

Monitoring Living Shorelines in Mississippi: Integrating Outcomes for Broader Restoration Success

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Living Shorelines

NRDA Early Restoration



St. Louis Bay

2.3 miles



Hancock County marsh

5.9 miles

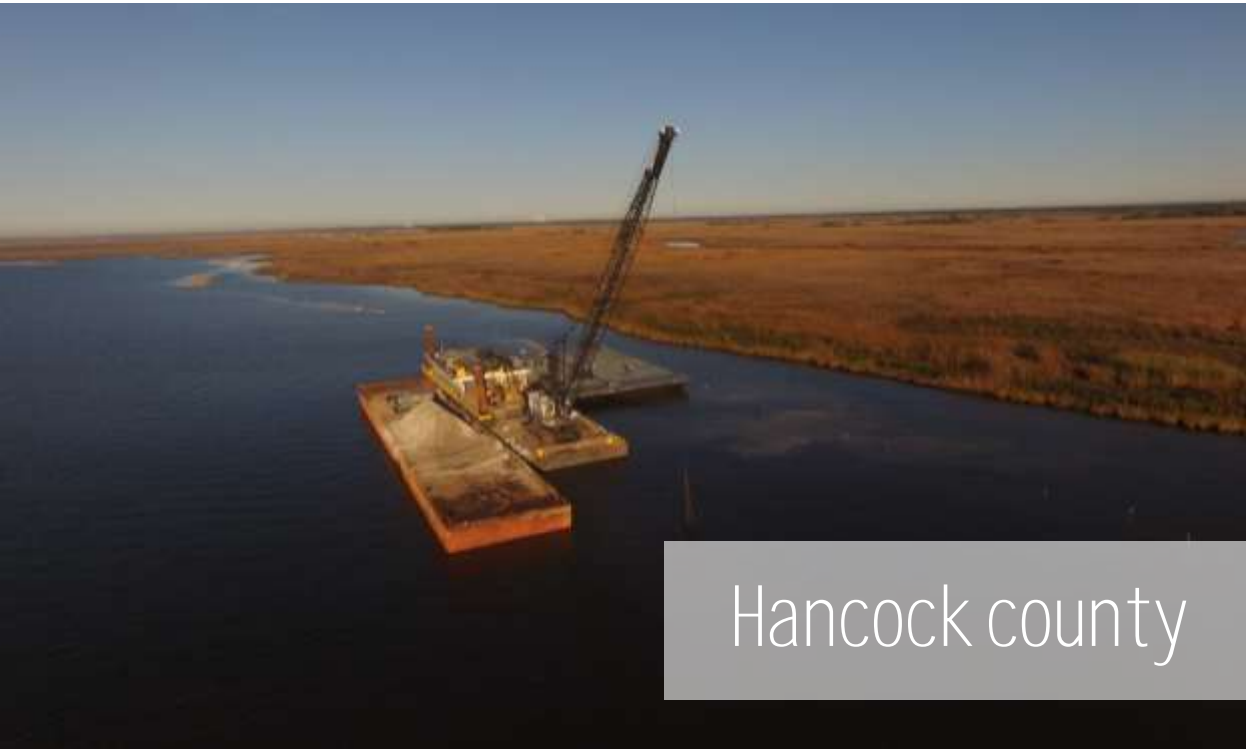


Back bay of biloxi

1.8 miles



Phase III - Hancock County Marsh Living Shoreline



Objectives

1. Reduce Wave Energy
2. Reduce Rate of Shoreline Erosion
