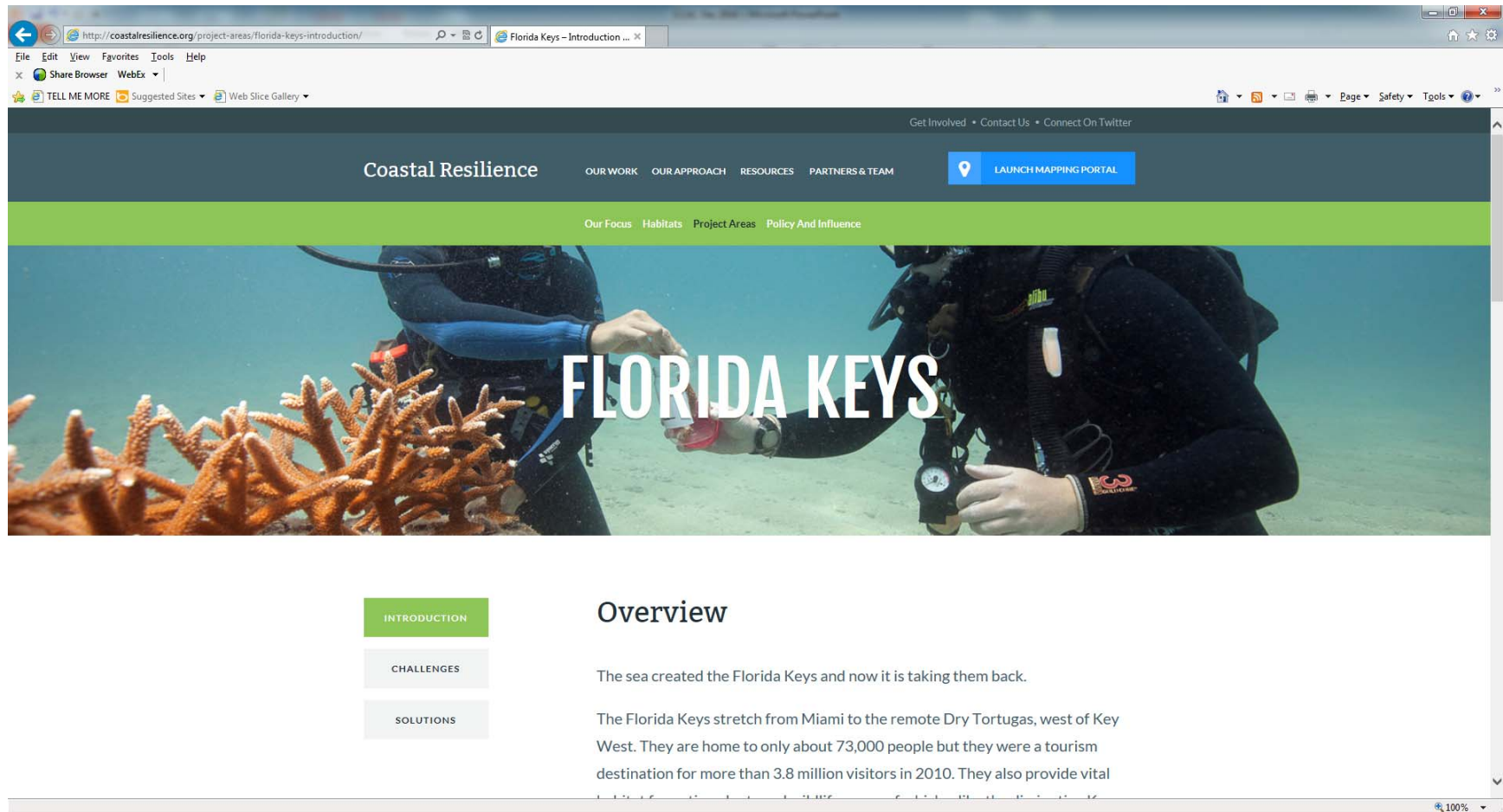


# On-line tools for exploring coastal hazards and nature-based hazard reduction options

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<http://coastalresilience.org>



The screenshot shows a web browser window displaying the Coastal Resilience website. The browser's address bar shows the URL <http://coastalresilience.org/project-areas/florida-keys-introduction/>. The website's header includes the logo "Coastal Resilience" and navigation links: "OUR WORK", "OUR APPROACH", "RESOURCES", "PARTNERS & TEAM", and a "LAUNCH MAPPING PORTAL" button. Below the header is a green bar with the text "Our Focus Habitats Project Areas Policy And Influence". The main content area features a large underwater photograph of two divers examining coral. Overlaid on the photo is the text "FLORIDA KEYS". To the left of the main text is a vertical menu with three items: "INTRODUCTION" (highlighted in green), "CHALLENGES", and "SOLUTIONS". The main text area is titled "Overview" and contains the following text: "The sea created the Florida Keys and now it is taking them back." and "The Florida Keys stretch from Miami to the remote Dry Tortugas, west of Key West. They are home to only about 73,000 people but they were a tourism destination for more than 3.8 million visitors in 2010. They also provide vital". The browser's status bar at the bottom right shows "100%".

