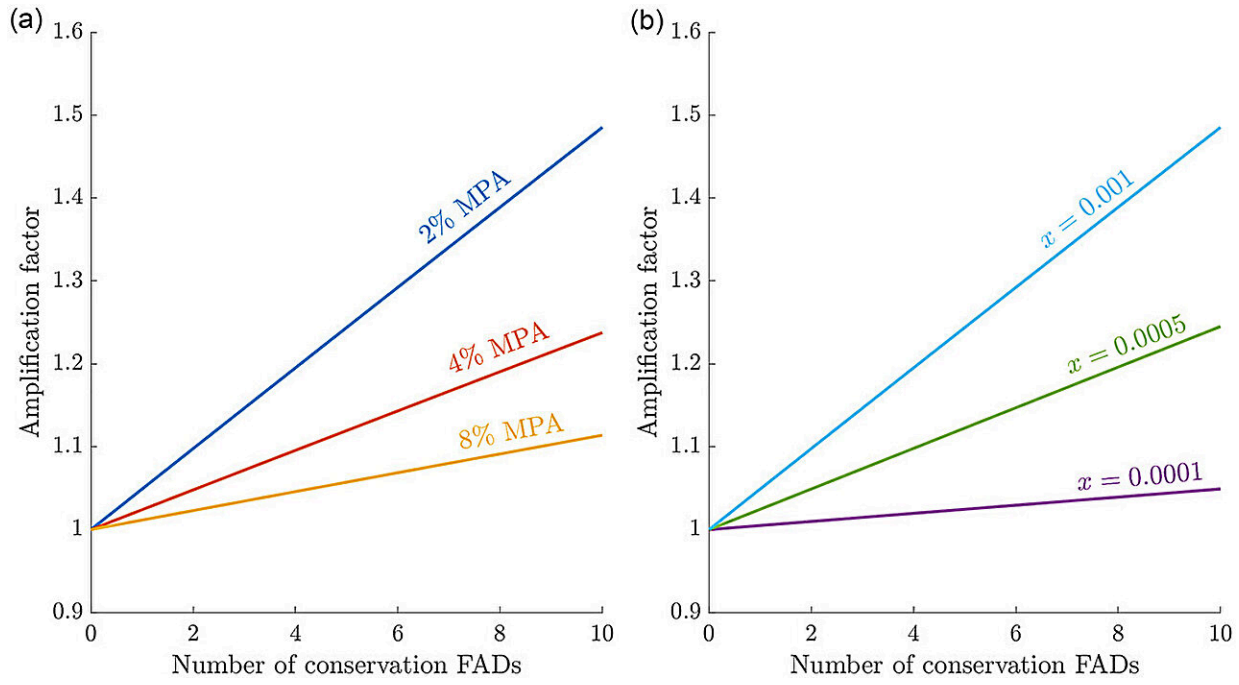
Research looks to flip commercial fishing method to aid species conservation

December 13 2023



Amplification factor results for the nonspatial model. Panel (a) shows the amplification factor provided to blue water MPAs of three different sizes, as the number of conservation FADs increases from 0 to 10 (x = 0.001 in this panel). Panel (b) shows the amplification provided when FADs attract more fish, as the number of conservation FADs increases from 0 to 10 (with a blue water MPA that encompasses 2% of the total area). Credit: *Conservation Letters* (2023). DOI: 10.1111/conl.12984

A QUT researcher has suggested a technology widely used by fishing

fleets to attract open ocean species could be used in Marine Protected Areas to protect, conserve and sustain exploited fish species. The study is published in *Conservation Letters*.

A fish aggregation device (FAD) is a human-made structure, with some designed to drift (dFAD) in the open ocean and attract fish like tuna, that swim past in schools.

Professor Michael Bode from the QUT School of Mathematical Sciences said a dFAD was simply a mat or raft that was attached to floats and/or a buoy—which was often fitted with a satellite location device and drifts with the ocean currents.

"Fish in the pelagic zone stay away from the ocean bottom and the shore, which makes them hard to find—as opposed to reef fish, or demersal fish that live on or near the sea floor," Bode said.

"The species of pelagic fish commonly targeted by commercial operations include tuna, marlin, and mahi-mahi (dolphin fish).

"Drifting FADs attract schools of these fish, making them easier and cheaper to catch. The technology has transformed the world's open ocean fisheries over the past 20 years.

"Most of the tuna you find in a can, for example, were caught using dFADs."

Bode said his team's research found that these same dFADs could be used to enhance blue water Marine Protected Areas (MPAs).

"If fishing fleets can use dFADs to attract fish towards their nets, why can't we use them to attract fish into protected areas?" Bode said.

"Also, by increasing the local density of exploited species, they may also improve the function of ecosystems in blue water MPAs.

"Breakthroughs in drone and autonomous technology can ensure these conservation FADs (cFADs) stay inside the protected areas.

"If used as conservation devices, cFADs could amplify the benefits of blue water MPAs."

Bode said cFADs could help to solve the primary problem with blue water MPAs—that they were too small relative to the vast ocean, making protecting pelagic species in these areas difficult.

"We find this use of cFADS could overcome the conservation areas' small size, compared with the vastness of the ocean, by giving fish an 'incentive' to remain or congregate within the protected area."

Bode conducted the research with Edward T. Game, The Nature Conservancy's (TNC) Asia Pacific Lead Scientist & Director of Conservation, and TNC's Alex Wegman (California) and Kydd Pollock (Hawai'i) TNC's Pelagic Conservation Strategy Lead with The Nature Conservancy's Climate Adaptation and Resilience Laboratory at Palmyra Atoll in the Central Pacific Ocean.

Co-author Edward T. Game said that by putting FADs inside MPAs, we could increase the time that species like tuna spend in those MPAs (where they can't be caught) thereby reducing mortality rates.

"Somewhat amazingly, we found that even a small number of FADs inside a blue water MPA can meaningfully amplify the benefits of that MPA," Game said.

Co-author Pollock said using FADs as a conservation tool was unique.

"We can have control over where they are positioned, so therefore can keep them inside an MPA and use them to aggregate the fish and increase their residence time within protected waters," Pollock said.

"Efficient seabird foraging is closely tied to breeding success, so by having consistently higher fish biomass in a region benefits the entire ecosystem."

More information: Michael Bode et al, Fish aggregating devices could enhance the effectiveness of blue water marine protected areas, *Conservation Letters* (2023). DOI: 10.1111/conl.12984

Provided by Queensland University of Technology