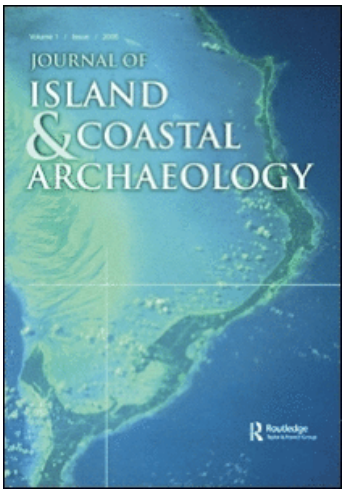

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NEWS & NOTES

Prehistoric Sea Turtle Hunting on the Pacific Coast of Mexico

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Archaeological sites on the west coast of Mexico provide long-term records of human predation on sea turtle populations. These large reptiles, valuable for their meat, eggs, shell, oil, and skin, are easily obtained from nesting beaches, but prolonged predation can disrupt rookeries and lead to population fragmentation and local extirpation. Our recent excavations at two sites in coastal Guerrero near Acapulco indicate that people hunted sea turtles, most likely from nesting grounds, by at least 5500 cal yrs BP and significantly reduced their local availability within a 3,000 year period. These data help provide a deeper historical and environmental framework for evaluating the disposition and vulnerability of these endangered species today (Limpus 1995; Spotila 2004).

Sea turtles occupy most of the world's tropical and subtropical oceans with five species—*Dermochelys coriacea* [Leatherback], *Eretmochelys imbricata squamata* [The Pacific Hawksbill], *Caretta caretta gigas* [Pacific Loggerhead], *Lepidochelys olivacea* [Olive Ridley], *Chelonia mydas agassizi* [East Pacific Green Turtle]—present along Mexico's Pacific Coast (Cliffton et al. 1995). These resilient animals have persisted on the planet for over 100 million years, surviving the Cretaceous-Tertiary extinction event about 65 mya, but

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have witnessed dramatic declines in their numbers worldwide in the last 100 years.

Sea turtle populations along the coast of Mexico once numbered in the millions, but are now reduced to a few hundred thousand (Cliffton et al. 1995). Green turtles are the most common species encountered with populations concentrated in one rookery located on the coast of Michoacan (Maruata Bay) ~300 km north of Acapulco (Figure 1). Olive Ridley rookeries are distributed widely along the Pacific Coast of Mexico with two, Piedra de Tlacoyunque and Chacahua, within a 250 km radius of Acapulco. Leatherback turtle nesting beaches are known from Michoacan, Guerrero, and Oaxaca, with the largest at Tierra Colorado 120 km south of Acapulco. Pacific Loggerheads and Hawksbills are rarely seen on the coast of Mexico south of Acapulco and no nesting grounds are known anywhere on the Pacific Coast of Mexico. Sea turtles in Mexico have faced a variety of challenges historically including illegal hunting of adults, over-collection of eggs from rookeries, and commercial operations that have drastically reduced their numbers (Cliffton et al. 1995). Changing abundances of these turtle species in archaeological deposits along the Pacific Coast of Mexico help contextualize

