FIELD REPORT

Dear Earthwatch Amigos:

Another productive field season on Rapa Nui has come to an end and without your assistance and hard work it would not have been possible. We made major strides that included finishing the survey and testing archaeological features in Quadrangle 26, and the retrieval and burial of soil temperature sensors. Three survey units have now been completed with four to go. The final goal seems much more attainable now that we are approaching the half-way mark.

As you will see in the field report, many of the artifacts we collected have led to the generation of a lot of new data on the time periods of site occupation and the geological origin, or source, of the obsidian. Many hours have been spent in the lab over the last 6 months putting the pieces of the puzzle together. As a result of this process, I am becoming more convinced that Rapa Nui was settled around AD 1000 and not at an earlier time period (ca. AD 700). I do pay attention to the work of others and their statements on a later period of settlement, but I have to convince myself through empirical efforts that the statements hold water. At the same time, the results also seem to challenge the 17th century collapse scenario that has been put forth by many researchers. It is however a little too early to say anything definitive.

The next field season is about to start and as the previous accomplishments are reviewed in preparation, I appreciate the fact that the enormous amount of work completed to date could only have been done as a team effort. Thanks again for making the Easter Island project a successful undertaking.

Chris, Sonia, and Thegn

Christopher M. Stevenson
Sonia Haoa
Thegn Ladefoged

SECTION ONE

Project Title: Easter Island Cultures: The Study of Ancient Gardens and Settlements, Rapa Nui, Chile
Principal Investigators: Christopher M. Stevenson; Sonia Haoa Cardinali
Research Area: Easter Island, Chile (S 27 08' 53 W 109 22' 59)
Protected area status: World Heritage Site
Date field report completed: December 2009
Period covered by this report: March 2009 To April 2009

Top Highlight from the Past Field Season

Non-technical Overview of Results

Introduction

In March-April 2009 archaeological survey (walkovers potentially yielding visual reconnaissance) and test excavations were conducted at sites in Quadrangle 26, located on the west coast of Rapa Nui, displayed in Figure 1 below.

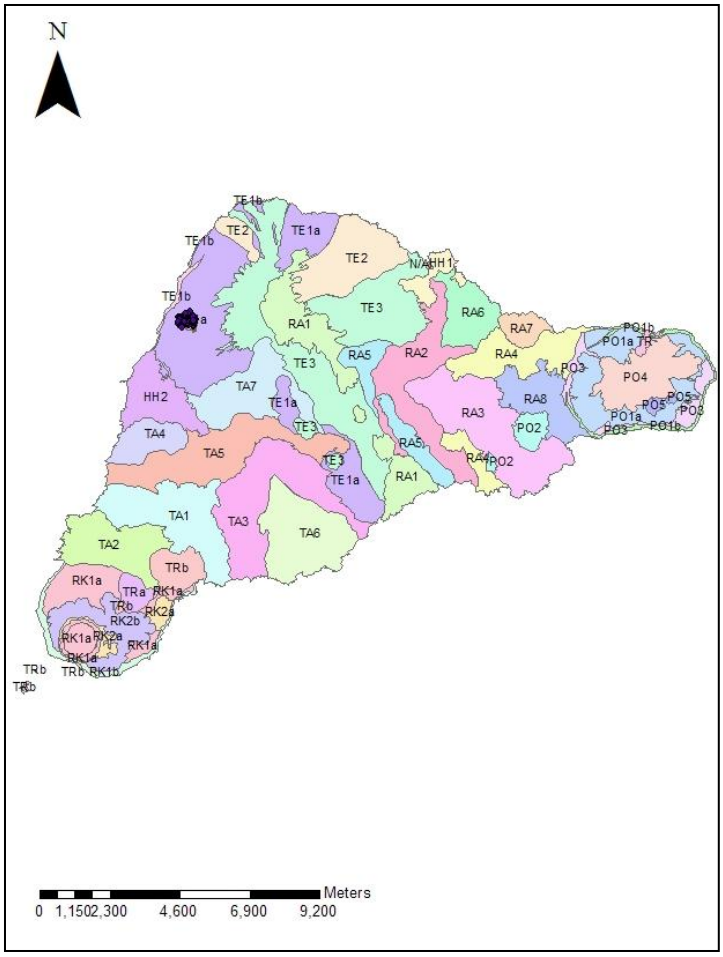

Figure 1: Island of Rapa Nui with geological flows showing the location of the Quadrangle 26 survey block

Previous work in the region has consisted of archaeological survey by The Rani Archaeological Survey Team that has recorded all of the prehistoric surface features in Quadrangle 26. This area is also known as Te Niu. Wozniak (1999, 2003) has described and dated settlement features, gardens, and a small coastal *ahu* (ceremonial platform). Settlements within Quadrangle 26 are high in density on a terrain that has a slope varying between 3-10 degrees. In the research described within this report, we surveyed and examined in detail the prehistoric settlements and gardens located within a 500m² study area located approximately 500m from the western shoreline.

Research Questions

Prior to initiating our study we formulated a set of three research objectives that would structure our investigations. These objectives concerned the themes of landscape settlement, chronology, and obsidian procurement.

1) Settlement Density and Configuration: Previous archaeological survey in Quadrangle 26 has documented hundreds of archaeological surface features constructed of placed stone (e.g., houses, chicken houses, and walled gardens). However, not all of the surface features had

consistent associations and many of the features were spatially clustered into larger settlements that were adjacent to, or surrounded by, large rock gardens. These differences suggest a significant variation in group living arrangements and different types of activity areas. The survey data was collected to reveal the range of feature associations present in the landscape.

2) Settlement Chronology: Conventional thinking suggests that Rapa Nui was settled around 700-800 AD (Flenley and Bahn 2003; Stevenson and Haoa 2008). However, recent research at Anakena Beach has radiocarbon dated cultural beach sand deposits to the 12th century. It is therefore projected that Rapa Nui was settled at the very end of the Polynesian migration into the Pacific during the 12th century (Hunt and Lipo 2006). If this late settlement date is correct then stratigraphic law (whereby soil layers are newer than the layers below) implies that Quadrangle 26 dates to after the 12th century.

We also propose that the settlement of Quadrangle 26 should show a long-term continuity since regions near the coast, providing easier access to both marine and agricultural resources. However, open to question is the occurrence of the Rapa Nui demographic collapse that would have led to a near abandonment of the survey area. Some authors consider this event a response to environmental degradation and place its occurrence in the late 17th century (Diamond 2005). Other researchers hypothesize that the demographic collapse was a result of contact with Europeans who introduced contagious diseases (Rainbird 2002). Our obsidian hydration dating of the settlement pattern should reveal the duration and intensity of habitation and will help evaluate the competing models.

3) Obsidian Procurement: The occupants of Quadrangle 26 are located approximately nine kilometers from the four obsidian sources of Rano Kao, Te Manavai, Mt. Orito, and Motu Nui/ Motu Iti (Beardsley et al. 1996; Stevenson et al. 1984). As a result, the numerous obsidian flakes and tools found in this area were transported into the region by past residents. However, it has not been established by prior research how obsidian was procured and distributed to the Rapa Nui population. Several procurement models have been proposed and are labelled as:

1) direct procurement
2) kinship based exchange,
3) controlled access and distribution

In the first case individuals would visit a quarry, extract the obsidian, and return with the material to their home region. In the second case, obsidian was received by down-the-line exchange as a result of barter with persons located closer to the quarries. Lastly, access to the quarry was restricted by chiefs, or elite managers, who would monitor visitation and the amount of material removed from the quarry. In this study we have not completed enough background research to test which model is more appropriate. However, we have conducted energy dispersive X-ray fluorescence analysis of obsidian trace elements on 175 obsidian flakes to look at which of the four quarries were utilized and in what proportions. This may eventually offer clues about preferred sources of material that can be explained by either social, geographic, or technological reasons.

Conclusions

In the 11th century the first recognizable human activity is represented in our sample of the archaeological record from the survey area. Depending upon the preferred date of permanent settlement, occupation of the survey area begins about 100 to 400 years after humans arrived on Rapa Nui. The surface survey of the 500 x 500m block shows the settlement pattern to be

varied. Small domestic settlements, or clusters of surface features, are dispersed over the landscape and are often located in swales (low points of land) or near basalt outcrops that offer some protection from the wind.

Two other large settlements are interpreted to reflect elite activity within the population. A small *ahu* and two large houses at the eastern edge of the survey area mark the higher status of these residences. On a lower terrace-like landform, two large cooking areas with multiple *umu pae* (stone lined earth ovens) and numerous rake-out mounds are associated with a *hare paenga* (canoe shaped houses) or elite dwelling. The elite occupants of these settlements were likely involved in the ritual management of farming and possibly in the collection, cooking and redistribution of cultivated food.

The production of tubers occurred in two distinct garden types. Small gardens with lithic mulch and boulders reflect a high investment in garden infrastructure and thus an intensive form of cultivation. Boulders found within the fields were quarried from nearby outcrops and brought into the garden perimeter. Lithic mulch was either transported to the garden or created through deep excavations into the regolith (heterogeneous material covering solid rock) or decomposing basalt located below the anthropogenic (relating to human activity) horizon. Such an intensive effort is thought to be associated with smaller domestic units working diligently to create a successful crop. In contrast to this are the large Scree gardens that comprise slightly over 90% of the cultivated land. The scatters of smaller surface rock are again humanly aggregated and help retain soil moisture and deflect wind. In this case however, energetic investment in garden infrastructure is lower. The plantings of dry land taro and sweet potato may have been more extensive with wider spacing between plants.

An alternate possibility is that lithic mulch gardens represent functionally different growing areas. In these locations, tubers such as yams or taro would be planted at a greater depth and covered with a mulch cap. Under these conditions moisture would be retained and temperature extremes reduced, thereby reducing the risk of crop failure. Our future work will be directed to resolving these various alternatives.

Tools were required in the farming process and obsidian was brought to the survey area from the quarries on the southwest end of the island. Our preliminary X-ray fluorescence analysis of the artifacts and geological source material indicates that at least three quarries (Motu Iti, Orito, Rano Kau) were utilized. Further source material analysis is required to determine if the Te Manavai quarry was also present in our sample. Obsidian hydration dating of the artifact obsidian shows that discard of the glass into the archaeological record stops in the middle AD 1700s, indicating that the population either abandoned the area or were negatively impacted by European disease.

Acknowledgements

We are very grateful to Mama Vicki (Victoria Pakomio) for taking such good care of the teams. We also thank the Consejo de Monumentos National de Chile and the Consejo de Monumentos de Rapa Nui for permission to work in Chile.

SECTION TWO: TECHNICAL RESULTS

1. REPORTING ON RESEARCH OBJECTIVES

Objective 1

Archaeological Survey and Test Excavations

Progress towards/against Objective

A comprehensive archaeological survey of Quadrangle 26 was completed in 2007 and recorded over 1137 cultural features (Haoa and Gonzalez n.d.). These data were integrated into a comprehensive GIS data base. For this study, we selected a 500 x 500 meter survey area as a sample of the larger quadrangle. The survey area was placed near the west margin of the quadrangle at an elevation between 26 and 156 meters. Site distributions are displayed within their overall context in Figure 2 below, and in detail in Figures 3-6.

