



# Oyster Futures

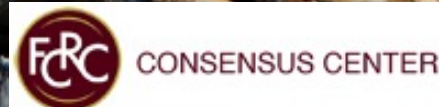
OysterFutures: A Collaborative Process for Developing Oyster Management  
Recommendations in Maryland

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ABSI  
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# Oyster Futures

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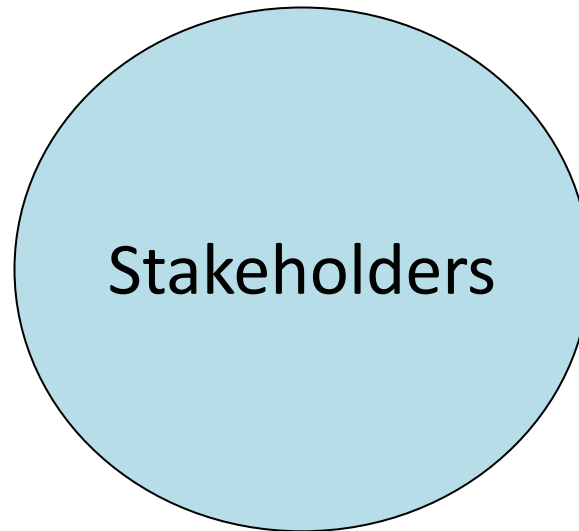


**Goal:** Help a diverse group of stakeholders develop recommendations for oyster restoration and management that meet the needs of industry, citizen, and government stakeholders in the Choptank and Little Choptank Rivers.



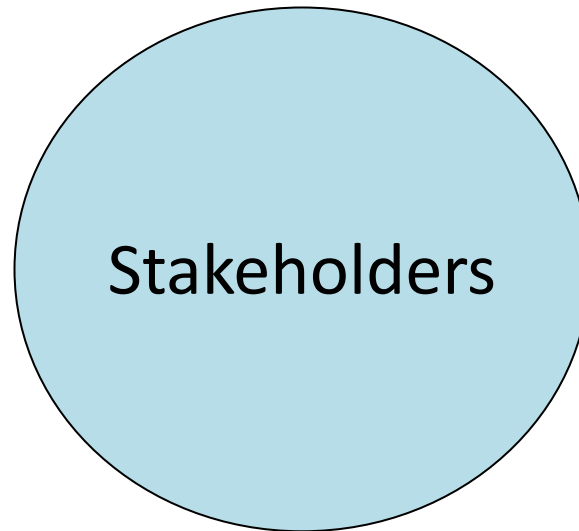
# Stakeholder-centered process

**Stakeholders** propose  
objectives, options,  
and performance measures



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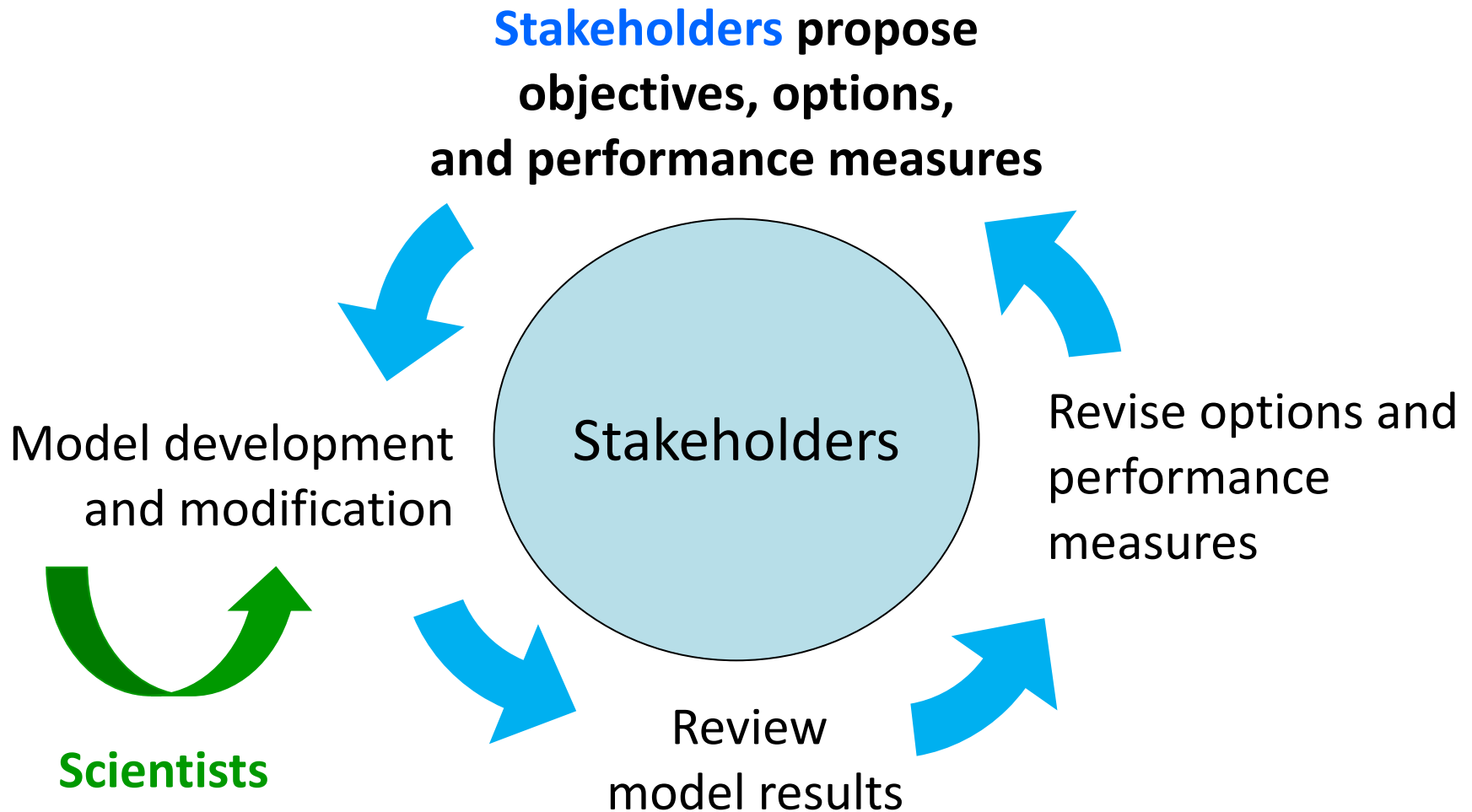


