The OysterFutures Stakeholder Consensus-Building Process

Jeff A. Blair and Robert M. Jones

Presented to the ABSI CAB March 11, 2020

FCRC CONSENSUS CENTER

FLORIDA STATE UNIVERSITY

FACILITATED SOLUTIONS

Research Team

Jeff Blair, Robert Jones, Elizabeth North, Michael Wilberg, Jeffrey Cornwell, Troy Hartley, Raleigh Hood, Lisa Wainger, Rasika Gawde, Chris Hayes, Melanie Jackson, Taylor Goelz, Matthew Damiano, Dylan Taillie, Emily Nastase

University of Maryland
Center for Environmental Science

FCRC Consensus Center

VIMS | William & Mary
Virginia Institute of Marine Science

Oyster Futures

Objective: test the *Consensus Solutions* process for developing fishing regulations and restoration policies.

Study Site: Choptank and Little Choptank Rivers in the Maryland Chesapeake Bay.

Approach: Facilitated process to promote consensus decision-making with modeling to forecast potential effects of decisions.

Integrating Stakeholder Objectives With Natural System Models

Project Premises:

- Natural resources can be better sustained by policies developed cooperatively among all affected stakeholders, scientists, and government representatives.
- A systematic approach for conducting collaborative policy development that is grounded in sound science is needed.
- We used the oyster fishery in Chesapeake Bay as a test case to study and improve this approach.

Integrating Stakeholder Objectives With Natural System Models

Project Goal:

- 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 of the Maryland Chesapeake Bay.

At the beginning...

OysterFutures Stakeholders
February 27, 2016

Their goal: an economically viable, healthy and sustainable Choptank and Little Choptank Rivers oyster fishery and ecosystem

… and at the end

March, 2018

The Entire Team

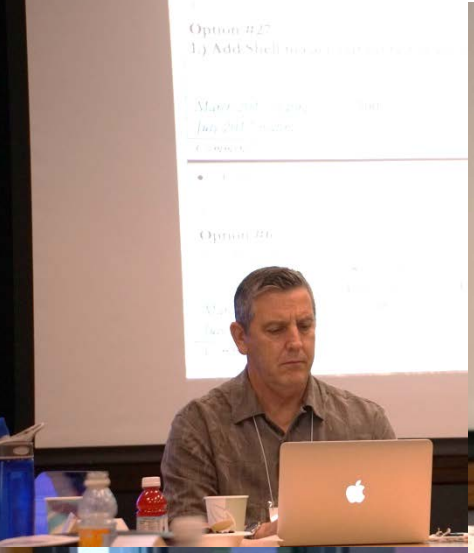
Stakeholders, Scientists, and Facilitators

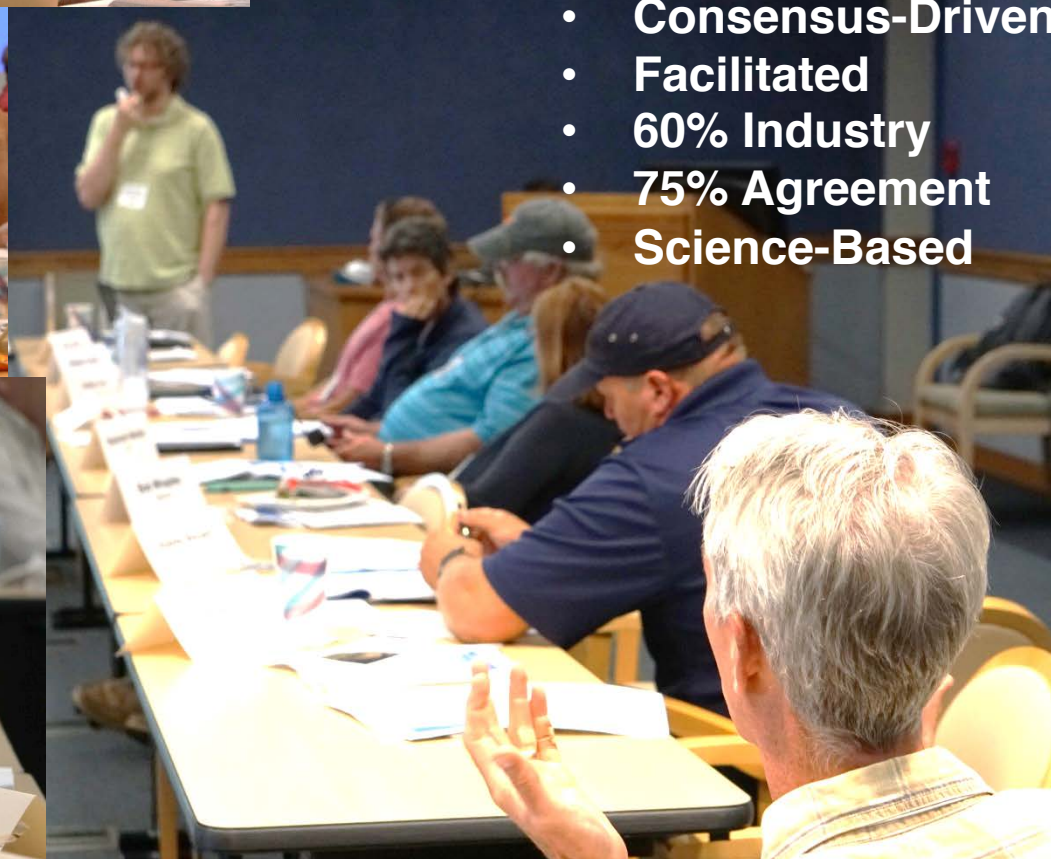
OysterFutures Stakeholders

Sixteen Stakeholders Representing:

- Waterman (6)
- Aquaculture (2)
- Seafood Buyers (1)
- Environmental Citizen Groups (3)
- Recreational Fishing Groups (1)
- State Agency–Maryland Department of Natural Resources (1)
- Oyster Recovery Partnership (1)
- Federal Agency–NOAA (1)

Listening, Thinking, Working Together





Key Points

- Consensus-Driven
- Facilitated
- 60% Industry
- 75% Agreement
- Science-Based

WORKGROUP PROCESS

1. Workgroup members identified and agreed to key issues, and identified and acceptability rated a full suite of options for each key issue.
2. Workgroup members identified & agreed to performance measures.
3. ≥75% in favor threshold required for consensus recommendations for options and performance measures.
4. Iterative process allowing stakeholders the flexibility to make changes based on model simulation results.

WORKGROUP PROCESS

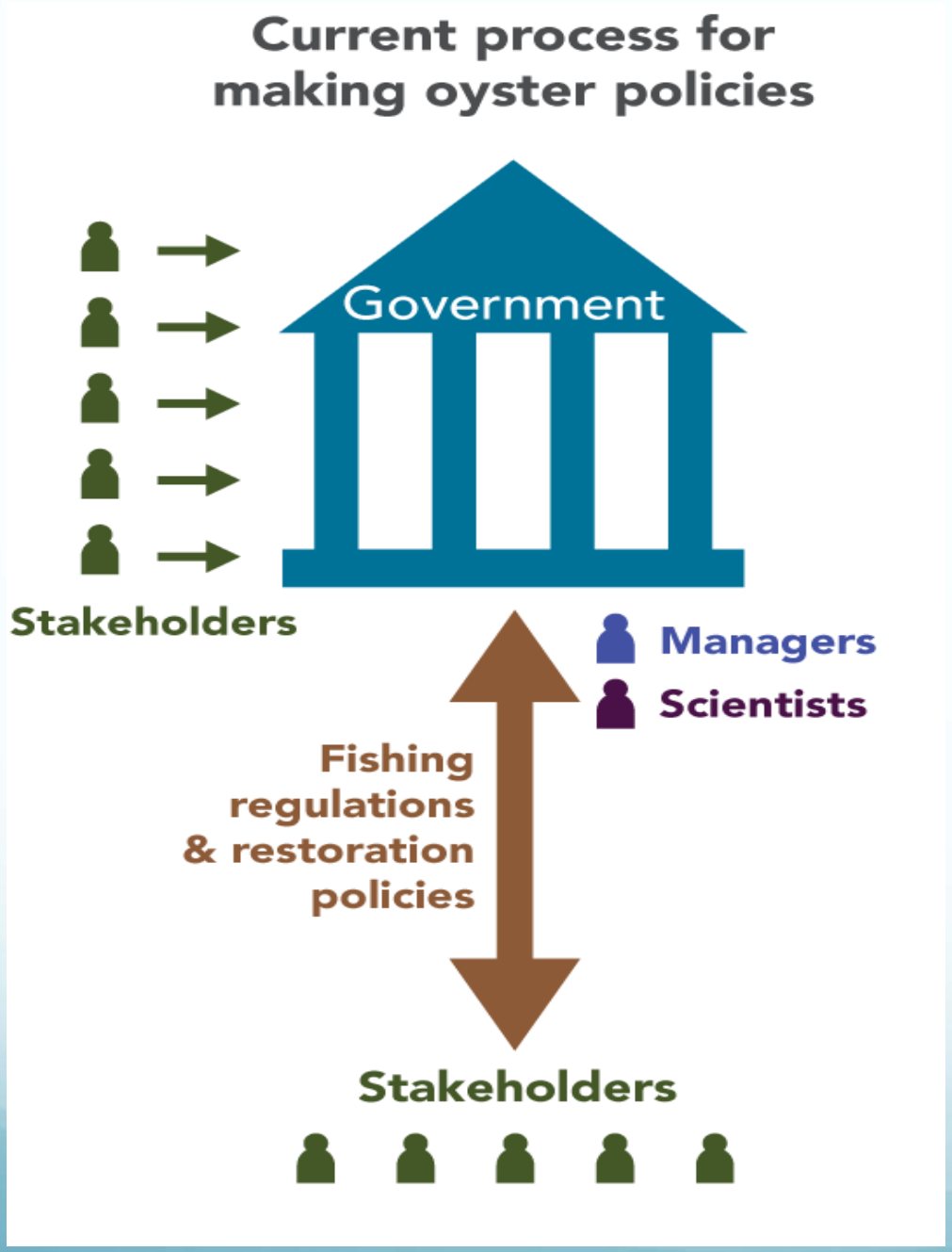
5. Evaluating options in the context of trusted science, built trust and a desire to work collaboratively to meet the needs of all stakeholders.
6. Science presented in a sensible and understandable format, including data gaps, assumptions and uncertainty.
7. All options, ratings, and comments are compiled and available through the entire process.
8. No decision is final until the vote on the consensus package of recommendations during the final meeting.

