



Stakeholder Workgroup

6TH MEETING SUMMARY REPORT

November 10-11, 2017
Horn Point Laboratory, University of Maryland
Cambridge Maryland

Summarized by:



CONSENSUS CENTER

“Facilitating Consensus Solutions, Supporting Collaborative Action.”



THE
FLORIDA STATE
UNIVERSITY

**OYSTER FUTURES STAKEHOLDER WORKGROUP
NOVEMBER 10-11, 2017 MEETING VI SUMMARY REPORT**

TABLE OF CONTENTS

OYSTER FUTURES MEETING VI EXECUTIVE SUMMARY	3
OYSTER FUTURES MEETING VI SUMMARY	8
I. OVERVIEW OF THE OYSTER FUTURES PROJECT CONTEXT	8
A. WORKGROUP INTRODUCTIONS AND SCHEDULE REVIEW	8
B. REVIEW OF AGENDA, JULY 2017 SUMMARY & OYSTER FUTURES PROJECT GOAL	8
C. OVERVIEW AND DISCUSSION OF OYSTER FUTURES FINAL REPORT OUTLINE	8
II. OVERVIEW OF THE OYSTER FUTURES SIMULATION MODEL	9
A. REVIEWING MODEL COMPONENTS	9
B. OVERVIEW OF MODEL RESULTS	10
III. WORKGROUP REVIEW AND RATING OF MODELING OPTIONS	11
A. REVIEW OF BASELINE MODELING OPTIONS	11
B. MANAGEMENT & REGULATION OPTIONS	11
1. ENFORCEMENT OPTIONS	11
2. ROTATIONAL HARVEST OPTIONS	12
3. HABITAT MODIFICATION/RESTORATION OPTIONS	18
4. STOCKING OPTIONS	22
5. POSSIBLE COMBINATION OF OPTIONS	22
6. TESTING SUPPORT FOR MODEL COMPONENTS	22
VI. NEXT STEPS	23
APPENDICES	24
1. WORKGROUP AGENDA	24
2. WORKGROUP MEMBERSHIP & PARTICIPATION	26
3. WORKGROUP MEETING VI EVALUATION SUMMARY	28
4. OYSTER FUTURES PROJECT DESCRIPTION	29
5. OYSTER FUTURES PROJECT SCHEDULE	30
6. DRAFT OYSTER FUTURES FINAL REPORT OUTLINE	31

Oyster Futures Workgroup, November 2017



Oyster Futures Workgroup, Facilitators and Research Team, November 2017





**OYSTER FUTURES WORKGROUP
MEETING VI EXECUTIVE SUMMARY
NOVEMBER 10-11, 2017**

On behalf of the Oyster Futures Research Team, Elizabeth North welcomed the Workgroup Members to the sixth meeting of the Oyster Futures Workgroup and introduced the facilitation team of Jeff Blair and Bob Jones with the FCRC Consensus Center at Florida State University. Following a workgroup member roll call, the facilitator noted the importance of full participation in the upcoming Workgroup meetings as they develop consensus recommendations to the Department of Natural Resources in 2018.

Elizabeth North noted that since the July 2017 Workgroup Meeting there had been presentations of the process at several meetings. Elizabeth North presented to the Maryland Oyster Advisory Commission and Dave Blazer and Allison Colden noted that this was an effective presentation and the Commission expressed a lot of interest in the OysterFuture process. Elizabeth North also presented at the Dorchester County Council and a Talbot County Council presentation is scheduled for early January 2018. Presentations on Oyster Futures were also made at: The 2017 American Fisheries Society Conference (Mike Wilberg); The 2017 International Council on the Exploration of the Seas where the team's OysterFutures poster presentation was awarded the conference's "best poster" (Elizabeth North); and at the 2017 Coastal Estuarine and Research Federation (Elizabeth North). Elizabeth asked Workgroup members to consider whether any of their groups would like an opportunity to hear an OysterFutures presentation.

The facilitators reviewed the agenda and the Workgroup approved the agenda and accepted the July 2017 Workgroup meeting summary without changes. The facilitator reminded the members of the workgroup guidelines that was adopted at the organizational meeting in February 2016 which calls for a package of Workgroup consensus recommendations informed by modeling collaboratively developed by the Workgroup and the OysterFutures project research team. As in past meetings, members also completed a short Social Science Study survey at the outset and after the review and rating of the modeling options on Saturday afternoon.

The facilitators presented a draft OysterFutures Workgroup final report outline. The Workgroup discussed the outline and suggested that Section II should include some conclusions, testimonials and recommendations on the collaboration process as a better way to make fishery management decisions and the importance of the social outcomes of the Workgroup collaboration. In terms of Section V, The Workgroup clarified that there may be important recommendations to DNR going forward that were not based on modeling (e.g. the importance of ongoing public education, etc.). Finally, there was discussion of the value of introducing and framing the Workgroup recommendations with some findings or assumptions that emerged out of the effort to build and model management options for the oyster fishery.

Mike Wilberg provided the Workgroup with a brief overview of the research objectives for the Population Models, Oyster Futures Simulation Model, Economics Model, and Water Quality Model. He focused his presentation on the changes that had been made based on the July meeting and the Workgroup direction. Other members of the Team provided comments as appropriate on the larval transport, nutrient, seston and economic model components. Members presented questions and comments on the model components including on issues of: Price per bushel; Reef ball Restoration in Middle Choptank; and Nitrogen Removal through harvest.

To prepare for the day two acceptability rating of each of the options, Mike Wilberg provided an initial overview of the results of the 27 options that were identified by the Workgroup and simulated since the March 2017 meeting. The options were captured on charts that featured the options and the related performance measures (abundance; habitat; harvest; revenue; number; seston and nitrogen) over 5 year intervals up to 25 years.

On Saturday morning, Mike Wilberg presented the range of options the Workgroup had identified and refined at its earlier meetings and pointed out changes that had been suggested at the July meeting. For each option the Workgroup rated the option's acceptability, discussed concerns and offered additional suggestions to the modelers. Options ratings with a green shading indicate 75% or more support. Options ratings with a yellow shading indicated between 50%-74% ratings. No shading indicates ratings between 0-49% support.

REVIEW OF BASELINE MODEL OPTIONS

Model Option #1: Status quo (SQ) (5% non-compliance with size limit, 1% Sanctuary harvest).

A. Noncompliance rate value.

B. Bushel price used in model revised to the average value from buy tickets in recent years. (\$47.22)

1st Rating- Both A & B (100%, 4- 9, 3- 1, 2-0, 1-0

2nd Rating (100% (100%, 4- 10, 3-0, 2-0, 1-0

MANAGEMENT AND REGULATION OPTIONS

ENFORCEMENT OPTIONS

Model Option #2: SQ with complete compliance with size, 1% Sanctuary harvest.

(Rating: 100% support- ratings 4-10, 3-0, 2-0, 1-0)

Model Option #3: Full compliance with the current size limit and sanctuary regulations.

(100% support- ratings 4-8, 3-2, 2-0, 1-0)

ROTATIONAL HARVEST OPTIONS

Model Option 4: 2-yr rotation scenario with large areas (Broad Creek and Tred Avon switched) – just shell.

(20% support- ratings 4-0, 3-2, 2-4, 1-4)

Model Option #5: 2-yr rotation scenario with large areas (Broad Creek and Tred Avon switched) – spat on shell.

(0% support- ratings 4-0, 3-0, 2-6, 1-4)

Model Option #6: 2-yr rotation with large areas that includes Middle Choptank sanctuary – just shell.

(0% support- ratings 4-0, 3-0, 2-6, 1-4)

Model Option #7: 2-yr rotation with large areas that includes Middle Choptank sanctuary – spat on shell.

(0% support- ratings 4-0, 3-0, 2-6, 1-4)

Model Option #8: 2-yr rotation in smaller areas (10-20% of least productive bars in each area, with annual costs of shell or spat on shell ~ \$2M) – just shell.

(1st Rating: 90% support- ratings 4-0, 3-9, 2-1, 1-0)

(2nd Rating: 100% support- ratings 4-0, 3-10, 2-0, 1-0)

Model Option #9: 2-yr rotation in smaller areas (10-20% of least productive bars in each area, with annual costs of shell or spat on shell ~ \$2M) – spat on shell.

