Sears Point Rock Art Recording Project, Arizona, USA

The Sears Point Archaeological District is a large and complex site extending along the terraces on the south side of the Gila River. The area is characterized by steep volcanic cliffs that have over 2000 panels of petroglyphs on vertical faces of basalt mesas and on boulders. Rupestrian CyberServices and Plateau Mountain Desert Research mapped an additional 87 archaeological features including geoglyphs, rock piles, rings, alignments, cleared areas, extensive trails, historic features from the 1800s, and evidence of temporary habitation. Sears Point is considered a major regional gathering area where people came together to collect food resources and participate in ceremonies. A variety of cultures, including the Desert Archaic, Patayan, and Hohokam, used the site, and it is possible there was Paleoindian presence. Documenting the archaeological features and analyzing the relationship of approximately 10,000 petroglyph elements to their natural setting increases our overall understanding of the prehistory of the lower Colorado and Gila River valleys. However, additional in depth documentation of regional sites must be done and analyzed before definitive patterns of prehistoric use can be confirmed.

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The Sears Point Archaeological District (SPAD) is about 58 kilometers west of Gila Bend and eight kilometers north of Interstate 8 in southwestern Arizona near the current international border between the United States and Mexico (Figure 1). This region has been utilized for centuries by many cultures. Managed by the Yuma Field Office (YFO) of the Bureau of Land Management (BLM), this National Register of Historic Places (NRHP) property is within a much larger designated Area of Critical Environmental Concern (ACEC). Fifteen tribes currently claim cultural affiliation with this study area, and many visitors enjoy the desert environment, native plants, animals, birds, and geology when they explore the volcanic landforms that form the rock canvas for one of the largest concentrations of petroglyphs in North America.

DOCUMENTATION

Responding to a BLM request for a comprehensive Sears Point Rock Art Recording Project (SPRARP), Rupestrian CyberServices (RCS) and Plateau Mountain Desert Research

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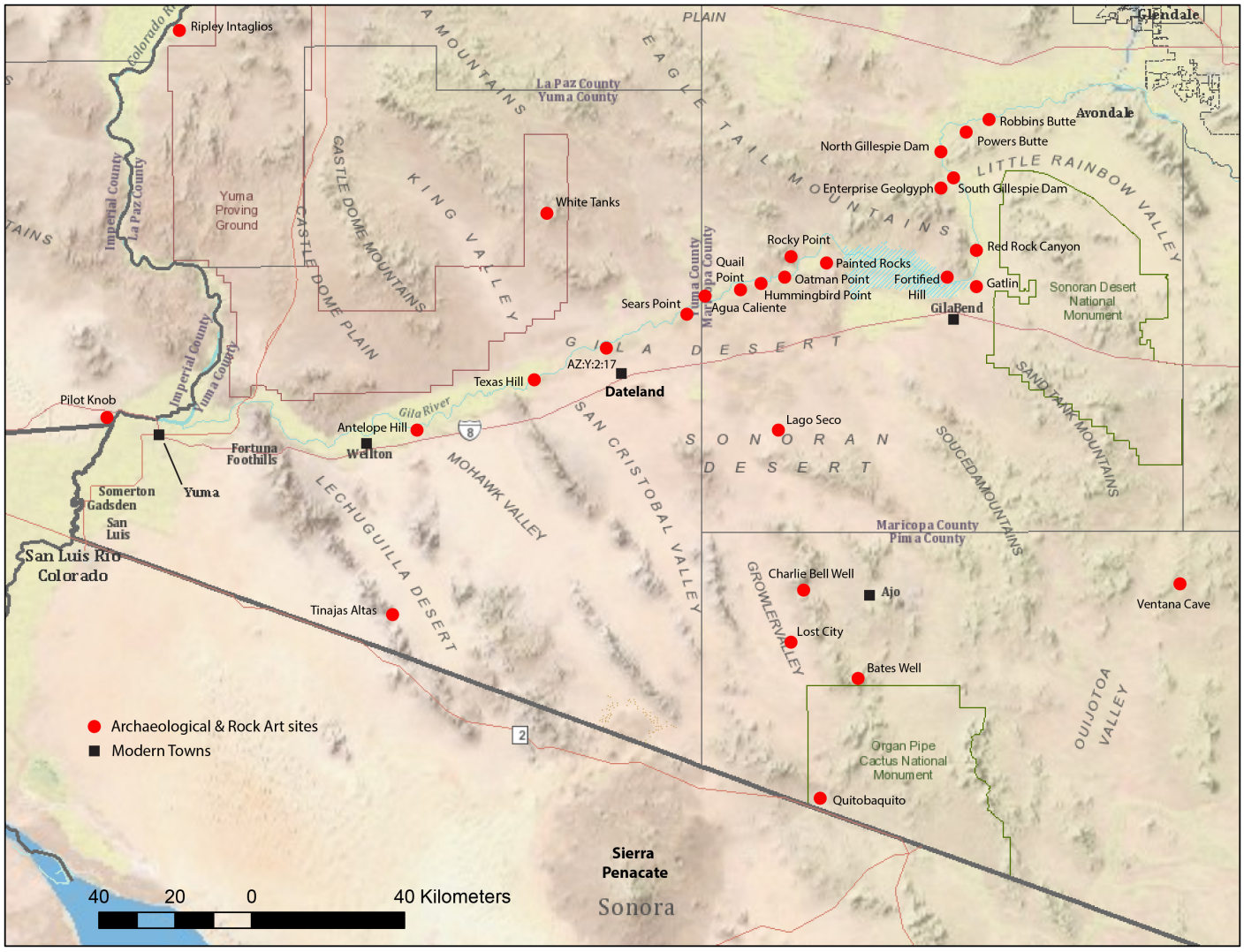


Figure 1. Rock art and other archaeological sites in Southwestern Arizona mentioned in the Sears Point Rock Art Recording Project Report (Weaver et al. 2012). North is up.

(PMDR) not only mapped 2008 petroglyph panels containing at least 9742 petroglyphs categorized into 88 different element classes, but also documented 87 archaeological features. Feature classes within the approximately three square kilometer study area included many rock piles, rings, alignments, enclosures, and one small rock shelter. Also recorded were seven geoglyphs, several grinding and cleared areas, a quarry, mounds, and trails dating to prehistoric times. Historic features, such as the Gila Canal, fence lines, survey markers, and trails, were also documented. At least thirty-six kilometers of trails and trail segments were mapped indicating the Sears Point Complex of petroglyphs and features has been a crossroads for people and animals, and most likely also a meeting place for centuries. This region is considered a major gathering and hunting area where surrounding people came together to collect food resources, hunt, and participate in ceremonies. The Desert Archaic, Patayan, and Hohokam were among the variety of cultures believed to have used the site, and it is possible remains here date back to the Paleoindian period.

