



Encountering the Prehistoric People of New Mexico

2012 FIELD REPORT

Background Information

Lead PI: Anastasia Steffen

Project scientists: The core groups is essentially the same. Matt Liebmann, and possibly Chris Toya, will have less involvement in the field than originally planned, but they can still be listed as part of the program at this point.

Report completed by: Anastasia Steffen

Period Covered by this report: 2012 June and September

Date report completed: 2013-03-25 01:50:04

Research site: No change in location.

Research site latitude / longitude: No change in location.

Protected area status: No change in protected status.



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Dear Volunteers,

Thank you for giving your time and hard work to the inaugural field season of excavations in Obsidian Valley. It was truly a joy to work with such adventurous and engaged people who share a commitment to unearthing the past's secrets!

Because of your support, the project has started off in a productive and positive direction. By the end of the season we had excavated in ten units and screened over 2 cubic meters of fill. You all know just how many little tiny obsidian flakes that included! We were able to achieve the first year goals set forth for the project which included understanding the spatial extent and condition of the prehistoric quarry.

The most gratifying outcome of the season was the discovery of widespread intact cultural deposits without substantial rodent disturbance. This site is more intact than any other we've encountered thus far at the Preserve.

The second big step forward during this season's work is a refinement of our field methods. We were uncertain how best to tackle the hard work of screening the excavated soils given the abundance of cultural and natural obsidian. By comparing the results of the two different sampling strategies utilized for the June and September expeditions, we are able to design a strategy for the future that maximizes efficiency and results.

With your help in testing these strategies, we now are confident that our sampling adjustments will make for a more streamlined and less back-aching system and will allow us to open even more excavation units next season. Lab processing is just now getting underway. By the end of May we will have a preliminary analysis of the materials we've examined, and will be able to prepare new interpretive materials for VCNP visitors so that they can share in your work.

Despite the dust of June and the curious bovine friends invading the dig site and occasionally interrupting our work in September, we found that working alongside volunteers with such good cheer and spirit of camaraderie made digging and screening all those little flakes more enjoyable for everyone!

We hope you find this report interesting and that you'll continue to follow the progress of the project. We thank you again for participating and we hope you will join us again, or send your friends our way, for another productive excavation at the Obsidian Valley quarry. With best regards,

A handwritten signature in black ink that reads "Ana Steffen". The signature is written in a cursive, slightly slanted style.

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VALLES CALDERA NATIONAL PRESERVE
"An Experiment in Public Land Management"

SECTION ONE: Scientific research achievements

Top highlight from the past season

Excavation in 2012 at archaeological site LA026919 in Obsidian Valley revealed intact cultural deposits across an extended area of this obsidian quarry site. The presence of relatively uncompromised soil horizons is not a complete surprise because we had high hopes for this location, but the degree and extent of intact soils exceeds our expectations; LA026919 may be the best-preserved large prehistoric site investigated thus far in the Preserve. The intact deposits here have the potential to hold numerous types of archaeological evidence of habitation behaviors (e.g., hearth, structures foundation, trash clusters) that could yield a wealth of information about past lifeways and patterns of human use in the valley. Likewise the potential for temporal dating at the site is promising. This offers enhanced opportunities to understand human use and occupation in the caldera and also to assess natural characteristics such as the spatial movement of the forest-meadow interface over time.

Reporting against research objectives

1. How can obsidian quarries inform on the long-term history of human land use in the Valles caldera? What information about past lifeways, technology, and economies can be gleaned from locations where obsidian was procured and reduced? In our excavations this year we did not find any surprises in the quarry artifact assemblage. Nearly all the artifacts recovered are indicative of lithic reduction rather than other activities associated with habitation or the processing of non-stone resources. This means that most of the inferences we'll be able to build at the quarries will depend on our understanding of the soil deposits, not the artifacts. See 4, below for a discussion of what we have learned about these deposits, and see 5 for a summary of how geoarchaeological results thus far relate to the questions here about past human behavior.

