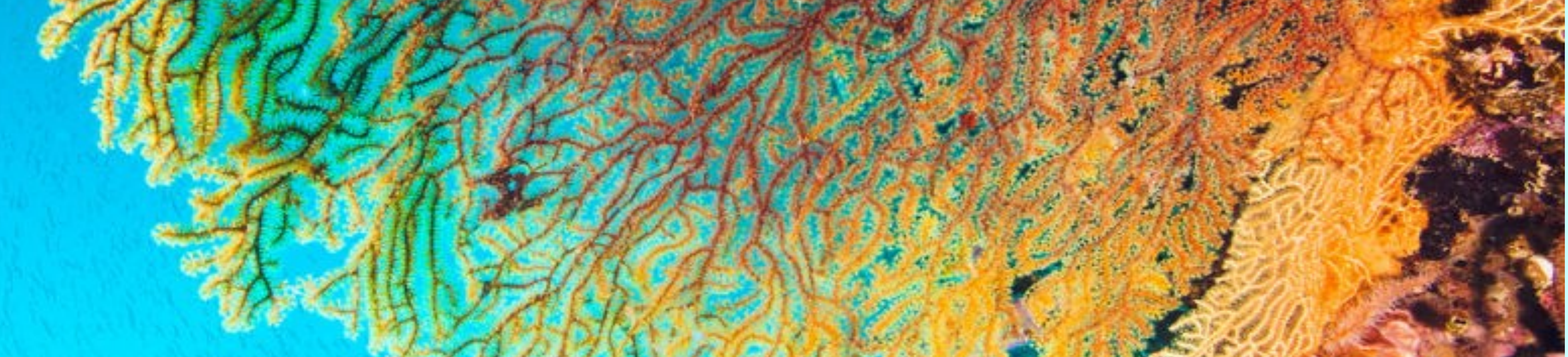




TOO HOT TO HANDLE ?