Despite the importance of the Sears Point

		Anthropomorphs	Complex/Abstract	Cupules	Geometric Curved Lines	Geometric Dots	Geometric Lines Straight	Historic/Modern	Miscellaneous Marks	Plant Forms	Zoomorphs		
No	Element_Name	ANT	CPX	CUP	GCL	GDT	GLS	HIS	MSC	PLT	ZOO	Code	Count
1	dot					X						GDT	92
2	dot pattern					X						GDT	228
3	circle				X							GCL	281
4	disc/solid circle				X							GCL	208
5	cupule			X								CUP	270
6	oval				X							GCL	196
7	connected circles/ovals				X							GCL	307
8	segmented circles/ovals				X							GCL	116
9	rayed circle/oval/disc				X							GCL	148
10	concentric circles/ovals				X							GCL	92
11	tailed circle/oval/disc				X							GCL	261
12	appendaged circle/oval/disc				X							GCL	293
13	crescent				X							GCL	53
14	barbell				X							GCL	50
15	decorated staff		X									CPX	47
16	straight line						X					GLS	353
17	curved line/arc				X							GCL	278
18	nested arcs				X							GCL	28
19	angle						X					GLS	151
20	nested angles						X					GLS	7
21	squiggle				X							GCL	155
22	zigzag						X					GLS	63
23	parallel lines				X							GCL	113
24	crossing lines						X					GLS	124
25	cross						X					GLS	93
26	outlined cross		X									CPX	26
27	asterisk						X					GLS	35
28	line bisecting circles/ovals		X									CPX	81
29	forked line						X					GLS	106
30	T shape						X					GLS	35
31	X shape						X					GLS	58
32	U shape				X							GCL	82
33	S shape				X							GCL	59
34	rectangle/square						X					GLS	49
35	appendaged rectangle/square						X					GLS	48
36	segmented rectangle/square						X					GLS	42
37	concentric rectangles/squares						X					GLS	2
38	triangle						X					GLS	30
39	appendaged triangle						X					GLS	20
40	nested triangles						X					GLS	2
41	diamond						X					GLS	5
42	appendaged diamond		X									CPX	20
43	connected diamonds						X					GLS	27
44	concentric diamonds						X					GLS	4
45	rake						X					GLS	75
46	grid						X					GLS	44
47	spiral				X							GCL	57
48	appendaged spiral				X							GCL	11
49	connected spirals				X							GCL	3
50	squared spiral						X					GLS	6
51	connected rectangles/sq						X					GLS	27
52	amorphic pecking								X			MSC	1107
53	amorphic shape								X			MSC	393
54	curvilinear meander				X							GCL	122
55	rectilinear meander						X					GLS	32
56	curvilinear abstract		X									CPX	169
57	rectilinear abstract		X									CPX	116
58	complex abstract		X									CPX	465
59	unidentified scratching (repatinated)								X			MSC	74
60	edge pecking								X			MSC	222
61	anthropomorph (human-like)	X										ANT	282
62	anthro male	X										ANT	70
63	anthro female	X										ANT	12
64	anthro w/head ornament	X										ANT	22
65	anthro w/round belly	X										ANT	9
66	anthro - splayed legs	X										ANT	23
67	archer	X										ANT	5
68	horse and rider							X				HIS	4
69	hand print	X										ANT	38
70	foot print	X										ANT	18
71	zoomorph (animal-like)										X	ZOO	248
72	tailed zoomorph										X	ZOO	132
73	horned/antlered zoomorph										X	ZOO	203
74	insect-like figure										X	ZOO	41
75	bird-like figure										X	ZOO	75
76	reptile-like figure										X	ZOO	200
77	life-form/biomorph	X										ANT	76
78	paw/hoof print										X	ZOO	17
79	bird track										X	ZOO	24
80	plant form									X		PLT	59
81	early historic inscriptions							X				HIS	28
82	names							X				HIS	88
83	initials							X				HIS	161
84	words							X				HIS	21
85	dates							X				HIS	62
86	modern symbols							X				HIS	30
87	modern scratches (not repatinated)							X				HIS	66
88	grinding/abraded areas								X			MSC	49

Figure 2. Element names as listed on field form, aggregated element categories shown by color and 3-letter code, plus total counts of each element.

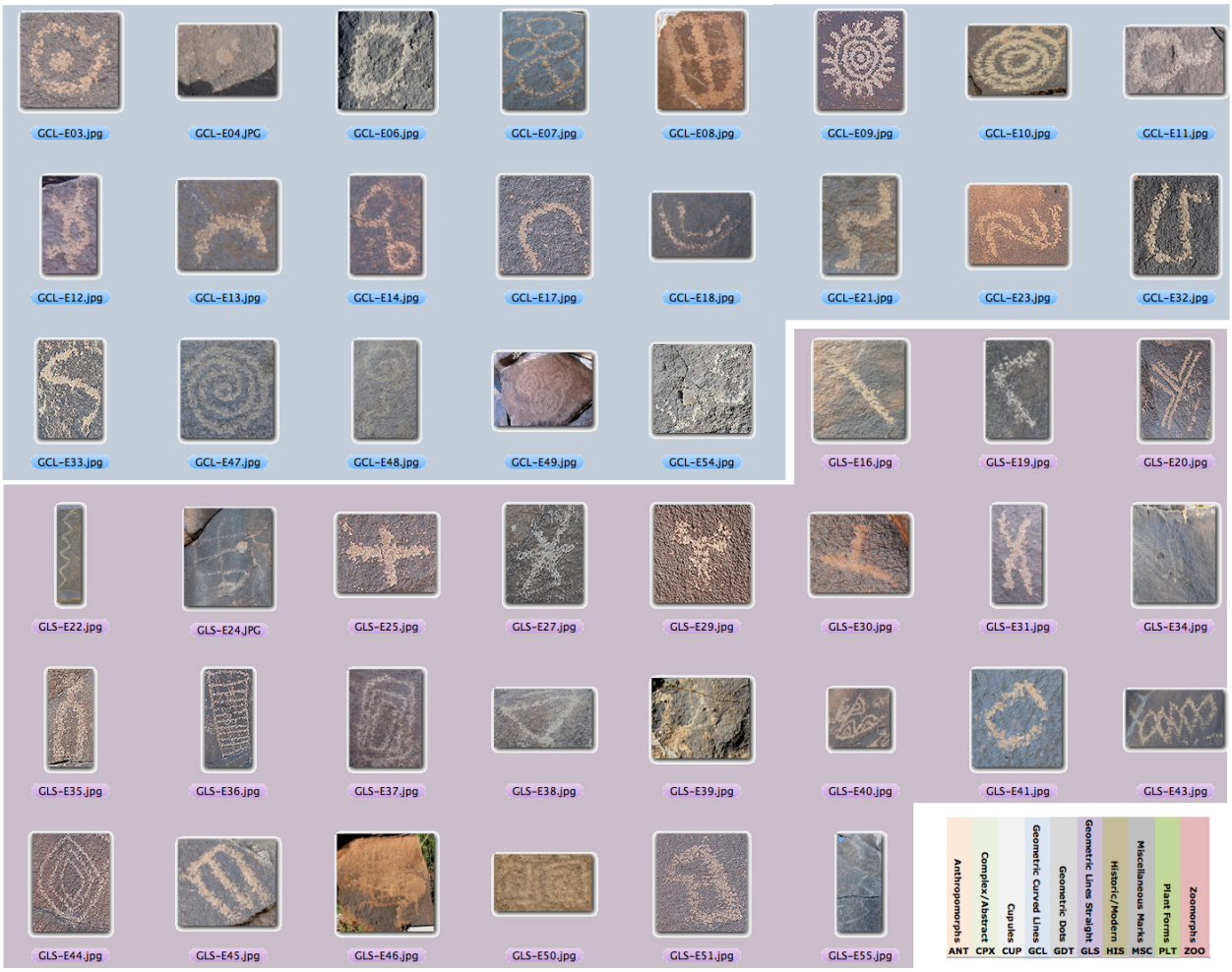
Complex, there have been only sporadic and limited projects to study and document the rock art and associated archaeological features prior to this undertaking, and this previous research is detailed in our report on the site (Weaver et al. 2012:17-21). Perhaps more detailed research was not done because of the complexity of the imagery, its spatial distribution, the difficulty of terrain, and many competing priorities for limited funding. BLM managers are commended for recognizing the need for thorough baseline recording and accurate mapping of the cultural resources including complex superimposed petroglyph panels and fragile or ephemeral archaeological features.

Assisted by over 50 volunteers, many of them ARARA members, PMDR and RCS mapped and recorded extensive measurements of each petroglyph panel and archaeological feature on multiple forms during 17 weeks of fieldwork between 2008-2012. Sub-meter accuracy locations were mapped in Arcview. Panel and element data were subsequently entered into FileMaker Pro and Excel databases. Extensis Portfolio was used to catalog over 20,000 digital images including scanned field sketches. The SPRARP Element Count Form contained 88 categories with small sample sketches to assist volunteers as they categorized glyphs. There were also four categories of landscape settings that each panel could be identified as having: boulder (usually on a talus slope), cliff face, mesa top, or along trails. With over two thousand panels mapped in 25 clusters, this produced a three-dimensional sparse data matrix of unmanageable size. For the purpose of analysis, the original category and cluster data were aggregated into ten combined element categories and seven spatial regions. Some of the original element categories were ambiguous in practice, as individual glyphs did not clearly fall into a particular category, such as X shapes and crosses, or lines bisecting circles and decorated staffs. Therefore, ten generalized categories were created: Anthropomorphs (ANT), Complex/Abstract

3a

(CPX), Cupules (CUP), Geometric Curved Lines (GCL), Geometric Dots (GDT), Geometric Lines Straight (GLS), Miscellaneous Marks (MSC), Historic/Modern (HIS), Plant Forms (PLT), and Zoomorphs (ZOO). Figure 2 identifies which of the original 88 categories are included in the new aggregated elements and shows the total number of each category identified in the field. The categories are grouped and color-coded by the aggregation, and one example from each of these categories is shown in Figures 3a and 3b. Sears Point rock art contains a preponderance of individual elements that fall under a broad category of geometric. Therefore, geometric was subdivided into curvilinear, straight line, and dot categories.