E.g. Decision Making-Economics

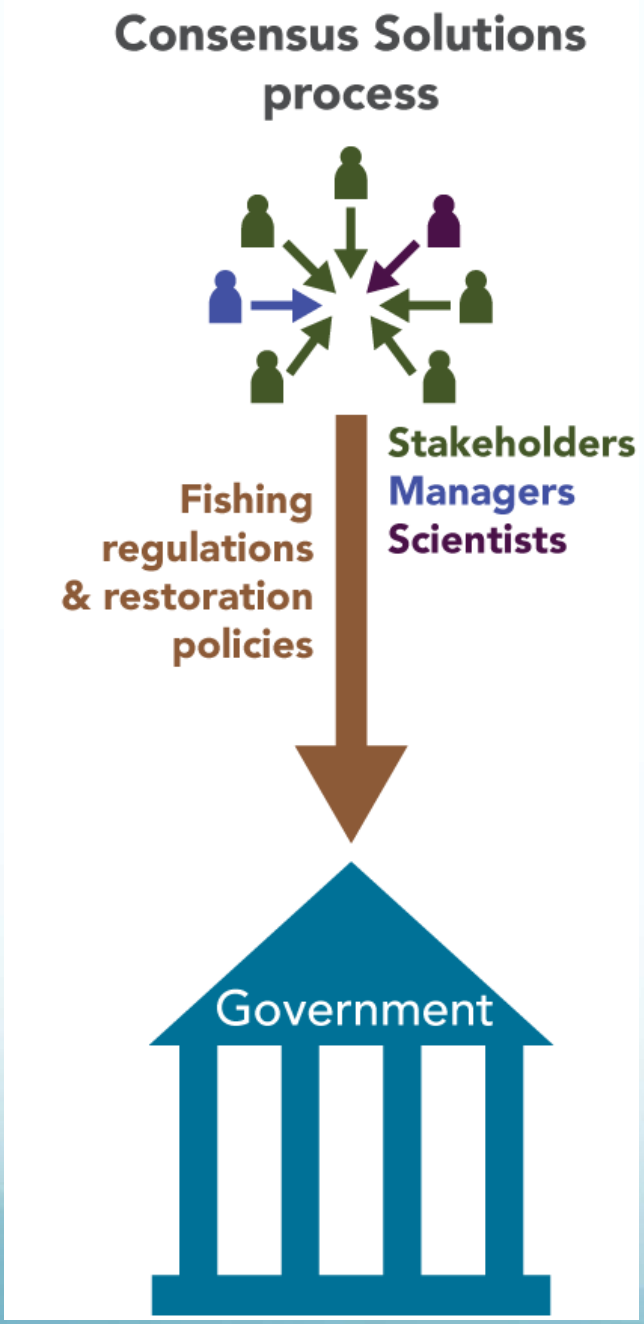
Economics	SUPPORT LEVEL (%)	*4—Acceptable*	*3—Minor Reservations*	*2—Major Reservations*	*1—Not Acceptable*
July 2017 Rating	**100%**	**7**	**3**	**0**	**0**
March 2017 Rating	**100%**	**7**	**4**	**2**	**0**
Nov. 2016 Rating	**100%**	**3**	**7**	**3**	**0**

Workgroup member comments before rating:

- Tried to incorporate economic dynamics into the model. Levels of harvest corresponding with profitability 5-8 bushels a day depending on gear type. “profitable oysters”
- Bushel price? A: Using data from the last completed fishing season.



Oyster Futures

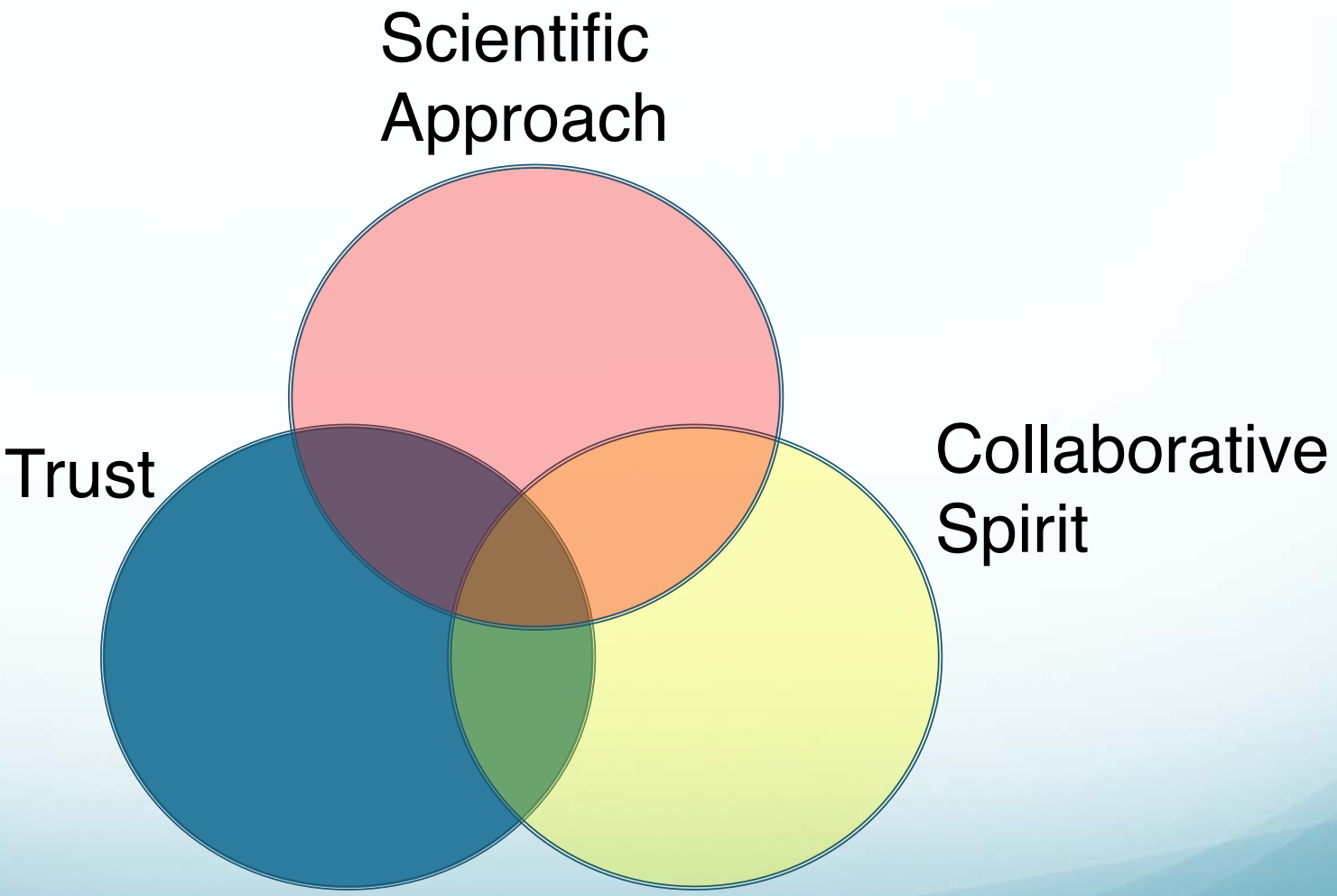


The Consensus Solutions process is designed to be:

- Fair
- Transparent
- Powerful
- Representative

It provides a respectful place for people to speak their truth to power and to each other.

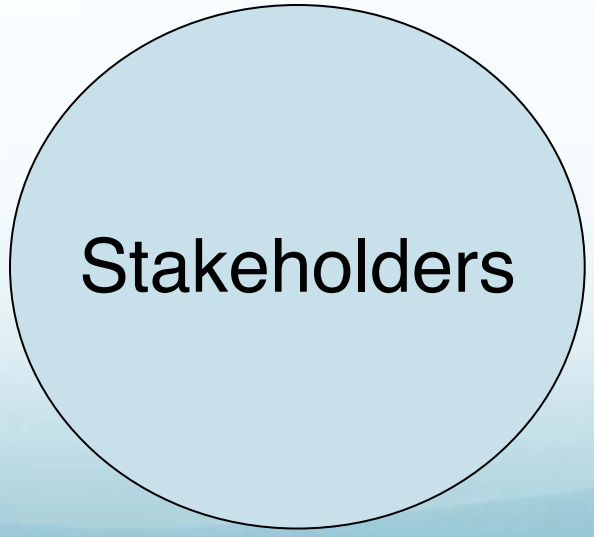
The Ingredients



Stakeholder-Centered Approach To Developing Management and Restoration Plans

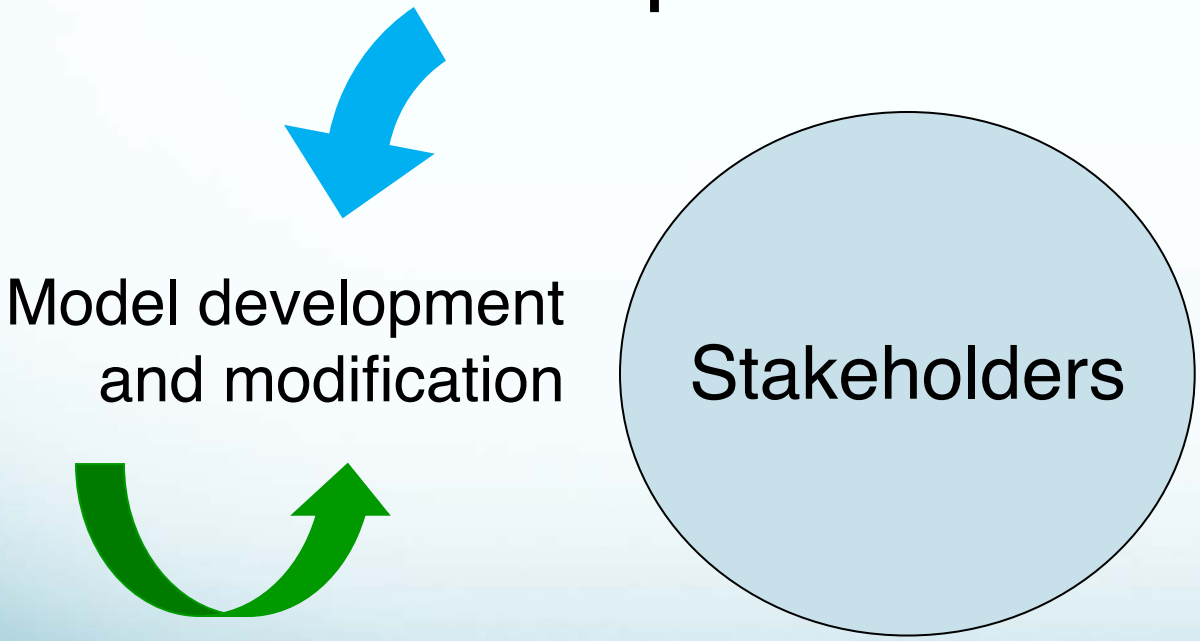
How did the process work?

