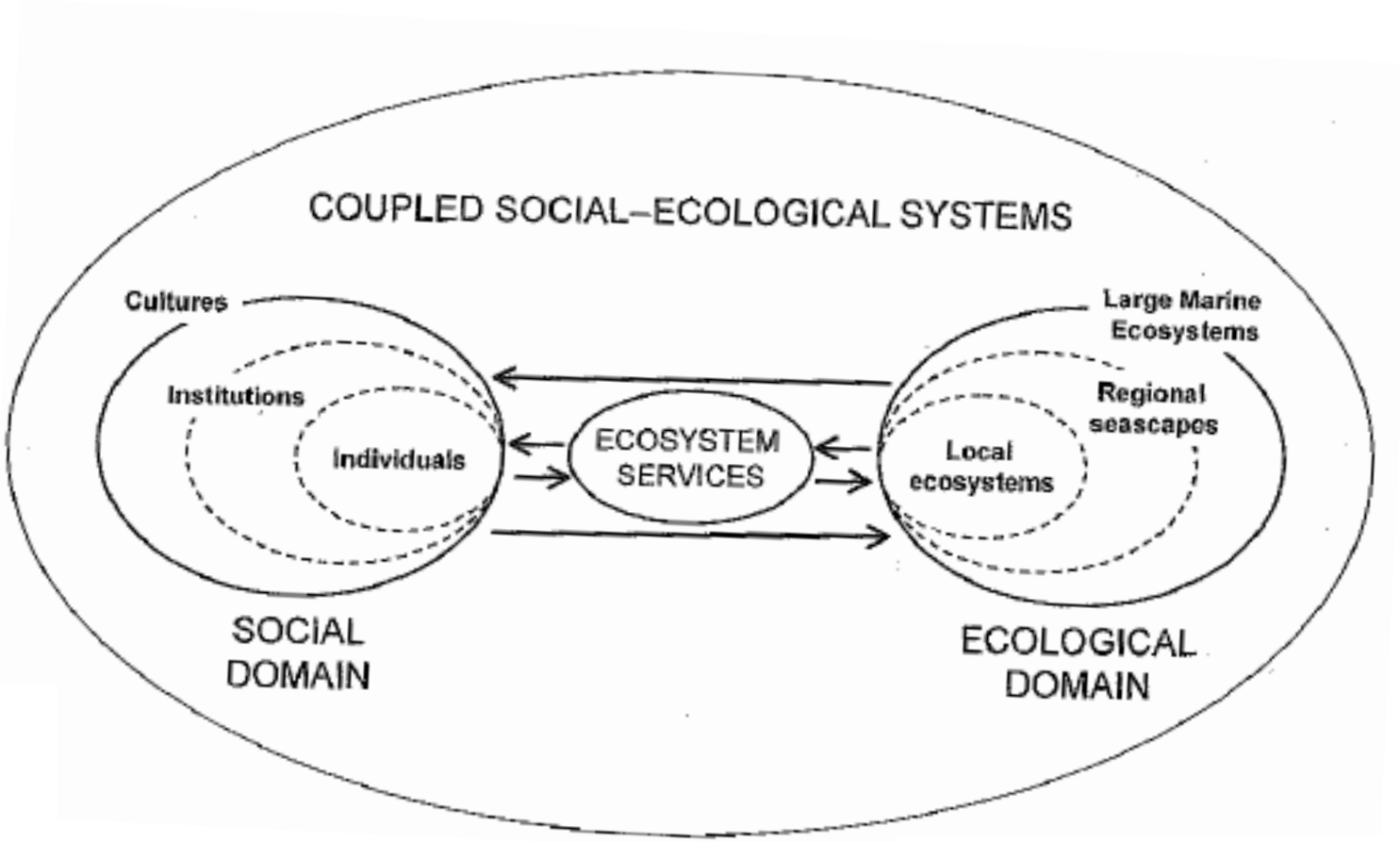
Ecosystem-Based Fisheries Management:

A place-based and species-focused test case

Ecosystem-Based Management for Oceans

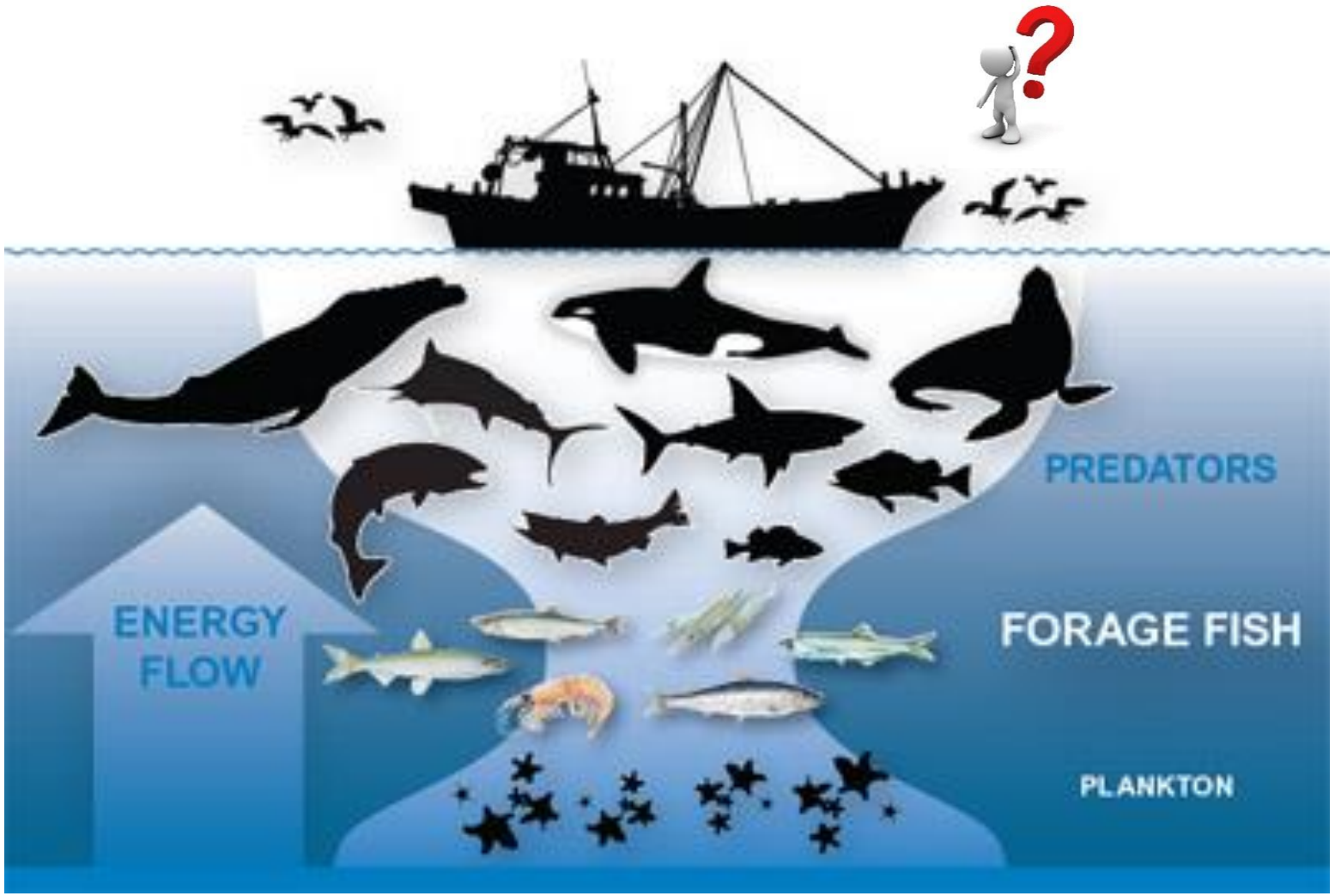
- Connectivity
- Cumulative impacts
- Multiple objectives



McLeod and Leslie 2009

- Fisheries Ecosystem Plan
- Habitat and Forage Fish efforts in Chesapeake Watershed Agreement
- Water quality concerns connecting land and sea

…But the human dimension…



www.pewtrusts.org

Goals: Oysters in Rappahannock & Choptank

- Indicator development
- Identify first policy steps
- Small-scale test

NOAA NMFS photo library

Indicator development

- What are the priorities of ecosystem-based management?

  → Chesapeake Bay Watershed Agreement, Fisheries Ecosystem Plan, specific oyster-related goals

- What does the literature say are good indicators?

