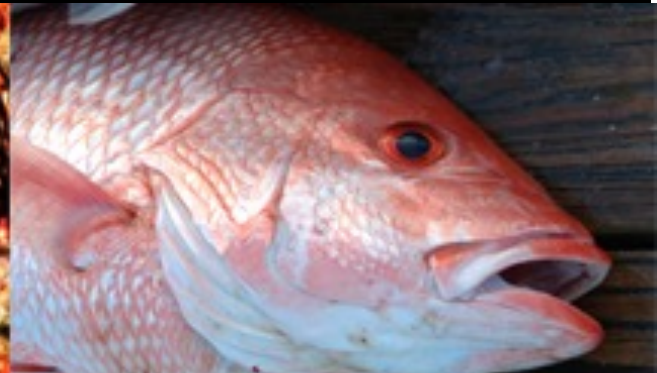Gulf of Mexico Fishery Management Council:

CCC Council Highlights

Outline

- **Fisherman Feedback**: Crowdsourcing Observations of the Fisheries

- **The Great Red Snapper Count**: Integrating Novel Science into Management

- **Ecosystem Modeling Success**

- **Coral Reef Conservation Program Products**

Fisherman Feedback

Crowdsourcing Qualitative Stakeholder Observations to Enhance Scientific Understanding of Fish Stocks

Crowdsourcing: "The practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community..."- *Merriam-Webster*

Why Gather Crowdsourced Observations?

- Regional Fishery Management Councils encourage local-level knowledge in federal fisheries management
  - Stakeholders with on-the-water knowledge engaged in process

- Crowdsourcing observations from Council stakeholders provides an opportunity for many people to share their individual perspectives

- Participation in the scientific aspects of resource management typically requires considerable involvement
  - Cooperative research
  - Citizen science

Why Gather Crowdsourced Observations?

Stock assessments can have data gaps or lack real-time data

Current on-the-water knowledge can be used to:

- Ground-truth observed trends
- Explain anomalies
- Inform projections

How Does Fisherman Feedback Work?

Solicit Feedback

Online tool used to collect species-specific observations prior to each assessment
- Association(s) with the fishery
- Observation
- Location of observation

Analyze

Comments analyzed for overall and stock condition related positive, neutral, or negative sentiment
- Manual Analysis: Two individuals classify sentiment separately and resolve discrepancies
- Automated Analysis: R statistical software package 'tidytext' using a revised 'Bing' lexicon library to classify sentiment

Share

- Stock Assessment Panel
- Scientific and Statistical Committee / Relevant Advisory Panel
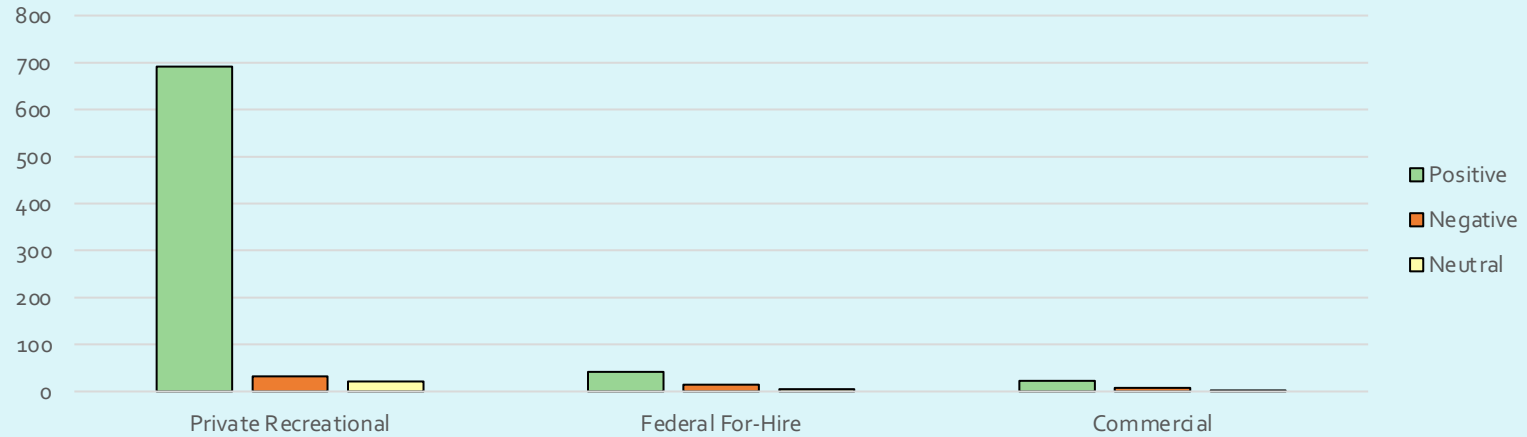- Council
- Respondents/Stakeholders