As the mapping of petroglyph panels progressed, it became obvious that the cliffs and talus slopes facing the Gila River floodplain were selected preferentially over interior locations. It was also evident that petroglyphs were not evenly or randomly distributed along the cliffs and talus slopes, as there were regions devoid of glyphs. This observation led to the designation of 25 clusters of panels that were then combined into 7 regions based on panel locations and site



3b

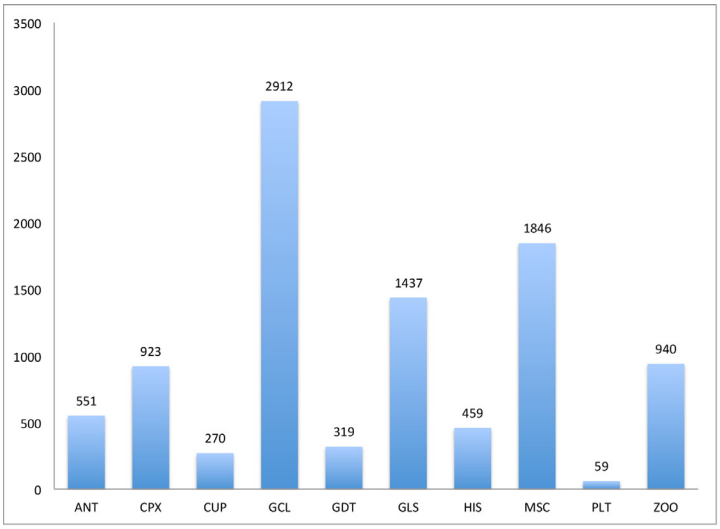
Figure 3. (a) Thumbnails of elements in aggregated categories ANT, CPX, CUP, GDT, MSC, PLT, and ZOO. (b) Thumbnails of elements in aggregated categories GCL (Geometric Curved Line) and GLS (Geometric Lines Straight).

geography. While most visitors to Sears Point are attracted to the cliff faces and prominent boulders with large panels that display many large, attractive, and complex elements, there are actually only 42 of the 2008 panels with more than 25 elements. These 42 panels account for only 2.1% of the total rock art mapped, and this includes three panels with over 100 elements each (Figure 4). By far the majority of the petroglyph panels had relatively few individual elements, with 72% being accounted for by 1446 panels with four glyphs or less. Of these, 630 (31%) had only one element, 367 (18%) had two, 239 (12%) had three, and 227 (11%) had four. The remainder of the rock art included 361 panels (18%) with five to ten elements, and 155 (7.8%) with counts of 11 to 24. Figure 5 is the aggregated element category data presented in bar and pie charts. Figure 6 provides element category counts and percentage by region. In addition, a contingency table was calculated of element count by glyph categories and setting that showed observed count, expected count for no relationship between categories and setting, and contribution to Chi-Squared statistic. Some

Figure 4. Northeast facing cliff face and talus slope of Sears Point Mesa East showing some of the panels with the highest element counts, including those that have been the subject of published interpretation.

patterns emerged with the three highest Chi-Squared numbers indicating that cupules are significantly correlated with positions on top of mesas rather than on cliff faces, and an excess of zoomorph glyphs appear on cliff faces over other settings. It is also of interest that diamond shapes with appendages are only found concentrated on the eastern side of Sears Point Mesa. This element deserves more study as Wallace (1989:42) reported that this motif does not occur to the east in the Painted Rocks Reservoir area. The authors are aware of one diamond glyph with appendage in Flagstaff Arizona's Picture Canyon, hundreds of kilometers to the north.

A thorough recording of prehistoric rock art is an important aspect of archaeological site studies. This is especially so when considering public rock art sites in multiple use areas, even when they have protective classifications such as ACEC and/or NRHP. Sites such as the Sears Point Cultural ACEC not only receive thousands of casual visitors, new agers, rock art and desert enthusiasts, but also are considered sacred sites and traditional cultural property by many Native Americans who continue to visit them. The accumulated impacts of these visits, in addition



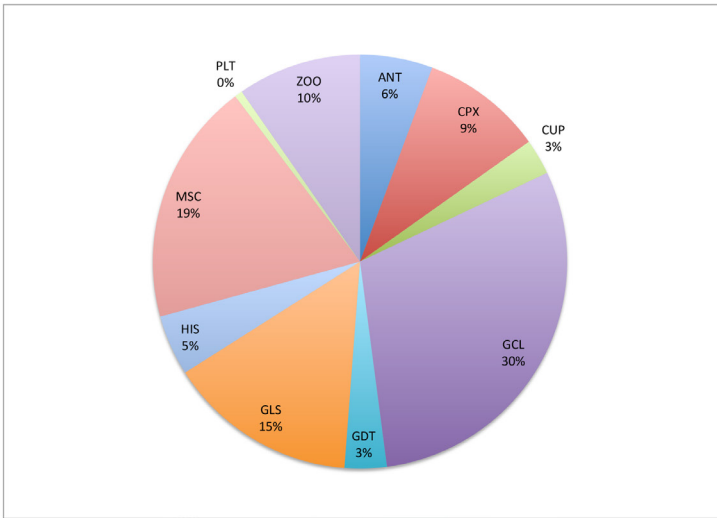


Figure 5. Bar and pie chart of petroglyph elements by aggregated categories.

to natural weathering processes and occasional major environmental stress events such as lightning strikes or earthquakes, makes preserving and protecting fragile natural and cultural resources a management challenge. Accurate maps, good photographs, sketches, and baseline panel data are important tools to assist land managers as they manage for multiple uses and also preserve and protect sites.

INTERPRETATION

Even though the project goal was mainly documentation, an effort was made to provide general analysis and some interpretation of what was found. However, an attempt to interpret a huge area like the Sears Point Complex with more than 2000 rock art panels with almost 10,000 individual elements, an anastomosing network of mapped trails and trail segments, plus wide ranging classes of Native American features is difficult at best and absolutely foolhardy at worst. Basic facts about the observed human modifications to the landscape including when they were constructed, who made them, why they were made, and how they functioned in the society through time are presently unknown. That said, general interpretations can be formulated on the basis of comparative analyses and by dividing the overall site into individual components such as geoglyphs, petroglyphs, and cupules.

GEOGLYPHS

The distribution of remaining southwestern geoglyphs is fairly well known today. It includes the desert regions along the lower Colorado River in California and Arizona, along the lower Gila River in southwestern Arizona, southwest into Baja California, Mexico, and also into the Sierra Pinacate of Sonora, Mexico (Solari and Johnson 1982:418-419). The distribution strongly suggests that geoglyphs were made primarily by members of the Delta Yuman language group (Cocopa, Kahwan, and Halyikwamai) and the River Yuman language group (Quechan, Mohave, Maricopa, Halchidhoma, and Kavilchadom) (Stewart 1983:1). South of the Gila River and extending into northern Mexico, relatively simple, small, and widely scattered geoglyphs (Hayden 1982) were probably made by the Hia C-ed O'odham or Sand Papago (Eiler and Doyel 2008:605-630; Fontana 1983:125-136). The Sand Papago had amicable trade relations with the Quechan (Vanderpot and Altschul 2008:372).

