



## EARTHWATCH INSTITUTE ANNUAL FIELD REPORT

**Date completed:** 8 January 2008

**Completed by:** Christopher M. Stevenson

**Period covered by this report:** September to November 2007

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Dear Amigos:

Iorana! How is everyone? I am assuming that you have not entirely lost your Rapa Nui vocabulary over the last few months and still have fond memories of all that happened on Easter Island. I am back to the grind and Sonia and her team (Tahira, Melinka, Geraldine and Singa) are still out on survey most days. They spent several weeks finishing up the Hiva Hiva lava flow survey and expressed great relief when they saw that rugged terrain for the last time. For us however, it is just the beginning.

To briefly sum up the 2007 field season, our three teams completed the garden and site survey of two 500m<sup>2</sup> land units. It doesn't sound like much but, with all the shovel tests and the difficult walking over rocky terrain, it was a very substantial task. In all we relocated and sampled for obsidian over 100 sites and fifty rock gardens of varying size. This completes two of our proposed 16 survey blocks around the island that will be used to document how ancient fields and gardens were constructed and how they used the landscape to buffer against high winds and low moisture conditions. In the Hiva Hiva area we defined a new garden variant that consisted of bolder gardens within large collapsed lava tubes. They are impressive and if you sign on to Google Earth they can be easily seen.

We also had time to place two large test units at a domestic site immediately at the base of the Hiva Hiva cone on the west side. One unit was placed on a partial rectangular house foundation and the other was on open ground without associated architecture. Much to our surprise, both test units revealed very large planting pits that were heavily mulched with charcoal; and I mean tons of charcoal. Radiocarbon dates from this site place it in the AD 1400-1700 range. We ran radiocarbon dates from other gardens as well and many of them date to the AD 1400-1500 period. One early date (AD 1060-1270) came from one of the large lava tube gardens and may reflect clearing of the palm forest in this area. The obsidian dating of the sites and gardens is about to begin and will more fully reveal site occupation length.

All of this fine information could not have been collected without your assistance in the field. Sonia and I are truly grateful for your interest, patience, and commitment to the

project during those several weeks. We thank you very much for all of your positive contributions.

Iorana,

Chris and Sonia

P.S. FYI: in early 2009 we plan to return to Hiva Hiva and conduct a major excavation at one of the larger cave complexes. So if you really want to get down and dirty come on back then.

## **Reporting on research objectives**

Below is a summary of project progress by objective within the last year.

### **Objective 1: Rock Garden Morphology and Placement**

*It is a major objective of this project to understand how the prehistoric Rapa Nui used rock placement to serve as a buffering system against harsher environmental factors created by deforestation of the landscape. As trees were removed, wind velocities increased and available moisture decreased because of greater evapotranspiration. This increased risk to plant maturity, and thus productivity, resulted in the development of the rock garden that sheltered plants. The types of rock gardens were variable and consisted of boulder gardens, surface pavements, lithic mulch, and combinations of all three in response to the severity of factors. The landscape location could also improve plant conditions by placing the gardens in swales, on the edges of outcrops, and at the base of hills. We seek to understand what local environmental conditions (e.g. soil type, slope, aspect, drainage) resulted in placing garden types at specific locations. To understand this we have proposed to survey eight, 500m<sup>2</sup> survey units around the island. Two of these units were finished in 2007.*

### **Objective 2: Garden Soil Fertility**

*It is our hypothesis that the ancient Rapa Nui periodically enriched the naturally nutrient deficient soils of the island by organic mulching but then depleted them to back to baseline levels or lower through intensive agriculture. To look at the state of depletion (or enrichment) we're comparing the nutrient levels of soils found within and outside of ancient gardens. Shovel tests will be excavated within and outside of rock gardens and soil samples taken from each for chemical analysis. In 2007 we located, mapped, and tested approximately 50 garden/non-garden locations. The soils samples are awaiting analysis.*

