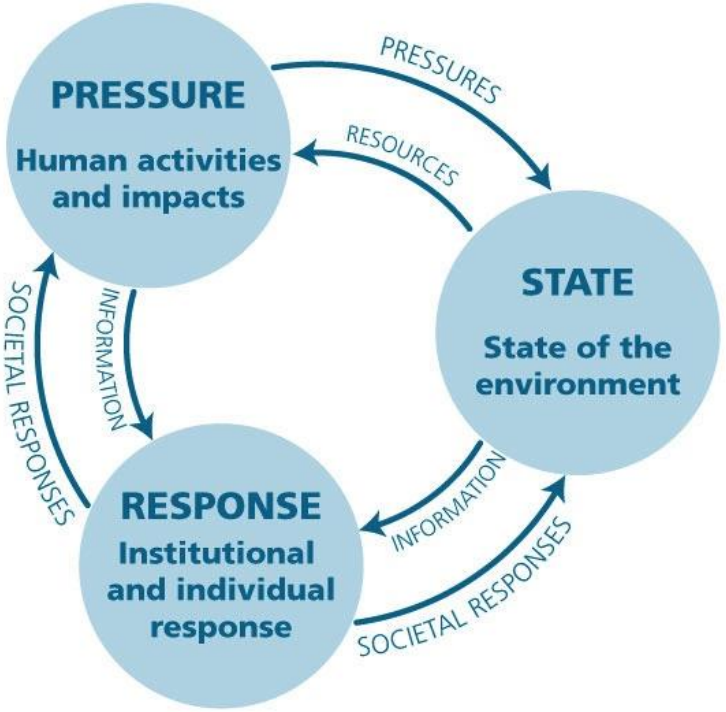
A holistic coastal assessment and reporting framework that balances economic, social, and environmental perspectives

- Water Supply
- Risk Reduction
- Economy
- Environment
- Recreation
- Transportation



University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

STAR Seminar
24 April 2014

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Bill Nuttle
Caroline Wicks
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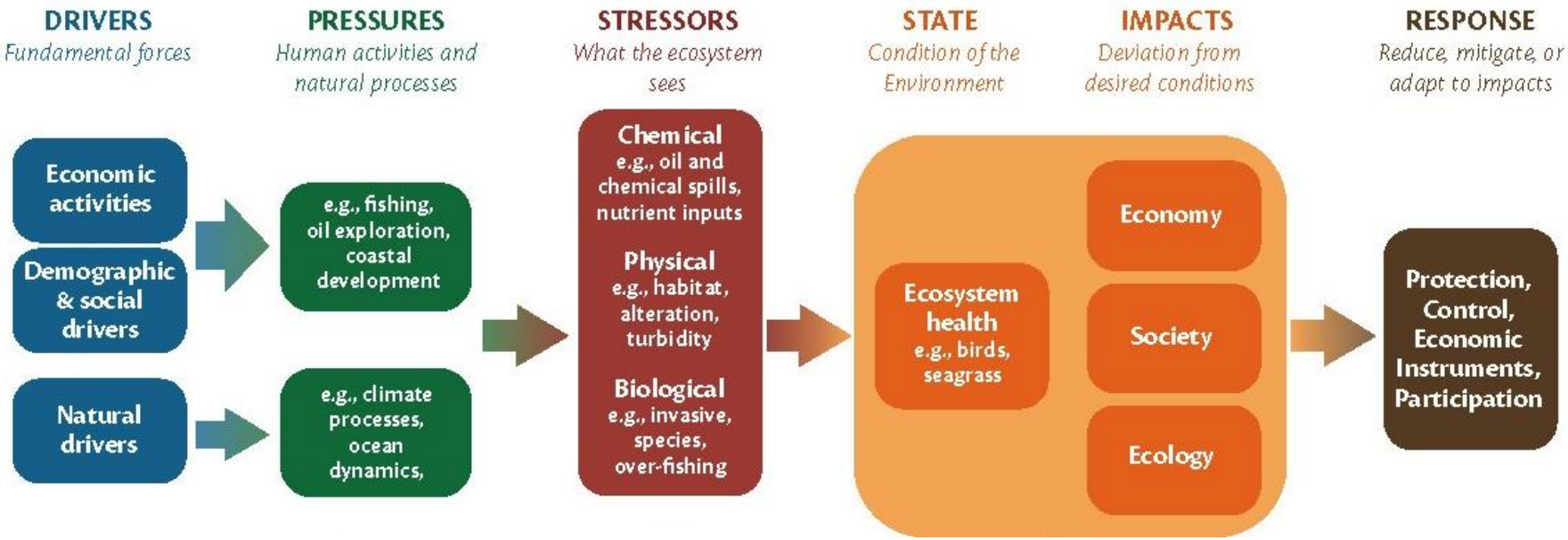
Jane Thomas