3. Support habitat utilization

Monitoring Parameters to Address Objectives

Dimension (Reef): elevation, area

Dimension (Marsh): marsh edge, slope

Oyster Density

Non-bivalve invert infauna and epifauna

Phase IV – Living Shorelines and reefs in Mississippi estuaries



Objectives

1. Build breakwaters that are sustained
2. Reduce Shoreline Erosion
3. Support habitat utilization

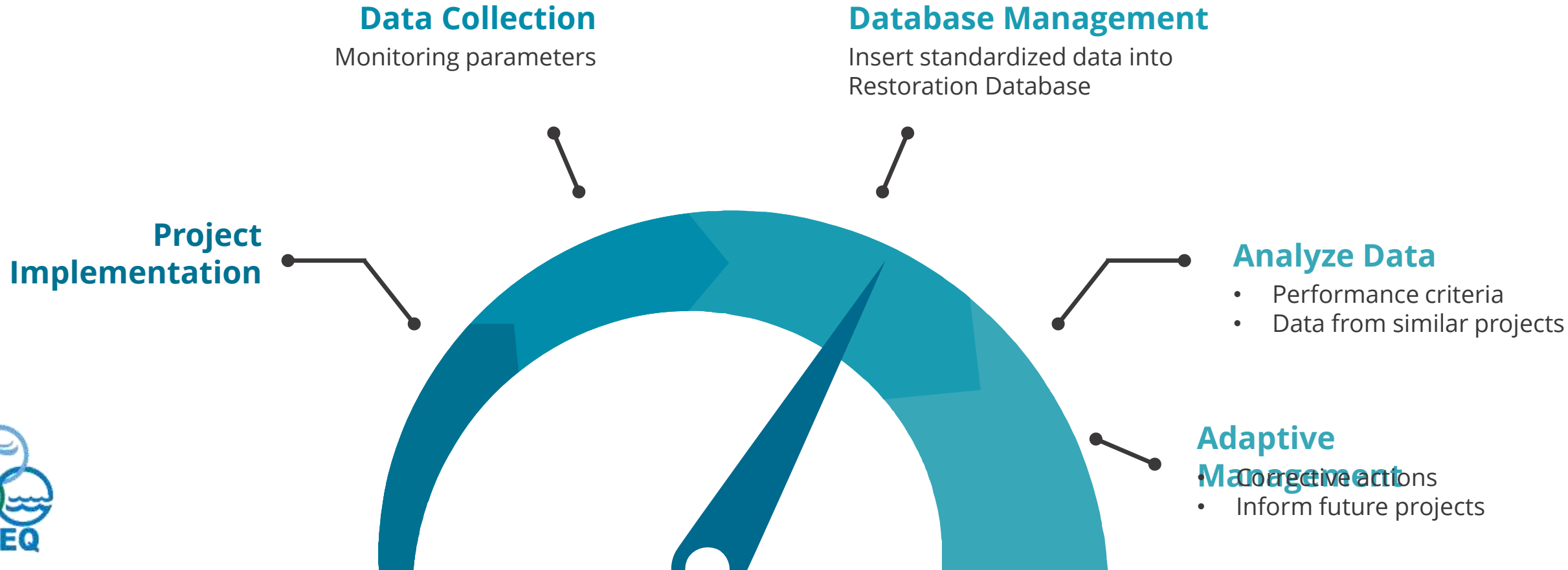
Monitoring Parameters to Address Objectives

