




Mesophotic & Deep Benthic Communities Restoration



Gulf of Mexico Fishery Management Council
Coral Advisory Panel/Scientific & Statistical Committee
February 8, 2022

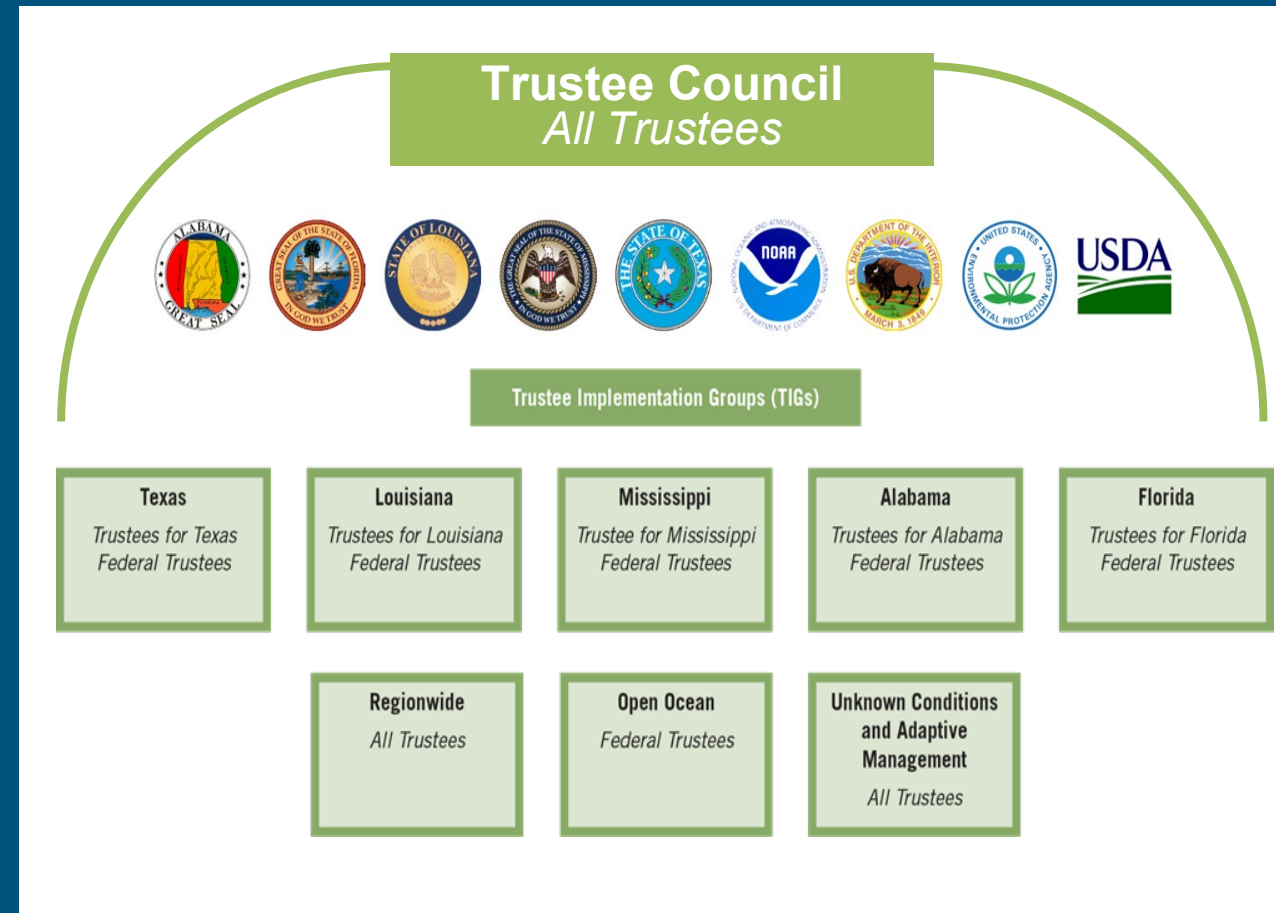


Overview

- Deepwater Horizon and Mesophotic and Deep Benthic Communities (MDBC) injury, restoration goals, and projects.
- MDBC Project Objectives and Planning Phase Highlights
- Implementation Phase Activities for 2022-2023
- Discussion

