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There is much we can do to save our reefs

By Cynthia Hunter, Charles Birkeland and Robert Richmond

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Around the world, ocean warming and acidification are commonly blamed for coral declines, but climate change is only part of the story.

Up until now, the impacts of climate change on reefs in Hawaii have been much less destructive than the localized effects of overfishing, land-based sources of pollution and the destruction of habitats from coastal flood control and development.

This actually good news because we can act locally to influence these factors for the better.

Coral reefs are declining in many places. In the Caribbean and the Great Barrier Reef, total coral cover has declined by half over several decades. We do not want to see that happen in Hawaii.

New findings reveal that the places with relatively healthy coral reefs, despite rising temperatures, have a few things in common: more abundant and large parrotfish and other herbivores that eat seaweeds, strong enforcement, low impact coastal development and less pollution.

Parrotfish, surgeonfish and sea urchins are the superheroes of our coral reefs. Without these herbivores, seaweeds can overgrow the reefs, suppressing coral growth and threatening the incredible array of life that depends on reefs for shelter and food. This is happening in Kaneohe Bay and parts of Maui where herbivores are depleted by overfishing.

Good management can save reefs. In West Maui, the Kahekili Herbivore Fishery Management Area has seen a doubling of parrotfish biomass and indications of coral improvement in just five years. Fishing is allowed, but taking herbivores is prohibited to allow recovery of these superheroes. In Hanauma Bay, where no fishing is allowed, coral and seaweeds remain in balance.

Proof of the destructive power of overfishing, pollution and development is evident when we compare the astonishingly rich reefs and abundant large fish of the Northwestern Hawaiian Islands, Palmyra and other remote islands in the Pacific with the heavily fished and polluted reefs of nearby islands that experience the same impacts of climate change.

Hawaii's new leaders at the state Department of Land and Natural Resources and state Department of Health have a tremendous opportunity to facilitate a future where our reefs are more resilient to the inevitable threats of climate change.

As an island state, coral reefs are vital to Hawaii's economy and provide direct benefits estimated at \$360 million per year.

Reefs are essential to protecting our islands from waves and storms, to our food supply, cultural traditions and recreation.

The consequences of losing our reefs are unthinkable.

Hawaii must take strong action to stop overfishing and to widely implement good management that includes our community-based fishery management areas, herbivore fishery management areas, aquarium fishery management areas, gear restrictions, size limits and fishery replenishment areas.

To save our reefs, Hawaii must also act to reduce pollution in coastal waters.

We must treat the runoff that carries trash and pollutants to the ocean with every rain, address untreated sewage from the 88,000 cesspools that pollute coastal waters across the state, and reuse valuable treated wastewater to irrigate and fertilize our landscape and suitable crops.

This call to action is supported by other coral reef scientists and managers who know that healthy reefs are more resilient to climate change and other stresses.

There is hope, even optimism, for Hawaii's reefs, if we step up our protections for herbivores and clean coastal waters.

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From left: Cynthia Hunter, Ph.D., Charles Birkeland, Ph.D., Robert Richmond, Ph.D.