Assessment Frameworks



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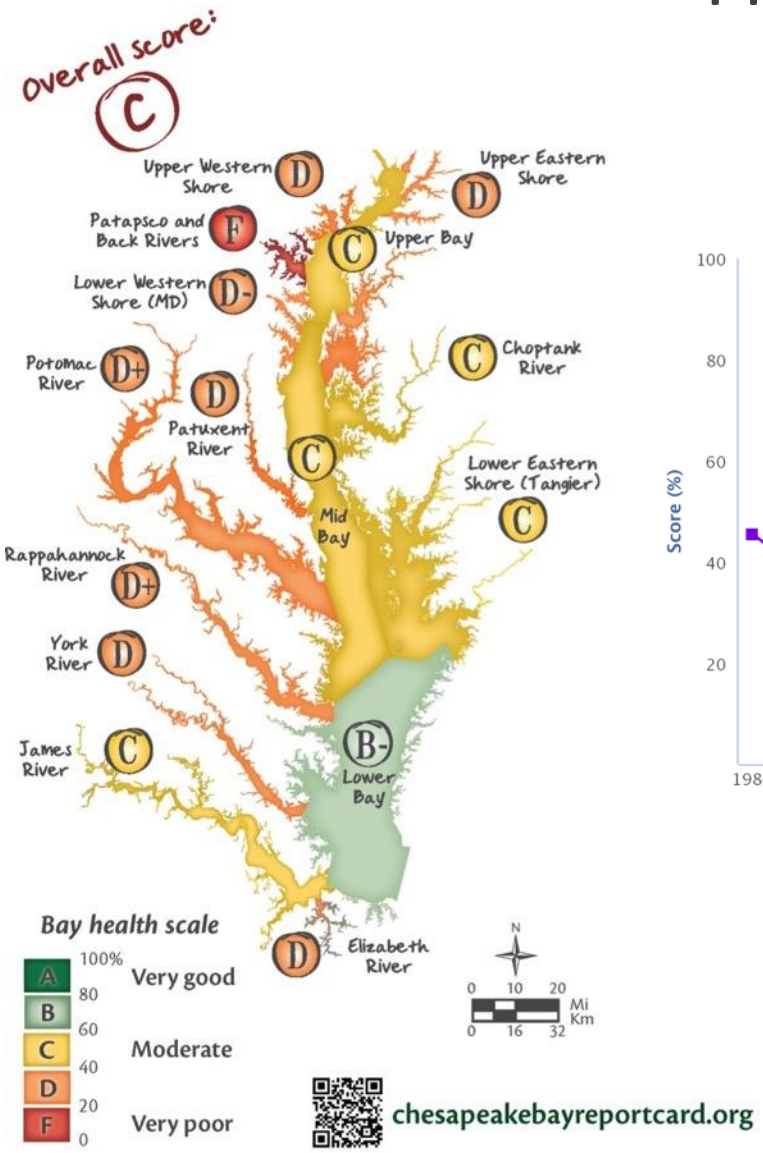
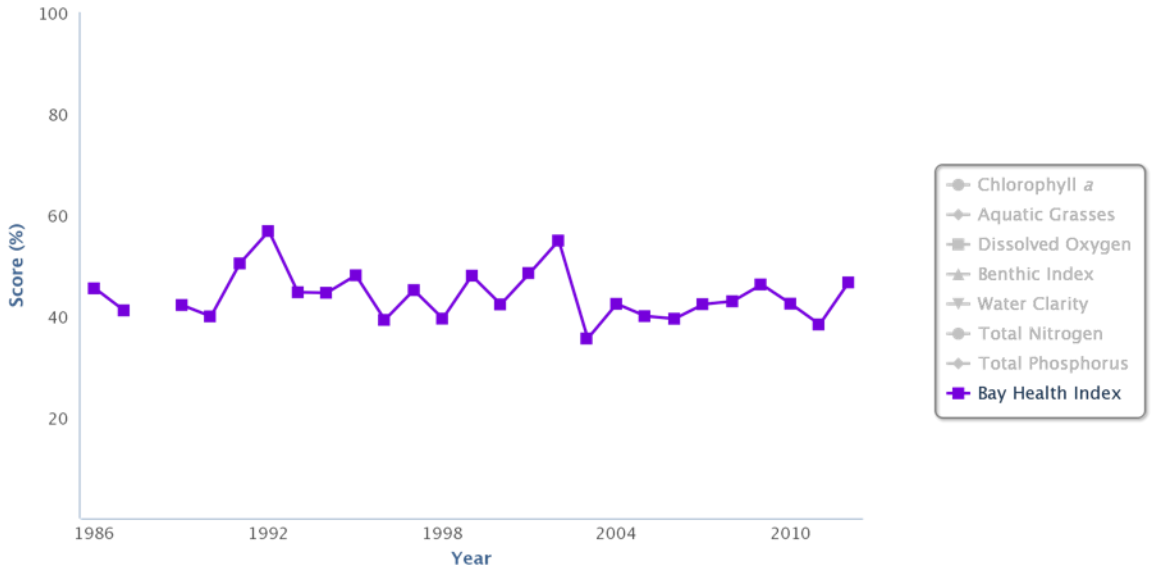
State: Chesapeake Bay Assessment Framework





