REVIVING THE CLASSICS: DOCUMENTING THE NORTH CHUCKWALLA MOUNTAINS PETROGLYPH AND QUARRY DISTRICTS

DOUGLAS MENGERS, NICK DOOSE, AND WILLIAM ECKHARDT

Research conducted on behalf of Southern California Edison for the construction of the Devers-Palo Verde 500-kV transmission line for environmental review and historic preservation identified and nominated two National Register districts in the Chuckwalla Valley, Riverside County, in 1981. A second 500-kV transmission line (DPV2) through this corridor was constructed in 2013. This article briefly addresses problems encountered with rectification of 30-year-old project data, identifies the methods and steps used to incorporate new data, and outlines measures taken to prevent similar loss in data from the DPV2 findings, with recommendations for managing resource preservation for the next 50 years.

DPV2 PROJECT BACKGROUND

The construction of the Devers-Palo Verde 500-kV transmission line (DPV1) led to research conducted on behalf of Southern California Edison (SCE) in the late 1970s for environmental review and historic preservation and the nomination of two National Register of Historic Places (NRHP) districts in the Chuckwalla Valley, Riverside County, California (Carrico, Gallegos, and Day 1981; Carrico, Gallegos, and Thesken 1981; Carrico et al. 1982). A second 500-kV transmission line (DPV2) through this corridor has recently been constructed, being completed in 2013 (Eckhardt et al. 2014).

THE CHALLENGE

The federal and state licensing requirements for recording, preservation, and mitigation treatment for this second transmission line within the two NRHP districts framed the challenge. This article briefly addresses problems encountered with the rectification of 30-year-old project data, the methods and steps used to incorporate new data, and measures taken to prevent similar loss in data from the DPV2 findings, with recommendations for managing resource preservation for the next 50 years.

INTRODUCTIONS

Key personnel on the cultural resources portion of the DPV2 project include Bill Eckhardt and Matt DeCarlo of ASM Affiliates, and Doug Mengers and Nick Doose of PanGIS. As Project Manager, Eckhardt also managed the DPV2 project for Mooney & Associates and Jones & Stokes. DeCarlo was the lead field archaeologist. Mengers was the GIS lead, with a special focus on the quarry district. Doose was GIS specialist, with a focus on the rock art district.

NATIONAL REGISTER DISTRICTS

The North Chuckwalla Mountains Petroglyph District (NCMPD) and North Chuckwalla Mountains Quarry District (NCMQD) were created in 1981 as a mitigation measure as part of the DPV1 project, the result of early implementation of Section 106 combined with cultural resource management. Mitigation by avoidance was favored over data recovery where possible. As originally planned, the DPV1 transmission corridor ran through the center of the NCMQD, with one tower built directly on the main quarry locus. Consultation between SCE, Westec Services, and the U.S. Bureau of Land Management (BLM) resulted in the relocation of three towers and the rerouting of the transmission line and access roads 150 m (500 ft.) south of the quarry hill base. In addition to mitigating most direct effects, the