(Rating: 90% support- ratings 4-0, 3-9, 2-1, 1-0)

Model Option #10: 2-yr rotation in smaller areas (10-20% of least productive bars in each area, with annual costs of shell or spat on shell ~ \$600K) – just shell.

(Rating: 80% support- ratings 4-0, 3-8, 2-2, 1-0)

Model Option #11: 2-yr rotation in smaller areas (10-20% of least productive bars in each area, with annual costs of shell or spat on shell ~ \$600K) – spat on shell.

(Rating: 80% support- ratings 4-0, 3-8, 2-1, 1-1)

Model Option #12: 2-yr rotation in smaller areas & include Middle Chop sanctuary - just shell. \$2 million.

(Rating: 80% support- ratings 4-0, 3-8, 2-2, 1-0)

Model Option #13: 2-yr rotation in smaller areas & include Middle Chop sanctuary - spat on shell.

(Rating: 80% support- ratings 4-0, 3-8, 2-2, 1-0)

Model Option#14: 2-yr rotation in smaller areas in Little Choptank tributaries – just shell every other year. @ \$700 annually, 170 acres.

(1st Rating: 90% support- ratings 4-4, 3-5, 2-1, 1-0)

(2nd Rating: 100% support- ratings 4-4, 3-6, 2-0, 1-0)

Option #15a: 2-yr rotation in smaller areas in Little Choptank tributaries – spat on shell on the same areas as in Option 14. Model different spat densities and \$\$

(Rating: 100% support- ratings 4-5, 3-5, 2-0, 1-0)

HABITAT MODIFICATION/RESTORATION OPTIONS

Model Option 16: Add shell to each bar every 3 years in the Lower Choptank (smaller areas so less than 2M every 3 years) (about 500 acres).

(November 2017 0% 4-0, 3-0, 2-8, 1-2)

Model Option 17a: Add shell to each bar every year –move all 4 sites to Broad Creek (smaller areas so less than 2M/650K per year, just under 500 acres). Work with the Talbot Co. Shell Committee

(November 2017 100% 4-6, 3-4, 2-0, 1-0)

Model Option 17b: Add spat on shell to each bar every year in Middle Choptank and work with Dorchester County Shell Committee (smaller areas so less than 2M/650K per year, just under 500 acres).

(November 2017 100% 4-6, 3-4, 2-0, 1-0)

Model Option 18: Open tributaries in the Little Choptank River to hand tonging, and provide added shell (every 3 years) (341 acres) (\$1.4 M)

(November 2017 90% 4-0, 3-9, 2-1, 1-0)

Model Option 19: Implement Little Choptank and Tred Avon Restoration (6" substrate)

(November 2017 100% 4-3, 3-7, 2-0, 1-0)

Model Option 20: Implement Little Choptank and Tred Avon Restoration. (12" substrate)

(November 2017 1st Rating: 90% 4-4, 3-5, 2-1, 1-0)

(November 2017 2nd Rating: 100% 4-6, 3-4, 2-0, 1-0)

Model Option 21: Make reefs in the current shellfish closure areas in the Middle Choptank region (6-inch substrate). (\$2M) (41 acres)

(November 2017 10% 4-0, 3-1, 2-8, 1-0)

Model Option 22: Make reefs in the current shellfish closure areas in the Middle Choptank region (6 inch with spat) (29 acres) (1 time \$2M) (144K annually over 25 years)

(November 2017 40% 4-0, 3-4, 2-6, 1-0)

Model Option 23: Place reefballs in the current shellfish closure areas in the Middle Choptank region (reef balls, 1 foot apart) (2 acres) (1 time \$2M)

(November 2017 60% 4-0, 3-6, 2-4, 1-0)

Model Option 23a: Place reefballs (placed near/around the bridge, channel markers, etc.?) in the Middle Choptank region (reef balls, 1 foot apart) (2 acres) (1 time \$2M) not in conflict with fishing activities. Work with watermen for placement options.

(November 2017 100% 4-8, 3-2, 2-0, 1-0)

Model Option 24: Make reefs in the current shellfish closure areas in the Middle Choptank region (reef balls, 3 feet apart).

(November 2017 100% 4-0, 3-10, 2-0, 1-0)

Model Option 24a: Place reefballs (placed near/around the bridge, channel markers, etc.) in the Middle Choptank region (reef balls, 3 foot apart) (2 acres) (1 time \$2M) not in conflict with fishing activities. Work with watermen for placement options.

(November 2017 100% 4-0, 3-10, 2-0, 1-0)

STOCKING

Model Option 25: Add spat to each bar every 3 years in the Lower Choptank (smaller areas so less than 2M).

(November 2017 0% 4-0, 3-0, 2-10, 1-0)

~~Model Option 26: Add spat to each bar every 3 years in the Lower Choptank, Middle Choptank and Broad Creek (smaller areas so less than 2M).~~

(November 2017 0% 4-0, 3-0, 2-10, 1-0)

Model Option 26a: Add spat to each bar every year in the Middle Choptank (smaller areas so less than 2M). (100 acres)

(November 2017 100% 4-3, 3-7, 2-0, 1-0)

The facilitator noted that at the end of the November 2016, March and July 2017 meetings, the Workgroup members used an acceptability rating for each of the model components to gauge the Workgroup's understanding and support for the work being done on each. He asked the Workgroup to rate the components based on the review and refinements promised at this meeting and offer any concluding observations or suggestions. The Workgroup expresses satisfaction and support for the following model components: Habitat Model 1; Habitat 2- Habitat Coding- Lower Choptank; Fishery/Effort Dynamics; and Economics.

The Workgroup discussed the meeting schedule and agreed to schedule 3 more meetings in 2018 tentatively set for January 5-6, February 16-17 and March 23-24 to reach consensus on the Workgroup recommendations to DNR and complete the Phase I activities. Elizabeth North reported that the videos of the presentations at the Oyster Futures Sea Grant Symposium in October 2016 were still in progress and would be posted soon. She also recounted that workgroup members decided at the last meeting to delay discussion of the communications strategy of the results of stakeholder deliberations and recommendations until later in the process. Workgroup members were asked to comment on the meeting by completing meeting evaluations. The meeting adjourned at 3:45 p.m. on Saturday afternoon.



**OYSTER FUTURES
WORKGROUP MEETING VI SUMMARY
NOVEMBER 10-11, 2017**

I. OVERVIEW OF THE OYSTER FUTURES PROJECT CONTEXT

A. WELCOME, WORKGROUP INTRODUCTIONS

On behalf of the Oyster Futures Research Team, Elizabeth North welcomed the Workgroup Members to the sixth meeting of the Oyster Futures Workgroup and introduced the facilitation team of Jeff Blair and Bob Jones with the FCRC Consensus Center at Florida State University. Following a workgroup member roll call, (*See Appendix #2 for the Workgroup members list and meeting participants*), the facilitator noted the importance of full participation in the upcoming Workgroup meetings as they develop consensus recommendations to the Department of Natural Resources in 2018.

Elizabeth North noted that since the July 2017 Workgroup Meeting there had been presentations of the process at several meetings. Elizabeth North presented to the Maryland Oyster Advisory Commission and Dave Blazer and Allison Colden noted that this was an effective presentation and the Commission expressed a lot of interest in the OysterFuture process. Elizabeth North also presented at the Dorchester County Council and a Talbot County Council presentation is scheduled for early January 2018. Presentations on OysterFutures were also made at: The 2017 American Fisheries Society Conference (Mike Wilberg); The 2017 International Council on the Exploration of the Seas where the team's OysterFutures poster presentation was awarded the conference's "best poster" (Elizabeth North); and at the 2017 Coastal Estuarine and Research Federation (Elizabeth North). Elizabeth asked Workgroup members to consider whether any of their groups would like an opportunity to hear an Oyster Futures presentation.