Model development  
and modification

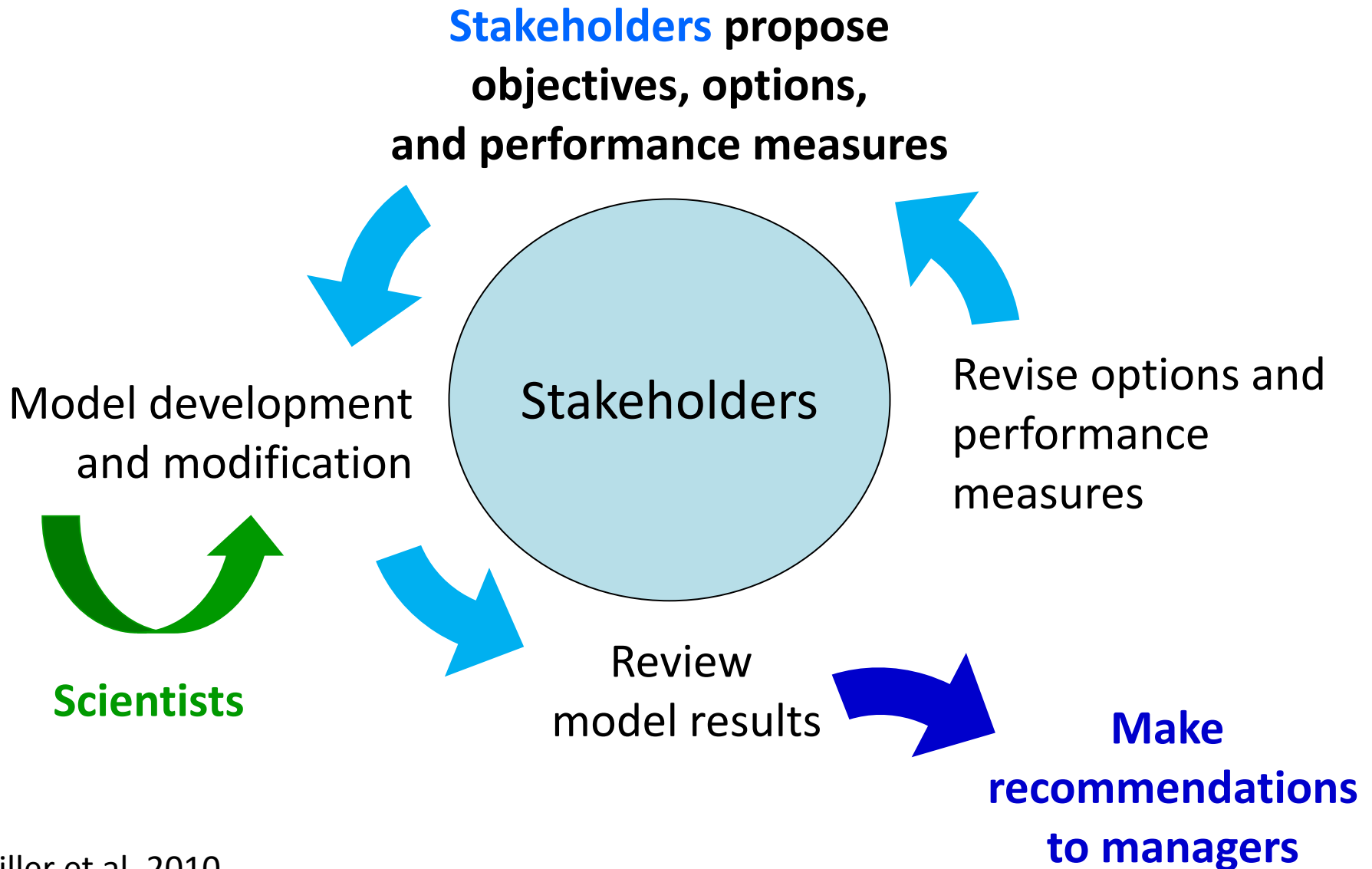


**Scientists**

# Stakeholder-centered process



# Stakeholder-centered process



# OysterFutures Workgroup

Workgroup has 16 members:

- 6 commercial fishers
- 1 oyster buyer
- 2 aquaculturists
- 5 environmental NGO representatives
- 2 agency representatives

Invitations to participate based on phone interviews during which we asked for names of people who are well respected, knowledgeable, and collaborative





OysterFutures Stakeholders  
February 27, 2016



OysterFutures Stakeholders  
March 24, 2018

# Process

- Stakeholders agree on their vision, what management options to evaluate, and what metrics to use to evaluate them
- Data and model components are presented to stakeholders with uncertainties clearly acknowledged; stakeholders provide missing information when possible
- Stakeholders use a formal ratings process (75% agreement) to move ideas forward and provide alternatives
- All ratings and comments are compiled and available through the whole process

# Information needed

- Actions to consider
- Important outcomes to consider (performance measures)
  
