Island, River, and Field

Landscape Archaeology in the Llanos de Mojos

JOHN H. WALKER

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To Susan, Sarah, and Alison

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CHAPTER ONE

Archaeology in the Amazon

The Amazon is a symbol of exotic, remote nature. Whatever the comparison, it generates superlatives at a continental scale. As a river, it is without peer, moving one-fifth of the world's freshwater through an area equal to the continental United States. As a tropical forest, it is the largest in the world, even as thousands of square kilometers are cleared every year. As a subject of anthropological study, it was once part of "the least known continent" and now is known to include one of the largest sets of language groups in the world. The Amazon has been a dancing ground for many theories, a place where anthropological ideas are formulated and tested: How do human societies relate to the environment? How did complex society arise in South America? Does some kind of structure lie behind the incomprehensibility of myth? Before it can be fit into arguments that come from globalizing perspectives, it is first the inheritance of towns and villages of women and men, children and grandparents, the inhabitants of the Amazon (figure 1.1).

This book is an archaeology of the west central Llanos de Mojos, encompassing about 10,000 km^2 in the Bolivian Amazon. It is written from a landscape perspective, meaning that earthworks and forests are related to communities through the requirements and possibilities represented by those features, by analogy with tasks that living and historical Amazonian communities carried out. West Central Mojos's history includes thousands of years of interaction between people, animals, plants, rivers, and soils (figure 1.2). The qualities of this landscape are not abstract, deriving from the relationship between the Amazon Basin and the rest of the world, but instead grow from the details of how villages of Movima, Mojo, and Cayuvava speakers and their ancestors farmed, fished, and traveled along the Iruyañez and Yacuma Rivers over more than two thousand years. The long-term histories

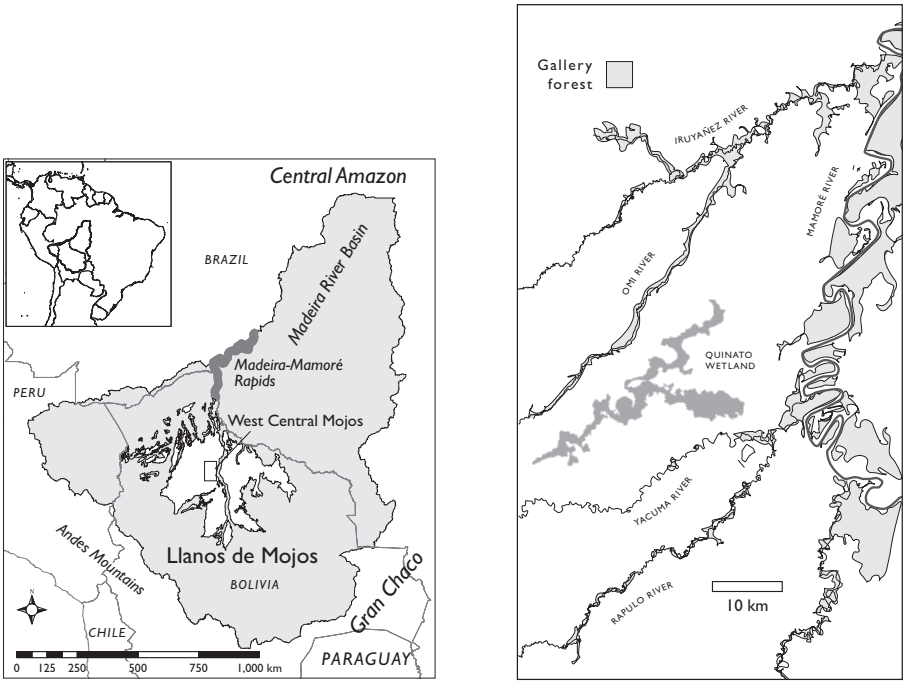

Figure 1.1. West Central Mojos and the Llanos de Mojos, located within the Madeira River basin, the Amazon basin, and South America.

and geographies of these places are the creations and inheritance of their inhabitants.

