Biological Conservation 152 (2012) 291–292

Contents lists available at SciVerse ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Letter to the Editor

Reply to Barlow et al. (2011): Towards an integrated understanding of the pre-conquest human footprint in Amazonia

Barlow et al. (2011) criticize the view that the majority of Amazonian landscapes were domesticated to some degree by pre-conquest Amazonian populations. Their major points are that the scale and spatial distribution of pre-conquest occupation are much smaller than historical ecologists claim, and that the pre-conquest anthropogenic influence on Amazonian environments is irrelevant for conservation.

Barlow et al. base their criticism on a small sample of the vast Amazonian historical ecology publications, including our recent commentary (Clement and Junqueira 2010). The authors define us as advocates of a "highly anthropocentric worldview", leaving "no space for the 'pristine' or 'primary' forests that the ecologists refer to when representing the most natural conditions available". Our purpose was to call attention to the fact that historical ecology is often ignored, so we indeed focused more on anthropogenic landscapes than on "relatively undisturbed primary forests". We stated that "many if not most other landscapes in Amazonia [...] have been domesticated to *varying* degrees", which includes domesticated landscapes where human influence was strong and long-lasting (e.g., Amazonian Dark Earths – ADE), but also areas subjected to much subtler human influences, such as campsites and trails with concentrations of useful species. Barlow et al. agree that the intensiveness of land use is variable, and their graph (Fig. 1) suggests that the entire Amazon basin was used, at least for hunting. Hunters seldom leave the forest undisturbed, with small campsites scattered along trails and small waterways. Campsites always have small dump heaps that receive waste from human activities, much like the dump heaps that gave rise to some ADE but on a smaller scale, and also give rise to small anthropogenic forests. All these are part of the "not-actively-managed category", which makes up the majority of the Amazonian basin, according to Barlow et al. Where is the 'pristine' in this category? Barlow et al. and we both agree that these landscapes contain mature forests, but we affirm that these forests are qualitatively different than they would have been without millennia of low intensity human promotion.

We agree that a strong bias in archaeological research in Amazonia exists to work close to major rivers, given the difficulty of access to most interfluve areas until the building of roads during the last 50 years. Nevertheless, archaeological research in interfluve areas, such as the Purus-Madeira interfluve in southwestern Amazonia, has documented hundreds of geometric earthworks (geoglyphs) in deforested areas that were covered by mature forests until recently. We argue, therefore, that although areas along the major whitewater rivers were the most densely settled and modified by pre-conquest populations, asserting that anthropogenic disturbance did not extend to interfluve areas is not tenable. This is especially true when the complexity of the basin is taken into account. The Amazon River has thousands of tributaries of different sizes; most of these tributaries have their own tributaries and so on. Hence the 'interfluve' is a relative term that needs to be used carefully as well. Our recent work in the Purus-Madeira interfluve has found numerous ADE sites on tributaries far from major rivers. The complex network of Amazonian rivers, with many connections during the high water season, certainly led people far from major rivers.

Curiously Barlow et al. fail to recognize that the same sampling constraints that affect historical ecology also apply to ecological research. Most ecological studies in Amazonia also concentrate along major rivers (Pitman et al., 2011), and therefore overlap with areas of pre-conquest landscape domestication. Many forests used as baselines to measure the "performance of conservation measures" may be anthropogenic forests of either the active or non-active management categories, which is why we urged that achieving a better understanding of contemporary biodiversity – crucial for improving conservation efficacy – requires more attention to historical ecology and its affiliated disciplines.

What surprised us most was their conclusion: "Understanding pre-historic environmental impacts is a fascinating scientific endeavor but is of little practical value for the conservation of Amazonia today". The Brazilian National System of Conservation Units considers human presence a given. These humans are considered vital partners in conservation, and most collect NTFPs and hunt in actively and not-actively managed forests that result from thousands of years of human occupation. They also farm and prefer to do so where pre-conquest peoples did. Essentially, what is being conserved is the past and present human interaction with Amazonian landscapes, and any manager of a conservation unit knows full well that a clear understanding of the ecosystems and people in the area is essential for successful conservation. We reiterate our call to integrate historical ecology into Amazonian biodiversity research and conservation to build on the synergies that should follow.

References

Barlow et al., 2011. How pristine are tropical forests? An ecological perspective on the pre-Columbian human footprint in Amazonia and implications for contemporary conservation. Biological Conservation, in press. http://dx.doi.org/10.1016/j.biocon.2011.10.013.

Clement, C.R., Junqueira, A.B., 2010. Between a pristine myth and an impoverished future. Biotropica 42, 534–536.

Pitman et al. 2011. Volume and geographical distribution of ecological research in the Andes and the Amazon, 1995–2008. Tropical Conservation Science 4, 64–81.

André Braga Junqueira *
Coordenação de Tecnologia e Inovação,
Instituto Nacional de Pesquisas da Amazônia,
Av. André Araújo 2936, Manaus 69060-001, Brazil

0006-3207/$ - see front matter
http://dx.doi.org/10.1016/j.biocon.2012.03.025

Centre for Crop Systems Analysis, Wageningen University, P.O. Box 430, Wageningen 6700 AK, The Netherlands
** Tel.: +55 (92) 3643 1862; fax: +55 (92) 3643 1867*
E-mail address: abjunqueira@gmail.com

Charles R. Clement
Coordenação de Tecnologia e Inovação, Instituto Nacional de Pesquisas da Amazônia, Av. André Araújo 2936, Manaus 69060-001, Brazil
E-mail address: cclement@inpa.gov.br