



# 2022 NATIONAL SALTWATER RECREATIONAL FISHERIES SUMMIT



**NOAA**  
**FISHERIES**



March 30, 2022

Session 4: Management Reform, Flexibility and Optimum Yield

# Alternative Management:

## *2021 National Academy of Sciences Consensus Study Report Recommendations*

National Saltwater Recreational Fisheries Summit  
March 30, 2022

*Presented by Michelle Duval, Mellivora Consulting*

# Study Context

- **2017:** National Academies review of Marine Recreational Information Program (MRIP)
  - Major improvements to survey
  - In-season monitoring still a challenge
- **2018:** Modernizing Recreational Fisheries Management Act (MFA)
  - National Academies study on how well MRIP meets needs of in-season management of fisheries with annual catch limits (ACLs)
  - Committee on “Data and Management Strategies for Recreational Fisheries with Annual Catch Limits”



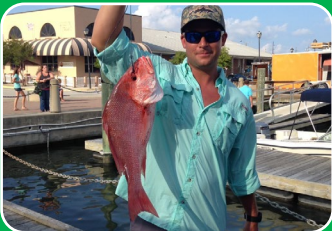
# Committee Charge



If and how the design of the MRIP, for the purposes of stock assessment and the determination of stock management reference points, can be improved to better meet the needs of in-season management of ACLs



What actions the Secretary, Councils, and States could take to improve the accuracy and timeliness of data collection and analysis to improve or supplement the MRIP and facilitate in-season management



Alternative management approaches that could be applied to recreational fisheries, consistent with requirements for fisheries with ACLs, for which the MRIP is not sufficient to meet the needs of in-season management

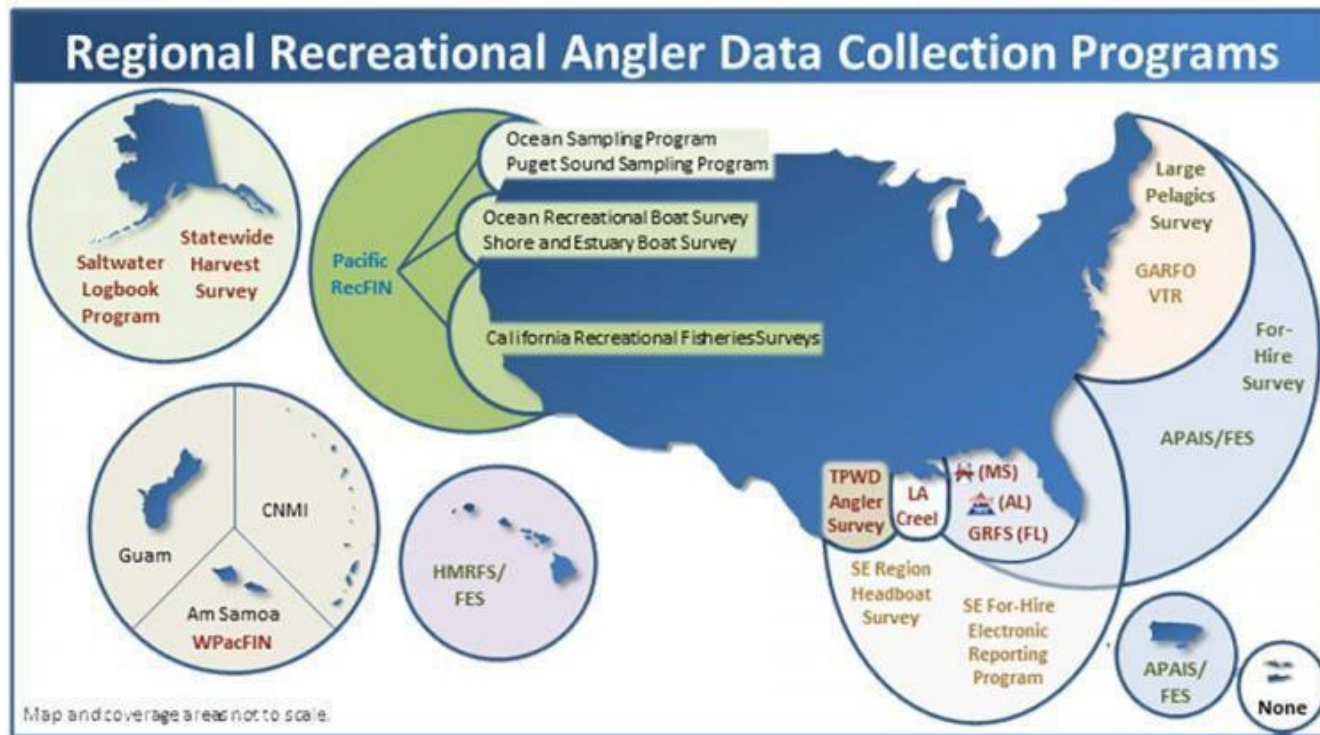
# Marine Recreational Fishing



- Conducted across the nation
- Economically impactful
- Distinct from commercial or subsistence-oriented fishing
- Diverse and dispersed
- Multiple motivations

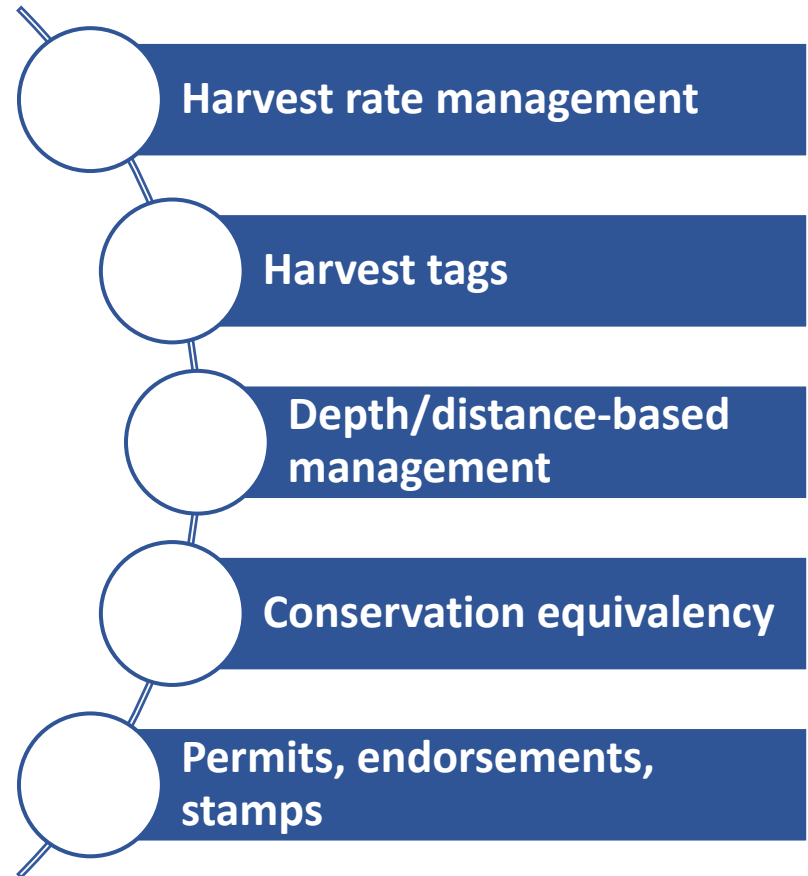
# Marine Recreational Fishing

- Management needs vary by region and fishery
- Different situations require different approaches



# Alternative Management

- NAS 2017: Implementation of ACL requirements and accountability measures created tension in recreational fisheries
- MFA: Councils and NOAA Fisheries can use alternative management approaches provided they are consistent with MSA requirements



# Alternative Management



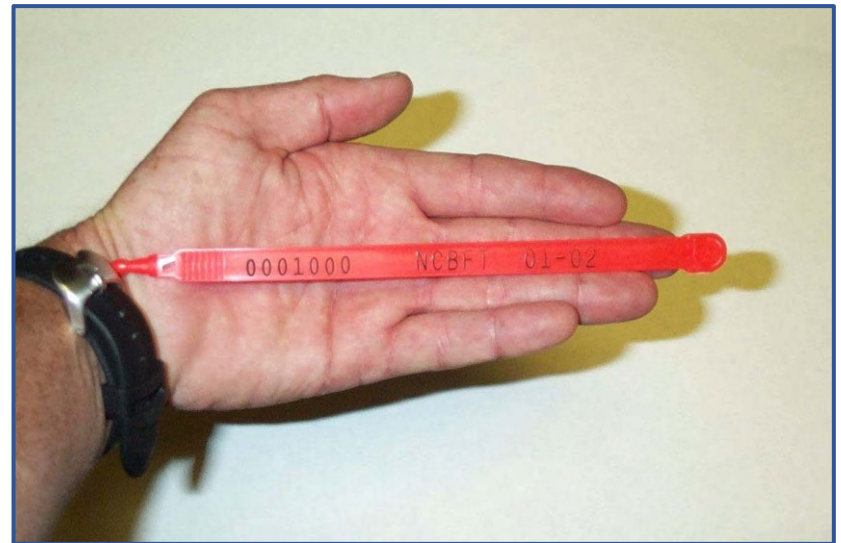
- Potential benefits and challenges of each approach vary
- All have been implemented in at least one region and/or fishery
- Several have been or are actively under consideration



# Alternative Management

**RECOMMENDATION:** NOAA Fisheries & MRIP should work in coordination with the Regional Fishery Management Councils, Interstate Fisheries Commissions, & States to, on a region-by-region basis, test:

- Harvest tags for low-ACL, rare-event species, or others that may not be well suited for sampling by MRIP
- Implementation of a private recreational fishing license endorsement focused on the subset of anglers that target Council-managed species



# Alternative Management

**RECOMMENDATION:** NOAA Fisheries & MRIP should further evaluate approaches to establishing criteria for use of carry-over provisions, as well as limits on unused ACL or ABC that could be carried forward.

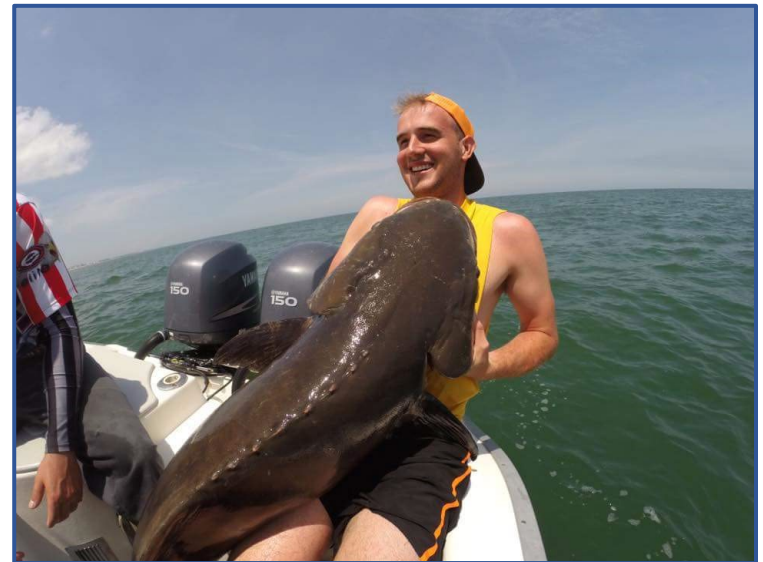


- Generalized carry-over applied equally to recreational underages and overages
- Could offset uncertainty associated with implementation of management measures
- Could reduce need for precise catch management in-season

# Alternative Management

**RECOMMENDATION:** NOAA Fisheries should review the National Standard 1 guidelines to ensure agency guidance with respect to recreational accountability measures (AMs) aligns with timeliness & precision of MRIP estimates.

