Construcción y comunicación de métricas del estado ambiental de las aguas del Golfo de México

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Tarjeta de Reporte para las aguas profundas del Golfo de Mexico

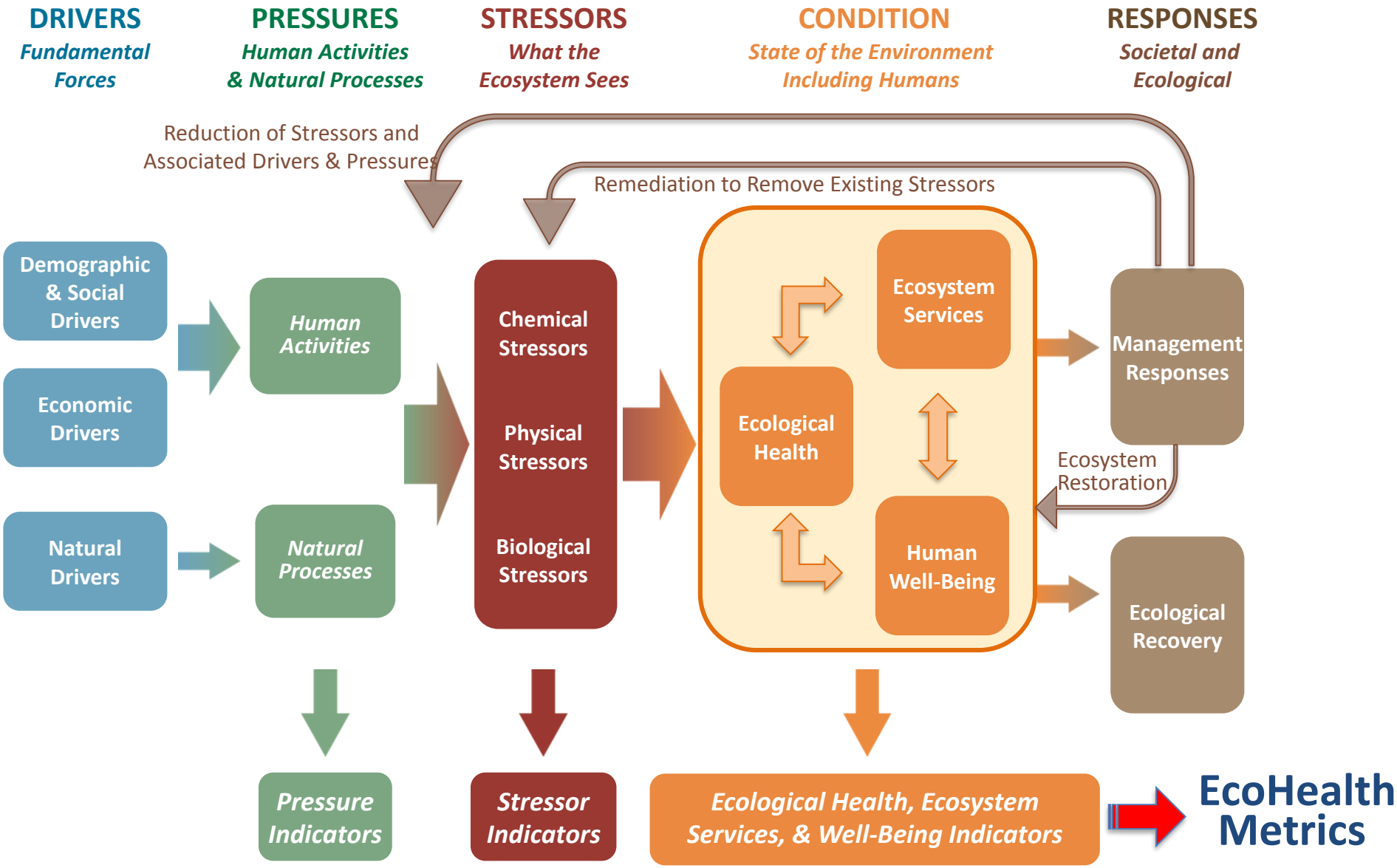
Vision:

- La caracterización científica de la condición ambiental del Golfo de México
- Ampliamente accesible y comprensible para las partes interesadas, legisladores, administradores, manejadores, científicos y el público en general..

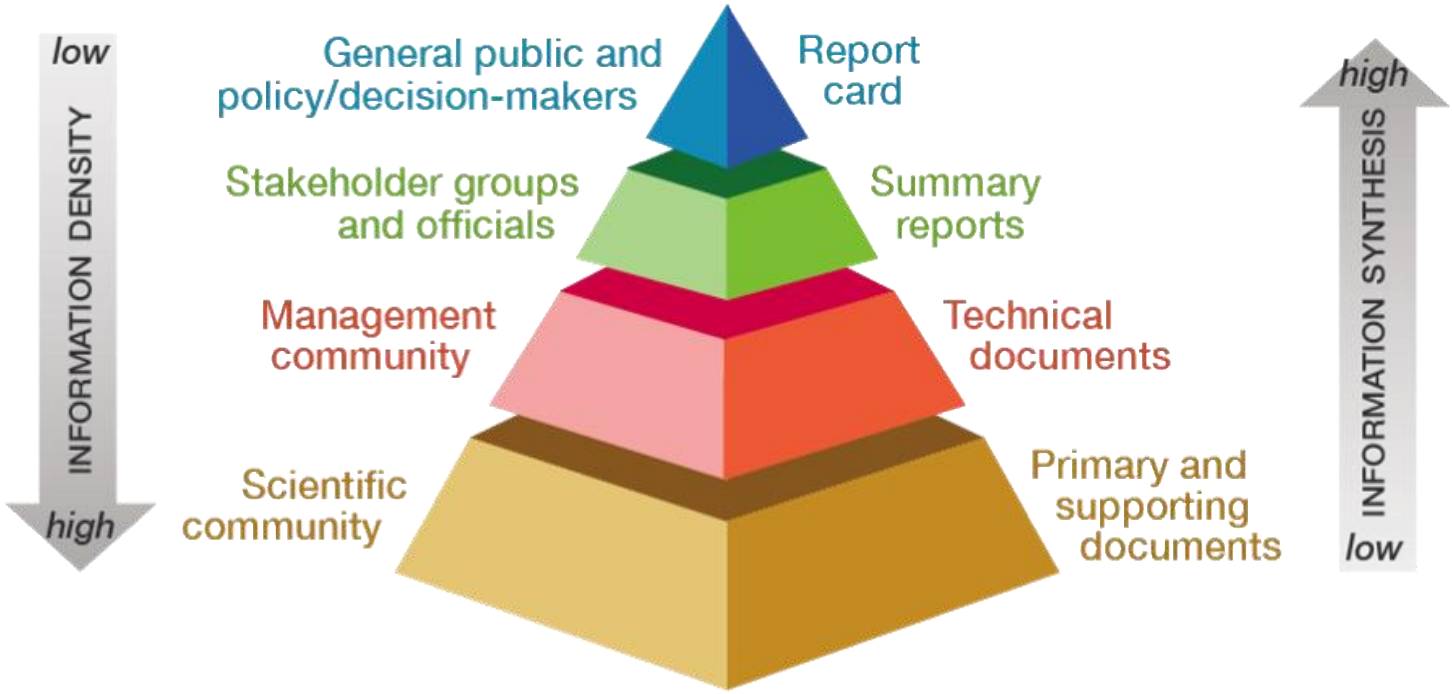
Objetivos:

