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**FISHERIES**

Southeast Region

**corals**

# Final Rule Listing 20 New Corals as Threatened Under the ESA

September 15, 2014

# Final Rule Results



- 20 reef-building coral species listed at threatened, none endangered.
  - 15 species in the Indo-Pacific.
  - 5 in the Caribbean.
  - None in the Hawaiian Islands
- Caribbean elkhorn and staghorn corals previously listed in 2006 remain listed as threatened.



## Threatened Corals

\* Listed as threatened in 2006

\*\*Only at Flower Gardens Bank National Marine Sanctuary

## Currently Known in These U.S. Geographic Areas

Caribbean Waters	Florida - Atlantic	Puerto Rico	U.S. Virgin Islands	Gulf of Mexico
<i>Acropora cervicornis</i> (Staghorn)*	X	X	X	
<i>Acropora palmata</i> (Elkhorn)*	X	X	X	X**
<i>Mycetophyllia ferox</i>	X	X	X	X
<i>Dendrogyra cylindrus</i>	X	X	X	
<i>Orbicella annularis</i>	X	X	X	X
<i>Orbicella faveolata</i>	X	X	X	X
<i>Orbicella franksi</i>	X	X	X	X



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# Most Extensive Rulemaking Ever by NOAA




- **Oct 2009** - Petitioned to list 83 corals under ESA.
- **Jan 2010** - Published 90-day finding that 82 of 83 required reviews.
- **Sep 2011** - Published Status Review Report.
- **Jul 2012** - Completed public information gathering meetings.
- **Dec 2012** - Published proposed rule to list 66 corals.
- **Apr 2013** - Completed public comment period on proposed rule, including 19 public hearings.
- **Nov 2013** - Completed 6-month extension to gather additional scientific info.
- **Aug 2014** - Published final rule to list 20 coral species as threatened under the ESA for the first time as well as staghorn and elkhorn previously listed as threatened in 2006.





# Proposed vs. Final Listings



	Indo-Pacific Species			Caribbean Species		
	LISTING STATUS					
	E	T	NW	E	T	NW
Proposed	7	52	16	7	2	0
Final	0	15	44	0	7	2

**15 THREATENED CORALS IN THE INDO-PACIFIC**  
**7 THREATENED CORALS IN THE WIDER-CARIBBEAN**



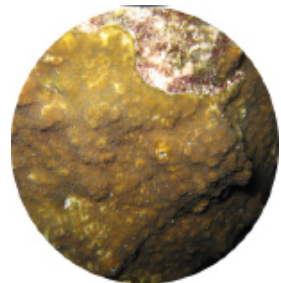
# Major Sources of New Information

- Immense amount of information from public comments, scientific literature, and coral experts.
- Many new scientific papers released since process started.
- Led to improved understanding of habitat diversity, abundance, distribution, species-specific exposure to threats, and species' vulnerability and resilience.



# Supplemental Reports

- **Veron 2014:** Report by Charlie Veron on the distributions and abundances of 66 of the 68 proposed corals, including much more detailed geographic distribution and semi-quantitative abundance data than previously available for the Indo-Pacific species.
- **Jackson et al. 2014:** Report sponsored by IUCN and edited by Jeremy Jackson providing meta-analyses of the status and trends of many Caribbean corals and coral reefs from 1970 to 2012.
- **IPCC WGI 2013:** The latest synthesis of the physical science of climate change by the International Panel on Climate Change's Working Group One (IPCC WGI), including new "pathways" that project climate change impacts to 2100 and beyond.



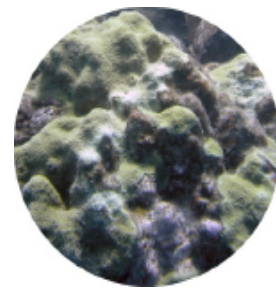
# Determination Framework

- Within the context of the general information on coral biology, habitat, and threats, we conducted a **species-by-species analysis** to make final determinations.
- Based on a set of *Guiding Principles* based on general information and **species-specific information**:
  1. Biology and ecology vastly **different** than vertebrates, which are typically the focus of ESA.
  2. For **all** species, responses to threats will be **variable**.
  3. Absolute **abundance** & absolute **distribution** inform species' **current** status and its **capacity** to respond to changing conditions over the foreseeable future.
  4. Wide variety of conditions throughout each species' range allows for **variable responses** to global and local threats.
  5. Impacts of climate change will likely **increase**; but, there are **limitations** to using this global, coarse-scale information for determining vulnerability to extinction for individual species.
  6. Impacts to coral reef ecosystems **do not equate** to impacts to individual coral species.
  7. Due to variability and uncertainty in climate change, **heterogeneous habitat** and **absolute demographic** and **spatial** characteristics are emphasized in evaluating extinction risk.