# <http://maps.coastalresilience.org>



## Coastal Resilience mapping portal

Click on the blue point markers on the map to navigate to specific geographies, or scroll down to see a list of places where we work. The green hatching on the map represents our Coastal Resilience coverage across countries, regions and states.

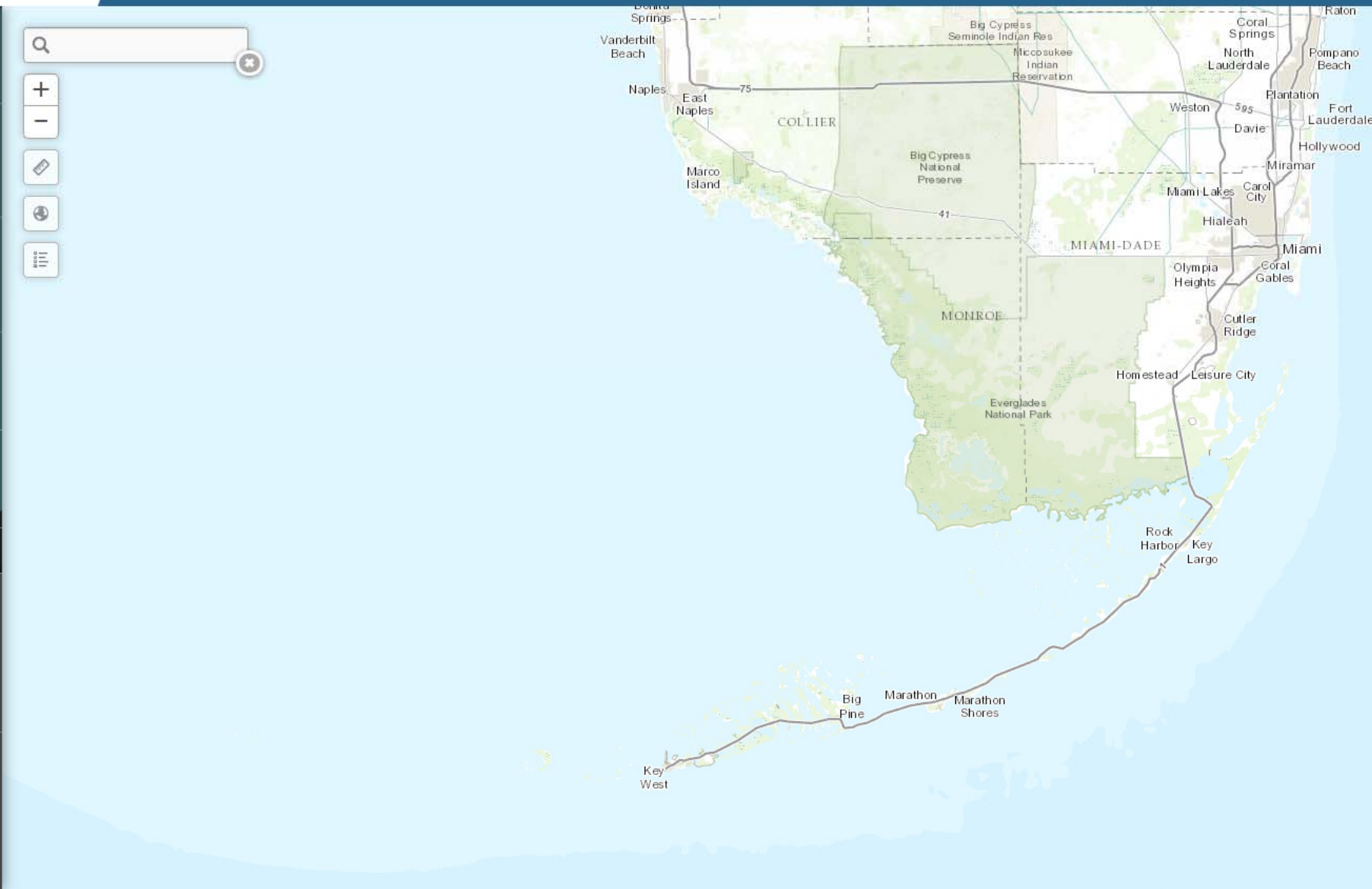
Coastal Resilience supports a community of practitioners around the world who are applying spatial planning innovations to coastal hazard risk, resilience and adaptation issues. This is a global network providing access to peer practitioners, tools, information and training focused on nature-based solutions. For more information see our [Coastal Resilience website](#)

GLOBAL PLATFORM, WORLD RISK, CONSERVATION ATLAS
CARIBBEAN
MEXICO AND CENTRAL AMERICA
UNITED STATES



COASTAL RESILIENCE SOUTHEAST FLORIDA GET STARTED

- Map Layers
- Community Planning
- Coastal Defense
- Future Habitat
- Risk Explorer
- Switch To Map 2
- Split View
- Save & Share
- Export Page





# Base Images (Key West example)

The image is a screenshot of a web browser displaying a satellite map of Key West, Florida. The browser's address bar shows the URL: `network.coastalresilience.org/network.html?xmin=-9132287.869915226&ymin=2824306.59570124&xmax=-8900072.177984772&ymin=2939420.7602987597&map=gpy%7C&sdefs=%5B%5D&dash`. The page title is "Coastal Resilience Network".

