

Indicators and Assessment Framework for Ecological Health and Ecosystem Services

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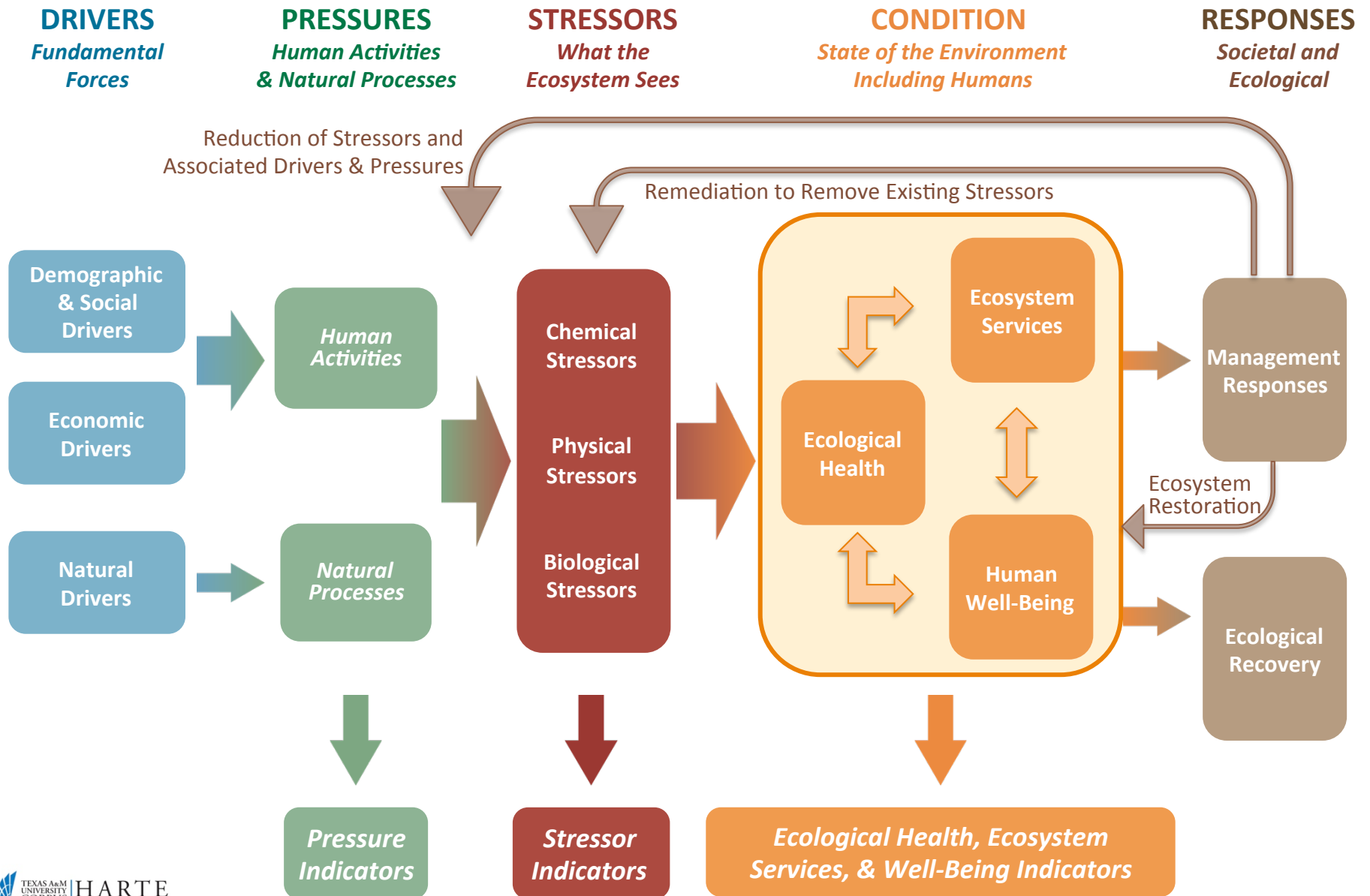
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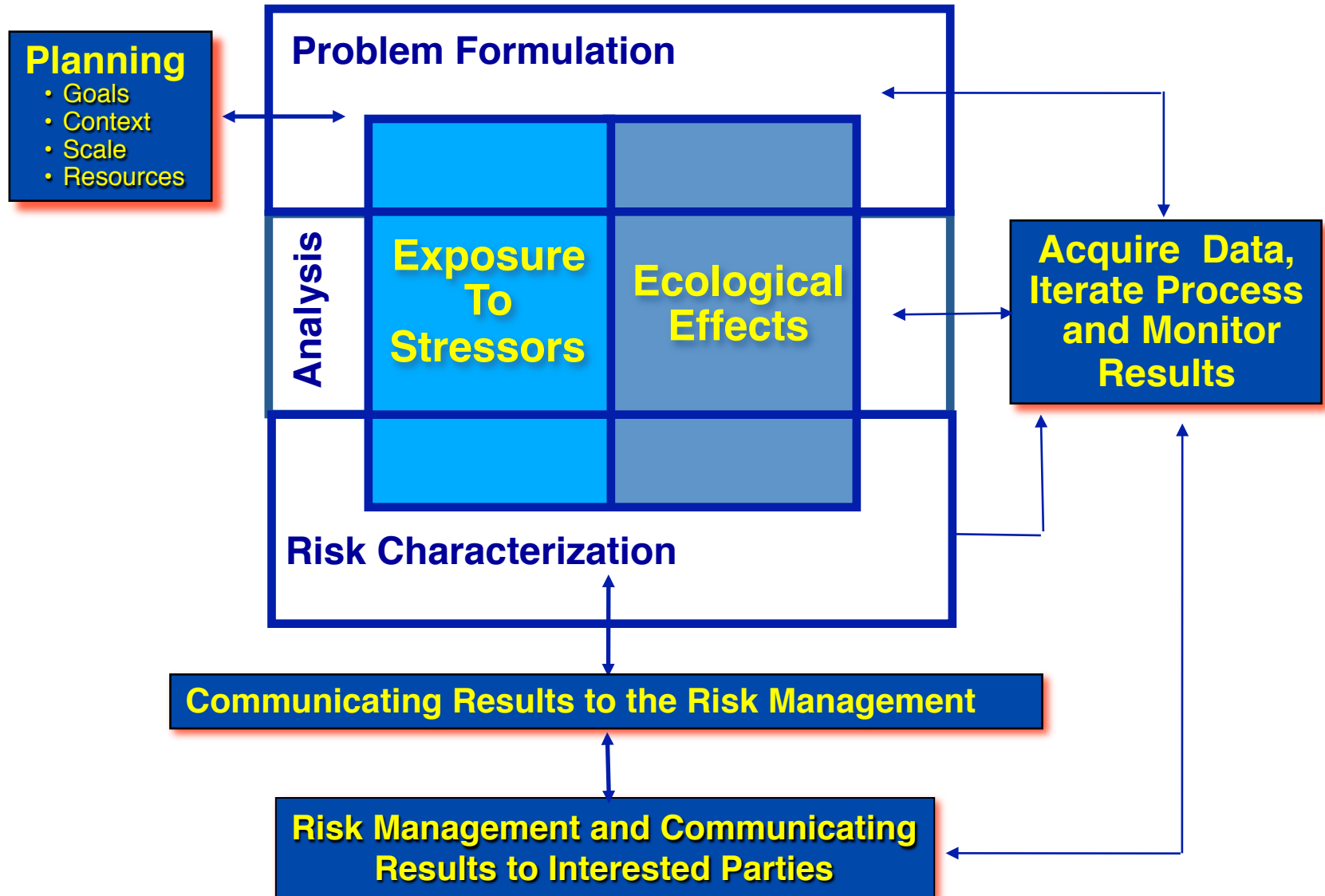
The *Gulf EcoHealth Metrics* initiative of the Harte Research Institute for Gulf of Mexico Studies is designed to characterize the health of the ecosystems of the Gulf, including their linkages to human communities, in support of restoring and sustaining a healthy Gulf of Mexico.