# Application of Species-Specific Information



Within the context of the Guiding Principles (*i.e.*, general information)

1. Detailed description of **available information**:
  - **Spatial**: geographic distribution, depth distribution, habitat
  - **Demographic**: occurrence, absolute abundance
  - **Threat response**: susceptibilities to the 9 major threats
  - **Other characteristics**: reproductive biology, taxonomic uncertainty, ID uncertainty...
2. Description of the species **vulnerability to extinction**:
  - Species' characteristics **moderate** or **exacerbate** its extinction risk
  - Most **influential characteristics** are geographic distribution, depth distribution, habitat heterogeneity, occurrence, absolute abundance, and threat susceptibilities.
3. Equate the species' status to either **endangered**, **threatened**, or **not warranted**
  - Extent to which the species' characteristics moderate or exacerbate extinction risk over the **foreseeable future** across the **range** of the species in a qualitative, non-formulaic manner



# *Acropora palmata*

(elkhorn coral)

## KEY INFORMATION:

- Major framework builder of Caribbean reefs
- Reproduces both sexually and asexually via fragmentation
- "Fast" growth rates

## WHAT DOES IT LOOK LIKE?

- The species has frond-like branches, which appear flattened to near round, and typically radiate out from a central trunk and angle upward.
- Branches are up to 50 cm wide and 4 to 5 cm thick.
- Individual colonies can grow to at least 2 m in height and 4 m in diameter
- Colonies can grow in nearly mono-specific, dense stands and form an interlocking framework known as thickets.

## WHERE IS IT FOUND?

- Western Atlantic and greater Caribbean
- 2 colonies at Flower Gardens Bank National Marine Sanctuary
- Most common in 0 to 5 m, but up to 30 m



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# *Acropora cervicornis*

## (staghorn coral)

### KEY INFORMATION:

- Major framework builder of Caribbean reefs
- Reproduces both sexually and asexually via fragmentation
- "Fast" growth rates

### WHAT DOES IT LOOK LIKE?

- Antler-like colonies with straight or slightly curved, cylindrical branches.
- Branches range from 0.25 to 5 cm thick
- The species can exist as isolated branches, individual colonies up to about 1.5 m diameter
- Can form large thickets with individual colonies difficult to distinguish

### WHERE IS IT FOUND?

- Western Atlantic and greater Caribbean
- Absent from the Gulf of Mexico
- Primary constructors of mid-depth (10 to 15 m) reef terraces in the western Caribbean
- Can be found to 30 m