Region	No of Panels	ANT	CPX	CUP	GCL	GDT	GLS	HIS	MSC	PLT	ZOO	Total	Elements/Panel
South Mesa	215	59	159	1	456	62	207	27	267	7	57	1302	6.1
Sears Pt East	458	228	255	30	924	168	527	162	509	22	468	3296	7.2
Sears Pt West	315	55	109	59	359	17	146	65	268	9	76	1169	3.7
Northwest	453	57	139	98	498	23	210	151	334	5	68	1590	3.5
West	303	74	133	75	396	12	161	21	187	4	98	1164	3.8
Howard Well	175	64	114	5	220	33	162	32	245	12	158	1051	6.0
Interior	89	14	14	2	59	4	24	1	36	0	15	170	1.9
	2008	551	923	270	2912	319	1437	459	1846	59	940	9742	4.9

	ANT	CPX	CUP	GCL	GDT	GLS	HIS	MSC	PLT	ZOO	
South Mesa	4.5	12.2	0.1	35.0	4.8	15.9	2.1	20.5	0.5	4.4	100.0
Sears Pt East	6.9	7.7	0.9	28.0	5.1	16.0	4.9	15.4	0.7	14.2	99.9
Sears Pt West	4.7	9.3	5.0	30.7	1.5	12.5	5.6	22.9	0.8	6.5	99.5
Northwest	3.6	8.7	6.2	31.3	1.4	13.2	9.5	21.0	0.3	4.3	99.6
West	6.4	11.4	6.4	34.0	1.0	13.8	1.8	16.1	0.3	8.4	99.7
Howard Well	6.1	10.8	0.5	20.9	3.1	15.4	3.0	23.3	1.1	15.0	99.4
Interior	8.2	8.2	1.2	34.7	2.4	14.1	0.6	21.2	0.0	8.8	99.4
Total Percent	**5.7**	**9.5**	**2.8**	**29.9**	**3.3**	**14.8**	**4.7**	**18.9**	**0.6**	**9.6**	

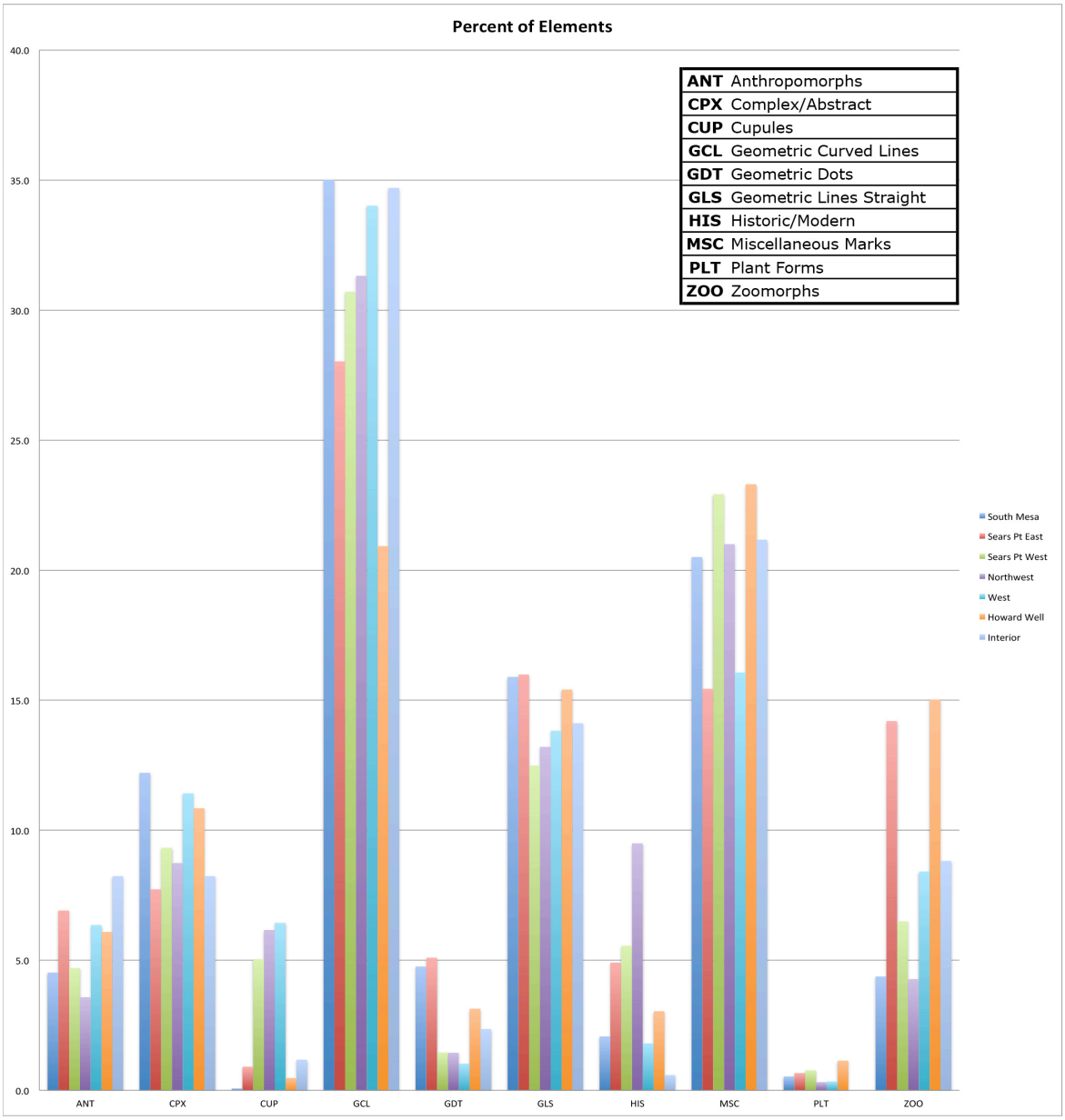


Figure 6. Tables and graphs of petroglyph elements by region (counts and percentages).

Figure 7. A portion of the tamped pathway of Feature 36 with recent vehicular disturbance.

Research by others, striving to obtain some semblance of chronological control for geoglyphs, led to a series of AMS 14C dating samples being obtained from geoglyphs in California and Arizona. The dating procedure used is still experimental, but the dates obtained have been published, ranging from 900 B.C. to A.D. 1200. It should be noted that nine of 13 dates obtained fall within the A.D. 440 to 1200 time period (Von Werlhof et al. 1995:264). Whitley (2000:96) has stated that rock alignments in southern California are less than 1,000 years old based on the repatination of overturned boulders. In the final analysis, there are currently no viable methods for absolutely dating geoglyphs.

The meanings or functions of geoglyphs are not well understood. However, one of the Sears Point geoglyphs, Feature F.6, has been described in print as a solstice marker (Hoskinson 1986, 1992). In a report on the Ripley Geoglyph Complex, approximately 150 km northwest of Sears Point, Holmlund (1993:98-101) has described the most common form at Ripley (eight of 27 features) as paths in desert pavement up to 50 m long and up to 80 cm wide with a circular cleared or cleared and tamped area at one end. Two features at Sears Point, F.36 and F.43, fit that description. Recent vehicle tracks have damaged the original tamped pathway of F.36 (Figure 7) that ran 95 m northwest to southeast across the mesa top and has associated rock piles. A large natural boulder outcrop with petroglyphs and cupules is located at the northwest end of the pathway. The function of this feature is unknown. No diagnostic artifacts were noted on the mesa top. Johnson (1985:24) describes the Quechan creation myth as centered at the mountain Avikwaame (Newberry Peak) at the southern tip of Nevada (Forbes 1965:22). A tradition among the Quechan tells of an annual trek from the Yuma area to Newberry Peak following the sacred "first trail to the homeland." The sacred trail may be represented by the geoglyph form described with the long path representing the trail, the clearing at one end representing Newberry Peak, rock piles or cleared areas nearby representing other landmarks along the way. Feature F.43 (Figure 8) is the only geoglyph recorded so far at Sears Point that includes either an anthropomorphic or zoomorphic element; in this case, a snake or serpent. One Sears Point

Figure 8. Aerial view of sinuous Feature 43.