- Oyster Biology
- Fishery
- Ecosystem
- Effects of management actions

# OysterFutures Model

Options



Simulation  
Model



Performance  
Measures

Status quo

Rotational harvest

Change sanctuary boundaries

Manage using shell supplements

Shell additions with rotation

Plant hatchery-reared oysters

Increased enforcement of regulations

Modify size limits

Placing reefballs

Completion of restoration efforts

# OysterFutures Model

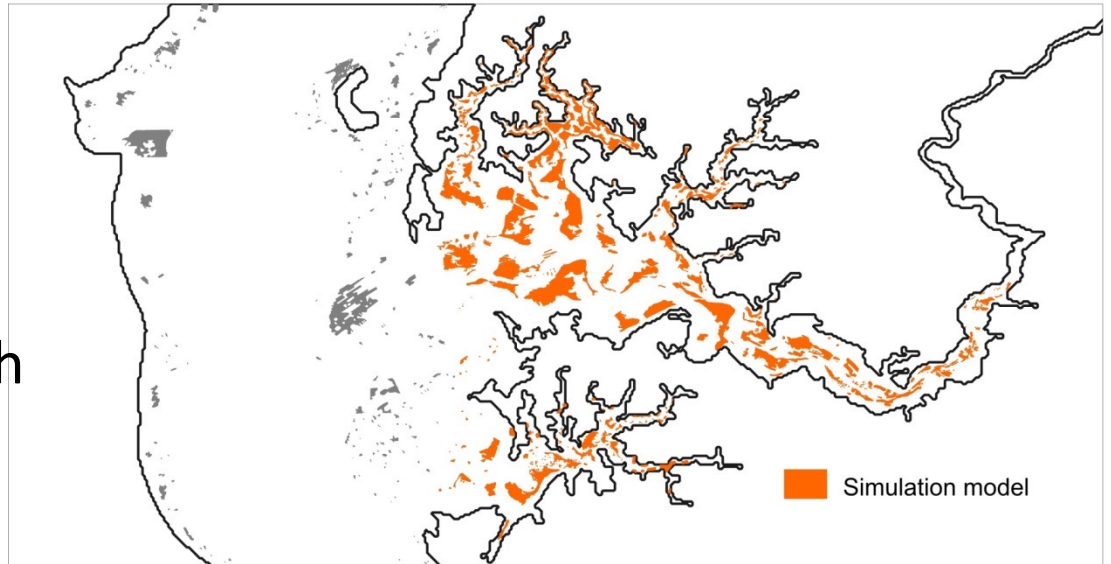


Oyster biology  
Fishery dynamics

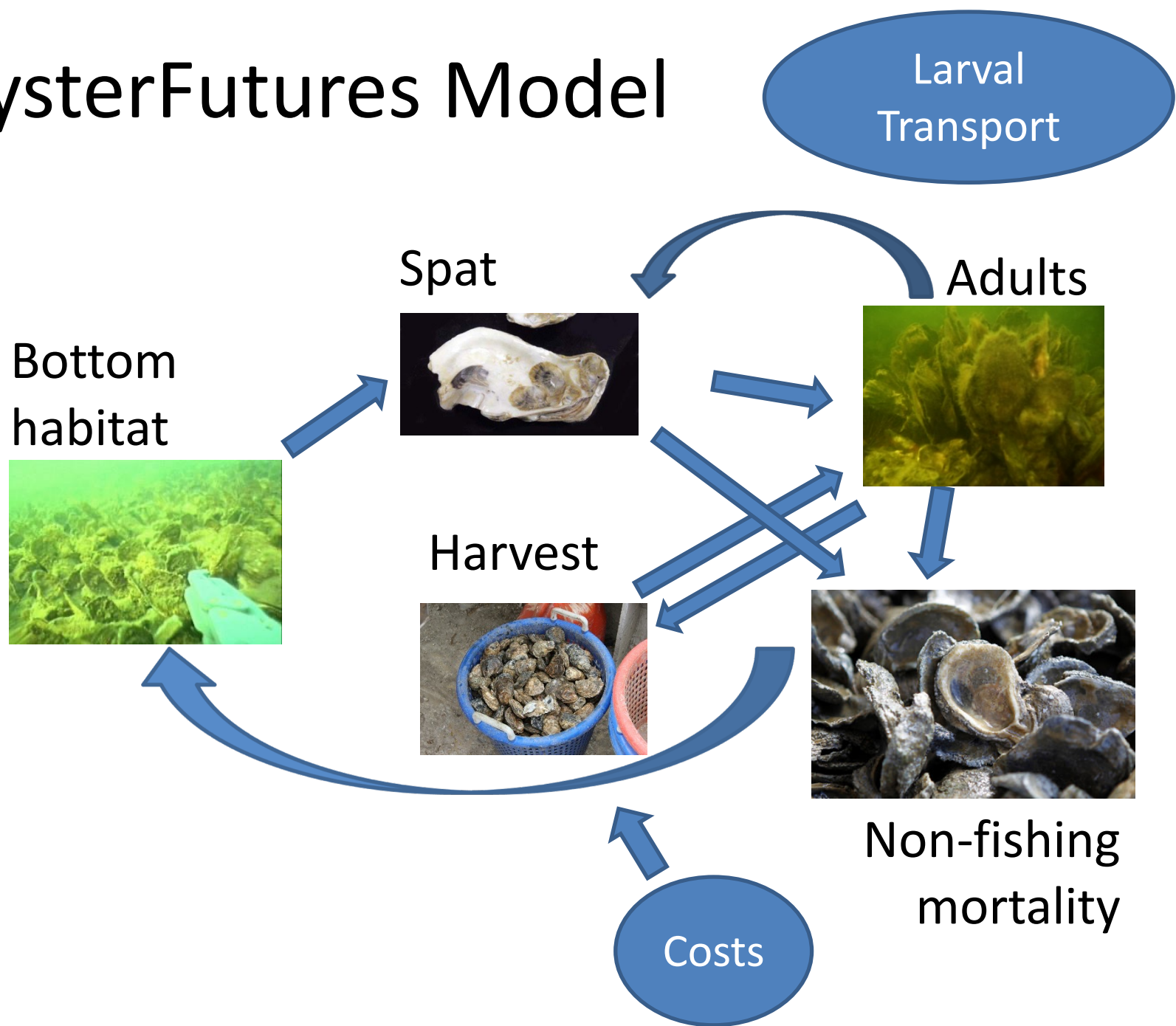
# OysterFutures Model



- Tracks separate populations on each of 1,132 habitat polygons
- Connectivity between polygons estimated with larval transport model
- Projects 25 yrs into future