An Example of Outputs: Red Snapper

Overall Sentiment by Sector
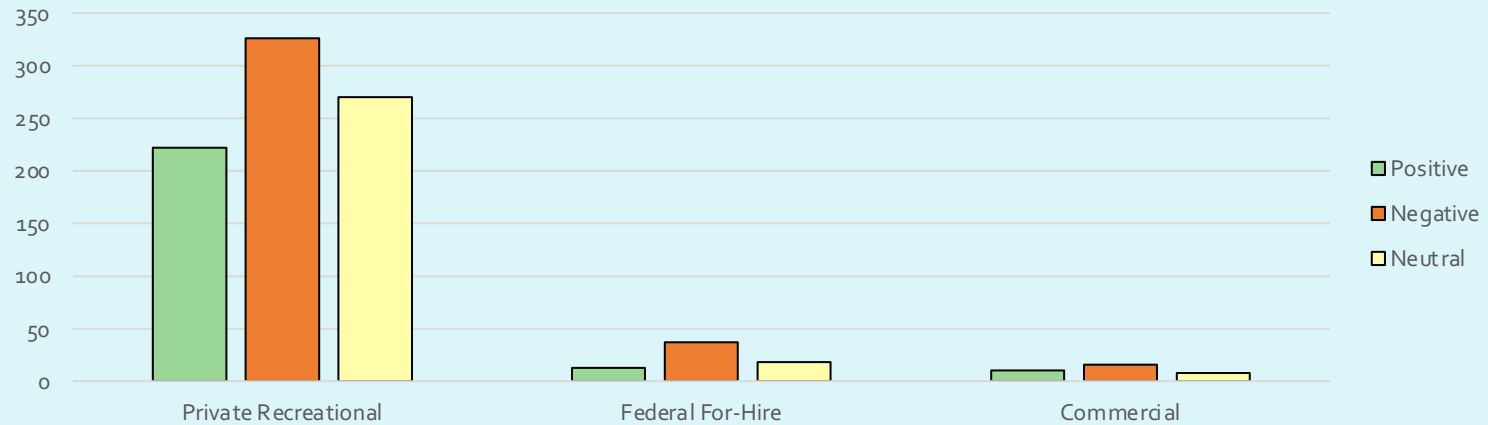