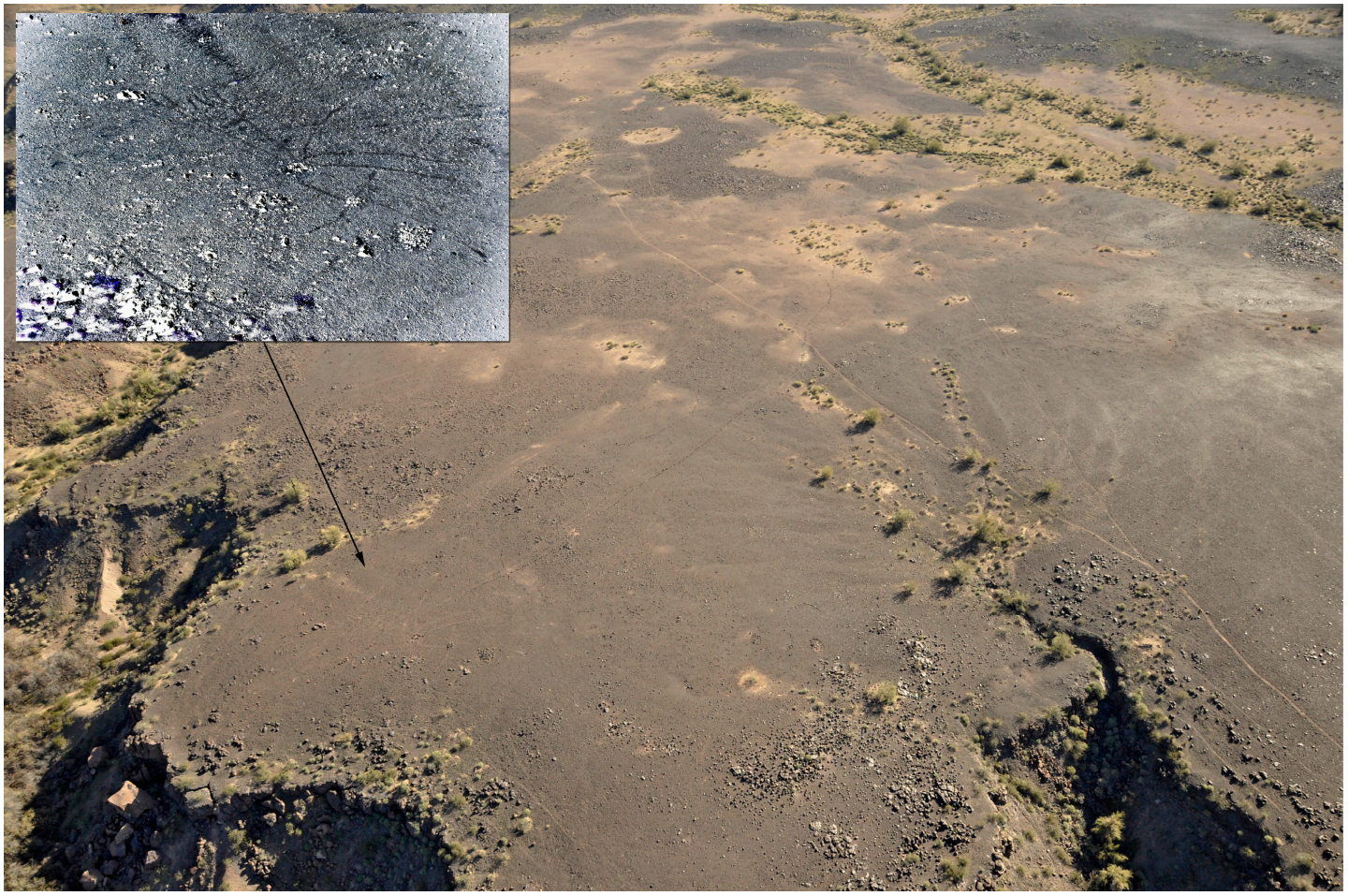


Figure 9. Geoglyph F.58 and 280 meter long rock alignment F.54 and other nearby features and trails. Vehicle damage is also visible. Insert is an enhanced image of the geoglyph. Photographs taken from a hot-air balloon.

geoglyph, F.58 (Figure 9), has been described by Johnson (1985:11,176) as a complex dance pattern with a combination of many elements including linear and curvilinear tamped paths, gravel mounds, cleared areas, rock piles, and rock alignments. Feature F.51 (Figure 10) was designated the "Racetrack" (Johnson 1985:30-31) after the main element within a similar array of associated patterns. Although several ethnographers refer to foot races among tribal groups in and around the Sears Point region, there is no way to confirm that this geoglyph was used for that purpose. In virtually every published study of geoglyphs, especially those associated with numerous ground figures such as rock piles or cairns, rock rings, cleared areas, rock alignments, trails, etc., the conclusion reached is that the collective ground figures are cosmological landmarks for the occupants of the region (Ezzo 1994; Ezzo and Altschul 1993:24-42; Johnson 1985:16, 39-41; Vanderpot and Altschul 2008:373-375). Although most geoglyph studies have been carried out along the lower Colorado River and in the Western Papagueria (Altschul and Rankin 2008), there is no reason to think that the research results are not applicable to the lower Gila River region as well. Obviously, if further progress is to be made, ethnographic studies must be emphasized in future research in the lower Gila River region.

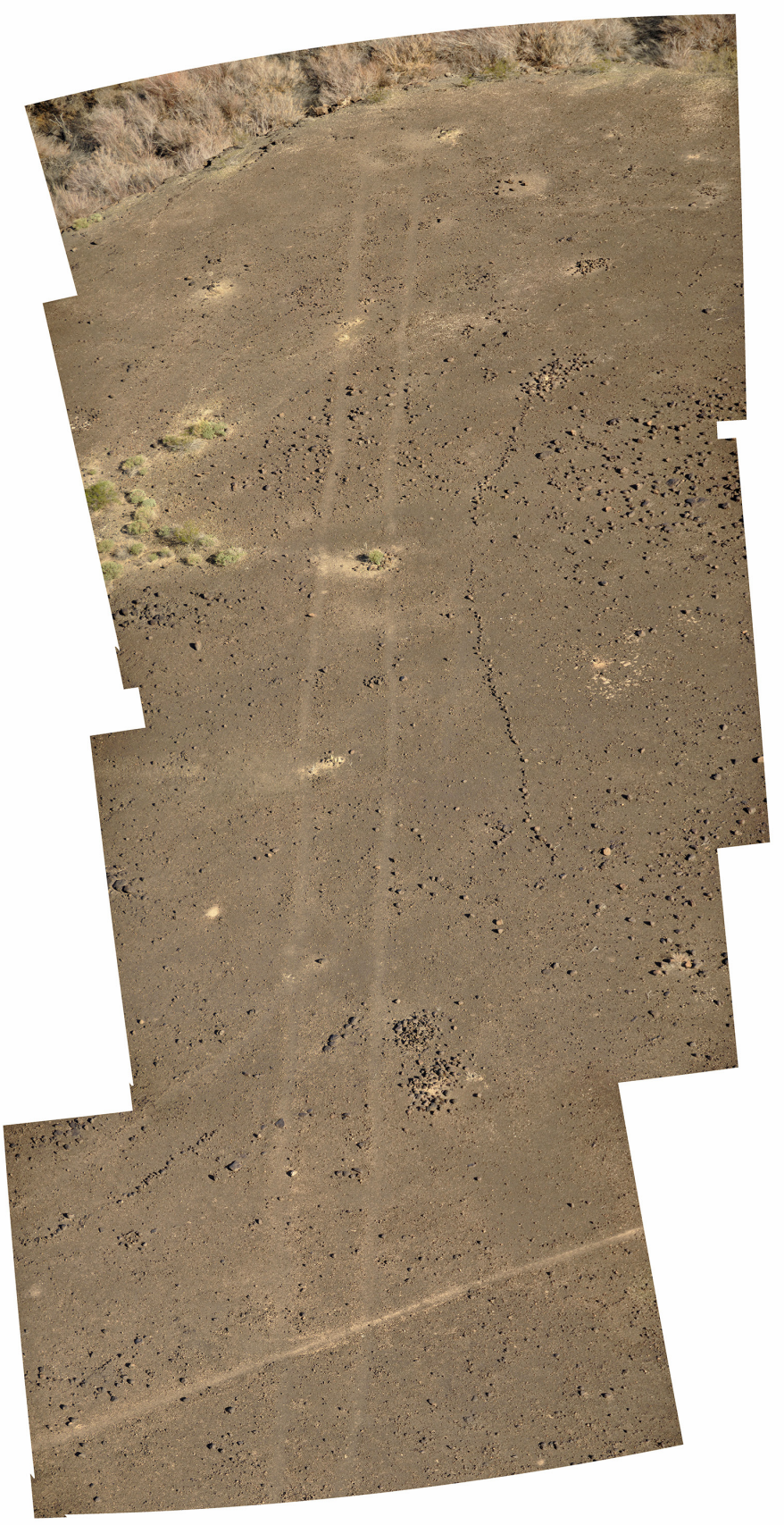


Figure 10. Mosaic of the 'racetrack' geoglyph Feature 51, rock alignments, rock piles, and trails. Individual stitched photographs were taken from a hot air balloon.

