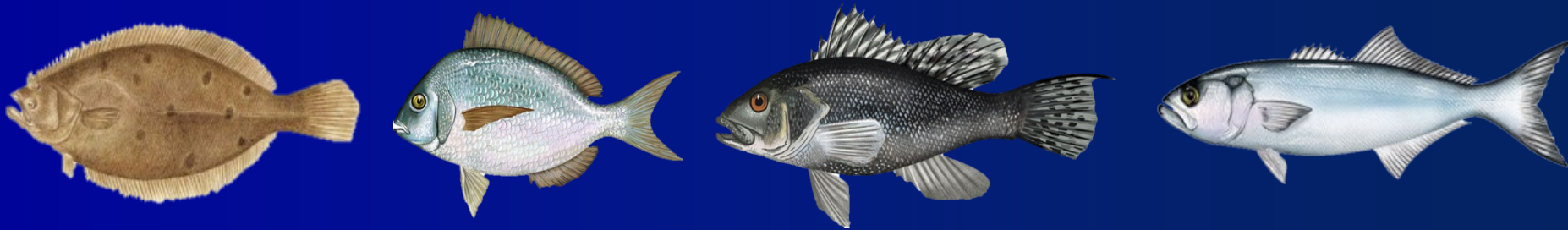




Recreational Harvest Control Rule Framework/Addenda



SSC Meeting
March 16, 2022

Objectives

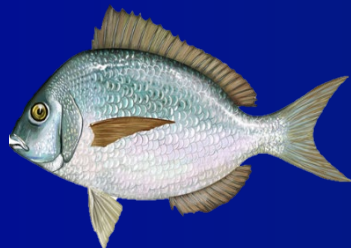
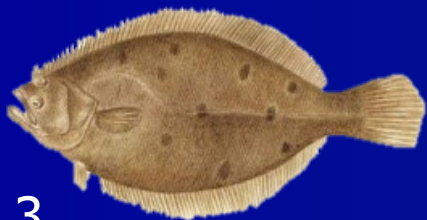
- Review Harvest Control Rule options.
- Discuss Council/Policy Board request for SSC evaluation.
- Discuss plan for addressing that request.

Harvest Control Rule FW/Addenda

Goal Statement

Establish process for setting rec bag/size/season limits (i.e., measures) that:

- Prevents overfishing,
- Is reflective of stock status,
- Appropriately accounts for uncertainty in the recreational data,
- Takes into consideration angler preferences, and
- Provides an appropriate level of stability and predictability in changes from year to year.



Challenges With Recent Process

- Concerns related to uncertainty and variability in the recreational fishery data.
- Need to change measures (sometimes annually) based on those data.
- Perception that measures are not reflective of current stock status.
- Management measures have not always had their intended effect on overall harvest.

Harvest Control Rule Options

- 5 primary options for setting measures.
- Key differences include:
 - Information considered when setting measures
 - Circumstances under which measures would change
- Each option defines a process for establishing measures.
- None of the options implement specific measures.
- Measures would be established and modified through separate future specifications actions.

Council/Policy Board Motion

Request that the SSC provide a **qualitative evaluation**, in time for final action at the June 2022 Council/Policy Board meeting, regarding the potential effect **of each of the five primary alternatives in the Harvest Control Rule Addendum/Framework on the SSC's assessment and application of risk and uncertainty in determining ABCs.**

The intent is to provide the Council and Policy Board with information to consider the tradeoffs among the different alternatives with respect to the relative risk of overfishing, increasing uncertainty, fishery stability, and the likelihood of reaching/remaining at B_{MSY} for each approach at different biomass levels (e.g., for $\frac{1}{2} B_{MSY} < B < B_{MSY}$, the relative risk among alternatives is (highest to lowest) $E > C > B > A > D$).

SSC Sub-Group

- Tom Miller, sub-group chair
- Cynthia Jones
- Lee Anderson
- Paul Rago
- Alexei Sharov