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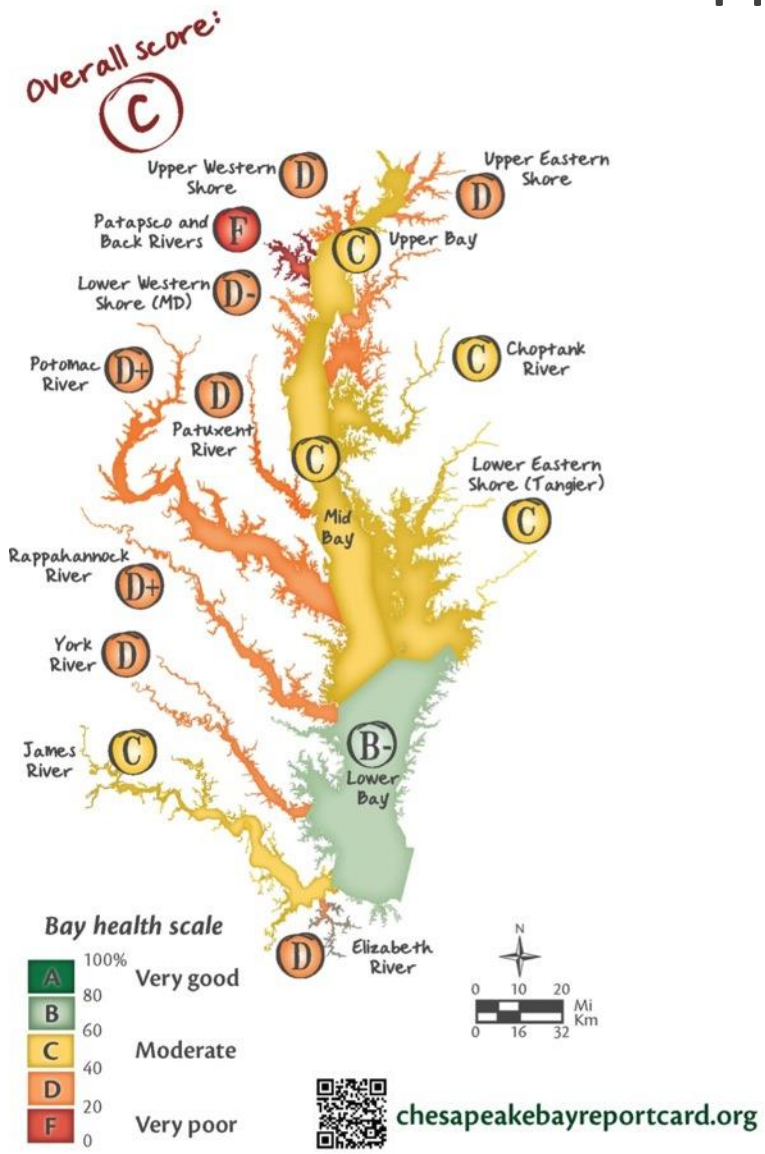

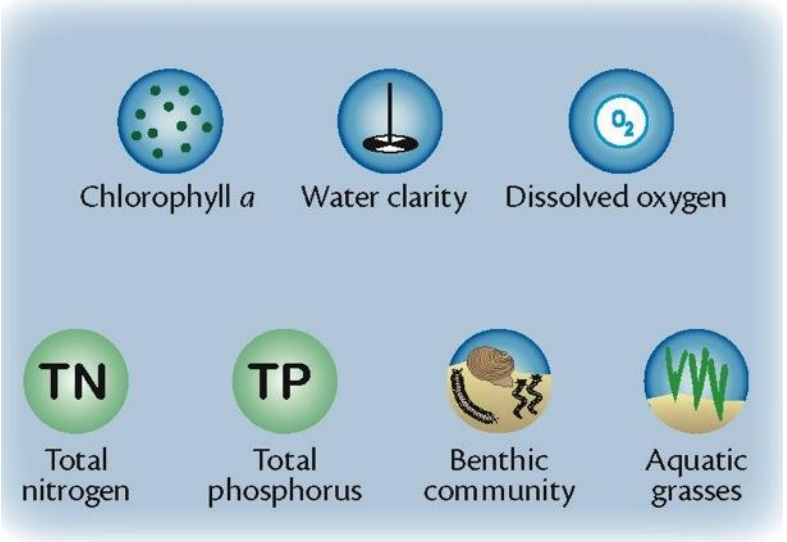

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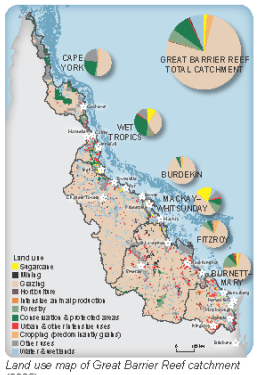
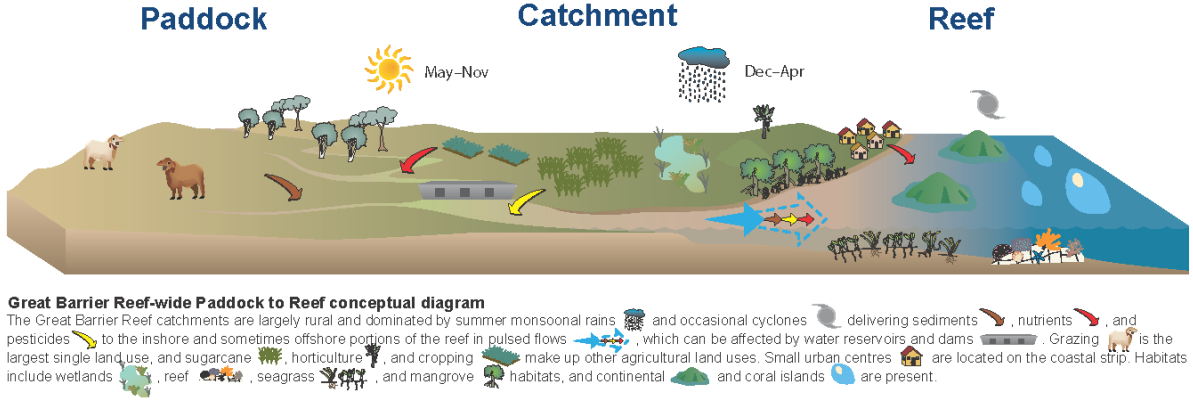
Pressure, State, and Response: Great Barrier Reef

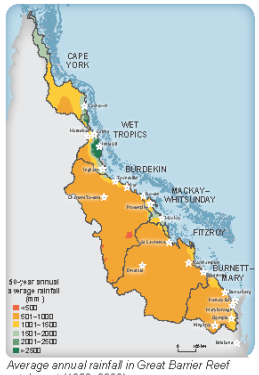


Land use map of Great Barrier Reef catchment (2005)



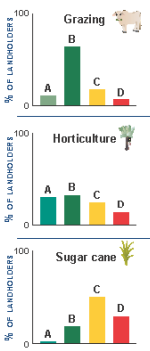
Great Barrier Reef-wide Paddock to Reef conceptual diagram

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.