- Proporcionar información y comprensión científica para evaluar la salud de los ecosistemas del Golfo de Mexico y sus vínculos con los seres humanos;
- Informar el proceso de toma de decisiones sobre las políticas necesarias para lograr la sostenibilidad de un Golfo de México saludable;
- Demostrar claramente el avance hacia las metas deseadas a largo plazo.

Indicadores de estado ambiental & marco conceptual de evaluacion (DPSCR$_4$ o DPSIR)

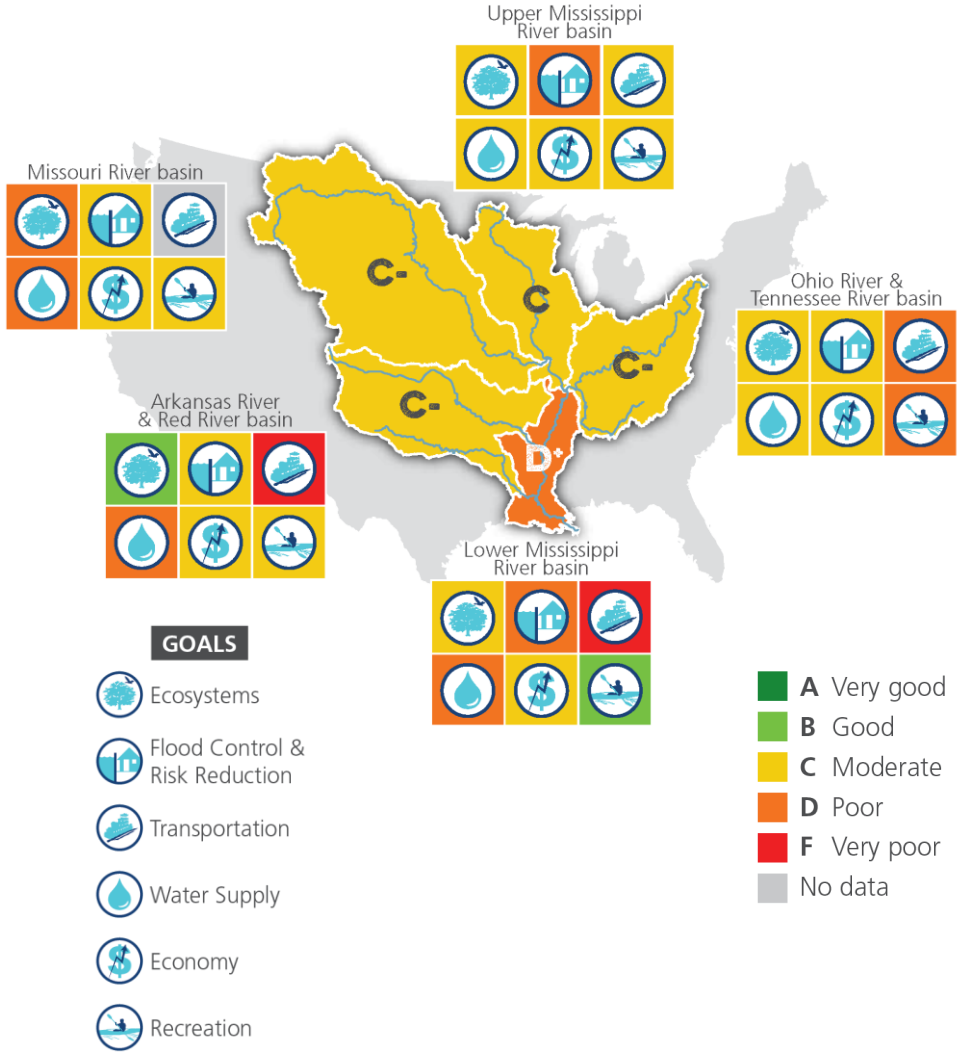


DPSCR4 Science Framework



Que es una tarjeta de Reporte de salud ambiental?

- Evaluaciones a gran escala de una región o sistema
- Comunica información compleja de manera clara
- Basada en datos reales y observaciones científicas
- Los métodos y criterios son transparentes y defendibles
- Los usuarios pueden acceder a la información mas relevante para ellos