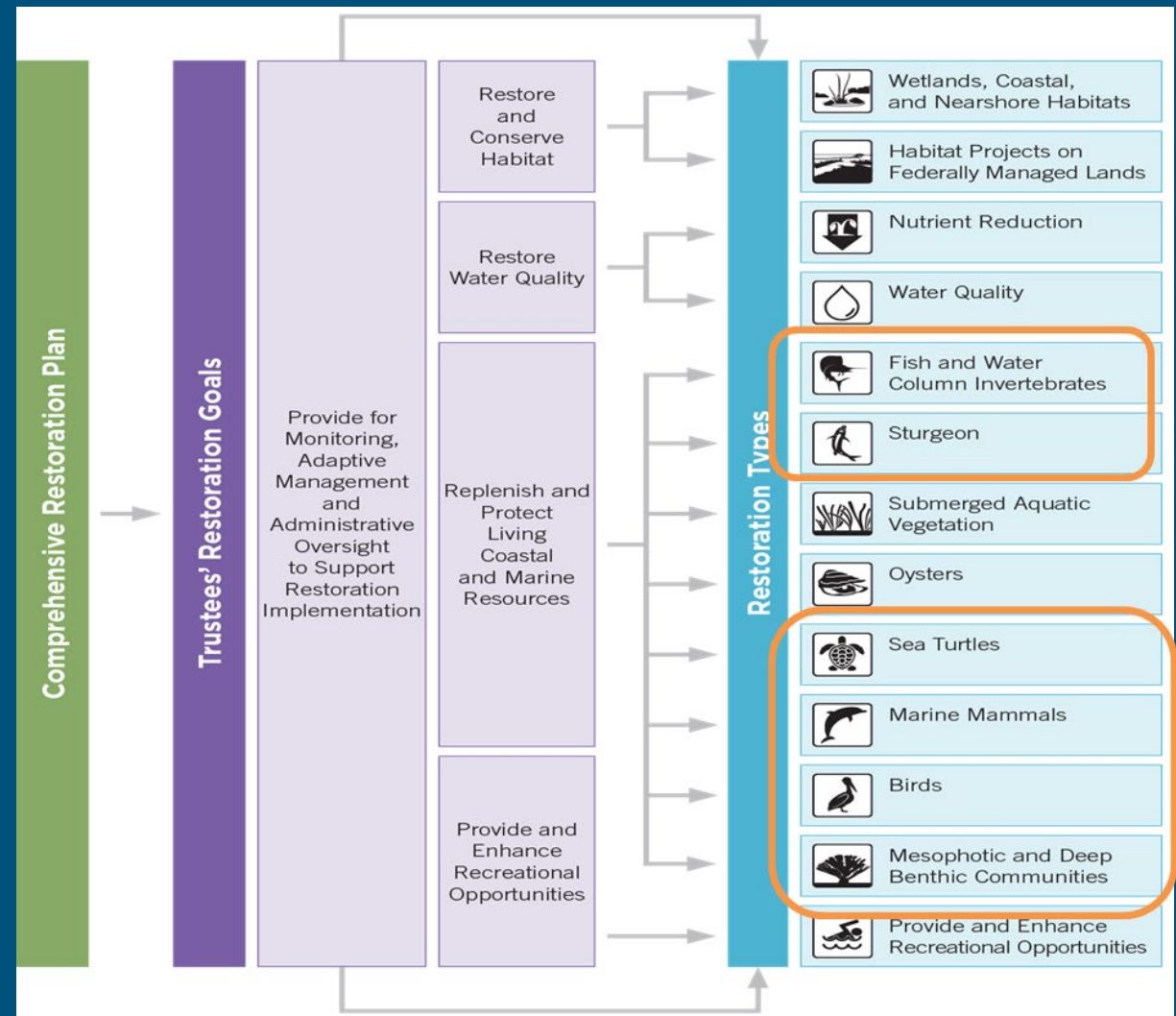
Deepwater Horizon Natural Resource Damage Assessment

- Natural Resource Damage Assessment (NRDA) is a legal process guided by the Oil Pollution Act to make the environment and public whole for injuries to natural resources and services.
- *Deepwater Horizon* was the largest offshore oil spill in U.S. history.
- 2016 NRDA settlement provided for payments up to \$8.8 billion over 15 years.



