

# MSE and Harvest Strategy Policy updates

Agenda item: 6.1

IPHC-2023-IM099-11

(A. Hicks, I. Stewart, D. Wilson)





# Management Strategy Evaluation (MSE)

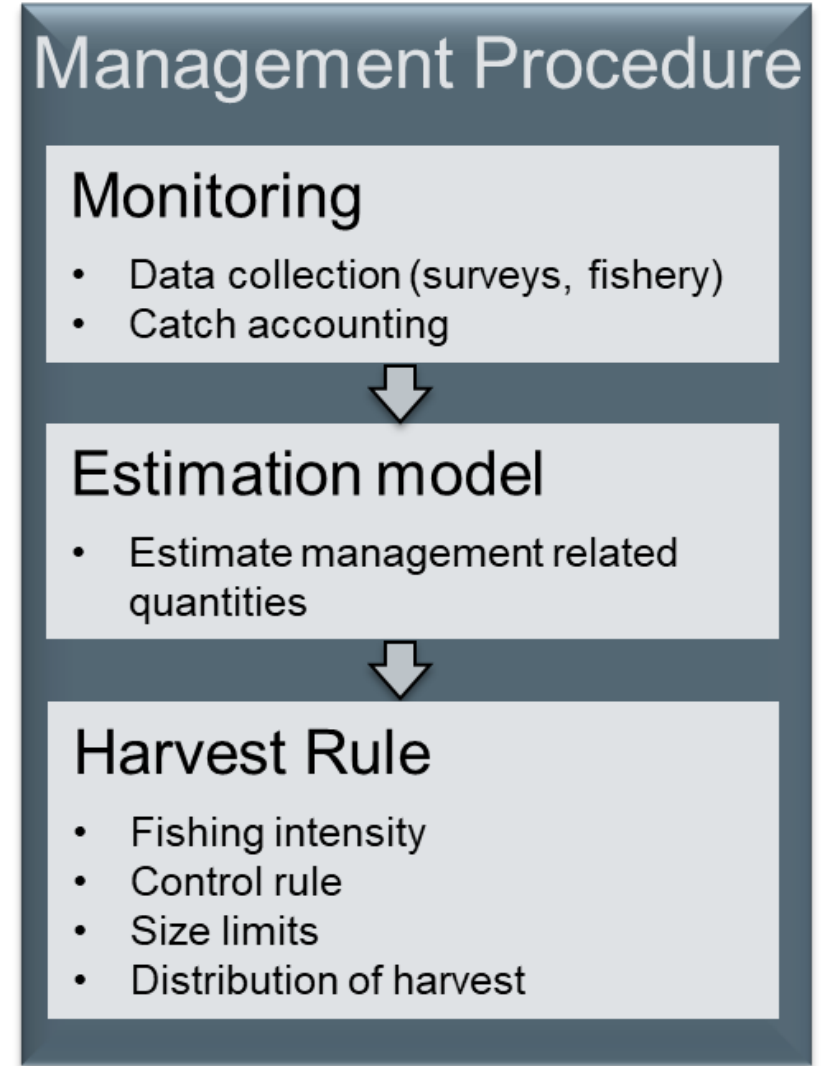
a process to  
**evaluate** harvest  
strategies and develop a  
**management procedure**  
that is **robust** to  
**uncertainty** and  
meets defined objectives





# Uses of MSE

- Evaluate many different elements of MPs
  - Size limits
  - Fishing intensity (i.e. SPR)
  - Assessment frequency
- Assist in the development a Harvest Strategy Policy
- Meet requirements of certification agencies
  - Marine Stewardship Council
- Design monitoring strategies
  - FISS designs
- Examine scenarios
  - Environmental effects





# Harvest Strategy Policy

A framework for applying a consistent and transparent science-based approach to setting mortality limits while ensuring sustainability

- Policy and process for setting mortality limits
- Objectives and standards for management of the fishery
- Reference points
- Balancing risk, cost, and catch
- Rebuilding strategies
- Validation of the harvest strategy
- Joint management