B. REVIEW OF AGENDA AND WORKGROUP JULY 2017 SUMMARY

The facilitators reviewed the agenda and the Workgroup approved the agenda (*See Appendix #1*) and accepted the July 2017 Workgroup meeting summary without changes. The facilitator reminded the members of the workgroup guidelines that was adopted at the organizational meeting in February 2016 which calls for a package of Workgroup consensus recommendations informed by modeling collaboratively developed by the Workgroup and the OysterFutures project research team. As in past meetings, members also completed a short Social Science Study survey at the outset and after the review and rating of the modeling options on Saturday afternoon.

C. OVERVIEW AND DISCUSSION OF A FINAL REPORT OUTLINE

The facilitators presented a draft OysterFutures Workgroup final report outline (*See, Appendix #6*). The Outline included the following proposed sections:

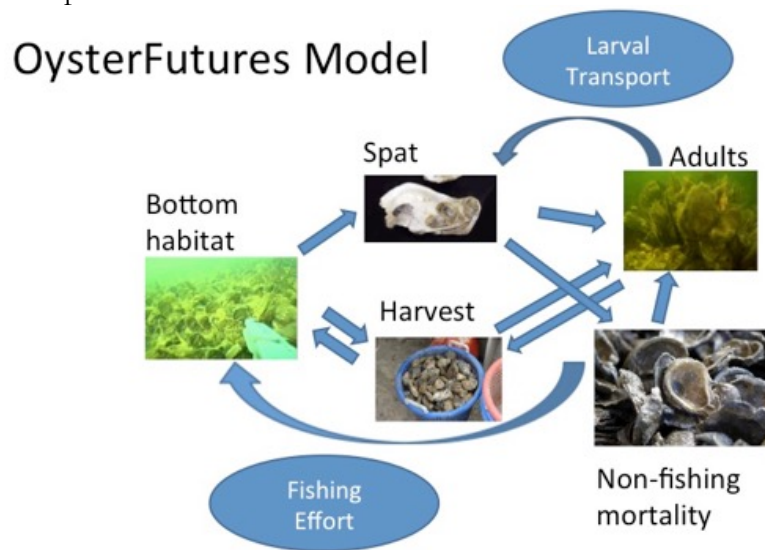
- I. Context for OysterFutures project
 - II. Description of the Oyster Futures Consensus Building Process
 - III. Overview of Model Component
 - IV. Modeled Management and Regulation Recommendations to Maryland DNR
 - V. Recommendations for Options Not Modeled
 - VI. Conclusions and Next Steps
- Appendices*

The Workgroup discussed the outline and suggested that Section II should include some conclusions, testimonials and recommendations on the collaboration process as a better way to make fishery management decisions and the importance of the social outcomes of the Workgroup collaboration. In terms of Section V. The Workgroup clarified that there may be important recommendations to DNR going forward that were not based on modeling (e.g. the importance of ongoing public education, etc.). Finally, there was discussion of the value of introducing and framing the Workgroup recommendations with some findings or assumptions that emerged out of the effort to build and model management options for the oyster fishery.

II. OVERVIEW OF THE OYSTER FUTURES MODELING

A. Reviewing Model Components

Mike Wilberg provided the Workgroup with a brief overview of the research objectives for the Population Models, Oyster Futures Simulation Model, Economics Model, and Water Quality Model. He focused his presentation on the changes that had been made based on the July meeting and the Workgroup direction. Other members of the Team provided comments as appropriate on the larval transport, nutrient, seston and economic model components.



Member Questions on the Model Presentation

Price per bushel-

- How was the price established? *A: From an average of buy tickets for DNR's last fishing season- (47.22 per bushel). Model holds this constant throughout season.*
- It is more reasonable but the price is going up this year.

Reef ball restoration in Middle Choptank

- *Added this after July meeting.*
- The low survival rate increases the cost of project on front end. More die if they are too crowded. Is this wasting resources? *A: Model has a pretty high mortality rate built in.*
- That's because they are too dense. *A: Hatcheries increase population size, can do practices to limit early life mortality. Grow them until they get larger.*
- Volume vs. area? Is there a way to value the 3D of the reefball- regarding growth and mortality/survival? *A: In theory yes. The studies measuring them are inconsistent.*
- What about deploying concrete and shell to compare in same area? *A: Studies pretty old. Shell attract more than concrete. There is a danger of overestimating of the reefball.*
- Are there any studies of the increase in sediment problem with reefballs vs. shell? *A: Don't know of any studies. Model treats as if it has the same properties as a shell reef.*
- Reefballs are ok in the right places. Sanctuary closed and unharvestable. Consider where they will be placed. Don't want them on harvestable bottom. Placement is a key issue- will model direct? *A: Reef ball options in shellfish closure areas in Middle Choptank. We tell the model where they go.*
- The option to restore shellfish closure areas with granite was too expensive. Suggested reef balls for a more reasonable cost.

Nitrogen removal through harvest.

- *Modeled removal in oyster meat and shell.*
- *The \$\$ value in model for nitrogen is not intended to be a market value. Until there is a market, won't know the market value. "Nutrient credits" are driven by government policies not the market. Until this happens, wild speculations.*
- *"Social benefit value"- government program investment. Pay farmers to do BMPs to get cleaner water. E.g. government may pay more than the market because of social values.*
- Various BMPs will be applied as tools to achieve TMDLs.
- Retrofitting impervious surface reduction is the big expense.
- Value of what you would have had to do that would be more expensive.
- What is the timeline for moving forward? *A: Next spring 2018. Just got new model available. Legislation will be needed to back the Bay Restoration Fund.*
- "Watershed Implementation Plan 3 plan"-state plan to describe that portfolio of items that can be used meet the targets.

B. Overview of Model Results

To prepare for the day two acceptability rating of each of the options, Mike Wilberg provided an initial overview of the results of the 27 options that were identified by the Workgroup and simulated since the March 2017 meeting. The options were captured on charts that featured the options and the related performance measures (abundance; habitat; harvest; revenue; number; seston and nitrogen) over 5 year intervals up to 25 years. Below are summary points in the discussion of the model results.

- *Don't take #s as anything other than means. Gauge the magnitude among the scenarios. Broad takeaways. **Don't expect success in 5 years.** No options will do that. Some get to beneficial outcomes in 25 years. Chief result. Won't recover \$\$ in first 5 years.*

- Table of contents- interpretations- Add Assumptions- and interpretations should be incorporated into the report.
- Think about these relative to status quo and relative to each other.
- Clarify the level of uncertainty in terms of implementation results.
- What does the last column represent, market value? *A: dock side value of product less the cost of shell and spat on shell. Net profit or gross? Gross. Doesn't include anything for the cost of harvesting. Cost is investment in the option (shell and spat).*
- Not watermen revenues. Not from a watermen perspective. How much market value you get from investment. Harvest times the bushel amount.
- Hope to work away from having 12-15 metrics. Simplify this. Hard to synthesize.
- If double that that is what the oysters [for Nitrogen removal from harvest]. Won't be able to count the shell.
- Smaller oyster= less nitrogen removal. Bigger- have more.
- Nitrogen removal (oyster size + abundance) similar trend to abundance column.
- Why is there a lag in shell growth (10 years)? *A: Population has to grow and amount of shell decline a bit.*

III. WORKGROUP REVIEW AND RATING OF MODELED OPTIONS

On Saturday morning, Mike Wilberg presented the range of options the Workgroup had identified and refined at its earlier meetings and pointed out changes that had been suggested at the July meeting. For each option the Workgroup rated its acceptability and support, discussed concerns and offered suggestions to the modelers. Options ratings with a **green shading** indicate 75% or more support. Options ratings with a **yellow shading** indicated between 50%-74% ratings. No shading indicates between 0-49% support.

A. REVIEW OF BASELINE MODEL OPTIONS

Model Option #1: Status quo (SQ) (5% non-compliance with size limit, 1% Sanctuary harvest).

