

Modern fish communities live fast and die young

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The Wildlife Conservation Society compared the remains of fish from ancient Swahili refuse heaps in Kenya with data from recently caught fish to understand how fish communities there have changed over time. The finding: fishing pressures have greatly reduced the percentage of longer-lived, slower growing species such as the lined surgeonfish. Credit: T. McClanahan/Wildlife Conservation Society

Fish communities in the 21st Century live fast and die young. That's the main finding of a recent study by researchers from the Wildlife Conservation Society who compared fish recently caught in coastal Kenya with the bones of fish contained in ancient Swahili refuse heaps in order to understand how to rebuild the current fisheries.

Of course, modern [fish](#) communities are not victims of reckless living, but of [overfishing](#) which has caused an ecosystem-level transition that may not be easily reversible, according to the study. Over the centuries,

human fishing has greatly reduced or eliminated larger and longer-lived species that were more commonly caught in the Middle Ages. The remaining fish communities today contain more species with shorter life spans, faster growth rates, smaller average sizes, and fewer top predators.

The study—which utilized more than 5,475 samples of ancient fish remains dating between 1250 and 600 years before the present (approximately AD 750—1400)—appears in the current online edition of the journal *Conservation Biology*. The authors are Tim R. McClanahan and Johnstone O. Omukoto of the [Wildlife Conservation Society](#).

"The ancient Swahili middens represent a time capsule of data, containing information on the composition of the region's fish assemblages and how human communities influenced the marine environment," said McClanahan, WCS Senior Conservationist and head of the WCS's coral reef research and conservation program. "The historical data suggest that fishing removes the slower-growing, longer-lived species over time and that marine protected areas are only partially successful in recovering the fish communities of the past."

Seeking to examine how fish populations are impacted by increasing fishing pressure over time, McClanahan and Omukoto compared data on the life histories of modern fish communities (gathered from fish caught in both heavily fished sites and protected closures on the Kenyan coast) with data gathered from fish remains excavated from an ancient Swahili settlement located in Shanga, Kenya. Spanning some 650 years, the refuse heaps provided the researchers with valuable insights into how fish assemblages and fishing pressures changed during that time span.

The researchers discovered that the life histories of fish caught by modern [fisheries](#) and the remains of ancient fish assemblages were significantly different. Whereas ancient fish communities had a high

percentage of top [predators](#)—species that prey on fish and large invertebrates such as snails, sea urchins, and clams—modern [fish communities](#) contain more species that feed on plants, small invertebrates like sea lice, generally smaller species that feed lower on the food chain. Modern fish assemblages also contain more species that are smaller in size with higher growth and mortality rates.

The researchers also found that the number of [fish](#) bones in the middens peaked between AD 1000-1100 (approximately 1000-900 BP) before declining, while the bones of sheep and goats become more prevalent in the higher levels of substrate, suggesting a shift in human diet to domesticated animals.

"The archeological evidence demonstrates the incredible longevity of humanity's utilization of coastal fisheries, while emphasizing the critical need to actively manage slower growing, longer-lived species within an ecosystem approach," said Dr. Caleb McClennen, Director of WCS's Marine Program. "The evidence from Kenya aligns with findings from around the world that for millennia humanity has relied on the world's oceans for our basic needs—but has more recently failed to do so in a manner that also will sufficiently sustain that resource."

From Fiji to Kenya to Glover's Reef, Dr. McClanahan's research has been examining the ecology, fisheries, climate change effects, and management of coral reefs at key sites throughout the world. This work has been supported by the John D. and Catherine T. MacArthur Foundation and The Tiffany & Co. Foundation.

Provided by Wildlife Conservation Society

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