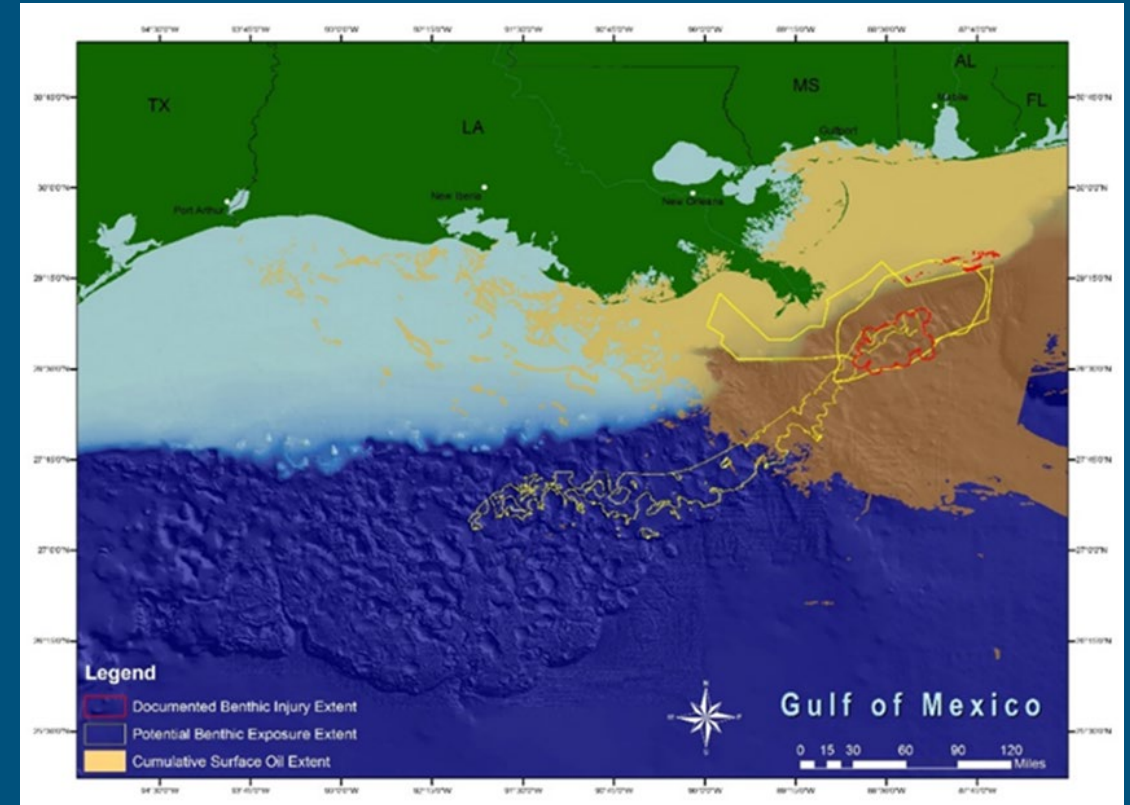
Open Ocean Trustee Implementation Group

- Restores wide-ranging and migratory species throughout their geographic range
- Total Allocation: ~1.2B
- Currently implementing 29 projects totaling approximately \$290M



Mesophotic & Deep Benthic Communities

- Total Natural Resources Damage MDBC Settlement: \$273.3M
- DWH Restoration Goals:
 - Improve understanding of mesophotic and deep-sea communities to inform better management and ensure resiliency.
 - Actively manage valuable mesophotic and deep-sea communities to protect against multiple threats and provide a framework for monitoring, education, and outreach.
 - Restore mesophotic and deep benthic invertebrate and fish abundance and biomass for injured species



Quantified injury to over 2,000 km² of injured benthic habitat and substantial losses to resident corals and fish.

MDBC Restoration Project Portfolio



- Mapping, ground-truthing, and predictive habitat modeling -- \$35.9M
- Habitat assessment and evaluation -- \$52.6M
- Active protection and management -- \$20.7M
- Coral propagation technique development -- \$17.0M

Timeline: **2 yr Planning Phase**, 5 yr Implementation, and 1 yr final reporting

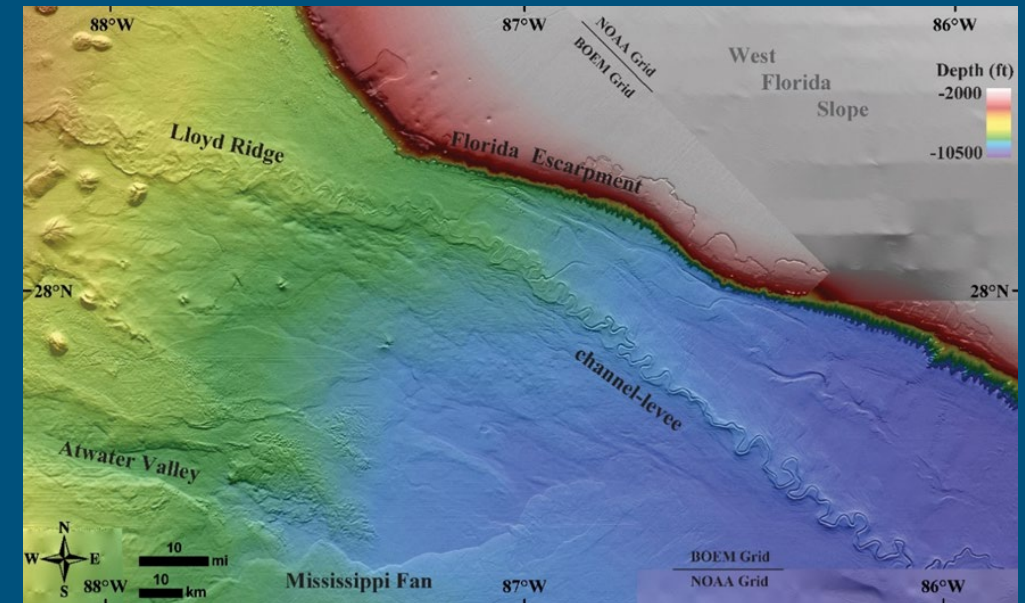
Implementation Phasing Approach

- Initial 2 year implementation planning period
 - Strategic Planning
 - Adaptive Management Plan
 - Coordinated management of cross-cutting project requirements
 - Public Engagement Plan
- 5 year implementation
- Final year reporting



Mapping, Ground-Truthing, and Predictive Habitat Modeling Project

- **Project Goals:** document abundance and distribution and gain a better understanding of their extent, species composition, and habitat characteristics; build upon existing deep-sea coral predictive models to develop improved northern GOM regional-scale predictive models of habitat suitability for mesophotic and deep water corals.
- **Desired outcomes:** provide fundamental information to prioritize and support protection and management activities and to target locations for direct restoration.