A. Noncompliance rate value.

B. Bushel price used in model revised to the average value from buy tickets in recent years. (\$47.22)

1st Rating- Both A & B (100%, 4- 9, 3- 1, 2-0, 1-0

2nd Rating (100% (100%, 4- 10, 3-0, 2-0, 1-0

Workgroup Comments

- 3- price per bushel going out 25 years. Factor in an increase each year? Price now is \$52. *A: Model accounts for today's \$\$\$. Price includes inflation over time. Establish a higher bushel prices e.g. \$53? Rerun everything to see if multiple analyses would reveal anything. \$5 more per bushel. \$52.22. Keep \$47.22 as baseline and run additional set @\$52.22.*

B. MANAGEMENT AND REGULATION OPTIONS

1. ENFORCEMENT OPTIONS

Model Option #2: SQ with complete compliance with size, 1% Sanctuary harvest.

(Rating: 100% support- ratings 4-10, 3-0, 2-0, 1-0)

- *This option tries to see what happens if substantial increase in enforcement. Compliance with size limit in this option. Measuring catch...*

Model Option #3: Full compliance with the current size limit and sanctuary regulations.

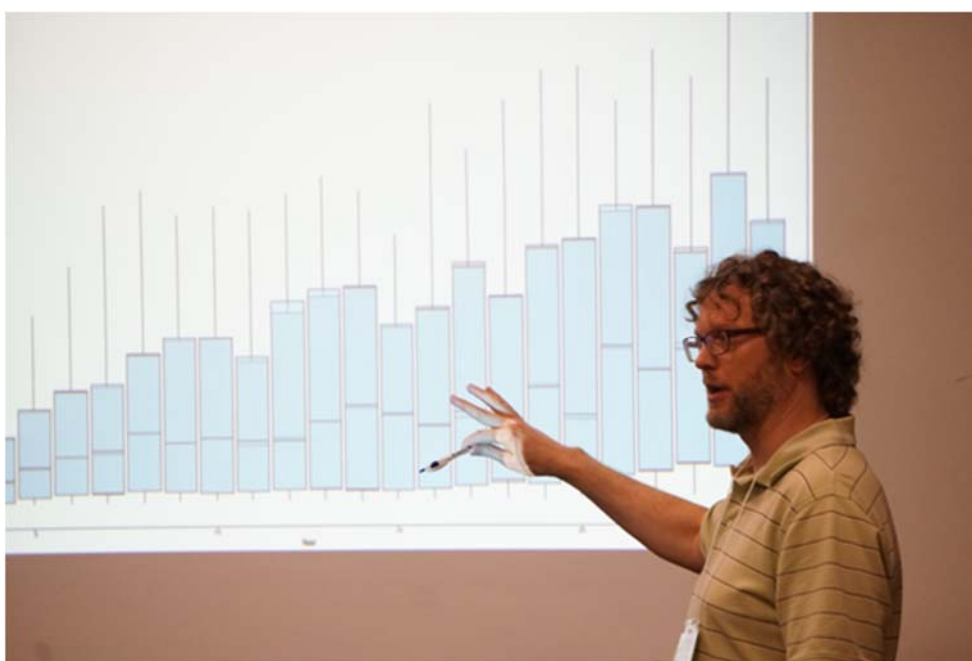
(100% support- ratings 4-8, 3-2, 2-0, 1-0)

- *This option tries to see what happens if substantial increase in enforcement- enforcement in sanctuary.*

2. ROTATIONAL HARVEST OPTIONS

Model Option 4: 2-yr rotation scenario with large areas (Broad Creek and Tred Avon switched) – just shell.

(20% support- ratings 4-0, 3-2, 2-4, 1-4)



Workgroup Comments

- *If accept, does this become a recommendation moving forward or an acceptability of the funding needed? A: Acceptable in concept right now. Will rate options at every meeting. Rate each on your current view. Suggest ways it could better address your concerns.*
- *Concern with lines on the map- 2 times as much first year, half as much 2nd year. Change the lines for the blue and green area acreage. Map shows 1 rotation is 1/2 the acreage.*
- *Long term- years where there is a funding issue. Will rotation be impacted? A: 4 options with big rotation areas. No option that doesn't include either shell or spat on shell. That is why the costs are so high. Could bring year 1 and 2 acres closer in line each other.*
- *Reservation about the size of the area- takes up oystering areas impacting current fishing. Different gear types involved. Could have 70% of the bottom not working. Not getting more but closing bottom.*

- Broad Creek is best natural reproductive area- biggest chunk for this option. Problems with the way these lines are cut.
- Rotational scenarios – none involve opening up new ground.
- Benefits from rotation will be in 3-4 years, not 2. May be able to present this if the areas are small not large.
- \$55 million/ \$13 million annual average, for this option. Looking at conceptually but is it worth our time process wise?



Model Option #5: 2-yr rotation scenario with large areas (Broad Creek and Tred Avon switched) – spat on shell.

(0% support- ratings 4-0, 3-0, 2-6, 1-4)

Workgroup Comments

- Same as Option 4 except spat on shell? *A: Yes*
- \$55 million annually for 25 years? *A: Yes*
- Not in the ballpark.
- If this ends up in recommendation to the agency. How will it be received? If we don't put it in, will we lose anything? Considered but the price tag was too high? In our report, say we considered, but not recommending as a plan going forward.
- Are the OysterFutures recommendations on management options going to the DNR or are we making recommendations for the model as a tool? *A: Could be both*
- Careful about judging the economics- will be an economic study that follows that may show the return on investment. E.g. the nitrogen credit in the future. Look at whether it produces oysters at this point first, vs. the costs.

Model Option #6: 2-yr rotation with large areas that includes Middle Choptank sanctuary – just shell.

(0% support- ratings 4-0, 3-0, 2-6, 1-4)

- This option Increases bottom. Adding shell in the off year.



Model Option #7: 2-yr rotation with large areas that includes Middle Choptank sanctuary – spat on shell.

(0% support- ratings 4-0, 3-0, 2-6, 1-4)

Model Option #8: 2-yr rotation in smaller areas (10-20% of least productive bars in each area, with annual costs of shell or spat on shell ~ \$2M) – just shell.

(1st Rating: 90% support- ratings 4-0, 3-9, 2-1, 1-0)

(2nd Rating: 100% support- ratings 4-0, 3-10, 2-0, 1-0)

- *Develop rotational areas- cost of shell \$2M a year. Might want to group close together. Because of the cost- had to select certain polygons. We can refine this and group them closer together. Vote with minor reservations. Could make it better by xx.*

Workgroup Comments

- Concerns about enforcement- small areas- would want to see if that can be addressed in a scenario.
- Not voting on exact locations- voting on that much area in this general region for this general cost.
- Why does abundance and harvest goes down in later years? *A: not sure why that is happening with the scenario.*

- Reservations about the model, questions and uncertainty and its impact on the watermen.
- Harvest a little bit higher; more oysters; bit more revenue. Ran 100 simulations for these options. This is similar to the status quo- in general. If did this 1000 times there would be less variability.
- How long will it take to have a mature model? *A: Current model is pretty mature. Better in quality than majority of models used to make fishery management decisions. Fisheries in general- harder than rocket science. Difficult time validating models for fisheries. Can't make this model better without major new data collection programs. There was no oyster model before this for Chesapeake Bay.*
- JD will change to a 3- on a “what if” basis.



Model Option #9: 2-yr rotation in smaller areas (10-20% of least productive bars in each area, with annual costs of shell or spat on shell ~ \$2M) – spat on shell.

(Rating: 90% support- ratings 4-0, 3-9, 2-1, 1-0)

- *Same regions, but smaller areas as previous; but has spat on shell- \$2M.*
- *Similar locations as in Option 8.*

11-11 Workgroup Comments

- Areas smaller since spat on shell is more expensive.
- Concern with 24 acres vs. 112 acres. 24 acres with a couple hundred boats- harvest derby problem. Watermen income for 5 days?
- Concept makes sense-will we prioritize these in recommendations.
- Shell vs. spat on shell? Look to do things that are more effective. Spend money on spat.
- # Licenses. 212. With 29 new licenses. Presents challenges.

