# Temporal changes in fish diversity in correlation to corals affected by stony coral tissue loss disease within the Florida Reef Tract

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## Background

- Coral reefs are one of the world's most ecologically diverse ecosystems supporting more species per unit area than any other marine environment (NOAA, 2013).
- The Florida Reef Tract is the largest coral reef ecosystem in the continental US, with extensive reefs spanning roughly 360 miles from the Dry Tortugas to the St. Lucie Inlet in Martin County (FLADEP, 2021).
- Since 2014, stony coral tissue loss disease (SCTLD) has rapidly spread throughout the Florida Reef Tract and the Caribbean, killing many reef-building coral species (FLADEP, 2021).
- Although many studies have investigated the impacts of SCTLD on corals, it is unclear what impact this disease may have on reef structural complexity, the foundation of diverse fish communities.

## Hypothesis

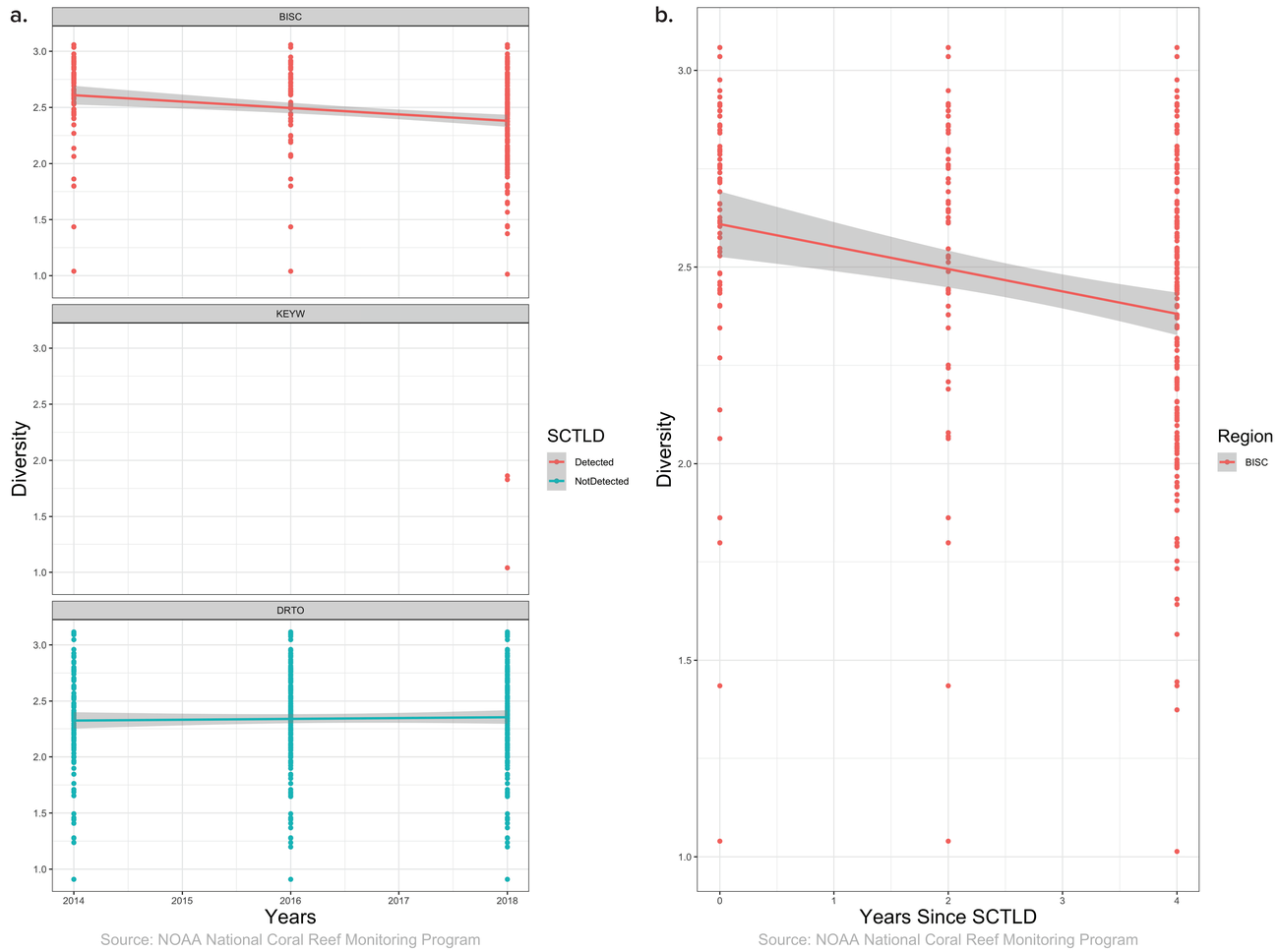
- We hypothesize that reef fish diversity has declined over time after first detection of SCTLD, likely as a result of decreased live coral cover.