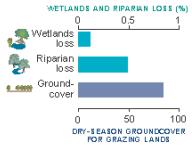
A – Cutting-edge practice
B – Current best practice
C – Common practice
D – Old or unacceptable practices

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

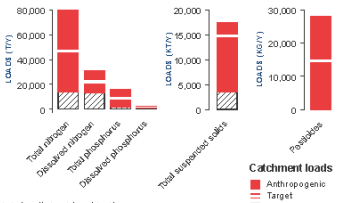


Wetland loss between 2001–2005 was ~0.1% of the total wetland area (720,000ha), although wetland loss prior to that had been extensive.

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



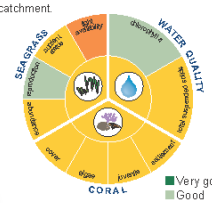
The total pollutant load to the Great Barrier Reef is largely due to anthropogenic (human-induced) activities, although natural nutrient and sediment loads do occur. Annual sediment loads were estimated at 3 million tonnes due to natural processes, but a total of 17 million tonnes were delivered to the 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 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 ~8% 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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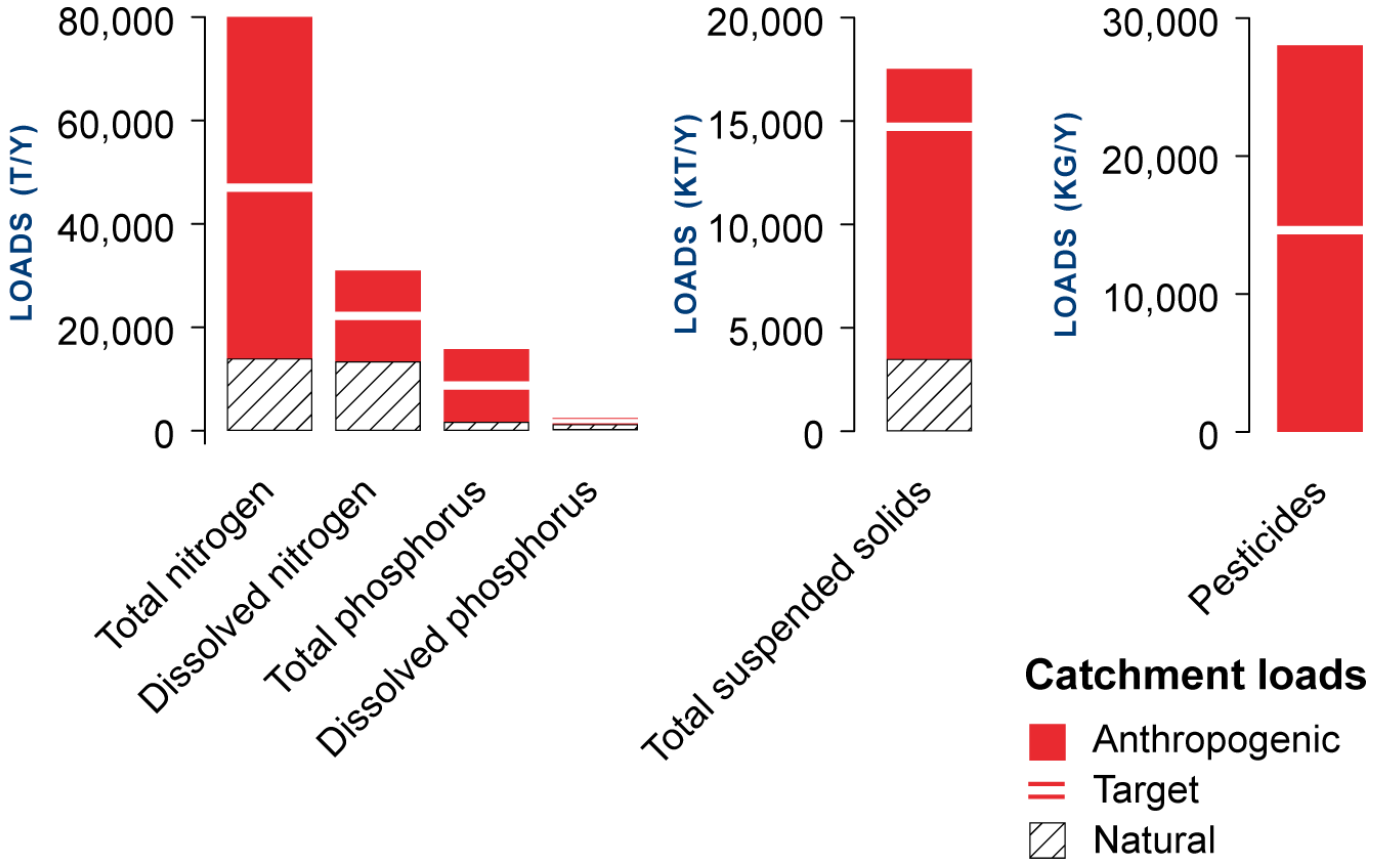
Pressure, State, and Response: Great Barrier Reef