Stakeholders propose objectives, options, and performance measures

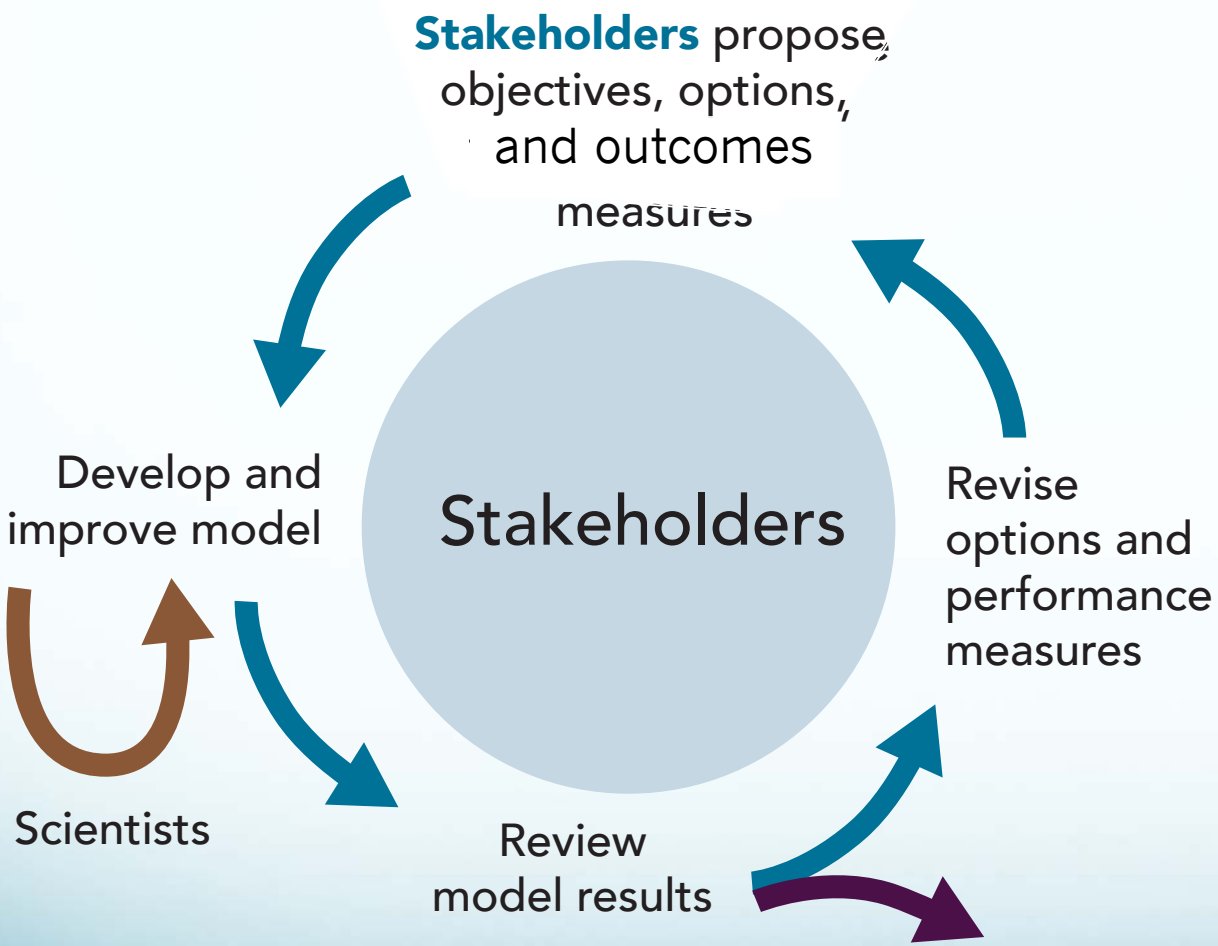


STAKEHOLDER-CENTERED APPROACH

Stakeholders propose
objectives, options,
and performance measures



Stakeholders are at the center of the *Consensus Solutions* process



Options with >75% agreement advance to package of recommendations

Stakeholders are at the center of the *Consensus Solutions* process

Stakeholders propose objectives, options, and performance measures

Develop and improve model

Stakeholders

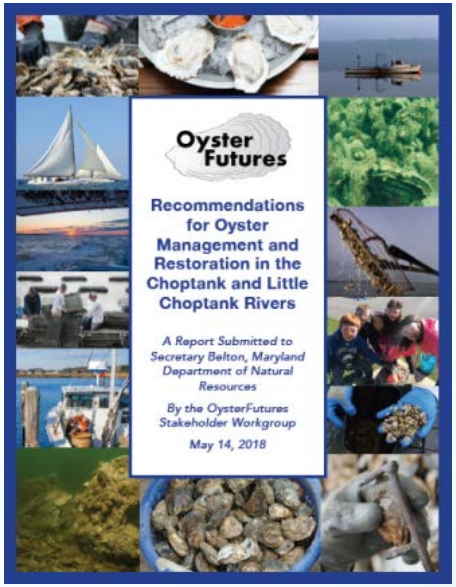
Revise options and performance measures

Scientists

Review model results

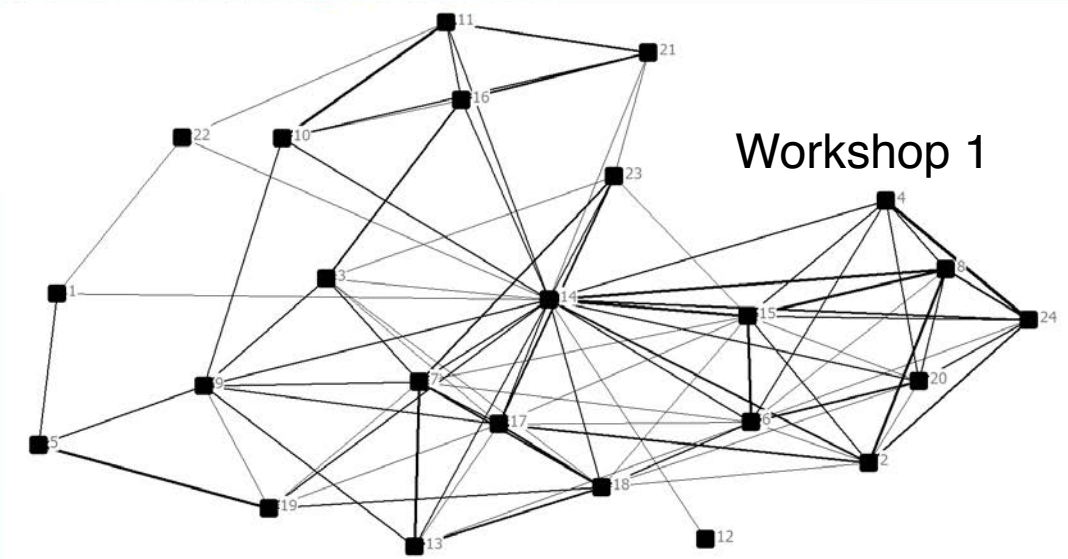
Options with >75% agreement advance to package of recommendations

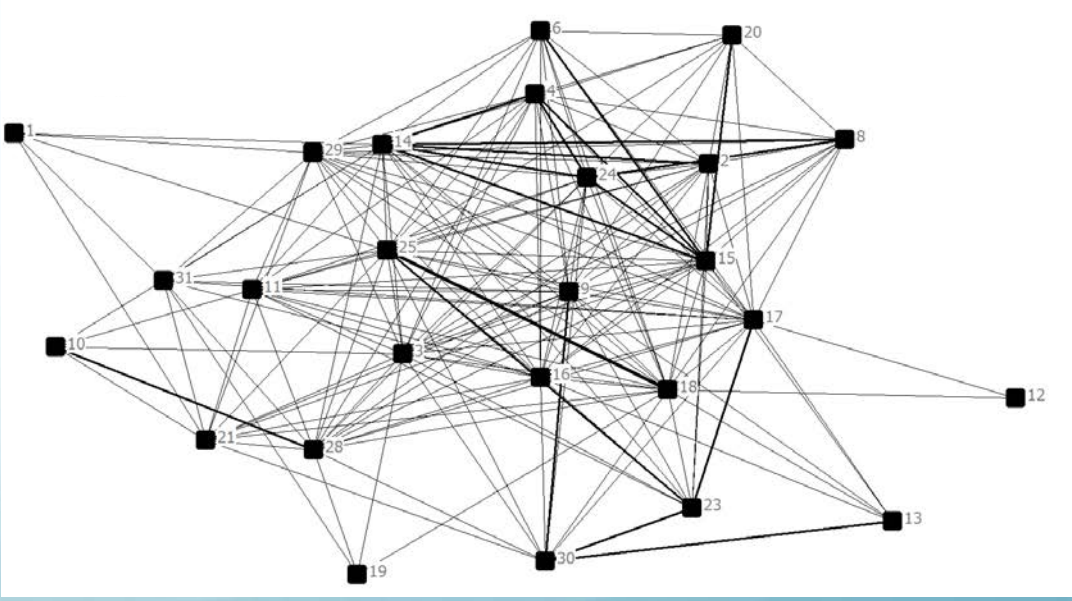
One consensus vote on the entire package

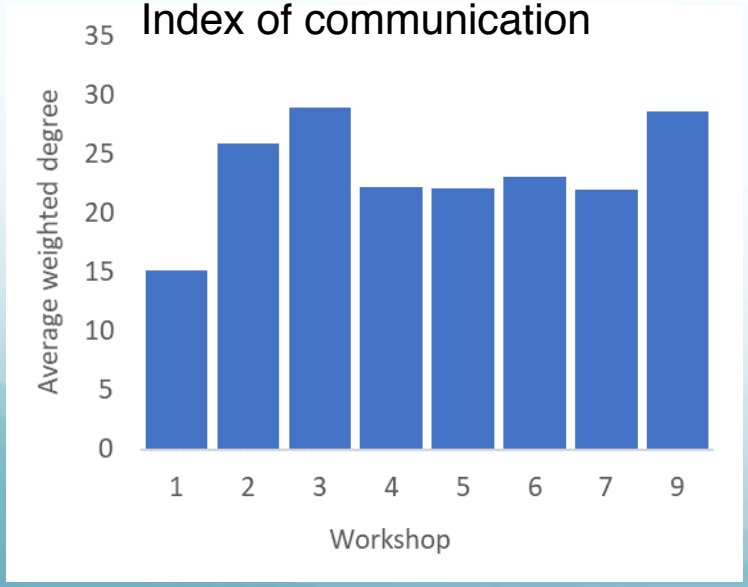


OysterFutures Communication Network

- Increase in communication (connecting to *more people*)
- Increase in frequency of communication (communicating *more often*)
- Decreased centralization (wider flow of information)

