Are We There Yet? How RECOVER Determines Restoration Progress and Success

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GEER Session 4

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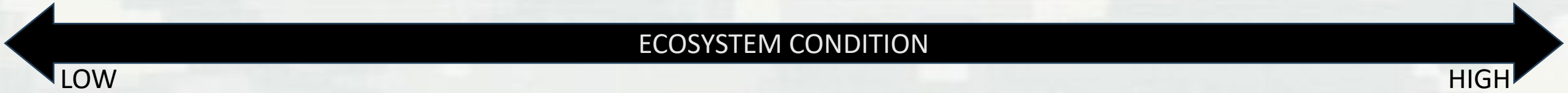
Restoration, **Co**ordination, **Ver**ification

- **Interdisciplinary collaboration** of agencies, tribes, and institutions
- Conducts scientific and technical **evaluations** and **assessments** to improve the Comprehensive Everglades Restoration Plan's (CERP) ability to restore the south Florida ecosystem while providing for the region's other water-related needs
- Technical support to CERP with a **system-wide and integrative perspective**

CERP Points of Reference



Where are we?

Where are we going?

Are we there yet?

CERP Points of Reference

Pre-CERP

ECOSYSTEM CONDITION

LOW

HIGH

CERP Points of Reference

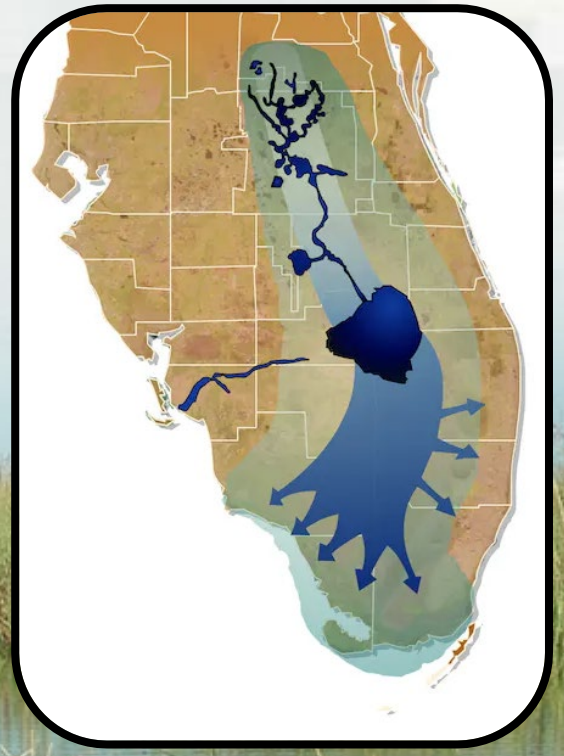
Pre-CERP

Pre-drainage (historic)

ECOSYSTEM CONDITION

LOW

HIGH



CERP Points of Reference

Pre-CERP

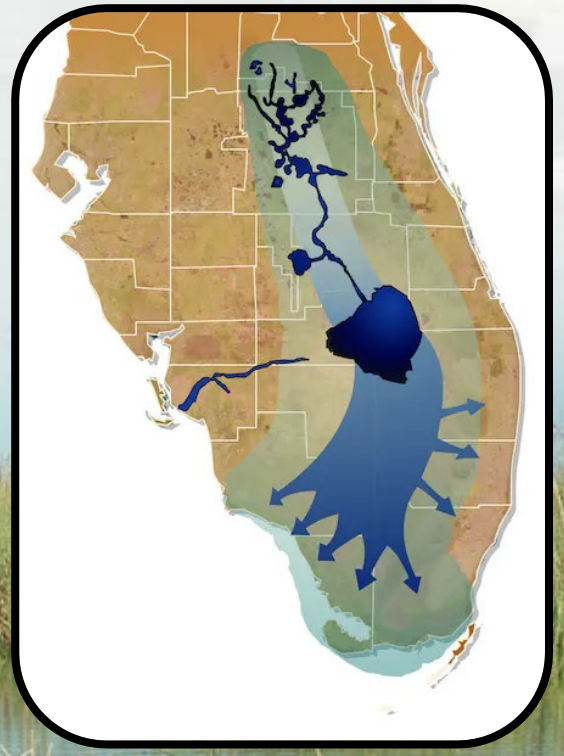
Desired Restoration

Pre-drainage (historic)

ECOSYSTEM CONDITION

LOW

HIGH



CERP Points of Reference

Pre-CERP

Full CERP

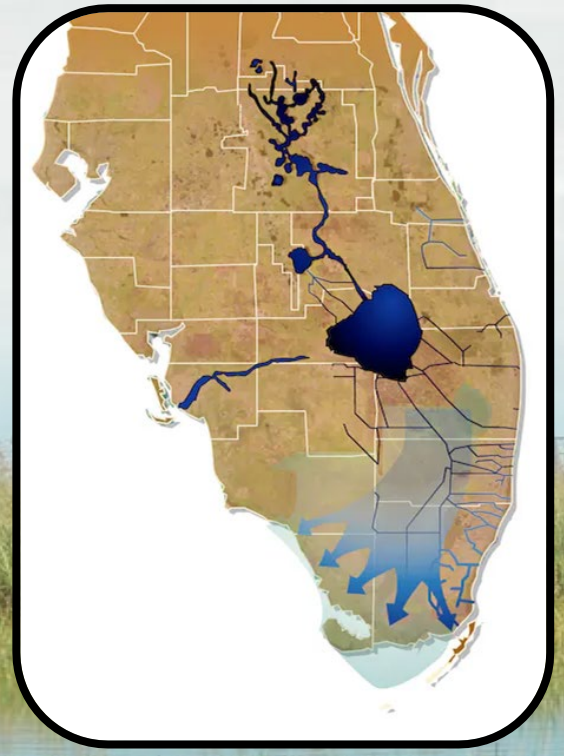
Desired Restoration

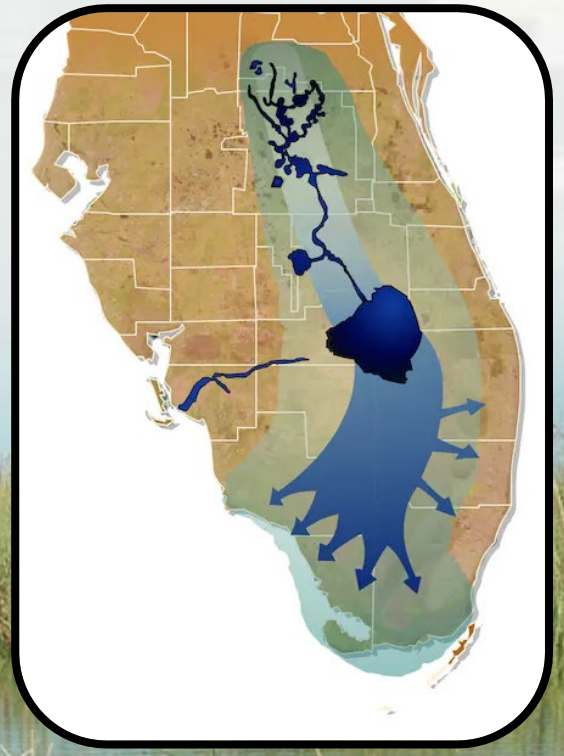
Pre-drainage (historic)