- Design & application of recreational AMs is challenging, particularly in-season
- AM approaches vary regionally
- Exploration of modeling tools and multi-year approaches could mitigate uncertainty and/or refine AM application



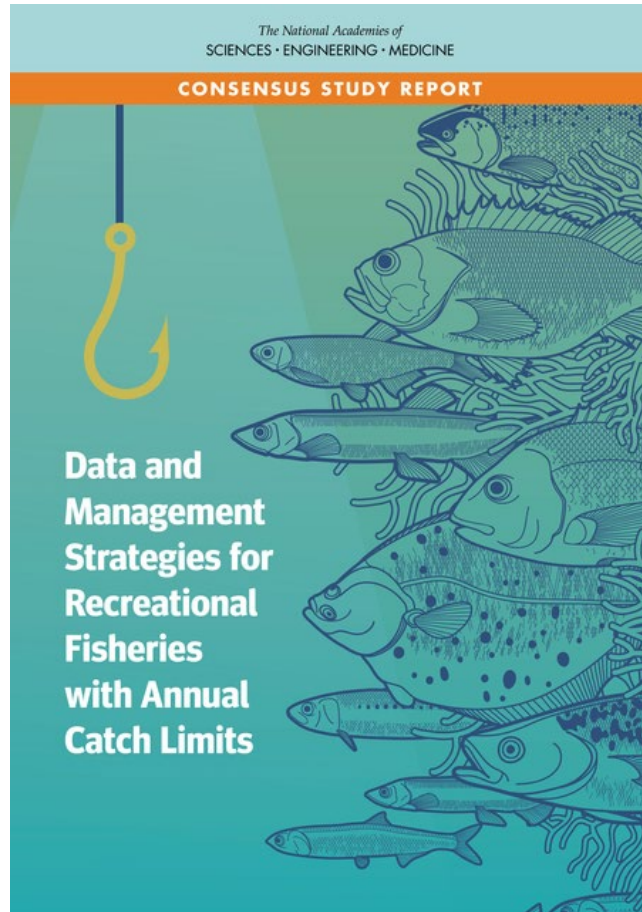
# Alternative Management

**RECOMMENDATION:** NOAA Fisheries and the Councils should develop a process for engaging recreational fisheries stakeholders in a more in-depth discussion of optimum yield (OY) and how it can be use to identify and prioritize management objectives that are better suited to the cultural, economic, and conservation goals of the angling community.

- OY framework explicitly accounts for social, ecological, and economic factors
- Address multiple motivations across recreational community
- Integrate angler satisfaction into process
- Improve trust
- Increase participation



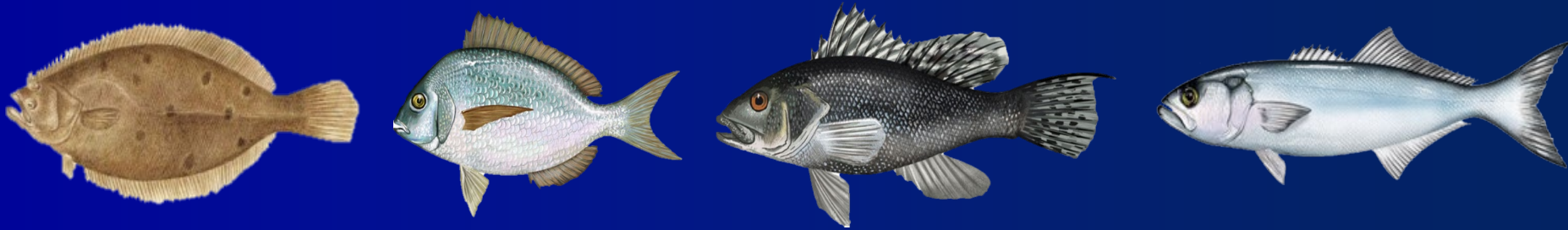
# Thank you!



Report available for  
download at [nap.edu](https://nap.edu)

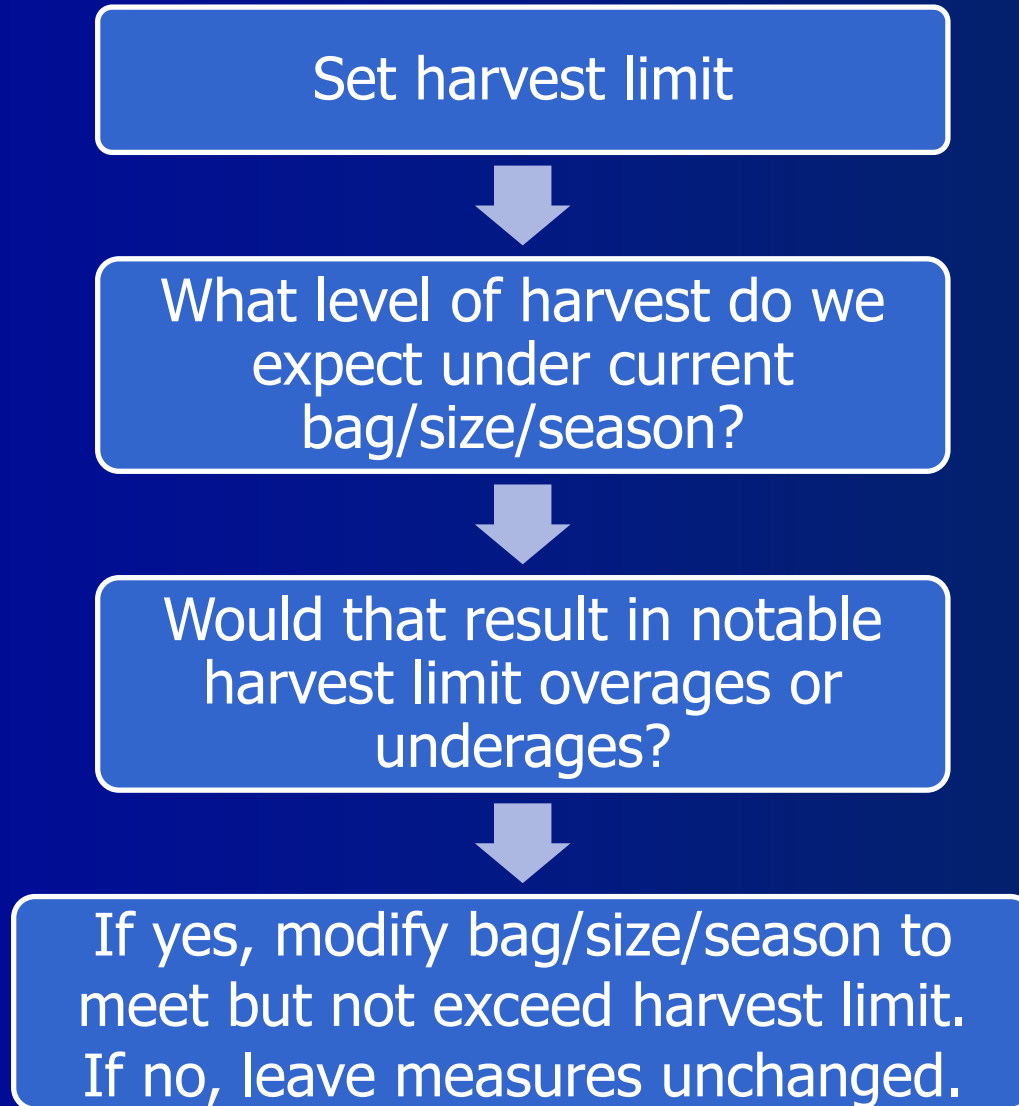


# Recreational Harvest Control Rule Framework/Addenda



2022 National Saltwater Recreational Fisheries Summit  
March 30, 2022

# Current Process



# Harvest Control Rule Example

## Combine multiple indicators:

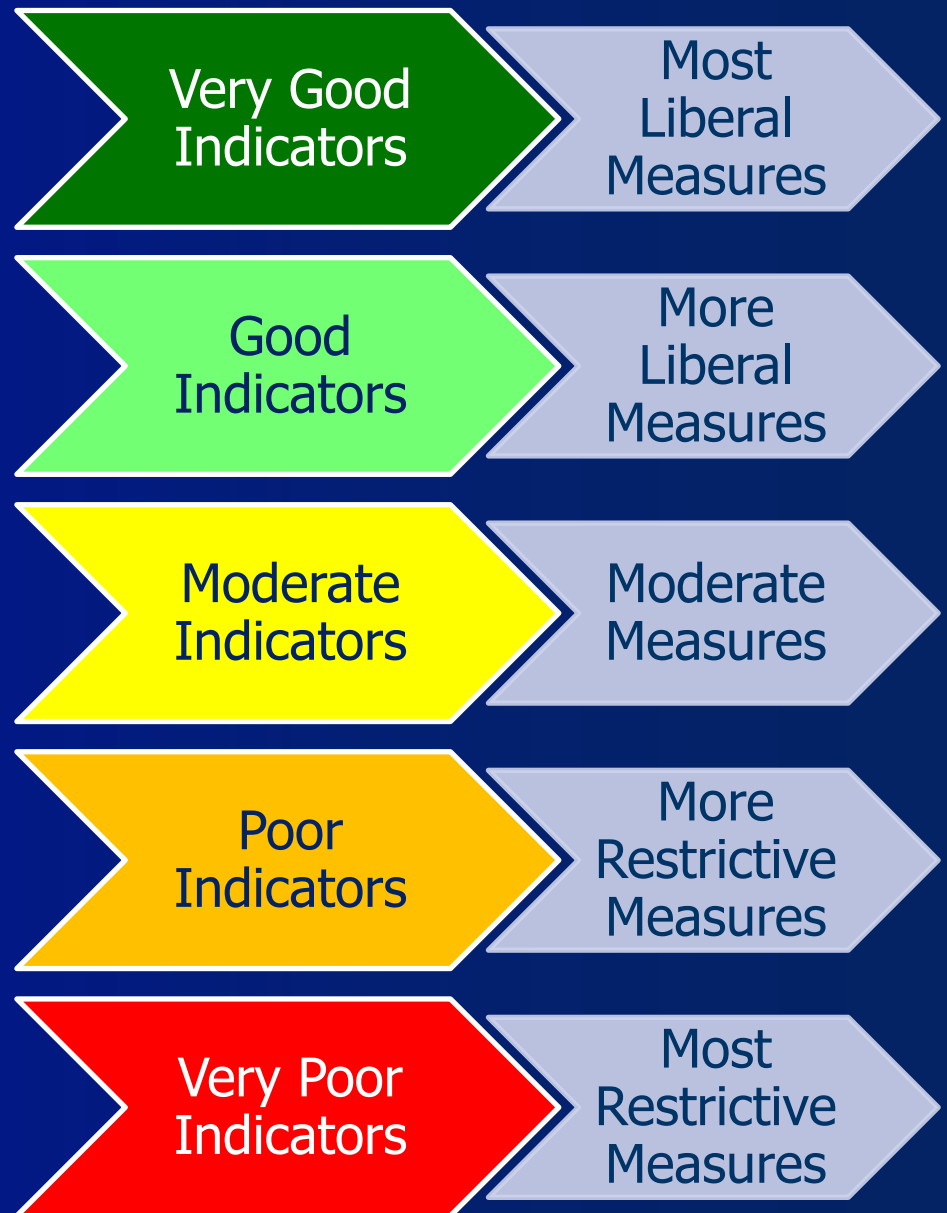
- Stock biomass compared to target
- Recent biomass trends
- Recent fishing mortality rate
- Recent recruitment
- Expected harvest under current bag/size/season



# Harvest Control Rule Approach

## Combine multiple indicators:

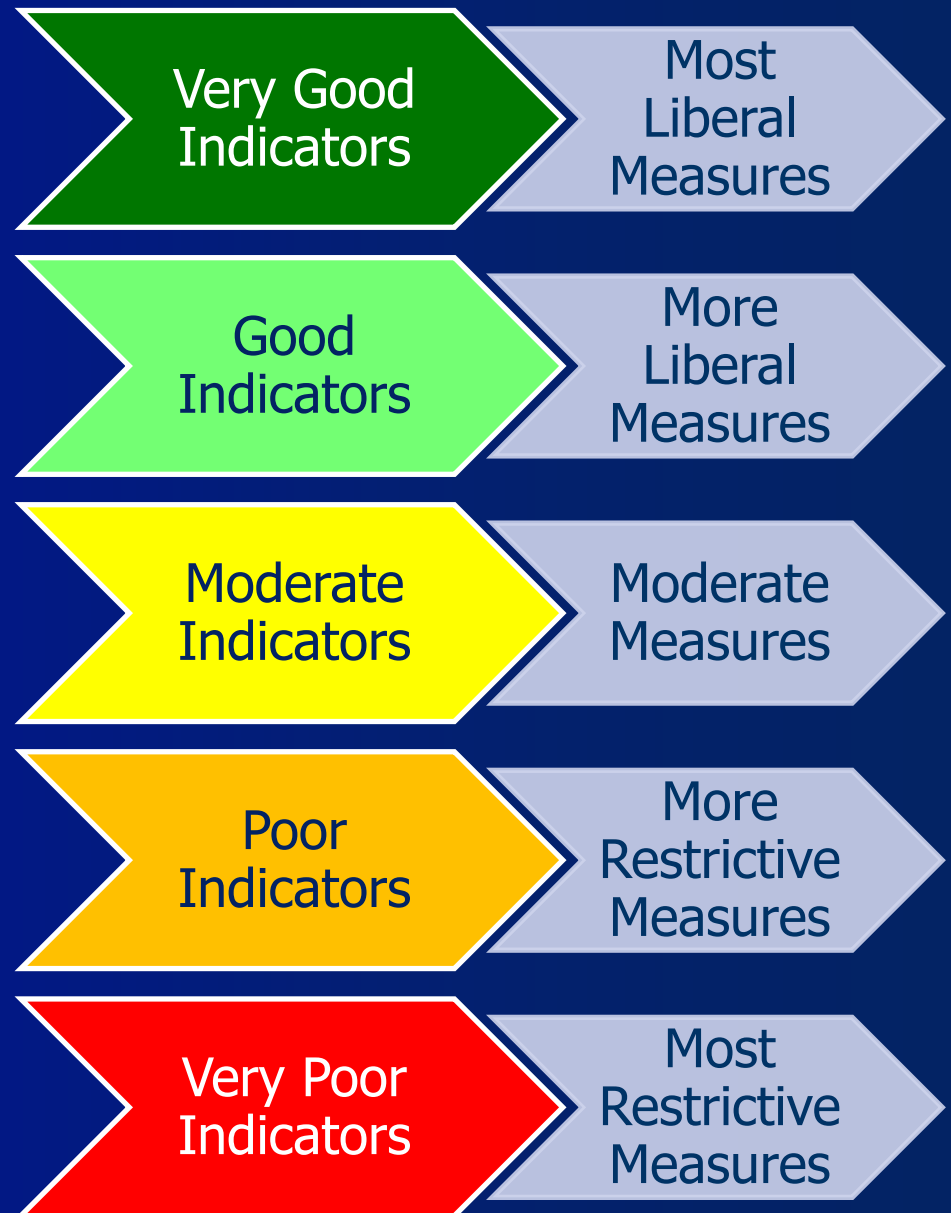
- Stock biomass compared to target
- Recent biomass trends
- Recent fishing mortality rate
- Recent recruitment
- Expected harvest under current bag/size/season