- Our vision: characterization of the environmental condition of the Gulf scientifically based and widely accessible and understandable by policy-makers, managers, stakeholders, scientists, and the public.
- Our objective: to provide the scientific information and understanding necessary to evaluate the health of the Gulf, clearly demonstrate how well it is or is not progressing towards desired long-term goals, and inform the decision-making process on the policies needed to achieve sustainability of a healthy Gulf of Mexico.

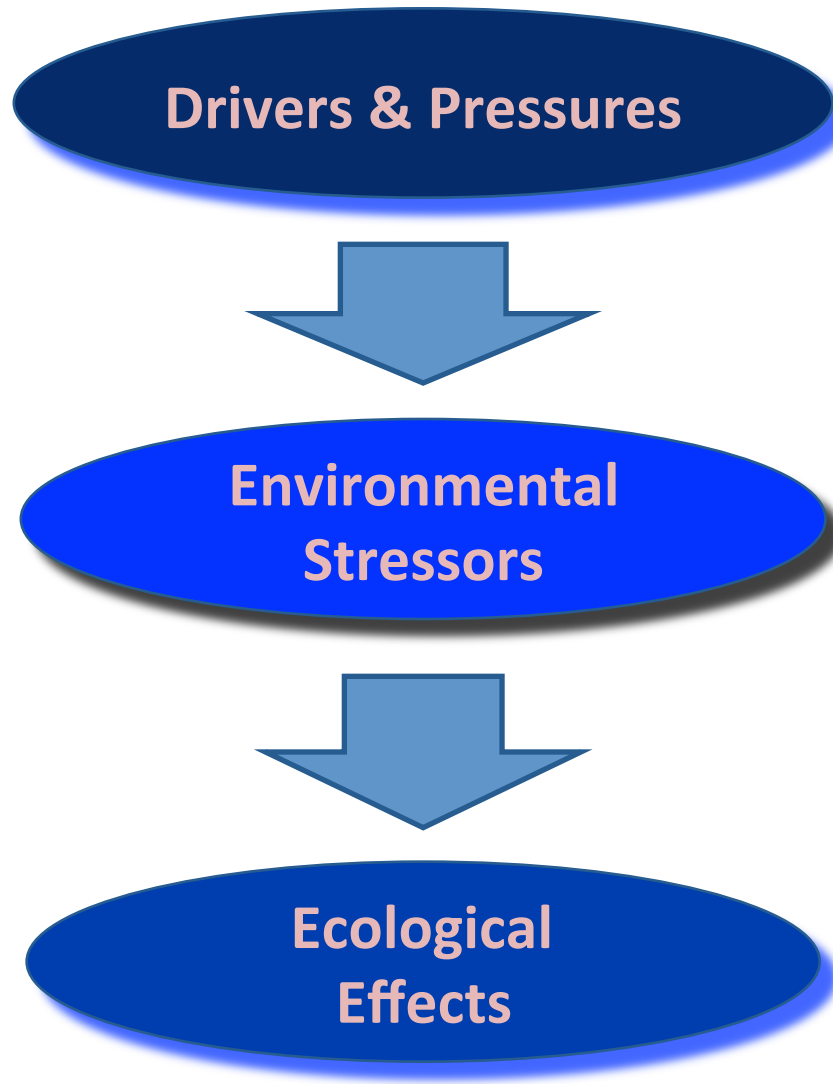
EcoHealth Indicators & Assessment Framework Based on DPSCR₄



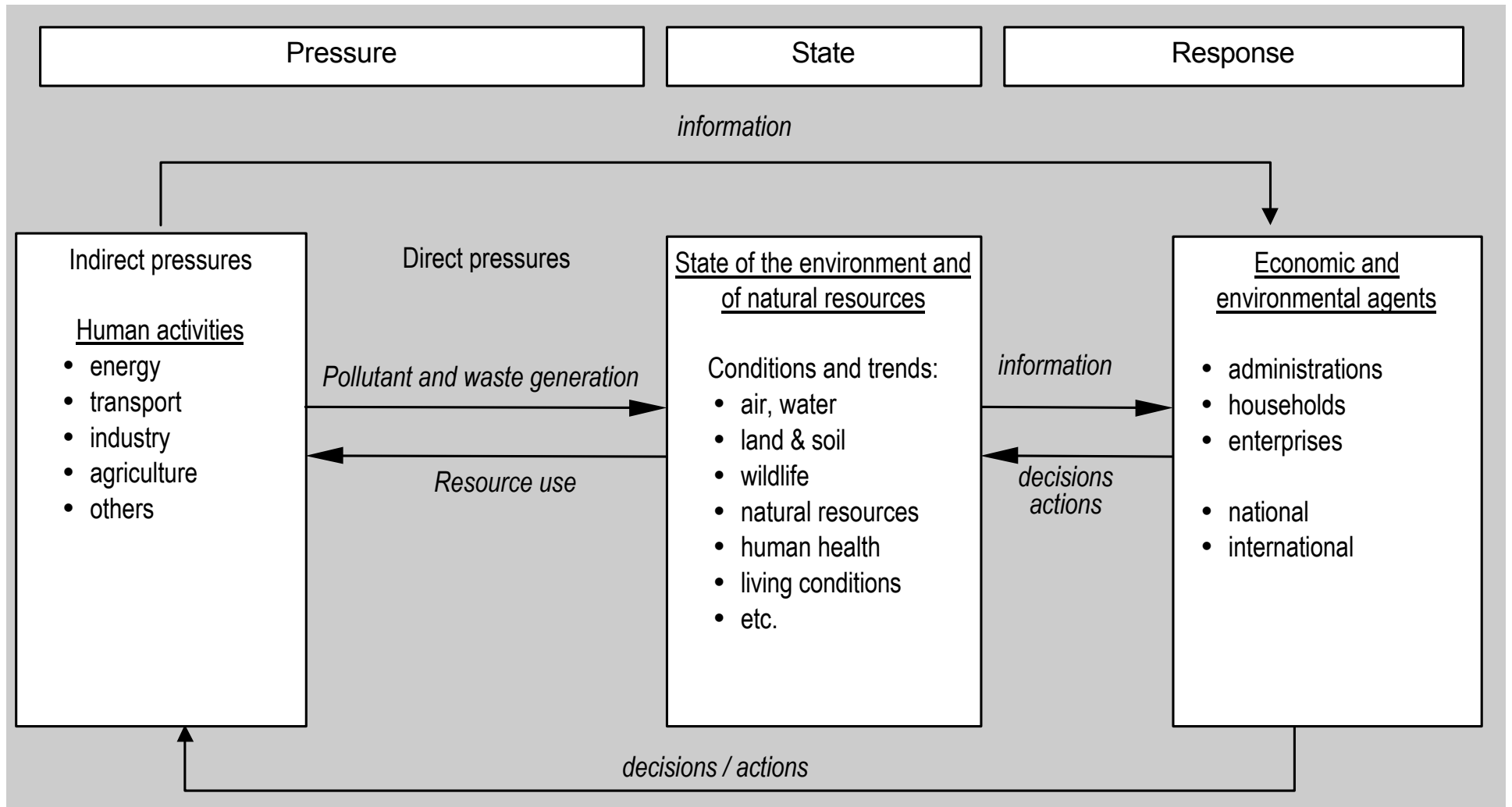
Framework for Ecological Risk Assessment



