

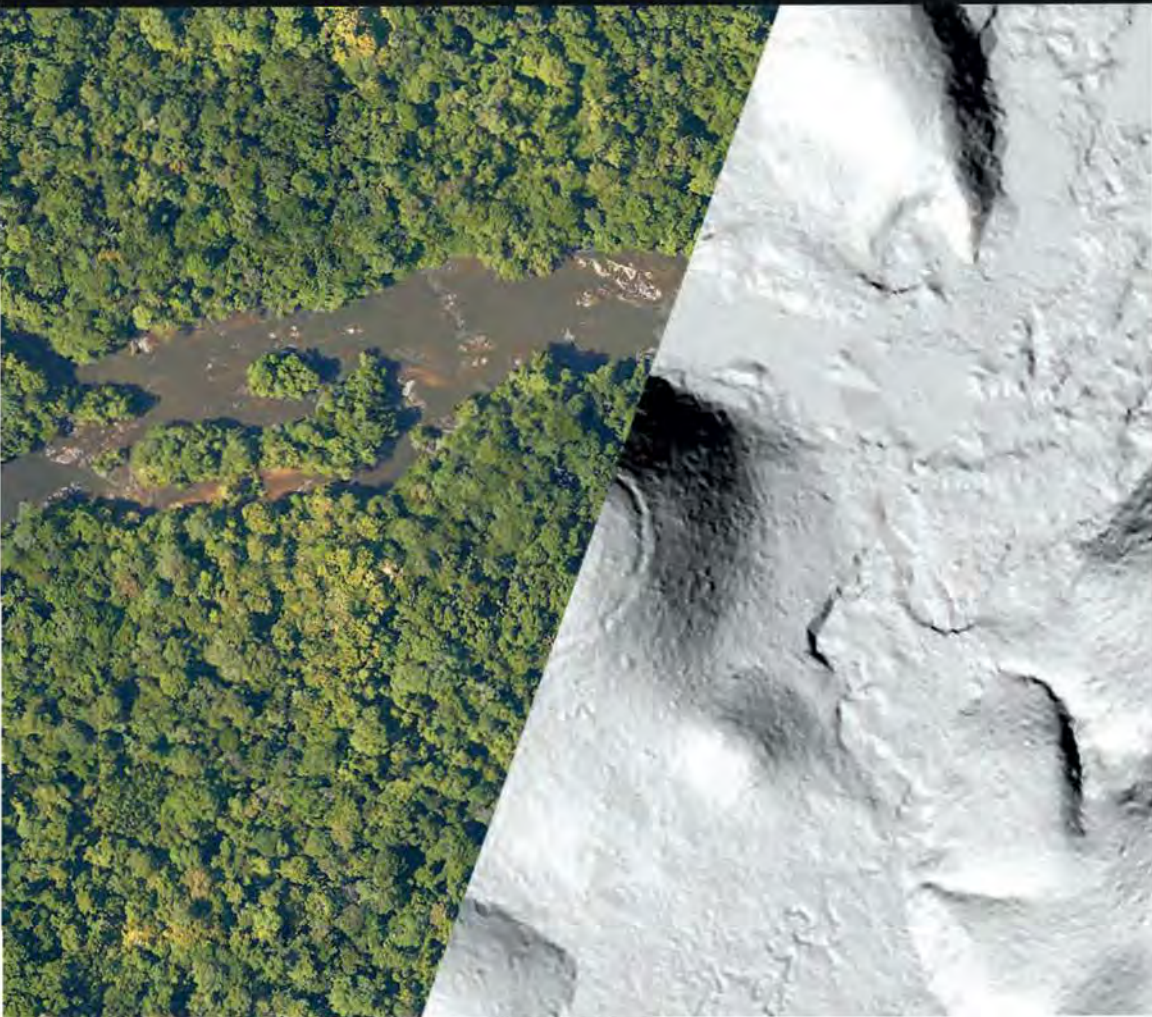
NEW FRONTIERS IN  
HISTORICAL ECOLOGY

ROUTLEDGE

# Methods in Historical Ecology

Insights from Amazonia

Edited by Guillaume Odonne  
and Jean-François Molino



# FOREWORD

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For most of my career, I have studied rural landscapes of the past, even before I knew that my research was landscape archaeology and historical ecology. When I first read Bill Balée's article *The Culture of the Amazon Forest* (Balée 1989) and Bill Denevan's *The Pristine Myth* (Denevan 1992), my view of the world was turned upside down. Wow, according to conservative Balée, 11.8% of the Amazon was human created, or maybe all of it according to Denevan. In 1984, I first met Balée on the street in the Amazonian city of Trinidad, Bolivia. We introduced ourselves, and he asked if I could help him date a 'cultural forest' growing on a huge archaeological settlement mound in the Sirionó Indigenous Territory that he had been studying for some years. I agreed to take my team out to see what we could do. Camping with Sirionó collaborators, Balée and I walked the forest. As an ethnobotanist and linguist, he looked upwards and sees human history in the vegetation, while I, an archaeologist, kicked leaf litter and stared at the ground looking for evidence of human occupation. In our own ways, we were both looking for patterns and reading signatures of human activity in the landscape.

We walked into a low forest area, and Balée saw a mango and grapefruit tree, declaring the place to be a recent house garden. I agreed, pointing out broken glass and plastic, plus tin cans. We continued, and Balée excitably pointed out lianas and palms among larger trees that must be at least 100 years old. I quickly found glazed pottery sherds, roof tiles and cloudy glass fragments and agreed. We moved on the tall tropical canopy. Balée was convinced that this location showed little botanical evidence of human use, but I pointed out the abundant pre-Columbian pottery, charcoal, burnt earth and part of a causeway – probably a large village site. Back on the huge archaeological mound, Balée showed me his survey plot of anthropogenic origin and the 'control plot' that is off the mound. I quickly disappointed him by

finding a black garbage midden and potsherds here and everywhere else. Now, Balée did not have a pristine location for comparison!

In this brief foreword, I hope to highlight a few key ideas and insights from historical ecology. Most of the examples will be from areas where I and/or close colleagues have worked.

- All terrestrial and wetland environments were transformed into landscapes by humans to some degree.
- All landscapes have long, complex human histories.
- Native peoples, past and present, have played an important role in the biodiversity that we appreciate and seek to conserve. We can learn from them.
- Native peoples do not adapt to the resources of their given environments, but rather transform, create, expand, and manage resources as anthropogenic landscapes.
- This activity is what we call ‘domestication of the landscape’.