ECOSYSTEM CONDITION

LOW

HIGH





CERP Points of Reference

Pre-CERP

Interim CERP

Full CERP

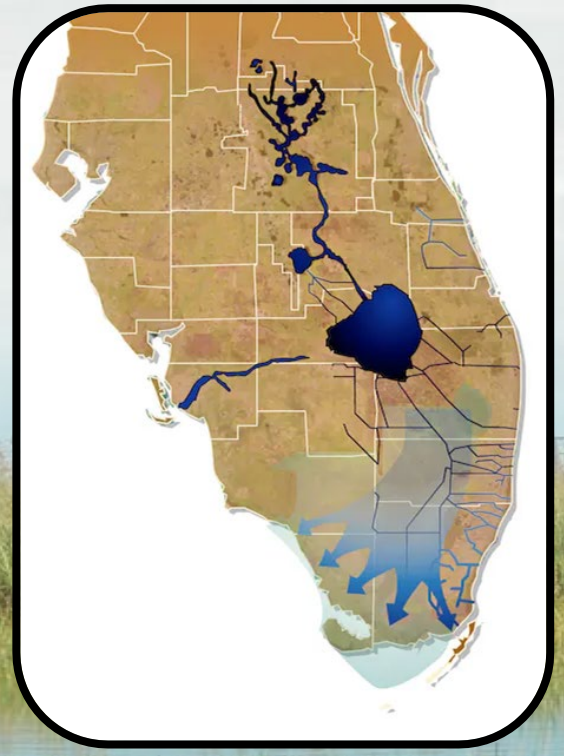
Desired Restoration

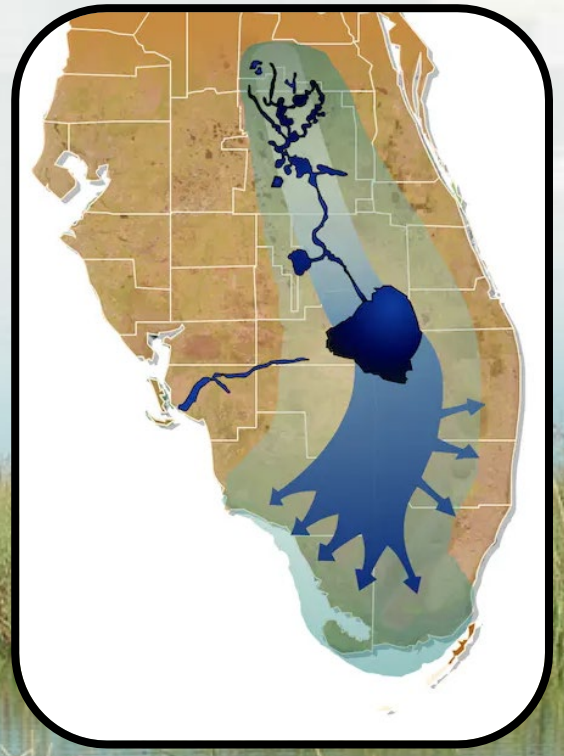
Pre-drainage (historic)

ECOSYSTEM CONDITION

LOW

HIGH





How does RECOVER inform and track CERP progress and success?