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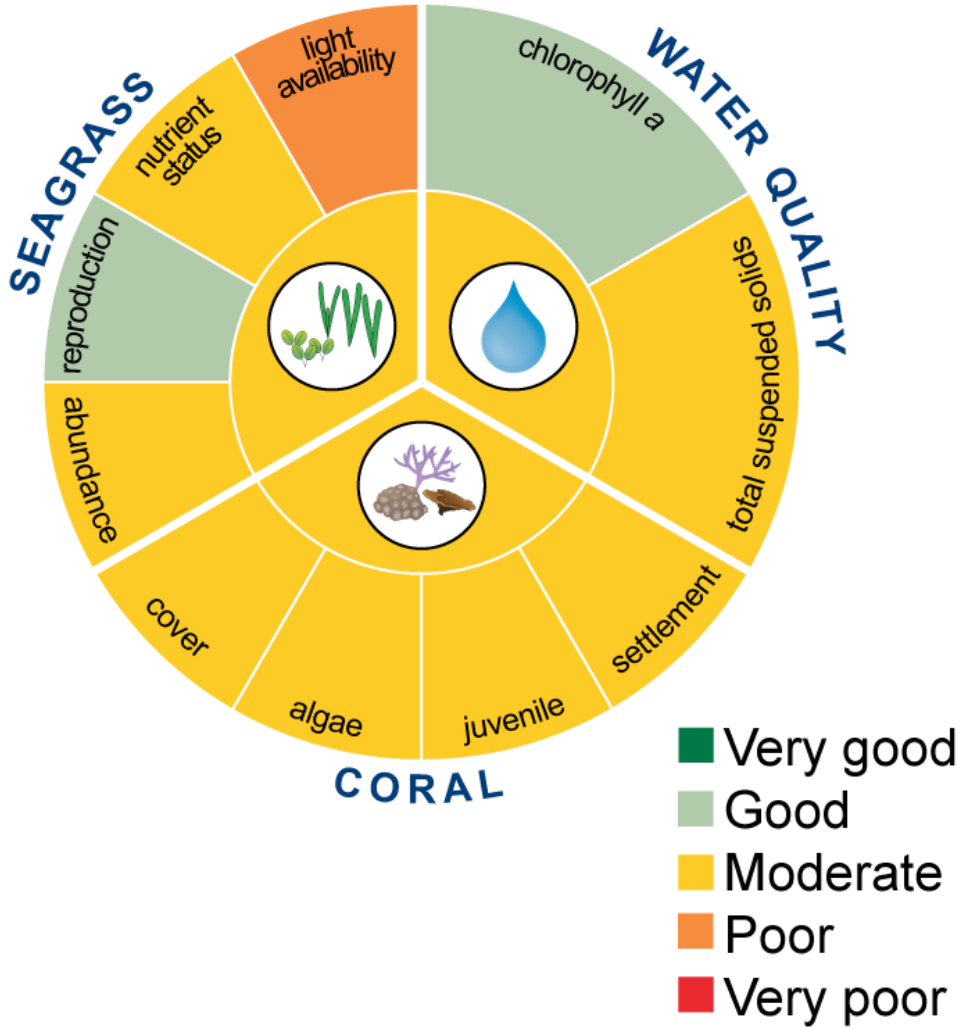
Pressure, **State**, and Response: Great Barrier Reef



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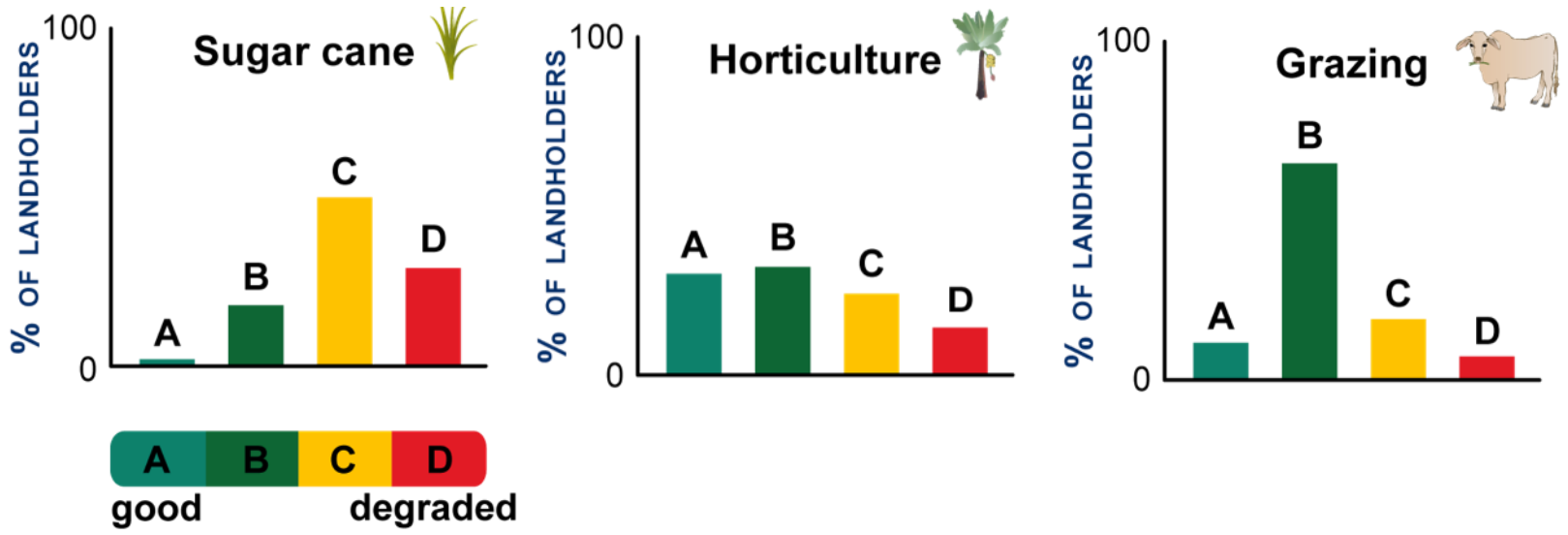
Pressure, State, and **Response**: Great Barrier Reef



