Seafood menus from Hawaii reflect long-term ocean changes

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The colorful restaurant menus that thousands of tourists bring home as souvenirs from Hawaii hold more than happy memories of island vacations.

They also contain valuable data that are helping a trio of researchers track long-term changes to important fisheries in the Aloha State.

The scientists are using the menus as part of a larger project to fill a 45-year gap in official records of wild fish populations in Hawaii's ocean waters during the mid-20th century.

"Market surveys and government statistics are the traditional sources for tracking fisheries. But when those records don't exist, we have to be more creative. Here we found restaurant menus were a workable proxy that chronicled the rise and fall of fisheries," said Kyle S. Van Houtan, adjunct assistant professor at Duke University's Nicholas School of the Environment and leader of the Marine Turtle Assessment Program at NOAA's Pacific Islands Fisheries Science Center.

The team's analysis of 376 menus from 154 different restaurants showed that near-shore species such as reef fish, jacks and bottom fish, for example, were common on Hawaiian menus before 1940. By its statehood in 1959, they appeared collectively on less than 10 percent of menus sampled.

Restaurants began serving large pelagic species, such as tuna and

swordfish. By 1970, 95 percent of the menus contained large pelagics; inshore fish had all but disappeared.

"The decline in reef fish in just a few decades was somewhat of a surprise to us. We knew at the outset the menus would have a unique historical perspective, but we did not expect the results to be so striking," said study co-author Jack Kittinger, an early career fellow at Stanford University's Center for Ocean Solutions.

Changes in public tastes might explain part of this extreme shift, Kittinger said, but the team's analysis of landings records and background socioeconomic data suggests the disappearance of reef fish from menus paralleled drops in their wild abundance.

"The menus provide demand-side evidence suggesting inshore fish were in steep decline," Van Houtan said.

The researchers hope their study will increase opportunities and attention for similar historical analyses elsewhere.

"Historical ecology typically focuses on supply-side information," said Loren McClenachan, assistant professor of environmental studies at Colby College in Maine and co-author of the study. "Restaurant menus are an available but often overlooked source of information on the demand side; they document seafood consumption, availability and even value over time."

"Most of the menus in our study came from private collections. They were often beautifully crafted, date-stamped and cherished by their owners as art," Van Houtan said. "The point of our study is that they are also data."

Added McClenachan: "This research demonstrates the tremendous

wealth of useful information that is often hidden away in people's attics."

The trio published their findings Aug. 1 as a peer-reviewed letter in the journal *Frontiers in Ecology and the Environment*.

More information: *Frontiers in Ecology and the Environment* DOI: 10.1890/13.WB.015

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