Dimension (Reef): elevation, area

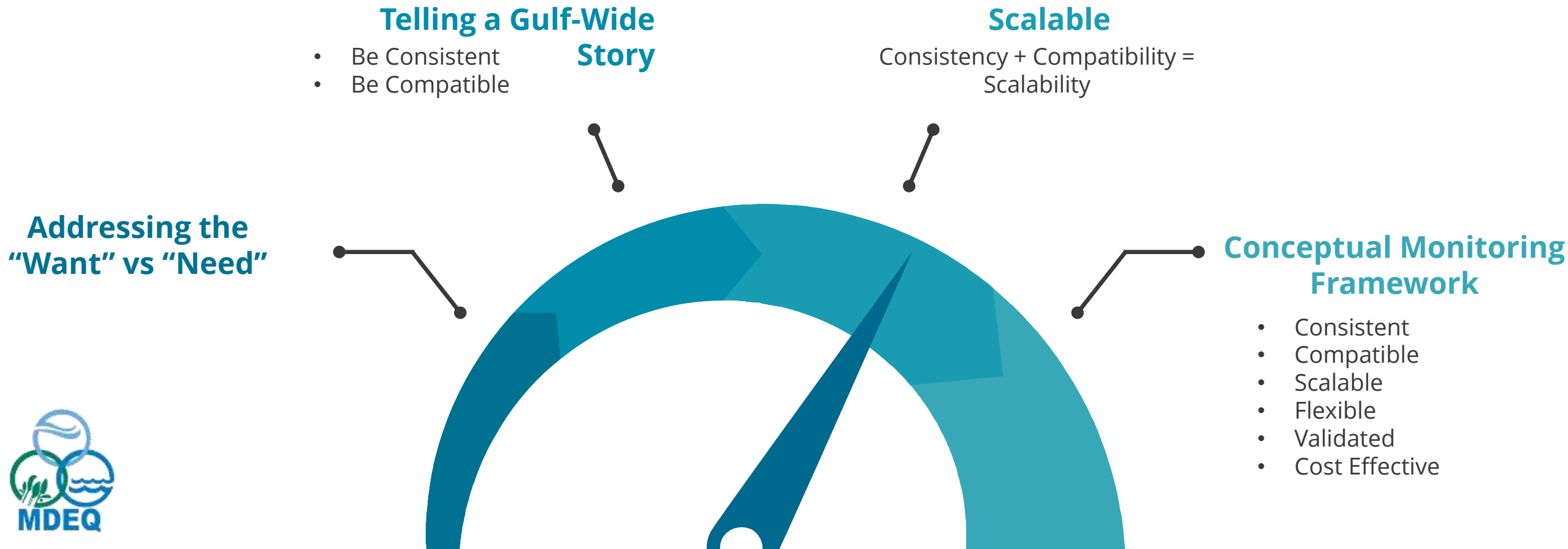
Dimension (Marsh): marsh edge, slope

Infauna and epifauna biomass, sp comp

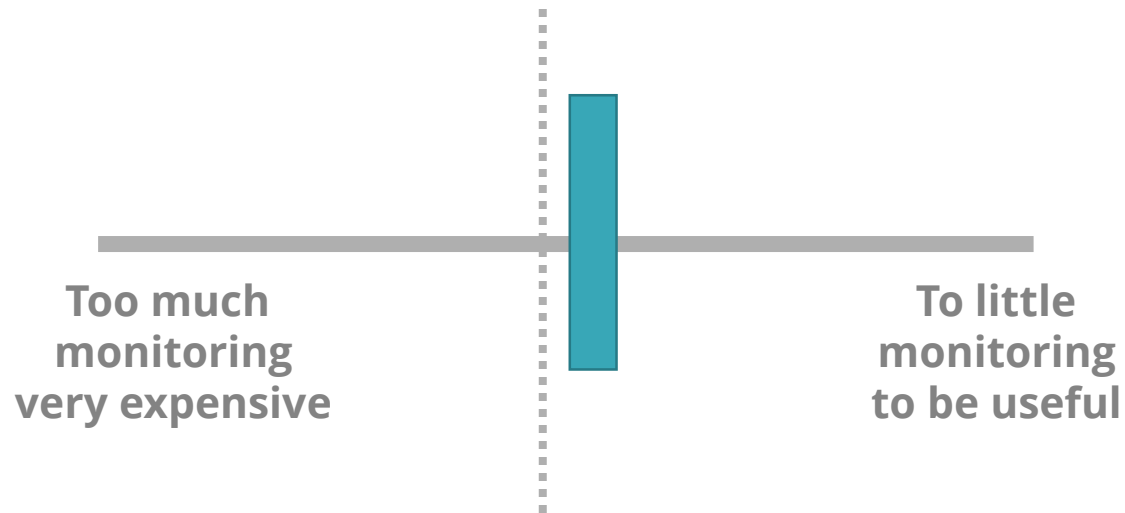
Moving the needle of restoration – Project Level



Moving the needle of restoration – bigger picture



Where do we start?



What data types are needed?

There is a huge amount of information to collect for every project



How much will it cost?

