Integrating Human Dimensions into Goals for Ecosystem Management in the Florida Keys: Experience from the MARES Project

William Nuttle, Jerry Ault, Jim Fourqurean, Grace Johns, Chris Kelble, Donna Lee, Bob Leeworthy, Diego Lirman, Dave Loomis, and Jerry Lorenz

Integrating Human Dimensions into Goals for Ecosystem Management in the Florida Keys: Experience from the MARES Project

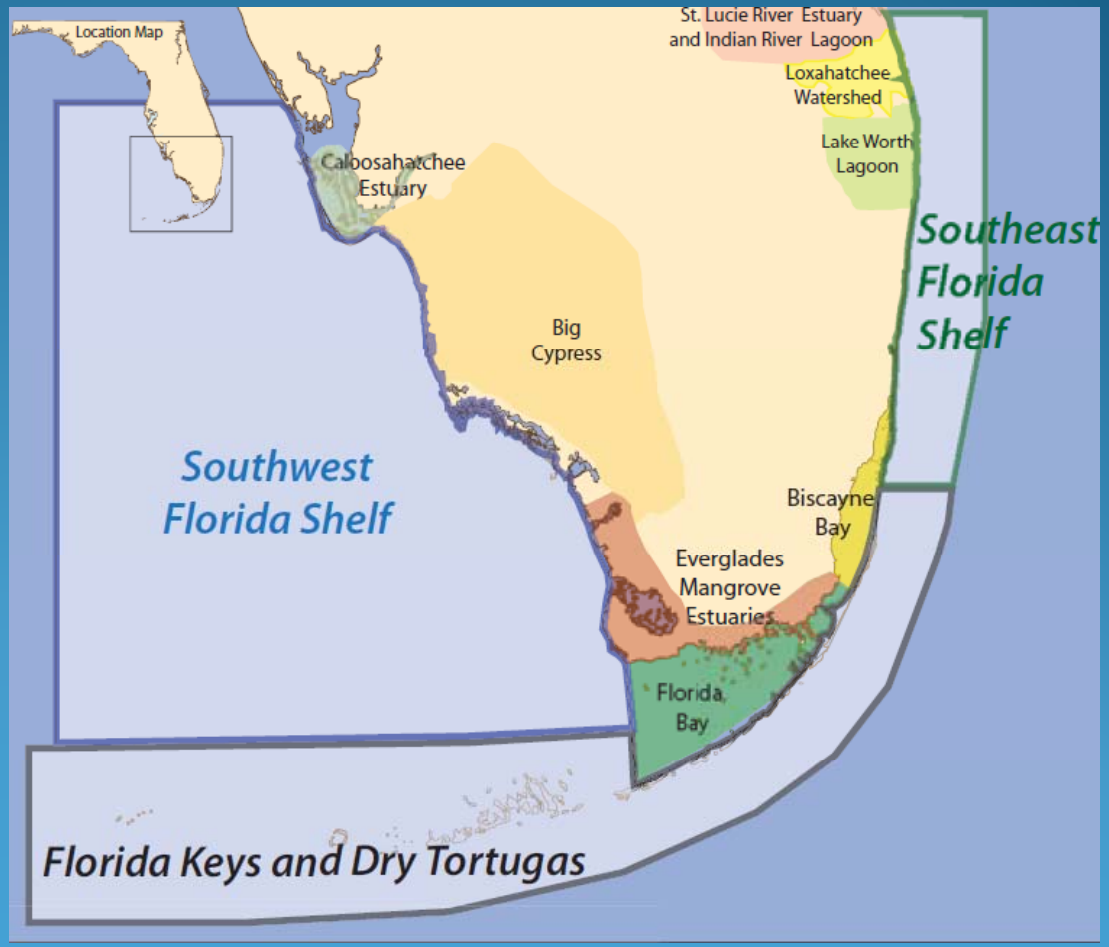
William Nuttle, Jerry Ault, Jim Fourqurean, Grace Johns, Chris Kelble, Donna Lee, Bob Leeworthy, Diego Lirman, Dave Loomis, and Jerry Lorenz