Ecological Indicators

Ecological Indicators

crocodilians

wading birds

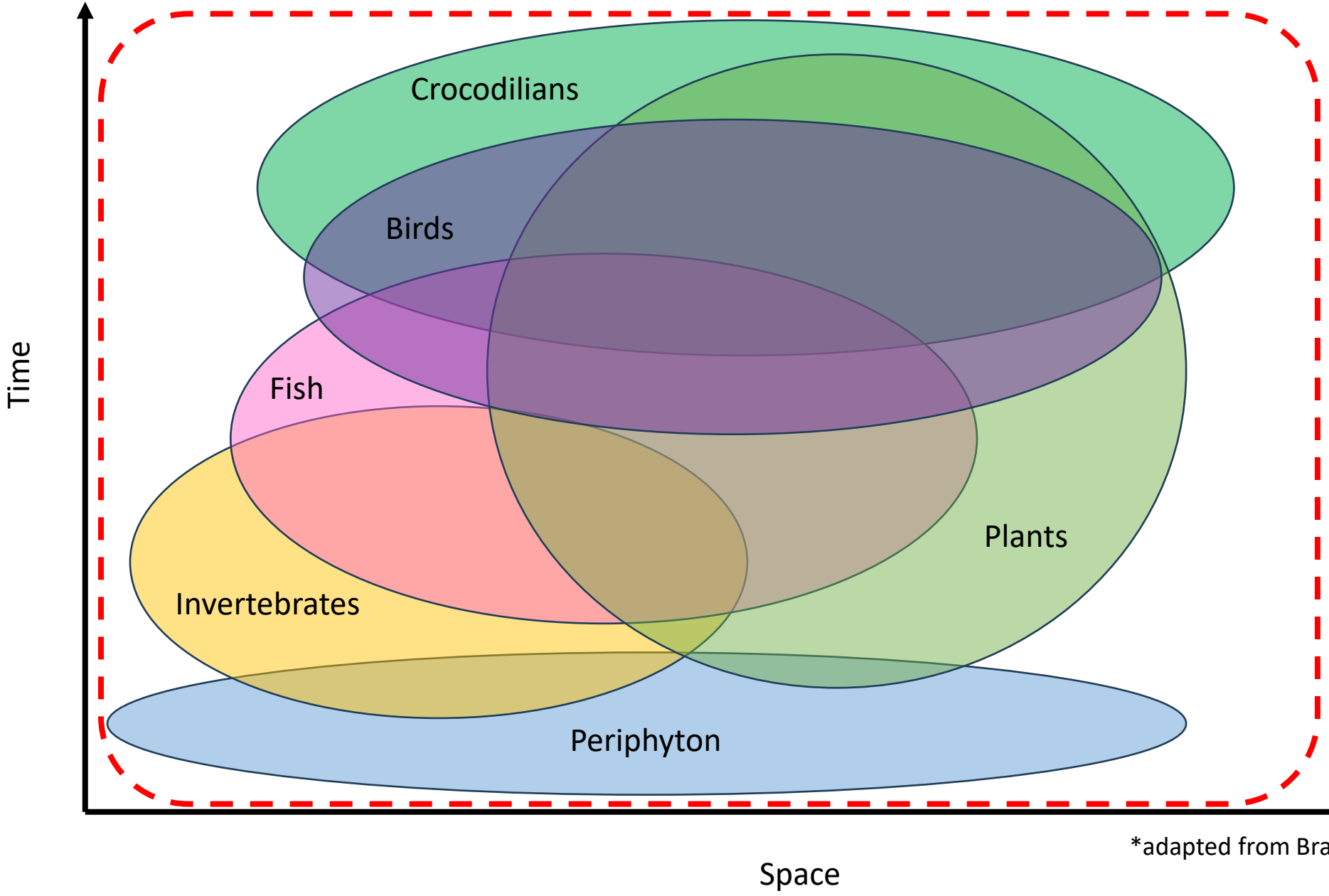
fish

invertebrates

periphyton

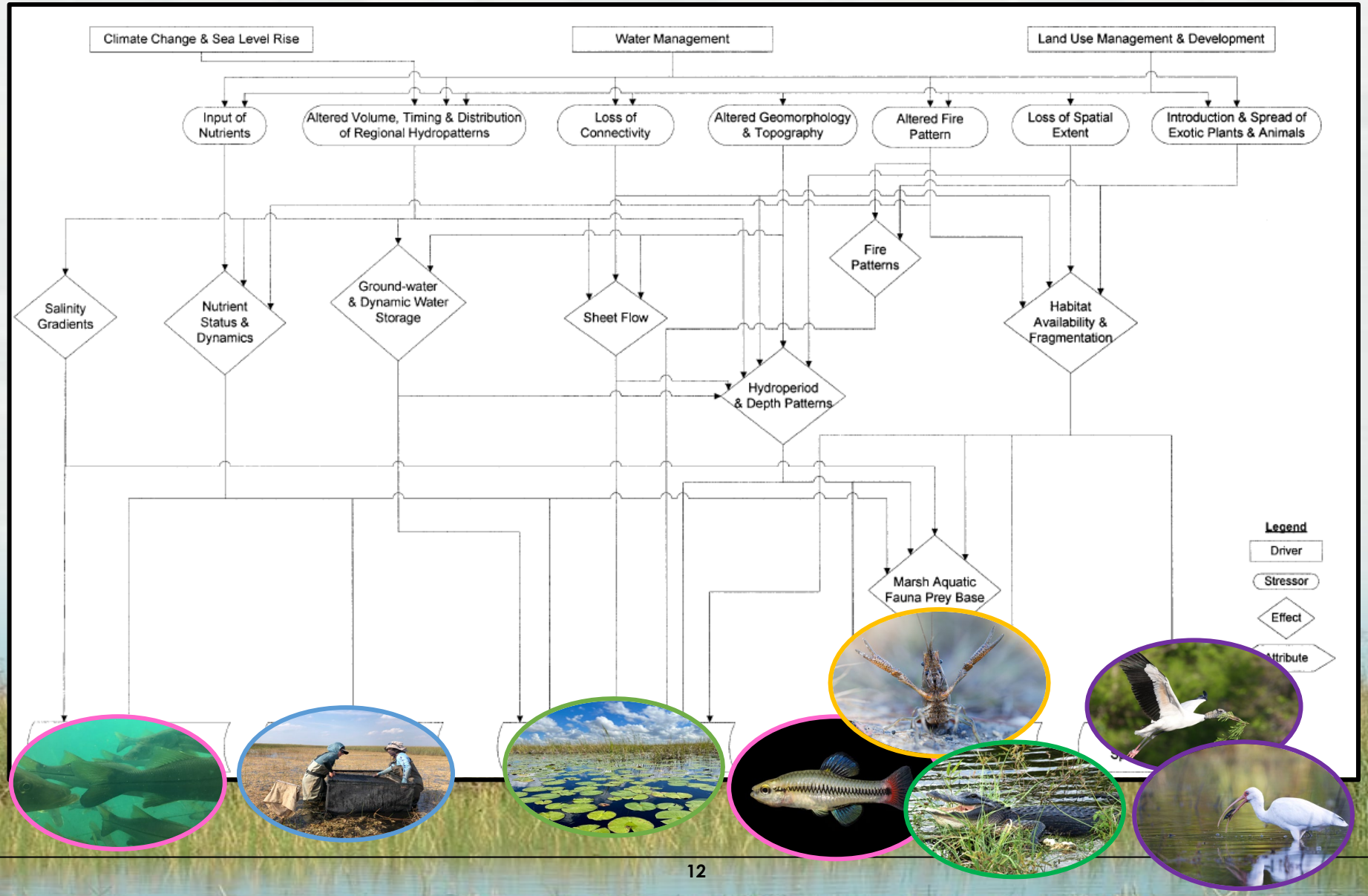
vegetation

Diverse suite of indicators



*adapted from Brandt et al. 2022

Conceptual Ecological Models (CEMs)

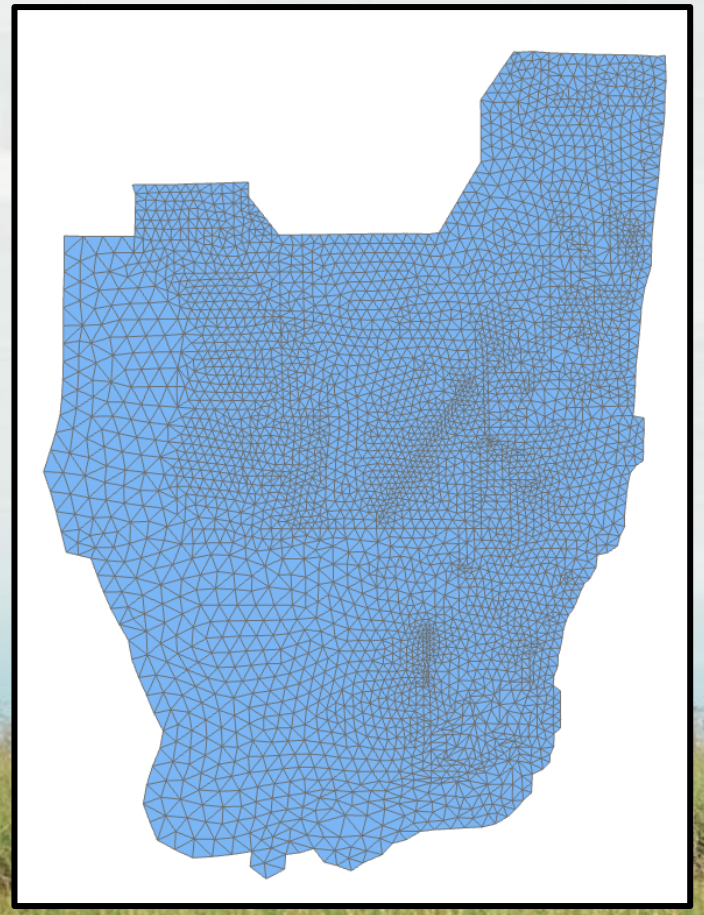


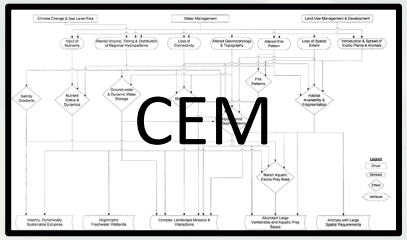
How does RECOVER use Ecological Indicators to Determine Restoration Progress and Success?

