



# RESTORING RESILIENCE OF FLORIDA'S CORAL REEF

EESI - Coastal Resilience in the Southeast

March 13, 2020



# FLORIDA'S CORAL REEF



Images: DEP, D. Gilliam, NOAA

# ECOLOGICALLY DIVERSE



Images: J. Marino, D. Gilliam 2011 & 2017 Reef Calendar winners

# COASTAL RESILIENCE

*First Line of Defense – Coastal Protection*



Illustration by Dawn Witherington

# ECONOMICALLY ESSENTIAL

*Shoreline Protection*

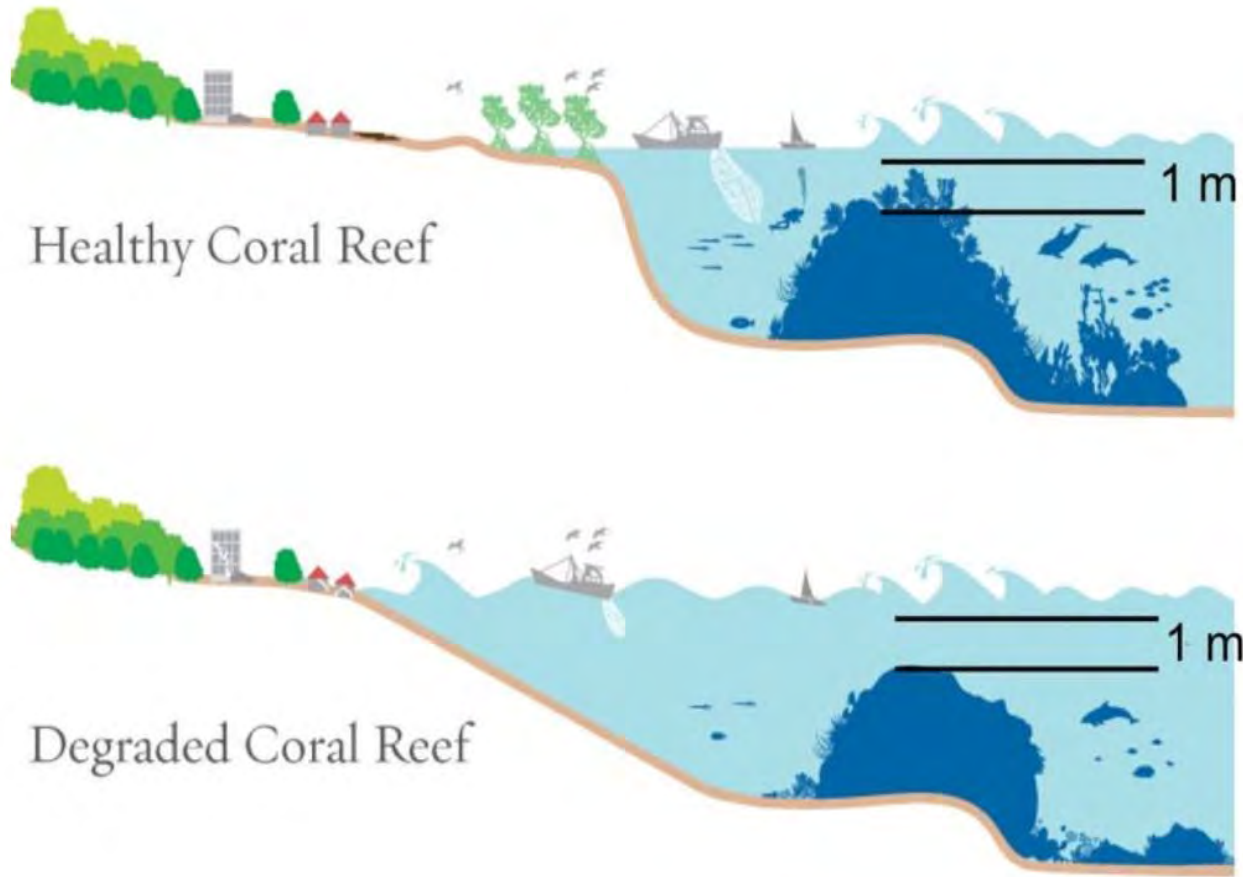
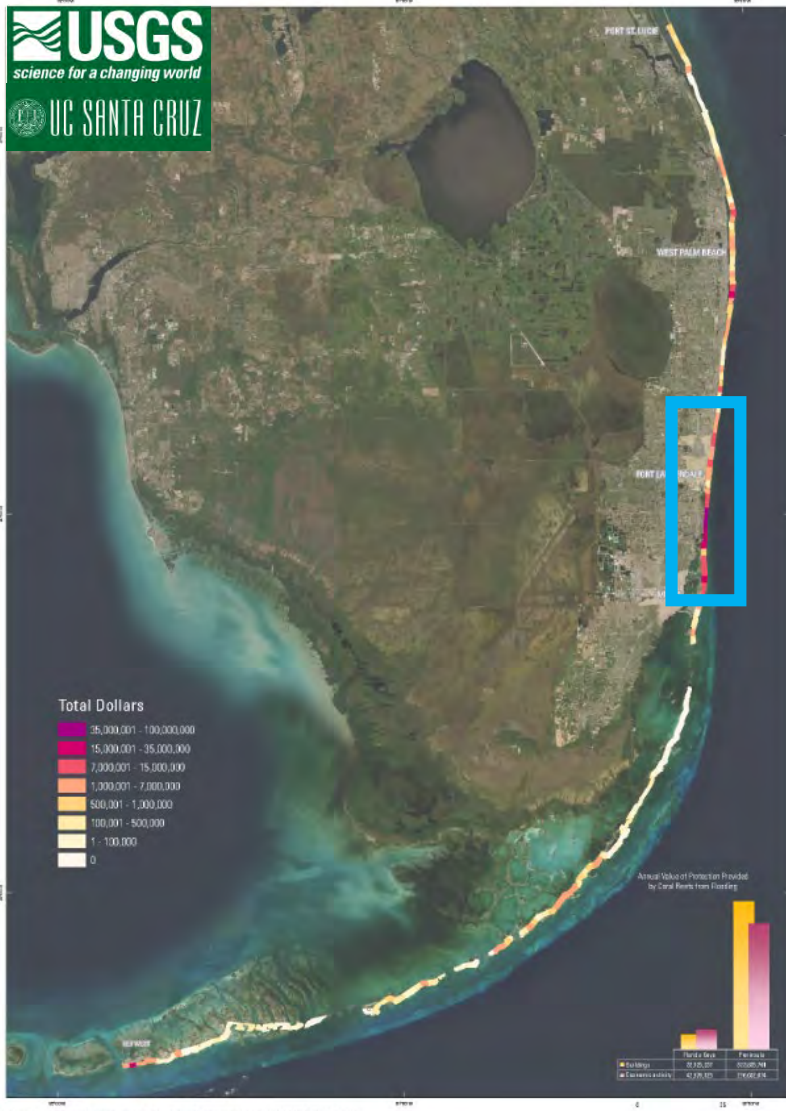