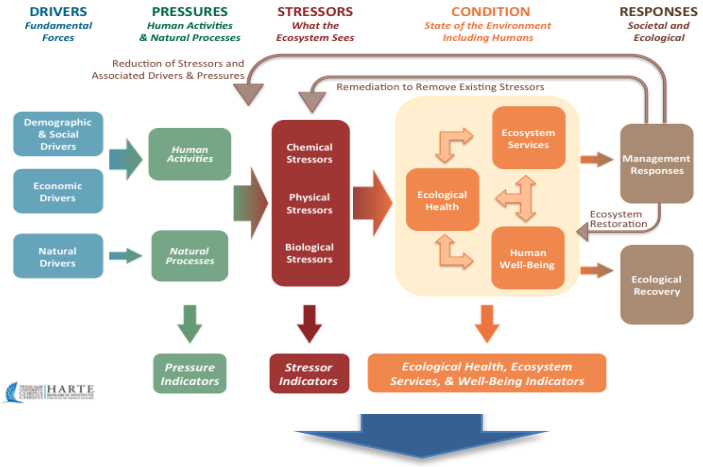
Avian EcoHealth Metrics Strategy

Categorize Coastal Avian Fauna

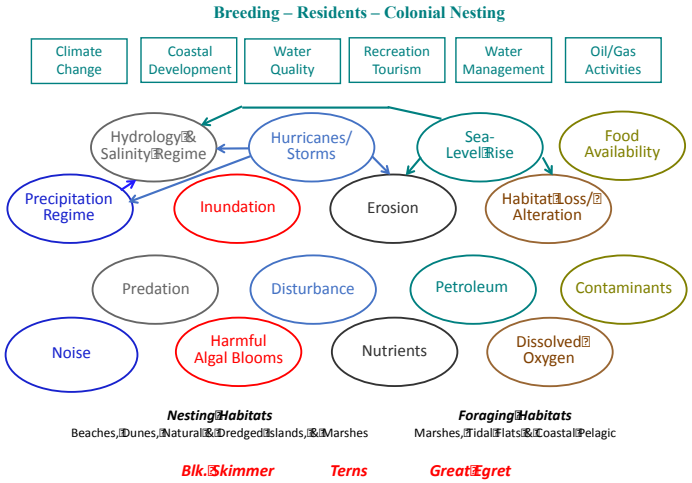
Over-wintering — Migrants
(Plovers, Sandpipers, Knot, etc.)

Breeding – Residents
(Skimmers, Terns, Egrets, etc.)

Apply DPSCR$_4$ Framework



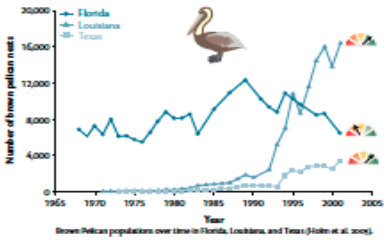
Conceptual Model



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

Rank DPSCR$_4$ Relationships
Define Benchmarks
Analyze Data

Analyze Indicator Trends



Communicate Results

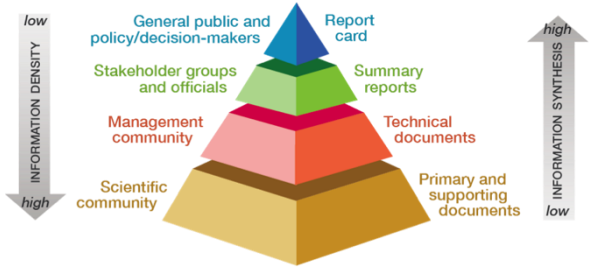


Table 3-7. *Temperature monitoring stations in the Willamette River and number of days the 7-day average maximum temperature (7DAM) criterion is exceeded during the summer of 2014. Percent of 7DAM meeting criteria based on 94 days from June 21 to September 22, 2014.*

Willamette Report Card region	USGS station number	Station location	Summer criterion °C 7DAM	Summer 7DAM meeting criterion	Report card region Average 7DAM meeting criterion	Percent of 7DAM meeting criterion	Report Card score (%)
Lower Willamette River	14211720	Portland	20	21	21	22%	22%
Mid Willamette River	14197900	Newberg	20	28	16	17%	17%
	14192015	Keizer	18	3			
Upper Willamette River	14174000	Albany	18	12	22	23%	23%
	14166000	Harrisburg	18	31			
	14158100	Eugene	18	23			

Water Quality Indicators

DO Dissolved oxygen

Dissolved oxygen is critical to the survival of fish and shellfish. The amount of dissolved oxygen needed before fish and shellfish are stressed, or even die, varies between species.

N Nitrogen

Nitrogen comes from human sources like wastewater, septic systems, and lawn fertilizer. Nitrogen, coupled with phosphorus, is leading to algal blooms and decreased dissolved oxygen levels. Nitrogen is taken up and used quickly by phytoplankton (microalgae).

P Phosphorus

Nitrogen and light limits algal growth in most of Long Island Sound. Phosphorus entering the Sound is greater than what the algae can use; the generally conservative nature of phosphorus therefore makes it a good indicator of human inputs to the system.

Chlorophyll *a*

Chlorophyll *a* measures the amount of phytoplankton (microalgae), which uses both nitrogen and phosphorus to grow. Too much algae in the water reduces water clarity, and decomposing algae leads to reduced dissolved oxygen.

Water clarity

Water clarity is a measure of how far light penetrates through the water. Clear water allows fish to find prey and helps underwater plants to thrive.

Water quality illustrates the story of pollution and dilution in Long Island Sound

D+ Eastern Narrows

The Eastern Narrows received a D+ (69%), a poor grade, because dissolved oxygen, water clarity, and nutrients continue to be problems. The Eastern Narrows has urban and suburban development and the water has little exchange with the Atlantic Ocean.

B Central

Central Long Island Sound received a B (84%), a moderately good grade, because most indicators scored well. This area is less developed than the Narrows, with fewer pollution impacts, and has better exchange with the Atlantic Ocean.

Long Island Sound

There is a variation from west to east of unhealthy (F) to healthy water quality (A). The Western Narrows is affected by the highly populated, suburban-urban communities surrounding New York City and scored the worst. Moving east from western Connecticut and western Long Island, the water quality improves. In the eastern Sound, the pollution is diluted by exchange with the Atlantic Ocean. Overall, water quality indicators in Long Island Sound scored good or very good except phosphorus, which scored poorly. Very high turbidity in the Western Narrows restricts light, preventing phytoplankton growth; however, moving east from western Connecticut and western Long Island, turbidity improves, which allows phytoplankton to grow.

Reducing nutrient inputs from human activities on land is critical to improving the health of the Sound. Check out the back page for actions you can take to help the Sound. To find out more about the report card indicators and grades, visit longislandsound.ecoreportcard.org.

F Western Narrows

The Western Narrows received an F (45%), the worst grade out of the entire Sound. Almost every indicator scored very poor or poor. Very high turbidity restricts light, preventing phytoplankton growth, which leads to a good chlorophyll *a* grade. This area is densely developed, and has very little exchange with the Atlantic Ocean.