Evaluation and Assessment

Evaluation (model world)

Simulated hydrology

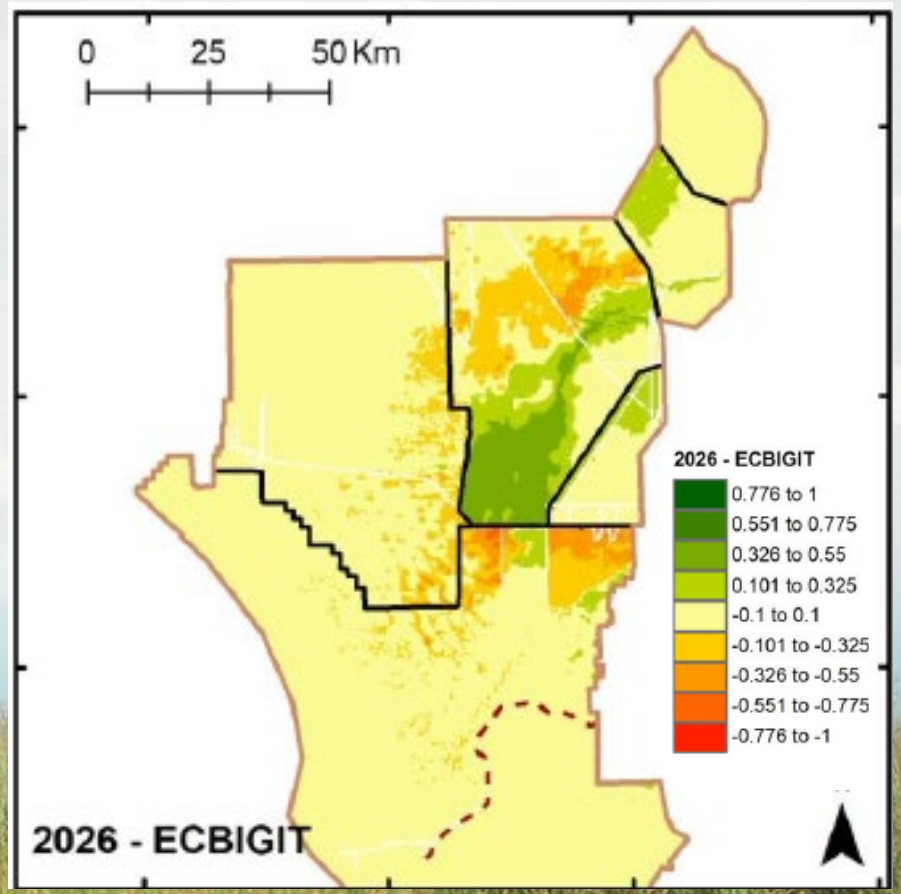




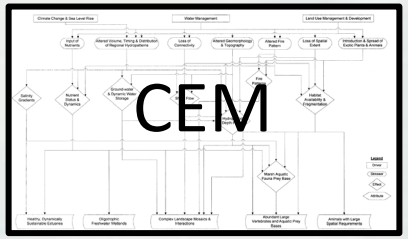
MODEL

Monitoring Data

Simulated indicator (alligator) response

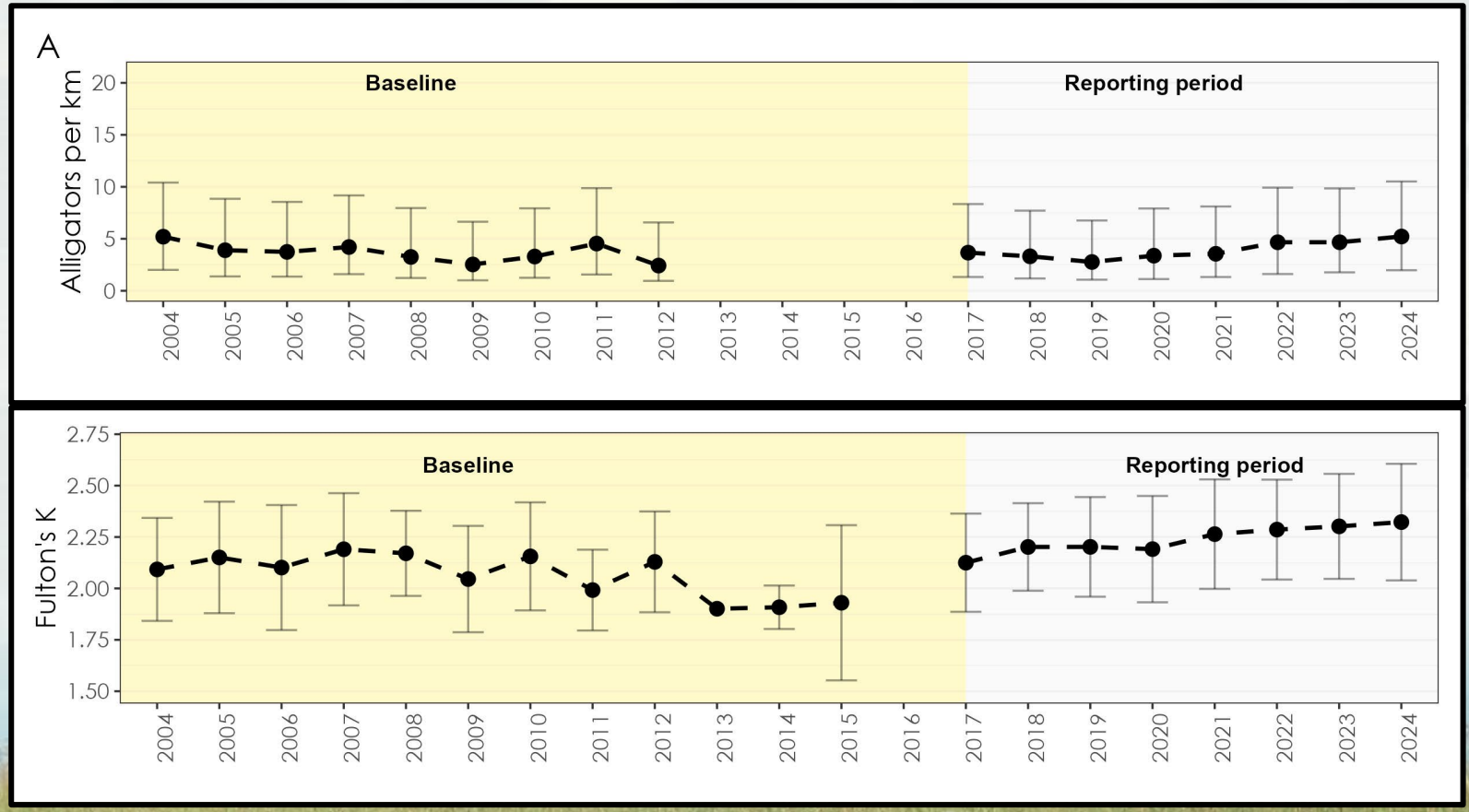


Assessment (real world)