Florida Keys marine ecosystem

- Goal – bring marine areas into South Florida regional ecosystem restoration
- Challenge - integrate human dimensions into restoration planning
  - People are part of the ecosystem
  - Mandates for coastal management create tradeoffs

MARES Project (2009-2012)

- 3 marine regions
- Approach
  - Conceptual models
  - Indicators
  - Consult with managers, public
- Results
  - Report card
  - Synthesis of existing science
  - Identify needs

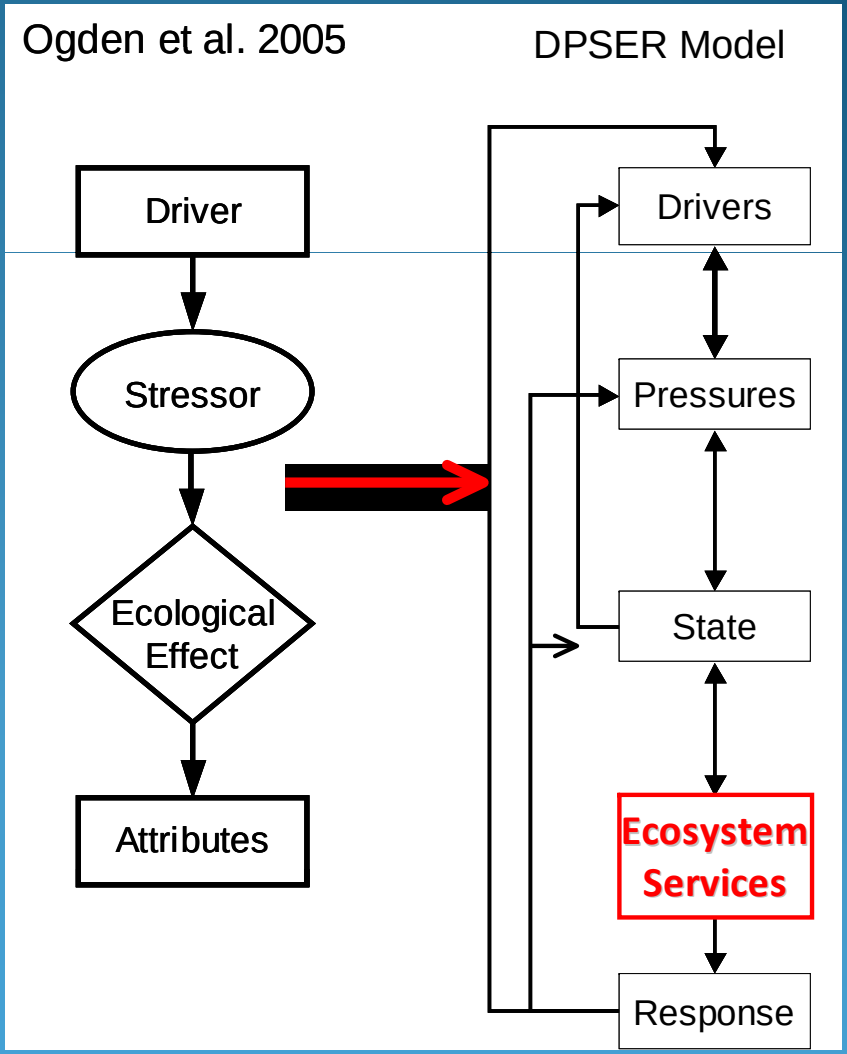


This talk . . .