# OysterFutures Model

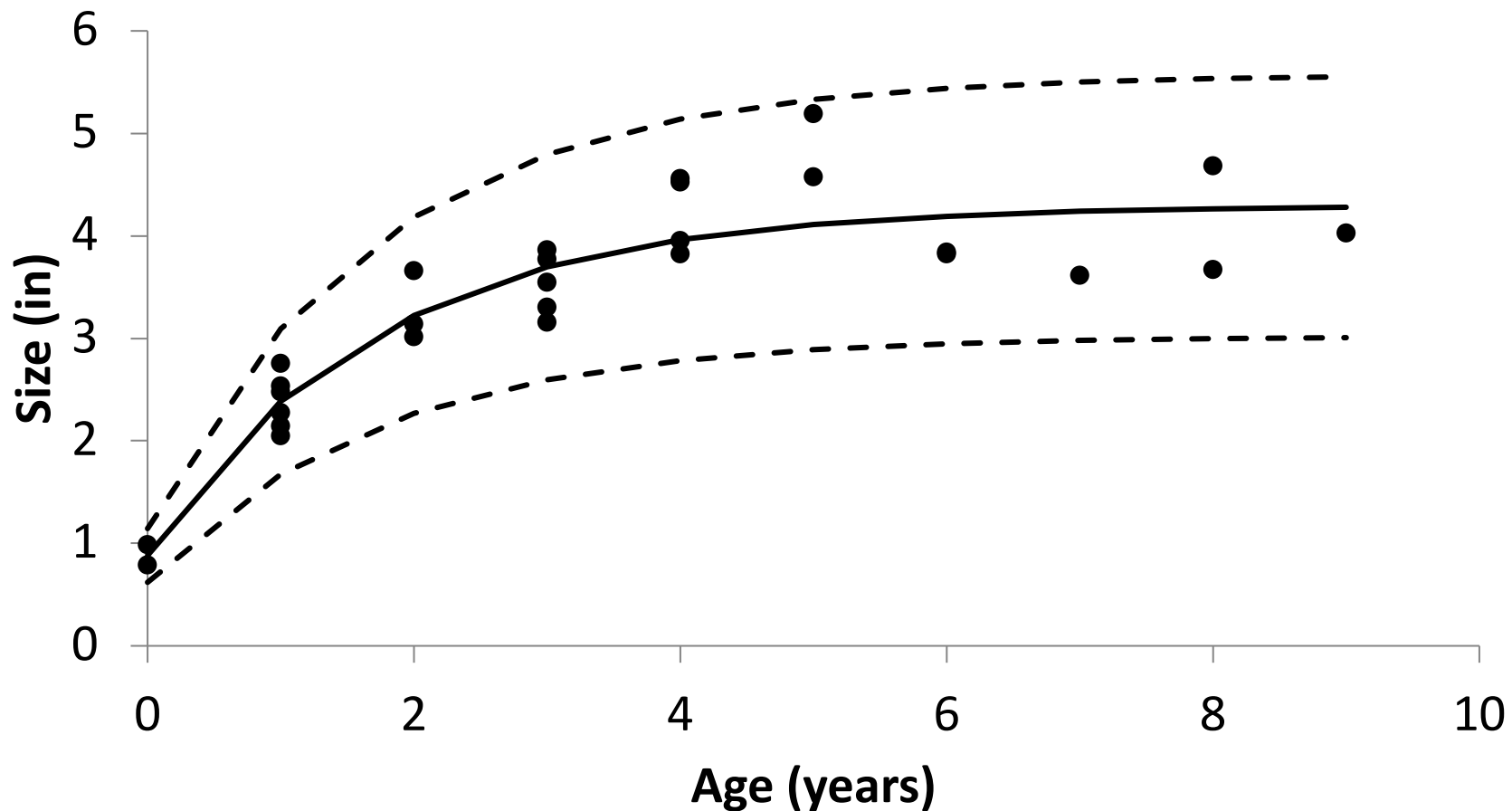




# Oyster Biology

- Growth (scientific literature)
- Maturity (scientific literature)
- Egg production (scientific literature)
- Larval transport (model developed for this project)
- Abundance and mortality (models developed for this project)
- Shell production (scientific literature)

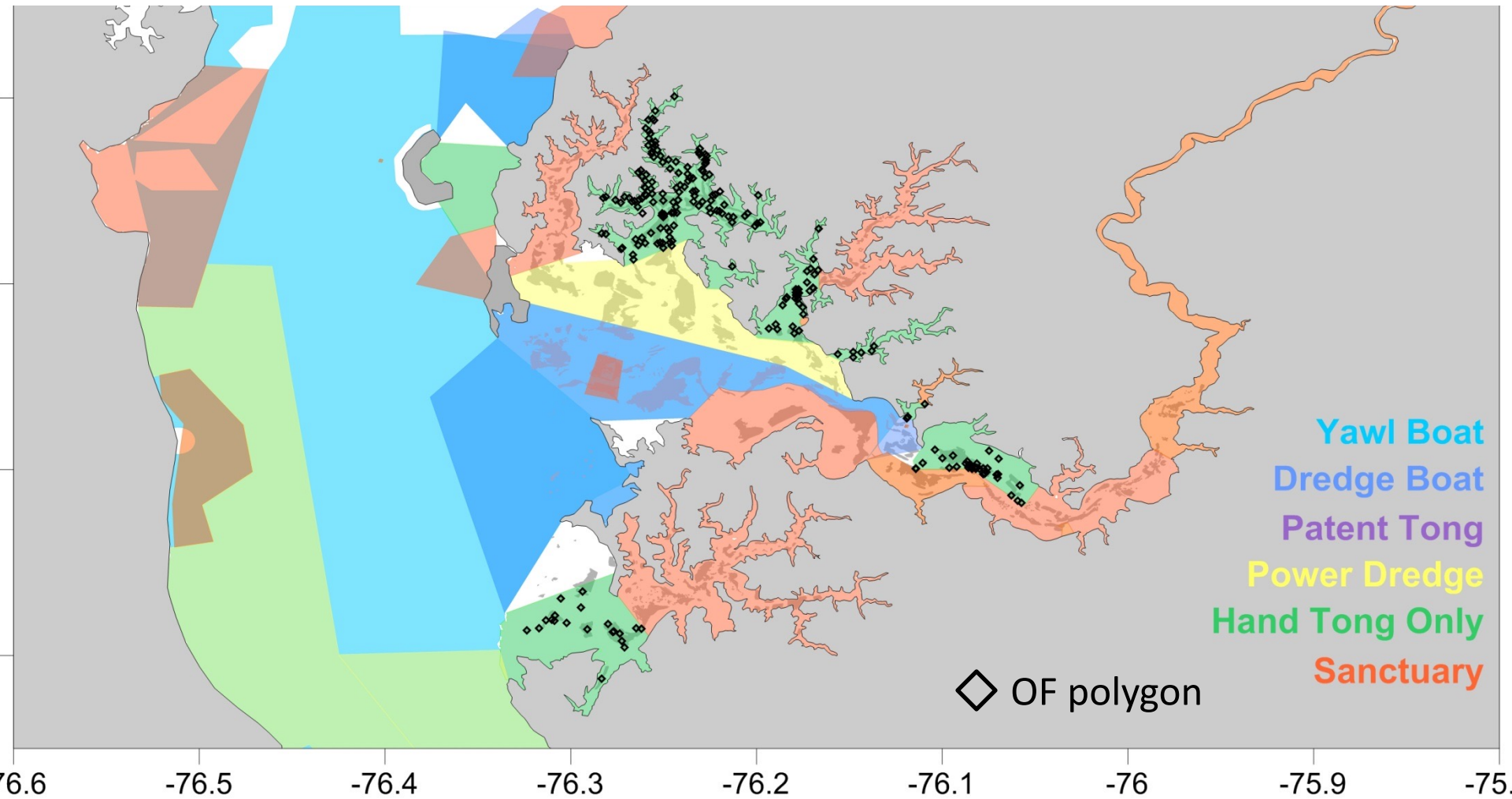
# Growth (From Oyster Recovery Partnership monitoring)