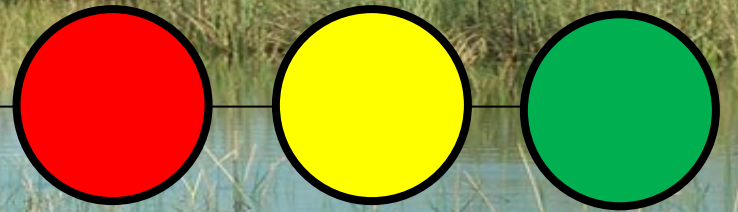


Monitoring

Indicator field data



Indicator status



How do Evaluations and Assessments inform CERP?

RECOVER Reports

Evaluations

RECOVER Reports

CERP Project Planning

Interim Interi (200

Pre-CERP

Interir

Desired estoration

Pre-drainage (historic)

LOW

HIGH

System Status Reports

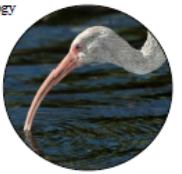
(2006, 2007, 2009, 2012, 2014, 2019, **2024**)

Assessments

2024 System Status Report

First opportunity to compare **interim evaluation** with **interim assessment**

- **Assessments** of all ecological indicators
  - WY2017 – WY2024
- **Evaluations** from 2020 IGIT
  - 2026 model simulation



INDICATOR STATUS AND PROGRESS TOWARDS INTERIM GOALS AND TARGETS

RECOVER has adopted "stoplights" to convey indicator status and change in status over time (Table 1). The stoplight methodology for each indicator is unique but shares a common definition for each stoplight color/status. Status definitions were made consistent with the biennial *South Florida Ecosystem Restoration Task Force System-Wide Ecological Indicators* report.

The 2024 System Status Report describes status and progress toward IGIT for indicators in RECOVER's **Lake Okeechobee, Northern Estuaries, Greater Everglades, and Southern Coastal Systems** regional modules. The **Southwest Florida** RECOVER region, established in 2021, does not currently have Interim Goals and RECOVER monitoring is limited to the Ten Thousand Islands. For the purposes of this report, the monitoring occurring within the region is captured under the Southern Coastal Systems section where the modules overlap.

Image (right): Ibis (Photo Credit: South Florida Water Management District).

Table 1. Regional and indicator statuses, including ecological indicators and other water related needs.

GOOD	Meets restoration target. Within range expected for healthy ecosystem.
FAIR	Below restoration targets, may require additional action.
POOR	Well below restoration targets, merits action.
N/A	No stoplight methodology in place; insufficient data.

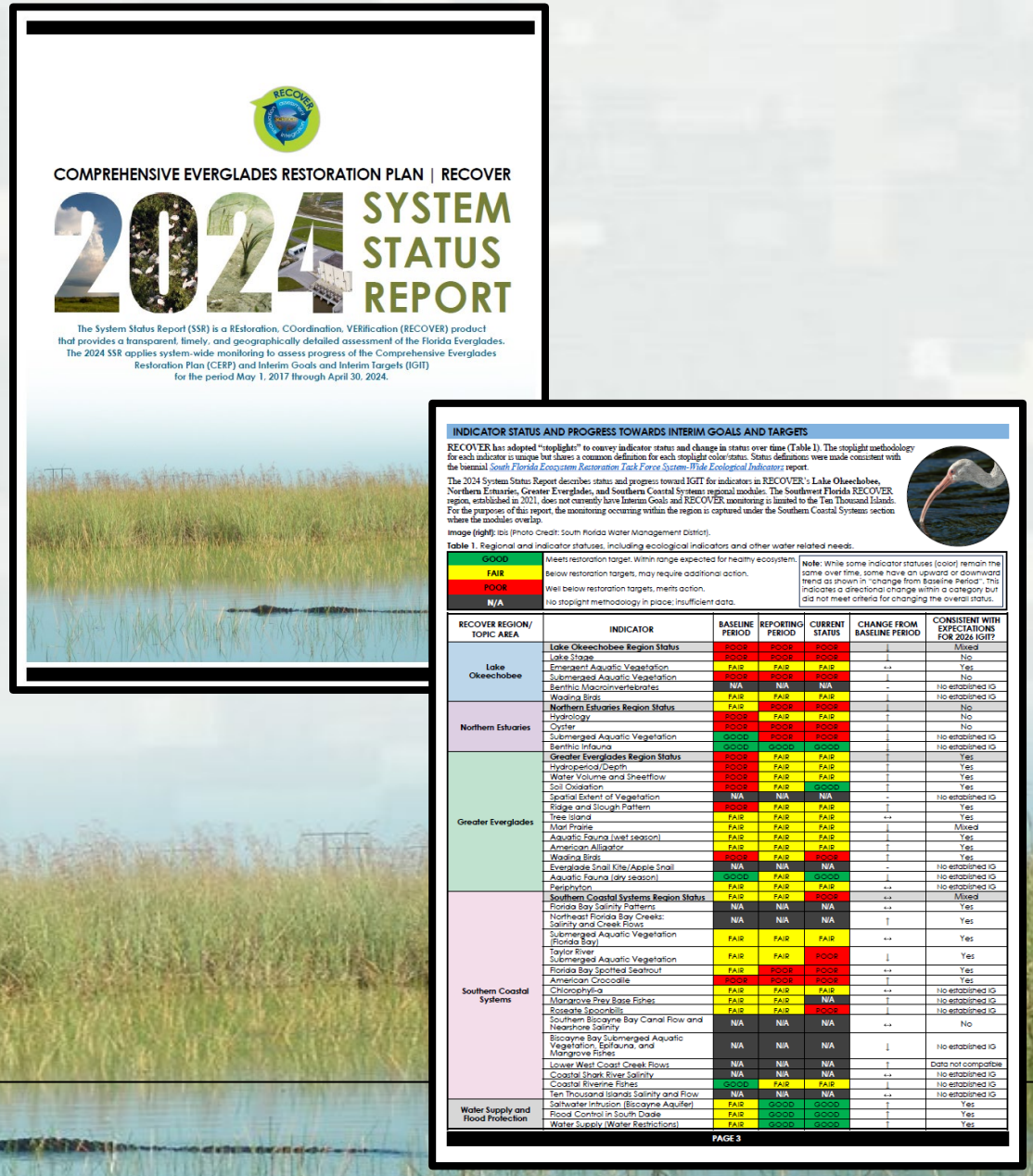
Note: While some indicator statuses (color) remain the same over time, some have an upward or downward trend as shown in "change from Baseline Period". This indicates a directional change within a category but did not meet criteria for changing the overall status.