Section 3.1

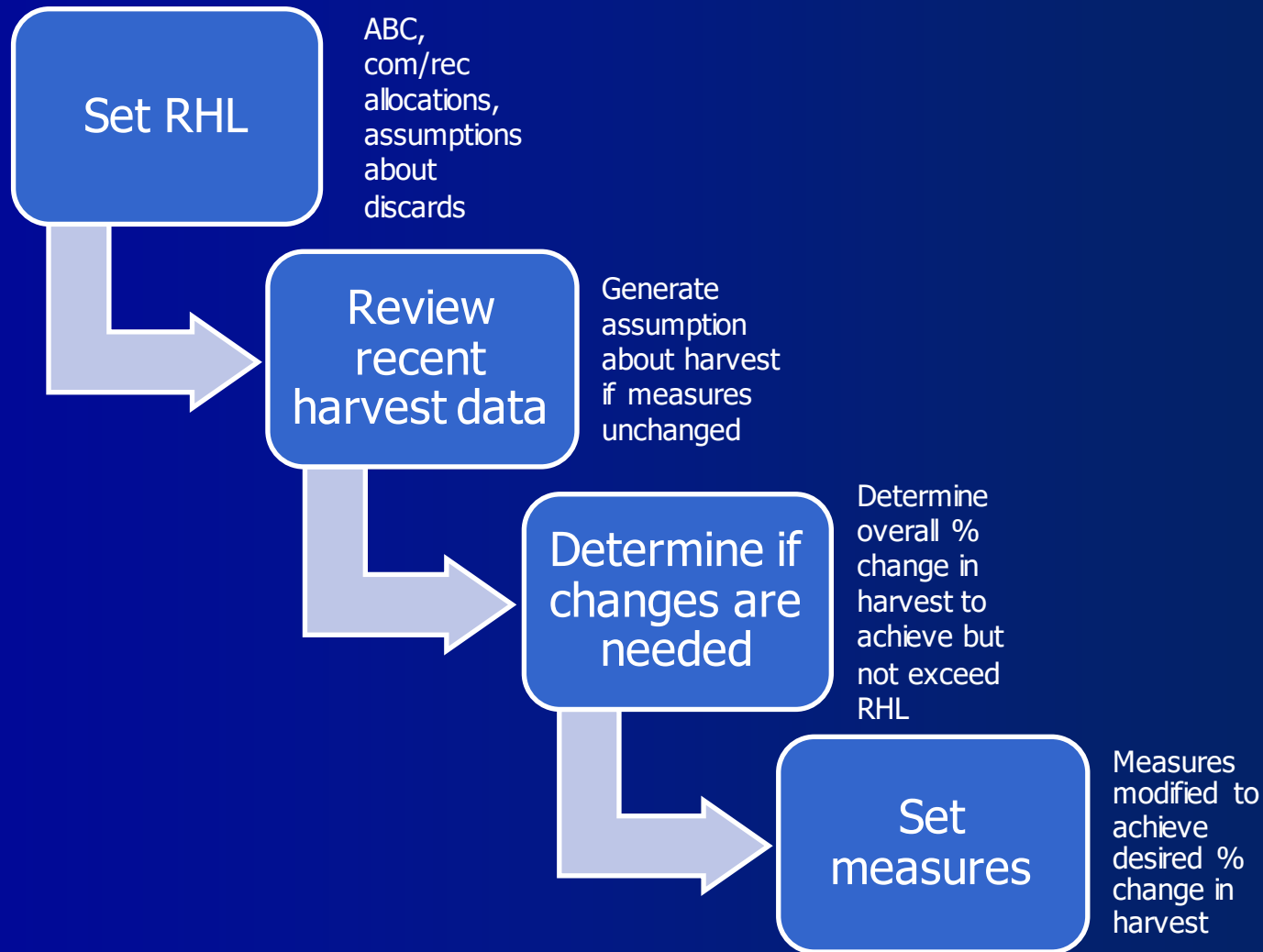
Management options to set recreational measures

- Option A: No Action
- Option B: Percent Change
- Option C: Fishery Score
- Option D: Biological Reference Point
- Option E: Biomass Based Matrix

Rebuilding Plans

- Stocks under an approved rebuilding plan are subject to the measures of that rebuilding plan.
- None of the options in this action are meant to replace rebuilding plan measures.
- In some instances, measures implemented through the HCR options may be used as temporary measures until a rebuilding plan is implemented, which can take up to two years after the stock is declared overfished.

Option A: No action



Option B: Percent Change

- Establishes a desired % change in harvest.
- Desired % change varies based on biomass compared to target level.
- Not strictly based on goal of meeting but not exceeding the RHL.
- Aims to set measures that can be in place for 2 years at a time.