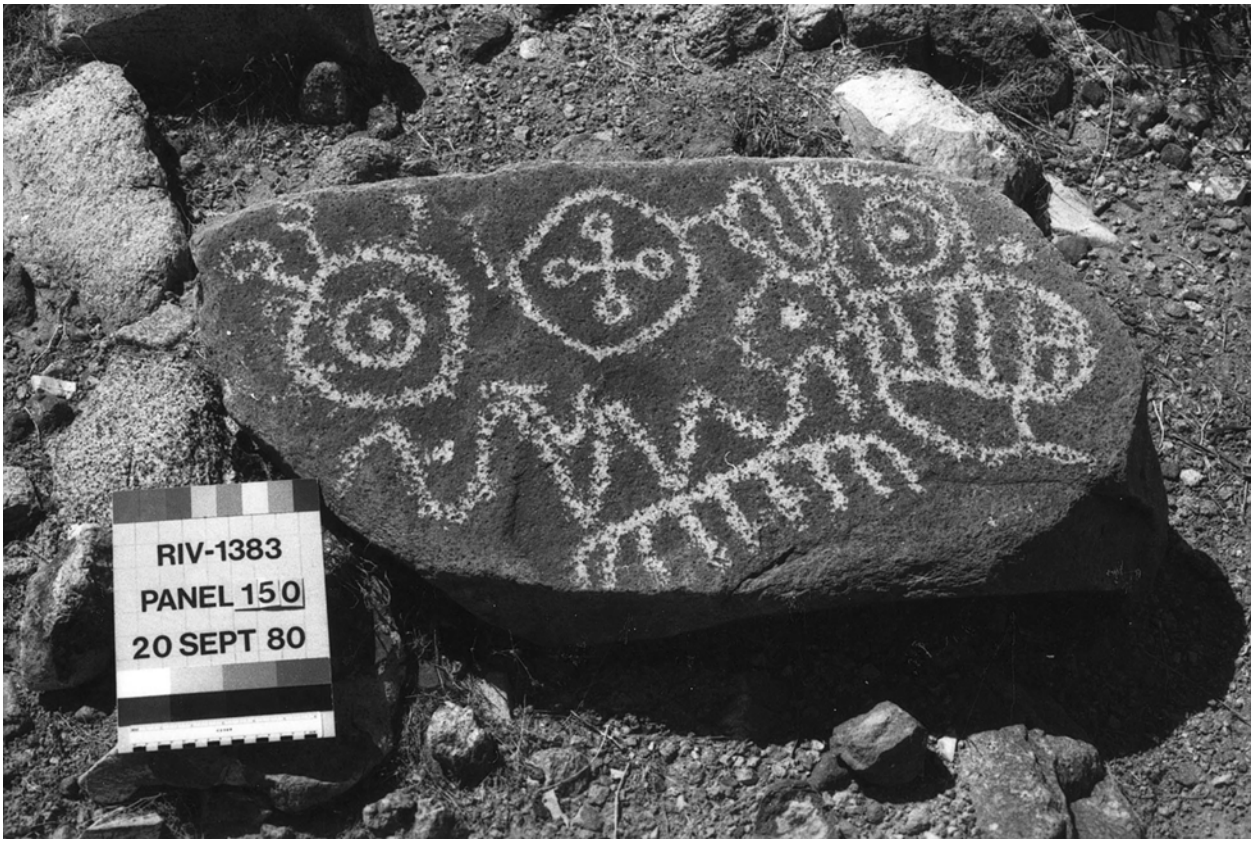

Figure 1. RIV-1383, Panel 150.

rerouting also minimized visual impacts to the quarry. Since five loci remained in proximity to the new southern route, it was recommended these loci be flagged for avoidance during project construction. For the NCMPD, a detailed survey and consideration of the relationships between its internal features determined that no rerouting of DPV1 would be required.

Following the construction of DPV1, the BLM initiated the development of a protection plan for the Alligator Rock Area of Critical Environmental Concern (ACEC), identifying continued survey, study, and recording of cultural sites, recommending specific road closures and the maintenance of barrier gates, and implementing a resource monitoring plan (Swenson 1986).

ROCK ART DISTRICT

The NCMPD (CA-RIV-1383) is located on the southern edge of Chuckwalla Valley, at the mouth of a major unnamed drainage on the northern flank of the Chuckwalla Mountains near Desert Center in Riverside County. Rock art occurs on rhyolitic outcrops forming a series of low ridges in front of a rocky hill on the east side of the wash and directly opposite on outcrops that form a small ridge on the west side. When originally recorded in 1980, the NCMPD covered an area of 76 acres and consisted of 170 panels (Figure 1).

The petroglyphs of site RIV-1383 were first located by Gerrit L. Fenenga of the BLM on June 20, 1979. In December 1979, the site was revisited and recorded by Westec Services as part of the DPV1 study for SCE. The third investigation of site RIV-1383 was conducted by Westec Services in 1980 to delineate site boundaries and to assess the site for NRHP nomination. As part of the 1980 investigation, the rock art was recorded in a single-pass process in which field crews marked petroglyph panels as they were encountered in the field survey. The NRHP nomination form for RIV-1383 was submitted to the

Figure 2. RIV-1814 lithic workshop.

Department of the Interior in late 1980 under the name "The Kingdom of Zion Site," after the religious commune located in the canyon upstream from the archaeological site. The current reexamination of the petroglyphs was conducted by Ken Hedges, field investigator and author of the previous record (Hedges 1982).

QUARRY DISTRICT

The NCMQD (RIV-1814) consists of a small system of granitic and basalt hills that rise out of the flat alluvial plains in the southern Chuckwalla Valley. The district was initially recorded in 1980 during surveys for the original Devers-to-Valley 500-kV transmission line (Carrico et al. 1982). The record noted that the site was predominately a tool stone procurement site, but also noted four rock features, including a hunting blind and one petroglyph element. Primary flakes and cores dominate the assemblage, as is typical of tool stone procurement sites; however, several bifaces were identified. The resource covered approximately 412 acres and included over 50 workshop areas within the main quarry, as well as 69 additional nearby loci (Figure 2). The site was in excellent condition, and there was little evidence of modern visitation. Soon after its recordation, the nomination of the quarry district to the NRHP was submitted and accepted.

WHAT WE STARTED WITH

The DPV2 cultural resources team began by assessing the existing data for both NRHP districts. This consisted of the 1980 site records filed by Westec and the NRHP applications for both districts, as well as archived data held by SCE from the DPV1 project. The artifact assemblage was obtained from curation at University of California, Riverside. Upon review, problems with this starting data collection immediately began to turn up.

PROBLEMS WITH WHAT WE STARTED WITH

Problems with imagery

Most noticeable was the poor quality of imagery. The photographs contained in the reports, site records, and NRHP applications had been reduced to unidentifiable blurs by repeated photocopying (Figure 3). This rendered them useless for re-locating the resources depicted or determining how the resources had been impacted over the intervening decades.

Problems with Maps

Detailed maps of both districts had been produced to support the NRHP nominations. The NRHP application form for the quarry district included a detailed map of the petroglyph district instead of the quarry district, and the petroglyph district map was not included in the petroglyph district application at all. What maps *were* included were low-quality black-and-white photocopies, degraded similarly to the imagery discussed above. Even the highest-quality map from the 1980 report was very nearly useless (Figure 4).

In general, the maps from 1980-1982 show inconsistencies, including typographical errors, inaccurate UTM coordinates, and multiple locations shown for single loci, primarily as a result of NAD27-to-NAD83 conversions and/or plotting from 1:62,500-scale maps to 1:24,000-scale maps.