# Harvest Control Rule Approach

## How will measures be determined?

- Measures for each bin must be appropriate for a range of conditions.
- Will aim to achieve a target level of harvest, catch, or fishing mortality that is appropriate for that range of conditions.
- Informed by modeling approaches and stakeholder input.



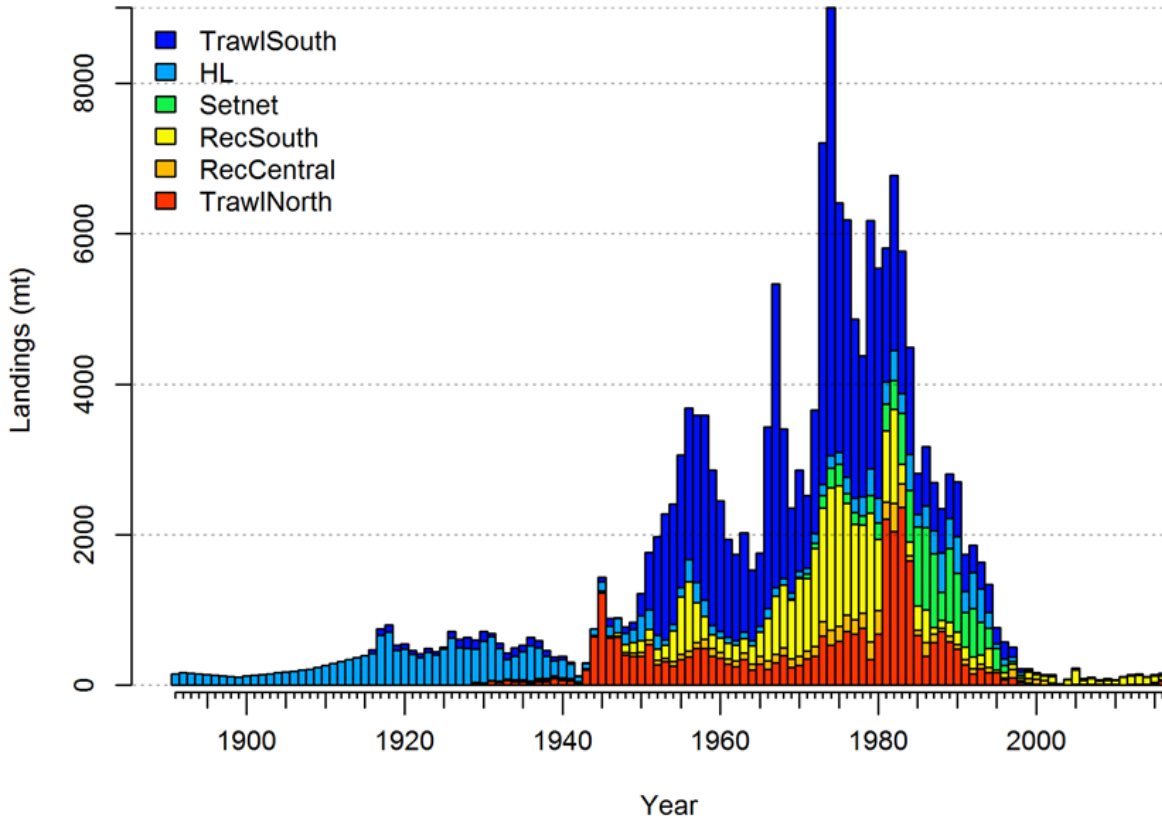


Rebuilding West Coast Groundfish Stocks and Fisheries  
Balancing Conservation and Opportunity



# Bocaccio

*Sebastes paucispinus*

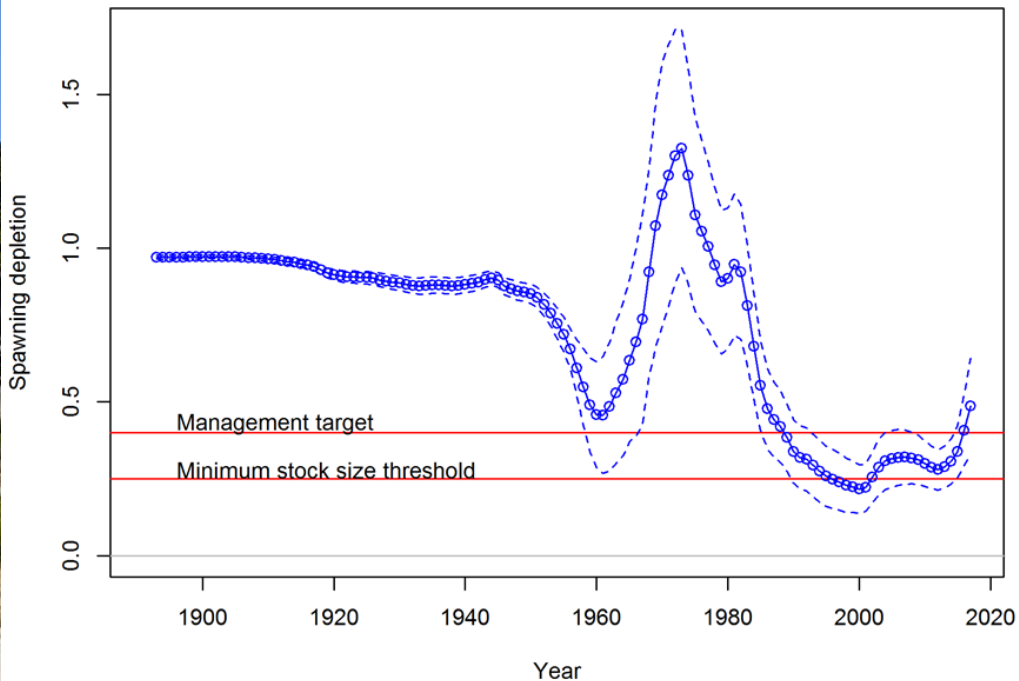


Vicky Okimura, Washington Department of Fish and Wildlife

- *Baja California to Gulf of Alaska*
- *Depth Range 15-180 fm (~30-300 m)*
- *Generally High Density 80-100 fm (~90-180 m)*



Spawning depletion with ~95% asymptotic intervals



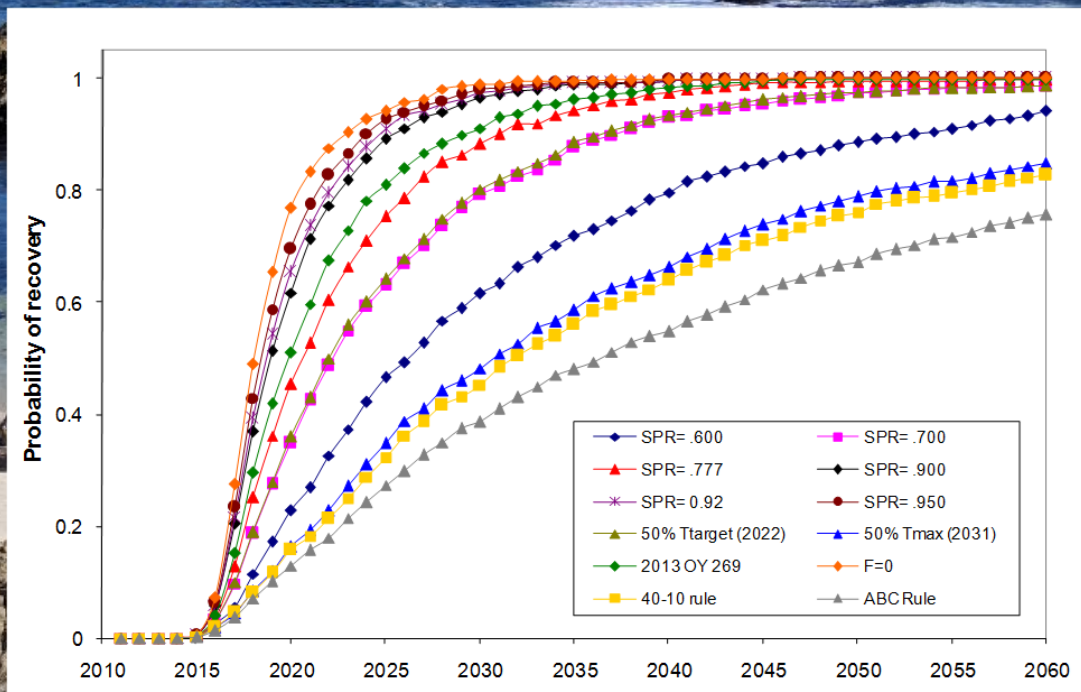
Declared Overfished South of Cape Mendocino CA in 2000

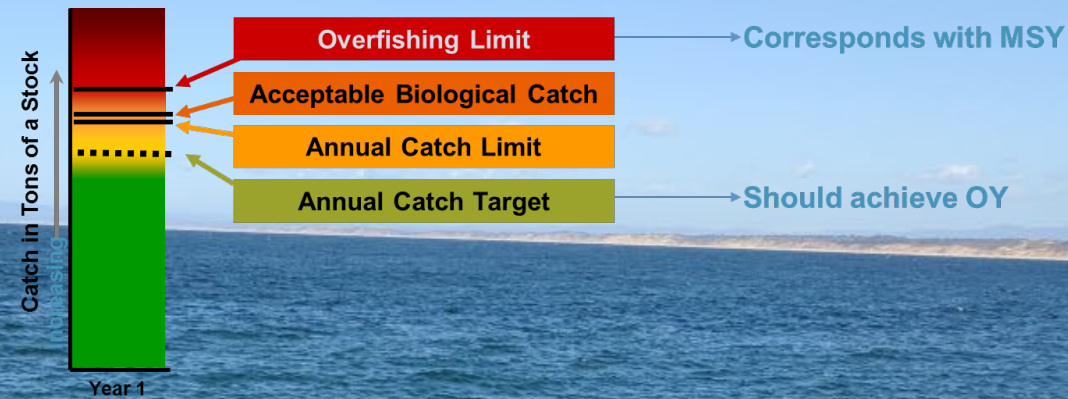
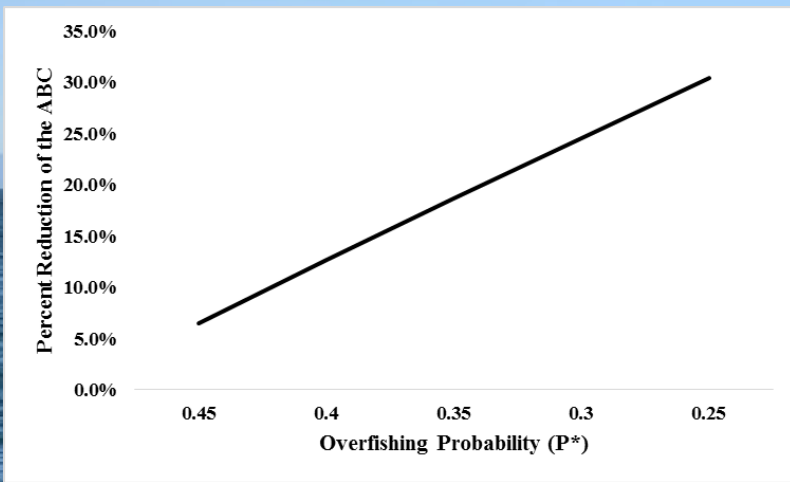
$T_{MIN}$  = Time to Rebuild in the Absence of Fishing = 2018