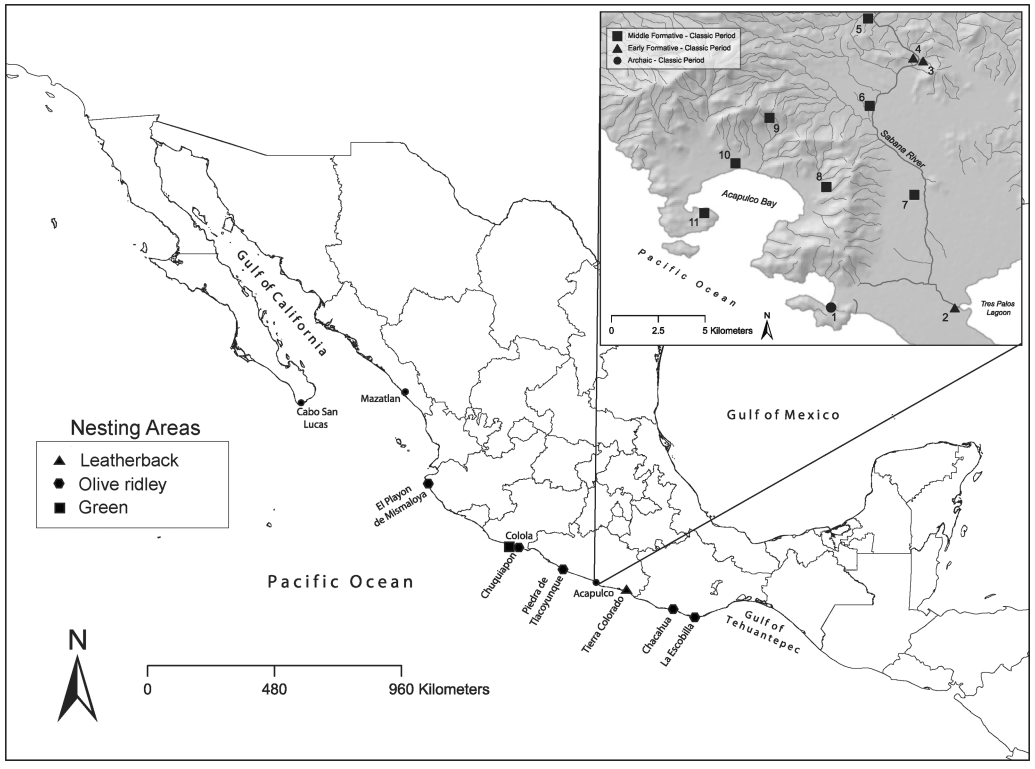

Figure 1. *Map showing modern turtle rookeries on the Pacific Coast of Mexico. Inset shows archaeological sites in the Acapulco region. 1 = Puerto Marqués, 2 = La Zanja, 3 = Arroyo Seco, 4 = El Recreativo, 5 = Barrio Nuevo, 6 = La Sabana, 7 = Infonivit, 8 = La Picuda, 9 = Palma Sola, 10 = Hornos, 11 = Tambuco.*

this historical information and provide greater time depth to study the dynamic nature of predator-prey interaction.

Our archaeological investigations have focused on two well-stratified archaeological sites just south of Acapulco: Puerto Marqués and La Zanja (Figure 1, inset). Puerto Marqués is positioned directly on the coast at the edge of a small bay formed by two coastal promontories. It contains material dating from the Late Archaic through Classic periods of Mesoamerican prehistory (~5500–1200 cal yrs BP). La Zanja was occupied during the Early and Middle Formative periods (~3400–2500 cal yrs BP) and is positioned in the coastal wetlands surrounding the Tres Palos lagoon. These records contain evidence for the transition to maize-based food production within the context of expanding regional populations and emerging social hierarchies (Kennett et al. in press). The faunal assemblages from both sites are diverse and show that fish and shellfish from coastal and wetland habitats were the primary source of meat acquired by these early coastal peoples.

Sea turtles are the most common reptile remains in the Late Archaic (~5500–4000 cal BP) deposits at Puerto Marqués (Figure 2). Most of the turtle remains were only identifiable to the family level (Cheloniidae), but *C. mydas* [Green] and *E. imbricata* [Hawksbill] bones were positively classified (Table