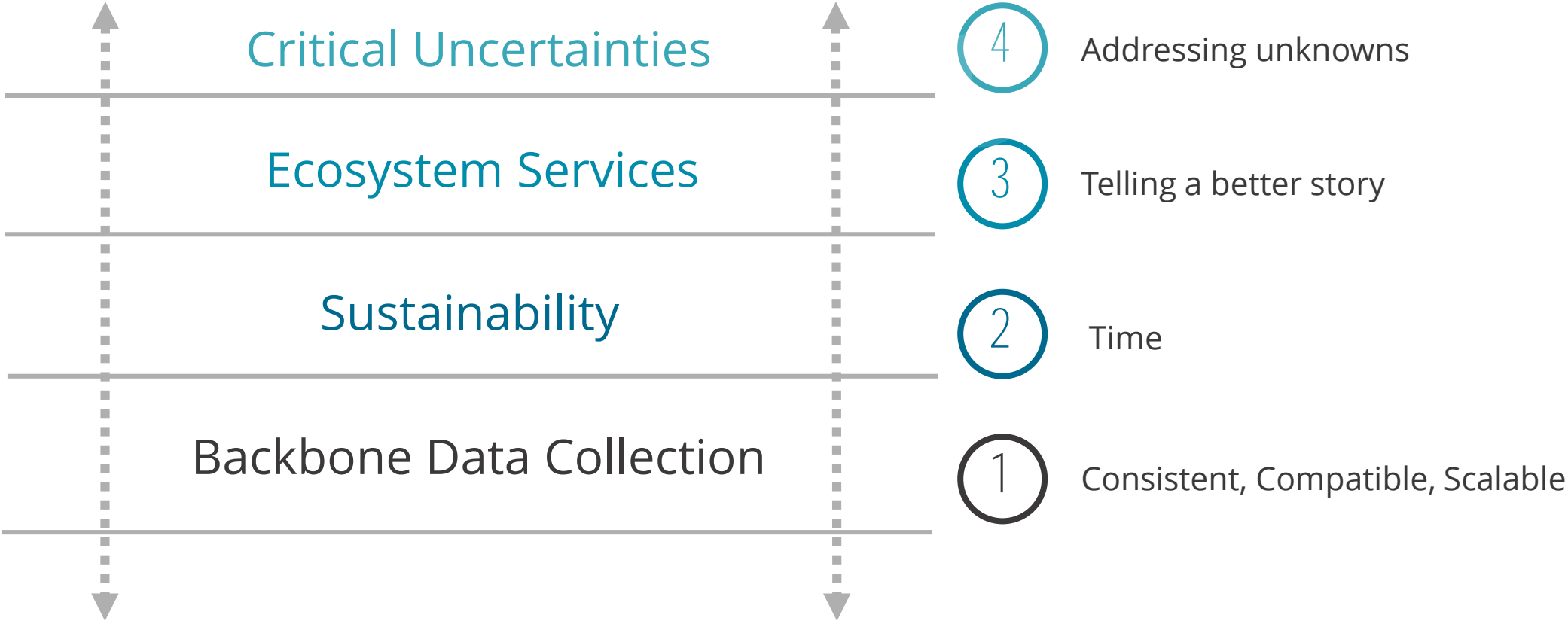
Balance the “want” vs “need”



Win-Win Scenario

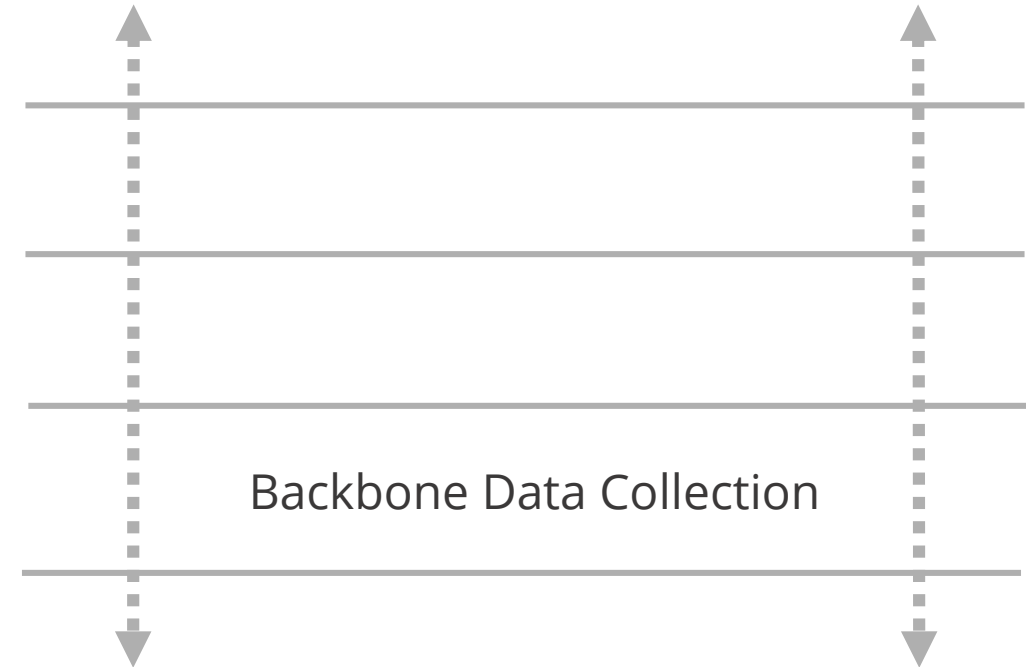
Scientifically valid and can inform decision making down the road