Causal Linkages Between Societal & Natural Drivers, Environmental Stressors, and Ecological Effects

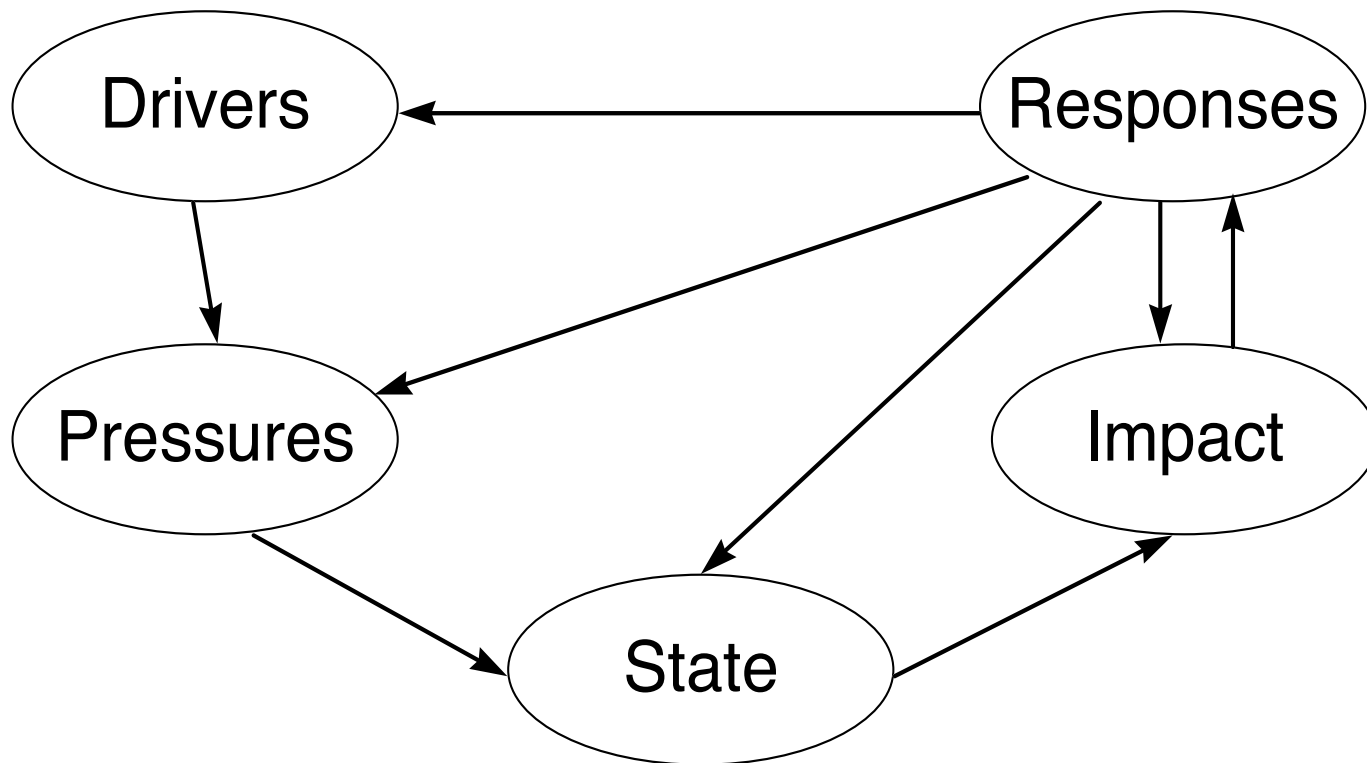


Organisation for Economic Co-operation & Development (OECD) Pressure-State-Response Model