CORAL BLEACHING AT THE GREAT BARRIER REEF, AUSTRALIA



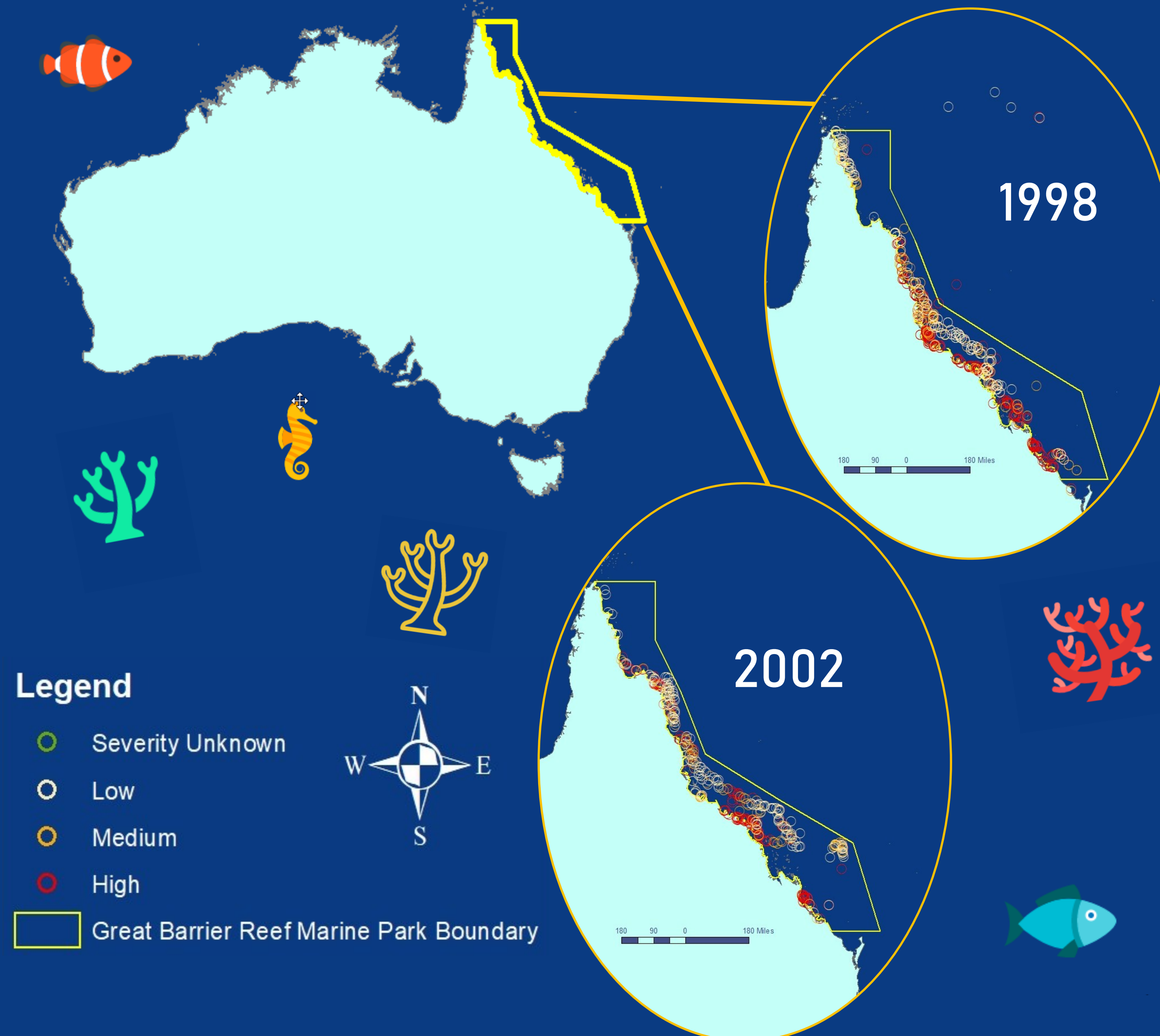
INTRODUCTION

As one of the world's most important biodiversity hotspots, the Great Barrier Reef is a living coral structure that provides shelter, food, and mating opportunity to thousands of marine species. The livelihood of the GBR, however, is at a growing risk of disease and mortality due to a phenomenon called coral bleaching. Studies show that rising ocean temperatures are one cause of stress to coral, resulting in the release of zooxanthellae, a type of algae which gives coral its color and nutrients to survive. Major bleaching events are increasing in frequency, which raises questions about the relationship between ocean temperatures and bleaching as well as corals' ability to recover from these events. By analyzing the location and severity of bleaching events, we can begin to analyze potential protection plans for specific species as well as the coral structure itself.

