River Treaty recommendation is currently at State department
2. Climate change challenges that will effect operations

Question and Answer Session for Operations Planning:

Q A Yakama cultural program staff asked if there any resources we can use to check flows, etc., that would be useful for the field/planning/protection of cultural resources, that is, beyond just cubic feet per second (cfs)?

A Mary and Bill will provide the website URL and further explanation to John. There are many resources on the internet that are available.

Q A CCT cultural program staff asked about annual power sale generation? Gross revenues?

A These types of numbers were not prepared for this presentation.

Natural River Processes and Reservoir Operations

Presenter: Tim J. Randle – Reclamation

Tim Randle presented information on river processes, sedimentation, and type of restoration projects across the west.

Dams and reservoirs provide benefits but there also negative environmental effects such as land inundation and wave erosion. Reservoirs trap sediment and lead to channel degradation. Possible downstream effects of altered hydrology are reduced flood peak, and increased low flows.

Six types of sediment particle grain sizes were shown and discussed. The sediment particle grains are classified by transport. Sediment transport increases as flow velocity increases. He gave a brief explanation of suspended load/bed load.

Channel stability is described by the stable channel balance equation. There was a discussion of the effects of changes in sediment size or stream slope.

Reservoir Sediment Profile -- Delta example --Cobbles, gravel, sand, etc.

Impacts of sedimentation become more prevalent as time passes. For example, if intakes were only set to handle the first 100 years of sediment, then there will be issues with the intakes after or leading up to the 100-year lifecycle.



General background on river processes such as migration and how vegetation stabilizes and constrains migration.

Habitat restoration strategies are used protect side channel habitat and slow terrace bank erosion, among other uses. Images and highlights of various strategies were reviewed.

Question and Answer Session for all Speakers

Q What is 1.5 feet in 24 hours based on?

A For bank stability as determined by geologists. This would minimize erosion for Lake Roosevelt. The figure of 1.5 is used commonly by Reclamation; however, there are also different criteria at different elevations.

Q Life expectancy of a dam?

A It varies. Factors are how they are designed, sedimentation management.

Q What happens when a reservoir fills up with sediment?

A It could be removed if there are safety issues.

Q What is the process to drawdown projects for special request like inventories?

A This is dependent on forecasting and whether they have flexibility within a certain range, for example, whether they have flexibility between 75 and 80. Other factors such as deepness and time period affect drawdowns for special requests. A year in advance is not too early for a special request, so they can forecast which month would work. Someone has done this in the past at Kootenai and was able to schedule multiple projects at same time, package deal.

Q FCRPS relationship with non-FCRPS dams. How is it coordinated?

A We need to know how much water to expect for Mid-Columbia hourly coordination, to coordinate with Mid-Columbia projects. No information on cultural coordination.

Q Bathymetric data for all 14 projects?

A Some. The Dalles 1992 was the last one. This affects navigation traffic. They do not have dates/availability of all data. Grand Coulee has its data on the site.

Q Reservoir based hydro models. Grand Coulee release, front load on upper end for example. Is that modeled anywhere? Elevations at forebays?





Training: “Reasonable and Good Faith Effort”

Presenter: Tom McCulloch, Senior Policy Analysis, ACHP

Note-taker: Eric Petersen, FCRPS Cultural Resource Program Project Manager, BPA

Tom McCulloch briefly reviewed the steps in the Section 106 process.

Identify historic properties and ask the question - what historic properties may be out there? You need to assess adverse effects and ask yourself, will my project harm historic properties? Finally, you need to resolve adverse effects. What is appropriate to mitigate adverse effects in the public interest?

The federal agency defines APE using direct, “reasonably foreseeable,” indirect, and cumulative effects. It then determines the “scope of identification efforts” in consultation with the SHPO/THPO, consulting parties, knowledgeable individuals and organizations, Indian Tribes, and Native Hawaiian organizations. There can be multiple APEs for a project and they can exist on all three planes/axis (x, y, and z). Identification of properties listed on or eligible for listing on, the NRHP can include: buildings, structures, districts, sites and objects.

Federal agencies must make reasonable and good faith efforts to identify tribes and consult with Tribes and Native Hawaiian organizations in order to make a reasonable and good faith effort to identify any Indian Tribe or Native Hawaiian organization that might attach religious and cultural significance to historic properties in the APE. Agencies should acknowledge “special expertise” in identifying historic properties of religious and cultural significance to them. You need to go to SHPO if necessary for help identifying appropriate groups. Agencies should give great weight to tribal perspectives

What constitutes good faith efforts? Not one size fits all and 100 percent survey coverage not required. Go through past planning research and studies, check with SHPO site/inventory files and ask the Indian Tribes.

Section 106 regulations require that a reasonable and good faith effort include at a minimum, a review of existing information on historic properties that are or may be within the APE. Construction monitoring only is not acceptable without checking what has been found previously in area and magnitude and nature of undertaking.

What is federal involvement and to what degree are they involved? It means the federal agency’s degree of control or influence over the undertaking, the nature and extent of potential effects to historic properties and based on APE, they may not be able to do anything to avoid effects.



What is the likely nature and location of historic properties? Identification efforts should focus on where effects are likely to occur within the APE, and the kind of impact a specific action may have on historic properties. More likely would mean more surveying.

What is the likely nature and location of historic properties? Identification efforts are based on where properties are likely to be located within the APE. The likelihood that the APE contains an exceptionally important historic property would mean a more intensive survey.

What may be included to meet the standard? Background research, consultation, oral history interviews, sample field investigation, field survey, additional background research, and interviews.

The “legal language” of the reasonable effort is one that is logically designed to identify eligible properties that may be affected by the undertaking, without being excessive or inadequate in light of the factors cited in the regulations.

Defensible activities to justify efforts would be to ask is this reasonable effort? Also, you can vary the level of effort and make sure target efforts are reasonable. Is a reasonable effort from a survey from 20 years ago? To complete a state survey form for all 400 sites, looking over but not filling out a new site form could be reasonable.

A good faith effort is where the effort is fully implemented, not after preferred alternative decided. Properties considered as part of a decision and there would be a phased approach. No wiggle room reduces the likelihood of good faith effort and you will need qualified personnel conducting the research.

In order to resolve disputes, you will need continued consultation and need to continue to seek advice of SHPO and ACHP, as well as other consulting parties. Keep in mind reasonable intensity and scale carried out throughout development and execution. You may not find everything through curation.

Meeting the reasonable and good faith identification standard means the efforts must be both reasonable in terms of intensity and scale, and the plan must be carried out in good faith through its development and execution

There is now new online ACHP guidance on developing Section 106 Memoranda of Agreement and Programmatic Agreements as well as new guidance on agreements documents. It answers various questions, covers stipulations and is for use by all Section 106 consulting parties. See guidelines on website www.achp.gov/agreementdocguidance.html



Questions and Answer Session

- Q** That never happens in the real world. The agencies are moving forward anyway and ACHP needs information to follow up with the agencies. They could have fifteen letters to ACHP a day. The worst are the non-land managers.
- A** We would like to hear about it. If agency asked to do more than normal review can ask for funds.
Follow-up: Agency identifies level of effort in consultation, sent invoices to Cultural Resource Management firms
- Q** Is the Walla Walla District USACE trying to consult more fully?
- A** Agency can delegate to an applicant (not a Cultural Resource Management firm). Upfront change in consultation should be agreed to.
- Q** What kinds of public outreach need to be conducted?
- A** Identify groups who can be at table, keep public informed, and find ways to design public outreach programs. Need to identify who is the public? And find appropriate ways for appropriate groups.
- Q** Agreements may talk about tribal issues so BPA tries to keep quiet in agreements regarding specific up front elements.
- A** Confidential does not mean non-addressing
- Q** What about tiered projects?
- A** You can have consulting party meetings. You also can limit numbers of individuals or ask them to leave.





Emergency Management at Reservoirs and Cultural Resources Management – Lessons from the Incident at Wanapum Dam

Presenter: Mark DeLeon, Senior Archaeologist, Grant County PUD

Facilitator: Sean Hess, Regional Archaeologist, Reclamation

Note-taker: Kara Kanaby, Archaeologist, USACE, Seattle District

Sean Hess – Introduction

Each year, Reclamation experiences some kind of emergency (i.e., wildfires, emergencies within the dams themselves, serious injuries, etc.). One of the provisions of SWPA is that the projects Historic Properties Management Plans (HPMP) are supposed to have provisions on how to handle emergencies. This break-out session deals with the emergency at Wanapum Dam which is managed by Grant County PUD. This is an opportunity for FCRPS to learn from the recent Wanapum Dam emergency that occurred at the end of February 2014 and is still continuing.

Mark DeLeon Archaeologist with Grant County PUD

He opened by stating that the information he is sharing is a work in progress and is his own version of a subset of a much larger story. No higher level review has occurred yet and he expects to prepare a summary and analysis.

He stated each emergency is unique.

The drawdown is still in effect and the PUD is still working through the cultural resource actions related to the drawdown.

He suggests not trying to “over plan” for an emergency, as flexibility is necessary. Do not make it over complicated. He suggests asking to see the emergency response plan for your organization. Questions to consider:

- Does your organization have emergency response plans?
- Are you the (i.e., cultural resources specialist) in it?
- Are you allowed to see it? Mark was not allowed to see the PUD emergency plan due to “security” information contained in the emergency response plan.

Look to your stakeholders. They want to help in an emergency and you should take your cues from your stakeholders.



Involve the media somehow as they can be key to some success in getting information out (i.e., closures of shoreline). Looking back, Mark says there were some missed opportunities involving the media.

PUD has working cultural resources group. When the emergency occurred PUD was encouraged by their working group to develop the plan on how to deal with the drawdown. Mark said the key was to not shortcut Section 106 and keeping the working group's interests/concerns in mind when developing it.

Grant County PUD is a licensed utility, but not all PUDS have Federal Energy Regulatory Commission (FERC) licensing. Priest Rapids development was first licensed for 50 years in 1955 (1956-1963). Grant County PUD received a new operating license for 44 years in 2008.

Wanapum Dam is at river mile 415. Normal pool is 517.5 feet above sea level. There is 38 miles of shoreline. The reservoir is created by a double elbow or Z shaped dam which was to allow for the development of a lock system had the Benjamin Franklin Dam been built.

There is a fault that runs through the middle of the river under the dam, but the fault was not the cause of the crack in the dam.

The Cultural Resource Program is housed in the hydro division. The cultural resources manager is Brett Lenz and there are four archaeologists. There are two cultural resource programs. The first is at the Grant County PUD and the second program is at the Wanapum Indian Community which includes language, plant gathering, a heritage center, repository, and river patrol.

Grant County HPMP has a section that addresses emergencies and it is only half a page in length. It is broad enough to allow a plan to be developed and tailored to the emergency.

The emergency began when an employee noticed that the spillway appeared to be out of kilter. Grant County PUD sent divers down and a 60 foot crack was discovered. The pool had to be drawn down to alleviate the pressure on the dam. The root cause was attributed to a math error in specification in the concrete

The repair chosen is a tendon and anchor repair in which a 10-foot-diameter, 200-foot-long cable is threaded into hole in the bedrock. This repair will be done on all 12 spillways. The pool will be raised after the damaged spillway is fixed. If the repair works, the pool will be filled to normal pool depth and all 12 spillways fixed. When the method of repair was announced, it was not earth shattering to engineers as it is a routine repair and this particular treatment has been around for years.



Cultural resources were brought in about a week after the incident. They began calling the cultural resources working group members on Friday. It took about a week to figure out what the issue was (crack in the dam) and what needed to be done (draw down of the pool).

Grant County PUD defined the undertaking as the operation of the pool below the base operating pool level. Grant County believed that the lower pool level fell outside operational range and was outside of the FERC license. Three months after Grant County had defined the undertaking FERC informed the Grant County PUD that the undertaking (operation of the pool below the base pool level) was not a Section 106 issue as there is no specification in the license regarding the lowering the pool below base operating pool, but FERC said they could keep going.

A list of issues needed to be considered. Public safety and security was the number one issue. Grant County PUD had to protect sites that spent 51 years underwater and were now exposed. Looters came together quickly and in response to the fact looters were coming together, there was an initiative to close the shoreline. There was also a big safety concern due to the unstable landscape. The PUD is governed by board of commissioners that are elected. The commissioners heard a lot of complaints from the public due to the closing of shoreline. All federal and state agencies were all on board with closing the shoreline. Both the federal agencies and state agencies closed their access points to the reservoir. Washington State created a Revised Code of Washington to specifically close their access points and after one month they had a strong security presence 24/7.

The lowering of the pool caused unstable landscapes. The rapid dewatering caused large drying cracks to develop which threaten the integrity of sites and caused safety issues (i.e. people got stuck); sand banks were being undercut. Sand is the primary sediment. Rapid wetting and drying created unstable surfaces. Erosion is a huge problem with the quick dewatering. Erosion occurred on large scale and is continuing. Hopefully, the pool raise will stop the erosion. Sediment deposits created by the reservoir are also eroding. These sediments are being re-deposited downstream.

Grant PUD did an archaeological survey in which the HPMP was the guiding document. Three archaeological contracting companies were hired and conducted a survey over 5 months in which 4,000 acres were surveyed. A lot of sites were relocated, but not all as some were still underwater. In some cases site boundaries expanded. Approximately 100 new sites were also recorded. There was no data recovery (other than bank profiles being taken) and no shovel testing as this was a survey only.

There were human remains recovered and many difficulties dealing with media. Grant County PUD tried to keep quiet about the human remains. There also were issues with land ownership.



Grant County PUD is not done with the drawdown. The pool is projected to be raised by January 1, 2015. The current conditions to take into account and the cultural resources on-going there is now a relative stability to the landscape. Analysis is on-going. They are talking to archaeologists who did the initial fieldwork prior to the dam being built and the Sunset Creek information is being revisited and re-thought by original researcher. The shoreline closure is still in force.

LiDAR/Orthophotography - Relocated only 3 petroglyph sites (Spanish Castle) that are finally coming to light. They are using land based LiDAR in recording the petroglyph sites.

This is an unusual mitigation domain. They do not know how long the drawdown will last due to conditions so mitigation does not apply very well to this incident. There are sites that are adversely affected by the drawdown, the drawdown flows and will likely be affected by the pool raise. Grant County PUD and working groups are still trying to figure out what to do. Site protection will be virtually impossible. They are looking at off-site mitigation measures and consultation is on-going for solutions and planning.

Mark recounted other dam failures not analogous to Wanampun, but to point out that there have been past dam failures. He listed the total failure of Teton Dam near Rexburg, Idaho, and Fontenelle Dam in southwest Wyoming. Efforts took until 1992 to get the concrete wall at Fontenelle Dam completed after a 1965 near failure through cracks to the right abutment. Additionally, in 1985, an emergency draining caused a dangerous slump on the dam face.

Mark found two sources helpful in thinking about emergencies. In the *Dynamics of Disaster* by Susan Kieffer, the author states that disasters or emergencies are caused by physics: a physical change in state. She deals mainly with geological disasters. *Command and Control* by Eric Schlosser deals with nuclear disasters, but points out that we engineer to prevent something from going wrong; however, we do not know what to do when something does go wrong.

Question and Answer Session

Q What had you wished you had known before the emergency?

A There were land ownership issues that complicated what set of laws the human remains would be handled under. Private and state land extended into drawdown. Grant County PUD had not put a priority on the land ownership in the drawdown zone and the cultural resources folk did not have a good land ownership map. All eight cases of the inadvertent discovery handled under state law.

Q How was the working group/tribes communicated to?

A A working group meeting was called about a week after the crack identified. Then weekly meetings occurred to update the group on what was happening and sites



identified the week before allowed for questions/issues to be discussed. In regards to mitigation, those discussions are occurring through individual meetings/conversations with DAHP, BLM, and tribes for creative mitigation ideas. Data recovery is not going to happen due to a variety of reasons (safety issues, etc.).

Q Explain the emergency management protocols in the HPMP?

A The plan in the HPMP is only half a page long and mainly a placeholder. The emergency management protocol allowed a plan specific to the emergency to be developed with working group. It took about a week to truly understand what the emergency was (crack in dam) and what needed to happen (rapid lowering of pool). Looking back Mark wishes that they had done more coordination with public relations.

Q Were cultural resources involved from the start? Did they have to push their way into the emergency response team?

A Mark suspects a little bit of both. PUD had not established an incident response team.





Rock Images Panel Discussion – Technological Advances in Recording and Preservation

- Presenter:** Evelyn Billo, CEO, Rupestrian CyberServices
J. Claire Dean, Conservator, Dean and Associates Conservation Services
Jon Harman Ph.D., Board Member, Western Rock Art Research
Robert Mark Ph.D., Chief Scientist, Rupestrian CyberServices
Karen Steelman Ph.D., Associate Professor, University of Central Arkansas
Chester Walker Ph.D., Owner, Archaeo-Geophysical Associates
Mark Willis, Archaeologist, Blanton & Associates, Inc.
- Facilitator:** James Harrison, Principal Investigator, Spokane Tribe of Indians
Archaeology and Preservation Program
- Note-taker:** Alice Roberts, FCRPS/NAGPRA Project Manager, Supervisory
Archaeologist USACE, Walla Walla District

Mark Willis, Archaeologist, Blanton & Associates **3D Imagery for Rock Image and Landscape Applications**

Mark began by stating that multiple images are overlapped to create point clouds that give the dimension to the images. The 3D models are important to incorporate features of the rock itself. The D-stretch software further identifies features that might not be otherwise visible. For petroglyphs not visible – overlapping photos to a very high resolution - points are sub-millimeter to allow for image resolution.

Older photos can be used and compared with current photos to document changes in the condition of the pictographs (i.e., quantification of damage). The 3D print outs of the images are possible with this technology. Petroglyphs and images are part of the landscape and drone-use is key in preparing a 3D model of landscape. (Example presented - Pre-and post-flood data used to show landscape before and after a flood event.)

See www.palentier.com for photo-processing of aerial, drone images.

Jon Harman Ph.D., Board Member, Western Rock Art Research **Creator of DStretch.com (former medical imaging technology)**

He developed the DStretch software for rock art research (pictographs) to enhance rock images. The process works very well on red pictographs, and it also brings out the yellow. The DStretch camera can produce results in the field. The software is not as effective on petroglyphs or charcoal.



De-correlation stretch algorithm. “Applet” on web where one can experiment with DStretch www.dstretch.com.

**Karen Steelman Ph.D. - Associate Professor, University of Central Arkansas
Radiocarbon Dating of Rock Paintings**

Plasma oxidation – developed in 1990s used to extract the organic parts of the paint sample.

Samples from the Western Australian desert -36 dates that were used to relate to occupation sequences; and stylistic changes over time.

Full documentation of images must be completed prior to collecting samples from the wall.

It is best to have the best sample come from area that the traditional owner is interested in. Only a very small sample is required: charcoal ~ 1cm, other pigments with organic binder ~1.5 cm. Take samples of unpainted rock as control. When you take the paint you have to take some rock because the paint has been bound to the rock.

Separation technique leaves rock behind and converts the organic material to CO² and water. AMS dating. Portable x-ray fluorescence - non-destructive – analyzes pigment components.

**J. Claire Dean, Conservator, Dean and Associates Conservation Services
Rock Art Conservation and Repair**

Her company does site condition assessments, management recommendations, and damage assessments for ARPA violations. They also do active treatment of sites – both natural and vandalism, natural damage – weathering and decomposition of rock. Documentation is critical as they can put in measures to reduce the damage (divert water, shade).

There are many techniques for repair of damaged, or at risk, rock image sites.

Overlapping photographs (photogrammetry) has been standard for many years as part of condition assessment, plus, it provides baseline data for future work. Detailed, computer aided mapping on a grid is critical for pre-treatment documentation. Panels may be divided in vertical columns or by grid for control during treatment. A combination of chemicals and laser treatment is used to remove graffiti. Different treatments are selected based on the type of pigment and rock-base. Testing of treatments is done in discreet areas where no pictographs can be damaged. Red Elk Rock shelter in Idaho was provided as a case study.



Evelyn Billo and Robert Mark, Rupestrian Cyber Services

Evelyn Billo: International Research on Rock Images – Ethnographic Research and Interpretation.

Several examples of research were presented. In New Caledonia, images include enclosed crosses and geometric imagery dominant and faces. In Australia, informants describe the meaning of the images, faces with headdresses having to do with water, clouds, and rain. Rattlesnake images and associated stories were documented in Arizona. At Mesa Verde, there are Hopi Story panels, the meaning of which may change over time. The journey of the sun is shown in rock in Scandinavia, and in Sweden they take rubbings and paint the images so they stand out, a potentially damaging practice.

Bob Mark: Technologies

Bob Mark demonstrated that panoramic and mosaic images should be taken to document an entire panel. Gigapan allows the user to take hundreds of images across the panels. Photogrammetry is used to create the 3D image. You can look at illumination from various angles with RTI (www.culturalheritageimagery.com). There is an iPad program developed for Reclamation for use that is great for photo board too. A Theodolite application also helpful.

DStretch can be used to map trails using drone photography. Images must be taken from multiple angles to generate 3d models. All photos must be retained for this to work. A USB microscope can document superposition of pigments (all black put on first, then all red – a complex artistic approach). www.rupestrian.com





Salmon and the People: The Chief Joseph Dam Fishery Story

Description: This short film told about the role salmon play in “the rhythm of life” for members of the 12 Colville Confederated Tribes. This film used interviews with Colville Tribal fishermen and historic photographs to explain the importance of fishing and consuming salmon for tribal community members, both for nutritional value and as a “healing experience.” Interviews illustrated how dam operations affect fish, and access to this important food source, as well as the role Chief Joseph Fish Hatchery plays in efforts to ensure healthy fish are available for future generations.

Cooperating Group Poster Session

Posters highlighting recent accomplishments for each FCRPS Cultural Resource Program Cooperating Group were viewed in the hotel lobby.





Summary and Closing Ceremony

Presenter: Gail Celmer, USACE
Sean Hess, Reclamation
Kristen Martine, BPA

Note-taker: Susan Tracey, BPA

Plenary Session Summary

Nancy Brown presented her 3-day training in 1 hour. Some Cooperating Groups have discussed landscape scale issues and how to approach cultural site management as either a landscape or a traditional cultural property. Nancy provided a “how-to” and overview information as well as a good foundation to follow up with our Cooperating Groups.

National Register Eligibility Panel Summary

Three SHPO offices, two Tribes, and the National Register Office in Washington DC were represented. Everyone gave a brief presentation of what their offices require for documenting sites for DOEs. They discussed boundaries in those presentations and how accurate they have to be.

All four National Register criteria need to be taken into consideration when things are being reviewed. Rob Whitlam stressed that we should be looking at all criteria and gave examples of sites that meet criterion A-C as well as D. There was also a discussion about sensitive information and TCPs, as well as private property and how to work with private landowners.

Systemwide Research Design Summary

Eric Petersen and Brent Hicks gave a presentation on the SWRD, which was a follow-up from a meeting that was held last week. They provided a status of what had been done over the last few months and emphasized info needed from the tribes to address criteria A-C. The focus was on trying to acquire information. They had difficulties in identifying what they need and best ways to acquire that information. Elders expressed the differences between the younger and older tribal members. Youth are not as engaged as the Tribal Elders have been in the past and do not know if that information was appropriate to be disseminated. There was discussion about confidentiality and perspective of the tribes to follow up that information. Agencies will follow up with the tribes in two different ways. They will have some one-on-one contact to pursue information that they would like to share and continued discussions in the Cooperating Groups. Mr. Hicks will attend if appropriate.



TCPs, Cultural Landscapes, and Bulletin 38 Summary

The discussion of TCPs and cultural properties and landscapes and applying for the National Register was led by Paul Loether, Nancy Brown, and Allan Marshall. Paul Loether gave an update on Bulletin 38 and that we should not be anticipating dramatic changes but there could be some. There will be a development of a FAQ page and it will be a living document available electronically. The update may come at the end of the year as it is in the legal review process with the National Register. Nancy Brown echoed many of the same themes. We can use our existing tools in addressing cultural landscapes. The highlight was the thoughts that Allan Marshall shared with us about the frontier. Back in the 1890s they said the frontier was closed, but for the native peoples the frontier is never closed. Marshall's description of TCPs is important to the tribes' knowledge journey as a people. This is an important aspect of maintaining their identity.

Reservoir Dynamics Summary

The panel consisted of Mary Mellema of Reclamation, Robyn MacKay of BPA, and William Proctor of the USACE. They each spoke about their different input and how during the various seasons they make adjustments for flow and power throughout the year. This was not directly about TCPs or cultural resources; it was a presentation about how the dams are maintained and how they are managed. They have to manage flows to meet the Biological Opinions and fish management as well as the requests, recreation, management, etc., at the different dams throughout the year trying to forecast weather and flows. There were a lot of archaeologists who were surprised they could do pool and flow forecasts throughout the year. Tim Randle of Reclamation gave a presentation about sedimentation and river dynamics and reservoir dynamics and how rivers function and the material that travels in and on the river. He also spoke about the erosion that occurs when the sediment builds up behind the dams and the effects it has on the life of the dam.

Field Trip: Approximately 30 people attended. They visited Old Man House, the Suquamish Museum, and Chief Seattle's grave.

Advanced Section 106 Training Summary

Tom McCulloch with ACHP provided some fairly good resources and pointed attendees to the ACHP website for questions in the future. How much survey you do, how you go about doing an inventory for TCPs and who your consulting parties are.

Emergency Management Summary

Mark DeLeon with Grant County PUD gave a presentation about the crack in Wanapum Dam. This precipitated a response for cultural resources from all up and down the river. We had four take-aways:



- Their HPMP played a critical role in their response; the section about emergencies is very short, the HPMP language created the framework for them to be able to have a response to the emergency.
- They discovered quickly how important communications were to respond to the situation. Weekly phone calls to get together and hear what the latest was and join the organized response were instrumental.
- Being clear about land ownership is something very important to have during a federal emergency. In the state of Washington, you are under the State law of burial and what you can do which requires a permit. Sometimes it was hard to quickly determine what type of property you have things on. Make sure your land ownership issues are straightened out before an emergency.
- The final thing was that even though this happened several months ago, it is still ongoing. It does not just go away and it takes a long time to resolve.

Rock Images Panel Discussion

We had a panel of rock image specialists from around the country. They went over the current methods that are available for recording, documenting and conserving rock image sites.

1. Mark Willis went over 3D imagery. Gathering images and using software to put it into a 3D perspective. They have a “drone” for 3D mapping and showed a presentation on a river valley in Arizona pre and post flood.
2. John Harmon has developed the Dstretch software. It essentially takes images from a rock and then they tie all the points together from a point cloud. The Dstretch technology allows the colors to stand out. It works better on certain pigments than on others.
3. Karen Steelman does radio carbon dating. A pigment sample is taken, the rock is extracted, and organic material is removed. This organic material is dated. A portable x-ray fluorescent laser gun can be used to evaluate material types while documenting in the field.
4. Evelyn Billo and Robert Mark discussed their recording of sites all over the world. They talked about high resolution panoramics and how you go about taking the images to use this type of technology.
5. Claire Dean discussed conservation. She is involved in removing graffiti on petroglyphs with a laser. This is a great opportunity for us to gather more information and properly curate the existing photos so you can tell the rate of degradation or changes over time.



Attachment A

2014 FCRPS Cultural Resource Program Systemwide Meeting Attendance List

First Name	Last Name	Affiliation
Andrews	Albert	Confederated Tribes of the Colville Reservation
Auld	Francis	Confederated Salish and Kootenai Tribes of the Flathead Reservation - Tribal Preservation Office
Baird	Patrick	Nez Perce Tribe Cultural Resource Program
Barney	Casey	Confederated Tribes and Bands of the Yakama Nation
Beery	Derek	U.S. Bureau of Reclamation
Billo	Evelyn	Rupestrian CyberServices
Bodi	Lorri	Bonneville Power Administration
Brown	Nancy J.	Advisory Council on Historic Preservation
Brunoe	Robert	Confederated Tribes of the Warm Springs Reservation
Buettner	Barbara	Nez Perce Tribe Cultural Resource Program
Casey	Joyce	US Army Corps - Portland District
Casserino	Chris	Spokane Tribe of Indians
Celmer	Gail	U.S. Army Corps of Engineers, Northwestern Division
Cloutier	Paul	U.S. Army Corps of Engineers, Northwestern Division
Colwash	Lavina	Confederated Tribes of the Warm Springs Reservation of Oregon
Colwash	Millie	Confederated Tribes of the Warm Springs Reservation of Oregon
Corley	Jackie	Spokane Tribe of Indians
Coyote	Arrow	Confederated Tribes of the Colville Reservation
Dailide	Ashley	U.S. Army Corps of Engineers - Seattle District
Dean	Claire	Dean & Associates Conservation Services
DeLeon	Mark	Grant County PUD
Dickson	Catherine	Confederated Tribes of the Umatilla Indian Reservation
Dryden	Marge	Columbia River Gorge National Scenic Area
Farrow Ferman	Teara	Confederated Tribes of the Umatilla Indian Reservation
Flowers	Mike	U.S. Army Corps of Engineers- Portland District
Griffin, Ph.D.	Dennis	Heritage Program Oregon Parks and Recreation Department

First Name	Last Name	Affiliation
Grimm	Lydia	Bonneville Power Administration
Halfmoon	Loretta	Nez Perce Tribe
Halfmoon	Ron	Nez Perce Tribe
Hall	Scott	U.S. Army Corps of Engineers, Walla Walla District
Harman	Jon	Dstretch
Harrison	James	Spokane Tribe of Indians
Hess	Sean	U.S. Bureau of Reclamation
Hicks	Brent	HRA
Inglis	J.R.	U.S. Army Corps of Engineers - Portland District
Jenevein	Steve	Confederated Tribes of the Warm Springs Reservation
Kanaby	Kara	U.S. Army Corps of Engineers - Seattle District
Kiona	Beatrice	Confederated Tribes and Bands of the Yakama Nation
Kiona	Gregg A.	Confederated Tribes and Bands of the Yakama Nation
Kirk	Roberta	Confederated Tribes of the Warm Springs Reservation of Oregon
Lewis	Randy	Confederated Tribes of the Colville Reservation
Light	Timothy	U.S. Forest Service Flathead National Forest
Loether	Paul	National Park Service
Lucei	Florence "Liz"	Confederated Tribes and Bands of the Yakama Nation
Luevano	Lucille	Confederated Tribes of the Colville Reservation
Luton	Robert H.	Confederated Tribes and Bands of the Yakama Nation
Lynam	Kurt	Bonneville Power Administration
Lyons	Kevin	Kalispel Tribe of Indians Kalispel Natural Resource Department
MacKay	Robyn	Bonneville Power Administration
Mainzer	Elliot	Bonneville Power Administration
Mark	Robert	Rupestrian CyberServices
Marshall	Alan	Nez Perce Tribe
Martine	Kristen	Bonneville Power Administration
Matt	Ira	Confederated Salish and Kootenai Tribes of the Flathead Reservation - Tribal Preservation Office

First Name	Last Name	Affiliation
Matt	David	Confederated Salish and Kootenai Tribes of the Flathead Reservation - Tribal Preservation Office
Matt	John	Spokane Tribe of Indians
Matt, Sr.	Bill	Spokane Tribe of Indians
McCulloch	Tom	Advisory Council on Historic Preservation
Mellema	Mary	U.S. Bureau of Reclamation
Meninick	Johnson	Confederated Tribes and Bands of the Yakama Nation Department of Cultural Resources
Mesenbrink	Alana	U.S. Army Corps of Engineers, Libby Dam
Miller-Smith	Crystal	Confederated Tribes of the Colville Reservation History and Archaeology Department
Moffett	Bernice	Nez Perce Tribe
Moore	Grace	Confederated Tribes of the Coville Reservation
Morton	Ethan	Idaho State Historic Preservation
Moura	Guy	Confederated Tribes of the Colville Reservation History and Archaeology Department
Naumann	Aaron	Confederated Tribes of the Coville Reservation
Norman	Jared	Nez Perce Tribe Cultural Resource Program
Petersen	Eric	Bonneville Power Administration
Pettinger	Rebekah	Bonneville Power Administration
Phillips	Kelly	Bonneville Power Administration, Contractor
Pollock	Katherine	Bonneville Power Administration
Pond	Ron	Confederated Tribes of the Umatilla Indian Reservation
Pouley	John	Heritage Program Oregon Parks and Recreation Department
Proctor, P.E.	William D.	U.S. Army Corps of Engineers, Northwestern Division
Queen	Rolla	U.S. Army Corps of Engineers - Seattle District
Randle Ph.D., P.E., D.WRE	Tim J.	U.S. Bureau of Reclamation
Roberts	Alice	U.S. Army Corps of Engineers, Walla Walla District
Salo	Lawr	U.S. Army Corps of Engineers - Seattle District

First Name	Last Name	Affiliation
Seth	Leroy	Nez Perce Tribe
Seymour	Vi	Spokane Tribe of Indians
Shellenberger	Jon D.	Confederated Tribes and Bands of the Yakama Nation Department of Cultural Resources
Smith	Coleman	U.S. Bureau of Reclamation
Sonneck	Ken	Nez Perce Tribe
Sonneck	Vera	Nez Perce Tribe
Steelman, Ph.D.	Karen	University of Central Arkansas
Steinmetz	Shawn	Confederated Tribes of the Umatilla Indian Reservation
Stensgard	Pauline	Confederated Tribes of the Colville Reservation
Tafoya	Celestino	U.S. Bureau of Reclamation
Taylor	Robert	Nez Perce Tribe
Tessman	Jo Marie	Confederated Tribes of the Umatilla Indian Reservation
Tracey	Susan	Bonneville Power Administration, Contractor
Trahan	Ron	Confederated Salish and Kootenai Tribes of the Flathead Reservation
VanDerBorg	Vanessa	U.S. Army Corps of Engineers - Portland District
Wadsworth	Melanie	Bonneville Power Administration, Contractor
Wagner	Jill	Coeur d'Alene Tribe of Indians
Ward	Elmer	Confederated Tribes of the Warm Springs Reservation of Oregon
Weaskus	Jarvis	Nez Perce Tribe Cultural Resource Program
Wertz	Clinton	U.S. Bureau of Reclamation
Whitlam, Ph.D.	Rob	Washington State Department of Archaeology and Historic Preservation
Whitney	Hazel	Confederated Tribes of the Colville Reservation History and Archaeology Department
Williamson	Nakia	Nez Perce Tribe Cultural Resource Program
Williams- Worden	Dara	Confederated Tribes of the Umatilla Indian Reservation

First Name	Last Name	Affiliation
Willis	Mark	Sacred Sites Research, Albuquerque, New Mexico
Wood	Delphine	Confederated Tribes of the Umatilla Indian Reservation

Attachment B

Plenary Session (Slide Presentation)

PRESERVING CULTURAL LANDSCAPES: PAST / PRESENT / FUTURE

FCRPS Cultural Resource Program Conference

Suquamish, WA

Nov. 5, 2014

ADVISORY COUNCIL ON HISTORIC PRESERVATION
PRESERVING AMERICA'S HERITAGE



GOALS

- ▶ Understand background of cultural landscapes (CLs) within preservation
- ▶ Learn about NPS methodology for CLs
- ▶ Find out how CLs fit into National Register and Section 106
- ▶ Think about CLs as we look to the future

CULTURAL LANDSCAPES: PAST

HISTORY OF LANDSCAPE PRESERVATION IN THE US

- ▶ Since time immemorial - certain sites revered and protected by certain groups
- ▶ Early 1800s - commemoration at Valley Forge
- ▶ 1853 - Mt. Vernon Ladies Association
- ▶ 1906 - Antiquities Act
- ▶ 1935 - National
Historic Sites Act



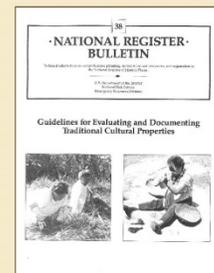
LANDSCAPE PRESERVATION IN THE US



- ▶ 1950s - development in rural America (dams, highways)
- ▶ 1960s - historic grounds documented
- ▶ 1966 – National Historic Preservation Act, creation of National Register
- ▶ 1970s - landscape preservation groups founded

LANDSCAPE PRESERVATION IN THE US

- ▶ 1980s - Methodology developed
- ▶ 1980s-90s – NR Bulletins on landscapes
 - Traditional Cultural Properties
 - Rural Historic Landscapes
 - America’s Historic Battlefields, etc.
- ▶ 1992 UNESCO recognized CLs
- ▶ 1996 – SOI’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes



CULTURAL LANDSCAPES: PRESENT

WHAT IS A LANDSCAPE?



“an expanse of natural scenery seen by the eye
in one view”

WHAT IS A CULTURAL LANDSCAPE?



NPS DEFINITION

- ▶ A CULTURAL LANDSCAPE is a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein), associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

*from Secretary of the Interior's Standards with
Guidelines for the Treatment of Cultural Landscapes*



NPS LANDSCAPE TYPES

- ▶ Designed historic landscapes
- ▶ Vernacular historic landscapes
- ▶ Ethnographic landscapes
- ▶ Historic sites



IDENTIFYING CULTURAL LANDSCAPES



- ▶ the tangible evidence of the activities and habits of the people who occupied and shaped the landscapes to serve human needs

LANDSCAPE CHARACTERISTICS

- ▶ Natural Systems and Features
- ▶ Spatial Organization
- ▶ Land Use
- ▶ Cultural Traditions
- ▶ Cluster Arrangement
- ▶ Circulation
- ▶ Topography
- ▶ Vegetation
- ▶ Buildings and Structure
- ▶ Views and Vistas
- ▶ Constructed Water Features
- ▶ Small-Scale Features
- ▶ Archaeological Sites

CHARACTER-DEFINING FEATURES

- ▶ Natural systems and features
- ▶ Topography



CHARACTER-DEFINING FEATURES



- ▶ Spatial organization
- ▶ Land use



CHARACTER-DEFINING FEATURES



- ▶ Cultural traditions



CHARACTER-DEFINING FEATURES

► Circulation



CHARACTER-DEFINING FEATURES

- ### ► Vegetation
- Native
 - Introduced



CHARACTER-DEFINING FEATURES

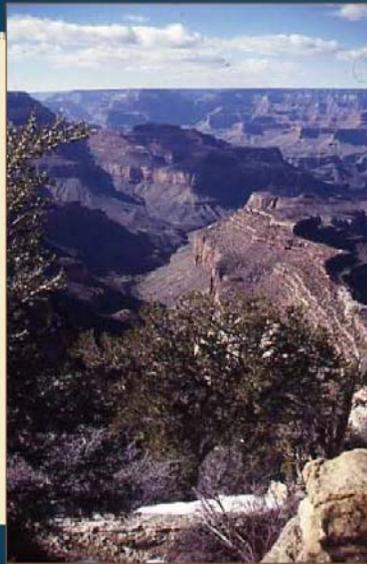
► Buildings and structures



CHARACTER-DEFINING FEATURES

► Views and vistas

- Natural
- Created/managed



CHARACTER-DEFINING FEATURES

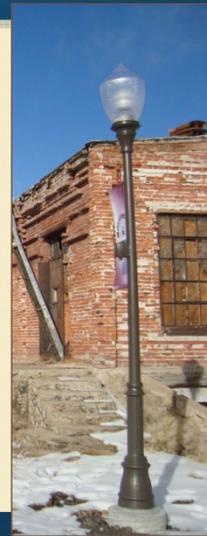
▶ Water features

- Natural
- Man-made



CHARACTER-DEFINING FEATURES

▶ Small scale features



CHARACTER-DEFINING FEATURES



▶ Archeological sites



NATIONAL REGISTER EVALUATION

- ▶ Landscapes are eligible
 - individually
 - contributing
 - multiple property
- ▶ Landscapes are listed as
 - historic districts
 - sites



DEFINING BOUNDARIES

- ▶ Historic or current legal boundaries
- ▶ Boundary demarcations
- ▶ Rights-of-way
- ▶ Natural features



DEFINING BOUNDARIES



- ▶ Long-standing vegetation
- ▶ Lines drawn along or between fixed points
- ▶ Changes in development or spatial organization
- ▶ Edges of new development

CULTURAL LANDSCAPES IN SECTION 106

- ▶ Need for good documentation
 - To understand historic property
 - To evaluate adverse effects
 - To develop appropriate mitigation measures



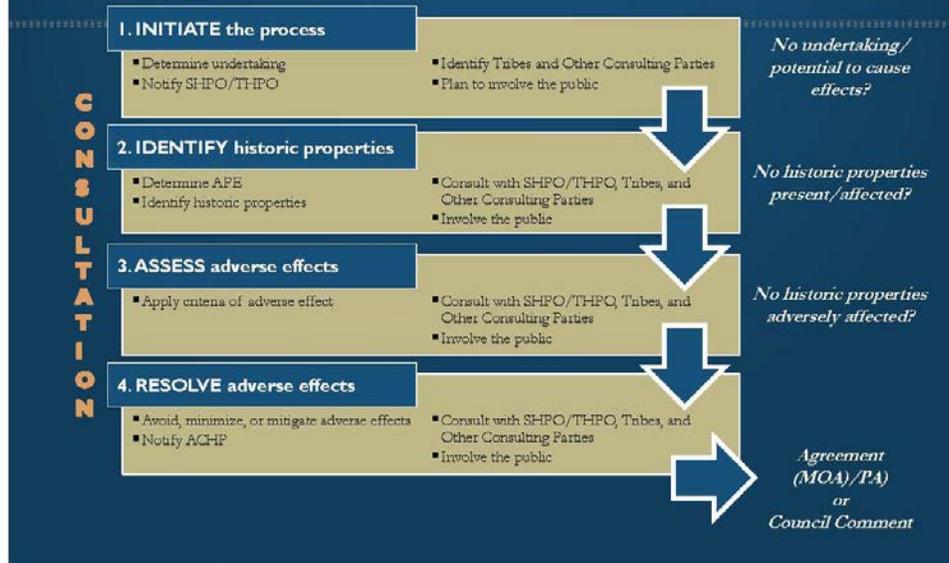
CULTURAL LANDSCAPES IN SECTION 106

- ▶ Well documented aspects
 - Buildings, Structures
 - Archaeology
- ▶ Less documented – landscape-scale information
 - Spatial Organization, Topography, Land Patterns
 - Circulation
 - Cultural traditions
 - Views



Register Cliffs WY

THE SECTION 106 PROCESS



ASSESSING EFFECTS

- ▶ Regs address:
 - Direct effects
 - Indirect effects
 - Cumulative effects

- ▶ What to do with:
 - Cultural effects?
 - Spiritual effects?