## Methods

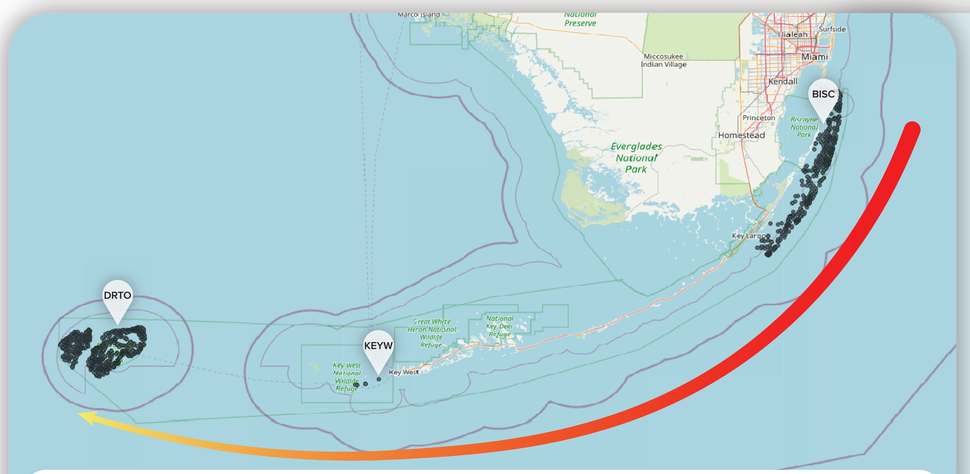
- Coral reef fish census data was obtained from the NOAA National Coral Reef Monitoring Program throughout South Florida for 2014-2018.
- Reef fish diversity was calculated using the Shannon diversity metric for three distinct regions along the Florida Reef Tract (Key Biscayne, Key West, and Dry Tortugas).
- Temporal trends in reef fish diversity were assessed with respect to the presence of SCTLD using linear regression.

## Results

**Fig. 1**
**Temporal trends of diversity are shown over time for each of the three study regions (BISC, KEYW, DRTO). (a) A relationship between fish diversity and the sampling year per region is shown, where colors of the points and regression lines indicate whether SCTLD has been detected for the respective site or not. A significant negative relationship was observed at Key Biscayne (BISC; slope = -0.057, p < 0.0001), but not at Dry Tortugas (DRTO; slope = 0.075, p = 0.587). We did not evaluate Key West (KEYW) due to lack of available data after first detection of SCTLD. (b) The relationship between years since first detection of SCTLD and diversity was also evaluated, where BISC was the only region that had more than one year of available data. Since 2014 was also the first year of detection, this relationship is the same as in (a).**




Source: NOAA National Coral Reef Monitoring Program




Region of study for Key Biscayne (BISC), Key West (KEYW), and Dry Tortugas National Park (DRTO). Sample size = 1,319,693 observations

## Conclusions

- The results of this study indicate that reef fish diversity decreased over time in the Key Biscayne (BISC) region.
- There was no significant change in reef fish diversity at Dry Tortugas National Park (DRTO).
- Decline in reef fish diversity is associated with detection of SCTLD.

References:
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3. US Department of Commerce, N.O.A.A. (2013, June 1). The importance of coral reefs - corals: NOAA's National Ocean Service Education. Corals. Retrieved March 12, 2022, from https://oceanservice.noaa.gov/education/tutorial_corals/coral07_importance.html

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