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Continuity and resilience in the central Georgia Bight (USA) fishery between 2760 BC and AD 1580

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ABSTRACT

Continuity is a hallmark of a broad-based fishery at archaeological sites from coastal Georgia (southeastern Atlantic coast, USA) despite changes in the biogeochemical and cultural contexts within which fishing occurred. This continuity probably is not due to a lack of adverse impacts of both non-anthropogenic and anthropogenic origins, but instead to the ecosystem's resilience. Resilient ecosystems are easily altered but recover quickly. The most ubiquitous and abundant fishes are characterized by flexibility and resilience, enabling them to flourish within an environment with considerable spatial heterogeneity and biogeochemical properties that change annually and with each tidal cycle. The fishing strategies practiced by people living along the coast also were flexible and resilient. Perhaps the fishery was managed through cultural institutions that avoided overfishing and a system-wide collapse. This conclusion is drawn from evidence for flexibility, resilience, and possible overfishing found in two aspects of the zooarchaeological record: (1) relative exploitation of different taxa and (2) subsistence efficiency.

1. Introduction

The focus of this paper is on the zooarchaeological evidence for resilience and possible management of a fishery by people living on the mainland and barrier islands of Georgia's Atlantic coast (USA) prior to European-sponsored colonization. As will be shown in this paper, this evidence indicates that continuity was a hallmark of a broad-based fishery set within a relatively stable, but rich, mix of other vertebrate resources. This continuity probably was not due to a lack of impacts of both non-anthropogenic and anthropogenic origins as changes in environmental conditions and cultural institutions are well-documented for the region (Bishop et al., 2011). Many of the fishes in these archaeological assemblages are characterized by flexibility, as are the fishing strategies used to acquire them. Continuity may have been sustained by ecosystem resilience and resource management that avoided overfishing these animals.

Overfishing and other adverse impacts are difficult to assess objectively in modern ecosystems and even more so in the archaeological record. The measures used to evaluate fisheries today produce results that are subject to diverse interpretations and may contradict one another (e.g., Grabowski et al., 2008; McCay et al., 2011; Murawski, 2000; Pauly, 1995; Weinstein et al., 2000). Murawski (2000) provides a list of symptoms of overfishing. This list includes reduced diversity, reduce production of exploitable resources, a decline in mean trophic level, an increase in by-catch, variability in the abundance of species, anthropogenic habitat modification, and regime change. Regime change refers to changes in the structure and function of a system. All of these symptoms may reflect non-anthropogenic events as well as anthropogenic ones. Many of these criteria are difficult to evaluate without direct observations and, in many cases, elude archaeological verification. The implications for modern fisheries management of evidence for pre-16th-century human impact and management of coastal fisheries in this region could be considerable, however.

In their study of fishing traditions in the Pacific Northwest coast of North America, Campbell and Butler (2010) approach the issue from the perspective of what can be verified in the archaeological record, specifically resilience and flexibility. Campbell and Butler (2010: 2) define resilience as "…the capacity of a system to tolerate disturbance without collapsing into a different state by maintaining the same basic properties and functions." Resilient ecosystems are easily altered but recover relatively quickly compared to resistant ones, which resistant disturbances and may not recover quickly, if at all (Odum and Barrett, 2005: 69–70). The most ubiquitous and numerically abundant fish in Pacific Northwest faunal assemblages is salmon (Salmonidae), and the proportion of salmon taken was

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relatively unchanged over their study period. They argue that "…flexible resource use, including human use of a range of local resources, many of which are linked in a food web with salmon, likely contributed to resilience (Campbell and Butler, 2010: 1)."

In addition to documenting a broad-based, flexible, and resilient fishery, Campbell and Butler (2010: 13) suggest that social practices and beliefs such as ownership, regulation, monitoring, and rituals were used to manage the salmon harvest. The salmon fishery originally was an open-access resource, available to all, but became a common-pool resource. A common-pool resource is a core resource that is available in limited quantity and is subject to overuse, such as a fishery.

Although it might be argued that overuse is less likely in an estuarine system, or might be restricted to molluscs, it is clear today that fishes, too, can be overused (e.g., Pauly et al., 1998), by extension suggesting that they could have been overused in the past. Management may avoid overuse and contribute to a resilient fishery that was sustainable. Sustainability is "…the ability of something, such as a yield, a predator-prey relationship, or an ecosystem, to persist for an extended period… (Campbell and Butler, 2010: 2)." Campbell and Butler (2010) found a 7500-year record of stability in the Pacific Northwest salmon fishery that may be evidence for the regulation of salmon fishing by cultural institutions in the region, which encouraged the persistence of the fishery by fostering resilience in coastal ecosystems.