- This would supplement the other places that are open. Still a plus for watermen. Not taking away from areas we currently have.
- Don't agree on spat on shell. Run numbers on Virginia seed on shell. 7 times cheaper.
- Enforcement will be a challenge on this idea.
- Bump it up by spreading the seed further? 125 acres thinner? *A: Yes, that can be modeled.*
- Going to have to put your shell down first. Will costs.
- Wouldn't work in Middle Choptank. Need spat on shell there. Broad Creek could use just shell.
- If we put down spat on 2-year rotation? Won't get harvest size oysters until 4th year. Will spat every 2 years kill/mortality to spat put down earlier. Inducing more mortality?
- Broad Creek option- model shells there? *A: 3 year options later- add shell in Lower Choptank.*
- Is it still be left up to shell committees of each County to steer where it will be going that will help resolve some of the issues here and focus the shells in the proper places.
- Maybe already reflected in the status quo.
- No discussion about changing the process. This is a tool to help County oyster shell committees.
- 1- concern with the limited acres

Model Option #10: 2-yr rotation in smaller areas (10-20% of least productive bars in each area, with annual costs of shell or spat on shell ~ \$600K) – just shell.

(Rating: 80% support- ratings 4-0, 3-8, 2-2, 1-0)

- *Smaller area option. \$600K annually.*

11-11 Workgroup Comments

- Less harvest than status quo? Area closures.
- 2- Way too little investment to consider.
- Bigger return for 2 million vs. 650. As abundance increases the returns get higher.
- 2- Acreage too small. Decrease harvest over the years is not good.
- Look at increasing overall abundance and harvest.
- Adults increase greater than the option 9. Gave us 3.
- Differences may have to do with the bars that were chosen.

Model Option #11: 2-yr rotation in smaller areas (10-20% of least productive bars in each area, with annual costs of shell or spat on shell ~ \$600K) – spat on shell.

(Rating: 80% support- ratings 4-0, 3-8, 2-1, 1-1)

Workgroup Comments

- *Similar to option 10. Areas smaller with spat on shell. 8 acres.*
- 3- stays within budget. Options benefit fishery and ecosystem. Very much like status quo
- 2- 33 acres total. With power dredging? Middle Choptank 8 acres? 600K and spread out.

- 1- size.

Model Option #12: 2-yr rotation in smaller areas & include Middle Chop sanctuary - just shell. \$2 million.

(Rating: 80% support- ratings 4-0, 3-8, 2-2, 1-0)

Workgroup Comments

- 2 year rotation. Include Middle Choptank in rotation. \$2 million. Can be moved.
- 2- negative in adult abundance.
- 2- that area doesn't produce- maximize in other areas that can provide the most benefit.

Model Option #13: 2-yr rotation in smaller areas & include Middle Chop sanctuary - spat on shell.

(Rating: 80% support- ratings 4-0, 3-8, 2-2, 1-0)

Workgroup Comments

- Similar to #12. Spat on shell more expensive and areas small.
- 2- Doesn't look like it helps much. Less variability in population size and N-removal.
- 2- same.
- Possible to do a run with spat in some and shell in others? *A: Yes*

Model Option#14: 2-yr rotation in smaller areas in Little Choptank tributaries – just shell every other year. @ \$700 annually, 170 acres.

(1st Rating: 90% support- ratings 4-4, 3-5, 2-1, 1-0)

(2nd Rating: 100% support- ratings 4-4, 3-6, 2-0, 1-0)

Workgroup Comments

- 2- Concern with enforcement issue. *A: One branch a blue and one all black to simplify enforcement.*
- 4- Little Choptank needs attention- hand tongs. Using spat on shells. Change to 3.
- Shell committees have local knowledge that should be used on this issue.
- Can the model help with location of spat to determine where to place shells? *A: Understanding abundance as a seed source could help. Upper Choptank- confident about predictions with lots of observations. Little Choptank fewer observations. Identify which bars are most connected with this region and present back next meeting.*
- *Use larval transport model but use local knowledge first.*

~~Option 15: 2-yr rotation in smaller areas in Little Choptank tributaries – spat on shell. just shell every other year.~~

Option #15a: 2-yr rotation in smaller areas in Little Choptank tributaries – spat on shell on the same areas as in Option 14. Model different spat densities and \$\$

(Rating: 100% support- ratings 4-5, 3-5, 2-0, 1-0)

Workgroup Comments

- *Similar with 14 but puts spat on shell in. Only areas available for harvest are the ones that are colored.*
- Green prongs- don't remain open in Option 15

- Model with rotating opening and closing the whole prong
- Mix of spat and shell? Use that strategy in figuring out how to maximize \$\$\$. Use local knowledge.
- Team go to the Dorchester Shell Committee to provide maps and get input on where.
- Will need to have a prong open for enforcement. Open each prong for a month to figure out what's on the bottom.
- DNR could do some survey work before adopting any rotation scheme.
- Work with watermen to do the surveys to make sure it is correct.
- Federal funding for getting watermen/shell committees into cooperative data gathering?
- How complicated is it to get a scale like 50% shell/ 50% spat? A: conceptually not complicated. However, it requires specific decisions on how best to implement this.



3. HABITAT MODIFICATION/RESTORATION OPTIONS

Model Option 16: Add shell to each bar every 3 years in the Lower Choptank (smaller areas so less than 2M every 3 years) (about 500 acres).

(November 2017 0% 4-0, 3-0, 2-8, 1-2)

Workgroup Comments after rating

- Fresh shell; fossil shell if available.
- Where are we getting all the shells?
- Not the most efficient use of the funding.
- Not a good place to put shells- lousy place for shells.

~~Option 17: Add shell to each bar every 3 years in the Lower Choptank, Middle Choptank and Broad Creek (smaller areas so less than 2M/650K per year, just under 500 acres).~~

Model Option 17a: Add shell to each bar every year –move all 4 sites to Broad Creek (smaller areas so less than 2M/650K per year, just under 500 acres). Work with the Talbot Co. Shell Committee

(November 2017 100% 4-6, 3-4, 2-0, 1-0)

Model Option 17b: Add spat on shell to each bar every year in Middle Choptank and work with Dorchester County Shell Committee (smaller areas so less than 2M/650K per year, just under 500 acres).

(November 2017 100% 4-6, 3-4, 2-0, 1-0)

Workgroup Comments after ratings

- Placement is the concern. 2 satisfactory areas. 2 Middle Choptank not good.
- Concern with putting shells on workable/live bottom in Broad Creek since it is productive.
- Can you put a little shell out every year vs. 3 years?
- Use the same bar but spread out in Middle Choptank.

Model Option 18: Open tributaries in the Little Choptank River to hand tonging, and provide added shell (every 3 years) (341 acres) (\$1.4 M)

(November 2017 90% 4-0, 3-9, 2-1, 1-0)

Workgroup Comments after Rating

- 2- long term- negative spat abundance, neg. seston removal, negative N-removal. Doesn't do well on eco-services.

Model Option 19: Implement Little Choptank and Tred Avon Restoration (6" substrate)

(November 2017 100% 4-3, 3-7, 2-0, 1-0)

Workgroup Comments

- On top of what has been done? *A: Yes, plus complete phase 2 of the plan.*
- Based on the previous plans.
- Utilize model to understand implications of what is on the table. Doing 100 acres less on the Choptank. For 19 and 20. Run the original.
- Run a 19a 20a. going forward? *A: We can do that*
- Dynamic, fluid issue- achieve restoration goals of 50%, decreasing the allowed buffer. Reducing 118 acres of original goal to reach 50% restoration goal. 15-22 acres needed. Looking at 118. Additional 20-40 acres for buffer. Will depend on surveys.
- Is there any difference between 6 and 12 inch?
- Modelers will decide if 6 and 12 inch.

Model Option 20: Implement Little Choptank and Tred Avon Restoration. (12" substrate)

(November 2017 1st Rating: 90% 4-4, 3-5, 2-1, 1-0)

(November 2017 2nd Rating: 100% 4-6, 3-4, 2-0, 1-0)

Workgroup Comments

- 2- Concern with the costs with little extra benefit?
- 4- maximizes and has highest return on investment on higher median vs. status quo. Abundance, harvest, nitrogen, etc.

Model Option 21: Make reefs in the current shellfish closure areas in the Middle Choptank region (6-inch substrate). (\$2M) (41 acres)

(November 2017 10% 4-0, 3-1, 2-8, 1-0)

Workgroup Comments

- 1- 6 inches of shell- waste of \$2M without spat.