- Present DPSER model framework
- Describe implementation for Keys
- Observations on outcomes… so far

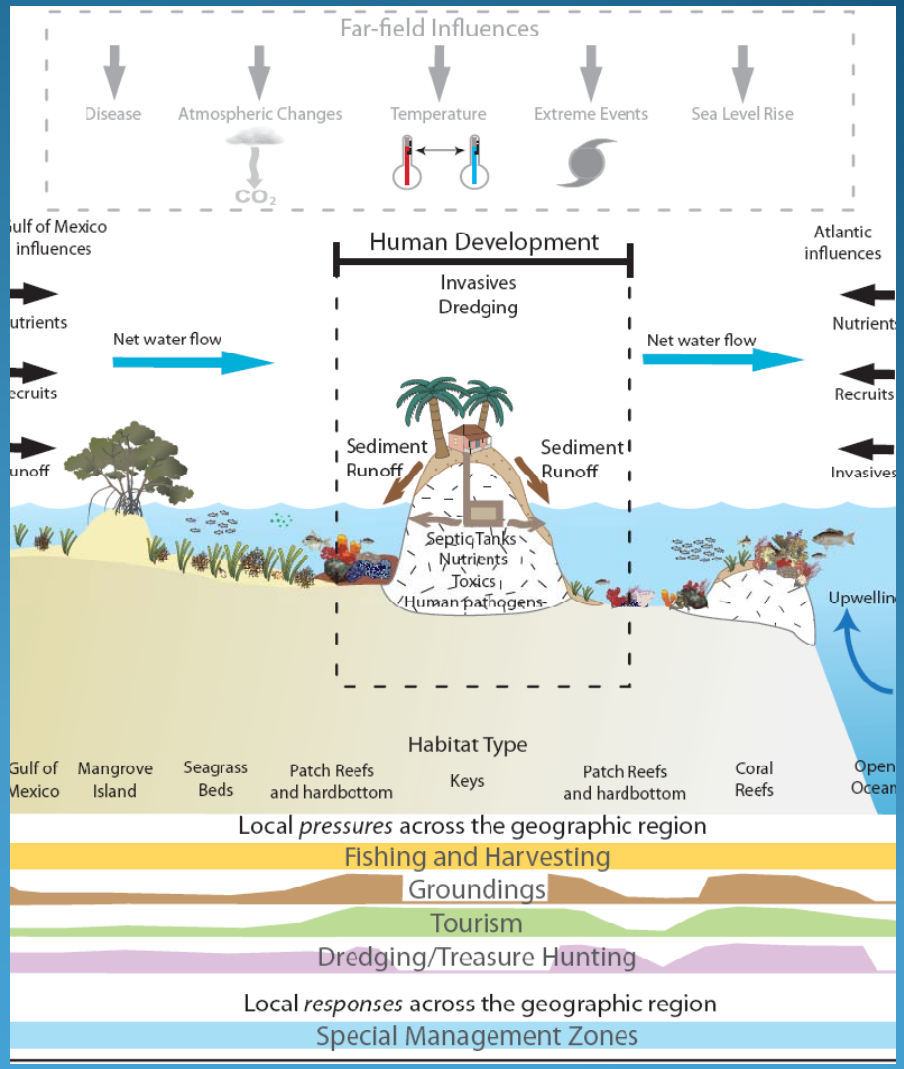
DPSER Framework

- Builds on conceptual models developed in CERP/RECOVER
- Human dimensions incorporated in new elements:
  - Ecosystem services
  - Response