$T_{TARGET}$  = Target Time to Rebuild with 50% Probability = 2026

$T_{MAX}$  = Maximum Time to Rebuild ( $T_{MIN}$  + mean generation time) = 2031

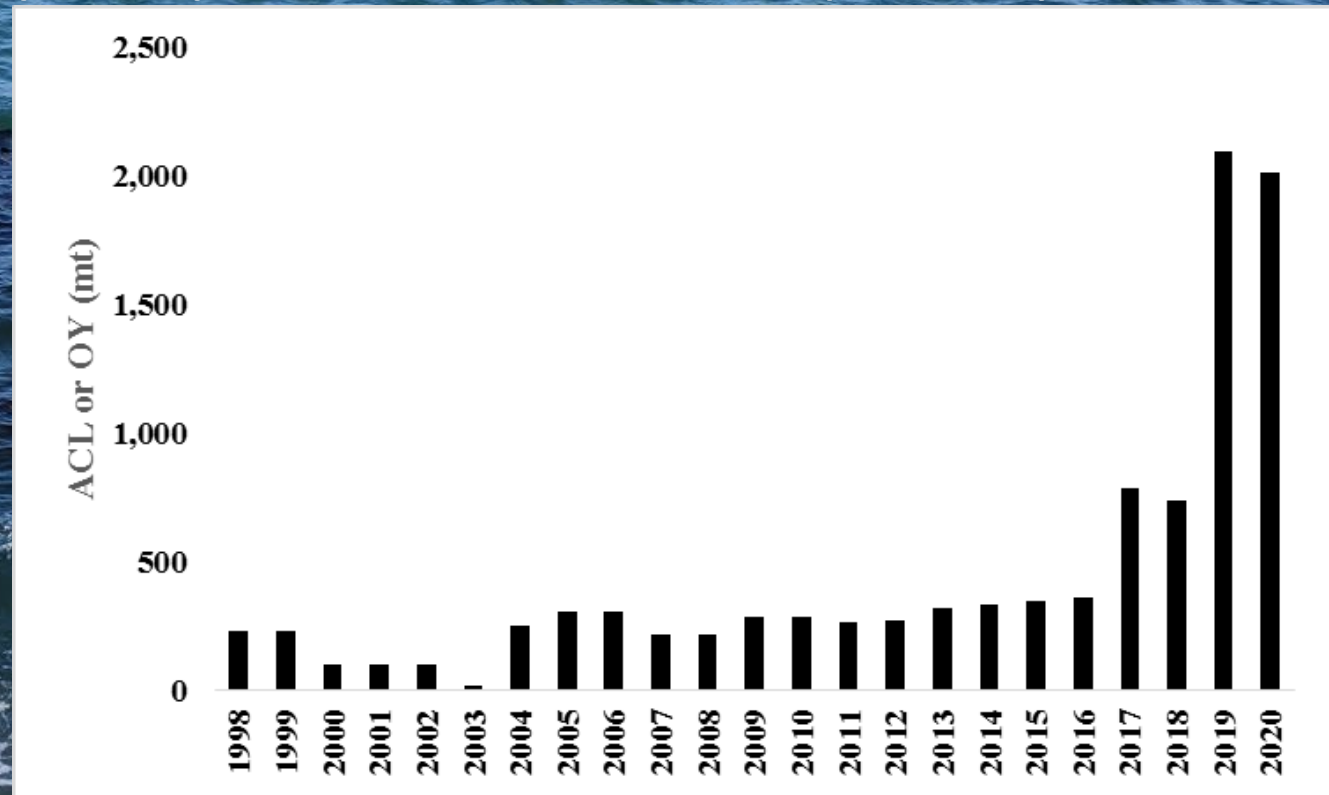
Declared Rebuilt in 2017





### Bocaccio Harvest Control Rules

Rebuilding "ACL" Harvest Control Rule: ABC ( $P^* = 0.45$ ), ACL (SPR = 77.7%)  
 Rebuilt (Default) Harvest Control Rule: ABC ( $P^* = 0.45$ ), ACL = ABC



# California Recreational Fishery Seasonal Closures and Depth Restrictions

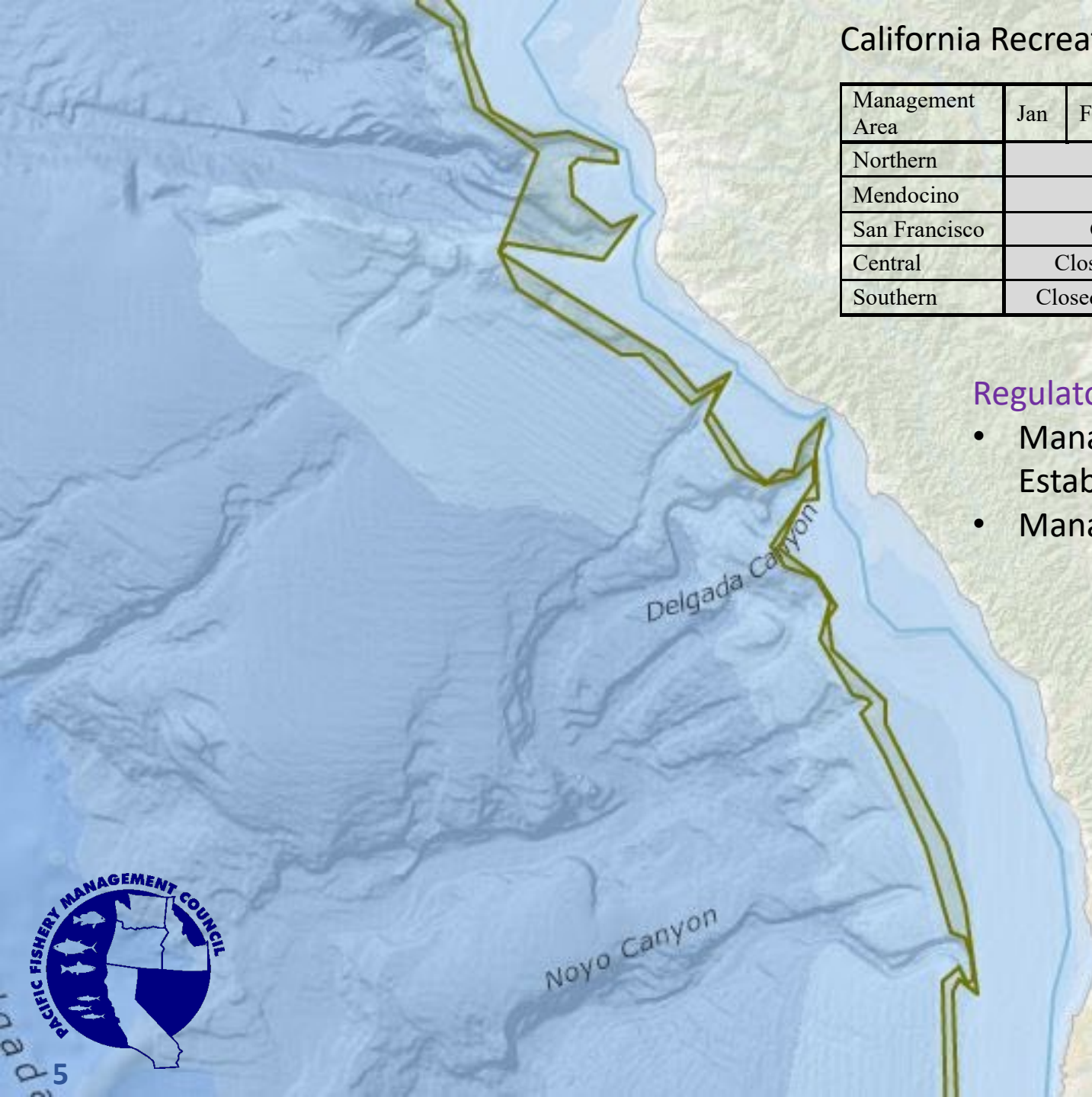
Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 1 – Oct 31 <30fm						All Depth	
Mendocino	Closed				May 1 – Oct 31 <20fm						All Depth	
San Francisco	Closed				April 15 – Dec 31 <40fm							
Central	Closed			April 1 – Dec 31 <50fm								
Southern	Closed		Mar 1 – Dec 31 <75 fm									

## Regulatory and Enforcement Challenges

- Management Lines Approximating Multiple Depth Contours Established in Regulation
- Management Line Enforceability Important

## Inseason Management is Critical

- Catch Monitored Continuously
- Pacific Council's Groundfish Management Team Tracks Catches Relative to Sector Harvest Guidelines
- Pacific Council Reviews Fishery Performance at Each of Five Council Meetings per Year with the Ability to Revise Regulations to Achieve But Not Exceed ACLs