# Harvest Strategy Policy Framework

**IPHC-2023-SRB023-R**, para. 30: *The SRB **RECOMMENDED** that the Commission consider revising the harvest policy to*

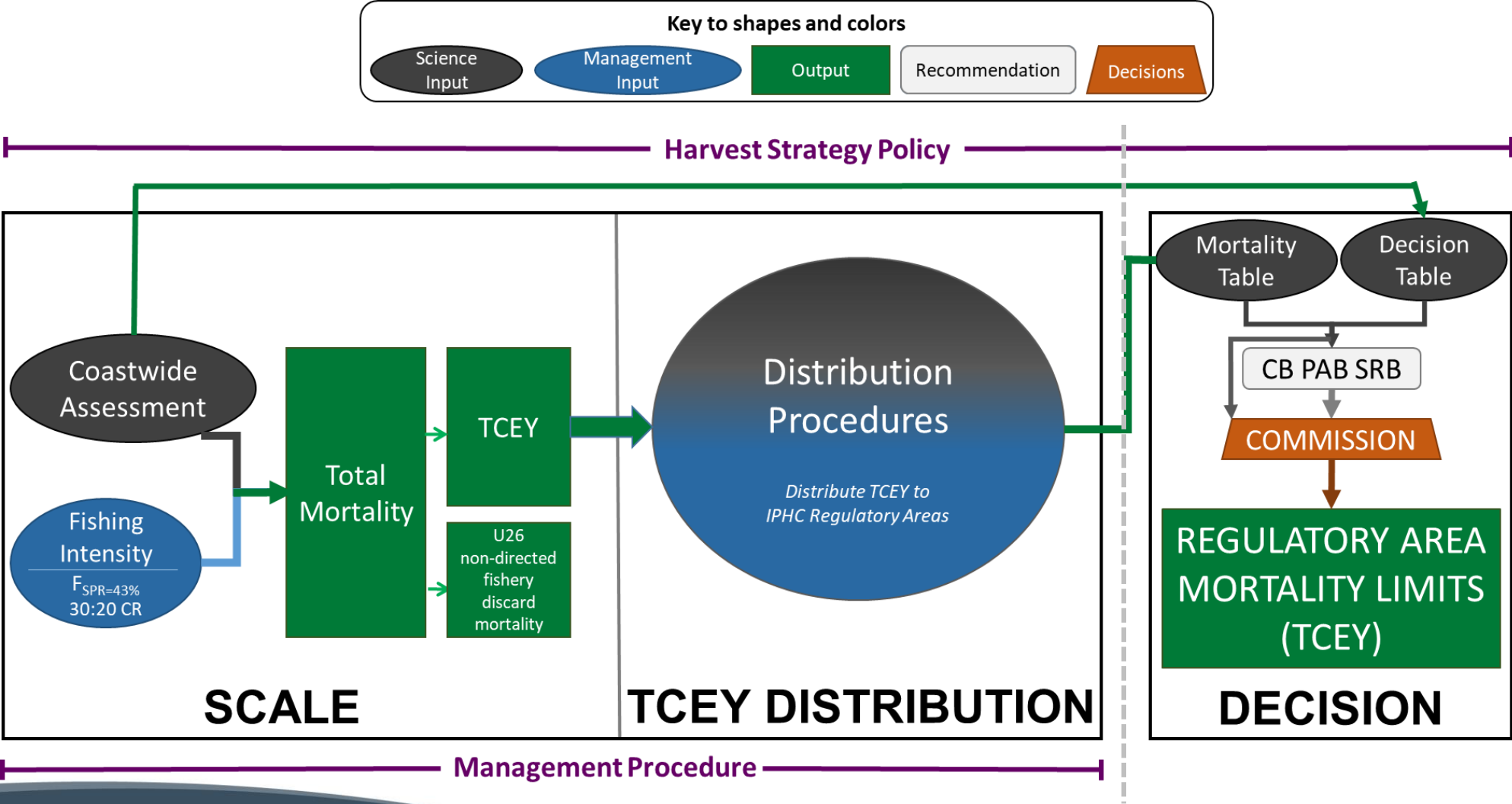
*(i) determine coastwide TCEY via a formal management procedure and*

*(ii) negotiate distribution independently (e.g. during annual meetings).*

*Such separated processes are used in other jurisdictions (e.g. most tuna RFMOs, Mid Atlantic Fishery Management Council, AK Sablefish, etc.).*