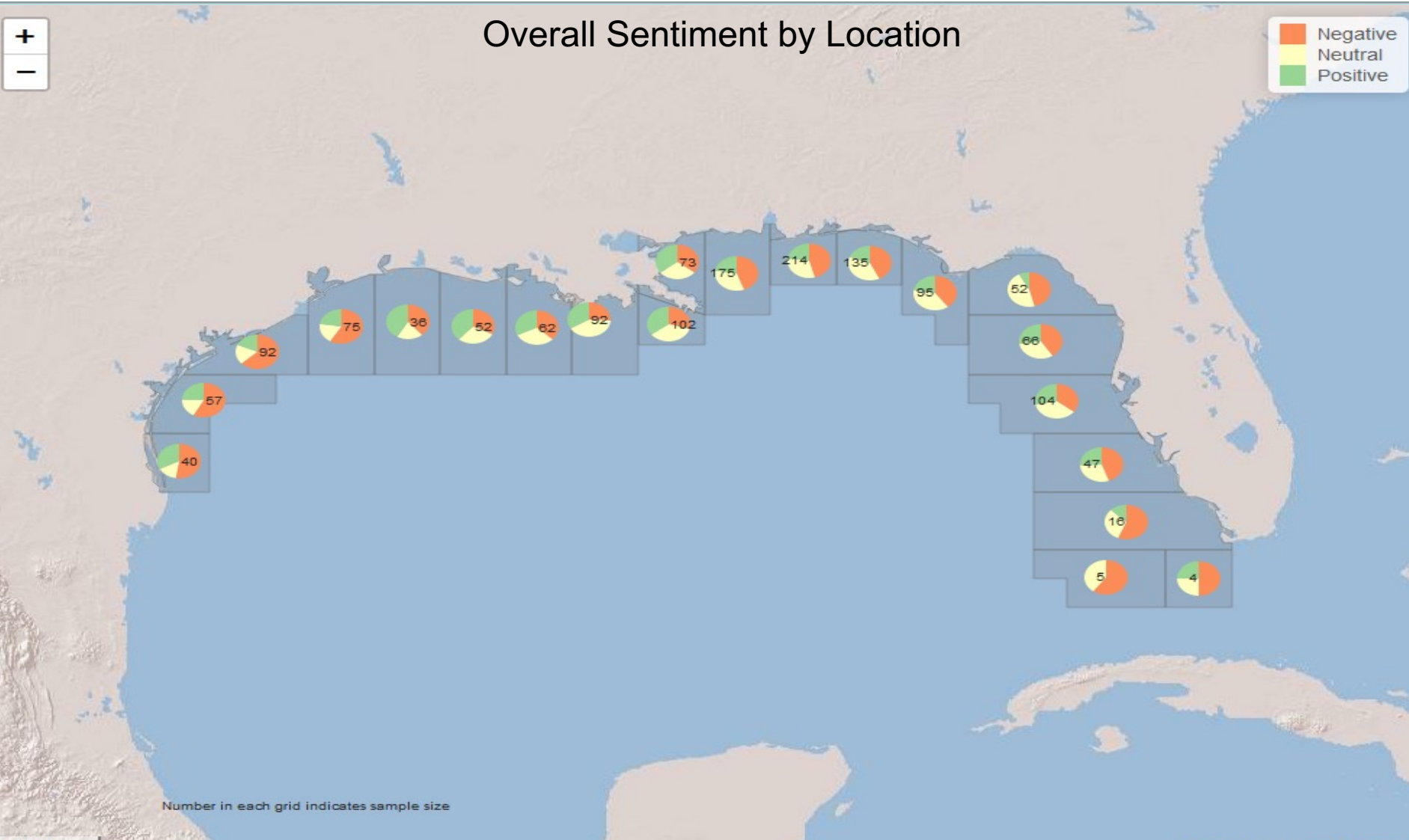Stock Condition Sentiment by Sector