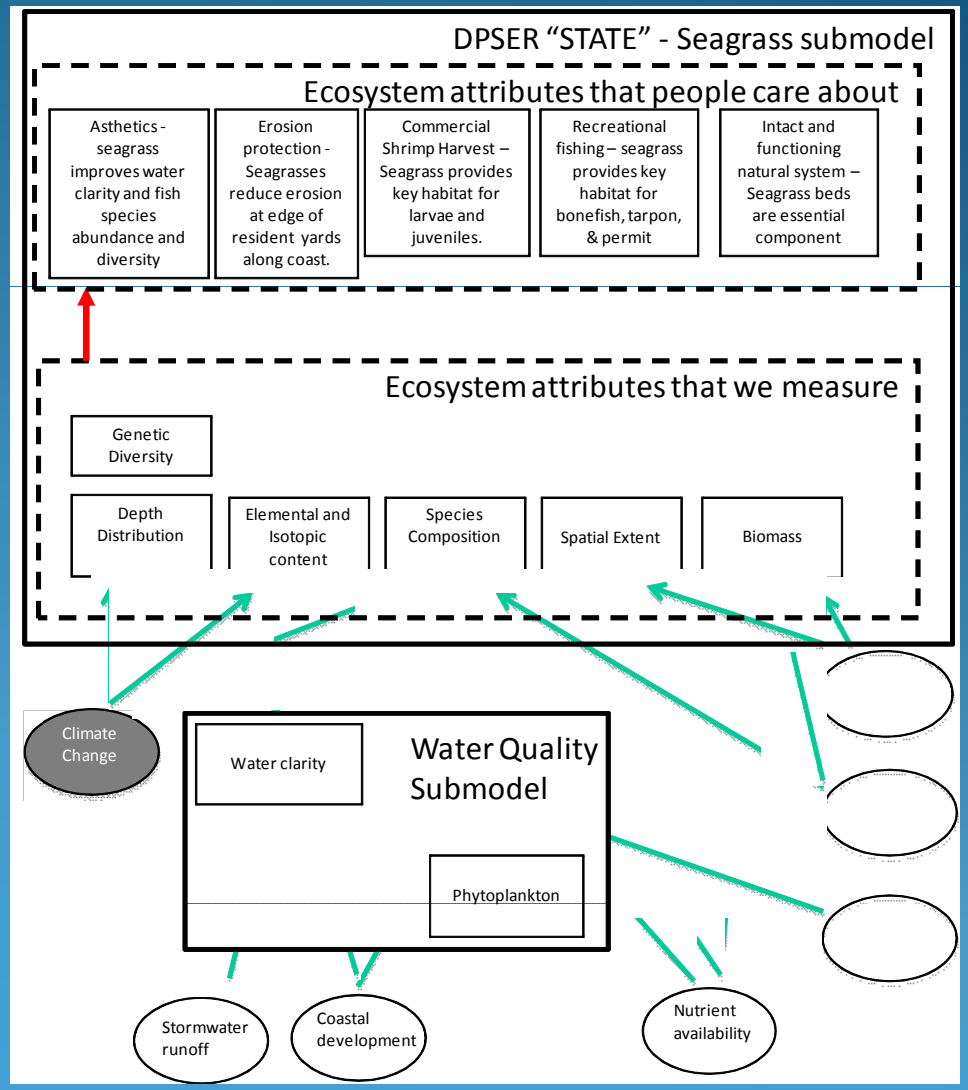
Drivers and Pressures

- Drivers
  - Global – climate change
  - Regional – inputs from South Florida region
  - Local – activities in Keys
- Pressures
  - Far-field
  - Near-field



State

- Represents conditions in the marine environment
- Divided into 5 components
- Detail at component level:
  - Pressures
  - Pathways
  - Measurable attributes
  - "Attributes that people care about"

