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Illuminating the benefits of marine protected areas for ecotourism, and vice versa

As California, the U.S. and the world work to make good on commitments to conserve 30% of oceans and lands by 2030, all strategies are on the table — and under the microscope. When it comes to the ocean, one valuable tool is marine protected areas (MPAs), regions that are defined, designated and managed for long-term conservation. Among other benefits, MPAs protect habitats and promote species diversity. They also hold value for communities and industries.

Researchers at UC Santa Barbara's Marine Science Institute have published a new study on the impact of MPAs on the recreational scuba diving industry in California's Northern Channel Islands. Their conclusions provide strong evidence of the benefit of MPAs for the scuba diving industry in Southern California and highlight that the diving community should be considered a key stakeholder in decision-making about the future of MPAs.

"UCSB has a strong history of conducting marine science in the Channel Islands," noted first author Molly Morse, senior manager with the campus-based Benioff Ocean Science Laboratory. "We hope this research contributes to that legacy of highlighting the measurable value of these ecosystems not only as a critical resource to fishers but also to those of us that place significant value in experiencing and exploring the 'Galapagos of North America' with our mask and fins."

To conduct their study, the team analyzed patterns from millions of Automatic Identification System (AIS) data points from for-hire scuba diving vessels to glean long-term insight into how MPAs shape ecotourism at large. (AIS is an onboard vessel broadcast system that shares high-resolution vessel location and behavioral information.)

Based on a set of behavioral criteria confirmed through interviews with for-hire dive vessel captains, the researchers were able to identify vessel behaviors linked to non-extractive ecotourism (e.g., underwater wildlife viewing, photography) versus recreational lobster fishing, and to compare the location of these activities within MPAs, on the MPA borders, or outside of MPAs.

They found that from 2016-2022, dive vessels engaged in ecotourism prefer MPAs, and that dive vessels primarily conducting recreational lobster fishing prefer MPA border zones. Specifically, a high proportion of the most popular ecotourism dive sites (38%) were located in MPAs, a large proportion of the total number of unique ecotourism dive events (45%) were conducted within MPAs, and vessels engaged in ecotourism diving exhibited high selection of MPAs.

Meanwhile, scuba diving vessel behavior in the lobster scenario, in which vessels were putatively engaged largely in recreational lobster fishing, showed quite different patterns. The majority of the lobster fishing dive events (78%) occurred outside of the MPAs, but these dive vessels exhibited preferential selection for the buffer zones around the MPAs. Of owner/operator survey respondents, 83% said they noticed that hunting (i.e., spearfishing, lobster fishing) was better near an MPA due to the so-called “spillover effect,” where species are so abundant and productive in an MPA that they spill over into surrounding areas – like interest yielded from a savings account.

That effect is partly what attracts divers to these particular MPAs, according to Morse. But the biggest draws?

“People come from around the state and around the world to dive the Channel Islands, drawn by playful sea lions, underwater cathedrals of emerald kelp forests and giant sea bass weighing four times more than the divers themselves,” she said. “The dive captains we interviewed stated that the MPAs of the Northern Channel Islands — Anacapa, Santa Cruz, Santa Rosa, San Miguel — enabled more of these

experiences for their clientele.”

Past considerations about the establishment of new MPAs or changes to existing MPA management have tended to focus on engagement with fishers (large- and small-scale) and evaluations of how this management tool affects fishing. “Given the significant role of the scuba sector in the blue economic portfolio of small and large coastal communities,” Morse added, “it is important to understand how this stakeholder community relates to and is influenced by MPAs. Ocean ecotourism is a fast-growing sector of coastal economies with a significant stake in the health of coastal biodiversity and the future of coastal planning.”

This study’s focus on scuba diving — an important sector of the Southern California marine ecotourism industry — is unique. Ecotourism is among the largest sectors in the ocean economy, constituting some 50% of all global tourism, equal to $4.6 trillion, the authors note. Yet it is an understudied benefit of marine protected areas.

“We stand at a critical time in history as state, national and world leaders contemplate how to achieve goals of protecting 30% of land and water by 2030,” said co-author Douglas McCauley, a professor of ecology, evolution and marine biology and director of the Benioff Ocean Science Laboratory. “Research like this sheds light on the diverse benefits that marine protected areas create for our local communities and economy. And these MPAs are only 20 years old this year. They are baby parks compared to their 150+ year old ancestors on land, like Yellowstone National Park. I think we can assume with high confidence based on other research that these benefits will only increase as these underwater protected areas mature.”

Other authors on this paper are Sara Orofino, Keenan Stears, Samantha Mladjov and Jenn Caselle — all from UCSB — as well as Tyler Clavelle of Global Fishing Watch and Ryan Freedman of NOAA Sanctuaries.

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