2. How were the Cerro del Medio quarries used by prehistoric peoples? Did these purposes change through time or remain stable across broad periods? Is there evidence for habitation as well as obsidian procurement, or were only the nearby habitation locations used? As noted above, habitation activities do not appear to be represented in the assemblage recovered thus far. To address questions regarding change over time we will need more field seasons and analyses that we will begin once we have the second season completed.

However one of the most exciting aspects of this season's results is confirmation of intact deposits, discussed in 4, below. We now have much greater optimism about the potential of this site for learning about temporal patterns of human use.

3. What chronometric methods can be used effectively to estimate the intervals and time range of quarry use? Applicable techniques for archaeological dating of surface assemblages may include relative dating via analyses of diagnostic lithic artifact form (e.g., obsidian projectile points) and ceramic types (if present). In subsurface contexts, analysis of stratigraphic superposition applies, and "absolute" methods include radiocarbon dating of buried soils and/or organic artifacts or charcoal, and optically stimulated luminescence. Obsidian hydration dating also offers enormous potential for both relative and absolute dating in both surface and subsurface archaeological contexts.

We will be able to successfully apply obsidian hydration for relative dating in the assemblages recovered in 2012. Thus far, our results do not support using any other methods. Radiocarbon and archaeomagnetic dating do not look promising here, but eventually there may be some application for optically stimulated luminescence. The potential for obsidian hydration dating (OHD) at LA026919 is very promising. Because advancing the methodology of OHD is a critical research focus for the cultural resources program at the Preserve, it appears that this site may be shaping up as a focal point for OHD analysis.

4. What is the condition of the archaeological record at the Obsidian Valley quarry location? How have cultural formation processes (e.g. trampling during site use), post-depositional disturbances processes (e.g., stratigraphic mixing caused by rodent and insect turbation), and geomorphic agency (e.g., hillslope processes) affected preservation of deposits and cultural information. To what degree have recent historic disturbances (e.g., road building, logging) diminished the integrity of information-bearing deposits?

Our greatest gains in understanding the archaeological record at LA026919 have come in these areas of geomorphology and site formation processes. The excavation in the eight units (fully completed in seven units) has been successful in providing a baseline assessment of the depth, stratigraphic characteristics, and integrity of the subsurface cultural deposits here (Worman 2012). Next year's work will address the spatial extent of intact deposits at the site. This will allow the Trust to build a plan for how to modify the road with full awareness of the potential impacts that may be incurred. Already the 2012 results are prompting some new brainstorming of other alternatives not previously developed, including

use of the slope above the road, including the existing logging roads that previously had not been considered suitable.

Summary: Excavations in 2012 were concentrated on the grassy slope in the meadow near and below the road, VC05, but we also began examining the burned/forested hillslope above

Figure (see appendices): Map of Obsidian Valley at archaeological site LA026919; burned/forested hillslope is on right and grassy meadow is on left.

Soils across the grassy lower portion of the site exhibit straightforward soil stratigraphy expressed as A/ B/ C horization with little evidence of either geologically- recent erosion or sediment accumulation. We could see a distinct visible boundary between the B and C layers which demonstrates the absence of substantial rodent burrowing



Figure: Discrete B to C soil horizons visible in side wall of excavated unit.

The rapid drop off of artifacts at this depth is in further support of minimal bioturbation. Some of the units further out into the meadow on the grassy slope below the road have a pronounced obsidian cobble layer at the B-to-C boundary. Causes are not yet determined but the cobbles may represent a layer created by severe bioturbation or may be related to ancient erosion.

On the forested and steeper slopes well above VC05, the minimal investigations thus far hint at deep cumulic soils and more mixing (possibly from tree throws and/or animal burrowing). Further testing will demonstrate both the information potential of the hillslope deposits (how much they may contain about past behavior) and how much recent disturbance processes (especially 20th century road building) have compromised the deposits, and how other natural disturbance (especially post-fire erosion) have contributed to the overall historic context of the soils.