### **Objective 3: Landscape Use Over Time**

*It is our hypothesis that the ancient Rapa Nui were conducting an intensive and non-sustainable form of agriculture until the late 17<sup>th</sup> century. At that time there was a significant restructuring and simplification of the agricultural system that no longer had the goal of high surplus food yields. We believe that certain marginal parts of the landscape would no longer be used and this would be reflected by the abandonment of the area. To test this idea we will locate prehistoric sites in our survey blocks and date them with radiocarbon and large numbers of obsidian hydration dates. In 2007 we relocated approximately 100 ancient sites and sampled approximately 50 habitation sites for obsidian and charcoal. Obsidian hydration is currently under way.*

## Project development

It is early in the implementation of this project. We believe that one new development will be the more substantial sampling of a limited number of sites to acquire numerically larger numbers of obsidian artefacts for dating. This will be required at low density sites.

## Non-technical summary of results

Two, 500m<sup>2</sup> survey quadrants were studied within the Hiva Hiva lava flow on the west coast of Rapa Nui in September – October, 2007. Despite its rugged and exposed lava the area was occupied in prehistory and cultivated to grow tubers such as sweet potato and taro. Project participants systematically revisited each of the archaeological surface features initially identified by the Chilean survey team, wrote detailed descriptions of the architecture, excavated one or more 50cm<sup>2</sup> test units to recover obsidian and carbon, and took GPS locations of the tests. Each quadrant was systematically covered to locate ancient rock gardens (not previously mapped by Chilean archaeologists), the boundaries were mapped with GPS rover units, and the soils within and outside each garden were sampled through small shovel test excavations. Soil samples were removed with a trowel for chemical analysis at a later date.

How these data contribute to achieving **conservation impacts** (e.g. actions based on results, management plans, site protection):

The mapping of ancient gardens, in addition to the sites, shows that the Rapa Nui landscape is indeed still a cultural landscape and not just a series of isolated stone surface features. This realization is helping to structure management policy to help conserve the areas between sites that are traditionally recognized.

### **Significance/ benefits** of the research

- Local (to the area of the research site)

The Co-PI is a Rapa Nui archaeologist in charge of primary archaeological survey. The Earthwatch program supports this local effort and conducts basic research to expand an understanding of the recent past. Information and results generated by the project assist in land management policy and information for the tourist industry.

- National / Regional

Our field reports are translated into Spanish and are on file at the National Council of Monuments in Santiago. The 2005 field report was published in a Spanish academic journal.

- International

The project consists of an international research team that includes the University of Auckland, New Zealand, the Virginia Department of Historic Resources, USA, and Rapa Nui

persons. Data from the survey are used for Master's theses and one doctoral dissertation is in progress.

## Communication of results

### Printed:

Stevenson, C.M., Ladefoged, T.N. and S. Haoa. (2007) An upland agricultural residence on Rapa Nui: Occupation of a hare oka (18-473G) in the Vaitea region. **Archaeology in Oceania** 42:72-78

Stevenson, C.M. and S. Haoa (In Press) **The Hanga Ho'onu Landscape Survey, Easter Island**. Easter Island Foundation. .

### Meetings and conferences:

Mulrooney, M., Ladefoged, T.N., Stevenson, C. and S. Haoa. (In Press) Empirical assessment of a pre-European societal collapse on Rapa Nui (Easter Island). **Proceedings of the VIIth International Conference on Rapa Nui and the Pacific**. Los Osos, Easter Island Foundation.

Mulrooney, M., Ladefoged, T.N., Stevenson, C. and S. Haoa. (In Press) Continuity or collapse? Developing a diachronic model for settlement and land use in Hanga Ho'onu, Rapa Nui (Easter Island): A brief progress report. **Proceedings of the VIIth International Conference on Rapa Nui and the Pacific**. Los Osos, Easter Island Foundation.

## Educational Opportunities

This project involves the local community directly by participating with the Chilean archaeological survey. It employs local personnel as well. Graduate students participate in the field work and assist in the analysis of the results.

How the research helps these groups better understand and act towards the conservation of a sustainable environment:

Land use policy and land conservation are based upon the occurrence of archaeological sites and preserved landscapes.

The project has contributed to the completion of two Master's degrees, and one Ph.D. is in progress.

## Acknowledgements

*Thanks to the Earthwatch staff that oversee my project!*