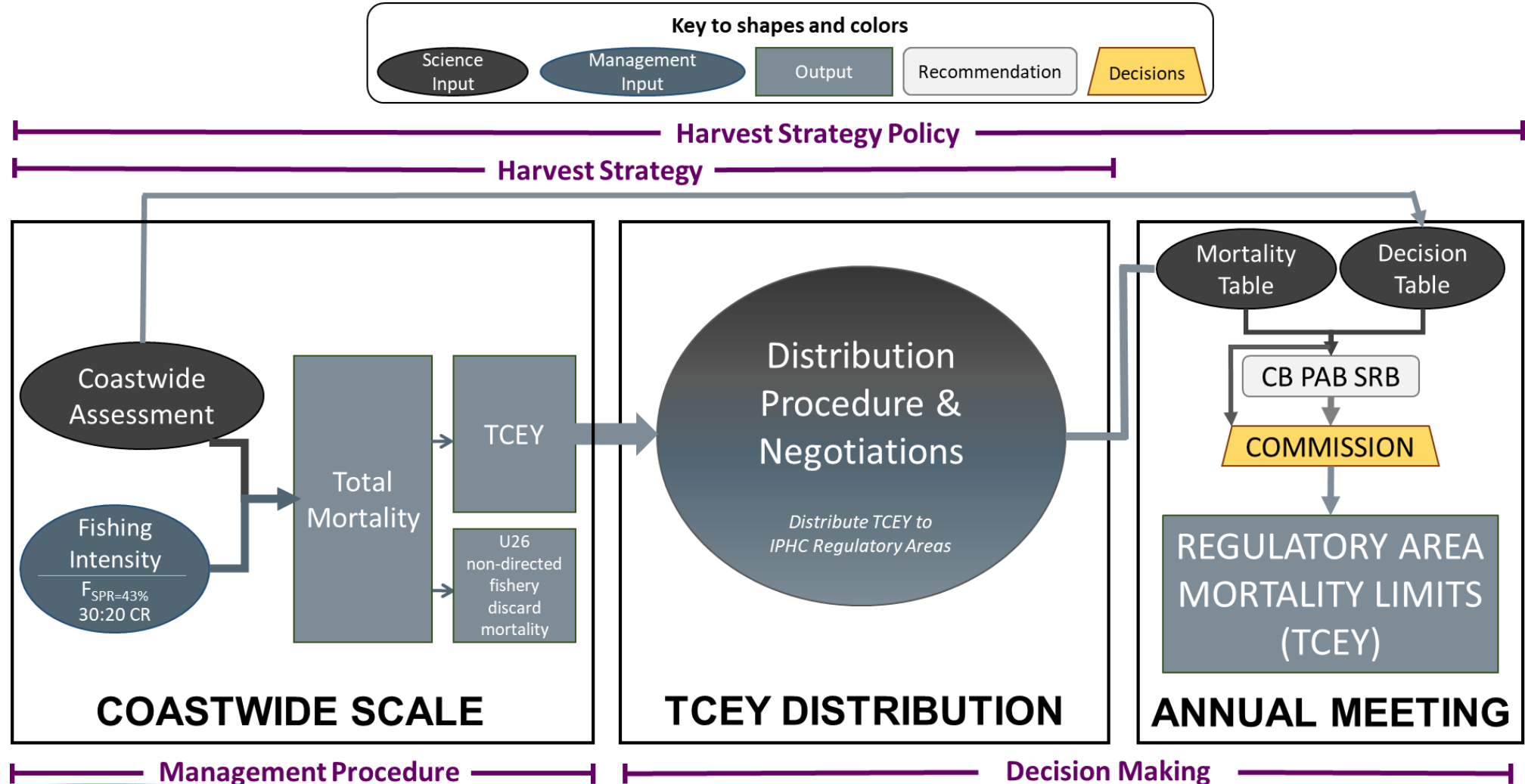


# Harvest Strategy Policy Framework





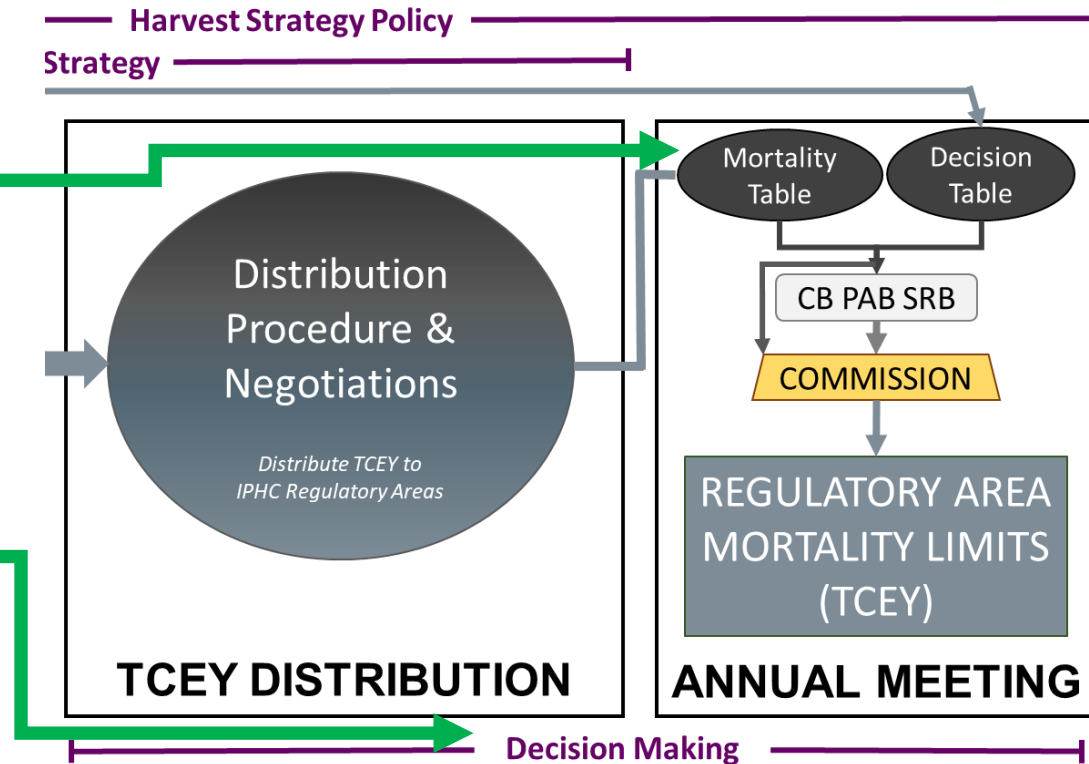
# Harvest Strategy Policy Framework





# TCEY Distribution Procedure

- Separating TCEY distribution can be part of the harvest strategy and decision-making
- A defined reference distribution procedure may be useful to inform the decision-making process
- MSE simulations can represent this HSP framework
  - Incorporate decision-making uncertainty
  - Can still use the “conserve spatial population structure” objective