Discussion of results: These preliminary data suggest that bioturbation processes are significantly different on different parts of the site. Specifically, they suggest that the grassy lower portion of the site has been affected by moderate levels of bioturbation caused by earthworms, other burrowing insects, and in some instances “fossorial mammals” such as rodents which dig and leave behind tunneled burrows that can fill with external sediments creating fossil-like features (e.g., krotovina). The higher, forested portions of the site, on the other hand, appear to have been impacted by higher levels of mixing. The absence of visible krotovina in those areas paradoxically may reflect a high level of faunalurbation by burrowing insects and/ or other animals. This is because the higher levels of mixing tends to obscure the differences of color and texture between soil horizons that make krotovina visible. In addition, floralurbation processes including tree-root throw probably are significant in the hillslope forested locations.

These investigations revealed surprisingly little evidence of erosion and deposition attributable to the recent Las Conchas fire. Much of the organic duff covering the forested portion of the site was burned, and burned organic material clearly has been re-deposited, but there is little evidence at present that there has been significant erosion of the underlying mineral soil. Approximately 4 to 12 cm of burned sediment were deposited after the fire at the location of excavation unit XU12-006, immediately below the forest – grassland boundary. The majority of those sediments appear to be organic (i.e., not the mineral soil), and the lack of artifacts within the recently deposited sediments suggests that there has been limited redeposition of cultural materials. Similarly, there is very limited evidence of cumulic soils at the site, with none of the excavation units besides XU12-006 revealing soils that suggest significant deposition or erosion in the geologically recent past. The mixing evident in the soils exposed by the shovel test pits in the forested portion of the site could reflect some amount of geologically recent deposition, but the depth of the soil profiles across the site overall indicates a high degree of surface stability. None of the excavated locations revealed deep cumulic soils similar to those common at site LA026917 nearby.

A concentration of cobbles and coarse gravels was visible near the boundary between the B and C soil horizons in many of the exposures. This concentration could be a stone line created by severe bioturbation. Alternatively, it may be a geogenic feature related to an episode of erosion in the past; or it could have been created by a combination of processes. At present, the observations that it is not present in all exposures and that it appears to vary in thickness and clastic content in patterned ways across the site (it is thicker and more prominent on higher and more steeply sloping landforms) provide some support to the hypothesis of a geogenic origin. Additional excavations and laboratory studies will help to determine the origin of the stone line, which in turn will provide some insight into the degree of bioturbation affecting the archaeological record.

We measure the space excavated as unit-levels (i.e., the materials found in a given 10-20 cm level removed from within one excavation unit is a unit-level). Over two hundred bags of obsidian from 86 unique unit-levels were collected from excavations in 2012. Analyses have begun in March 2013 and to date, only a small subset (70 cm below surface) and heavily disturbed by rodent turbation causing significant and deep mixing of cultural deposits (Worman et al. 2009). The site in Obsidian Valley has intact deposits with little apparent mixing in the grassy slopes below the road. That all the excavation units showed this result bolsters the potential for intact deposits widespread across the grassy slope. If this is in fact the case and there are widespread intact deposits across several acres, then there is a potential to find numerous types of archaeological evidence of habitation behaviors (e.g., hearth, structures foundation, trash clusters) that could yield a wealth of information about past lifeways and patterns of human use in the valley.

5. How can the investigations at Obsidian Valley quarry inform on similar sites on Cerro del Medio and at related geomorphic settings across the Preserve? How do the site formation processes and disturbance sources at this landform compare to other locations? How do these results suggest subsequent locations for study? Prior archaeological testing projects in the Preserve since 2000 had all encountered high degrees of rodent turbation and mixing of deposits. The presence of intact deposits at this location reinvigorates the effort to seek out similar kinds of locations and to gather data to develop models for how disturbance agents such as rodents are disturbed across the landforms and lithologic structures, elevation zones, vegetation regimes, and hydrologic systems. Ultimately archeological investigations can be key in describing not only the distribution of these attributes, but also how they have changed across the Holocene.