My research began with the study of pre-Columbian landscapes of intensive agriculture, where nearly 100% of the Earth’s surface is anthropogenic, with earthworks whose construction altered soil profiles down to a metre or two below the surface in terraformed or engineered landscapes of raised fields in the Lake Titicaca Basin of Peru and later in the Bolivian Amazon.

After learning about and applying the concept of domestication of landscape, colleagues and I began to recognise that small-scale non-farming societies can also transform environment to landscape when given enough time. This domestication of the landscape is often more subtle than earthworks, black earths and fish weirs extending to the horizon, but equally important. I now have returned full circle by extending the concept of domestication of landscapes to dramatically transformed environments in which water, soil and even climate were managed for human purposes.

Balée and I share a vision of historical ecology that is explicitly people centred or anthropocentric and recognises humans as a keystone species, in contrast to other human–environmental approaches that emphasise neoenvironmental determinism: human niche construction, complex systems, resilience theory, cultural ecology, human ecology, systems theory and systems ecology. Colleagues accuse us of ignoring the role of the forces of nature and evolution. We do this intentionally because of a long history of prioritising the limitations that the environment and climate impose on native peoples, from the environmental determinism of Victorian anthropology through Betty Meggers and the more recent trend of reducing major cultural change and societal collapse, to past climate change. In contrast, we emphasise human intentionality, agency, decision-making and Indigenous knowledge accumulated over generations that resulted in anthropogenic landscapes.

Bill Balée convinced us that management of resources was what successful native people really do rather than ‘adapt’ to environments. In my view, native peoples also transformed and even created and expanded resources that they wanted through domestication of the landscape. Amazonian peoples are continually selecting and

encouraging useful species of plants and animals and ‘weeding out’ the rest over the long term, changing the character of forests, savannas and wetlands.

Balée and I argue that ‘the human species itself is a principal mechanism of change in the natural world, as qualitatively significant as natural selection’. The cumulative effects of human agency are permanently inscribed in specific landscapes as cultural signatures and patterns to be ‘read’. This process is historical and dynamic: once the environment is transformed into landscape, there is no going back to ‘nature’ even after removing people.

To understand people of the past, archaeologists study physical ‘stuff’. In landscape and historical ecology, the evidence can be subtle or not, such as the presence and absence and distribution of certain plants and animals; soil microorganisms; disturbed and enhanced soils; earthworks; fields; gardens; trails, paths and roads; and charcoal.