Image: TNC

# ECONOMICALLY ESSENTIAL

*Rigorously Valuing the Role of Florida's Coral Reefs in Coastal Hazard Risk Reduction*



**Florida's Reefs annually provide \$355 million in flood protection benefits to buildings and protect nearly \$320 million in economic activity.**

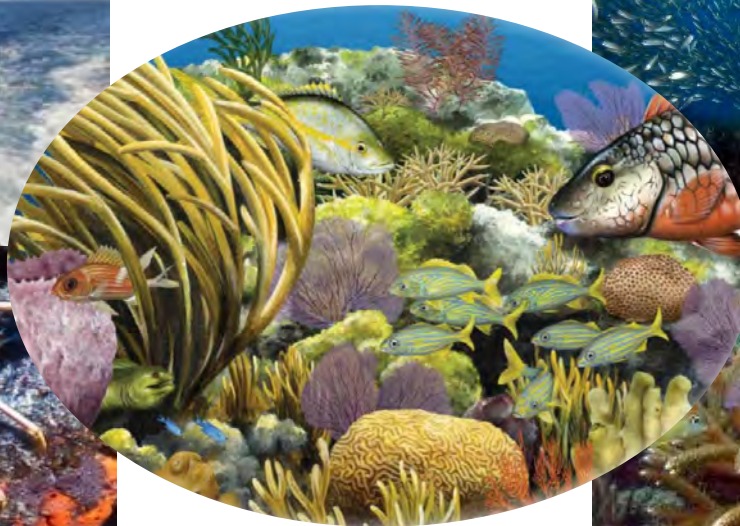
**Over \$1 billion in protection during extreme storm events**

# ECONOMICALLY ESSENTIAL

*Commercial and Recreational Fishing*



## *Fisheries Habitat*



# ECONOMICALLY ESSENTIAL

*Biomedical Exploration*



## MARINE BIOMEDICAL & BIOTECHNOLOGY RESEARCH





# ECONOMICALLY ESSENTIAL

## Tourism



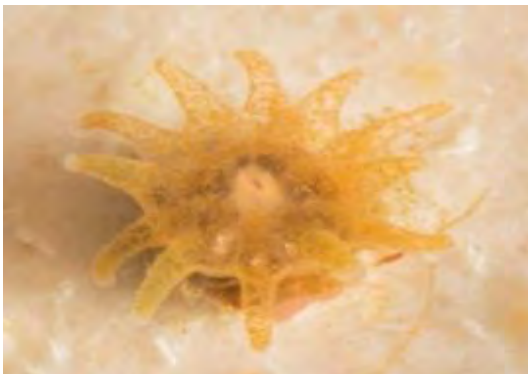
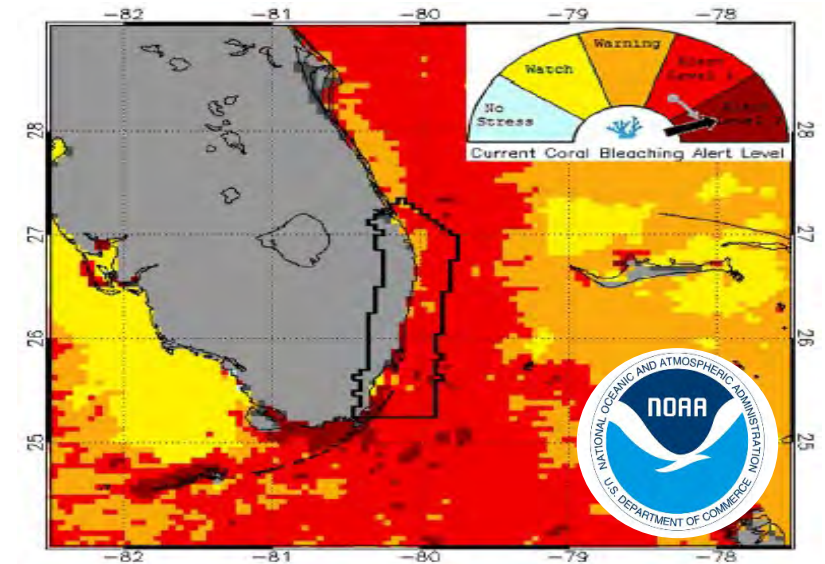
Estimated to annually support **71,000 jobs** and generate **\$6.3 billion in sales and income** in Monroe, Miami-Dade, Broward, Palm Beach, & Martin counties

(Johns et al, 2001 & 2004)



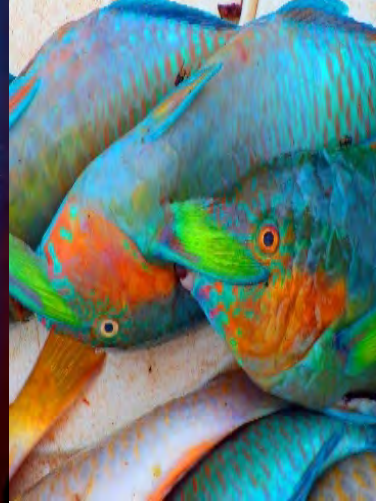
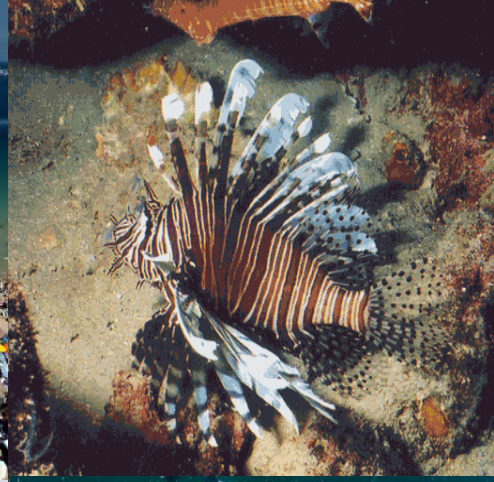
# GLOBAL STRESSORS