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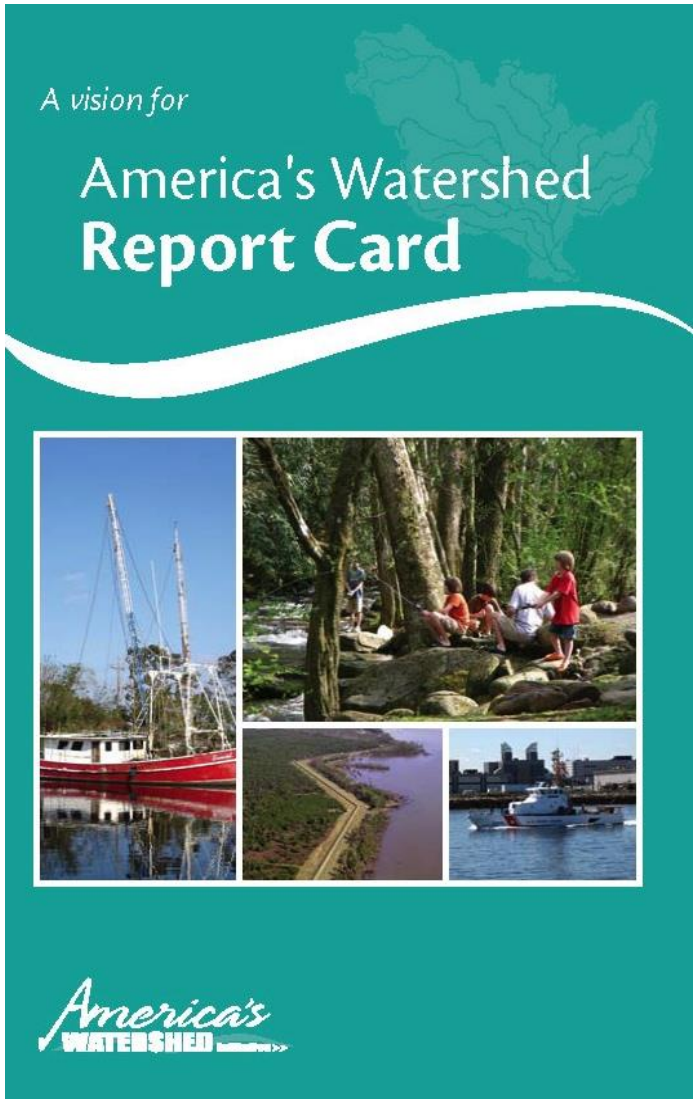
Mississippi River Basin Report Card: economic, social, and environmental



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Mississippi River Basin Report Card: economic, social, and environmental

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1 Create a conceptual framework

Create a framework defining goals and major aspects of each goal that should be evaluated over time.

2 Choose indicators

Select indicators that convey meaningful information and can be reliably measured.

3 Define thresholds

Define status categories, reporting regions, and method of measuring threshold attainment.

4 Calculate scores

Source	Station	Region	Date	DO Value
DNR	CCC0008		4/29/09	9.00
DNR	CCC0008		4/29/09	9.50
DNR	CCC0008		4/29/09	9.70
DNR	CCC0008		5/28/09	8.90
DNR	CCC0008		5/28/09	9.00
DNR	CCC0008		5/28/09	9.00

Calculate indicator scores and combine into index grades.

5 Communicate results

A vision for America's Watershed Report Card

Communicate results using visual elements, such as photos, maps, and conceptual diagrams.

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Mississippi River Basin Report Card: economic, social, and environmental

Workshop to identify appropriate indicators and data sources

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Mississippi River Basin Report Card: economic, social, and environmental

Focus on getting local knowledge

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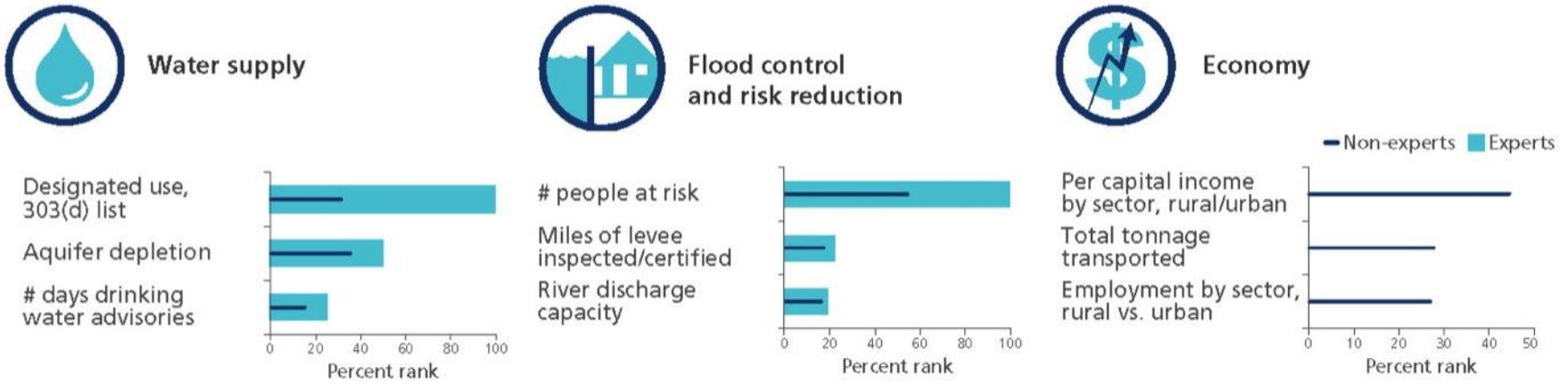