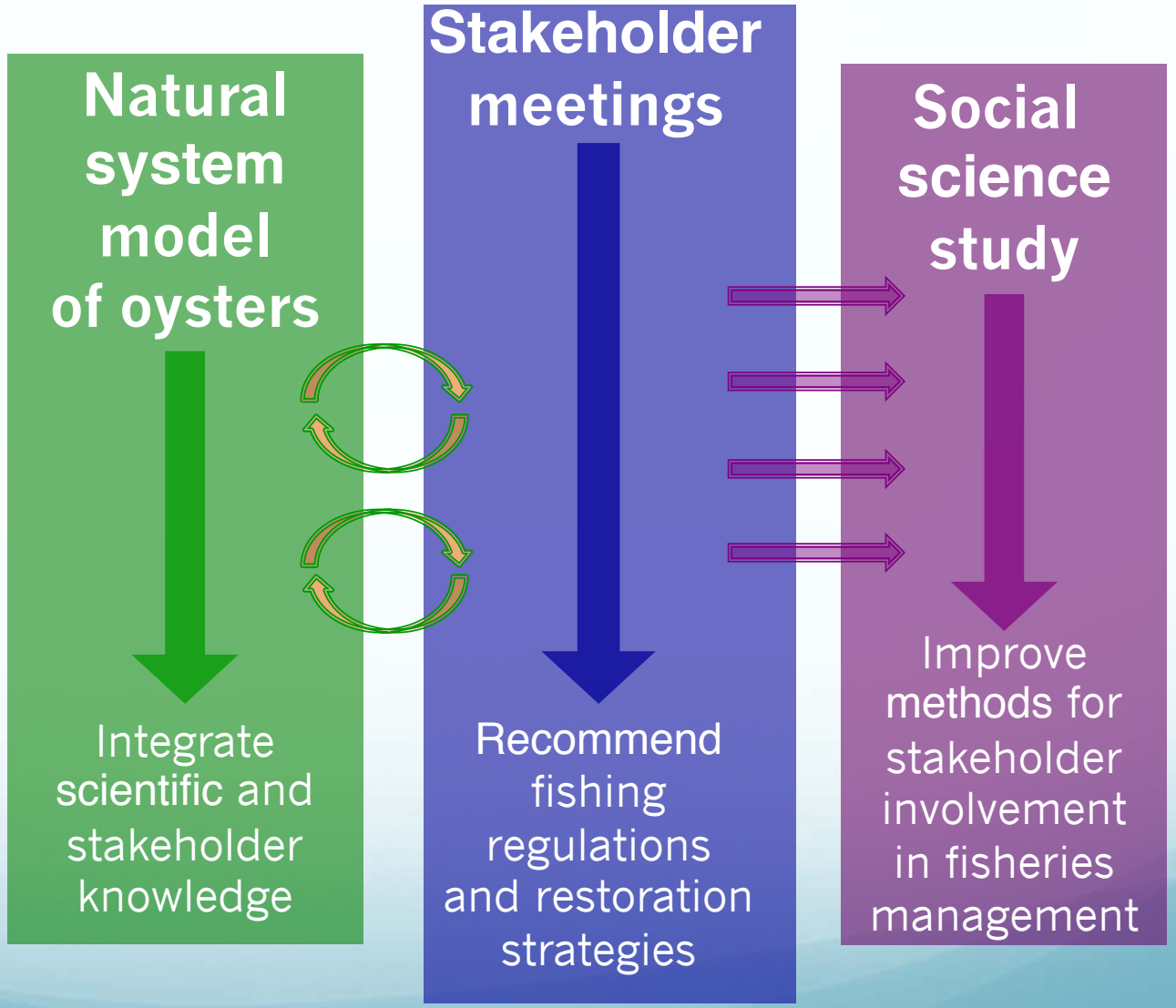




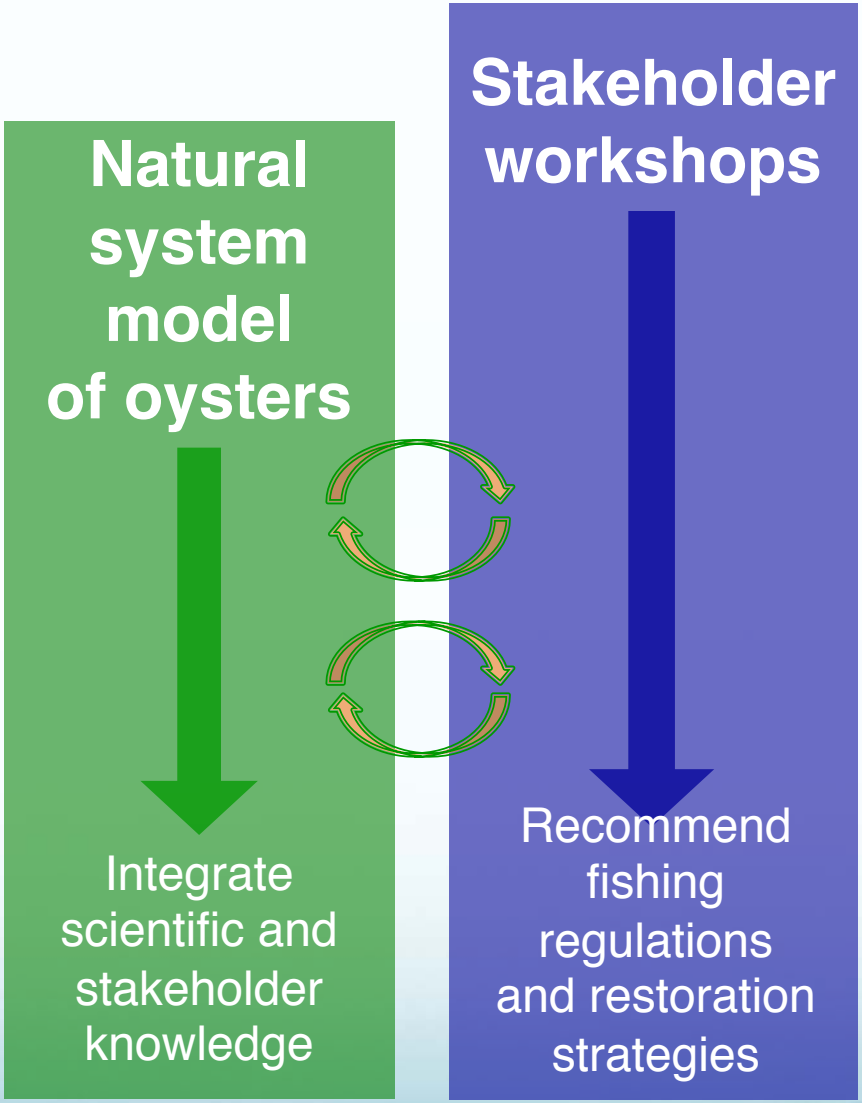


Slide from Goelz and Hartley

Oyster Futures



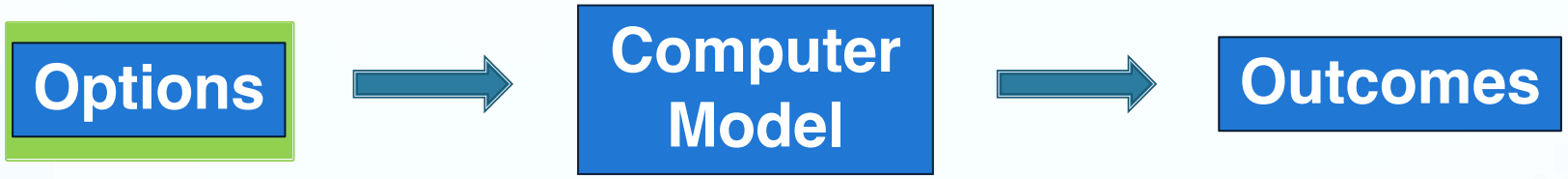
Oyster Futures



Scientists serve as consultants

Stakeholders decide on options and outcomes to be modeled

How did computer models support the process?



- Changing or rotating fishing areas
- Planting shell, spat-on-shell, and reef balls
- Restoring reefs

Computer model includes scientific and stakeholder knowledge

Options → **Computer Model** → **Outcomes**

- Changing or rotating fishing areas
- Planting shell, spat-on-shell, and reef balls
- Restoring reefs

- Economics
- Oyster biology
- Oyster habitat
- Water quality

Computer model forecasts outcomes and stakeholders consider results

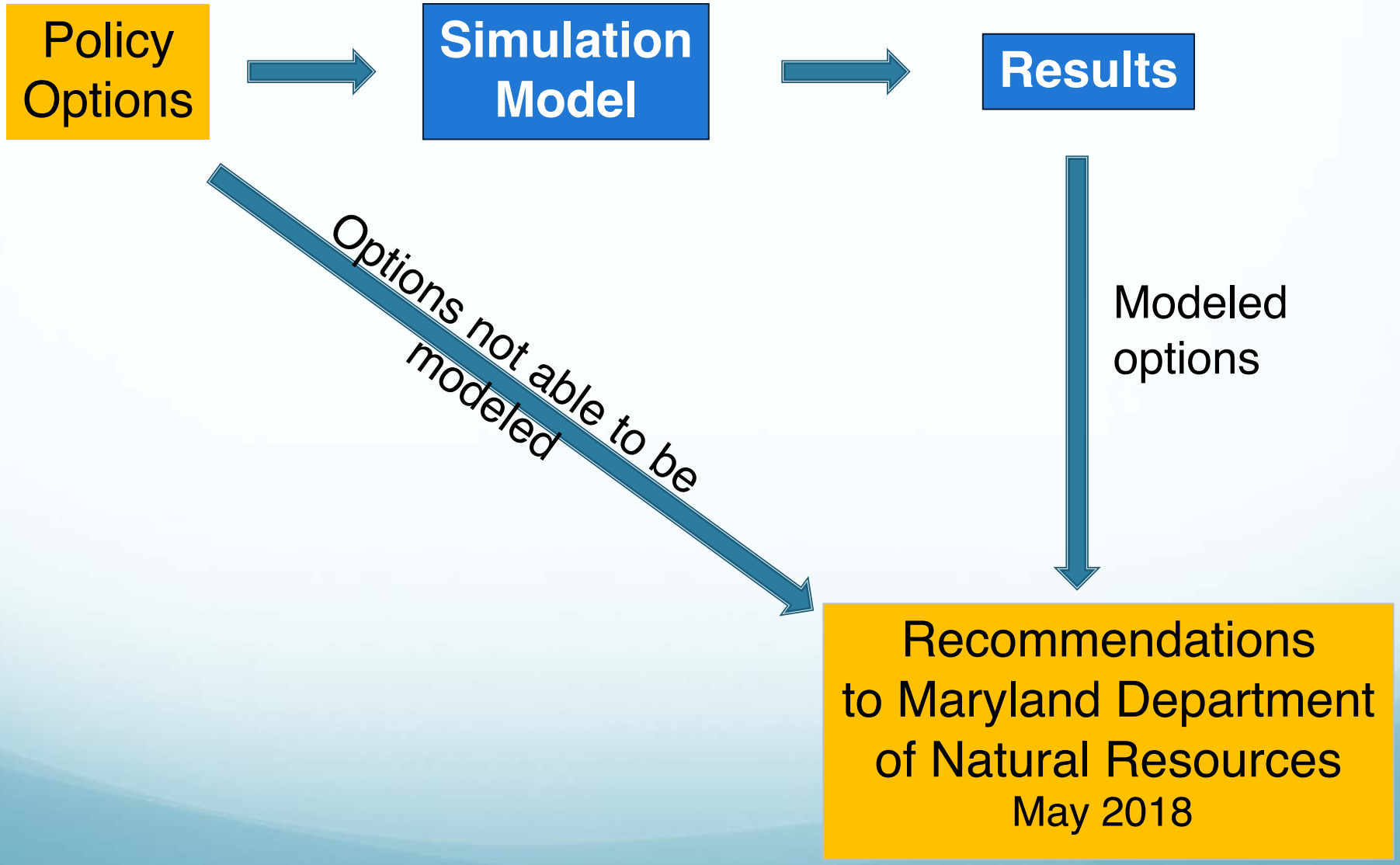
Options → **Computer Model** → **Outcomes**

- Changing or rotating fishing areas
- Planting shell, spat-on-shell, and reef balls
- Restoring reefs

- Economics
- Oyster biology
- Oyster habitat
- Water quality

- Oyster abundance
- Oyster habitat
- Harvest revenue
- Pollution reduction

Stakeholders make recommendations



Stakeholder Options That Were Evaluated

1. Rotational harvest
2. Enforcement
3. Use of assessment of population in management
4. Limited entry
5. Habitat modification/restoration
6. Fees and taxes
7. Spatial
8. Gear type
9. Stocking
10. Marketing and business practices

OysterFutures Simulation Model
7/22/2017

July 2017

YEAR 25

Performance Measures (difference from Status Quo)

