CAN-109-HOPE FOR CORAL REEFS

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OCEAN OPTIMISM: HOPE FOR CORAL REEFS

corals, conservation, communication, acidification, teaching

Coral reef image: Flikr

This week in class we talked about the worldwide decline in coral reefs and what we can do to try and save these important ecosystems. Corals are unique: they consist of both a plant and animal in a symbiotic relationship occurring in a calcified mineral skeleton. Corals grow in colonies, making up the reefs that can act as a habitat for various marine species. Thus, in a way, coral reefs are like the rainforests of the sea. They assist in creating biodiversity within marine habitats by providing shelter for the life that lives within them. Corals are home to about 25% of all marine life (at some point in its life) and they act as coastal barriers to protect the shore. Corals are not just vibrantly colored tourist hotspots. They are truly essential to the health of the ocean for the many services they provide marine life and surrounding waters.

According to recent research, coral reefs may face extinction as early as 2050 because of the impacts of humans on these ecosystems. This decline in the overall coral population is caused primarily by overfishing, habitat degradation, rises in global ocean temperatures, and ocean acidification. Warm water temperatures cause corals to eject symbiotic plant cells; without photosynthetic algae, corals will starve. This state is recognized when corals turn from a healthy brown color to white during a process called bleaching. After El Nino in 2015, coral reefs faced massive effects of bleaching, therefore, scientists declared bleaching a global issue. When corals have reached the

state of being white, or bleached, they can either self-restore to a healthier state or completely die. While these human-caused problems persist, researchers have focused on different techniques that can help provide coral restoration efforts: in our class, we specifically discussed micro-fragmentation and transgenerational acclimatization.

Micro-fragmentation is a promising new method of coral conservation. Pioneered by David Vaughn at the Mote Tropical Research Laboratory, this simple technique has shown monumental results. Small fragments of coral are cut from a larger coral, and these smaller fragments are then arranged in a grid on the seafloor. The coral fragments grow rapidly at rates up to 50 times faster than their normal growth rates. The corals, starting from a small piece, then fuse together, creating a larger colony. Many corals, especially massive coral species such as brain coral, grow very slowly. Intervention in the form of micro fragmentation could help rebuild massive coral populations so that they're able to resist any harmful changes in the future. This week, we spoke with Elizabeth Lenz at the Hawaii Institute of Marine Biology. She explained that this method offered a promising alternative to other coral restoration approaches.

Scientists from the University of Hawaii's Institute of Marine Biology are trying to restore and stabilize the coral reefs by breeding "super corals". The process of transgenerational acclimatization begins with collecting samples from the reef, transporting the samples to the lab, and trying to apply techniques that would allow the samples to withstand climate change. They are key in assisting reefs to become more resilient to different water temperatures and eventually pass on their genes to their younger offspring.

In our discussion we focused on important questions researchers have to grapple with for each coral conservation method. Is focusing on proliferating species less effective than attacking the root causes of harm to corals (climate change, human impacts, acidification, overfishing)? Should we instead focus efforts on addressing the core issues affecting a variety of ocean communities? We as a class also struggled with the decision of whether it would be better to aid corals by altering them to survive new ocean conditions or by stopping ocean acidification and other threats at the source. Each option has clear advantages and disadvantages. Through discussion, our class thought it would be best to implement a combination of solutions to tackle the coral problem. Our conversation with Elizabeth Lenz gave us hope for selection techniques that may produce corals more resilient to a changed ocean. During our discussion, we also emphasized the dire need to stop human behaviors that are producing ocean acidification, rising water temperatures, and habitat degradation. Though the ideas around using science to aid corals with their adaptation and recovery could potentially be successful, all of our efforts will have been for nothing if the ocean habitat continues to worsen. Our class ultimately found that it would be most effective to approach the issue with combined efforts: saving corals by using the best science, and changing human habits that will in turn provide the corals with a more survivable environment.

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- Public Service Announcements (PSA)

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- Emergency Reporting Reports (ERR)
- Call to Action (CTA)
- Marine Protected Areas (MPA)
- Marine Life Alert (MLA)
- Seismic and Oil Production Threats
- Natural Science Reports (NSR)
- Oil Spill Alerts (OSA)
- And other miscellaneous documents