**If you build it, they will come: coastal amenities facilitate human engagement in marine protected areas**

Marine protected areas (MPAs), areas in the ocean where fishing is prohibited or restricted, are commonly used as tools to protect biodiversity, recover fisheries, and promote other beneficial human experiences. While the conservation and fisheries impacts of MPAs have been well studied, the impacts of MPAs on other dimensions of human use -- such as recreation, education, and scientific research -- have received less attention. Identifying traits of MPAs that promote or limit human engagement is critical to designing MPA networks that achieve multiple goals effectively, equitably, and with minimal environmental impact.

In our recent paper, we develop a novel and transferable framework for quantifying human engagement in California’s MPA network, one of the largest MPA networks in the world. We assemble and compare diverse indicators of human engagement -- leveraging information from citizen science programs, social media platforms, and government datasets -- that capture recreational, educational, and scientific activities across California’s MPAs.

We find that human engagement is correlated with local population density: unsurprisingly, the more people that live close by, the more people that engage in an MPA. However, we also find that MPAs near tourist destinations, adjacent to state parks and their amenities, and with long sandy beaches generate more engagement than would be expected based on population density alone. Conversely, remote MPAs without sandy beaches or parking lot access had lower than expected human engagement.

What does this mean as the world aims to expand MPA coverage to protect 30% of the ocean by 2030? On one hand, human engagement can be promoted by developing land-based amenities that increase access to coastal MPAs or by locating new MPAs near existing amenities during the design phase. On the other hand, human engagement can be limited by locating MPAs in areas far from population centers, coastal amenities, or sandy beaches. This choice depends on management goals. Our paper provides a transferable framework for current and future MPA networks to track progress towards meeting their own human use objectives.



Kayakers exploring the Matlahuayl State Marine Reserve off of La Jolla Cove in San Diego, California, USA. Photo by Jacob Eurich.

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We develop a framework for measuring recreational, educational, and scientific engagement in California’s marine protected area network. We find high engagement in MPAs close to population centers, tourist destinations, state parks, and sandy beaches. @ChrisFree14 @PISCOScience

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**What was the inspiration for this article?**

Many marine protected areas (MPAs) around the world aim to facilitate recreational, educational, and scientific engagement in marine ecosystems, yet human engagement in MPAs has received little attention in the scientific literature. We sought to fill this gap by developing a transferable workflow for documenting human engagement in MPAs and for identifying traits of MPAs associated with high and low engagement. This knowledge is critical to designing MPA networks that are effective in achieving both their human use and conservation goals. We focus on California’s MPA network given that promoting recreational, educational, and scientific engagement in marine ecosystems is an explicit goal of the network, which is currently undergoing a legislatively mandated decadal performance review. Thus, the paper also provides a basis for benchmarking the success of the network in achieving its human engagement goals and for informing adaptive management to better achieve these goals in the coming decade.

**How does your article inform future research?**

Our paper sets the stage for future research into human engagement in MPAs. We focus on California, but our methods draws on human engagement indicators that are globally relevant, and could be used to document human engagement in other MPA networks around the world. Our paper also reveals critical next steps through what it was unable to address. While we were successful in documenting the magnitude of human engagement in MPAs, we were unable to discern the demographics of people engaged in these activities, precluding us from understanding the equity of MPA access and engagement. Furthermore, lack of data on the engagement of indigenous people with MPAs limited the types of cultural values we could evaluate. Future work into the equity of MPA engagement and cultural value of MPAs to indigenous people will be critical to designing fair and effective MPA networks.

**Why did you choose People and Nature for your research?**

We choose *People and Nature* because our research explicitly examines how people (People) interact with marine protected areas (Nature) and how MPA networks can be designed to either enhance or limit such engagement based on network objectives. We value the high-quality synthetic science published in *People and Nature* and the journal’s commitment to open-access.