

# Marine Spatial Planning from an Ecosystem-Based Management Perspective in Florida, USA

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# South Florida, USA

Largest coral reef system in the continental United States

- ~ 500 km long
- ~ 6,000 marine species
- ~400 maritime heritage sites and artificial reefs

6.7 million residents and \$4.4 billion sales

Multiple jurisdictions and management areas

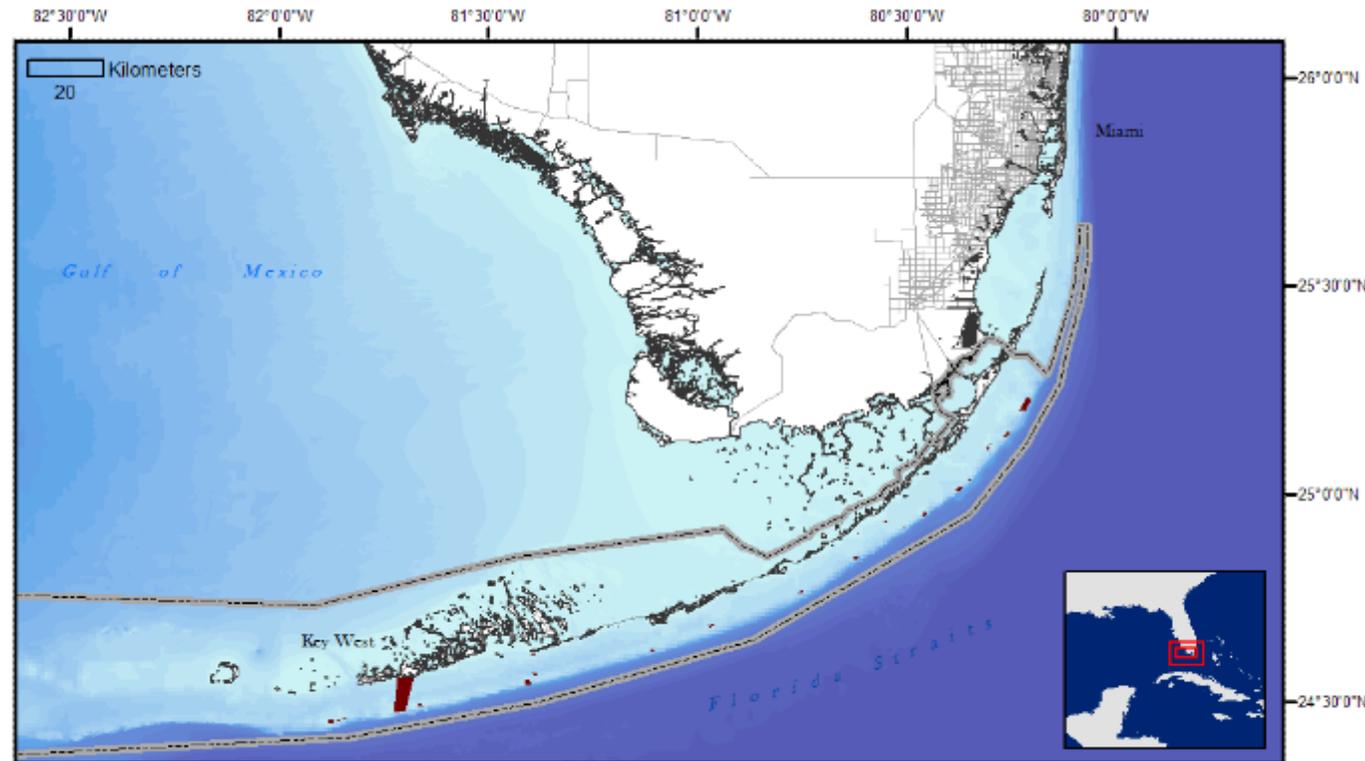
- County level
- State Parks
- National Parks (NP)
  - Biscayne NP, Everglades NP, Dry Tortugas NP
- Florida Keys National Marine Sanctuary (FKNMS)