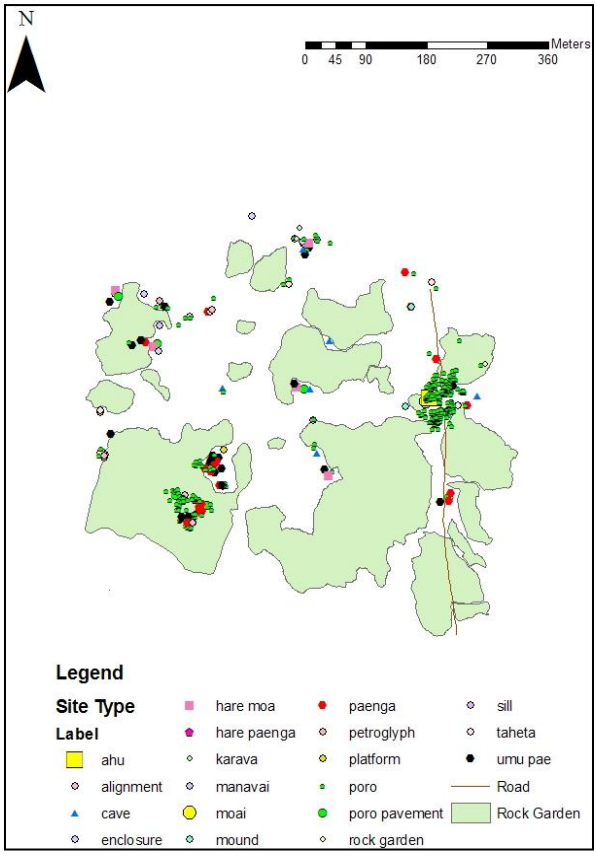

Figure 2: Site distributions within the 500m^2 survey block

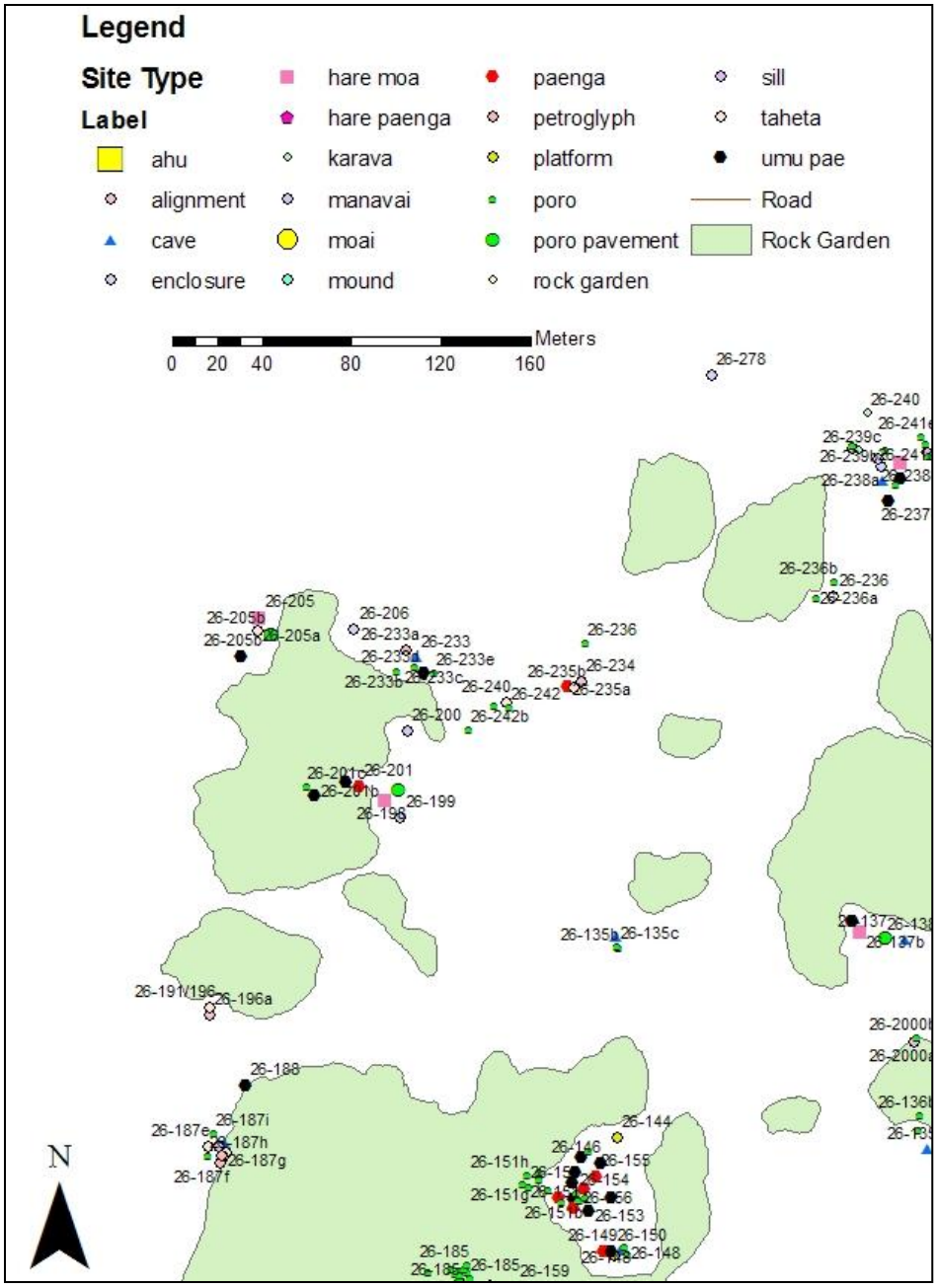

Figure 3: Site distributions within the northwest quarter of the survey block

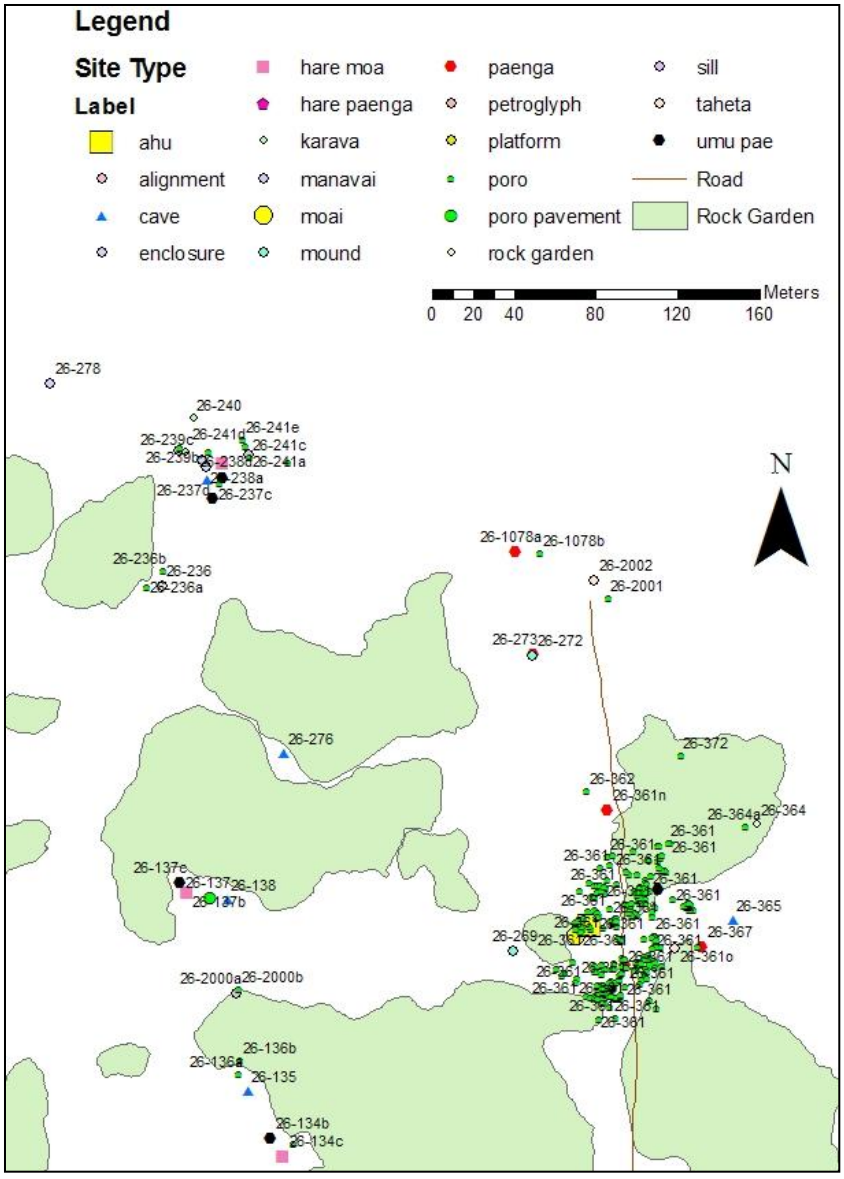

Figure 4: Site distributions within the northeast quarter of the survey block

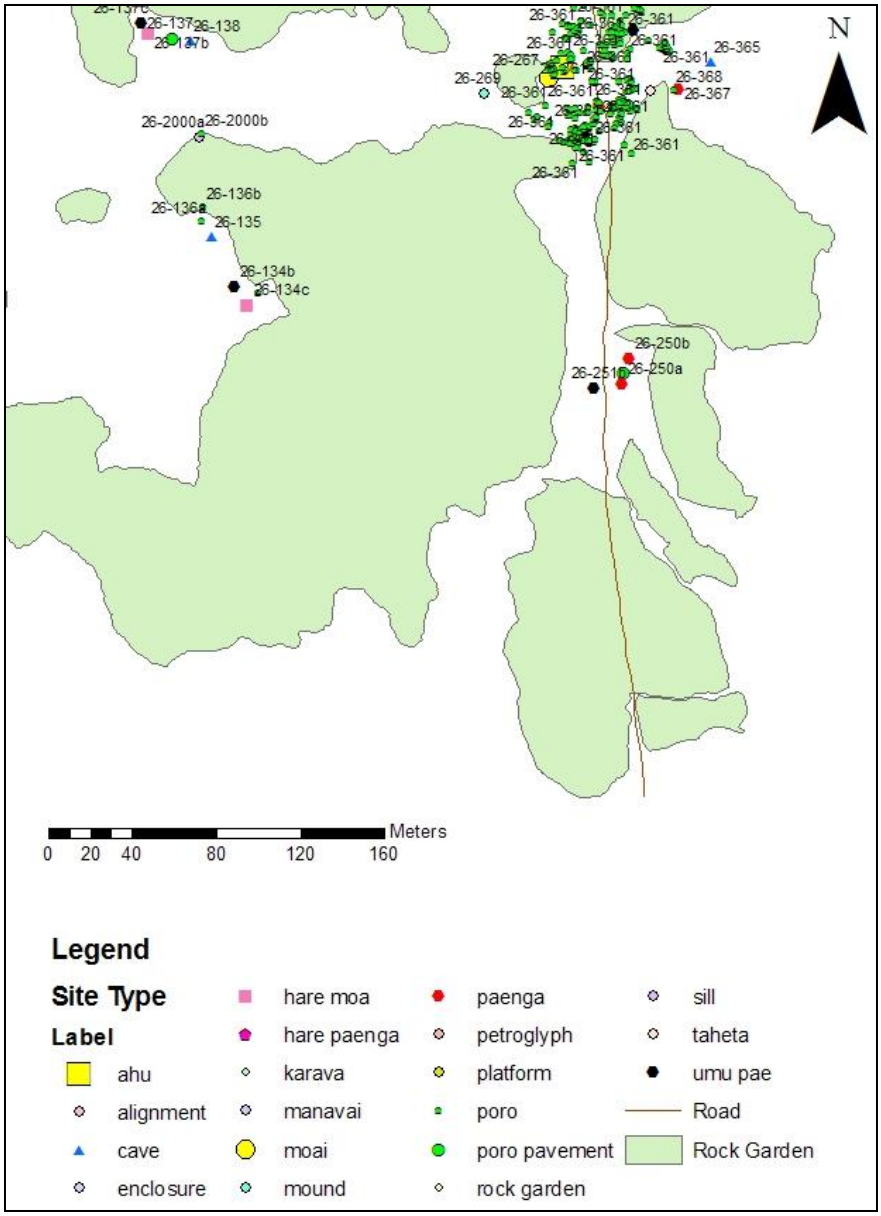

Figure 5: Site distributions within the southeast quarter of the survey block

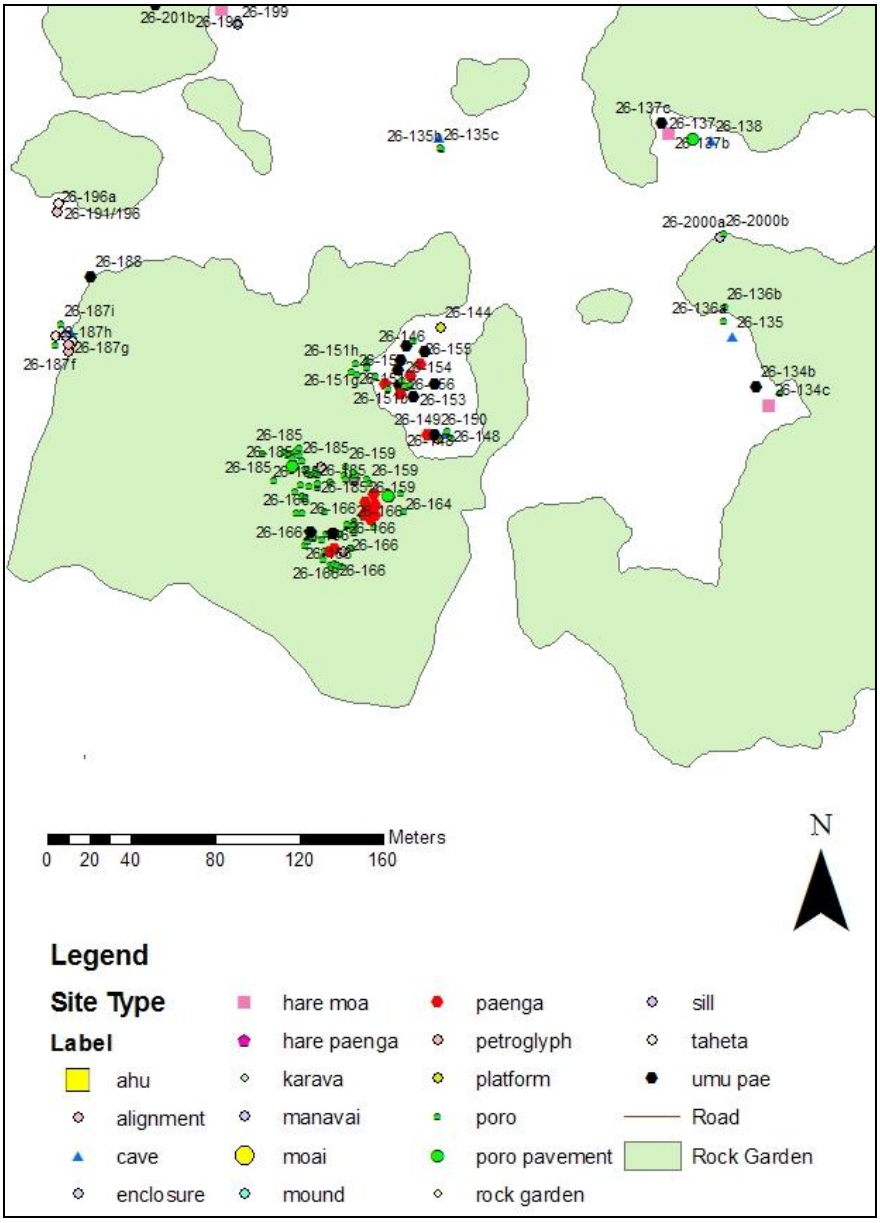

Figure 6: Site distributions within the southwest quarter of the survey block

The objectives of the field investigation were to resurvey the sample block at an intensive level to record the distribution and boundaries of the previously unrecorded prehistoric rock gardens. Once identified and mapped using GPS, each garden was tested with a 50cm^2 shovel test to confirm that an anthropogenic soil, or Ap-horizon, was present beneath the surface rock layer. Obsidian artifacts and charcoal samples were recovered when present. Soil samples were also taken for a future nutrient assessment of the garden and approximately 150 grams of earth were recovered from the shovel test profile at a depth of 20-25cm. Shovel tests were also placed outside of the garden to obtain soil samples from equivalent depths in non-cultivated contexts. A total of 22 gardens were identified and tested, the locations are displayed in Figure 7 below.