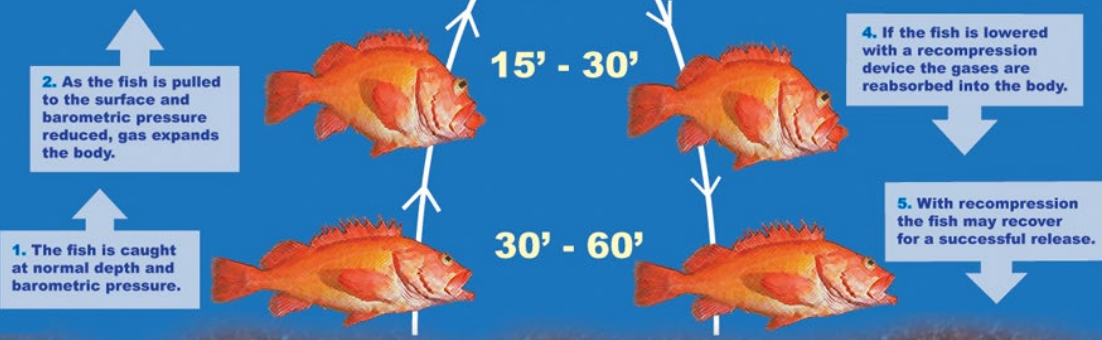




# Catch-and-Release + Recompression Reduces Barotrauma in Deep Water Species

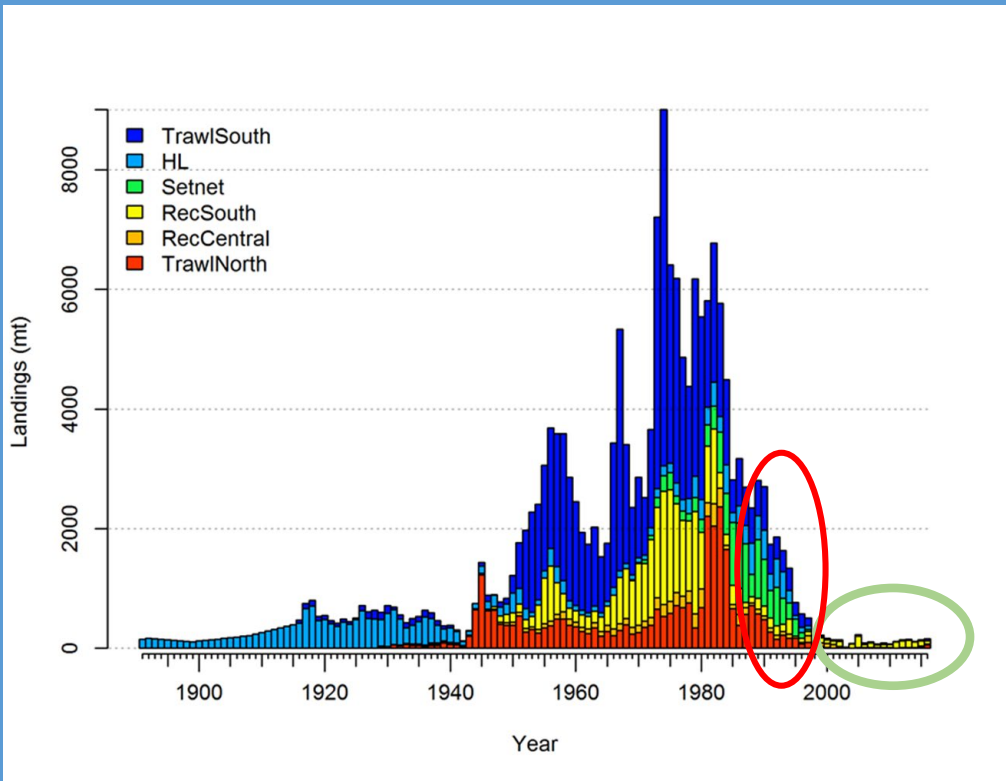


OCEAN SURFACE





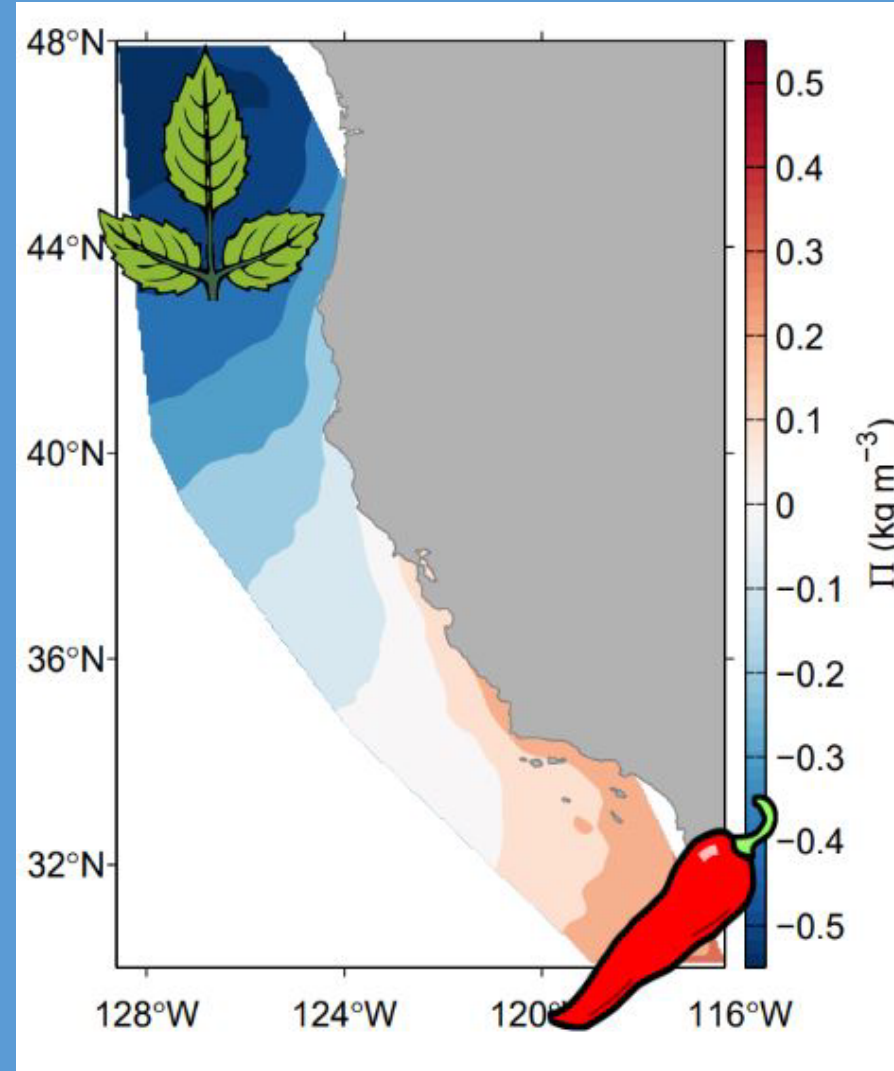
# Environmental Factors



## We Caught a Break

Reduced harvest since 1999 was coupled with favorable “minty” ocean conditions producing strong recruitment events.

Source waters of the California Current, for which sea level has been a historical indicator are a major driver of rockfish recruitment (minty- lower relative sea level; spicy – higher)



Pacific Subarctic Water (PSUW) originates from Gulf of Alaska region, tends to be cooler, lower salinity, and higher in oxygen and nutrients (minty).

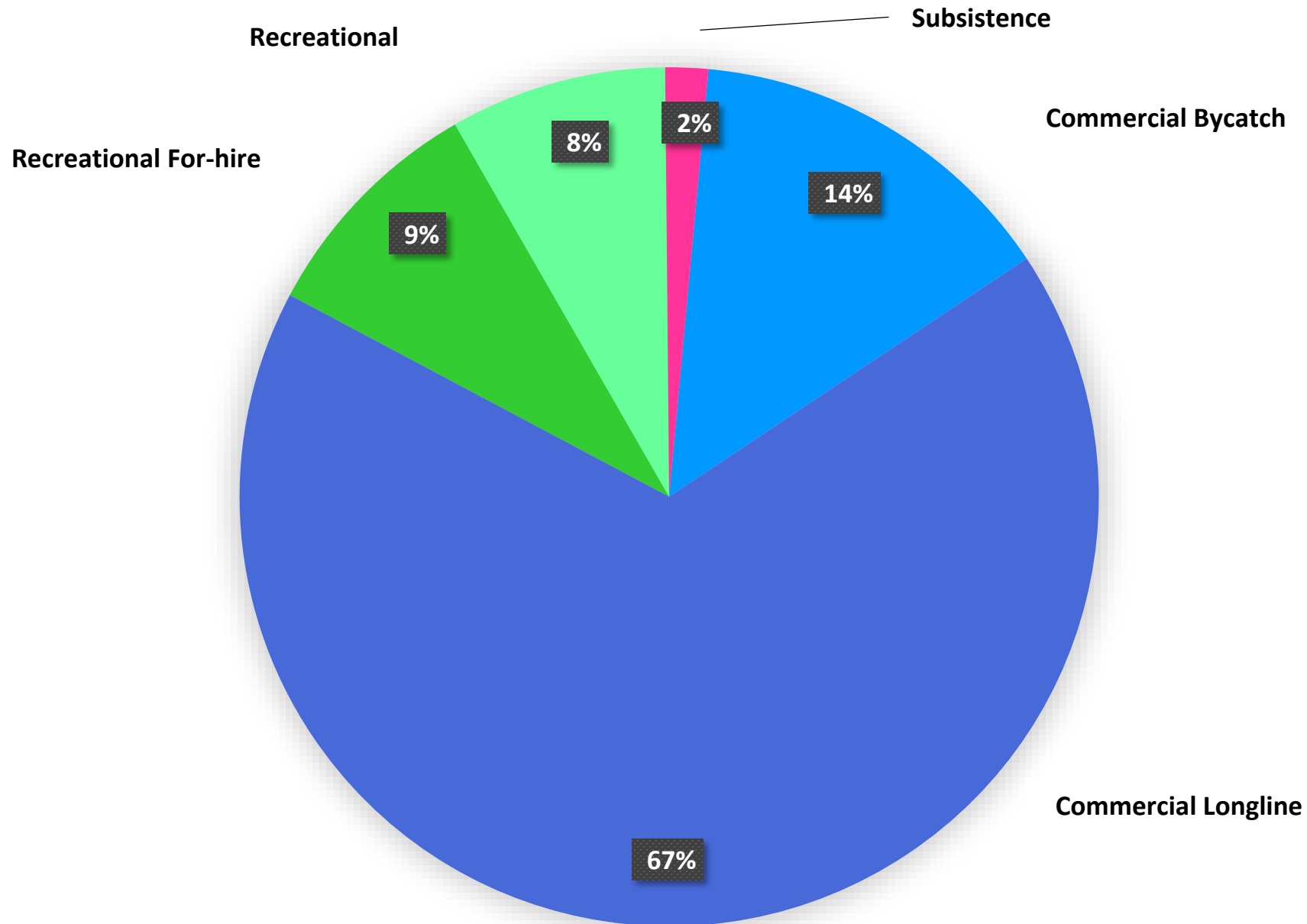
By contrast, Pacific Equatorial Water (PEW) reflects the poleward reach of the more subtropical waters of the California undercurrent, waters tend to be warmer, more saline, low oxygen, nutrient poor (spicy).

*Schroeder, et al., (2019) Source water variability as a driver of rockfish recruitment in the California Current Ecosystem: implications for climate change and fisheries management, Can, J. Aquat. Sci.*



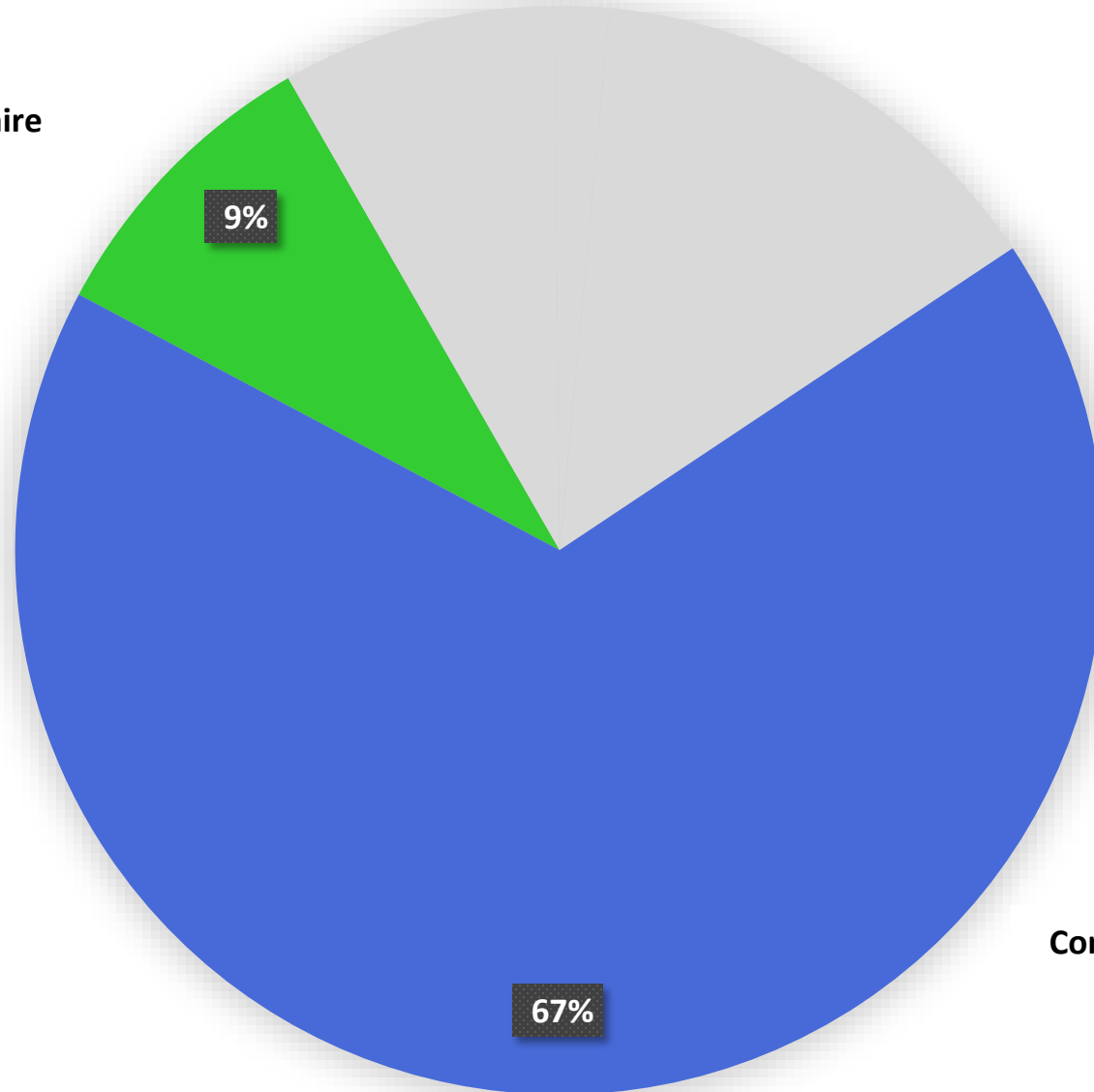
# Alaska Perspective on Recreational Catch Shares