B- Western

The Western Long Island Sound received a B- (81%), a moderately good grade. There is a mix of healthy and unhealthy indicator grades. Improved water clarity led to a moderate chlorophyll *a* grade. This region is influenced by the poor health of the Eastern Narrows, but is somewhat less developed than the Narrows.

A Eastern

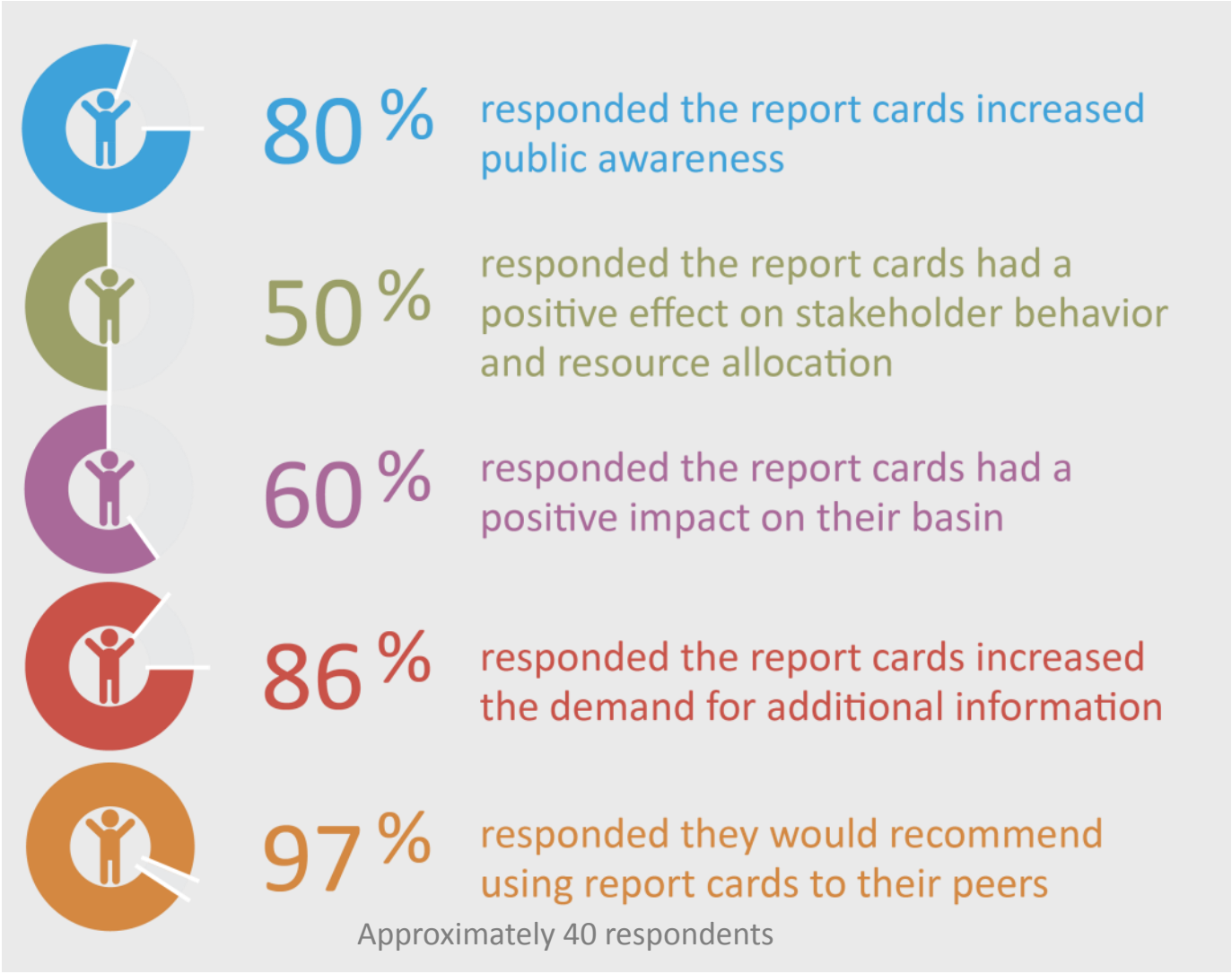
The Eastern Long Island Sound received an A (93%), the best grade out of the entire Sound. All indicators scored very good. This region has a lower population and a mix of rural, suburban, and agricultural uses, and has a lot of exchange with the Atlantic Ocean.

How are the scores calculated?

This report card compares water quality indicators (dissolved oxygen, nitrogen, phosphorus, chlorophyll *a*, and water clarity) to scientifically derived thresholds or goals. These indicators are combined into an overarching Water Quality Index, which is presented as a subregion percent score. Other indicators presented on these pages are not included in the score. For more information about methods, please visit longislandsound.ecoreportcard.org.

- **A** 90–100%: All water quality indicators meet desired levels. Quality of water in these locations tends to be very good, most often leading to preferred habitat conditions for aquatic plants and animals.
- **B** 80–90%: Most water quality indicators meet desired levels. Quality of water in these locations tends to be good, often leading to acceptable habitat conditions for aquatic plants and animals.
- **C** 70–80%: There is a mix of good and poor levels of water quality indicators. Quality of water in these locations tends to be fair, leading to sufficient habitat conditions for aquatic plants and animals.
- **D** 60–70%: Some or few water quality indicators meet desired levels. Quality of water in these locations tends to be poor, often leading to degraded habitat conditions for aquatic plants and animals.
- **F** 0–60%: Very few or no water quality indicators meet desired levels. Quality of water in these locations tends to be very poor, leading to unacceptable habitat conditions for aquatic plants and animals.
- **ID** Insufficient Data (ID) is a designation used for areas where there is either insufficient or no data to give a grade on desired health levels.