The map interface includes a navigation bar with "Map Layers", "Legend", "Change to Split View", "Flood Scenarios", and "Geographies". In the top right corner, there are logos for "The Nature Conservancy" and "THE UNIVERSITY OF SOUTHERN MISSISSIPPI". Below the navigation bar, there are icons for "Background", "Help", and "Bookmark Link".

The main map area shows a satellite view of Key West, with a scale bar in the bottom left corner indicating distances of 0.2 and 0.4 miles. The Google logo is also visible in the bottom left. In the bottom right corner of the map area, there is a copyright notice: "Imagery ©2013 DigitalGlobe, GeoEye, The Florida Department of Environmental Protection, U.S. Geological Survey - Terms of Use".

At the bottom of the browser window, the Windows taskbar is visible, showing the "start" button and several open applications: "Inbox - Mailbox...", "Presentations", "LWV SLR March...", and "Coastal Resilenc...". The system clock in the bottom right corner shows "6:02 PM".







# Storm Surge Mapper

The screenshot displays the 'Storm Surge Mapper' web application. The browser address bar shows the URL: `network.coastalresilience.org/network.html?xmin=-9132287.869915226&ymin=2824306.59570124&xmax=-8900072.177984772&yymax=2939420.7602987597&mapt=gpy%7C&sdefs=%5B%5D&dash=`. The page title is 'Coastal Resilience Network'. Logos for 'The Nature Conservancy' and 'THE UNIVERSITY OF SOUTHERN MISSISSIPPI' are visible in the top right.

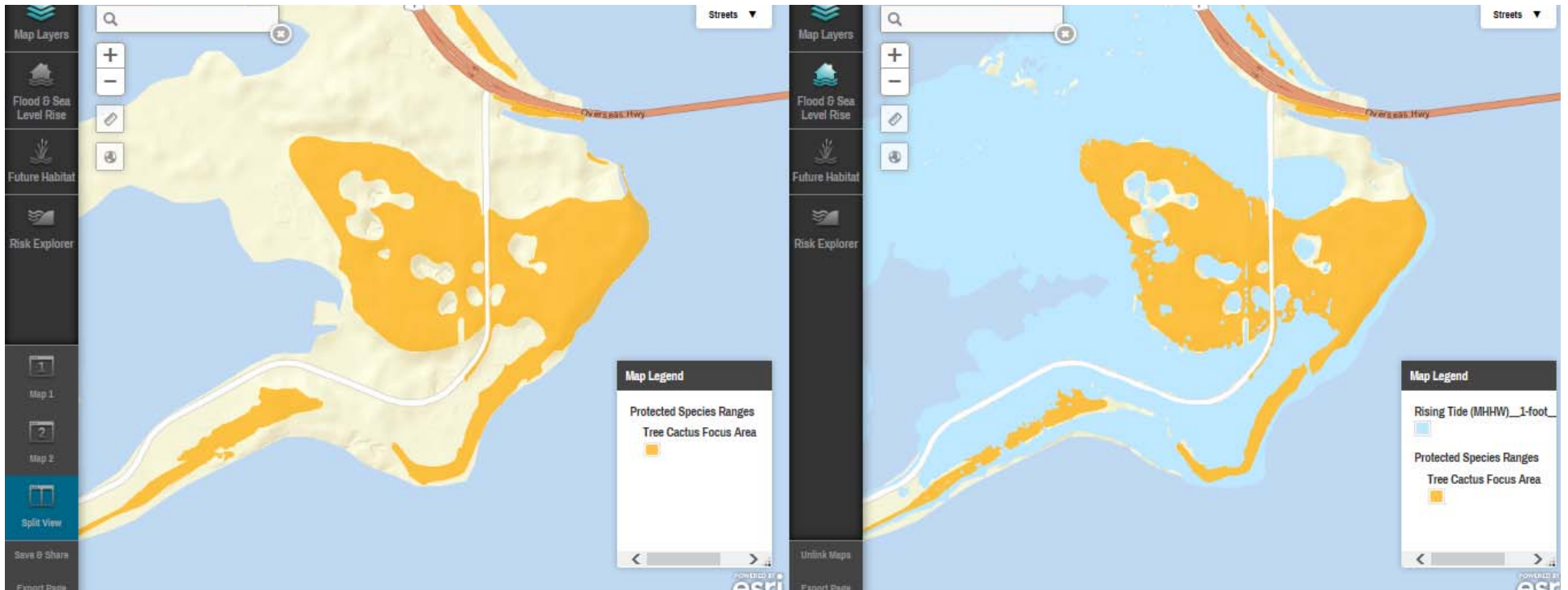
The interface includes a 'Map Layers' panel on the left and a 'Legend' panel on the right. The 'Map Layers' panel is set to 'Left Map' and contains the following sections:

