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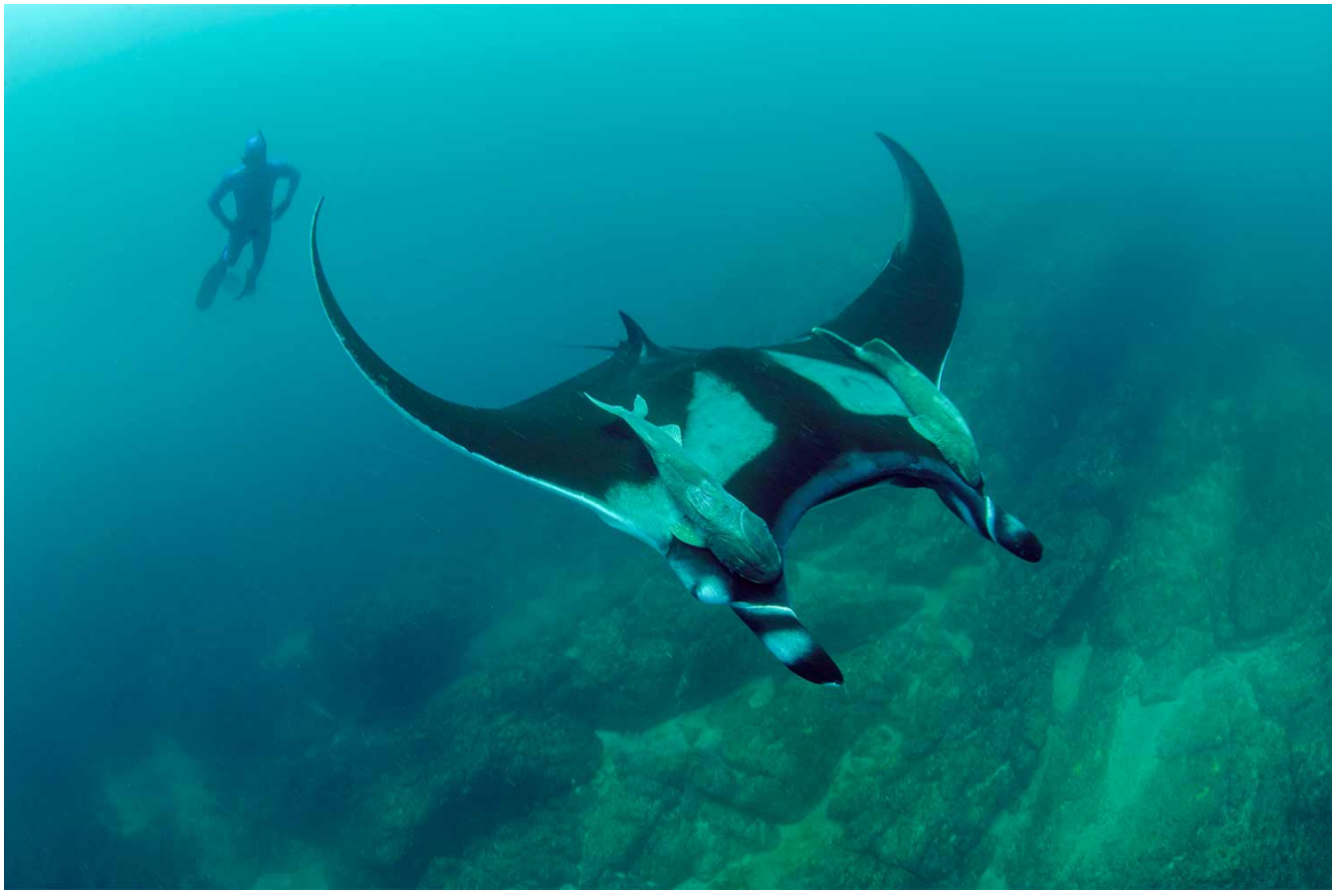
Study Finds Manta Rays Are Local Commuters; Not Long-Distance Travelers

Scripps-led study has important implications for the threatened species' conservation



Scripps graduate student Josh Stewart swims near a giant oceanic manta ray at Bahia de Banderas off mainland Pacific Mexico. Photo by Octavio Aburto

Oceanic manta rays–often thought to take epic migrations–might actually be homebodies, according to a new study. A Scripps Institution of Oceanography at the University of California San Diego-led research team studied satellite-tracked manta rays to shed light on the lives of these mysterious ocean giants.