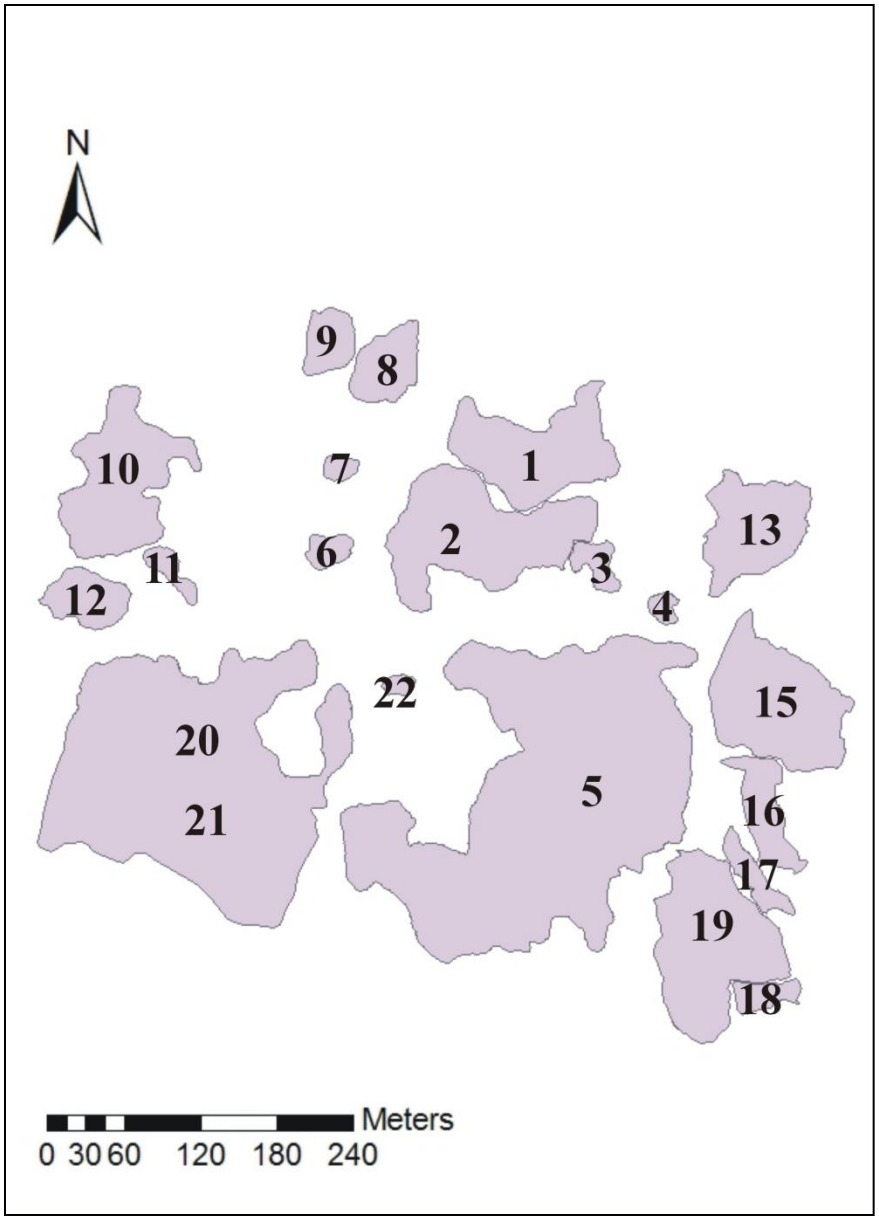

Figure 7: Garden locations within the survey block

Each previously recorded cultural surface feature was relocated using GIS maps and a list of UTM coordinates. These features included above ground structural remains such as house foundations, cobble patios, walled gardens, earth ovens, and alignments, as well as modified natural features such as caves. Shovel testing was also conducted adjacent to these remains to assess the depth of deposits and to recover obsidian and carbon for chronometric dating. A total of 16 sites were relocated and shovel tested (Table 3, Appendix A).

Objective 2

Environmental Monitoring: Soil Moisture, Soil Temperature, and Wind Velocity

Progress towards/against Objective

Soil temperature sensors were recovered from two locations. The first setting was a shallow, collapsed lava tube, which was entered from the top opening and would have been used as temporary habitation. A sensor was placed to the rear of the feature where it did not receive direct sunlight. This would provide an annual temperature for many similar features across the island. The second location was a rock garden where boulders and small stones covered the surface. The sensors were recovered from within and outside of the garden to show the impacts of rock cover on the ground temperature. New sensors were also buried at two garden/non-garden locations in Quadrangle 26. In 2010, six weather stations will be installed at locations across the island.

Objective 3

Soils Evaluation: Soil Nutrients

Progress towards/against Objective

A total of 54 samples were recovered from garden/non-garden contexts in Quadrangle 26. These samples are currently at ALS Labs in Canada undergoing analysis for phosphorus.

Objective 4

Rock Garden Chronology and Function

Progress towards/against Objective

Pedestrian survey was conducted to map the number and extent of ancient rock gardens. Using a Trimble GeoXT, the boundaries of all gardens were recorded. The survey area contained 19 discreet rock gardens that were of variable types and dimensions. The type of garden determination was made by visual inspection of the rock cover and by shovel testing within the garden boundaries. Gardens with a lithic mulch were the most frequent (n=10) while Scree gardens (n=8) with no underlying lithic mulch occurred less often. One garden (i.e., Garden 18) had been destroyed by heavy equipment and was a linear spoil pile. The less frequent Scree gardens however constituted 91.8% of the total cultivated area while lithic mulch gardens comprised only 8.2% of the worked ground.

The size of rock gardens varied considerably within the survey block. The vast majority of gardens were less than 10,000$m^{2,}$ some of which were as small as 322m^2 (Table 2, Appendix A). A small number of gardens (n=3; Gardens 2/3, 5, 20/21) are substantially larger and range between 33471 and 104,058m^2. This small subset is composed exclusively of Scree gardens.

At present, interpretation of the two gardens types is difficult. On one hand, it is possible that small lithic mulch gardens may represent horticulture associated with individual or extended family households, while the Scree gardens represent larger community farming efforts where planting was more extensive. Intensive horticulture using lithic mulch technology may have been reserved for the family gardens where greater effort was made to protect plants in order to generate a higher yield. This increased effort is also reflected by the fact that only the small gardens have boulders in association. On the other hand, lithic mulch gardens may be functionally different than Scree gardens, and because of their energetically expensive features may represent a focused community effort. Future analysis of plant starches present in the soil, and the density of subsurface planting pits may help resolve these issues.

Objective 5

Landscape Settlement and Landscape Settlement Chronology

Progress towards/against Objective

The terrain in the survey area consists of an east-west sloping terrain with natural terraces and small swales or valleys. Archaeological surface remains are numerous and a total of 145 surface features (Table 1 in Appendix A) were documented in the initial survey (Haoa and Gonzalez n.d.). The major categories of features were mapped and include beach cobble (*poro*) patios, lithic workshops, walled gardens (*manavai*), earthovens (*umu pae*), elite houses (*hare paenga*), chicken houses (*hare moa*), and worked stone (*paenga*). In addition, we recorded the exact location of numerous loose beach cobbles to more fully understand the original size of the prehistoric house patios. This raised the number of surface features to a total of 444. Prehistoric settlement remains are not evenly distributed and formed four loosely associated clusters of features in the northwest, northeast and southwest areas of the survey block (Figures 2-6). The regions between the clusters exhibited less numerous prehistoric settlements.

The northwest quadrant (Figure 3) primarily contained a dispersed set of domestic features (26-199 to 26-205, 26-233) at the base of a west facing slope that were positioned at the margin of a large rock garden. House foundations, a chicken house, cooking features and a semi-subterranean *manavai* were all present. A significant feature was a broad shallow cave that possessed an artificial apron with a flat surface. A shovel test at the margin of the apron revealed the fill deposits to be approximately 1m in depth. Other notable features included a flat basalt outcrop with 15 oval, circular and rectangular grinding basins (*taheta*) (26-191-196). Further to the south was an additional cluster of residential features (26-187) that also contained a subterranean *manavai*.

The northeast quadrant (Figure 4) contained two large beach cobble patios and associated domestic structures (26-361-367) such as a chicken house, a cave, loose *paenga*, and an earth oven. Scores of loose cobbles (*poro*) were scattered around the in situ *poro* and one patio was estimated to be approximately 17m in length. Directly in front of the living area was a small eroded *moai* made of Rano Raraku tuff. The statue was 2.18m long and a meter wide across the stomach region. It once was positioned upright on a low earthen platform without a masonry wall. Several in situ *poro* on the down slope side suggested that a cobble pavement was once present. Taken together, the *ahu*, large dwellings, and scattered *paenga* suggests that the site reflects an elite presence likely directed toward the management of farming. A second substantial domestic site (26-239-241) is present to the northwest by about 250m but no attributes of ranking exist in the surface archaeological record.

The southeast quadrant (Figure 5) has only scant surface evidence of human settlement (26-250/251) although the gardens in the region are large in size. However, the southwest quadrant (Figure 6) has two obvious activity areas that cover large sections of the delineated area. The first feature cluster (26-144/151) is a very large cooking area consisting of nine dispersed earth oven soil rake-out mounds some of which have *umu pae* and others which do not. All four of the *umu pae* contain one or more fine architectural *paenga* that would have originated from an elite house. The area around the cooking features is generally stone free and contains interred and loose *poro* that is evidence for a former patio. As a set the features suggest cooking for a larger number of persons over an extended period of time.

The second activity area (26-159/164-166/185) also has a large number of earth oven soil rake-out mounds and *umu pae* but differs from the previous feature complex in that it has a very large number of loose surface cobbles scattered in and around the cooking features. Within the

cluster is half of a *hare paenga* where the foundation has been pushed over and mostly buried. Its length is 12.5m and it could be the source of the scattered *poro* found in the cooking area. This house again reflects an elite presence within the settlement pattern for the management of production. The overall high number of cooking features suggests that population densities in this region were either high or nucleated around the elite structure.

The survey quadrant as a unit contains two sites where elites are present. The first is associated with a small *ahu* with little evidence for cooking while the second elite structure is positioned between two very large cooking areas. This suggests that some ranked persons may have focused more on ritual while others were overseeing the larger scale consumption of foods from the local gardens. Small family production centers are located away from these more central places.

Landscape Settlement Chronology

Chronological dating was conducted on a sample of archaeological features to establish the time period in which the survey area was occupied during prehistory. The sample was not selected randomly but depended upon the discovery of obsidian in a suitable context as well and the overall quantity of obsidian. However, samples from all four quadrants of the survey block were dated. Despite this sampling limitation, the chronological data is informative about prehistoric use of the region.

Obsidian hydration dates were processed from five gardens and nine archaeological features in the survey area. Gardens 5, 6, 12, 13, and 19 were dated. Archaeological features included two obsidian workshops (26-134, 26-286), earth ovens on mounds (26-151, 26-166), a group of *taheta* associated with an obsidian workshop (26-196), a house *poro* pavement (26-205), a cave entrance apron (26-233), and an enclosure associated with two large pavements and a *hare moa* (26-238). A total of 214 samples were processed (Table 4, Appendix A). Obsidian hydration layers were measured by infrared photoacoustic spectroscopy (Stevenson et al. 2001) and hydration rates calculated based upon an average water content value (0.10%) for Rapa Nui obsidian (Stevenson et al. 1998).

The obsidian dates show a range of dates with the earliest occupation beginning right around AD 1100 and activity continuing through the very early AD 1800s (Figure 8). Archaeological sites show long occupations that range from 200-400 years and artifacts from ancient gardens date to the same time periods as the settlements. Several samples returned very early age estimates (e.g., DHR-1750: 2222 BC; DHR-1746: 1073 BC) and this may have originated from artifact burning and super-hydration during cooling. One sample returned a 20th century date (DHR-1682: AD 1948) that may have been caused by historic breakage. However, this sample of dates does not contain any valid age estimates before AD 1050, thereby lending support for a later settlement date than the 9th century. In the later period of Rapa Nui settlement, there is evidence of landscape occupation after AD 1680. Thirty-four percent of the dates are after this period which suggests that numerous activities and people were present after the proposed demographic collapse. Significant population reduction seems to occur around AD 1750.

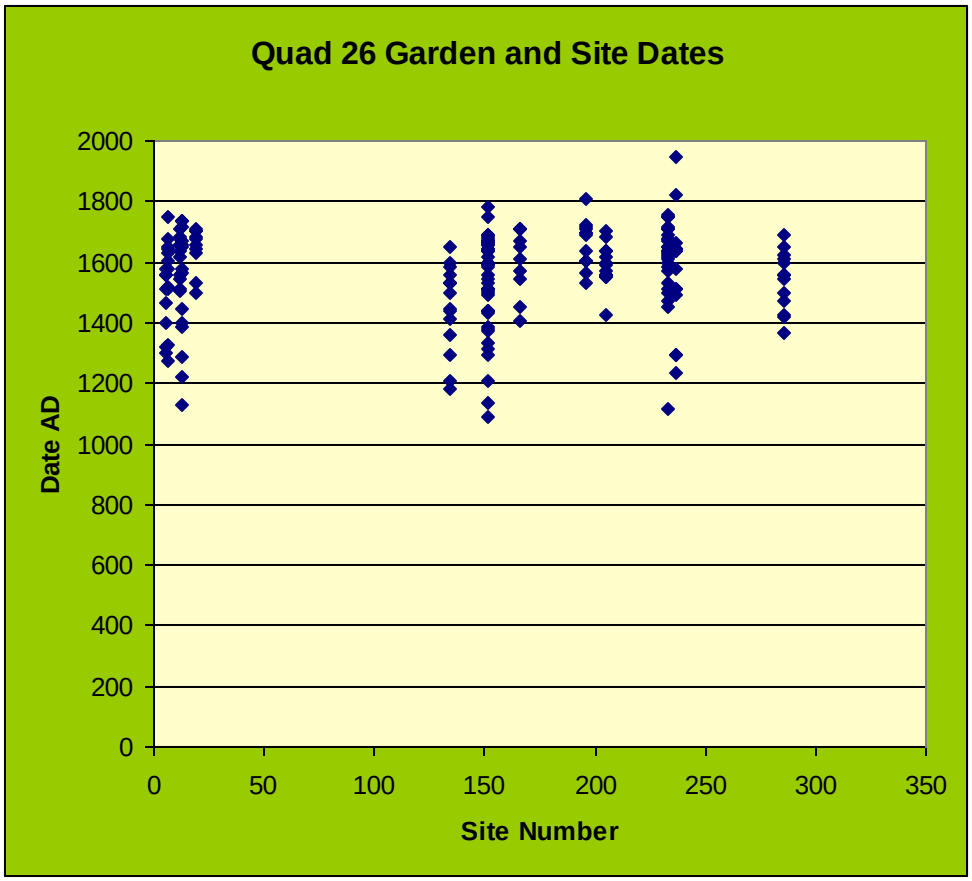

Figure 8: Obsidian hydration dates for prehistoric gardens and sites

Objective 6

X-ray Fluorescence Analysis of Obsidian

Progress towards/against Objective

The obsidian sources on Rapa Nui are clustered in the southwestern portion of the island. Previous geochemical testing for trace elements by neutron activation (Beardsley et al. 1996) or by laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) (Thomas et al. 2007) has shown that the four quarries have chemically unique concentrations of trace elements that can be used to identify artifacts originating from the quarry. Beardsley et al. (1996) found that scandium, zinc and selenium were discriminating elements. Thomas et al (2007) demonstrated that each quarry had a unique concentration range for strontium and that all four quarries could be discriminated when multivariate statistics were applied to the sample element profiles.

