

Dear volunteers,

Emily, Mara and myself are back into the normal routine after a few weeks of cultural reorientation. Mara is in Hawai'i at her summer job (New Zealand summer) with a cultural resources management firm, and Emily has returned to the Headlands Institute to work with the mobs of children that pass through. I am back at my desk and the artefacts and soil samples from this year's effort are on the floor beside my desk waiting to be analysed.

We were very satisfied with how the project went this year. The field effort this year accomplished much. The survey teams led by Emily, Mara and Sonia registered about 400 cultural features. Mara was able to finish her survey in La Perouse of an entire aerial photograph and in the last week was able to test eight sites through excavation. She successfully recovered a large number of obsidian samples from her 50 x 50 cm tests to conduct obsidian dating which she will do over here in Richmond during the first part of April 2007.

The excavation of an *umu pae* rake-out mound was completed as well. Thousands of pieces of carbon, bone and shell were recovered by hand. Water flotation of feature soil contents and a soil column from the margin of the test unit was also completed and sorted. In addition to the many interesting artefacts coming from the screen, the flotation analysis resulted in the recovery of a faceted trade bead. That was quite an unexpected surprise. In the area surrounding the *umu pae* we surveyed and mapped a 500 x 300 m area for its sites and gardens and tested one suspected garden area with a large backhoe trench. A garden was indeed found and the numerous planting pits were drawn and sampled for soil and carbon. In all, it was very productive.

We would like to thank each one of you for working with us this year. We enjoyed your company, appreciated your hard work, and learned from you as well. Please call or email me if you have any questions about the fieldwork and we hope that your future expeditions are great experiences.

Sincerely,

Chris, Emily, Mara

## EARTHWATCH INSTITUTE FIELD REPORT 2006

**Project Title:** Easter Island Cultures

**Principal Investigators:** Christopher M. Stevenson and Sonia Haoa

**Position/Affiliations:** Virginia Department of Historic Resources, Richmond, VA

**Research Site:**

Easter Island, Chile

**Local Management Status of the Research Site:** CONAF (Corporacion Nacional Forestal/National Park Service)

**Scientific names of primary species being studied:** N/A

**Key Research Objectives:**

- To understand the forms of Rapa Nui agricultural rock gardens
- To determine the antiquity of the agricultural innovation
- To investigate how the structure of rock gardens varied across the landscape in response to soil attributes, landform and available moisture
- To document the spatial distribution of gardens through GPS/GIS mapping
- To study how intensive agriculture changes the organisation of society

**Data Collection and Results**

a) Give a concise account of the data you have collected during the past field season.

This year we collected data in three regions of the island. An archaeological survey was conducted in the region of Vaitea near the center of the island at an elevation of about 200m. Here the team identified and recorded locations with a GPS on 180 archaeological features that included house pavements, cooking ovens, chicken houses, caves, petroglyphs and rock gardens. A survey was also conducted in the region known as La Perouse on the north coast. Here, a resurvey of earlier work was conducted with a GPS system to precisely locate archaeological features that had been initially recorded on aerial photographs. In this effort, more than 200 sites were revisited. Lastly, an excavation was conducted at a cooking midden and a set of three gardens located near the shore on the south coast of the island. Deep deposits of soil contained ample food remains consisting of chicken, fish, rat and shell fragments. These data will provide insights into late phase (AD 1800-1900) subsistence patterns of the local Rapanui.

b) What progress have you made towards achieving your original objectives?

Beginning this year, our field objective is to put together a set of 20 survey blocks in different settings around the island to look at how agricultural strategies vary in response to environmental constraints. In this approach, some of the new 500 m<sup>2</sup> survey units can capitalize upon previous survey efforts in Vaitea in which Earthwatch volunteers have

worked. The resurvey of La Perouse has resulted in high quality data that is also suitable for inclusion in the new comparative survey.

c) Please provide a summary of your results.

This year's field program resulted in the addition of almost 400 precisely located archaeological features. The garden excavations on the south coast started the process of quantifying the difference between rock garden types based upon counting and volume measurements of the amount of rock recovered from the test units. Two of these units were excavated in a "lithic mulch" garden and demonstrated that the volume of rock to soil was extremely high. Over 3,000 stones of varying size were recovered from each of the units. The soil deposits below the rock revealed high densities of ancient planting pits attesting to intensive agriculture.

### **Significance/Benefits of Research**

a) What is/are the significance/benefits of your research at the following levels?