RECOVER REGION/ TOPIC AREA	INDICATOR	BASELINE PERIOD	REPORTING PERIOD	CURRENT STATUS	CHANGE FROM BASELINE PERIOD	CONSISTENT WITH EXPECTATIONS FOR 2026 IGIT?
Lake Okeechobee	**Lake Okeechobee Region Status**	POOR	POOR	POOR	↓	Mixed
	Lake Stage	POOR	POOR	POOR	↓	No
	Emergent Aquatic Vegetation	FAIR	FAIR	FAIR	↔	Yes
	Submerged Aquatic Vegetation	POOR	POOR	POOR	↓	No
	Benthic Macroinvertebrates	N/A	N/A	N/A	-	No established IG
	Wading Birds	FAIR	FAIR	FAIR	↓	No established IG
Northern Estuaries	**Northern Estuaries Region Status**	FAIR	POOR	POOR	↓	No
	Hydrology	POOR	FAIR	FAIR	↑	No
	Oyster	POOR	POOR	POOR	↓	No
	Submerged Aquatic Vegetation	GOOD	POOR	POOR	↓	No established IG
	Benthic Infauna	GOOD	GOOD	GOOD	↓	No established IG
Greater Everglades	**Greater Everglades Region Status**	POOR	FAIR	FAIR	↑	Yes
	Hydroperiod/Depth	POOR	FAIR	FAIR	↑	Yes
	Water Volume and Sheetflow	POOR	FAIR	FAIR	↑	Yes
	Soil Oxidation	POOR	FAIR	GOOD	↑	Yes
	Spatial Extent of Vegetation	N/A	N/A	N/A	-	No established IG
	Ridge and Slough Pattern	POOR	FAIR	FAIR	↑	Yes
	Tree Island	FAIR	FAIR	FAIR	↔	Yes
	Marl Prairie	FAIR	FAIR	FAIR	↓	Mixed
	Aquatic Fauna (wet season)	FAIR	FAIR	FAIR	↓	Yes
	American Alligator	FAIR	FAIR	FAIR	↑	Yes
	Wading Birds	POOR	FAIR	POOR	↑	Yes
	Everglade Snail Kite/Apple Snail	N/A	N/A	N/A	-	No established IG
	Aquatic Fauna (dry season)	GOOD	FAIR	GOOD	↓	No established IG
	Periphyton	FAIR	FAIR	FAIR	↔	No established IG
Southern Coastal Systems	**Southern Coastal Systems Region Status**	FAIR	FAIR	POOR	↔	Mixed
	Florida Bay Salinity Patterns	N/A	N/A	N/A	↔	Yes
	Northeast Florida Bay Creeks: Salinity and Creek Flows	N/A	N/A	N/A	↑	Yes
	Submerged Aquatic Vegetation (Florida Bay)	FAIR	FAIR	FAIR	↔	Yes
	Taylor River Submerged Aquatic Vegetation	FAIR	FAIR	POOR	↓	Yes
	Florida Bay Spotted Seatrout	FAIR	POOR	POOR	↔	Yes
	American Crocodile	POOR	POOR	POOR	↑	Yes
	Chlorophyll-a	FAIR	FAIR	FAIR	↔	No established IG
	Mangrove Prey Base Fishes	FAIR	FAIR	N/A	↑	No established IG
	Roseate Spoonbills	FAIR	FAIR	POOR	↓	No established IG
	Southern Biscayne Bay Canal Flow and Nearshore Salinity	N/A	N/A	N/A	↔	No
	Biscayne Bay Submerged Aquatic Vegetation, Epifauna, and Mangrove Fishes	N/A	N/A	N/A	↓	No established IG
	Lower West Coast Creek Flows	N/A	N/A	N/A	↑	Data not compatible
	Coastal Shark River Salinity	N/A	N/A	N/A	↔	No established IG
	Coastal Riverine Fishes	GOOD	FAIR	FAIR	↓	No established IG
	Ten Thousand Islands Salinity and Flow	N/A	N/A	N/A	↔	No established IG
Water Supply and Flood Protection	Saltwater Intrusion (Biscayne Aquifer)	FAIR	GOOD	GOOD	↑	Yes
	Flood Control in South Dade	FAIR	GOOD	GOOD	↑	Yes
	Water Supply (Water Restrictions)	FAIR	GOOD	GOOD	↑	Yes

PAGE 3

2024 SSR Feedback

- **Indicator status hard to interpret**
- **Missing “system-wide” perspective**



COMPREHENSIVE EVERGLADES RESTORATION PLAN | RECOVER

2024 SYSTEM STATUS REPORT

The System Status Report (SSR) is a REstoration, COordination, VERification (RECOVER) product that provides a transparent, timely, and geographically detailed assessment of the Florida Everglades. The 2024 SSR applies system-wide monitoring to assess progress of the Comprehensive Everglades Restoration Plan (CERP) and Interim Goals and Interim Targets (IGIT) for the period May 1, 2017 through April 30, 2024.