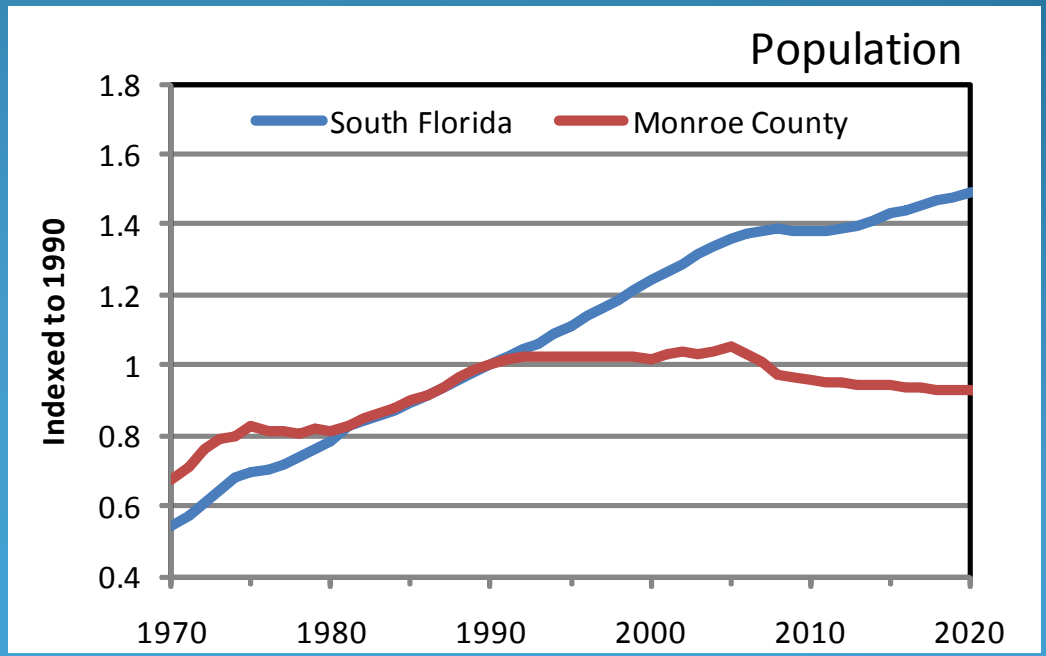


Ecosystem Services

- Services and goods that people receive from the marine environment
- Related to “attributes that people care about”
- Have **VALUE** that can be measured objectively
- Provide input to decision-making (preserving services, maximizing utility, etc.)

Response

- Individual behavior
- Institutional (historical)
  - Controls on development
  - Regulation on marine activities
  - Ecosystem research and monitoring
- Influence on Drivers and Pressures



DPSER so far . . .

- Builds on previous CEMs
- Integrates human dimensions efficiently
- Provides information useful in decisions that involve conflicting goals and tradeoffs
- Caveat – utility depends on flexibility/adaptability of management framework

MARES - MARINE AND ESTUARINE GOAL SETTING FOR SOUTH FLORIDA

www.sofla-mares.org

MARES - next steps

- Indicators
- Consultation with managers
- Communication
- Report card – how will human dimensions be reflected here?

Abstract

Humans are an integral part of all ecosystems, including especially the Florida Keys and its surrounding marine ecosystems. The overall goal of the MARES project is to reach a science-based consensus about the defining characteristics of a South Florida coastal marine ecosystem that is both sustainable and capable of providing the diverse ecological services upon which our society depends. Whereas the over-riding focus in the Everglades has been upon ecosystem restoration, management of coastal marine ecosystems must, by legal mandate, integrate and give equal priority to interactions between environmental and human dimensions components ecosystems. Incorporating human dimensions aspects of these ecosystems into conceptual ecological models and ecosystem indicators represents a major challenge in the MARES project.

The MARES project has adopted a Driver-Pressure-State-Ecosystem Services-Response (DPSER) framework for developing integrated conceptual ecosystem models. This framework extends the Driver-Stressor-Effects-Attributes (DSEA) framework, originally used by EPA for ecological risk assessment, by incorporating elements of the more recent Driver-Pressure-State-Impact-Response (DPSIR) framework. The DPSIR framework explicitly represents the interdependence between human dimensions and environmental attributes through feedback loops in the model structure. Human dimensions aspects of the ecosystem are also represented in the Ecosystem Services component of the DPSER model. Linking conditions in the ecosystem to "services", rather than the more general "impacts," allows human use values, activities, and impacts to be modeled explicitly.

Quantitative Ecosystem Indicators (QEI) provide metrics for monitoring and reporting the progress of ecosystem management based upon the integrated conceptual ecosystem model. The QEIs developed by the MARES project represent both environmental and human dimensions aspects of the regional ecosystem. These provide better integration of all ecosystem processes into regional management plans. With a resident population of 81,000 and the arrival of 3 million visitors per year, humans have long been a significant component of the Florida Keys and Dry Tortugas marine ecosystems.