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July 3, 2008

### **Smithsonian Coral Biodiversity Survey of Panama's Pearl Islands**

A comprehensive survey of coral biodiversity in Panama's Las Perlas Archipelago, published in the journal *Environmental Conservation* by researchers from the Smithsonian Tropical Research Institute and their colleagues, has resulted in clear conservation recommendations for a new coastal management plan.

"To evaluate strategies for the protection of natural resources in the Las Perlas archipelago, we gathered basic information about coral species distributions. Our recommendations include large conservation units, "no take zones" and marine reserves, with an emphasis on the northern part of the archipelago, and extremely careful regulation of fishing, tourism and development," said Smithsonian staff scientist, Hector Guzman.

The Las Perlas Islands in the Gulf of Panama are one of two archipelagos in the Tropical Eastern Pacific. The other is the Galapagos. The Las Perlas Marine Special Management Zone, created under Panama's Law 18 in May 2007, is the most recent addition to a major regional marine conservation corridor extending from Costa Rica to Ecuador. The 1688-km<sup>2</sup> management zone includes 250 mostly uninhabited rock islands and islets.

The authors conducted an extensive biodiversity inventory, determining coral distribution and species richness across the region. They counted a total of 57 coral species: 19 hard (scleractinian) corals and 38 soft corals (octocorals). For comparison, the species count for Panama's Pacific biodiversity hotspot in the Gulf of Chiriqui is 74, whereas near Caño Island Biological Reserve, Costa Rica's hot spot, there are 43 coral species.

Coral reefs in the Las Perlas archipelago tend to be small and patchy. Some corals also grow directly on bedrock, where they form communities, but not consolidated reefs. This study showed that reefs and coral communities in Las Perlas are equally diverse. The analysis defined areas of high species richness near Isla Galera, Isla San Telmo, Isla Camote, Isla Monte and Bajo Trollope in the southern part of the archipelago; the south and west coast of Isla San Jose; the southwest shore of Isla Pedro Gonzalez and around the northernmost islands, especially Isla Pacheca and Pachequilla. Isla Del Rey and areas near Isla Viveros and Isla Mina were low in species richness.

Live coral cover on reefs averaged 61.2%, ranging from 0.1 to 96.4%, whereas live cover in coral communities averaged 26%. Reef sites with the highest live coral cover are along the north and east shores of Isla Contadora and in the San Telmo Islands. The central archipelago tended to show low coral cover.

In the Las Perlas archipelago, coral cover and coral species richness do not go hand in hand. Extensive areas of coral can be low in species diversity, whereas smaller, patchy areas of coral can be higher. Patchy distribution of high coral biodiversity areas makes it challenging to specify discrete conservation areas, therefore the authors recommend larger conservation units. The central archipelago is less important both in terms of coral cover and coral species richness, while the islands from Isla Mogo Mogo north are more important.

Because coral communities in the archipelago tended to have higher species diversity and a higher proportion of soft corals (octocorals) than typical Pacific Panama reefs, the authors recommend that the management plan protect a significant proportion of the coral communities. Bajo Trollope, San Jose Island, the southern coast of Pedro Gonzales Island, and San Telmo, Galera, Mogo-Mogo and Pachequilla islands should be fully protected marine reserves.

Sedimentation, pollution, overfishing and coastal development have already been targeted as the most significant threats to marine biodiversity in Las Perlas. Developers plan to build entirely new towns with residential areas, malls, marinas and golf courses on several of the islands in this fragile ecosystem, which Guzman describes as "...lacking concern for the fragility of the archipelago and island ecosystem functions. Whatever you do to an island affects the others. It's a chain-reaction."

The Marine Special Management Zone regulates fisheries, but not tourism. It protects coral reefs and mangroves and creates a framework for participatory governance of the area but does not regulate land use, although several of the forested islands have protected areas or are designated as reserves.

The authors recommend further study of the connectivity—the movement of marine organism and their offspring along the coast—that may be extremely important to the health of protected areas across the Tropical Eastern Pacific region.

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Reference:

Hector M. Guzman, Sarah Benfield, Odalisca Breedy and James M. Mair. 2008. Broadening reef protection across the Marine Conservation Corridor of the Eastern Tropical Pacific: distributions and

diversity of reefs in Las Perlas Archipelago, Panama. *Environmental Conservation* 35:46-54 Cambridge University Press doi: 10.1017/S03768929080004542 Published online, April 29, 2008.

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Funded by the DEFRA Darwin Initiative Fund, Heriot-Watt University (U.K.) and the Smithsonian Tropical Research Institute

Related information:

The Science of Marine Reserves. 2007. Partnership for Interdisciplinary Studies of Coastal Oceans with the Communication Partnership for Science and the Sea

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