# Current Planning Activities

## Florida Fish and Wildlife Conservation Commission (FWC)

- Manage fish and wildlife for long-term well-being
- Requires an ecosystem-based management approach
- Extensive monitoring and modeling programs



*Florida Keys National Marine Sanctuary*

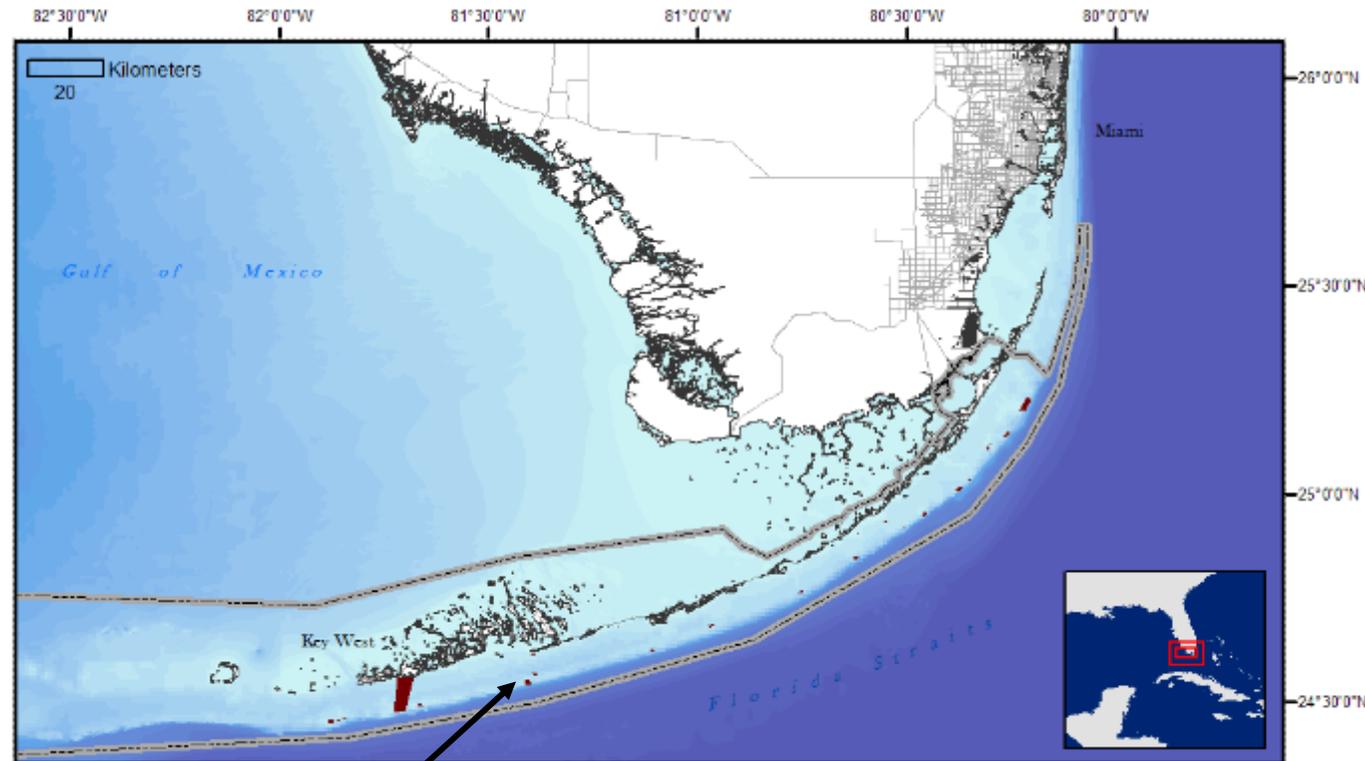
# Current Planning Activities

Florida Fish and Wildlife Conservation Commission (FWC)

FKNMS recognized a need to re-zone existing managed areas

- FWC is one of many stakeholders
- “Existing marine zones and management plan activities designed and implemented by FKNMS in the mid-1990s are no longer sufficient to ensure long-term resource protection and ecosystem function into the future.”