PETROGLYPHS

During the Sears Point Rock Art Recording Project, 2008 petroglyph panels displaying approximately 10,000 elements were recorded. In order to present interpretive conclusions about such a large and complex database, some basic facts must be known or inferred. Basic questions include: when were the rock art elements produced and by whom, why were they made, and how did they function within the society responsible? Unfortunately, most of these questions cannot be answered in any reliable way. Perhaps the easiest question to attempt to answer is who made the rock art. Because the Sears Point Complex is located within the established territory of the Patayan cultural tradition,

Figure 11. Enhanced photograph and sketch of scratched ship, panel 2529.

it is highly likely that Patayan groups made most of the rock art at Sears Point. That is, the ancestors of the historically documented Yuman groups living along the lower Gila River valley and the lower Colorado River valley when first contacted by Euro-Americans. Virtually all of the ceramics found during the field recording were identified as types within the Lowland Patayan Ceramic Tradition (Waters 1982a, 1982b). However, no collections were made and field identifications are not always reliable. Therefore, it is difficult to be more specific because of the almost constant movement of Yuman tribal groups back and forth along the lower Gila River valley during the late prehistoric and early historic periods. Determining when the rock art was made is even more difficult because no reliable scientific dating techniques for petroglyphs are available. Relative dating techniques based on the degree of repatination and/or element content are imprecise and also difficult to apply to such a large assemblage of rock art. However, some divisions based on relative dating techniques could prove useful. For example, it may be possible to separate Archaic-period (pre A.D. 700) petroglyphs from the later Patayan period (A.D. 700-1800) petroglyphs (McGuire and Schiffer 1982:284). If such a distinction can be made and documented, this would provide a solid three-part chronological system for the Sears Point Complex with pre A.D. 700 (Archaic), A.D. 700-1800 (Patayan), and A.D. 1800 to present (present day Native American and Anglo-American). Datable element subject matter noted at Sears Point includes four horse and rider images, five archers, a very detailed scratched sailing ship (Figure 11), and numerous inscriptions and graffiti. Most of these images are associated with various aspects of historic period rock art. For example, horse and rider elements were probably made by Native Americans in the early historic period after the introduction of the horse into the New World by the Spanish. The numerous inscriptions and graffiti all date to the period from about 1840 to the present and are documented in the full digital report on file at the BLM YFO.

Some efforts to interpret rock art at Sears Point have been made and published in the past. Primarily those efforts involved calendric investigations centered on large complex panels on the northeast facing cliffs (Figure 4) within the Sears Point East Region (Hoskinson 2005). Working in the same area, Johnson (1996) has suggested that many of the complex panels are essentially narrative panels that tell stories based on the creation mythology of the Native Americans living in the region, their lifeways, and their experiences – both secular and spiritual. Obviously, making such interpretations requires detailed knowledge of the tribal groups involved. Such information is not easily obtained and is definitely not well known to outsiders, or even to the average tribal members. While such studies should definitely continue, all the other panels that contain fewer individual elements should also be considered when attempting to interpret the Sears Point Complex of petroglyph and archaeological features.

In the process of reviewing the ethnographic literature for the Yuman groups, especially the Quechan along the lower Colorado River valley (Forbes 1965:62-67, 345), a high level emphasis on the icama or dream-vision quest individual experience and on the major group ceremonies including the keruk cremation, funeral, and harvest festivals - was noted. Among the Yuman tribes of the Gila River region Spier (1978:242-254) noted an overwhelming dependence on individual dreams to obtain power. This was based on occurrences of vision quests that were reported by informants. In these quests, the participants traveled to caves in mountain settings to communicate with powerful spirits. The possibility of Sears Point as a long used and important vision quest site has not been adequately addressed. Such could explain the numerous small temporary shelters (cleared areas, rock rings, enclosures, wind breaks, etc.) and the very numerous individual rock art panels with five

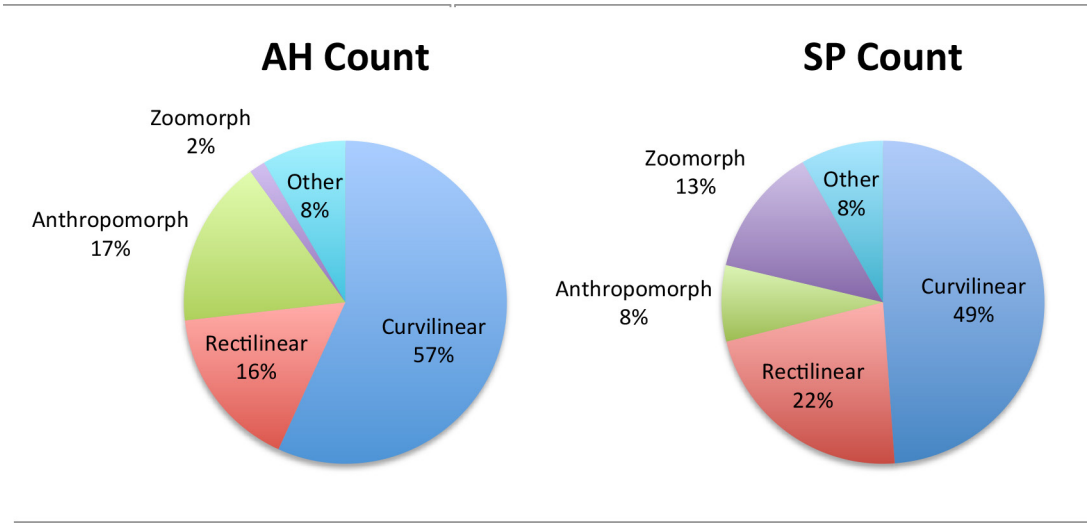


Figure 12. Comparison of roughly comparable petroglyph element categories for Antelope Hill (n=250, Doolittle 2000:88-92) and Sears Point (n=7223).

or less elements. As an aside, individual vision quests might also have been responsible for some of the rock art on Texas Hill and Antelope Hill, located far to the west of Sears Point along the Gila River.

Another important interpretative study that could be considered would be an effort to refine the definition of the Patayan Rock Art Tradition. Traditions must be internally consistent and distinguishable from other adjacent traditions such as the California Tradition (Whitley 2000:46,50) to the west, the Hohokam Tradition to the east, and the Great Basin Tradition to the north. Definitions of traditions must consider geographical distributions, the techniques used to create the images, and the demonstrated functions and meanings of the total assemblage. Unfortunately, only a few rock art sites within the geographic region of the Patayan Rock Art Tradition have been recorded and reported in detail. These sites include the Sears Point Complex (Weaver et al 2012) and Antelope Hill studies by Doolittle (2000:85-110) and Schneider and Altschul (2000). Both of these sites are along the lower Gila River. The Sears Point Complex is at the extreme eastern boundary of the Patayan Rock Art Tradition. On the other hand, the Antelope Hill site study was so limited in scope that it cannot be considered representative of the Patayan Rock Art Tradition even though it is closer to the center of the tradition region. Furthermore, the huge difference in numbers of panels (2008 vs. 130) and elements (9689 vs. 358) recorded at the Sears Point Complex and Antelope Hill means that direct comparisons are suspect. Instead, the comparison made (Figure 12) was based on percentages and aggregated element counts derived from the aggregations used in the Antelope Hill study. Obviously there are similarities between the two site element percentages, as well as significant differences. For example, the sum of the curvilinear and rectilinear elements for Antelope Hill (73 percent) and Sears Point (71 percent) are almost identical. On the other hand, zoomorphs at Sears Point (13 percent) are six and a half times as numerous as zoomorphs at Antelope Hill (two percent). More data from other sites in the region will be required to make a meaningful statement about the Patayan Rock Art Tradition

CUPULES

One of the more interesting results for this recording project was the high number of cupules identified, 270 cupules or 2.7 percent of all glyphs. Cupules, a worldwide phenomena, are small hemispheric depressions pecked or abraded into horizontal, sloping, or vertical rock surfaces (Bednarik 2008:70; Christensen 2005:71).