Options	Abundance (1000s) Spat	2-3"	3-4"	4+"	Habitat (L/m2)	Harvest (1000 bu)	Revenue (1000 $)	Number Licenses	Seston (kg) Deposited	Nitrogen Removed
1. Status quo (SQ) - median of simulation results	347,962	297,704	334,796	200,442	57.8	106	3,775	495	84,718	94,417
2. Status quo (10% non-compliance with size regulation)	-3,496	-2,668	-2,878	-1,767	-0.1	0	7	3	-610	-656
3. All open to hand tong (other gears same as SQ)	-233,720	-169,661	-163,545	-94,818	-5.6	-72	-2,565	-263	-40,298	-48,577
4. All closed	231,348	130,646	181,007	122,449	4.1	-66	-2,358	-410	45,824	61,081
5. All closed with full compliance	297,740	163,742	232,334	155,176	5.1	-106	-3,775	-410	58,459	76,427
6. Lit Choptank and Tred Avon restoration (6 in substrate)	198,137	117,193	129,411	83,158	6.4	93	3,302	351	33,754	34,360

>100 options were evaluated

OysterFutures Model
Base Run - 1/3/2018

January 2018

YEAR 22-25 (average)

Performance Measures (difference from Status Quo)

Options	Abundance (10,000s) Spat	Adults	Habitat (1000 bu)	Harvest (1000 bu)	Revenue (1000 $)	Number Licenses	Number Full Time	Seston Deposited	Water clarity	Reef: N removed	Catch: N removed	Social valu N removed	Cost/yr (1000 $)	Revenue - Cost	Social N-Cost +Revenue
A. Status quo (SQ) (median)	35,658	94,419	11,478	161	$7,594	678	108	198,588		224,887	1,032	$188,416	$0	$7,594	$196,010
2. SQ, full compliance with size	298	624	12	-1	-$66	0	0	1,248		1,682	-6	$1,398	$0	-$66	$1,333
3. SQ, full compliance	3,141	6,927	106	-4	-$198	69	13	14,877		18,263	-23	$15,212	$0	-$198	$15,014
8. 2-yr Rotation (R), small, $2M – shell	3,449	2,109	3,698	3	$157	1	1	5,544		9,393	21	$7,851	$2,001	-$1,844	$6,007
9. 2-yr R, small, $2M – spat	6,345	3,593	438	21	$1,006	96	17	7,168		11,660	131	$9,834	$2,023	-$1,016	$8,818
10. 2-yr R, small, $600K – shell	2,321	408	1,017	-4	-$169	-14	-3	2,012		2,813	-23	$2,327	$544	-$714	$1,614
11. 2-yr R, small, $600K – spat															

OysterFutures Model
Base Run - 3/5/2018

March 2018

YEAR 22-25 (average)

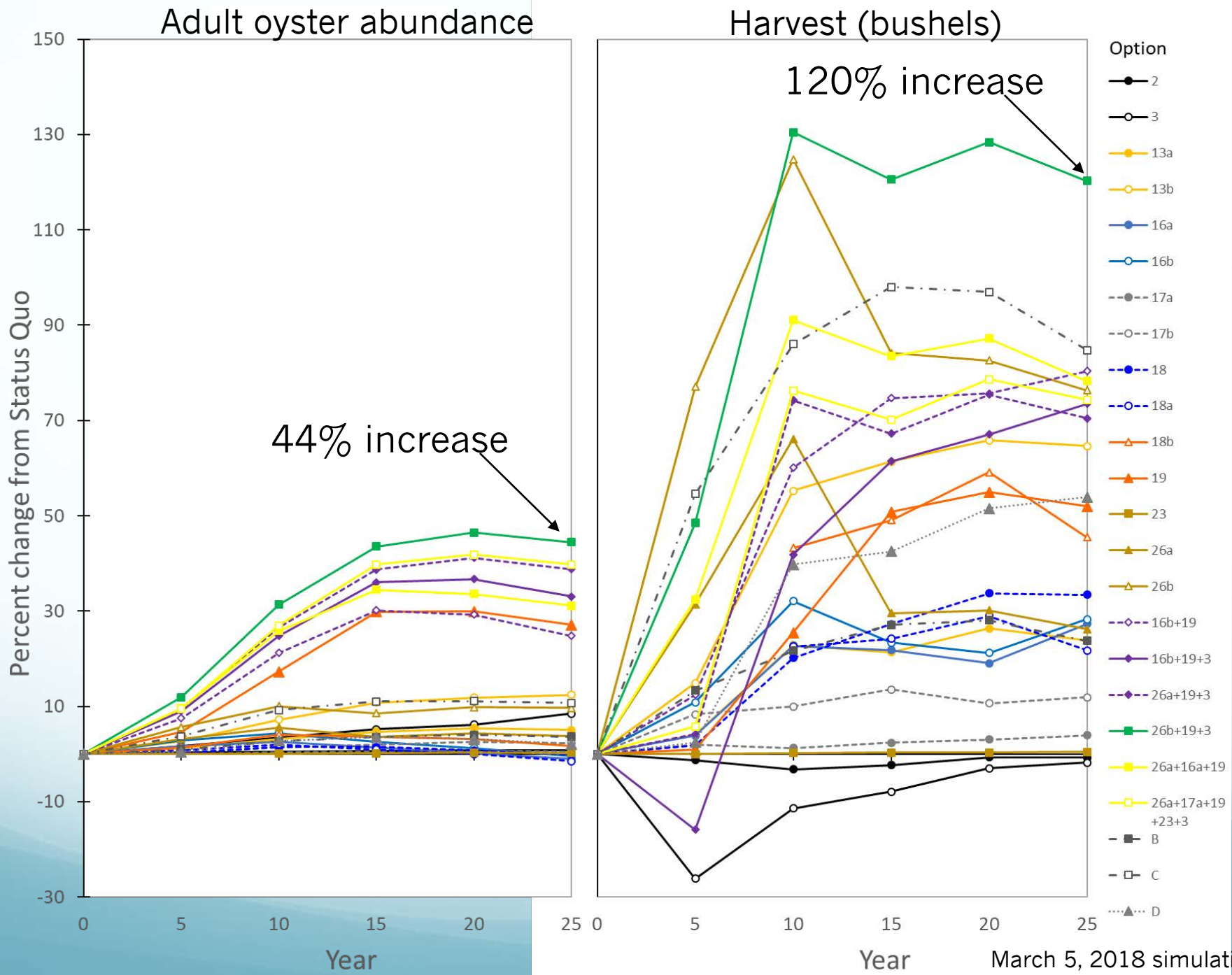
Performance Measures (difference from Status Quo)

Options	Abundance (10,000s) Spat	Adults	Habitat (1000 bu)	Harvest (1000 bu)	Revenue (1000 $)	Number Licenses	Number Full Time	Seston Deposited	Water clarity	Reef: N removed	Catch: N removed	Social valu N removed	Cost/yr (1000 $)	Revenue - Cost	Social N-Cost +Revenue
A. Status quo (SQ) (median)	39,643	93,792	11,347	152	$7,156	643	102	205,665		232,426	976	$194,657	$0	$7,156	$201,813
2. SQ, full compliance with size	286	686	11	-1	-$55	-3	0	1,403		1,522	-2	$1,268	$0	-$55	$1,213
3. SQ, full compliance	3,757	7,933	110	-3	-$126	71	13	15,677		19,554	-22	$16,289	$0	-$126	$16,163
13a. 2-yr R, MC sanc, $600K – spat	3,169	4,723	198	36	$1,713	152	27	11,385		10,892	226	$9,273	$603	$1,110	$10,382
13b. 2-yr R, MC sanc, $2M – spat	8,833	11,622	586	98	$4,625	406	73	23,596		27,066	624	$23,093	$2,001	$2,624	$25,718
16a. 2-yr R, LC tribs, $600K – spat	1,853	-900	119	41	$1,954	183	32	-1,335		-170	269	$83	$603	$1,352	$1,434
16b. 2-yr R, LC tribs, $2M – spat	4,369	-435	396	43	$2,024	187	34	-459		591	277	$724	$2,001	$23	$748
17a. Shell every yr in BC, $600K	295	427	1,109	6	$280	16	4	713		508	37	$454	$600	-$320	$135
17b. Shell every yr in BC, $2M	726	2,176	3,695	18	$850	84	15	4,105		2,150	111	$1,885	$1,999	-$1,149	$737
18. Open LC tribs, shell 3rd yr	-243	-55	865	51	$2,393	224	40	-1,508		-6,669	316	-$5,298	$424	$1,969	-$3,330
18a. Open LC tribs, spat 3rd yr, $600K	203	-1,403	115	33	$1,554	147	26	-3,504		-5,155	208	-$4,126	$556	$998	-$3,129
18b. Open LC tribs, spat 3rd yr, $2M	2,636	1,527	432	69	$3,256	302	53	1,110		-1,703	422	-$1,068	$1,847	$1,409	$341
19. Complete LC & TA restoration	16,719	25,399	626	79	$3,718	314	58	55,090		73,576	494	$61,774	$686	$3,033	$64,807
23. Reef balls in MC sanc	97	202	4	1	$29	2	0	460		512	4	$431	$63	-$34	$397
26a. Spat every yr in MC, $600K	2,931	3,565	182	40	$1,877	173	31	7,296		7,148	250	$6,170	$602	$1,275	$7,445
26b. Spat every yr in MC, $2M	7,341	9,047	546	116	$5,460	483	86	16,603		14,004	718	$12,278	$2,001	$3,459	$15,737
16b+19. 2-yr R LC, full restoration	20,104	23,259	981	122	$5,748	492	89	50,263		67,295	777	$56,772	$2,686	$3,061	$59,833
16b+19+3. 2-yr R LC, restore, compliance	23,769	31,005	1,093	111	$5,258	562	102	68,151		91,658	711	$77,036	$2,686	$2,572	$79,607
26a+19+3. Spat MC $600K, restore, com	22,918	36,365	925	107	$5,042	544	99	79,694		104,068	673	$87,354	$1,288	$3,754	$91,108
26b+19+3. Spat MC $2M, restore, comp	27,197	41,707	1,281	182	$8,606	852	153	87,840		110,057	1,144	$92,742	$2,686	$5,920	$98,662
26a+16a+19. Spat MC $600K, 2-yr R LC,	20,812	29,189	929	119	$5,603	480	88	62,059		83,217	750	$70,028	$1,890	$3,712	$73,741
26a+17a+19+23+3. Spat MC, Shell BC, re	23,287	37,283	2,034	113	$5,318	568	103	81,686		105,457	707	$88,541	$1,898	$3,420	$91,961
Sensitivity study – spat set 3.4x higher on clean shell															
B. Shell every yr in BC, $600K (#17a)	2,581	3,391	1,171	36	$1,699	163	29	5,354		3,984	231	$3,515	$600	$1,099	$4,614
C. Shell every yr in BC, $2M (#17b)	7,731	10,079	3,901	128	$6,065	574	102	16,342		10,899	801	$9,757	$1,999	$4,066	$13,824
D. Open LC tribs, shell 3rd yr (#18)	2,583	1,920	901	82	$3,856	360	64	1,158		-3,495	511	-$2,489	$424	$3,432	$944