  → Literature review

- What do stakeholders think are good indicators?

  → Survey of researchers, managers, watermen, aquaculturists, nonprofits

Priorities of EBFM

- improve system resilience
- oyster health
- oysters as habitat
- improve water quality
- support economy
- maintain cultural heritage
- healthy relationships between parts of the watershed
- effective management and stewardship

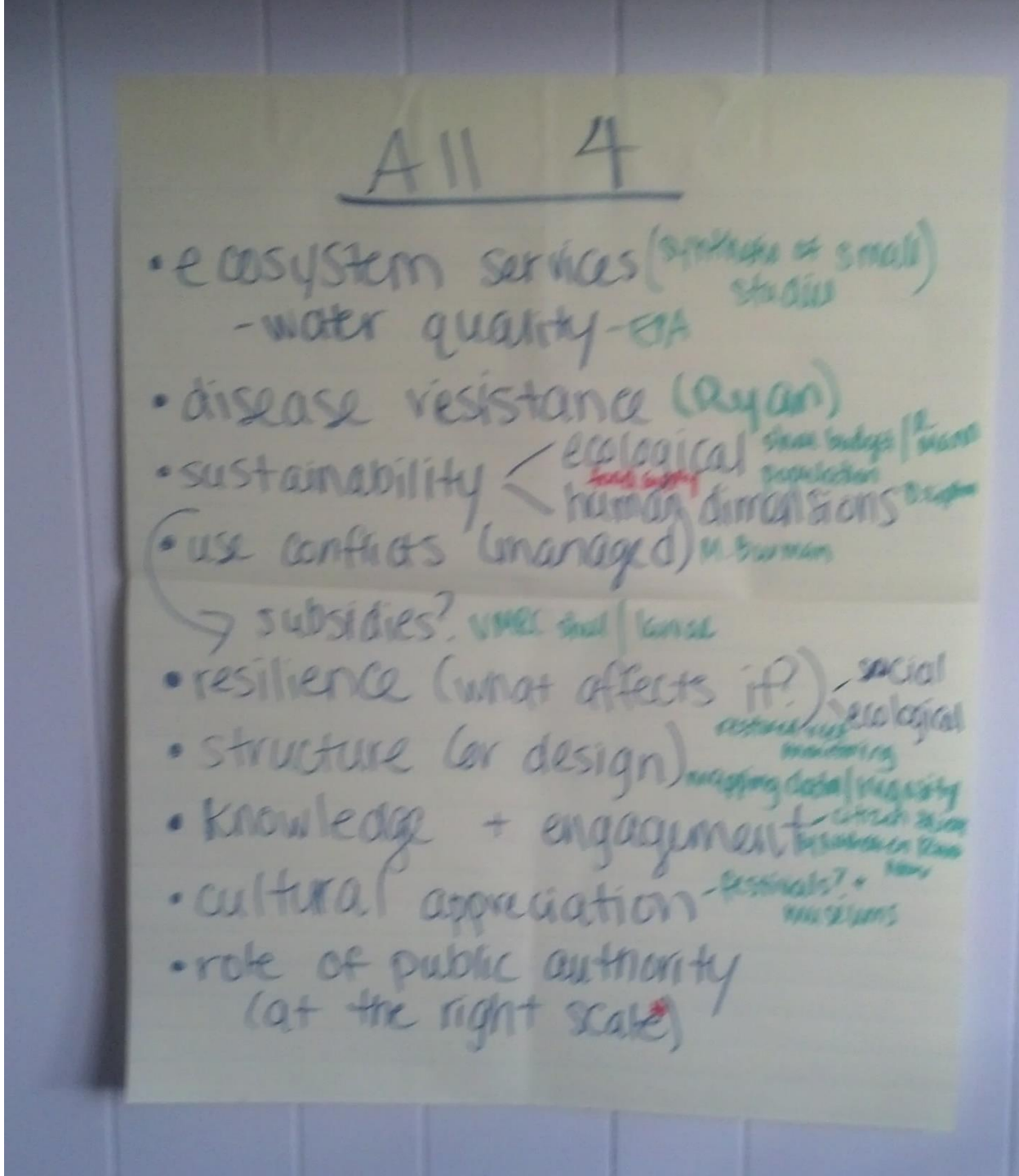
Rema Rahman, Capital Gazette

Literature Review

Ecosystem priority	Most popular indicator
Improve ecosystem resilience	Biodiversity – number of species in community
Oyster health	Survival ratio/age composition
Oysters as habitat	Food web structure; striped bass abundance and age
Improve water quality	Chlorophyll a
Support economy	Commercial fisheries harvest
Maintain cultural heritage	Human population trends
Healthy relationship between parts of the watershed	Climate change – temperature
Effective management and stewardship	n/a