An Example of Outputs: Red Snapper

Stock Condition Sentiment by Location


Stock Condition Sentiment by Location

An Example of Outputs: Red Snapper

Manual Analysis

- A majority of respondents believe the stock is in good condition.
  - Stock is so prolific that it's difficult to target other species.
  - Damaging the ecosystem

- Some respondents indicated red snapper regulations do not match the health of the stock
  - Recreational seasons and/or bag limits should be increased
  - Culling and regulatory discards are an issue

- Some respondents did indicate that fishing pressure is too high
  - Causing local-level depletion
  - In-shore stocks are depleted but offshore populations are healthy.

- Some respondents shark, and to a lesser extent dolphin, depredation was on the rise and that something needs to be done to mitigate the issue

Automated Analysis
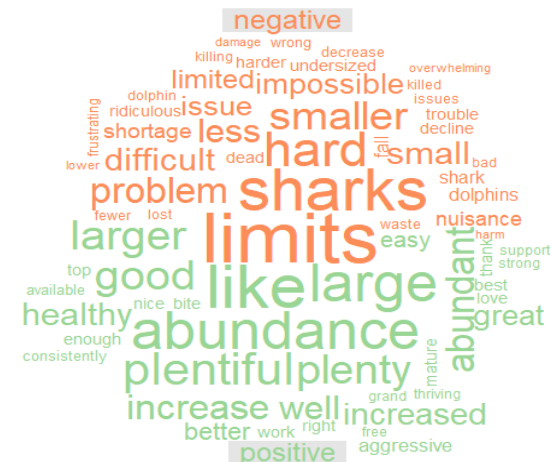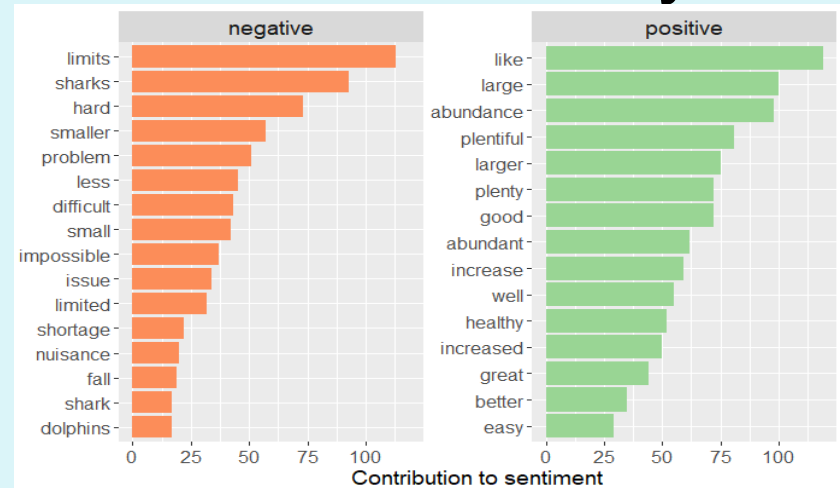
Fisherman Feedback Efforts

Species	Assessment	# of Respondents
Red Grouper	SEDAR 61	97
Gray Triggerfish	SEDAR 62	132
Yellowtail Snapper	SEDAR 64	364
King Mackerel	Update Assessment	47
Vermilion Snapper	SEDAR 67	63
Cobia	Update Assessment	586
Scamp	SEDAR 68	32
Greater Amberjack	SEDAR 70	64
Gag	SEDAR 72	418
Red Snapper	SEDAR 74	880

Next up: Mutton Snapper and Spanish Mackerel

Fishermen Feedback Features

- Bridges data lags and gaps
- Identifies ecosystem indicators
- Bolsters recreational engagement
  - Great 'bang for the buck,' from staff and public perspectives
  - Gathers private recreational angler feedback effectively

The Future of Fisherman Feedback

- Continue to complete one for each stock assessment

- Formalize SOPP's and a Technical Guidance document

- Currently working to achieve Paperwork Reduction Act 'general approval'

- Develop and publish a paper

Novel Science and Management: The *Great Red Snapper Count*

The *Great Red Snapper Count* (GRSC):

- Region-wide collaborative research project
- Purpose: estimate absolute abundance of red snapper in the Gulf
- Completed between 2018 – 2019

Result: estimated 85.6 million age 2+ red snapper

Novel Science and Management: The *Great Red Snapper Count*

- GMFMC led NS2-compliant expert peer-review, quick integration of BSIA into fisheries management
  - Rigor applauded by GRSC PIs and observers

- What's next?:
  - GRSC data considered in next stock assessment
  - Stock assessment process will consider best ways to apply GRSC to broader universe of data
  - *Great Amberjack Count*
    - Peer-review will be similar in structure and rigor to example set by GMFMC for GRSC

Ecosystem Modeling: Red Tide and Gag

Red tide:

- Dinoflagellate
- Ever-present in the Gulf of Mexico, can bloom over vast areas
- Grows in thick mats, blooms can be detected via remote sensing satellites
- Releases a toxin as it dies; decomposition draws dissolved O_2 out of the water

Ecosystem Modeling:
Red Tide and Gag

Gag grouper vulnerable to episodic mortality from red tide harmful algal blooms

Red tide model explorations and products:

- Improves estimates of natural and fishing mortality rate by year
  - Generated estimates of comparative severity of 2018 red tide relative to 2005 (presumed worst)
  - Estimated mortality effects at age
  - Determined fraction of vulnerable biomass
- Supports improved catch level projections

Ecosystem Modeling: Red Tide and Gag

GMFMC supported integration of ecosystem component into science and management

- Explicit consideration of an environmental variable
  - Allows for better understanding of effects
- Directly affects short-term yield projections
  - Allows for better conceptualization of fisheries management for vulnerable stocks

Ecosystem Modeling: Red Tide and Gag

What's next?

- GMFMC will support similar work for red grouper to inform upcoming stock assessment
- Consideration of red tide as a fishery ecosystem issue
  - FEI is a way of integrating ecosystem issues into a broader goal of ecosystem-based or ecosystem-informed fisheries management
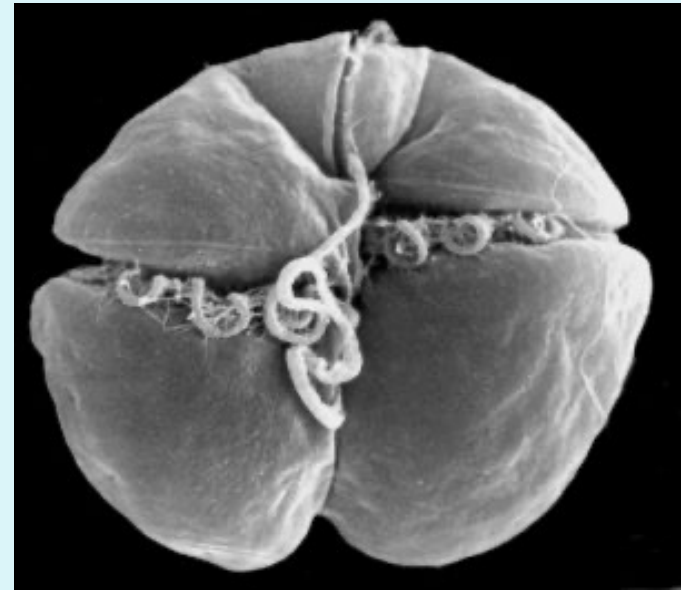
Coral Reef Conservation Program Products

Grant focuses on identifying status, changes in **coral reef habitats** and **potential management implications** to promote the **sustainability and conservation of** coral reef and associated fisheries in the Gulf of Mexico.

