Indicators for Management of Forage Species

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Indicators for Management

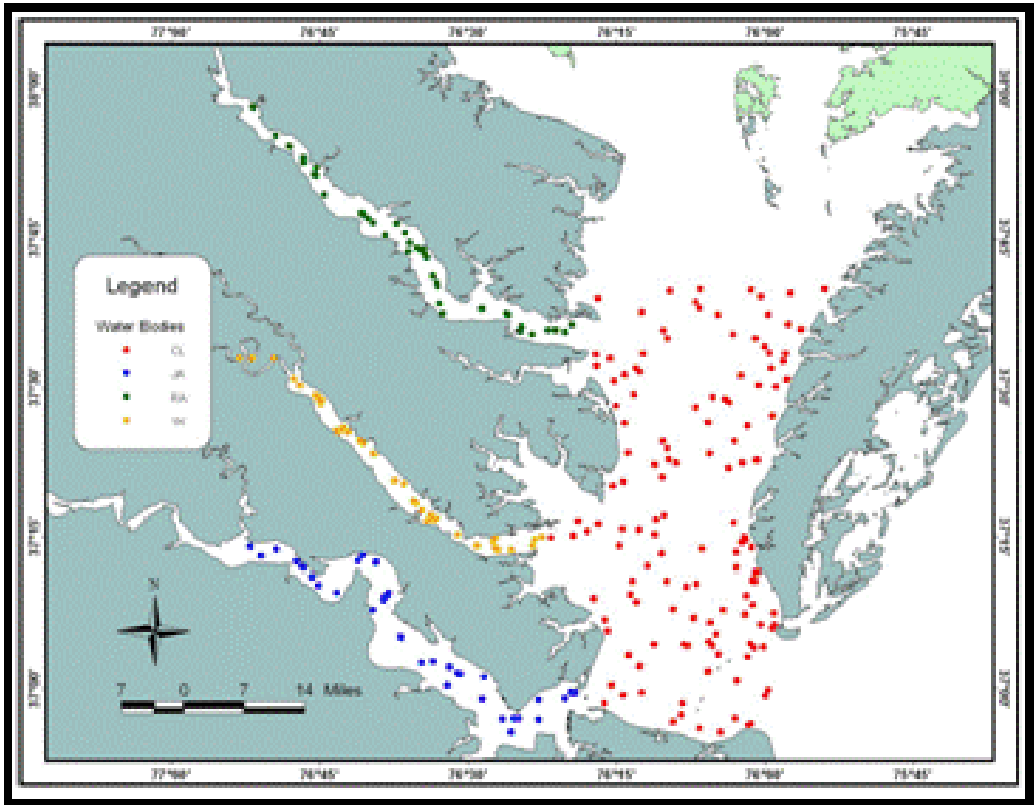
- Reflect the state of the system
- Linked to management actions
- Collected routinely
- Can be compared to reference points (targets or limits)

Types of Indicators

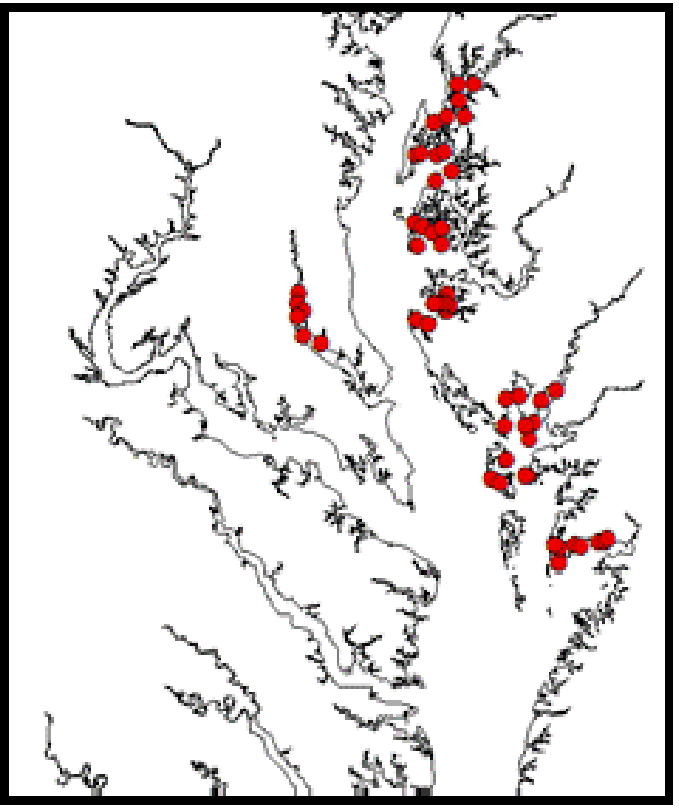
- Single species
- Guild (e.g., forage, predators)
- Size-based
- Condition-based indices (e.g., lipid levels, condition, disease)
- Diet