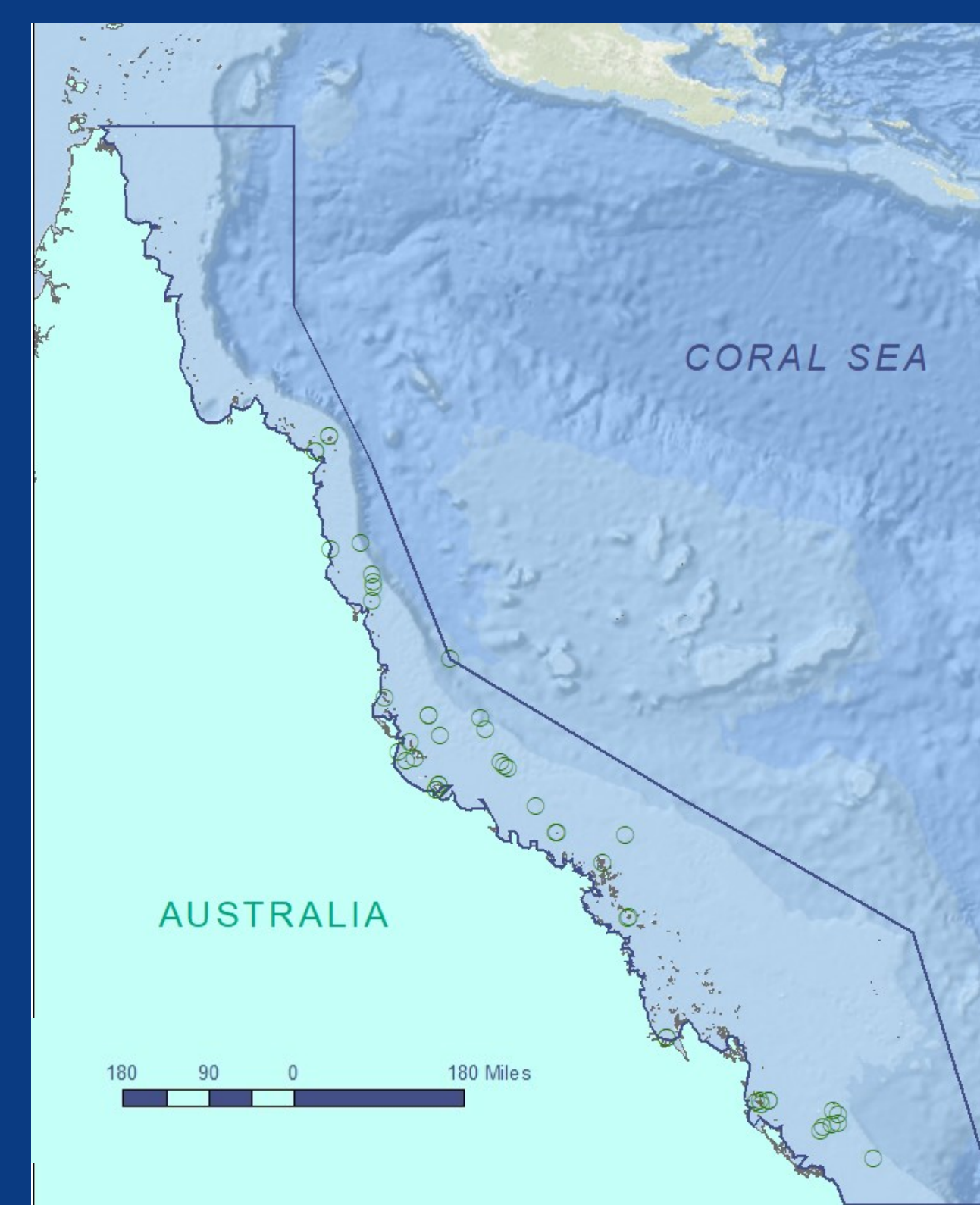
METHODS

The maps and charts presented were created using data collected and organized by ReefBase and the Australian Institute of Marine Science, respectively. The coral bleaching dataset included instances of coral bleaching around the globe, but for the purpose of this analysis, were cleaned to include events along the Great Barrier Reef from 1980 - 2010. Each map shows the coordinate locations of the bleaching events, categorized by severity (Unknown, Low, Medium, and High) based on predetermined values in the dataset.