Model Option 22: Make reefs in the current shellfish closure areas in the Middle Choptank region (6 inch with spat) (29 acres) (1 time \$2M) (144K annually over 25 years)

(November 2017 40% 4-0, 3-4, 2-6, 1-0)

Workgroup Comments

- Strong return
- Work done previously on the area? *A: Not sure. Not aware of any.*
- Looks better than one before, but other options are more cost effective.

Model Option 23: Place reefballs in the current shellfish closure areas in the Middle Choptank region (reef balls, 1 foot apart) (2 acres) (1 time \$2M)

(November 2017 60% 4-0, 3-6, 2-4, 1-0)

Model Option 23a: Place reefballs (placed near/around the bridge, channel markers, etc.?) in the Middle Choptank region (reef balls, 1 foot apart, 1 time \$2M) not in conflict with fishing activities. Work with watermen for placement options.

(November 2017 100% 4-8, 3-2, 2-0, 1-0)

Workgroup Comments

- Watermen concerns: Any trot lining. Zero harvest off it.
- Once reefballs in becomes unusable for watermen.
- Put reefballs around the bridge. Won't affect any watermen. Create more habitat.
- *Didn't have a polygon by the bridge. Can put one in the model going forward (phase 2).*
- This might be a non-modeled option. Model gives you some performance information.
- Also put around channel markers, tripod markers.
- 700 reefballs already at the bridge. Placed in stripes to allow fishing. Planted on both sides of the channel on or near the bridge.
- Reefballs- put in, counted like a pile of shells with same shape as a reefball.
- Concerned about crab harvest vs. oyster harvest. Conflict with blue crab fishing activities. Trot lining a big issue.
- Is the value of trot lining in the area more than the longer terms value of reefballs.

- See value of stone if not piled too high, to save the shell.
- Reconvening conversation- on stone, shell, reef balls.
- Reef balls- can be put in areas otherwise marginal for shell or possible stone. Opportunity. Don't have to put on shell or hard bottom. Put around places, a little higher, don't dissolve as quickly. Need to place them in a good place to be effective.
- Taking trot line grounds is a controversy and challenge now.
- Pile of corn when deer hunting. Look at things from every angle and everyone's ideas for the future of the entire industry.
- You can be very precise in placement of reefballs to not impact trot lines.
- Funding sources for this option. CCA CBF, foundation, membership donations- for these.

Model Option 24: Make reefs in the current shellfish closure areas in the Middle Choptank region (reef balls, 3 feet apart).

(November 2017 100% 4-0, 3-10, 2-0, 1-0)

Model Option 24a: Place reefballs (placed near/around the bridge, channel markers, etc.) in the Middle Choptank region (reef balls, 3 feet apart, 1 time \$2M) not in conflict with fishing activities. Work with watermen for placement options.

(November 2017 100% 4-0, 3-10, 2-0, 1-0)

4. STOCKING

Model Option 25: Add spat to each bar every 3 years in the Lower Choptank (smaller areas so less than 2M).

(November 2017 0% 4-0, 3-0, 2-10, 1-0)

Workgroup Comments

- 2- Lower Choptank lousy place to put spat.
- 2- Not a good use of funds.

~~Model Option 26: Add spat to each bar every 3 years in the Lower Choptank, Middle Choptank and Broad Creek (smaller areas so less than 2M).~~

(November 2017 0% 4-0, 3-0, 2-10, 1-0)

Model Option 26a: Add spat to each bar every year in the Middle Choptank (smaller areas so less than 2M). (100 acres)

(November 2017 100% 4-3, 3-7, 2-0, 1-0)

Workgroup Comments

- Consider doing the same with shell plantings. Eliminate Broad Creek and Lower Choptank
- 26a- same acres? One spot currently circled. M
- Majority on Turtle Back,
- Ask shell committee-
- Every year

5. OTHER ADDITIONAL OPTIONS OR COMBINATIONS

Workgroup Comments

- Nitrogen credits- future strategy regarding certain activities that can get the most nitrogen removal.
- Jurisdictional- TMDLs- smaller reach vs. the entire Bay.
- Harris Creek- aligning with the amount of bio-mass.
- Legislative changes for nutrient trading- probably will start with the agricultural side in MD.
- Restoration plans moving forward in the next 2 years.
- Completing Little Choptank restoration and open up prongs. Feedback to areas.
- Finish the Tred Avon, Broad Creek and Middle Choptank.
- Couple for Little Choptank and couple for the Choptank.

6. SUPPORT FOR MODEL COMPONENTS

The facilitator noted that at the end of the November 2016, March and July 2017 meetings, the Workgroup members used an acceptability rating for each of the model components to gauge the Workgroup's understanding and support for the work being done on each. He asked the Workgroup to rate the components based on the review and refinements promised at this meeting and offer any concluding observations or suggestions. The Workgroup expresses satisfaction and support for the following model components: Habitat Model 1; Habitat 2- Habitat Coding- Lower Choptank; Fishery/Effort Dynamics; and Economics.

IV. NEXT STEPS

The Workgroup discussed the meeting schedule and agreed to schedule 3 more meetings in 2018 tentatively set for January 5-6, February 16-17 and March 23-24 in order to reach consensus on the Workgroup recommendations to DNR and complete the Phase I activities.

Elizabeth North reported that the videos of the presentations at the OysterFutures Sea Grant Symposium in October 2016 were still in progress and would be posted soon. She also recounted that workgroup members decided at the last meeting to delay discussion of the communications strategy of the results of stakeholder deliberations and recommendations until later in the process.

Workgroup members were asked to comment on the meeting by completing meeting evaluations (*see Appendix #3*). The meeting adjourned at 3:45 p.m. on Saturday afternoon.

**Appendix #1 Workgroup Meeting VI Agenda
November 10-11, 2017**

OYSTER FUTURES WORKGROUP MEETING VI FRIDAY – SATURDAY, NOVEMBER 10 - 11, 2017 Horn Point Laboratory—AREL Conference Room 2020 Horns Point Road—Cambridge, Maryland		
WORKGROUP MEETING OBJECTIVES		
<ul style="list-style-type: none"> ✓ To Approve Agenda and Meeting V Summary Report ✓ To Receive Update, Discuss and Provide Feedback Regarding Development of the Oyster Futures Modeling Tool ✓ To Receive Results of New and Revised Options Evaluated by Oyster Futures Model ✓ To Evaluate the Level of Acceptability of the Results of Options Modeled Relative to Project Goals and Consistency With Performance Measures ✓ To Identify, Discuss and Acceptability Rate Additional Options or Performance to be Modeled ✓ To Receive a Briefing and Discuss Draft Outline of Workgroup Report and Recommendations ✓ To Identify Needed Next Steps, Information Needs, and Agenda Items for Next Meeting 		
MEETING AGENDA DAY ONE—FRIDAY, NOVEMBER 10, 2017		
<i>All Agenda Times—Including Adjournment—Are Approximate and Subject to Change</i>		
	1:30 PM	LATE LUNCH AND SOCIAL SCIENCE STUDY SURVEY (ON CAMPUS)
1.)	2:00 PM	WELCOME AND INTRODUCTIONS
2.)	2:10 PM	AGENDA REVIEW AND APPROVAL
3.)	2:15 PM	APPROVAL OF FACILITATOR’S SUMMARY REPORT (July 22 - 23, 2017)
4.)	2:20 PM	UPDATE, DISCUSSION AND FEEDBACK REGARDING THE DEVELOPMENT OF THE OYSTER FUTURES MODELING TOOL (Population and Fishery Dynamics Model, Economics Model, and Water Quality Model)
	~4:00 PM	BREAK
5.)	4:15 PM	OVERVIEW AND DISCUSSION OF RESULTS OF OPTIONS MODELED
6.)	6:25 PM	SUMMARY OF DAY ONE AND REVIEW OF DAY TWO AGENDA
7.)	~6:30 PM	RECESS AND INFORMAL SOCIAL WITH DINNER (ON CAMPUS)
MEETING AGENDA DAY TWO—SATURDAY, NOVEMBER 11, 2017		
<i>All Agenda Times—Including Adjournment—Are Approximate and Subject to Change</i>		
	8:30 AM	BREAKFAST (ON CAMPUS)
8.)	9:00 AM	WELCOME
9.)	9:05 AM	DISCUSSION, EVALUATION AND ACCEPTABILITY RATING OF MODELED OPTIONS RELATIVE TO PERFORMANCE MEASURES AND PROJECT GOALS
	~10:15 AM	BREAK
9.)	10:30 AM	EVALUATION AND ACCEPTABILITY RATING OF MODELED OPTIONS RELATIVE TO PERFORMANCE MEASURES AND PROJECT GOALS—CONTINUED
	~12:30 PM	LUNCH (ON CAMPUS)
10.)	1:00 PM	IDENTIFICATION AND ACCEPTABILITY RATING OF NEW OPTIONS AND PERFORMANCE MEASURES, AS NEEDED
	~2:40 PM	BREAK—CONCURRENT WITH SOCIAL SCIENCE STUDY SURVEY
11.)	3:00 PM	ACCEPTABILITY RATING OF MODEL COMPONENTS, AS RELEVANT
12.)	3:15 PM	OVERVIEW AND DISCUSSION OF DRAFT OUTLINE OF WORKGROUP REPORT AND RECOMMENDATIONS
13.)	3:45 PM	UPDATE ON COMMUNICATION STRATEGY AND ACTIONS FOR THE PROJECT
14.)	3:55 PM	NEXT STEPS: AGENDA ITEMS AND INFORMATION FOR THE NEXT MEETING <ul style="list-style-type: none"> • Review action items and assignments • Identify agenda items and any needed information for next meeting
15.)	~4:00 PM	ADJOURN