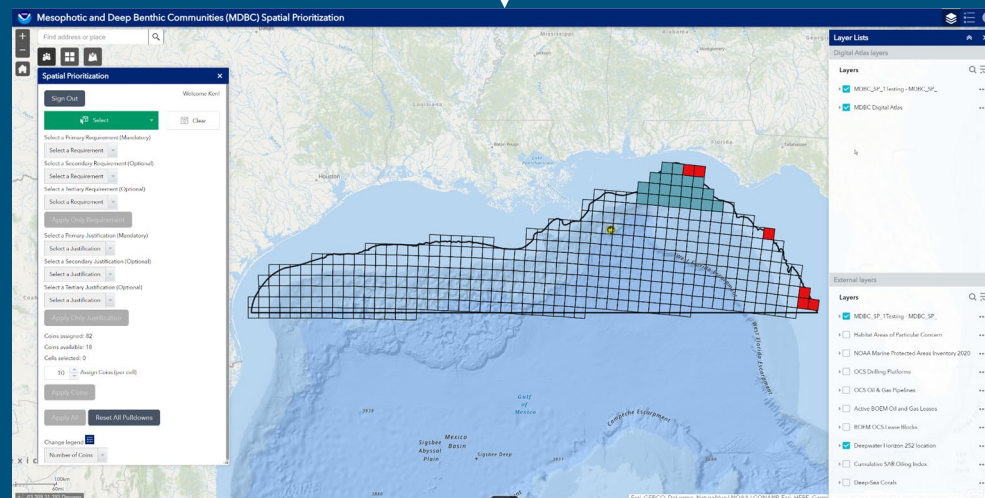


Planning Phase Highlights

Release of MGM Geospatial Inventory

Spatial Prioritization

FY22 Operational Planning
Mission plans
Partner Agreements



Seafloor mapping

Ground-truthing

Habitat models

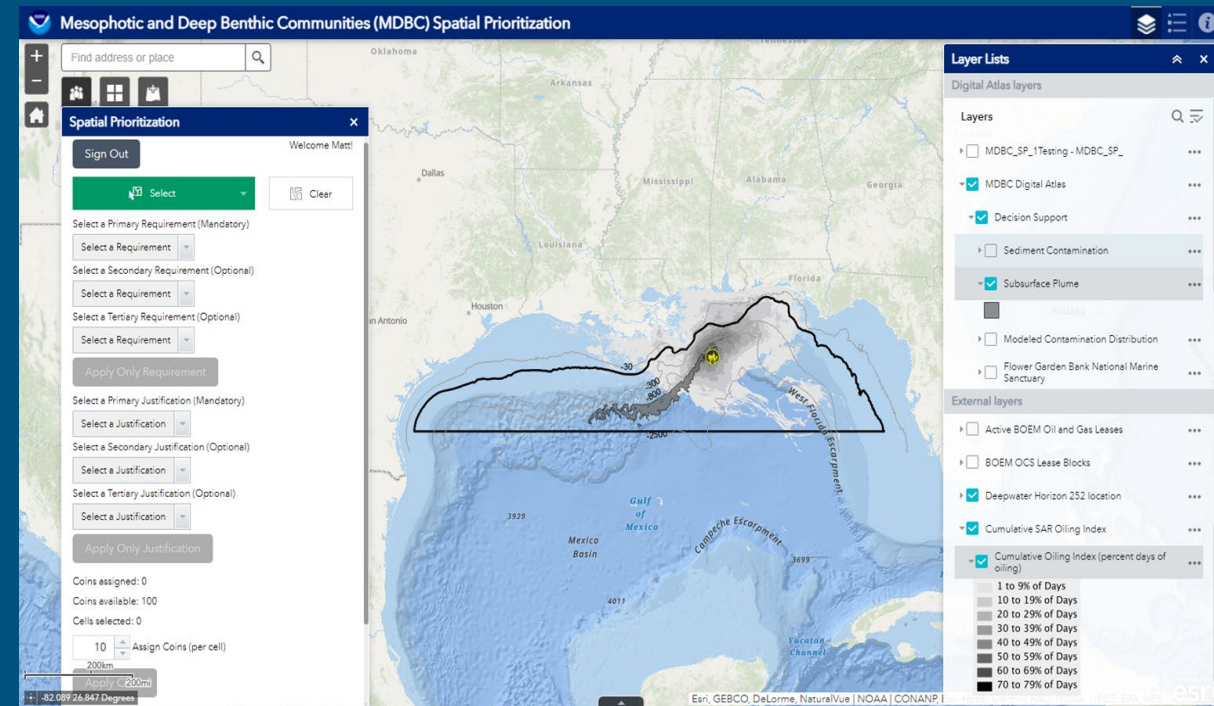
Additional stakeholder engagement through SME summits and Tech Memos in prep

Spatial Prioritization Highlights

- Overall goal is to identify high-priority areas for mapping, ground-truthing, and modelling activities to support MDBC restoration

Where- What- When- Why-

- Results are part of a process to select and justify activities conducted during the 2022-2027 NRDA implementation phase
- Geodatabase and Technical Memorandum products