# Fishery

- Regulations
  - Maryland Dept. Natural Resources
  - Compliance? (stakeholder expert judgement)
- How many oysters are in a bushel?
  - Stakeholders provided new information on the number of oysters per bushel
- Price per bushel (Maryland DNR data and stakeholder knowledge)
- Where and when do people fish?
  - Discussions with the group
  - Stakeholders provided data on costs of fishing
  - Developed a bio-economic model to describe oyster fishing based on profitability

# Gear restrictions



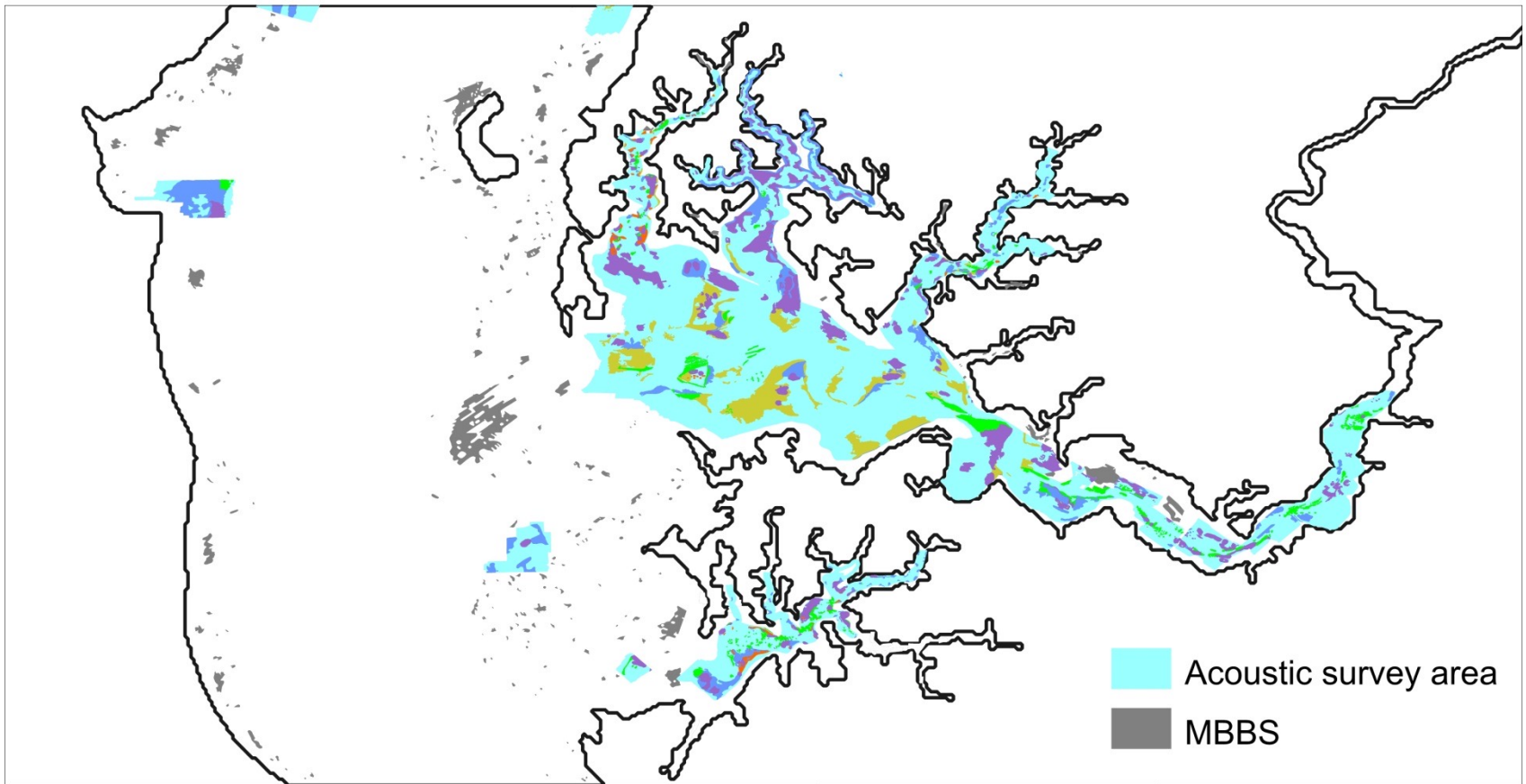
# Fishing

- Four gears:
  - Hand tong
  - Diver
  - Sail dredge
  - Power dredge
- All harvestable oysters above a minimum number/sq. m are harvested on each bar
  - Hand tong >4.8-5.3 bushels per day
  - Power Dredge > 7.5-8 bushels per day
  - Diver/Sail dredge – same as power dredge

# Ecosystem

- Location and amount of shell
  - Recent sonar surveys
  - Knowledge of watermen in areas that were not surveyed
- Shell degradation
  - Literature
  - Stakeholder expert judgement
- Ecosystem effects of oysters (scientific literature)
  - Nitrogen removal on oyster reefs
  - Nitrogen removal through harvest

# NOAA Geodatabase Habitat Classifications



Habitat classifications and polygons in acoustic survey area based on NOAA's Chesapeake Bay CMECS v4 Substrate Component 01062017 geodatabase

