

Lucy Gill

Tinker Final Report

Human-environment interaction in pre-Hispanic Lake Cocibolca, Nicaragua: a historical ecology approach

This project performed the first systematic archaeological survey of the Zapatera Archipelago, located within Lake Cocibolca, the largest lake in Central America and an important source of transport and subsistence from pre-Hispanic times through the present. Although the island's archaeology was initially documented in the 19th century due to its exceptional stone statuary and petroglyph panels, very little scientific archaeology or environmental work has taken place. This survey constituted part of a larger investigation of the intersection between environmental and cultural variability across a transect of Lake Cocibolca. It draws upon previous excavation and survey on either side of the lake conducted under the auspices of two recent projects. Pilot research conducted by the grantee and others from 2015 to the present has suggested that despite Zapatera's proximity to the western coast of the lake, the architectural and ceramic styles more closely resemble those of the Chontales region, on the eastern side of the lake. Therefore, this archipelago was uniquely situated to provide a perspective on cross-lake networks of interaction, as well as how these interconnectivities were influenced by micro-environmental variations, exploitation of lacustrine resources and perceptions of landscape. This survey cataloged human activity areas, evidenced by mounded architecture, petroglyphs and artifact scatters, as well as geomorphological features, to discern relationships between settlement locations, non-occupational activity areas, and prominent features within the landscape, which include rivers, rock shelters and volcano peaks. Additionally, it demonstrated the utility of a paperless survey methodology in a region where such techniques are underutilized.

This survey was essential to responsibly executing the next phase of the project, targeted excavation, as it allowed me to select sites with synchronic and diachronic variability to maximize relevant data while minimizing destructive excavation. It also allowed me to target sites for additional geoarchaeological sampling, such as areas hypothesized to have been used for agricultural cultivation, to complement the soil cores retrieved during the first phase of the project.

This research consisted of eight weeks of systematic pedestrian surface survey. Previously, contextual environmental information has never been recorded, even for the limited corpus of previously documented archaeological sites, and geomorphological features have not been recorded alongside and integrated with archaeological data. Systematic survey and surface collection of archaeological materials was executed using a 'siteless survey' method, which is compatible with a historical ecological conception of all landscapes as anthropogenic. It encompassed the entirety of Zapatera Island, an area of 52 square kilometers, as well as the thirteen surrounding much smaller islands, each of which measures less than 0.25 square kilometers. The survey team consisted of the project leader (the grantee) and three archaeologists with extensive survey experience in Nicaragua (from the Nicaraguan Dirección Nacional de

Arqueología and Leiden University), as well as four local collaborators who are residents of the archipelago and are thus the most knowledgeable about the local landscape. The team used a transect spacing of 20 meters, based on the average diameter of mounded architecture in the area. This methodology was successful in a survey area of the same size on the eastern side of the lake, an area whose mounded architecture has been noted to be very similar to that of Zapatera.

Each team member used an iPad Air tablet (owned by the project) loaded with ESRI's Collector for ArcGIS application and equipped with a GPS receiver to record spatial and multimedia feature attribute information. Although there is no cellular service or Internet connection within the archipelago, data was collected in the offline mode using downloaded maps and synced weekly during trips to the nearest city, Granada. The immediate generation of ArcGIS maps from survey data will save significant post-processing time and allow for a more rapid publication turnaround. Smooth integration into the project database will facilitate data querying to elicit relationships between archaeological materials, their locations and geomorphological features. The team used a Real Time Kinematic (RTK) system, which establishes a local base station and rover connection to enhance the precision of position data derived from global navigation satellites. This allowed survey and mapping, often two separate phases of archaeological work, to be carried out simultaneously, as the RTK provided sufficient resolution (less than 2.5cm of error) to document not just the location of entire sites or landforms, but individual mounds, artifacts and petroglyphs.

Although the survey data is still being processed, it is clear that the archipelago hosted a variety of human activities in the pre-Hispanic past – in other words, much more than the two so-called 'ritual centers' with monumental statuary previously documented by avocational and professional archaeologists. Close to the site of monumental statuary on the northeastern part of the main island, called Sonzapote, the grantee encountered a basalt quarry with hundreds of groundstone artifacts in various phases of production, as well as statue performs. This likely represents the first evidence for how and where these monumental statues, which occur in various forms throughout pre-Hispanic Nicaragua, were produced.

The grantee and collaborators documented many new anthropomorphic, zoomorphic and geometric petroglyphs throughout the island. They can be classified into two main categories: those inscribed directly on protruding bedrock and those that are carved into freestanding boulders. Those on bedrock tend to be located either at points of elevation or along the shore, while those on boulders are situated alongside contemporary footpaths (there are no vehicles of any kind on Zapatera, with the exception of boats). Preliminary interpretation suggests that due to this alignment of the petroglyphs and the fact that nodes of these footpaths coincide with multiple pre-Hispanic archaeological sites, these footpaths are themselves likely pre-Hispanic. The author plans to conduct further micromorphological sampling to attempt to verify this hypothesis. The survey participants encountered two 'cemeteries' – one on the main island and other on the very small isleta of Guanacaste, off the western coast of the main island. These are visible prior to excavation because pre-Hispanic burials in Lower Central America often consist of interments within ceramic urns, and the concentrated rims of the urns are visible in both locations. Extensive terracing, potentially for agriculture, was documented on the entire eastern

coast of the island, representing the first documented evidence of this type of monumental terracing in Nicaragua. Perhaps most interestingly given the research objectives of the grantee, survey participants documented two types of mounds: rectilinear alignments of slab-like stones positioned on their narrow axis and circular mounds constructed of round cobbles of bedrock and river stones as well as earth. This supports the grantees hypothesis that this island was likely a meeting point for cultural groups from both the eastern and western coasts of Lake Cocibolca.

In an attempt to carry out a community-engaged project, we held two summer workshops that included prominent members from all communities within the archipelago. These workshops provided an opportunity to not just inform community members of the project's progress and future plans, but also to receive input about research questions and design, as well as their potential ramifications today. The first summer workshop presented the goals of the survey and asked for additional community input regarding data collection to the survey methodology. It also asked community members, if they were willing, to contribute information regarding modern and recent historical land use and observed ecological changes. The second summer workshop discussed survey results, emphasizing presentations by local collaborators of their contributions and interpretations. It also solicited community input regarding the next phase of research, consisting of additional targeted geoarchaeological sampling and excavation.