- Critical Facilities:**
  - Communication Systems
  - Electric Power Facility
  - Hazardous Materials Facilities
  - Wastewater Facility Regulation
  - Solid Waste Facilities
- Community Facilities:**
  - School
- Social Vulnerability:**
  - Number of people living in poverty
  - Percent employment in farming, fishing, or hunting
  - Percent of housing units that are renter-occupied
  - Percent population under age 5
  - Percent population age 65 or older
  - Social Vulnerability Index
- Inundation Scenarios:**
  - Analysis Extent
  - Mean Higher High Water with Sea Level Rise:**
    - Sea level rise of 1 foot
    - Sea level rise of 2 feet
    - Sea level rise of 3 feet
    - Sea level rise of 4 feet
  - Hurricane Wilma Type Storm Surge with Sea Level Rise:**
    - Storm at mean higher high water
    - Storm at MHHW plus 1 ft SLR
    - Storm at MHHW plus 2 ft SLR
    - Storm at MHHW plus 3 ft SLR
    - Storm at MHHW plus 4 ft SLR
- Geographies:**
  - Grenadine Bank
  - US Virgin Islands

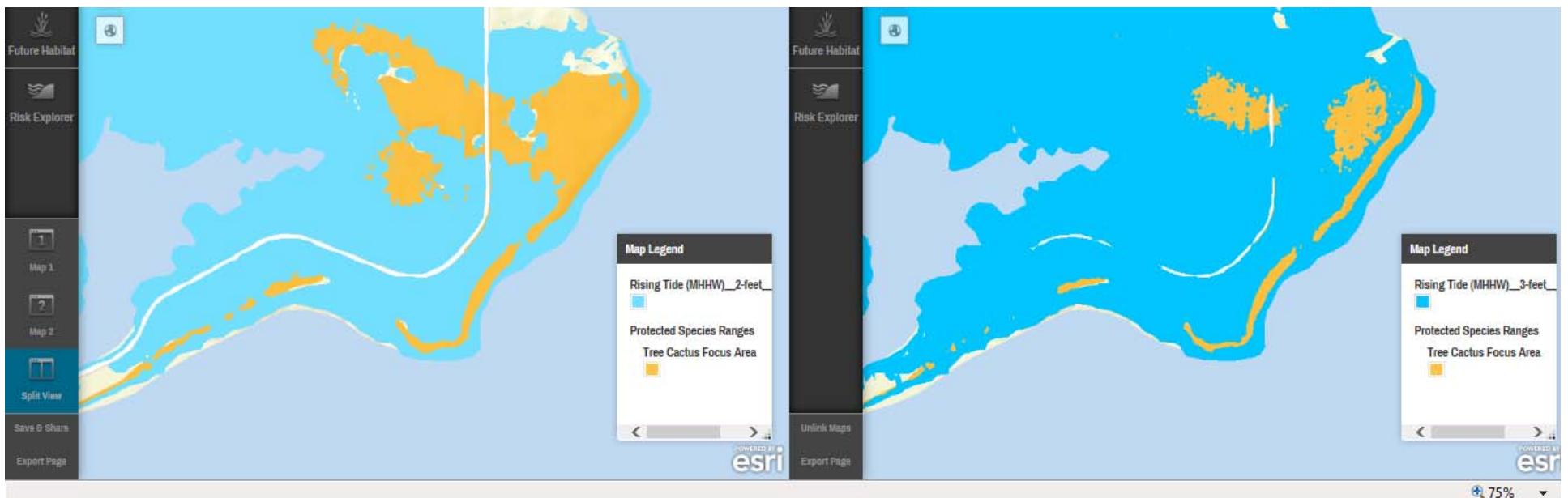
The 'Legend' panel on the right shows the following categories:

- Landuse\_and\_Other\_Management:**
  - Public Conservation Lands (represented by a green square)
- Social\_and\_Economic:**
  - Emergency Response (represented by a red fire station icon)
  - Fire Stations (represented by a red fire station icon)
- Community Facilities:**
  - School (represented by a green school icon)
- Inundation\_Scenarios:**
  - Hurricane Wilma Type Storm Surge with Sea Level Rise
    - Storm at mean higher high water (MHHW) (represented by a light blue square)
    - Storm at MHHW plus 1 ft SLR (represented by a medium blue square)
    - Storm at MHHW plus 2 ft SLR (represented by a dark blue square)
    - Storm at MHHW plus 3 ft SLR (represented by a very dark blue square)

The main map area shows a coastal region with various overlays. A large area is shaded in light blue, indicating inundation at MHHW. Darker blue areas represent higher surge levels. Green areas represent public conservation lands, and red icons represent fire stations. The map is overlaid on a satellite-style background. A scale bar at the bottom left indicates a distance of 0.4 miles. The bottom of the screen shows a Windows taskbar with the 'start' button and several open applications, including 'Inbox - Mailbox...', 'Presentations', 'LWV SLR March...', and 'Coastal Resilience...'. The system clock shows 6:01 PM.