For the sake of brevity, it is desirable to use a covering term for people living before 1492 CE who built raised fields, inhabited forest islands, and traveled the rivers of the Llanos de Mojos. Although it is not perfect, the book will use the term *Mojeño*, rather than several flawed alternatives. *Beniano* is not sufficient because it is too strongly connected to the modern history of the department of the Beni. *Llanero* is similarly associated with modern history, especially with other environmental settings around the Americas. Terms such as *Cayuvava*, *Movima*, *Mojo*, or *Baure* are more specific than is warranted by the archaeological evidence at this time. As a result, *Mojeño* will serve as shorthand for the precolumbian inhabitants of the Llanos de Mojos.

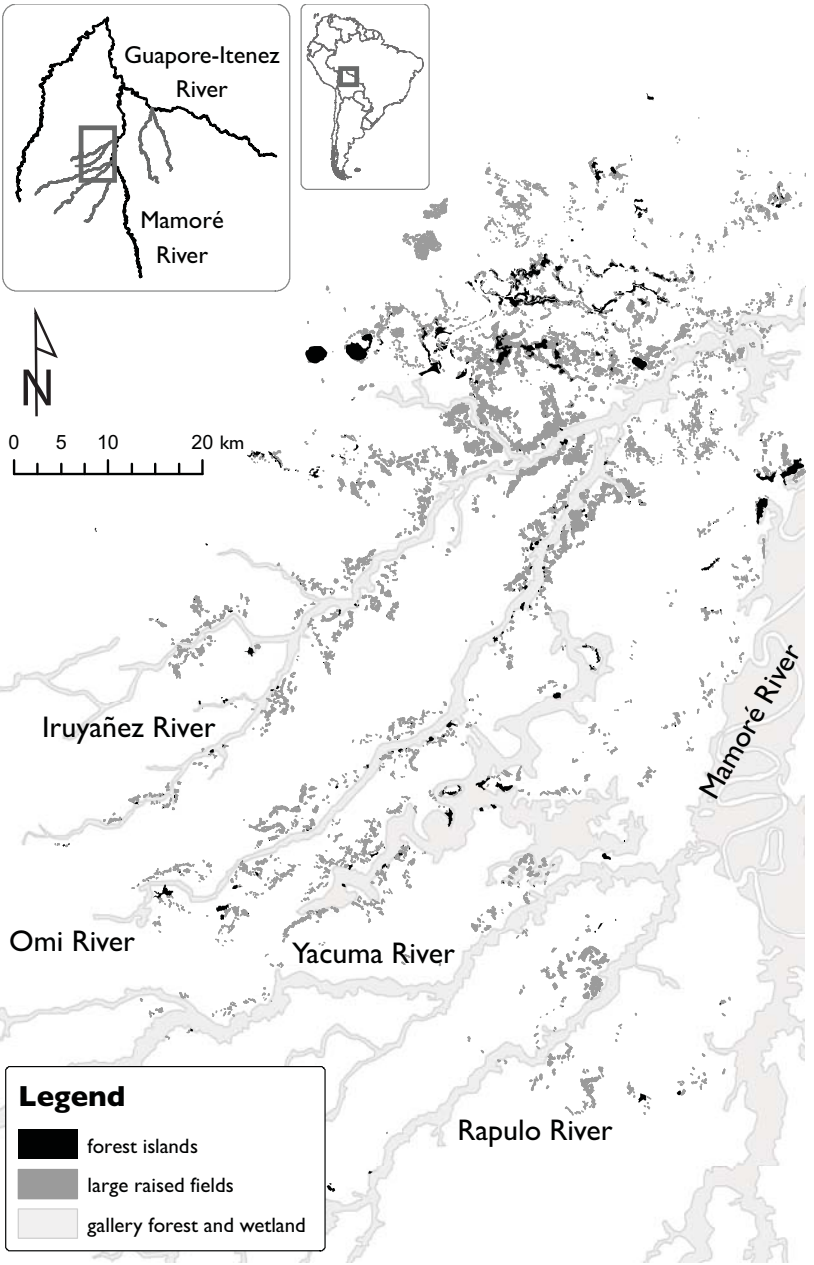

Figure 1.2. West Central Mojos, showing the location of large raised fields, forest islands, and the four principal rivers, the Iruyañez, Omi, Yacuma, and Rapulo, Yacuma Province, Department of the Beni, the Plurinational State of Bolivia.