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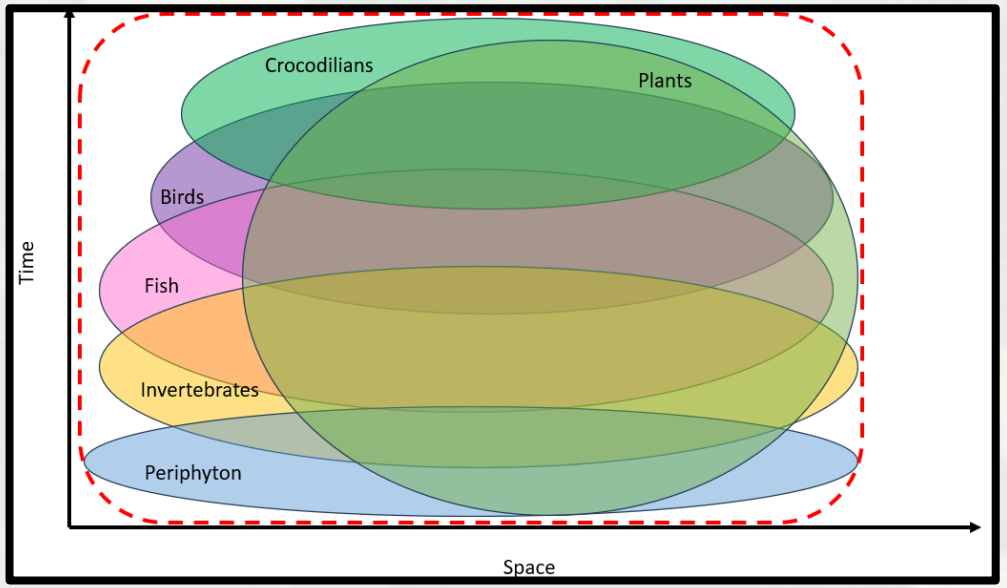
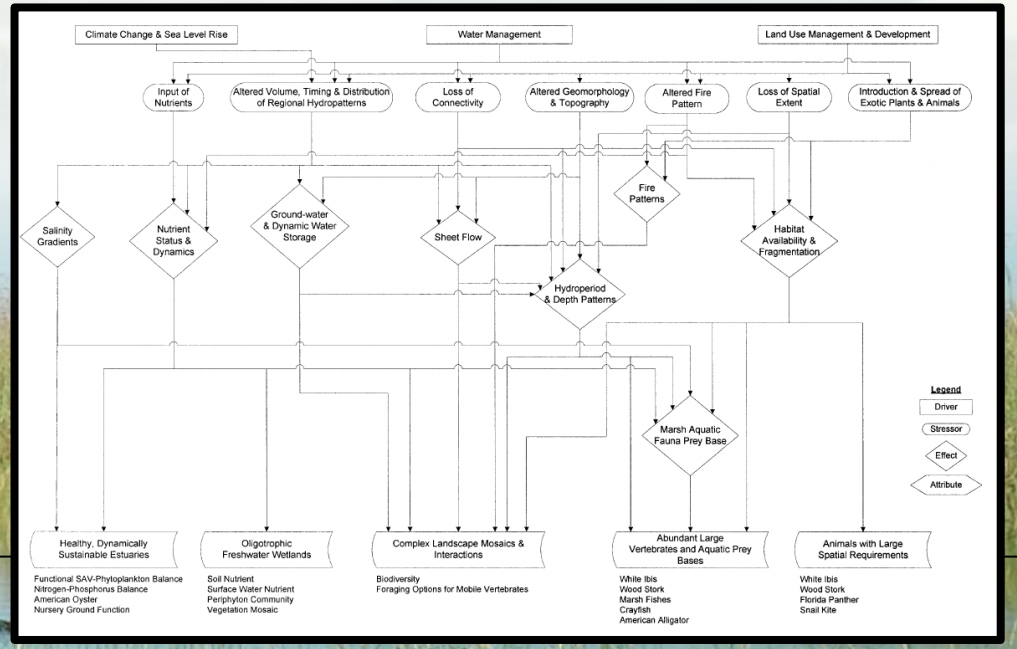
PAGE 3

2024 SSR Feedback

- **Indicator status hard to interpret**
  - Qualitative → Quantitative
  - Incorporate ecologically relevant thresholds



- **Missing "system-wide" perspective**
  - Indicator-centric → foundational ecosystem processes



Summary

- RECOVER supports CERP by **evaluating** and **assessing** ecological (and hydrologic) indicators
- The 2024 System Status Report was RECOVER's first attempt to compare interim evaluations with interim assessments
- Tying indicator status stoplights to ecologically relevant thresholds
  - More accurately reflect indicator status and ecosystem processes
  - Inform adaptive management actions
- For system-wide perspective we need to interpret indicator statuses within the context of CEMs → fundamental ecological processes

References

RECOVER. (2020). *The RECOVER Team's Recommendations for Revisions to the Interim Goals and Interim Targets for the Comprehensive Everglades Restoration Plan: 2020*. Restoration Coordination and Verification Program c/o U.S. Army Corps of Engineers, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL. June 2020.

RECOVER. (2024). *2024 System Status Report*. Restoration Coordination and Verification Program c/o U.S. Army Corps of Engineers, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL. December 2024.

Brandt, L.A., S.A. Balaguera-Reina, V. Briggs-Gonzalez, J.A. Browder, M. Cherkiss, N. Dorn, T. East, M. Ernest, A. Fine, P. Frederick, E. Gaiser, L. Garner, S. Geiger, S. Godfrey, J. Goldston, A. Huebner, N. Jennings, C. Kelble, J. Kline, N. LaSpina, J. Lorenz, C.J. Madden, F.J. Mazzotti, E. Montes, M. Parker, L. Rodgers, R. Sobczak, J. Spencer, J. Trexler, Z. Welch, I. Zink. (2022). *System-wide Indicators for Everglades Restoration. 2022 Report*. Unpublished Technical Report. Science Coordination Group. South Florida Ecosystem Restoration Task Force. Pp 107.

Photo credits: Frank Mazzotti, Tasso Cocoves, NCfishes.com, Mark Cook, Evelyn Gaiser, Jay Sah, Jen Rehage

Questions?