The main NCMQD map is a good illustration of these problems. Included as Figure 2 of the 1982 report by Carrico and others, this map was not included at all in the NRHP application. Additionally, a different version of the map was used as the cover of a hardcopy image gallery included with the DPV1 document archive. To add to this confusion, the district boundaries were different on each of the maps; one map used points to indicate loci, while the other used polygons; and each map was missing certain features that were included on the other.

The maps included in the NRHP application were problematic as well. UTM transcription errors were fairly easy to rectify, but once the maps were georeferenced it became clear that the UTM points did not match the verbal boundary descriptions given in the NRHP applications. Once an aerial background was layered in, these errors became more pronounced. For instance, one particular boundary point's verbal description clearly stated that it was located on the east side of a major wash. However, the plotted UTM coordinates placed it on the west side of the wash, an error of 80-100 m. Additionally, the shape of the NCMQD boundary on the main NRHP application map did not match the shape of the district on other maps included in the application. The largest discrepancy occurred near the main quarry area. According to the main application map, approximately 25 percent of the main quarry area falls outside the district boundary. Because of these errors, the information on the application map regarding loci shapes, sizes, and locations could not be trusted.

Furthermore, what appeared to be an incomplete map of the NCMQD had no legend and contained labels for points not mentioned in any report or record. The details of this map, and the process performed to extract usable data from it, are discussed later in this article.

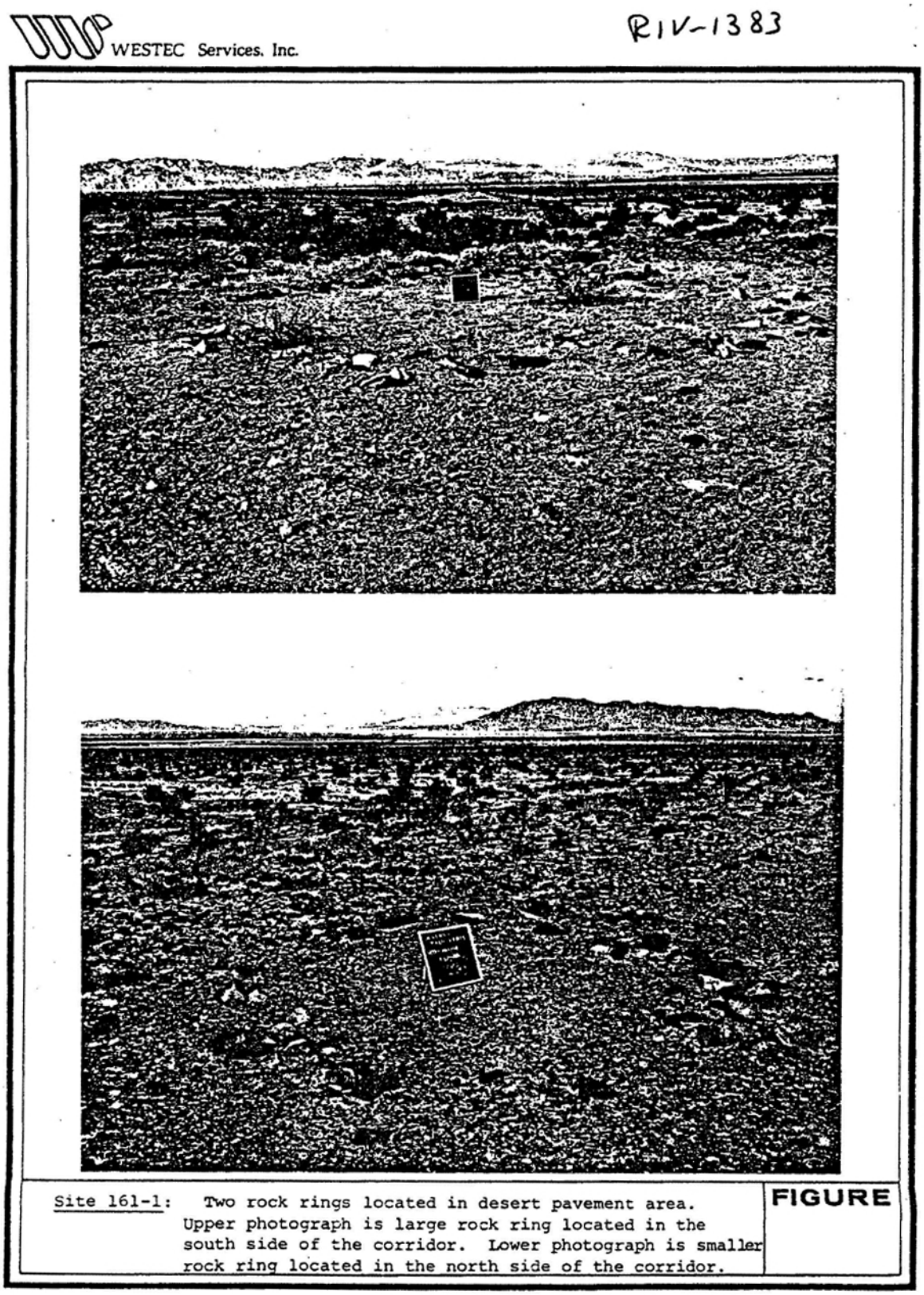

Figure 3. RIV-1383, Site 161-1, WESTEC report, 1980.