FROM THE AIR AND ON THE GROUND

Landscape archaeology is a flexible term (David and Thomas 2008; Walker 2012a), and its use here begins with the combination of two distinct research strategies: remote sensing from the air and pedestrian survey on the ground. Although landscape archaeology, as used here, fits within the definition proposed by Ingold (1993), the path that leads to that definition begins with the practices and study of historical ecology (Crumley 1994; Balée and Erickson 2006; Erickson 2008). The relationship between these two methodological approaches and the information they together produce and rely on have changed significantly over the past thirty years.

My first understanding of Mojos was based on a task that my advisor Clark Erickson set for me in the fall of 1990. In a temporarily unclaimed office deep in the recesses of the University Museum in Philadelphia, I sat with a bright lamp, a magnifying glass, and a stack of aerial photographs. Copying numbers from the edges of the nine-by-nine prints, I described any and all faint gray lines that might indicate the presence of raised fields. That fall I generated pages and pages of handwritten notes, but what endured were habits of interpreting remote sensing imagery. Scrutinizing those black-and-white photographs initiated me into the study of landscape as mapping—taking a point of view above normal lived experience on the ground and creating documents that encompass large areas with the goal of creating a distinction to define precolumbian earthworks. At its core, the work of examining aerial photographs requires a series of judgments about which shapes on the photo are "cultural" (the lines) and which are "natural" (everything else). In this, it shares a common outlook with field archaeology, and survey archaeology in particular.

My first trip to Bolivia, in 1992, began with a series of visits to the headquarters of the Bolivian armed forces, the Estado Mayor in La Paz. I watched Erickson climb the chain of command in the Fuerzas Aereas, until we met an officer with authority to show us the huge airphoto negatives and prints taken by Standard Oil beginning in the 1950s to explore for petroleum. Those appointments resembled rapid versions of the afternoons in the museum, as we would attempt to find and categorize useful airphotos as quickly as possible. Even though at that time we couldn't easily locate those photos in reference to any map or georeferenced control point, we eagerly searched out any print that showed earthworks.

A few days later I saw the Amazon Basin from a wooden plank high above the contents of a project pickup truck. Fieldwork in the 1990s included many frustrating days in the savanna, looking for the same earthworks that were so clearly visible on aerial photographs (figure 1.3). The truck was parked in the savanna, while the crew stood on the roof and tried to (1) figure out where we were in relation to the photograph and (2) find the raised fields that had to be just meters away. However, many ranch owners are also pilots, and when we talked to the experienced ones, we heard much more about raised fields, since they are so easily seen from the air. These conversations led quickly to hourly airplane rentals. Not an accomplished photographer, I sat in the back of the Cessna with a new GPS (about US$4,000), recording a series of points that we hoped would help us find the causeways and raised fields that we saw from the airplane. I also learned that my best strategy was to eat after flying, not before.

Between 1992 and 2018, aerial and satellite photography became widely available. Views of the earth from airplanes and space, once available only to a few specialists, are now easily accessed through the Internet by billions of people. The same LANDSAT imagery once stored on magnetic tapes and mailed out with hundreds of pages of documentation is now the background of public domain maps and imagery services accessed on tablets and telephones. High-resolution imagery is now available for the globe, even for sparsely populated areas like the Bolivian Amazon. The role of landscape archaeologists has changed from being the guardians of secret knowledge to the interpreters of a public record. Although this book includes maps and photographs of Amazonian landscapes, many sources of imagery are publicly available and richly reward closer examination. A good place to start is the town of Santa Ana del Yacuma, and then to range between 13 and 14 degrees south latitude and 65 and 66 degrees west longitude, switching between large and small scales. Having more imagery available, in easier to use formats, has made it much easier to "get oriented," to not be lost, to relate the raised fields visible on a computer screen to the larger context of the landscape. It also continues to show earthworks in places where none have been documented and in some cases where they were never predicted.