The Oyster Portfolio

- Sanctuaries
- Restoration
- Aquaculture
- Wild harvest



Identify first policy steps

- Network analysis
  - → Survey starting with oyster leaders and snowball
- Policy analysis
  - → Identify where existing legislation or code supports EBM
  - → Identify where indicator list can be useful
  - → Develop decision analytic tool combining these

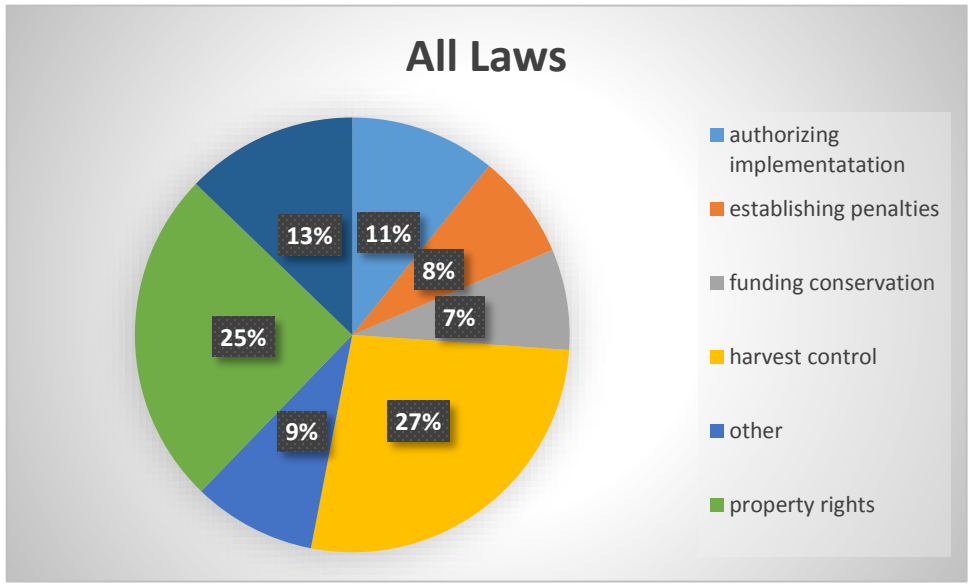
342 regulations for oysters…

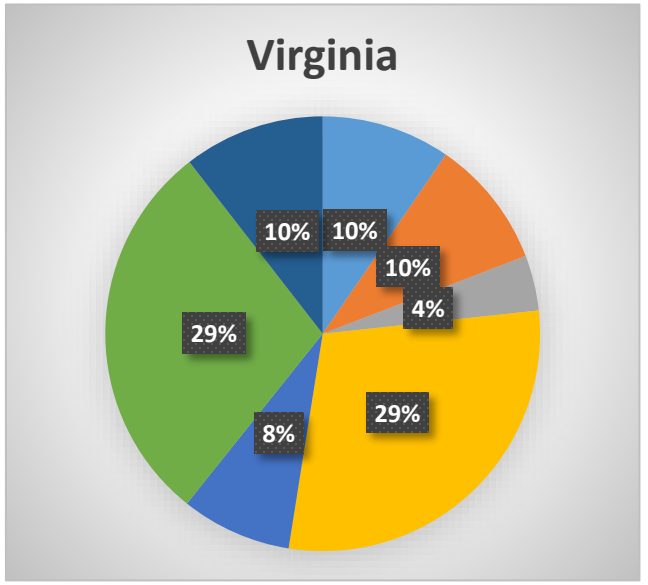
… 20 that could help EBFM

