

TRUE COLORS: CORAL BLEACHING EVENTS

BACKGROUND

Fascinatingly functional and captivatingly colorful, coral reefs are a critical component of many marine ecosystems. Most abundantly found within the waters between the Tropic of Cancer and the Tropic of Capricorn, these living, breathing organisms offer shelter and protection to thousands of species. Studying coral reefs is one mechanism by which we can attempt to measure the adverse effects of anthropogenic climate change, which have ultimately been detrimental to reef habitats across the globe.

Oceans act as a carbon sink, absorbing enormous amounts of the billions of tons of CO₂ that are emitted into the atmosphere yearly. As a result, ocean temperatures and pH levels are fluctuating, altering the natural living conditions and functionality of coral reefs. Bleaching occurs when coral release, zooxanthellae, a type of algae with which they have a mutualistic relationship. An analysis of bleaching events along the Great Barrier Reef can help us answer questions about the location, severity, and patterns of coral bleaching, providing context for the prioritization of protection.

SPECIES & CONSERVATION



The Great Barrier Reef is sometimes referred to as the 'rainforest' of the ocean because of its role as a biodiversity hotspot. Thousands of species live on or near the reefs, relying on the structure for habitat, food, and protection.

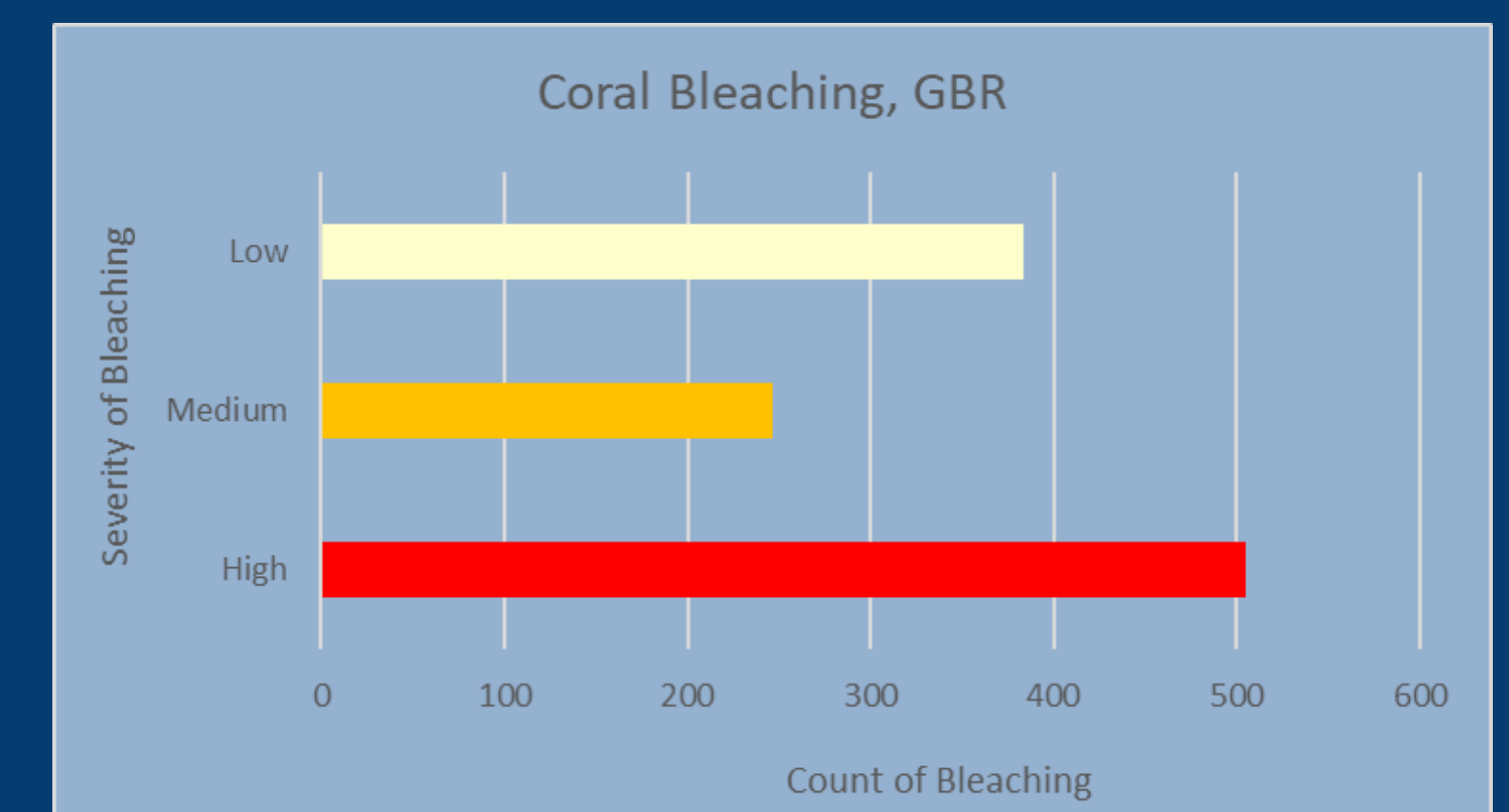
Threats to the livelihood of the 1,400 coral reef species are ultimately a threat to other organisms, such as the dugong, 1,625 fish species, 300 types of mollusks, and 30 different kinds of whales and dolphins that live in the same ecosystem.