The contrast between getting lost on the ground and getting lost in the air is significant. A view from the air, beginning with aerial photographs and including the technologies of airplane flights, satellite imagery, and image

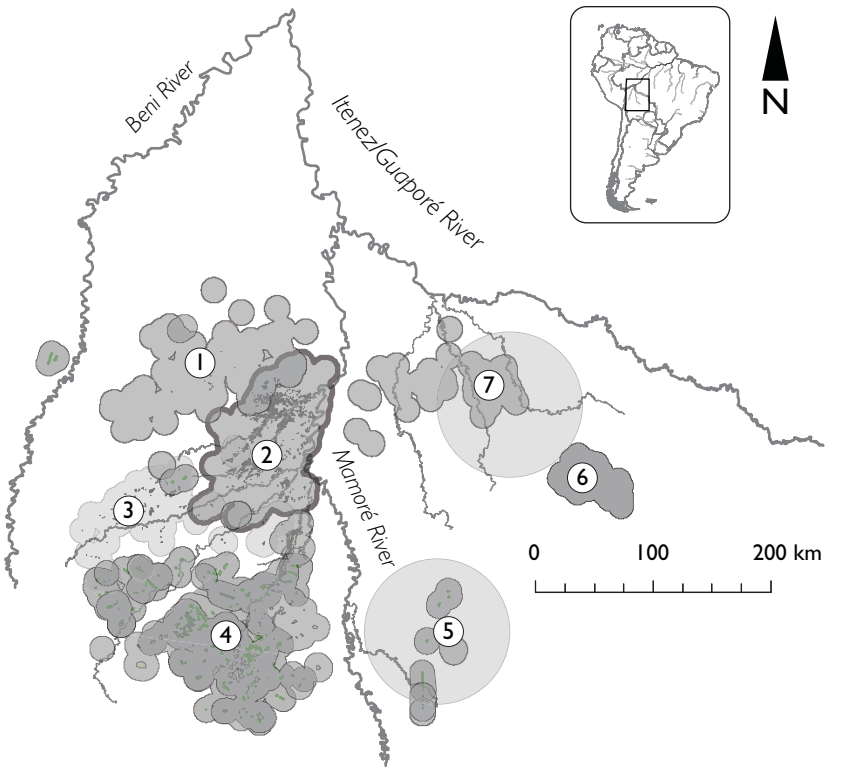

Figure 1.3. Patterns of precolumbian earthworks in the Llanos de Mojos: (1) ditched fields, (2) large raised fields, (3) mound fields, (4) raised fields and causeways, (5) large mounds and causeways, (6) Baures hydraulic complex, (7) ring ditches and ditched fields.

processing, is a 20th-century point of view. In the words of Philippe Descola, it is the product of a "naturalist ontology" (2013:172–200), based precisely on a Cartesian understanding that pulls raised fields and other landscape elements into a measured, geometric context, becoming parts of a GIS database. By contrast, the ground view includes not only the transects of test excavations laid out to locate archaeological evidence but hikes from excavations to the field camp and trips in pickup trucks or motorcycles to get between work and dinner. In this case, it also led to research along the Iruyañez River with a stated goal of living for a year within this kind of landscape, through an entire wet and dry season (Walker 2004) (figure 1.4).