(FKNMS Restoration Blueprint 2019)



*Florida Keys National Marine Sanctuary*

# Current Planning Activities

## FKNMS re-zoning *and reporting* needs

- GIS support
- What is the status of biological resources?
- How will new zones impact biological resources?
- Assistance with data volume

## Addressing needs

- Form strategic partnerships
- Promote data standards and visualization
- Create models that inform spatially explicit ecosystem dynamics



Illustration courtesy of F. Chavez/K. Lance  
(Monterey Bay Research Institute/MBARI)

# Partnerships



Promotes systematic, long-term observation of marine biology and ecosystems across taxonomic, spatial and temporal scales.

- Improves our understanding of changes and connections between marine biodiversity and ecosystem functions.
- Consists of regional networks of scientists, managers, end-users
- Thematic node within the Group on Earth Observations (GEO) Biodiversity Observation Network; US MBON supported by NOAA Integrated Ocean Observing System (IOOS) Office



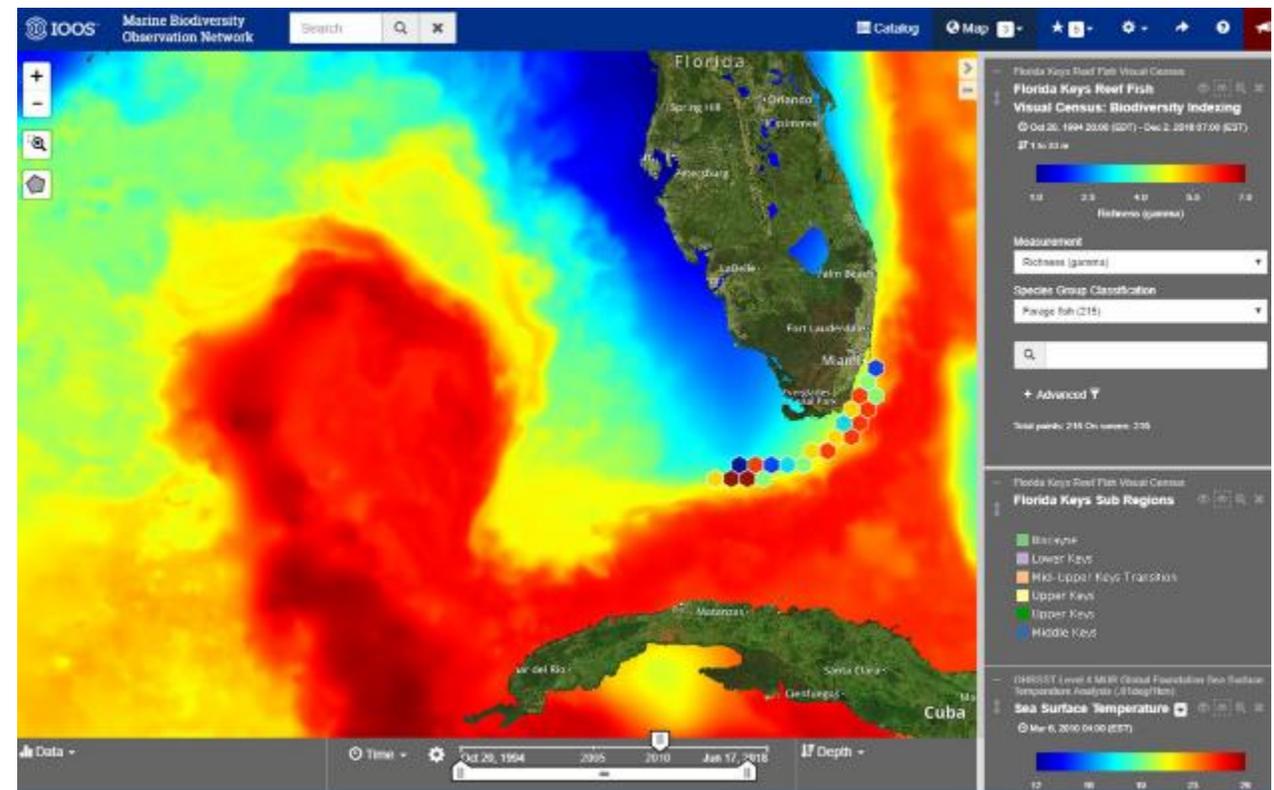
[marinebon.org](http://marinebon.org)