Option B: Percent Change

Row	Future RHL vs Harvest Estimate	B/B_{MSY}	Change in Harvest	
A	Future 2-year avg. RHL greater than upper bound of harvest estimate CI (underage expected)			
B	Future 2-YR avg. RHL within CI of harvest estimate			
C	Future 2-YR avg. RHL less than lower bound of harvest estimate CI (overage expected)			



Option B: Percent Change

Row	Future RHL vs Harvest Estimate	B/B_{MSY}	Change in Harvest	
A	Future 2-year avg. RHL greater than upper bound of harvest estimate CI (underage expected)			
B	Future 2-YR avg. RHL within CI of harvest estimate	> 1.5		
		1-1.5		
		< 1		
C	Future 2-YR avg. RHL less than lower bound of harvest estimate CI (overage expected)			



Option B: Percent Change

Row	Future RHL vs Harvest Estimate	B/B_{MSY}	Change in Harvest
A	Future 2-year avg. RHL greater than upper bound of harvest estimate CI (underage expected)		
B	Future 2-YR avg. RHL within CI of harvest estimate	> 1.5	10% Liberalization
		1-1.5	No liberalization or reduction
		< 1	10% Reduction
C	Future 2-YR avg. RHL less than lower bound of harvest estimate CI (overage expected)		




Option B: Percent Change

Row	Future RHL vs Harvest Estimate	B/B_{MSY}	Change in Harvest	
A	Future 2-year avg. RHL greater than upper bound of harvest estimate CI (underage expected)			
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Option B: Percent Change

Row	Future RHL vs Harvest Estimate	B/B _{MSY}	Change in Harvest	
A				
B				
C	 Future 2-YR avg. RHL less than lower bound of harvest estimate CI (overage expected)	> 1.5		
		1-1.5		
		< 1		

Option B: Percent Change

Row	Future RHL vs Harvest Estimate	B/B _{MSY}	Change in Harvest	
A				
B				
C	Future 2-YR avg. RHL less than lower bound of harvest estimate CI (overage expected)	> 1.5	Sub-Option B-2A: 10% Reduction	Sub-Option B-2B: No liberalization or reduction
		1-1.5		
		< 1		



Option B: Percent Change

Row	Future RHL vs Harvest Estimate	B/B _{MSY}	Change in Harvest	
A				
B				
C	Future 2-YR avg. RHL less than lower bound of harvest estimate CI (overage expected)	> 1.5	Sub-Option B-2A: 10% Reduction	Sub-Option B-2B: No liberalization or reduction
		1-1.5	Sub-Option B-1A: Reduction percent % = difference between harvest estimate and 2-year avg. RHL	Sub-Option B-1B: 20% Reduction
		< 1	Sub-Option B-1A: Reduction percent % = difference between harvest estimate and 2-year avg. RHL	Sub-Option B-1B: 40% Reduction

Option B: Percent Change


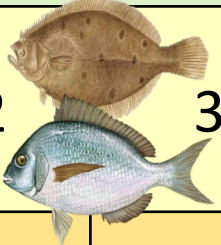
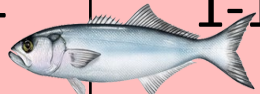
Row	Future RHL vs Harvest Estimate	B/B_{MSY}	Change in Harvest	
A	Future 2-year avg. RHL greater than upper bound of harvest estimate CI (underage expected)	> 1.5	Sub-Option B-1A: Liberalization % = difference between harvest estimate and 2-year avg. RHL	Sub-Option B-1B: 40% Liberalization
		1 – 1.5	Sub-Option B-1A: % = difference between harvest estimate and 2-year avg. RHL	Sub-Option B-1B: 20% Liberalization
		< 1	Sub-Option B-2A: 10% Liberalization	Sub-Option B-2B: No liberalization or reduction
B	Future 2-YR avg. RHL within CI of harvest estimate	> 1.5	10% Liberalization	
		1-1.5	No liberalization or reduction	
		< 1	10% Reduction	
C	Future 2-YR avg. RHL less than lower bound of harvest estimate CI	> 1.5	Sub-Option B-2A: 10% Reduction	Sub-Option B-2B: No liberalization or reduction
		1-1.5	Sub-Option B-1A: Reduction percent % = difference between harvest estimate and 2-year avg. RHL	Sub-Option B-1B: 20% Reduction
		< 1	Sub-Option B-1A: Reduction percent % = difference between harvest estimate and 2-year avg. RHL	Sub-Option B-1B: 40% Reduction

Option C: Fishery Score

- Combine multiple metrics into one fishery score.
 - Fishing mortality
 - Biomass
 - Recruitment
 - Fishery performance
- Each metric is weighted.

$$F/F_{MSY}(W_F) + B/B_{MSY}(W_B) + R(W_R) + \text{Fishery performance}(W_{FP}) \\ = \text{Fishery Score}$$