Physical signatures and changes in landscape use and structure gradually accumulate as layers, or what we call palimpsest in landscapes, as an historical record of activities, strategies and design built up through accretion or accumulation, generation after generation, until it becomes landesque capital or the land improvements, assets and legacy inherited, exploited and added to by later generations. Some basic approaches are borrowed from landscape archaeology, such as pattern recognition of continuity, disjuncture and anomaly in structure to determine boundaries, territories, communities, land tenure and even social organisation – some of us refer to the sum of these approaches as ‘reading landscapes’.

Environmental determinism has a long history in anthropology. Amazonia was long considered the prime example of how marginal environments severely limited the cultural development of Indigenous societies due to poor soils, simple technology and frequent mega-El Niños according to Betty Meggers (Meggers 1954). Her theory of environmental determinism was expanded by cultural ecologists to include limited access to protein as an explanation of cultural practices. The result was simple societies, high mobility, low population density, hunting-gathering and slash-and-burn agriculture as the only options, plus endemic tribal warfare and an inability to cope with her proposed mega-El Niños. Megger’s proof was the dominance of small, temporary sites in the archaeological record and the ubiquitous dispersed bands and tribes of the ethnographic record, treating Amazonian peoples as if they had no history and were frozen in time rather than impoverished and exploited survivors of colonialism, Old World diseases, massive population collapse and victims of slavery.

Adaptationist perspectives (including cultural ecology, cultural materialism and evolutionary ecology) have shaped the interpretation of native peoples in the Americas. Humans are treated as passive responders (either well adapted or maladapted) to a given environment and at the mercy of their limited opportunities in the case of Amazonia. Julian Steward’s version of cultural evolution was developed to explain the diversity of societies for the *Handbook of South American Indians* of the 1940s (Steward 1948). Cultural ecologists used this to classify Amazonian societies from simple to complex by their capacity to adapt, capture energy and sustain

populations within what nature gave them. The same model is applied to the environment, with the inherent assumption that hunter-gather bands are ahistorical, 'cold' and have minimal impact on their surroundings, while states are historical, 'hot' and will transform the environment. Here the nature/culture becomes the forager/farmer dichotomy. Popular notions include hunter-gatherers as noble savages and states as environmental degraders.

The origins of domestication and evolution of agriculture have been and remain an important focus of human-environment relations. I spent my career studying pre-Columbian agriculture in the Andes and Amazonia. Over time, I realised that what humans were doing to wild species through disturbances over the short and long term within 'small-scale' hunting-gathering and fishing societies can also significantly transform environment and biodiversity. Hunter-gatherers do not 'tip-toe through the forest leaving only footprints' throughout their long history. Domestication of the landscape becomes useful for understanding more subtle forms of human agency. Historical ecologists now also include gardening, farming, orchard, pastoralism, black earth formation, roads and earthworks as examples of domestication of landscapes. Throughout the world, most rural farmers practice periodic hunting, gathering and fishing, despite being committed full-time agriculturalists. Many 'classic' hunter-gatherers were once farmers in recent history. Current farming activities and those of past generations have created conditions in which so-called wild resources are more abundant and readily available and are inherited by present generations.

If classic domestication implies genetic and/or phenotypic modifications of crops and animals by human intervention on their reproduction, then what about all the other intentional transformations that humans do to plants and animals to make them useful or abundant?

Domestication of the landscape was initially explored in the 1950s and 1960s and became a coherent concept by the late 1980s. Focusing on the continuum between wild and domestic species rather than defining the 'threshold' or boundary between them, scholars turned to how hunter-gatherers encouraged, propagated and enhanced wild resources of economic value in their local environment. In 1952, Edgar Anderson postulated an 'accidental' origin of agriculture: early human camps caused significant forest disturbances in the form of light gaps and nutrient-rich garbage heaps or middens that attracted 'camp followers' which, after being observed and exploited by camp residents, gave rise to modern crops (Anderson 1952). Around the same time, Carl Sauer made the case that the origins of domestication and agriculture were rooted in stable, sedentary riverine peoples relying on fish, wild plants and wetland resources; people who were living a great lifestyle where they had the leisure to intentionally experiment with plants that would become crops (Sauer 1952). In the early 1980s, Donald Lathrap combined the best elements of Anderson and Sauer to propose that the tropical garden of sedentary fisher-folk was the experimental playground for domestication through transplanting, tending and observing of first utilitarian (such as cotton and gourds for fishing technology), medicinal and drug plants and later foods (1970s), clearly a context of conscious human agency (Lathrap 1973, 1977, 1987).