# Data Visualization



Working within MBON allowed us to:

- Combine complex spatially explicit information via interactive data portals
- Combine in situ and satellite data across scales
  - 2010 was an unusually cold year, why?
  - Loop current was 'restricted'
  - High coral mortality
- Consider regional factors and time dynamics



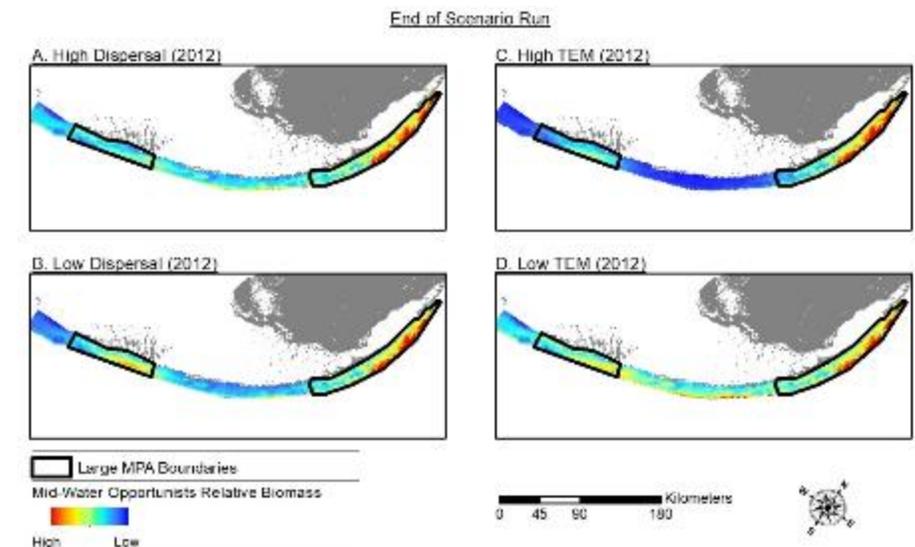
marinebon.org

# Ecosystem Models

Contrast management zoning strategies and identify indirect trophic effects

Ecopath with Ecosim and Ecospace

- Accessible ecosystem model with active user base
- Aggregate species into trophic groups
  - Requires diets, consumption, production, biomass, and catch
- New capabilities integrate GIS and ecosystem modeling (Steenbeek et al. 2013)
  - Predict species distributions in monthly time steps in response to dynamic environmental factors (chlorophyll  $a$ , temperature), and management zones
- Identify data gaps and research priorities
  - E.g., movement and effort



# Moving Forward

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Space-time data visualizations and ecosystem models are technical solutions to informing marine spatial planning from an ecosystem perspective

- Data portals, models, visualizations are fluid
- Combining data is time intensive

Sustaining an ecosystem-based management perspective in MSP

- Maintain feedback from an effective network of managers, scientists, and end-users to understand needs
  - Follow-up, technical workshops, delegate travel funds, etc.
- Promote data standards and best practices
  - Quality control, metadata, access, ownership, and attribution



# Resources

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Commission

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Marine Biodiversity Observation Network

[Marinebon.org](http://Marinebon.org)

Florida Keys National Marine Sanctuary Restoration  
Blueprint

[Floridakeys.noaa.gov/blueprint](http://Floridakeys.noaa.gov/blueprint)