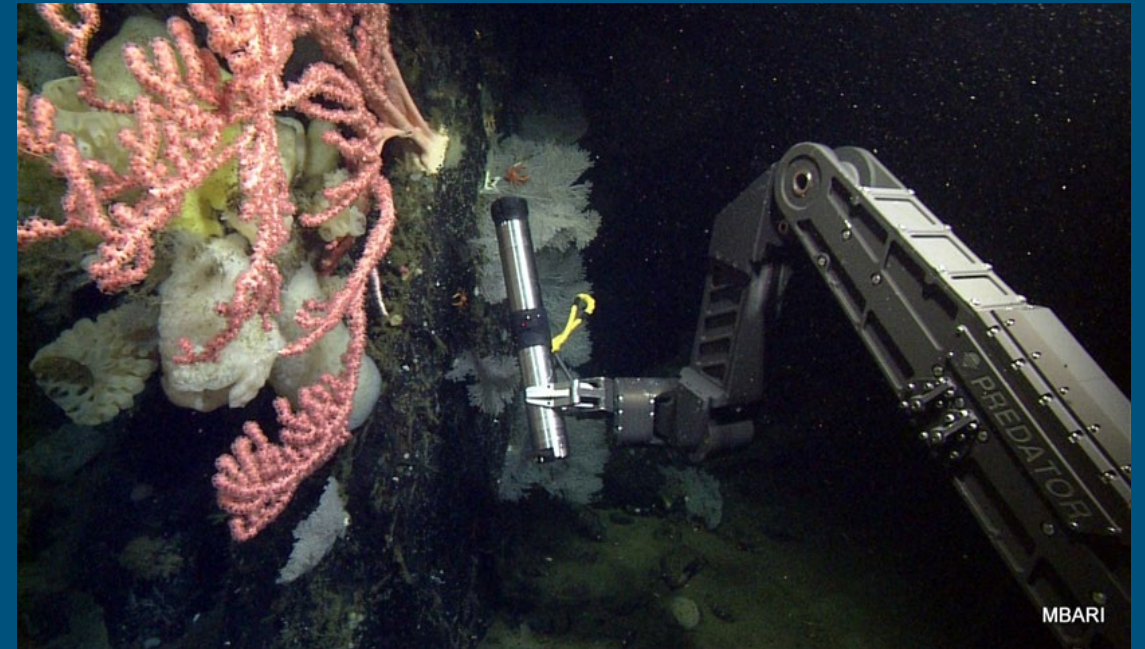
Who participated?

...64 experts from government, industry, academia, management, and other organizations fully responded.



Habitat Assessment and Evaluation Project

- **Project Goals:** fill critical gaps in our understanding of the health, biodiversity, recovery, and resilience; analyses of habitat and age and growth rates of corals; maximize restoration and protection using population genetic models.
- **Desired outcomes:** evaluate sites for potential direct restoration and protection; identify ongoing impacts and assess threats; establish a baseline for health and condition.

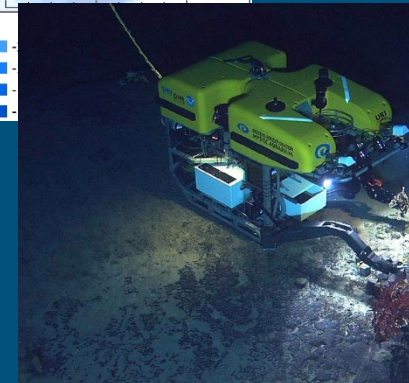
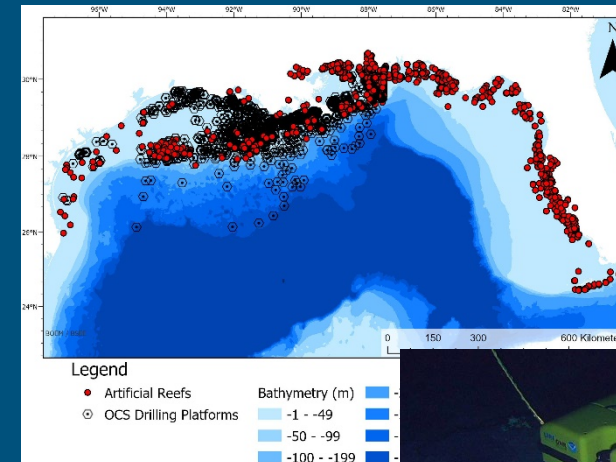


Planning Phase Highlights

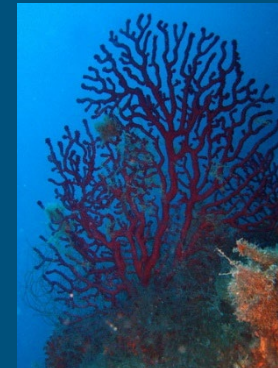
1 - Assemble a Bibliography



2 - Inventory Data

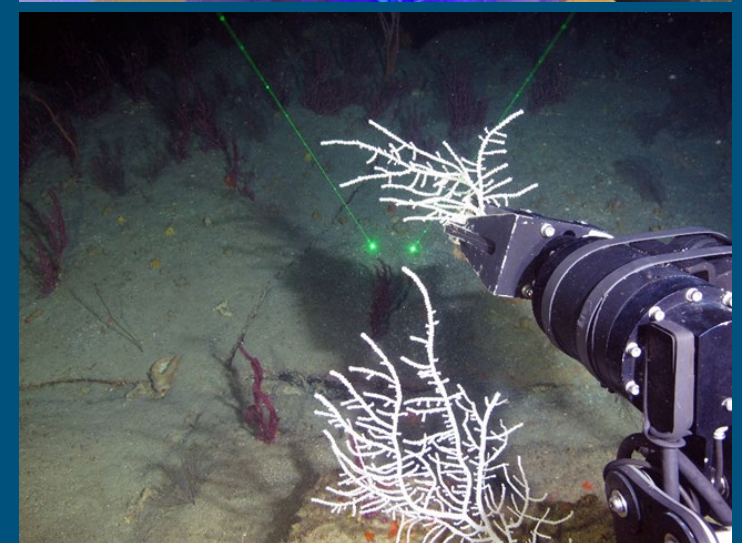
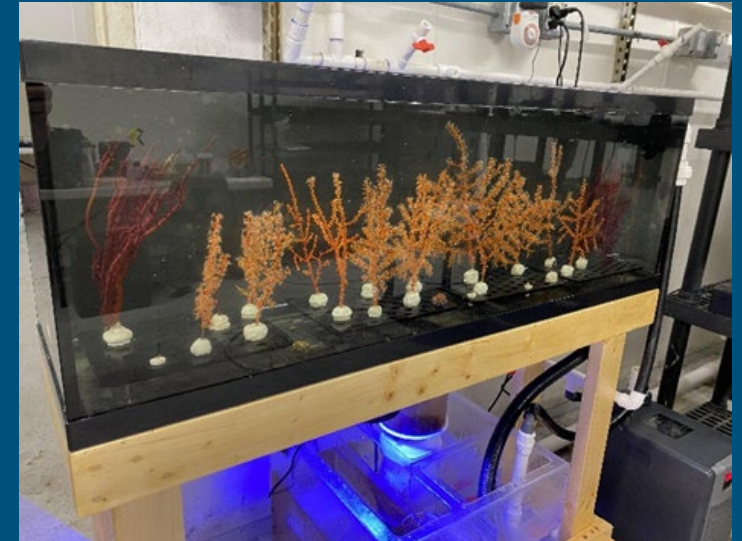