Although a great deal of research on cupules has been carried out in California (Gordon 1990:227-236; Hedges 1983:10-21; Minor 1975; Nissen and Ritter 1986; Parkman 1995:1-12) only a few studies have been reported on the numerous cupules in Arizona (Christensen 2005; Wallace 1983:143-182, 1989:38-39). Examples of Sears Point cupules are shown in Figure 13. Half of the cupules at Sears Point occur on panels with three or fewer other petroglyphs, and large concentrations of cupules occur primarily on mesa tops, usually along the edges in groups near the end points. In some instances cupules were pecked into individual petroglyph elements (Figure 14). Even isolated boulder panels with cupules and no other petroglyphs are usually relatively close to other petroglyph panels and/or to ground features. None of the cupules in the Sears Point Complex are directly associated with obvious grinding features such as mortar holes, and none of the cupules had definite pigment residue in them. While some researchers do not consider cupules rock art, others define cupules as petroglyphs, going so far as saying cupules are the oldest surviving rock art in the world (Bednarik 2001a:18-23). The close association between cupules and rock art panels and/or ground features suggests that the Sears Point cupules were ritual-related, in a way similar to the ritual-relationship of petroglyphs and features in the area such as geoglyphs, trails, or rock alignments (Bednarik 2008:90-91; Wallace 1989:39). The nature of the inferred rituals is not known at the present time but could certainly be a subject for further study.

DISCUSSION

A close examination of the Sears Point area indicates the importance of considering the efforts to define a Sears Point Petroglyph Style. First proposed by Hedges and Hamann (1994, 1995) and discussed by Thiel (1995:80-81, 83), the Sears Point Petroglyph Style is believed to be applicable to a series of sites upstream from Sears Point, including Quail Point, Hummingbird Point, and Oatman Point. While some researchers dismiss the whole concept of rock art styles as useless (Bednarik 2001b:11-12), none of them have come up with an alternative that allows reasonable regional discussion of rock

Figure 13. Cupules on mesa top, panel 1077.

Figure 14. Cupules over petroglyph elements on panel 516.

art distributions. It should be noted that only the Sears Point Complex has been recorded in detail, and that much of the area along the Gila River between Sears Point and Oatman Point, and beyond, has not been closely inspected for additional rock art and archaeological sites.

Styles in rock art research are defined on the basis of the design elements selected for use, the techniques and ways of representing them, and the overall spacing and distribution of those elements on the natural landscape (Hedges 2002:36; Schaasfma 1985:246-247). Specific styles usually have definition boundaries in space and time, but they can crosscut cultural boundaries. Although style definitions should be based on the attributes of a relatively substantial sample of sites in the style region, the suggestions put forth for the Sears Point Petroglyph Style have been limited to specific elements that are believed to be diagnostic for the proposed style. Those elements include anthropomorphs with fingers and toes (digitated anthropomorphs), anthropomorphs with bows and arrows (archers), heraldic birds, quadrupeds with D-shaped or boat-shaped bodies, long-legged water birds, and diamond shapes with attached legs (appendaged diamonds) (Thiel 1995:80-81). To this list the following elements have been suggested as a result of the present study: lines bisecting circle/ovals (decorated staffs), outlined crosses, and cupules. None of these elements are numerically dominant for the entire Sears Point Complex, but many of them are dominant on individual panels, based on size and placement. Based on the definition of style presented previously, it is not realistic to formulate a Sears Point Petroglyph Style with the limited regional data presently available. Additional in depth recording of sites along the Gila River valley is required before a reasonable style can be formulated.

The Sears Point Cultural ACEC was the setting for both everyday Native American subsistence endeavors and special ceremonial activities for thousands of years. The natural land form and setting provided a spectacular vista of the Gila River valley and surrounding mountains. It also provided ample flat space for camping, group activities, and making ground figures as well as providing water, riverine food resources, lithic resources for making basic tools, and numerous rock cliffs and boulders suitable for rock art production. Although this combination of natural resources is not unique along the lower Gila River valley, the situation at Sears Point was probably as close to ideal as any. Furthermore, its location along a well-used prehistoric river trail, known in the historic period as the Gila Trail, made the location easily accessible to anyone familiar with the local landscape. The fact that Sears Point is just west of a well-documented cultural boundary between the Hohokam to the east and the Patayan to the west may also have been an important factor in the development of the size and complexity of the site. Based on the relatively low number of cleared areas and temporary rock ring shelters, the groups that visited Sears Point were generally small. And very sparse cultural material left behind around the temporary shelters suggests that the small groups did not stay very long, perhaps as little as a few days. If visitors to Sears

Point camped in the floodplain the evidence of their camps would have been washed away by flooding long ago. However, it should be noted that much of the territory around Sears Point has not been thoroughly surveyed for habitation sites. At least one long-term habitation site, Agua Caliente, is well documented and is only about five kilometers northeast of Sears Point. It would be worthwhile to consider additional research at the Sears Point ACEC to resolve demographic issues.

The primary purpose of the SPRARP was to locate and record all of the rock art panels within a specific core area of the larger Sears Point Cultural ACEC. Regardless of the level of rock art documentation achieved, additional components of conservation and management, as well as data gaps, interpretive needs, and future studies must also be considered in a project of this kind. The difficulty and expense of rock art site management often results in the long term needs of sites, especially large and complex ones, being ignored completely or minimally until the problems become acute (Whitley 2005:151). Considering the study area rock art, the largest single destructive incident observed, after the fact, was the collapse of the cliff face on the east facing slope of Sears Point East, where a 30 m long stretch of the cliff fell on to the steep talus slope below. It is not known how many rock art panels are now facedown under huge boulders. Even if the time of collapse and the specific causes were known, most likely nothing could be done to prevent additional collapses.

Based on field observations, one of the primary destructive processes for the archaeological features is the intrusion of vehicles into the study area. Specifically, geoglyphs F.36, F.58, and F.71 have all been impacted by recent vehicle tracks. Figure 9 shows some of the damage to F. 58. Although the BLM has recently constructed vehicle barriers, and posted signs prohibiting vehicle entry, vehicles are still getting in to protected areas. Installing additional vehicle barriers and signs may reduce this threat; however, these measures alone are not likely to be sufficient. An active site steward program that has been instituted by the BLM YFO should help.

It would be valuable to the science of archaeology and to rock art researchers in particular to have robust complete databases for all Gila River archaeological sites. Then charts of the frequencies of petroglyph types and maps of the distribution patterns of various petroglyph elements could be generated. This would allow researchers, managers, and the public through interpretation to visualize how patterns of occupation and uses of the landscape change along the river corridor. An understanding of the chronology might be improved by additional superimposition analysis at Sears Point and extending it to data from the regional sites. Future research should also consider using multivariate correspondence analysis such as that described in Wright (2011:231-241). Analyzing the relationships among the still extant fragile archaeological features and the rock art concentrations by categories of images is paramount to interpreting the history of the region. Therefore, it is most important and time critical to fully record the rock art and the fragile desert features before they are lost to the cumulative effects of natural and human impacts.

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REFERENCES CITED

Altschul, Jeffrey H., and Adrianne G. Rankin
2008 *Fragile Patterns, The Archaeology of the Western Papagueria*. SRI Press, Tucson, Arizona.

Bednarik, Robert G.
2001a Cupules: the Oldest Surviving Rock Art. *International Newsletter of Rock Art* 30:18-23.
2001b *Rock Art Science, The Scientific Study of Paleoart*. Aryan Books International, New Delhi, India.
2008 Cupules. *Rock Art Research* 25(1):61-100.

Christiansen, Don D.
2005 Preliminary Report on Cupules in North-Central Arizona. In *Rock Art Papers*, Vol. 17, edited by Ken Hedges, pp. 71-80. San Diego Museum Papers No. 20, Museum of Man, San Diego.

Doolittle, Christopher J.
2000 Petroglyph Research at Antelope Hill. In *Of Stones and Spirits: Pursuing the Past at Antelope Hill*, edited by Schneider J.S. and J.H. Altschul, pp. 83-118. Technical Series 76. SRI, Tucson, Arizona.