In 1982, R. A. Hynes and Athol K. Chase introduced the concept of ‘domiculture’ as defined in dense jargon as ‘hearth-based areas of exploitation (domuses), each carrying with it a package of resource locations, restrictions upon open-ended exploitation (religious prohibitions, strategic planning of delayed harvesting, etc.), and localised technologies to fit particular domuses’ for Australian Aborigine landscape practice, and Douglas Yen proposed the ‘domestication of environment’ and the ‘agronomy of hunter-gatherers’ for Southeast Asia (Hynes and Chase 1982; Yen 1989). In presenting the co-evolution of agriculture in 1984, David Rindos explored ‘incipient’ and ‘specialised’ domestication in contrast to full domestication (Rindos 1984). In contrast to the intent of Hynes, Chase and Yen, Rindos characterises the process as unconscious and without human agency. In 1989, David Harris considered ‘sowing, transplanting, tilling, irrigation, and drainage’ by hunter-gatherers as the tongue-twisting ‘pre-domestication wild plant-food production’. These authors’ contributions to *Foraging and Farming: The Evolution of Plant Exploitation* by Harris and Hillman (1989) clarified these ideas, but unfortunately the editors force these powerful ideas into unilineal stages of biological and cultural evolution and assumed that domestication of landscape as an ‘earlier stage’, implying ‘inferior’, and full domestication as a ‘final state’, implying ‘superior’ (Harris 1989; Harris and Hillman 1989).

In the late 1980s, Peter Wilson and Ian Hodder proposed that major social transformation in the Neolithic was not the domestication of plants and animals and the adoption of agriculture, but rather the domestication of human society. In the built environment of houses and village communities, social roles, relationships and meaning were inscribed in people’s lives (Hodder 1990; Wilson 1988). This helps widen the concept of domestication to consider settling down, living with neighbours, marking and territory and thinking about and knowing the environment, thus back to the realm of historical ecology.

At the same time, two seminal volumes were published: *Resource Management in Amazonia: Indigenous and Folk Strategies* by Darrell Posey and William Balée (1989) and *Swidden-Fallow Agroforestry in the Peruvian Amazon* by William Denevan and Christine Padoch (1988). Balée’s contribution ‘The Culture of the Amazon Forest’ contrasts the dominant environmental determinist and adaptationist literature with Indigenous resource management, and he claims that at least 11.8% of the Amazon basin is anthropogenic rather than natural. Later, Balée and I expanded the concept to include terraforming, black earths, raised fields, fish weirs and other human-built environment features that change biodiversity and distribution of economic plants and animals, and tentatively propose that the anthropogenic landscape of Amazonia may be closer to 100%.

The contribution of Padoch and Denevan showed that forest fallow, or the long period of so-called ‘abandonment’ of swidden fields after a few years of cropping, is actually an important component of food production of useful wild plants and game animals. Denevan’s article ‘The Pristine Myth’ (1992) demolished any claim that ‘wilderness’ without evidence of past human activity exists in the Americas.

Borrowing from Hynes and Chase in 1999, geneticist Charles Clement defines landscape domestication as ‘a process by which human manipulation of the landscape results in changes in landscape ecology and in the demographics of its plant and animal populations, resulting in a landscape more productive and congenial for humans’ (Clement 1999: 190). He subdivides domestication of the landscape into a continuum of intensity of manipulation: pristine, promoted, managed and cultivated (1999, 2014). My definition is similar, but with more stress on intentionality and without the evolutionary continuum of ‘types’ because I believe that landscape domestication was practiced before, during and, in some cases, after full agriculture and still is an important production strategy in many regions today. Cultural evolutionary assumptions about differences of scale and intensity of environmental impact or transformation of simple vs. complex societies are questioned. The most important tool that early humans and later hunter-gatherers had was control of fire, which probably did more to change the Earth than the development of agriculture and urbanism up until the appearance of industrial society. As a core strategy of landscape management, Stephen Pyne shows that systematic and long-term human fire regimes have shaped most environments of the world (Pyne 1997). We can now show that most of Amazonia was regularly burnt. In later periods, burn-and-char strategies were critical for the formation of fertile black earths.