LANDSCAPES IN SECTION 106: POSITIVE EXAMPLES



Cave Rock, Nevada



Bighorn Medicine Wheel, Wyoming

CULTURAL LANDSCAPES: FUTURE

ACHP: TRADITIONAL CULTURAL LANDSCAPES INITIATIVE

- ▶ To date:
 - Developed and posted Q and A on our web site
 - Outreach to partners in effort
- ▶ Continuing challenges:
 - Need for a policy statement and guidance
 - Need for early tribal and NHO consultation
 - Consideration of landscapes in Section 106
 - Role of tribes, THPOs, and NHOs
 - How to determine effects on such properties

NPS CL / TCP EFFORTS

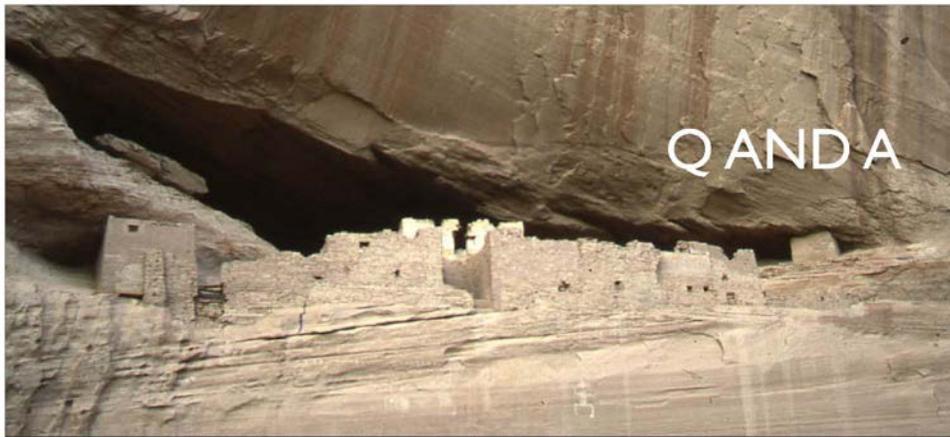
- ▶ To date:
 - Outreach on NR Bulletin 38: *Guidelines for Evaluating and Documenting Traditional Cultural Properties*
 - NPS outreach/webinars on different types of cultural landscapes; adding CLs to property types of NR
 - Indigenous CLs Program - Chesapeake Bay office
- ▶ Continuing challenges:
 - Update NR guidance TCPs
 - Update NR guidance on CLs
 - Update NR forms

OTHER CL EFFORTS

- ▶ Submerged Paleo CLs Project
 - Narragansett Indian Tribe, BOEM, U of RI
- ▶ WY and CO SHPOs CL workshops
- ▶ Characterizing Tribal CLs Analysis Guide
 - BOEM, NOAA, Makah Tribe, Confederated Tribes of Grand Ronde Community of OR, Yurok Tribe
- ▶ Maritime CL Summit – Oct. 2015 in WI

NEXT STEPS

- ▶ More discussion of CLs
- ▶ Ask more questions about CLs
- ▶ Acquire more expertise
 - info at www.nps.gov/cultural_landscapes/Preservation.html
 - document for Historic American Landscapes Survey (HALS) www.nps.gov/hdp/
 - hire historical landscape architects, ethnographers, tribal experts
 - take courses/ get training



Nancy J. Brown, ACHP Liaison to the BLM

www.achp.gov

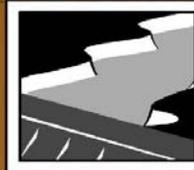
nbrown@achp.gov

ADVISORY COUNCIL ON HISTORIC PRESERVATION
PRESERVING AMERICA'S HERITAGE



Attachment C

Program Manager Status Report (Slide Presentation)



FCRPS
FEDERAL
COLUMBIA RIVER
POWER SYSTEM

Cultural Resources Program

Past Accomplishments & Future Plans

The Dalles - 1957



Spokane River - 2014



Building Blocks

- ∞ National Historic Preservation Act (1966)
 - ∞ Section 106: "take into account the effects of the undertaking"
- ∞ Energy Policy Act (1992)
 - ∞ BPA authorized to directly fund USACE & Reclamation
- ∞ System Operations Review (1997)
 - ∞ Identified impacts to cultural resources from reservoir ops
 - ∞ Lead to commitment to develop a Programmatic Agrmt.
- ∞ System Wide Programmatic Agreement (2009)
 - ∞ Gave structure to how we address cultural resources

11/5/2014

2

FCRPS Undertaking



- ❧ Operation & Maintenance (O&M) of the 14 FCRPS dams & reservoirs covered by the System Operation Review
- ❧ Includes O&M for all authorized project purposes
 - ❧ Flood control
 - ❧ Irrigation
 - ❧ Power generation
 - ❧ Navigation
 - ❧ Recreation
 - ❧ Water regulation
 - ❧ Fish & Wildlife protection



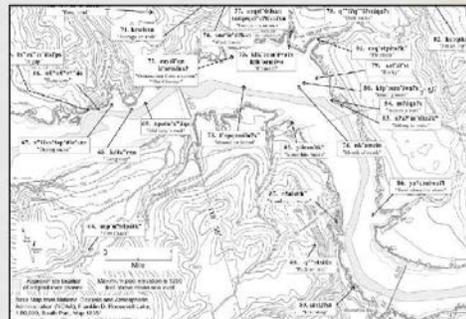
11/5/2014

Dworshak Dam
USACE

Cultural Resources Program



- ❧ Seeks to take into account affects of the undertaking on all kinds of cultural resources
 - ❧ Archaeological Sites
 - ❧ about 3550 sites known
 - ❧ Traditional Cultural Properties
 - ❧ 1000s of documented places with Indian names
 - ❧ Built environment
 - ❧ Standing structures & dams



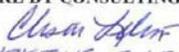
Conf. Tribes of the Colville Reservation
"Native American Place Names" 4

11/5/2014

Accomplishments 2013 & 2014



- ☞ Three new signatories to the Systemwide Programmatic Agreement
 - ☞ Confederated Tribes of the Colville Reservation
 - ☞ Washington State Historic Preservation Officer
 - ☞ Pacific West Region, National Park Service

SIGNATURE BY CONSULTING PARTY:	
	
By: <u>CHRISTINE S. LEHNERTZ, REG. DIR.</u>	Date: <u>06-06-2014</u>
<small>Name and Title</small>	
Representing: <u>NATIONAL PARK SERVICE, PACIFIC WEST REGION</u>	
<small>Agency/Tribe/Entity</small>	

11/5/2014

5

Inventory



- ☞ The Lead Federal Agencies continue to identify historic properties affected by the undertaking
- ☞ US Army Corps of Engineers Projects
 - ☞ 2013: 85,000 acres inventoried
- ☞ Bureau of Reclamation Projects
 - ☞ 2013: 19,000 acres inventoried
- ☞ At least 400,000 acres of lands still need inventory

11/5/2014

6

Determinations of Eligibility



- ∞ Agencies determine what properties are eligible for the National Register of Historic Places
- ∞ Requires consultation with tribes, state/tribal historic preservation offices, and sometimes the Keeper of the National Register
- ∞ If a property is determined eligible, this helps to justify expenditure of Federal funds on preservation
- ∞ As of the end of FY 2013, over 2500 sites require Determinations of Eligibility

11/5/2014

7

Resolution of Adverse Effects

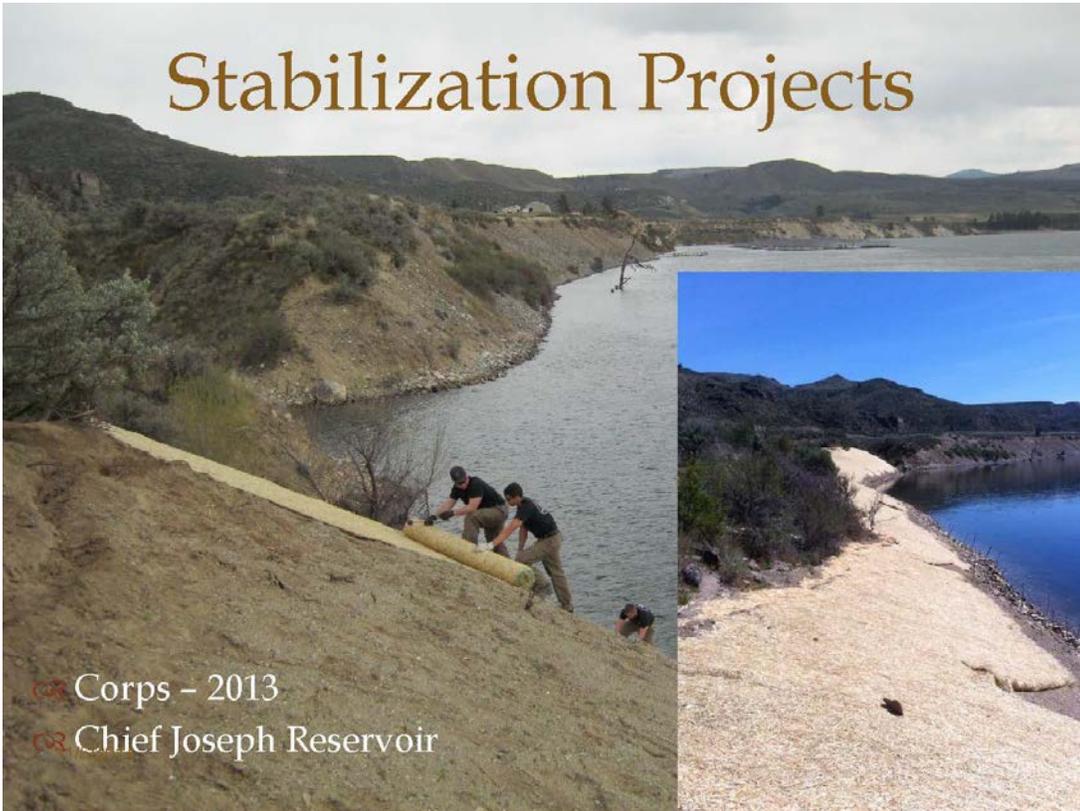


- ∞ Direct physical mitigation of effects
 - ∞ Erosion control and shoreline stabilization
- ∞ Creative mitigation
 - ∞ Wide range of options
 - ∞ Examples
 - ∞ Signage
 - ∞ Educational Materials
 - ∞ Restoration projects off-site
 - ∞ Analysis of existing artifact collections
 - ∞ Oral histories and ethnographic research
 - ∞ Planting native vegetation

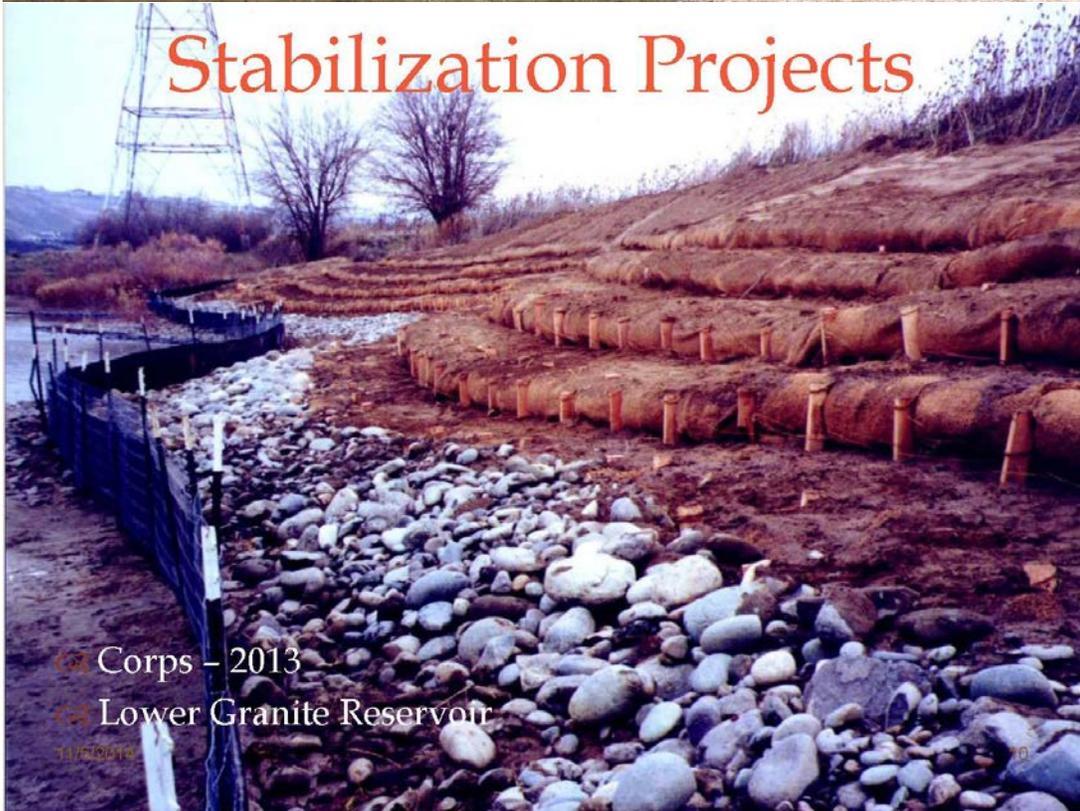
11/5/2014

8

Stabilization Projects



Stabilization Projects





Stabilization Projects

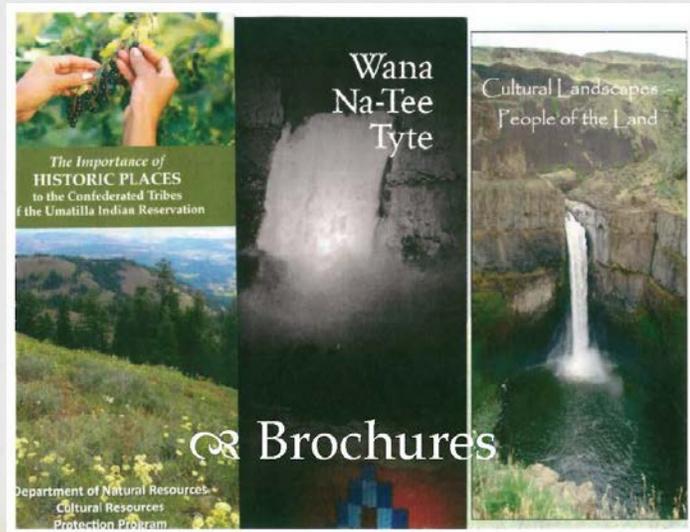
Reclamation - 2014
Lake Roosevelt



Creative Mitigation

Signs to Protect Cultural Resource Sites

Creative Mitigation

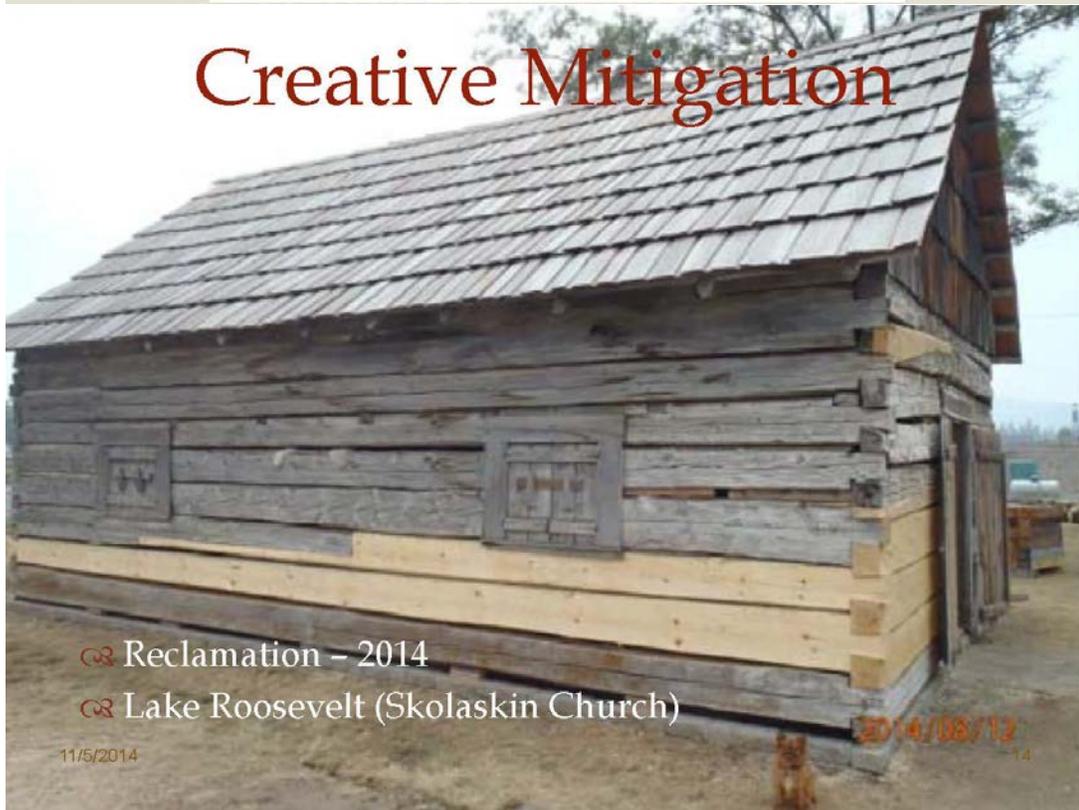


11/5/2014

Brochures

13

Creative Mitigation



11/5/2014

Creative Mitigation

Before



After



Corps - 2013

John Day Project (Rock Image Restoration)

11/5/2014

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FCRPS Funding



- FCRPS Cultural Resources Program Joint Funding
 - 88% BPA + 12% Corps & Reclamation
- BPA power rates are set by the BPA Administrator after completion of the Integrated Program Review
- Congress approves Corps & Reclamation funding

11/5/2014

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FCRPS Funding Levels



- ❧ FY13 Program Funding Total: \$7,600,000
 - ❧ Corps - \$4,000,000
 - ❧ Reclamation - \$3,600,000
- ❧ FY14 Program Funding Total: \$8,500,000
 - ❧ Corps - \$4,800,000
 - ❧ Reclamation - \$3,700,000
- ❧ FY15 Program Funding Total: \$10,000,000
 - ❧ Corps - \$6,200,000
 - ❧ Reclamation - \$3,800,000



Dentalia beads

11/5/2014

FCRPS Funding Levels



- ❧ This program is one of the best supported reservoir cultural resources programs in the nation
- ❧ More than is spent on comparable Federal programs along the Missouri River , Colorado River, and Tennessee Valley Authority
- ❧ FCRPS Program is unique nationwide in terms of partnership, funding and resources to be managed

11/5/2014

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2015 and Beyond



- ❧ 5-Year Review of the System Wide Programmatic Agreement
 - ❧ How are we doing with fulfilling the agreement?
 - ❧ Please comment by December 1, 2014.
 - ❧ Comments will be included in the FY 2014 Annual Report, which will come out in March 2015
 - ❧ We will work to address the comments

11/5/2014

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2015 and Beyond



- ❧ System Wide Research Design (SWRD)
 - ❧ October 6, 2011 - draft distributed
 - ❧ Agencies received lots of comments
 - ❧ Agencies preparing a revised version to address the comments
 - ❧ Revised version to be distributed late Spring 2015 for another round of comments

11/5/2014

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2015 and Beyond



☞ Inventory

- ☞ Identify archaeological & historic sites on project-affected lands (APE) by end of FY 2017
- ☞ Identify Traditional Cultural Properties on project lands by end of FY 2018

☞ Determination of Eligibility and Effects

- ☞ Make sure the 10 most sensitive and high priority sites are evaluated at each reservoir by end of FY 2015
- ☞ Tackle additional sites thereafter

11/5/2014

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2015 and Beyond



☞ Resolution of Adverse Effects

- ☞ Agencies will continue to concentrate on treatment and mitigation of all types of historic properties
- ☞ More challenging projects to come
 - ☞ Appropriate resolution of adverse effects to TCPs
 - ☞ Protection of archaeological and burial sites in dynamic environments such as ...

11/5/2014

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2015 and Beyond

- ∞ Reclamation – project in planning phase
- ∞ Lake Roosevelt
- ∞ Site over 100 acres; meandering stream

11/5/2014

Questions?



- ∞ For more information, please contact:
 - ∞ Gail Celmer – USACE
 - ∞ (503) 808-3850
 - ∞ Sean Hess – Reclamation
 - ∞ (208) 378-5316
 - ∞ Kristen Martine – BPA
 - ∞ (503) 230-3607

11/5/2014

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Attachment D

Systemwide Research Design Incorporating Criteria A-C Evaluation (Slide Presentation)

Systemwide Research Design – Incorporating Criteria A-C Evaluation

- AGENDA

- Purpose of the Systemwide Research Design (SWRD)
- Status of SWRD development
- Outcome of 10/29 TCP Subcommittee meeting
- Next Steps

SWRD Purpose

- Aid National Register eligibility determinations for all types of resources, and all evaluation criteria
- Define broad themes, study domains and historic contexts that span the region
- Identify types of information needed to address research questions
- Define best practices/methods for collecting information
- Identify audiences for information generated under the SWRD

Status of Development of the Research Design

- A previous version of the Research Design circulated to the Cooperating Groups generated hundreds of comments.
- Many comments said the document was too focused on archaeological resources and their evaluation under Criterion D of the National Register of Historic Places.
 - Too little about Traditional Cultural Properties (TCPs) and Cultural Landscapes.
 - Should include evaluations under Criteria A-C also.
- Agencies began revising in response to comments, then sought contractor help.
- HRA refining context sections, reorganizing the document.

Current Research Domains

- Ethnohistory and Ethnography
- Environmental Variability
- Tracing Temporal Dimensions/
Chronology
- Economies and Resources
- Social Change
- Euroamerican Regional History

Research Design Structure – Draft

- Program Area Scale (Plateau Culture Area):
 - Research Themes that describe the research domains.
 - Status of research to date on the archaeological Research Themes.
 - Information Needed to complete the understanding of the Research Themes (Data Gaps).
- FCRPS Projects Scale (the 14 Projects APEs):
 - Archaeological Research Questions that address the Data Gaps.
 - Types of Information that will answer the Research Questions.
 - Best Practices/Methods for collecting that information.

NRHP Criteria

The National Register criteria for evaluation are applied to all types of Properties under NHPA:

- A) Associated with events that have made a significant contribution to the broad patterns of our history;
- B) Associated with the lives of persons significant in our past;
- C) Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;
- D) Have yielded, or may be likely to yield, information important in prehistory or history.

Discussion of Outcomes

- Purpose - Contributes to Agencies' regulatory compliance by aiding evaluation of the resources.
- Value of the Research Design for:
 - Agencies – provides a basis for evaluating resources' National Register eligibility to complete regulatory compliance, which is necessary to justify expenditures for potential mitigation measures.
 - Tribes – assists the process of reaching the goal of protection of important resources.
- Tribal input is necessary to defining importance of the resources so they can be properly evaluated.
- Tribes choose what information they are willing to provide based on their own value decisions.

Types of Information Needed

- What is the resource?
- What are its spatial limits and what is included within them?
- What is the Tribe's connection to the resource and the cultural value(s) that makes it important?
- Does the resource retain integrity (for Criteria A and D)?
- How is the Project affecting what makes it an important resource?

Potential Methods for Getting the Work Done

- Arrange Cooperating Group meetings focused on specific topics and/or writing tasks
- Arrange separate meetings focused on specific topics and/or writing tasks
- Tribes can write content independently and submit to Agencies to fold into the Research Design document
- Tribes can collaborate/share information with Agencies' contractor in writing parts of the document
- Tribes can review and comment on document prepared by Agencies' contractor
- Others?

Next Steps

- Determine what parts of the RD document each Tribe is interested in contributing to
- Determine how each Tribe will contribute, the nature of their involvement
- Prepare an appropriate scope, budget, and schedule for those services
- Can do the work through existing Agency contracts or new task-specific contracts or through discussions

The SWPA Provision

A. To date, the Lead Federal Agencies have largely focused Section 106 compliance efforts at the Project level, particularly on localized measures to address adverse effects to historic properties. While this focus remains a priority, the Lead Federal Agencies also agree that, given the geographic scope of the undertaking, it is important to facilitate an understanding of the history and culture of the Columbia Basin and its peoples on a broader scale than at the Project level. In order to facilitate a broader view as this Systemwide PA is implemented, the Lead Federal Agencies shall prepare a Systemwide Research Design.

B. The Systemwide Research Design will encourage consideration at the Project level of research, cultural, and educational objectives that have application on a broader, potentially regional level. The Systemwide Research Design could be used, for example, in updating Project HPMPs and research designs. It could also aid in defining priorities at a Project, preparing historic contexts for evaluating sites for the National Register, designing site treatment plans or evaluating contract proposals.

C. The Systemwide Research Design shall be prepared by the Lead Federal Agencies with input and assistance from the Cooperating Groups and consulting parties. Opportunity for input and assistance during preparation shall also be afforded to interested members of the public. The Lead Federal Agencies shall review and revise the Systemwide Research Design as needed. Any substantive revisions will be prepared with the same opportunities for input and assistance as for the initial design.

RD Organization

- Chapter 1 – Purpose, Background, and Scope
- Chapter 2 - The NRHP Evaluation Process
- Chapter 3 – Environmental Contexts
- Chapter 4 – Cultural Contexts
- Chapter 5 – Culture History
- Chapter 6 – Research Domains and Themes and Status of Existing Research
- Chapter 7 – Data Needs, Research Questions, and Best Practices/Methodologies
- Chapter 8 - References

Ethnohistory and Ethnography Research Themes and Subthemes

- Euroamerican Effects on Environment and Cultural Response
 - Alterations to Human Mobility
 - Alterations to Resource Access (plant and animal communities)
- Eras in Native History
 - Legendary Time
 - Intergenerational Sharing
- Economics and Resources
 - Subsistence Resources
 - Settlement System
 - Material Culture
 - Exchange and Trade
 - Transportation (river and land)
- Social Change
 - Population Changes
 - Sociopolitical Organization/Ranking - intergenerational training (craftsmen, resource knowledge, etc.)
 - Ceremonialism – religious practices in response to other changes, loss of spiritual leaders,
 - Symbolism (including Rock Art)
 - Trade
 - Warfare

Attachment E

Reservoir Dynamics 3 Agency (Slide Presentation)



Operations Planning for the FCRPS

November 2014



US Army Corps
of Engineers®
Northwestern Division



Bill Proctor – COE
Mary Mellema – Reclamation
Robyn MacKay – BPA



Background - The FCRPS

- ✦ The Federal Columbia River Power System (FCRPS) was developed and operated for flood control, navigation, irrigation, municipal and industrial water supply, recreation, fish & wildlife, and power production
- ✦ FCRPS comprises 31 hydro projects and one nuclear plant
- ✦ Over 22,000 MW of nameplate capacity and about 9,000 aMW of energy production with average water.
- ✦ Ninety-four percent (94%) of the FCRPS generating capacity is in 12 projects.
- ✦ Seventy-five percent (75%) of BPA power comes from hydro.
- ✦ Sixty-five percent (65%) of the region's power comes from hydro.

2



Hydrologic Data

- ✦ 258,000 square mile river basin in SE British Columbia and Pacific Northwest
- ✦ Average Jan – Jul runoff 102 million acre feet (MAF), 1929 – 2008 record
- ✦ Range 54 – 159 MAF (1929 – 2014 record)
- ✦ US Storage approximately 20 MAF, Canadian 20.5 MAF
- ✦ Storage limited system—when the US System is empty, it can store only 30% of the average annual runoff
- ✦ The Missouri and Colorado systems can store 200% and 300%, respectively, of the average annual runoff

3



Columbia River Drainage

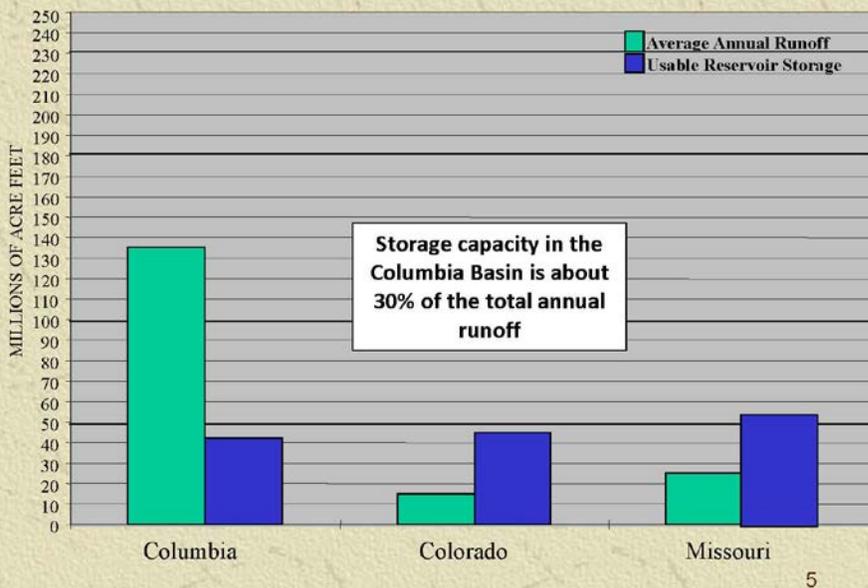


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Comparison of Major US River Basins

Columbia Basin Reservoir Storage Limited

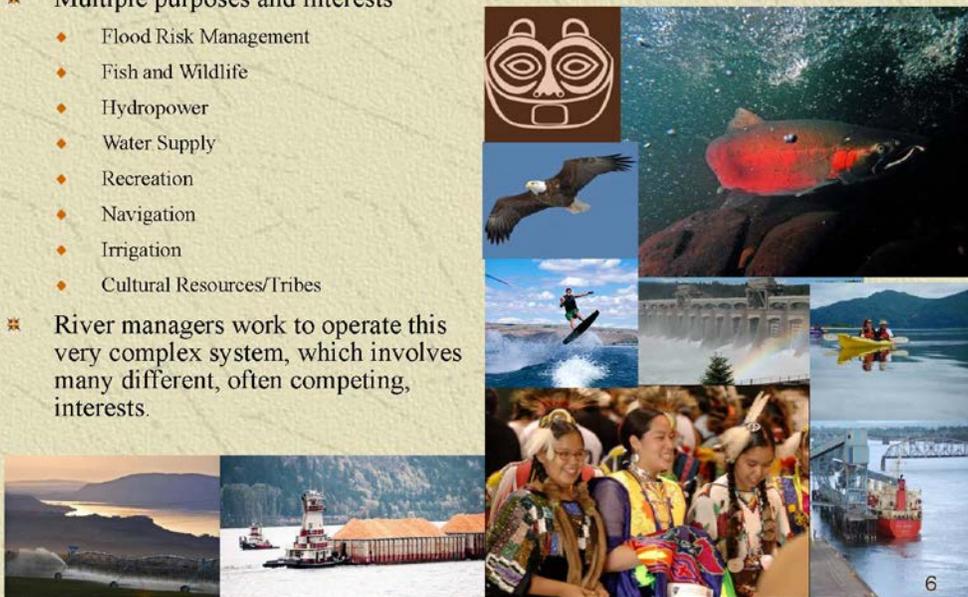


5



The Columbia River Basin

- ✦ Multiple purposes and interests
 - ◆ Flood Risk Management
 - ◆ Fish and Wildlife
 - ◆ Hydropower
 - ◆ Water Supply
 - ◆ Recreation
 - ◆ Navigation
 - ◆ Irrigation
 - ◆ Cultural Resources/Tribes
- ✦ River managers work to operate this very complex system, which involves many different, often competing, interests.



6



Annual Planning Process General operations for storage projects

- ✦ Winter – Draw down season dictated by flood risk
- ✦ Spring – Refill season dictated by flood risk management & salmon migration flow needs
- ✦ Summer – limited draft for summer fish migration
- ✦ Fall – Base Flows (most projects on minimum discharge)

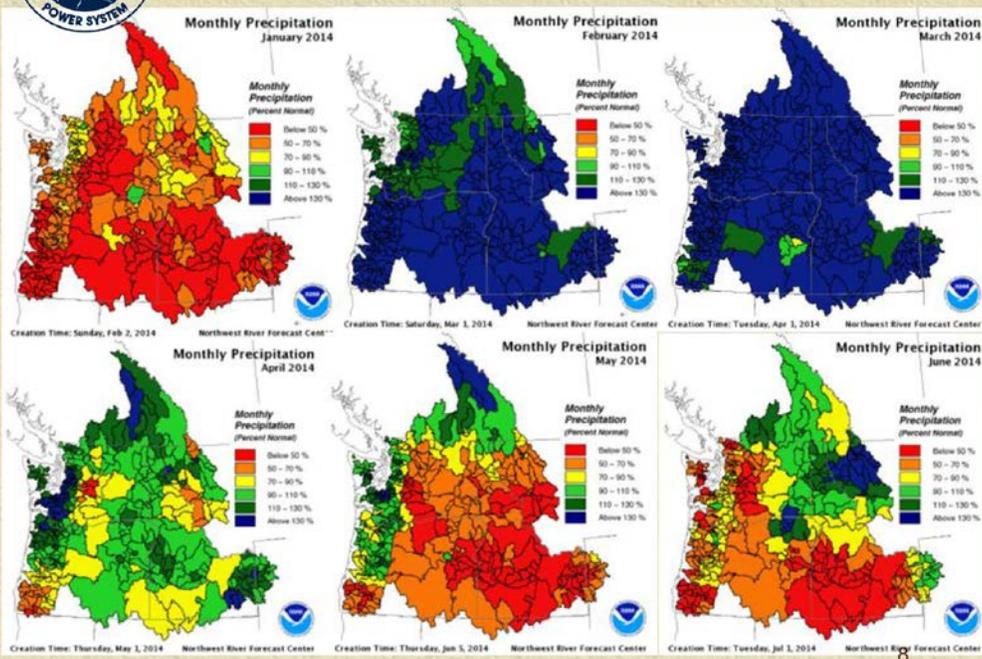


And it all starts with the weather ...

7



Factors that dictate annual system operations Regional Precipitation



8



Factors that dictate annual system operations Water Supply

**COLUMBIA - THE DALLES DAM (TDAO3)
Forecasts for Water Year 2015**

Official Forecast

10 days QPF: Ensemble: 2014-10-26 Issued: 2014-10-26

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	72378	93107	100	116255	92704
APR-JUL	61822	79480	100	100348	79855
APR-AUG	67969	87415	100	110151	87532
JAN-JUL	78225	98564	97	123957	101368

5 days QPF: Ensemble: 2014-10-26 Issued: 2014-10-26

APR-SEP	74215	94203	102	117613	92704
APR-JUL	62527	80482	101	100475	79855
APR-AUG	69709	88862	102	110554	87532
JAN-JUL	79700	99008	98	123059	101368

0 days QPF: Ensemble: 2014-10-26 Issued: 2014-10-26

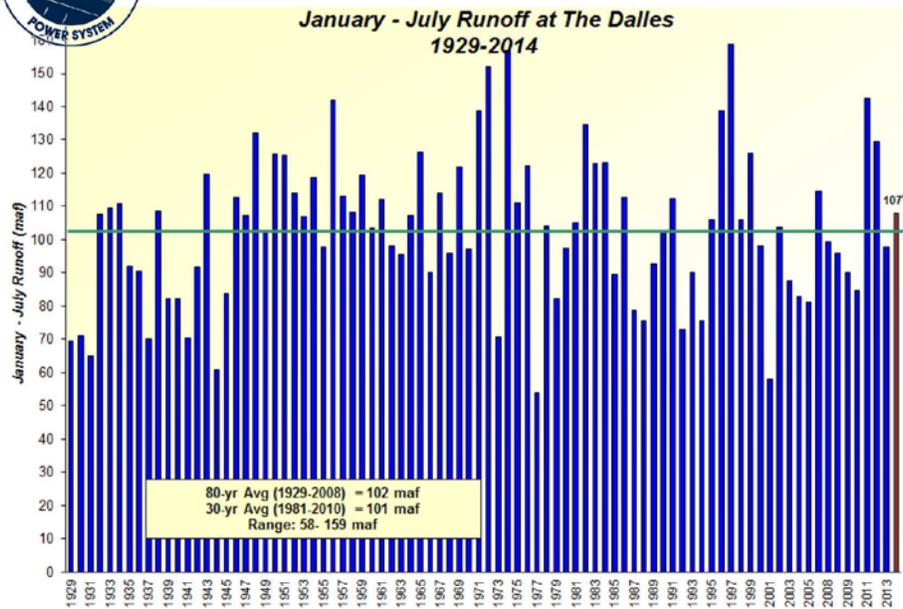
APR-SEP	73905	94603	102	116845	92704
APR-JUL	62448	80721	101	100009	79855
APR-AUG	69403	88991	102	110480	87532
JAN-JUL	80626	99404	98	123712	101368

- ✳ Biggest driver is the current **water supply forecast**.
- ✳ Larger forecasts require more storage to manage the potential flood events.
- ✳ Forecasts are largely driven by precipitation but also impacted by temperatures.

9



Annual Planning Process – Variability in Water Supply



10



Example of Water Supply Forecast Libby Dam

Libby : April Runoff Forecast & Flood Control Calculation

WY 2014

Runoff Forecast and Flood Control

	1981-2010 Average	Percent of Average	1929-2008 Average	Percent of Average	
Most Probable Runoff Volume: Apr-Aug	6868 KAF	5885	117%	6282	109%
Apr-Jul	6234 KAF	5342	117%	5720	109%
May-Jul	5626 KAF	4821	117%	5199	108%

30-Apr Flood Control Space 3063 KAF
30-Apr Flood Control Elevation 2377.2 ft

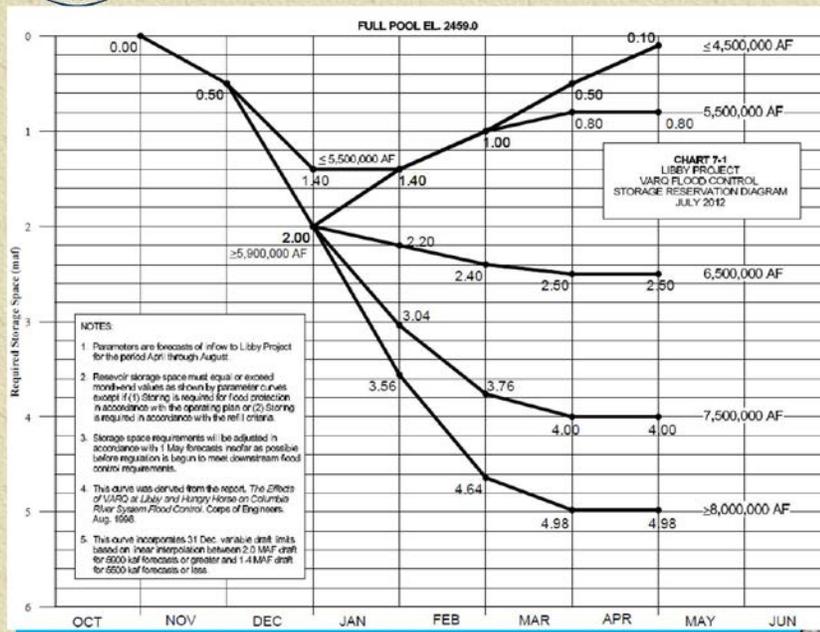
Forecast Date >>	VARQ Flood Control Implemented					
	Nov	Dec	Jan	Feb	Mar	Apr
Apr-Aug Runoff Forecast	5125	5446	5432	5213	5478	6868
First-of-Month Elev	2452.5	2437.4	2426.3	2424.9	2422.8	2418.6

Date >>	30-Nov	31-Dec	31-Jan	28/29-Feb	31-Mar	30-Apr
Flood Control Space	500	1400	1400	1000	809	3063
Flood Control Elevation	2448.0	2426.6	2426.7	2436.4	2440.9	2377.2

11

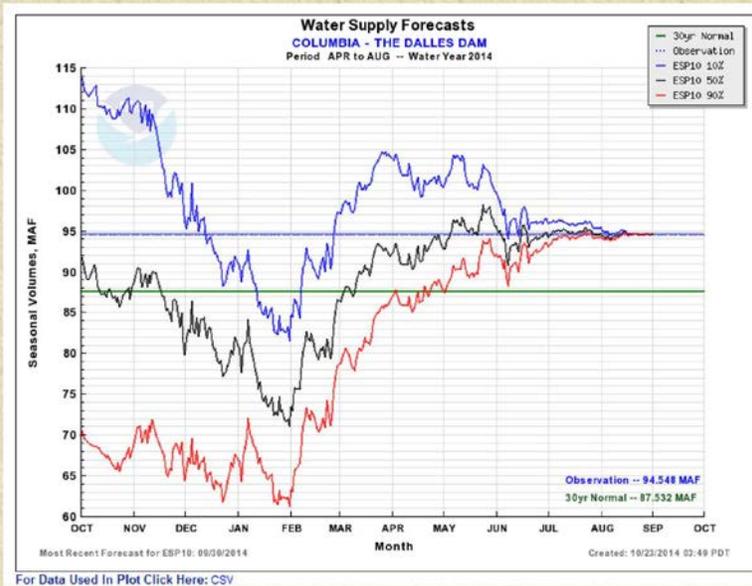


Drafting for Flood Risk Management





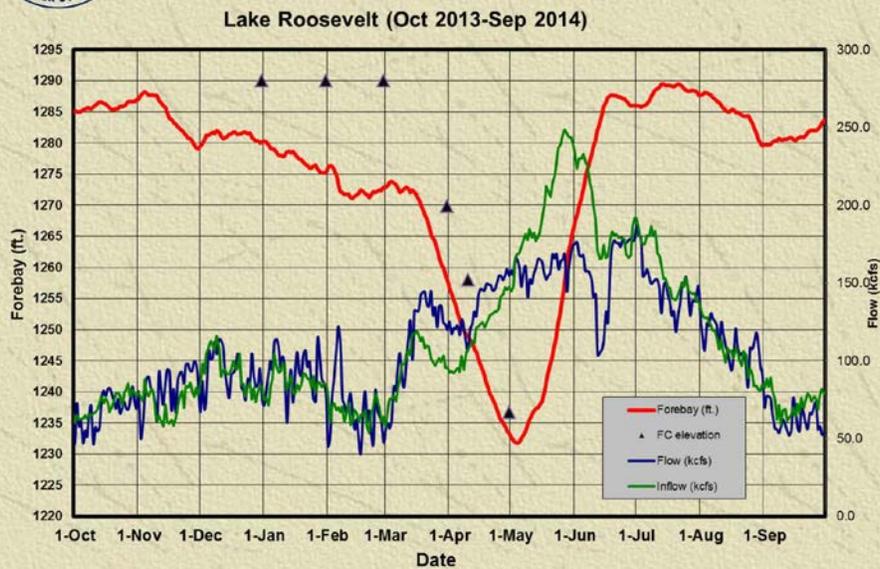
Water Supply Forecasts can vary significantly though the year



13



Grand Coulee Dam Operations



14



Planning Documents that help set operations

- ✦ Planning documents are as follows:
 - ◆ Biological Opinions
 - ◆ Flood Control Operating Plan (flood risk management operations)
 - ◆ Detailed Operating Plan (annual Treaty planning with BCH)
 - ◆ Fish Passage Plan (annual project passage & spill guidance)
 - ◆ Water Management Plan (annual adaptive management plan for implementing BiOps)
 - ◆ Water Quality Plan (to manage water quality on the mainstem)
- ✦ Other helpful information:
 - ◆ Summary of Columbia River Flood Control Data
 - ◆ Storage Reservation Diagrams
 - ◆ Technical Management Team meeting notes

All of these are available online

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Other factors influencing system operations

- ✦ Water Quality Standards
- ✦ Requests for special operations
 - ◆ Treaty fishing
 - ◆ Fish habitat restoration projects
 - ◆ Recreation Events (fishing derbies, boat races, etc.)
 - ◆ Special navigation requests
 - ◆ Dam/reservoir modifications
 - ◆ Outages

16



A more detailed look at FCRPS annual operations

Fall

- ✦ Kokanee Spawning minimum elevation at Coulee, Fall Chinook spawning maximum flow at Brownlee
- ✦ Vernita Bar Fall Chinook spawning maximum daytime flow mid-October through November then maintain minimum protection flow through May at Priest Rapids
- ✦ Bonneville Chum operation min/max tailwater elevation for spawning Nov/Dec with protection flows through March

Winter

- ✦ *System draft for winter loads, first snow survey and volume forecast to determine Flood Risk Elevations, and Variable Draft Limits*
- ✦ Continue to maintain Bonneville minimum flow for chum salmon
- ✦ Maintain Priest Minimum flow for Vernita Bar
- ✦ Store 1 MAF Flow Augmentation in Treaty projects for spring/summer BiOp flows
- ✦ Operate Arrow (Canadian Treaty project) discharge for whitefish spawning

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FCRPS Operations (continued)

Spring

- ✦ Target reaching April 10 BiOp elevations at storage projects followed by April 30, flood risk draft
- ✦ Begin releasing water for BiOp flow requirements at McNary and Lower Granite
- ✦ Begin fish spill at Lower Columbia and Lower Snake projects
- ✦ Begin White sturgeon flows in May–June at Libby
- ✦ Target storage project refill by about June 30
- ✦ Meet Bull Trout flows at Libby and Hungry Horse in May–September
- ✦ Operate Arrow for Trout spawning

Summer

- ✦ Continue drafting to provide summer flows per BiOp
- ✦ Continue fish spill on Lower Columbia and Snake River per BiOp
- ✦ Operate Dworshak for downstream temperature control and Nez Perce Agreement

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**US Army Corps
of Engineers®**
Northwestern Division

Operations Planning Agency Responsibilities

✦ **US Army Corps of Engineers**

- ◆ Corps storage projects – Libby, Dworshak, and Albeni Falls planning for near- and long-term operations
- ◆ Corps Run of River projects – Chief Joseph, Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, Bonneville
- ◆ Flood risk management for the system
- ◆ Setting flows and reservoir elevations at Corps projects
- ◆ Implementing the BiOp objectives
- ◆ Implementing the Columbia River Treaty (Corps & BPA)
- ◆ Navigation coordination
- ◆ Special river operations

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Operations Planning Agency Responsibilities

✦ **Bureau of Reclamation**

- ◆ Irrigation – Deliver water to 175 irrigation districts to irrigate approximately 2.9 million acres with an annual crop value of about \$2.2 billion.
- ◆ Reclamation projects in FCRPS – Hungry Horse and Grand Coulee, planning for near- and long-term operations.
- ◆ Grand Coulee is the major storage project in the US on the Columbia River, provides not only generation but releases storage for biological concerns.
- ◆ Coordination of Grand Coulee powerhouse units overhaul and outages for routine maintenance.
- ◆ Notification of Grand Coulee operations to non-federal entities such as tribal interests and others.



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Operations Planning Agency Responsibilities

✦ Bonneville Power Administration

Markets the power from the FCRPS to meet NW customer needs, marketing surpluses to manage customer rates

- ◆ Real Time (24x7 operation)
 - Send generation requests to projects (matching generation to load)
 - Integrate hourly/daily marketing & wind with hydraulic objectives
 - Manage hourly water operation of FCRPS (spill, tailwater, forebay, ramp rates, etc.)
- ◆ Short-Term/Mid-Term Planning (next two weeks – one year)
 - Coordinate special operations with Corps/BOR
 - Coordinate Outage planning with Corps /BOR
 - Providing Inventory assessment (capacity and energy) for marketing
 - Implement Treaty via weekly Treaty requests with BCH for flow at boarder

21



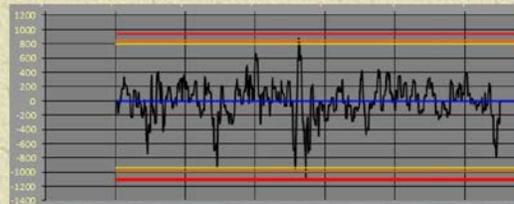
Operational Challenges

✦ Wind Integration

✦ Aging Infrastructure

- ◆ Hydro Units
- ◆ Spillways
- ◆ Transformers
- ◆ Transmission lines
- ◆ Buildings

✦ Managing TDG



22



On the Horizon

✦ Columbia River Treaty

- ◆ Modernize framework of Treaty to ensure a balance of power production, flood risk management, and ecosystem-based functions as the primary purposes.
- ◆ Recommendation is currently at State Department.

✦ Climate Change

- ◆ Indications from climate change studies in the Columbia Basin indicate less snow accumulation, more winter rain, wide variability in runoff events, lower annual peaks, and lower base flow in the summer.
- ◆ Challenge will be to adapt FCRPS operations with changes in the runoff patterns to provide for all needs in the basin.
- ◆ Three agency studies are underway to provide runoff data across the Columbia Basin for the future under climate change scenarios.
- ◆ Results from these studies will help identify adjustments to future FCRPS management under a changing climate.

23



Questions????

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Attachment F

Natural River Processes and Reservoir Operations (Slide Presentation)

RECLAMATION

Managing Water in the West

Natural River Processes and Reservoir Operations

Tim Randle, Ph.D., P.E., D.WRE.

Civil Engineer and Manager

Sedimentation and River Hydraulics Group



U.S. Department of the Interior
Bureau of Reclamation



Rivers and Floodplains Provide Many Ecosystem Benefits

- Aquatic and terrestrial habitats.
- Pathways for migratory fish.
- Human benefits (e.g., water, food, cultural resources, navigation, recreation)



RECLAMATION

Dams and Storage Reservoirs can Provide Additional Benefits:

- Water supply
- Flood control
- Hydropower
- Navigation
- Recreation



RECLAMATION

but reservoirs also have environmental effects:

- Land inundation
- Shoreline wave erosion
- Potential for landslides,
especially during rapid
drawdown
- Reservoir sedimentation
and increased upstream
inundation



RECLAMATION

Possible Downstream River Effects

- Altered hydrology
 - Reduced flood peaks and increased low flows →
 - Altered seasonal flow patterns →
 - Hourly flow fluctuations from hydropower peaking operations →
- Response
 - Reduced floodplain connections
 - Altered cues for aquatic species
 - Potential stream-bank erosion

RECLAMATION

Possible Downstream River Effects

- Reduced sediment supply →
- Reduced capacity to transport sediment with less floods
- Channel degradation and stream-bank erosion
- Erosion finest stream-bed material (e.g. loss of spawning gravels).



RECLAMATION

**Some effects can be mitigated
through reservoir reoperations**

**Secretary of the Interior
Dirk Kempthorne at
Glen Canyon Dam in 2008**



RECLAMATION

**Special High-
Flow Release to
Rebuild Grand
Canyon Sandbars**



RECLAMATION



RECLAMATION

New sand bars were deposited within the first 24 to 48 hours of peak-flow

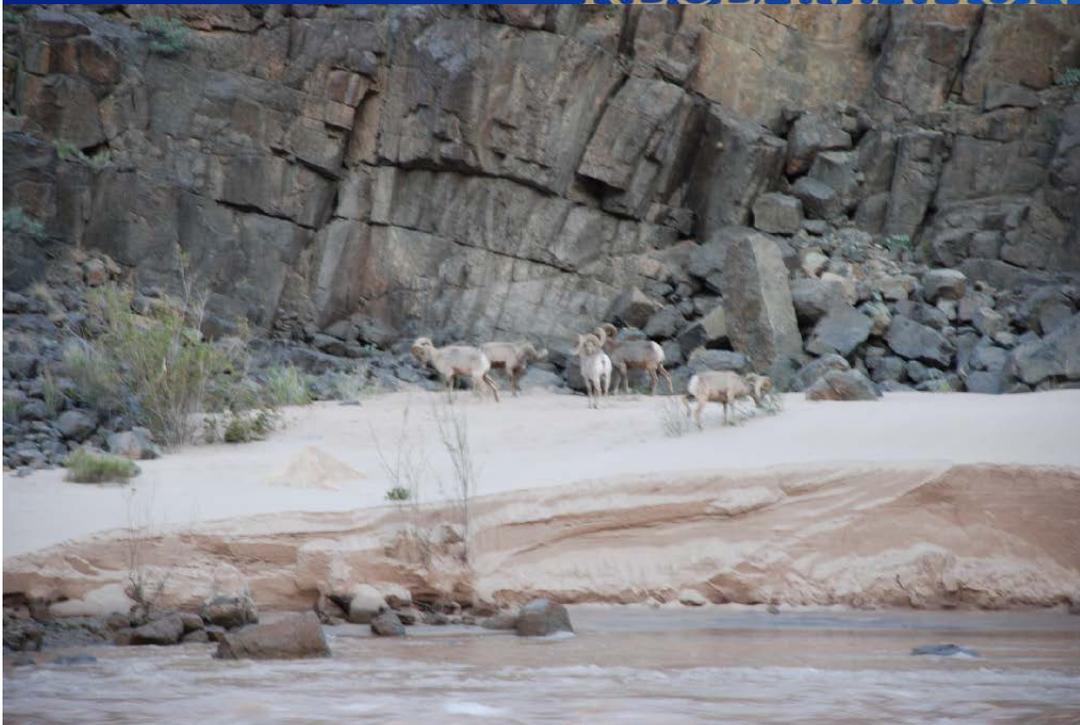


RECLAMATION

Restoration of Cultural Resources



RECLAMATION



RECLAMATION

Natural River Processes

- The width, depth, and alignment of a river are a function of the water flow, sediment load, vegetation, and geologic constraints.