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# *Orbicella annularis*

## (lobed star coral)

### KEY INFORMATION:

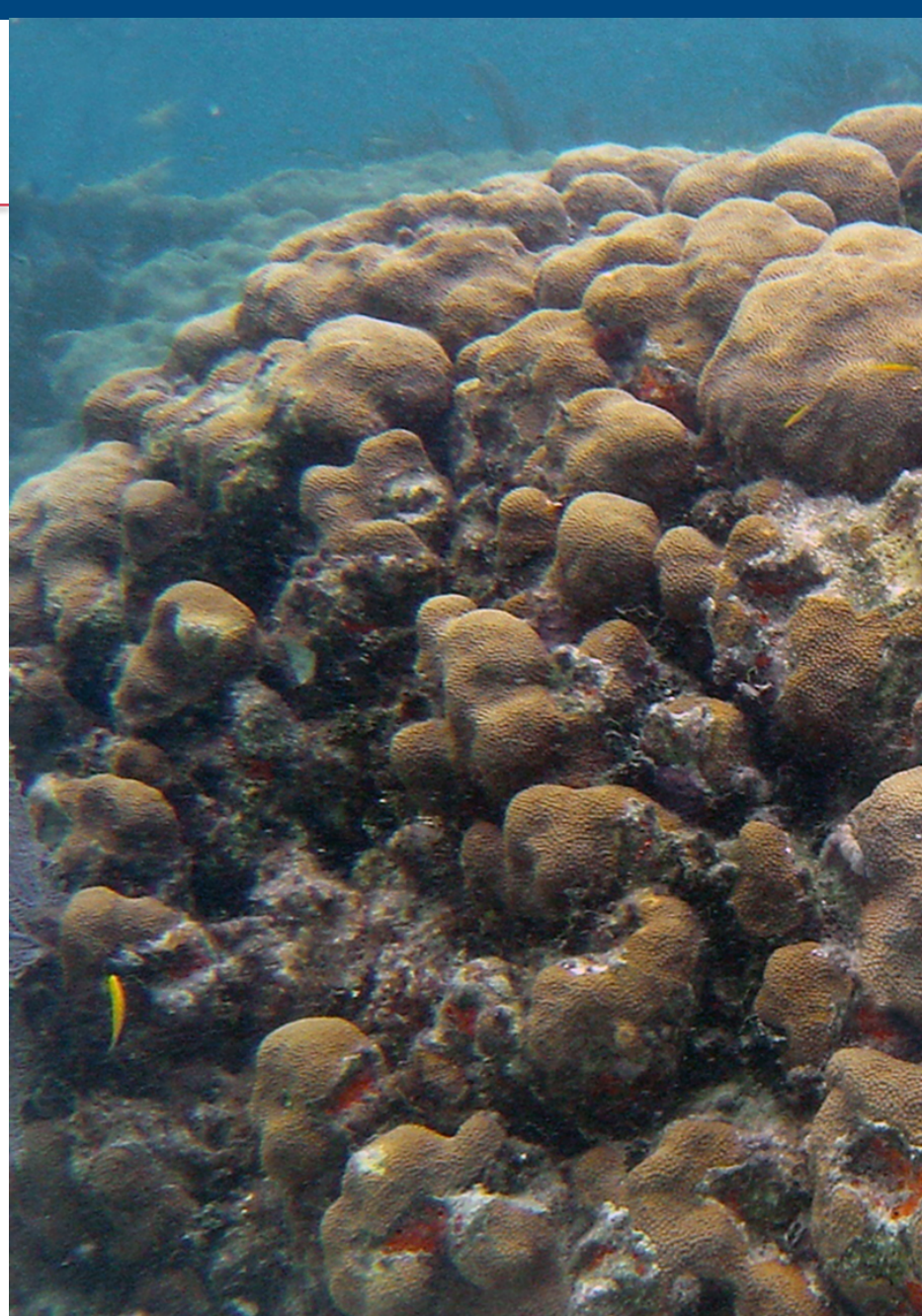
- *Orbicella* (formerly *Montastraea*) *annularis* was previously lumped with the other 2 *Orbicella* species and considered as the *O. annularis* complex.
- Many reef surveys still report all 3 species as the complex
- Major framework builder of Caribbean reefs

### WHAT DOES IT LOOK LIKE?

- The species forms massive (*i.e.*, large and boulder-like) colonies that grow in columns that exhibit rapid and regular upward growth.
- Live colony surfaces usually lack ridges or bumps.
- Colonies can reach up to 10 m in diameter and 4-5 m in height.

### WHERE IS IT FOUND?

- Common throughout the western Atlantic and greater Caribbean including the Flower Garden Banks
- Most reef environments in depths of 0.5 to 20 m
- Can be found on artificial structures