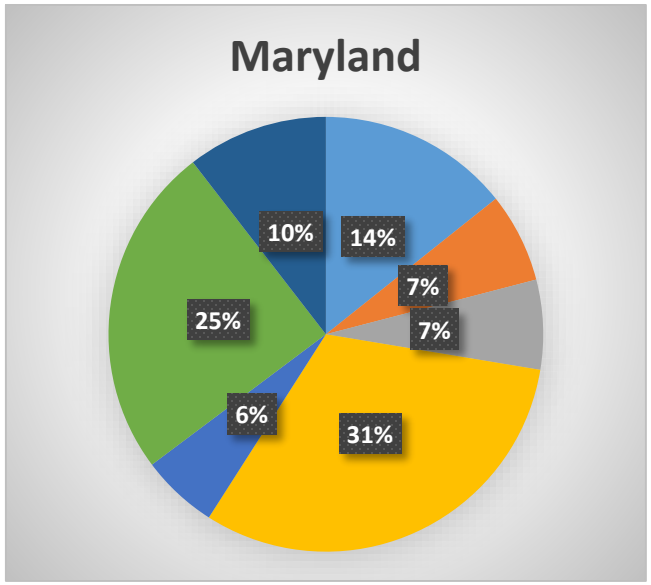
- County Comprehensive Plans
- MD DNR has the right to experiment with new management strategies

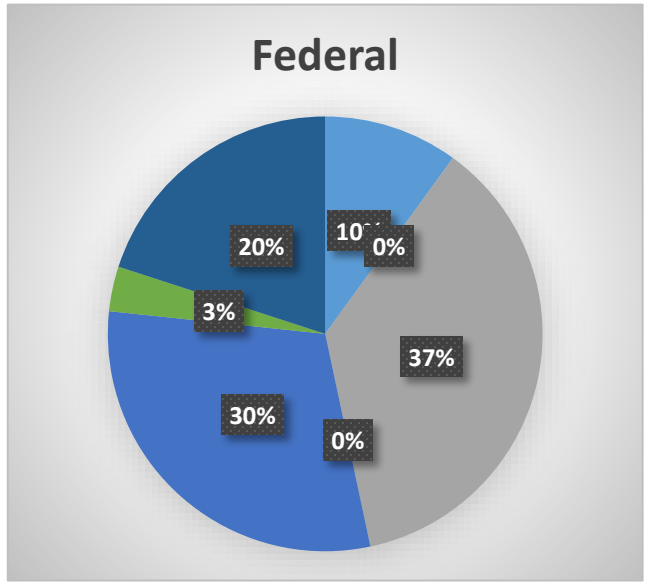
type of oyster	count
aquaculture	57
aquaculture, restoration	6
aquaculture, sanctuary	4
restoration	17
sanctuary	10
sanctuary, restoration	1
wild harvest	137
wild harvest, aquaculture	94
wild harvest, aquaculture, restoration	2
wild harvest, aquaculture, restoration, sanctuary	12
wild harvest, sanctuaries	2
Grand Total	**342**

Who's regulating what?





