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## Ichthyoarchaeology in the Americas: An introduction



This special issue assembles new methodological approaches and case studies from recent investigations on the ichthyoarchaeological remains throughout the Americas, from the Late Pleistocene to historical times, from both marine and freshwater environments. These topics were discussed in the symposium *Ichthyoarchaeology in the Americas: Methodological approaches and case studies*, which took place at the 12th International Conference of Archaeozoology -ICAZ- (San Rafael, Argentina, September 22<sup>nd</sup> - 27<sup>th</sup>, 2014).

Ichthyoarchaeology is a vital discipline for understanding human adaptation to the aquatic environments of the past; consequently, research in this area has been essential to address critical questions in the archaeology of the Americas. In many influential works in anthropological archaeology (Murdock, 1969; Kelly, 1995; Binford, 2001), fishing, which occurs across a huge diversity of environments and stems from both a natural and social context, basically encompasses foraging activities in aquatic environments. However, this ignores the technological abilities, seascape knowledge and socio-political organization that fishing requires; and the challenges and affordances that significantly differ in the hunting of mammals and birds in aquatic ecosystems. For example, fishing gear must be adapted to different aquatic conditions and to different fish taxa; this technology cannot be directly transferred from seal or seabird hunting devices. The acquisition of seascape knowledge is also a distinct factor: the intertidal zone is less dangerous than offshore areas, where humans can only enter with the support of artificial devices of mobility (e.g. canoes, watercrafts) and with acute knowledge regarding weather and sea conditions. Waterscape knowledge is also vital for predicting fish harvests and the seasonal organization of fishing.

In this special volume, original research articles that assess the ichthyoarchaeological record across a wide variety of environments throughout the Americas, from Alaska to Patagonia, are brought together, touching on a range of different anthropological and ecological issues from multiple disciplines.

Central discussions on the colonization of the Americas were linked to fish exploitation. Along the Pacific Coast of the Americas, some of the earliest archaeological sites from island or mainland coastal settings contained evidence for the harvesting of fish (e.g. Llagostera-Martínez, 1979; Llagostera et al., 1997; Béarez et al., 1998; Sandweiss et al., 1998; Rick et al., 2001, 2005). In this volume, Reitz and her co-authors re-examine the evidence of two archaeological sites from the Terminal Pleistocene located along the coast of Southern Peru: Quebrada Jaguay and the Ring Site. The authors assess the ichthyoarchaeological record, and consider multiple environmental and taxonomic variables in order to characterize the relationship between fish resources and coastal foragers. As a result of their analysis, they conclude that different subsistence strategies were conducted. Based on this conclusion, Reitz and her co-authors warn that discussions about the peopling of the

Americas based on a single coastal model "fail to capture the richness of human solutions to life on this, or any, coast".

If marine fish resources were vital in the subsistence and history of foragers in the Pacific Rim, freshwater fish resources were equally critical for human populations that inhabited the eastern lowlands. The exploitation of fish resources has been evidenced in the inland environments of the Amazonas from the Late Pleistocene (Roosevelt et al., 1996), and they continue to play a major role in modern forager societies; however, little is known about their importance in forager economies throughout the Holocene in this tropical forest area. Prestes-Carneiro et al. present the results of the first zooarchaeological study in the Central Amazon Basin. Fish was the most significant resource in the subsistence of the Late Holocene occupations at the Hathara site, where a high diversity of fish taxa was discovered. The ichthyoarchaeological record also reveals that fishing activities were conducted with specific knowledge about species distribution, in relation to the annual flooding cycle. Subsistence strategies relying on freshwater fish were also observed in occupations from 4400 BP in the Everglades, South Florida, USA (Fradklyn, this volume). Considering that the natural formation of this freshwater marsh appears to be no earlier than 5000 BP, it is remarkable that the environmental knowledge for the exploitation of fish resources was acquired in such a short time span.

The archaeological study of fish remains was also critical in understanding the emergence and development of non-egalitarian socio-political organizations in human populations. The ethnographic and archaeological evidence for fish intensification from the Northwest Coast of North America, has inspired interpretations of social complexity in the archaeological record of hunter-gatherers (e.g. Renouf, 1989; Rowley-Conwy, 1983; but see discussions in Bailey and Milner, 2002/3; Rowley-Conwy, 2001). More recently, it was suggested that fish intensification can instigate other socio-cultural trends beyond social complexity (Zangrando, 2009; Moss, 2012). In fact, Moss (2012: 2) has recently indicated that "the diversity of human-environment interactions over 10,000 years of Northwest Coast history is more variable and complicated" than the progressive and simplistic view of human evolution towards social complexity through the intensification of certain fish resources. In this volume, McKechnie and Moss present a meta-analysis of the ichthyoarchaeological record of the Northwest Coast of North America. They show that individuals or groups who fished had definitive knowledge of the habitats and behaviours of dozens of fish species, developing cultural preferences for targeting certain taxa; "these preferences reveal spatial patterning within geographically and culturally distinct regions". At the other extreme of the Americas, fishing intensification was identified in the zooarchaeological record of the Beagle Channel and surrounding areas, where the use of deeper water areas was implied (Zangrando, 2009). In this study,

Zangrando et al. used stable isotope information, from modern and archaeological fish bone collagen samples, to determine the use of pelagic zones in fishing practices during the Late Holocene.

In many past societies of the world, fisheries were created to produce stock and establish long-scale economic relationships. (De France, this volume) examines the ichthyoarchaeological record from prehistoric and colonial sites in the Osmore River Valley, Peru, to determine the importance of fish "as either a political economic commodity or as a status good". While there is no clear evidence of drying fish for long-term storage or commercial inland transport in later prehispanic periods, the analysis does support fish drying activities for local consumption. The production and exchange of fish as a commodity is only apparent from the Spanish colonial period.

At the beginning of the new millennium, and with the recent collapse of marine ecosystems, specialists in the study of archaeological fish remains started to work closely with conservation biologists and fishery managers (e.g. Jackson et al., 2001). In the Americas, this was recently conducted through the adoption of new perspectives and techniques in the study of the ichthyoarchaeological record. It was shown that by combining a historical ecology perspective with DNA and stable isotope analyses on archaeological remains, significant contributions to the holistic study of conservation management, and the assessment of modern and prehistoric human impact on marine ecosystems, could be made. (Moss et al., this volume) integrate ethnographic, historical, archaeological and genetic data, to reconstruct the historical ecology of herring in Alaska, and in doing so provide an innovative methodology for understanding the decline of herring populations during previous centuries. The authors also indicate that this information will be useful for both fish conservation and the management of herring in ensuring the survival of this taxon.

So, to summarize, ichthyoarchaeologists have much to contribute both to the "grand challenges for the archaeology" (Kintigh et al., 2014) and to the "global marine historical research agenda" (Schwerdtner Mániz et al., 2014). Questions such as "Which were the pristine characteristics of the aquatic ecosystems" or "Which were the drivers in anthropic, biological and physical systems that produced modifications in the aquatic environments over different time scales", should lead efforts towards an increasing integration between the "traditional" ichthyoarchaeological studies and stable isotope and biomolecular analyses. Historical ecological approaches can work as "theoretical bridges" between disciplines for assessing the historical dialogue amongst humans, fish resources and aquatic environments. Additionally, constructions of historical datasets and meta-analysis of the ichthyoarchaeological record can contribute or be actively incorporated into conservation and fishery management agendas. In other words, as was recently stated by Lambrides and Weisler (2016, in press) "archaeologists have a unique opportunity to provide century-to-millennial historical perspectives that can inform modern fisheries conservation and management practices".

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