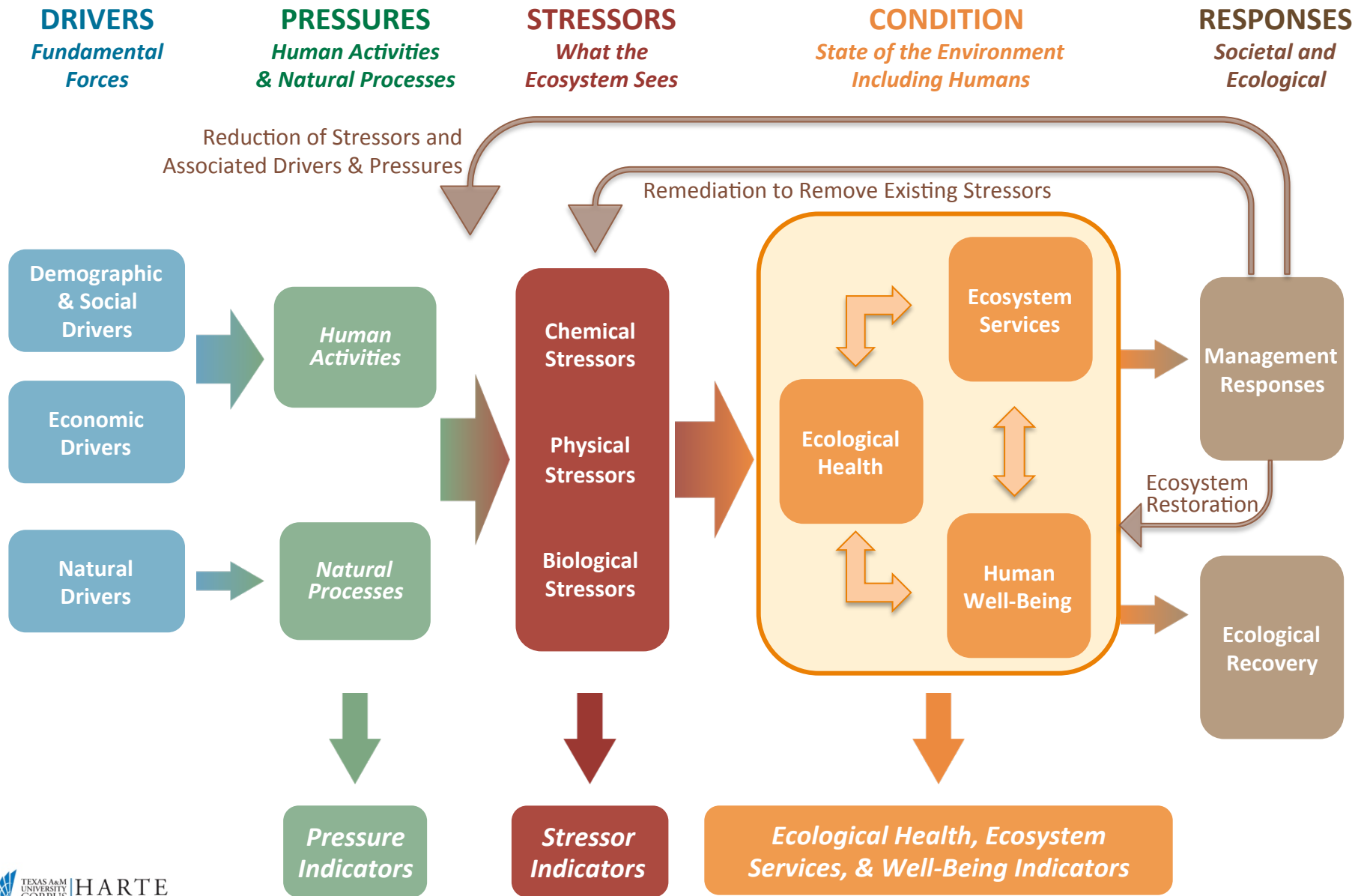


European Environmental Agency DPSIR Framework

Figure 1: The DPSIR Framework for Reporting on Environmental Issues

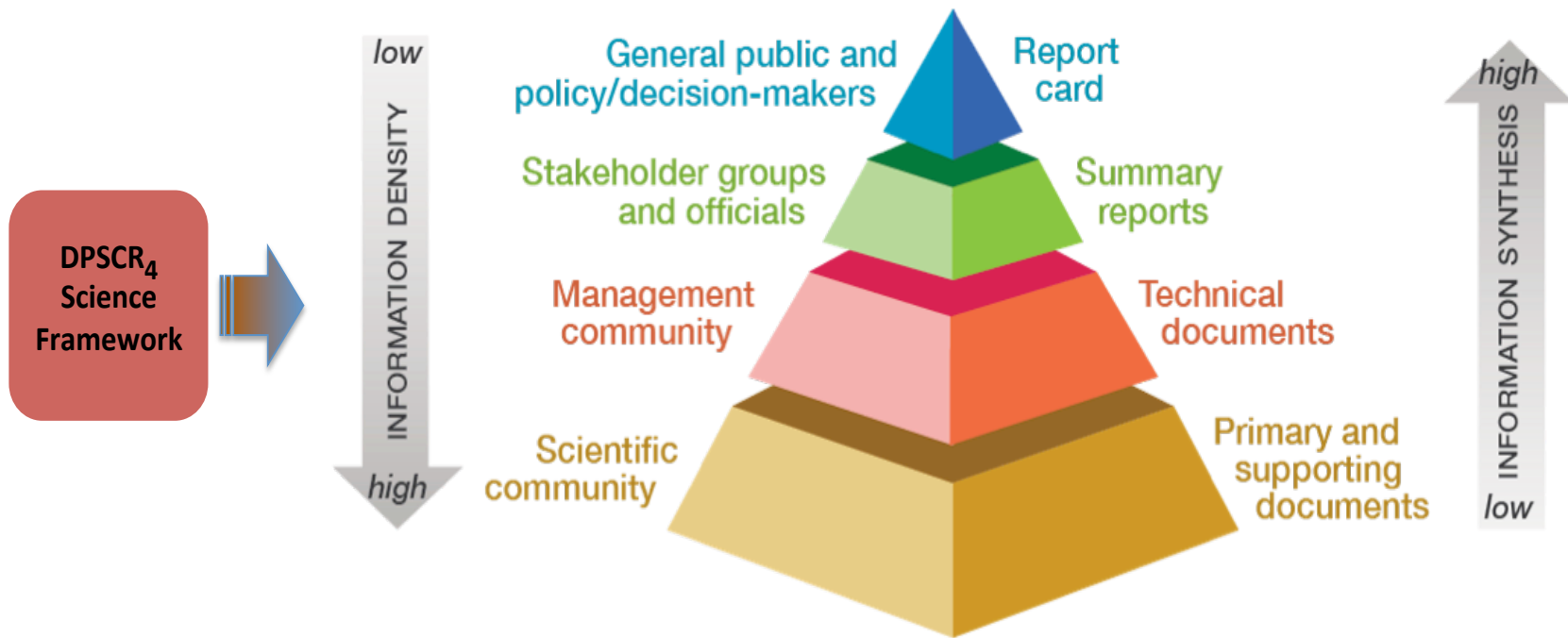


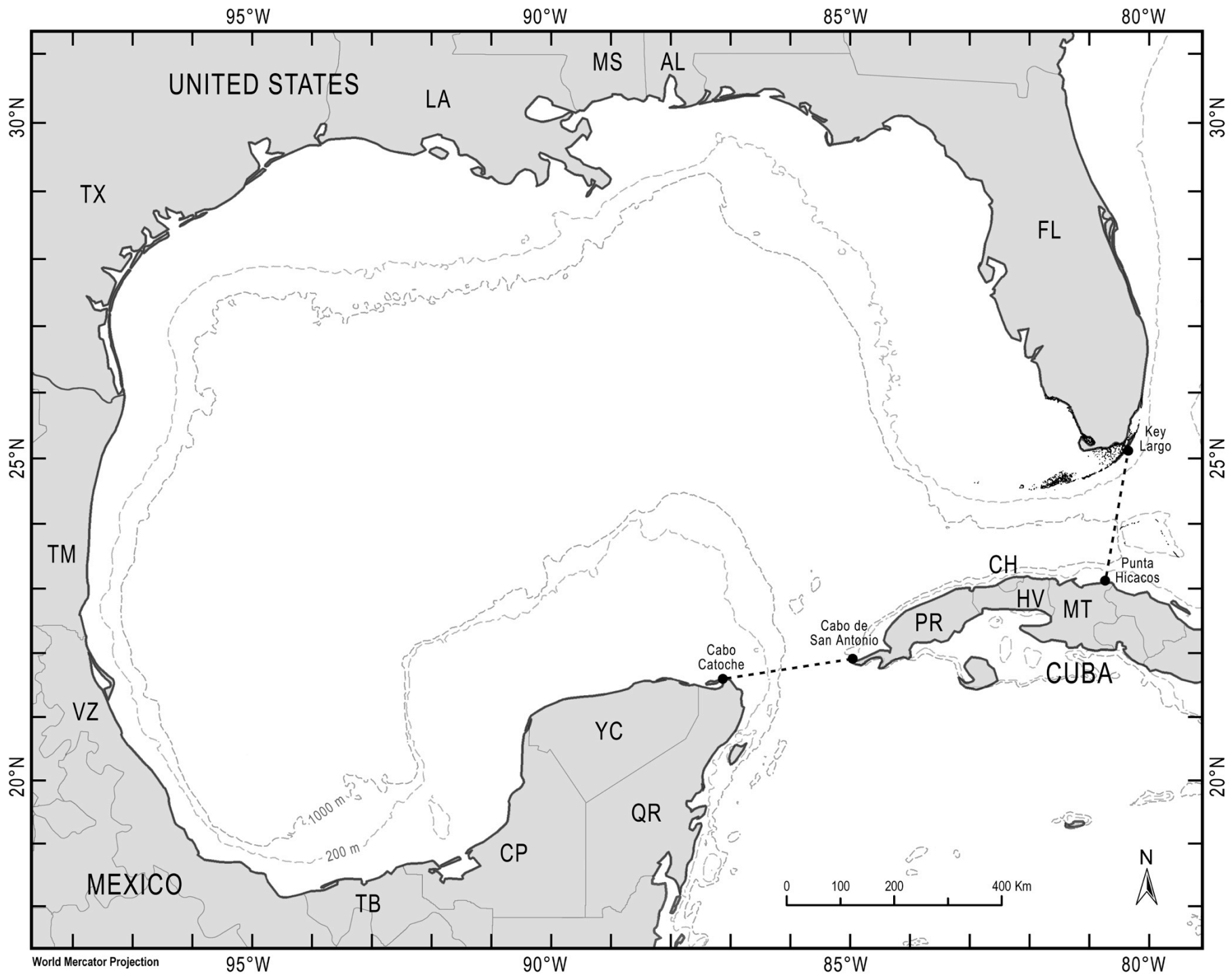
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Gulf EcoHealth Metrics

Hierarchical Reporting Structure for Various Audiences





