

# Size-selective fishing results in trade-offs between fishery yield, reproductive productivity

March 9 2020, by Heather Leslie

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University of Maine researcher Kara Pellowe scans the ocean floor for clams alongside a fisherman in Loreto Bay, Mexico. Credit: Sofia Castello

How people fish matters perhaps as much as the quantity harvested, say University of Maine researchers Kara Pellowe and Heather Leslie.

Their study published in *Ecosphere* details the impacts of size-selective fishing on an economically important species of [clam](#) in Baja California Sur, Mexico.

The information is critical for fisheries managers to design policies that balance short- and long-term ecological and economic goals, say the scientists based at the Darling Marine Center in Walpole, Maine.

The findings highlight that size-selective fishing that aligns with the life history of target populations and stakeholders' goals is critical to sustaining fisheries and the valuable food and livelihoods they provide.

Pellowe conducted the research as part of her UMaine Ph.D. dissertation in ecology and [environmental science](#). Over the last six years, she regularly traveled from New England to Baja to work closely with fishermen who harvest chocolate clams (*Megapitaria squalida*) near Loreto Bay National Park, on the gulf coast of the Baja peninsula.

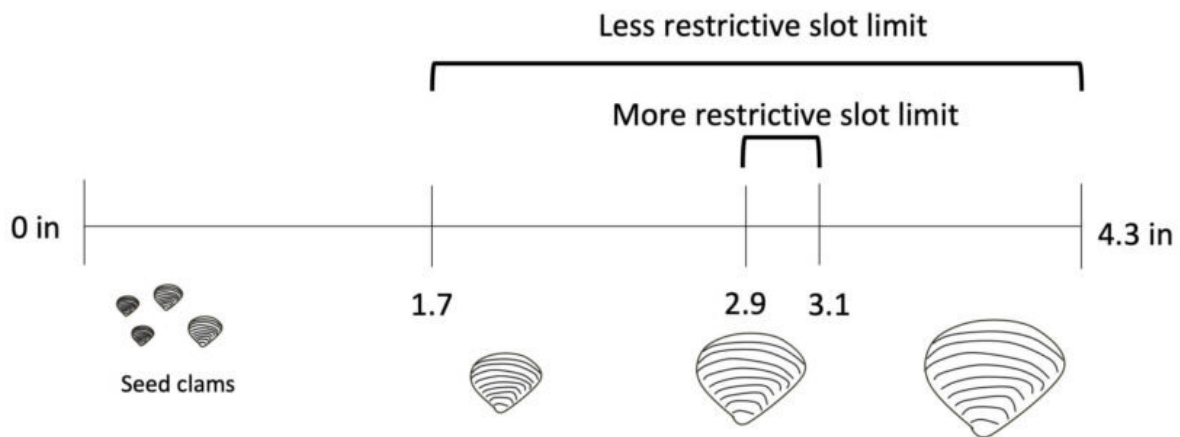
"Most fishing, whether in Mexico or Maine, is inherently size-selective," says Pellowe. "Fishermen preferentially target certain sizes of fish, often because of the economic value or cultural preferences associated with different sized seafood products."

Like the soft-shell clam in Maine, the Mexican chocolate clam is a culturally and economically important species, providing food and income for many households, particularly at times when other opportunities are scarce.

Despite the species' importance, many aspects of the biology of Mexican chocolate clams were unknown before Pellowe began her graduate research.

Pellowe and Leslie, director of the Darling Marine Center, used

information collected over years of ecological fieldwork to develop a model of how the Mexican chocolate clam population and fishery would be expected to respond to different size-selective fishing scenarios.



With a less-restrictive slot limit, a greater range of sizes can be harvested, and with a more-restrictive slot limit, a smaller range of clam sizes can be harvested. Pellowe and Leslie found that a more-restrictive slot limit results in higher reproductive capacity and long-term fisheries yield. Credit: University of Maine

"Our work revealed that the range of sizes fishermen harvest results in important trade-offs between fisheries yield and reproductive capacity of the clam population," says Leslie.

"Over time, a more restrictive slot limit will likely lead to a higher number of young clams, a larger clam population, and the ability to fish more over time, relative to a less restrictive scenario, where clams of a broader range of sizes are harvested."

National Science Foundation program director Betsy von Holle said, "This research team applied basic science techniques to aid applied management decisions regarding fisheries production, which could have major implications for fisheries production, as well as the conservation of this species."

Leslie and Pellowe continue to conduct research in Mexico with the support of the National Science Foundation. They also recently initiated a project in collaboration with the joint shellfish committee of the towns of Damariscotta and Newcastle, focused on local shellfish populations in midcoast Maine.

**More information:** Kara E. Pellowe et al. Size-selective fishing leads to trade-offs between fishery productivity and reproductive capacity, *Ecosphere* (2020). [DOI: 10.1002/ecs2.3071](https://doi.org/10.1002/ecs2.3071)

Provided by University of Maine

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