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Geoparks seeking marine protection

In the mid 1980s, while performing routine surveys on the continental shelf off the coast of British Columbia, Kim Conway and a team of researchers from the Geological Survey of Canada came across unusual, large mounds on the seabed. Those mounds turned out to be Hexactinellid sponges — enormous glass-like sponges that form complex 3-D framework structures.

Nearly a decade later, German paleontologists, led by Manfred Krautter at the University of Stuttgart, took interest in the sponges. Krautter's team had been studying outcrops of a fossilized reef in Europe. In the upper Jurassic, about 150 million years ago, a vast reef of Hexactinellid sponges stretched 7,000 kilometers across southern Europe. As far as Krautter and his colleagues knew, that type of reef should have disappeared some 80 million years ago. They were thrilled to see the same type of sponge reefs living today — over about 700 square kilometers of seafloor between the Queen Charlotte Islands and Vancouver Island, Conway says.



"With the opportunity that it presented to study a living system that was the only analog available to look at these ancient reefs, we formed a joint project in 1998," Conway says.

In 1999, joint Canadian-German team of scientists took the submersible Delta down into the British Columbian waters to observe and study the geology and biology of the Hexactinellid sponge reefs. The research has helped spur conservation and awareness of the unique reefs, which face potential destruction from fishing practices in the area. Photo courtesy of Kim Conway.

Since then, the joint Canadian-German team has performed 18 submersible dives and conducted oceanographic surveys to better understand the unique conditions that created the sponge reefs. With help from the Canadian Parks and Wilderness Society (CPAWS), they have been working to make the sponge reefs in the Hecate Strait a Marine Protected Area (MPA) — a designated area with controlled activity to ensure long-term protection. Currently less than 1 percent of Earth's marine area is similarly protected, according to the U.S. National Oceanic and Atmospheric Administration.

Around the world, geologically significant areas found underwater are gaining protection. At last year's World Summit on Sustainable Development in Johannesburg, countries pledged to create networks of marine protected areas by 2012. Just this year, Australia created the largest highly protected marine reserve at the Heard and McDonald Islands — home of Australia's only active volcano and several seamounts. In March, under the Oceans Act of 1997, Canada designated its first ever MPA: the Endeavor Hydrothermal Vents, located 250 kilometers southwest of Vancouver Island, 2.25 kilometers below the surface of the ocean.

"The Endeavor site has had a lot of participation from scientists," says Sabine Jessen, conservation director of CPAWS in British Columbia. With Canadian and American dives to collect pieces of the underwater chimneys, marine protection has set controls over conducting research there. Similarly, for the Hecate Strait sponges, marine protection would allow for

controlled scientific research in the area, while preventing harmful fishing activities.

Although the full ecological importance of the sponge reefs has yet to be determined, dives last year shed new light on their underwater world. "Just as a coral reef provides habitat for a large numbers of tropical reef fishes, we suspect that the reefs on our shelf may play an important role in providing habitat or a nursery area or other types of required habitat for different fish species," Conway says.

After finding new sponge damage last year from ground fish trawling, the government closed those fisheries; but, long line fishing and shrimp trawling are still in place. Because of the slow growth rate of the Hexactinellid sponges, between 1 and 7 centimeters a year, it could take anywhere from 50 to 150 years for that sponge reef area to recover, if at all, Conway explains.

Exactly why this type of reef system, long assumed extinct, popped up in the British Columbia waters about 9,000 years ago is still unknown. "This part of our continental shelf has experienced this huge sea level change after the ice left; sea level rose up to about 140 meters, freezing in time this substrate that existed there during the glaciation," Conway says. This quiescent area is ideal for colonization by these sponges, which require stable, non-changing seabed to get a real hold on. High nutrient availability and upwelling, he says, likely also play a role.

While Conway's research team is busy analyzing the latest survey data from the reef site, Jessen and her conservation team are continuing to lobby hard for the reefs to gain MPA status and designation as a World Heritage Site by UNESCO. She's optimistic. "More and more people are looking toward oceans and the need to better protect them."

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