In this analysis, we used energy dispersive X-ray fluorescence to determine the trace element concentrations of titanium (Ti), magnesium (Mn), iron (Fe), zinc (Zn), Galium (Ga), rubidium (Rb), strontium (Sr), yittrium (Y), zirconium (Zr), and niobium (Nb) within 147 flakes and 28 geological source samples. The source samples were from Mt. Orito (n= 24), Motu Nui (n=3),

and Rano Kao (n=1). The analysis was conducted on a QuanX spectrometer. Solid obsidian samples and a pressed pellet standard of RGM-1 were placed in the sample holders and exposed to 200 seconds of live counting time. Elemental values were estimated from a calibration developed from eight USGS rock standards (e.g., BVO-1, RGM-1).

Figure 9a (below) shows a bivariate plot of strontium versus zinc for all of the analyzed specimens with the source samples superimposed on the artifact cluster. The Orito material forms a tight group between 44 and 62 ppm Sr and 207 and 261 ppm Zn (Table 5, Appendix A). Motu Nui is slightly more enriched in Sr but Rano Kau strontium levels appear to be within the concentration range of the Orito source. Rano Kao is better discriminated when rubidium is plotted with strontium (Figure 9b below). At this time additional source samples from Motu Iti and Rano Kau, plus samples from Te Manavai, are not available, and any further analysis must wait for their inclusion. The broad distribution of artifacts on the bivariate plots suggests that three of the four obsidian sources are represented in the archaeological assemblage.

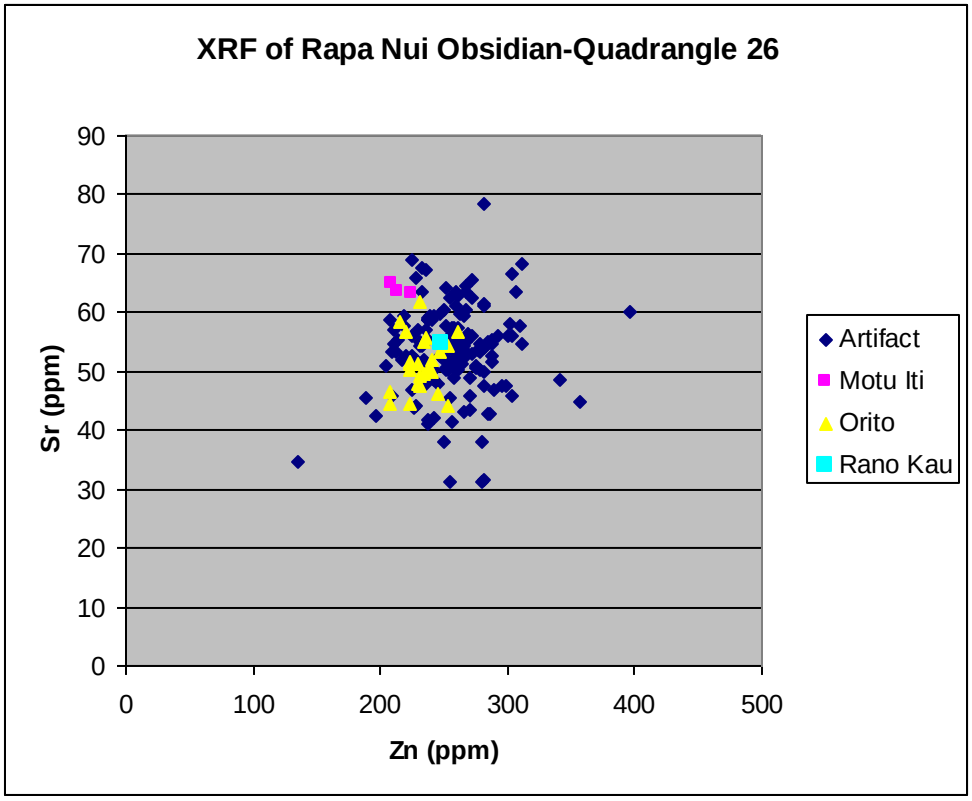

Figure 9a: XRF of Rapa Nui Obsifian Quadrangle 26 (Stronium Vs Zinc)

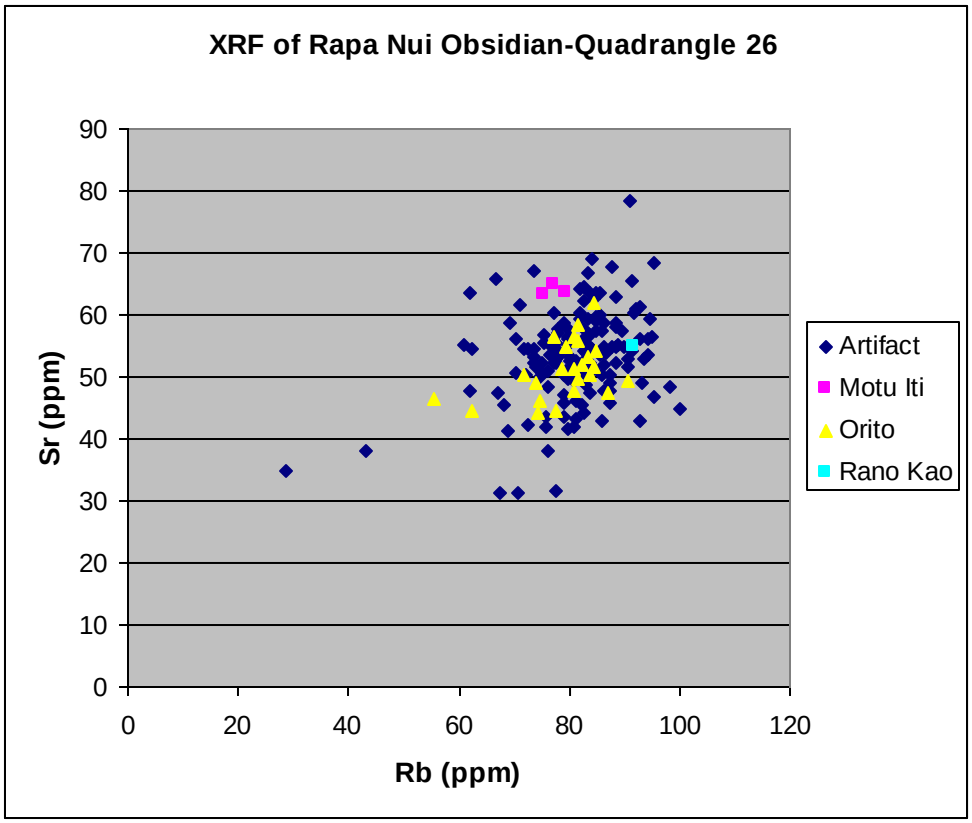

Figure 9b: Bivariate plots for trace elements contained within Rapa Nui artifacts and geological source samples using strontium versus rubidium.

2. PARTNERSHIPS

CONAF: Corporation Nacional Forestal (the Chilean equivalent of the National Park Service). They allow us to work in parts of the island that are considered to be the National Park. The CONAF archaeologist oversees our work.

Consejo de Monumentos Nacional/Rapa Nui: Grants permission for archaeological field work. Co-PI Sonia Haoa is the island representative of the Consejo de Monumentos Nacional.

3. PROJECT DEVELOPMENT

3.1. Removed or Modified Objectives

N/A

3.2. New Objectives

N/A

4. DISSEMINATION

N/A

5. CAPACITY DEVELOPMENT AND EDUCATION

A CONAF park guard received training in archaeological field methods over three weeks as a result of working collaboratively with our field teams. The PI (Stevenson) gave a workshop on obsidian dating at the University of Chile, Santiago, and the island park archaeologist attended the four lectures.

6.1. CONTRIBUTIONS TO INTERNATIONAL CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

N/A

6.2. CONTRIBUTIONS TO LOCAL, NATIONAL AND REGIONAL CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

N/A

7. ACTIONS OR ACTIVITIES THAT ENHANCE NATURAL AND SOCIAL CAPITAL

N/A

8. LONG TERM IMPACT OF PROJECT

Cultural heritage enhanced, restored or maintained

The archaeological surveys conducted by the EW teams and Co-PI efforts document the islands' cultural resources. These in-depth studies raise the awareness of local authorities about the richness and diversity of the archaeological record that is not obvious at first glance. The archaeological record is now considered in the planning process.

Livelihoods enhanced, restored or maintained

We rent accommodations from a local Rapa Nui family rather than larger, Chilean based hotels. This employs several people within the family and provides resources to the extended family.

We work with the National Park and provide training for their staff in archaeological methods. We typically work with one or two people each year and pay them a small stipend that augments their typically low wage.

References

Beardsley, F.R., Goles, G.G. and W.S. Ayres (1996). Provenance studies on Easter Island obsidian: An archaeological application. Archaeological Chemistry; Organic, Inorganic and Biochemical Analysis. 625:47-63.

Diamond, J. (2005). Collapse: How Societies Choose to Fail or Succeed. N.Y.: Viking Press.

Flenley, J. and P. Bahn (2003). The Enigmas of Easter Island. Oxford University Press.

Haoa, S. and Gonzalez, L. (n.d.) Archaeological survey of Quadrangle 26, Rapa Nui. Data on file, Hanga Roa, Isla de Pascua.

Hunt, T. and C. Lipo (2006). Late colonization of Easter Island. Science 311:1603-1606

Ladefoged, T., Stevenson, C.M., Vitousek, P. and O. Chadwick (2005). Soil nutrient depletion and the collapse of Rapa Nui society. Rapa Nui Journal 19(2):100-105.

Louwagie, G., Stevenson, C.M. and R. Langohr (2006). Impact of moderate to marginal land suitability on prehistoric agricultural production and models of adaptive strategies for Easter Island (Rapa Nui), Chile. Journal of Anthropological Archaeology 25:290-317

Rainbird, P. (2002). A message for our future? The Rapa Nui (Easter Island) ecodisaster and Pacific Island environments. World Archaeology 33(3):436-451.

Stevenson, C.M., Shaw, L. and C. Cristino (1984). Obsidian procurement and consumption on Easter Island. Archaeology in Oceania 19:120_124

Stevenson, C.M., Mazer, J.J. and B.E. Scheetz (1998). Laboratory obsidian hydration rates: theory, method and application. In Archaeological Obsidian Studies: Method and Theory. Advances in Archaeological and Museum Science, Volume 3, M. Steven Shackley, editor. New York: Plenum Press. pp: 181-204

Stevenson, C.M., Wozniak, J. and S. Haoa (1999). Prehistoric Agricultural Production on Easter Island (Rapa Nui). Antiquity 73:801-812.

Stevenson, C.M., Abdelrehim, I. and S.W. Novak (2001). Infrared photoacoustic measurement of obsidian hydration rims. Journal of Archaeological Science 28:109-115

Stevenson, C.M. and S. Haoa (2008). Prehistoric Rapa Nui. Easter Island Foundation, Los Osos, CA.

Thomas, R. Neff, H. and C. Lipo (2007). The sourcing of stemmed obsidian bifaces on Easter Island. Poster presented at the Society for American Archaeology annual meeting.

Wozniak, J.A. (1999). Prehistoric horticultural practices on Easter Island: Lithic mulched gardens and field systems. Rapa Nui Journal 13: 95-99.

Wozniak, J.A. (2003). Exploring Landscapes on Easter Island (Rapanui) with geoarchaeological studies: settlement, subsistence, and environmental changes. Dissertation. University of Oregon, Eugene.