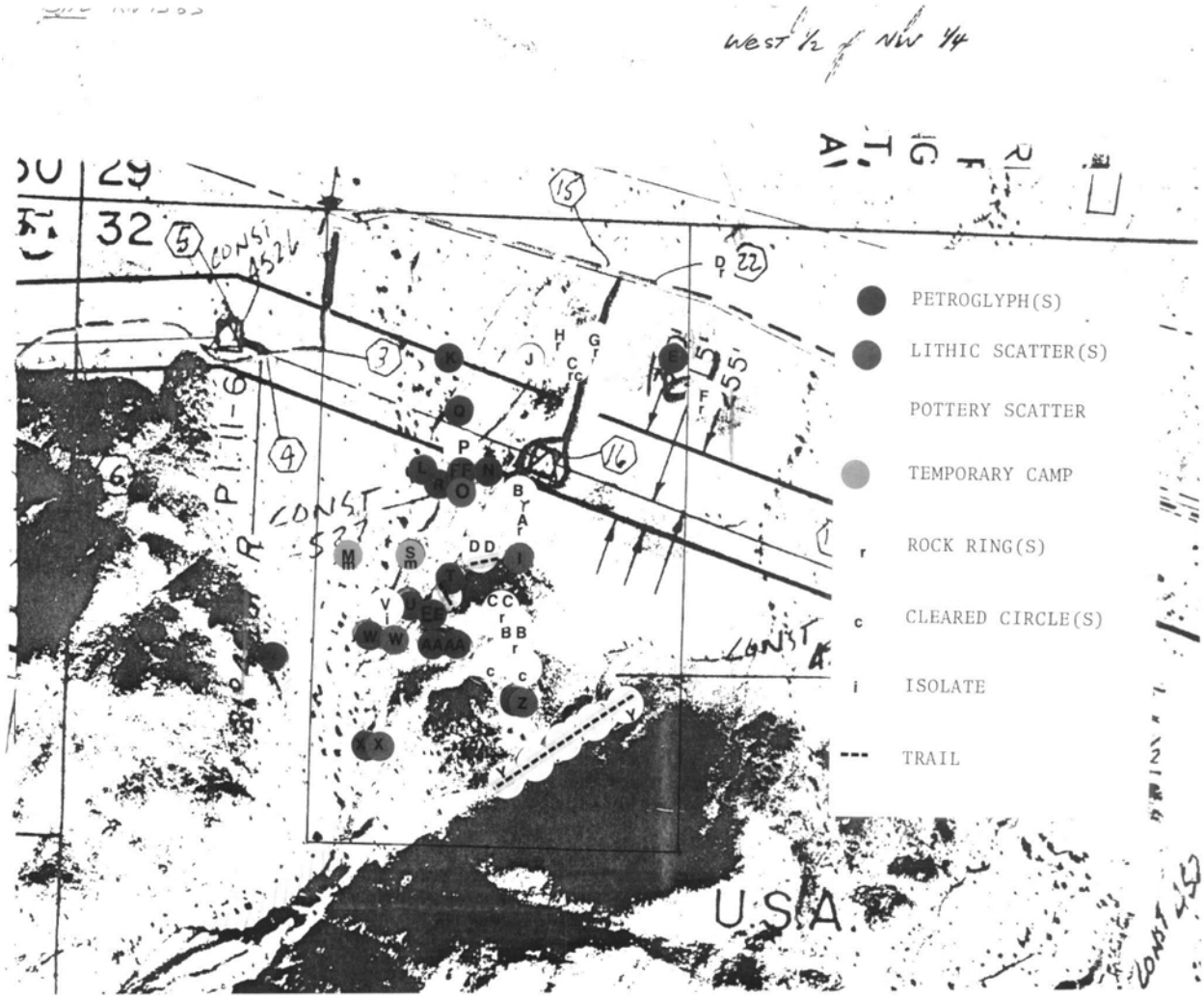

Figure 4. RIV-1383, Site Map, WESTEC report, 1980.

Problems with Artifacts

The 1980-1981 testing program of the NCMQD and NCMPD was only a portion of the archaeological study undertaken by SCE for DPV1 (Carrico et al. 1982). In 2010, efforts were initiated to locate the artifact assemblages generated from that study (DeCarlo et al. 2013:38). It was determined that an assemblage consisting of seven boxes and two milling stone slabs representing the artifacts recovered from 13 sites and 40 isolated finds had been transferred to the Archaeological Curation Unit, Department of Anthropology, University of California, Riverside, and curated as Accession No. 77 (Matthew C. Hall, personal communication 2010). The boxes and documentation of Accession No. 77 were reviewed in Riverside on June 16, 2011, and copies of the original transmittal correspondence (Westec Services 1981) and the complete artifact catalog were obtained at that time.

The 1982 DPV1 report indicated a total of 535 specimens collected from the NCMQD (Carrico et al. 1982:148). Clay Singer's NRHP district investigation reported a total of 587 pieces collected, including a few miscellaneous tools collected from outside the main quarry (Locus 21-1) (Carrico et al. 1982:D-9; Singer 1982). The same page of the Singer appendix, however, also reported a total artifact count of either 604 or 667, depending upon how reconstructions were counted, which is unclear. As

received by ASM from UCR, the NCMQD portion of Accession 77 was catalogued as 588 items, but actually consisted of 514 artifacts. Approximately 70 lithics and four ceramic sherds could not be found in the accessioned assemblage. Fifty of the missing lithic items were catalogued as micro-flakes, most with weights recorded as less than 0.1 g.