# Alaska Halibut 2022 Catch Projections

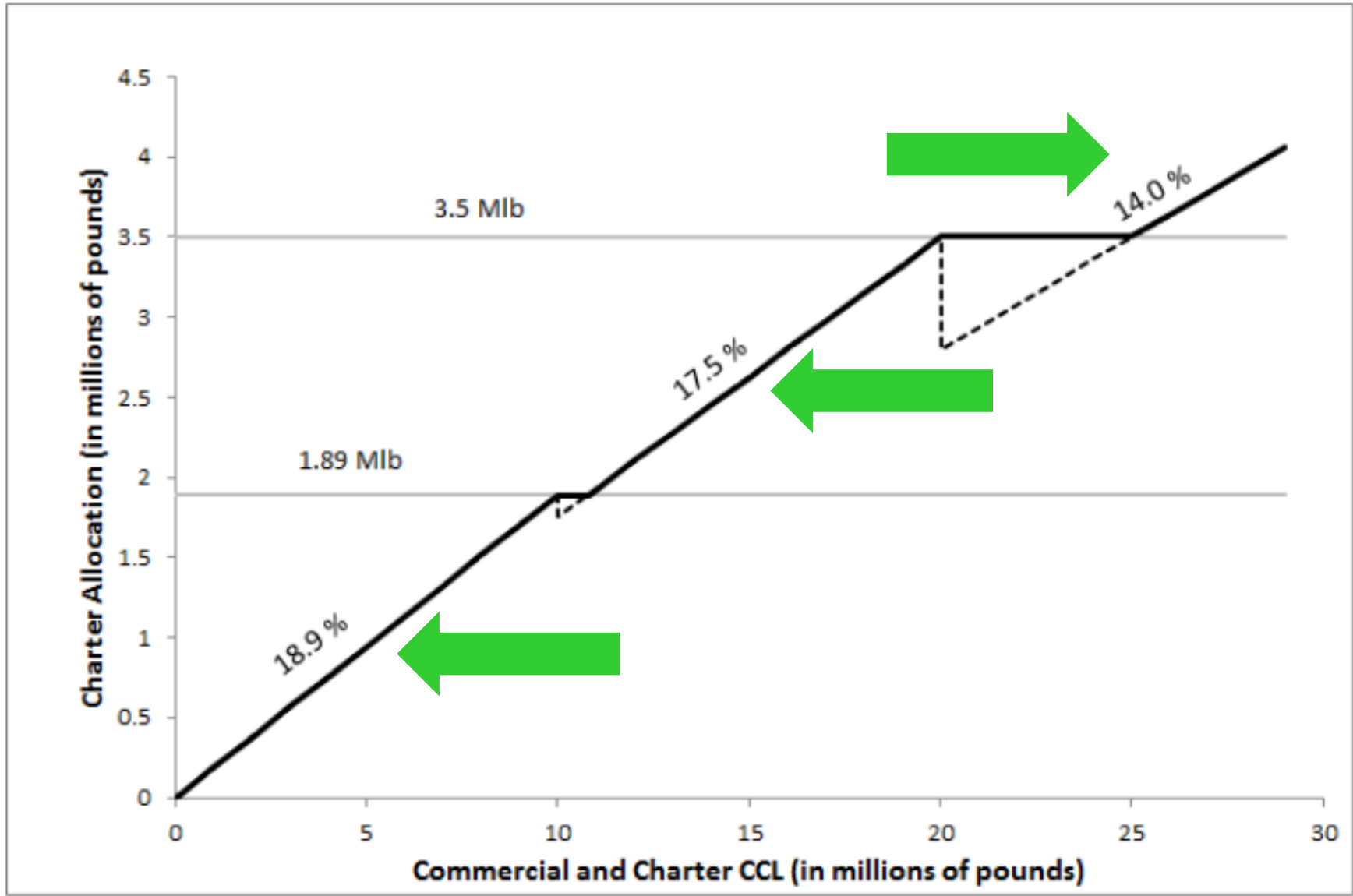


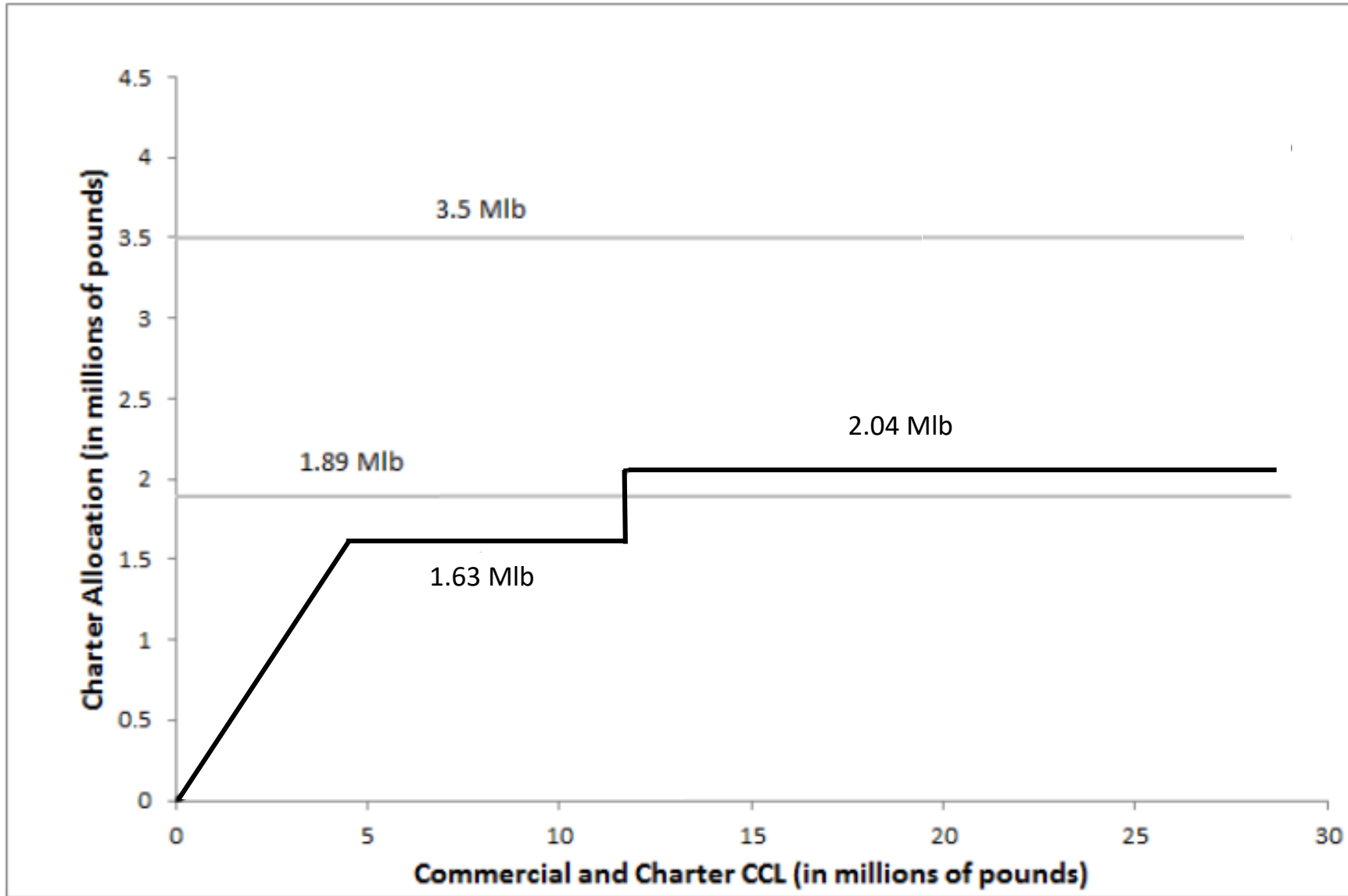
# Alaska Halibut Catch Share Program

Recreational For-hire



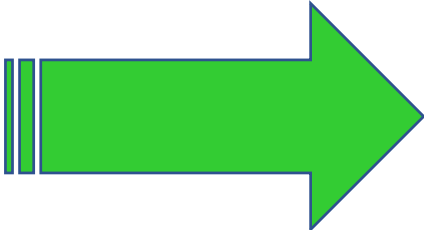
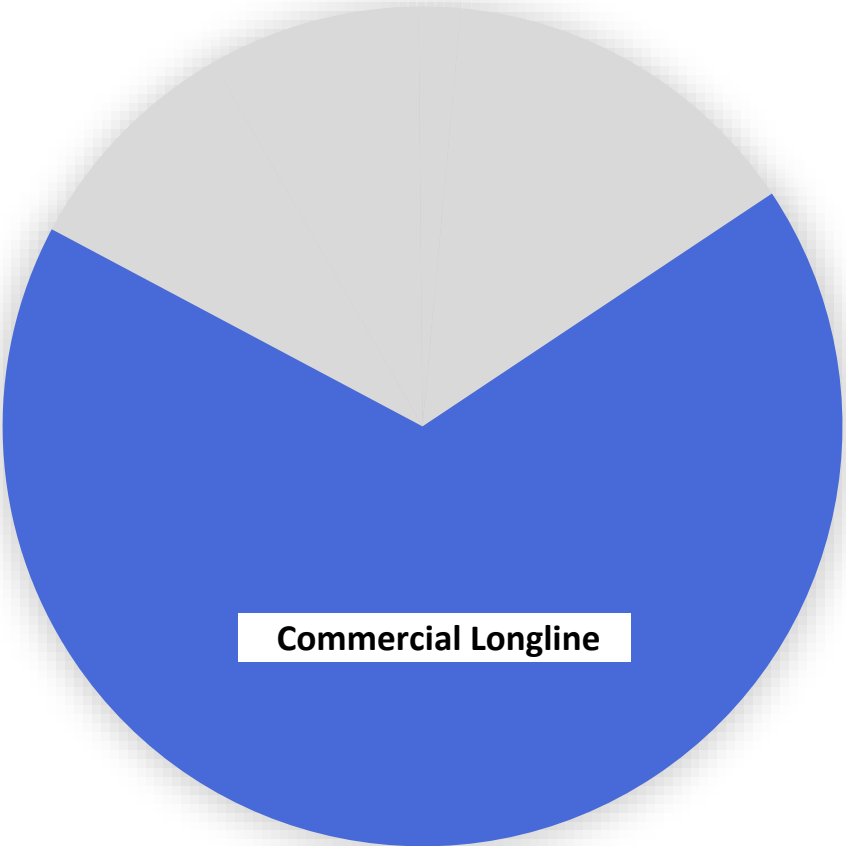
Commercial Longline





# Guided Angler Fish (GAF) Program

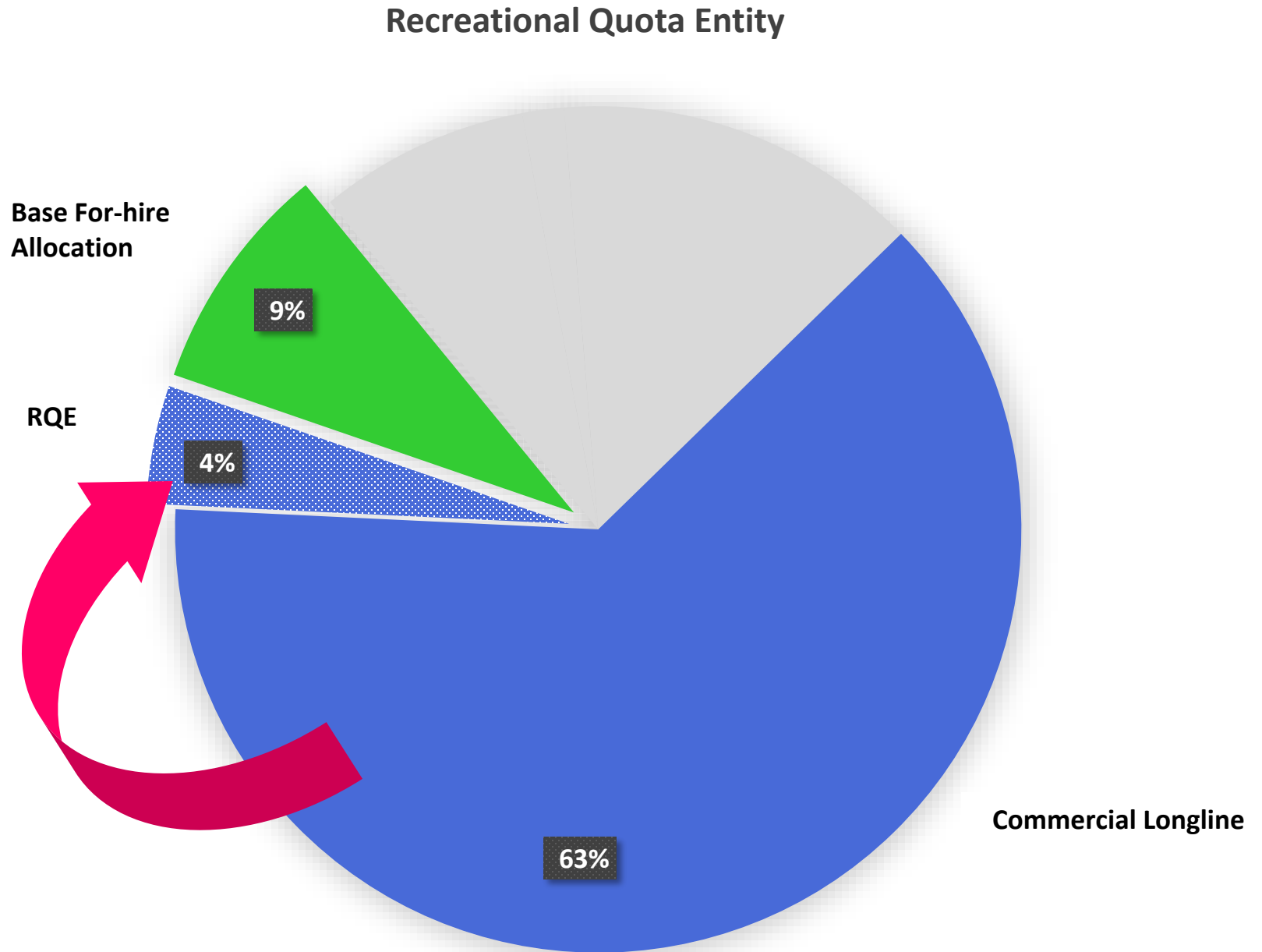
**One halibut, no  
size limit**



**Lease = 74 lbs.  
IFQ (2022)**



- Transfers allocation from commercial to RQE through a willing seller, willing buyer market-based transaction.
- Base Allocation + RQE Holdings = Total Allocation
- Max annual transfer cap and max accumulative cap.
- Halibut stamp required for guided angler to fish halibut with stamp revenue going to RQE