Methods

- Comprehensive scientific review
- Broad stakeholder engagement

Outreach Products

- Learning modules
- Spatial decision-support tools
- White papers

Learning Modules

Spiny Lobster
Closed Areas

Coral Reef
Invasive Species

Non-climatic Stressors of Corals

Soft Corals(*Callogorgia spp.*)
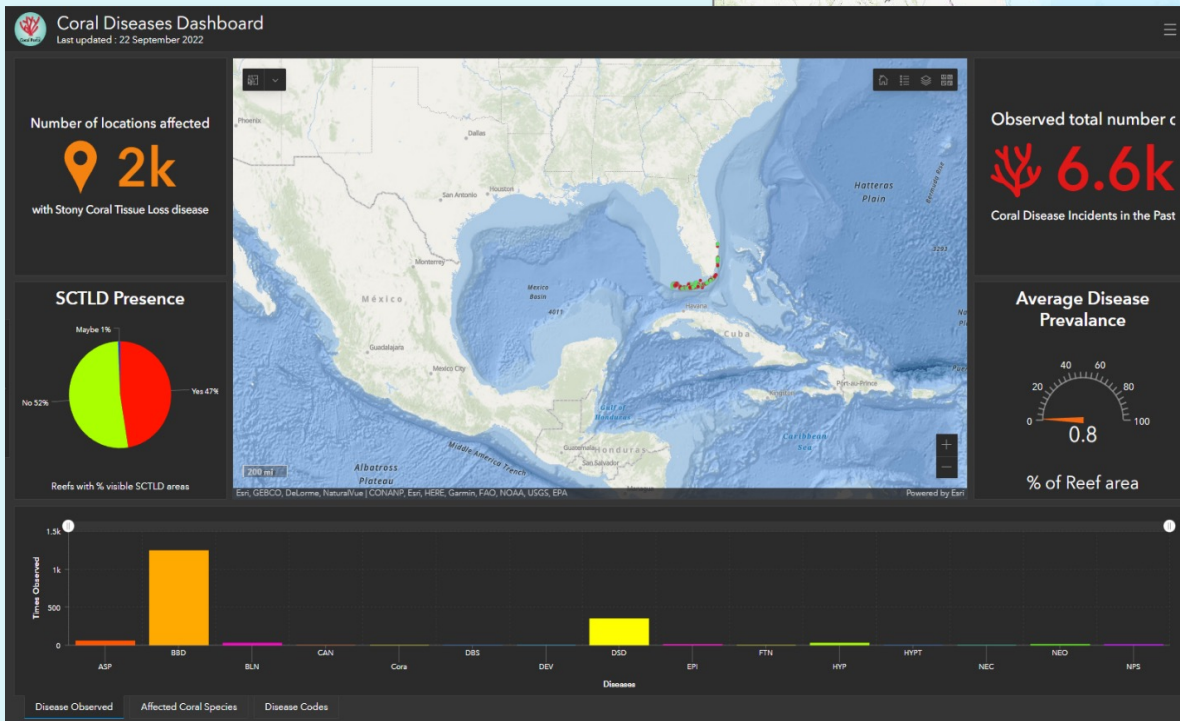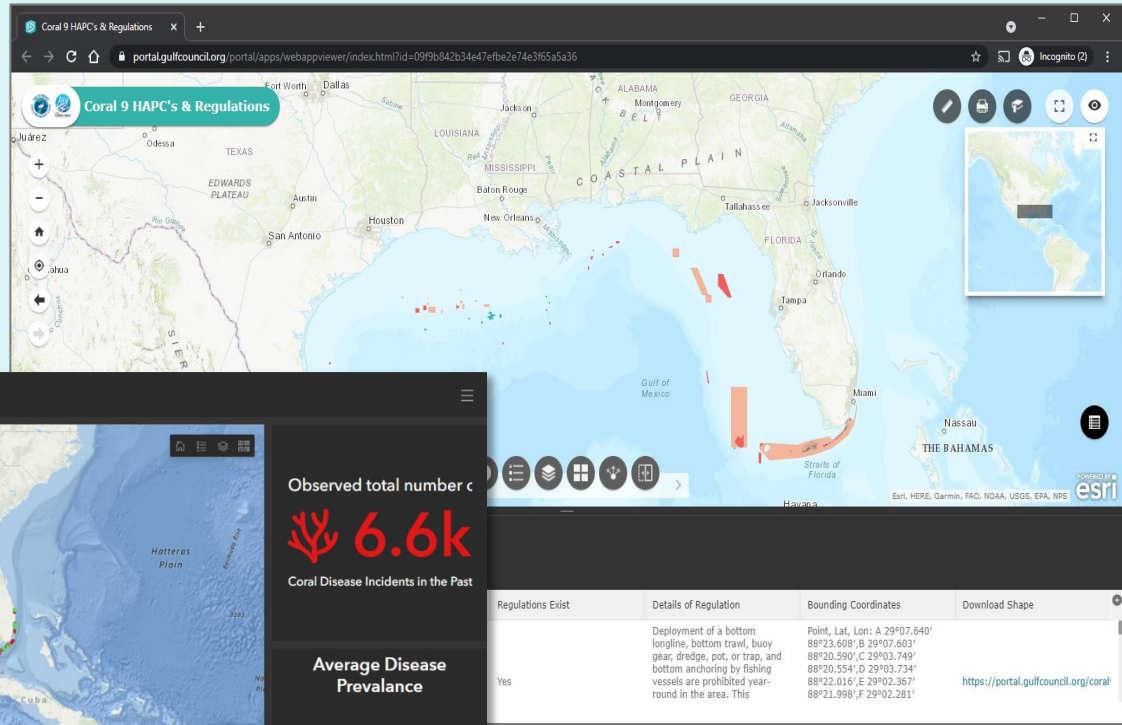
Black Corals (*Antipathes* sp.)