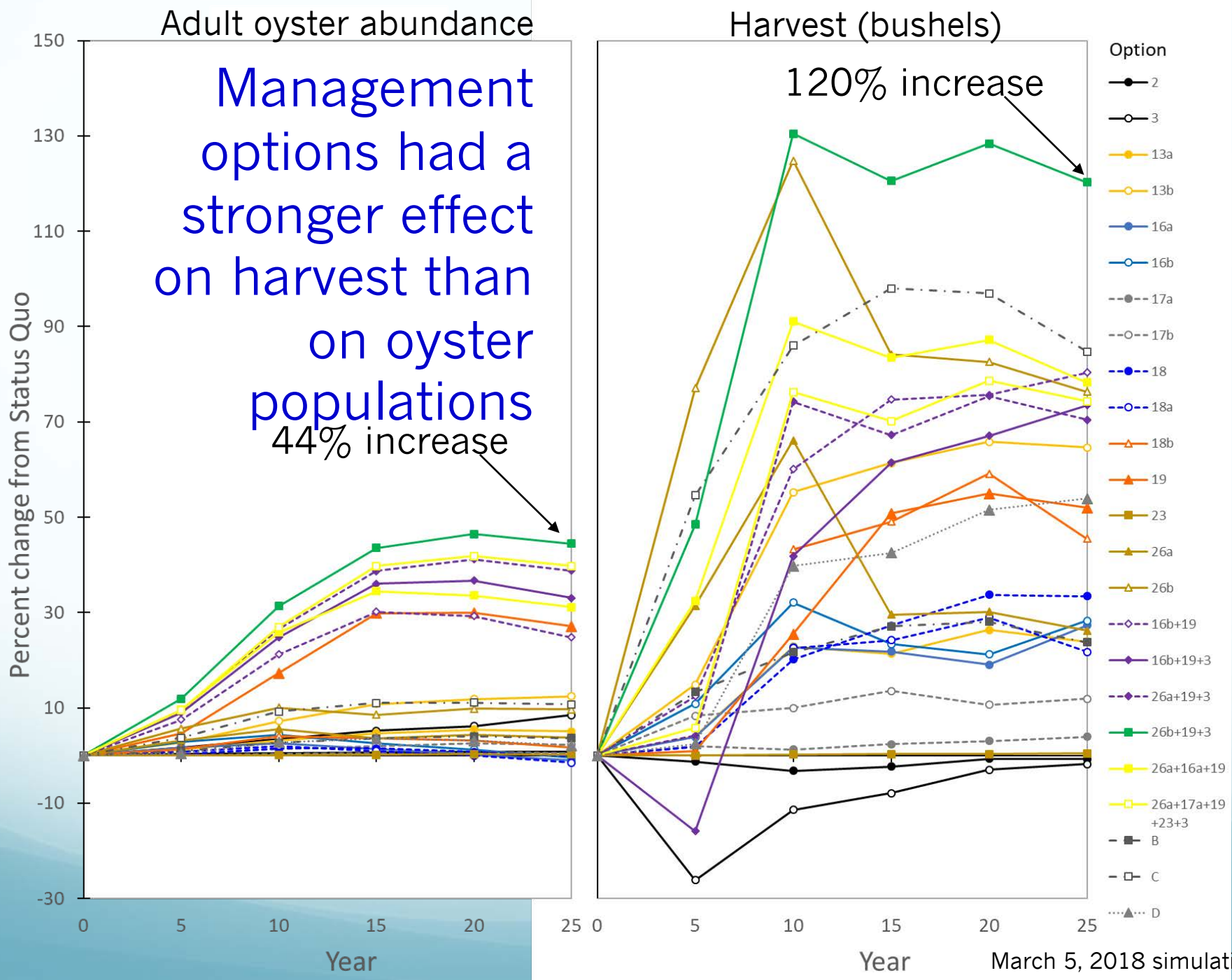
Key:	greater than 1	less than -1	(lbs)	(lbs)	(lbs)	(1000 $)	25-yr ave	(1000 $)	(1000 $)

Options	
1. Status quo (SQ) - median of simulation results	
2. Status quo (10% non-compliance with size regulation)	
3. All open to hand tong (other gears same as SQ)	
4. All closed	
5. All closed with full compliance	
6. Lit Choptank and Tred Avon restoration (6 in substrate)	
7. Lit Chop	
8. 3d artifi	
9. Restore	
10. SQ with	
11. Low ha	
12. High ha	
13. Slot siz	
14. Slot siz	
15. Slot siz	
16. Little C	
17. Little C	
18. 2 year	
19. 3 year	
20. 4 year	
21. 2 year	
22. 3 year	
23. 4 year	
24. 2 year	
25. 3 year	
26. 4 year	
27. Shell ir	
12. 2-yr R, small, MidC, $2M – shell	
13. 2-yr R, small, MidC, $2M – spat	
13a. 2-yr R, small, MidC, $600K – spat	
14. 3-yr R, Little Choptank tribs – shell	
15a. 3-yr R, Little Choptank tribs – spat	
17a. Shell every yr in BC, $2M	
17a2. Shell every yr in BC, $600K	
18. Open LitChop tribs, shell every 3 yr	
19. LitChop & Tred restored (6" high)	
20. LitChop & Tred restored (12" high)	
23a. Reef balls in MidC SCA (1' apart)	
24a. Reef balls in MidC SCA (3' apart)	
26a. Spat every yr in MidC, $600K	
26b. Spat every yr in MidC, $2M	
B. All areas open to hand tonging	
C. All areas closed	
D. All areas closed, full compliance	
E. SQ, 10% size, 1% sanct harvest	
F. SQ, 0.5% sanctuary harvest	
G. SQ, 1.5% sanctuary harvest	
H. Restore all areas to 6"	
I. Full restoration over 25 yrs	
J. Implement a slot limit 3" – 5"	