Una tarjeta de reporte es una estrategia de comunicación efectiva y util



http://ian.umces.edu/

Tarjetas de Reporte desarrolladas por el UMCES

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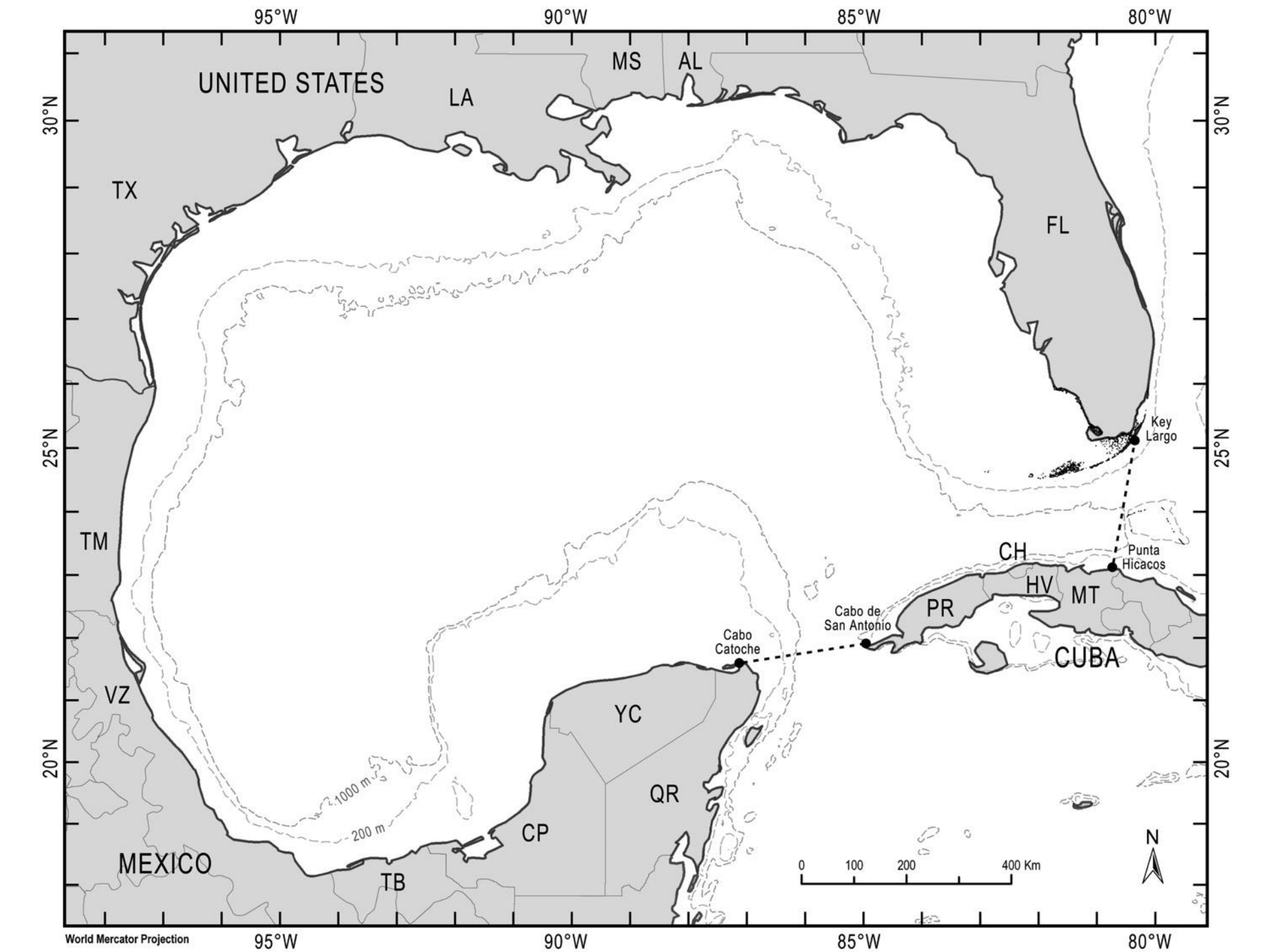
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Cabo de San Antonio
Cabo Catoche
CUBA
VZ
YC
QR
CP
TB
MEXICO
1000 m
200 m
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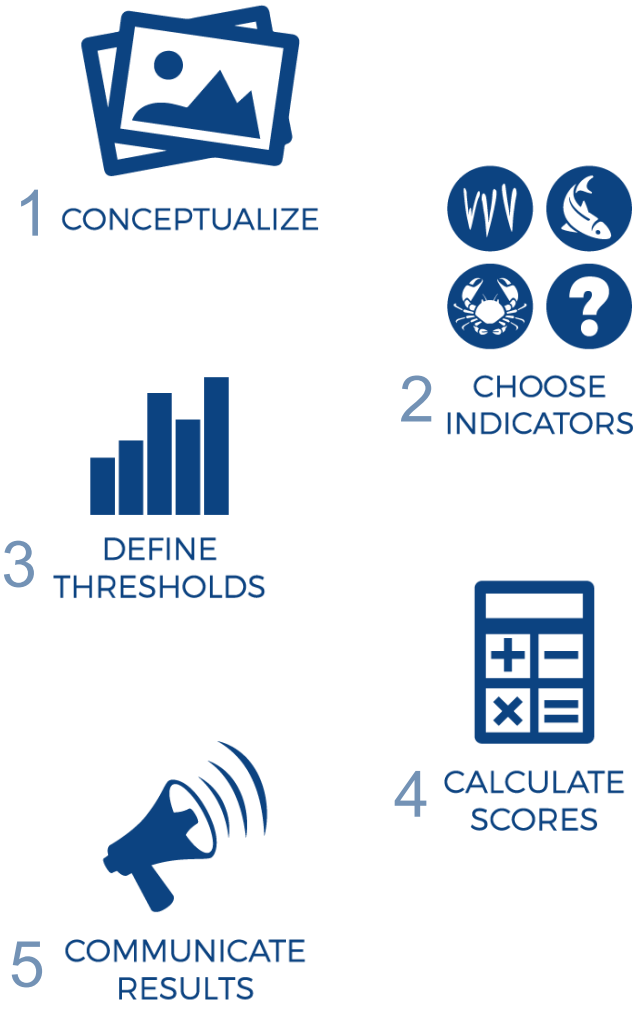
World Mercator Projection

El proceso proporciona grandes beneficios

- Crea una participación plena de múltiples partes interesadas
- Fuerza una revisión crítica de los datos disponibles
- Fuerza la definición de objetivos y una evaluación de estado
- Crea una visión compartida