Additionally, a serious and in some ways insurmountable shortcoming of recorded provenience information exists for these collections. Provenience for the artifact assemblages recovered from the NCMQD and NCMPD was known only as far as their respective locus addresses. No archived coordinate location (e.g. point-provenience) data for either the assembled artifacts or the placement of excavation test units could be located. There is evidence that provenience was recorded for each locus collection (Carrico, Gallegos, and Thesken 1981:Table 1; Carrico et al 1982:120), but no tabulated record of artifact or test unit coordinates nor any notes of transit reading positions have survived. Two report graphics demonstrating intra-site artifact distribution for loci where artifact scatters were micro-mapped are all that remain (Carrico et al. 1982:Figures 7-14 and 7-16).

FIRST STEP: OBTAIN MORE DATA

Our first step in rectifying the 30-year-old data and bringing them forward was to obtain more data where available.

Original Aerial Imagery

Aerial photography and photogrammetric processing were conducted by San-Lo Aerials of San Diego in September 1980. We contacted the company, and, although they were still in business, their archives for this particular project were incomplete. We were able to obtain the original high-resolution black-and-white stereoptical pairs in digital format for each of the districts. What they were unable to provide to us was any georeferencing data, which would have to be reconstructed manually.

1980 Lithic Specialist

We also contacted the lithic expert who had done the detailed investigation of the quarry district ahead of the NRHP application. Singer, the lithic specialist who performed the intensive recording, mapping, and data recovery of the main quarry area (Locus 21-1) in August and October 1980, was contacted in September 2012, to secure any additional project material that had not already been curated. In October 2012, Singer shipped a box of material to ASM Affiliates to be curated with the combined DPV collection. The box included slides, field notes, and research (Figure 5).

Included with the package of field notes and other materials received from Singer was a single projectile point. The point, a leaf-shaped Pinto/Amargosa-period white chalcedony projectile point exhibiting fine pressure flaking technique, was the sole artifact recorded for Locus 28-2 (Carrico et al. 1982:146). It is assumed that the point was collected during the NRHP investigation in 1980, but it is unknown how it came to be in the Singer collection. It has now been added to the artifact collection.

1980 Project Archaeologist

Dennis Gallegos, project archaeologist during the 1980 investigations, was contacted in June 2012 to secure any additional project material that had not already been curated. In July and August 2012, he loaned to ASM three binders of appendices to the 1982 report by Carrico and others. These appendices include handwritten site record forms, the original artifact catalogue, project-wide route maps with site locations, and a temporary-to-permanent site number key. The binder contents were digitally scanned, and the binders were returned to Gallegos. A plastic overlay map of the quarry district survey was also provided, which allowed us to reconstruct the initial NRHP survey, including how the loci were numbered, which was less than obvious.

Figure 5. Collage of Singer materials.

Kingdom of Zion: Trouble Acquiring More Data

The Kingdom of Zion, the popular name for a religious cult that at one time occupied an area adjacent to the rock art district, presented a unique research problem (Figure 6). Research in local newspaper archives was conducted for information on the group, and the BLM was contacted for any information they may have had. Two main problems surfaced. First, individuals contacted had disparate memories of occupant affiliation, dates of contact and residency, and so on. Second, and related to the first, was the length of research time required and the lack of solid information garnered. This "diminishing return" resulted in the research project being called off before definitive information could be obtained.

RECTIFICATION

The next step in the process was to rectify all of the extant geographical data. A GIS project file was created for the district in December 2011. This included all relevant geographic data from the main DPV2 GIS project file, as well as any data related specifically to the NCMQD and NCMPD. Maps from the DPV1 report (Carrico et al. 1982), the 1981 NRHP application, and the small-scale Singer contour map were added to the GIS project file. Because physical ground-control points were missing from these maps, georeferencing was required to be done manually with the use of ArcGIS software, a digital form of "rubber-sheeting."

Figure 6. RIV-1383, Zion Painted Rock.

PROCESS – INCORPORATION OF NEW DATA

Once the geographic data were compiled, a workflow was created that would lead from rough data to analysis to a field plan to a field visit to revised data, which would then themselves be analyzed, starting the cycle over again (Figure 7).

ROUGH DATA

To prepare for the incorporation of new data, existing data were first gathered together. These rough data included all reports, site records, and NRHP application forms, as well as all additional imagery and maps obtained from those associated with the 1980-1982 investigations mentioned above.

ANALYSIS → FIELD PLAN → FIELD VISIT → REVISED DATA → …

In the first step of this process, the rough data were analyzed. This included comparing one report with another, compiling tabled data from each of the reports, layering georeferenced maps in the GIS file, performing spatial analysis, and so on. Once georeferenced maps were examined, inconsistencies could be analyzed and reduced, resulting in more accurate locational information with which a field plan could be developed.