Increased frequency & severity of: extreme thermal events (**hot & cold**) and virulent pathogens

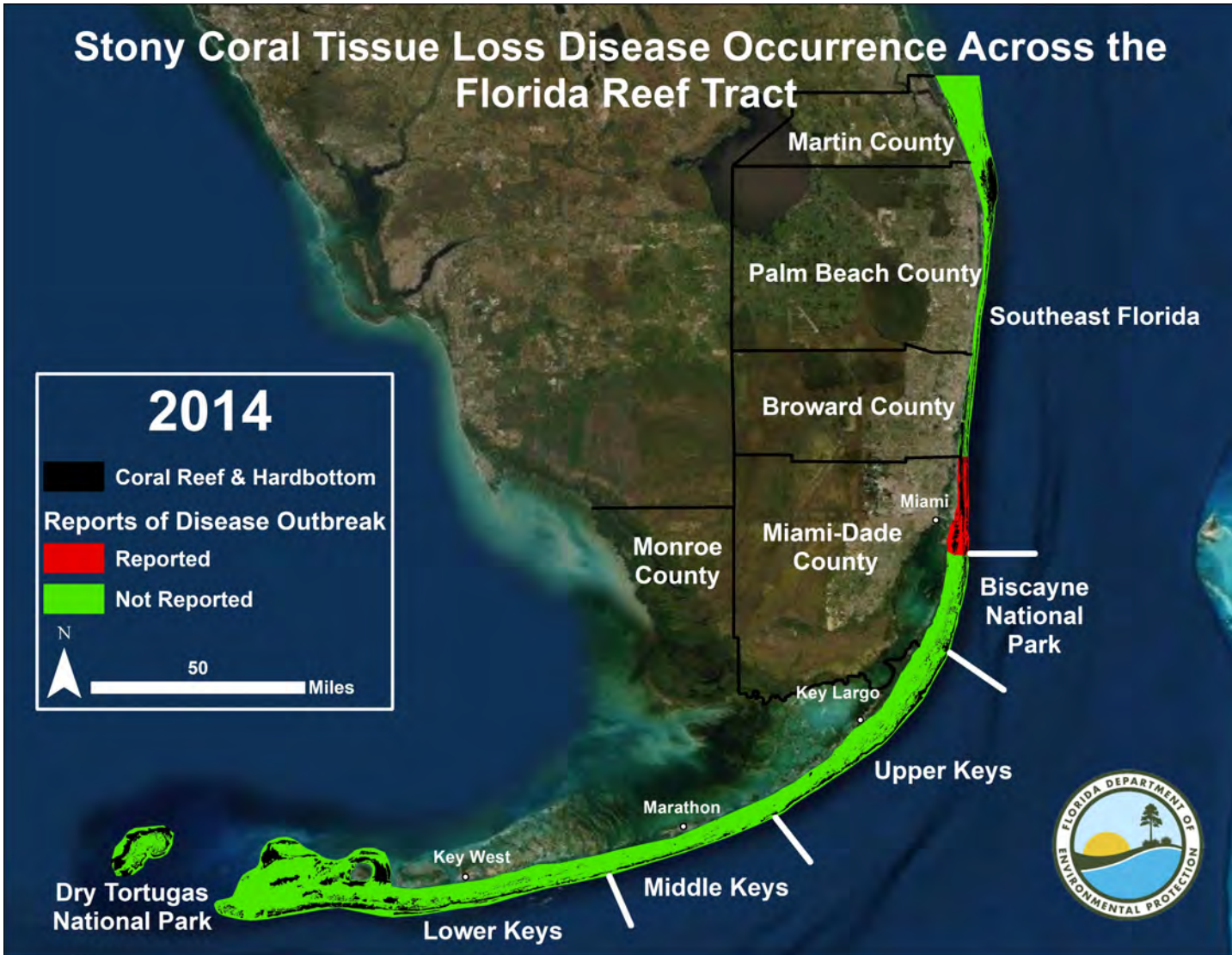


Ocean (& coastal)  
acidification