World Mercator Projection

95°W

90°W

85°W

80°W

30°N

25°N

20°N

30°N

25°N

20°N



Gulf of Mexico EcoHealth Metrics



Synthesis Indicators



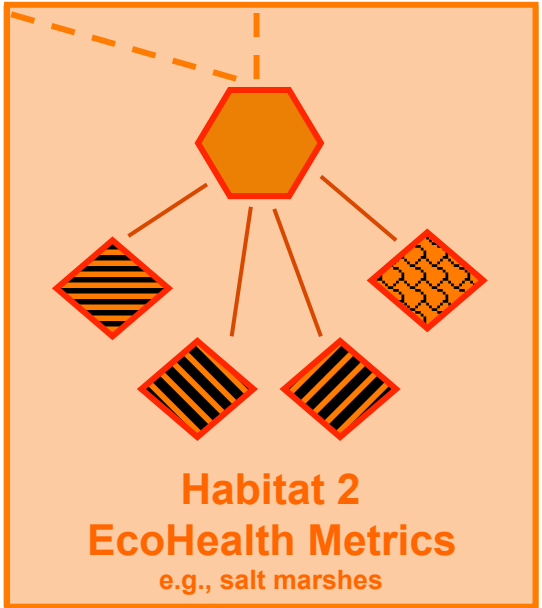
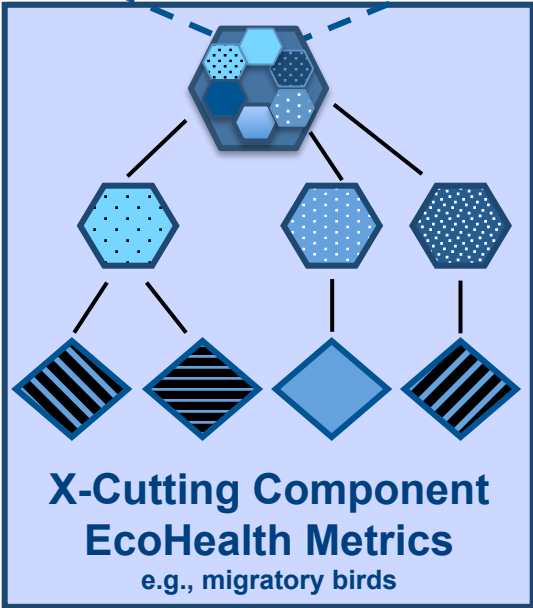
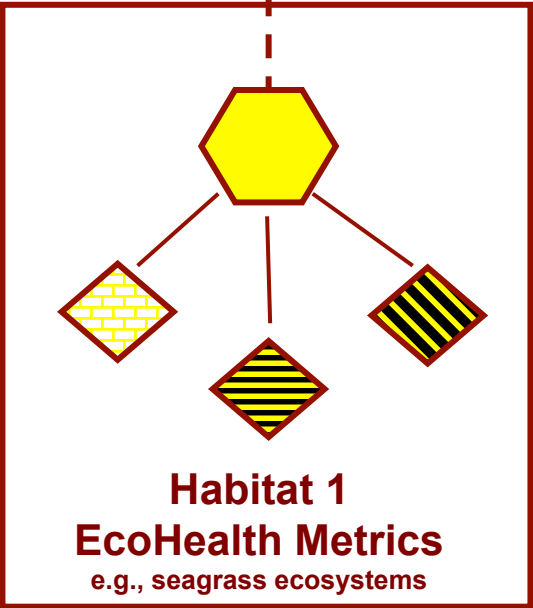
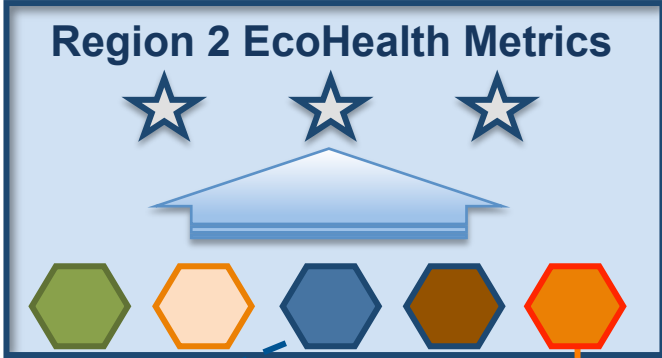
Regions