**NOAA**  
**FISHERIES**

# Optimum Yield:

## Balancing competing goals and objectives

Marian Macpherson

March 2022

***“The determination of OY is a decisional mechanism for resolving the MSA’s objectives, achieving an FMP’s objectives, and balancing the various interests that comprise the greatest overall benefits to the Nation.”***

*~ 50 CFR 600.310(b)(2)(ii)*

# We will discuss:

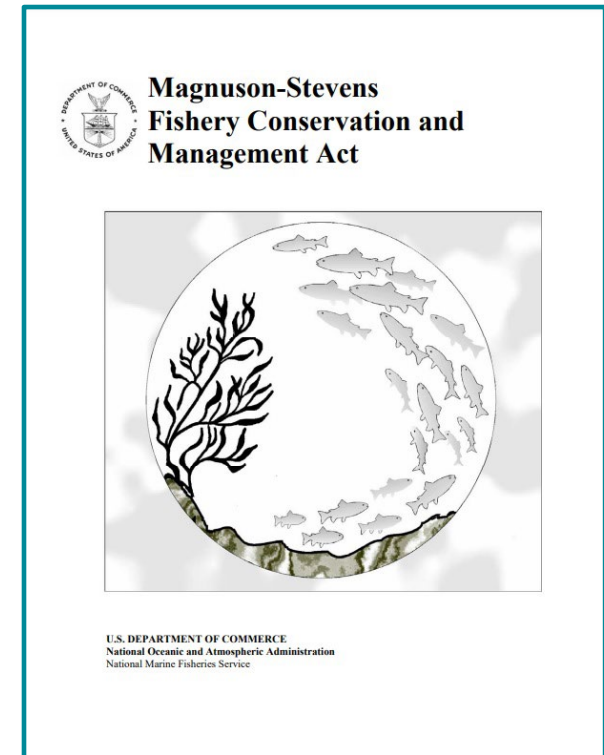
- **What does the MSA say?**
- **What is the Regulatory Guidance?**
- **Determining Greatest Benefits/Considering Factors**
- **How do FMPs address OY**
- **Snapshot: OY's Evolution over time**
- **Key Take-Aways**

# Requirements in the MSA

OY – “amount of fish,” (from a “fishery”),\*

Greatest benefit to Nation

- Food, Recreation, Ecosystems
- MSY as *reduced by* “ESE” factors\*
  - Economic
  - Social
  - Ecological
- Rebuild to MSY



NS 1: prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery

FMPs must: Specify MSY and OY; Prevent Overfishing and Rebuild; Annual Catch Limits (ACLs) and Accountability Measures (AMs)

# Regulatory Guidance

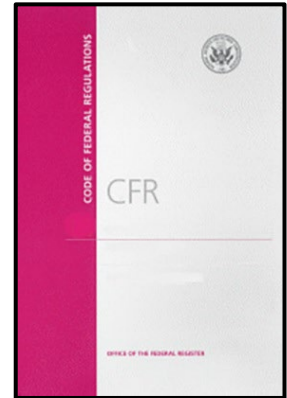
MSY: a long-term average

Overfishing, ACLs, and AMs: Limits and Flexibilities

Annual monitoring/flexibilities for 3-year averages; types of AM established; phased-in reductions

OY:

- Long-term goal
- Applies to Stock, Complex, or Fishery
- Linkage to FMP Objectives
- “Decisional Mechanism” for determining Greatest Benefit to Nation: what to consider for
  - Food, recreation, ecosystem, and ESEs



# Decisional Mechanism: Determining Greatest Benefits



## Values to Seriously Consider:

- Food Production
- Recreational Opportunities – *includes quality of experience and non-consumptive uses*

## ESE Factors that can reduce OY from MSY:

- Economic – *satisfaction of recreational needs*
- Social – *enjoyment from recreational fishing*
- Ecological

## Documentation and Process of OY Assessment:

- Summarize information considered
- Document how “greatest benefits” were determined
- Review on a continuing basis

# OY Decisional Mechanisms in FMPs

## Considering Values and ESE Factors

- OY established in the FMP: ESEs are considered through the FMP process, and OY is specified within the FMP
- Combo: The FMP establishes default control rules, but reference points (including OY) are reviewed through a public process for setting specifications.
- OY specified through the stock assessment process via a control rule that buffers down from MSY.

## Linkage to FMP objectives

- FMPs evolve over time





# Optimum Yield over 40 Years

by Marian Macpherson  
Office of Sustainable Fisheries, Silver Spring, MD

## Statutory and Regulatory Requirements

Optimum Yield	Optimum Yield	Optimum Yield	Optimum Yield	Optimum Yield	Optimum Yield
<ul style="list-style-type: none"> <li>Timing ambiguous</li> <li>Based on MSY (as modified)<sup>(FCMA)</sup></li> </ul>	<ul style="list-style-type: none"> <li>An annual goal <sup>(Req.)</sup></li> </ul>	<ul style="list-style-type: none"> <li>An annual goal <sup>(Req.)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Long-term average <sup>(Req.)</sup></li> <li>Based on MSY (as reduced)<sup>(BFA)</sup></li> <li>Must Rebuild <sup>(BFA)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Long-term average <sup>(Req.)</sup></li> <li>Based on MSY (as reduced)<sup>(BFA)</sup></li> <li>Must Rebuild<sup>(BFA)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Long-term average<sup>(Req.)</sup></li> <li>Based on MSY (as reduced)<sup>(BFA)</sup></li> <li>Rebuild and "Prevent" overfishing<sup>(Req.)</sup></li> </ul>
<p><u>Overfishing</u></p> <ul style="list-style-type: none"> <li>Long-term determination <sup>(Req. (1982))</sup></li> <li>Based on maximum yield, maximum biological yield or economic value <sup>(Req.)</sup></li> </ul>	<p><u>Overfishing</u></p> <ul style="list-style-type: none"> <li>Long-term determination <sup>(Req.)</sup></li> <li>Based on MSY <sup>(Req. (1989))</sup></li> </ul>	<p><u>Overfishing</u></p> <ul style="list-style-type: none"> <li>Long-term determination <sup>(Req.)</sup></li> <li>1989 regulation requiring OF definitions led to over 100 FMP overfishing definitions, mostly based on F- and B-targets</li> </ul>	<p><u>Overfishing</u></p> <ul style="list-style-type: none"> <li>Based on MSY <sup>(BFA)</sup></li> <li>"Long-term" removed from regulatory description <sup>(Req.)</sup></li> <li>SDCs to determine stock status <sup>(BFA)</sup></li> <li>MSY Control Rule <sup>(Req.)</sup></li> <li>Technical Guidance <sup>(75%MSY)<sup>(Revised)</sup></sup></li> </ul>	<p><u>Overfishing</u></p> <ul style="list-style-type: none"> <li>Based on MSY <sup>(BFA)</sup></li> <li>SDCs to determine stock status<sup>(BFA)</sup></li> <li>End OF "immediately"<sup>(MSRA)</sup></li> <li>ACLs <sup>(MSRA)</sup></li> <li>ABC control rule <sup>(Req.)</sup></li> </ul>	<p><u>Overfishing 2009</u></p> <ul style="list-style-type: none"> <li>Annual OFL <sup>(Req.)</sup></li> </ul> <p><u>Overfishing 2016</u></p> <ul style="list-style-type: none"> <li>Allows multi-year determination of status<sup>(Req.)</sup></li> </ul>

1976-83

1984-89

1990-95

1996-98

1999-08

2009-16

## Expressions of OY in FMPs

Most Common Forms	New Forms	New Forms/Issues	Shifts	Trends	Trends
<ul style="list-style-type: none"> <li>Size limits and seasons</li> <li>Weight or Number of fish</li> <li>All caught under management</li> </ul> <p><u>Additional Approaches</u></p> <ul style="list-style-type: none"> <li>Avoid "Biologically OF"</li> <li>Hard quota <sup>(Close on attainment)</sup></li> <li>Numeric Estimate</li> <li>Framework</li> <li>Aggregate OY</li> <li>85%MSY</li> </ul>	<ul style="list-style-type: none"> <li>Dual annual/long-term OY definitions (Long-term MSY; short-term IOY)</li> <li>TAC</li> <li>ABC</li> <li>MSY+10%</li> <li>Escapement Goals</li> </ul>	<ul style="list-style-type: none"> <li>6 councils developed OYs linked to F or B targets</li> <li>Direct linkage to preventing OF and/or rebuilding in OY definition</li> <li>Emerging focus on recruitment and reproductive capacity</li> <li>%SSBR (spawning stock biomass per recruit)</li> <li>%SPR (spawning potential ratio)</li> <li>2 new Frameworks</li> <li>2 new ABCs</li> </ul>	<ul style="list-style-type: none"> <li>Increasing use of F- and B-targets</li> <li>Shift from general expressions of management over time to specific targets</li> <li>No more exceeding MSY</li> </ul> <p>SAFMC: "There is no longer a distinction between OY and preventing OF."</p>	<ul style="list-style-type: none"> <li>Widespread reliance on OF criteria to define OY in FMPs</li> <li>Widespread use of F and B targets</li> <li>Widespread use of Technical Guidance Default %MSY</li> <li>Widespread use of Frameworks</li> </ul>	<ul style="list-style-type: none"> <li>OY=rebuilding plan</li> <li>OY=Technical Guidance Default</li> <li>OY defined in terms of OFL, ABC, and/or ACL</li> <li>OY removed from FMP</li> <li>OY established by SSC</li> <li>Widespread use of Frameworks</li> </ul>



# Key Take-Aways:

## OY

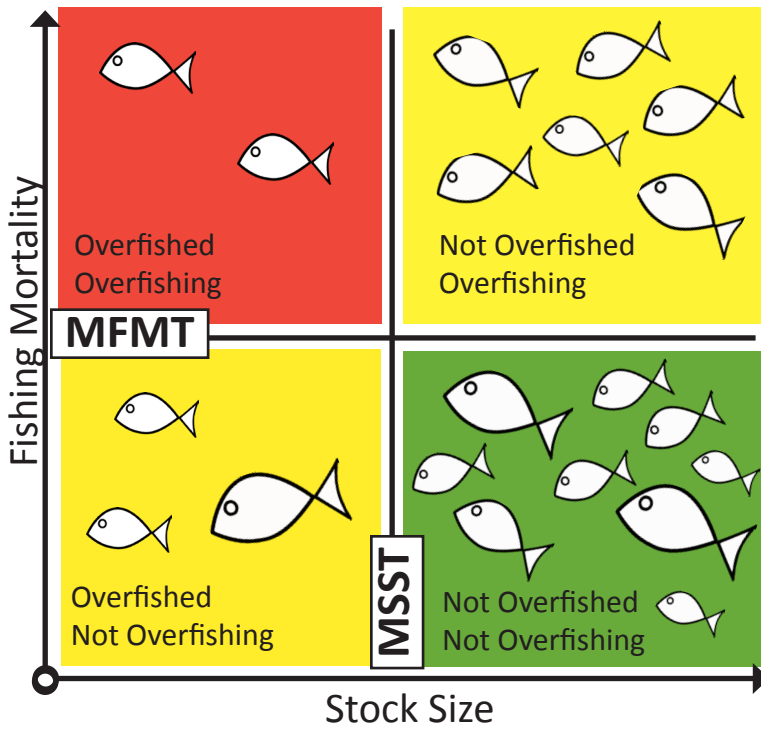
- **Determining OY = balancing interests**
- **The “What” - Consider recreational interests**
- **The “How” - Process set forth in each FMP? Where is *your* chance to provide input?**
- **Review Objectives of the FMP**