Hoh River, WA

RECLAMATION

All Rivers Transport Sediment

- River channels and floodplains are typically composed of sediment



RECLAMATION

Common Sediment Classifications

- Particle grain size
 - Clay (< 0.004 mm)
 - Silt (0.004 to 0.062 mm)
 - Sand (0.062 to 2 mm)
 - Gravel (2 to 32 mm)
 - Cobble (32 to 256 mm)
 - Boulder (> 256 mm)
- Transport
 - Suspended Load
 - Bed Load

RECLAMATION



Stream
Bed Material

Pavement Layer



Underlying Layer

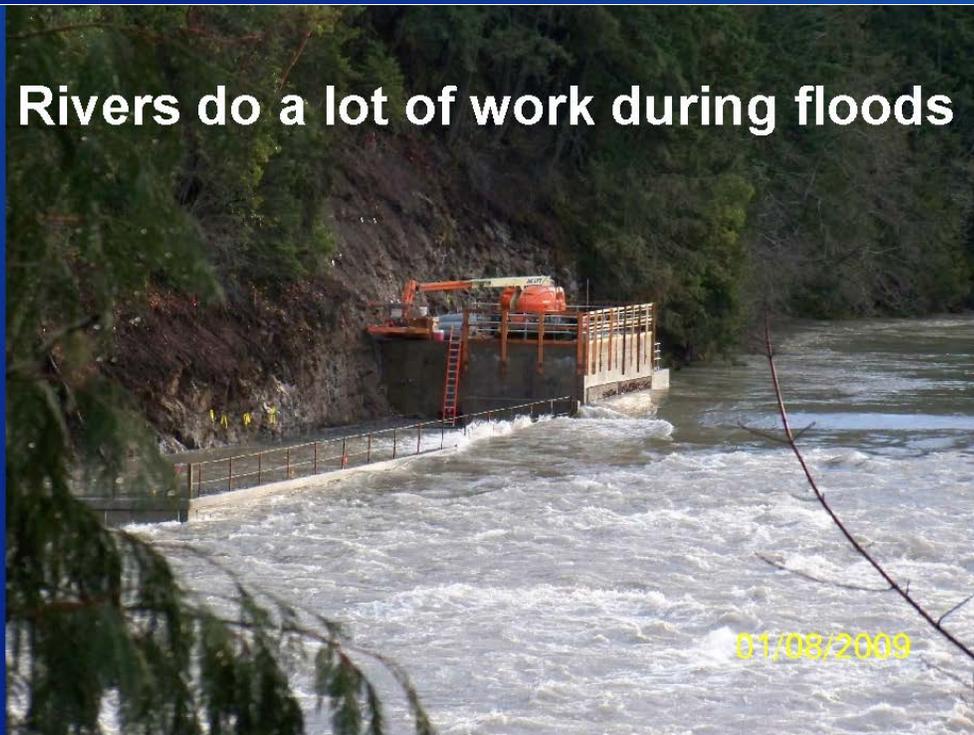
RECLAMATION

Sediment Transport

- Sediment transport increases
 - as river flow and stream velocity increase
 - if the channel becomes steeper
- Clay, silt, and fine sand tend to be transported as suspended load near the speed of water.
- Coarse sand, gravel, and cobbles tend to be transported much slower and along the stream bed.

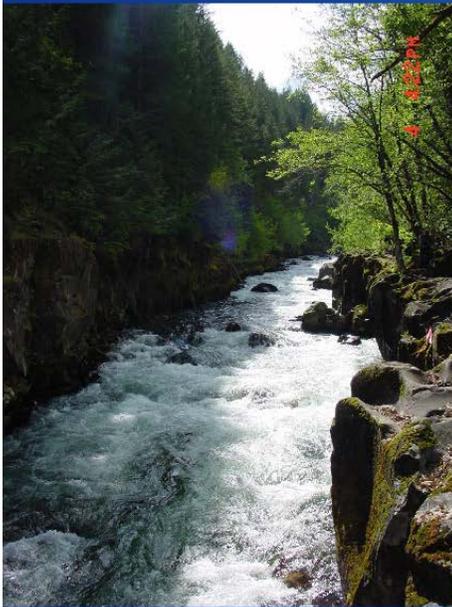
RECLAMATION

Rivers do a lot of work during floods



RECLAMATION

Channel Stability

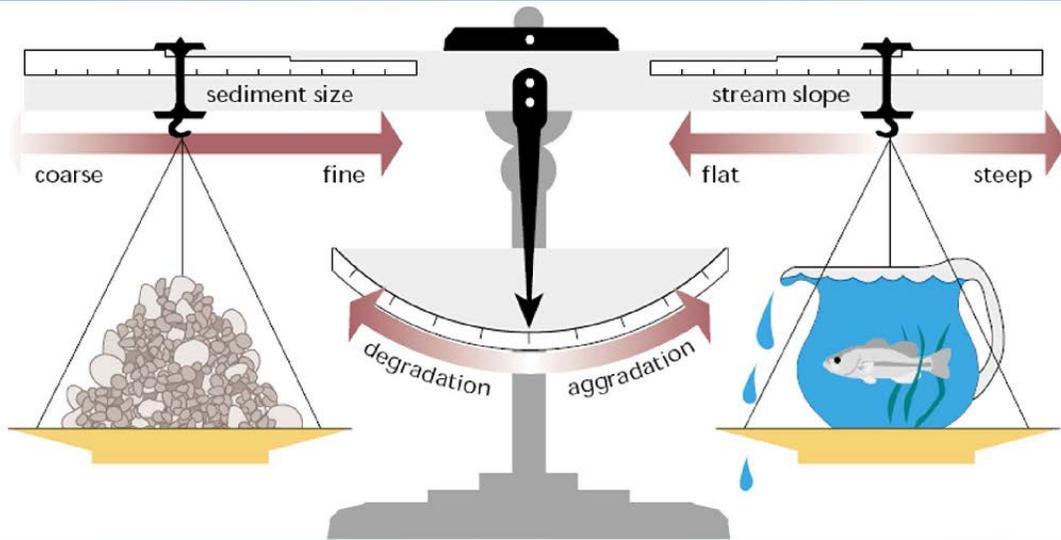


Alluvium (sediment)

Bedrock
Canyon

RECLAMATION

Stable Channel Balance



$$Q_s \cdot D_{50} \propto Q_w \cdot S$$

RECLAMATION

Channel Degradation after channel straightening and increased flow.



RECLAMATION

Sediment Balance

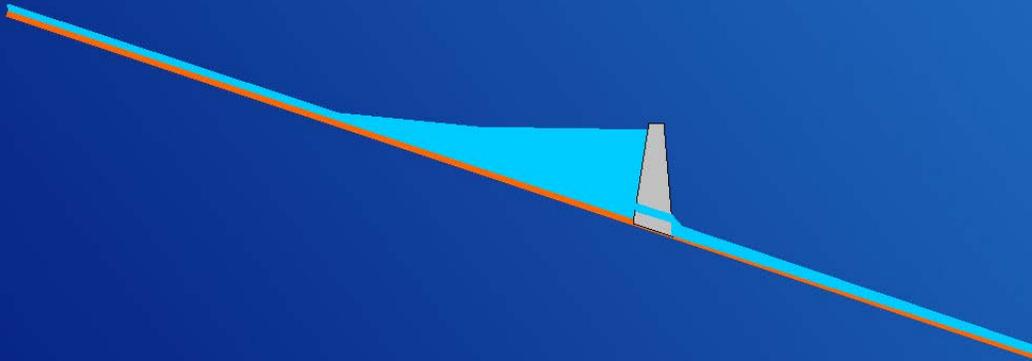
- **Initial stable river profile**



RECLAMATION

Sediment Balance

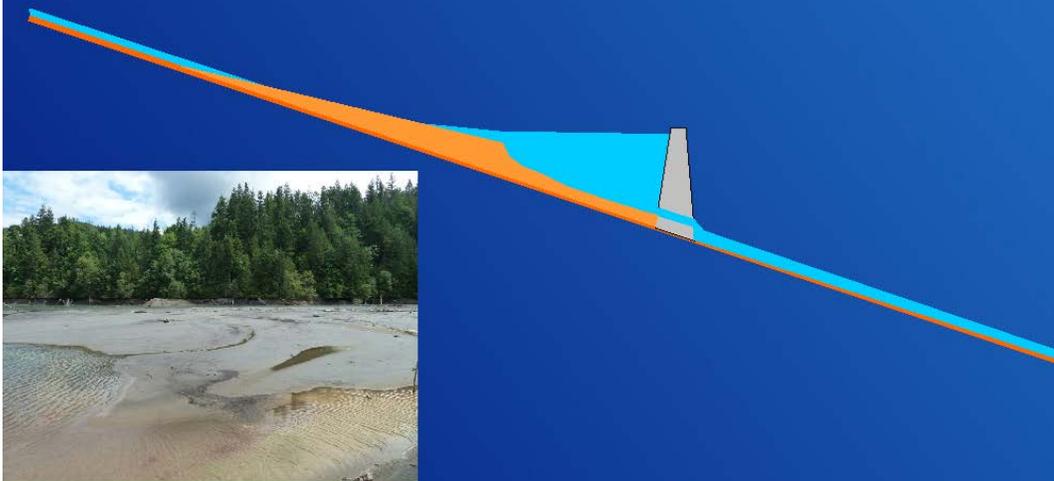
- Reservoirs can disrupt sediment transport



RECLAMATION

Sediment Balance

- Reservoir sedimentation



RECLAMATION

Sediment Imbalance

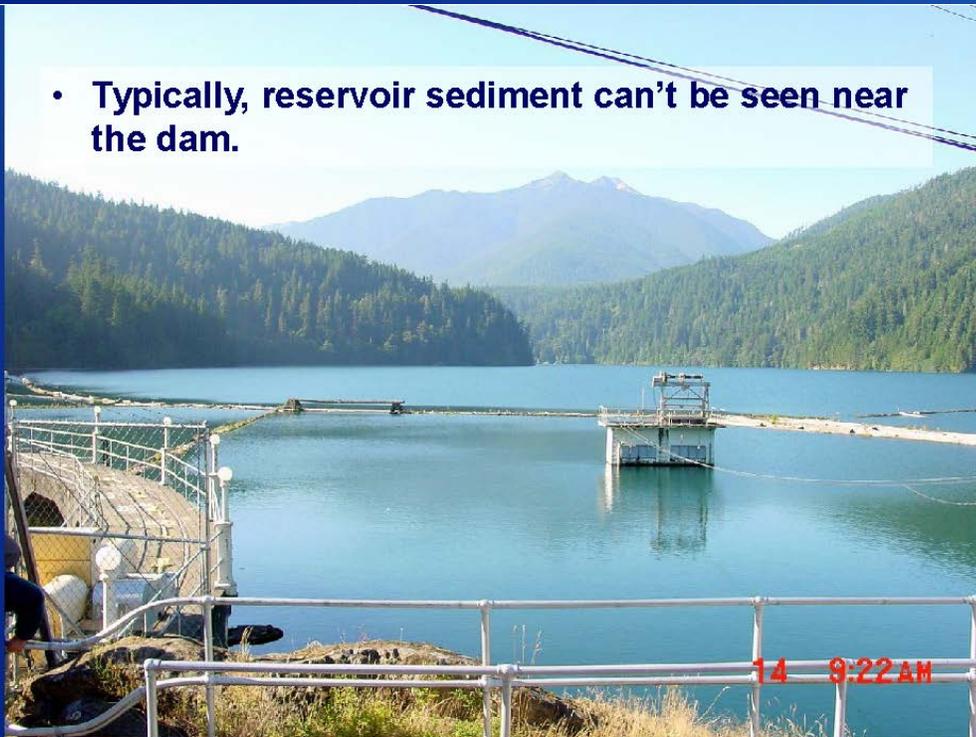
- Reservoir sedimentation



- Downstream degradation

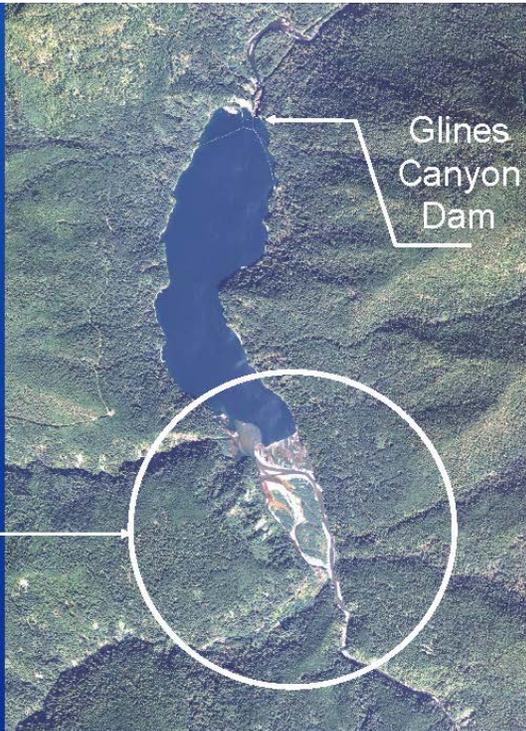
RECLAMATION

- Typically, reservoir sediment can't be seen near the dam.



RECLAMATION

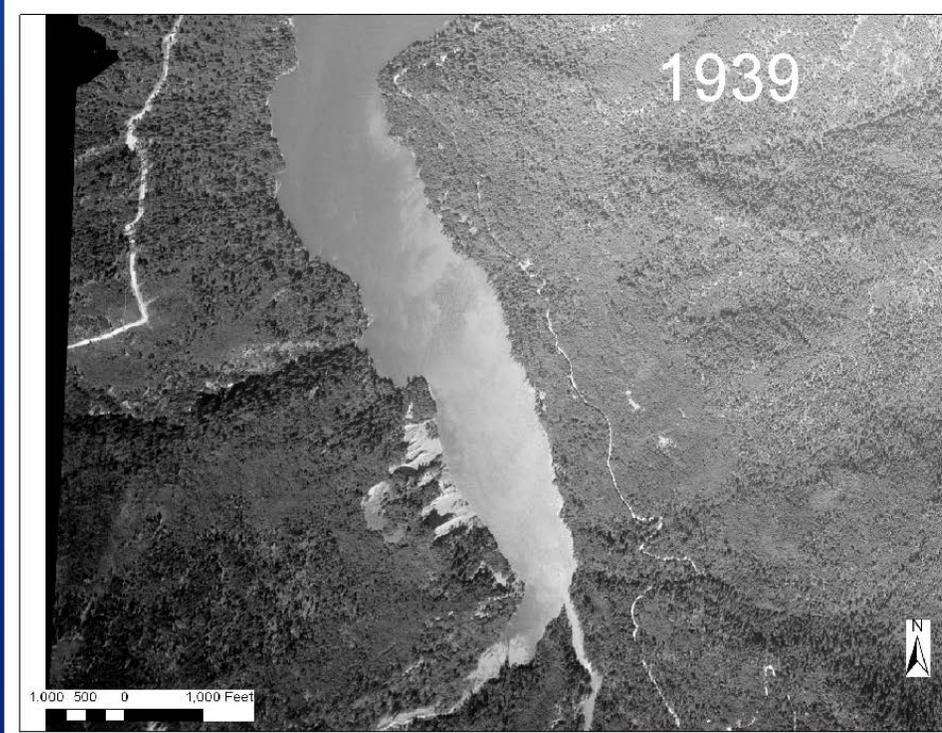
Lake Mills, WA
2009



Delta

Glines
Canyon
Dam

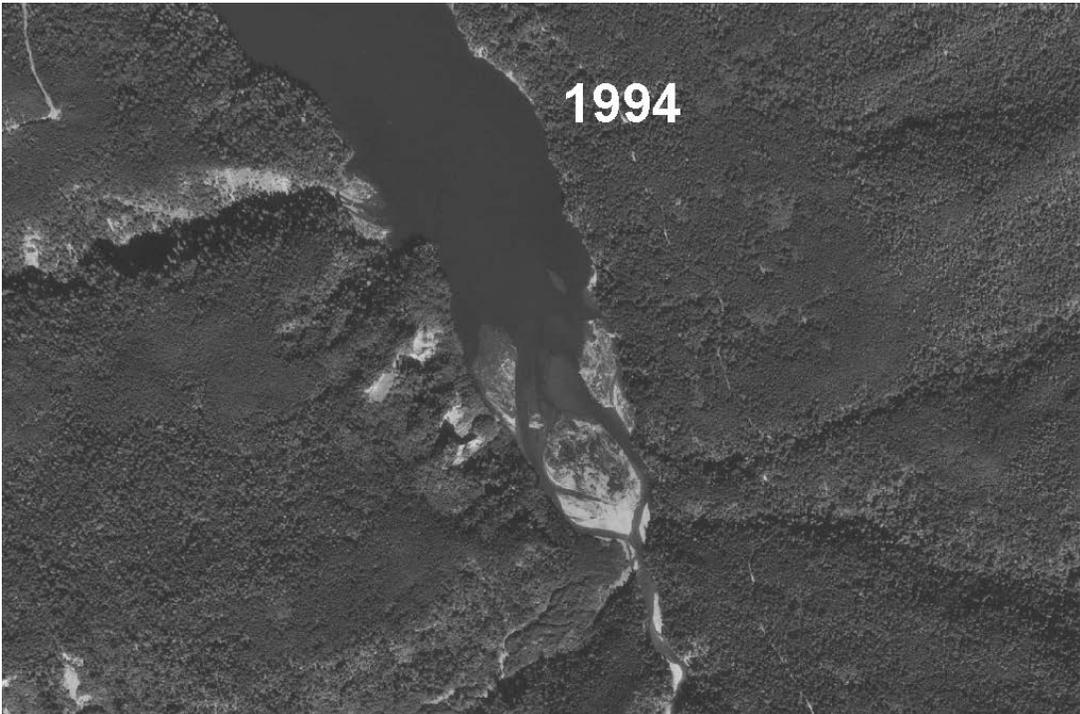
RECLAMATION



1939

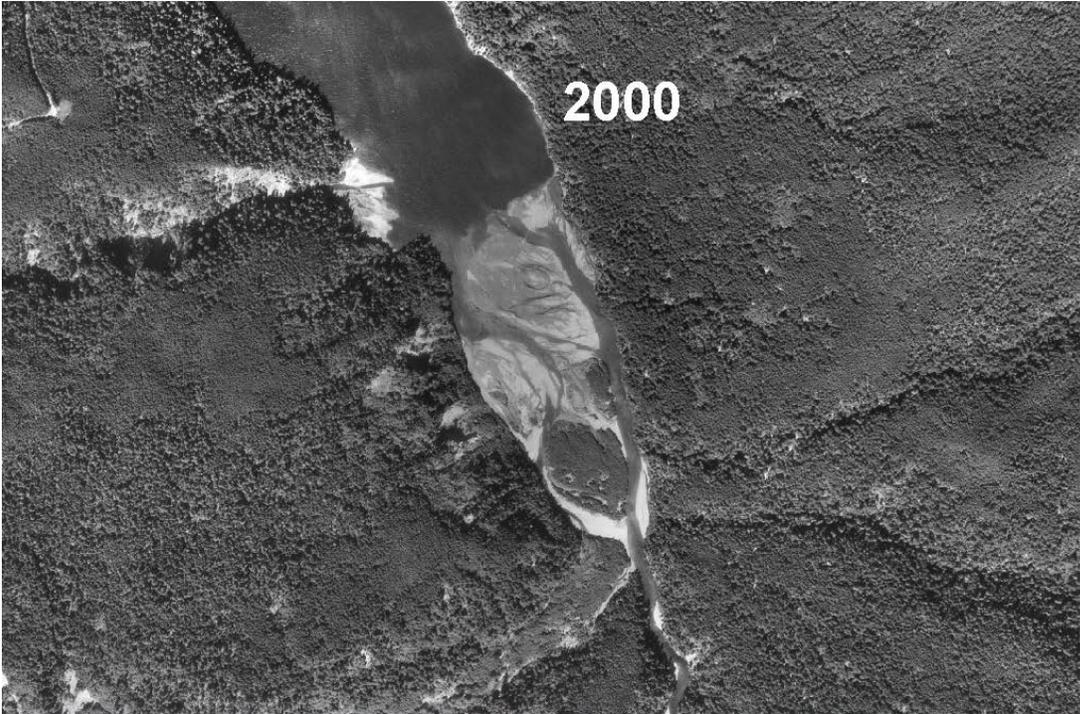
1,000 500 0 1,000 Feet

RECLAMATION



1994

RECLAMATION



2000

RECLAMATION



2005

RECLAMATION



2009

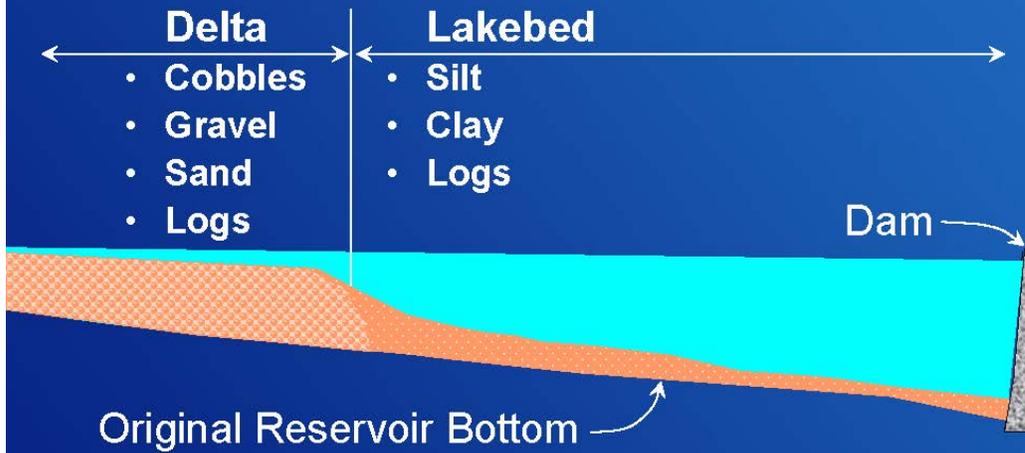
RECLAMATION

Lake Mills 2010



RECLAMATION

Reservoir Sediment Profile



RECLAMATION

Impacts of Reservoir Sedimentation

- Loss of reservoir storage capacity
- Eventual burial of outlet works, boat ramps, and marinas
- Reduction of reservoir surface area for boating
- Upstream increase in water table and flood stage
- Downstream channel erosion and habitat loss

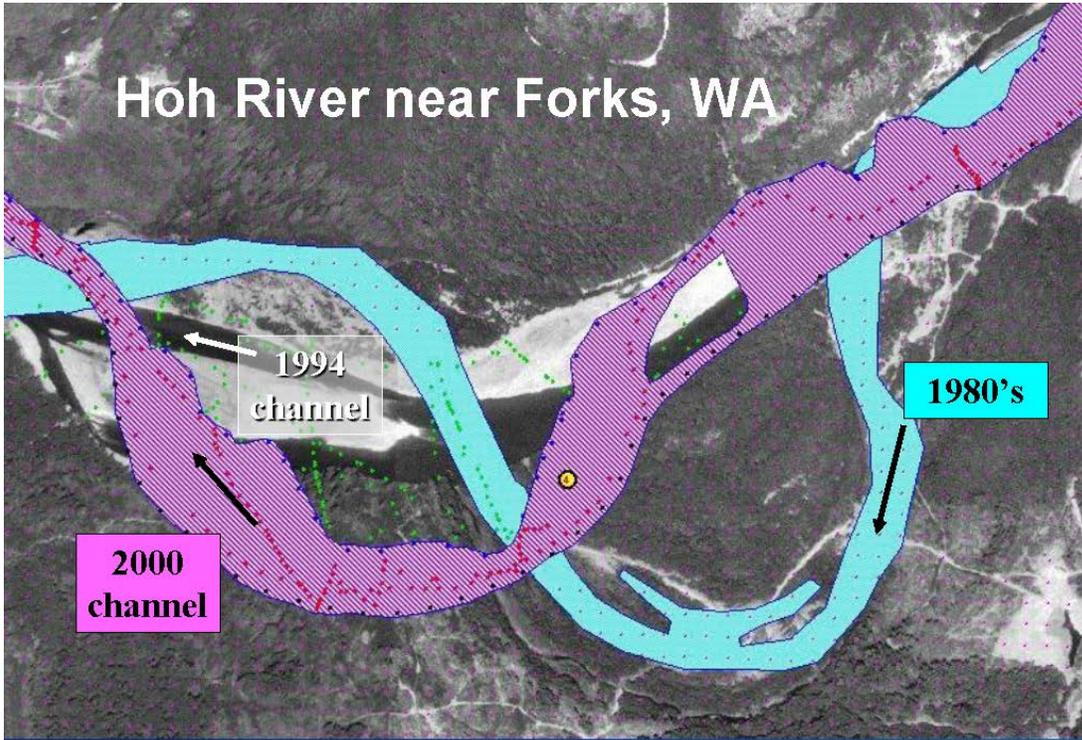
RECLAMATION

River Channel Migration

The migration of river channels across their flood plains and the occasional erosion of terrace banks is a natural process. River channel migration becomes especially important to people living along a river and to agencies planning or maintaining infrastructure along a river.



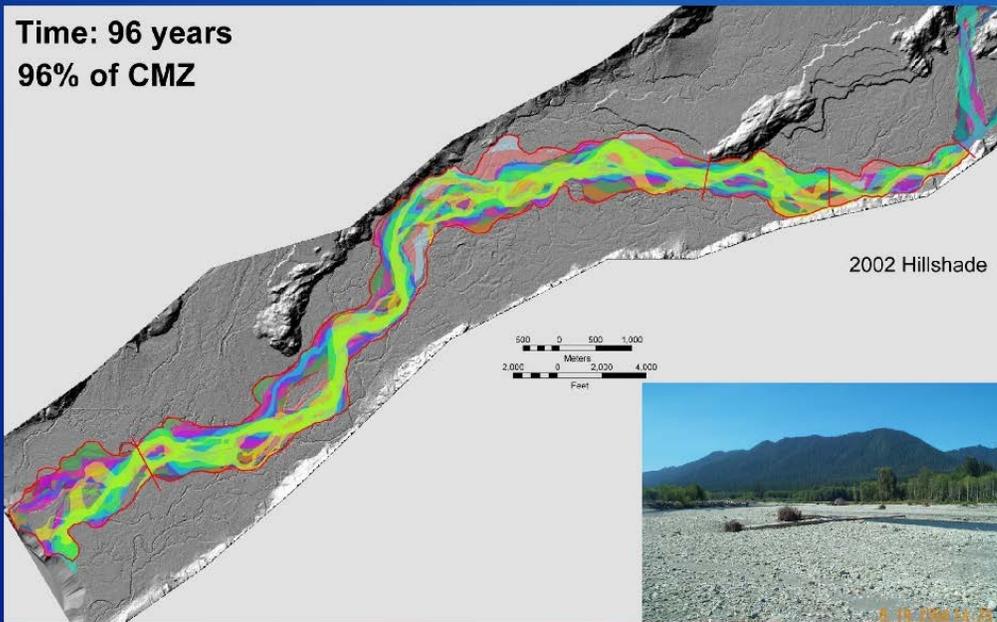
RECLAMATION



RECLAMATION

Quinault River Channel Migration, WA

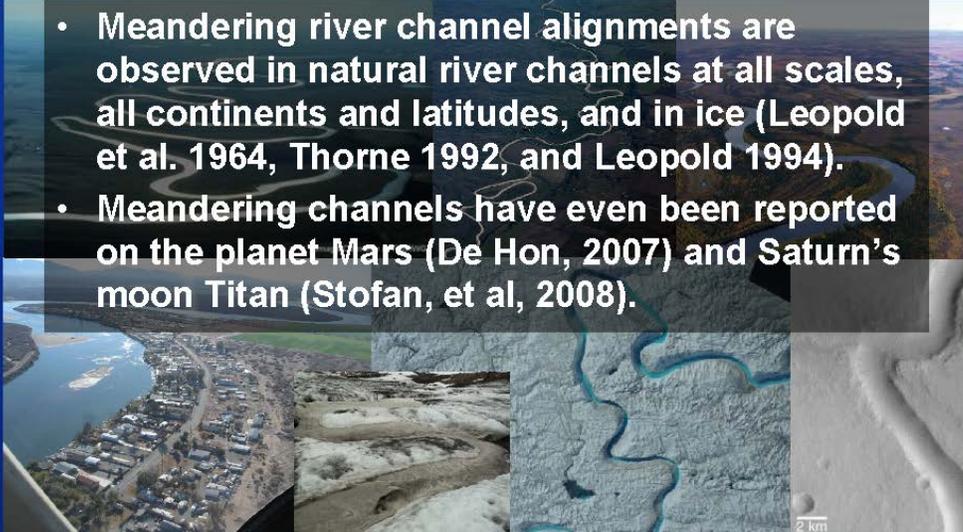
Time: 96 years
96% of CMZ



RECLAMATION

Meandering Rivers

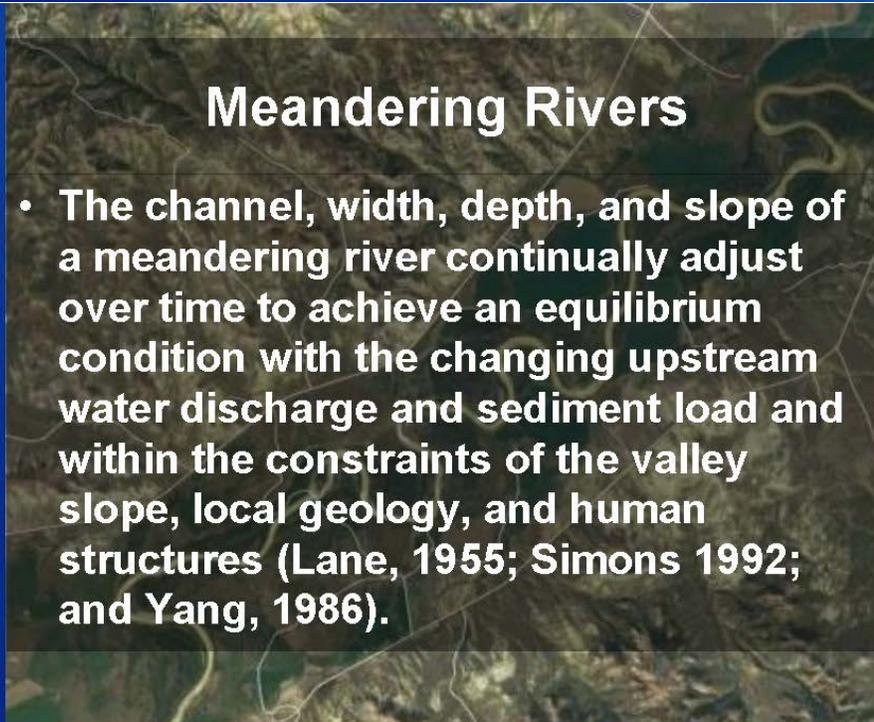
- Meandering river channel alignments are observed in natural river channels at all scales, all continents and latitudes, and in ice (Leopold et al. 1964, Thorne 1992, and Leopold 1994).
- Meandering channels have even been reported on the planet Mars (De Hon, 2007) and Saturn's moon Titan (Stofan, et al, 2008).



RECLAMATION³⁹

Meandering Rivers

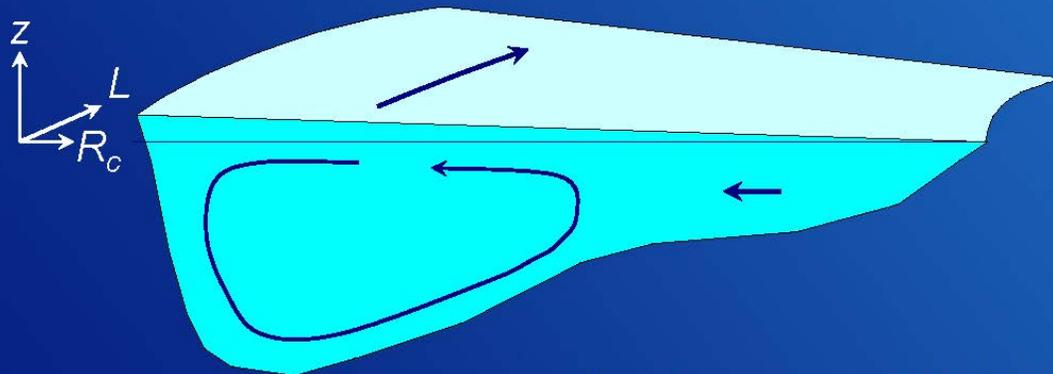
- The channel, width, depth, and slope of a meandering river continually adjust over time to achieve an equilibrium condition with the changing upstream water discharge and sediment load and within the constraints of the valley slope, local geology, and human structures (Lane, 1955; Simons 1992; and Yang, 1986).



RECLAMATION

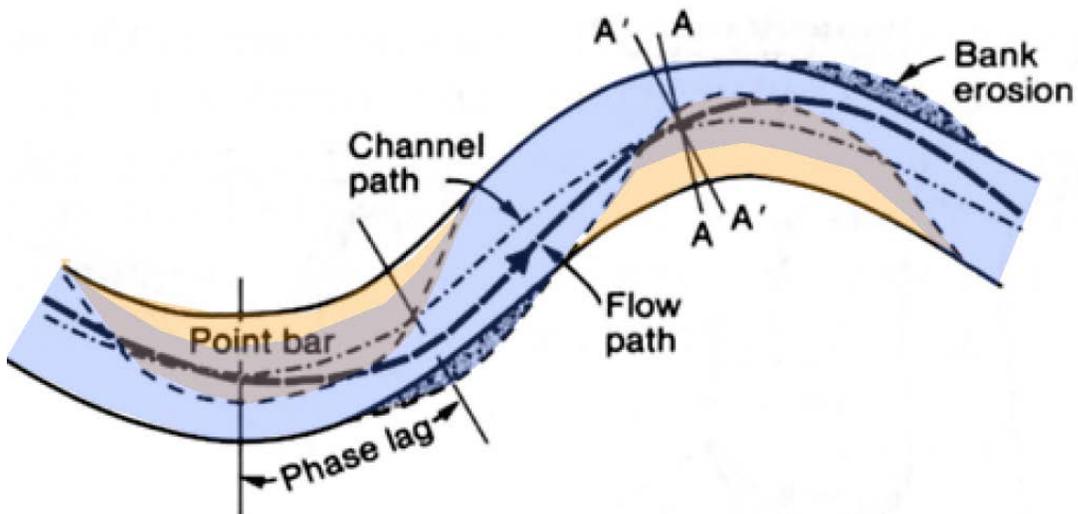
Causes of River Meandering

- Super elevation of flow around a meander bend causes a pressure imbalance, which induces a secondary flow current.



RECLAMATION

Planform Phase Lag



RECLAMATION

Vegetation in Meandering Rivers

- A meandering channel requires a cohesive floodplain. Vegetation plays an important role in stabilizing the banks, constraining channel migration, and allowing deeper and narrower channels to develop.



RECLAMATION



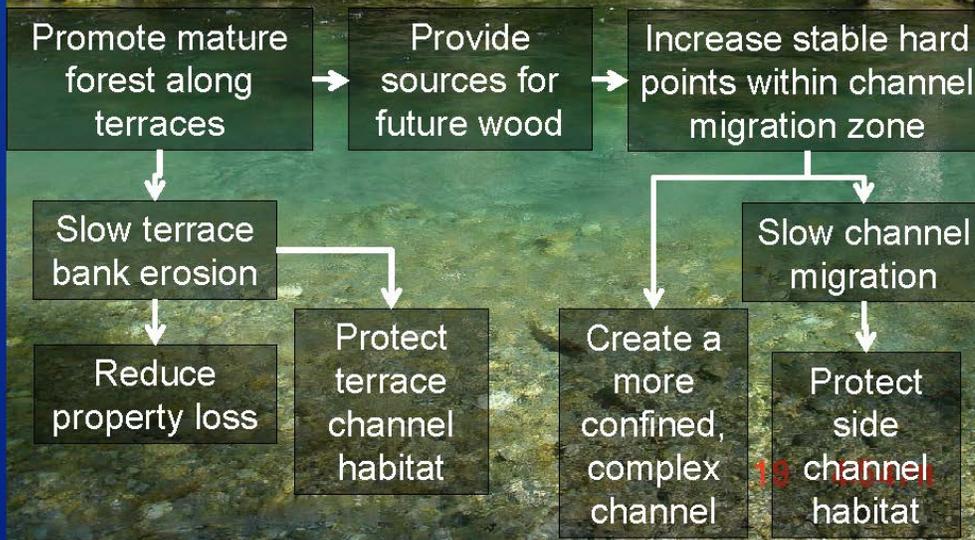
Rain Forest

Channel widening
after logging of
the riparian forest



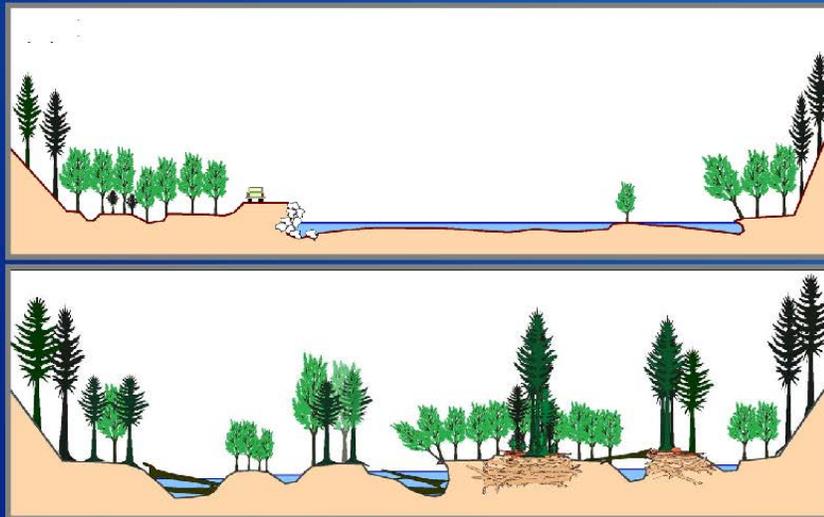
RECLAMATION

Habitat Restoration Strategies



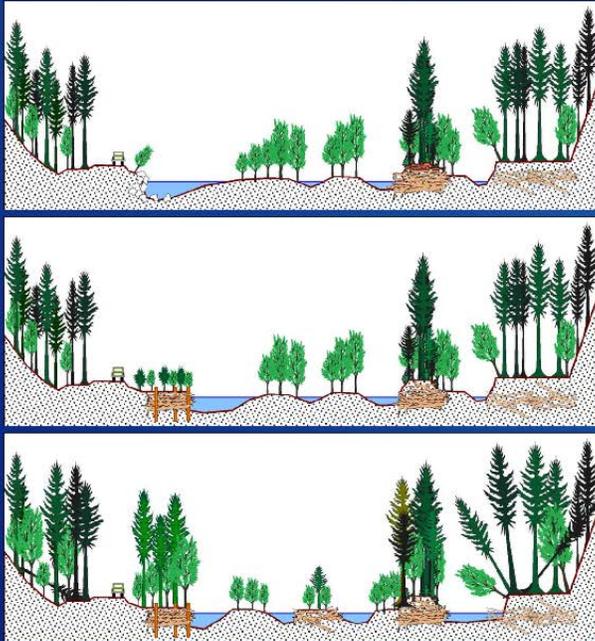
RECLAMATION

Engineered log jams can be used to emulate channel hard points and restore channel complexity, while vegetation matures into a natural source of future wood.



Created by Herrera Environmental Consultants

RECLAMATION

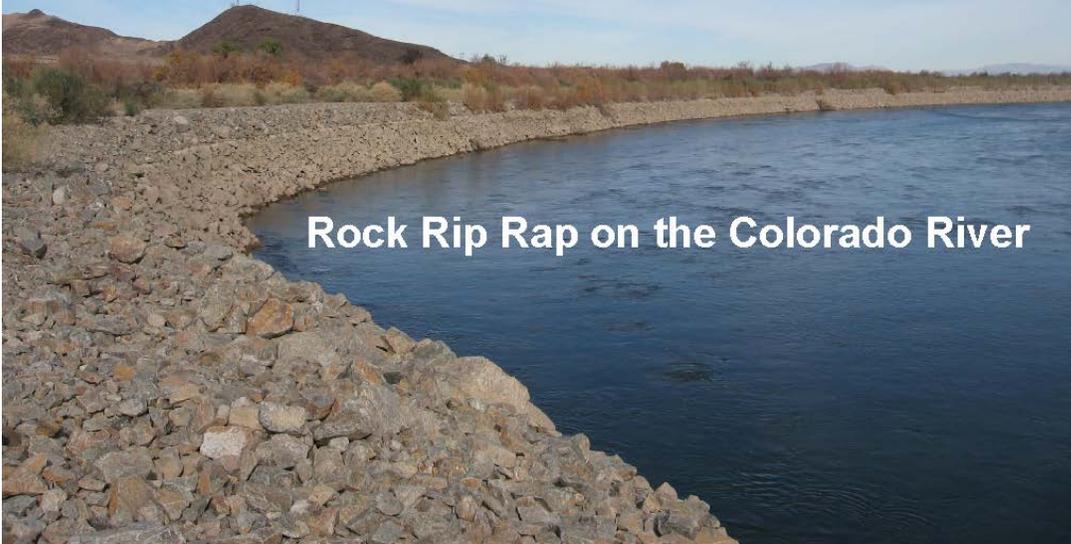


Native materials can emulate natural boundaries establishing buffer zones along banks that have a high risk of erosion

Created by Herrera Environmental Consultants

RECLAMATION

Stream-bank Protection



Rock Rip Rap on the Colorado River

RECLAMATION

Rip Rap or Stone Toe Protection



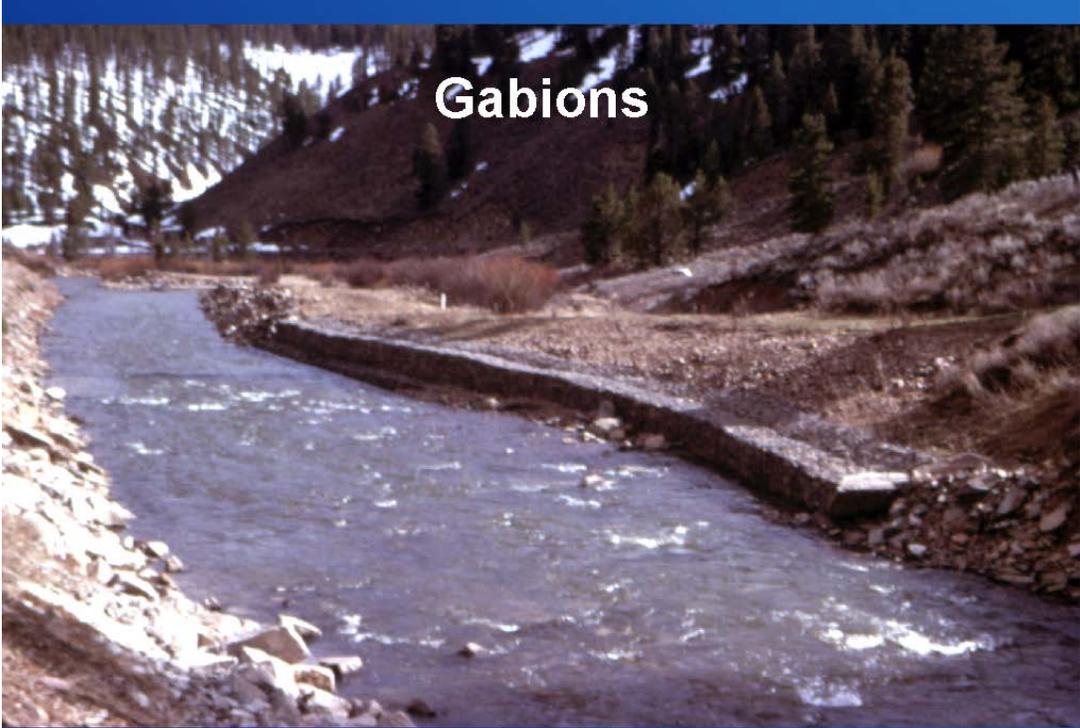
RECLAMATION

Rock Jetties



RECLAMATION

Gabions



RECLAMATION

Jacks Control Bank Erosion on Rio Grande, NM

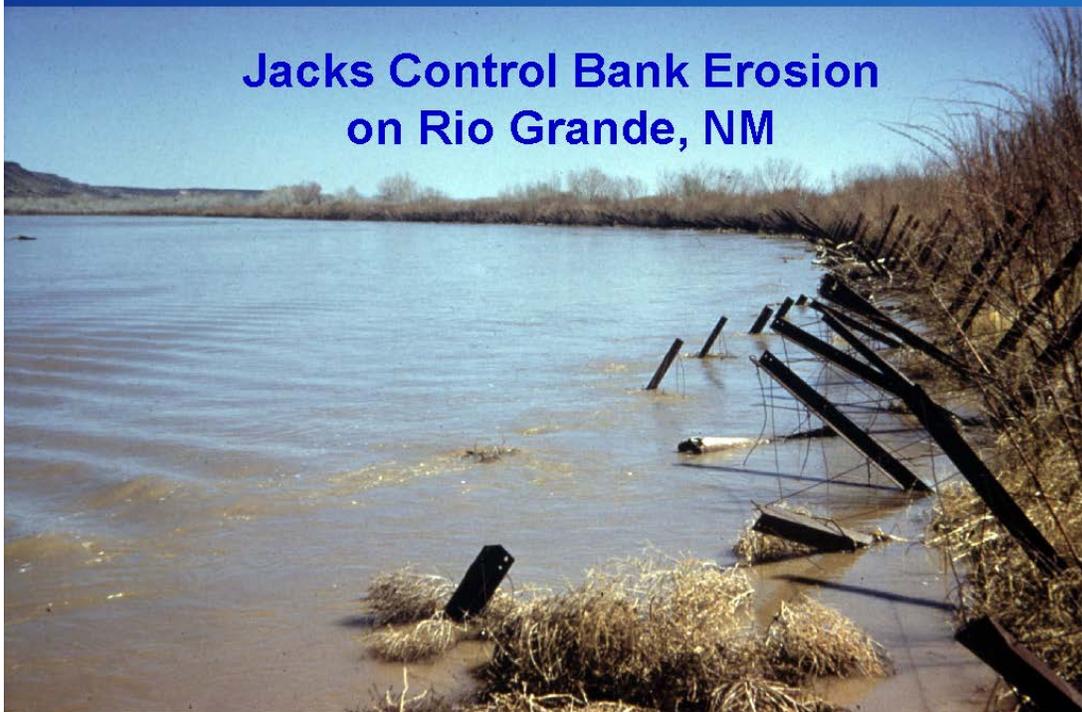


RECLAMATION



**Jacks Control Bank Erosion
on Rio Grande, NM**

RECLAMATION



**Jacks Control Bank Erosion
on Rio Grande, NM**

RECLAMATION



Grade Control

RECLAMATION

Rio Grande Examples, NM

- **Bio-engineered & deformable bank protection**
- **Gradient restoration facility**
- **Channel realignment**
- **Floodplain reconnection**
- **Limited bank stabilization**



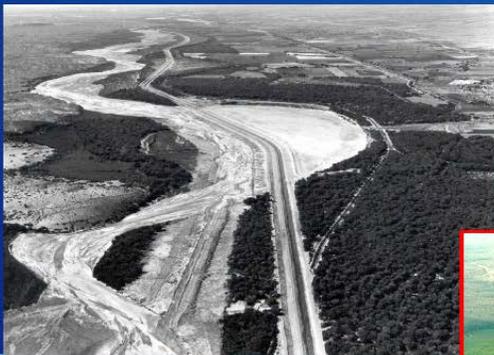
RECLAMATION

La Canova Bioengineered Bank Protection



RECLAMATION

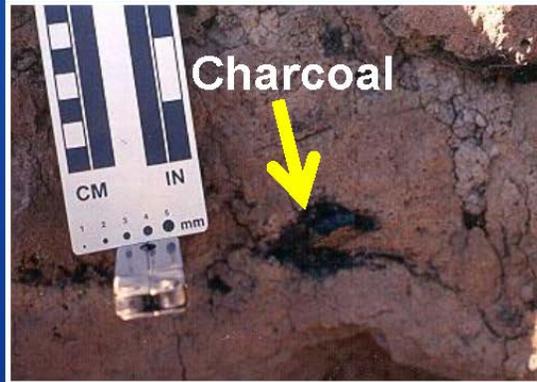
Rio Grande, NM Levee Setback Project



RECLAMATION

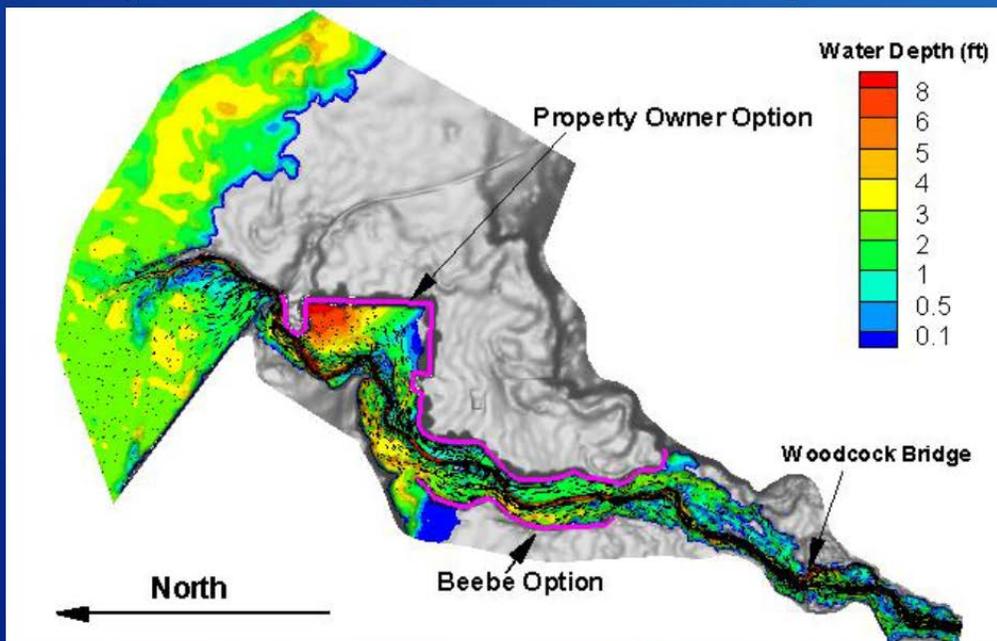
Radiocarbon Dating Of Terraces

Determines how long ago that terraces were abandoned by the river. These terraces are the boundaries of natural channel migration zone.