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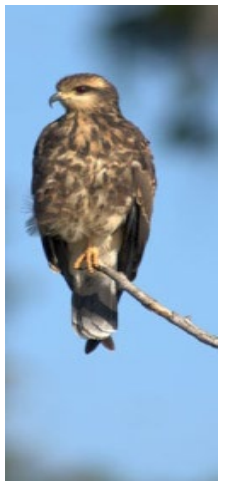
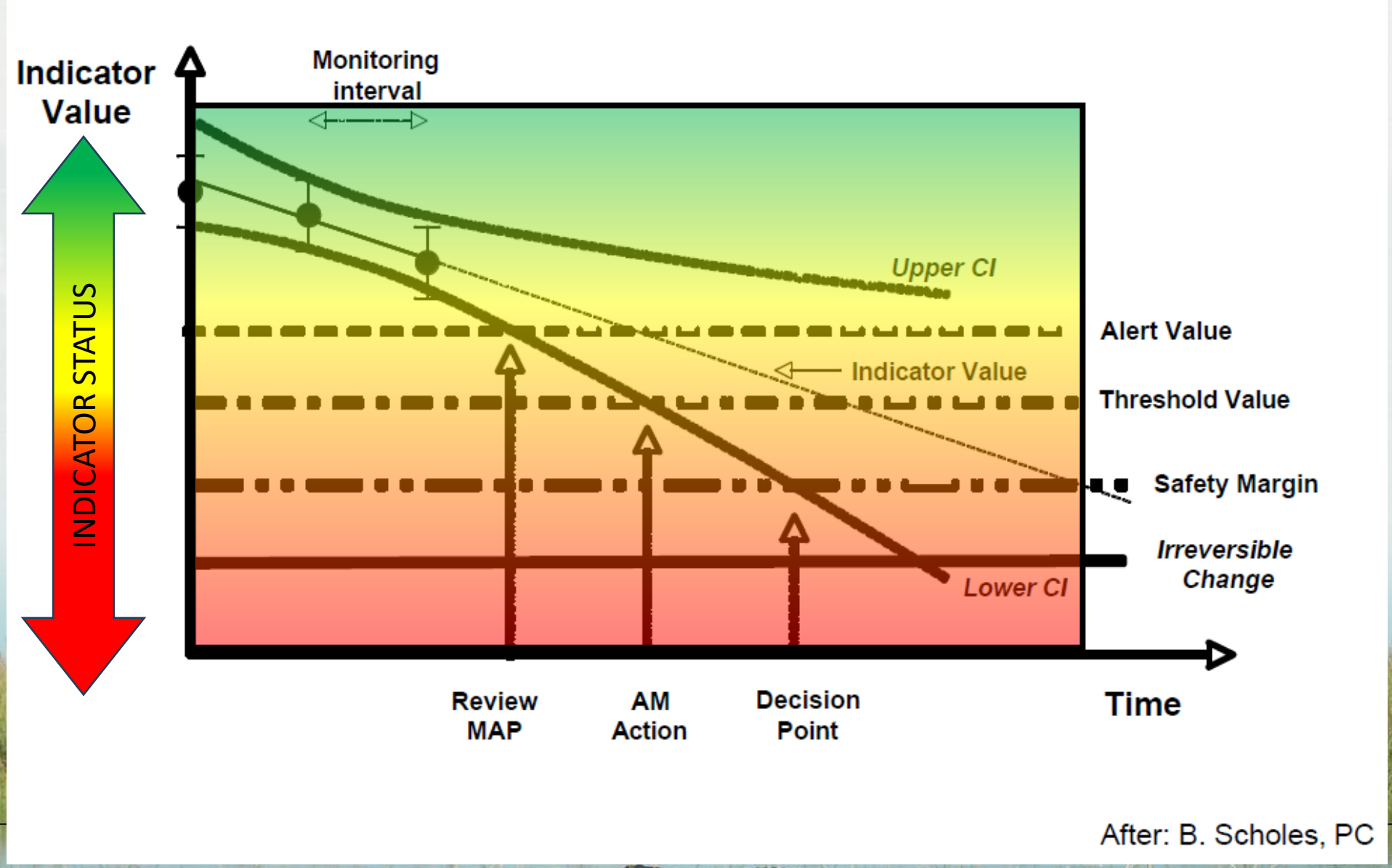


Ecological Thresholds in AM Framework



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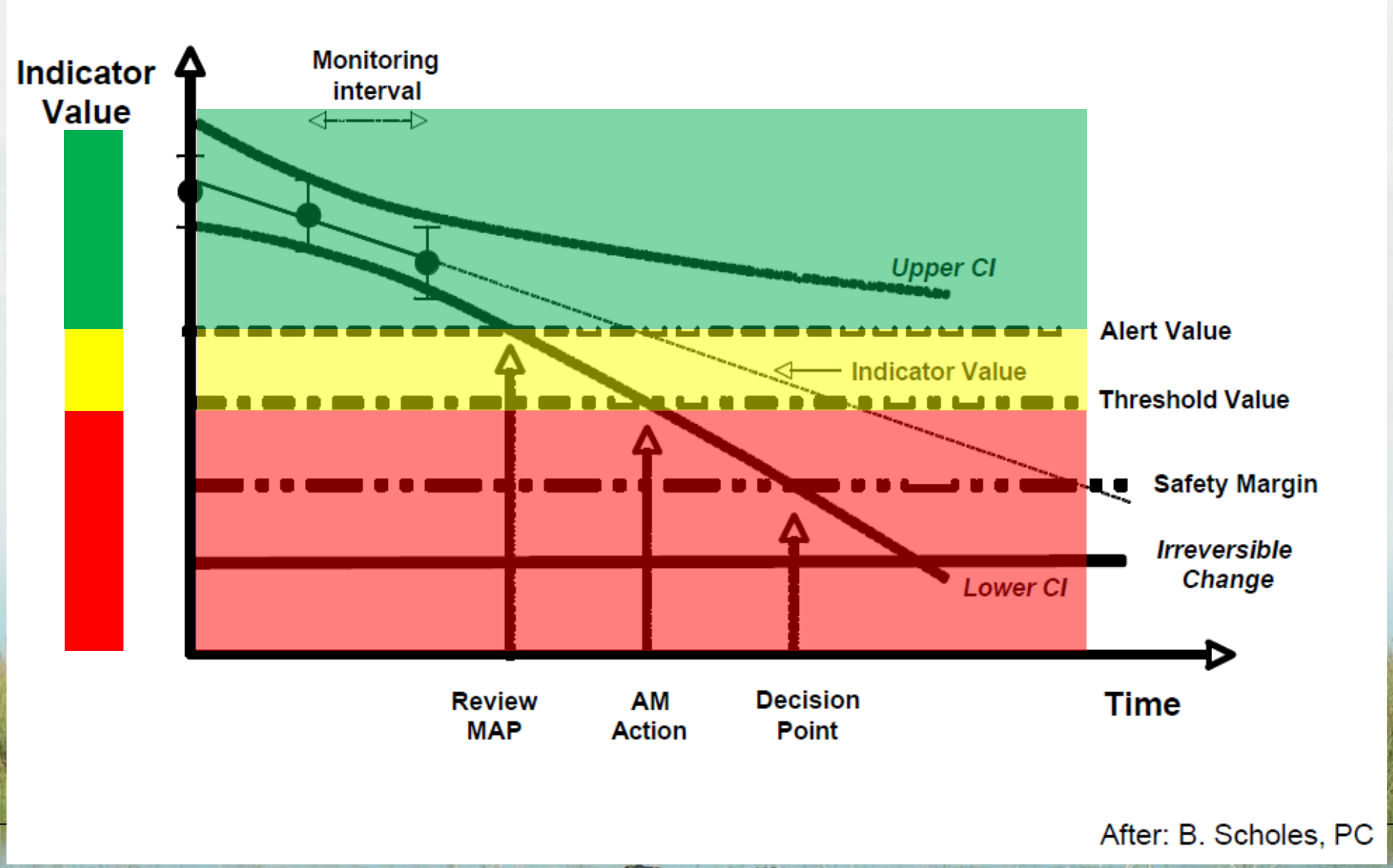

Improving Stoplight Methods

- **Qualitative → Quantitative**
  - Facilitate clear understanding of methods

- **Stoplight colors discreetly tied to ecologically relevant thresholds**
  - More accurately reflect indicator status and ecosystem processes
  - Inform adaptive management decisions