Worman, F. Scott 2012 Preliminary Report on Geoarchaeological Investigations at LA26919, Valles Caldera National Preserve Sandoval County, New Mexico. OCA/UNM Unnumbered Report. Ms. on File at Valles Caldera Trust, Jemez Springs, NM. VCT CR Report R2012-019.

Worman, F. Scott, Christopher. A. Turnbow, Yuichi Nakazawa, Richard C. Chapman 2009 2007 Archeological Data Recovery Program at LA 26917: VC02 (Road B) Mitigation, Valles Caldera National Preserve, New Mexico. OCA/UNM Report No. 185-908B. Ms. on File at Valles Caldera Trust, Jemez Springs, NM. VCT CR Report R2008-006. NMCRIS Activity 112788.



Volunteer excavation showing Band C horizons



Picking artifacts from screen



Sorting artifacts in nested sieves



Size sorted obsidian pieces

Changes to research plan or objectives

There have been no significant changes to the project activities. In the proposal we listed activities including survey on the Cerro del Medio dome. However due to the Las Conchas Fire in 2011, these have been curtailed. We noted this in the 2012 expedition briefing.

SECTION TWO: Impacts

Partnerships

All of the prior partnerships are being continued, with the exception of Matt Liebmann from Harvard (his role has been reduced to visiting researcher). One new partnership is with Missouri State University in Springfield, Missouri, where co-PI Scott Worman has been recently hired as a faculty member in the Department of Sociology and Anthropology.

Contributions to conventions, agendas, policies, management plans

- National or regional

The VCNP is working with the NM State Historic Preservation Office to develop a programmatic agreement for the management of cultural resources (CR) at the Preserve. This agreement will be innovative as it introduces several creative elements for management of cultural landscapes (i.e., instead of simply sites) and provides increased efficiencies in implementation of large projects (see "local" below). While management of cultural landscapes is not unique, prior efforts (especially by the National Park Service) take a somewhat different approach. NM SHPO has asked the Preserve to create a plan that can be used as a model for the state and potentially elsewhere in the US. Work at this site is one focal point in the development of this model. The excavation site was visited this summer by several staff from NM SHPO during the Earthwatch excavations, and they responded very favorably to the Earthwatch partnership and to the research effort underway.

- **Local**

This project has significant influence on resource management planning at the Valles Caldera National Preserve, and was noted in our recent "State of the Preserve" document.* Specifically, the results will help determine how road improvements will be designed in Obsidian Valley. Without the current project, we would be unable to assess and respond to potential impacts to the site. A motto of the VCNP CR program since inception has been that all management "compliance" projects should have a potential research outcome. With this project we are rapidly realizing that potential while also involving the public directly in site-specific fieldwork. More broadly, the project is providing information to be used in the modeling effort underway as a key part of the implementation of the cultural resource management component of our Preserve-wide "CFLR" plan. This collaborative forest landscape restoration program was recently created by US Congress to develop and fund large landscape-scale restoration programs across multiple agencies. The VCNP is in partnership with the USFS Santa Fe National Forest. The CFLR requires a Preserve-wide plan for CR management and this project is serving as an important source of knowledge about the information potential of subsurface deposits in the Preserve and will be used in building the CFLR geodatabase model for the Preserve. * The VCNP State of the Preserve 2007-2012 document will be posted to the VCNP website any day now. I can send a link as soon as it is available.

Developing Environmental Leaders

Local youth education: During both the 2012 sessions we were joined by a local student, Gabriella Ruiz, as a participant in the excavations and to video-document several presentations. Now Gabby is working in the lab on collections processing and artifact

analysis. She'll continue in the field in 2013 and will be using various media to document the work. The plan is for her to use this documentation to communicate with teen peers (e.g., as a video or website—she is still working this out) on what archaeologists do in a preservation program. We also were visited in June 2012 by members of Jemez Pueblo, accompanying co-investigator Chris Toya, who brought with them two Pueblo teens interning in the Pueblo Resource Protection office. Our excavation provided an example of a cultural resources management project within their ancestral landscape. Local outreach: PI Steffen gave an evening lecture at the Los Alamos Pajarito Environmental Education Center (PEEC) in January that discussed forest fire effects on archaeological sites (of great interest given the 2000 Cerro Grande and 2011 Las Conchas forest fires that affected the community). This project was included as an example of how to use the archaeological record to investigate the time depth of forest fires in the area. PEEC has great potential for developing co-programs and volunteer partnerships; the lecture provided an opportunity to initiate discussions of how to form a local group to participate in VCNP excavations and the potential for using PEEC as an organizing body for such efforts in private-federal conservation partnership.