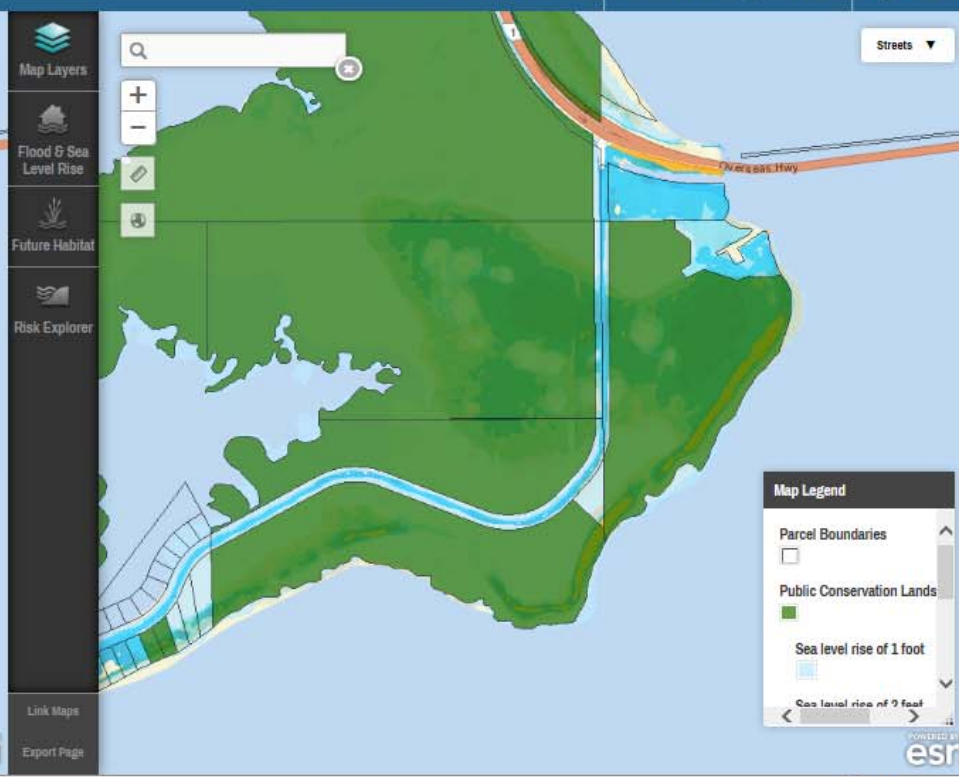


## Key Tree Cactus "Focus Area" x 1', 2', 3' SLR Example

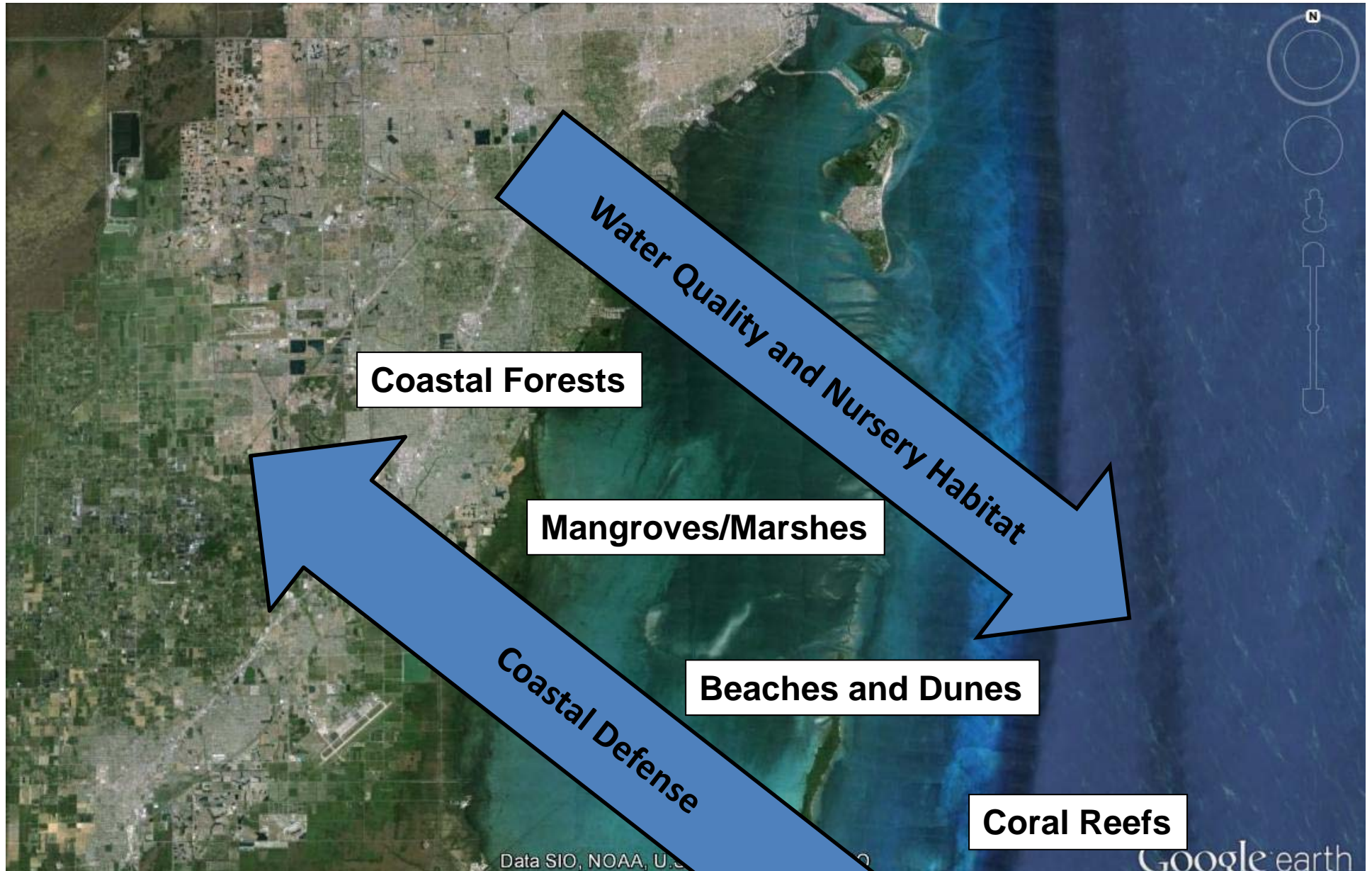




COASTAL RESILIENCE FLORIDA KEYS



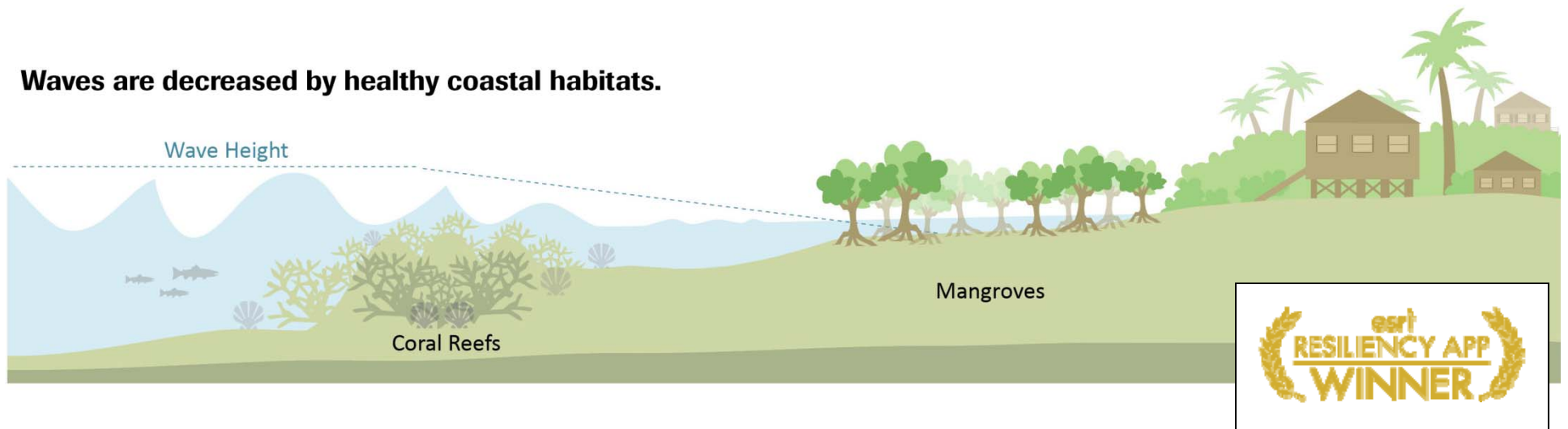
Natural coastal defenses minimize erosion and absorb floodwaters.



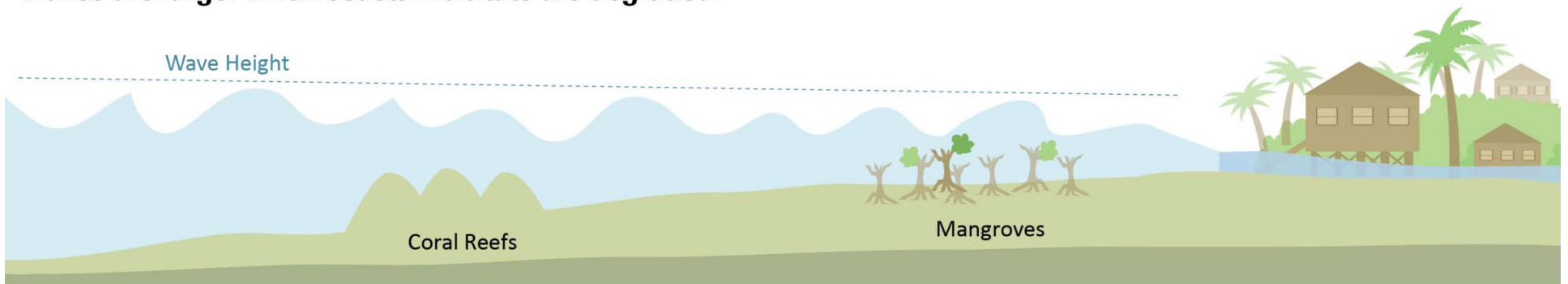


Natural coastal defenses provide cost-effective risk reduction, they are relatively adaptable to changing conditions and they provide numerous co-benefits that south Floridians already value.

**Waves are decreased by healthy coastal habitats.**



**Waves are larger when coastal habitats are degraded.**



# Coastal Resilience

# Coastal Defense app



COASTAL RESILIENCE | SOUTHEAST FLORIDA | GET STARTED | TOUR | GO TO ▾ | The Nature Conservancy | Partners | Legal Disclosure

Map Layers

- Coastal Defense

Search by Address

Topographic

Switch To Map 2

Split View

Save & Share



Search by Address

Topographic ▾

### Coastal Defense

Overview Inputs Results

Geographic Parameters Wave Parameters Water Parameters

Region: **Region** ▾ 1. Click to select a region for analysis.