Monitoring Framework



Monitoring Framework – Tier 1

- Tier 1 is the minimum requirement for monitoring for all projects, programs, and activities
- Identified broad consistent data types across all projects that will ensure:
 - Document progress
 - Showcase results
 - Project objectives are achieved
- Data types are consistent, scalable, and provide opportunities to link to:
 - Sustainability
 - Ecosystem services
 - Comprehensive ecosystem success



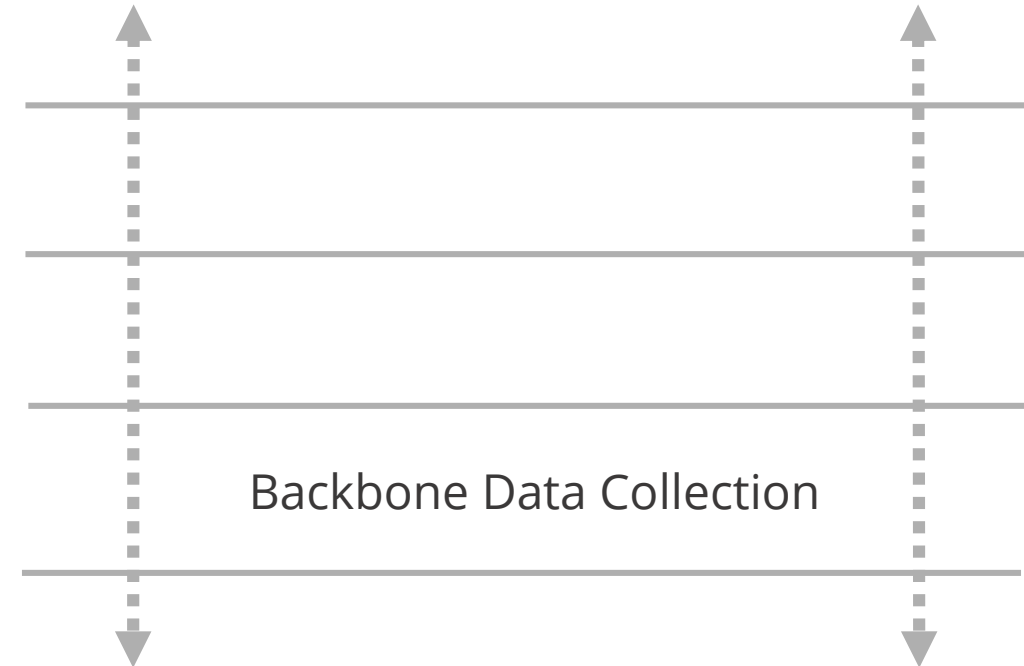
Monitoring Framework – Tier 1

Three Backbone Data Types:

1. **Extent:** X,Y,Z
2. **Density/Biomass:** Species specific measurement of success of planting or recruitment for a specific habitat restoration. Density should be calculated as number of individuals per unit area.
3. **Species Composition:** A simple measure of species richness of the community of the habitat restored.