Historical ecology scholarship has demonstrated for a worldwide audience that native Amazonian peoples, past and present, completely reworked their environment into productive anthropogenic landscapes in some regions. Key examples include:

- Agroforestry and swidden-fallow systems
- Monumental mound building
- Amazonian dark earth
- Raised-field agriculture
- Amazonian green urbanism
- Causeway and canal networks for transportation, communication and water control
- Monumental geoglyphs and ring ditches
- Fish weirs and artificial fisheries

These Amazonian examples of large-scale and permanent transformation of the Earth raise the question again: what are humans ‘adapting’ to if the very wild plant and animal resources that they are exploiting are there because people created and managed them rather than simply as elements of some given natural environment?

Are Amazonian native peoples aware of the short- and long-term implications of environmental transformation into landesque capital that they inherit from the past? Some prominent scholars argue that the process is largely unconscious. We disagree because most native peoples know how to read the history and meaning of their landscapes much better than scientists do, but in their own way. Native people’s decisions are based on cultural logic, long-term memory through oral history, close

observations of their surroundings and accumulated environmental knowledge. Are past and present native people 'natural' conservationists? Probably not, since they are trying to live the good life, feed their families, hunt game and support a rich social life and, at times, political structures through abundant surplus. Rather than conserve, they learned how to transform, create, expand and manage resources they needed or domesticated landscape to ensure future abundance. Do native peoples, past and present, practice sustainable lifeways? The term sustainability has become relatively vacuous and often implies long-term equilibrium or a static state. In the case of the Bolivian Amazon and much of Amazonia, the anthropogenic landscapes supported large populations over millennia, suggesting considerable stability and success through their domestication of landscape, but with considerable change over time.

Are all native peoples' activities beneficial for biodiversity? The answer depends on what is beneficial and what is not, how to measure it, what scale of time and space is used and so on. Humans decide what they want and do not want based on their own cultural logic and knowledge. In most cases, native peoples probably limited or eliminated plants and animals that they were not interested in, replacing them with useful species over time, both wild, semi-domesticated and domesticated. Thus 'natural' diversity has been replaced with agrobiodiversity, a rich variety of weeds, ornamentals, medicinal and drug plants and, in many cases, exotics and invasives due to cosmopolitan canoe culture, migrations and trade. All should count as biodiversity but often not when Amazonian botanical surveys often exclude any plant that is less than 10 cm in circumference or any 'non-natural' plant. Some scholars have proposed that urban and suburban Los Angeles is an important global biological hotspot if what counts as biodiversity is expanded.

In summary, the concept of domestication of the landscape contributes to historical ecology and general anthropology in multiple ways:

- First, by redirecting attention away from the Neolithic Revolution, agriculture and specific domesticated crops as being the most important transformation of environment, one can better appreciate the importance of human cultural activities that do not change the genetics of the specific species that lead to domestication but that do influence the presence, availability and productivity of these species.
- Second, the focus on a range of wild and semi-domesticated species rather than on individual cultivated or cropped species redirects attention toward the landscape as a complex and historical context of human culture.
- Third, by unravelling the unproductive dichotomy between foragers who practice hunting, gathering and fishing and farmers who practise agriculture (a sharp distinction assumed in cultural ecology, human ecology, cultural evolution and evolutionary ecology), one can understand often subtle, but important, strategies of human environmental change.
- Fourth, by rejecting the simple linear evolutionary continuum from foraging to agriculture, one can appreciate that the domestication of landscape can be an end itself for the creation and management of productive landscapes.



- Fifth, moving beyond the myths of pristine environment and the ecologically noble savage and the assumptions that most human activities affect the environment negatively, one appreciates human creativity, agency, traditional environmental knowledge and engineering that was employed to domesticate landscapes for human use, all of which often resulted in mostly positive changes in biodiversity and in the spatial distribution and availability of economically useful species.
- Sixth, domestication of landscape emphasises that all landscapes have long, complex human histories and that no pristine benchmark for comparison exists.

The important contributions of numerous scholars in this volume edited by Guillaume Odonne and Jean-François Molino highlight the impact and relevance of historical ecology on a wide range of diverse classic and contemporary themes of investigation. The authors demonstrate the use of a myriad of old and new methods, technology and analysis in research by historical ecologists. I am proud to have participated in and possibly contributed to the development of and pioneering use of historical ecology and now to see historical ecology is accepted, flourishing and growing with a new generation of scholars and approaches.

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