Wave Strength: Storm ▾

Sea Level Increase Type: Tide ▾

Tide Level: Mean Sea Level ▾

Habitat Parameters ▾

Live Coral Reef

Restored Area

Sea Edge (m): 0 ▹ ▸ ▹ ▸

Shore Edge (m): 0 ▹ ▸ ▹ ▸

Mangrove

Artificial Reef Structure

\* Use the sliders to set the area where habitat is to be modified \*

Meters from Mean Sea Level

Distance From Shore (m)

Habitat Profile Graph

— Coral Reef & Hard Bottom — Mangrove — Artificial Reef Structure

Run Scenario

Map Legend

POWERED BY esri

QuickTimeInstaller.exe TNC CR network ap...pptsx

Show all downloads...

Search by Address

Topographic ▾

Océano Atlántico

### Coastal Defense

Overview Inputs Results

Geographic Parameters Wave Parameters Water Parameters

Choose Region: Biscayne Wave Conditions: Oceanic Sea Level Increase Type: Tide

Wave Strength: 2. Click to set a profile for analysis.

Tide Level: Mean Sea Level

Habitat Parameters ▾

Live Coral Reef

Restored Area

Sea Edge (m): 0

Shore Edge (m): 0

Mangrove

Artificial Reef Structure

\* Use the sliders to set the area where habitat is to be modified \*

Meters from Mean Sea Level

Distance From Shore (m)

Run Scenario

Map Legend

- Coral Reef & Hard Bottom
- Mangrove

POWERED BY esri

Show all downloads...

QuickTimeInstaller.exe TNC CR network ap...pptx



The screenshot displays a web-based map application for Southeast Florida. The interface includes a top navigation bar with the title 'COASTAL RESILIENCE SOUTHEAST FLORIDA' and several utility links: 'GET STARTED', 'TOUR', 'GO TO ▾', 'The Nature Conservancy', 'Partners', and 'Legal Disclosure'. On the left side, there is a vertical toolbar with icons for 'Map Layers', 'Community Planning', 'Coastal Defense', 'Flood & Sea Level Rise', 'Risk Explorer', 'Future Habitat', 'Switch To Map 2', 'Split View', 'Save & Share', and 'Export Page'. The main map area shows a topographic view of the coastline from Miami in the north to Key Largo in the south. Several coastal features are highlighted with colored overlays: red outlines for 'Profile (Region to Click)', blue for 'Coral Reef & Hard Bottom', and green for 'Mangrove'. A search bar at the top left of the map area is labeled 'Search by Address'. In the top right corner of the map area, there is a 'Topographic' dropdown menu. A 'Map Legend' window is open in the bottom right corner, showing the legend items and their corresponding colors. The map also shows various geographical labels such as 'Miami Beach', 'Miami Int'l Airport', 'Biscayne Bay Aquatic Preserve', 'Biscayne National Park', 'Card Sound', and 'Little Card Sound'. The bottom of the screen shows a Windows taskbar with open applications: 'QuickTimeInstaller.exe' and 'TNC CR network ap...pptx'. A 'Show all downloads...' link is visible in the bottom right corner of the taskbar area.

Search by Address

Topographic ▾

### Coastal Defense

Overview Inputs Results

Geographic Parameters	Wave Parameters	Water Parameters
Choose Region: <b>Biscayne</b> ▾	Wave Conditions: <b>Oceanic</b> ▾	Sea Level Increase Type: <b>Tide</b> ▾
	Wave Strength: <b>Storm</b> ▾	Tide Level: <b>Mean Sea Level</b> ▾

**Habitat Parameters** ▾ 3. Click to select a habitat scenario for analysis.

Live Coral Reef \* Use the sliders to set the area where habitat is to be modified \*

Restored Area

Sea Edge (m): -7891

Shore Edge (m): -5872

Meters from Mean Sea Level

Distance From Shore (m)

— Coral Reef & Hard Bottom — Mangrove — Artificial Reef Structure

Run Scenario

Map Legend

- Profile (Transect)
- Coral Reef & Hard Bottom
- Mangrove



Search by Address

Topographic ▾

### Coastal Defense

Overview Inputs Results

Geographic Parameters	Wave Parameters	Water Parameters
Choose Region: <b>Biscayne</b>	Wave Conditions: <b>Oceanic</b>	Sea Level Increase Type: <b>Tide</b>
<a href="#">Click to Set Profile Location</a>	Wave Strength: <b>Storm</b>	Tide Level: <b>Mean Higher High Water</b>

Habitat Parameters ▾ **Coral Reef, Mangroves, & Artificial Reef Structures**

Live Coral Reef

Restored Area

Sea Edge (m):

Shore Edge (m):

Mangrove  
 Artificial Reef Structure

**\* Use the sliders to set the area where live corals are to be restored \***

Meters from Mean Sea Level

Distance From Shore (m)