As will be shown below, a similar long-lived, flexible fishery and fishing tradition characterizes archaeological vertebrate assemblages from sites along Georgia's Atlantic coast (Fig. 1; Table 1). A core group of fishes was used within a rich mix of other vertebrate resources for millennia. This strategy persisted despite changes in climate, coastal topography, water conditions, ecosystem processes, cultural institutions, and site functions within the region (Bishop et al., 2011). This raises the possibility that the core fishery was sustained by ecosystem resilience and maintained by institutions that managed its use. Resilience and management of the fishery by people associated with the central Georgia Bight (coinciding with the State of Georgia, USA) prior to European-sponsored colonization is explored using zooarchaeological evidence for: (1) relative exploitation of different animals and (2) subsistence efficiency (Fig. 1; Table 1). Evidence for the use of shellfishes is excluded from this review for reasons discussed below.

2. The study area and materials

We do not have access to the full sequence of human occupation on North America's southeastern Atlantic coast because much of

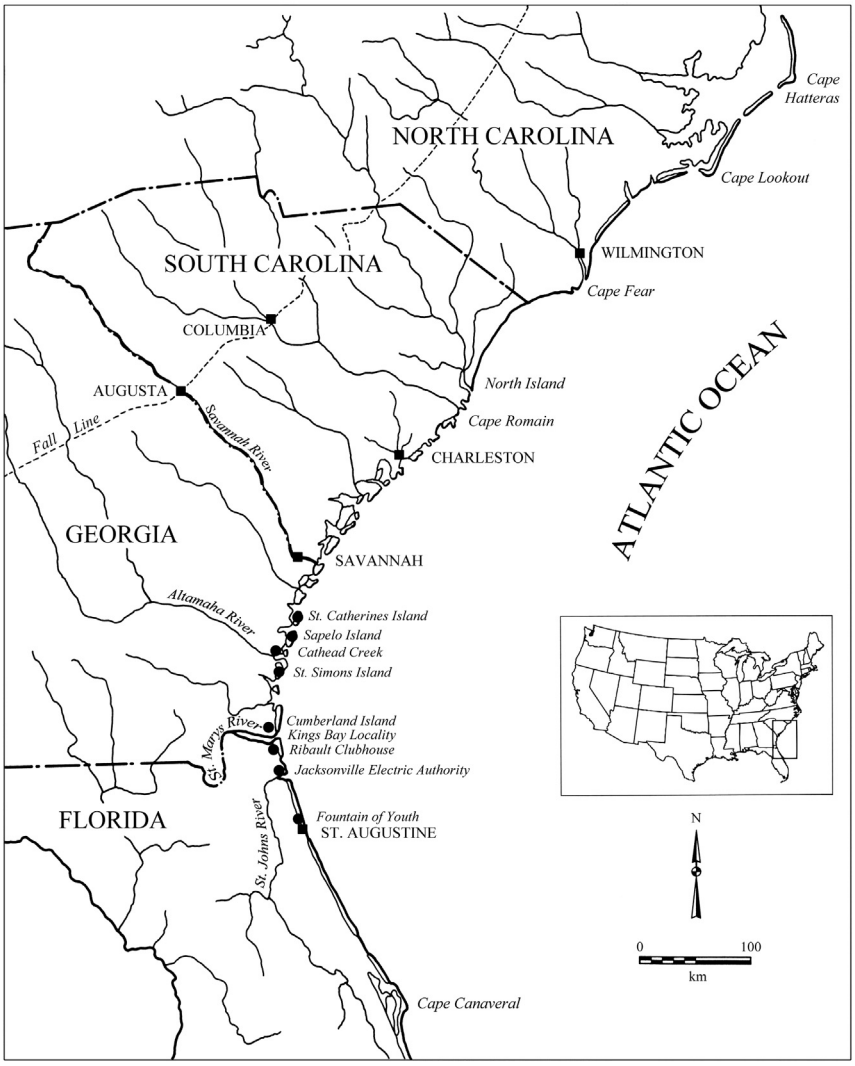

Fig. 1. Map of study area. Squares indicate present-day cities and circles are islands or sites mentioned in the text.