- Local

Some of our excavations and survey are conducted in parts of the island that will eventually be distributed to the local population for agriculture. This will lead to the destruction of the archaeological record. However, knowledge of where sites are located can assist in a land management plan that will minimize impacts to the ancient landscape.

- National

Our results contribute to the records of the National Park Service of Chile and augment their archaeological database.

- International

The program provides professional training for graduate students and supplies data sets for analysis that form the basis for Masters papers and Doctoral dissertations.

b) How do your findings contribute to issues of sustainability?

Our research is aimed directly at understanding why rock garden agriculture in a marginal environment such as Rapa Nui became a sustainable system for more than 500 years. Our research also wants to know why this long-term system eventually failed and whether it was due to climatic or human induced factors.

### **Dissemination of Results**

a) Have you provided details of results from your research to or within:

- Scientific papers

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

- 2005 Stevenson, C.M., T.N. Ladefoged, S. Haoa, and A. Guerra T. Managed Agricultural Production in the Vaitea Region of Rapa Nui, Chile. **Vith International Conference on Easter Island and the Pacific**. C. Stevenson, J.M. Ramirez, F. Morin and N. Barbacci, editors. Easter Island Foundation. Bearsville Press, Los Osos. Pp: 125-136
- 2006 Stevenson, C., T. Jackson, A. Mieth, T. Ladefoged and H-R. Bork. Prehistoric and early historic agriculture at Maunga Orito, Easter Island (Rapa Nui), Chile. **Antiquity** 80:919-936 (peer reviewed)
- 2006 Louwagie, G., Stevenson, C., and R. Langohr. 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 (peer reviewed)
- Management plans and reports  
Management plan for Rapa Nui archaeological resources. To be prepared for CONADI (Planning Commission), Hanga Roa, Rapa Nui, Chile.
  - Books, chapters, illustrations  
Diamond, Jared. 2005 Collapse. (See chapter 3)

### **Volunteer Tasks and Accomplishments**

- a) How did the volunteers contribute ideas, skills, expertise and motivations beyond that which you anticipated?

I am always pleased by the great interest and enthusiasm of the volunteers on my project. There were several people that stood out and really made unanticipated contributions. One person, for example, was very technically adept and could troubleshoot problems with the digital cameras and automatic triggering system. Some volunteers were very skilled at hand drawing and put this to good use capturing the details of archaeological features. Others made use of their language skills in the field.

- b) How have volunteers helped you to achieve your research or educational objectives?

The objectives of the project are to record the landscape features (e.g., gardens, habitation sites) at various locations around the island. We surveyed around one square kilometre and recorded approximately 400 features. Several of the gardens were tested through excavation and four 2 m x 2 m test units were completed.

### **Project Development**

- a) What logistical or scientific challenges have you encountered in the past season and how will you address them during the next field season?

Large teams increase coordination demands significantly and transportation complexity as well. We intend to reduce team size from 12 to 7 and will more closely evaluate potential participants for agility and fitness.

- b) Have you used any additional methods/strategies to meet your research objectives? If so, please describe them.

The solution for this year was to partition the large teams into three separate and independent operations each led by an Earthwatch staff member. This allowed multiple objectives to be achieved.

- c) How will you develop your research in the coming field season?

Next year we hope to incorporate more GPS units into the data recording procedure and to simplify some of the data collection procedures. We have also acquired some external funding to quantify the moisture and temperature parameters associated with Rapa Nui rock gardens.

### **Educational Opportunities**

- a) Does your project directly or indirectly involve the following groups in your research topic?
- Local communities
  - Students
  - Early career scientists
  - Other groups

This project includes a graduate student involved in developing a Ph.D. dissertation. I include students on a routine basis. The project co-PI is of Rapa Nui origin and lives on the island. It is difficult to include university aged students from the island since people in this age category are in mainland Chile.

- b) Please tell us the ways your research helps these groups better understand the conservation of a sustainable environment.

N/A

- c) Has your project helped lead to the completion of Masters' theses, or other educational research findings?

This project has been directly responsible for providing the opportunity to complete two doctoral dissertations and one Masters thesis.

### **Partnerships**

- a) List partnerships or collaborations with other organizations that you have developed or maintained in the past season.

None

- b) How have these organizations contributed to your project objectives?

N/A

- c) How do you anticipate these organizations will use the results generated by the project, and in what timeframes? N/A