Performance improved over time

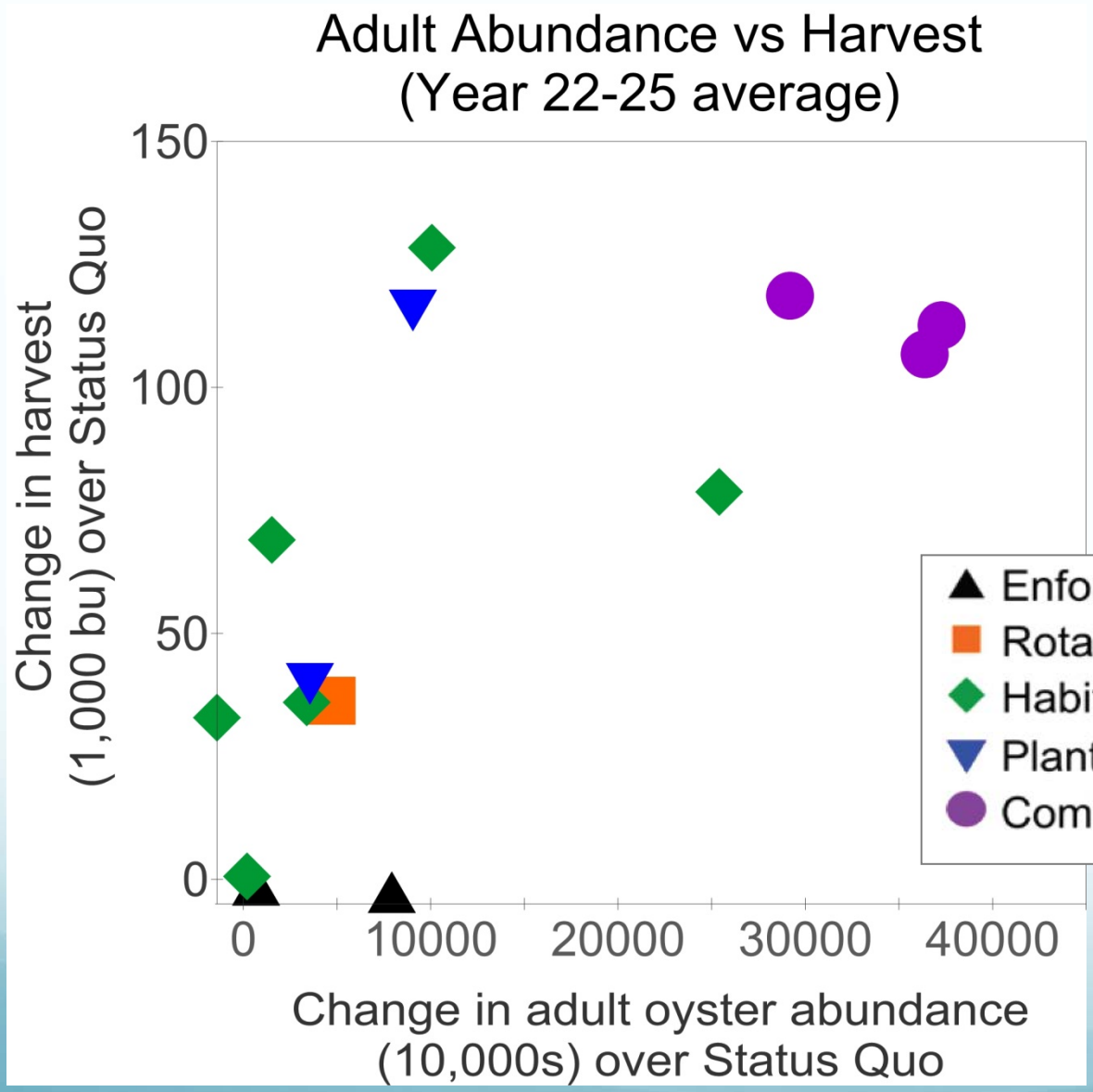


March 5, 2018 simulations



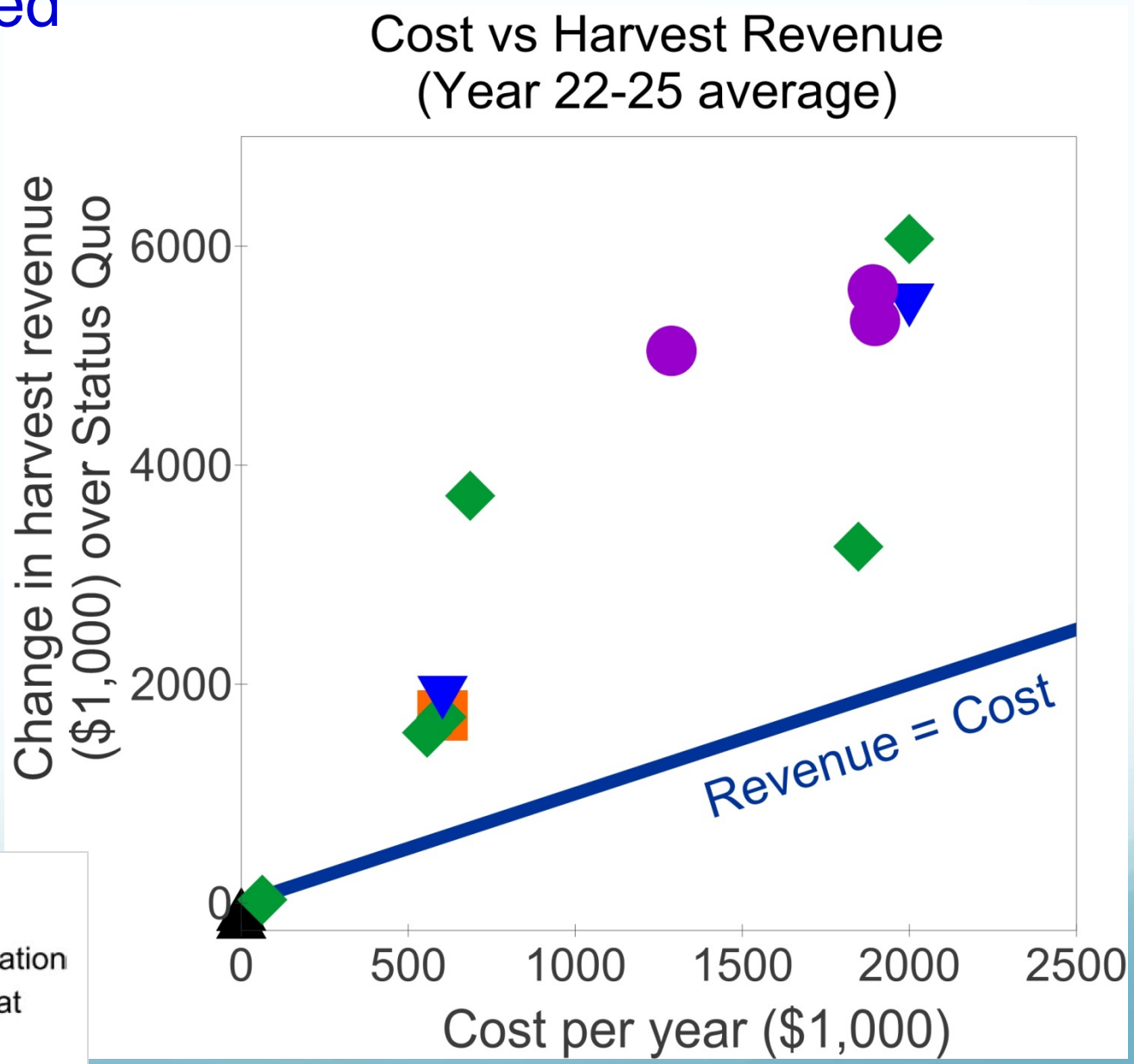
March 5, 2018 simulations

Win – win options exist: high abundances and high harvest

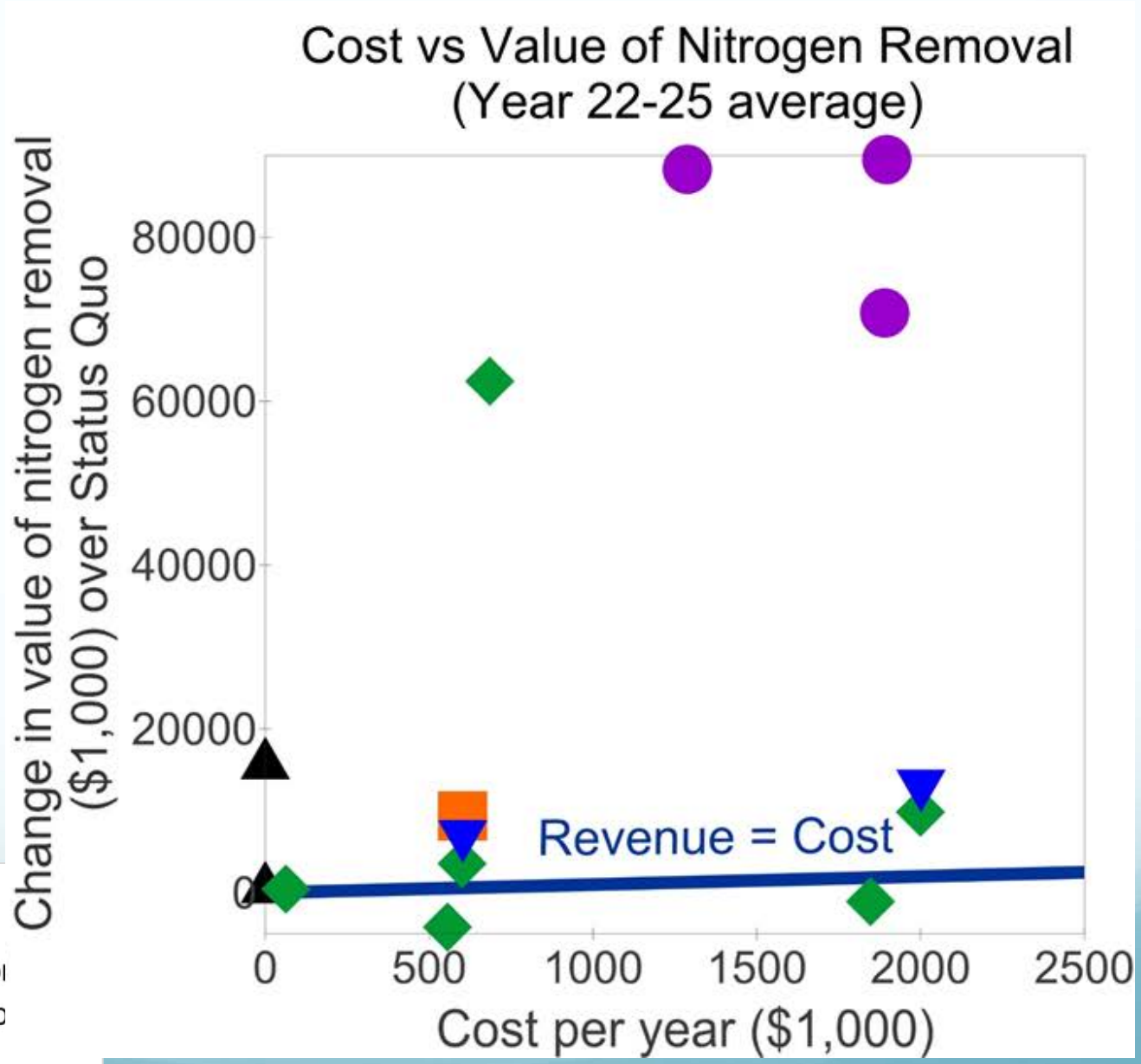


Important note:
For most options, these strong positive benefits did not start to be realized until around 10 years after implementation.

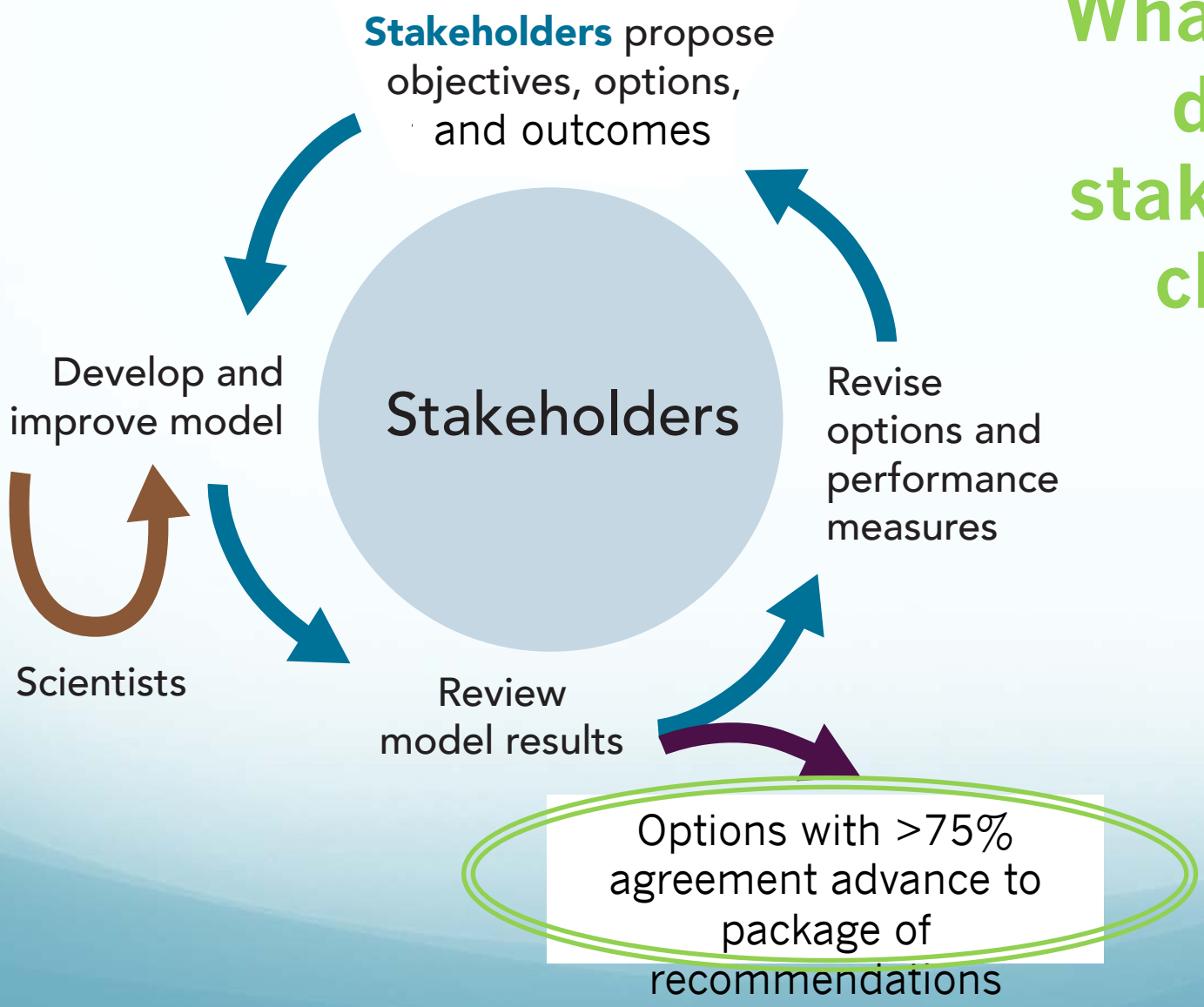
All but two scenarios showed increased revenues to watermen



All but two scenarios resulted in higher value of nitrogen removal compared to cost



Consensus Solutions process



What options did the stakeholders choose?

