Researchers discover forests of endangered tropical kelp

A research team led by San Jose State University and the University of California, Santa Barbara has discovered forests of a species of kelp previously thought endangered or extinct in deep waters near the Galapagos Islands. The discovery has important implications for biodiversity and the resilience of tropical marine systems to climate change. The research paper describing the discovery is published in this week's on-line issue of the *Proceedings of the National Academy of Sciences*.

"The ecosystems that form in these cold, deep pockets beneath warm tropical waters look more like their cousins in California than the tropical reefs just 200 feet above," said co-author Brian Kinlan, a researcher with UC Santa Barbara's Marine Science Institute. "It is very similar to what we see when we climb a high mountain. For example, high alpine country in California looks more like Alaska."

Kinlan and Michael Graham, associate professor at SJSU, began by developing a mathematical model designed to predict likely habitat for the kelp, Eisenia galapagensis, based on information from satellites and oceanographic instruments on conditions including light, depth and nutrient availability. The premise of the model was developed by collaborator Louis Druehl, of the Bamfield Marine Science Centre, who surmised it was possible to create a predictive model for locating kelp forests rather than focusing on the limited details available from rare field observations.

The research team tested the model by traveling to the predicted habitat, where they searched for the kelp. Scuba divers -- including students from CSU Monterey Bay, CSU East Bay and UC Davis -- found the kelp forests from 40 to 200 feet below the surface, making the mission a success. The students conducted their surveys alongside the famed Amblyrhynchus christatus, the world's only seagoing iguanas.

The mission's success has three major implications. First, the World Conservation Union, which recently added Eisenia galapagensis to its global database of threatened species, may reconsider that action. Second, the model may find other marine life presumed endangered or rare but actually hidden beneath the ocean's surface. The model does this by pinpointing unexpected places to search. In this case, the model correctly predicted that deep waters in the tropics could harbor kelp forests more commonly associated with temperate regions such as central California. The model identified nearly 10,000 square miles of similar unexpected cold spots in deep tropical waters worldwide.

The third implication of the research is that marine biodiversity may be more tolerant of climate change than presumed. Graham compares his team's kelp forests to the underwater hydrothermal vents discovered off South Africa in 1977. Scientists were surprised to find thriving ecosystems near those vents in water previously considered too deep and dark to harbor complex communities.

Graham theorizes the kelp forests his team discovered may reveal a similar wealth of plant and animal life. So while global warming may heat coral reefs and alter life there, marine communities may continue to thrive in kelp forests deep beneath the surface, where cooler nutrient-rich waters are less affected by surface warming.

Source: University of California - Santa Barbara