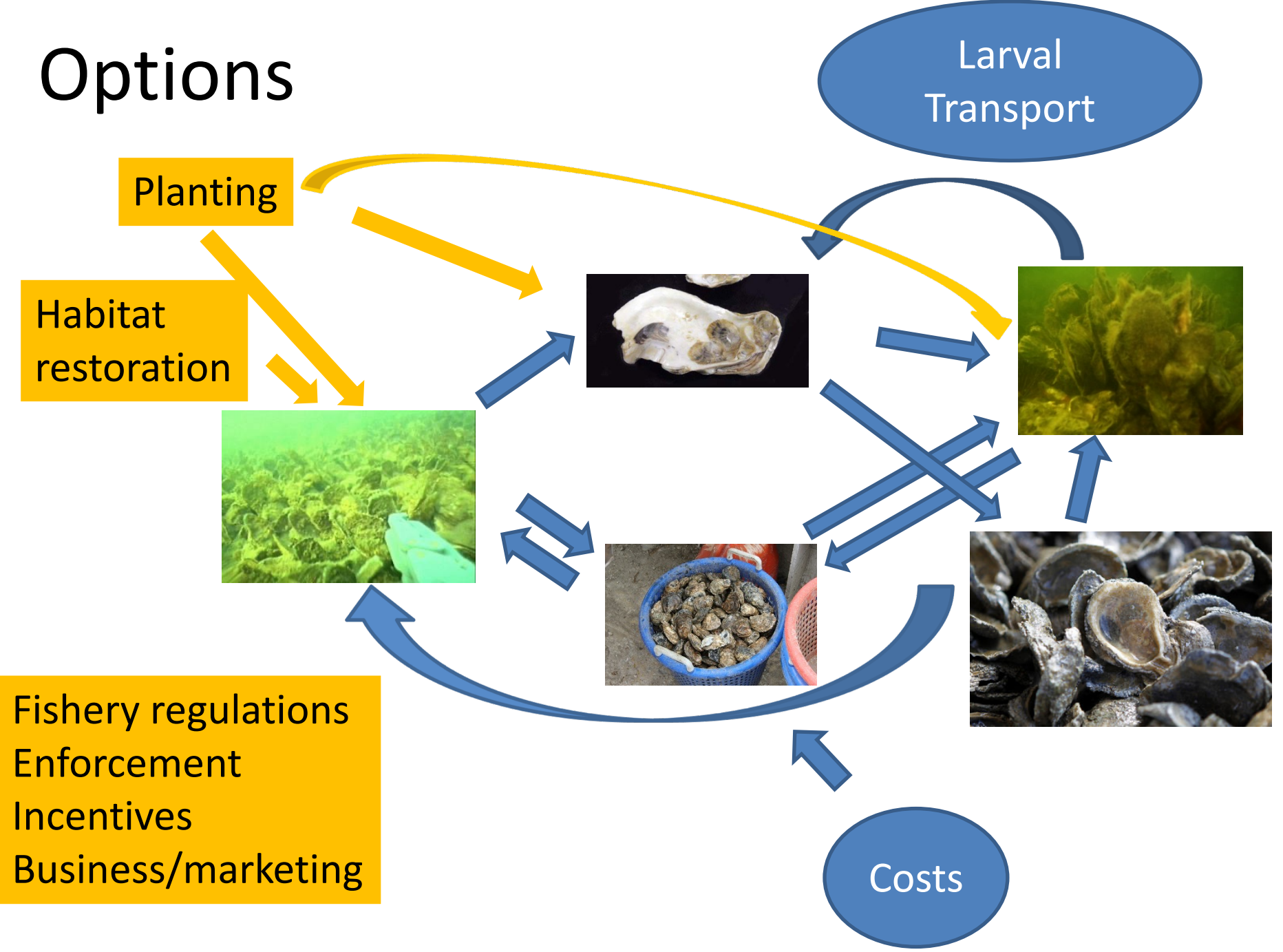
- 1: Shell fragments
- 2: Flat (2D) shell, sand/mud
- 3: Flat (2D) shell
- 4: Raised (3D) shell
- 5: Raised (3D) stone

# Effects of management actions

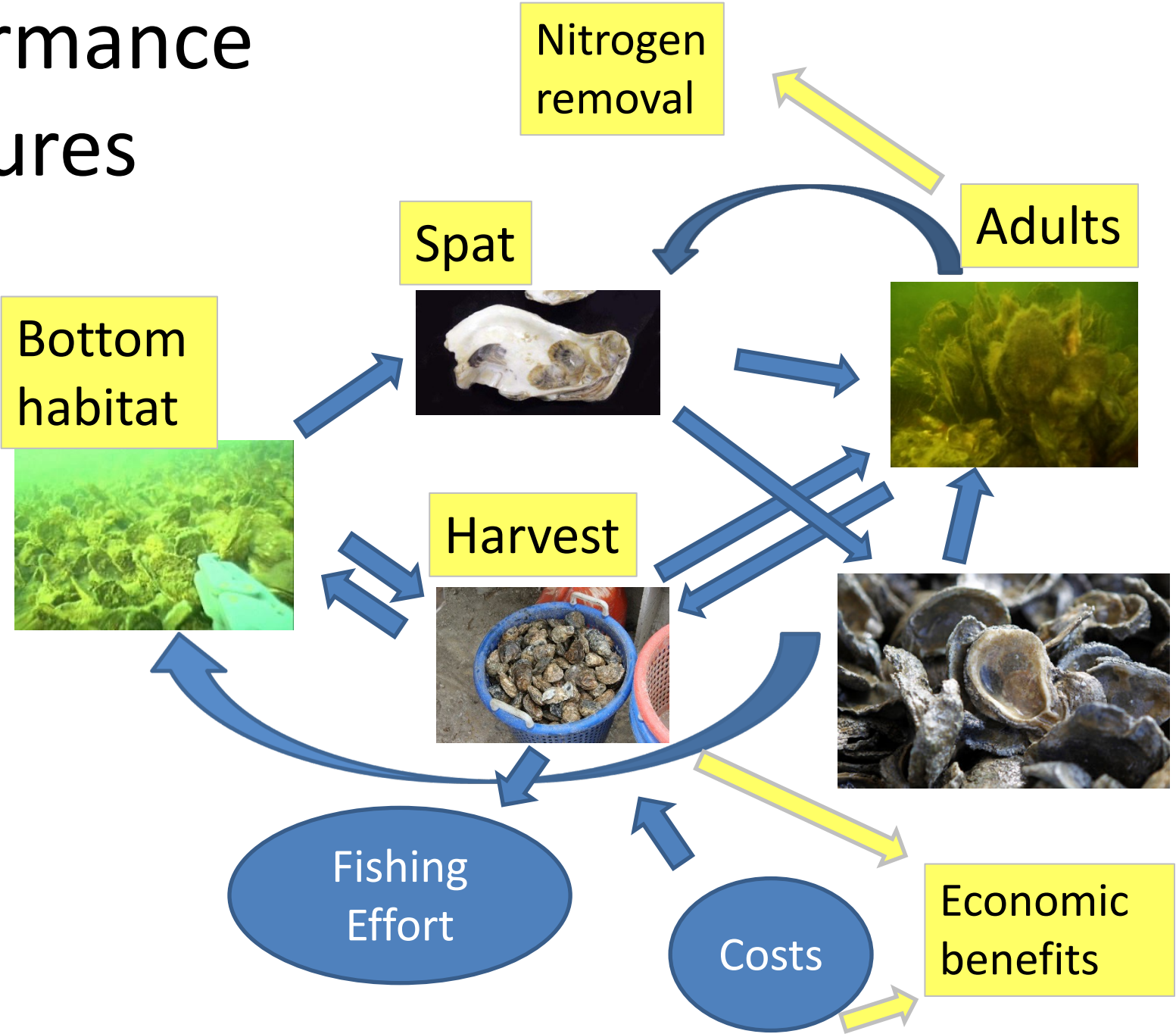
- Effects of planting shell
  - Maryland DNR data and stakeholder expert judgement
- Costs of shell and spat
  - NOAA and Maryland DNR data
- Costs of alternate substrate (usually granite)
  - NOAA data
  - Stakeholder data
- Other constraints
  - Stakeholder expert judgement