Option C: Fishery Score

Bin	Fishery Score	Stock Status and Fishery Performance Outlook	Measures
1	 4-5	Good	Most Liberal
2	 3-3.99	Moderate	Liberal
3	2-2.99	Poor	Restrictive
4	 1-1.99	Very Poor	Most Restrictive




Fishery Score Metrics

F/F_{MSY}	B/B_{MSY}	Recruitment 3 yr avg compared to time series used for ABC projections	Fishery Performance
<p>5: less than 95%</p> <p>3: 95-105%</p> <p>1: more than 105%</p>	<p>5: at least 150%</p> <p>4: at least 100% but less than 150%</p> <p>3: at least 75% but less than 100%</p> <p>2: at least 50% but less than 75%</p> <p>1: below 50%</p>	<p>5: 81-100 percentile</p> <p>4: 61-80 percentile</p> <p>3: 41-60 percentile</p> <p>2: 21-40 percentile</p> <p>1: 0-20 percentile</p>	<p>5: 2-yr avg. RHL above upper bound of harvest estimate CI</p> <p>3: 2-yr avg. RHL within harvest estimate CI</p> <p>1: 2-yr avg. RHL below lower bound of harvest estimate CI</p>

Option D: Biological Reference Point Approach

- Primary metrics:
 - Biomass
 - Fishing mortality
- Secondary metrics evaluated when primary metrics are unchanged:
 - Recruitment
 - Biomass trend
 - Expected harvest (only considered when overfishing is occurring)




Option D: Biological Reference Point Approach

	$F \leq F_{msy}$	$F > F_{msy}$																										
$B \geq 150\% B_{target}$	<p>R↑ R↓</p> <table border="1"> <tr> <td>B↑</td> <td>liberal</td> <td>liberal</td> </tr> <tr> <td>B↓</td> <td>default</td> <td>default</td> </tr> </table>  <p>1</p>	B↑	liberal	liberal	B↓	default	default	<table border="1"> <tr> <td></td> <td></td> <td>R↑</td> <td>R↓</td> </tr> <tr> <td>MRIP ≤</td> <td>B↑</td> <td>default</td> <td>restrictive</td> </tr> <tr> <td>RHL/ACL</td> <td>B↓</td> <td>restrictive</td> <td>restrictive</td> </tr> <tr> <td>MRIP ></td> <td>B↑</td> <td colspan="2">restrictive & re-evaluate measures</td> </tr> <tr> <td>RHL/ACL</td> <td>B↓</td> <td colspan="2">restrictive & re-evaluate measures</td> </tr> </table> <p>4</p>			R↑	R↓	MRIP ≤	B↑	default	restrictive	RHL/ACL	B↓	restrictive	restrictive	MRIP >	B↑	restrictive & re-evaluate measures		RHL/ACL	B↓	restrictive & re-evaluate measures	
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$B_{target} \leq B < 150\% B_{target}$	<p>R↑ R↓</p> <table border="1"> <tr> <td>B↑</td> <td>liberal</td> <td>liberal</td> </tr> <tr> <td>B↓</td> <td>default</td> <td>default</td> </tr> </table> <p>2</p>	B↑	liberal	liberal	B↓	default	default	<table border="1"> <tr> <td></td> <td></td> <td>R↑</td> <td>R↓</td> </tr> <tr> <td>MRIP ≤</td> <td>B↑</td> <td>default</td> <td>restrictive</td> </tr> <tr> <td>RHL/ACL</td> <td>B↓</td> <td>restrictive</td> <td>restrictive</td> </tr> <tr> <td>MRIP ></td> <td>B↑</td> <td colspan="2">restrictive & re-evaluate measures</td> </tr> <tr> <td>RHL/ACL</td> <td>B↓</td> <td colspan="2">restrictive & re-evaluate measures</td> </tr> </table> <p>5</p>			R↑	R↓	MRIP ≤	B↑	default	restrictive	RHL/ACL	B↓	restrictive	restrictive	MRIP >	B↑	restrictive & re-evaluate measures		RHL/ACL	B↓	restrictive & re-evaluate measures	
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$B_{threshold} \leq B < B_{target}$	 <p>R↑ R↓</p> <table border="1"> <tr> <td>B↑</td> <td>default</td> <td>restrictive</td> </tr> <tr> <td>B↓</td> <td>restrictive</td> <td>restrictive</td> </tr> </table> <p>3</p>	B↑	default	restrictive	B↓	restrictive	restrictive	<table border="1"> <tr> <td></td> <td></td> <td>R↑</td> <td>R↓</td> </tr> <tr> <td>MRIP ≤</td> <td>B↑</td> <td>default</td> <td>restrictive</td> </tr> <tr> <td>RHL/ACL</td> <td>B↓</td> <td>restrictive</td> <td>restrictive</td> </tr> <tr> <td>MRIP ></td> <td>B↑</td> <td colspan="2">restrictive & re-evaluate measures</td> </tr> <tr> <td>RHL/ACL</td> <td>B↓</td> <td colspan="2">restrictive & re-evaluate measures</td> </tr> </table> <p>6</p>			R↑	R↓	MRIP ≤	B↑	default	restrictive	RHL/ACL	B↓	restrictive	restrictive	MRIP >	B↑	restrictive & re-evaluate measures		RHL/ACL	B↓	restrictive & re-evaluate measures	
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RHL/ACL	B↓	restrictive & re-evaluate measures																										
$B < B_{threshold}$	<p>MOST RESTRICTIVE/REBUILDING PLAN</p>  <p>7</p>																											