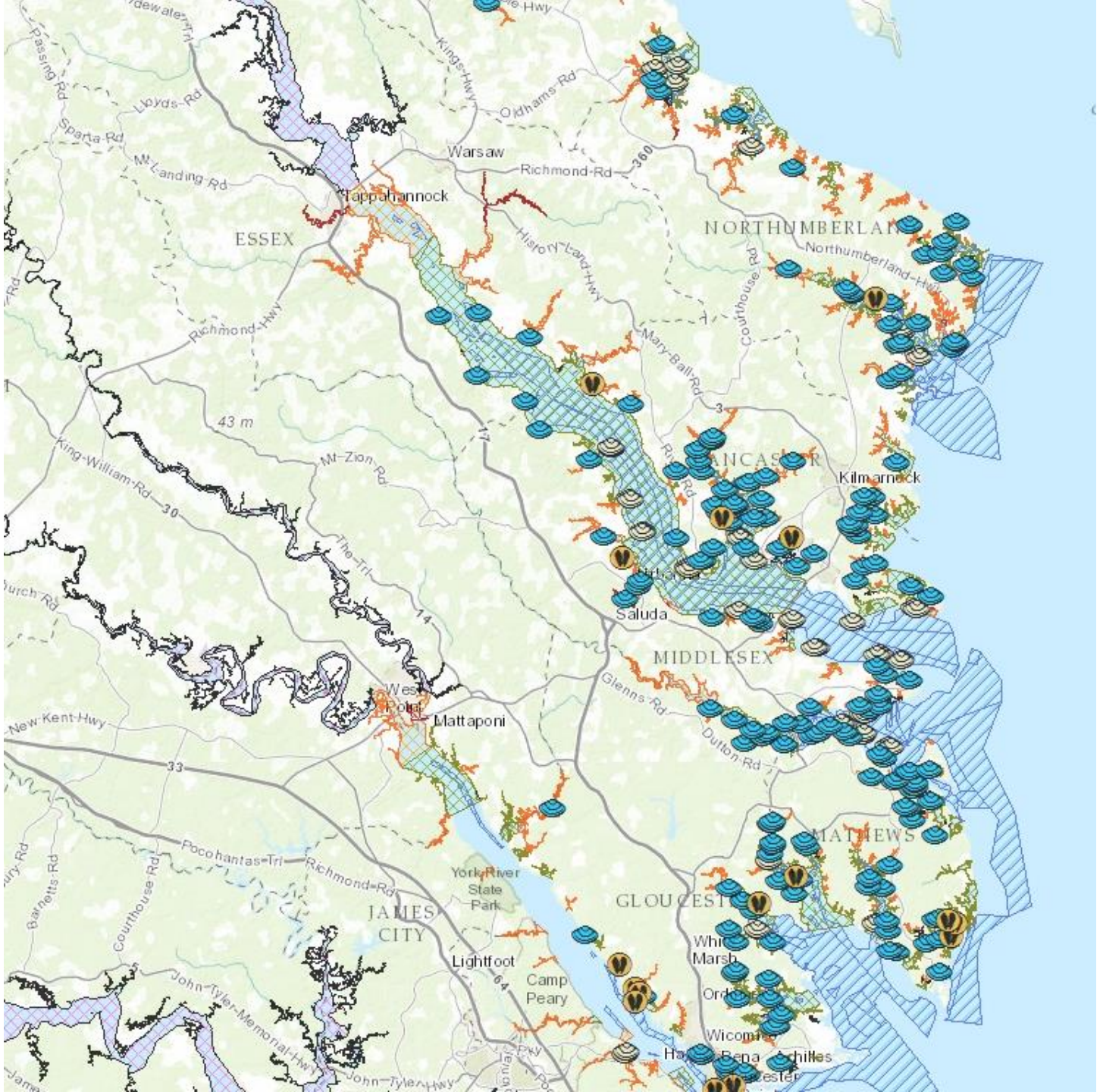




Small-scale community-based test

- Find data sources for indicators and integrate them
- Sensitivity analysis
- Town hall meetings

