

## Background

The Great Barrier Reef is one of the most biodiverse ecosystems in the world, spanning more than 350,000 square kilometers with more than 2,900 individual reefs and contributing heavily to the fishing and tourism industries. However, rising sea temperatures, ocean acidification, and declining water quality due to climate change have impacted the health of the ecosystem and reduced the ability of the Reef to recover from environmental catastrophes.

## Reduced Coral Cover

Increasing ocean temperatures have led to two mass coral bleaching events in 2016 and 2017, sparking unprecedented coral devastation in the Reef's history. These events in combination with coral disease, a category 4 cyclone, and outbreaks of the invasive crown-of-thorns starfish have resulted in decreased coral density and biodiversity.

## Coral Bleaching



Image credit: (Perrine, 2014)



Image credit: (Oregon State University, 2012)



Image credit: (Willis, 2019)

The healthy coral has a symbiotic relationship with the algae that lives on it, giving the coral its color and food source.

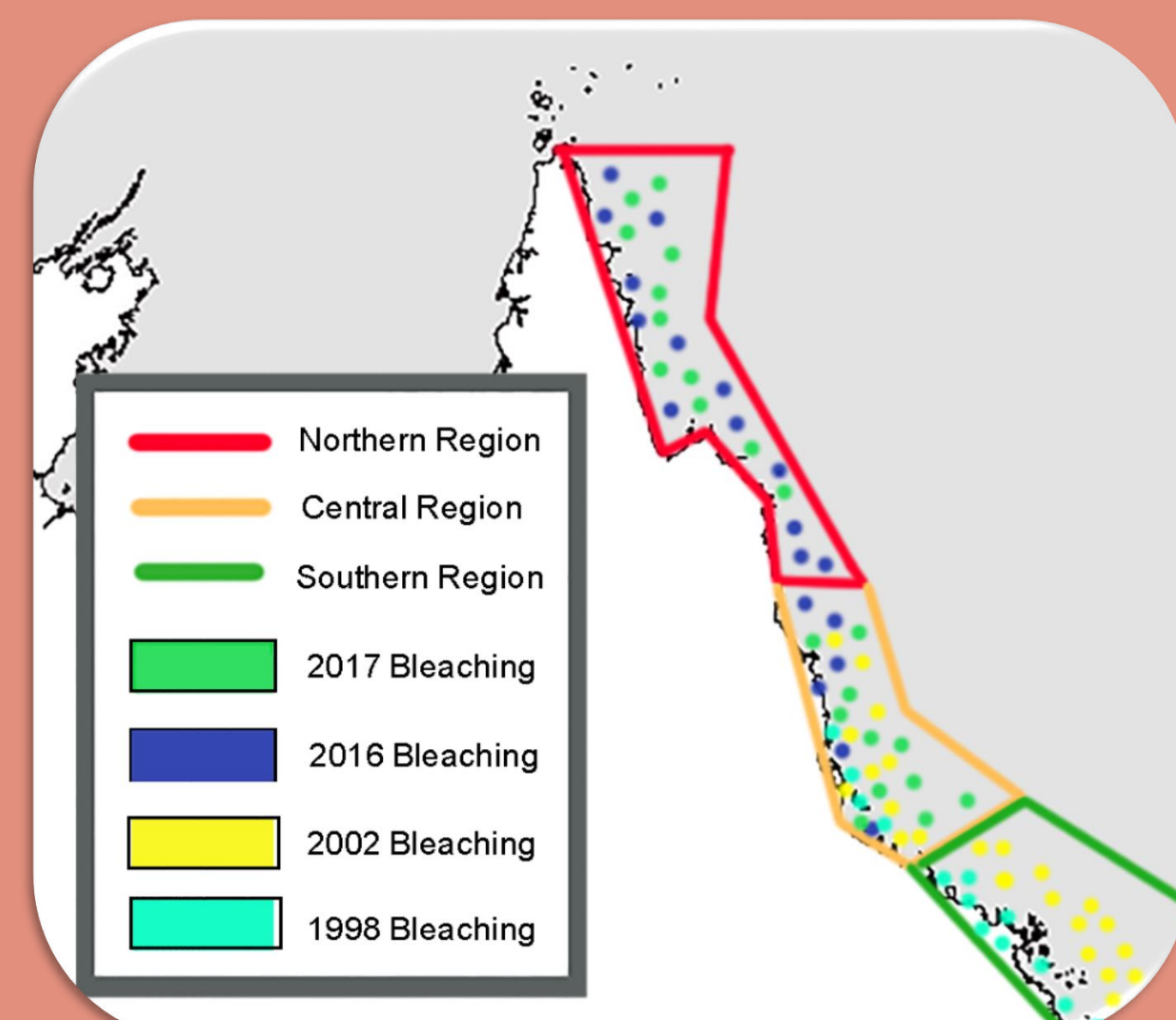


When coral becomes stressed due to climate change or pollution, the algae begins to leave the coral.



In the absence of algae and therefore its main food source, the coral loses its color and is at risk for disease and death.

Coral bleaching events in Australia's Great Barrier Reef



## Project Goals

Our objective was to research the effects of climate change on the Great Barrier Reef, explore possible solutions to preserve coral reefs, and raise awareness on the WPI campus about the significance of coral reefs as a marine ecosystem.