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# *Orbicella faveolata*

## (mountainous star coral)

### KEY INFORMATION:

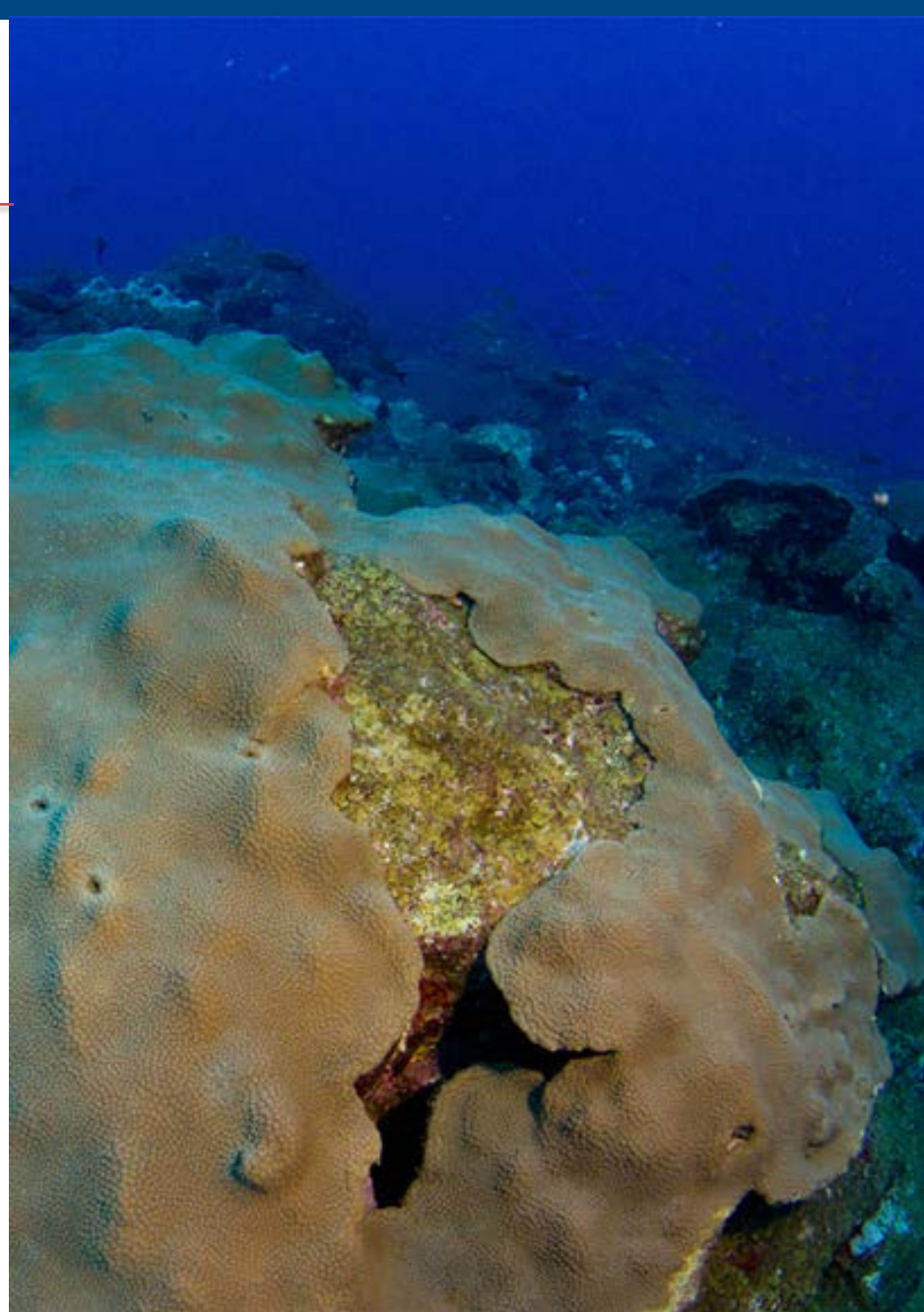
- *Orbicella* (formerly *Montastraea*) *faveolata* was previously lumped with the other 2 *Orbicella* species and considered as the *O. annularis* complex.
- Many reef surveys still report all 3 species as the complex
- Major framework builder of Caribbean reefs

### WHAT DOES IT LOOK LIKE?

- The species forms massive (*i.e.*, large and boulder-like) heads or sheets
- Live colony surfaces may be smooth or have keels or bumps
- Colonies can reach up to 10 m in diameter and 4-5 m in height.

### WHERE IS IT FOUND?

- Common throughout the western Atlantic and greater Caribbean including the Flower Garden Banks
- Most reef habitats and is often the most abundant coral between 10 and 20 m in fore-reef environments; can be found to 90 m
- Can be found on artificial structures



# *Orbicella franksi*

## (boulder star coral)

### KEY INFORMATION:

- *Orbicella* (formerly *Montastraea*) *franksi* was previously lumped with the other 2 *Orbicella* species and considered as the *O. annularis* complex.
- Many reef surveys still report all 3 species as the complex
- Major framework builder of Caribbean reefs

### WHAT DOES IT LOOK LIKE?

- The species forms massive (*i.e.*, large and boulder-like) heads or sheets
- Live colony surfaces have large, unevenly arrayed polyps that give the colony its characteristic irregular surface
- Colonies can reach up to 5 m in diameter and 2 m in height.

