Oyster Modeling Description (and intro Demonstration)

ABSI CAB 01/26/2022

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What I want to show you :

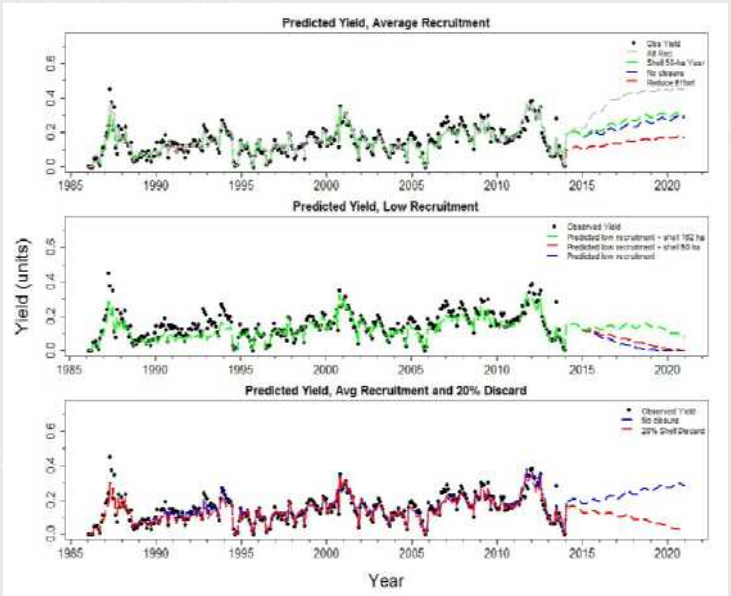
1. Review my role & provide “mental model”
2. Review models: in general, estimation, simulation
3. Updates on what we’ve been doing
4. Review of strategies that we’re trying to build into model
5. Questions and concerns

1. Reviewing my role: broadest picture

- Hydrologic model
  - Climate, water use & mgmt. → water, nutrients entering bay
- Hydrodynamic model
  - Water entering bay → water qual. throughout bay
- Oyster model
  - Fishery, mgmt. & rest., water → oyster populations and fisheries
  - Complement FWRI (Melanie Parker's) sampling and analyses
  - Inform FWC (Estes & Norberg) mgmt. actions

2. Review models: process

1. Oysters and fisheries assumptions
2. Translate to math and statistical equations
3. Revise with CAB input
4. Fit to data
5. Repeat 3-4
6. Make predictions
   -Environment
   -Management
   -Restoration



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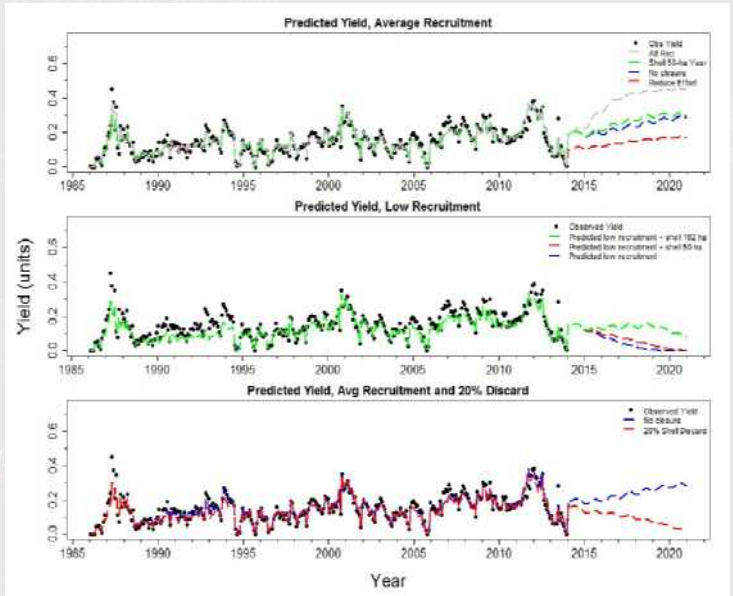

3. Updates

- Simple simulation model
  - Improved, ready for some testing
- Simple (bay-wide) stock assessment model
  - Not fitting well to fisheries data, working with fisheries independent data now
- More complex (bay-wide) stock assessment model
  - Initial fitting but needs to be tweaked for oyster specific
- Non-assessment model
  - Initial interesting results need to be confirmed

4. Questions about things to model

- **Action 4-A: Evaluate management scenarios**
- -seasonal (summer) closure to wild harvesting,

Can be done now

- - rotational closures

What areas defined? All open access?

- -5-day work weeks

Ok to model with effort reduction? But would actually reduce effort?

- -non-harvested spawning reefs (permanent closures),

Ok but needs spatial model asap.

- - limited entry,

Is effectively modeled now

- -transferable license program,

This would change who but not number of harvesters, right?

4. Questions about things to model

- **Action 4-A: Evaluate management scenarios**
- -closures based on stock levels (stock assessment),

Can be big task, can you we historic measures (XXX/acre) for now?

- - reduced bag limits,

Can be done implicitly now, but will need to tweak model to be better

- -bag tags,

How would this most concretely effect harvest

- - relaying oysters to better habitat,

Do you really want me to look at this? It's probably a bad/risky idea and it's going to require modeling the unfished areas

- -additional enforcement presence,

Can be done implicitly now

4. Questions about things to model

- • **Action 4-A: Evaluate management scenarios**
- -manage harvest areas to prevent the concentration of effort in specific locations (open larger areas).

This is a big deal, but we do want to get to spatial mgmt,

Do we have any information about how effort has varied reef to reef?

5. Questions you have for me

Questions and concerns
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Fishery Quantitative Model Categories

Estimation

- Given the data, what is number (parameter value) is most likely (M, N, q, etc.)
- Stock assessment
- Ecological questions (change in population over time, correlation)

Simulation

- Given these numbers (parameters), what is likely outcome
- How do results depend on certain assumptions (uncertainty analyses)
- “What-if” analyses
- Management strategy evaluations (MSE)