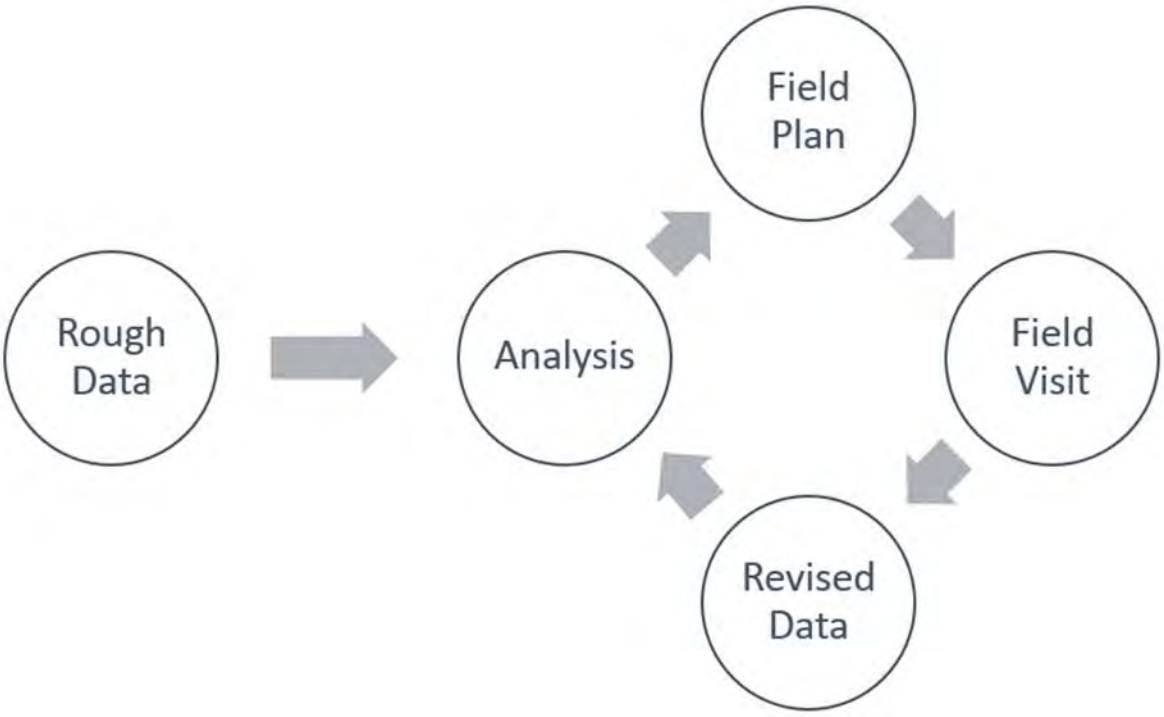

Figure 7. Process flow.

This field plan was then used by field archaeologists to help determine how to load up the field global positioning system (GPS) units for a field visit, primarily to re-locate loci during June and July 2013 visits to the NCMQD (Figure 8). For the NCMPD, high-resolution scans of contact sheet prints for all panels examined in 1980 were created and used in the field survey to aid in panel reidentification.

This allowed for a much more targeted and efficient use of time while on site during the summer heat. (Fieldwork was conducted at the NCMPD in March, April, and June, and at the NCMQD in June and July.) With this type of pre-field analysis and preparation, we were able to ground-truth several streams of existing data in one visit. This then helped us to fine-tune and revise the data, beginning the cycle again.

SINGER MAP EXAMPLE

An example of this process can be seen in how the "incomplete" map mentioned above (the Singer map) was addressed. The Singer map is a large-scale contour map that was included in the DPV1 document archive obtained from SCE. Singer's handwritten notes explained that the "incomplete" map was from the separate NRHP investigation of the main quarry, indicating that perhaps it was not "incomplete" at all.

The map was created using data collected by Singer during his 1980 investigation of the NCMQD. In reviewing that map, ASM archaeologists noticed that several dozen map points were clustered around the main quarry area of the district, but the map contained no legend, and most of the labels ("SW4", "FAN #1", etc.) could not be related to any data in the NRHP nomination or the 1982 report by Carrico and others. The significance of these locations was unexplained.

In preparation for the field visit, the Singer map was georeferenced in ArcGIS software, and all of the points were loaded onto a Trimble field GPS unit. During the June 2013 field visit, pin flags with metal tag labels, some with writing legible enough to match the label on the contour map, were discovered within 5-8 m of most of these mapped points (Figure 9).

