Protecting Caribbean Coral Reefs

Executive Summary

Since the early 1980's, Caribbean coral reefs have suffered drastic losses due to increasing human population, overfishing, coastal pollution, global warming and invasive species. Coral cover in the Caribbean has significantly declined, from 50% in the 1970s to just 10% today[1]. If this degraded state exists for corals, habitats for reef fisheries and protection of erosion in coastal areas will be comprised. The tremendous decline in reef health is due to human impact, and the restoration of coral reefs is likewise dependent on human action. Local management of fishing, pollution and global warming can aid in recovering coral reef populations in the Caribbean.

Why are Caribbean coral reefs important?

Many Caribbean countries depend on reef fisheries, as they are a vital source of protein and a source of employment for fishers. Caribbean coral reefs cover about 26, 000 square km, and are a hot spot for marine biodiversity as it contains the greatest concentration of marine species in the Atlantic ocean[3]. Caribbean reefs, spanning a total of 38 countries, house 9% of the world's coral reefs, and are vital to the region's economy. The population within 100km of the Caribbean coast is more than 116 million people, and more than 25 million tourists annually visit the coastal areas. The region generates more than 3 billion $USD annually from tourism and fisheries combined[2]. The decline in reef health poses risks for future losses, ultimately affecting economic stability and biological diversity of the Caribbean region.

Recommendations

Preliminary actions:

- Educate local communities on the importance of coral reefs
- Communicate the effects of overfishing, pollution, global warming and increases in ocean acidification, and invasive species

Secondary actions:

- Change gear to reduce by-catch of parrotfish
- Regulate coastal development and ensure they meet standards of quality

Tertiary actions:

- Prohibit fishing and selling of parrotfish species
- Monitor Caribbean reefs
- Facilitate communication with local authorities, as well as other reef management strategists

Stoplight Parrotfish
Photo credit: Arkive.org

Issues

Coral cover on many Caribbean reefs is in decline, and many regions are well below 10% cover. If low coral coverage persists for long periods of time, the future of the coral reefs as well as the benefits that are reaped from their existence will be threatened. Previous events, such as the significant coral bleaching event in 2005, have left Caribbean coral reefs in need of substantial recovery. Recovery, however, is often slowed due to continuous human impact by means of overpopulation, overfishing, coastal pollution, global warming, and invasive species. Local efforts to improve the health of reefs are vital to sustain current coral biodiversity. Specifically, management of overfishing can lead to increases in parrotfish populations, and consequently decreases in the amount of macroalgage. Parrotfishes are important to the coral reef ecosystem as they are the main grazers of algae and can reduce the abundance of algae in reefs. Macroalgae can interfere with coral recovery by occupying desirable space and thus hindering the survival of juvenile corals, as well as smothering coral and subsequently stunting growth.

Drivers of decline

The consequences of **overpopulation, overfishing, coastal pollution, increases in global warming, and invasive species** have resulted in only about one-sixth of the original coral cover left [3].

- **Overpopulation:** tourism is at the centre of Caribbean nations, and this temporary increase in conjunction with the existing population contributes to the overall decline in coral cover—values above the median of 1,500 people per square km annually, show less than the average 14% coral cover.

- **Overfishing:** causes reductions in herbivores, especially renowned algae grazers such as parrotfish—reefs where parrotfishes were previously overfished, suffered greater declines in coral cover and increases in macroalgae than reefs in which parrotfish populations were still intact.

- **Coastal Pollution:** water quality is in decline in areas of unregulated agricultural and development—coral diseases have been linked to excessive organic pollutants.

- **Global Warming:** previous increases in sea temperatures have caused severe coral bleaching, and the spread of infectious coral diseases—decreases in pH can further compromise the ability of corals to deposit skeletons.

- **Invasive Species:** Caribbean coral species are prone to impact of introduced species, due to their relative isolation—species introduced through shipping have introduced pathogens such as “white-band disease”

Algae overgrowth on coral
Photo credit: scribd.com

References

[1] Jackson, J. Status and Trends of Caribbean Coral Reefs: 1970-2012, Executive Summary. 2012.

[2] Burke, L., and Maidens, J. Reefs at Risk in the Caribbean. World Resources Institute Co., Washington D.C. 2004.

[3] Miloslavich, P., Díaz, J.M., Klein, E., Alvarado, J.J., Díaz, C., Gobin, J., Escobar-Briones, E., Cruz-Motta, J.J., Weil, E., Cortés, J., Bastidas, A.C., Robertson, R., Zapata, F., Martín, A., Castillo, J., Kazandjian, A., and Ortiz, M. Marine Biodiversity in the Caribbean: Regional Estimates and Distribution Patterns. 2010. *Public Library of Science*

Manreet Sangha
Biology 420
Policy Brief