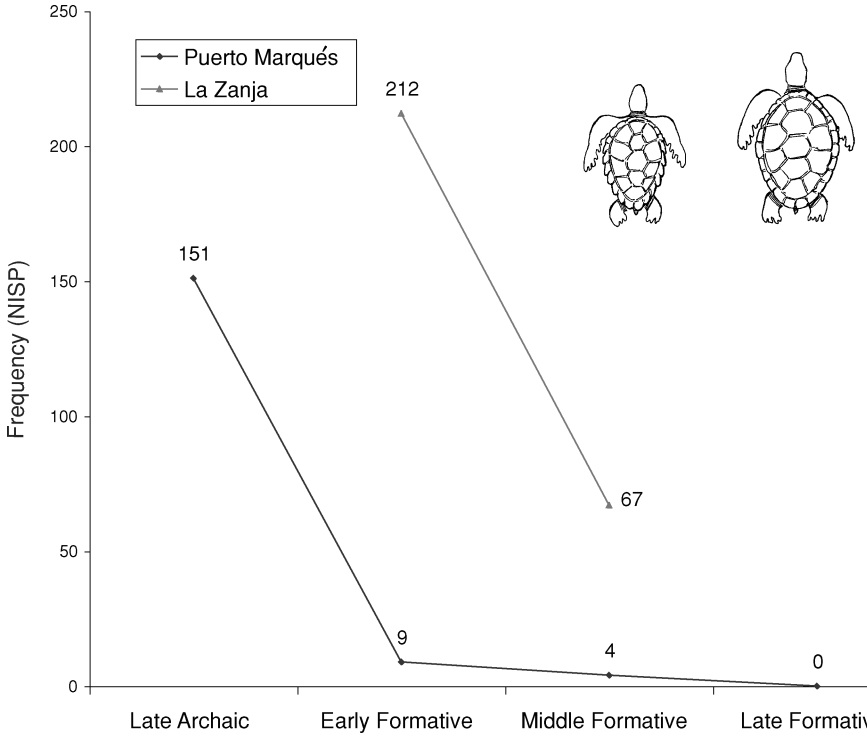

Figure 2. *Graph showing decrease in sea turtle remains (NISP) over time at Puerto Marqués and La Zanja. Numbers have been volumetrically corrected (per m^3) for comparative purposes (see Table 1 caption for volumetric information).*

Table 1. **Identified sea turtle remains in NISP and MNI from Puerto Marqués and La Zanja. Not corrected for volume. Volumes excavated from Puerto Marqués are 1.6 m^3 (Late Archaic), 2.4 m^3 (Early Formative), 3.6 m^3 (Middle Formative), and 0.39 m^3 (Late Formative). Volumes excavated for La Zanja are 2.4 m^3 (Early Formative) and 3.2 m^3 (Middle Formative).**

		LATE		FORMATIVE					
		ARCHAIC		EARLY		MIDDLE		LATE	
		NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI
Puerto Marqués									
Green	*Chelonia mydas*	7	2	1	1	2	1	0	0
Hawksbill	cf. *Eretmochelys imbricata*	1	1	0	0	0	0	0	0
Sea Turtles	Cheloniidae	234		21		12		0	
La Zanja									
Loggerhead	*Caretta caretta*			2	1	1	1		
Green	*Chelonia mydas*			8	2	21	5		
Olive Ridley	cf. *Lepidochelys olivacea*			2	1	0	0		
Sea Turtles	Cheloniidae			497		192			

1). Sea turtle bone frequencies at Puerto Marqués decline from the Late Archaic through Middle Formative (~2800–2500 cal yrs BP) and disappear entirely from all later levels. A similar trend is visible in the stratigraphic record at La Zanja. Taxa identified at this more interior location include *C. mydas*, *C. caretta*, and *L. olivacea.* The number of sea turtle bones is highest (n = 212) in the Early Formative period (~3400–3100 cal yrs BP) deposits and a declining trend is evident based on reduced numbers of bones in the Middle Formative (2800–2500 cal yrs BP) assemblage.

Our work in coastal Guerrero suggests a reduction in the availability of sea turtles that parallels expanding human populations in the region (see Figure 1, inset). Sea turtle bones and carapace fragments were the most common reptile remains in the earliest deposits at the two locations sampled. Subsequent declines are evident in both records. We interpret this trend as disturbance to nesting grounds in the immediate vicinity of these prehistoric villages. Although industrial scale hunting has severely impacted sea turtle populations in recent years, prehistoric hunting and disruption of breeding colonies is partially responsible for shaping the modern distribution and extent of these populations. For instance, our data suggest that Green sea turtle nesting beaches extended farther to the south than those recorded historically in coastal Michoacan, at least prior to disruptions associated with expanding prehistoric populations in the Late Holocene. Olive Ridley (*L. olivacea*) remains in the Early Formative period deposits at La Zanja are also suggestive of nesting areas closer than those recorded historically at Piedra de Tlacoyunque and Chacahua.

Larger sample sizes and more systematic work at archaeological sites spanning the Holocene will help elucidate the biogeographical distributions of the different sea turtle species along the Pacific Coast of Mexico. However, our preliminary work shows that the distribution of Green sea, and possibly Olive Ridley, turtles, was greater than that recorded historically, an important observation for conservation biologists. These data also demonstrate that even small human populations, using relatively simple technology, can have lasting and directional effects on sea turtle populations. This emphasizes the vulnerability of these species and illustrates the cumulative effects of human predation over long periods of time. This is especially relevant in light of recently documented declines in fisheries worldwide and the ever-increasing danger of animal extinctions associated with the cascading ecological effects of expanding human populations.

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