### WHERE IS IT FOUND?

- Common throughout the western Atlantic and greater Caribbean including the Flower Garden Banks
- Most reef habitats and is often the most abundant coral between 5 and 50 m in fore-reef environments; often dominant, component of Caribbean mesophotic reefs
- Can be found on artificial structures





# *Dendrogyra cylindrus*

## (pillar coral)

### KEY INFORMATION:

- Uncommon but conspicuous with scattered, isolated colonies
- Gonochoric spawning mode and lack of observed sexual recruitment

### WHAT DOES IT LOOK LIKE?

- The species forms cylindrical columns on top of encrusting bases
- Colonies are generally grey-brown in color and may reach 3 meters in height.
- Tentacles remain extended during the day, giving columns a furry appearance.

### WHERE IS IT FOUND?

- Western Atlantic and throughout the greater Caribbean.
- Absent from Gulf of Mexico
- Most reef environments between 1 to 25 m depth



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# *Mycetophyllia ferox*

(rough cactus coral)

## KEY INFORMATION:

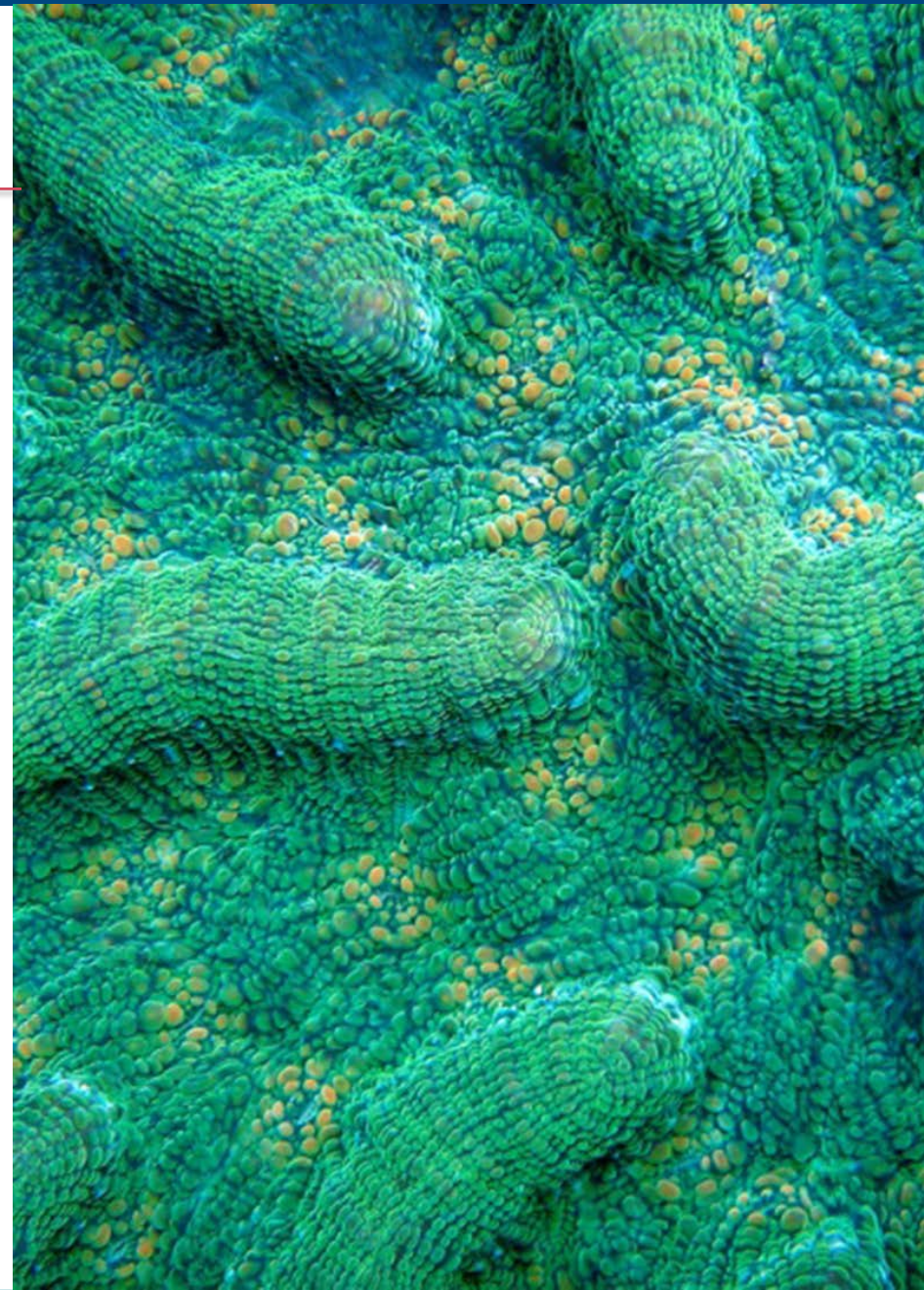
- Most species of *Mycetophyllia* can be difficult to distinguish in the field, and many studies report data to the genus level rather than species