Actions or activities that enhance natural and/or social capital

The Valles Caldera National Preserve was created to preserve and enhance the natural and cultural values of this volcanic landscape. There are numerous activities the Trust creates, encourages, and undertakes to facilitate or restore the natural environment. Most prominent recently is our involvement in the CFLRP (Collaborative Forest Landscape Restoration program) with activities ranging from forest restoration (i.e., fuels reduction through tree thinning and use of prescribed fire), watershed restoration (through roads improvements to decrease sediment runoff, replanting native species along streams impacted by a century of livestock grazing, and through wetlands erosion control projects, often using volunteers from the “Los Amigos de Valles Caldera” non-profit support group), systematic removal of noxious invasive species (esp. along roads), and through incubation of local economic partnerships (e.g., the Walatowa Woodlands Enterprise at Jemez Pueblo to create commercial uses for trees thinned during forest restoration). Overall VCNP environmental activities are even more numerous and include activities as diverse as volunteer surveys to locate the biggest ancient trees in the caldera for genetic testing and potential seed harvest, teen ranching camps that include addressing sustainable beef production practices, and events to teach primitive skills such as animal tracking, stone tool technology, and fishing. Within the VCNP cultural resources program we conduct several activities to involve and engage the public including public tours to archaeological and historic sites in the Preserve, survey projects

using local volunteers, and an oral history interview program to capture the stories and experiences of the ‘old-timers’ from the surrounding communities.

Conservation of Habitats

Our research project is not a project that directly conserves habitat. However our work is in support of road upgrade needed not only to improve the function of the dirt road but also to repair drainage problems that increase surface run off and sediment transport. Repairing the road will contribute to VCNP efforts to improve stream quality, decrease water turbidity levels, and enhance the riparian and fish ecology of the caldera stream network. More broadly, our investigations will inform on establishing baseline data for reconstructing historic and earlier habitats in this high-elevation montane setting. Specifically, our archaeological research will help create data to eating data to define shifts in the configurations of the forest-meadow ecotone, and discern temporal intervals and age ranges associated with diverse burrowing creatures, including ants, worms, gophers, and prairie dogs.

Ecosystem Services

Not directly. The VCNP is deeply involved in improving of stream water quality and restoring forest systems to increase downstream water delivery to urban consumers (i.e., Albuquerque and Rio Rancho) and Pueblos (e.g., Jemez, Zia, and Santa Ana Pueblos). This project supports these objectives indirectly.

Conservation of Cultural Heritage

Archaeological research and cultural resources preservation are the central goals of the project. The tangible cultural resource being protected is the specific archaeological record at site LA026919 and the entirety of archaeological resources across the Preserve. The intangible values include the educational, interpretive, and experiential contexts associated with the cultural uses of intact natural landscapes.

Work at the quarries furthers archaeological research goals, and enhances efforts to develop effective measures to discover, evaluate, and protect cultural resources, while also creating opportunities to educate the public in the Native American present and past in the region. This project integrates research with management goals in order to make the best informed decisions about how both to protect and to explore the information potential contained in the subsurface at archaeological site LA026919. More broadly, the project is providing information useful for assessing the information potential of buried sites across the caldera, and will be incorporated into larger efforts to describe the status of archaeological sites as

we model archaeological site distribution across the caldera landforms using the GIS geodatabase currently under development.