Habitats/
X-cutting
Components
or
Sub-components



Indicators



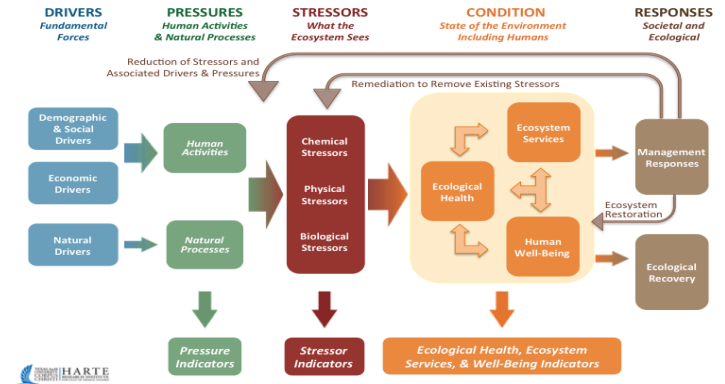
Texas EcoHealth Metrics

- Focus on Texas coast as proof-of-concept demonstration project
- Developing EcoHealth Metrics for specific coastal ecosystems/components:
 - Seagrass ecosystems
 - Oyster reefs
 - Fisheries – recreational & commercial
 - Birds - resident populations & migratory birds
- Develop Conceptual Ecosystem Models (CEMs)
- Identify valued ecosystem components (VECs)
- Identify drivers, pressures, stressors
- Select indicators and metrics
- Identify and acquire data
- Identify monitoring deficiencies
- Develop communications pyramid for targeted audiences

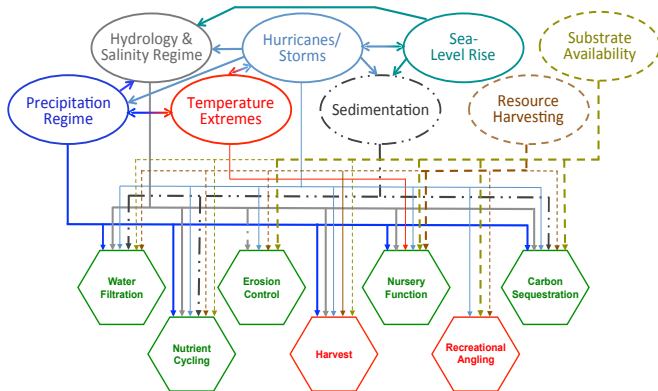
Oyster EcoHealth Metrics Strategy



Apply DPSCR₄ Framework



Oyster Conceptual Models



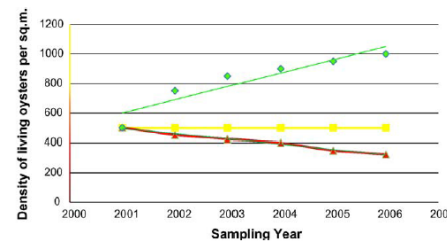
DRIVERS	PRESSURES	STRESSORS
Population Growth	Agriculture	Pesticides
Climate Change	Sea-Level Rise	Salinity Changes
Urban Development	Water Management	Sedimentation
Energy Development	Resource Extraction	Habitat Alteration
Demographics	Land-Use Changes	Invasive Species
Industry	Contaminant Spills	Nutrient Loading