Eiler, Lorraine Marquez, and David E. Doyel
2008 The Extinct Tribe. *Fragile Patterns, The Archaeology of the Western Papagueria*, edited by Jeffery H. Altschul and Adrianne G. Rankin, pp. 605-630. SRI Press, Tucson.

Ezzo, Joseph A (editor)
1994 *Recent Research Along the Lower Colorado*. Statistical Research Technical Series, No. 51, Tucson, Arizona.

Ezzo, Joseph A., and Jeffrey H. Altschul (compilers)
1993 *Glyphs and Quarries of the Lower Colorado River Valley*. Statistical Research Technical Series, No. 44, Statistical Research, Tucson.

Fontana, Bernard J.
1983 Pima and Papago: Introduction. In *Handbook of North American Indians*, Volume 10, Southwest, ed. Alfonso Ortiz, pp. 125-136, Smithsonian Institution, Washington, D. C.

Forbes, Jack D.
1965 *Warriors of the Colorado. The Yumas of the Quechan Nation and Their Neighbors*. University of Oklahoma Press, Norman.

Gordon, Mary
1990 Cupule Petroglyphs in Tulare County, California. In *American Indian Rock Art,* Vol. 16, edited by Solveig A. Turpin, pp. 227-236. American Rock Art Research Association, San Miguel, CA.

Hayden, Julian D.
1982 Ground Figures of the Sierra Pinacate, Sonora, Mexico. *Hohokam and Patayan, Prehistory of Southwestern Arizona*, edited by Randall H. McGuire and Michael B. Schiffer, pp. 581-588. Academic Press, New York.

Hedges, Ken
1983 A Re-Examination of Pomo Baby Rocks. In *American Indian Rock Art,* Vol. 9, edited by Frank G. Bock, pp. 10-21. American Rock Art Research Association, San Miguel, CA.
2002 Rock Art Styles in Southern California. In *American Indian Rock Art,* Vol. 28, edited by Alanah Woody, pp. 25-40. American Rock Art Research Association, Tucson.

Hedges, Ken, and Diane Hamann
1994 Oatman Point: New Discoveries on the Lower Gila. In *American Indian Rock Art,* Vol. 20, edited by Frank G. Bock, pp. 7-12. American Rock Art Research Association, San Miguel, CA.
1995 Petroglyphs at Quail Point, Southwestern Arizona. In *Rock Art Papers,* Vol. 12, edited by Ken Hedges, pp. 89-94. San Diego Museum Papers No. 20, Museum of Man, San Diego.

Holmlund, James
1993 The Ripley Geoglyph Complex. In *Glyphs and Quarries of the Lower Colorado River Valley: The Results of Five Cultural Resources Surveys*, compiled by Joseph A. Ezzo and Jeffrey H. Altschul, Statistical Research Inc., Tucson, Arizona.

Hoskinson, Tom
1986 Coyotes, Rainbows, and Power Mountains. In *Rock Art Papers*, Vol. 3, edited by Ken Hedges, pp. 91-103. San Diego Museum Papers No. 20, Museum of Man, San Diego.
1992 Saguaro Wine, Ground Figures and Power Mountains: Investigations at Sears Point, Arizona. In *Earth and Sky: Visions of the Cosmos in Native American Folklore*, edited by R. A. Williamson and C. R. Farrer, pp. 131-161. University of New Mexico Press, Albuquerque.
2005 Calendric Investigations of a Complex Petroglyph Panel at a Gila River Archaeological Site in Arizona. In *Current Studies in Archaeoastronomy, Conversations Across Time and Space*, edited by John W. Fountain and Rolf M. Sinclair, pp. 169-179. Carolina Academic Press, Durham, North Carolina.

Johnson, Boma
1985 Earth Figures of the Lower Colorado and Gila River Deserts, A Functional Analysis. *The Arizona Archaeologist*, No. 20, Arizona Archaeological Society.
1996 A Lesson in Stone: The Sears Point Archaeological Site, Lower Gila River, Southwestern Arizona. Manuscript on file at Yuma Field Office, Bureau of Land Management, Yuma, Arizona.

McGuire, Randall R., and Michael B. Schiffer (editors)
1982 *Hohokam and Patayan: Prehistory of Southwestern Arizona*. Academic Press, New York.

Minor, Rick
1975 The Pit-and-Groove Petroglyph Style in Southern California. In *Ethnic Technology Notes*, No. 15, Museum of Man, San Diego.

Nissen, Karen M., and Eric W. Ritter
1986 Cupped Rock Art in North-Central California, Hypothesis Regarding Age and Social/Ecological Context. In *American Indian Rock Art,* Vol. 11, edited by William D Hyder, Helen Crotty, Kay Sanger, and Frank G. Bock, pp. 59-75. American Rock Art Research Association, San Miguel, CA.

Parkman, E. Breck
1995 California Dreamin': Cupule Petroglyphs Occurrences in the American West. In *Rock Art Studies in the Americas,* edited by Jack Steinbring, pp. 1-12. Oxbow Monograph 45.

Schaafsma, Polly
1985 Form, Content, and Function: Theory and Method in North American Rock Art Studies. In *Advances in Archaeological Method and Theory*, Vol. 8, edited by M. B. Shiffer, pp. 237-277. Academic Press, New York.

Schneider, Joan S., and Jeffrey H. Altschul (editors)
2000 *Of Stones and Spirits, Pursuing the Past of Antelope Hill.* Statistical Research Technical Series, No. 76, Tucson, Arizona.

Solari, Elaine Maryse, and Boma Johnson
1982 Intaglios: A Synthesis of Known Information and Recommendations for Management. In *Hohokam and Patayan: Prehistory of Southwestern Arizona*, edited by Randall H. McGuire and Michael B. Schiffer, pp. 417-432. Academic Press, New York.

Spier, Leslie
1978 *Yuman Tribes of the Gila River*. Dover Publications, New York.

Stewart, Kenneth M.
1983 Yumans: Introduction. In *Handbook of North American Indians*, Volume 10, Southwest, edited by Alfonso Ortiz, pp. 1-3, Smithsonian Institution, Washington, D. C.

Thiel, Homer J. (Preparer)
1995 *Rock Art in Arizona*: *A Component of the Arizona Historic Preservation Plan*. Arizona State Historic Preservation Office, Arizona State Parks Board, Phoenix.

Vanderpot, Rein, and Jeffrey H. Altschul
2008 Patterns on Stone, Ritual Landscapes of the Western Papagueria. In *Fragile Patterns, The Archaeology of the Western Papagueria*, edited by Jeffrey H. Altschul and Adrianne G. Rankin, pp. 347- 376. SRI Press, Tucson.

Von Werlhof, Jay, H. Casey, R. J. Dorn, and G. A. Jones
1995 AMS 14C Constraints on Geoglyphs in the Lower Colorado River Region, Arizona and California. *Geoarchaeology: An International Journal* 10(4):237-273.

Wallace, Henry
1983 The Mortars, Petroglyphs, and Trincheras on Rillito Peak. *The Kiva* 48(3):137-246.
1989 *Archaeological Investigations of Petroglyphs Sites in the Painted Rocks Reservoir Area, Southwestern Arizona*. Technical Report No. 89-5, Institute for American Research, Tucson.

Waters, Michael R.
1982a The Lowland Patayan Ceramic Tradition. In *Hohokam and Patayan, Prehistory of Southwestern Arizona*, edited by Randall H. McGuire and Michael B. Schiffer, pp. 275-297. Academic Press, New York.
1982b The Lowland Patayan Ceramic Tradition (Appendix G). In *Hohokam and Patayan Prehistory of Southwestern Arizona*, edited by Randall H. McGuire and Michael B. Schiffer, pp. 537-570. Academic Press, New York.

Weaver, Donald E., Jr., Evelyn Billo, and Robert Mark
2012 Sears Point Rock Art Recording Project Report, on file at U. S. Department of the Interior, Bureau of Land Management, Yuma District Office, Arizona.

Whitley, David S.
2000 *The Art of the Shaman, Rock Art of California*. University of Utah Press, Salt Lake City.
2005 *Introduction to Rock Art Research*. Left Coast Press, Walnut Creek, California.

Wright, Aaron Michael
2011 *Hohokam Rock Art, Ritual Practice, and Social Transformation in the Phoenix Basin*, Ph.D. dissertation, Department of Anthropology, Washington State University, Pullman.