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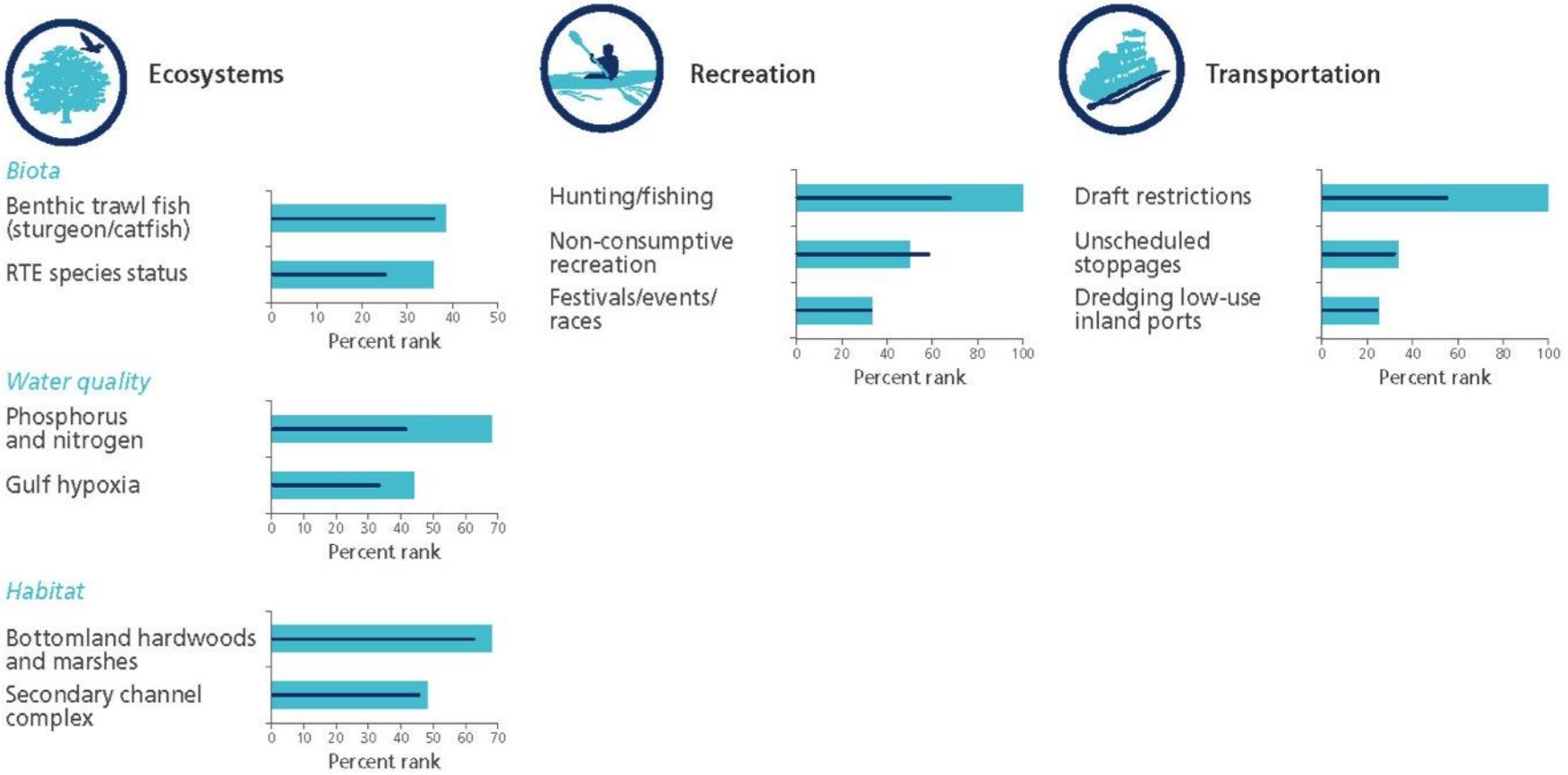
Mississippi River Basin Report Card: economic, social, and environmental



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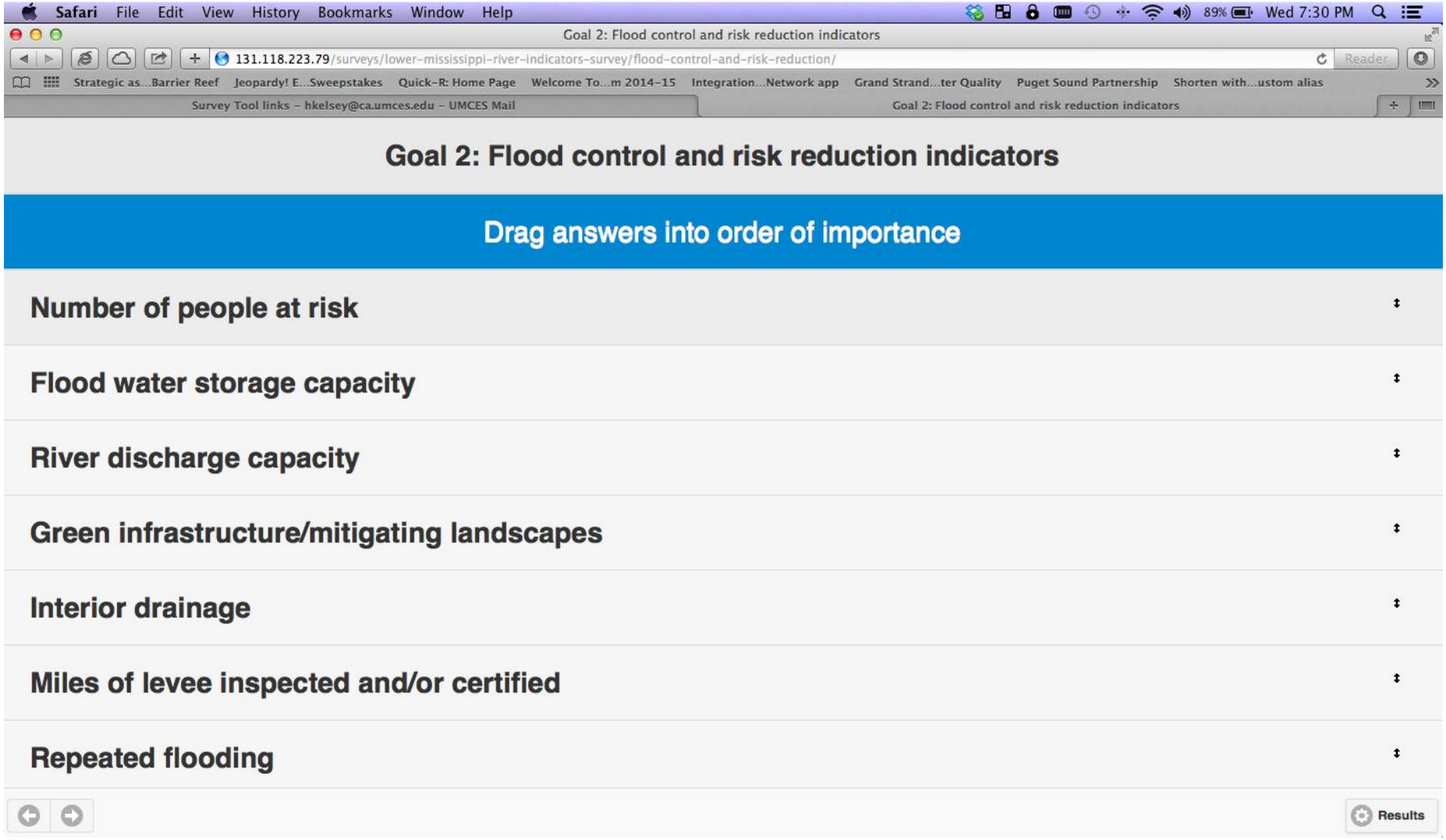
On-line survey tool