Define Indicators, Metrics, Goals, and Benchmarks

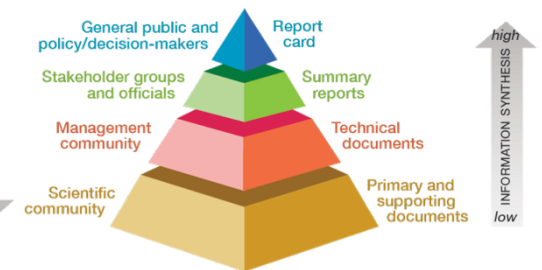
Acquire and Analyze Data

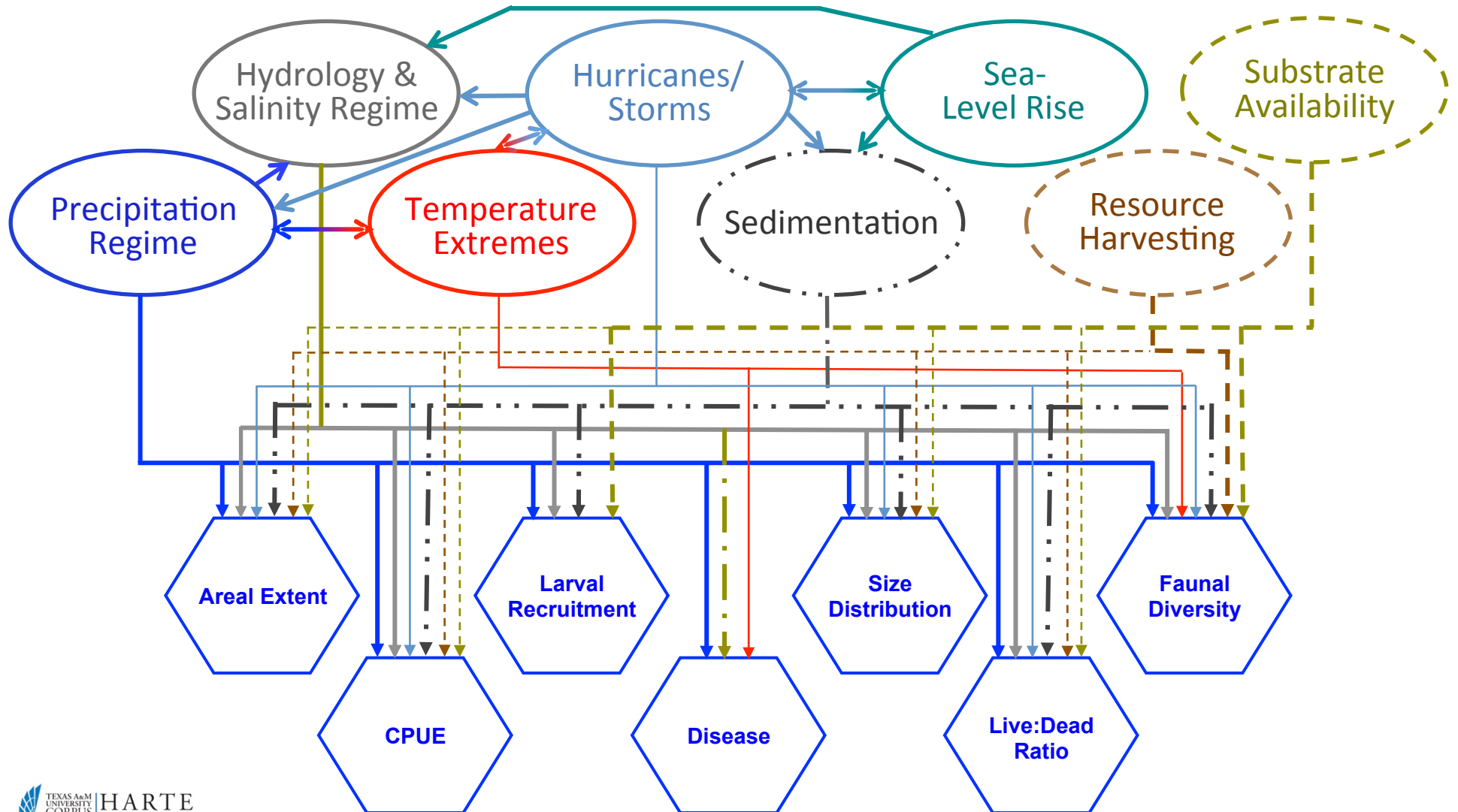


Analyze Indicator Trends



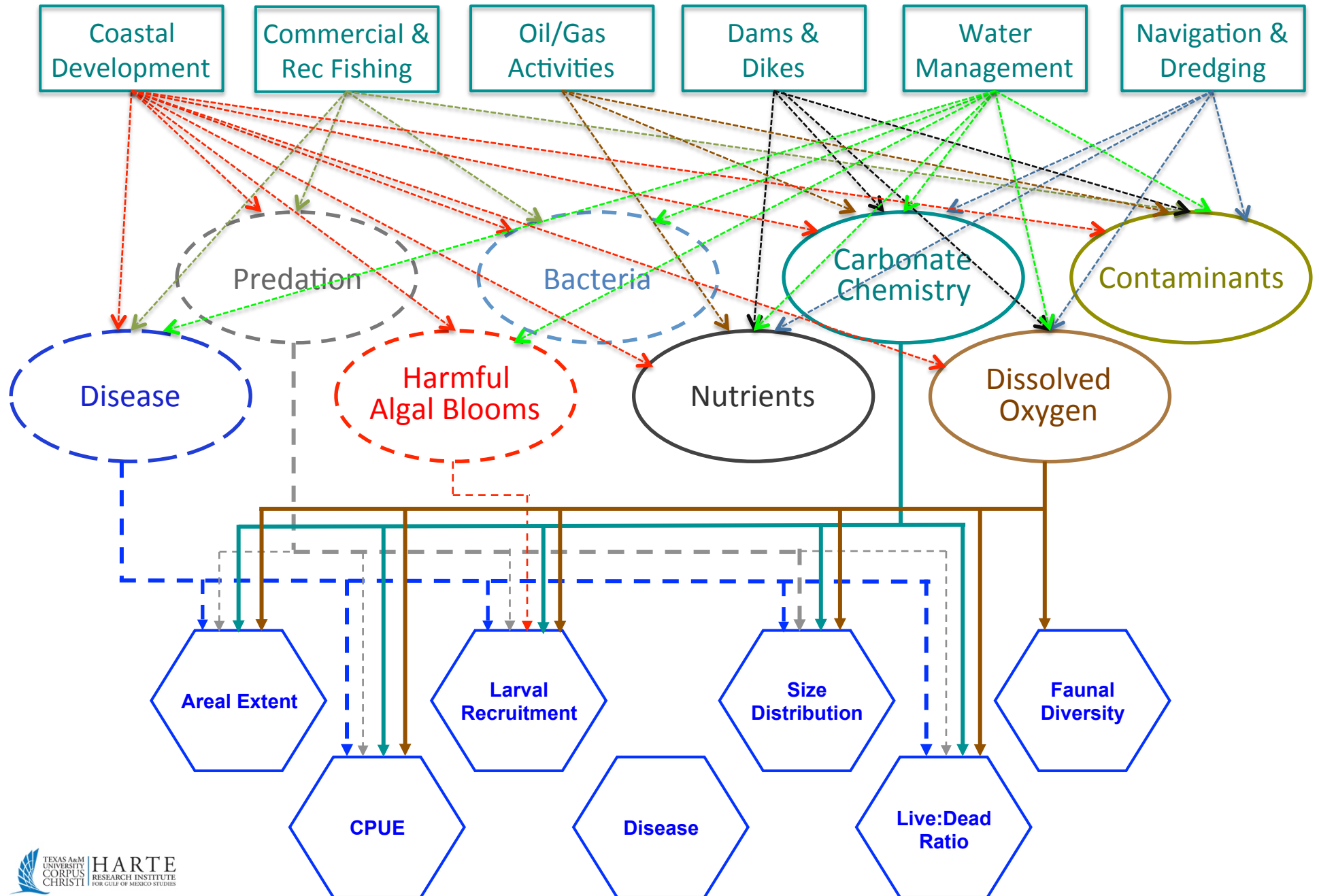
Communicate Results to Multiple Audiences