3 - Conduct a gap analysis



Coral Propagation Technique Development Project

- Develop methods and techniques for effective enhancement of coral recruitment and growth at a large scale for restoration.
- Extend studies of coral transplantation to include substrate placement for transplantation and recruitment of coral larvae; applicability at meaningful scales; and examine results of these studies across NGOM; assess knowledge gaps.
- **Desired Outcomes:** The objective of this project is to develop techniques to directly restore mesophotic and deep coral communities, and to recommend best techniques for Phase 2.





Artificial Substrate Prioritization

Data Inventory and Analysis

- Comprehensive literature review of 50+ artificial substrates
- Guided by federal working group at FKNMS, NCCOS, CRCP
- December 2022 Focus Group with subject matter experts:
 - US Navy, WHOI, MBARI, Force Blue, Gulf state agencies
 - Shared expertise in artificial reefs, robotics, tech diving
 - Surveyed this team for input and feedback

Focus Group Survey Results

- **Preferred structure types:** natural boulders, sculpted concrete structures, larger aggregate structures
- **Recommended approach:** coral nurseries, “seeded” settlement tiles
- **Strategies** to include active propagation and passive recruitment
- **Recommend** to deploy substrates in mesophotic and deep
- **Monitor** for 1-2 years with ARMS and landers b4 deployment
- Start work in the **mesophotic zone** to adapt shallow methods with tech divers and then pursue deep-sea work using submersibles

Aggregate
Structure



Thanner et al 2018

Sculpted
Concrete
Structure



Ocean Rescue Alliance (2021)

Pilot
Coral
Landers



Linares et al 2020

Autonomous
Reef
Monitoring
Structures



Georgen et al 2020

Active Management and Protection Project

- **Project Goals:** enhance public awareness and perform active management and protection activities; education and outreach targeting MDBC resource users and the public; engage stakeholders and develop socioeconomic analyses; and directly address threats through management activities.
- **Desired Outcomes:** Provide information to managers and conduct activities to maintain ecological integrity and increase ecosystem resilience.



Planning Phase Highlights

- **Education & Outreach –**

- Website / Social media
- Partnerships (Universities, AZA, NGO'S)
- Displays & Exhibits (Museums, Zoos & Aquariums, Nature Centers)
- “Telepresence” – project expeditions

- **Threat Reduction –**

- Marine Debris – assessment & removal
- Invasive Species – management
- Mooring buoy - installation
- Risk Assessment

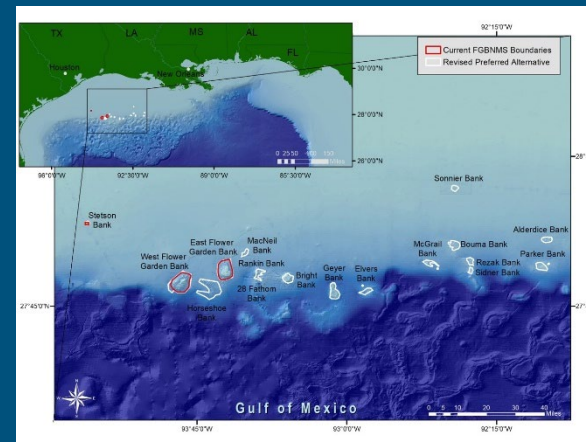
- **Protected Area Management –**

- Ongoing efforts to identify & protect MDBC areas (NOAA/ONMS, GMFMC/HAPC, BOEM)
- Conduct socioeconomic analysis support