Manta rays (*Manta birostris*) spend much of their lives swimming in remote open-ocean environments, such as on seamounts and offshore islands, in search of tiny free-floating plankton, their main source of food. They can live for over 40 years and reach a wingspan of up to seven meters (23 feet).

The findings, published in the journal *Biological Conservation*, have important implications for the conservation of the threatened species.

To better understand their travels, the researchers tagged and collected muscle tissue samples from the rays at four different sites in the Indo-Pacific separated by 600-13,000 kilometers (373-8,078 miles), to see if the local aggregations of mantas were in fact a network of highly connected subpopulations.

Using the tagging information, which included up to six months of data on their movements, along with genetic and stable isotope analyses on the collected tissues, the researchers found that manta rays remained close to their tagged location, and are very likely distinct subpopulations with very limited connectivity between regions.

“These animals are showing a remarkable degree of residency behavior compared to the migrations we were expecting,” said Scripps Oceanography PhD candidate Joshua Stewart, a researcher in the Scripps Gulf of California Marine Program and the study’s lead author. “While mantas do make the occasional long-distance movement, it appears that the norm is to stay put. This means that any one population of mantas is highly susceptible to fisheries and other human impacts, but that local populations are also more easily protected.”

Populations of manta and closely related mobula rays are in decline worldwide due to targeted fishing mainly for their gill plates, which are used in traditional Chinese medicine, and from accidental bycatch in other fisheries.

Scientists had previously assumed manta rays to be long-distance travelers, similar to other large marine vertebrates such as sharks, tunas, and whales, largely based upon their size and pelagic habitat preference.

“We found that these patterns of residency remain true on multi-year and generational time scales, with both genetic and isotopic separation between populations,” said Stewart, also a researcher at the UK-based nonprofit The Manta Trust.

According to the authors, this study demonstrates that oceanic manta rays can be effectively protected by local and regional management strategies, which are often not considered viable for highly migratory species.

“The research we’ve conducted has shown that perhaps the most effective management strategies for oceanic manta rays will come from the local and national level,” said study co-author Calvin Beale of the Misool Manta Project.

The population of manta rays studied in Indonesia appears to reside exclusively in Indonesian waters, where there is a complete moratorium on the landing of manta rays, and local marine protected areas that cover a substantial portion of the population’s range.

“If more countries follow suit and protect their local manta populations, the outlook for the species may improve from the current downward trajectory,” said Beale.

In a separate study recently published in the journal *Zoology*, Stewart and his team analyzed the diving behaviors of six satellite-tagged oceanic manta rays at the Revillagigedo Archipelago in Mexico. They found seasonal shifts in diving behavior, likely the result of changes in the location and availability of their main prey source–zooplankton.

“This additional study helps explain why the mantas may remain resident, unlike most other large marine animals,” said Stewart. “Rather than move horizontally over long distances to track specific prey items, it seems that oceanic mantas are quite flexible in their foraging behavior, perhaps allowing them stay put rather than migrate.”

Stewart and colleagues at National Geographic Crittercam are conducting a follow-up study to affix cameras to the animals to directly observe their feeding behaviors.

The New England Aquarium’s Marine Conservation Action Fund, PADI Foundation, Save Our Seas Foundation, Misool Baseftin, Carl F. Bucherer, Conservation International, SEA Aquarium Singapore, The Punta Mita Foundation, National Geographic Society/Waitt Grants Program, and private donors provided funding for the research study. Stewart was supported by a National Science Foundation Graduate Research Fellowship, a Switzer Environmental Fellowship, and a Nancy Foster Scholarship through the NOAA Office of National Marine Sanctuaries.

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