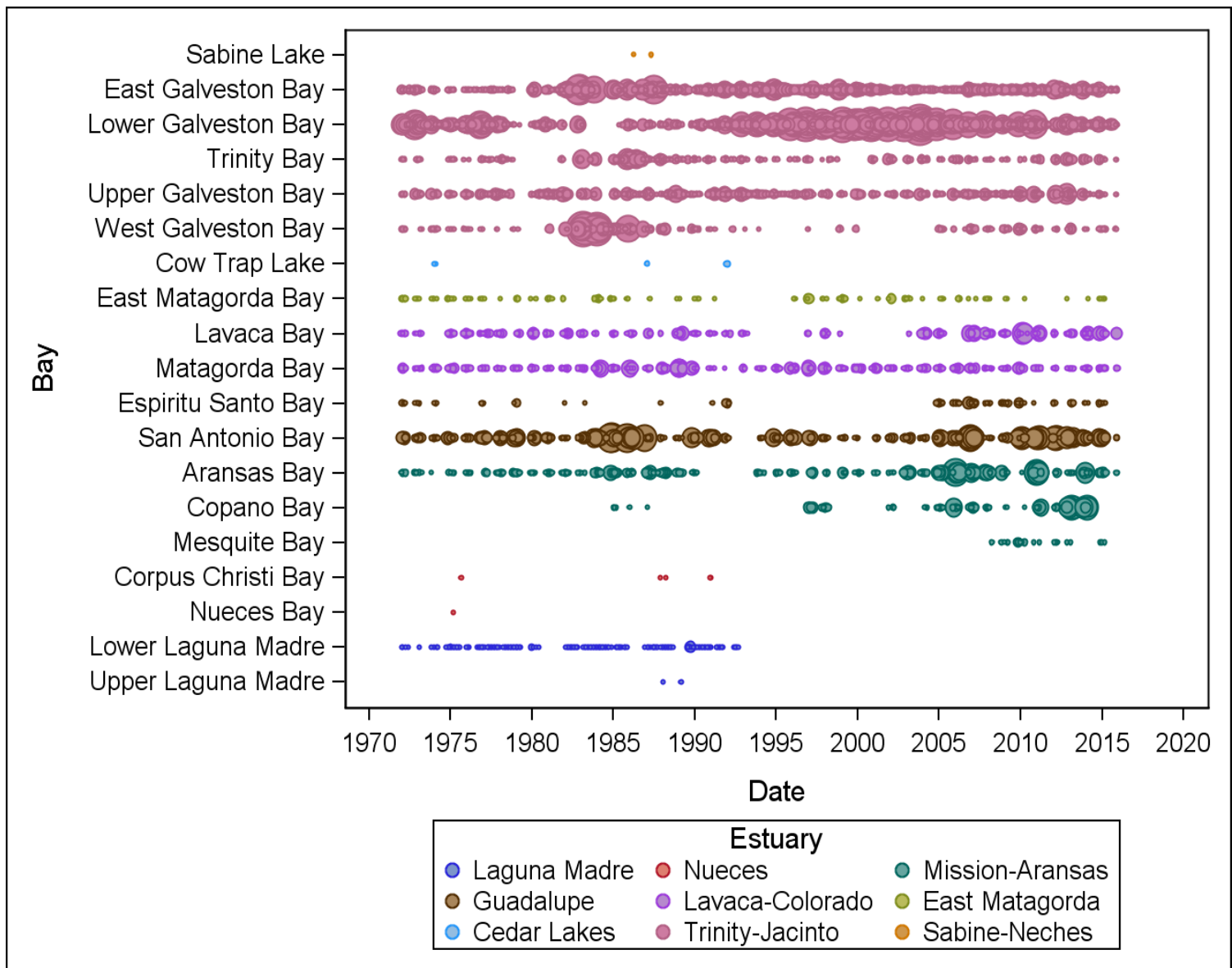




Texas Oyster Reefs

Biological & Chemical Stressors - 1 Structural Indicators

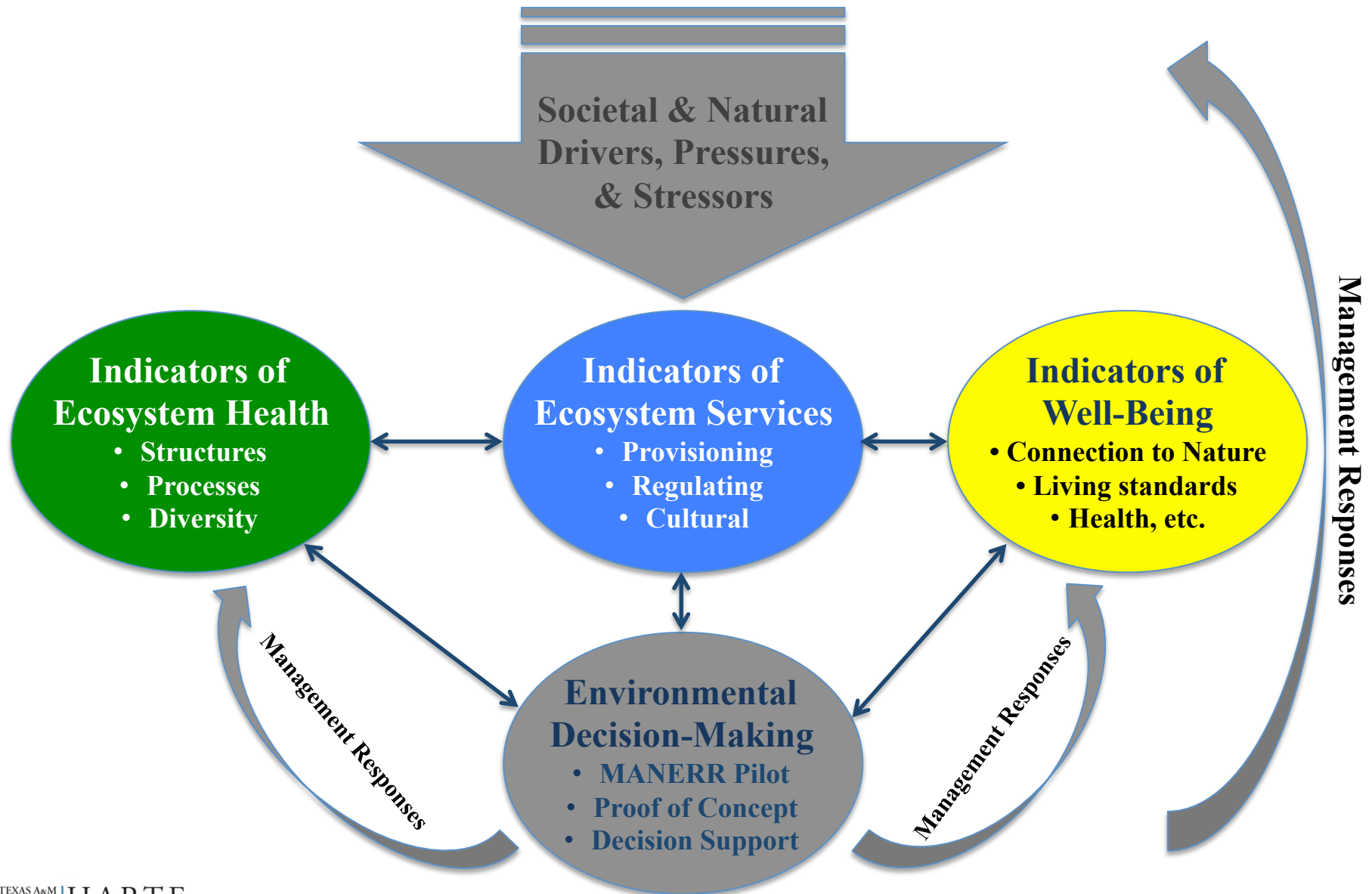




Example: Annual commercial oyster landings in each Texas Bay.

The size of each bubble is proportional to the live weight landed in each year.

Linking Ecosystem Health, Services, and Well-Being



Parallel Project:

NOAA RESTORE–funded project to expand DPSCR4 and EcoHealth Metrics for the Gulf to more fully address ecosystem services and human well-being through demonstration pilot project ... following presentation.