## WHAT DOES IT LOOK LIKE?

- The species forms a thin, encrusting plate that is weakly attached.
- Maximum colony size is 50 cm.

## WHERE IS IT FOUND?

- Western Atlantic and throughout the wider Caribbean
- Absent from the Flower Garden Banks (Gulf of Mexico) and Bermuda
- Reef environments in water depths of 5 to 90 m, including shallow and mesophotic habitats.



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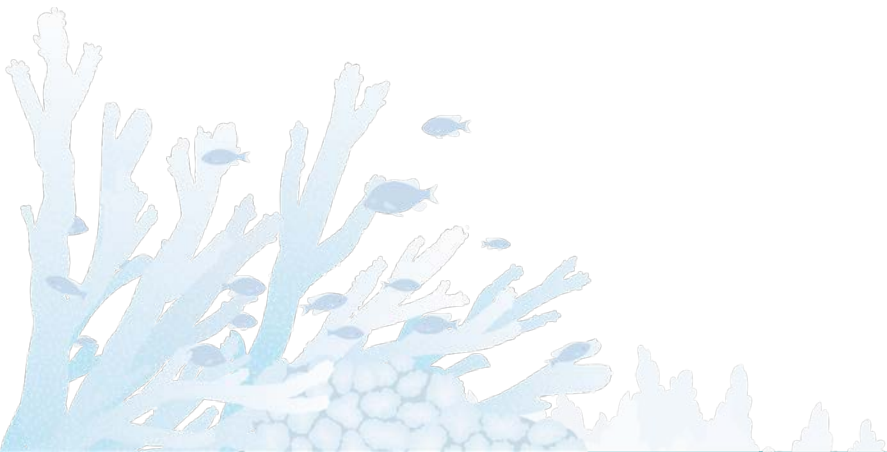
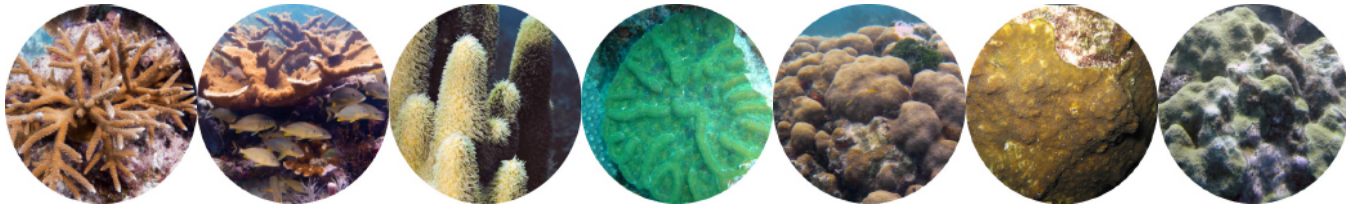
# What's Next?

- No prohibitions relating to individual conduct, except for those related to the two previously listed elkhorn and staghorn corals in the Caribbean.
- Consult with federal agencies on actions that they execute, fund, or authorize that “may affect” listed corals.
- May identify specific regulations for the conservation of these *threatened* species.
- Continue working with communities to help them understand how the agency's decision may or may not affect them. ESA tools available are flexible so that they can be used in a manner that will allow activity to move forward in a way that does not jeopardize listed coral.
- We will now work with partners on mitigation measures and recovery strategies for the newly listed corals, building from approaches that have shown success elsewhere.
- No ESA Section 10 research and enhancement permits
- May designate critical habitat if determinable and prudent.
- May develop recovery plan to identify the criteria that must be met so that the species no longer need the protection of ESA.