APPENDIX A: Tables

Table 1

Archaeological Sites Surveyed within Quadrangle 26, Rapa Nui

FID	Site Description	Label	Site_Number
0	moai near platform	moai	26-267
1	indeterminate structure	structure	26-268
2	mound	mound	26-269
3	hare moa?	hare moa	26-361
4	paenga fragment	paenga	26-361b
5	paenga fragment	paenga	26-361a
6	umu pae	umu pae	26-361d
7	cave	cave	26-365
8	poro pavement	poro pavement	26-361f
9	paenga	paenga	26-361g
10	rock garden	rock garden	26-364
11	poro	poro	26-364a
12	poro	poro	26-372
13	paenga	paenga	26-361n
14	poro	poro	26-362
15	poro pavement	poro pavement	26-251a
16	umu pae	umu pae	26-251b
17	paenga	paenga	26-250a
18	paenga	paenga	26-250b
19	poro	poro	26-134a
20	umu pae	umu pae	26-134b
21	hare moa	hare moa	26-134c
22	cave	cave	26-135
23	poro	poro	26-136a
24	poro	poro	26-136b
25	poro pavement	poro pavement	26-137
26	hare moa	hare moa	26-137b
27	umu pae	umu pae	26-137c
28	cave	cave	26-138
29	cave	cave	26-276
30	taheta	taheta	26-236
31	poro	poro	26-236a
32	poro	poro	26-236b
33	umu pae	umu pae	26-237a
34	poro	poro	26-237b
35	umu rake out mound	umu pae	26-237c
36	small cave	cave	26-237d
37	enclosure	enclosure	26-238a
38	enclosure	enclosure	26-238b
39	semi-subterranean manavai	manavai	26-239a
40	poro	poro	26-239b
41	karava	karava	26-239c
42	karava	karava	26-240
43	hare moa	hare moa	26-238c
44	poro	poro	26-238d
45	cave	cave	26-148a
46	poro	poro	26-148b

47	poro	poro	26-148c
48	platform	platform	26-148a
49	paenga	paenga	26-149
50	umu pae	umu pae	26-150
51	platform	platform	26-144
52	umu/paenga	umu pae	26-146
53	two paenga [2]	paenga	26-155
54	umu pae	umu pae	26-153
55	poro	poro	26-156
56	umu mound	umu pae	26-154c
57	paenga	paenga	26-151
58	umu mound	umu pae	26-154d
59	umu mound	umu pae	26-154e
60	umu mound	umu pae	26-154f
61	paenga	paenga	26-153
62	poro	poro	26-154
63	poro	poro	26-154a
64	poro	poro	26-154b
65	umu mound	umu pae	26-154g
66	poro	poro	26-146a
67	paenga	paenga	26-151a
68	poro	poro	26-151b
69	poro	poro	26-151c
70	poro	poro	26-151d
71	poro	poro	26-151e
72	poro	poro	26-151f
73	poro	poro	26-151g
74	poro	poro	26-151h
75	umu pae	umu pae	26-188
76	cave	cave	26-187a
77	subterranean manavai	manavai	26-187b
78	taheta	taheta	26-187c
79	taheta	taheta	26-187d
80	taheta	taheta	26-187e
81	petroglyph	petroglyph	26-187f
82	petroglyph	petroglyph	26-187g
83	poro	poro	26-187h
84	poro	poro	26-187i
85	entrance sill	sill	26-2000a
86	poro	poro	26-2000b
87	paenga	paenga	26-273
88	boulder mound	mound	26-272
89	crude paenga	paenga	26-1078
90	broken poro	poro	26-2001
91	taheta	taheta	26-2002
92	isolated poro	poro	26-1078b
93	broken poro	poro	26-241b
94	entrance sill and pavement	sill	26-241a
95	isolated poro	poro	26-241c
96	poro	poro	26-241d
97	isolated poro	poro	26-241e
98	enclosure	enclosure	26-278
99	isolated poro	poro	26-236
100	paenga	paenga	26-235a
101	shallow taheta	taheta	26-235b
102	alignment	alignment	26-234

103	taheta	taheta	26-240
104	isolated poro	poro	26-242
105	broken poro	poro	26-242a
106	broken poro	poro	26-242b
107	umupae and mound	umu pae	26-205b
108	taheta	taheta	26-205a
109	hare moa	hare moa	26-205
110	entrance sill and poro pavement	poro pavement	26-205b
111	enclosure	enclosure	26-206
112	cave	cave	26-233
113	petroglyph	petroglyph	26-233a
114	broken poro	poro	26-233b
115	broken poro	poro	26-233c
116	umu pae	umu pae	26-233d
117	broken poro	poro	26-233e
118	subterranean manavai	manavai	26-200
119	house/poro pavement	poro pavement	26-198a
120	hare moa	hare moa	26-198
121	enclosure	enclosure	26-199
122	paenga	paenga	26-201
123	umupae and mound	umu pae	26-201a
124	umupae and mound	umu pae	26-201b
125	isolated poro	poro	26-201c
126	alignment	alignment	26-196a
127	taheta [multiple]	taheta	26-191/196
128	cave	cave	26-135a
129	isolated poro	poro	26-135b
131	isolated poro	poro	26-135c
130	ahu	ahu	26-267
132	alignment	alignment	26-185a
133	poro pavement	poro pavement	26-185
134	alignment	alignment	26-184
135	hare paenga	hare paenga	26-159
136	paenga	paenga	26-161
137	paenga	paenga	26-160
138	paenga	paenga	26-166
139	paenga	paenga	26-165
140	paenga	paenga	26-164
141	paenga	paenga	26-163
142	paenga	paenga	26-157
143	poro pavement	poro pavement	26-158
144	paenga	paenga	26-160a
145	paenga	paenga	26-160b
146	loose poro	poro	26-185
147	loose poro	poro	26-185
148	loose poro	poro	26-185
149	loose poro	poro	26-185
150	loose poro	poro	26-185
151	loose poro	poro	26-185
152	interred poro	poro	26-185
153	interred poro	poro	26-185
154	interred poro	poro	26-185
155	loose poro	poro	26-185
156	interred poro	poro	26-185
157	loose poro	poro	26-185
158	loose poro	poro	26-185

159	loose poro	poro	26-185
160	loose poro	poro	26-185
161	loose poro	poro	26-185
162	loose poro	poro	26-185
163	loose poro	poro	26-185
164	loose poro	poro	26-185
165	loose poro frag	poro	26-185
166	loose poro frag	poro	26-185
167	loose poro	poro	26-185
168	loose poro	poro	26-166
169	loose poro frag	poro	26-166
170	loose poro	poro	26-166
171	loose poro	poro	26-166
172	loose poro	poro	26-166
173	loose poro frag	poro	26-166
174	loose poro	poro	26-166
175	loose poro	poro	26-166
176	loose poro	poro	26-166
177	interred poro	poro	26-166
178	interred poro	poro	26-166
179	interred poro	poro	26-166
180	loose poro	poro	26-166
181	loose poro	poro	26-166
182	loose poro frag	poro	26-166
183	interred poro	poro	26-166
184	loose poro	poro	26-166
185	loose poro	poro	26-166
186	loose poro	poro	26-166
187	loose poro	poro	26-166
188	loose poro frag	poro	26-166
189	loose poro	poro	26-166
190	loose poro	poro	26-166
191	interred poro	poro	26-166
192	interred poro frag	poro	26-163
193	loose poro frag	poro	26-166
194	loose poro	poro	26-166
195	loose poro	poro	26-166
196	interred poro	poro	26-166
197	loose poro frag	poro	26-166
198	loose poro	poro	26-164
199	loose poro	poro	26-158
200	loose poro	poro	26-159
201	loose poro	poro	26-159
202	loose poro	poro	26-159
203	loose poro	poro	26-159
204	interred poro	poro	26-159
205	loose poro	poro	26-159
206	loose poro	poro	26-159
207	loose poro	poro	26-159
208	loose poro	poro	26-185
209	loose poro	poro	26-185
210	loose poro	poro	26-185
211	loose poro	poro	26-185
212	umu mound	umu pae	26-166b
213	umu mound with paenga	umu pae	26-166c
214	paenga	paenga	26-166d

215	paenga	paenga	26-166e
216	alignment	alignment	26-166f
217	paenga	paenga	26-367
218	poro	poro	26-368
219	taheta	taheta	26-361o
220	poro and house support	poro	26-361p
221	interred poro	poro	26-361
222	interred poro	poro	26-361
223	interred poro	poro	26-361
224	interred poro	poro	26-361
225	loose poro	poro	26-361
226	interred poro	poro	26-361
227	interred poro	poro	26-361
228	loose poro fragment	poro	26-361
229	interred poro	poro	26-361
230	loose poro	poro	26-361
231	loose poro	poro	26-361
232	loose poro	poro	26-361
233	loose poro	poro	26-361
234	loose poro	poro	26-361
235	loose poro	poro	26-361
236	loose poro	poro	26-361
237	loose poro	poro	26-361
238	loose poro	poro	26-361
239	loose poro	poro	26-361
240	loose poro	poro	26-361
241	loose poro	poro	26-361
242	loose poro	poro	26-361
243	loose poro	poro	26-361
244	loose poro	poro	26-361
245	loose poro	poro	26-361
246	loose poro	poro	26-361
247	loose poro	poro	26-361
248	loose poro	poro	26-361
249	loose poro	poro	26-361
250	loose poro	poro	26-361
251	loose poro	poro	26-361
252	loose poro	poro	26-361
253	loose poro	poro	26-361
254	loose poro	poro	26-361
255	loose poro	poro	26-361
256	loose poro	poro	26-361
257	loose poro	poro	26-361
258	loose poro fragment	poro	26-361
259	loose poro	poro	26-361
260	loose poro	poro	26-361
261	loose poro	poro	26-361
262	loose poro	poro	26-361
263	loose poro fragment	poro	26-361
264	loose poro	poro	26-361
265	interred poro	poro	26-361
266	loose poro	poro	26-361
267	loose poro	poro	26-361
268	loose poro	poro	26-361
269	loose poro	poro	26-361
270	loose poro	poro	26-361

271	loose poro	poro	26-361
272	loose poro	poro	26-361
273	loose poro	poro	26-361
274	loose poro	poro	26-361
275	loose poro	poro	26-361
276	loose poro	poro	26-361
277	interred poro	poro	26-361
278	interred poro	poro	26-361
279	interred poro	poro	26-361
280	interred poro	poro	26-361
281	interred poro	poro	26-361
282	loose poro	poro	26-361
283	loose poro	poro	26-361
284	loose poro	poro	26-361
285	loose poro	poro	26-361
286	loose poro	poro	26-361
287	loose poro	poro	26-361
288	loose poro	poro	26-361
289	interred poro	poro	26-361
290	interred poro	poro	26-361
291	loose poro	poro	26-361
292	loose poro	poro	26-361
293	loose poro	poro	26-361
294	loose poro	poro	26-361
295	loose poro	poro	26-361
296	loose poro	poro	26-361
297	loose poro	poro	26-361
298	loose poro	poro	26-361
299	loose poro	poro	26-361
300	loose poro	poro	26-361
301	loose poro	poro	26-361
302	loose poro	poro	26-361
303	loose poro	poro	26-361
304	loose poro	poro	26-361
305	partially interred poro	poro	26-361
306	partially interred poro	poro	26-361
307	loose poro	poro	26-361
308	loose poro	poro	26-361
309	loose poro	poro	26-361
310	loose poro fragment	poro	26-361
311	loose poro	poro	26-361
312	loose poro	poro	26-361
313	interred poro	poro	26-361
314	loose poro	poro	26-361
315	loose poro	poro	26-361
316	loose pporo	poro	26-361
317	loose poro	poro	26-361
318	loose poro	poro	26-361
319	loose poro	poro	26-361
320	loose poro	poro	26-361
321	loose poro	poro	26-361
322	loose poro	poro	26-361
323	loose poro	poro	26-361
324	interred poro	poro	26-361
325	loose poro	poro	26-361
326	loose poro	poro	26-361

327	loose poro fragment	poro	26-361
328	loose poro fragment	poro	26-361
329	loose poro fragment	poro	26-361
330	loose poro	poro	26-361
331	loose poro fragment	poro	26-361
332	partially interred poro	poro	26-361
333	loose poro	poro	26-361
334	loose poro	poro	26-361
335	loose poro	poro	26-361
336	loose poro	poro	26-361
337	loose poro	poro	26-361
338	loose poro	poro	26-361
339	loose poro	poro	26-361
340	loose poro	poro	26-361
341	loose poro	poro	26-361
342	loose poro	poro	26-361
343	loose poro	poro	26-361
344	loose poro	poro	26-361
345	loose poro	poro	26-361
346	loose poro	poro	26-361
347	loose poro	poro	26-361
348	loose poro	poro	26-361
349	loose poro	poro	26-361
350	loose poro	poro	26-361
351	loose poro	poro	26-361
352	loosee poro	poro	26-361
353	loose poro	poro	26-361
354	loose poro	poro	26-361
355	loose poro	poro	26-361
356	loose poro	poro	26-361
357	loose poro	poro	26-361
358	loose poro	poro	26-361
359	loose poro	poro	26-361
360	loose poro	poro	26-361
361	loose poro	poro	26-361
362	loose poro	poro	26-361
363	loose poro	poro	26-361
364	loose poro	poro	26-361
365	loose poro	poro	26-361
366	interred poro	poro	26-361
367	loose poro	poro	26-361
368	loose poro	poro	26-361
369	loose poro	poro	26-361
370	loose poro	poro	26-361
371	loose poro	poro	26-361
372	loose poro	poro	26-361
373	loose poro	poro	26-361
374	looe poro	poro	26-361
375	loose poro	poro	26-361
376	loose poro	poro	26-361
377	loose poro	poro	26-361
378	loose poro	poro	26-361
379	loose poro	poro	26-361
380	loose poro	poro	26-361
381	loose poro	poro	26-361
382	loose poro	poro	26-361

383	loosse poro	poro	26-361
384	loose poro	poro	26-361
385	loose poro	poro	26-361
386	loose poro frag	poro	26-361
387	loose poro	poro	26-361
388	loose poro	poro	26-361
389	loose poro	poro	26-361
390	loose poro	poro	26-361
391	loose poro	poro	26-361
392	loose poro	poro	26-361
393	loose poro	poro	26-361
394	loose poro	poro	26-361
395	loose poro	poro	26-361
396	loose poro	poro	26-361
397	loose poro	poro	26-361
398	loose poro	poro	26-361
399	loose poro	poro	26-361
400	loose poro	poro	26-361
401	loose poro	poro	26-361
402	loose poro	poro	26-361
403	loose poro	poro	26-361
404	loose poro frag	poro	26-361
405	loose poro	poro	26-361
406	loose poro	poro	26-361
407	interred poro on ahu	poro	26-267
408	interred poro on ahu	poro	26-267
409	loose poro	poro	26-361
410	loose poro	poro	26-361
411	loose poro	poro	26-361
412	looseporo	poro	26-361
413	interred poro	poro	26-361
414	loose poro frag	poro	26-361
415	loose poro	poro	26-361
416	loose poro	poro	26-361
417	loose poro	poro	26-361
418	loose poro	poro	26-361
419	loose por	poro	26-361
420	loose poro	poro	26-361
421	loose poro	poro	26-361
422	loose poro fragment	poro	26-361
423	loose poro	poro	26-361
424	loose poro	poro	26-361
425	loose poro	poro	26-361
426	loosee poro	poro	26-361
427	loose poro frag	poro	26-361
428	loose poro frag	poro	26-361
429	loose poro	poro	26-361
430	loose poro frag	poro	26-361
431	loose poro	poro	26-361
432	loose poro	poro	26-361
433	loose poro	poro	26-361
434	loose poro	poro	26-361
435	loose poro frag	poro	26-361
436	loose poro frag	poro	26-361
437	loose poro	poro	26-361
438	loose poro	poro	26-361