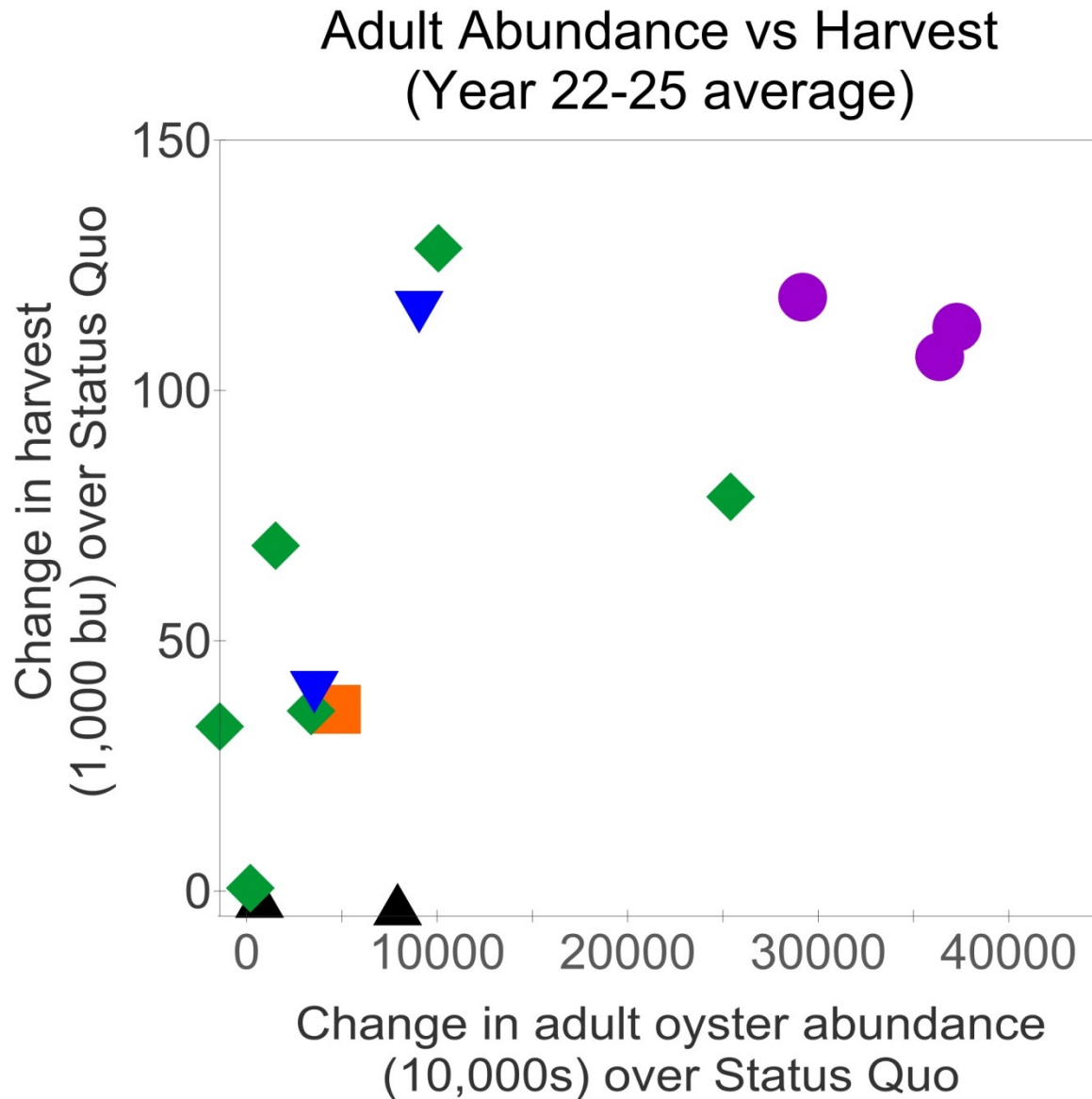
# Options



# Performance measures

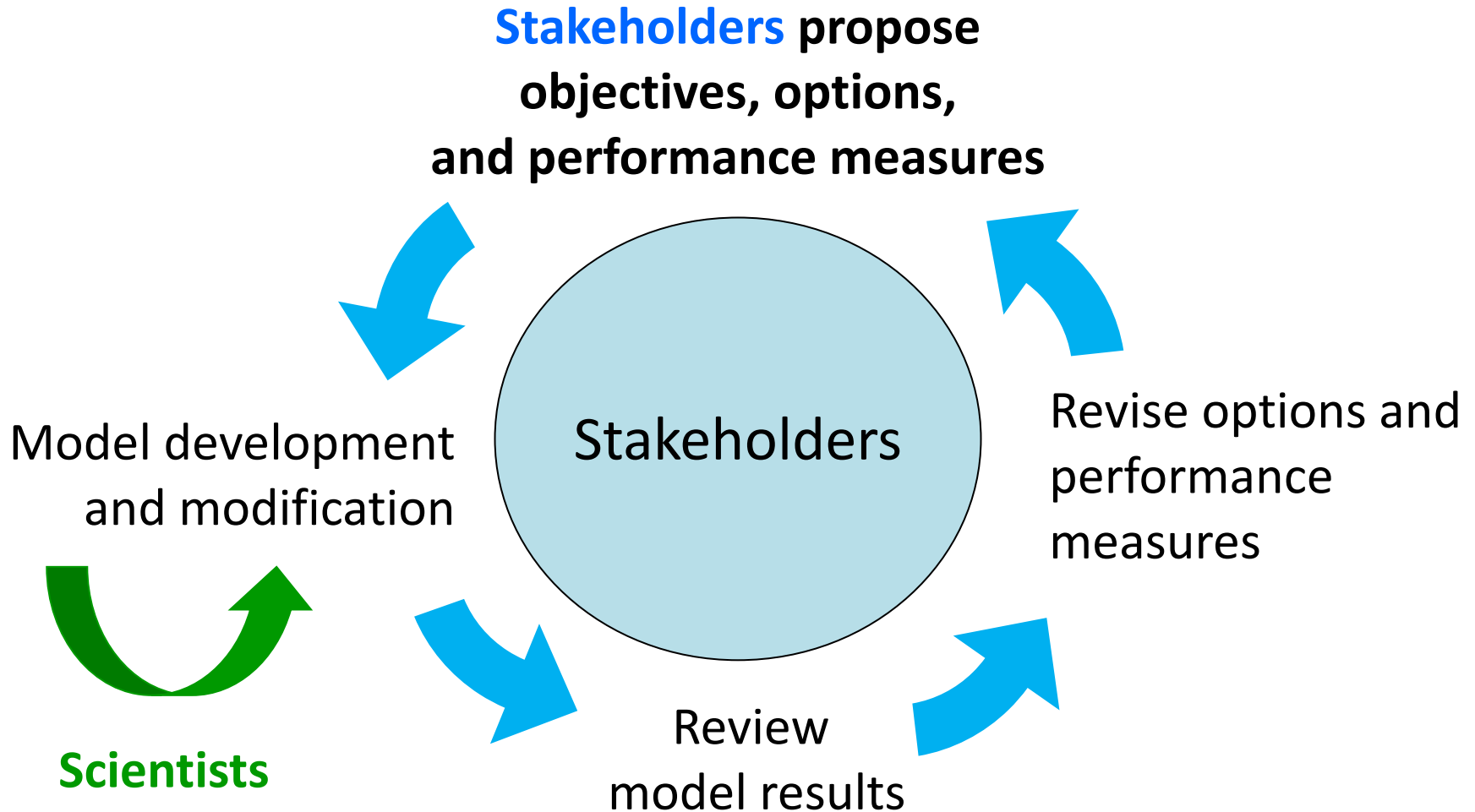


# Win – win options exist: high abundances and high harvest



**Important note:**  
For most options, these strong positive benefits did not start to be realized until around 10 years after implementation.

# Stakeholder-centered process





# Timeline

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## 2016

- February 1<sup>st</sup> workshop: visioning
- May 2<sup>nd</sup> workshop: model directives
- November 3<sup>rd</sup> workshop: model development

## 2017

- March 4<sup>th</sup> workshop: model development
- July 5<sup>th</sup> workshop: model development
- Nov 6<sup>th</sup> workshop: final model development

## 2018

- Jan 7<sup>th</sup> workshop: recommendations
- Feb 8<sup>th</sup> workshop: recommendations
- March 9<sup>th</sup> workshop: final recommendations
- May Public unveiling of recommendations

# Take Aways

- The process will work best when it's open and transparent
  - Show and talk about the data and assumptions
  - Describe the model in ways that help people understand it
- Everyone has important contributions to make
  - Listen carefully, and be patient, and express concern when something seems “off”
  - Take the time to learn from one another
- Positive mindset:
  - Everyone should be thinking about the end goal of making the situation better

# More information available on the web

The image shows a screenshot of a Facebook page for the 'OysterFutures Community'. The page features a large background image of oysters. On the left, there is a profile picture of the community, which is a logo with the text 'Oyster Futures' and 'Community' below it. The page header includes navigation tabs for 'Page', 'Messages', 'Notifications', 'Insights', and 'Publishing Tools', along with 'Settings' and 'Help'. The main content area displays the community name and a 'Timeline' tab. On the right side, there is a 'Promote' section with a dropdown menu and a summary of performance metrics for 'THIS WEEK': 16 Post Reach, 9 Post Engagement, and 2 Website Clicks. Below the main content, there is a search bar for posts on the page and a row of icons for 'Status', 'Photo / Video', and 'Offer, Event +'. The browser's address bar at the top shows the URL 'https://www.facebook.com/oysterfutures'.

<https://oysterfutures.wordpress.com/>

and

[www.facebook.com/oysterfutures](http://www.facebook.com/oysterfutures)

# Questions?

Many thanks to:

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OysterFutures  
Stakeholders and  
Team Members



Images  
Paynter Lab  
IAN symbol Library