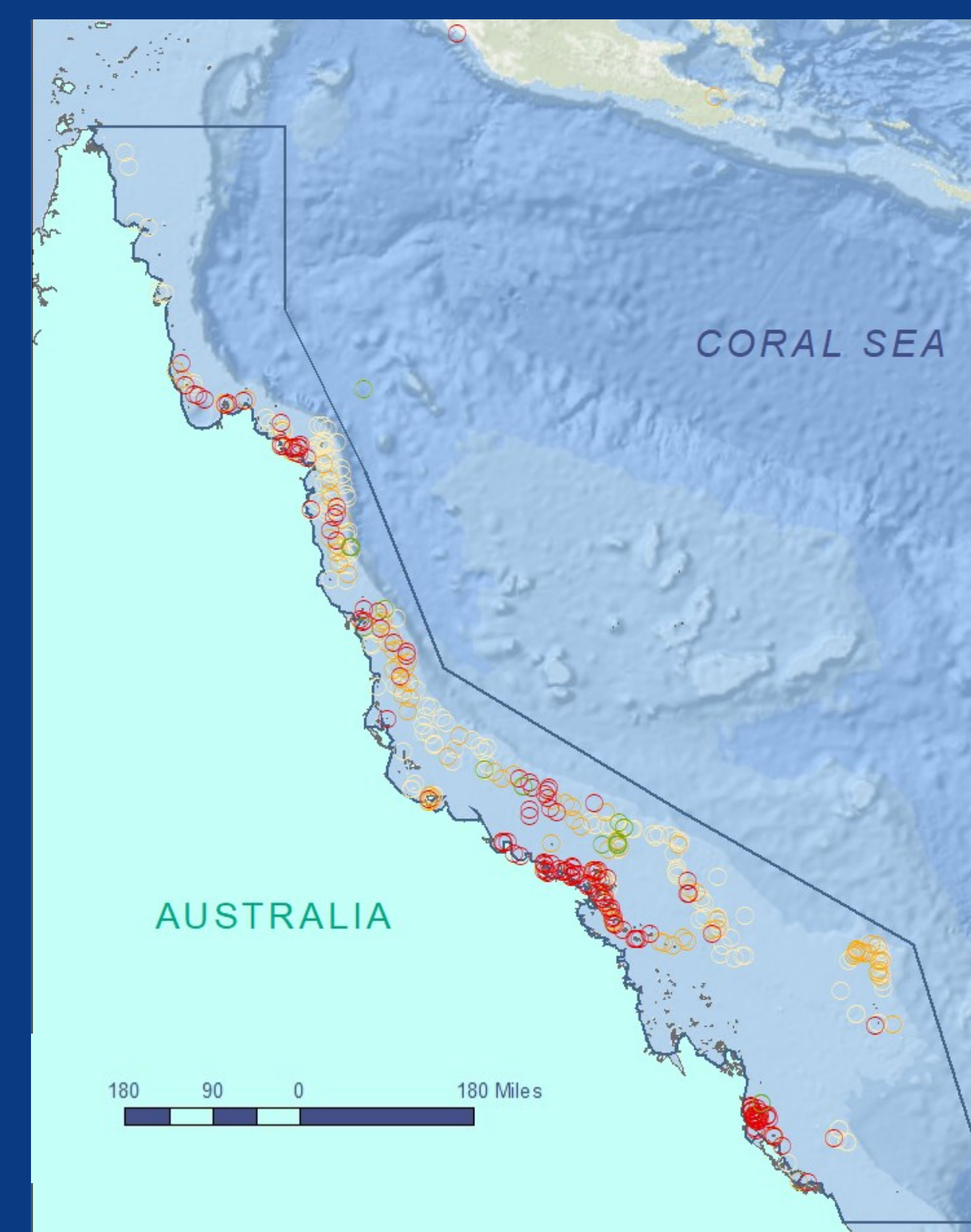
Information on ocean temperatures throughout the given period were not as accessible, so the analysis focuses on data sources from a weather station located at Davies Reef, off of the coast of Townsville, Australia. The three charts show long term ocean temperatures, 1998 ocean temperatures, and 2002 ocean temperatures; major bleaching events occurred in these two years.