With these three data types a number of analyses can be performed:

- Diversity metrics (Alpha [α], Beta [β], Gamma [γ] diversity)
- Extent change analyses
- Community composition, abundance (i.e., oyster abundance $dn/dt \geq 0$)



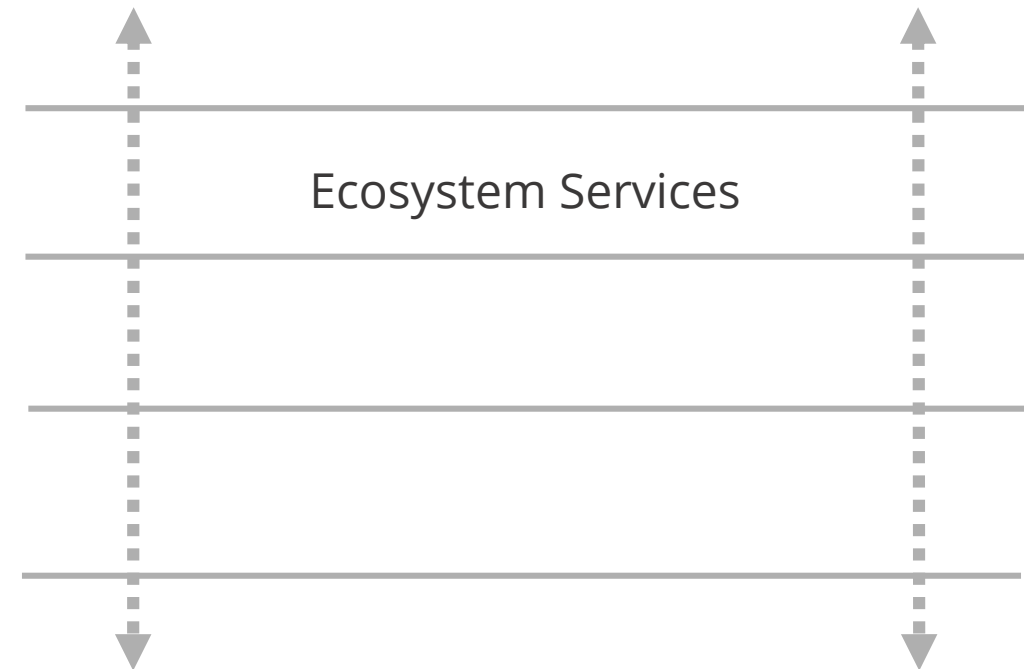
Monitoring Framework – Tier 2

- Tier 2 is a set of data collection efforts that adds a sustainability metric to the associated project, program or activity
- These data build on Tier 1 data to capture the success of the project towards sustainability of the restoration effort
- Sustainability metrics are **habitat type specific**, and consistent among similar project types across the Gulf.
- LS Example: Salinity
 - Too low: lack of oyster recruitment and viability of oysters
 - Too high: predation from oyster drills