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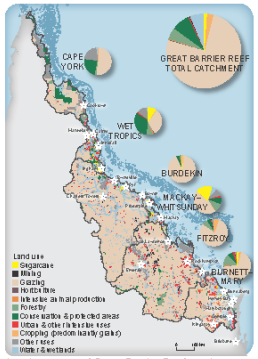
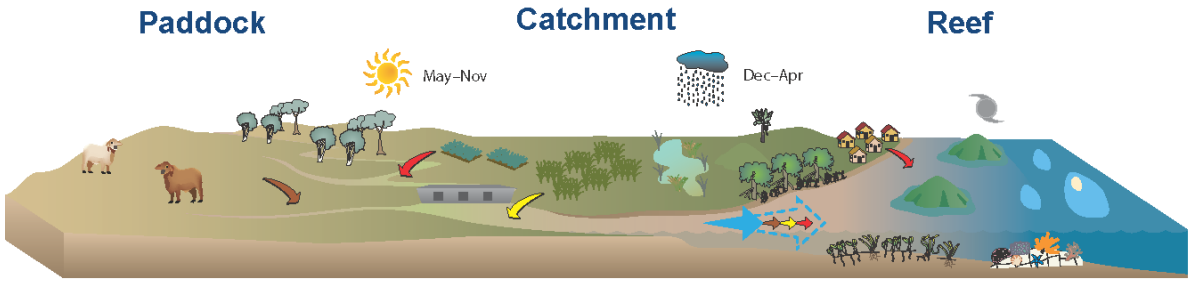
Great Barrier Reef Report Card



Land use map of Great Barrier Reef catchment (2005)

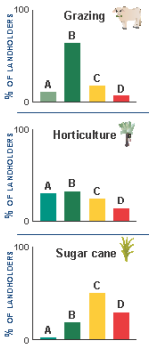


Great Barrier Reef-wide Paddock to Reef conceptual diagram

The Great Barrier Reef catchments are largely rural and dominated by summer monsoonal rains and occasional cyclones delivering sediments, nutrients, and pesticides to the inshore and sometimes offshore portions of the reef in pulsed flows, which can be affected by water reservoirs and dams. Grazing is the largest single land use, and sugarcane, horticulture, and cropping make up other agricultural land uses. Small urban centres are located on the coastal strip. Habitats include wetlands, reef, seagrass, and mangrove habitats, and continental and coral islands are present.

Average annual rainfall in Great Barrier Reef catchment (1950–2000)

Land practice



Land condition is influenced by a range of factors including climate, land types, and management practices.

A B C D
good degraded

Seventy-five percent of graziers in the Burdekin and Fitzroy regions had properties in A- or B-class land condition which represented 59% of the grazing land area, while 25% of graziers had properties in C- or D-class land condition which represented 41% of the grazing land area.

The adoption of improved management practices for horticulture and sugar cane is presented using the following framework.

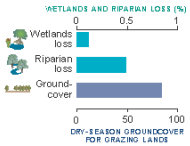
A – Cutting-edge practice
B – Current best practice
C – Common practice
D – Old or unacceptable practices

Cutting-edge or best management practices (A or B) have been adopted by 62% of horticultural producers. Practices considered common practice or unacceptable by industry or community standards (C or D) have been used by 38% of horticultural producers.

Cutting-edge or best management practices (A or B) have been adopted by 20% of sugar cane growers. Practices considered common practice (C) have been used by 50% of sugar cane growers, while practices considered unacceptable by industry or community standards (D) have been used by 30% of sugar cane growers.

Land condition is ... Lorem ipsum dolor sit amet, consectetur adipiscing elit. Lorem ipsum dolor sit amet, consectetur adipiscing elit dolor sit amet.

Catchment indicators

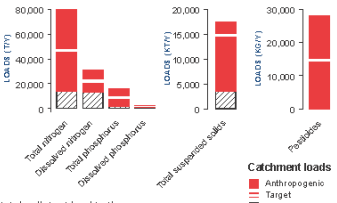


Wetland loss between 2001–2005 was ~0.1% of the total wetland area (720,000ha), although wetland loss prior to that had been extensive.

Riparian vegetation (streamside vegetation within 50m of the stream) is extensive (6 million ha), and the loss between 2004–2008 has been significant (0.5%).

Dry season groundcover for grazing lands was high (84%) in 2009, likely due to high rainfall, well above the 50% target.

Catchment loads



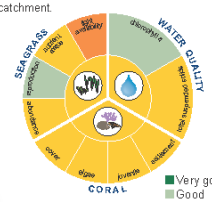
The total pollutant load to the Great Barrier Reef is largely due to anthropogenic (human-induced) activities, although natural nutrient and sediment loads do occur. Annual sediment loads were estimated at 3 million tonnes due to natural processes, but a total of 17 million tonnes were delivered to the reef, largely from grazing lands in the Burdekin (4.7 million tonnes) and Fitzroy (4.1 million tonnes) regions. Fertilised agricultural lands are a key source of nutrient runoff, particularly of various types of nitrogen, with 31,000 tonnes of dissolved nitrogen leaving the Great Barrier Reef catchment each year. All pesticides are of human origin, and the highest annual loads of pesticides entering the Great Barrier Reef (~28,000kg per year)were from the Mackay-Whitsunday and Wet Tropics regions (~10,000kg each per year).

Marine indicators

The effects of river discharge into the Great Barrier Reef are largely concentrated into inshore areas up to 20km from shore. Higher than normal rainfall in the Great Barrier Reef catchment occurred between 2007–2009, particularly in the Burdekin River catchment.

Seagrass: Seagrass abundance in intertidal regions was highly variable and has declined over the last 5–10 years associated with reduced light availability and excess nutrients. Many seagrass meadows have low or variable numbers of reproductive structures, indicating limited resilience to disturbance.

Waters within 20km of the shore are at highest risk for degraded water quality. These waters are only ~6% of the Great Barrier Reef Marine Park, but support significant ecosystems as well as recreation, commercial tourism, and fisheries.



Coral: Most inshore reefs were in good or moderate condition, based on coral cover, macroalgal abundance, settlement of larval corals, and numbers of juvenile corals. Most inshore reefs had either high or increasing coral cover, however the Burdekin region corals were mostly in poor condition.

Water quality: Inshore waters often contain elevated concentrations of chlorophyll a (a measure of nutrient status) and highly elevated concentrations of total suspended sediments.

Pesticides: Monitoring during flood events detected pesticide concentrations above the water quality guidelines over 25km from the coast. Pesticide monitoring shows lorem ipsum dolor sit amet, consect.