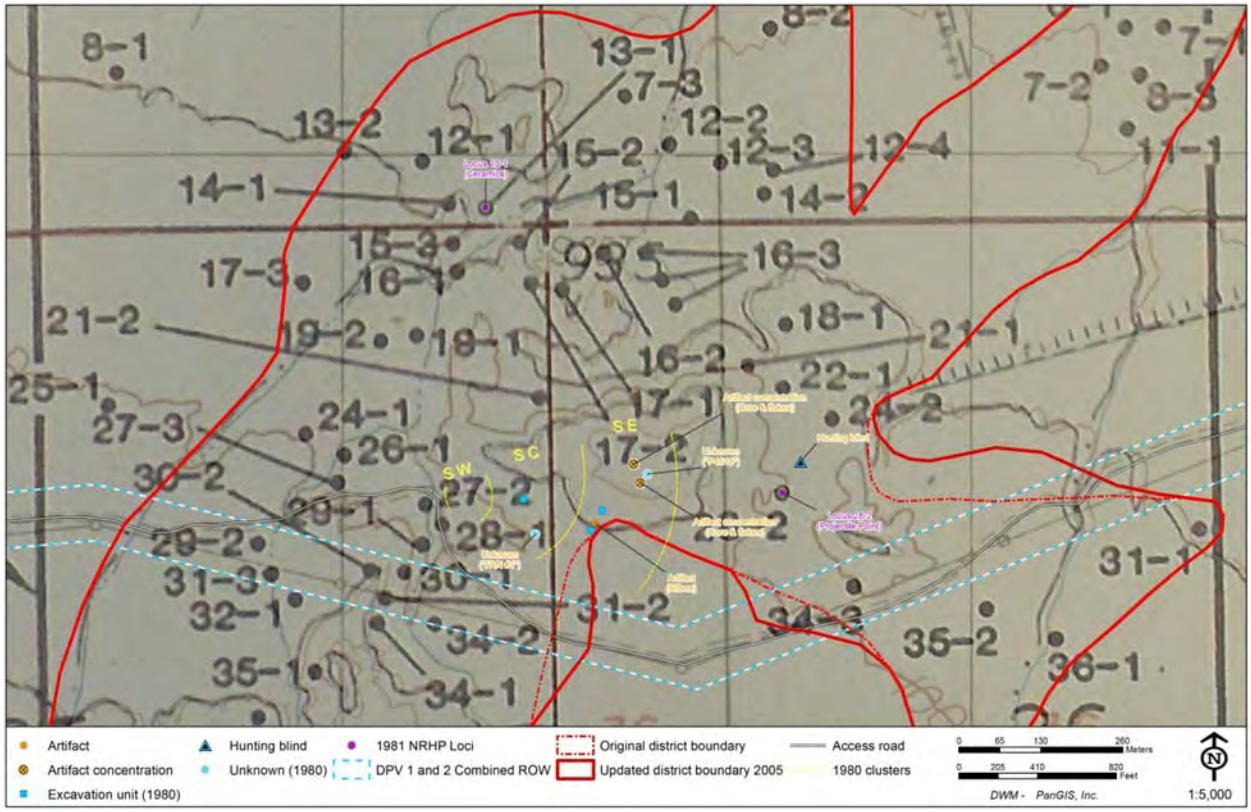

Figure 8. RIV-1814 target areas.

Once on the ground, it became apparent that the map points referred to individual workshops within larger sample areas (SW Area, SC Area, and SE Area) discussed in the DPV1 report (Carrico et al. 1982:148) and in its Appendix D. New GPS points were then recorded at each of these locations.

Using these new data, the Singer map was more precisely georeferenced (Figure 10). The DPV1 report indicated that descriptions of these smaller individual workshops existed (Carrico et al. 1982:148), but researchers were unable to locate any workshop descriptions, even in Singer's handwritten field notes. With this new understanding, more useful rough data could be extracted from the remainder of the Singer map and Singer's field notes, beginning the cycle again.

WHAT WE WOUND UP WITH

After several cycles of this process, we wound up with a collection of very accurate and useful data to bring the record forward. This included high-precision UTM coordinates (NAD83, sub-foot accuracy) of rock art panels, lithic workshop locations, and test units. ArcGIS map packages were created, allowing these data to be delivered to the client and curated with the artifact and document archive. Google Earth kml/kmz files were also created, allowing those without ArcGIS to access the geographic data visually.

Ultimately, significant updates were made to both the NCMQD and NCMPD. Nineteen new loci were added to the quarry district between the original recording and 2014. In the same timeframe, 61 additional panels and four new loci were added to the petroglyph district, bringing the total number of elements in that district up to 512.

Figure 9. RIV-1814, metal pin tag.

GOING FORWARD

Going forward, we devised several steps to meet our goals of bringing forward a coherent data archive and preventing data loss for the DPV2 findings.

Remove or Segregate Bad Data

Our first step will be to remove or segregate "bad" data. Getting rid of data that we now know to be inaccurate (for instance, incorrect geographical coordinates for resources), will benefit future researchers. They will not need to vet old data again, and can start with the 2014 dataset instead of the 1979 dataset.

Prevent Future Data Loss

Another goal is to prevent future data loss, in part achieved by improving future data accessibility. The goal here is to use available technology in such a way as to make the data accessible to many people in the future, rather than the technology limiting access. To this end, we will archive the data in multiple file formats, including the latest versions of ArcGIS and Google Earth (kml/kmz). We will store the data on multiple digital media storage platforms, including optical disc (CD/DVD) and USB memory stick. The data will be curated with the artifact and paper document collection at the Western