Monitoring Framework – Tier 3

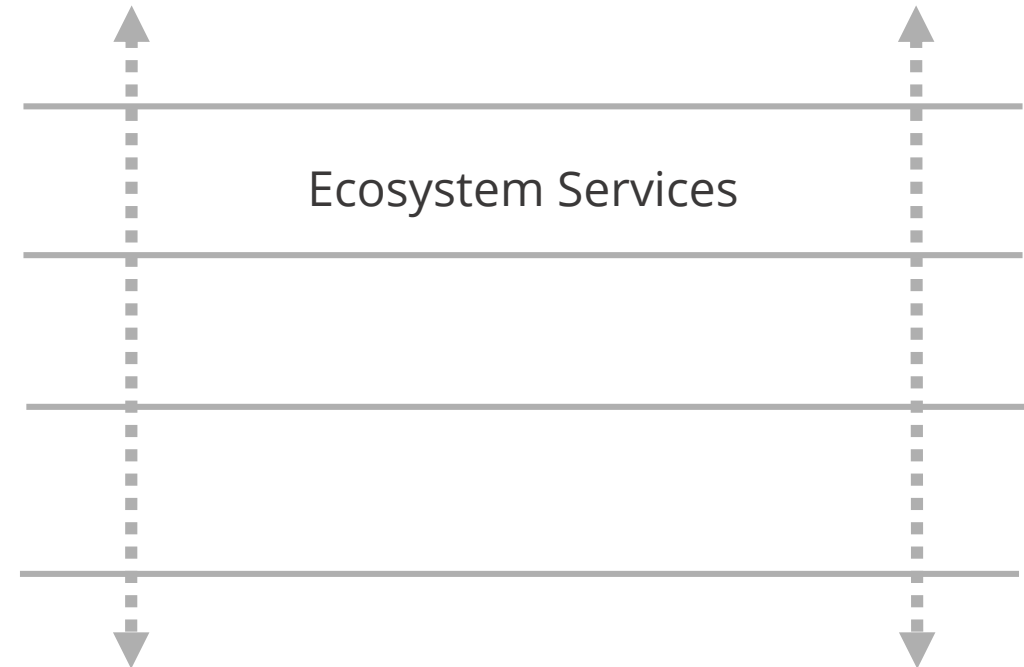
- Tier 3 is a further set of data collection efforts that build on Tier 1 and 2 to provide selective ecosystem service benefits
- These data collection efforts can be tied to values data / public perception data to provide true ecosystem services
- Ecosystem service data collection can occur two ways:
 - Specific metrics to a specific service (ecosystem service)
 - General metrics to enhance knowledge about ecosystem service tradeoffs (habitat condition / resilience)



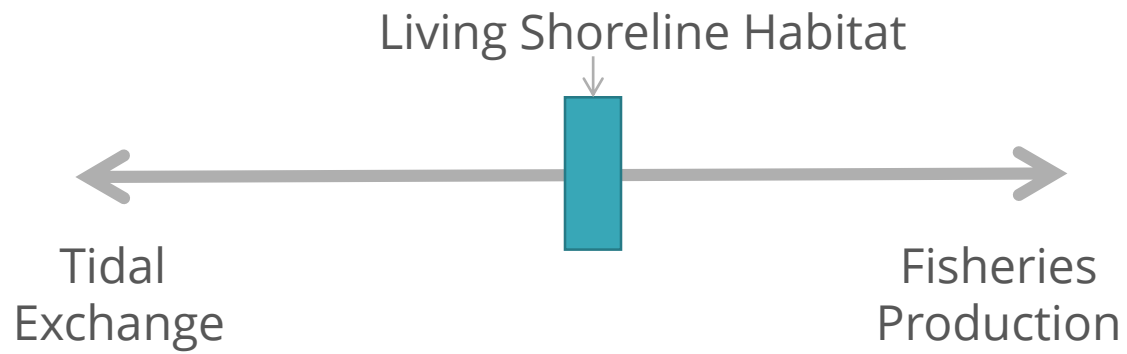
Monitoring Framework – Tier 3

Ecosystem Services Can Include:

1. Raw materials (including marine food production, wildlife, timber, oyster shell)
2. Biodiversity
3. Carbon sequestration
4. Flood protection
5. Water quality
6. Aesthetics
7. Education and Environmental Knowledge
8. Recreation and Tourism