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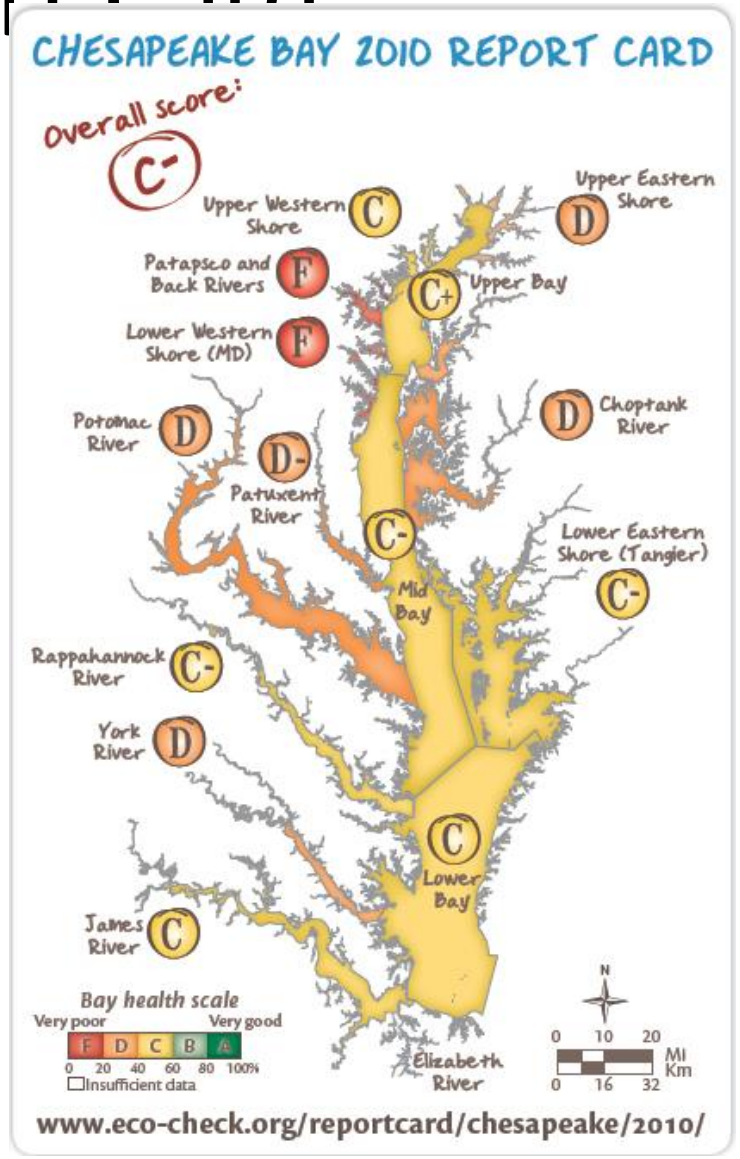
Chesapeake Bay Report Card

- Provides a performance derived grade by region
- Enables large amounts of information to be communicated to a broad audience
- Can provide measurement of progress over time
- Can help identify regions or issues of concern



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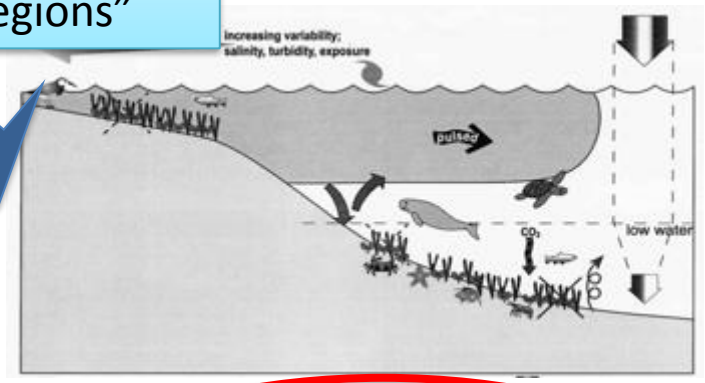
TX seagrass Mapping – define " regions"

Seagrass EcoHealth Metrics Strategy

Conceptual Models

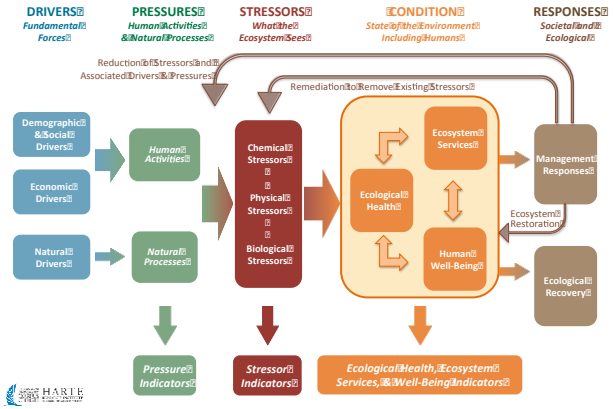


Candidate Seagrass Indicators & Metrics

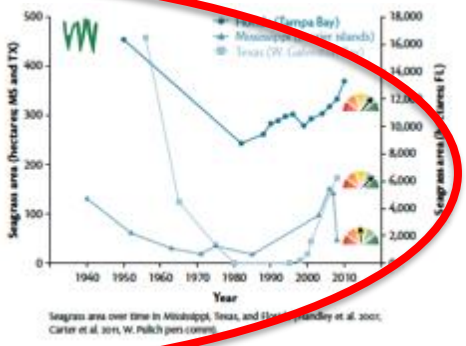
- Areal Extent
- Species Composition
- Biomass
- Disease
- etc.