Education & Outreach

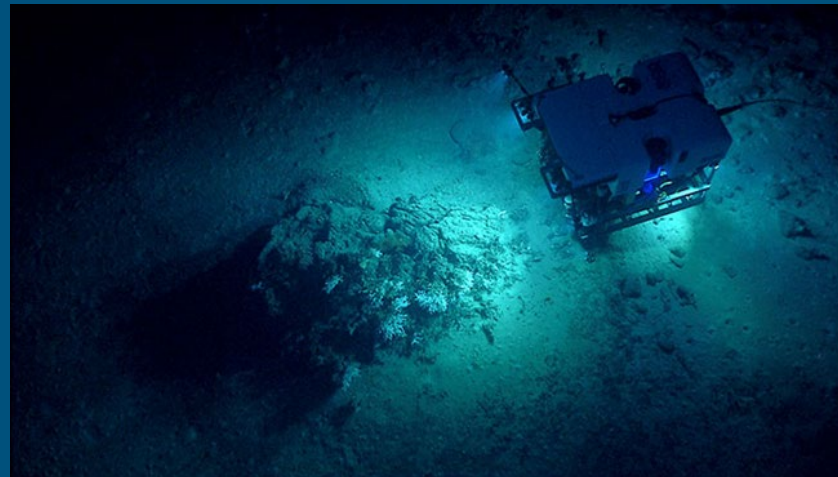
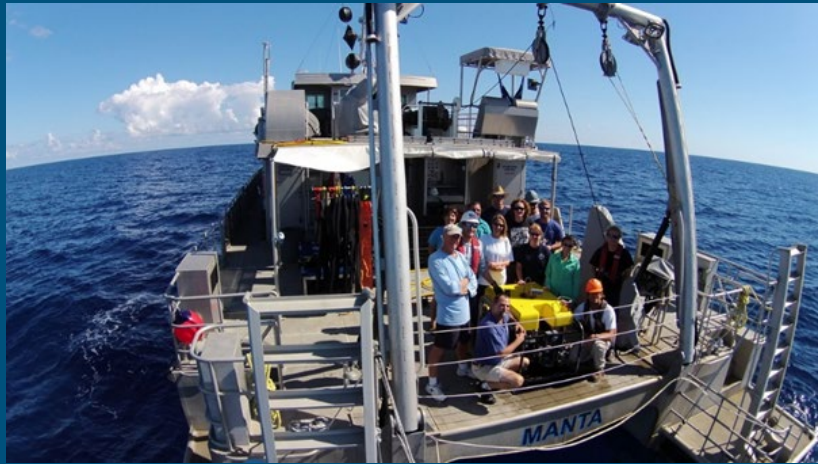
Threat Reduction