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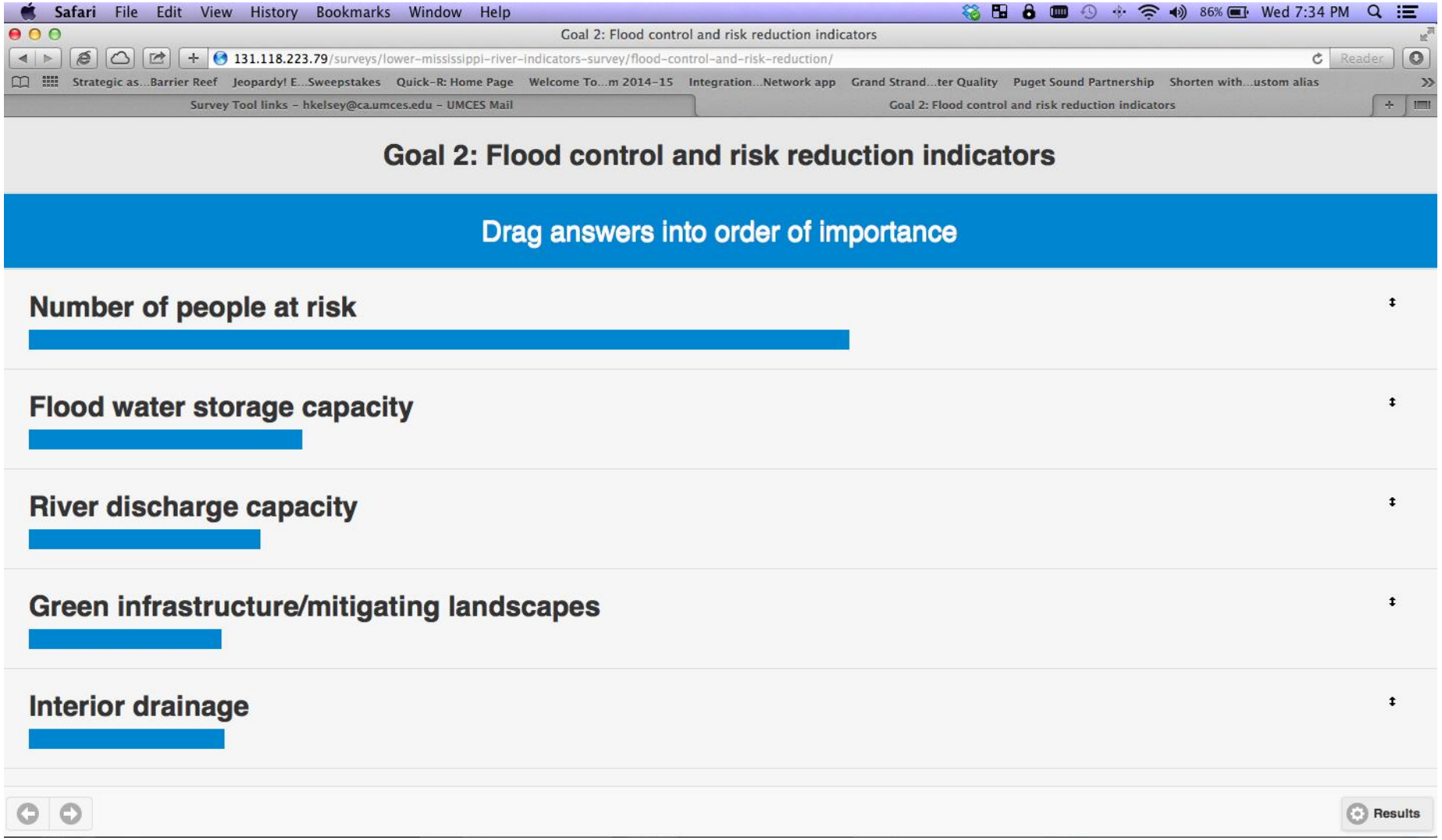

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Report Card process includes workshops in each basin

✔ September 2013

May 2014

✔ December 2013

Acknowledgements

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