439	loose poro	poro	26-361
440	loose poro	poro	26-361
441	loose poro	poro	26-361
442	loose poro frag	poro	26-361
443	loose poro	poro	26-361
444	loose poro	poro	26-361
445	loose poro	poro	26-361

Table 2

Rock Garden Types and Dimensions

Rock Garden	Garden Type	%Rock Coverage	Area (m^2)
1	Lithic Mulch	30	7300
2/3	Scree	30	104058
4	Boulder/Lithic Mulch	70	432
5	Scree	25	41036
6	Boulder/Lithic Mulch	40	737
7	Boulder/Lithic Mulch	30	418
8	Lithic Mulch	15	2477
9	Lithic Mulch	55	1673
10	Scree	95	8028
11	Boulder Lithic Mulch	25	740
12	Boulder/Lithic Mulch	45	2288
13	Scree	45	5362
14	Dirt Road	0	0
15	Scree	15	8539
16	Lithic Mulch	90	2556
17	Scree	95	1208
18	Destroyed	0	970
19	Scree	10	9816
20/21	Scree	50	33471
22	Boulder/Lithic Mulch	30	322

Table 3

Test Units and Obsidian Counts

Bag No.	Test Unit	Material	Site	Quantity	Level	Loaned
OB-1	TU 1	Obsidian	26-361	34		x
OB-2	TU 2	Obsidian	Garden 13	27		x
OB-3	TU 3	Obsidian	Non-garden	2		
OB-4	TU 4	Obsidian	Garden 1	5		x
OB-5	TU 5	Obsidian	26-237/240	5		x

OB-6	TU 6	Obsidian	26-237/240	23		x
OB-7	TU 7	Obsidian	Garden 8	9		x
OB-8	TU 8	Obsidian	Garden ?	23		x
OB-9	TU 10	Obsidian	Garden 2	1		
OB-10	TU 11	Obsidian	26-137	15		x
OB-11	TU 12	Obsidian	Non-garden	6		
OB-12	TU 13	Obsidian	26-135	5		x
OB-13	TU 14	Obsidian	26-135	2		x
OB-14	TU 15	Obsidian	Garden 6	21		x
OB-15	TU 16	Obsidian	Non-garden	4		
OB-16	TU 17	Obsidian	26-135	2		x
OB-17	TU 19	Obsidian	26-2003	10		x
OB-18	TU 20	Obsidian	26-2003	3		x
OB-19	TU 21	Obsidian	Non-garden	18		
OB-20	TU 22	Obsidian	26-2003	2		x
OB-21	TU 23	Obsidian	Garden 10	7		x
OB-22	TU 24	Obsidian	Non-garden	9		
OB-23	TU 25	Obsidian	26-198	10		x
OB-24	TU 27	Obsidian	26-198	8		x
OB-25	TU 28	Obsidian	Garden 12	14		x
OB-26	TU 29	Obsidian	Garden 4	1		x
OB-27	TU 31	Obsidian	Non-garden	6		
OB-28	TU 33	Obsidian	26-286	28		x
OB-29	TU 34	Obsidian	Garden 17	5		x
OB-30	TU 35	Obsidian	Garden 19	14		x
OB-31	TU 36	Obsidian	26-134	45		x
OB-32	TU 37	Obsidian	Garden 5	14		x
OB-33	TU 38	Obsidian	Garden 22	13		x
OB-34	TU 39	Obsidian	26-251	18		x
OB-35	TU 40	Obsidian	26-151, L.1	25		x
OB-36	TU 40	Obsidian	26-151, L.2	1		x
OB-37	TU 41	Obsidian	26-151	20		x
OB-38	TU 42	Obsidian	Garden 20	1		x
OB-39	TU 44	Poro	26-159	48		
OB-40	TU 44	Obsidian	26-159	8		x
OB-41	TU 45	Obsidian	26-159	12		x
OB-42	TU 45	Poro	26-159	24		
OB-43	TU 46	Obsidian	26-185	4		x
OB-44	TU 47	Obsidian	Garden 11	13		x
OB-45	TU 48	Obsidian	26-166	16		x
OB-46	TU 49	Obsidian	26-187	4		x
OB-47	TU 50	Obsidian	26-187	1		x
OB-48	TU 51	Obsidian	26-196	36		x
OB-49	TU 52	Obsidian	26-187	8		x
OB-50	TU 53	Obsidian	Garden 12	12		x
OB-51	TU 54	Obsidian	26-233	211	Shovel Test	
OB-52	TU 54	Obsidian	26-233	41	Level 1	x
OB-53	TU 54	Obsidian	26-233	7	Level 2	x
OB-54	TU 54	Obsidian	26-233	14	Level 3	x
OB-55	TU 54	Obsidian	26-233	27	Level 4	x

OB-56	TU 54	Obsidian	26-233	16	Level 5	x
OB-57	TU 54	Obsidian	26-233	16	Level 6	x
OB-58	TU 54	Obsidian	26-233	20	Level 7	x
OB-59	TU 54	Obsidian	26-233	19	Level 8	x
OB-60	TU 54	Obsidian	26-233	9	Level 9	x
OB-61	TU 54	Obsidian	26-233	0	Level 10	
OB-62	TU 55	Obsidian	26-205	40		x
OB-63	TU 56	Obsidian	Garden 6	6		x
OB-64	TU 57	Obsidian	Garden 6	14		x
OB-65	TU 58	Obsidian	Garden 6	15		x
OB-66	TU 59	Obsidian	Garden 6	12		x
OB-67	TU 60	Obsidian	Garden 6	17		x
OB-68	TU 61	Obsidian	Garden 6	11		x
OB-69	TU 62	Obsidian	Garden 6	24		x
OB-70	TU 63	Obsidian	Garden 6	29		x
OB-71	TU 64	Obsidian	Garden 6	30		x

Table 4

Obsidian Hydration Dates

DHR Number	Provenience	Hydrated ABS 1630cm-1	Initial %OH	EHT	%rH/100	Site	Date AD	S.D.
DHR-1663	26-251, TU 41	0.1238	0.10	22.59	0.98	151	1659	24
DHR-1643	26-151, L.1, TU 40	0.1384	0.10	22.59	0.98	151	1587	27
DHR-1600	26-233, TU 54, L 4	0.1031	0.10	22.59	0.98	233	1748	20
DHR-1638	26-134, TU 36	0.1764	0.10	22.59	0.98	134	1360	34
DHR-1606	26-233, TU 54, L 6	0.1284	0.10	22.59	0.98	233	1637	25
DHR-1617	26-166, TU 48	0.1696	0.10	22.59	0.98	166	1405	33
DHR-1724	26-205, TU 55	0.1321	0.10	22.59	0.98	205	1619	26
DHR-1639	26-134, TU 36	0.1639	0.10	22.59	0.98	134	1441	32
DHR-1799	Garden 19	0.1141	0.10	22.59	0.98	19	1703	22
DHR-1619	26-166, TU 48	0.1419	0.10	22.59	0.98	166	1568	27
DHR-1790	Garden 12	0.1191	0.10	22.59	0.98	12	1681	23
DHR-1613	26-233, TU 54, L 9	0.1280	0.10	22.59	0.98	233	1639	25

DHR-1659	26-251, TU 41	0.1232	0.10	22.5 9	0.98	151	1662	24
DHR-1718	26-205, TU 55	0.1436	0.10	22.5 9	0.98	205	1559	28
DHR-1607	26-233, TU 54, L 7	0.1119	0.10	22.5 9	0.98	233	1713	22
DHR-1678	26-237/240, TU 6	0.1288	0.10	22.5 9	0.98	237	1636	25
DHR-1621	26-166, TU 48	0.1123	0.10	22.5 9	0.98	166	1711	22
DHR-1801	Garden 19	0.1190	0.10	22.5 9	0.98	19	1682	23
DHR-1736	26-196, TU 51	0.1101	0.10	22.5 9	0.98	196	1720	21
DHR-1797	Garden 19	0.1202	0.10	22.5 9	0.98	19	1676	23
DHR-1602	26-233, TU 54, L 5	0.1133	0.10	22.5 9	0.98	233	1707	22
DHR-1597	26-233, TU 54, L 3	0.1588	0.10	22.5 9	0.98	233	1472	31
DHR-1692	26-251, TU 39	0.2128	0.10	22.5 9	0.98	151	1092	41
DHR-1775	Garden 6	0.1200	0.10	22.5 9	0.98	6	1677	23
DHR-1792	Garden 12	0.1321	0.10	22.5 9	0.98	12	1619	26
DHR-1740	26-196, TU 51	0.1485	0.10	22.5 9	0.98	196	1532	29
DHR-1733	26-196, TU 51	0.1162	0.10	22.5 9	0.98	196	1694	23
DHR-1662	26-251, TU 41	0.1203	0.10	22.5 9	0.98	151	1676	23
DHR-1605	26-233, TU 54, L 6	0.1198	0.10	22.5 9	0.98	233	1678	23
DHR-1640	26-134, TU 36	0.1863	0.10	22.5 9	0.98	134	1292	36
DHR-1691	26-251, TU 39	0.1279	0.10	22.5 9	0.98	151	1640	25
DHR-1666	26-251, TU 41	0.0944	0.10	22.5 9	0.98	151	1781	18
DHR-1760	Garden 13	0.1062	0.10	22.5 9	0.98	13	1736	21
DHR-1754	Garden 5	0.1441	0.10	22.5 9	0.98	5	1556	28
DHR-1704	26-286, TU 33	0.1169	0.10	22.5 9	0.98	286	1691	23
DHR-1711	26-286, TU 33	0.1589	0.10	22.5 9	0.98	286	1471	31
DHR-1800	Garden 19	0.1293	0.10	22.5	0.98	19	1633	25

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				22.5				
DHR-1702	26-286, TU 33	0.1311	0.10	9	0.98	286	1624	25
	26-151, L.1, TU			22.5				
DHR-1648	40	0.1176	0.10	9	0.98	151	1688	23
				22.5				
DHR-1795	Garden 19	0.1546	0.10	9	0.98	19	1497	30
	26-151, L.1, TU			22.5				
DHR-1644	40	0.1731	0.10	9	0.98	151	1382	33
				22.5				
DHR-1625	26-166, TU 48	0.1256	0.10	9	0.98	166	1651	24
				22.5				
DHR-1786	Garden 12	0.1122	0.10	9	0.98	12	1711	22
	26-233, TU 54, L			22.5				
DHR-1589	1	0.1521	0.10	9	0.98	233	1511	29
				22.5				
DHR-1776	Garden 6	0.1294	0.10	9	0.98	6	1633	25
				22.5				
DHR-1794	Garden 12	0.1243	0.10	9	0.98	12	1657	24
				22.5				
DHR-1629	26-134, TU 36	0.1489	0.10	9	0.98	134	1530	29
				22.5				
DHR-1705	26-286, TU 33	0.1669	0.10	9	0.98	286	1422	32
	26-233, TU 54, L			22.5				
DHR-1591	1	0.1255	0.10	9	0.98	233	1651	24
				22.5				
DHR-1671	26-251, TU 41	0.1358	0.10	9	0.98	151	1600	26
	26-233, TU 54, L			22.5				
DHR-1598	4	0.1333	0.10	9	0.98	233	1613	26
				22.5				
DHR-1793	Garden 12	0.1198	0.10	9	0.98	12	1678	23
				22.5				
DHR-1635	26-134, TU 36	0.1252	0.10	9	0.98	134	1653	24
				22.5				
DHR-1802	Garden 19	0.1271	0.10	9	0.98	19	1644	25
				22.5				
DHR-1696	26-251, TU 39	0.1174	0.10	9	0.98	151	1689	23
	26-151, L.1, TU			22.5				
DHR-1650	40	0.1526	0.10	9	0.98	151	1509	29
				22.5				
DHR-1741	26-196, TU 51	0.1155	0.10	9	0.98	196	1697	22
				22.5				
DHR-1708	26-286, TU 33	0.1342	0.10	9	0.98	286	1609	26
				22.5				
DHR-1732	26-196, TU 51	0.1115	0.10	9	0.98	196	1714	22
	26-233, TU 54, L			22.5				
DHR-1610	8	0.1175	0.10	9	0.98	233	1688	23
				22.5				
DHR-1796	Garden 19	0.1491	0.10	9	0.98	19	1529	29