# Re-initiated Consultations in the South Atlantic

- Dolphin-Wahoo: Informal
- Snapper-Grouper: Informal
- Spiny Lobster: Formal



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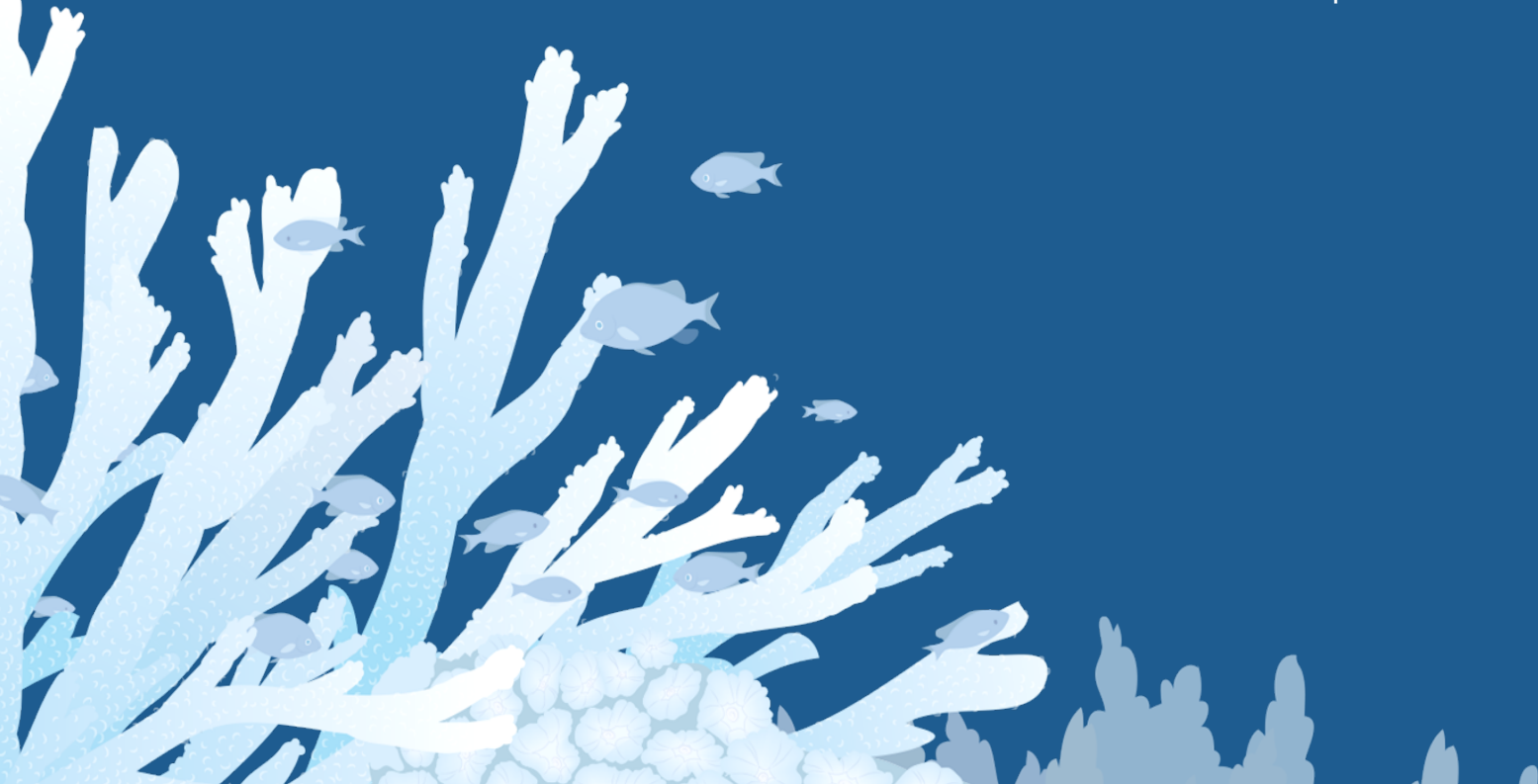
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# Contact Information and Supporting Documents

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