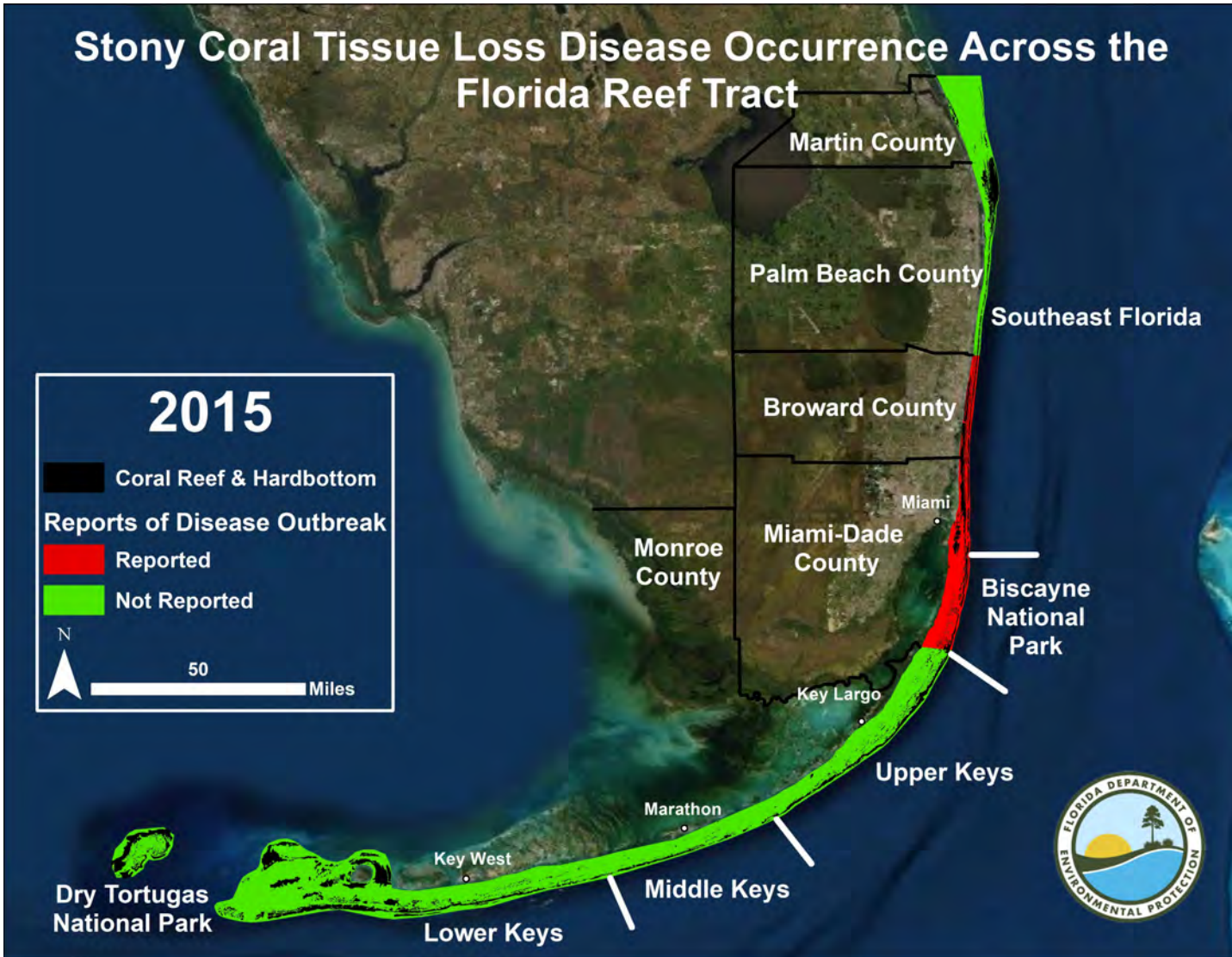
# LOCAL STRESSORS



# FLORIDA'S CORAL DISEASE OUTBREAK



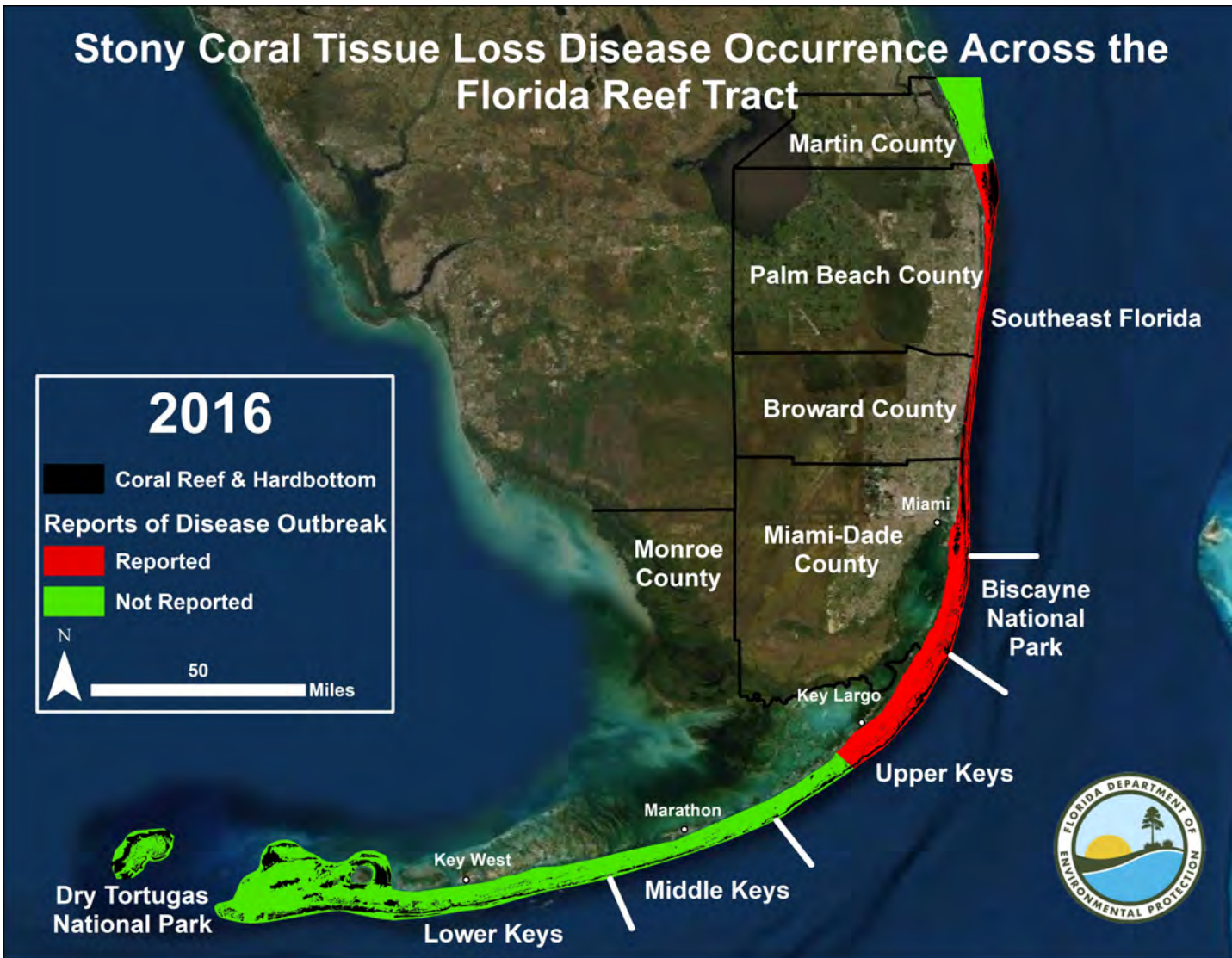
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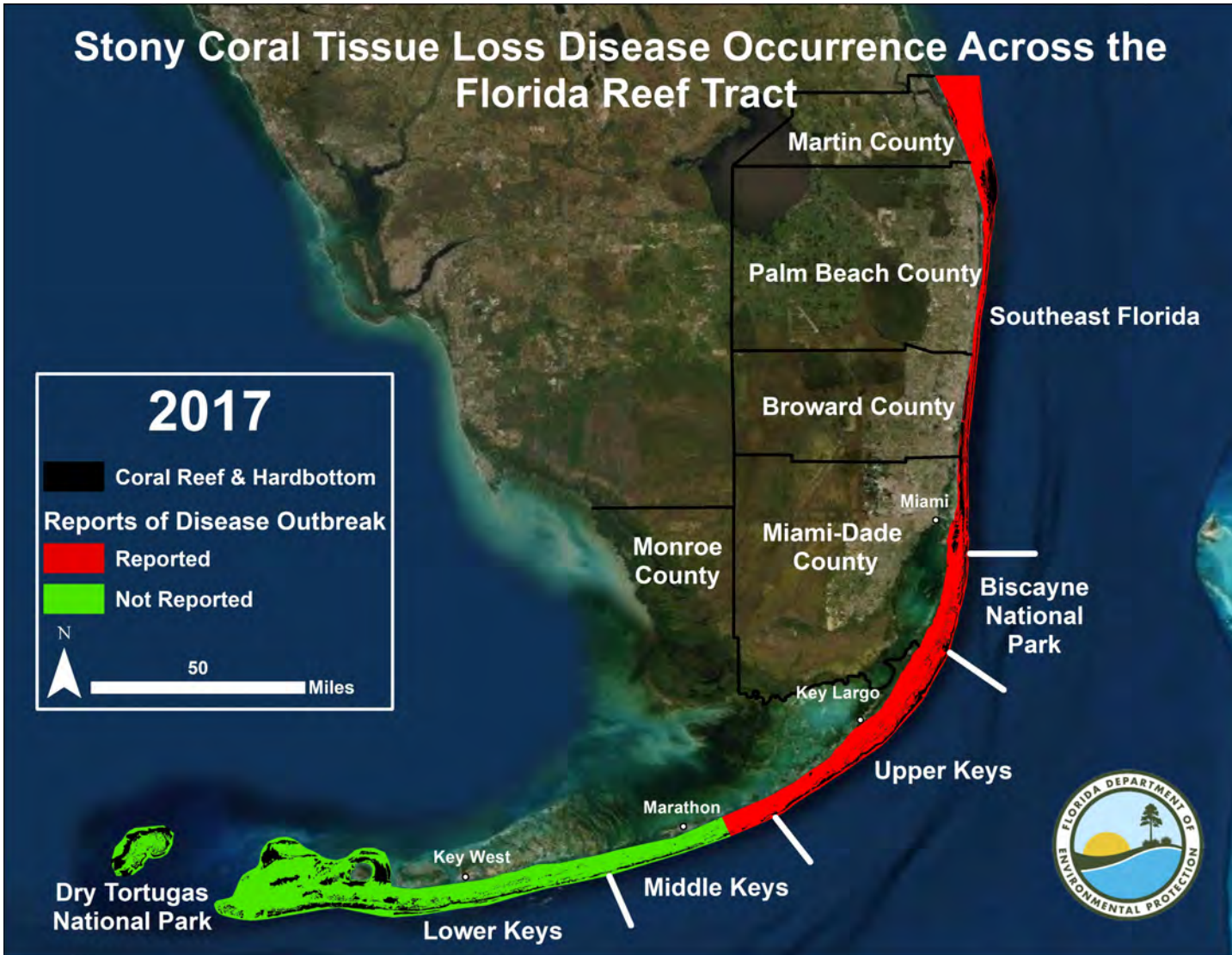