RECLAMATION

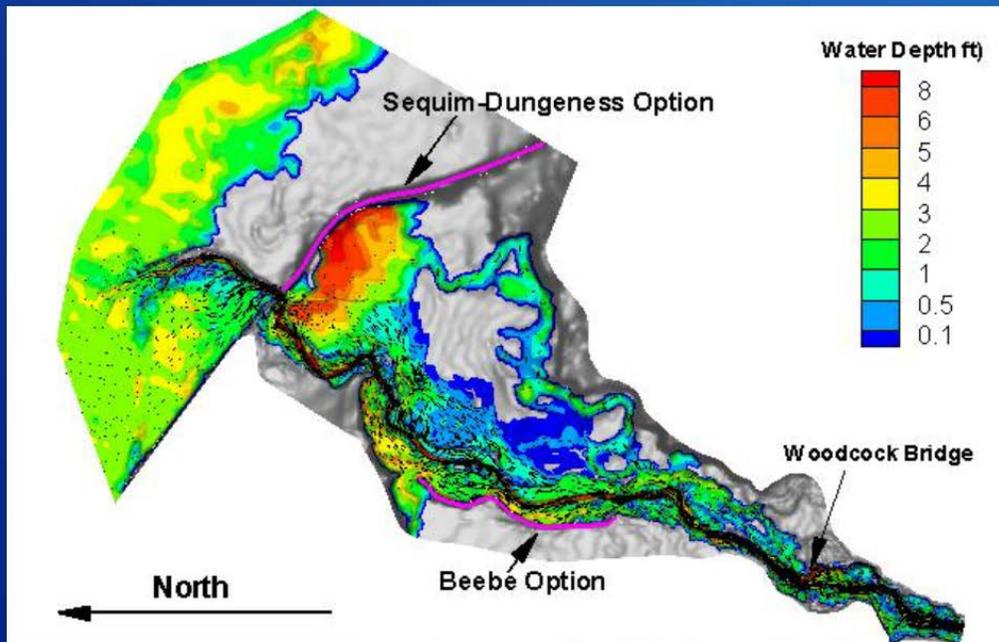
100-year flood depths and velocity vectors



Dungeness River, WA

RECLAMATION

100-year flood depths and velocity vectors



Dungeness River, WA

RECLAMATION

With proper investigations and planning, solutions can be found to mitigate the impacts to natural and cultural resources.



RECLAMATION

The End

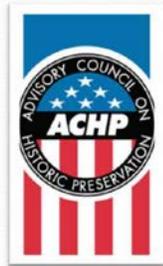


Attachment G

Reasonable and Good Faith Training (Slide Presentation)

Meeting the “Reasonable and Good Faith” Identification Standard in Section 106 Review

Federal Columbia
River Power System
Conference
November 2014



The Section 106 Process

- 1: Initiate the process:** *Do I need to go through 106 review? If so, who else do I need to talk to?*
- 2: Identify historic properties:** *What historic properties may be out there?*
- 3: Assess adverse effects:** *Will my project harm historic properties?*
- 4: Resolve adverse effects:** *What is appropriate to mitigate adverse effects in the public interest?*

What's an agency to do?

Federal agency first defines APE:

- direct, “reasonably foreseeable” indirect, future, and cumulative

Agency then determines the “scope of identification efforts” in consultation with:

- SHPO/THPO
- Consulting parties
- Knowledgeable individuals and organizations
- Indian tribes and Native Hawaiian organizations

Advisory Council on Historic Preservation

What exactly are we looking for?

- Identification of properties listed on, or eligible for listing on, the National Register of Historic Places. Can include:
 - Buildings
 - Structures
 - Districts
 - Sites
 - Objects



Advisory Council on Historic Preservation

Properties of traditional religious and cultural significance to tribes and NHOs



Advisory Council on Historic Preservation

Consultation with tribes and native Hawaiian organizations

- Make a reasonable and good faith effort to identify any Indian tribe or Native Hawaiian organization that might attach religious and cultural significance to historic properties in the APE. [800.2(c)(2)(ii) & 800.4(a)(4)]
- Acknowledge “special expertise” in identifying historic properties of religious and cultural significance to them. [800.4(c)(1)]

Advisory Council on Historic Preservation

What IS THE REASONABLE AND GOOD FAITH EFFORT Standard?

- Required by 36 CFR § 800.4(b)(1).
- ≠ 100% survey, 100% coverage.
- Several factors to be considered.
- No “one size fits all” approach.
- Extended discussion in ACHP’s online archaeology guidance and RGFE fact sheet.

Advisory Council on Historic Preservation

1. “Past planning, research, and studies”

- Check SHPO site/inventory files?
- Ask Indian tribes/NHOs?

- Section 106 regulations require that a RGFE include *at a minimum*, a review of existing information on historic properties that are or may be within the APE (36 CFR § 800.4(a)(2)).

Advisory Council on Historic Preservation

2. “Magnitude and nature of the undertaking”



3. “Degree of federal involvement”

- Federal “involvement” means the federal agency’s degree of *control or influence* over the undertaking.
- How much control over the undertaking and its outcome does the agency have?

Advisory Council on Historic Preservation

4. “Nature and extent of potential effects to historic properties”

- Identification efforts should focus on *where* effects are likely to occur within the APE, and the *kind of impact* a specific action may have on historic properties.

Advisory Council on Historic Preservation

5. “Likely nature and location of historic properties”

- Identification efforts are based on where properties are likely to be located within the APE.
- Likelihood APE contains an exceptionally important historic property → more intensive survey.

Advisory Council on Historic Preservation

What *MAY* be included in the identification effort?

- Background research
- Consultation
- Oral history interviews
- Sample field investigation
- Field survey



Photo, U.S. Forest Service

Advisory Council on Historic Preservation

What is a “reasonable” effort?

- A *reasonable* effort is one that is logically designed to identify eligible properties that may be affected by the undertaking, without being excessive or inadequate in light of the factors cited in the regulations.

Advisory Council on Historic Preservation

Is this a reasonable effort?

- To vary the level of identification effort (such as survey intensity) within the APE?



Advisory Council on Historic Preservation

Is this a reasonable effort?

- To rely on a comprehensive survey report from twenty years ago to determine if historic properties are present.



Advisory Council on Historic Preservation

Is this a reasonable effort?

- To complete a state survey form for all 400 properties over 50 years old within a large corridor project APE.



Photo, FTA, Region V

Advisory Council on Historic Preservation

The *reasonable* identification effort is carried out in *good faith* when

- The effort is *fully implemented* by or on behalf of the federal agency, and
- the plan is *appropriate* to the nature and scale of the undertaking.

Advisory Council on Historic Preservation

Is this a good faith effort?

- The first review of survey files and existing information begins after a preferred alternative has been selected.



Advisory Council on Historic Preservation

Is this a good faith effort?

- An archaeologist will also carry out the architectural survey.



Advisory Council on Historic Preservation

Is this a good faith effort?

- The plan for a new irrigation ditch provides for a phased approach to identification.



Advisory Council on Historic Preservation

How to resolve disputes?

- Continued consultation with the SHPO/THPO, Indian tribe, Native Hawaiian organization, and/or other consulting party(ies).
- Seek the advice and assistance of the ACHP 36 CFR § 800.2(b)(2).



Advisory Council on Historic Preservation

Keep in mind...

Meeting the reasonable and good faith identification standard means the efforts must be both reasonable in terms of intensity and scale, and the plan must be carried out in good faith through its development and execution.



Advisory Council on Historic Preservation

Where to Go For Help...

ACHP
Office of Federal Agency Programs
401 F St NW, Suite 308
Washington, DC 20001

(202) 517-0200
www.achp.gov



Advisory Council on Historic Preservation

Guidance on Agreement Documents

- New online ACHP guidance on developing Section 106 Memoranda of Agreement and Programmatic Agreements
- For use by all Section 106 consulting parties



www.achp.gov/agreementdocguidance.html

Advisory Council on Historic Preservation

GAD answers the tough questions:

- When do I need an MOA or PA?
- What is the difference between an MOA and PA?
- Who prepares the agreement? When?
- What role do consulting parties play in the agreement's development?
- Who signs the agreement? What is the federal agency committing to by signing?
- What if changes need to be made to the agreement?
- What happens to the agreement once the undertaking is completed?

Advisory Council on Historic Preservation



GAD example stipulations

An extensive series that eventually will cover a wide variety of issues, including:

- Stipulations recommended for any agreement
- Public outreach: interpretation, education and heritage tourism
- Creating and managing historic property information
- Archaeology
- Managing changes in property control
- Minimizing effects on the built environment
- Exempting undertakings from further review

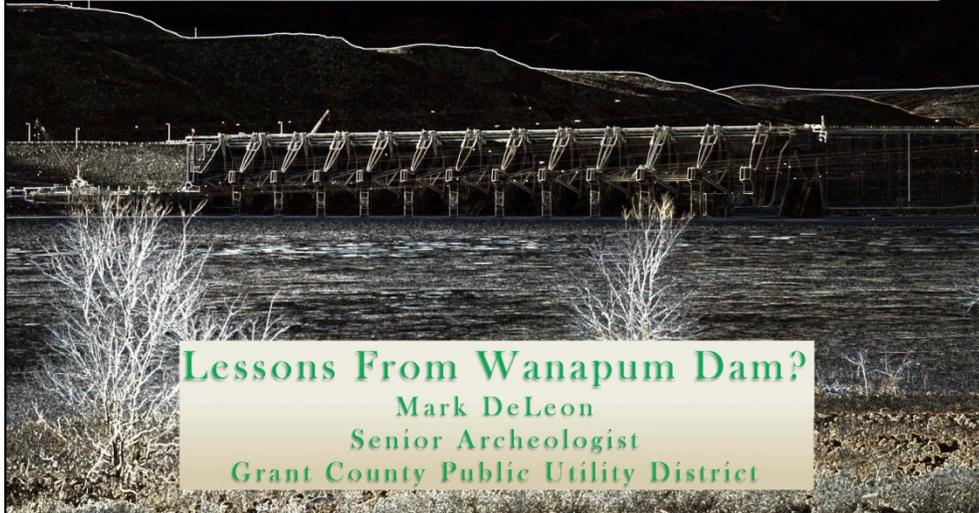
Advisory Council on Historic Preservation

Attachment H

DeLeon Presentation

(Slide Presentation)

Emergency Management at Reservoirs and Cultural Resource Management

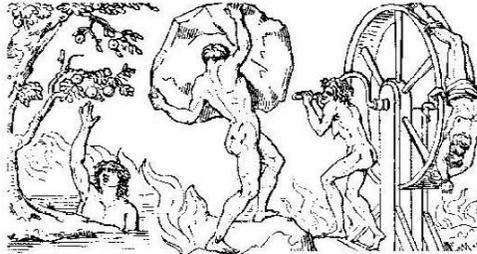


Today's Outline

- **Introduction**
- **PUD Background**
- **CR Program Background**
- **The Incident**
- **Management Response – CR Strategy**
- **Wacky Way of Section 106**
- **Taking Historic Properties into Account**
- **Understanding Context of Emergency Response**

DISCLAIMER

Work in Progress!



Thus:

Theorem := I think I can prove it

Conjecture := Wishful thinking

Speculation := Nonsense



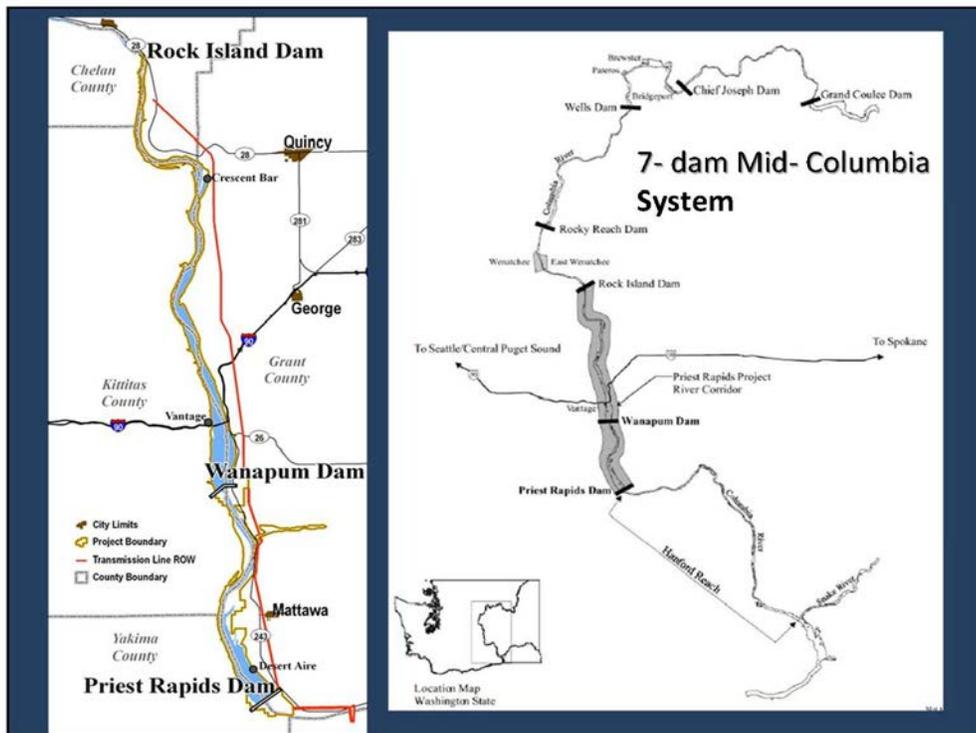
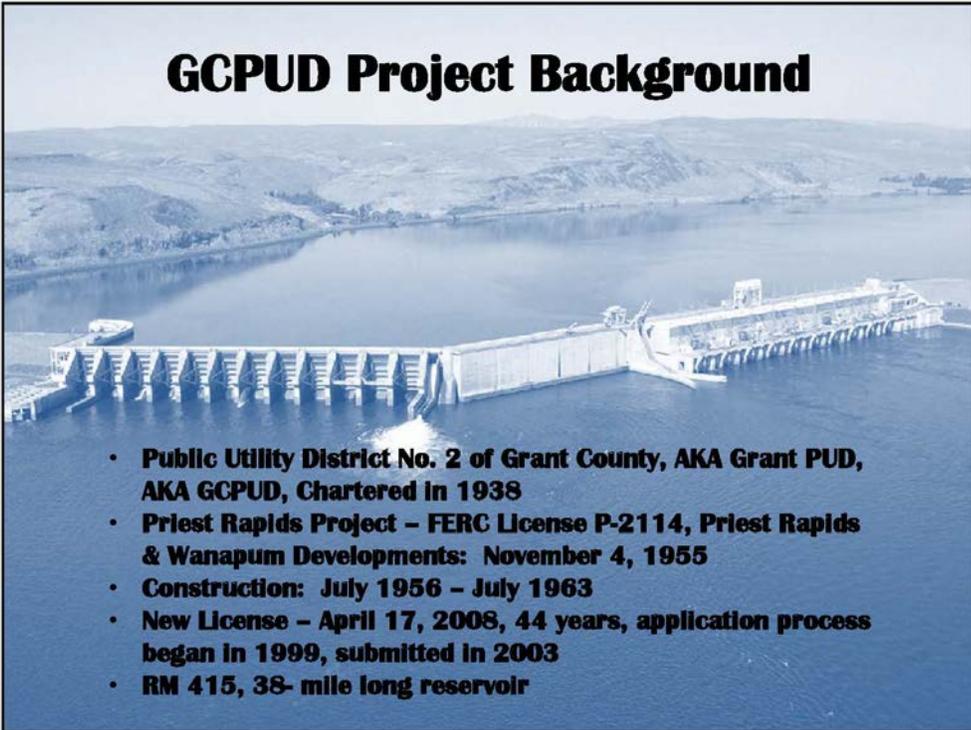
The Pre-Post Mortem

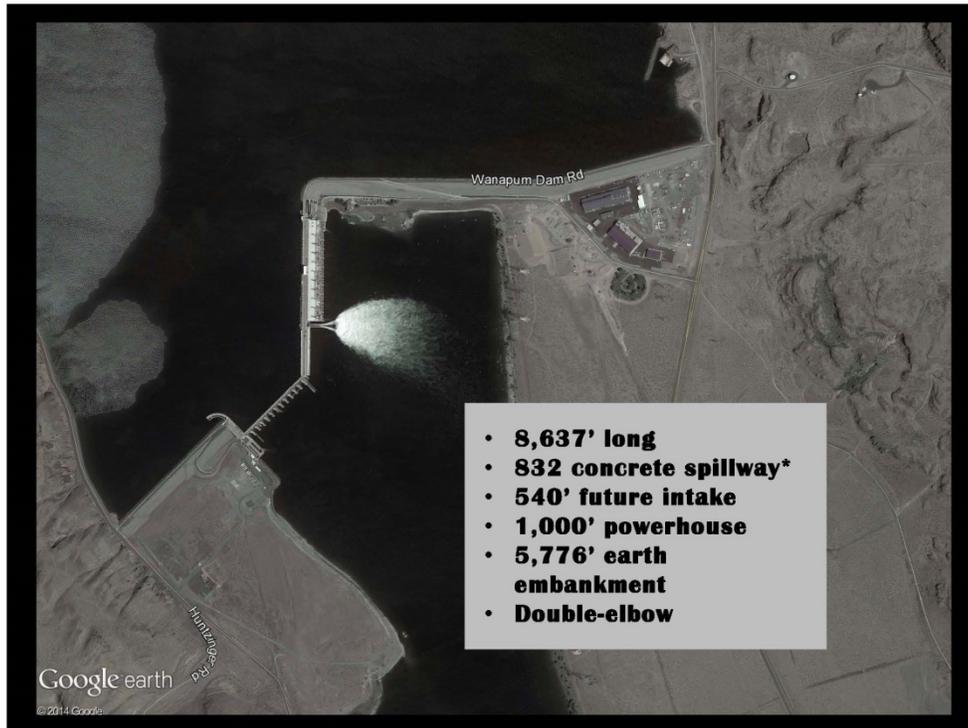
- Has not been written yet...
- Emergency Planning for cultural resources is over rated
- Your agency has an emergency response plan; are you it?
- Are you even allowed to see it?
- In event of incident – Stakeholders want to help; take cues from them
- In Event of incident – A good time for management to delegate
- Involve the media somehow in getting your story ou

Today's Outline

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GCPUD Project Background

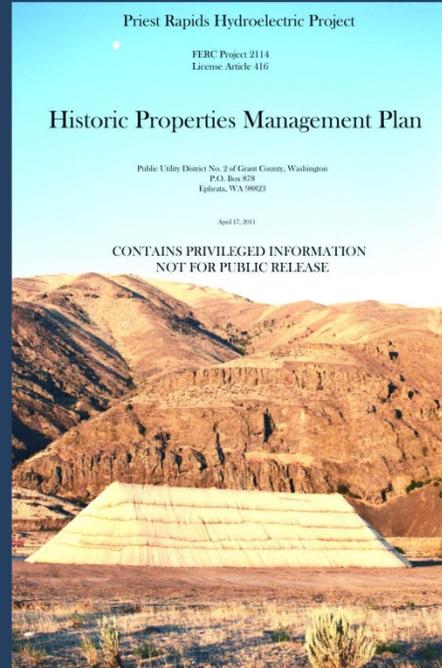




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- **Section 106 of NHPA**
- **FERC – lead federal agency**
- **Delegated to GCPUD 106 actions conforming to PA and the HPMP**
- **PA effective April 12, 2007**
- **Established a Cultural Resources Working Group**
- **License Requirements: NRHP evaluations, protection, mitigation, effects analysis and ongoing monitoring**



PROGRAMMATIC AGREEMENT
 AMONG
 THE FEDERAL ENERGY REGULATORY COMMISSION
 THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
 AND THE
 WASHINGTON STATE HISTORIC PRESERVATION OFFICER
 FOR
 MANAGING HISTORIC PROPERTIES THAT MAY BE AFFECTED
 BY ISSUING A LICENSE TO
 PUBLIC UTILITY DISTRICT NO. 2 OF GRANT COUNTY, WASHINGTON
 FOR THE CONTINUED OPERATION OF THE
 PRIEST RAPIDS PROJECT
 IN GRANT, YAKIMA, KITTITAS, DOUGLAS, BENTON, AND CHELAN
 COUNTIES, WASHINGTON
 (FERC No. 2114-116)

WHEREAS, the Federal Energy Regulatory Commission or its staff (hereinafter, "Commission") proposes to issue a new license to the Public Utility District No.2 of Grant County, Washington (hereinafter, "Licensee") to operate the Priest Rapids Project (hereinafter, "Project") as authorized by Part 1 of the Federal Power Act, 16 U.S.C. sections 791(a) through 825(r) as amended; and

Cultural Resources Working Group



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The Incident

- **February 24: spillway deck shifted**
- **February 27: divers inspect**
- **March 4: 26' drawdown, crack closes**
- **May 13: root cause identified**
- **September 9: first tendon installed**
- **December 31: pool raise?**





Today's Outline

- **Introduction**
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- **CR Program Background**
- **The Incident**
- **Cultural Resource Response & Strategy**
- **Wacky Way of Section 106**
- **Taking Historic Properties into Account**
- **Understanding Context of Emergency Response**

Cultural Resource Response Major Issues

- **Establish the Section 106 framework**
- **Security & Public Safety**
- **Erosion**
- **Archaeological fieldwork**
- **Multi-jurisdictional project area**
- **Adverse effects of the drawdown on cultural resources must be mitigated**

Today's Coverage

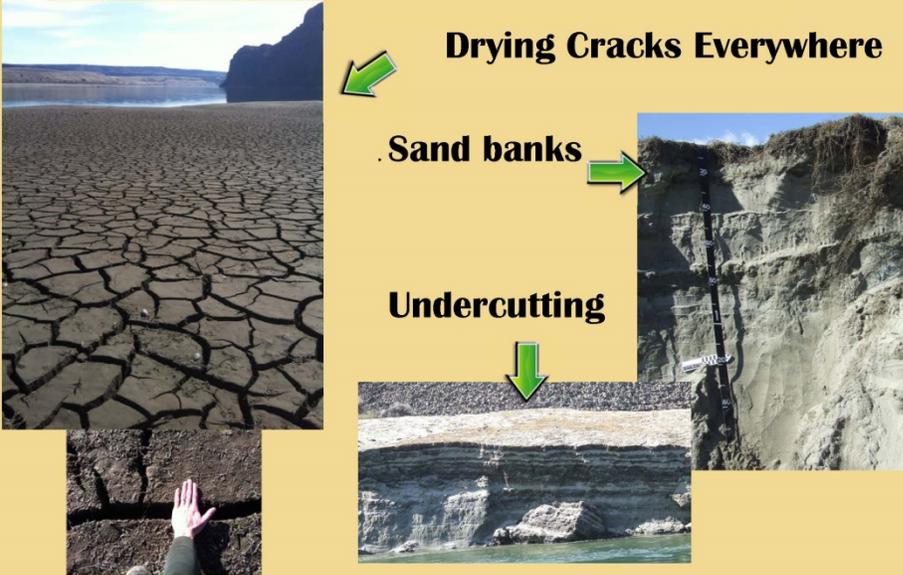
- **Introduction**
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The top photograph shows a dirt road blocked by orange and white striped barriers. A sign in the center reads "DANGER! HAZARDOUS CONDITIONS - SHORTLINE CLOSED - NO TRESPASSING". The background features a dry lake bed and mountains under a cloudy sky. The bottom photograph shows a similar scene from a different angle, with a sign that says "DANGER! HAZARDOUS CONDITIONS" and "SHORTLINE CLOSED".

**Security
&
Public
Safety**

Unstable Landscape



Drying Cracks Everywhere

Sand banks

Undercutting

The diagram illustrates the process of landscape instability. It starts with a large image of a dry lake bed with extensive cracking. A green arrow points from this image to a smaller image of a hand touching a crack. Another green arrow points from the cracked earth to a vertical cross-section of a sand bank. A third green arrow points from the sand bank to a cross-section of a cliff face showing undercutting at its base. A final green arrow points from the undercutting to a photograph of a cliff face with a large rock falling into the water below.

Erosion



Intact and stratified shell midden eroded during dewatering

Deposition





**Erosion of
Lacustrine
Deposits due
To Rapid
Dewatering**

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Archeological Fieldwork



Continuing to take historic properties into account

- **Relative stability has occurred in most places**
- **100% survey – continue to analyze artifacts, features and geo-referenced site data**
- **Shoreline closure still enforced**
- **Retrospective archeology**
- **LIDAR and high resolution orthophotography**
- **Geological mapping**

Mitigation Solutions in Planning

- Sites are adversely effected from drawdown hydraulics, existing drawdown flows, and no doubt from pool raise.
- Measures to offset effects will be creative, likely involve off-site actions, and consultation is occurring now

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- **Understanding Context of Emergency Response**

Post Mortem Examples - Dam Emergencies

FONTENELLE, RIRIE, AND TETON DAMS: HOW ORGANIZATIONS FAIL

Nate Snorteland, P.E.
Director, Risk Management Center
Denver, CO
16 May 2013



US Army Corps of Engineers
BUILDING STRONG



Fontenelle Dam, Green River, SW WY



1965 – Near failure due to seepage through cracks, right abutment

1985 – Emergency draining caused another dangerous slump on dam face

1992 – Completion of 840' concrete wall, dam declared safe

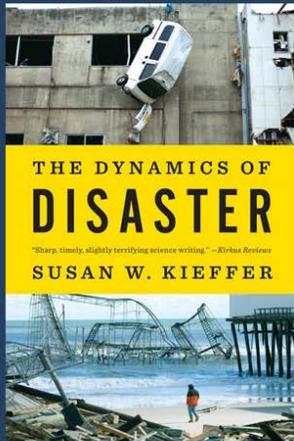
Teton Dam, Teton River near Rexburg SE ID

1976 – Piping through permeable loess core and fissured rhyolite in abutments.

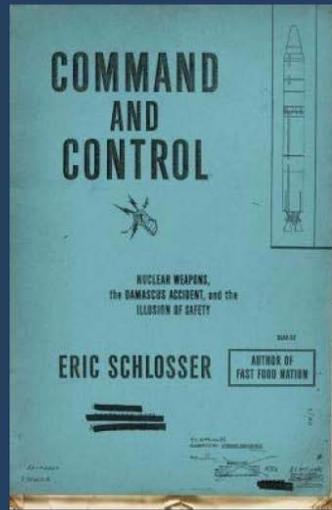
4 ½ hours – wet spot to total collapse

8 hours later – reservoir drained

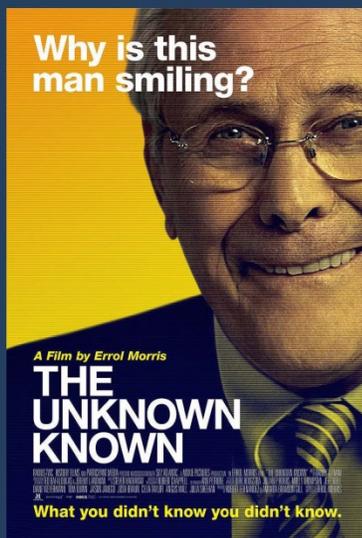




Kieffer – Disasters or emergencies or incidents happen due to physics: a physical change in state



Schlosser – We engineer to guard against anything going wrong, but when something goes wrong we don't know what to do



THERE ARE KNOWN KNOWN
THERE ARE THINGS THAT WE KNOW THAT WE KNOW, THERE ARE
KNOWN UNKNOWN
THAT IS TO SAY, THERE ARE
THINGS THAT WE NOW KNOW WE DON'T KNOW
BUT THERE ARE ALSO
UNKNOWN UNKNOWN
THERE ARE THINGS
WE DO NOT KNOW
WE DON'T KNOW
AND EACH YEAR WE DISCOVER
A FEW MORE OF THOSE
UNKNOWN UNKNOWN

Acknowledgements

My co-workers: Brett Lenz, Aaron Kuntz, Andrew Murphy, Rex Buck Jr., Angela Neller

Our contractors and consultants, especially Dave Rice, Darby Stapp, Stan Gough, Mathew Root, Darryl Ferguson, Glenn Hartmann, Jay Miller, Bill Layman, Charles Nelson, Brian & Suzie Holmes, The Wanapum River Patrol: Kenny Mathias, Melvin Lucei, Jason Buck, Malcolm Aleck

And especially our Cultural Resources Working Group: Johnson Meninick, Gregg Kiona, Jon Shellenberger, Guy Moura, Eric Oosawashee-Voss, Jackie Cook, Rich Bailey, Dan Meatte, Warren Hurley, Susan White, Maurice Major, Kat Kelly, Randy Korgel, Rob Whitlam

Thank You For Your Kind Attention!

To Continue The Discussion Please Contact Me:

Mark DeLeon
Grant County Public Utility District
15655 Wanapum Village Lane SW
Beverly WA 99321
509 754-5088 x3311
mdeleon@gcpud.org

Attachment I

Rock Art – Mark Willis (Slide Presentation)

Inexpensive 3D Modeling and Rock Image Exploration

Mark D. Willis

What is SfM?



Structure from motion (SfM)

What's needed



Traditional

OR

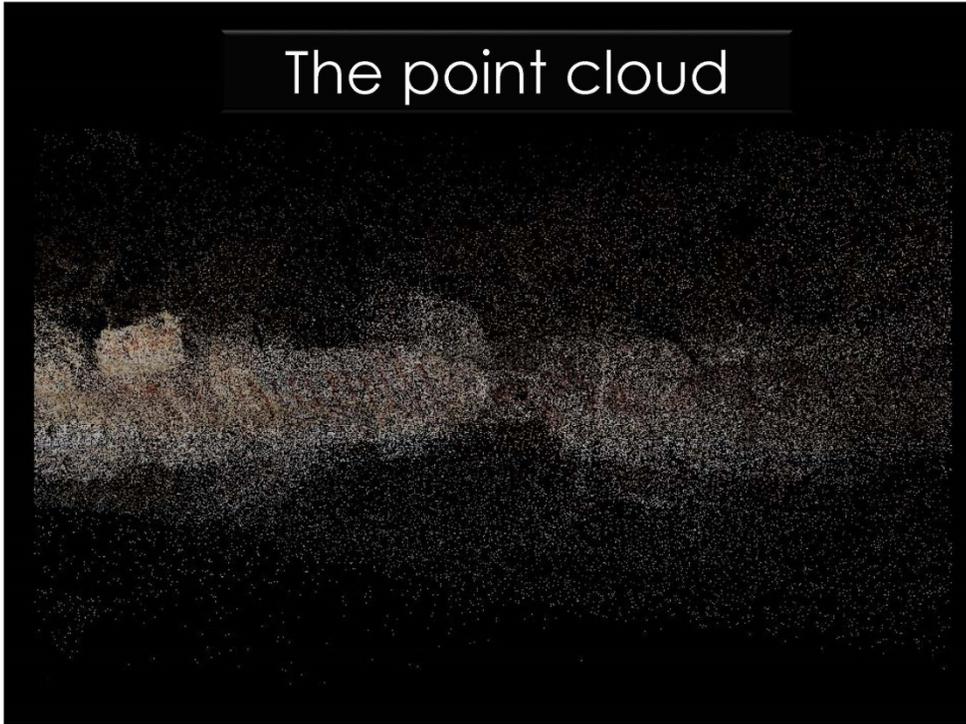


Digital

Series of overlapping images



The point cloud



2009 3D Modeling



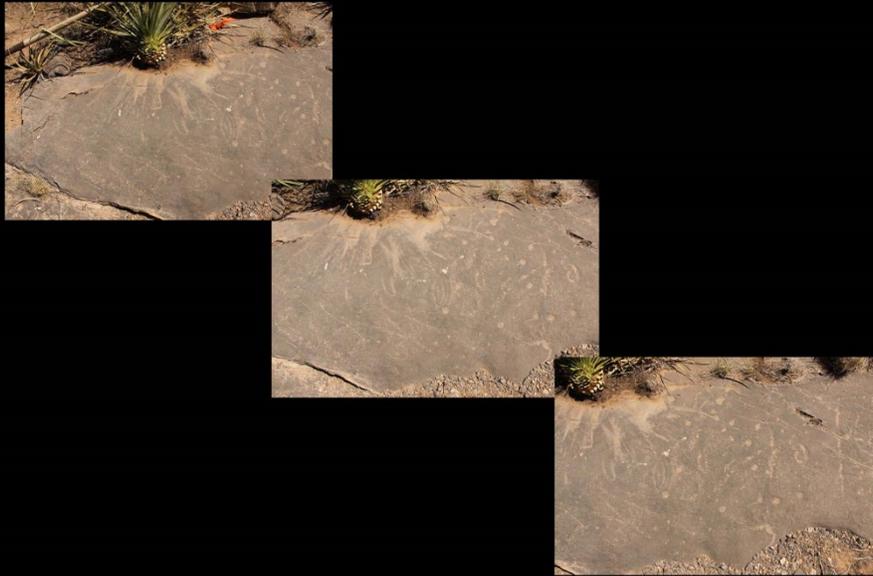
FB 16253: Panel 5



FB 9289: Panel 3



Overlapping Photos



Xshade Enhancement



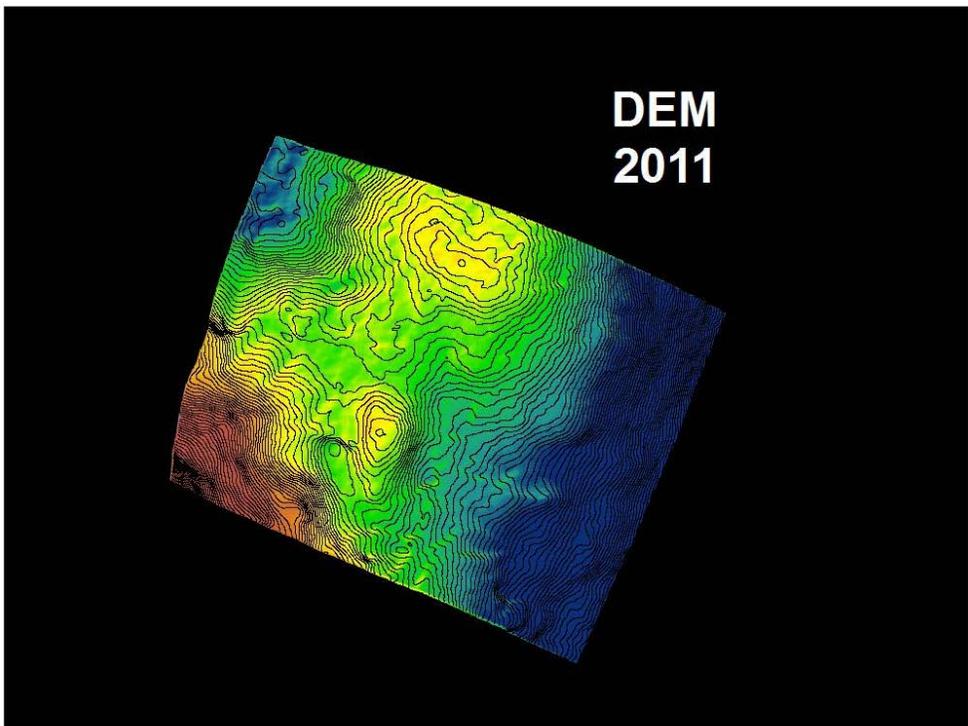
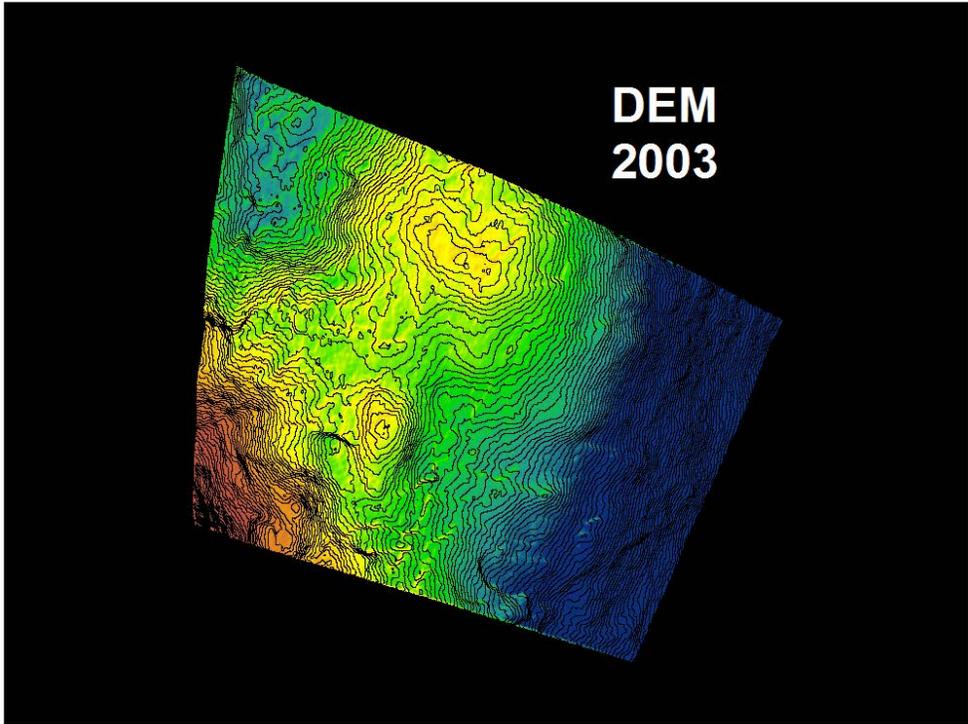
41CX2

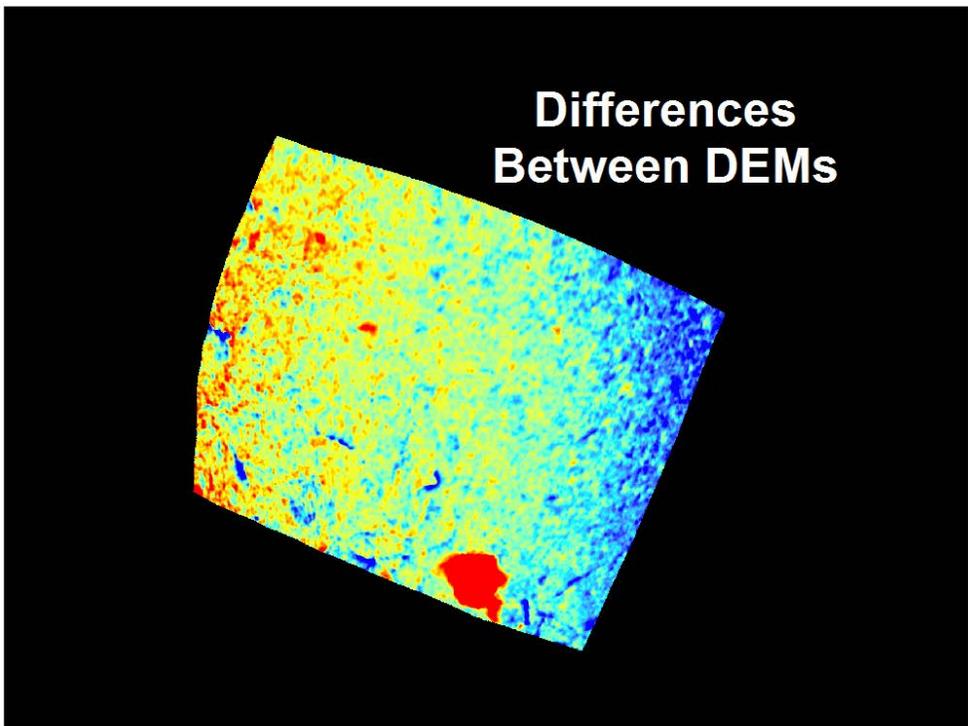
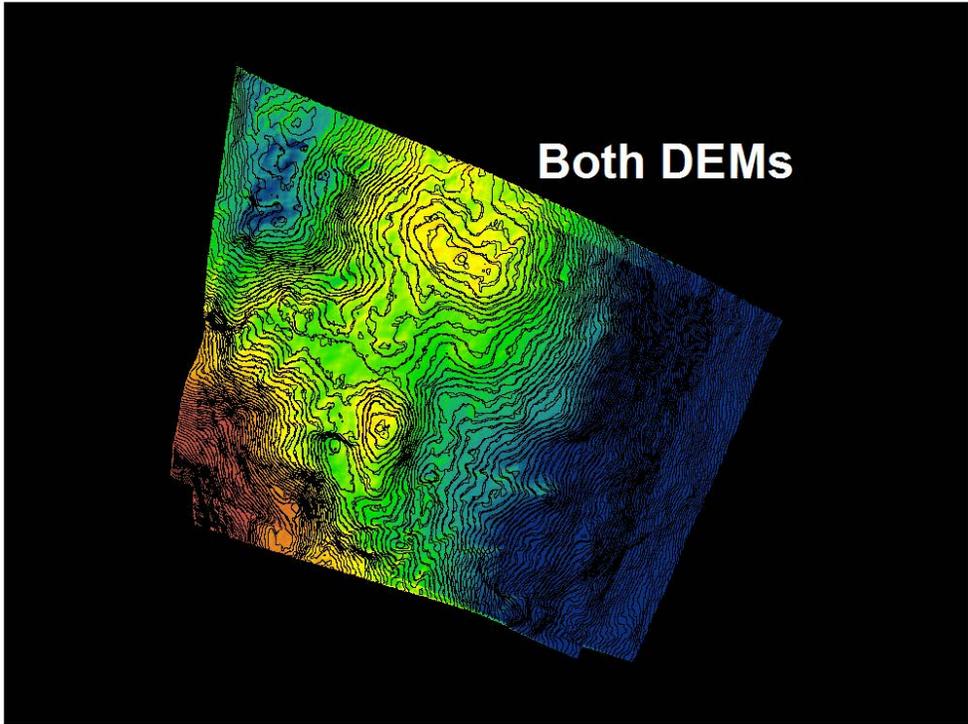


