The Honolulu Declaration on Ocean Acidification and Reef Management

Although ocean acidification will have effects throughout the world's oceans, most of the research on it so far has been in a tropical context, where its implications for coral reef health pose a major concern. Reduced pH levels of seawater are expected to lead to the breakdown of corals' calcium carbonate skeletons, causing significant and potentially irreversible changes in reef ecosystems.

In August 2008, The Nature Conservancy convened a meeting in Hawai'i of climate experts, marine scientists, and coral reef managers to identify strategies for addressing acidification and safeguarding the value of coral reef systems. It resulted in the Honolulu Declaration on Ocean Acidification and Reef Management, available at www.nature.org/wherewework/northamerica/states/hawaii/files/final_declaration_no_app.pdf.

In addition to calling for a stabilization in global CO2 levels, the declaration seeks the inclusion of climate change actions (addressing acidification, sea level rise, and ocean warming) into MPA management plans. It details several ways reef managers can incorporate such actions, such as identifying and protecting high biodiversity coral reefs that are likely to be less vulnerable to the impacts of acidification.

Planning for resistance

Rod Salm of The Nature Conservancy, who directed the meeting, says there are several reef types that may be more resistant than others to both ocean acidification and the threat of ocean warming. "An example of overlap between lowered vulnerability to both acidification and warming/bleaching would be reefs that are washed by localized upwelling," says Salm. "Such mid-depth vertical mixing of the water column brings up cool water that mixes with the hot surface water, cools it, and reduces the heat stress on corals. The same water, as long as it is drawn up from water shallower than the deep acid layer, would have the potential to dilute the relatively CO2-rich surface waters and reduce the acidity of these waters."

Another example, he says, would be reefs or parts of reefs that are well-flushed by ocean water. "Oceanic water has been shown to have lower CO_2 than inshore waters in general," says Salm. "Flushing with oceanic water would help dilute the CO_2 concentration of inshore waters while at the same time serving to wash away any toxic byproducts of heat-stressed corals, such as superoxides that weaken or kill coral tissues."

Salm says MPAs are essential to addressing acidification. "MPAs will always be an important tool for protecting marine ecosystems from all stressors, including ocean acidification, for two main reasons," he says. "First, we can select and zone these MPAs for their potential to resist or avoid climate change impacts and so maximize their survival prospects. Second, we can focus management attention on the MPAs and concentrate resources on reducing all stresses as much as possible. In this way we can increase the health and resilience of the reef ecosystem, leaving the component communities better able to absorb, adapt to, or recover from stress."

For more information:

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