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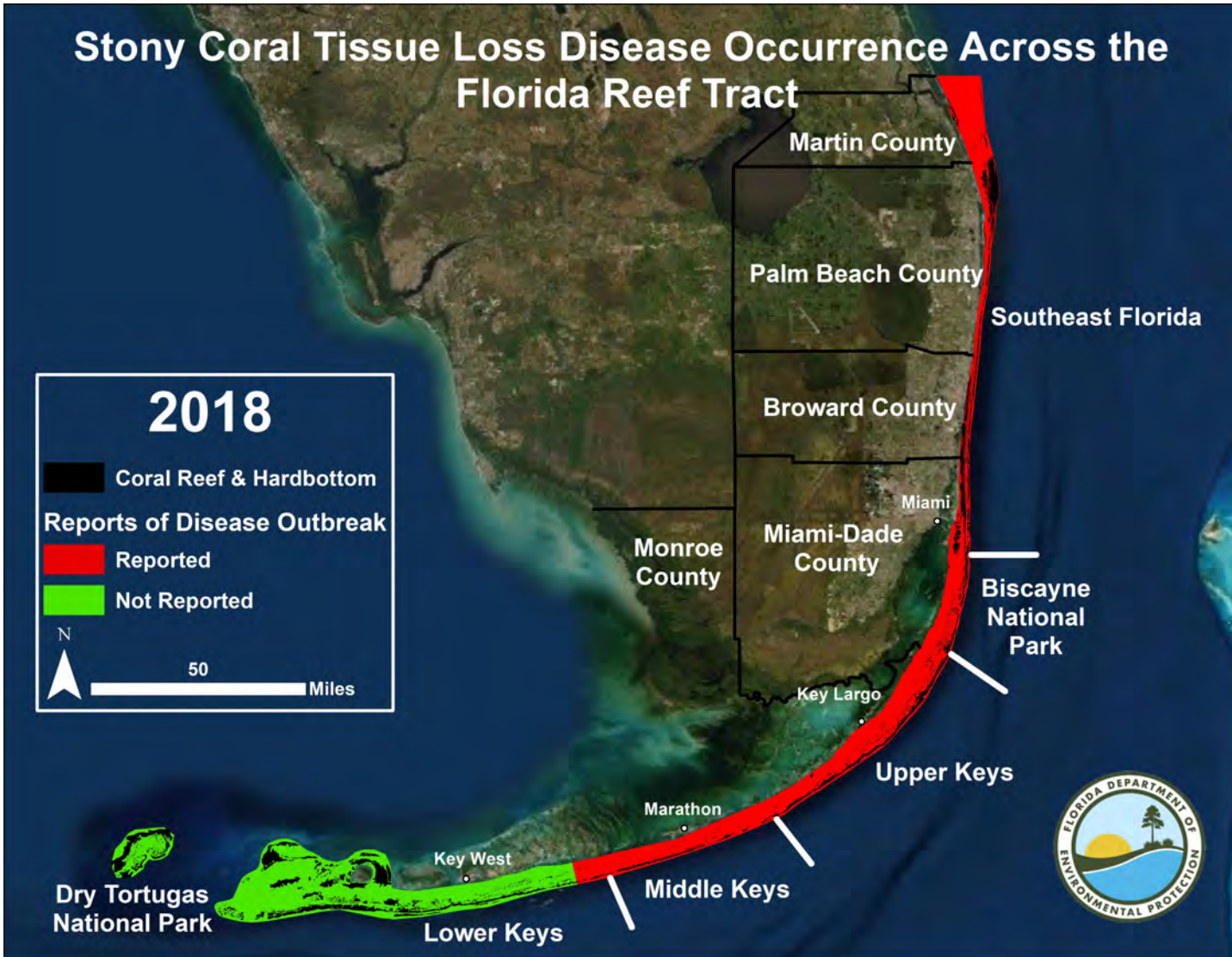
## Stony Coral Tissue Loss Disease Occurrence Across the Florida Reef Tract