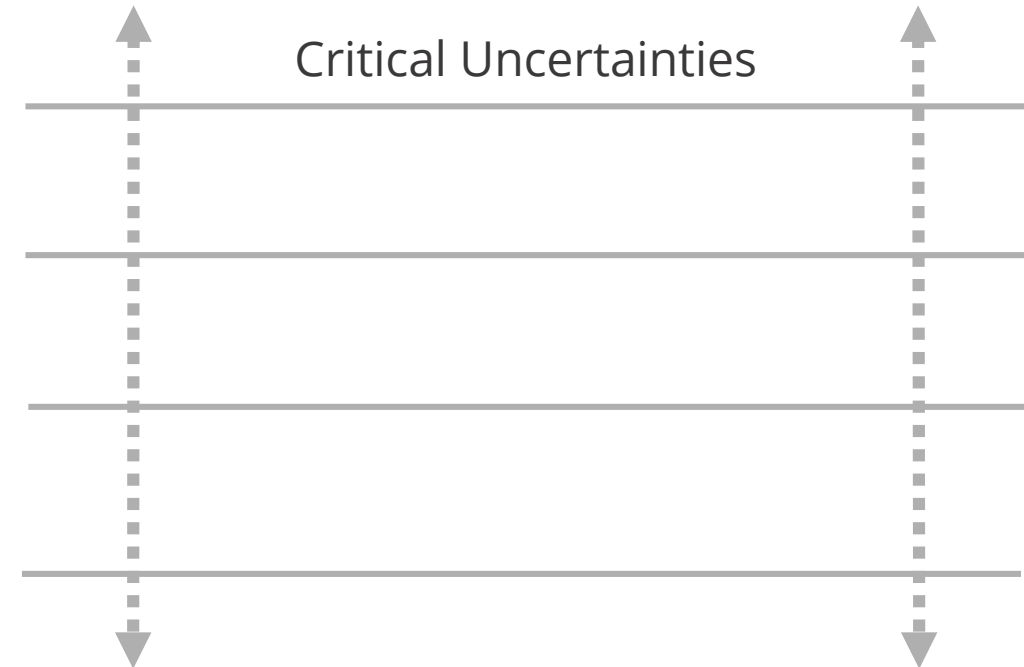


Monitoring Framework – Tier 3



Monitoring Framework – Tier 4

- Tier 4 are data collection efforts that build on the Tiers 1-3 to address critical uncertainties associated with the project, program, or activity
- Data needs would be front loaded through prior gap analysis or management/planning effort
- These data are meant to improve the science of restoration specifically about impacts related to the specific restoration project, program, or activity
- Example: Impacts of freshwater diversions on secondary production



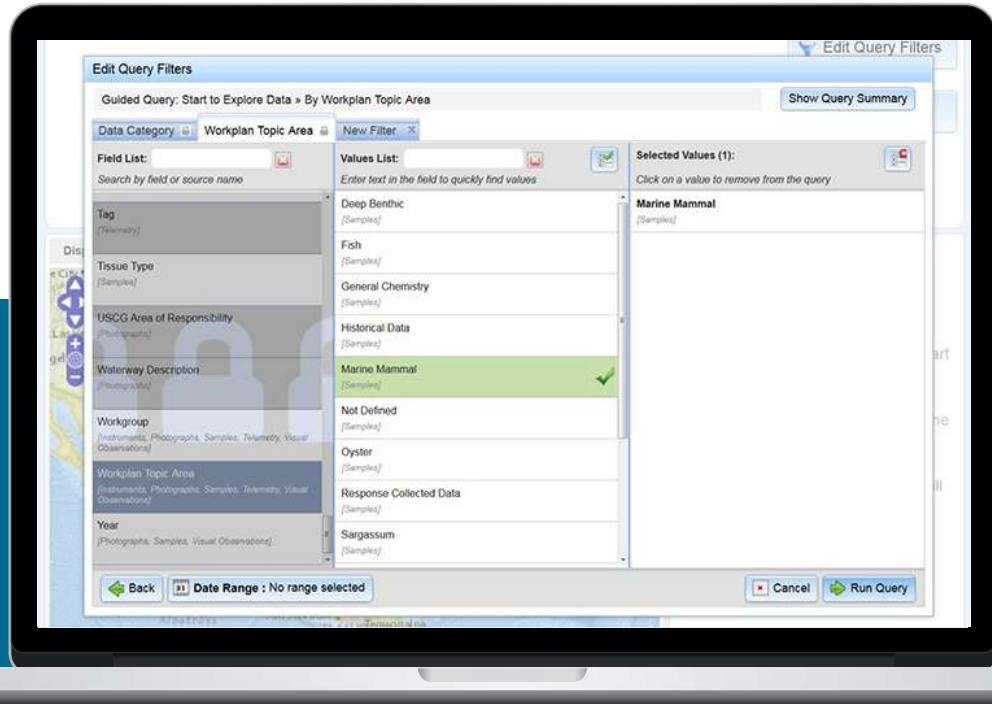
Bringing it all together



NRDA



Restoration database Discoverable, Accessible, & usable data



GOAL: Establish a restoration database to include all monitoring information associated with Deepwater Horizon funded projects which will be accessible and discoverable by the entire restoration community.

End – Thank You