Spatial Coverage

VIMS Trawl Survey

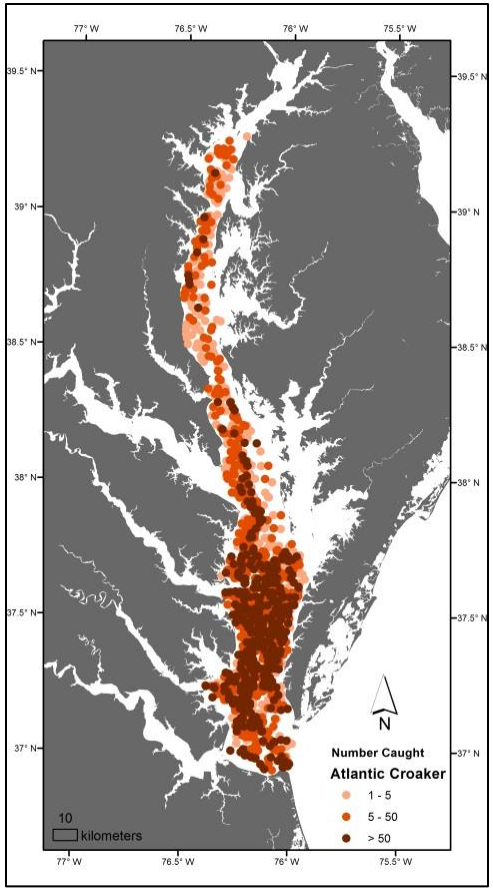


Maryland Trawl Survey



Spatial Coverage

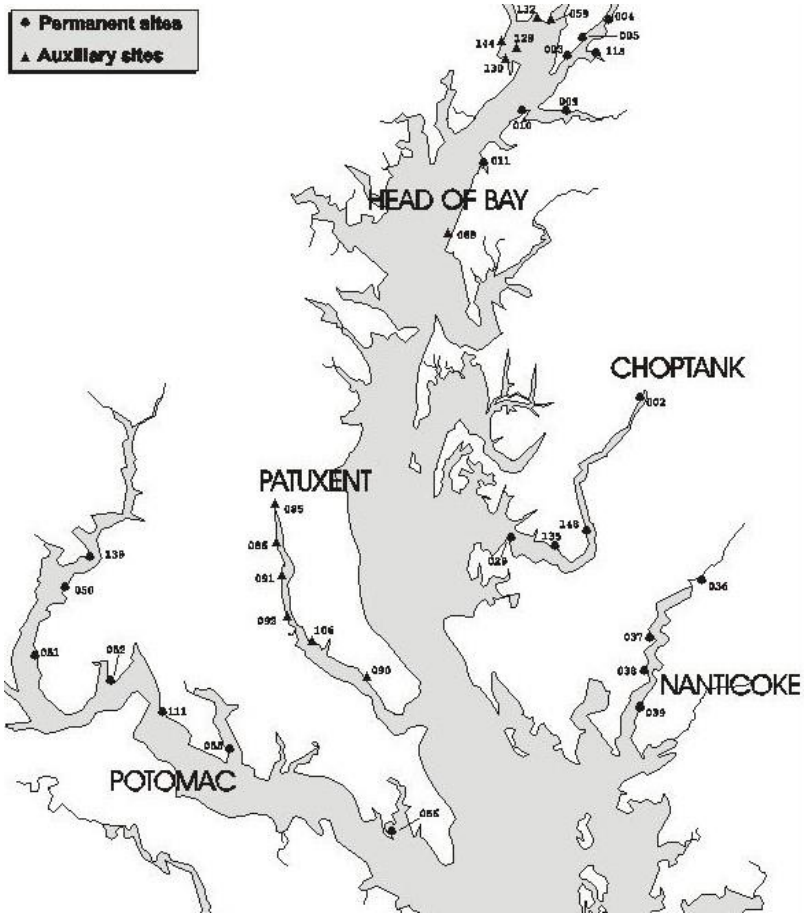
ChesMMAP



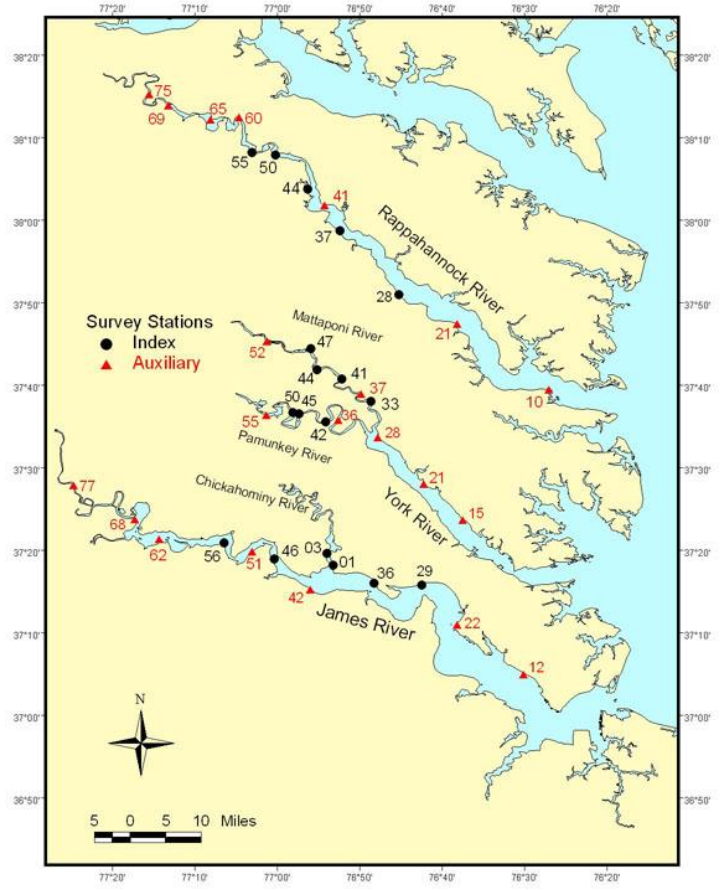
Blue crab winter dredge survey

Spatial Coverage

Maryland Seine Survey



VIMS Seine Survey



Considerations for Guild Indices

- When indices for multiple species are averaged or summed, it assumes their catchabilities are equal

- Catchability includes probability of the organism being in the sampling area and the probability that it will be caught by the gear

Link to Management Actions

- Requires models to predict the magnitude and expected direction of change

- For adaptive management, changes in the system should be compared to their predicted responses and the models updated to reflect the new data

Reference Points

- Reference points for ecosystem-based management tend to be similar to those from single species management
  - Biomass thresholds
  - Fishing mortality thresholds
- Targets tend to be trickier because they depend on making decisions about trade-offs

Single Species Stock Assessments

- Uses a statistical model to integrate multiple data sources to describe the changes in population size over time
- Primarily for exploited stocks
- Only one stock assessment that produces estimates of abundance for the Bay (blue crab)

Unexploited Species

- Most forage species in the Bay are unexploited and are not tracked well with current surveys

- Potential to use diet data to develop indices of forage species