DHR-1655	26-151, L.1, TU 40	0.1644	0.10	22.5 9	0.98	151	1438	32
DHR-1717	26-205, TU 55	0.1437	0.10	22.5 9	0.98	205	1559	28
DHR-1757	Garden 13	0.1257	0.10	22.5 9	0.98	13	1650	24
DHR-1680	26-237/240, TU 6	0.1273	0.10	22.5 9	0.98	237	1643	25
DHR-1710	26-286, TU 33	0.1541	0.10	22.5 9	0.98	286	1500	30
DHR-1803	Garden 19	0.1120	0.10	22.5 9	0.98	19	1712	22
DHR-1706	26-286, TU 33	0.1754	0.10	22.5 9	0.98	286	1367	34
DHR-1647	26-151, L.1, TU 40	0.1021	0.10	22.5 9	0.98	151	1752	20
DHR-1660	26-251, TU 41	0.1229	0.10	22.5 9	0.98	151	1664	24
DHR-1627	26-134, TU 36	0.1976	0.10	22.5 9	0.98	134	1210	38
DHR-1767	Garden 13	0.1062	0.10	22.5 9	0.98	13	1736	21
DHR-1608	26-233, TU 54, L 7	0.1301	0.10	22.5 9	0.98	233	1629	25
DHR-1599	26-233, TU 54, L 4	0.1325	0.10	22.5 9	0.98	233	1617	26
DHR-1798	Garden 19	0.1139	0.10	22.5 9	0.98	19	1704	22
DHR-1611	26-233, TU 54, L 8	0.1365	0.10	22.5 9	0.98	233	1597	26
DHR-1649	26-151, L.1, TU 40	0.1330	0.10	22.5 9	0.98	151	1615	26
DHR-1626	26-134, TU 36	0.1686	0.10	22.5 9	0.98	134	1411	32
DHR-1715	26-286, TU 33	0.1435	0.10	22.5 9	0.98	286	1560	28
DHR-1689	26-251, TU 39	0.1467	0.10	22.5 9	0.98	151	1542	28
DHR-1624	26-166, TU 48	0.1131	0.10	22.5 9	0.98	166	1708	22
DHR-1773	Garden 6	0.1355	0.10	22.5 9	0.98	6	1602	26
DHR-1713	26-286, TU 33	0.1437	0.10	22.5 9	0.98	286	1559	28
DHR-1728	26-205, TU 55	0.1445	0.10	22.5 9	0.98	205	1554	28
DHR-1694	26-251, TU 39	0.1529	0.10	22.5 9	0.98	151	1507	29
DHR-1603	26-233, TU 54, L	0.1254	0.10	22.5	0.98	233	1652	24

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	26-233, TU 54, L			22.5				
DHR-1596	3	0.1409	0.10	9	0.98	233	1574	27
				22.5				
DHR-1725	26-205, TU 55	0.1188	0.10	9	0.98	205	1682	23
				22.5				
DHR-1742	26-196, TU 51	0.1168	0.10	9	0.98	196	1691	23
				22.5				
DHR-1753	Garden 5	0.1597	0.10	9	0.98	5	1467	31
	26-233, TU 54, L			22.5				
DHR-1593	2	0.1547	0.10	9	0.98	233	1496	30
				22.5				
DHR-1763	Garden 13	0.1113	0.10	9	0.98	13	1715	22
	26-237/240, TU			22.5				
DHR-1672	6	0.1273	0.10	9	0.98	237	1643	25
	26-233, TU 54, L			22.5				
DHR-1612	8	0.1207	0.10	9	0.98	233	1674	23
				22.5				
DHR-1735	26-196, TU 51	0.1353	0.10	9	0.98	196	1603	26
	26-151, L.1, TU			22.5				
DHR-1654	40	0.1521	0.10	9	0.98	151	1511	29
				22.5				
DHR-1623	26-166, TU 48	0.1467	0.10	9	0.98	166	1542	28
				22.5				
DHR-1782	Garden 6	0.1521	0.10	9	0.98	6	1511	29
				22.5				
DHR-1737	26-196, TU 51	0.1125	0.10	9	0.98	196	1710	22
	26-237/240, TU			22.5				
DHR-1686	6	0.1283	0.10	9	0.98	237	1638	25
				22.5				
DHR-1669	26-251, TU 41	0.1217	0.10	9	0.98	151	1669	24
	26-237/240, TU			22.5				
DHR-1677	6	0.0821	0.10	9	0.98	237	1822	16
				22.5				
DHR-1622	26-166, TU 48	0.1129	0.10	9	0.98	166	1708	22
				22.5				
DHR-1774	Garden 6	0.1404	0.10	9	0.98	6	1576	27
				22.5				
DHR-1789	Garden 12	0.1441	0.10	9	0.98	12	1556	28
				22.5				
DHR-1766	Garden 13	0.1867	0.10	9	0.98	13	1289	36
	26-233, TU 54, L			22.5				
DHR-1615	9	0.1116	0.10	9	0.98	233	1714	22
				22.5				
DHR-1628	26-134, TU 36	0.1436	0.10	9	0.98	134	1559	28
				22.5				
DHR-1761	Garden 13	0.1211	0.10	9	0.98	13	1672	23
				22.5				
DHR-1745	26-196, TU 51	0.0859	0.10	9	0.98	196	1810	17

DHR-1674	26-237/240, TU 6	0.1276	0.10	22.5 9	0.98	237	1641	25
DHR-1661	26-251, TU 41	0.1282	0.10	22.5 9	0.98	151	1638	25
DHR-1634	26-134, TU 36	0.1486	0.10	22.5 9	0.98	134	1531	29
DHR-1657	26-251, TU 41	0.1369	0.10	22.5 9	0.98	151	1595	26
DHR-1604	26-233, TU 54, L 6	0.1308	0.10	22.5 9	0.98	233	1626	25
DHR-1670	26-251, TU 41	0.1743	0.10	22.5 9	0.98	151	1374	34
DHR-1734	26-196, TU 51	0.1289	0.10	22.5 9	0.98	196	1635	25
DHR-1765	Garden 13	0.1239	0.10	22.5 9	0.98	13	1659	24
DHR-1785	Garden 12	0.1281	0.10	22.5 9	0.98	12	1639	25
DHR-1743	26-196, TU 51	0.1428	0.10	22.5 9	0.98	196	1563	28
DHR-1787	Garden 12	0.1464	0.10	22.5 9	0.98	12	1544	28
DHR-1676	26-237/240, TU 6	0.1232	0.10	22.5 9	0.98	237	1662	24
DHR-1616	26-166, TU 48	0.1336	0.10	22.5 9	0.98	166	1612	26
DHR-1756	Garden 5	0.1820	0.10	22.5 9	0.98	5	1322	35
DHR-1722	26-205, TU 55	0.1358	0.10	22.5 9	0.98	205	1600	26
DHR-1609	26-233, TU 54, L 7	0.1216	0.10	22.5 9	0.98	233	1670	24
DHR-1590	26-233, TU 54, L 1	0.1392	0.10	22.5 9	0.98	233	1583	27
DHR-1804	Garden 19	0.1243	0.10	22.5 9	0.98	19	1657	24
DHR-1723	26-205, TU 55	0.1146	0.10	22.5 9	0.98	205	1701	22
DHR-1668	26-251, TU 41	0.1543	0.10	22.5 9	0.98	151	1499	30
DHR-1695	26-251, TU 39	0.1181	0.10	22.5 9	0.98	151	1686	23
DHR-1618	26-166, TU 48	0.1222	0.10	22.5 9	0.98	166	1667	24
DHR-1769	Garden 13	0.1629	0.10	22.5 9	0.98	13	1447	31
DHR-1595	26-233, TU 54, L 3	0.1616	0.10	22.5 9	0.98	233	1455	31
DHR-1601	26-233, TU 54, L	0.1006	0.10	22.5	0.98	233	1758	20

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	26-151, L.1, TU			22.5				
DHR-1651	40	0.1643	0.10	9	0.98	151	1438	32
				22.5				
DHR-1709	26-286, TU 33	0.1366	0.10	9	0.98	286	1596	26
	26-151, L.1, TU			22.5				
DHR-1646	40	0.1243	0.10	9	0.98	151	1657	24
				22.5				
DHR-1630	26-134, TU 36	0.1486	0.10	9	0.98	134	1531	29
				22.5				
DHR-1744	26-196, TU 51	0.1357	0.10	9	0.98	196	1601	26
	26-151, L.1, TU			22.5				
DHR-1656	40	0.1720	0.10	9	0.98	151	1389	33
	26-151, L.1, TU			22.5				
DHR-1641	40	0.1371	0.10	9	0.98	151	1594	26
				22.5				
DHR-1726	26-205, TU 55	0.1376	0.10	9	0.98	205	1591	27
				22.5				
DHR-1749	Garden 5	0.1852	0.10	9	0.98	5	1300	36
				22.5				
DHR-1707	26-286, TU 33	0.1442	0.10	9	0.98	286	1556	28
	26-237/240, TU			22.5				
DHR-1673	6	0.1517	0.10	9	0.98	237	1514	29
				22.5				
DHR-1699	26-251, TU 39	0.1266	0.10	9	0.98	151	1646	24
	26-237/240, TU			22.5				
DHR-1679	6	0.1524	0.10	9	0.98	237	1510	29
				22.5				
DHR-1788	Garden 12	0.1520	0.10	9	0.98	12	1512	29
				22.5				
DHR-1770	Garden 13	0.1705	0.10	9	0.98	13	1399	33
				22.5				
DHR-1690	26-251, TU 39	0.1644	0.10	9	0.98	151	1438	32
	26-151, L.1, TU			22.5				
DHR-1642	40	0.1859	0.10	9	0.98	151	1295	36
				22.5				
DHR-1687	26-251, TU 39	0.1487	0.10	9	0.98	151	1531	29
				22.5				
DHR-1697	26-251, TU 39	0.1650	0.10	9	0.98	151	1434	32
	26-237/240, TU			22.5				
DHR-1683	6	0.1396	0.10	9	0.98	237	1581	27
	26-237/240, TU			22.5				
DHR-1681	6	0.1557	0.10	9	0.98	237	1490	30
				22.5				
DHR-1781	Garden 6	0.1255	0.10	9	0.98	6	1651	24
				22.5				
DHR-1727	26-205, TU 55	0.1412	0.10	9	0.98	205	1572	27
	26-151, L.1, TU			22.5				
DHR-1653	40	0.1276	0.10	9	0.98	151	1641	25

DHR-1688	26-251, TU 39	0.1215	0.10	22.5 9	0.98	151	1670	24
DHR-1783	Garden 12	0.1527	0.10	22.5 9	0.98	12	1508	29
DHR-1755	Garden 5	0.2084	0.10	22.5 9	0.98	13	1127	40
DHR-1780	Garden 6	0.1027	0.10	22.5 9	0.98	6	1750	20
DHR-1703	26-286, TU 33	0.1661	0.10	22.5 9	0.98	286	1427	32
DHR-1701	26-251, TU 39	0.1280	0.10	22.5 9	0.98	151	1639	25
DHR-1747	Garden 5	0.1435	0.10	22.5 9	0.98	5	1560	28
DHR-1667	26-251, TU 41	0.1438	0.10	22.5 9	0.98	151	1558	28
DHR-1777	Garden 6	0.1267	0.10	22.5 9	0.98	6	1646	24
DHR-1693	26-251, TU 39	0.1371	0.10	22.5 9	0.98	151	1594	26
DHR-1620	26-166, TU 48	0.1620	0.10	22.5 9	0.98	166	1452	31
DHR-1631	26-134, TU 36	0.1358	0.10	22.5 9	0.98	134	1600	26
DHR-1719	26-205, TU 55	0.1666	0.10	22.5 9	0.98	205	1424	32
DHR-1698	26-251, TU 39	0.1522	0.10	22.5 9	0.98	151	1511	29
DHR-1779	Garden 6	0.1812	0.10	22.5 9	0.98	6	1328	35
DHR-1658	26-251, TU 41	0.1804	0.10	22.5 9	0.98	151	1333	35
DHR-1633	26-134, TU 36	0.1633	0.10	22.5 9	0.98	134	1444	31
DHR-1751	Garden 5	0.1707	0.10	22.5 9	0.98	5	1398	33
DHR-1784	Garden 12	0.1243	0.10	22.5 9	0.98	12	1657	24
DHR-1675	26-237/240, TU 6	0.1860	0.10	22.5 9	0.98	237	1294	36
DHR-1720	26-205, TU 55	0.1456	0.10	22.5 9	0.98	205	1548	28
DHR-1748	Garden 5	0.1520	0.10	22.5 9	0.98	5	1512	29
DHR-1771	Garden 13	0.1398	0.10	22.5 9	0.98	13	1579	27
DHR-1752	Garden 5	0.1407	0.10	22.5 9	0.98	5	1575	27
DHR-1721	26-205, TU 55	0.1286	0.10	22.5	0.98	205	1636	25

				9				
	26-233, TU 54, L			22.5				
DHR-1592	2	0.2101	0.10	9	0.98	233	1113	40
				22.5				
DHR-1716	26-286, TU 33	0.1460	0.10	9	0.98	286	1546	28
				22.5				
DHR-1772	Garden 6	0.1512	0.10	9	0.98	6	1517	29
				22.5				
DHR-1664	26-251, TU 41	0.1559	0.10	9	0.98	151	1489	30
				22.5				
DHR-1637	26-134, TU 36	0.1545	0.10	9	0.98	134	1497	30
				22.5				
DHR-1759	Garden 13	0.1431	0.10	9	0.98	13	1562	28
				22.5				
DHR-1762	Garden 13	0.1726	0.10	9	0.98	13	1385	33
	26-237/240, TU			22.5				
DHR-1685	6	0.1861	0.10	9	0.98	237	1293	36
				22.5				
DHR-1632	26-134, TU 36	0.1394	0.10	9	0.98	134	1582	27
	26-237/240, TU			22.5				
DHR-1684	6	0.1939	0.10	9	0.98	237	1237	37
				22.5				
DHR-1764	Garden 13	0.1958	0.10	9	0.98	13	1223	38
				22.5				
DHR-1730	26-205, TU 55	0.1279	0.10	9	0.98	205	1640	25
				22.5				
DHR-1700	26-251, TU 39	0.2073	0.10	9	0.98	151	1135	40
	26-151, L.1, TU			22.5				
DHR-1645	40	0.1832	0.10	9	0.98	151	1314	35
				22.5				
DHR-1714	26-286, TU 33	0.1254	0.10	9	0.98	286	1652	24
				22.5				
DHR-1636	26-134, TU 36	0.2013	0.10	9	0.98	134	1182	39
	26-151, L.1, TU			22.5				
DHR-1652	40	0.1977	0.10	9	0.98	151	1209	38
	26-237/240, TU			22.5				
DHR-1682	6	0.0096	0.10	9	0.98	237	1948	2
	26-233, TU 54, L			22.5				
DHR-1614	9	0.1023	0.10	9	0.98	233	1752	20
				22.5				
DHR-1778	Garden 6	0.1886	0.10	9	0.98	6	1276	36
				22.5				
DHR-1746	26-196, TU 51	0.3993	0.10	9	0.98	196	-1073	76
	26-233, TU 54, L			22.5				
DHR-1594	2	0.1483	0.10	9	0.98	233	1533	29
				22.5				
DHR-1750	Garden 5	0.4691	0.10	9	0.98	5	-2222	89