## Overfishing Restrictions/Flexibilities

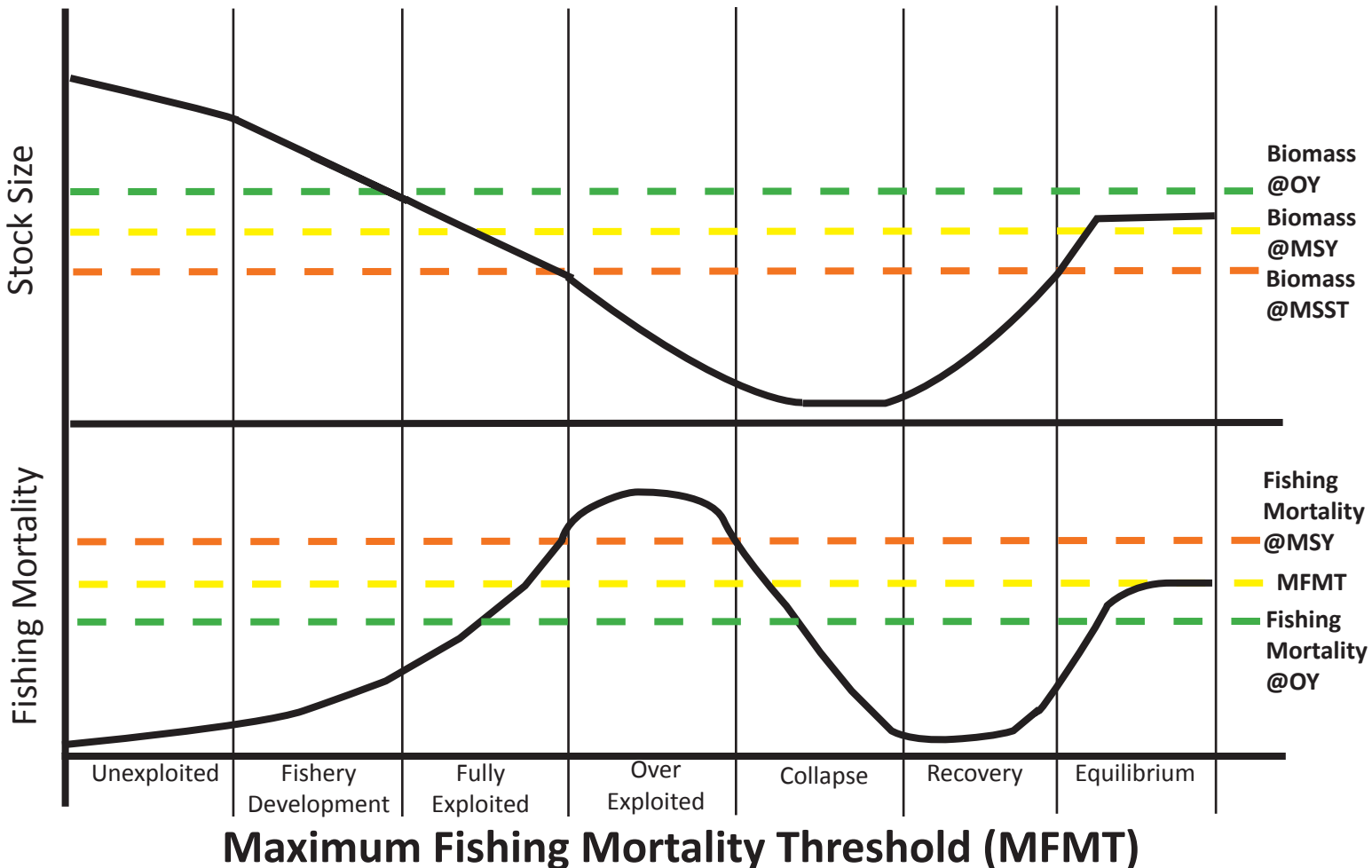
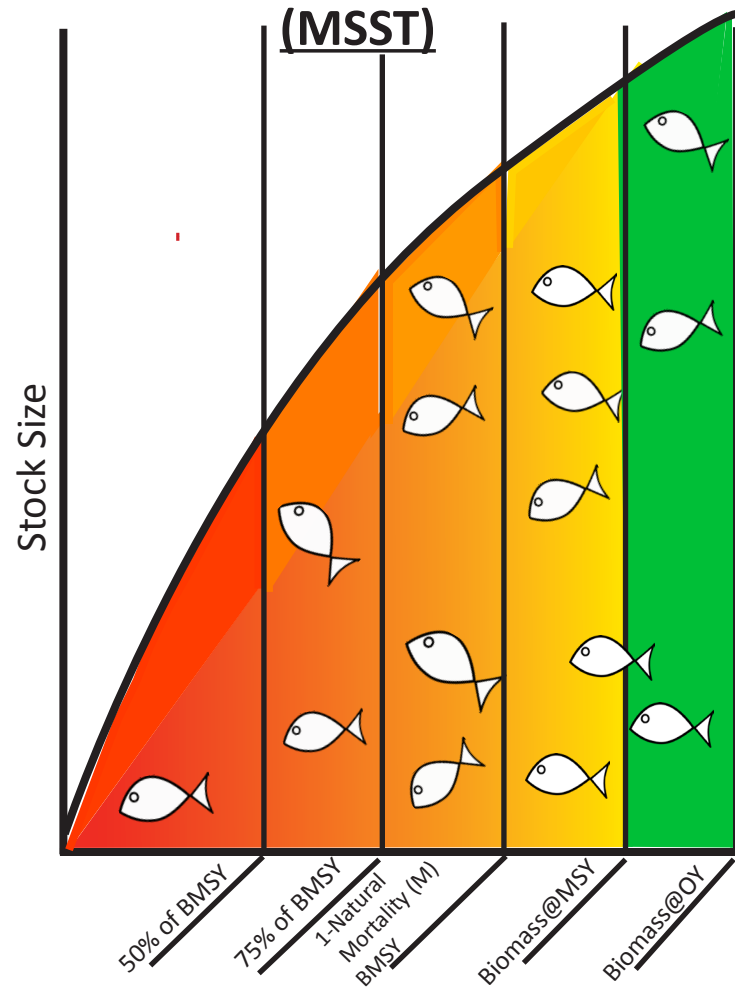
- **OY is not a magic bullet; Annual Overfishing constraints**
- **Flexibilities:**
  - **3-year rolling average to monitor for overfishing**
  - **Phased-in Accountability Measures**
  - **Design of Accountability Measures**

# Questions?

## Stock Status



## Minimum Stock Size Threshold (MSST)



## Status Determination Criteria Definitions

### **Maximum Sustainable Yield Proxy (MSY)**

The largest long-term average catch, or yield that can be taken from a stock or stock complex each year on a continuing basis under prevailing conditions (ecological, environmental, fishery characteristic). MSY can rarely be calculated with accuracy, so a proxy that can be more readily calculated and represents a sustainable level of harvest is usually used.

### **$F_{MSY}$**

The rate of fishing mortality that, if applied over the long term, would result in catching the MSY.

### **$B_{MSY}$**

The long-term average size of the stock or stock complex that would be achieved by fishing at a constant fishing mortality rate equal to  $F_{MSY}$ . It can be measured in terms of spawning biomass or other appropriate measure of the stock's reproductive potential.

### **Minimum Stock Size Threshold (MSST)**

The biomass level that a stock can decline to before being declared overfished (stock abundance is too low) and requiring a rebuilding plan. It can be no lower than 50% of the  $B_{MSY}$ .

### **Maximum Fishing Mortality Threshold (MFMT)**

Maximum fishing mortality threshold (MFMT) is the rate of fishing mortality above which a stock is declared to be experiencing overfishing (fish are being removed at too rapid a rate). MFMT may not exceed  $F_{MSY}$ .

### **Optimum Yield (OY)**

Optimum yield (OY) is a level of harvest that will provide the greatest overall benefit to the Nation, and is based on MSY as reduced by any relevant economic, social, or ecological factor. It takes the protection of marine ecosystems into account and, in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the MSY or MSY proxy.

### **Spawning Potential Ratio (SPR)**

Spawning potential ratio (SPR) assumes that a certain amount of fish must survive and spawn in order to replenish the stock. It is calculated as the average number of eggs per fish over its lifetime when the stock is fished compared to the average number of eggs per fish over its lifetime when the stock is not fished.

# Optimum Yield: challenges

Jorge Holzer - UMD

*2022 National Saltwater Recreational Fisheries Summit*

Arlington, March 30<sup>th</sup>



COLLEGE OF  
AGRICULTURE &  
NATURAL RESOURCES

DEPARTMENT OF AGRICULTURAL AND  
RESOURCE ECONOMICS

# MSY & Optimum Yield (OY)

- “...MSY as reduced by any relevant economic, social, or ecological factor...” (MSA)
- How do we adjust it?
- By adopting management that takes anglers’ preferences into account.
- Yield is problematic, implies a quantity. First you determine desired quality and then provide quantity.



# In order to determine OY, we need to understand anglers' preferences....

- What determines the quality of the fishing trip for anglers? How important is the # of fish caught and kept?
- What are the trade-offs anglers face in their choice of when and where to go fishing? Probabilities?
- Are the regulations (e.g., size and bag limits) just restrictions or they convey additional information?
- Does trip quality depend on the type of angler (e.g., catch-and-release vs focus on keep)?





# In order to determine OY, we need to understand anglers' preferences....

- We can then communicate to the Councils what rec. fishermen are looking for.
- Councils can then incorporate that information in their decision making.
- E.g., using bioeconomic models we can select regulations that, while restricting harvest, preserve the quality of the trip.
- However, eliciting anglers' preferences is not an easy exercise.



# Eliciting anglers' preferences....

- We use focus groups to hear directly from anglers what they care about when going fishing.
- We can also design surveys to understand anglers' choices.
- Next time you are asked to fill out one of these surveys, do it! Helps us understand.
- We also use approaches based on observed behavior (revealed preference).



# Eliciting anglers' preferences....

## SECTION A: YOUR RECREATIONAL SALTWATER FISHING EXPERIENCES

These questions are about you and your recreational saltwater fishing experiences.  
Please do not include any information about other people you go fishing with.

1. Within the last five years, which of the following species have you gone fishing for, even if you didn't catch or keep any? Please select all that apply.



Summer Flounder



Black Sea Bass



Scup

None of these species → Go to Section D on Page 11

2. During 2021, which of the following species did you go fishing for, even if you didn't catch or keep any? Please select all that apply.



Summer Flounder



Black Sea Bass



Scup

3. During 2021, on how many trips did you go fishing for summer flounder, black sea bass, or scup, even if you didn't catch or keep any? Please fill in the number of trips by fishing mode.

Party or head boat (usually 25 or more anglers per boat)..... #  2021 trips

Charter or guide boat (usually 1-6 anglers per boat)..... #  2021 trips

From shore..... #  2021 trips

Private boat (owned or rented by you, a friend, or a relative)..... #  2021 trips

## SECTION B: SALTWATER FISHING TRIPS

Suppose that you have the choice between two recreational saltwater fishing trips (Trip A or Trip B) and not going recreational saltwater fishing (Trip C). Below the table, indicate which of these three options would be your first choice.

### REGULATIONS

You are legally allowed to keep:  
5 Fluke (Summer Flounder), 18" or longer  
15 Black Sea Bass, 13" or longer  
50 Scup, 9" or longer

TRIP FEATURES		Trip A	Trip B	Trip C
CATCH	<b>TOTAL NUMBER OF FISH YOU CATCH</b> This number includes both undersized and legal size fish.	11 Fluke	6 Fluke	
	<b>NUMBER OF LEGAL-SIZE FISH YOU CAN KEEP</b> These fish are at least legal minimum size.	5 Fluke	5 Fluke	
	<b>TOTAL NUMBER OF OTHER FISH YOU CATCH</b> Other fish you catch.	7 Black Sea Bass 11 Scup	4 Black Sea Bass 14 Scup	
TRIP DETAILS	<b>NUMBER OF OTHER LEGAL-SIZE FISH YOU CAN KEEP</b> Other fish you catch on this trip that can be legally kept.	3 Black Sea Bass 6 Scup	1 Black Sea Bass 7 Scup	Do something other than saltwater fishing.
	<b>TOTAL TRIP COST</b> Your share of the fishing-related, transportation, and other expenses. This cost would not cover anyone else on the trip.	\$300	\$225	

# Summary

- To implement OY we need to understand anglers' motivations and preferences (assessment of values).
- Additionally, need to assess which anglers catch what and when over the season (sorting of values).
- Time dimension: how does the fishing experience, partly determined by regulation, impact participation over time (if that is a policy goal)?



Thank you