EcoHealth Indicators Framework

Seagrass Matrices	Physical																
Stressors	Hydrology	Salinity Regime	Precipitation Regime	Sedimentation	Erosion	Habitat Alteration	Fire Regime	Sea-Level Rise	Hurricanes/Storms	Resource Harvesting	Marine Debris	Solid Waste Disposal	Temperature Changes	Turbidity	Noise	Subsidence	Saltwater Intrusion	Seagrass *Damage*
Seagrass																		
Areal Extent/Distribution	L	L	L	H	H	H	na	H	M	L	L	L	L	H	-	H	na	H
Primary/Secondary Production	L	L	L	H	H	H	na	H	M	L	L	L	L	H	-	H	na	H
Water Quality	L	L	L	H	H	H	na	H	M	L	L	L	L	H	-	H	na	H
Erosion Control	L	L	L	H	H	H	na	H	M	L	L	L	L	H	-	H	na	H
Nursery Function	L	L	L	H	H	H	na	H	M	L	L	L	L	H	-	H	na	H
Essential Fish Habitat	L	L	L	H	H	H	na	H	M	L	L	L	L	H	-	H	na	H
Red Fish	L	L	L	H	H	H	na	H	M	M	L	L	L	H	-	H	na	M
Spotted Sea Trout	L	L	L	H	H	H	na	H	M	M	L	L	L	H	-	H	na	L
Recreational Fishing	L	L	L	H	H	H	na	H	M	M	L	L	L	H	-	H	na	H

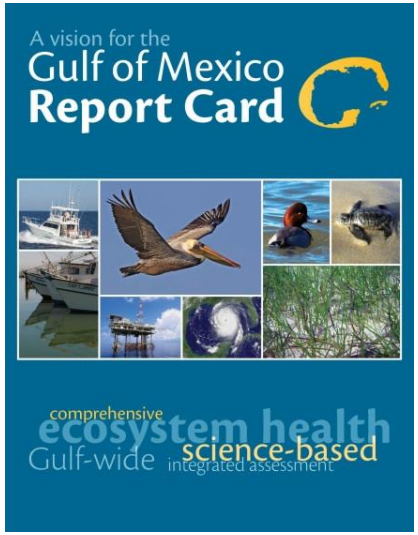


Analyze Indicator Trends



Define Indicator Health Goals and Benchmarks

Communicate Results to Multiple Audiences



EcoHealth Metrics Workshop
Harte Research Institute
9-11 March 2016

Goals for the Texas Prototype of the Gulf Report Card

TRANSPARENT

Generate an objective assessment of the "health" of the Gulf of Mexico whose scientific foundations are transparent and discoverable.

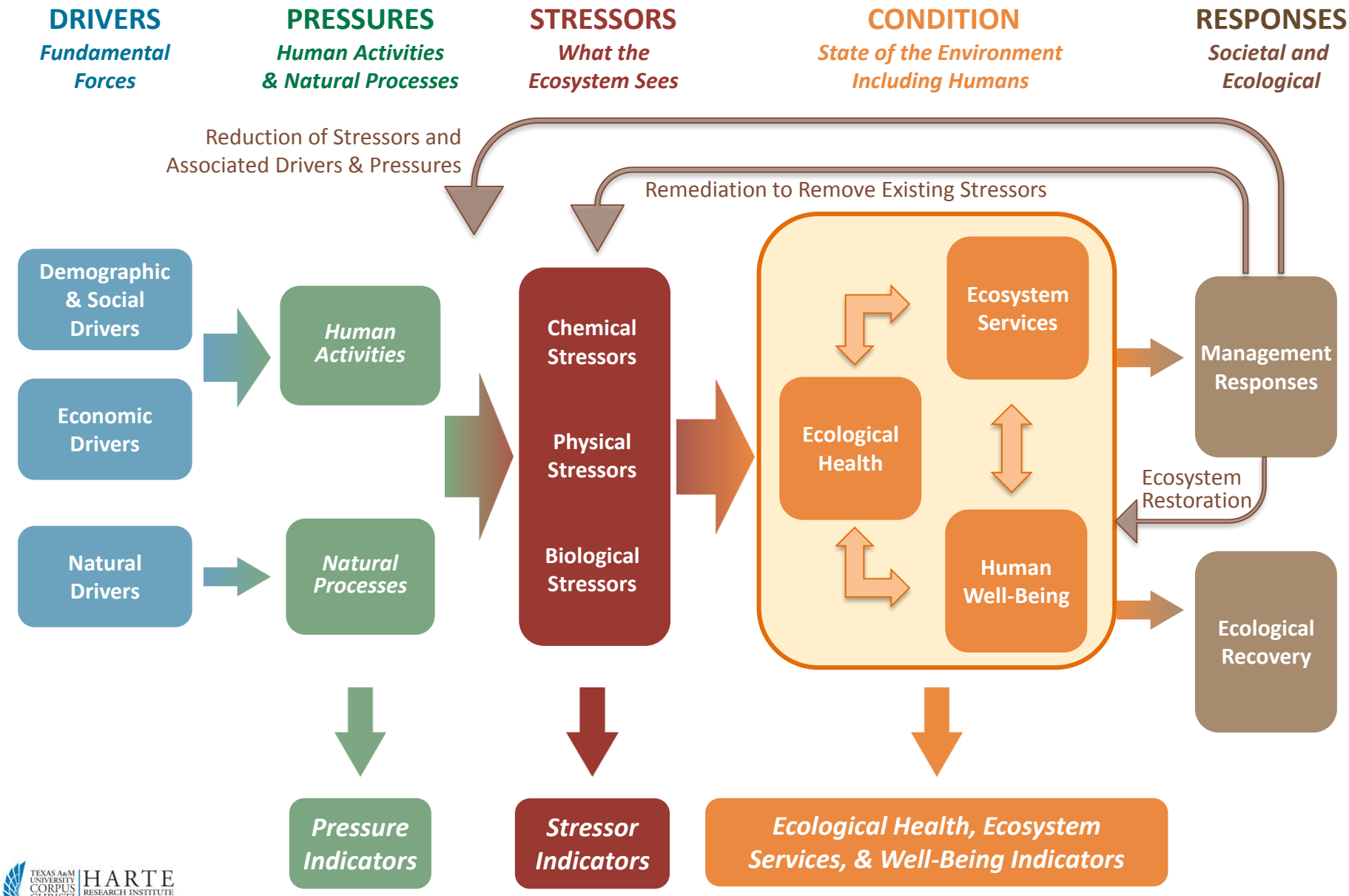
OBJECTIVE

Provide a tool in which resource managers and decision-makers will have confidence in its objectivity and that is spatial scalable to the degree practicable while maintaining the scope of the Gulf of Mexico as a large marine ecosystem

ACCESSABLE

Produce an assessment of the health of the Gulf of Mexico on a regular, preferably annual, basis that is easily accessible and understandable to the engaged public

EcoHealth Indicators Framework



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