

# Historical Ecology and Ethnobiology: Applied Research for Environmental Conservation and Social Justice

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Received: January 11, 2015

Published: March 6, 2015

Volume: 6:5-7

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*Abstract:* Historical ecology provides a research program and toolkit for applied interdisciplinary research in ethnobiology. With a focus on long-term changes in built environments and cultural landscapes, historical ecology emphasizes the need for scientific collaboration between disciplines for more relevant and applied academic research—particularly in service to environmental conservation and social justice.

**Keywords:** Historical ecology, ethnobiology, environmental change, applied ethnobiology, conservation, social justice

Historical ecology is a research program that focuses primarily on landscape as the unit of analysis and emphasizes the understanding of environmental change through deep time with an eye toward application in the present. By extending the timescale of landscape change, it is possible to create a more historically situated understanding of socio-environmental interactions and patterns. Such patterns can be used to help inform and initiate environmental conservation and social justice.

Since the early 1990s, historical ecology has been undertaken in various global contexts by ecologists, biologists, archaeologists, and anthropologists. Crumley and Balée have been the most visible advocates of historical ecology through their respective work in France and the Amazon (Balée 2013; Crumley 1994). Their unique but complimentary approaches to historical ecology—Crumley trained in archaeology and Balée in cultural anthropology—argue: (1) nearly all landscapes on earth have been affected by humans to differing degrees; (2) both human and natural phenomena that physically manifest in landscapes or immaterially in cultural memory can be studied as an integrative whole; and (3) knowledge of human-land use and change through time can and should be applied to contemporary issues (e.g., global climate change, Indigenous sovereignty). These foci contribute to and reinforce two interrelated paradigm shifts in contemporary anthropology and geology: the ‘ontological turn’ in the

social sciences that challenges Western nature-culture dualisms and sees humans and landscapes as inseparable and interrelated wholes (Latour 2014); and increasing support for geological re-classification of the current epoch as the ‘Anthropocene’ in recognition of the keystone role that humans play in socio-ecological earth systems (e.g. Zalasiewicz et al. 2011).

The applied focus is likely the most broadly relevant aspect of historical ecology and provides fertile cross-linkages with ethnobiology. In Wolverton’s (2013) conceptualization of ‘Ethnobiology 5,’ he calls for ethnobiologists to communicate the relevance of their research to help solve contemporary socio-environmental issues. In the historical ecology research program, anthropologists are encouraged to broaden their research of local or Indigenous knowledge by including ethnohistoric data (e.g. Nabhan 2007); or by showing cultural memory, symbolism, and culinary practices are as important to agrobiodiversity conservation as official programs (e.g. Veteto and Welch 2013). In the field of archaeology, historical ecology allows scholars to make their research more relevant by contributing to contemporary environmental issues (Balée and Erickson 2006) and providing, for example, long-term zooarchaeological data for the reassessment of ecological baselines (McKechnie et al. 2014).

Ongoing and more classic research demonstrates how ethnobiologists, environmental anthropologists,



and archaeologists are applying historical ecology to contemporary environmental issues. Fairhead and Leach's (1996) groundbreaking work showed that Indigenous land-use strategies in a West African forest-savannah mosaic create forest islands rather than furthering deforestation (as previously assumed by scientists, forest ecologists, and conservationists), contributing policy recommendations of significant importance to both environmental conservation and social justice. Welch et al. (2013) have provided evidence for reversing assumptions of both development practitioners and conservationists in Central Brazil, using combined ethnographic and historical ecological data to show that Indigenous burning practices in a fire-adapted cerrado biome are significantly more conducive to forest stability and vegetation recovery than fire suppression and agribusiness expansion. A historical ecology research program in Peru utilized archaeological methods (pollen and soil analyses) to document relict agricultural features such as terraces, canals, and raised fields that exhibited excellent soil quality, good drainage, and buffers to frost risk (Erickson 1998). Archaeologists, agronomists, and communications experts subsequently worked with descendant communities to rehabilitate farming practices—based on insights from ancient agriculture—and their results proved to be more sustainable compared to contemporary European-style farms after only a few seasons. In another important case study, archaeologists and paleoecologists (Szpak et al. 2012) have used isotopic and zooarchaeological data (ca. 5200 years BP – AD 1900) to better understand the foraging ecology and historical range of locally extinct sea otters and help inform re-introduction programs on the Pacific Northwest Coast of North America.

Human health in Indigenous and local communities is intimately connected to the health of the environment and is another domain where historical ecology and ethnobiology are making significant contributions. The restoration or reinvigoration of sustainable cultural landscapes has had positive impacts on social well-being worldwide. Barthel et al. (2013) combine social memory, traditional ecological knowledge, landscape features, and local environmental fluctuations to argue that land-sharing (instead of land-sparing) is a key variable for preserving biocultural diversity and promoting food sovereignty in communities across Europe. A historical ecology orientation also informed experimental research that shows how anthropogenic non-Western management

in ancient intertidal terraces and clam gardens resulted in clam density and overall biomass increases (Groesbeck et al. 2014). This work effectively demonstrates that viable food production and sustainable ecosystems can be simultaneously achieved, both in the past and (hopefully) in the present and future. Furthermore, such research demonstrates that First Nations communities have had long-term positive dialectical effects on contemporary (previously considered 'wild') ecosystems, providing evidence that can help Indigenous people assert rights and access to traditional landscapes in the context of current socio-political realities.

To date, historical ecology has been underutilized by ethnobiologists as a productive research program with notable exceptions (e.g. Balée 2013). This may be a result of the lack of exposure historical ecology receives in academia (it is often taught, if at all, as a segment or sub-unit of advanced courses in geography, anthropology, and ecology). We can envision future and ongoing (e.g. Human Ecodynamics Research Center—HERC; Integrated History and Future of People on Earth—IHOPE; Resilience in East African Landscapes—REAL) long-term historical ecology projects that combine the strengths of cultural anthropology, archaeology, and biology/ecology in a unifying ethnobiological approach. This approach has the potential to further expand our research into the applied realm, contributing to a future that is more environmentally sustainable and socially just.

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### Biosketches

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