## Current Solutions

### Coral Gardening

Remove pieces of coral from healthy reefs, grow them in nurseries, and transplant them into degraded reefs

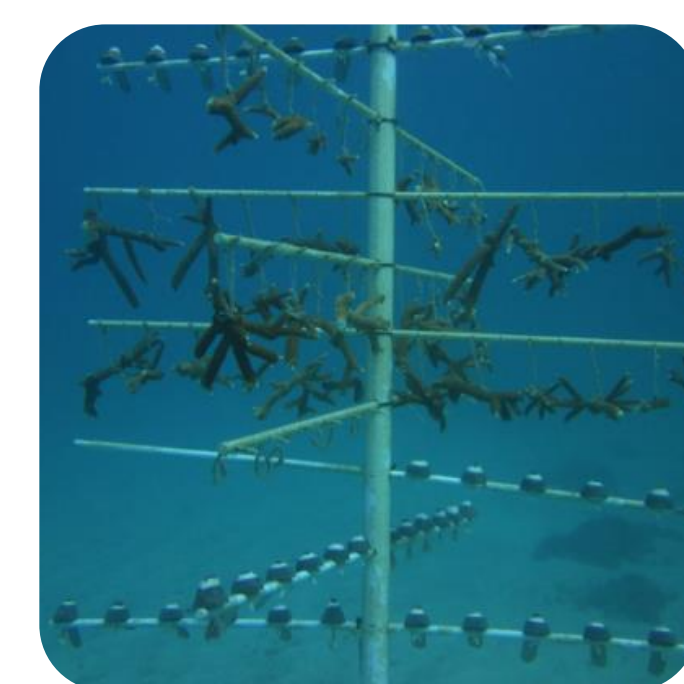


Image credit: (Lirman & Schopmeyer, 2016)

### Coral Propagation

Raise coral gametes in labs and release them during spawning periods



Image credit: (UHHMOP, 2018)

### Zoe Underwater Art Installation

Creates a zone of higher pH that stimulates mineral formation and incorporates corals into its structure



Image credit: (Beans, 2018)

A more concrete solution addressing climate change is needed to reduce coral bleaching and ocean acidification.

## Approach

- Performing research about climate change, coral bleaching, and loss of biodiversity in the Great Barrier Reef in addition to current solutions
- Contacting professionals who work with reef restoration
- Researching the role of art in environmental activism

## Painting Process



## Final Product

We created a painting that illustrates the effects of coral bleaching on the Great Barrier Reef by showing the loss of color and biodiversity as time progresses.



## Next Steps

- The painting is being displayed in the Global Lab and Mixed Reality Room in Foisie Innovation Studio on the WPI campus
- We will be presenting our project at the Climate Summit in April of 2020

## Acknowledgments

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## References

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