Ancient Corals (*Leiopathes spp.*)

Web Applications and Dashboards

Coral 9 HAPC Explorer Application. Displays the HAPCs established through Coral Amendment 9 in relation to other existing HAPCs in the Gulf with detailed regulations in each of them. Can be accessed from **https://portal.gulfcouncil.org/coral9/**
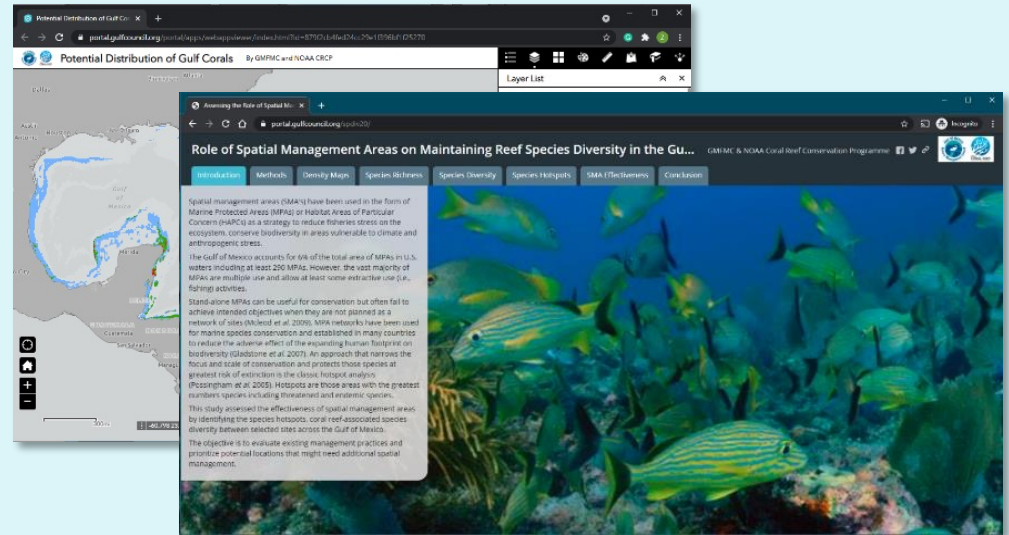

Coral Disease Dashboard. Highlights coral disease occurrence in the Gulf with data sourced from partner agencies. Can be accessed at **https://portal.gulfcouncil.org/coraldisease**
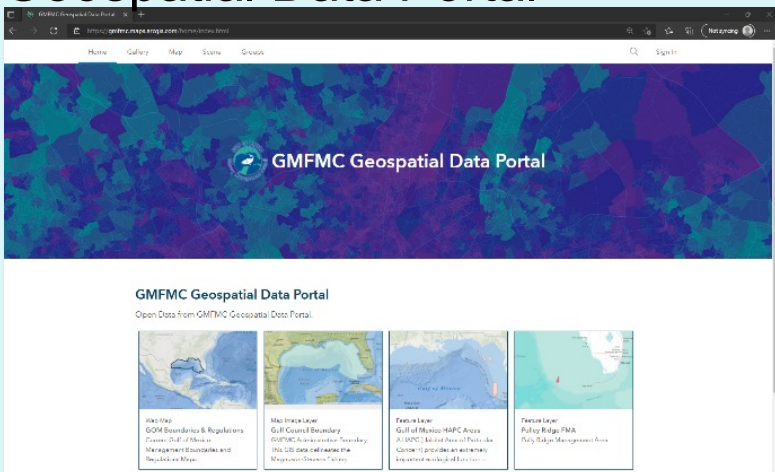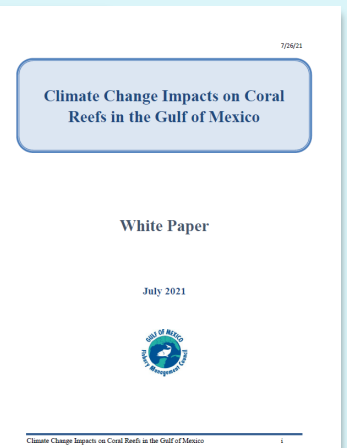
Engagement and Outreach