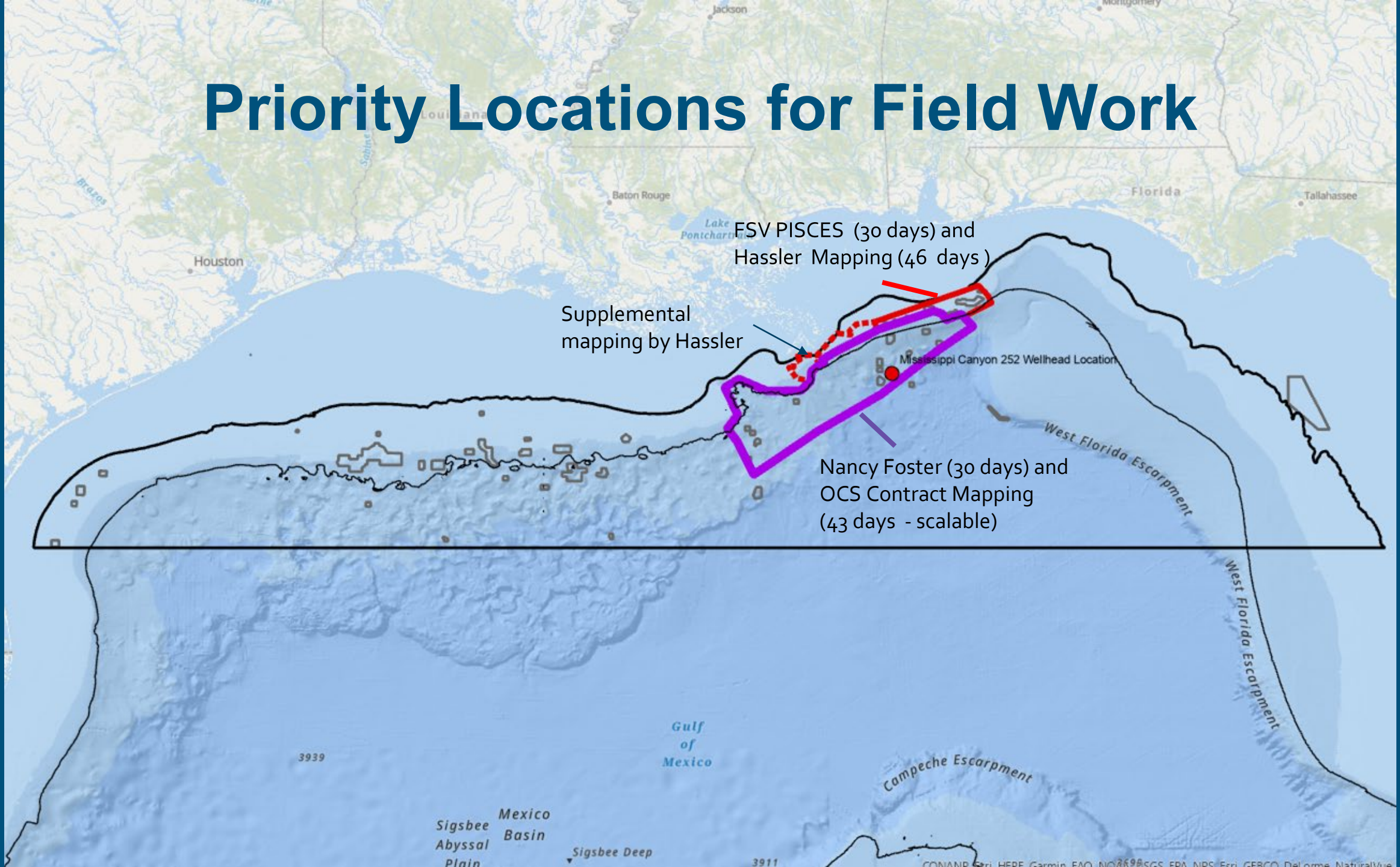
Protected Area Management



Scope of 2022 At-Sea Activities

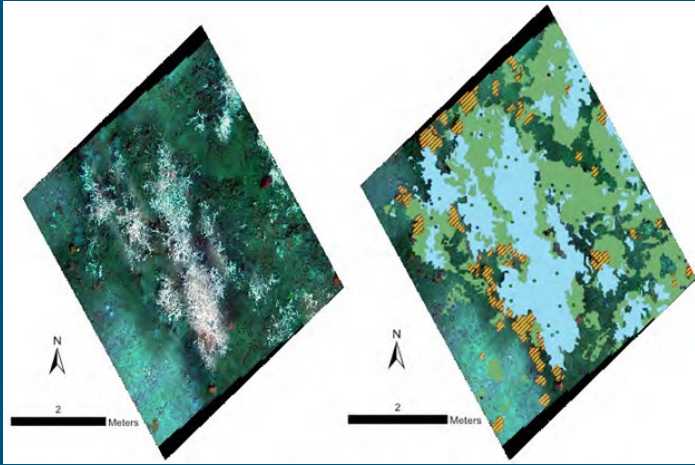


Priority Locations for Field Work

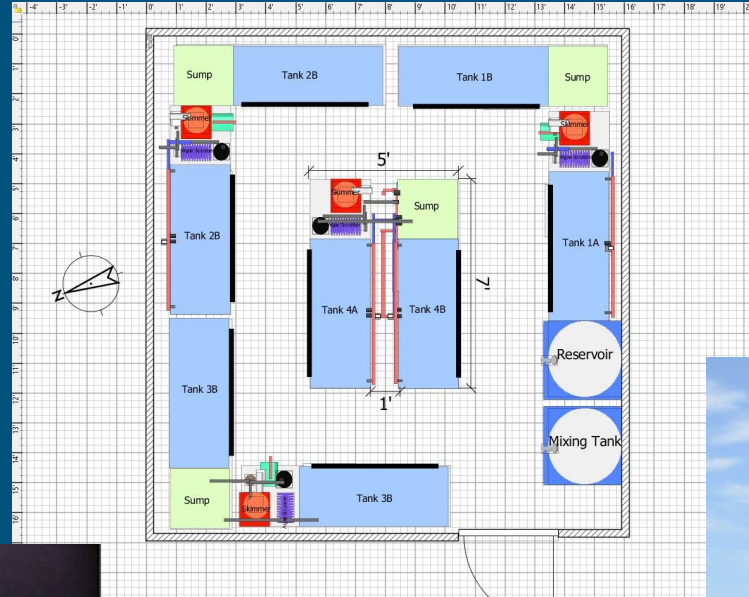


MDBC Planned Implementation Activities 2022		
Cruise	Duration	Timeframe
Ferdinand Hassler - no ROV or AUV	60 DAS	Apr - Jun 2022
Point Sur w/ ROV Global Explorer	14 DAS	Jun 2022
Pisces w/ ROV Mohawk + Remus 600 AUV	30 DAS	Jun - Jul 2022
Manta w/ ROV Beagle	12 DAS	Aug 2022
Nancy Foster w/ ROV Global Explorer	30 DAS	Aug 2022
Manta w/ ROV Mohawk	6 DAS	Sept 2022
Point Sur no ROV or AUV	21 DAS	Sept 2022
Point Sur w/ ROV Mohawk	5 DAS	Oct 2022
OCS Contract Cruise	30 DAS	Summer/Fall 2022

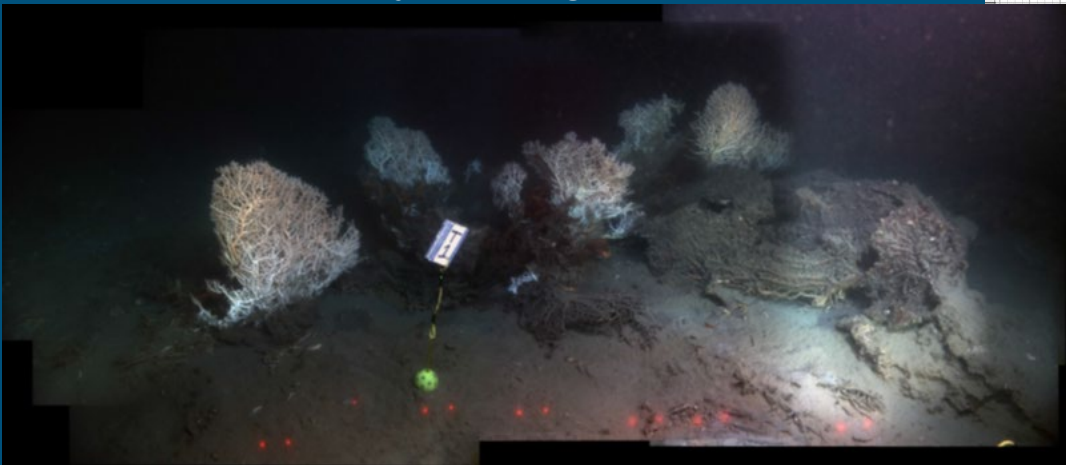
Scope of 2022 Shore-side Activities



Photomosaic assembly and digitization



Coral propagation
lab development



Coral community metrics



Partnership development

Questions? Discussion?