2003

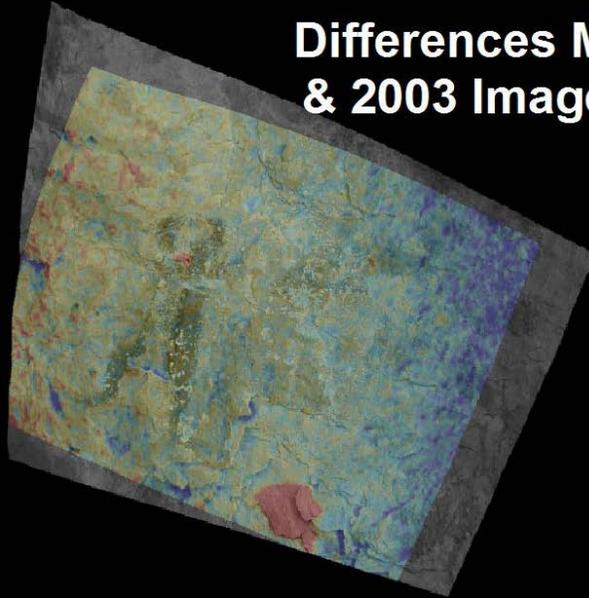




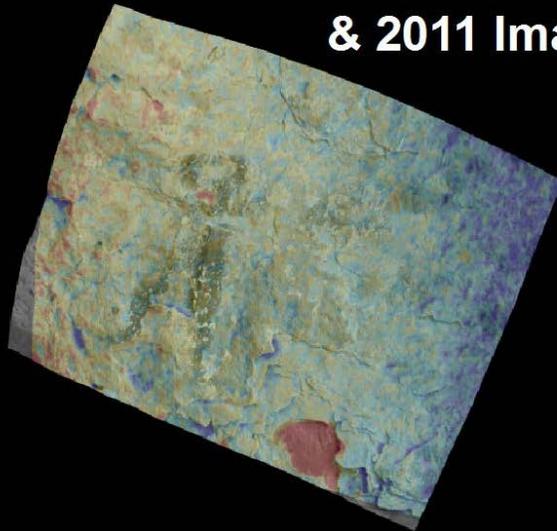


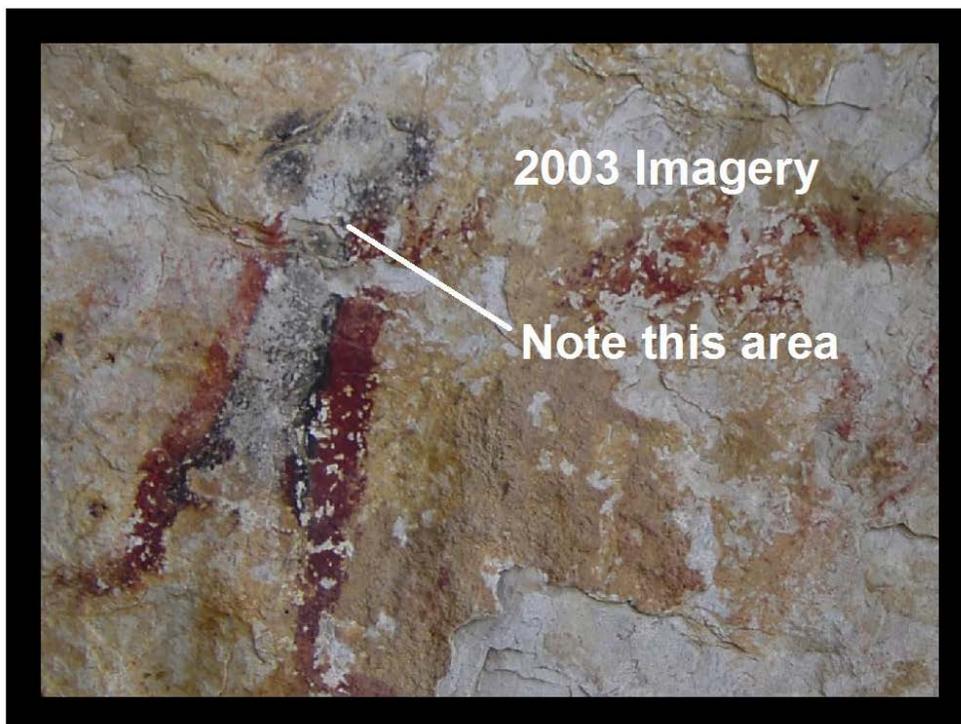
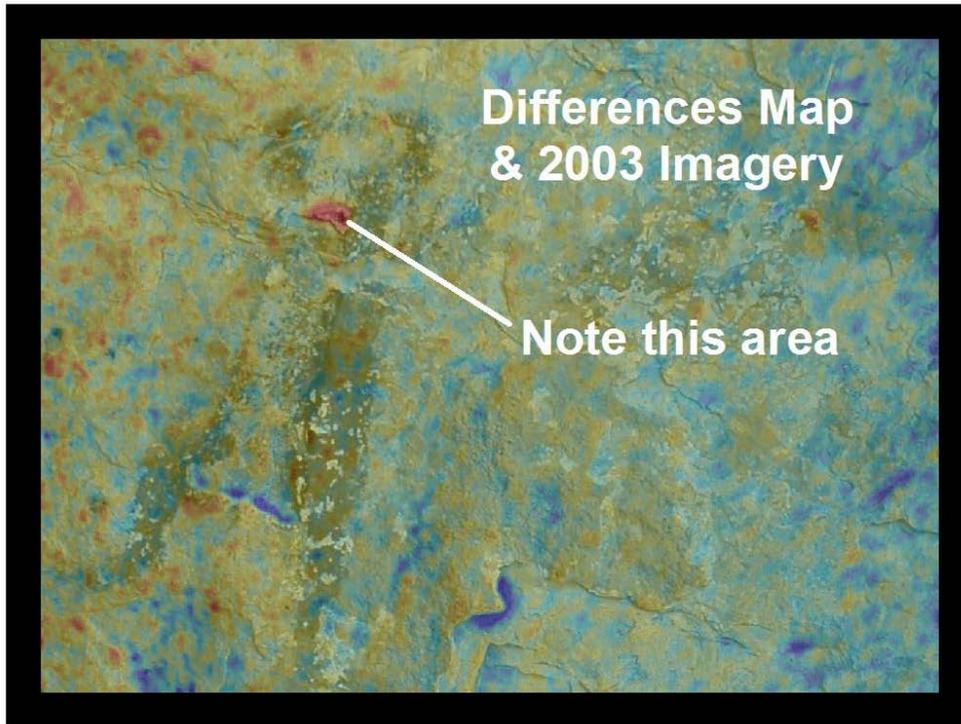


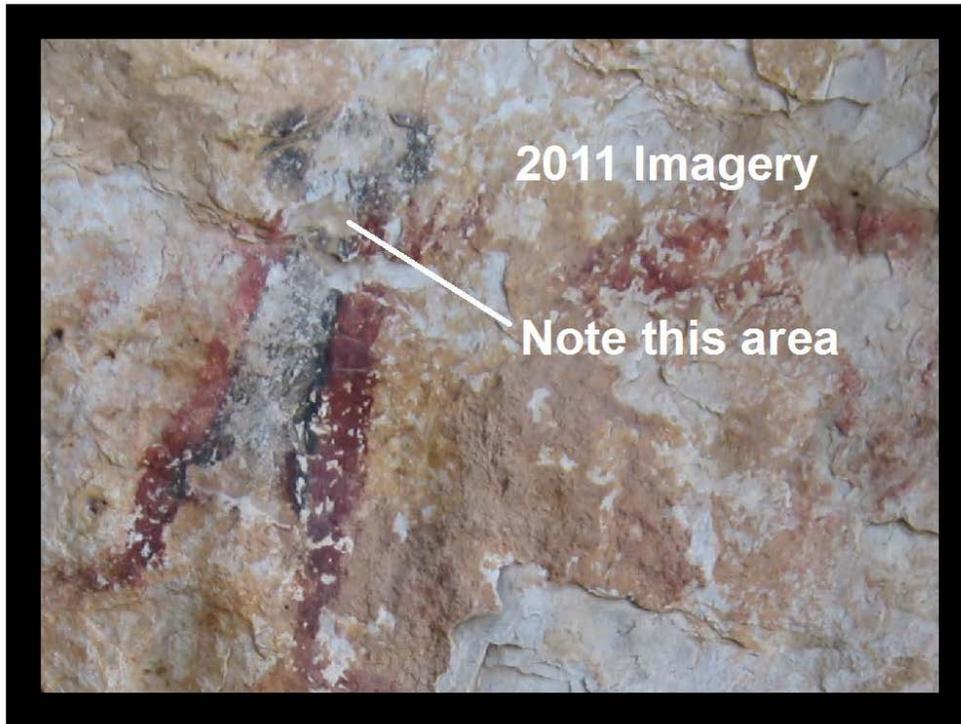
**Differences Map
& 2003 Imagery**



**Differences Map
& 2011 Imagery**





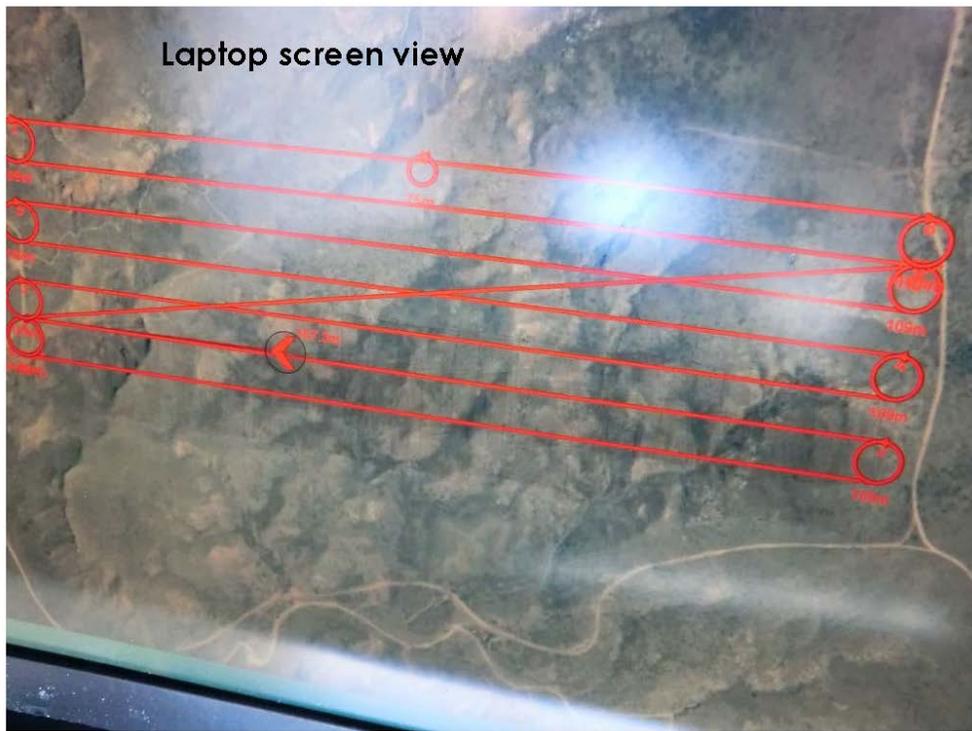




3D Printout



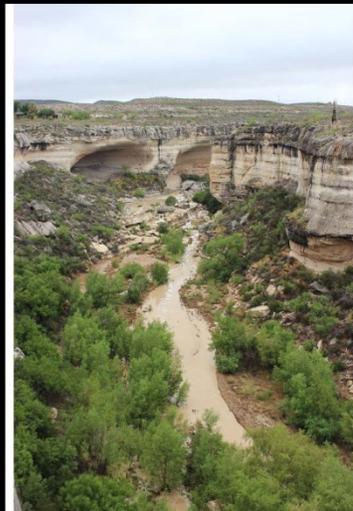
Petroglyphs
and
Pictographs
are part of the
Landscape



The Power of Water

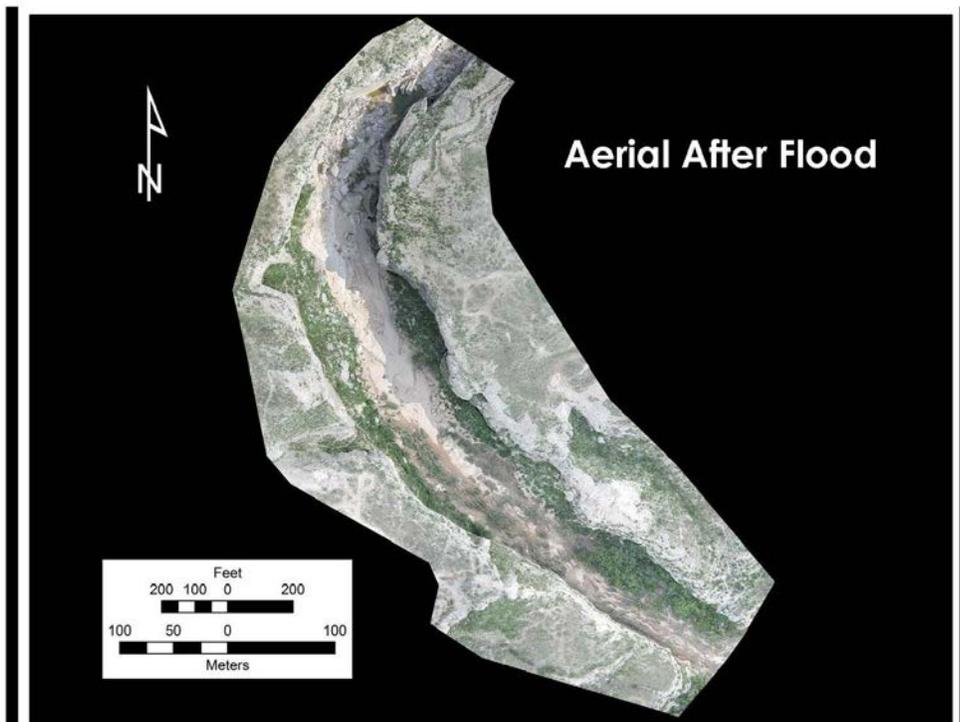
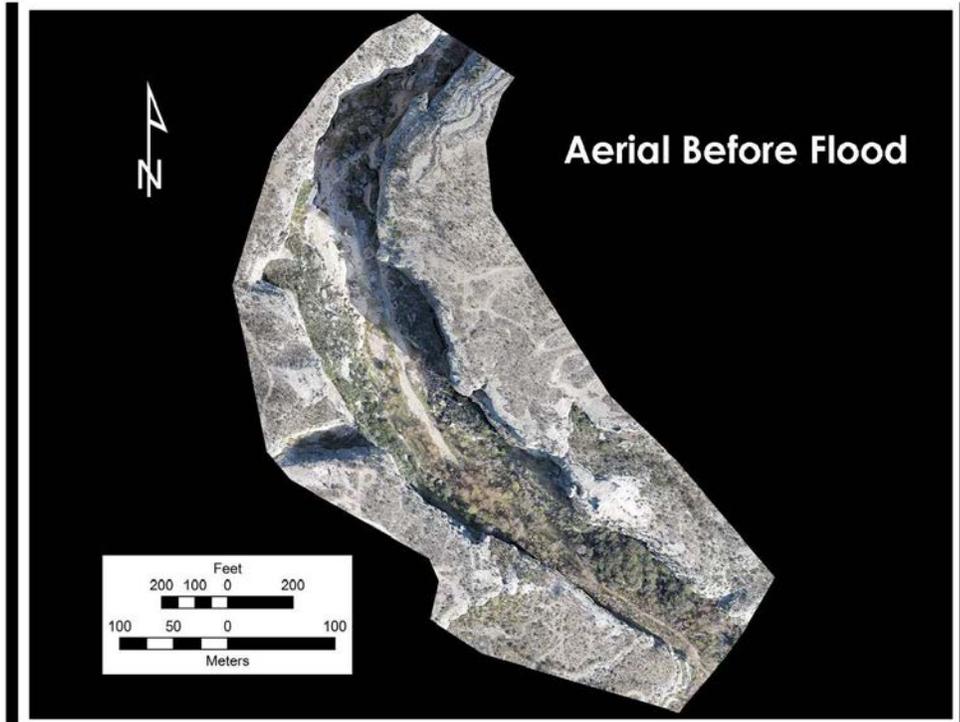


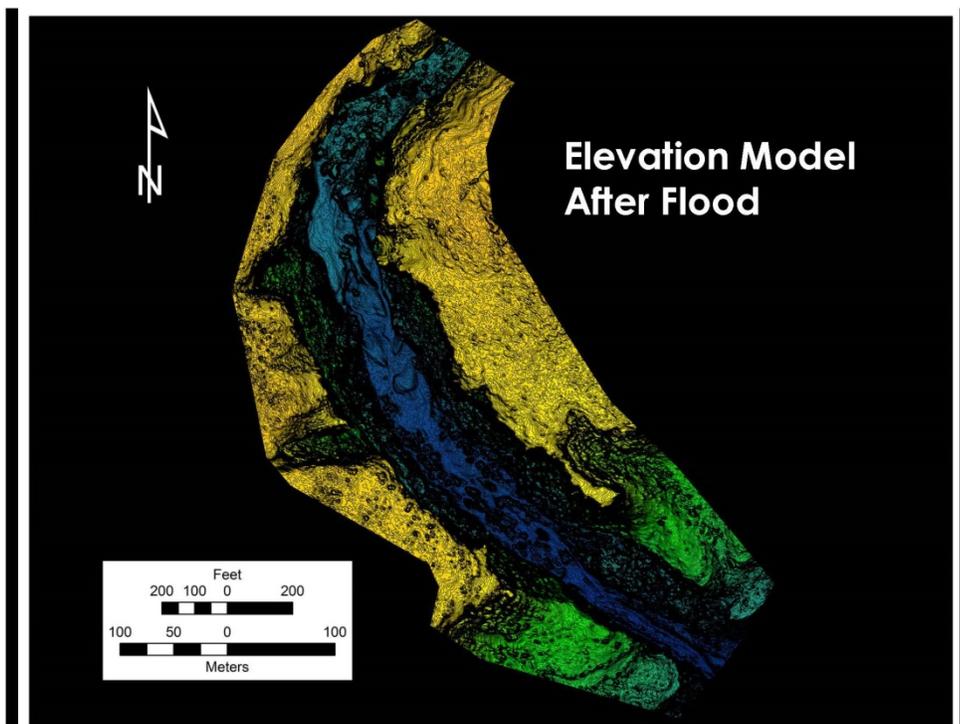
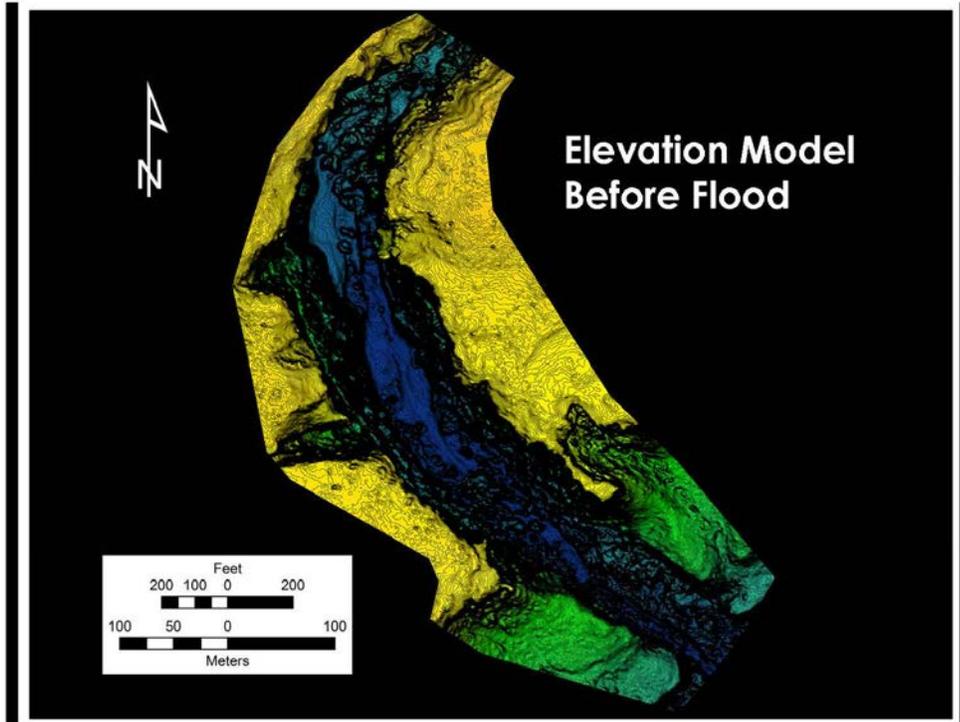
Small Flood

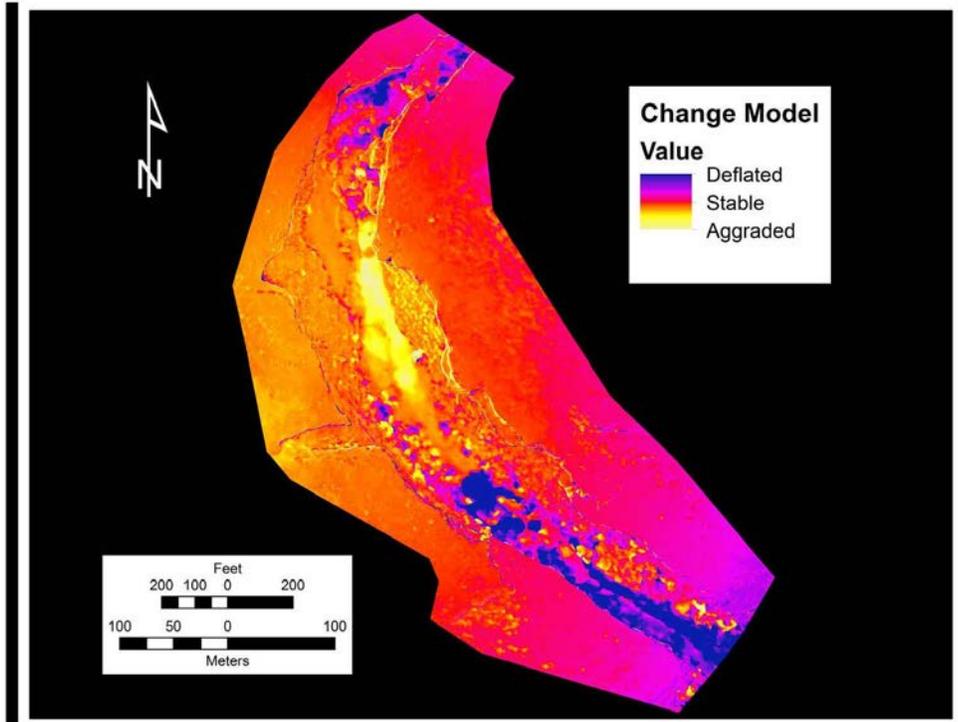


Big Flood









For more info:

Website: www.palentier.com

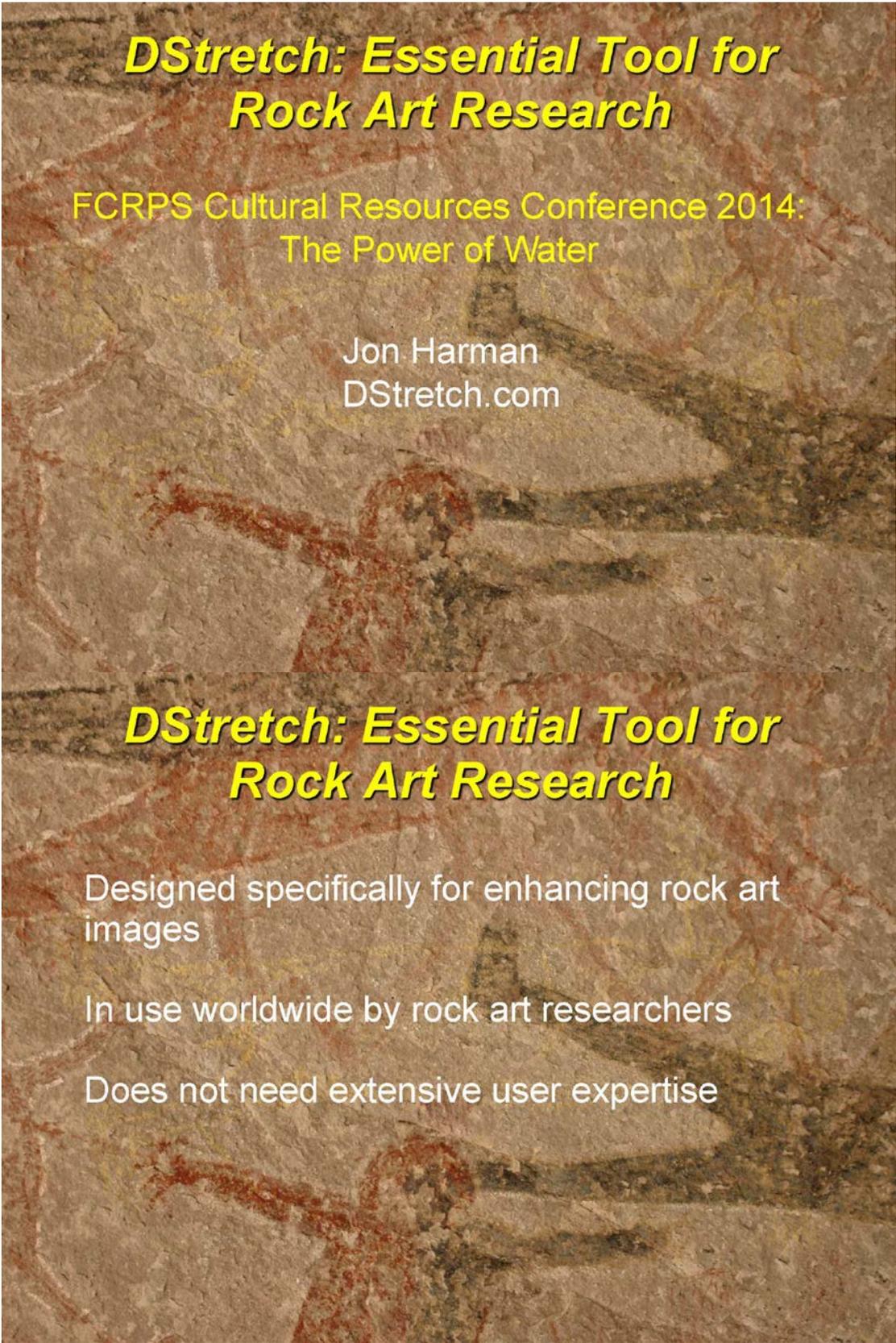
Or

Mark D. Willis
Willis.arch@gmail.com

Attachment J

Rock Art – Jon Harman

(Slide Presentation)



DStretch: Essential Tool for Rock Art Research

FCRPS Cultural Resources Conference 2014:
The Power of Water

Jon Harman
DStretch.com

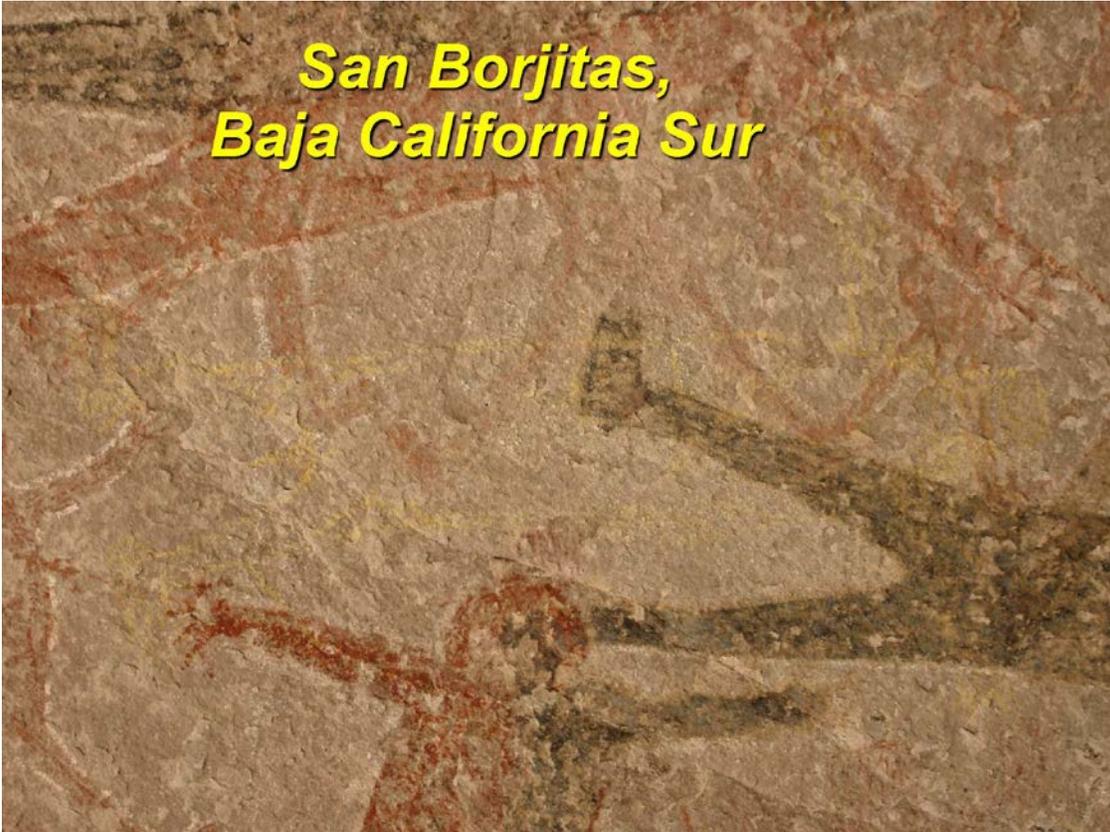
DStretch: Essential Tool for Rock Art Research

Designed specifically for enhancing rock art
images

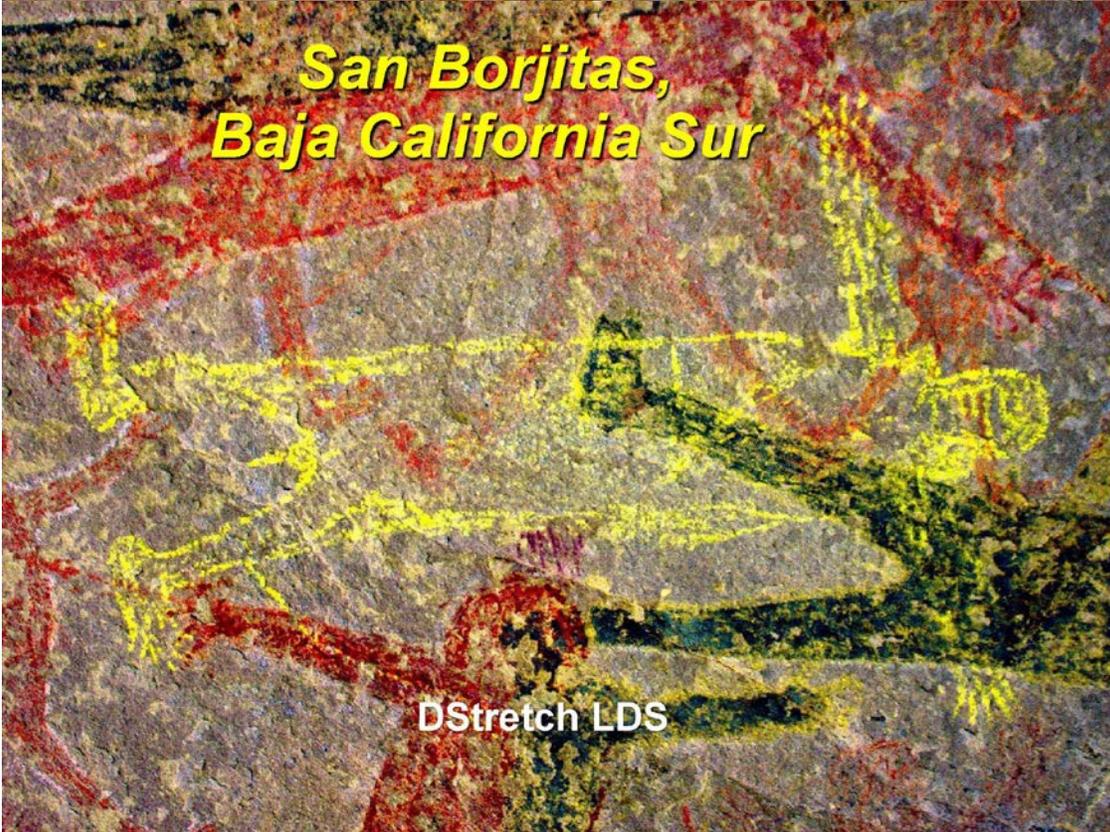
In use worldwide by rock art researchers