Online Surveys
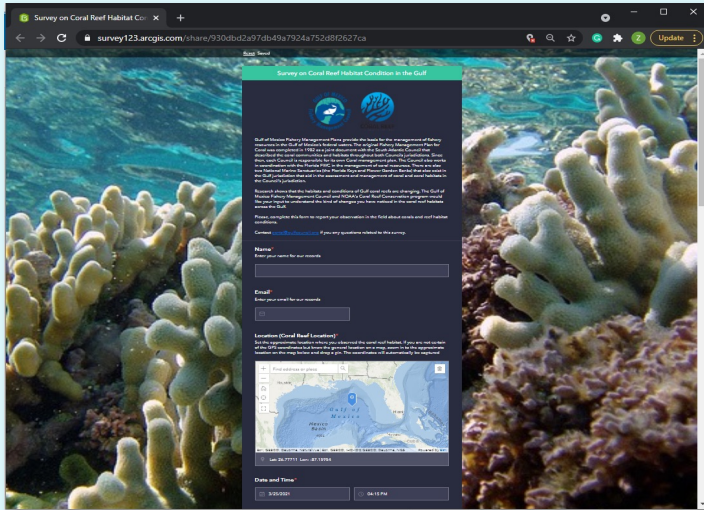
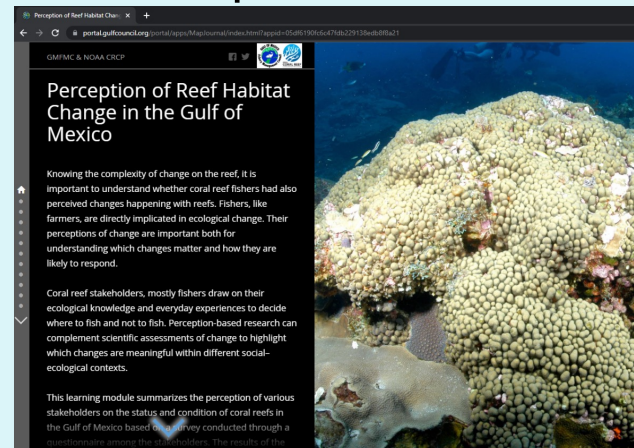

Interactive Web Modules

Geospatial Data Portal

White Papers

Guides on Gulf Corals

Printable flash cards on **ESA listed coral species** and waterproof guides for common coral species from the Gulf are available in hard copy and as a downloadable **electronic pdf format** on the portal.

Takeaways

Fisherman Feedback:	Great Red Snapper Count	Ecosystem Modeling	Coral Grant

• Reaches recreational anglers that don't usually participate in the Council process
  • Large ROI
• Ground truthing trends identified in stock assessments
• Identifies ecosystem indicators
	• Developed rigorous, collaborative review process for integrating novel science into management
	  • Can be applied to future efforts
		• Made progress towards integrating environmental factors into management and catch advice	• Improves understanding of linkage between habitat and associated fisheries to support ecosystem management
			  • Provides resources to develop interactive stakeholder tools