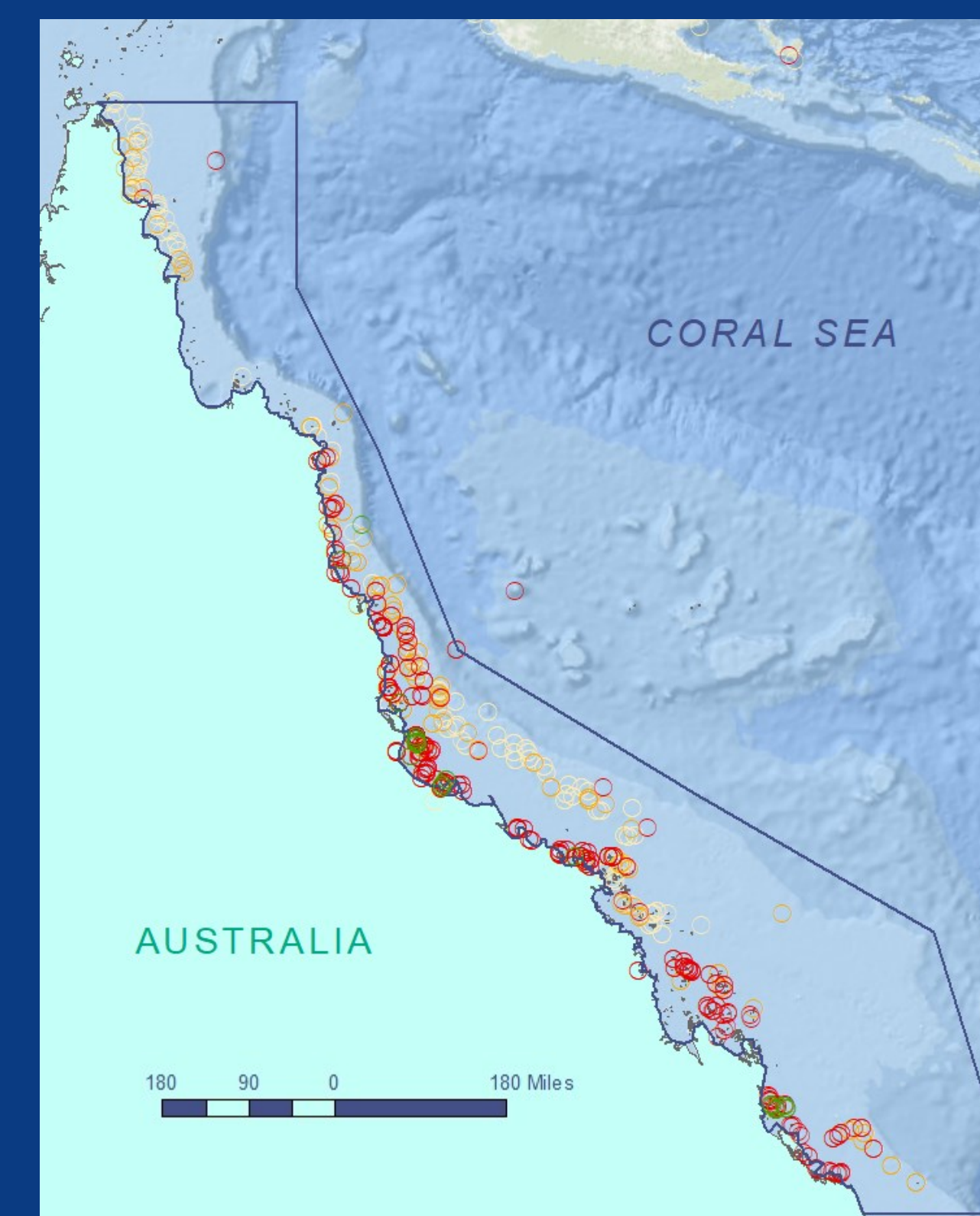
1980-1989



1990-1999



2000-2010



RESULTS

In the maps separated by decade, there is a general trend toward an increase in bleaching events and severity. In addition, one can see a significant amount of data points in the inset maps, which show two examples of major bleaching events. The 1998 map depicts 1,244 cases of coral bleaching, 28.53% of which were high severity, and the 2002 map shows 644 cases of coral bleaching, 21.58% which were of high severity. It is important to consider the percentages of high severity bleaching, as the sole number of collected data may be influenced by factors limiting the ability to collect information, such as funding, weather, and resources. The charts modeling ocean temperatures show that the water was warmer for longer in 1998 than 2002, which may account for the higher percentage of severe bleaching.

CONCLUSION

As one of the natural wonders of the world and a UNESCO World Heritage Site, the Great Barrier Reef is known for its vast size and vibrant color. The beautiful reefs that make up this massive structure, however, are increasingly losing their pigment and ability to provide a habitat. As ocean temperatures rise due to anthropogenic climate change, coral becomes more susceptible to stress, disease, and death. The preliminary analysis conducted on this poster can be further developed with the addition of more recent bleaching data, affected coral species, and rates of recovery. Though some of these attributes were included in the dataset, the volume of missing data was too high to create a clear narrative. An additional roadblock in this project was comparing data throughout decades in which technology and the ability to collect coral data has changed significantly. Increases in bleaching events may have been due to warmer temperatures as well as the fact that data in general was easier to obtain. While the visualizations show increases in coral bleaching and ocean temperatures, any plans to prevent future occurrences will require a far more complex analysis with a greater volume of data.



SOURCES: REEFBASE Coral bleaching , AIMS Ocean Temperature Data

COORDINATE SYSTEM : GSC_GDA_1994

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