What Options Did the Stakeholders Choose

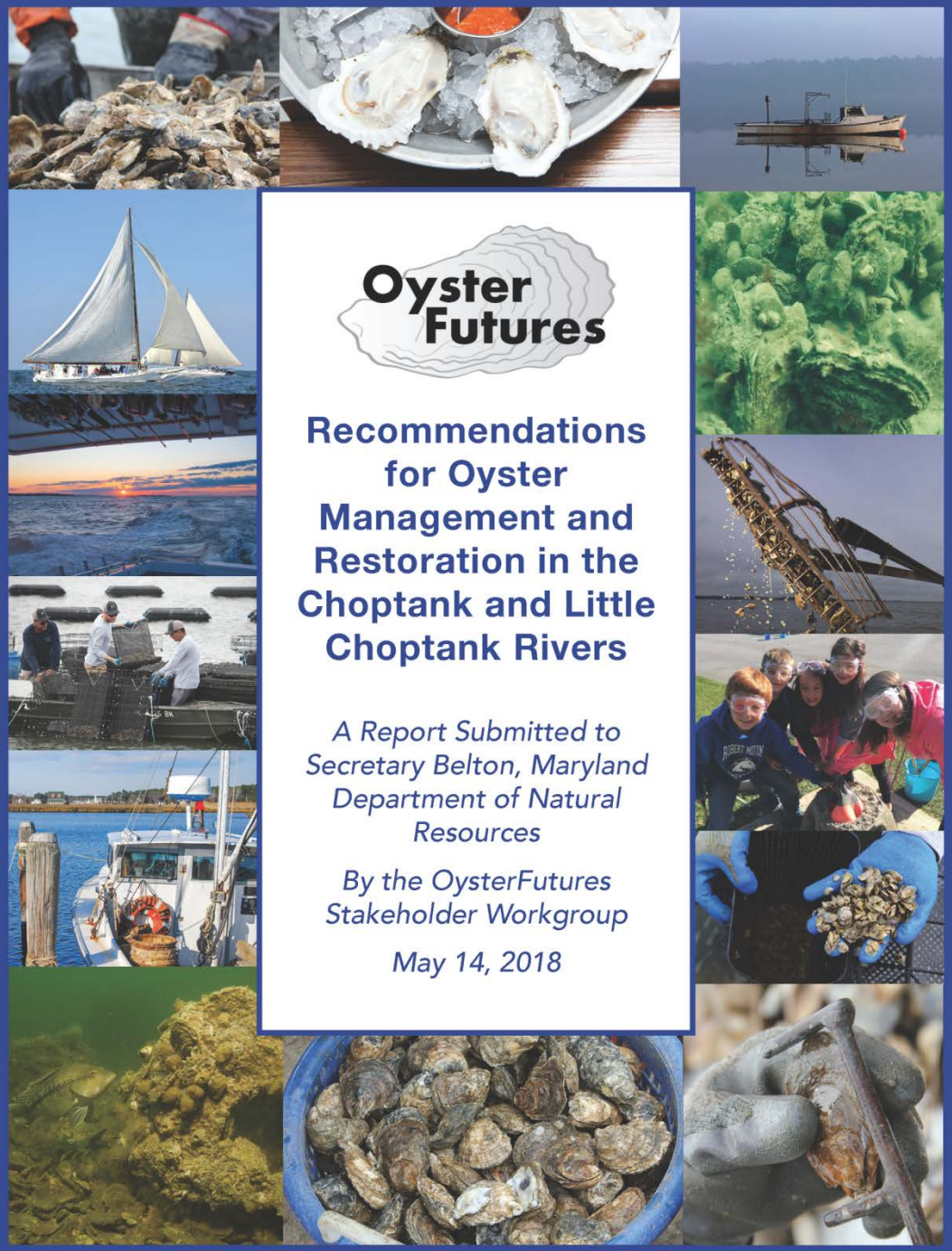
1. They chose options that increased oyster abundance and harvest.

2. They chose options that increased revenue to fisherman and were cost effective.

3. They chose options that increased nitrogen reduction and were cost effective.

Take Home Points From Model Forecasts

- Win-win-win options exist
- Strong positive benefits were not realized for 10 years
- Combining options led to best overall performance
- After 20 years, harvest revenue could be twice that of annual public investments
- After 20 years, there could be more than an 8-fold return on public investment for pollution reduction
- Choice of options had a stronger control on harvest than on oysters



Package of Consensus Recommendations

The stakeholders support ***all*** of the recommendations, and ***continuing to work with stakeholders*** using the ***Consensus Solutions*** process

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:

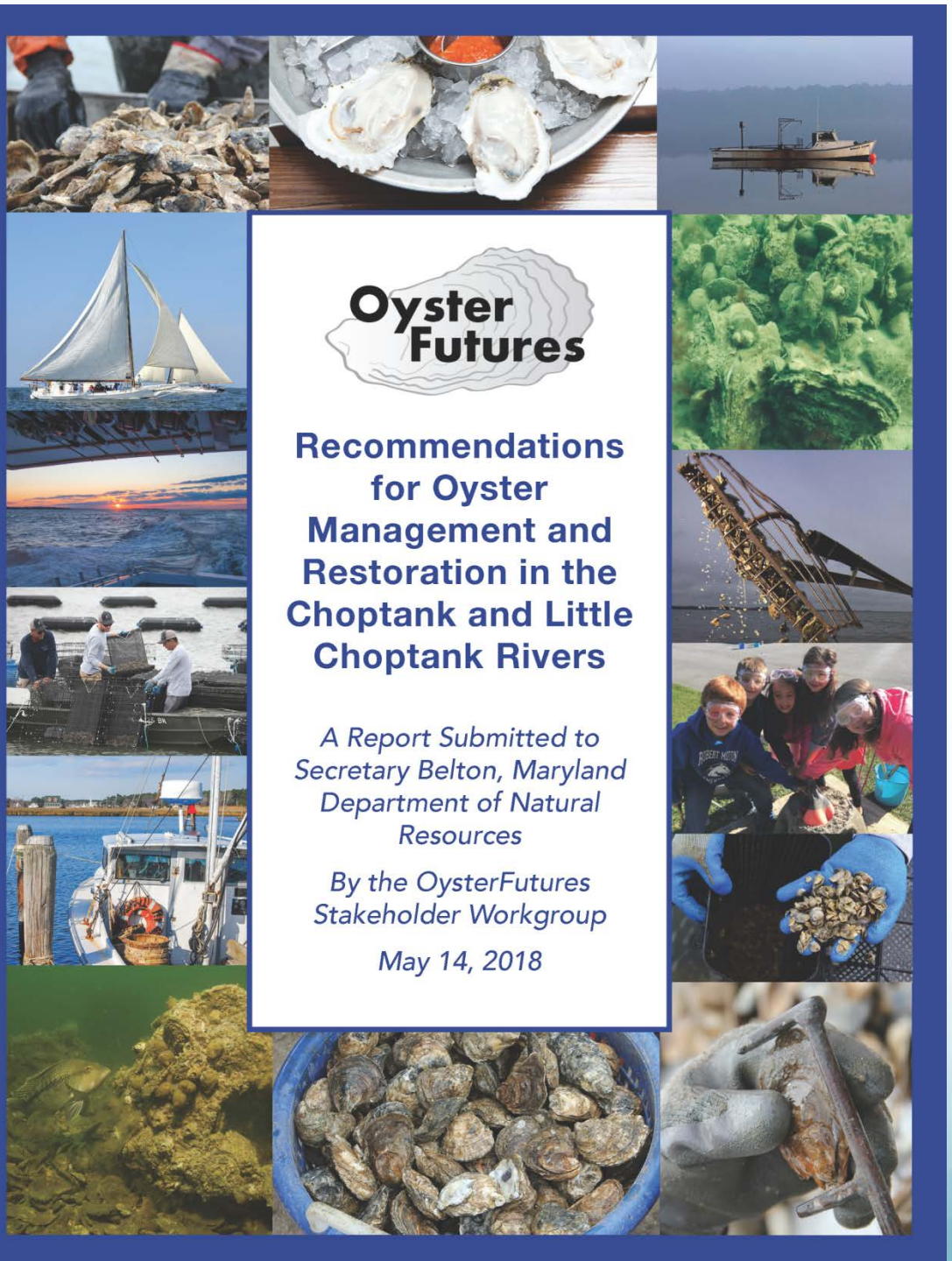
1. Working together with oyster resource stakeholders, DNR should evaluate a limited entry oyster fishery that can provide access to watermen making the majority of their living from commercial fishing, enables generational succession in the fishery, and should have a way for new participants to gain 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



How influential were the stakeholder's consensus recommendations?

Consensus Is Now The Law For Oysters In Maryland

SENATE BILL 830

M2 (9lr3106)

ENROLLED BILL

— Education, Health, and Environmental Affairs/Environment and Transportation —

Introduced by **Senator Elfreth**

The Department of Natural Resources shall:

"… convene a stakeholder workgroup to develop a ***package of consensus recommendations*** for enhancing and implementing the Fishery Management Plan for Oysters…" "…using a facilitated ***consensus solutions*** process, based on a 75% agreement level…"

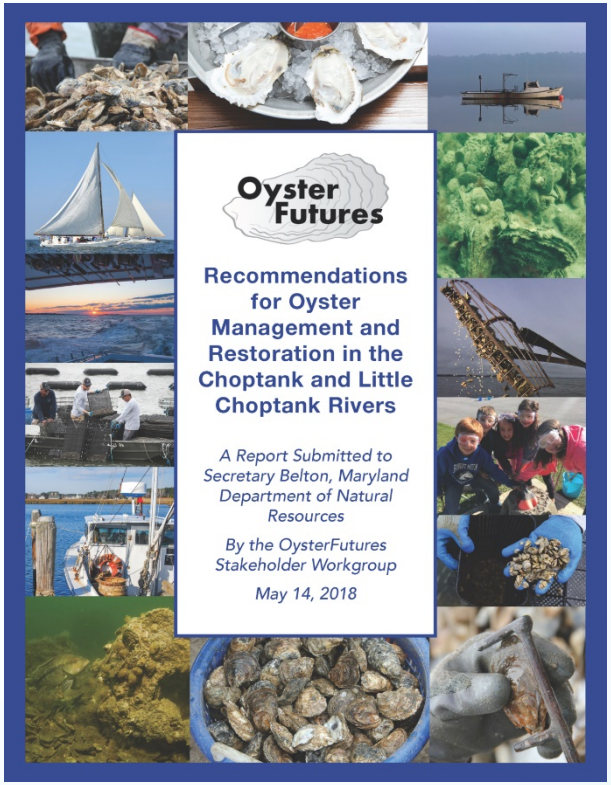
Comments From Participants:

- The right people were at the table.
- The *Consensus Solutions* process promotes collaboration, creative problem solving, and sharing of knowledge.
- This is the best process that we have ever experienced.
- Hopefully the State of MD will find the process and our stakeholders' recommendations useful.

Oyster Futures

Conclusions

- Consensus is possible
- Process is important - it can create or alleviate conflict
- The *Consensus Solutions* process helped create well-thought-out regulations with broad stakeholder support
- Win-win-win solutions for the oyster, the industry, and the environment can be found



Oyster Futures

Conclusions

- Scientific and local knowledge can be integrated and put in service of consensus.
- The *Consensus* process can help transform relationships and reframe conflict and produce “win-win" solutions.

Questions, Comments and Discussion

Jeff A. Blair and Robert M. Jones

jblair@fsu.edu
http://consensus.fsu.edu

CONSENSUS CENTER

http://facilitatedsolutions.org

Key Roles In A Science-Based Stakeholder Consensus Building Process

- Scientists
- Stakeholders
- Facilitators

The Importance and Role of Scientists Committed to Collaboration

- Understand the importance of meaningfully involving stakeholders.
- Are committed to the fair and effective involvement of impacted stakeholders.
- Respect and fairly evaluate and include observational data based on stakeholders' experiences in their data sets.
- Communicate to stakeholders in a respectful and collaborative manner.
- Are responsive to considering the experiences and observations of those who are most impacted by proposed solutions.

The Importance and Role of Stakeholders Committed to Collaboration

- Are willing to commit to the process for the duration, and honor consensus developed recommendations.
- Understand the need and are willing to collaborate with different stakeholder groups as well as communicate with their constituents.
- Listen to understand. Seek a shared understanding even if when they don't agree.
- Will work to achieve common ground on issues, and to address other stakeholder groups' concerns.
- Are committed to developing consensus recommendations that are sustainable and implementable within realistic constraints.

The Role of a Neutral in Facilitated Consensus-Building Stakeholder Processes

- **Include** professional and neutral process experts **in all phases**.
- **Consider an assessment phase** to determine viability and who should participate.
- Ensure there is appropriate and credible stakeholder **representation.**
- Plan & design a **transparent and fair process** that fosters collaboration.
- **Convene and facilitate** a fair and transparent representative stakeholder consensus-building process.
- **Recommend/Require a super-majority decision making threshold** for approval (≥75%) to encourage collaboration and not vote counting.