Biological Ref. Point Option Metrics

B/B _{MSY}	F/F _{MSY}	Recruitment	Biomass trend	Fishery Performance
<ul style="list-style-type: none"> • At least 150% • At least 100% but less than 150% • At least 50% but less than 100% • Below 50% 	<ul style="list-style-type: none"> • 1 or lower • Greater than 1 	<i>Only considered when stock remains in same bin for 2 specs cycles.</i>		
		3 yr avg compared to time series used for ABC projections <ul style="list-style-type: none"> • Is greater than or equal to median • Is below median 	Avg % change over most recent 3 years <ul style="list-style-type: none"> • Stable (+/- x% change) or increasing • Decline of at least x% • Example x%: 3, 4, or 5% 	Are current measures expected to result in overages in the upcoming specs cycle? <ul style="list-style-type: none"> • Yes • No

Option E: Biomass Based Matrix

B/B_{MSY}	Biomass Trend		
	Increasing	Stable	Decreasing
Abundant At least 150% of target	Bin 1 		
Healthy Above target, but less than 150% of target	Bin 1	Bin 2	
Below Target but above threshold 	Bin 3	Bin 4	
Overfished Below threshold	Bin 5	Bin 6 	

Harvest Control Rule Options Comparison



Which information is most important in guiding the selection of measures?
How responsive should measures be to changing conditions?

Option	Information used to set measures					Expected # of pre-set measures
	Estimated harvest compared to future limits	B/B_{MSY}	F/F_{MSY}	Recruitment	Biomass trend	
A. No action	Primary					Measures are not pre-set
B. Percent change	Primary	Primary				Measures are not pre-set
C. Fishery score	Primary	Primary	Primary	Primary		4
D. Biological reference point	Only when $F > F_{MSY}$	Primary	Primary	Secondary	Secondary	13
E. Biomass based matrix		Primary			Primary	6

Impact on measures	High	Medium	Low
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Target for Measures

- Options C-E Only
- All aim to achieve but not exceed
- A. Recreational Harvest Limit
 - Calculated by removing dead discards estimate
- B. Annual Catch Limit
 - Total dead catch including dead discards
- C. Recreational Fishing Mortality Target
 - Recreational specific F target

Measures for Each Bin

- One set of measures for a range of conditions.
- Bin determined based on multiple factors.
- Target level of harvest, catch, or F for each bin could be based on biomass.

Example B/B_{MSY} to define target level of harvest, catch, or F		
Fishery Score	Biological Ref. Point	Biomass Based Matrix
Bin 1: 200%	Bin 1: 200%	Bin 1: 150%
Bin 2: 125%	Bin 2: 140%	Bin 2: 100%
Bin 3: 75%	Bin 3: 75%	Bin 3: 75%
Bin 4: 25%	Bin 4: 100%	Bin 4: 60%
	Bin 5: 100%	Bin 5: 40%
	Bin 6: 60%	Bin 6: 20%
	Bin 7: 25%	

Other Option Sets

- Accountability measures.
 - Sub-options under Section 3.1. B-E.
 - Section 3.4.
- ASMFC conservation equivalency options – what degree of flexibility do states have in setting alternative measures?
 - Section 3.3

Next Steps

- SSC sub-group
- May 10-11 full SSC meeting
- June 7-9 Council meeting: Final action
- Goal to use in setting 2023 recreational measures

Questions/Discussion

Request that the SSC provide a **qualitative evaluation**, in time for final action at the June 2022 Council/Policy Board meeting, regarding the potential effect **of each of the five primary alternatives in the Harvest Control Rule Addendum/Framework on the SSC's assessment and application of risk and uncertainty in determining ABCs.**

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