The Preserve generally avoids excavation at significant archaeological sites, so the invasive work we are doing at LA026919 must produce the maximum knowledge output to justify the disturbance incurred. Given that the excavation results obtained in the first season are rather more productive than expected, we anticipate that by the end of the first two years we will be able to make specific decisions about how to reconfigure the road while minimizing disturbance and maintaining the in-road exposures of obsidian that we seek to use as a teaching opportunity for future visitors to Obsidian Valley.

This scenic location has already been a focal point for public engagement with the prehistoric lifeways in the caldera. Our goal is to have an upgraded road to bring visitors to the valley for hands-on interpretation of how past peoples used the obsidian, and also to experience this specific location. Here visitors are exposed to the quiet of solitude and a visual landscape unaltered by human development. It is evocative of the prehistoric environment before the agrarian landscape modifications we have become so accustomed to seeing. A key perspective of the VCNP CR Program is that the direct experience of these early landscapes affords a unique opportunity for modern peoples to learn about a sustainable human past. The current project supports this approach by providing specific knowledge about the early human uses of this specific undisturbed valley. As our public access and use plan goes into further development (this plan is now in the post-public comment phase and entering the stage where actual use zones are being developed), the research results discussed elsewhere in this field report can be used to weave a narrative for visitors that gives tangible details to the more subtle place-based learning experiences the caldera landscapes can provide.

Local community activities

The local community is kept informed through short articles in the local paper. We were able to include two dedicated volunteers from the local community, a local teenager and Dr. Jamie Gardner who assisted on both teams. For next year we are hoping to build a small group of local volunteers to assist in lab processing of excavated materials. We also will have field visit day(s) for professional and public visitors. This was not possible in 2012 because of damage to the road caused by erosion due to the 2011 Las Conchas Fire. We anticipate that road conditions will be much better in 2013 allowing greater access by visitors.

Dissemination of research results

Grey literature and other dissemination

Attachments: 1. Jemez Thunder article (local paper) 2. Geoarchaeology preliminary report (Worman 2012) 3. LA026917 Ch. 6: Natural Transformations and the Archaeological Record (Worman 2009; this is a helpful reference to understand the field results obtained in 2012). 4-6 Three additional maps