— Coral Reef & Hard Bottom — Mangrove — Artificial Reef Structure

Run Scenario

Map Legend

- Profile (Transect)
- Coral Reef & Hard Bottom
- Mangrove

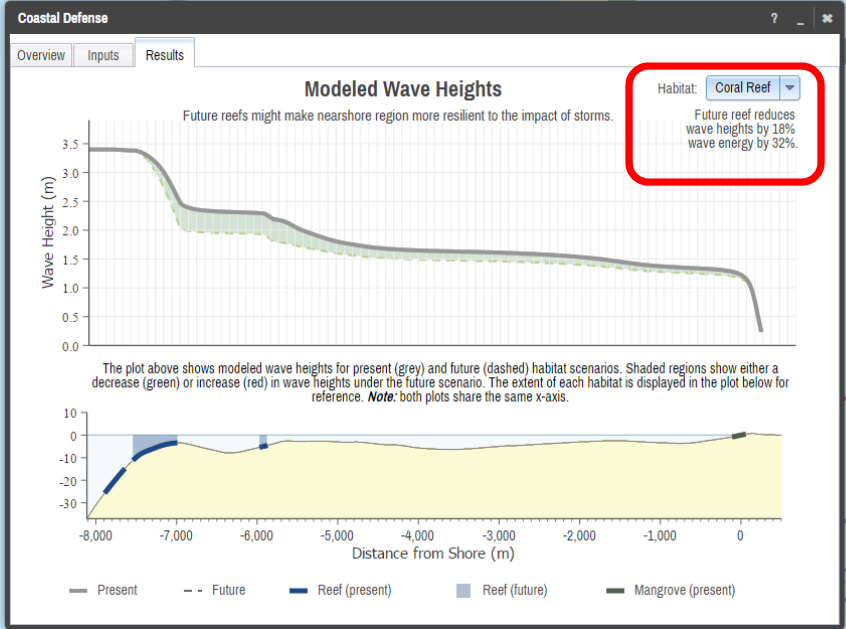
POWERED BY esri

QuickTimeInstaller.exe | TNC CR network ap...pptx

Show all downloads...

Search by Address

- Map Layers
- Community Planning
- Coastal Defense
- Flood & Sea Level Rise
- Risk Explorer
- Future Habitat
- Switch To Map 2
- Split View
- Save & Share
- Export Page

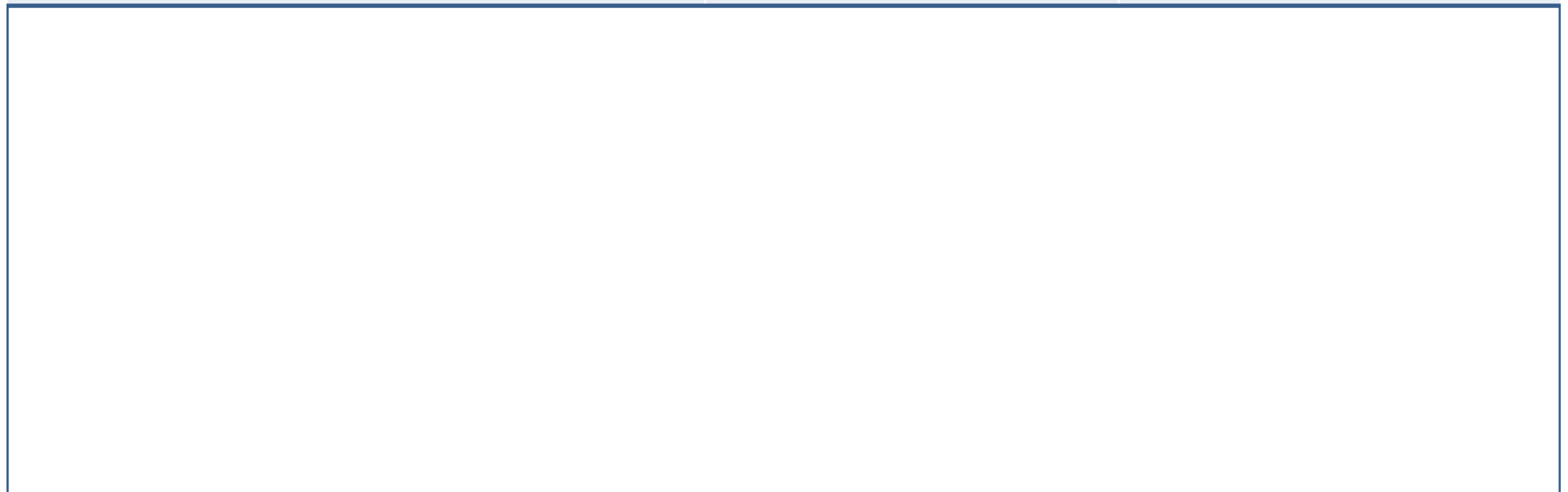


#### Map Legend

- Profile (Transect)
- Coral Reef & Hard Bottom
- Mangrove



Shoreline Protection Scenario	Wave height reduction	Wave energy reduction
Restore reefs between approximately -10m depth and the shoreline	18%	32%
Restore mangroves	0%	0%



# On-line tools for exploring coastal hazards and nature-based hazard reduction options

Background information

<http://coastalresilience.org>

Mapping tools

<http://maps.coastalresilience.org>

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The Nature  
Conservancy   
Protecting nature. Preserving life.™