# FLORIDA'S CORAL DISEASE OUTBREAK

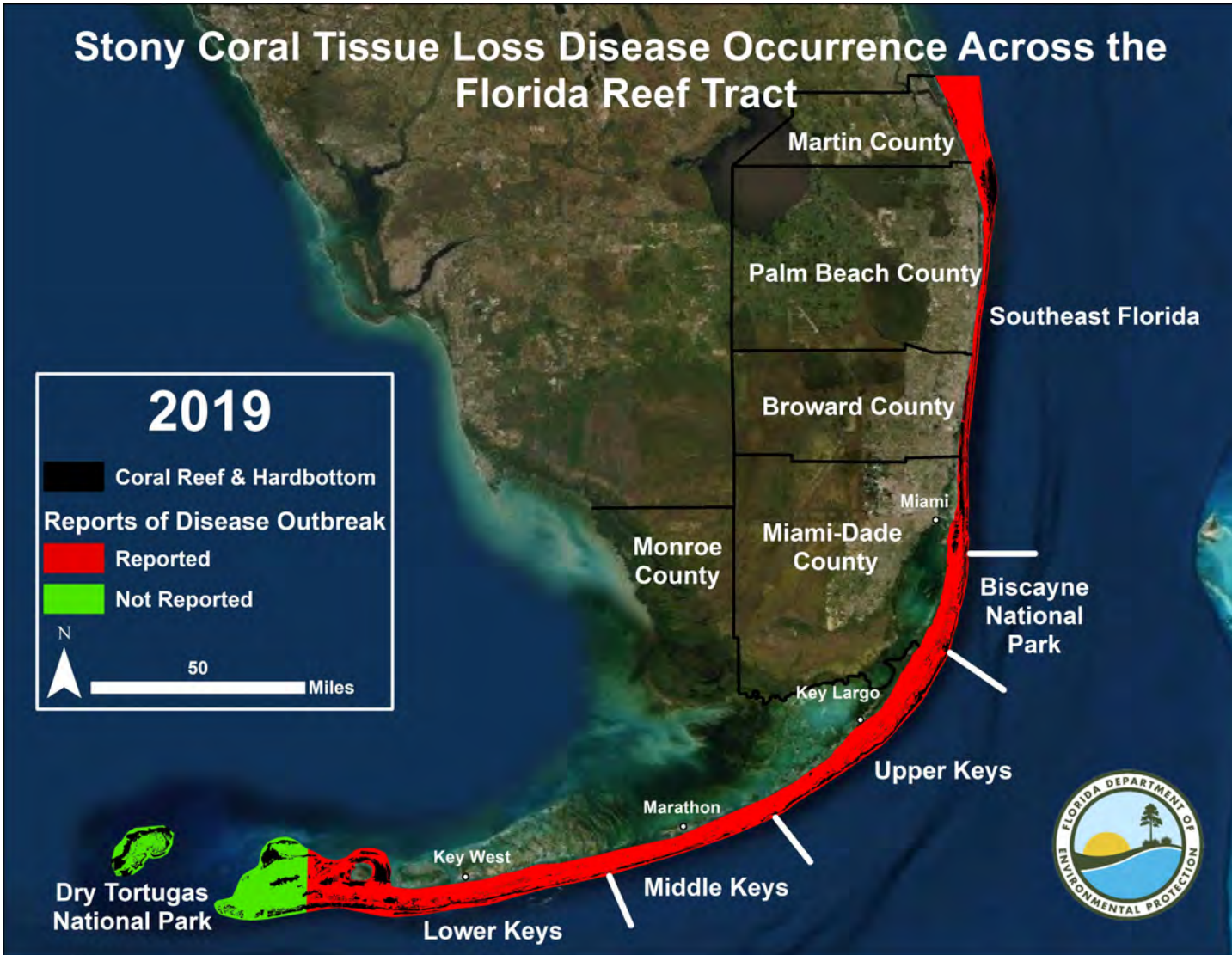


# FLORIDA'S CORAL DISEASE OUTBREAK





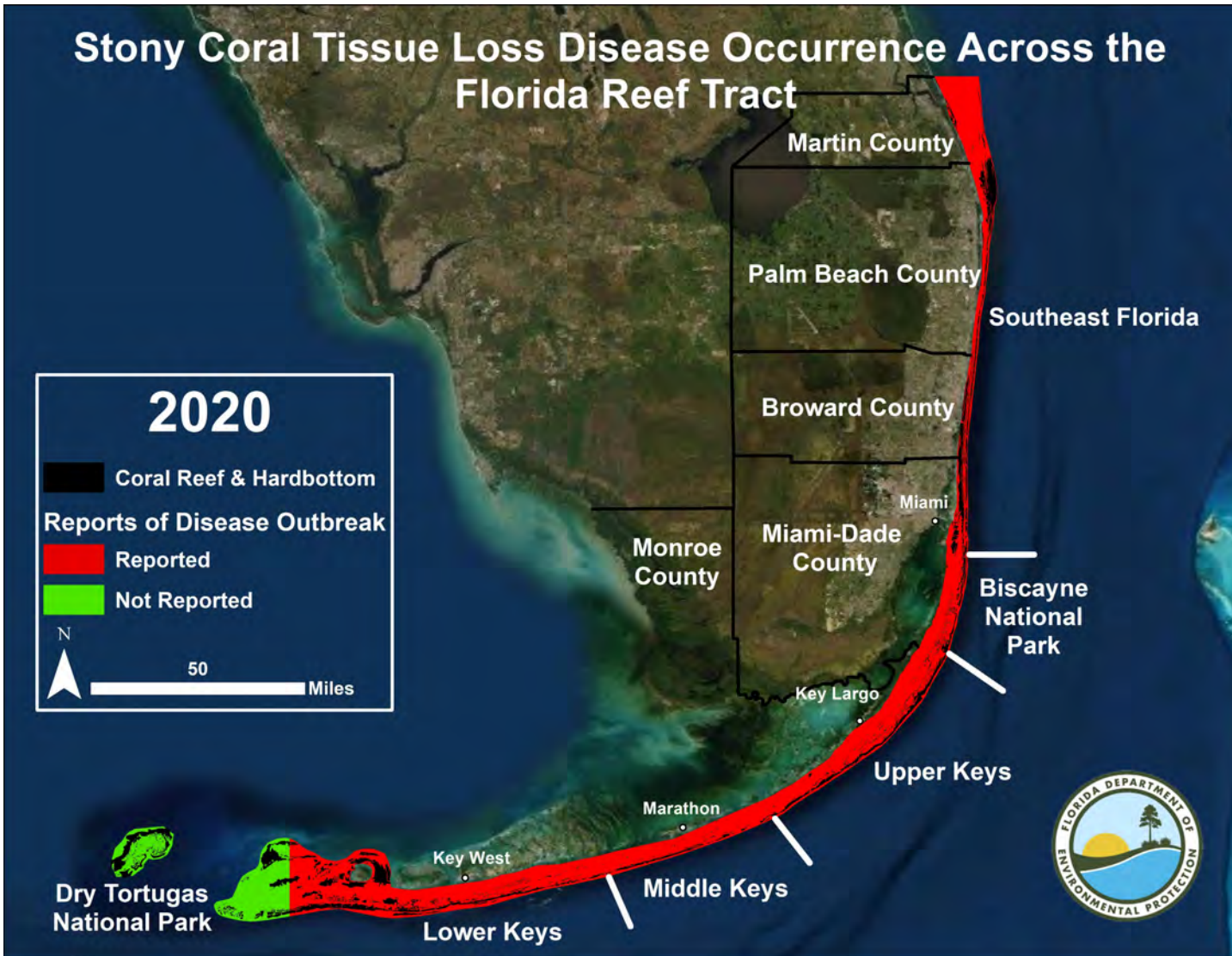
# FLORIDA'S CORAL DISEASE OUTBREAK



# FLORIDA'S CORAL DISEASE OUTBREAK



## Stony Coral Tissue Loss Disease Occurrence Across the Florida Reef Tract



# CARIBBEAN CORAL DISEASE OUTBREAK



# STONY CORAL TISSUE LOSS DISEASE



# STONY CORAL TISSUE LOSS DISEASE



- **Highly infectious, waterborne disease**
- **Long residence time of pathogen(s) – 6+ years**
- **Affects 22+ species of stony coral – more than 50% of primary reef builders**
- **Prevalence rates of 66%-95% in some susceptible species**
- **Mortality rates of nearly 100% of affected colonies – including oldest known colonies (330+ years)**
- **Globally unprecedented**



# DISEASE RESPONSE PARTNERS



[FloridaDEP.Gov/RCP/CoralDisease](http://FloridaDEP.Gov/RCP/CoralDisease)

[FloridaKeys.Noaa.Gov/Coral-Disease](http://FloridaKeys.Noaa.Gov/Coral-Disease)