In December 1997, after more than a year on the Iruyañez and Omi, and

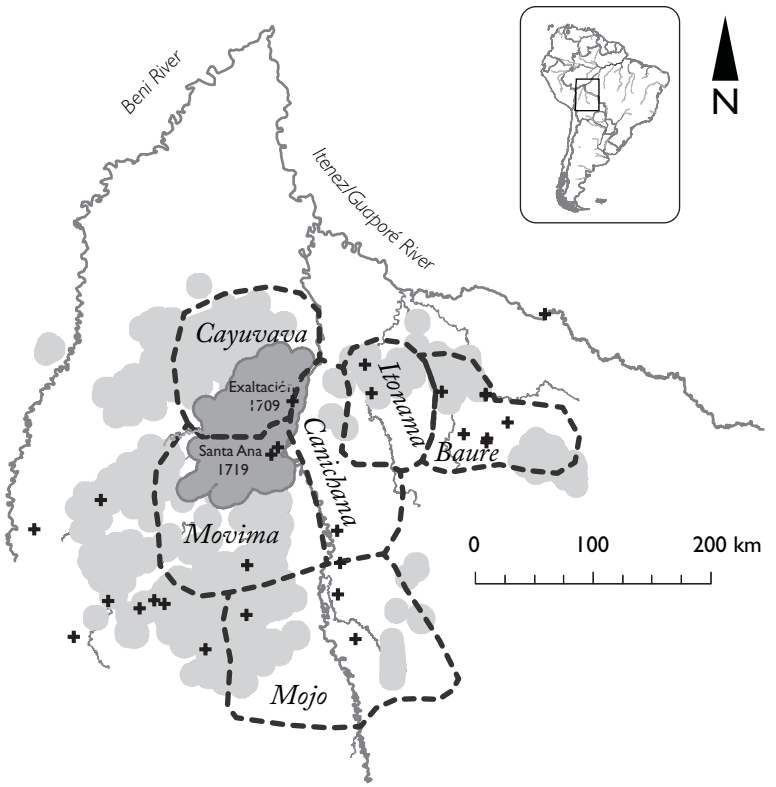

Figure 1.4. Locations of language groups during the Jesuit mission period (after Denevan 1966:figure 3). Crosses represent Jesuit missions, dotted lines bound areas associated with the named language groups, and the light gray represents the distribution of precolumbian earthworks (see figure 5.6). Exaltación and Santa Ana are labeled with the date the missions were founded.

in Santa Ana del Yacuma, I was as much an inhabitant of Mojos as I ever will be. I could not drive a motorcycle, although I could ride a horse all day without incident. In other words, I had few skills that were of use on a ranch, but I could use the airphotos that I carried in a transparent square plastic carrier to find a route to concentrations of raised fields. The photos were both a map and a flyswatter, on days in the spring and fall when insects were on the move. Some days the plastic was spattered with blood as I tried to defend the ears of my horse from biting flies. The "ground truthing" of the raised fields we had seen on the aerial photographs had been surprisingly simple: all of

the fields on the photos were still present on the ground. Traveling to those places produced a different kind of information, however.

On-the-ground knowledge grew through long days on foot and on horseback with my colleagues, Adalberto Rapu Lucu, Javier Rodríguez Suárez, and especially Jaime Bocchietti Arias. These Benianos have spent much of their lives outdoors, working in all kinds of trades: cowboy, day laborer, riverboat driver, and lumberjack. In such roles, different kinds of specialized landscape knowledge are cultivated: where the cattle gather, where valuable trees grow, or where the fish are biting. But in the stories shared on horseback or over dinner, in a canoe or back in town, glimpses of other ideas emerged. For example, to be successful at cutting down trees, one must be on good terms with the *dueño*, their supernatural owner. Each kind of tree has a different dueño, and some are more sympathetic than others. Another example is how distance is measured in *leguas*, or leagues, although no one worries much about how long a league is exactly. It might be five kilometers, but it certainly is the distance a horseman travels in an hour. A third example is how prey animals are sure to be found on a forest island during the dry season and can be safely "stored" there, because during the flood they cannot escape. Not all such conversations are used for archaeological interpretation, but when they relate to durable landscape features, useful information can be found among them.

The approach taken in this book is a product of both points of view: the aerial photograph and satellite image, and the cowboy, fisher, forester, and survey archaeologist. The tools that enable this are the concepts of landscape archaeology suggested by Ingold in his influential 1993 article and carried further in later writings (Ingold 1993, 2000, 2007). The idea that replaces the search for and definition of sites through the distinction between nature and culture is the characterization of landscape, and its connection to *taskscape*. A taskscape is an array of activities, related in time and space (see chapter 6). In this archaeological case, the activities are the result of communities working in groups to build raised fields and mounds. Because the tasks that make up the taskscape result in durable modifications of the landscape, archaeologists can study the relationships between them. This perspective is particularly fruitful in Mojos, not because communities were essentially different from those of people inhabiting landscapes anywhere else in the world but because the landscapes they inhabited were so visible in aerial photographs, and later in satellite images. In 1959 William Denevan, George Plafker, and

Kenneth Lee saw raised fields from the air as each of them traveled across eastern Bolivia. Taking this overhead view on South American landscapes would prove a tipping point in how precolumbian agriculture and society were understood.