## MANAGEMENT RECOMMENDATIONS

## A. THE NEED FOR CHANGE

The OysterFutures Workgroup recommends that DNR take swift and positive action to change existing regulations and policies regarding oyster management in the Choptank and Little Choptank Rivers. Maintaining the Status Quo (current regulations and policies) does not benefit the oyster resource or the ecosystem and human economies that depend on it. Change is needed.

## B. ENFORCEMENT RECOMMENDATIONS

The OysterFutures Workgroup reviewed enforcement options that could be modeled to determine their impact on oyster abundance, habitat, and harvest. The Workgroup found that enforcement and compliance play an important role in ensuring the protection of the oyster resource, and has the following recommendations:

1. In consultation with oyster resource stakeholders, DNR should enhance enforcement presence on the water, address noncompliance by providing funding to increase the numbers and training of compliance officers, and support strategies such as checking oysters where they are bought.
2. To enhance compliance, DNR should modify regulations so a single oyster bar is not divided between gear types, or where parts are open and other parts are closed.
3. To help inform and guide oyster resource participants in the Choptank system, DNR should address, correct and update DNR oyster resource mapping issues such as bottom mapping to better define oyster bars, and provide electronic maps that could be used with GPS chart programs.
4. DNR should provide the necessary resources to make its website more user friendly.
5. To protect the oyster resource, oyster populations, and the oyster industry, DNR should strive for full compliance with the current size laws and sanctuary regulations.

## C. LIMITED ENTRY RECOMMENDATION

The OysterFutures Workgroup discussed options for maintaining a level of fishing effort which would improve the long-term viability of the oyster fishery and the health of the oyster resource. The workgroup has the following recommendation:

1. Working together with oyster resource stakeholders, DNR should evaluate a limited entry oyster fishery that can provide access to watermen making the majority of their living from commercial fishing, enables generational succession in the fishery, and should have a way for new participants to gain entry that does not solely rely on having a large amount of capital.

## D. ROTATIONAL HARVEST RECOMMENDATION

The Workgroup evaluated opening portions of sanctuaries to rotational harvest where no restoration

# Consensus Recommendations

- Enhance **enforcement**
- Explore a **limited entry** program
- Allow **hand tonging in some sanctuary areas**
- **Plant more shell and spat**
- **Complete planned restoration**
- **Place privately-funded reef balls**
- Combine the above options
- Use *Consensus Solutions* in MD
- Develop cost effective strategies for shell and substrate
- Coordinate marketing and business plans
- Increase fees and taxes
- Promote education, training, and research