# RESTORING RESILIENCE



## SHORT TERM

**Enhance Management & Response Capacity**



## LONG TERM

**Reduce Local Stressors & Restore Environmental  
Conditions to Improve Reef Resilience**

# RESTORING RESILIENCE



**SHORT TERM**

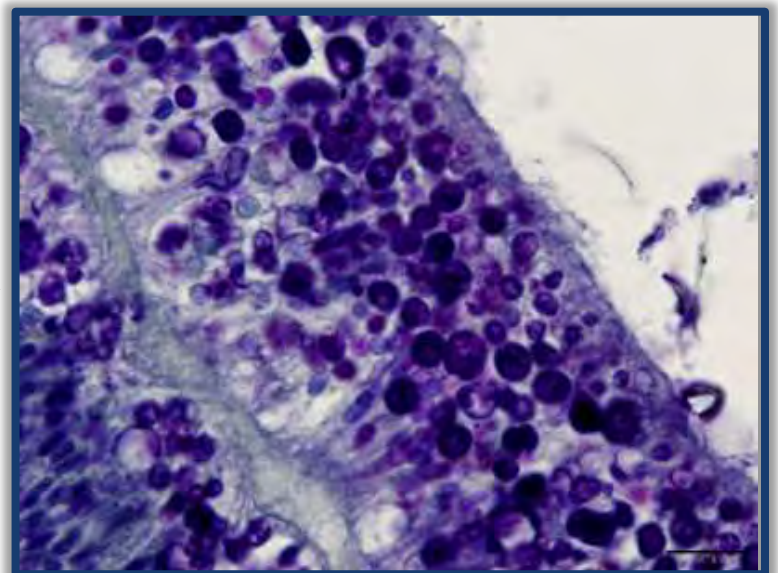
**Enhance Disease Response Capacity**



# RESEARCH & EPIDEMIOLOGY

**IDENTIFY PATHOGEN(S), CHARACTERIZE THE DISEASE(S)  
AND TRANSMISSION**

**DETERMINE IF ENVIRONMENTAL FACTORS (Nutrients, Temperature,  
Salinity, etc.) DRIVE DISEASE**





# RECONNAISSANCE & INTERVENTION

## TREAT PRIORITY CORALS TO MAINTAIN A WILD POPULATION



**Laboratory Trials**



**Small-Scale Field Trials**

# CORAL RESCUE



## RESCUE HEALTHY & SURVIOR CORALS TO PRESERVE GENETIC STOCK





# CORAL PROPAGATION

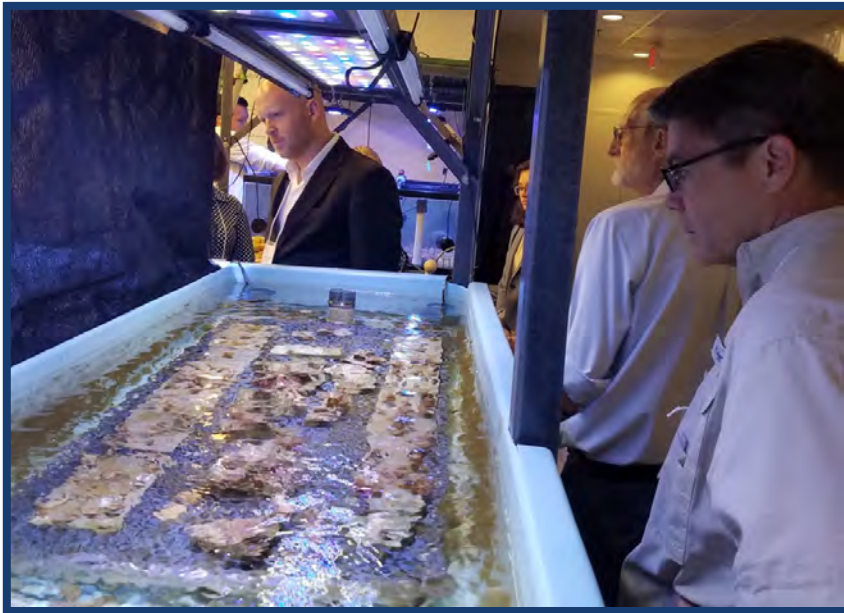
## BUILD INFRASTRUCTURE & CAPACITY TO GROW CORALS FOR LARGE-SCALE REEF RESTORATION



# RESTORATION TRIALS & OUTPLANTING



**DETERMINE WHAT, WHERE, AND WHEN TO RESTORE**





# RESTORING RESILIENCE



## LONG TERM

**Reduce Local Stressors & Restore Environmental Conditions  
to Improve Reef Resilience**

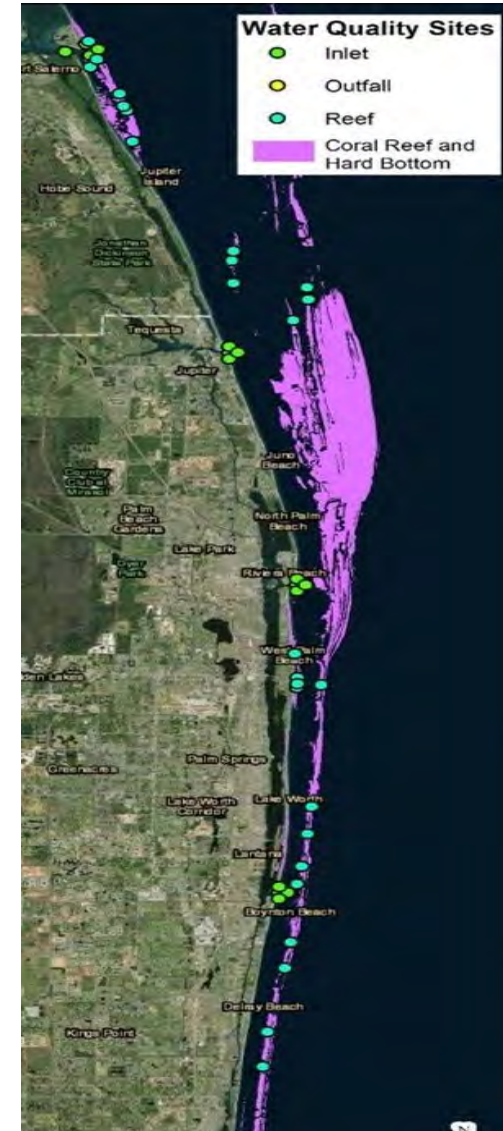


# MANAGING FOR RESILIENCE Path Forward, Long Term

BOLD VISION FOR A **BRIGHTER FUTURE**

**RESTORE WATER QUALITY**

**ESTABLISH CORAL REEF SPECIFIC  
NUMERIC NUTRIENT CRITERIA**





# MANAGING FOR RESILIENCE Path Forward, Long Term

## BUILD PUBLIC PRIVATE PARTNERSHIPS TO IMPLEMENT ECOSYSTEM RESTORATION



## RESTORING 7 ICONIC REEFS IN THE FLORIDA KEYS







# MANAGING FOR RESILIENCE Path Forward, Long Term

## BUILD PUBLIC PRIVATE PARTNERSHIPS TO IMPLEMENT ECOSYSTEM RESTORATION



### ONE HUNDRED YARDS OF HOPE

A REEF RESTORATION PROJECT HONORING THE NFL CENTENNIAL,  
SUPER BOWL LIV AND AMERICA'S MILITARY VETERANS



# MANAGING FOR RESILIENCE Path Forward, Long Term

## FEASIBILITY STUDY: CORAL REEF INSURANCE IN FL & HI



Protecting Reefs for Enhanced Coastal Resilience





# MANAGING FOR RESILIENCE Path Forward, Long Term

## STAKEHOLDER ENGAGEMENT



Southeast Florida Coral Reef Initiative

*Acting above to protect what's below.*



# OUR FLORIDA REEFS

**YOUR VOICE, OUR FUTURE**

### FLORIDA KEYS NATIONAL MARINE SANCTUARY RESTORATION BLUEPRINT

World class fishing and diving

More than 6000 species

3,800 square miles

mangrove shorelines

FL KEYS	Coral Reef
	Fish Species
	Acidification
Florida Keys NMS Restoration Blueprint	

# THANK YOU!



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