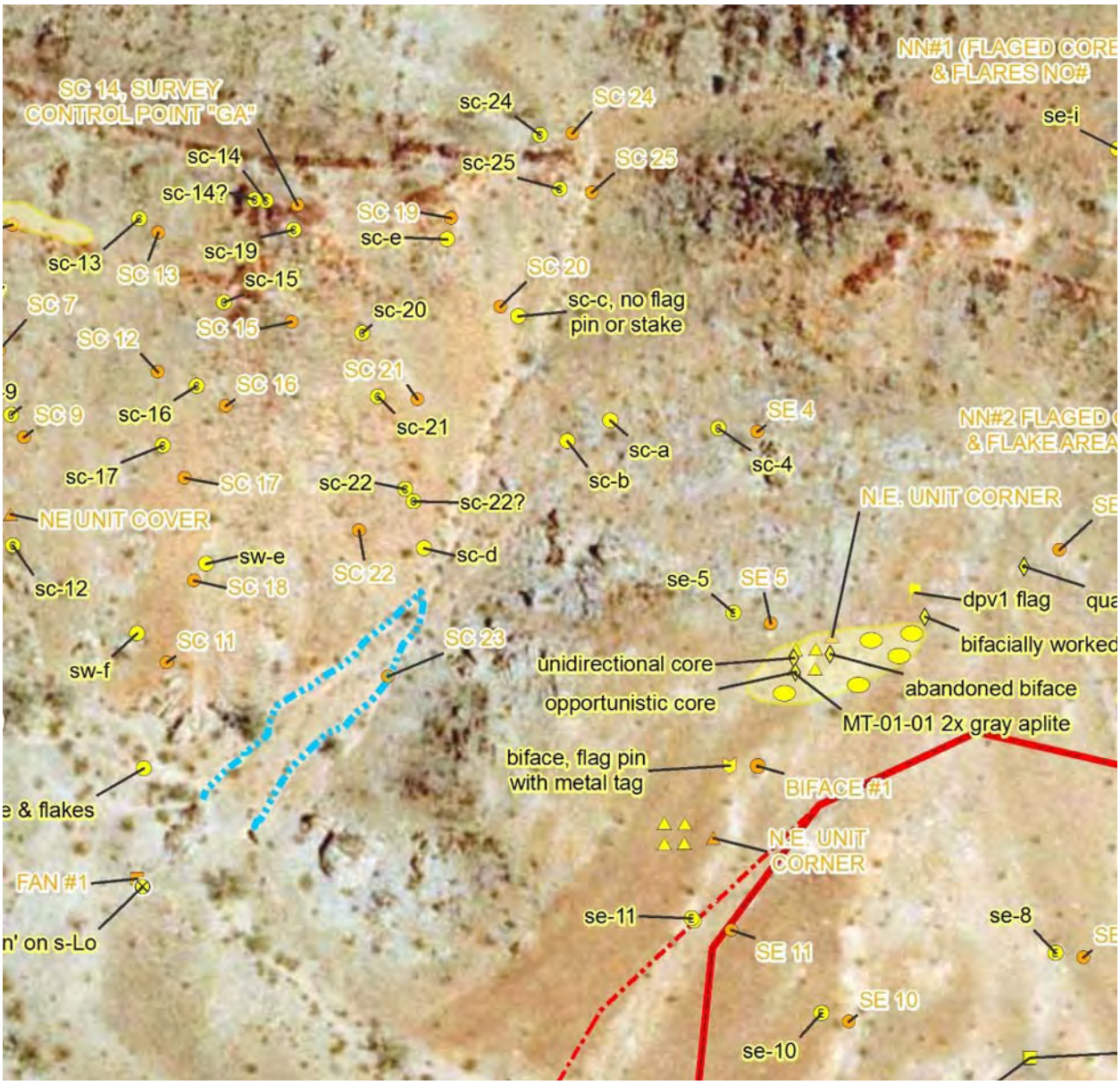

Figure 10. RIV-1814 Comparison of plotted (uppercase) vs. collected (lowercase) points.

Science Center (WSC) in Hemet, California, the permanent curation facility for collections from the DPV2 project.

Material received will be housed in the WSC Curation Repository and will be made available for scientific analysis and study. Data will be available to qualified researchers, land managers, and government officials upon request.

FOR MORE INFORMATION

This is just a sample of the challenges and solutions related to cultural resources data management associated with the DPV2 project. For more information, see the DPV2 report (Eckhardt et al. 2014).

REFERENCES CITED

Carrico, Richard L., Dennis R. Gallegos, and Sandra Day

1981 *National Register of Historic Places Nomination Form, North Chuckwalla Mountains Petroglyph District (CA-RIV-1383)*. Westec Services, San Diego.

Carrico, Richard L., Dennis R. Gallegos, and Jay Thesken

1981 *National Register of Historic Places Nomination Form, North Chuckwalla Mountain Quarry District (CA-RIV-1814)*. Westec Services, San Diego.

Carrico, Richard L., Dennis K. Quillen, and Dennis R. Gallegos

1982 *Cultural Resource Inventory and National Register Assessment of the Southern California Edison Palo Verde to Devers Transmission Line Corridor (California Portion)*. Westec Services, San Diego.

DeCarlo, Matthew M., Scott C. Justus, and William T. Eckhardt

2013 *Final Summary Class III Cultural Resource Inventory: Proposed Southern California Edison Devers-Palo Verde 2 500kV Transmission Line Project, Riverside County, California*. ASM Affiliates, Carlsbad California.

Eckhardt, William T., Matthew M. DeCarlo, Doug Mengers, Sherri Andrews, Don Laylander, and Tony Quatch

2014 *Archaeological Investigations and Monitoring for the Construction of the Devers-Palo Verde No. 2 Transmission Line Project, Riverside County, California*. ASM Affiliates, Carlsbad, California.

Hedges, Ken

1982 The Petroglyphs of Riv-1383. In *Cultural Resource Inventory and National Register Assessment of the Southern California Edison Palo Verde to Devers Transmission Line Corridor (California Portion)*, by Richard L. Carrico, Dennis K. Quillen, and Dennis R. Gallegos. Westec Services, San Diego.

Singer, Clay A.

1982 Geoarchaeological Analysis of Two Prehistoric Quarry-Workshop Sites in Riverside County, Riv-1814 and Riv-1819. In *Cultural Resource Inventory and National Register Assessment of the Southern California Edison Palo Verde to Devers Transmission Line Corridor (California Portion)*, by Richard L. Carrico, Dennis K. Quillen, and Dennis R. Gallegos. Westec Services, San Diego.

Swenson, James D.

1986 *Alligator Rock Area of Critical Environmental Concern: Final Management Plan and Environmental Assessment*. U.S. Bureau of Land Management, Palm Springs, California.

Westec Services

1981 Letter of Transmittal of Artifacts and Catalogs, UCR Accession No. 77, to Archaeological Research Unit, University of California, Riverside. Westec Services, San Diego.