SECTION THREE: Anything else

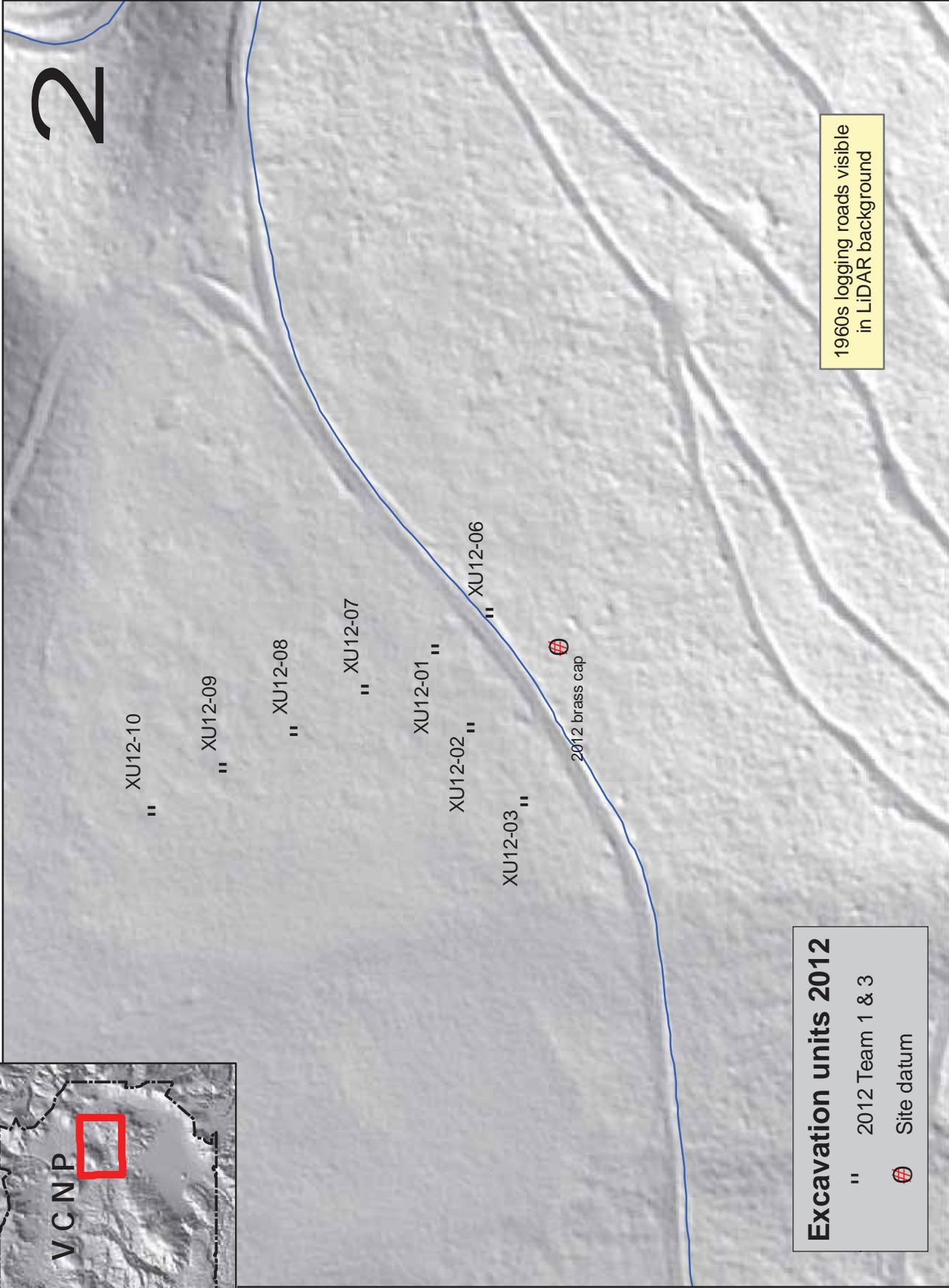
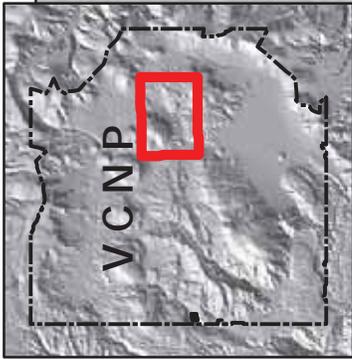
Is there anything else you would like to tell us?

We have really enjoyed this experience so far. Working with the Earthwatch volunteers has been an enriching experience, not only with regard to the current project, but also because it has provided an excellent opportunity to see the VCNP with new eyes and to expand our vision for CR education and engagement. Thank you!

Acknowledgements

The entire team would like to thank the Earthwatch volunteers who provided so much hard work and helped us get this project off to a great start. We appreciate not only their labor but also their curiosity, their suggestions for improving the project, and their good cheer. The staff of the VCNP cultural resource program also deserves a big thank you for kicking in more time and energy than originally planned and graciously putting aside other priorities to make this project happen smoothly. These include not only research team members Jamie Civitello and Jackie Stark, but also Heather Evans, Jonathan Knighton-Wisor, Lillian Richards, Mia Jonsson, Michaela Grillo, and Tom Hanson. We appreciate other VCNP staff members who shared their expertise with us along the way including Jim Trout, Marie Rodriguez, Bob Parmenter, and Executive Director Dennis Trujillo. Special thanks to Rory Gauthier, Bandelier National Monument, for providing perspectives on Ancestral Pueblo lifeways, to Tim Haarmann, VCNP, for helping with the roads and cattle, and to all the staff at Science and Education Center for making our stay there comfortable and delicious..

Appendices



Excavation units 2012

- " 2012 Team 1 & 3
- ⊕ Site datum

1960s logging roads visible
in LIDAR background



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**Valles Caldera National Preserve
LA026919 Site Testing 2012**