Does not need extensive user expertise

***San Borjitas,
Baja California Sur***



***San Borjitas,
Baja California Sur***



DStretch LDS

Masange, Tanzania



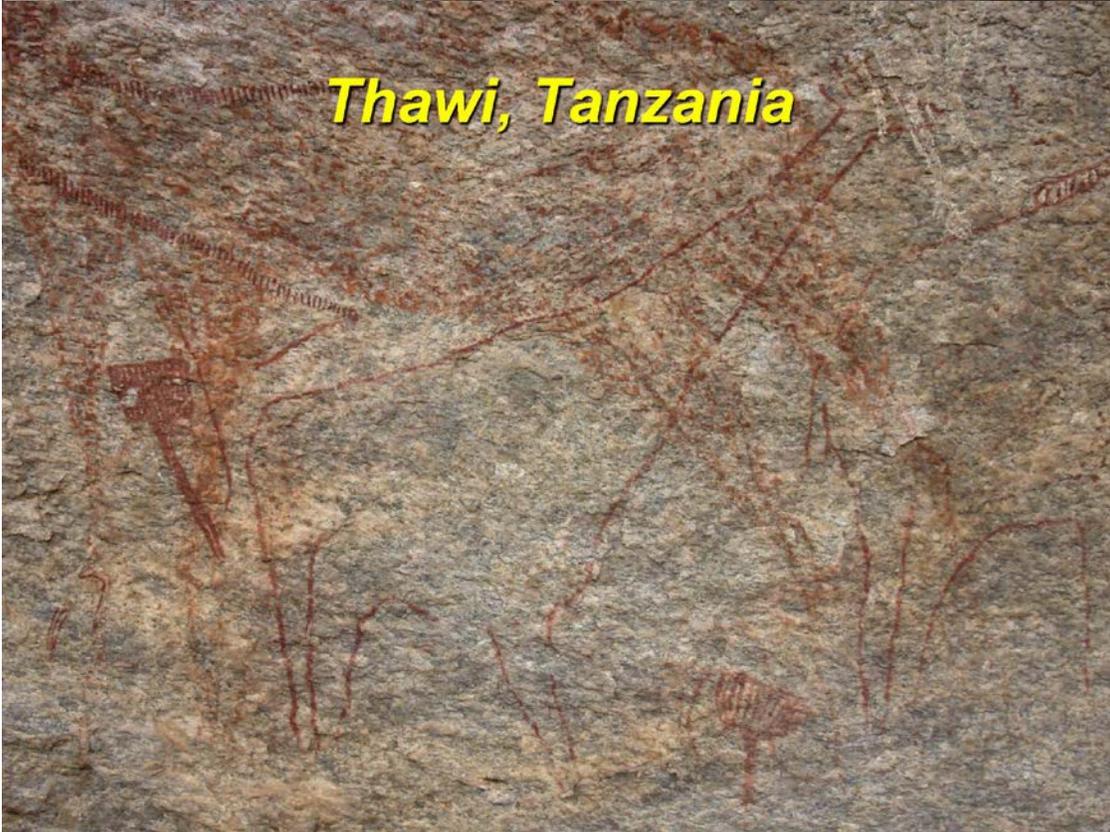
Masange, Tanzania

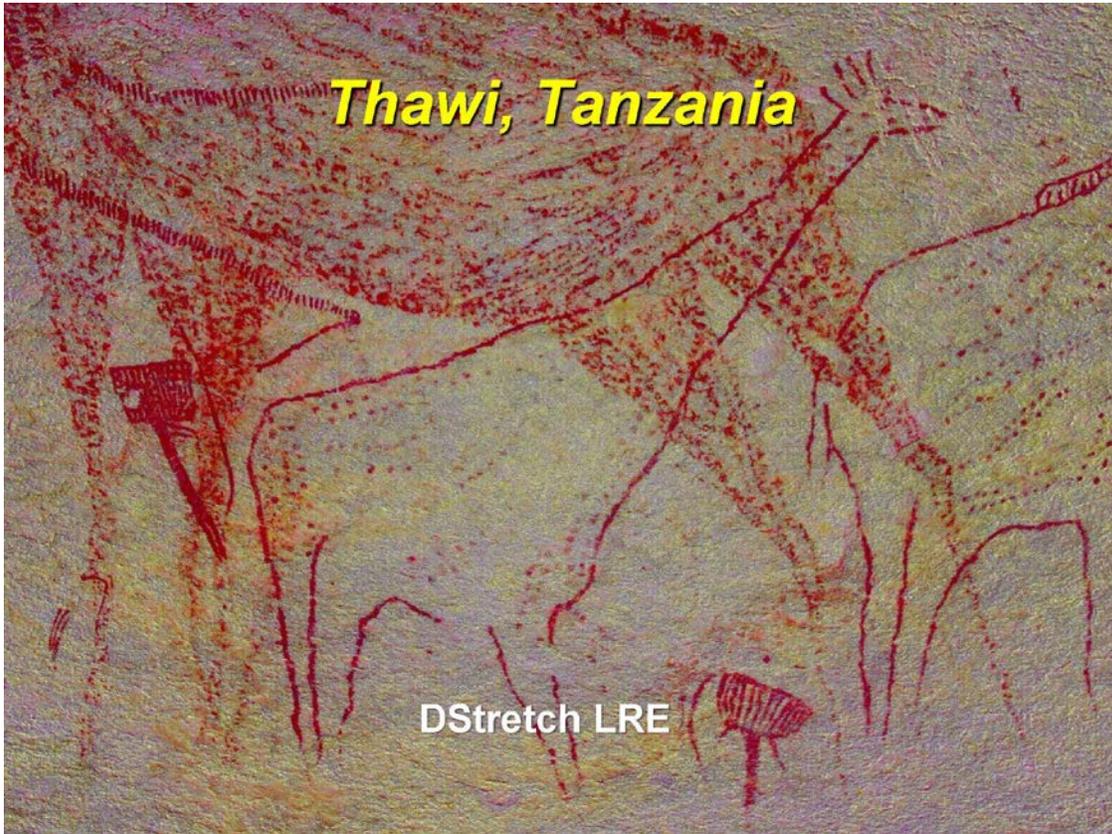


DStretch Camera



Thawi, Tanzania



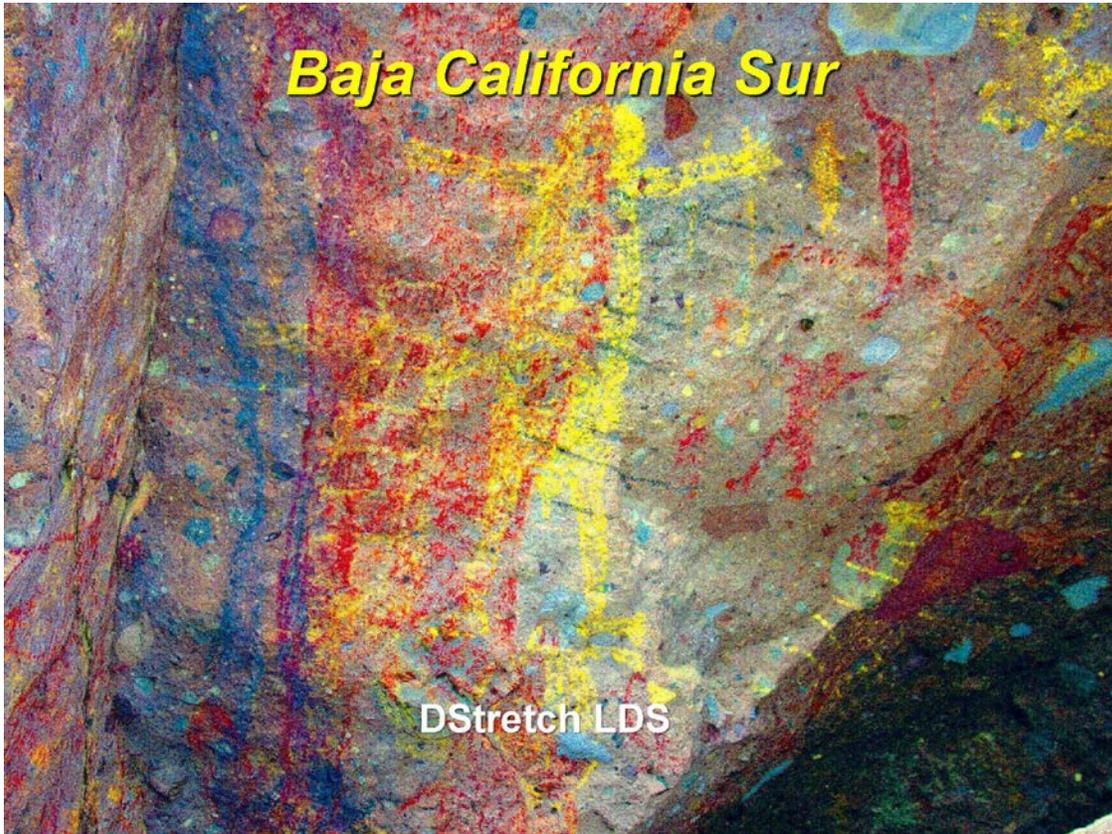


Thawi, Tanzania

DStretch LRE



Baja California Sur



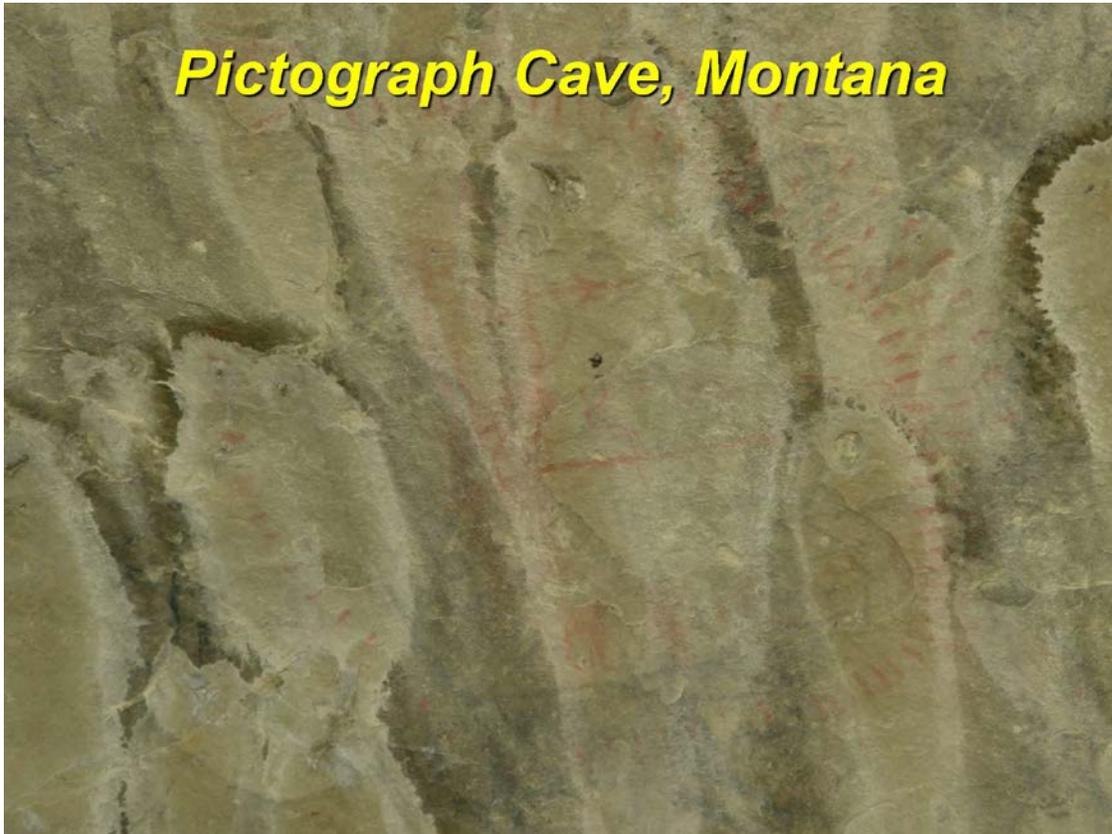
Colpana, Bolivia



Colpana, Bolivia



Pictograph Cave, Montana



Pictograph Cave, Montana

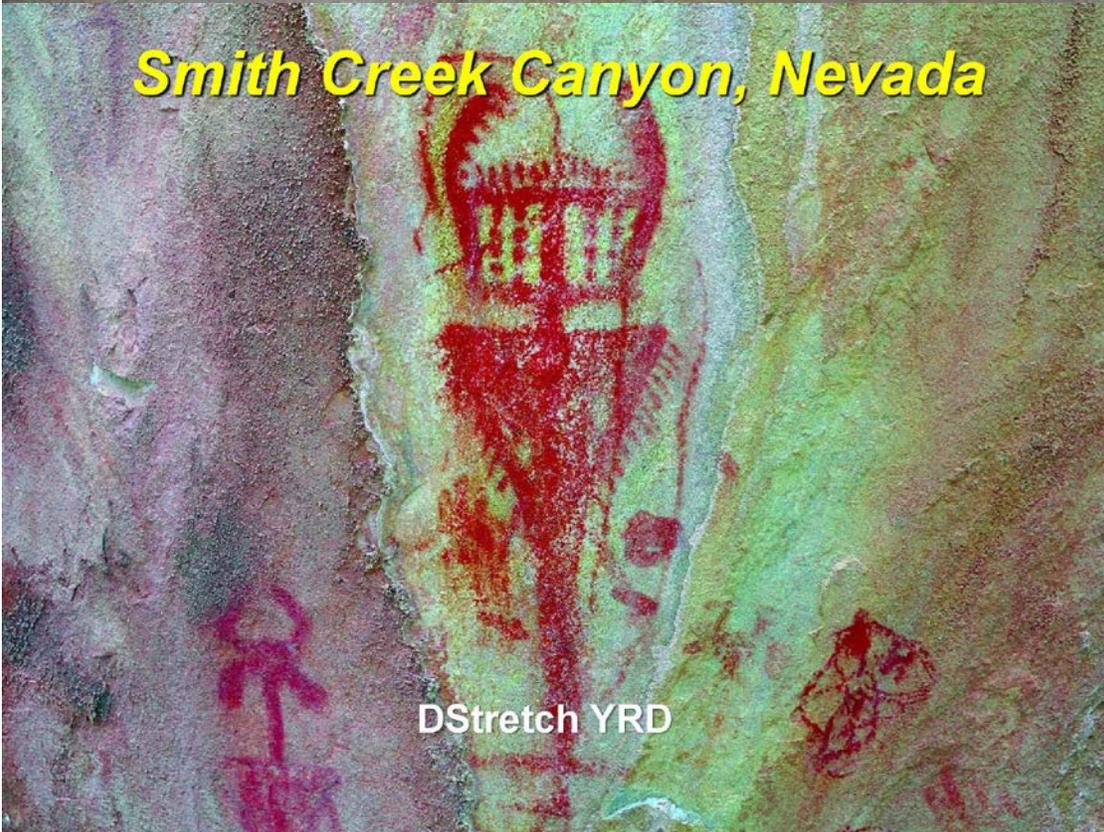


DStretch CRGB

Smith Creek Canyon, Nevada

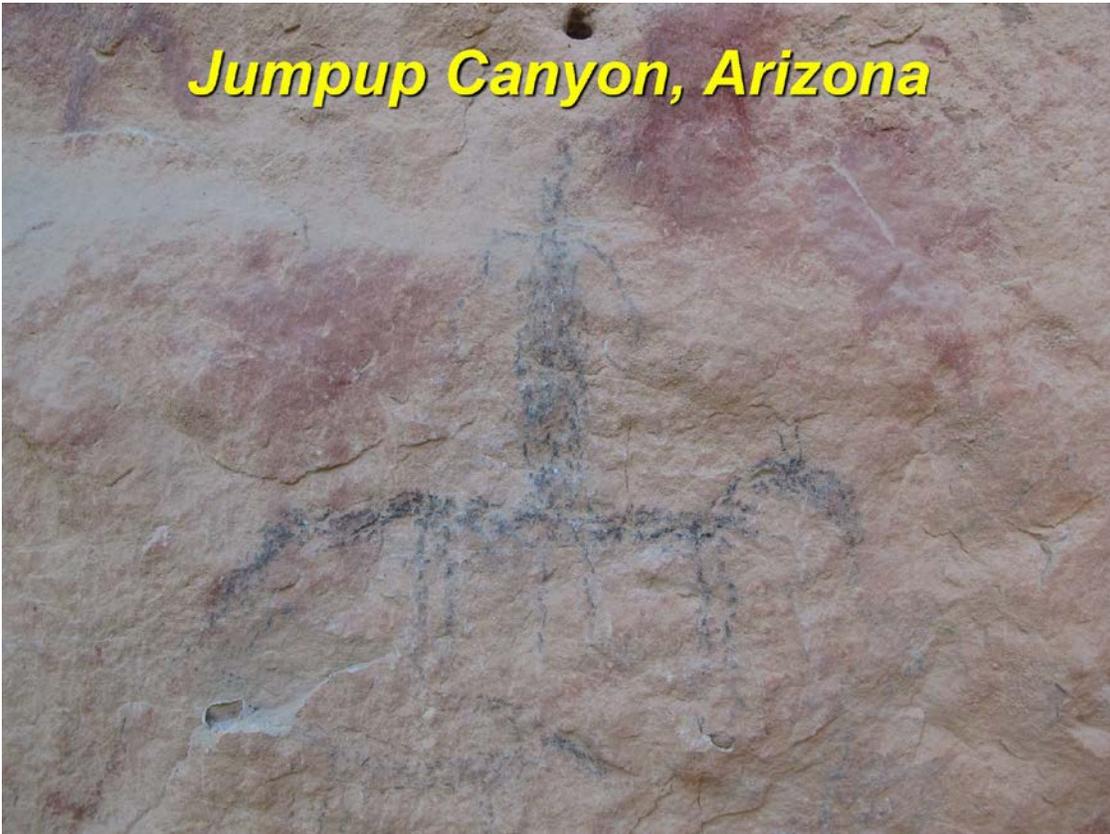


Smith Creek Canyon, Nevada

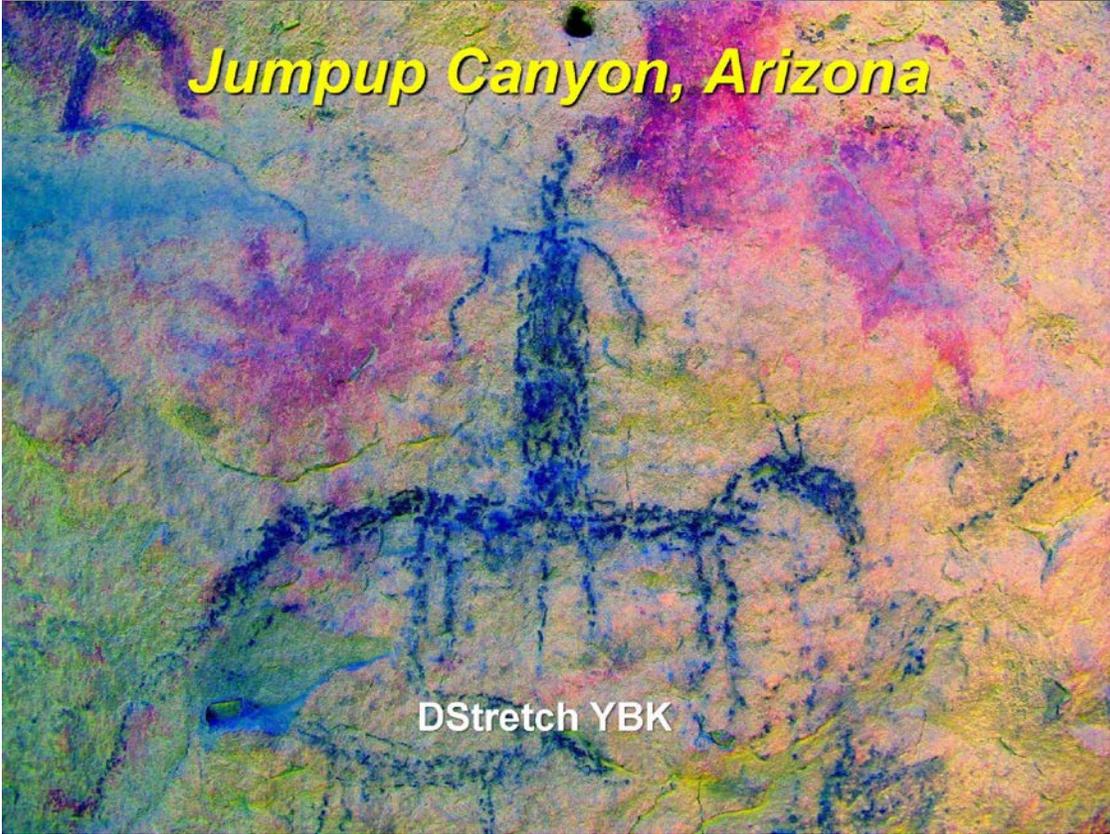


DStretch YRD

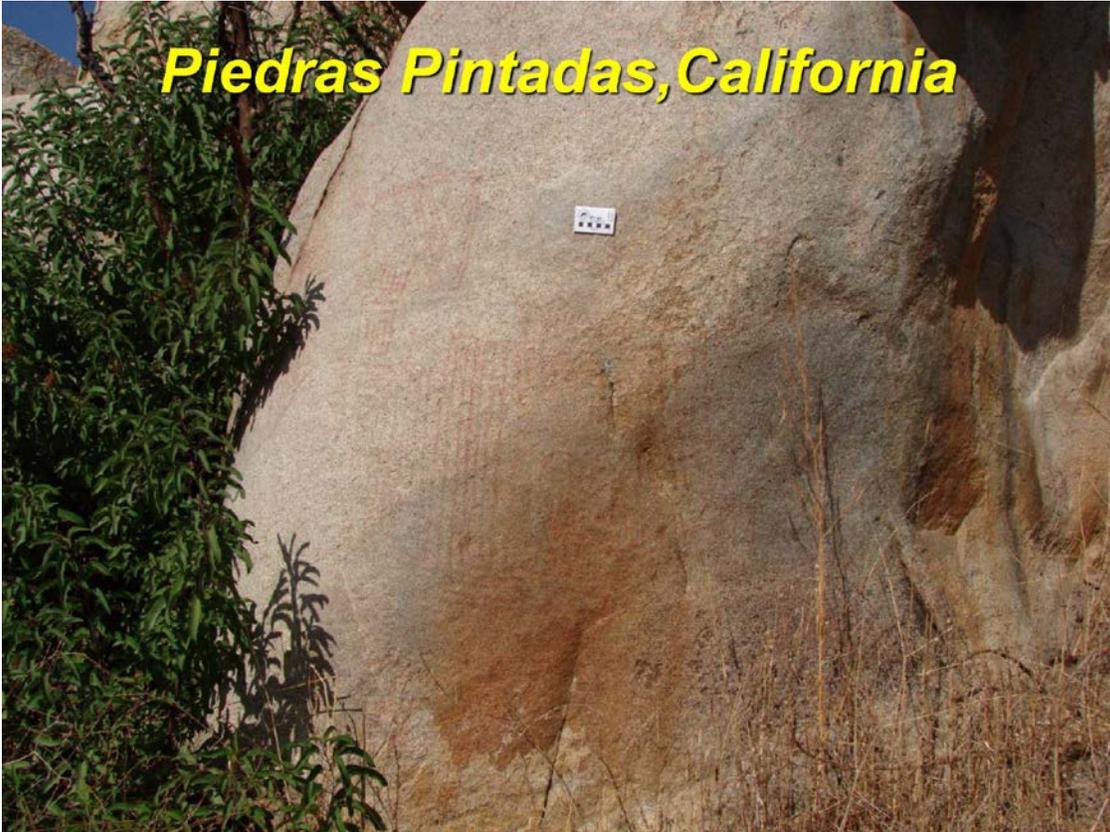
Jumpup Canyon, Arizona



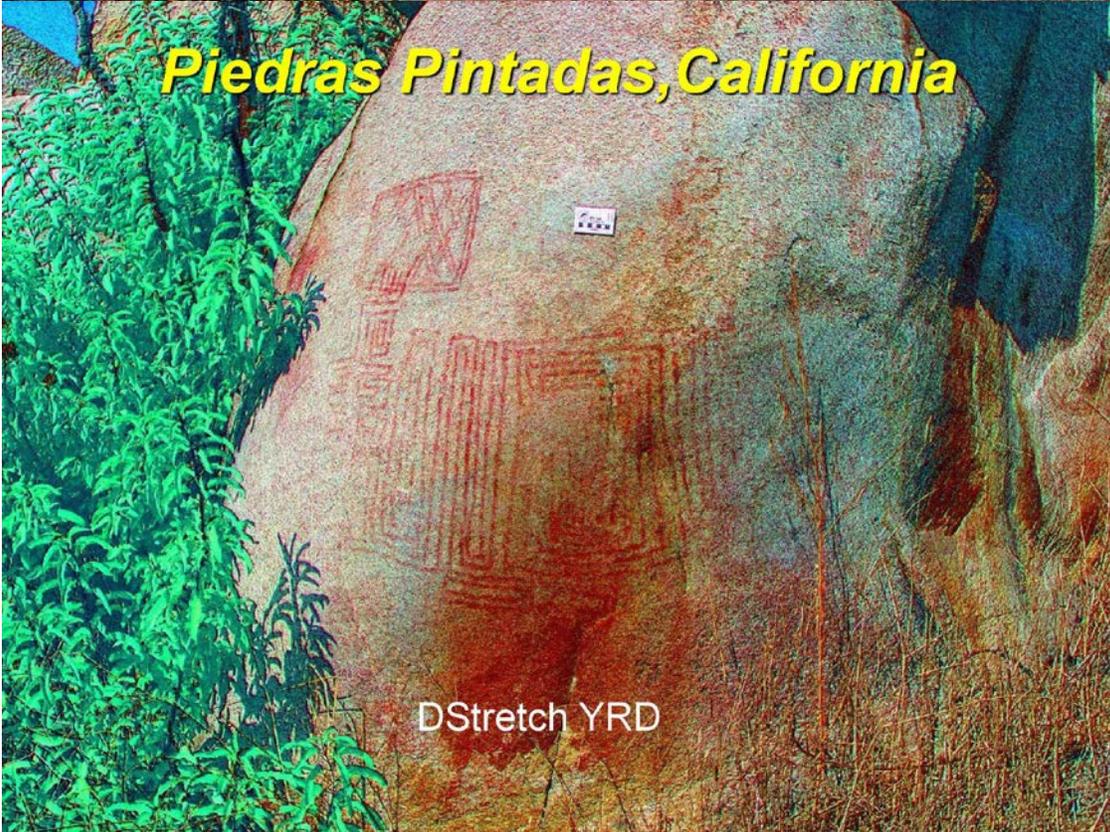
Jumpup Canyon, Arizona



Piedras Pintadas, California

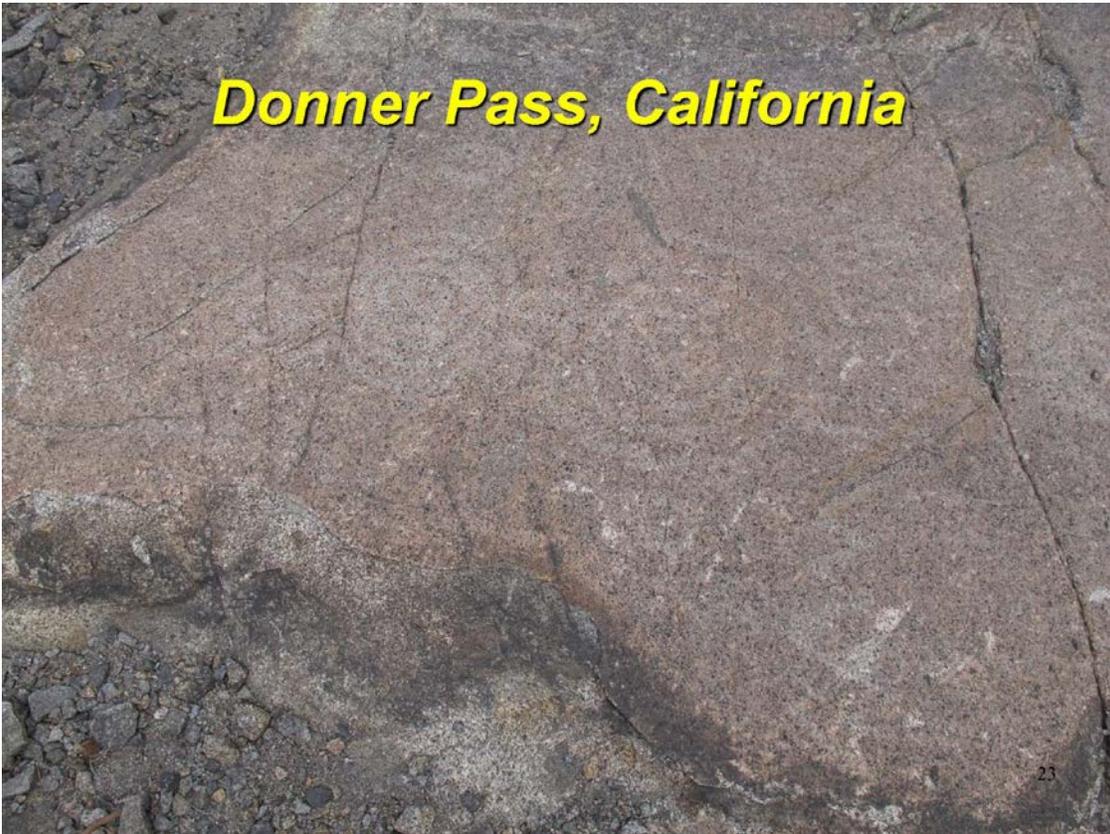


Piedras Pintadas, California

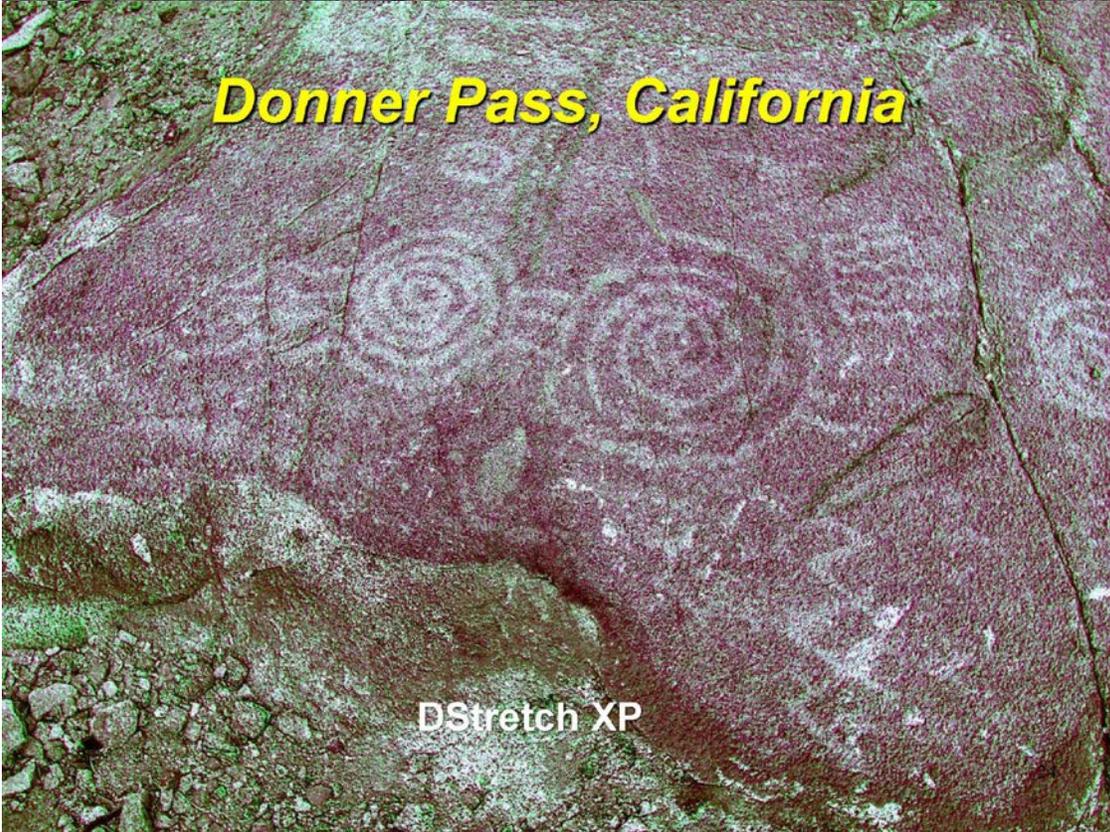


DStretch YRD

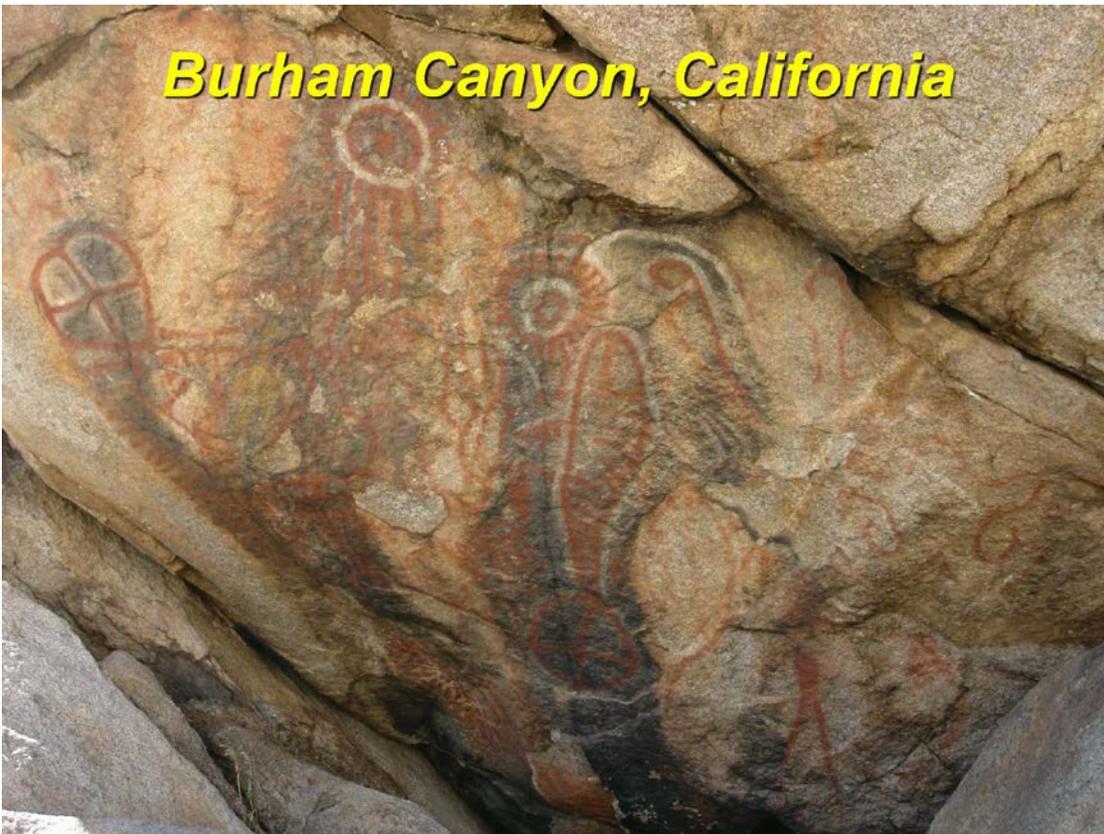
Donner Pass, California



Donner Pass, California



Burham Canyon, California



Burham Canyon, California

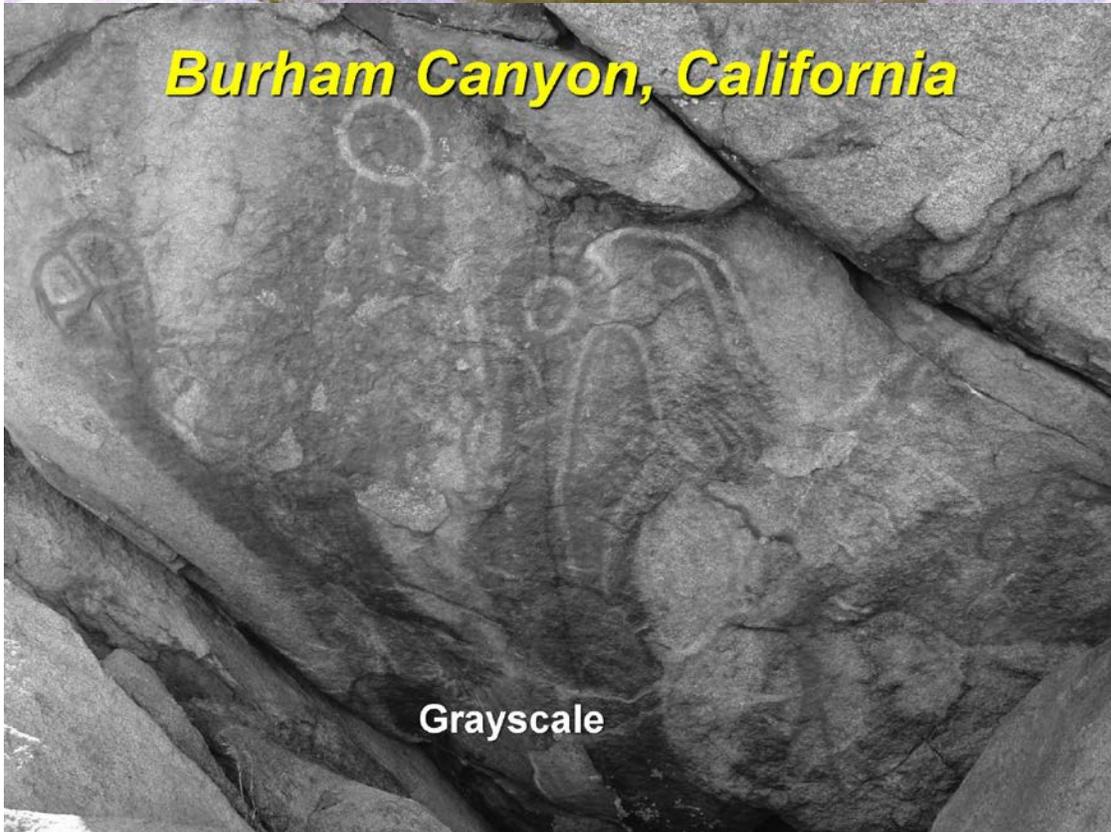


Burham Canyon, California



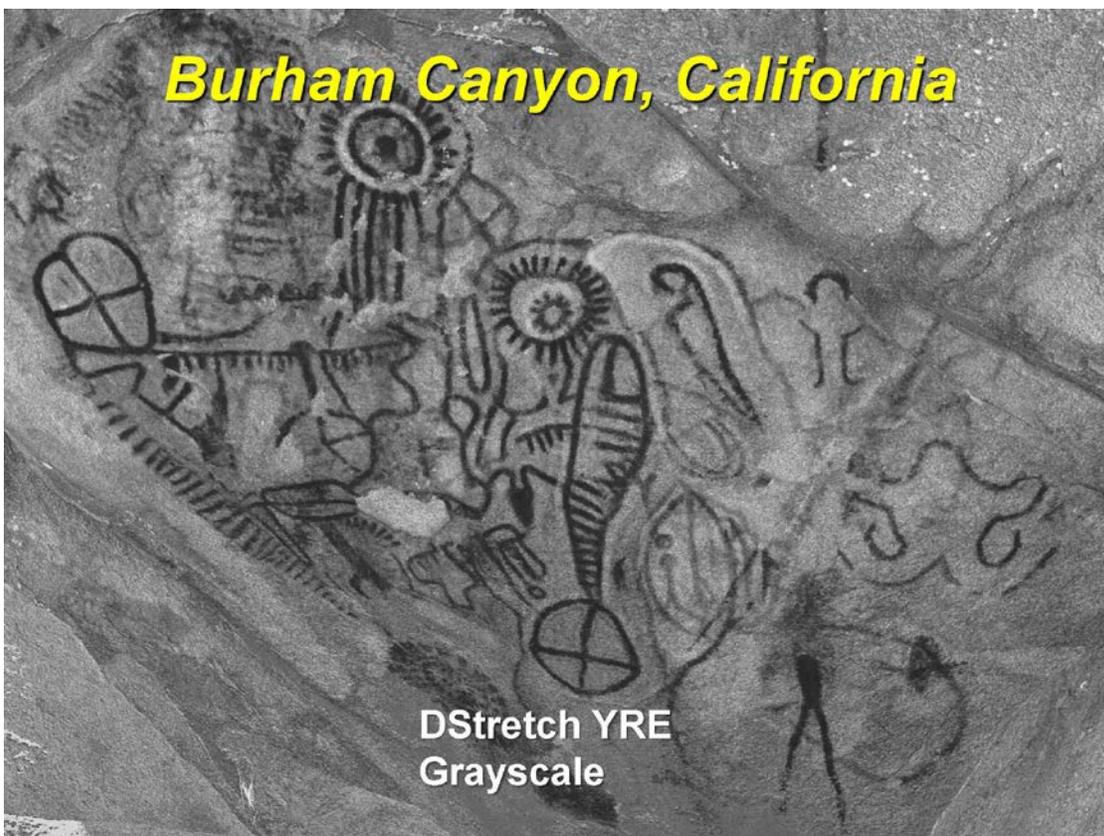
DStretch XP

Burham Canyon, California



Grayscale

Burham Canyon, California



DStretch YRE
Grayscale

Burham Canyon, California



DStretch XP
Grayscale

Decorrelation Stretch

DStretch uses the decorrelation stretch algorithm to automatically transform the colors in an image. It improves the contrast of faint colors by mapping them to colors better perceived by our eyes.

Different results can be achieved by doing the decorrelation stretch in different color spaces.

Enhancements (color spaces) are given 3 (sometimes 4) letter names.

DStretch

The different color spaces and other enhancements give the user many tools for rock art enhancement.

DStretch enhancements require only a button push. They are consistent and repeatable.

A subset (for example LDS, YRD, YBK, YYE) suffices to discover most faint pigments.

DStretch is perfect for documentation.

Documentation Using DStretch

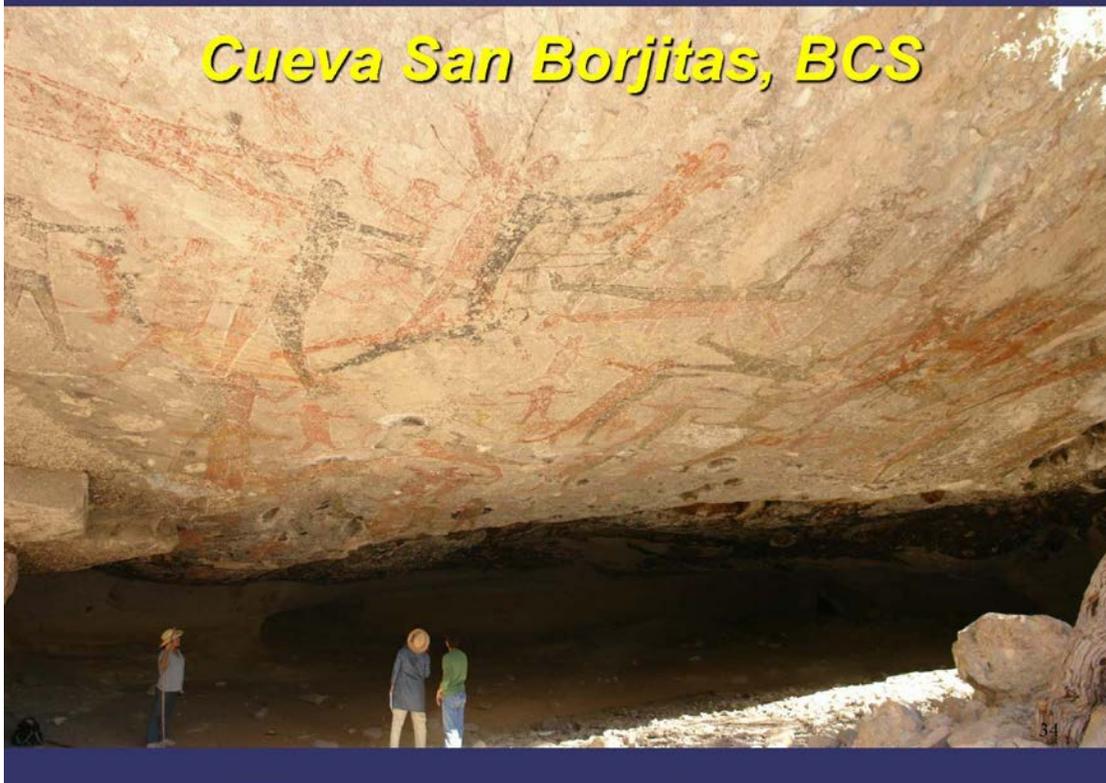
Images or prints, color or grayscale.

**Web page with enhancements as
slideshow.**

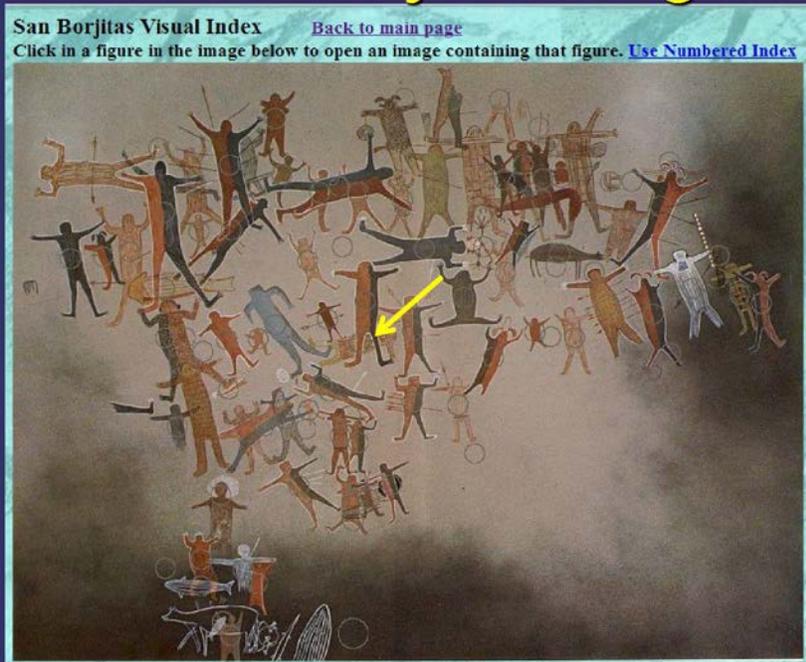
**Web page with applet allowing user
to perform enhancements.**

Perfect for interactive exhibits

33



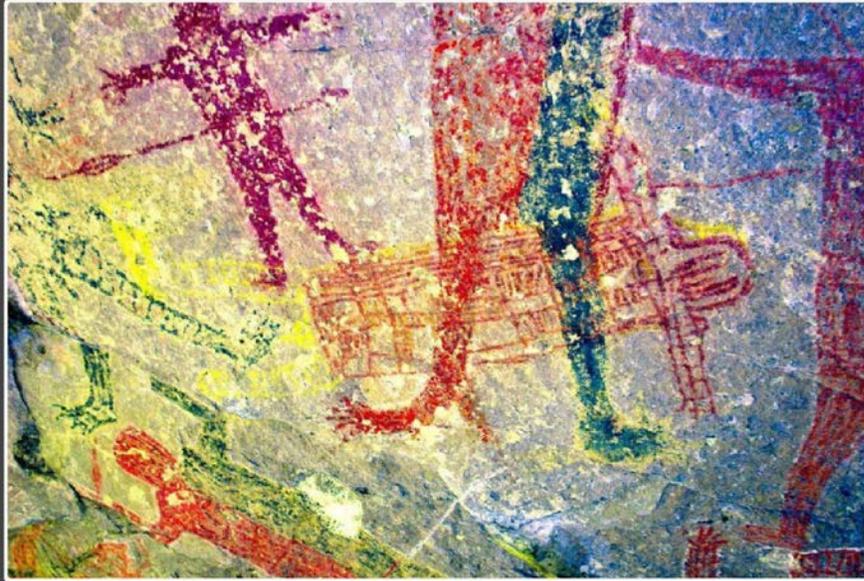
Slideshow of Enhancements Indexed by Drawing



Slideshow of Enhancements Indexed by Drawing



Slideshow of Enhancements Indexed by Drawing



Slideshow of Enhancements Indexed by Drawing



Cueva El Dipugon, BCS



Applet Indexed by Photo

El Dipugon

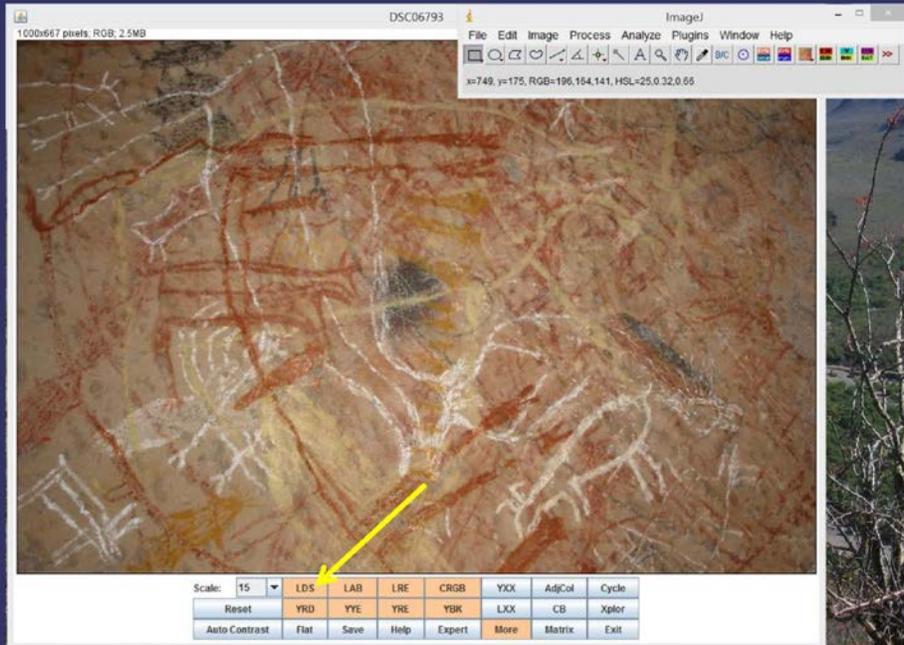
Located in the Sierra de Guadalupe, Baja California Sur. Photos taken November 30, 2007.

Click on a red dot in the image below to open a closeup image inside an ImageJ Applet in a new window or tab.



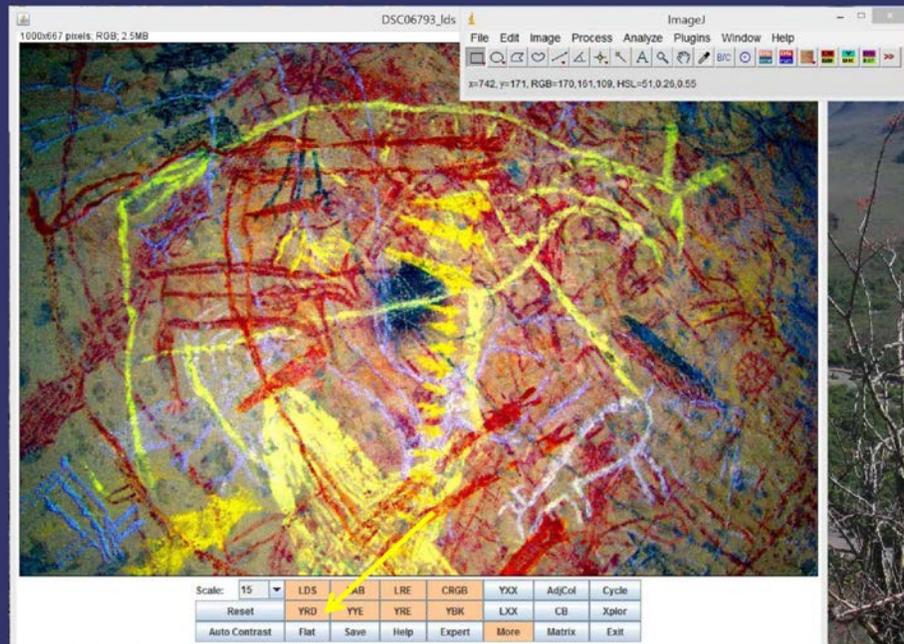
This is the upper ceiling. The images indexed by dots at the far right are from the lower ceiling and wall on the right side of the rockshelter.

Applet Indexed by Photo



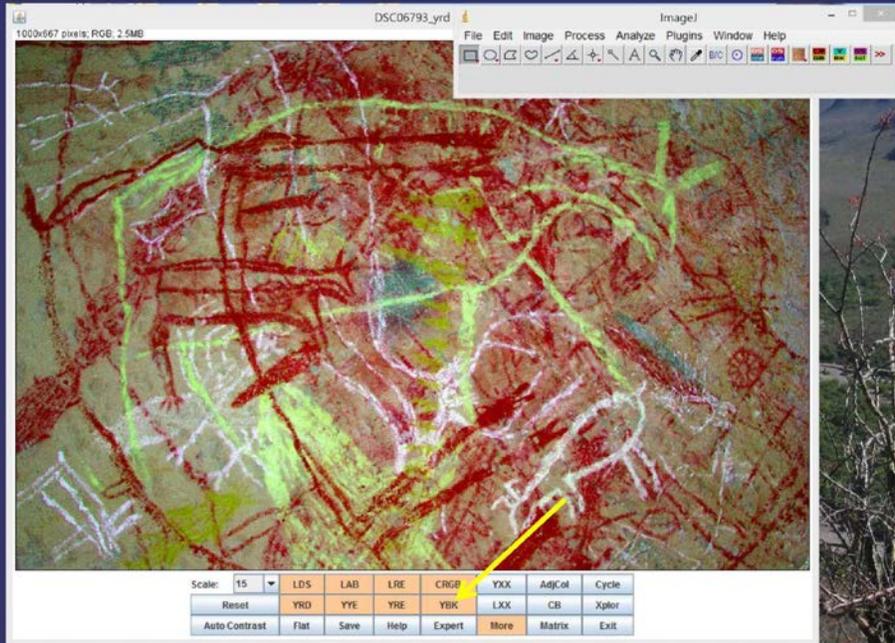
41

Applet Indexed by Photo



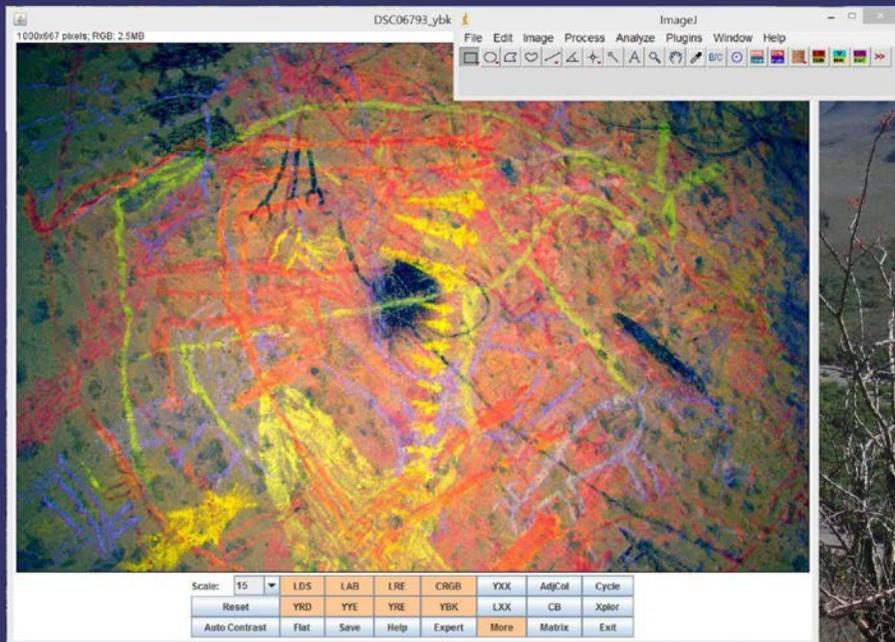
42

Applet Indexed by Photo



43

Applet Indexed by Photo



44

Web Site: DStretch.com

DStretch

Web Site for the DStretch plugin to ImageJ. DStretch is written by Jon Harman.

A tool for the digital enhancement of pictographs



[DStretch from the web!](#)



[DStretch Help](#)
[Mode d'emploi de DStretch](#)

DStretch News: [Click to view the latest DStretch events and additions to the web site.](#)

DStretch can bring out faint pictographs that are invisible to the naked eye. It works on digital camera images. No special filters or lighting are needed. To see what it can do check out the slide shows, especially [Rocky Hill](#) and [Tulare](#). More Rocky Hill images are in the [RA 2006 presentation on Rocky Hill](#). The [ARARA 2007](#) presentation has some beautiful images from Kachina Rockshelter in Nevada. My wife Sheila and I visited Tanzania in 2009. DStretch worked very well as can be seen in the [Masango](#) slideshow. My latest work has been on Cueva San Borjitas. I gave presentations about this incredible site at [SAA 2011 in Sacramento and ARARA 2011 in Idaho falls](#) and [Rock Art 2010 in San Diego and Balances 2010 in Ensenada](#) and have a slideshow about it [here](#).