Appendix #2 Workgroup & Research Team Membership & Participation

WORKGROUP MEMBERSHIP PARTICIPATION- FRIDAY, NOVEMBER 10, 2017

MEMBER <i>(BOLD= PRESENT)</i>	AFFILIATION
WATERMAN	
J.D. Buchanan	Preston, MD, Caroline County, Talbot County Waterman
Robbie Casho	St. Michaels, MD, Dorchester County Waterman
Jeff Harrison	Tilghman, MD, Talbot County, President Talbot Waterman's Association
Gregory Kemp	McDaniel, MD, Talbot County, Vice President Talbot Waterman's Association
Cody Paul	Church Creek, MD, Dorchester County Commercial Oyster Committee Chair
<i>Bobby Whaples</i>	Vienna, MD, Dorchester County Waterman
AQUACULTURE	
<i>Bobby Leonard/MJ Dubois, Alternate</i>	Tred Avon Treats, Ruff-N-Ready, LLC.
Johnny Shockley	Hoopers Island Oyster Aquaculture Co.
SEAFOOD BUYERS	
<i>Aubrey Vincent</i>	Lindy's Seafood
ENVIRONMENTAL CITIZEN GROUPS	
Kelly Cox	Phillips Wharf Environmental Center
Allison Colden	Chesapeake Bay Foundation
<i>Joe Febrer</i>	The Nature Conservancy
RECREATIONAL FISHING GROUP	
David Sikorski	Coastal Conservation Association (CCA)
MARYLAND DEPARTMENT OF NATURAL RESOURCES	
Dave Blazer	Maryland Department of Natural Resources
OYSTER RECOVERY PARTNERSHIP	
Ward Slacum	Oyster Recovery Partnership
FEDERAL AGENCY	
Stephanie Westby	National Oceanic and Atmospheric Administration (NOAA)

PROJECT SCIENTISTS AND FACILITATORS	
NAME	AFFILIATION
UNIVERSITY OF MARYLAND CENTER FOR ENVIRONMENTAL SCIENCE	
Elizabeth North	Fisheries Scientist
Jeffery Cornwell	Estuarine Biogeochemist
Raleigh Hood	Biological Oceanographer
<i>Thomas Miller</i>	Fisheries Ecologist
Lisa Wainger/Chris Hayes	Environmental Economist (Social Scientist)
Michael Wilberg	Fisheries Scientist
VIRGINIA INSTITUTE OF MARINE SCIENCE	
<i>Troy Hartley</i>	Environmental and Natural Resource Policy (Social Scientist)
FCRC CONSENSUS CENTER, FLORIDA STATE UNIVERSITY	
Jeff Blair	Workgroup Facilitator
Robert Jones	Workgroup Facilitator

WORKGROUP MEMBERSHIP PARTICIPATION- SATURDAY NOVEMBER 11, 2017

MEMBER <i>(BOLD= PRESENT)</i>	AFFILIATION
WATERMAN	
J.D. Buchanan	Preston, MD, Caroline County, Talbot County Waterman
Robbie Casho	St. Michaels, MD, Dorchester County Waterman
Jeff Harrison	Tilghman, MD, Talbot County, President Talbot Waterman's Association
Gregory Kemp	McDaniel, MD, Talbot County, Vice President Talbot Waterman's Association
<i>Cody Paul</i>	Church Creek, MD, Dorchester County Commercial Oyster Committee Chair
<i>Bobby Whaples</i>	Vienna, MD, Dorchester County Waterman
AQUACULTURE	
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Johnny Shockley	Hoopers Island Oyster Aquaculture Co.
SEAFOOD BUYERS	
<i>Aubrey Vincent</i>	Lindy's Seafood
ENVIRONMENTAL CITIZEN GROUPS	
Kelly Cox	Phillips Wharf Environmental Center
Allison Colden	Chesapeake Bay Foundation
Joe Fehrer	The Nature Conservancy
RECREATIONAL FISHING GROUP	
David Sikorski	Coastal Conservation Association (CCA)
MARYLAND DEPARTMENT OF NATURAL RESOURCES	
Dave Blazer/Chris Judy	Maryland Department of Natural Resources
OYSTER RECOVERY PARTNERSHIP	
Ward Slacum	Oyster Recovery Partnership
FEDERAL AGENCY	
Stephanie Westby	National Oceanic and Atmospheric Administration (NOAA)
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Lisa Wainger	Environmental Economist (Social Scientist)
Michael Wilberg	Fisheries Scientist
VIRGINIA INSTITUTE OF MARINE SCIENCE	
<i>Troy Hartley</i>	Environmental and Natural Resource Policy (Social Scientist)
FCRC CONSENSUS CENTER, FLORIDA STATE UNIVERSITY	
Jeff Blair	Workgroup Facilitator
Robert Jones	Workgroup Facilitator

Appendix #3 Workgroup Meeting Evaluation Summary

<p>OYSTER FUTURES WORKGROUP NOVEMBER 11-12, 2017—CAMBRIDGE, MARYLAND MEETING EVALUATION SUMMARY</p>
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Workgroup members used a 0 to 10 Rating Scale Where a 0 meant Totally Disagree and a 10 meant Totally Agree. The average ranking for each statement and comments of the 10 evaluations received are noted below.

1. Please assess the overall meeting.

- 9.4 ___ The background information was very useful.
- 9.4 ___ The agenda packet was very useful.
- 9.4 ___ The objectives for the meeting were stated at the outset.
- 9.4 ___ Overall, the objectives of the meeting were fully achieved.

2. Do you agree that each of the following meeting objectives was achieved?

- 9.4 ___ Update and Feedback Regarding Development of the Oyster Futures Modeling Tool.
- 9.5 ___ Discussion of Results of New and Revised Options Evaluated by the Oyster Futures Model.
- 9.7 ___ Acceptability Rating of Options Modeled Relative to Project Goals and Performance Measures.
- 9.6 ___ Identification and Evaluation of Any Additional Options and/or Performance Measures.
- 9.6 ___ Briefing and Discussion of Draft Outline of Workgroup Report and Recommendations.
- 9.7 ___ Review of Next Steps and Agenda Items for the Next Meeting.

3. Please tell us how well the Facilitator helped the participants engage in the meeting.

- 9.7 ___ The members followed the direction of the Facilitator.
- 9.7 ___ The Facilitator made sure the concerns of all members were heard.
- 9.7 ___ The Facilitator helped us arrange our time well.
- 9.6 ___ Participant input was documented accurately in Facilitator's Summary Report (last meeting).