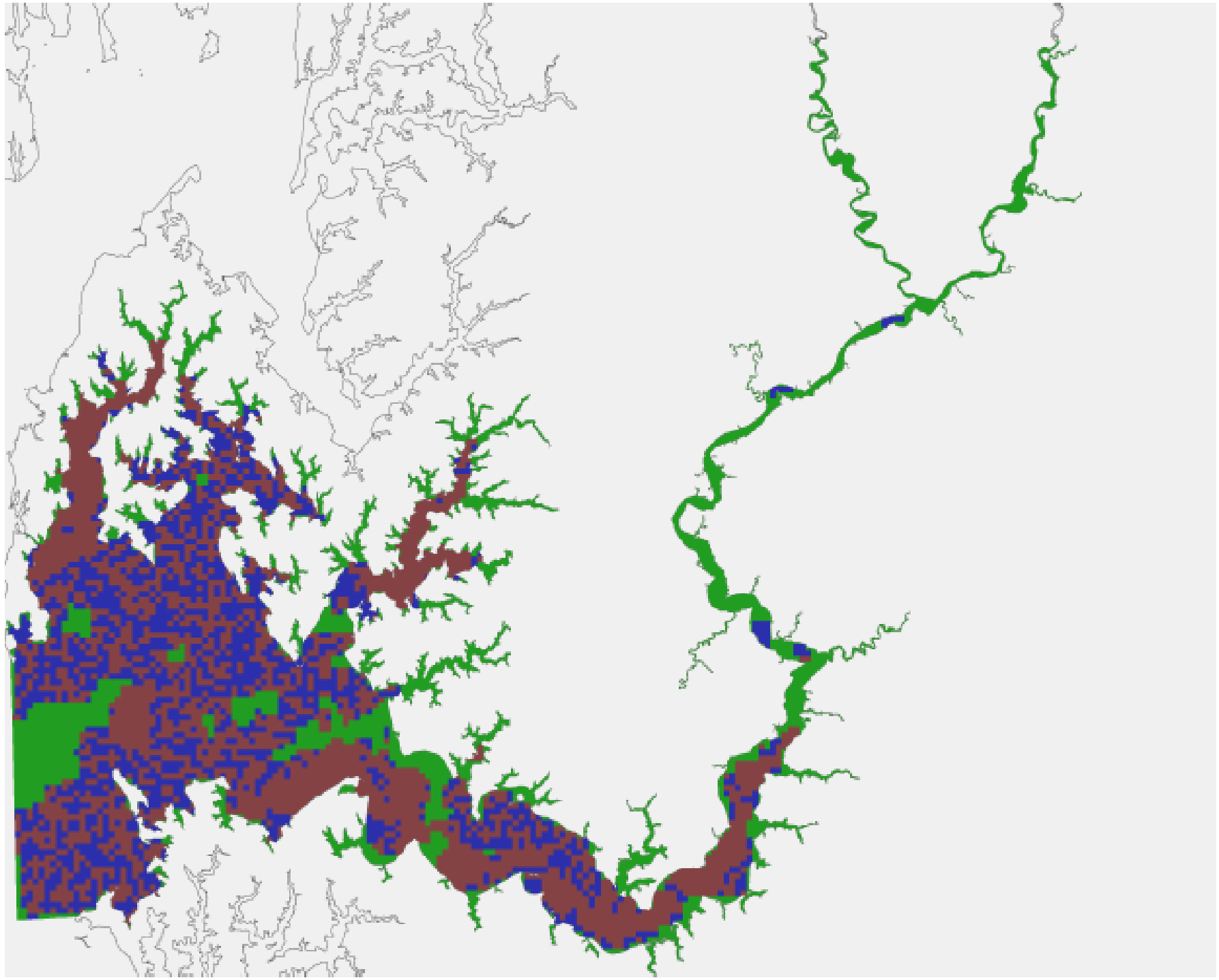
Urbanna Oyster Festival
www.bayjournal.com



Virginia Coastal Zone MANAGEMENT PROGRAM VCU

Map | Results

- [x] **Coastal Water**
  - [ ] **Healthy Waters**
    - [ ] Healthy Streams (Locations)
    - [ ] Healthy Streams (Reach)
    - [ ] Healthy Watersheds
    - [ ] Benthic Index of Biotic Integrity
    - [ ] Threatened and Endangered Species Waters
    - [ ] Seaside SAV Planting Sites
  - [ ] **303D Waters (DEQ Impaired)**
    - [ ] Scenic Rivers
    - [ ] Submerged Aquatic Vegetation
    - [ ] Tidal Flushing Rates
- [ ] **Coastal Wildlife**
- [ ] **Coastal Land**
- [x] **Shellfish Management**
  - [x] Commercial Shellfish Aquaculture Sites
  - [x] Oyster Gardening Sites
  - [x] State Constructed Oyster Reefs
  - [ ] Private Oyster Leases
  - [ ] Oyster Aquaculture Vulnerability Model
  - [ ] Clam Aquaculture Vulnerability Model
  - [ ] Oyster Aquaculture Suitability Model
  - [ ] Clam Aquaculture Suitability Model
  - [ ] Seaside Oyster Density
  - [x] Condemned Shellfish Areas
    - Open
    - Prohibited-Nonproductive
    - Seasonally Restricted
    - Restricted
    - Prohibited
  - [x] Baylor Grounds (Public Oyster Grounds)



Choptank MarZone:

(thanks Mark Bryer, TNC)

Blue = mixed use

Brown = sanctuary

Green = aquaculture

End goal: a roadmap

- What did we learn?
- What will be different in other rivers or with other species?
- Visioning exercise

Outcomes

- Socioecological indicators
- Map-based data integration tool
- Decision-support tool
- Policy suggestions to better support EBFM

Questions?