Attachment K

Rock Art Stone Tools

(Slide Presentation)

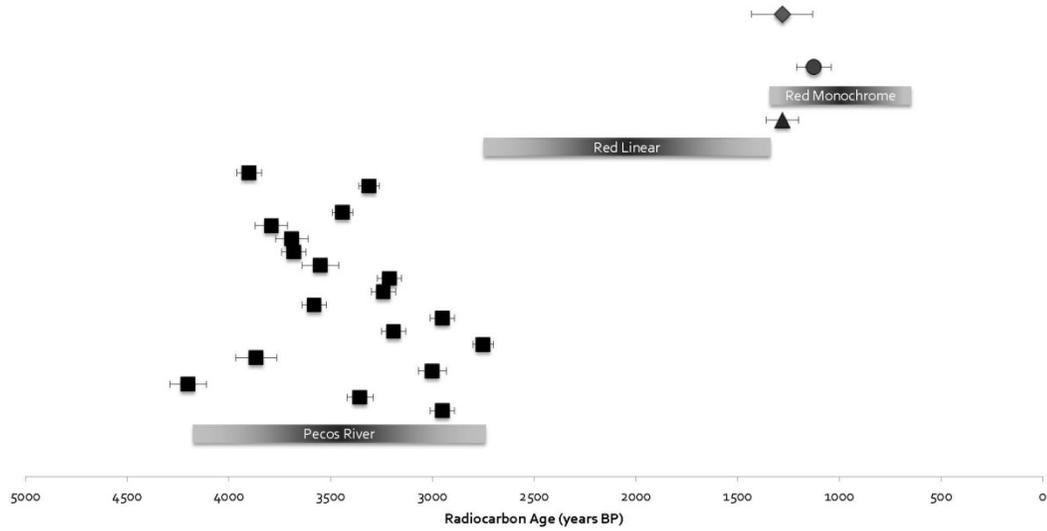
Radiocarbon Dating Rock Paintings & Pigment Analysis



Karen L. Steelman
ksteel@uca.edu



Radiocarbon Results for the Lower Pecos



Plasma Oxidation



Radiocarbon Dating

Journal of Archaeological Science 46 (2014) 195–204



Contents lists available at ScienceDirect

Journal of Archaeological Science

journal homepage: <http://www.elsevier.com/locate/jas>



Results from the first intensive dating program for pigment art in the Australian arid zone: insights into recent social complexity

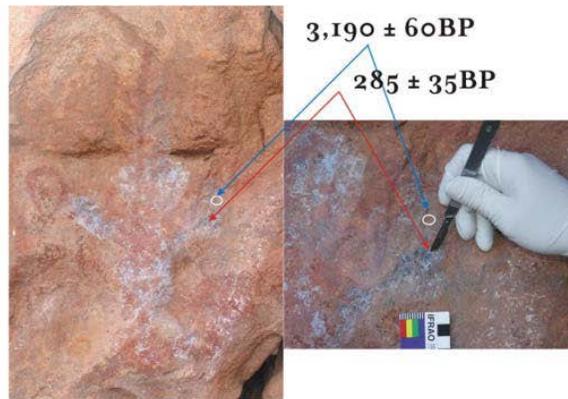


Jo McDonald ^{a,*}, Karen L. Steelman ^b, Peter Veth ^a, Jeremy Mackey ^b, Josh Loewen ^b, Casey R. Thurber ^b, T.P. Guilderson ^c

^a Centre for Rock Art Research and Management, University of Western Australia, Perth, Australia

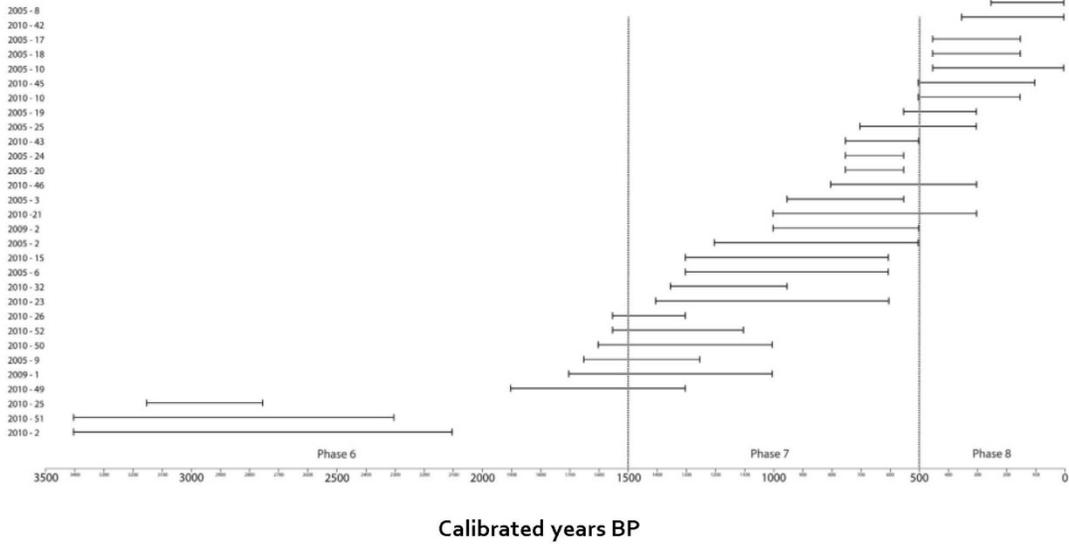
^b Department of Chemistry, University of Central Arkansas, Conway, AR 72035, USA

^c Center for Accelerator Mass Spectrometry, Lawrence Livermore National Laboratory, Livermore, CA 94551, USA



Australian Western Desert

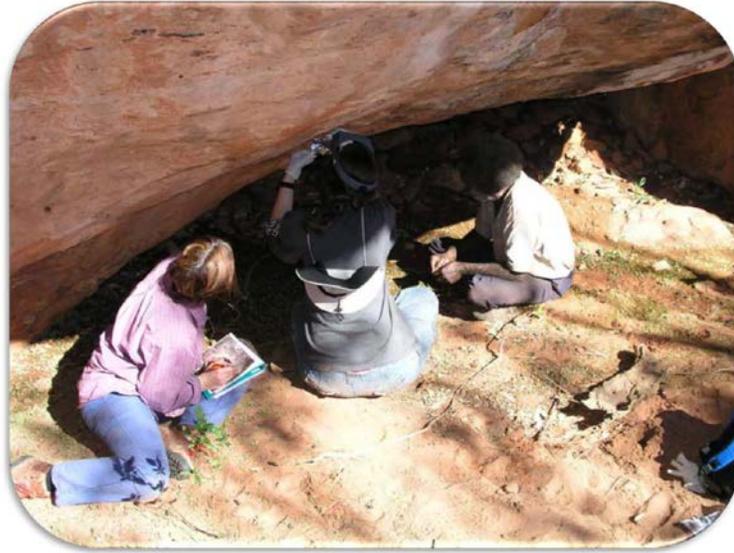
36 Radiocarbon Dates for Paintings



Western Desert Paintings



Traditional Owners



Sampling

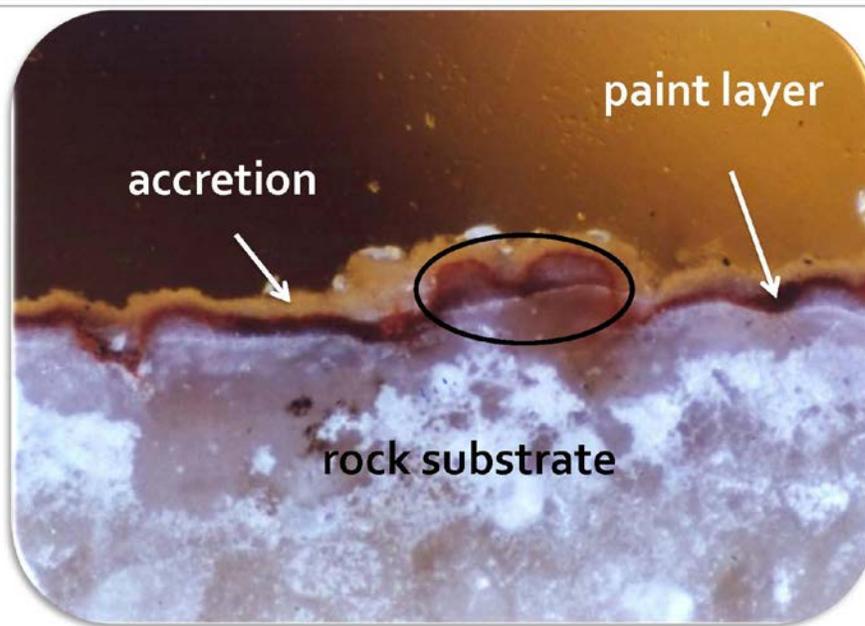
- Traditional owners, archaeologists, site managers, chemist/physicist
- ~2 cm² surface area
- Documentation before & after



Backgrounds: Unpainted Rock

- Adjacent to collected paint samples
- Insignificant levels of organic contamination in rock
- Increases likelihood of successful analyses

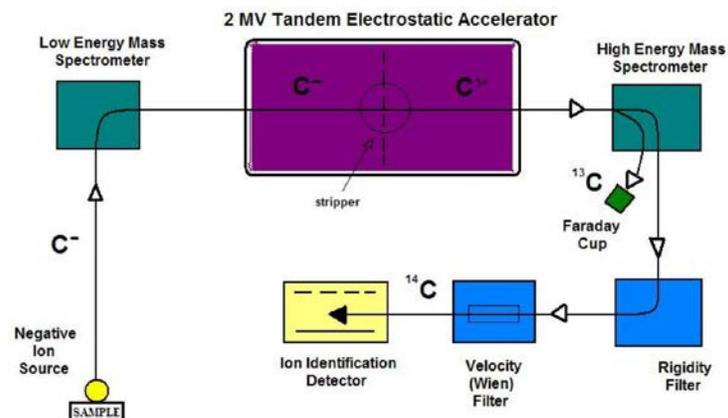
Paint Cross-Section



Plasma Oxidation



- Base treatment
 - Removes humic acids
- Argon plasma
 - Removes adsorbed gases
- Oxygen plasma
 - μg quantities for AMS ^{14}C



Pigment Analysis

archaeometry

Archaeometry 56, Suppl. 1 (2014) 168–186

doi: 10.1111/arc.12060

PORTABLE X-RAY FLUORESCENCE SPECTROSCOPY OF PICTOGRAPHS: A CASE STUDY FROM THE LOWER PECOS CANYONLANDS, TEXAS*

C. W. KOENIG, A. M. CASTAÑEDA and C. E. BOYD

SHUMLA School, Inc., Comstock, TX 78837, USA

M. W. ROWE

*Texas A&M University at Qatar, Doha, Qatar and Conservation Laboratory, Museum of New Mexico, Santa Fe,
NM 87504, USA*

and K. L. STEELMAN†

Department of Chemistry, University of Central Arkansas, Conway, AR 72035, USA



pXRF Considerations

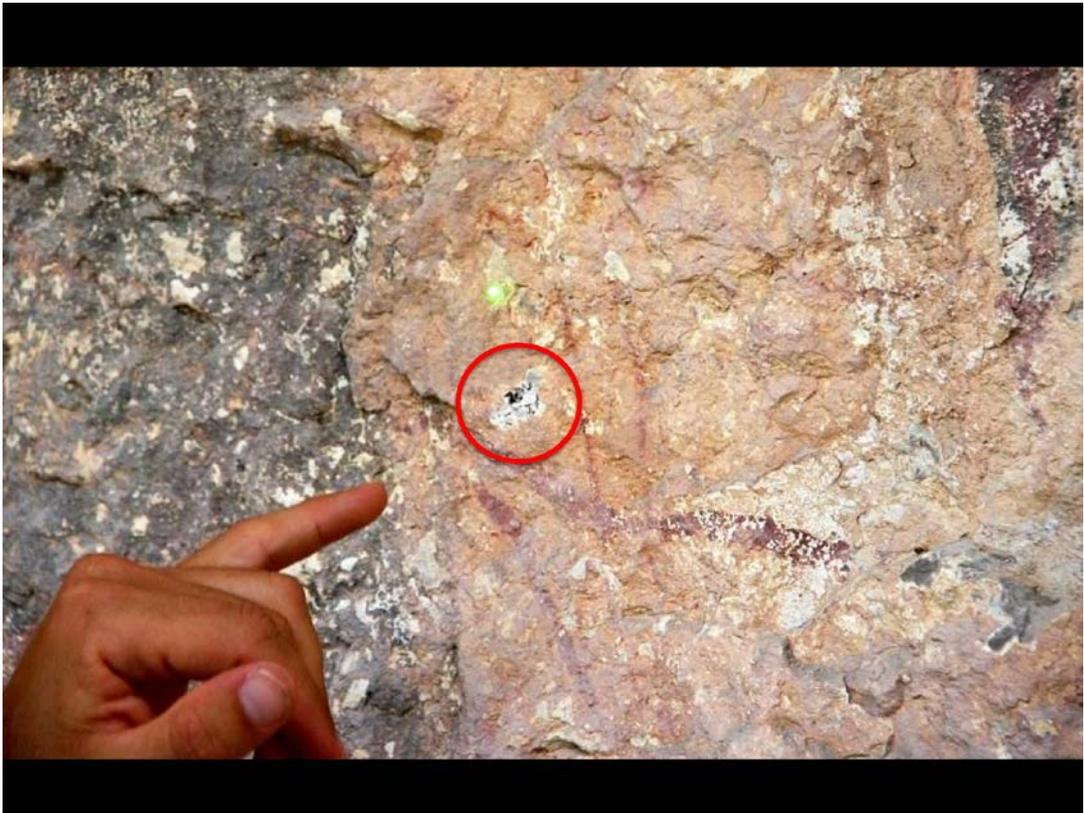
- Sample inhomogeneity
- Paint thickness and X-ray penetration depth
- Pigment area
- Mineral accretions
- Irregular shaped surfaces
- Mineral Structure
- Limits of Detection and Background levels
- No standardization or calibration
- Semi-quantitative pXRF



Portable X-Ray Fluorescence



- Elemental Analysis
- Semi-quantitative
- Charcoal or Manganese?
- Superimpositioning
- Gun Shot Damage



Attachment L

Rock Art – Evelyn Billo

(Slide Presentation)

Evelyn Billo and Robert Mark, Rupestrian CyberServices



Power of Water
as it Relates to Rock Imagery
FCRPS Nov. 6, 2014



Some questions you asked related to rock images:

**Social Media?
Meaning to tribes?
Documentation?
Conservation?
Dating methods?**

In 10 minutes, probably not the answers you are expecting. Instead, a brief global perspective from 35 years of experiences in many countries.



Social Media &
the Internet:
found rock art
site information
via Google
New Caledonia?
Total solar
eclipse cruise
2012.



Meaning to tribes?

Some Kanak cultural traditions related to rock art:

Archanbault (1909) said “petroglyphs were made to guard the memory of important events.”

Myth makers (location of story),

Social bonds such as marriage reflected in making,

Horticultural connection (access to water),

Fertility rituals, Boundary markers.

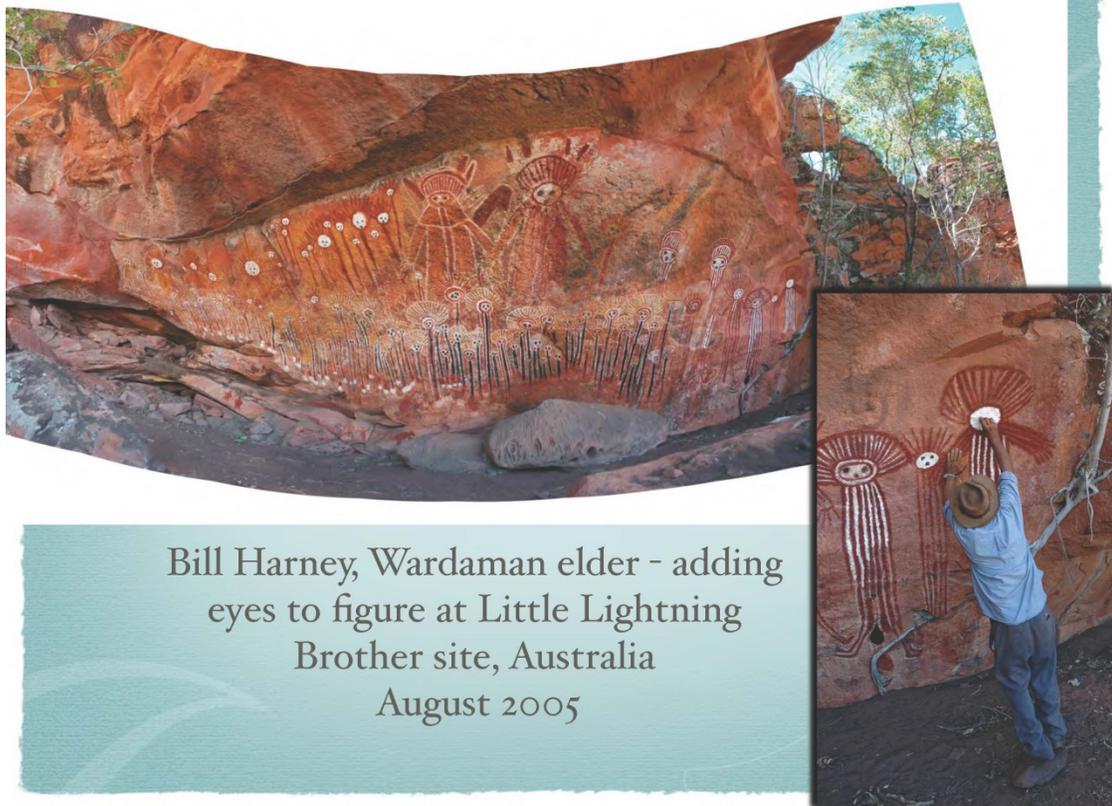




One local guide with his sunny smile! When I asked if I could take his picture, he said, "Oh yes, and put it on the Internet!"



Woman's site, north central Australia

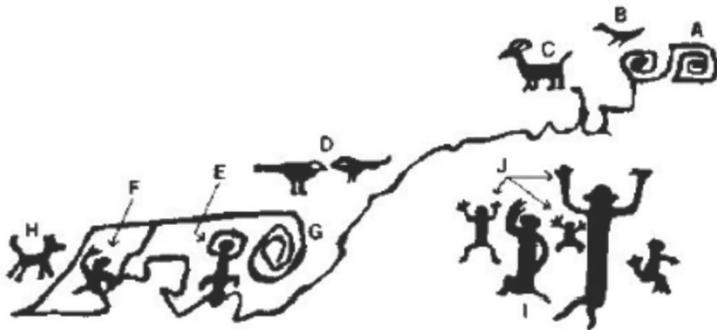


Bill Harney, Wardaman elder - adding eyes to figure at Little Lightning Brother site, Australia
August 2005

- The Red Rock Canyon country near Sedona, Arizona, is the most significant cultural landscape to the Yavapai people, as it contains the places where many events in their oral traditions took place. Most of these revolve around Skatakaamche, a supernatural culture hero who killed monsters, created humans, and taught them the skills and ceremonies needed to exist. He can be recognized in the rock art by his eagle feather headdress and associations with zig zag and diamond-shaped elements. His image is generally larger than other elements, as befits his importance.
- A zig zag line that encircles Skatakaamche and emerges through his hands and elbows indicates lightning, a powerful force that is intimately associated with Skatakaamche, and which may relate this pictograph to several stories about him. In one story, Skatakaamche visits his two fathers, the Cloud and the Sun, who set him through a series of tests and ordeals. After successfully passing these challenges, he returns to earth by holding onto two lightning bolts, created for him by Cloud and Sun.
- Another story concerns Skatakaamche and Komwidapokuwiya, his grandmother, in their roles as the first rattlesnake shamans. When he taught people the rattlesnake shaman's song, or sang the Dark Medicine song, lightning surrounded him and ran up and down his body. Diamond designs, such as the white one above Skatakaamche's head, resemble the pattern on the back of rattlesnakes and are indicative of rattlesnake shamans.



Yavapai Skatakaamche



Petroglyph Point,
Mesa Verde
National Park,
Colorado

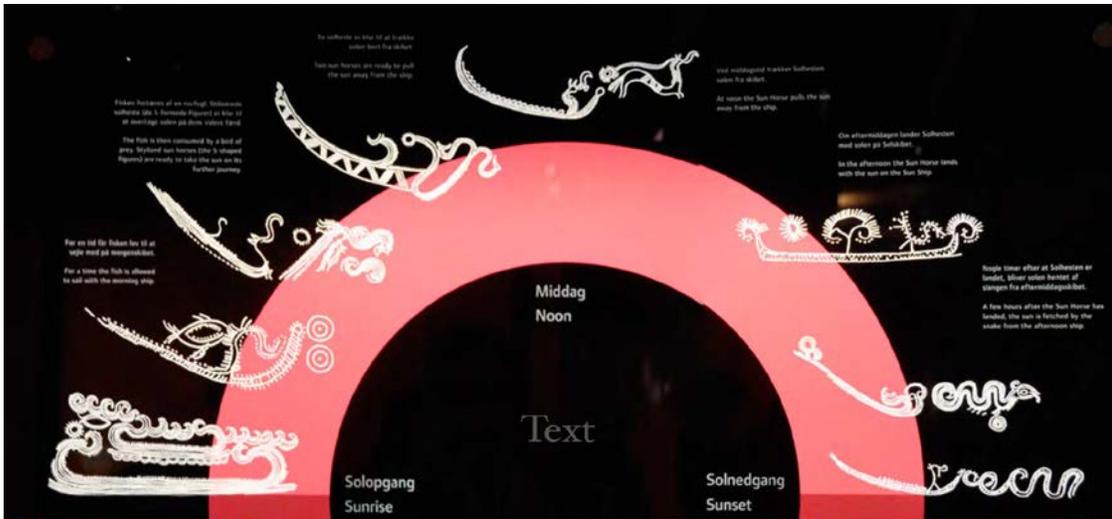


Navajo deity, *Ganiskidi* with seeds in backpack, cloud terrace with corn, concentric circles, zig zags, rake or rain, hand, tracks, etc.

Tanum, Sweden. Sun Horse at night, side light.



- Sunrise, the fish pulls the sun up from the night ship to the morning ship
- For a time, the fish is allowed to sail with the morning ship.
- Fish is then consumed by a bird of prey. **Stylized Sun Horses (the S shaped figures)** take the sun on its further journey.
- Two Sun Horses pull the sun away from the ship at noon.
- Afternoon, the Sun Horse lands with the sun on the Sun Ship.
- A few hours after the Sun Horse has landed, the sun is fetched by the snake from the afternoon ship.
- At sunset, the snake holds the sun in its coils. The snake is about to take the sun down below the horizon.
- The night ship sails to the left, the direction of travel at night.
- Throughout the night, the ship is accompanied by a fish who gets ready to perform its task of pulling the sun up from the night ship to the morning ship at dawn: a new day begins.

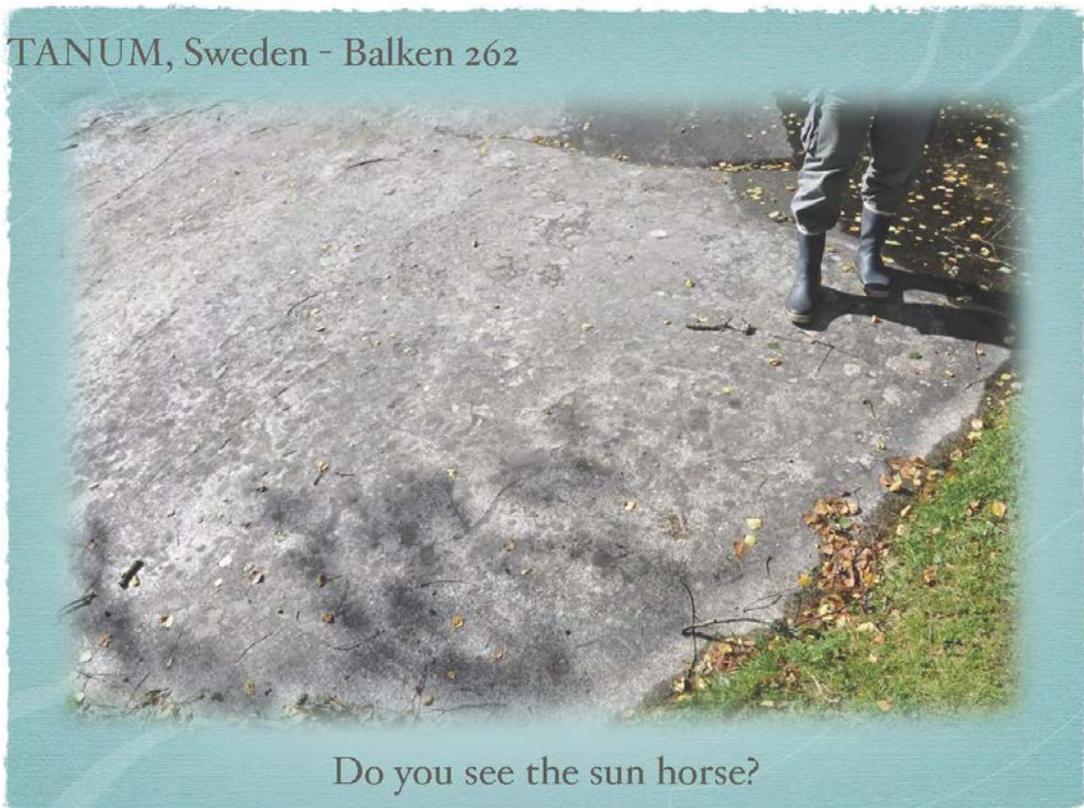


The Journey of the sun across the vault of the sky by day and through the darkness of the underworld sea by night

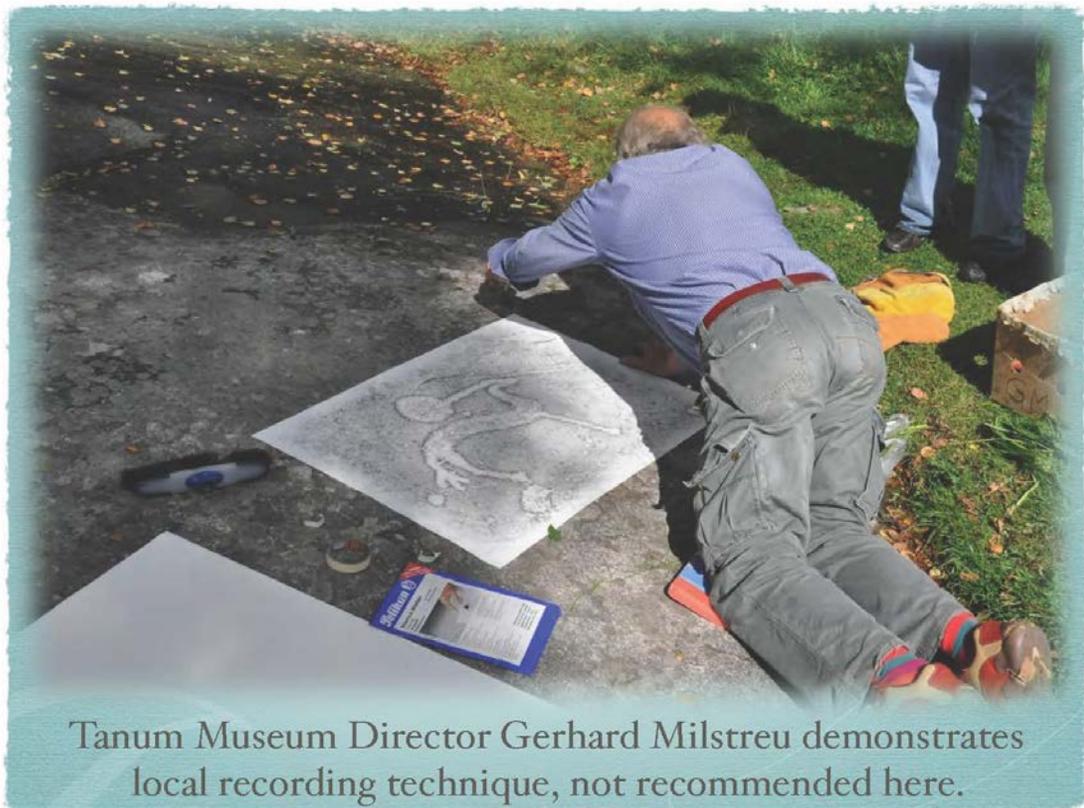


Depicted by motifs on Danish razors 1100-500 BC and on display at National Museum in Copenhagen

TANUM, Sweden - Balken 262



Do you see the sun horse?

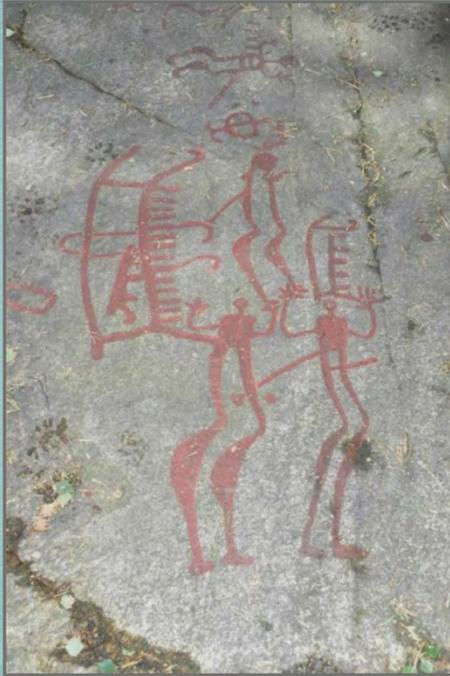


Tanum Museum Director Gerhard Milstreu demonstrates local recording technique, not recommended here.

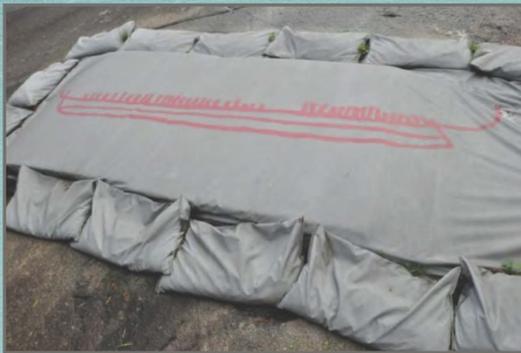
Research, Conservation and Preservation Efforts

Acceleration of weathering caused by

- Acid rain
- Humic acid created by newly planted scientifically managed forest.
- Environmentally-caused changes of the vegetation on the surface of the rocks.



Torsbo, Kville 163



Various methods being tested include raised and ventilated covering, painted with the design hidden below.





Or, total blockage of elements with weighted tarps and sign displaying what visitors are missing.

Documentation process of tracing is used to help accurately paint complex panels



Backa, Tanum, Bohuslan, Sweden



Left, Wrangell, AK, tidal zone petroglyphs near mouth of Stikine River.

Photo by Klaus Wellman, prior to 1975

Eroded condition in 1992. A 1984 report says Tlingit mentioned glyphs function as totemic displays and territorial markers.



In 1992, cruise ship passengers could take classes in how to make rubbings and pay for a Wrangell bus tour to go make their rubbings. We estimated that thousands of visitors per year scrambled over and stepped on the nearly invisible glyphs while rubbing others. We called for a management plan, reproductions be made to rub, and educational information be provided.



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News & Events

Visitor Info

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- Area Attractions
- Travel Directory
- Travel Information
- Request Info

Business Info

Town Directory

City Government

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Petroglyph Beach State Historic Park

Some of the best surviving examples of native artistic expression are petroglyphs found in southeast Alaska. Petroglyph is a word derived from the Greek "petra" and "glyphe" for rock and carving.

Petroglyphs are designs or symbols pecked into rocks. They are found on boulders and bedrock outcrops on the shore just above or below mean high tide usually near important salmon streams and habitation sites. The rock is metamorphic and tends to be dark gray, fine grained, moderately hard and durable, and highly fractured.

Petroglyph Beach in Wrangell has the highest concentration of petroglyphs in Southeast and has recently been designated a State Historic Park. Access to the beach was improved in the year 2000. There is an accessible boardwalk to a deck overlooking Petroglyph Beach, the Stikine River and Zimovia Straits. Replicas of several designs are displayed on the deck for visitors to make rubbings on. Access to the beach is provided directly from the deck overlook. During construction of the interpretive facility, two new petroglyphs were unearthed. One of these petroglyphs was long thought lost and its discovery was a delight to the local Tlingit natives and Wrangell residents.



Killer Whale rock carving



Observation Deck at Petroglyph Beach

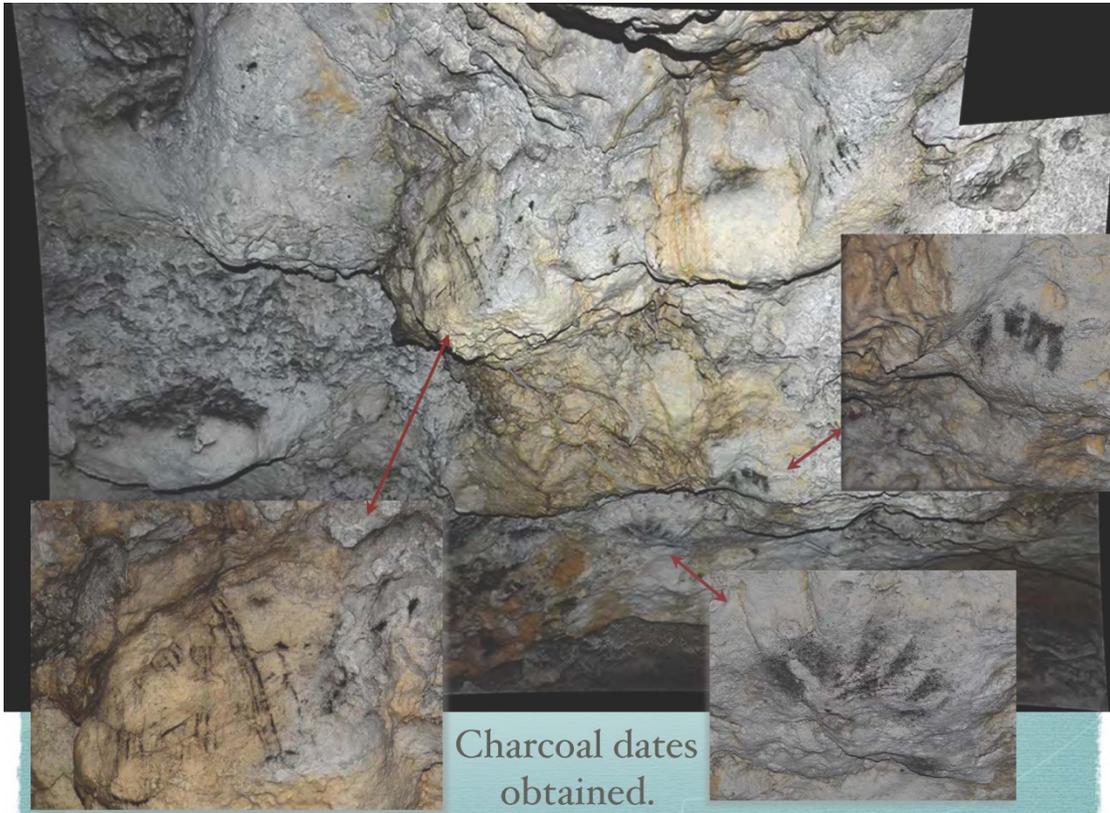


Looking for the Spiral rock carving

We have no way to discern the true intent or motivation of the artists, nor do we know what the designs really meant to their makers and users. Based on what we know from the archaeological record and cultural ethnographies, petroglyphs may be a form of writing, a method of communication, or a way to record events. There are a variety of possible interpretations: to commemorate victories in war; to document the transfer of wealth or territory in settlement of a feud; important potlatches; shamanistic exploits; or simply the work of visiting Tsimshian or of the Tlingit themselves. They may have a magic-religious significance, using petroglyphs as a ritual device to assure success of the hunt and to increase the supply of game. On the other hand, they may simply have no meaning beyond their artistic conception.

Petroglyph Beach is easily accessible from town (approximately 1 mile from the ferry terminal) and allows direct access to this unique cultural collection. Visitors enjoy searching for the more than 40 petroglyphs located on the beach. But please, document your experience with photographs only, and step lightly in order to preserve this record for the future. Make rubbings of the replicas only. An extensive body of research has shown that constant rubbing of the petroglyphs contributes greatly to their accelerated deterioration. Leave what little of the past is left for the future. Enjoy your experience.

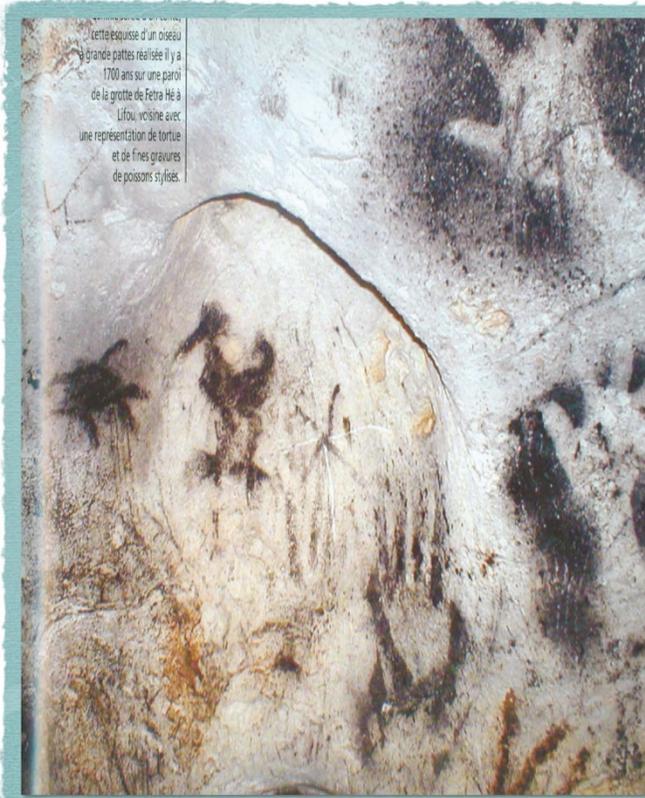
Petroglyphs and associated site components are under the protection of Federal Laws and State of Alaska Antiquities Laws.



Five handprints were
AMS dated at
between 2600 to
2400 BP.



Engravings over hand
stencil indicate a
relatively more recent
form of expression.



A bird (87-525 AD) and a circle (777-1156 AD) are younger. All images were from a cave, a very important sacred space to many cultures around the world,

Image from Sand, Bole', Ouetcho, and Baret, *Parcours Archéologique*, page 129.

The circle has an oral tradition in the Chiefdom of Wetr. It was identified as "presence of drinking water nearby."



Mortar with hand-rubbed charcoal around it, near hand prints.



Thank you!

Southwest is in drought. Send the Power of Water our way, please.



**Rupestrian
CyberServices**

<http://www.rupestrian.com/>

rockart@infomagic.net

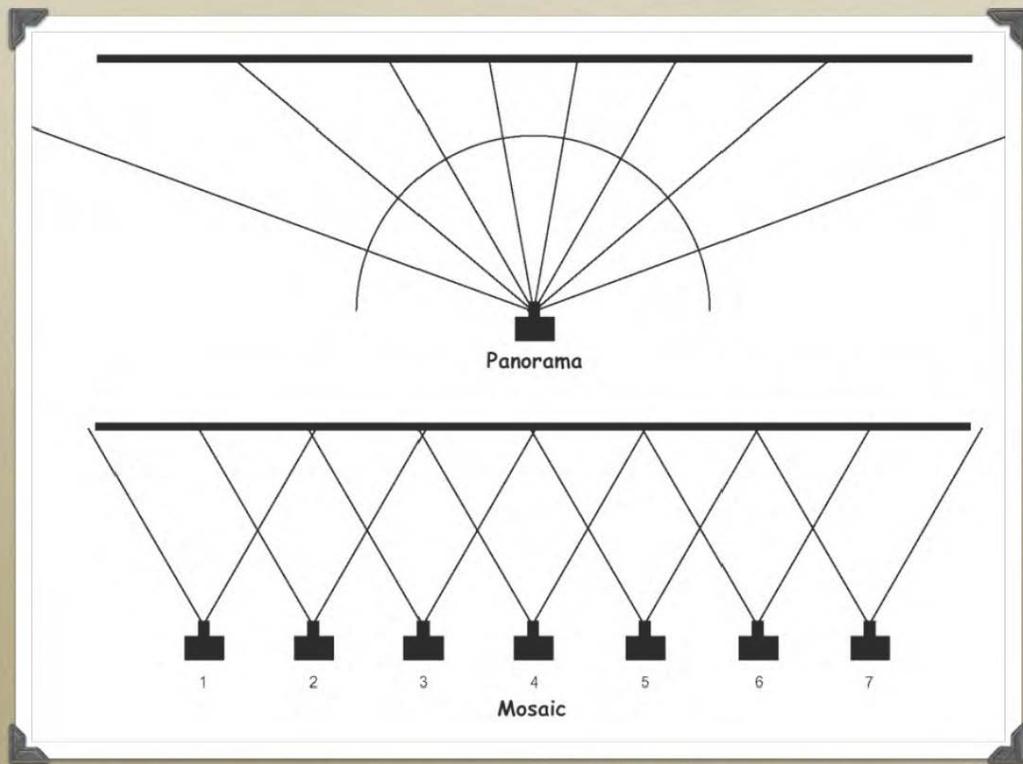
ATTACHMENT M
ROCK ART IMAGING TECHNOLOGIES
(SLIDE PRESENTATION)

An Overview of Imaging Technologies for Rock Art Documentation

Robert Mark & Evelyn Billo
Rupestrian CyberServices

- Mosaics, Panoramas, & Gigapans
- Image Enhancement (Photoshop & D-Stretch)
- 3D Models with SFM software
- Reflectance Transformation Imaging (RTI)
- iPads in the Field
- Drone Photography
- And 2 instruments

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Panorama and Mosaic



Mosaic from India



Gigapan robotic panhead in the field, Sears Point, Arizona.



Array of images in the Gigapan stitcher, prior to stitching.
A full rectangular array is required with this stitcher.
This is a very small example; arrays of several
hundred images are possible.



For Examples

[http://www.rupestrian.com/
panoramas.html](http://www.rupestrian.com/panoramas.html)

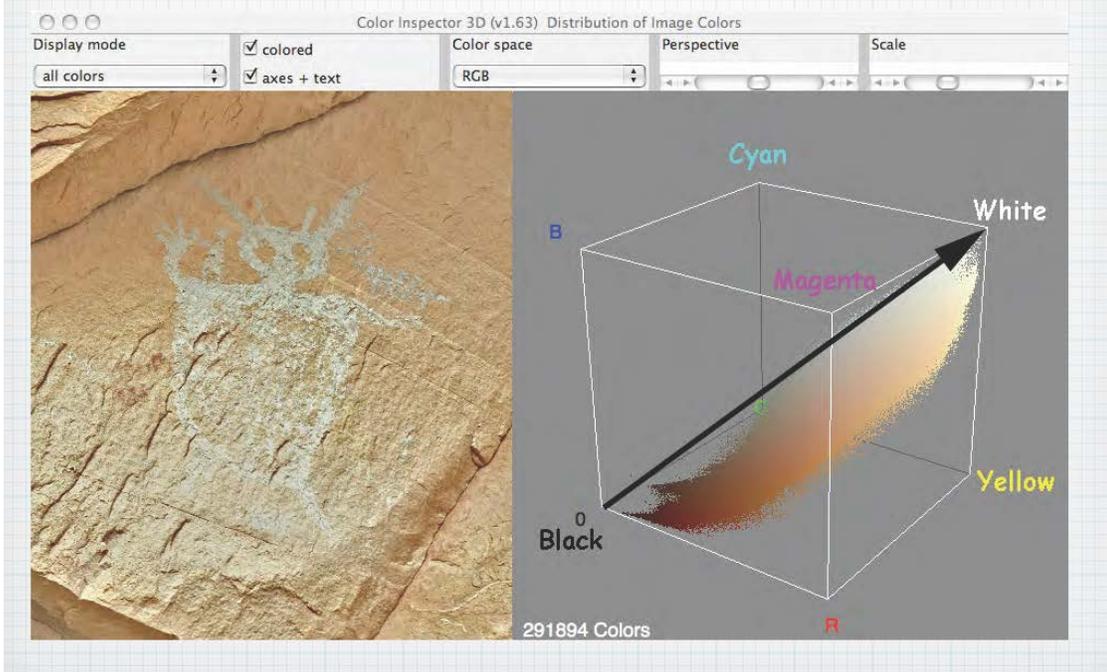
with links to many Gigapans

Stitcher

There are many available.
Our current choice:
Autopano Giga

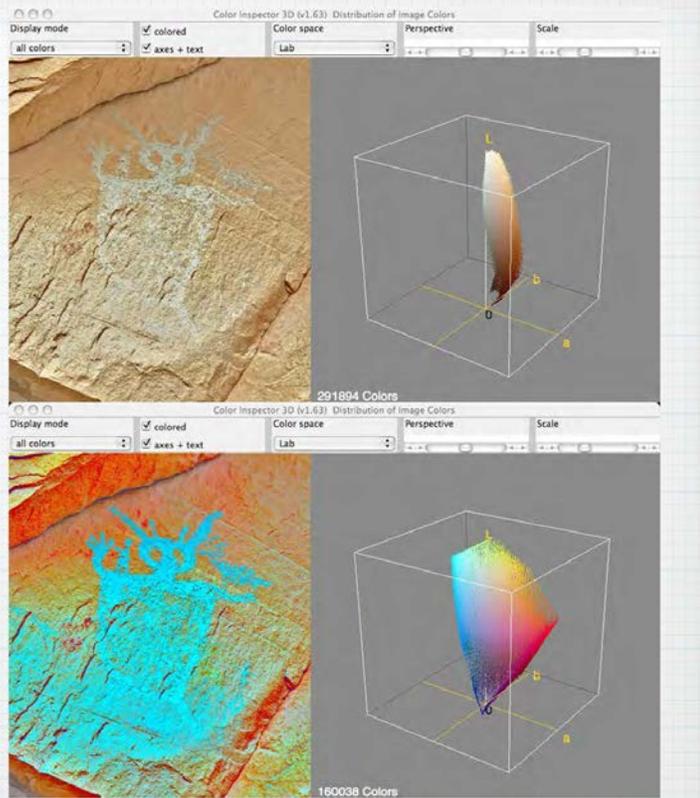
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Color Spaces



Lab
Color
Space

Spread
Color
Channels



File Edit Image Layer Select Filter View Window Extensis Help 10:19:34 AM

00-025_016.jpg @ 73.5% (b)

Levels

Channel: b

Input Levels: 0 1.00 255

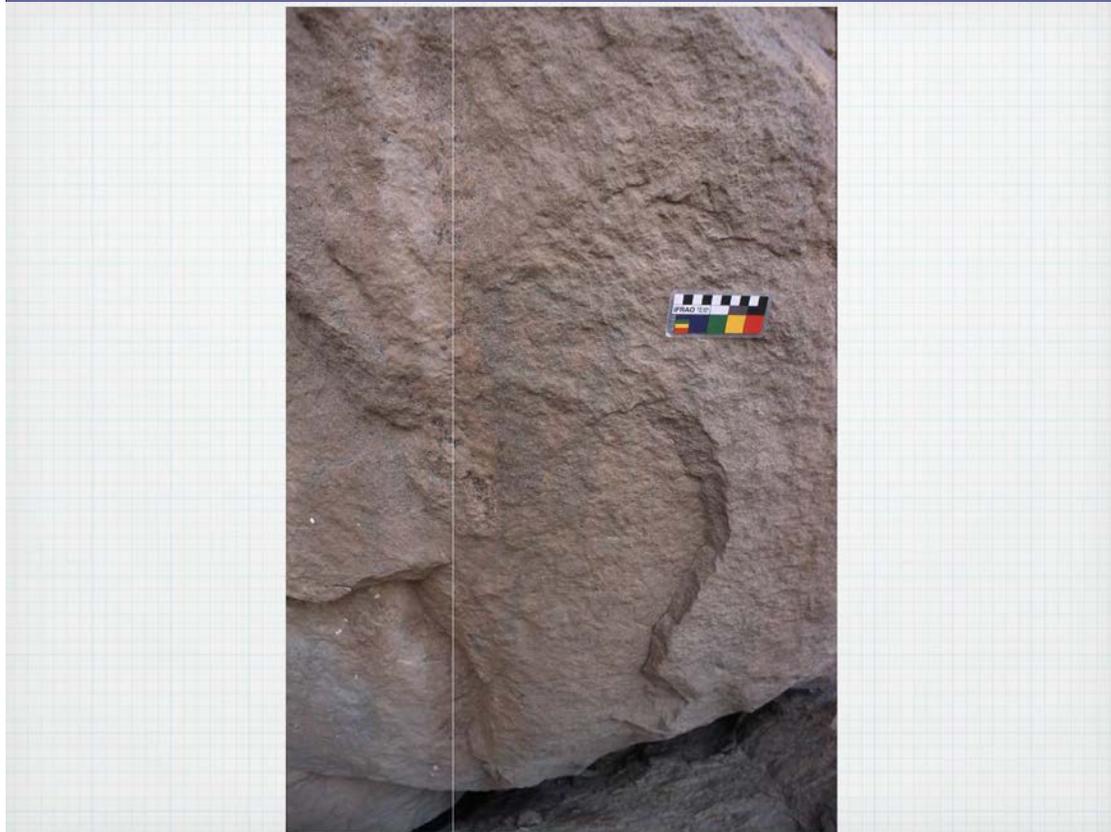
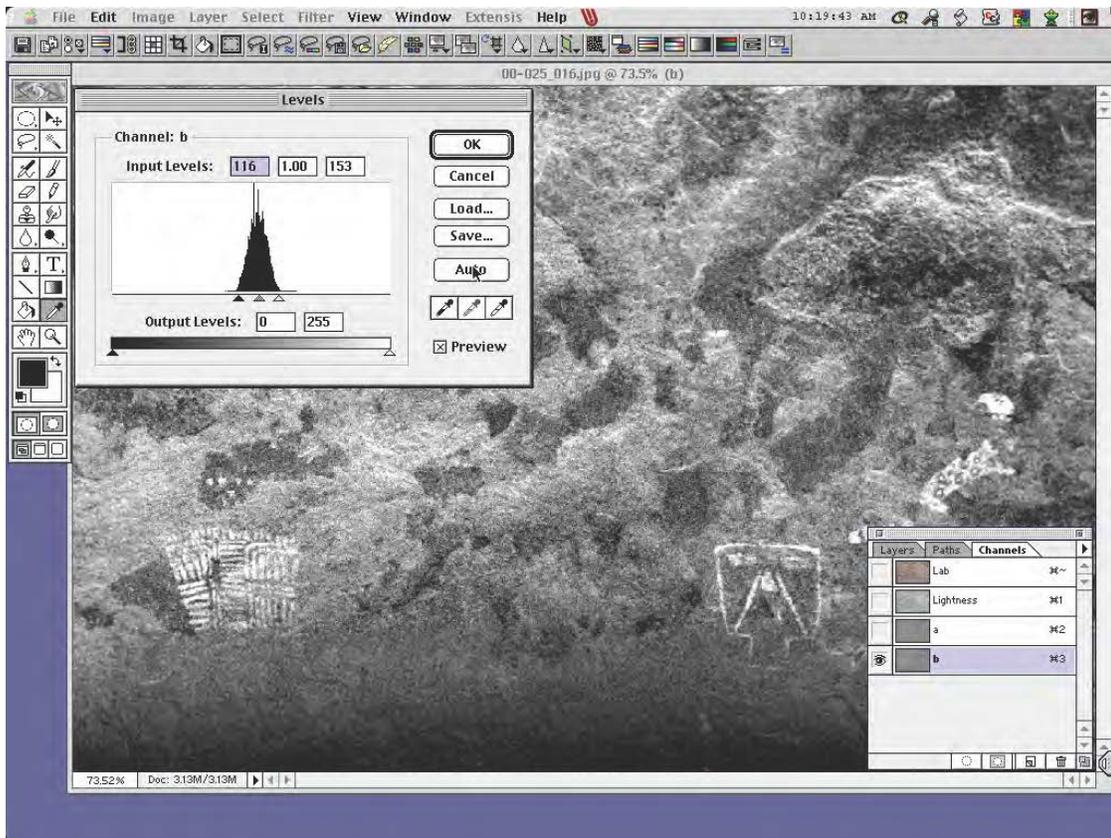
Output Levels: 0 255