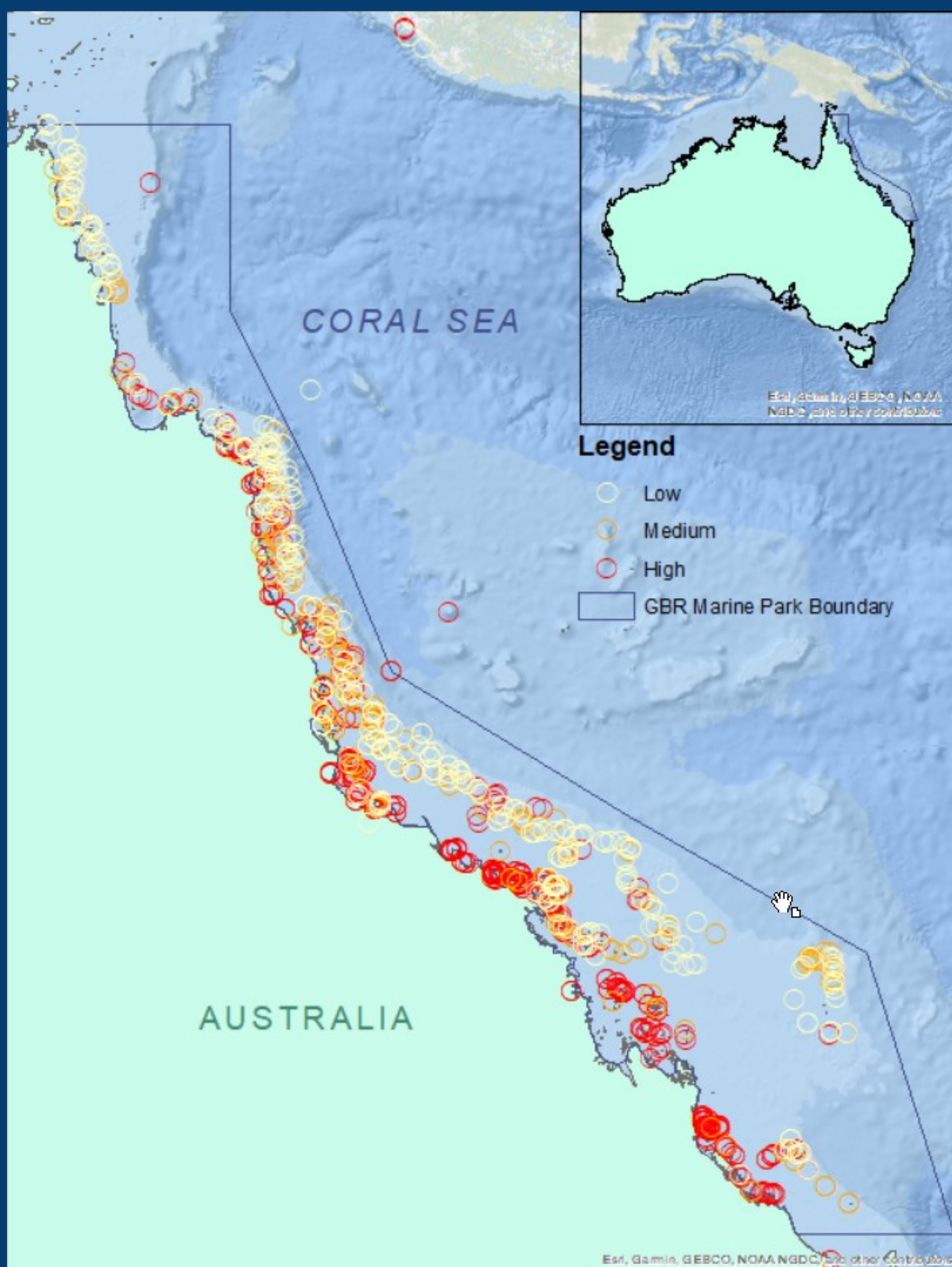
Conservation efforts from the Australian Government's Department of the Environment and Energy include water quality control programs, runoff reduction, and species protection plans.

DATA & METHODS

Data used for the map visualization was sourced from a dataset collected and organized by ReefBase, accounting for coral bleaching events around the world. The records specifically used in this analysis are instances of bleaching events in the Great Barrier Reef Marine Park from 1980 - 2010. After using the latitude and longitude to plot specific coordinates of the bleached coral, the data was symbolized into low, medium, and high severity, levels that were predetermined in the dataset. A comparison of the severities of bleaching shows that 505 of the 1,135 counts of bleaching were high severity, a threat to the reefs ability to recover properly.



GREAT BARRIER REEF, AUSTRALIA



RESULTS & CONCLUSION

By visualizing cases of bleaching on the Great Barrier Reef, it becomes possible to identify trends and create plans for coral protection. Based on the information presented in the map, there is a general trend of high severity bleaching events closer inland and less severe events farther from the shore. In addition, many of the high severity cases are located very closely to each other, if not laying directly on top of each other. The clustering of intense bleaching is alarming, as it can be an indicator of potential mass mortality or areas of frequent bleaching that are unable to fully recover. This visualization may indicate general areas that should be prioritized for conservation, but a deeper analysis of ocean temperatures, pH levels, ocean depths, and current protection plans will offer a more complete narrative and a clearer vision of the future of the GBR.

SOURCES

Coral Bleaching Dataset: collected, organized, and distributed by ReefBase

'Half the Great Barrier Reef is Dead': visual inspiration by Lauren E. James

'Animals': Great Barrier Reef Marine Park Authority

'Managing and Protecting the Great Barrier Reef': Australian Government Department of Environment and Energy