Table 5

Trace Element Concentrations for Rapa Nui Obsidian Artifacts and Sources

Lab No	Ti	Mn	Fe	Zn	Ga	Rb	Sr	Y	Zr	Nb	Comment
1771	1650	834	26330	233	35	88	68	134	740	99	Artifact
1770	1260	579	21910	228	31	67	66	125	657	91	Artifact
1767	1553	746	27970	287	33	75	56	148	752	117	Artifact
1769	1929	541	20820	189	29	68	46	131	660	100	Artifact
1757	1326	588	21230	225	30	81	53	142	733	109	Artifact
1768	1334	569	22082	221	27	88	52	131	781	107	Artifact
1761	1726	713	23600	238	40	85	59	141	814	98	Artifact
1763	1501	637	25730	251	34	86	52	149	778	125	Artifact
1758	1567	721	26400	270	40	80	56	160	757	116	Artifact
1759	1709	647	24790	263	39	85	53	149	711	107	Artifact
1760	1415	646	24140	258	45	87	49	126	670	118	Artifact
1762	820	380	12840	135	16	29	35	25	244	35	Artifact
1764	1775	700	25700	258	38	77	55	152	776	102	Artifact
1765	1434	701	23880	236	33	78	57	145	798	118	Artifact
1766	1398	711	24980	279	32	74	53	135	701	111	Artifact
1777	1294	652	22960	233	28	78	55	141	908	134	Artifact
1775	1710	975	34860	397	42	92	60	167	753	107	Artifact
1774	1666	625	25980	261	37	79	50	162	721	123	Artifact
1773	1579	620	25040	261	37	83	53	139	845	131	Artifact
1772	1800	637	24620	295	37	67	47	130	654	127	Artifact
1776	1226	587	22990	266	38	83	54	148	751	119	Artifact
1781	1433	527	23890	256	37	74	52	131	772	102	Artifact
1782	1298	627	22560	237	33	81	50	140	732	105	Artifact
1778	2018	722	29180	281	43	80	50	146	795	107	Artifact

1779	1947	767	27900	283	38	92	54	154	807	128	Artifact
1780	1707	528	22680	225	34	80	56	145	969	118	Artifact
1670	1434	558	21460	208	34	69	59	138	778	111	Artifact
1669	1586	691	24719	225	34	84	69	149	725	121	Artifact
1671	1680	662	26530	312	39	95	68	152	943	90	Artifact
1667	1444	548	23130	236	35	87	48	140	745	108	Artifact
1657	1347	722	23060	235	32	74	67	151	1001	130	Artifact
1658	1626	611	24800	251	35	82	64	131	744	126	Artifact
1660	1546	667	22560	250	37	72	55	141	832	116	Artifact
1659	1785	627	22660	238	36	81	42	134	706	115	Artifact
1661	1524	570	27510	303	39	83	67	148	923	122	Artifact
1663	1471	665	27650	311	35	89	55	161	779	107	Artifact
1664	1527	596	24610	256	33	84	54	140	884	94	Artifact
1665	1450	622	20930	306	26	62	64	102	710	91	Artifact
1666	1752	783	29690	281	37	91	78	146	734	130	Artifact
1687	1315	508	23260	235	34	76	48	150	826	109	Artifact
1688	1483	577	24630	254	36	82	46	142	777	128	Artifact
1689	1516	570	23650	242	30	83	59	146	786	105	Artifact
1690	1793	536	21450	210	33	75	57	117	719	121	Artifact
1691	1670	733	25080	288	42	84	55	147	712	112	Artifact
1692	1926	597	23080	232	33	83	54	151	738	117	Artifact
1693	1240	609	21360	261	36	61	55	120	722	85	Artifact
1694	1371	664	23890	253	35	87	50	149	754	111	Artifact
1695	1590	540	21754	210	31	78	53	138	763	123	Artifact
1696	1880	737	27950	309	32	83	58	148	774	112	Artifact
1697	2103	712	26120	268	33	84	64	152	863	118	Artifact
1698	1566	585	24550	256	36	95	57	143	786	113	Artifact

1589	1360	563	22432	241	34	72	50	144	807	113	Artifact
1590	1325	580	22200	212	29	80	53	142	826	125	Artifact
1591	1420	652	27090	272	38	93	56	152	753	114	Artifact
1592	1405	552	22149	236	35	80	51	145	768	123	Artifact
1593	1342	587	21350	218	29	74	52	123	810	127	Artifact
1594	1159	587	22560	242	36	76	42	133	732	112	Artifact
1595	1421	542	25010	254	33	83	55	143	836	123	Artifact
1596	1520	577	21580	280	27	71	31	131	630	90	Artifact
1597	1324	621	25420	270	42	93	49	140	798	115	Artifact
1598	1454	586	21814	235	29	84	52	137	764	126	Artifact
1599	1369	624	24530	281	34	93	61	126	831	110	Artifact
1600	1743	626	26200	288	33	94	53	151	855	122	Artifact
1601	2150	680	24360	252	29	75	51	120	671	107	Artifact
1602	1442	640	25310	267	29	82	60	146	756	126	Artifact
1603	1110	506	20770	255	29	68	31	95	551	56	Artifact
1604	1504	727	25620	276	42	94	54	143	805	107	Artifact
1605	1943	804	27720	289	42	95	47	143	808	112	Artifact
1606	1682	665	26650	272	40	91	53	166	876	98	Artifact
1607	1551	694	26518	278	42	86	50	164	825	122	Artifact
1608	1290	456	22280	251	29	75	50	124	713	88	Artifact
1609	1473	687	23750	256	29	80	42	137	769	107	Artifact
1610	1628	651	21540	228	34	83	44	113	680	126	Artifact
1611	1550	602	21550	282	29	84	48	132	653	100	Artifact
1612	1213	611	24270	263	44	86	60	142	690	111	Artifact
1613	1120	540	21010	225	36	79	47	104	580	112	Artifact
1614	920	502	20140	266	34	75	52	130	523	109	Artifact
1615	1527	785	28810	284	40	93	43	147	755	127	Artifact

1702	1558	580	21895	214	32	80	55	139	779	121	Artifact
1703	1787	621	23080	257	30	80	51	140	764	119	Artifact
1704	1954	599	22560	210	34	73	55	149	736	127	Artifact
1705	1365	639	24130	271	34	79	44	145	779	111	Artifact
1706	1418	615	23480	249	32	83	55	147	752	115	Artifact
1707	1541	521	22268	227	36	76	44	147	787	117	Artifact
1708	1433	607	24150	242	34	83	49	154	838	134	Artifact
1709	1600	604	24059	241	36	89	59	144	876	114	Artifact
1710	2140	751	26250	265	31	84	51	151	834	112	Artifact
1711	1410	576	24160	281	36	78	32	133	631	102	Artifact
1712	1857	680	25655	257	37	86	57	156	798	127	Artifact
1713	1608	677	24830	271	35	87	46	139	788	118	Artifact
1714	1750	618	26910	292	28	70	56	140	767	83	Artifact
1715	2020	688	27170	287	42	91	52	135	751	118	Artifact
1716	1549	844	31650	357	46	100	45	157	755	120	Artifact
1717	1432	550	22279	220	32	78	53	146	828	115	Artifact
1718	1421	569	20861	210	31	79	46	135	785	117	Artifact
1719	1638	635	23492	232	32	83	55	152	771	129	Artifact
1720	1423	741	26080	304	43	81	46	145	701	110	Artifact
1721	1890	793	28240	341	40	98	48	144	825	114	Artifact
1722	1630	536	23680	275	33	81	51	129	672	127	Artifact
1723	1283	622	22100	246	31	86	48	131	751	104	Artifact
1724	1910	741	29150	285	46	88	55	151	852	136	Artifact
1725	1990	572	22970	237	20	69	41	122	633	79	Artifact
1726	1630	739	28030	286	36	86	43	136	697	81	Artifact
1727	2324	733	26280	251	37	80	58	148	751	126	Artifact
1728	1300	524	20110	250	35	43	38	85	451	68	Artifact

1729	1801	686	26580	232	35	85	64	147	878	109	Artifact
1730	1805	668	24620	218	35	78	58	127	654	120	Artifact
1731	1990	655	26530	300	46	83	56	112	830	128	Artifact
1732	1683	671	23640	250	38	77	54	135	812	111	Artifact
1733	1409	607	22633	228	30	78	52	147	750	126	Artifact
1734	1431	601	23735	246	32	90	55	147	875	130	Artifact
1735	1230	498	20170	196	31	72	42	123	779	106	Artifact
1736	1438	665	23960	252	36	77	52	160	883	123	Artifact
1737	2480	706	28040	267	34	83	65	146	967	122	Artifact
1738	2570	640	24730	266	34	81	43	122	793	95	Artifact
1739	1432	635	23840	240	36	85	59	153	884	120	Artifact
1740	1834	749	27970	302	37	89	58	147	839	126	Artifact
1741	1500	630	24160	298	28	62	48	113	683	92	Artifact
1742	1290	501	20105	205	29	71	51	135	784	123	Artifact
1743	1344	665	25060	259	38	92	61	151	817	134	Artifact
1744	1615	652	25180	261	33	85	58	153	1074	136	Artifact
1745	1572	648	24430	246	29	80	53	141	778	113	Artifact
1746	2024	635	22910	237	29	86	59	146	797	116	Artifact
1785	1496	628	25350	266	37	95	60	145	844	137	Artifact
1786	1717	626	24868	219	34	82	59	137	833	119	Artifact
1787	1501	678	26460	268	34	86	55	154	835	128	Artifact
1788	1549	677	24800	276	32	83	51	141	716	102	Artifact
1789	1474	595	22610	247	36	85	60	141	898	119	Artifact
1790	1394	618	23590	229	35	84	57	148	805	111	Artifact
1791	1617	688	26073	273	33	91	66	147	836	130	Artifact
1792	1635	742	27700	282	41	87	54	148	783	122	Artifact
1793	1640	809	26740	265	42	62	54	120	688	118	Artifact

1794	1660	570	21010	280	38	76	38	86	392	87	Artifact
1795	2414	726	26360	254	38	83	62	145	865	130	Artifact
1783	1489	564	23340	258	37	90	58	146	786	106	Artifact
1784	1523	564	23630	238	34	78	56	146	794	112	Artifact
1797	1623	626	25240	261	36	88	63	139	790	122	Artifact
1798	1403	551	22980	251	33	77	60	153	886	101	Artifact
1799	1760	727	26298	254	34	89	55	148	802	108	Artifact
1800	1773	785	27220	304	36	94	56	149	776	121	Artifact
1801	1623	710	27130	272	35	84	63	151	896	117	Artifact
1802	1421	642	22790	236	32	76	51	140	745	106	Artifact
1803	1579	566	23070	259	32	86	64	146	868	117	Artifact
1804	7670	1455	48720	282	40	71	62	122	577	41	Artifact
1665	1620	498	23300	256	34	78	54	125	673	100	Artifact
1699	2160	699	28290	279	35	74	55	135	667	98	Artifact
1701	1380	702	21840	237	32	79	59	139	740	131	Artifact
Motu1	1354	647	23404	214	32	79	64	138	714	121	Motu Nui Source
Motu2	1405	703	23670	226	32	75	63	137	701	112	Motu Nui Source
Motu3	1245	631	23444	210	33	77	65	134	719	125	Motu Nui Source
82-2248	1820	450	17740	207	23	55	47	114	594	98	Orito Source
82-2247	1443	577	22236	215	31	82	58	144	784	116	Orito Source
82-2251	1354	583	22090	237	29	72	50	144	716	100	Orito Source
82-2252	1159	511	22282	221	36	77	57	144	757	109	Orito Source
82-2253	1299	561	22204	223	33	84	52	139	765	113	Orito Source
82-2246	1396	551	20920	246	31	75	46	134	728	108	Orito Source
82-2250	1400	450	18030	208	26	63	45	129	676	95	Orito Source
82-2249	1433	658	22971	230	30	85	62	150	778	119	Orito Source
82-2254	1385	520	21340	224	32	81	51	146	752	117	Orito Source

82-2278	1527	586	23078	230	32	79	51	153	811	117	Orito Source
82-2267	1647	634	23695	241	33	82	52	146	863	116	Orito Source
82-2261	1697	589	22590	253	29	74	44	128	719	128	Orito Source
82-2264	1423	547	22210	229	32	81	48	139	764	127	Orito Source
82-2258	1452	569	22893	240	34	82	50	144	809	126	Orito Source
82-2277	1269	566	21160	231	29	74	49	138	841	119	Orito Source
82-2274	1470	598	23255	236	33	82	56	149	902	121	Orito Source
82-2271	1570	614	24240	232	37	87	47	156	832	118	Orito Source
82-2257	1276	576	21860	234	34	79	55	141	878	129	Orito Source
82-2259	1674	629	24960	254	36	85	54	146	796	131	Orito Source
82-2262	1491	552	23676	223	30	84	50	142	799	118	Orito Source
82-2263	1367	624	23188	234	40	91	50	141	871	115	Orito Source
82-2265	1377	577	23008	247	33	84	53	153	855	124	Orito Source
82-2266	1605	610	23610	261	36	81	57	134	847	114	Orito Source
82-2270	1368	577	21792	223	32	78	44	143	791	114	Orito Source
1796	1629	668	22850	249	29	92	55	135	779	126	Rano Kao Source