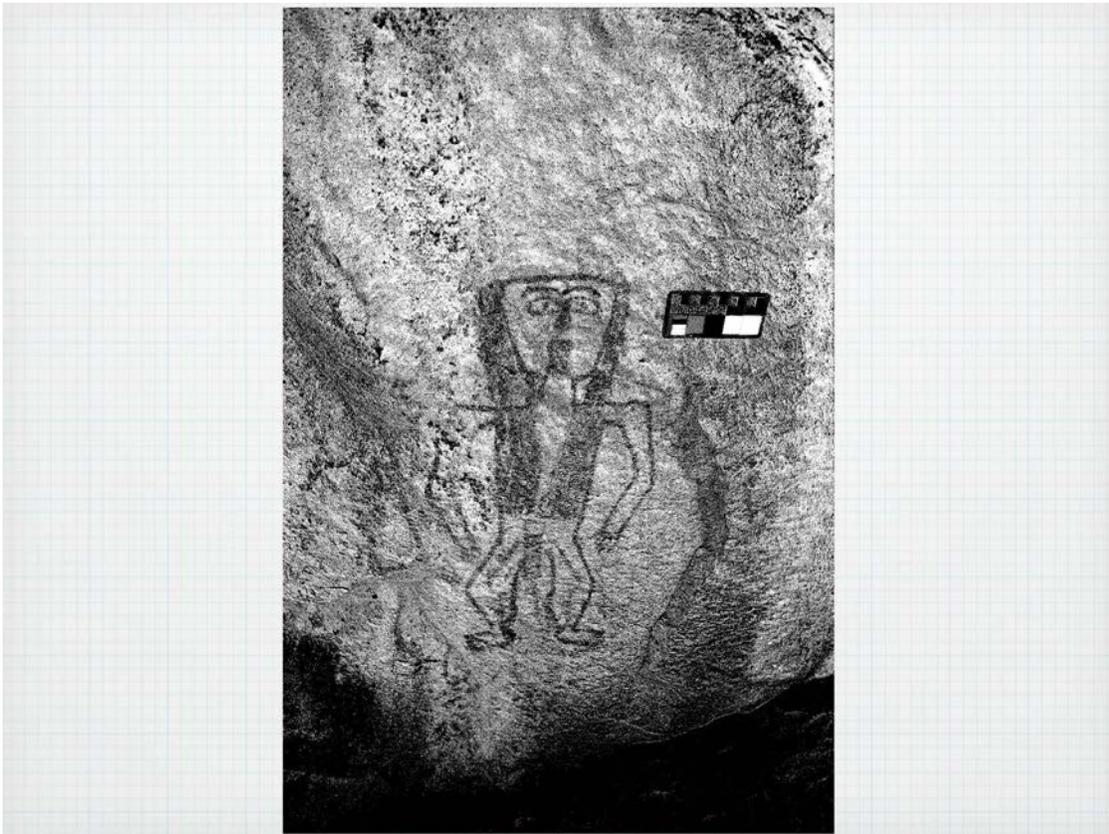
OK Cancel Load... Save... Auto Preview

Layers Paths Channels

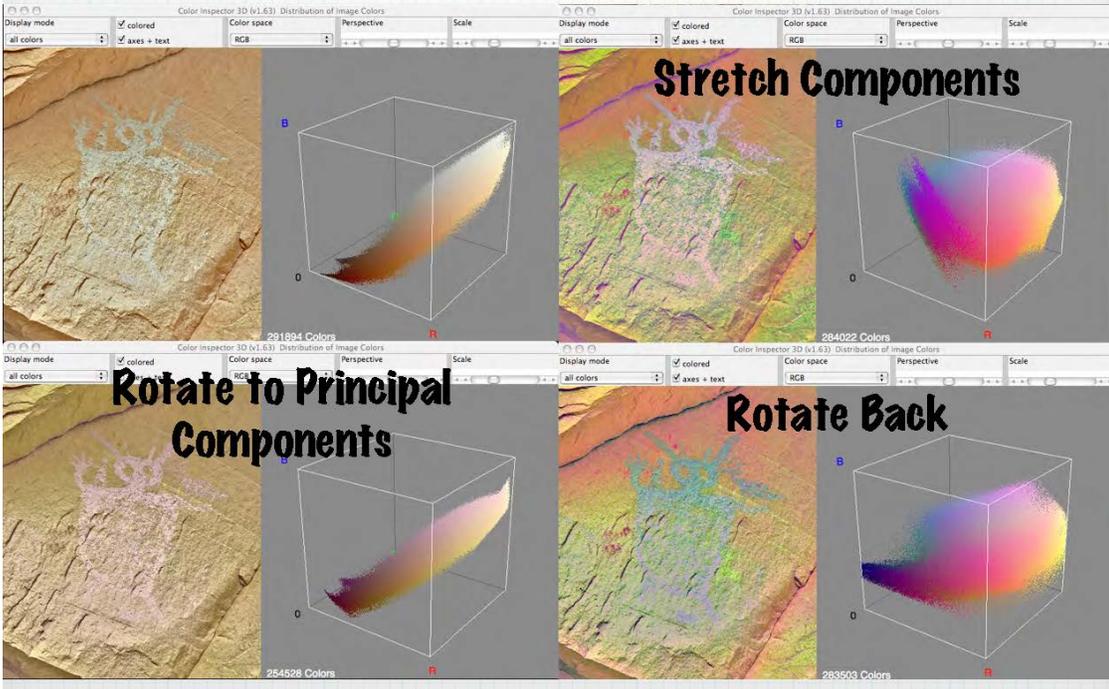
- Lab #1~
- Lightness #11
- a #12
- b #13

73.52% Doc: 3.13M/3.13M





Decorrelation Stretch

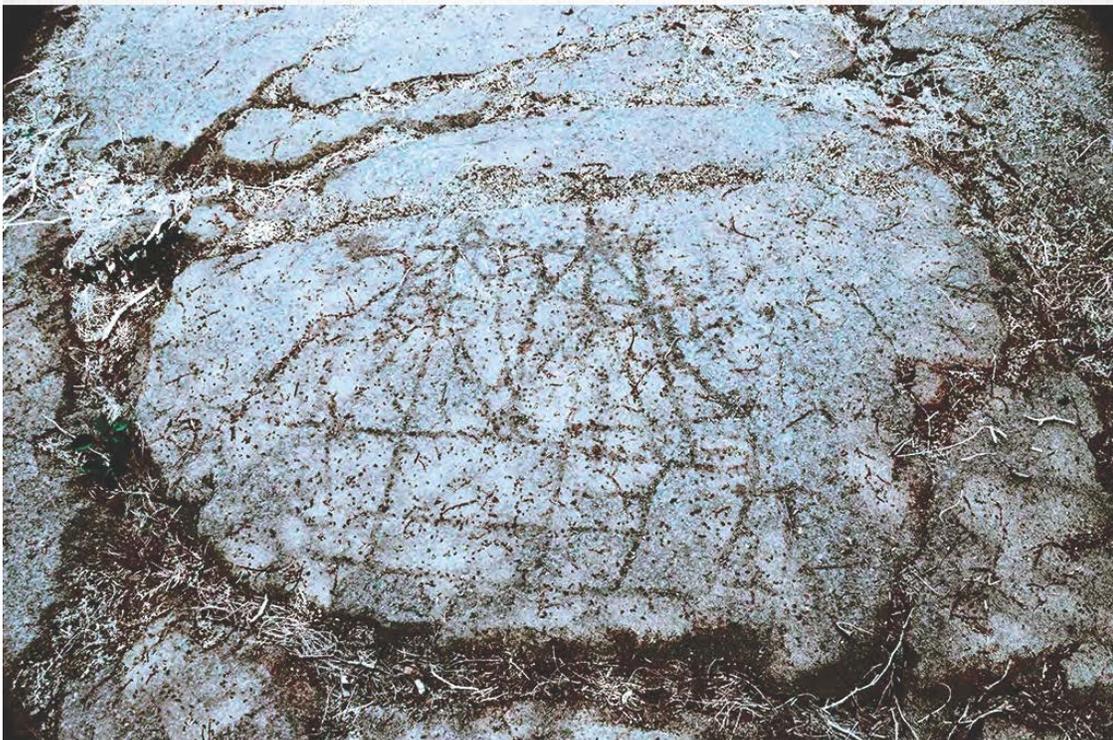




Scale: 15 : LDS LAB LRE CRGB YXX AdjCol Cycle
Reset YRD YYE YRE YBK LXX CB HCycle
Auto Contrast Flat Save Help Expert More Matrix Exit



Scale: 15 : LDS LAB LRE CRGB YXX AdjCol Cycle
Reset YRD YYE YRE YBK LXX CB HCycle
Auto Contrast Flat Save Help Expert More Matrix Exit



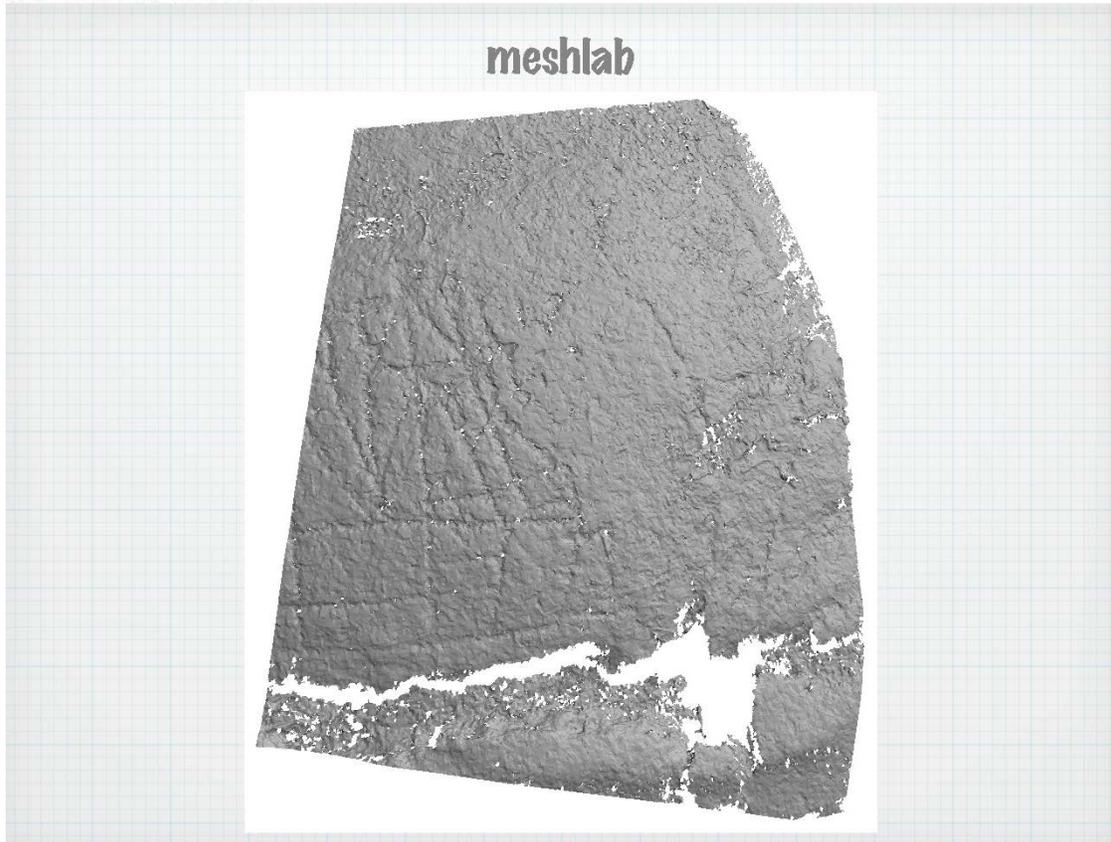
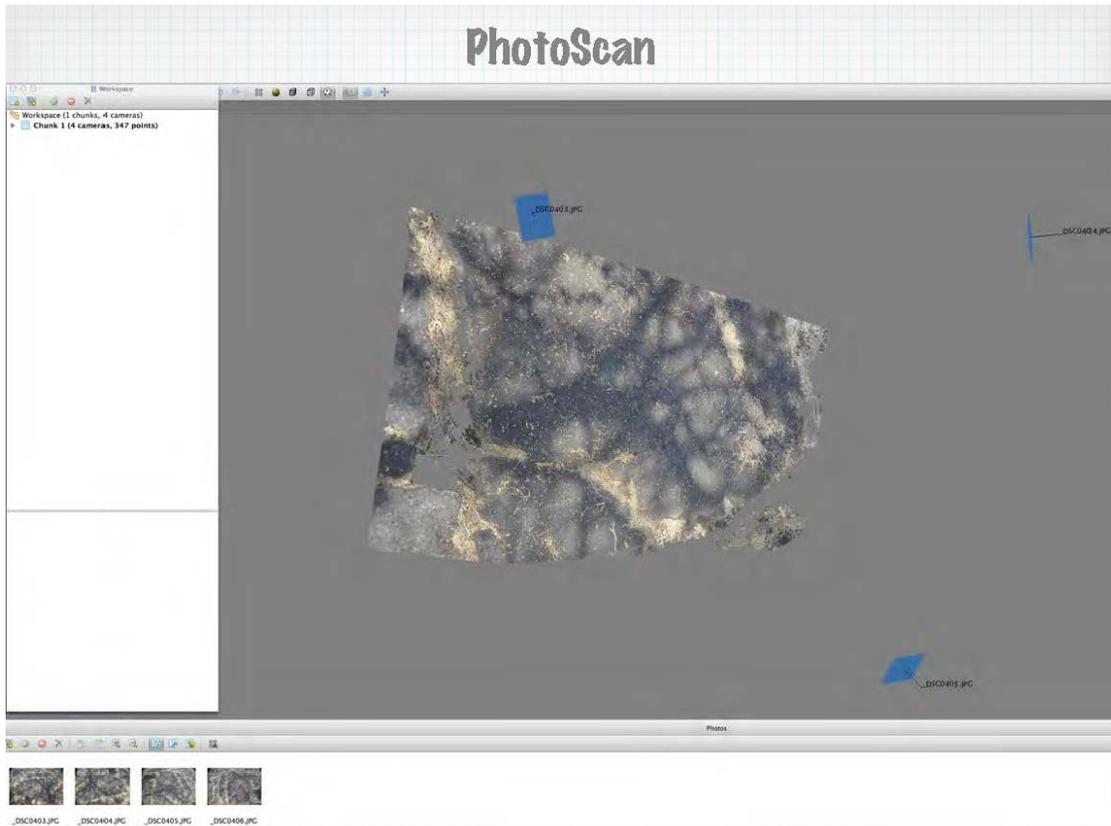
For Additional Information

[http://www.rupestrian.com/
publications.html](http://www.rupestrian.com/publications.html)

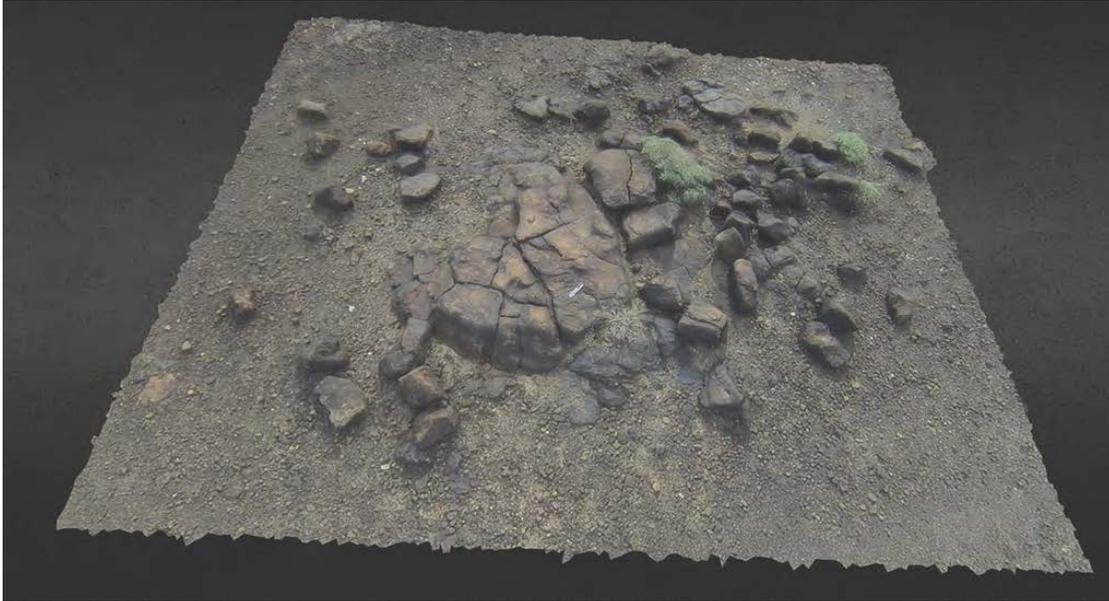
&

<http://www.dstretch.com/>
(Jon Harman)

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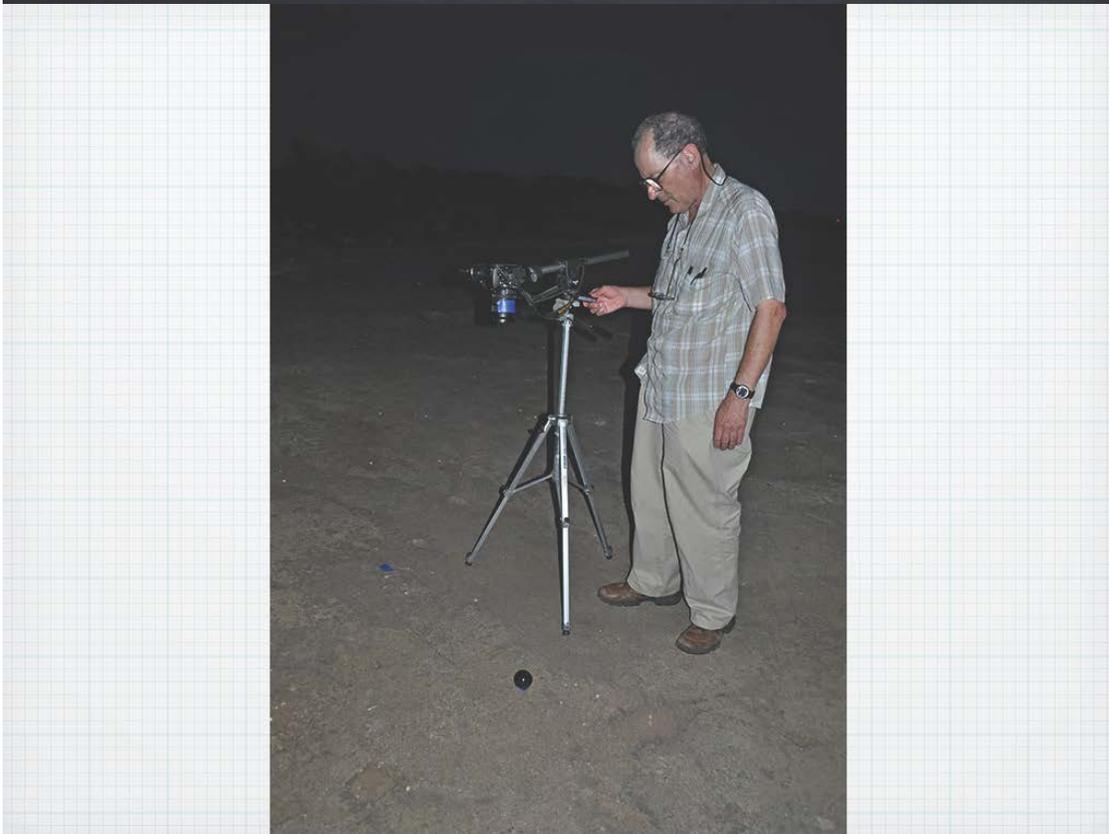
3D Model from Quadcopter Images

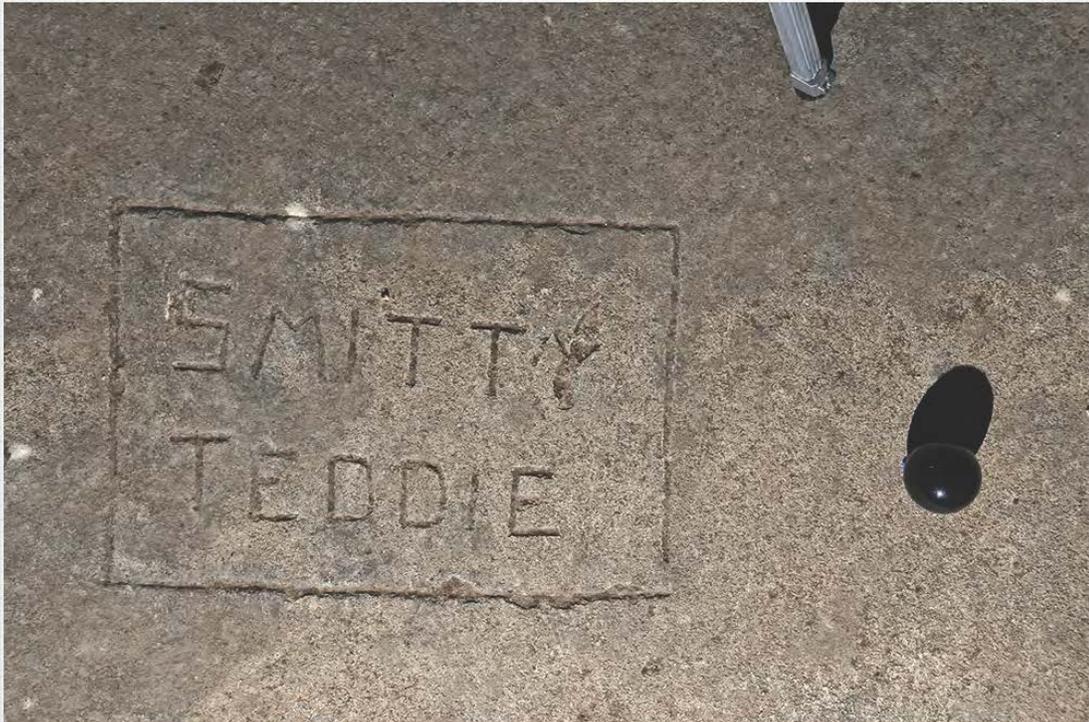


Programs

PhotoScan
&
meshlab

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RTIbuilder

RTIbuilder

Sphere 1

Sphere 1

<input checked="" type="checkbox"/> _RCS9664.jpg	<input checked="" type="checkbox"/> _RCS9665.jpg	<input checked="" type="checkbox"/> _RCS9666.jpg	<input checked="" type="checkbox"/> _RCS9667.jpg	<input checked="" type="checkbox"/> _RCS9668.jpg	<input checked="" type="checkbox"/> _RCS9669.jpg
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<input checked="" type="checkbox"/> _RCS9688.jpg	<input checked="" type="checkbox"/> _RCS9689.jpg	<input checked="" type="checkbox"/> _RCS9690.jpg	<input checked="" type="checkbox"/> _RCS9691.jpg	<input checked="" type="checkbox"/> _RCS9694.jpg	<input checked="" type="checkbox"/> _RCS9695.jpg
<input checked="" type="checkbox"/> _RCS9697.jpg	<input checked="" type="checkbox"/> _RCS9698.jpg	<input checked="" type="checkbox"/> _RCS9699.jpg	<input checked="" type="checkbox"/> _RCS9700.jpg	<input checked="" type="checkbox"/> _RCS9701.jpg	<input checked="" type="checkbox"/> _RCS9702.jpg
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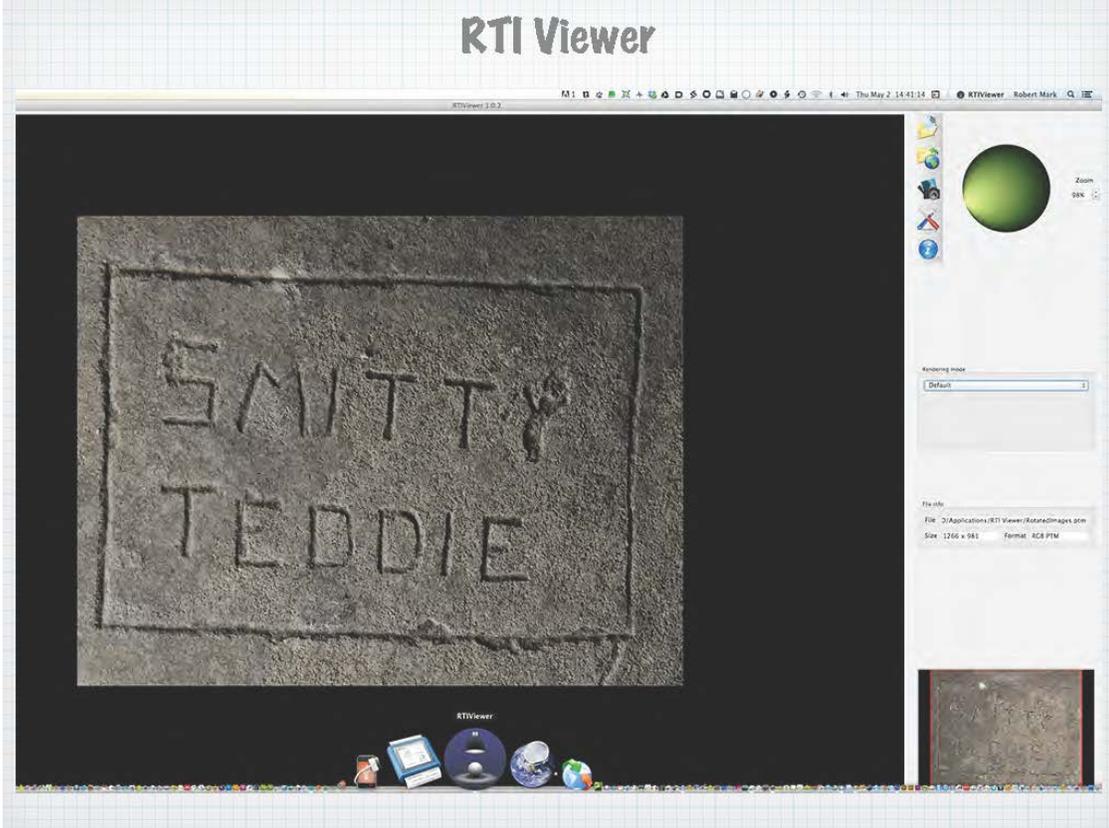
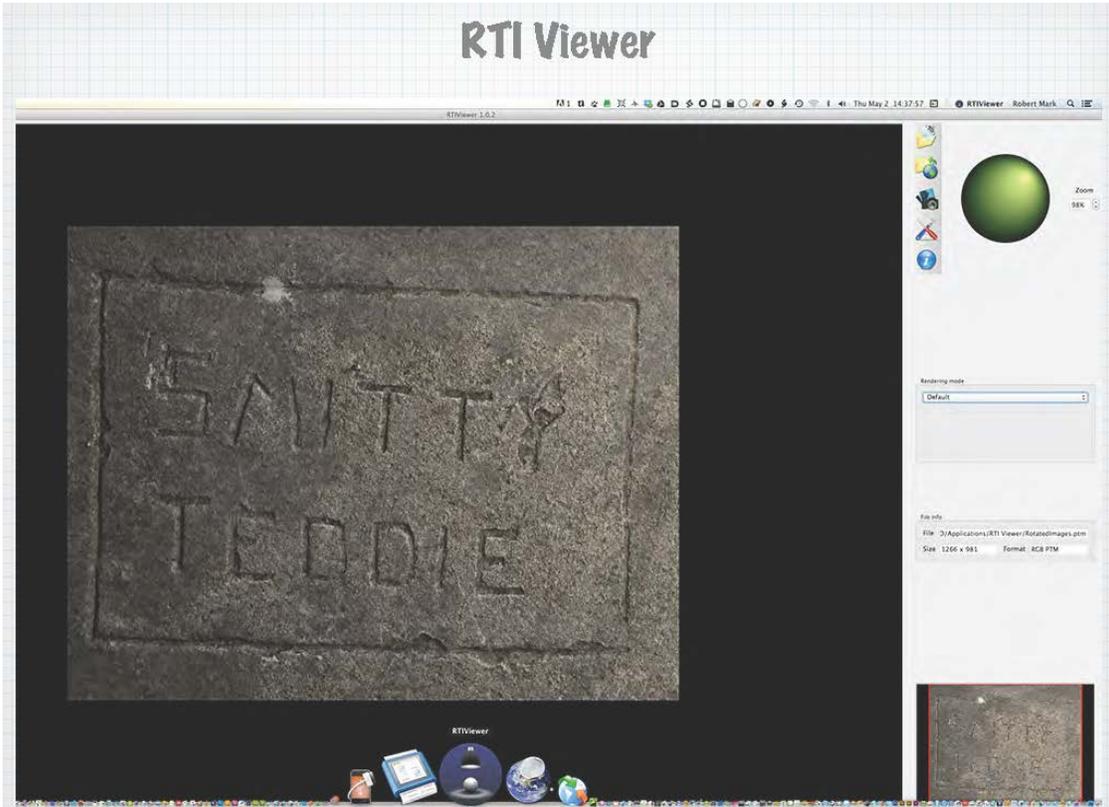
User Highlight Threshold

10 35 60 85 110 135 160 185 210 235

Highlight detection

Go to Output ->

Back Next

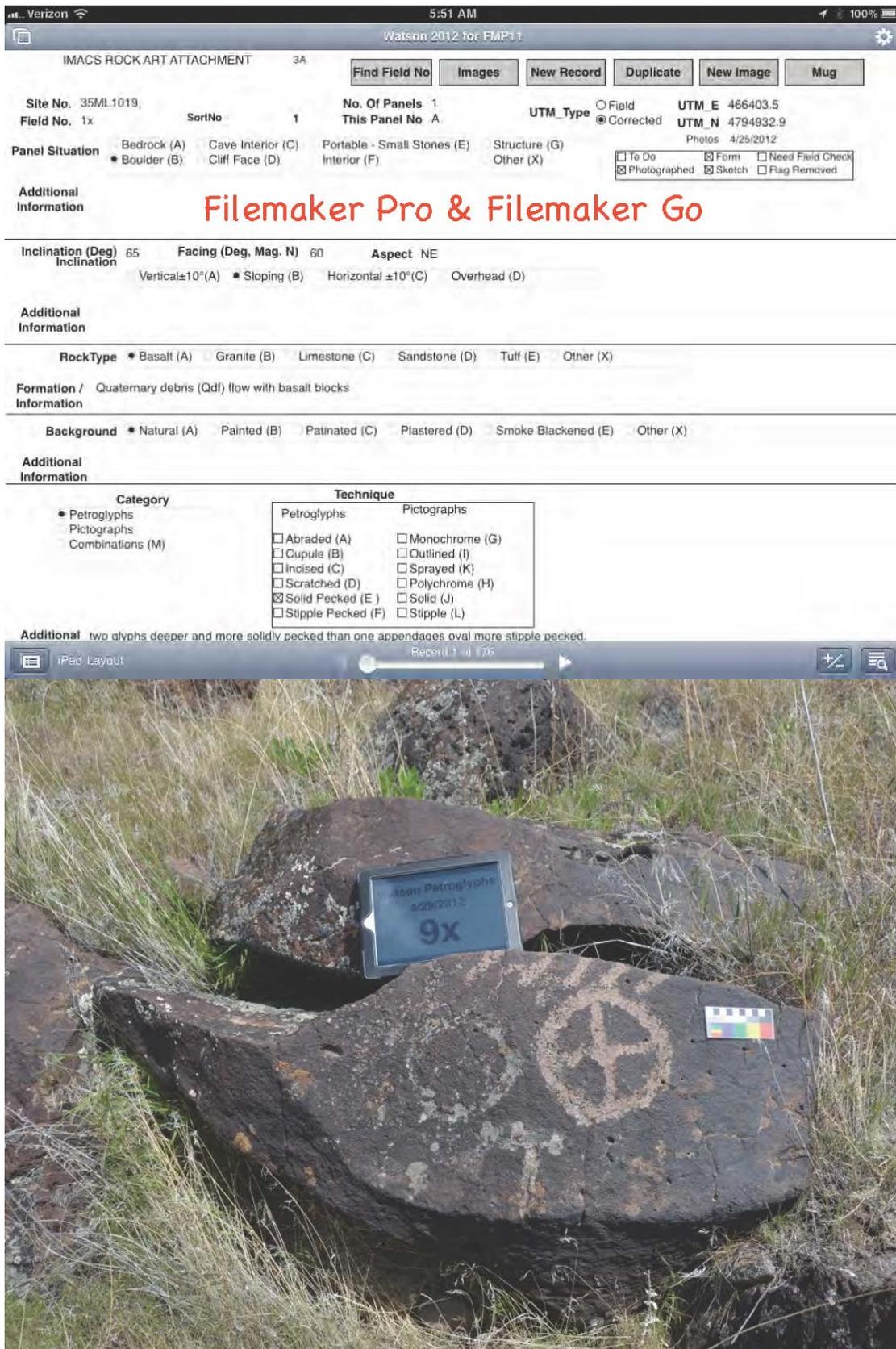


For More Info & Free Software

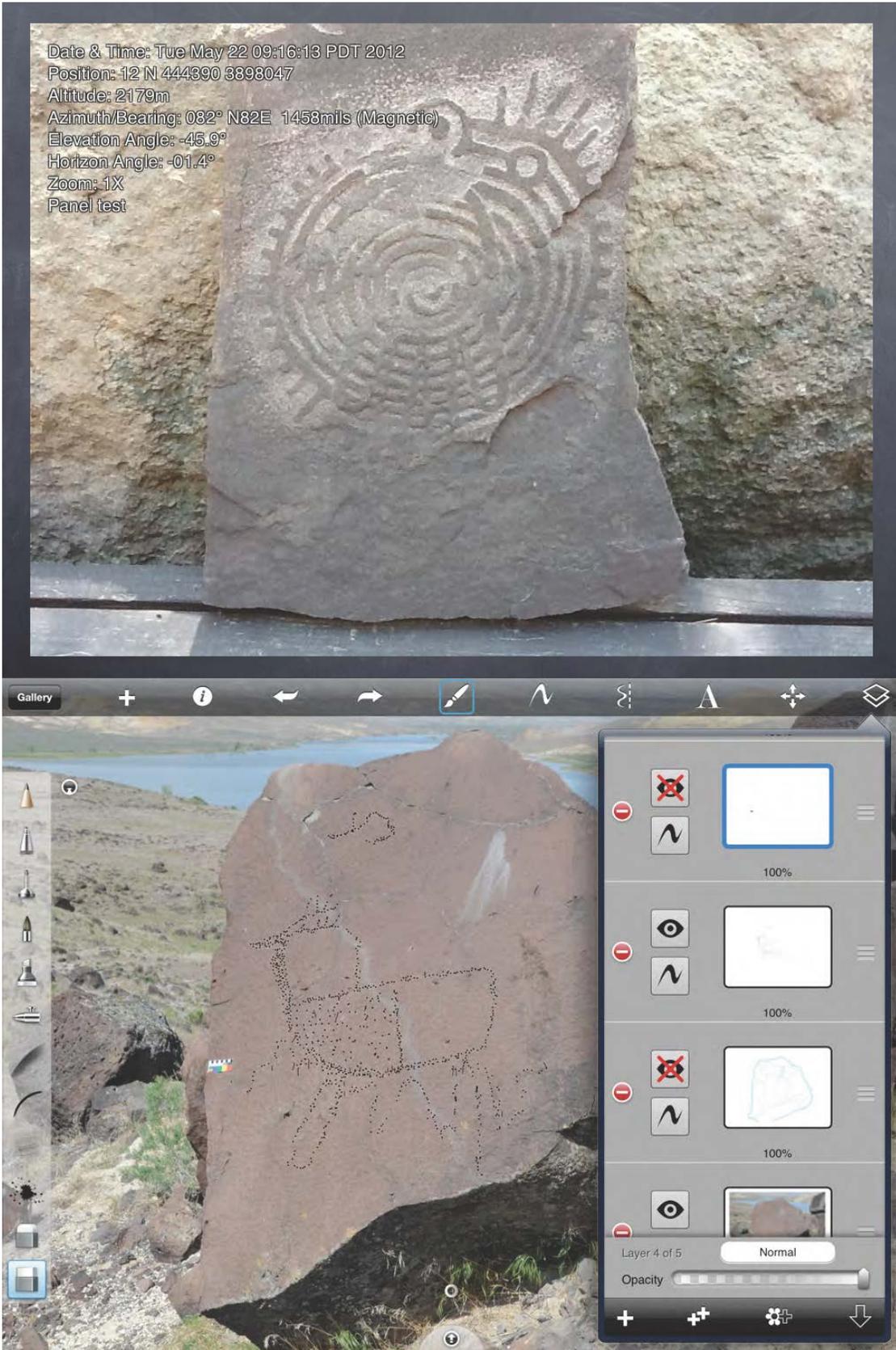
Cultural Heritage Imaging

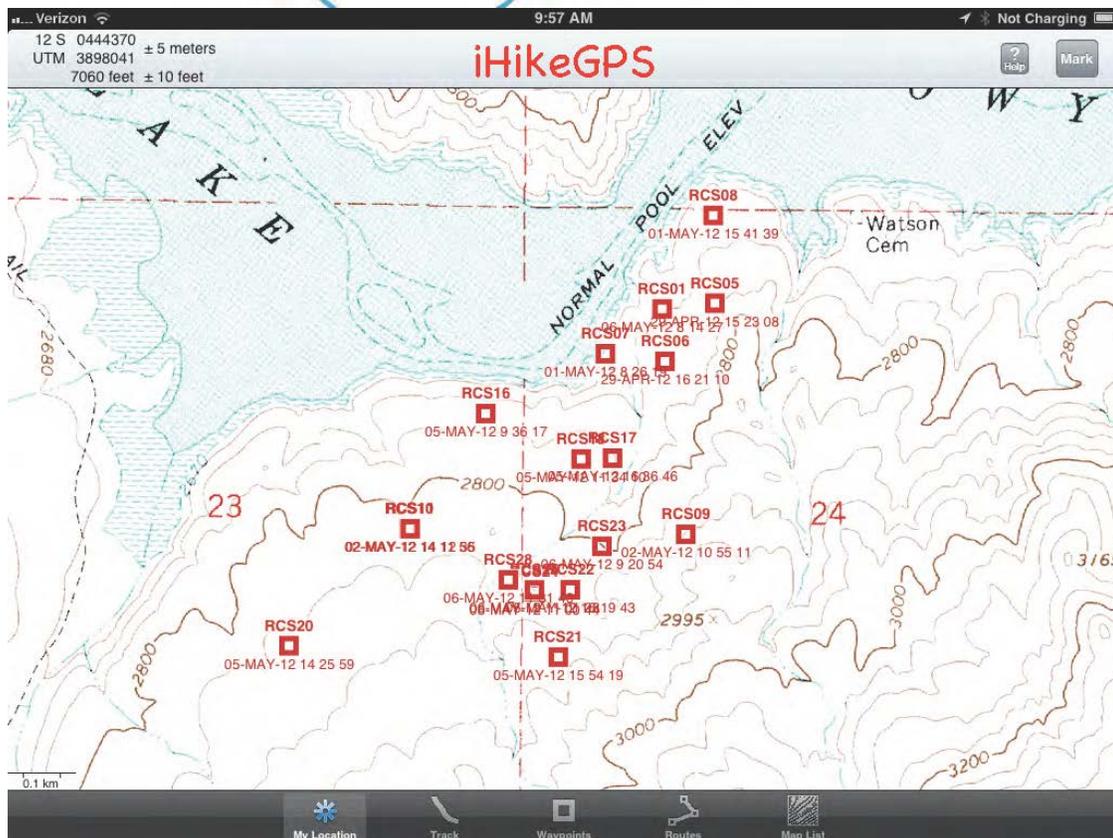
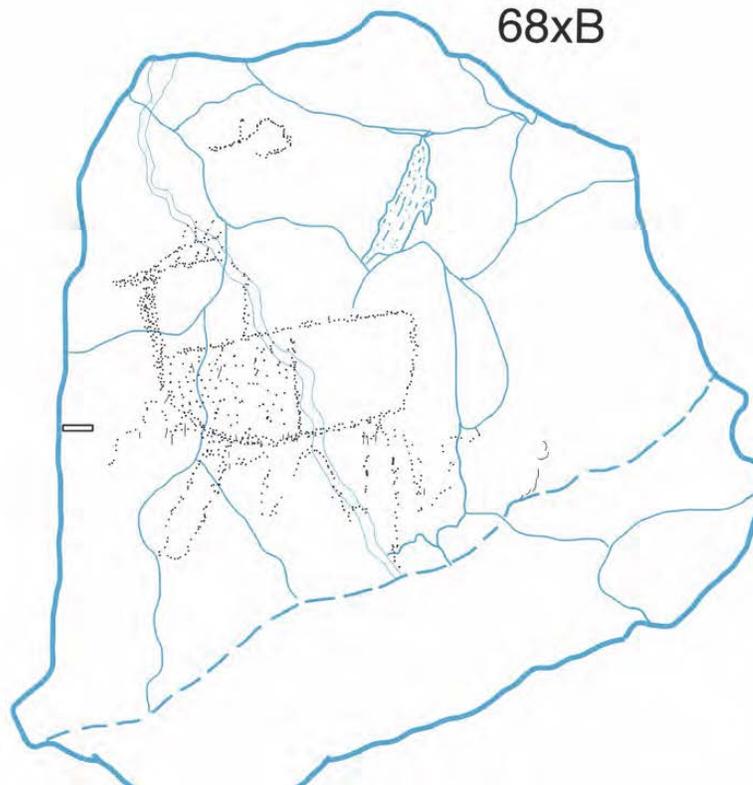
<http://culturalheritageimaging.org/>

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Phantom Quadcopter

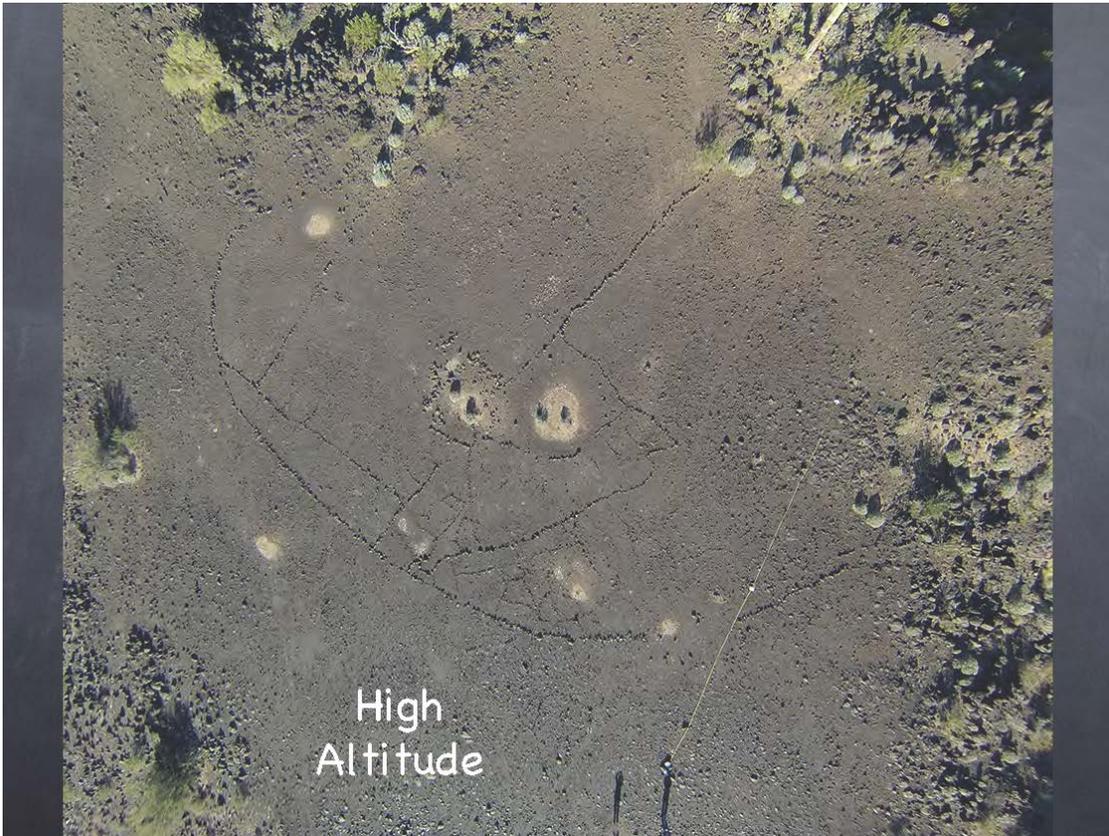


With GoPro Camera



Sears Point Area, AZ





High
Altitude

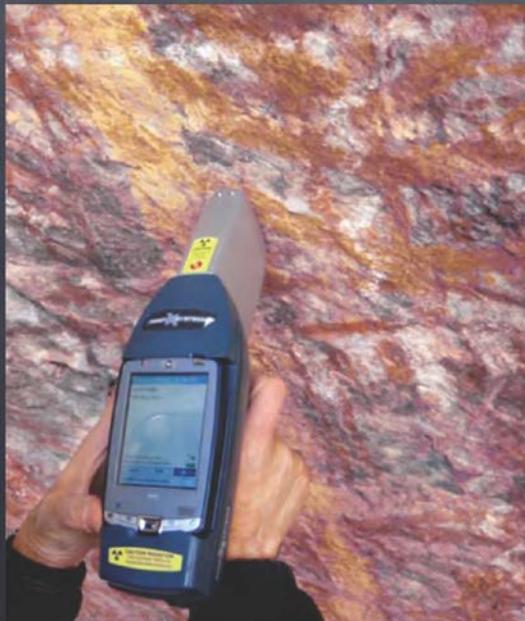


Horizontal Panel

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Portable XRF



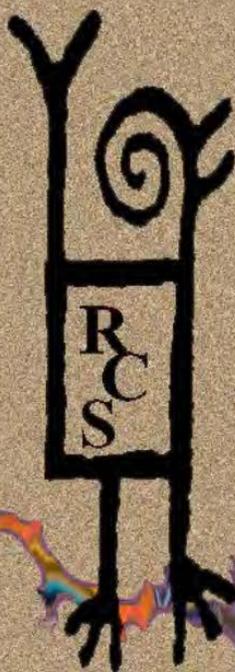
Qualitative Analysis, or “Is the blue-green pigment a copper-bearing mineral?”



Basketmaker site in northeastern Arizona.

Fe	Blq	Blue	Lt Green	Dk Green	Orange	Red	White
	5364	15850	5155		16291	8299	4738
	10363	19551	5912		22200	8444	8935
	6146	19472	5962				17720
	6027	8552	4553				
	5773	17647	5378				
	5051	24534	4700				
	4721	12393	6120				
	5106	13986					
	5663	10719					
	5314	16746					
		11897					
		6395					
		15697					
		6934					
		12891					
		15350					
		7725					
		6157					
		7952					
		13223					
		13495					
		8888					
Mean	8953	13030	8426	10564	19246	9356	10467
SD	1613	4891	631		4178	87	6630

Iron



Rupestrian CyberServices

rockart@infomagic.net

<http://www.rupestrian.com/>