4. Please tell us your level of satisfaction with the meeting?

- 9.7 ___ Overall, I am very satisfied with the meeting.
- 9.9 ___ I was very satisfied with the services provided by the Facilitator.
- 9.7 ___ I am satisfied with the outcome of the meeting.

5. Please tell us how well the next steps were communicated?

- 9.8 ___ I know what the next steps following this meeting will be.
- 10 ___ I know who is responsible for the next steps.

6. What did you like best about the meeting?

- Dialogue among stakeholders
- Things are coming together
- Collaborative discussion on stone/reef balls.
- Very civil
- The useful discussions
- Very productive!
- Great job! There was a lot of confusing information but the Team did well to explain all the details to an understandable level. Very patient.
- The organization and food
- The people

7. **How could the meeting have been improved?**

- None
- No improvements
- Not sure was good.
- A full bar with dinner.
- Faster

Appendix #4 Oyster Futures Workgroup Purpose, Goal and Project Summary



STATEMENT OF PURPOSE. The goal of Oyster Futures is to develop recommendations for oyster policies and management that meet the needs of industry, citizen, and government stakeholders in the Choptank and Little Choptank Rivers.

With funding from the National Science Foundation, we will hold a series of workgroup meetings with a representative group of stakeholders. Through these meetings, the stakeholders will produce a collective vision for the future of oysters in this region and build consensus on policy and regulatory options which will be informed by stakeholder and scientific knowledge and by the joint development and use of a modeling tool. The Maryland Department of Natural Resources has agreed to evaluate the consensus recommendations that result.

The stakeholders participating on the workgroup will be representatives from the key interest groups that affect and are affected by the oyster fishery. Researchers from the University of Maryland Center for Environmental Science and the Virginia Institute of Marine Science will serve as consultants to the stakeholders. Professional independent facilitators with experience in fisheries issues will convene the stakeholder meetings. The facilitators will ensure that a consensus-based approach which includes the input of diverse stakeholders is used to develop the collective vision and recommended actions for a sustainable and profitable future for the oyster industry in the Choptank and Little Choptank Rivers.

WORKGROUP'S ADOPTED GOAL STATEMENT: (*Adopted Unanimously February 26, 2016*) The goal of the Oyster Futures Workgroup is to develop a package of consensus recommendations informed by a model collaboratively developed by the Workgroup and the Oyster Futures project research team. The model will be designed so that it can be used to evaluate oyster fishery practice and management options and restoration policies in the Choptank and Little Choptank Rivers. The Workgroup's recommendations will be directed to Secretary Mark Belton of the Maryland Department of Natural Resources. The project's ultimate goal is to ensure that the regulation and management of the oyster fishery, and oyster restoration policies are informed by the best available science and shared stakeholder stewardship values, resulting in an economically viable, healthy and sustainable Choptank and Little Choptank Rivers oyster fishery and ecosystem.

PROJECT SUMMARY. Achieving effective natural resource management is challenging because of the multiple and often competing objectives of different stakeholder groups, a limited set of policy options, and uncertainty in the performance of those options. Yet, managers need policies that allow continued use of natural resources while ensuring access for future generations and maintenance of ecosystem services. Formal approaches are needed that will assist managers and stakeholders in choosing policy options that have a high likelihood of achieving social, ecological, and economic goals. The goal of this project, Oyster Futures, is to address this need by improving the use of predictive models to support sustainable natural resource policy and management. A stakeholder-centered process will be used to build an integrated model that combines estuarine physics, oyster life history, and the ecosystem services that oysters provide (e.g., harvest, water quality) to forecast outcomes under alternative management strategies. Through a series of facilitated meetings, stakeholders will participate in a science-based collaborative process which will allow them to project how well policies are expected to meet their objectives using the integrated model. This iterative process will ensure that the model will incorporate the complex human uses of the ecosystem as well as focus on the outcomes most important to the stakeholders. In addition, a study of the socioeconomic drivers of stakeholder involvement, information flow, use and influence, and policy formation will be undertaken to improve the process, enhance implementation success of recommended policies, and provide new ideas for integrating natural and social sciences, and scientists, in sustainable resource management. In this presentation, the strategy for integrating natural system models, stakeholder views, and sociological studies as well as methods for selecting stakeholders and facilitating stakeholder meetings will be described and discussed.

Appendix #5 Oyster Futures Project Schedule

OYSTER FUTURES WORKGROUP MEETING SCHEDULE		
PHASE I MEETING SCHEDULE—2016 AND 2018		
I.	February 26 - 27, 2016	Horn Point Laboratory
II.	April 30 – May 1, 2016	Horn Point Laboratory
--	October 23, 2016 (<i>Oyster Symposium</i>)	St. Michael’s Maritime Museum
III.	November 5 - 6, 2016	Horn Point Laboratory
IV.	March 24 – 25, 2017	Horn Point Laboratory
V.	July 22 – 23, 2017 (Management Options)	Horn Point Laboratory
VI.	November 10 -11, 2017 (Management Options)	Horn Point Laboratory
VII.	January 5-6, 2018	Horn Point Laboratory
VIII.	February 16-17, 2018	Horn Point Laboratory
PHASE II LONG TERM IMPACTS		
IX.	March 23-24, 2018	Horn Point Laboratory

PROJECT WEBPAGE (URL): <https://OysterFutures.wordpress.com/>

PROCESS DESIGN AND PROJECT FACILITATION: Process design and meeting facilitation by Jeff Blair and Bob Jones from the FCRC Consensus Center at Florida State University. Information at: <http://consensus.fsu.edu/>



Appendix #6
OYSTER FUTURES WORKGROUP
DRAFT OUTLINE OF FINAL REPORT AND RECOMMENDATIONS
NOVEMBER 10 - 11, 2017

Executive Summary

I. CONTEXT FOR OYSTER FUTURES PROJECT

- A. Oyster Futures Statement of Purpose and Research Project Description

II. DESCRIPTION OF THE OYSTER FUTURES CONSENSUS BUILDING PROCESS

- A. Description of the Consensus Building Process
B. Workgroup's Adopted Goal Statement, Guiding Principles, and Vision Themes
C. Stakeholder's Collaboration in the Development of the Modeling Tool

Comments on Section II.

- Conclusions about “social outcomes” of the group- collaboration? Taylor's work?
- Discussion- testimonials about the process. In addition to the recommendations.
- Recommendation on the collaboration process as a better way to make management decisions.

III. OVERVIEW OF MODEL COMPONENTS

- A. Oyster Populations Model- Reproduction & Larval Transport; Mortality; Growth
B. Habitat and Habitat Coding
C. Fishery Effort/Dynamics
D. Economics
E. Ecosystem Services: Water Quality (*light availability and seston removal*) and Nitrogen Removal

IV. MODELED MANAGEMENT AND REGULATION RECOMMENDATIONS TO MARYLAND DNR

- A. Performance Measures and Baseline Assumptions
B. Options Development
C. Enforcement Options and Recommendations
D. Rotational Harvest and Recommendations
E. Habitat Restoration/Modifications Options and Recommendations
F. Stocking Options and Recommendations
G. Limited Entry Options and Recommendations
H. Use of an Assessment of Population – Recommendations

V. RECOMMENDATIONS FOR OPTIONS NOT MODELED

- A. Regulations related to Specific Gear Options and Recommendations
B. Fee and Tax Options and Recommendations
C. Disease Options and Recommendations
D. Best Business and Marketing Practices Options and Recommendations
E. Ongoing Collaboration Options and Recommendations
F. Oyster Futures Education Options and Recommendations

Member Comments on Section V.

- Section V- Options not modeled? How much detail in that section?
- E.g. electronic maps used in gps- showing all regulated areas.
- E.g. increase enforcement. Education programs.
- 14-15 of the Worksheet-

VI. CONCLUSIONS AND NEXT STEPS

APPENDICES

- A. Workgroup and Research Team Members
- B. Meeting Schedule and Summary and Overview of Meetings