PRECOLUMBIAN RAISED FIELDS

To sketch the study of raised fields in its larger geographic and historical context, it is sorted into three arbitrary periods: the initial "discovery" of raised fields and their extent, then the first archaeological approaches, and finally the recent diversity of multidisciplinary research.

From roughly 1960 to 1980 a small group of pioneers recognized that raised fields and other anthropogenic landscapes were widespread throughout the precolumbian Americas (Denevan 1963, 1966; Harrison and Turner 1978; Parsons and Bowen 1966; Parsons and Denevan 1967; Parsons 1969; Turner 1983; Puleston 1978). In South America (figure 1.5), raised fields or intensive wetland cultivation has been less well studied in comparison to Mesoamerica, but in general seem to represent much larger hectarage, in more cases across a larger distribution. In Mojos, Denevan was a leader in this generation of scholars who demonstrated that farmers built raised fields and turned wetlands into productive landscapes. These cultural geographers set a significant challenge for archaeology: to document and explain the precolumbian societies responsible for these monumental built environments. Previously, these locations had been described as wastelands and written out of the histories of civilization in the New World. If instead they were anthropogenic landscapes, they must then be recast as settings for significant cultural creativity and perhaps high populations. In addition to Mojos, the extent of *chinampas* in the Valley of Mexico, raised fields in Colombia, Venezuela, and Ecuador, the Maya lowlands of Belize, and raised fields in the United States in the Upper Midwest and Georgia (Boomert 1976; Harris 1935; Mason 2005; Parsons 1978; Siemens and Puleston 1972) made it clear that raised fields were not an isolated phenomenon but represented something fundamental about the long-term history of agriculture across the hemisphere.

To a larger scholarly audience, these findings reinforced and validated the perspective that the environment and its human inhabitants are interdependent (Sauer 1925; Olwig 1996). With few exceptions (Armillas 1971; M. Coe 1964;

Palerm 1973), raised fields were not clearly associated with living farming traditions. Likewise, historical documentation had little concrete information about who had built raised fields, how they functioned, or when they were abandoned. Although geographic evidence of managed landscapes was impressive, the need for carefully designed archaeological research was clear.

A similar perspective on the interrelationship between humans and the environment over the long term had long been a part of Old World archaeology, because of the development of environmental archaeology in Europe. For many decades, archaeology in Europe has combined techniques of ecological and environmental study with a much longer historical record (see Clark 1954). European archaeology includes a rich literature on field patterns that provides valuable comparisons with the New World (Johnston 2005). But the documentation of the landscape as a palimpsest that combined evidence of human habitation over several millennia was not ingrained into New World archaeology in this way.

The contribution of this first generation of raised field scholarship is tremendous and ongoing. The realization that precolumbian peoples created and used the landscape on a large scale provided empirical support for the developing consensus that precolumbian populations were much larger than previously thought (Denevan 1992a). The idea of indigenous peoples as "ecologically noble savages" was contradicted by this new information, contributing to this discussion (Redford 1991). Presenting examples of intensive agriculture on a monumental scale, Denevan and his contemporaries turned the attention of geographers, archaeologists, historians, and anthropologists toward other ways that precolumbian peoples changed the environment, through fire, independent domestication of plants, and hunting practices (Pyne 2001). The study of raised fields helped break the consensus that precolumbian societies were the products of the environments where they were found.

From roughly 1980 to 2000 a larger group of scholars, notably including several archaeologists, took up the challenges posed in earlier decades and began to describe and analyze raised field evidence in greater detail (Erickson 1984, 1992, 1993; Graffam 1990, 1992; Kolata 1986, 1996; Lennon 1982, 1983; Riley, Moffat and Freimuth 1980, 1981). In Mojos as well as the Bolivian Altiplano, Erickson was part of the generation of scholars who took up this challenge in order to document specific raised field landscapes and place them into their chronological and archaeological contexts (Erickson 1995).