# Objectives and Performance Metrics

- Four priority coastwide objectives are currently endorsed for the MSE.
  - a) Maintain the long-term coastwide female spawning stock biomass above a biomass limit reference point (B20%) at least 95% of the time.
  - b) Maintain the long-term coastwide female spawning stock biomass above a biomass reference point (B36%) at least 50% of the time.
  - c) Optimise average coastwide TCEY.
  - d) Limit annual changes in the coastwide TCEY.

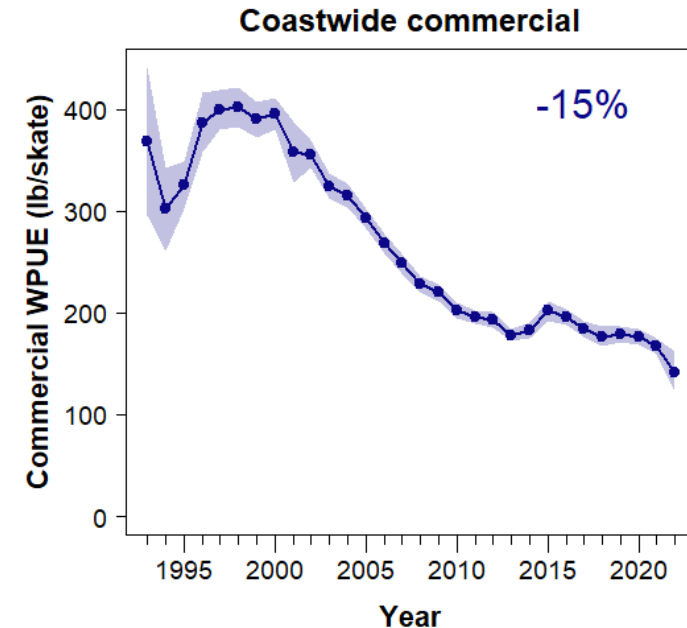
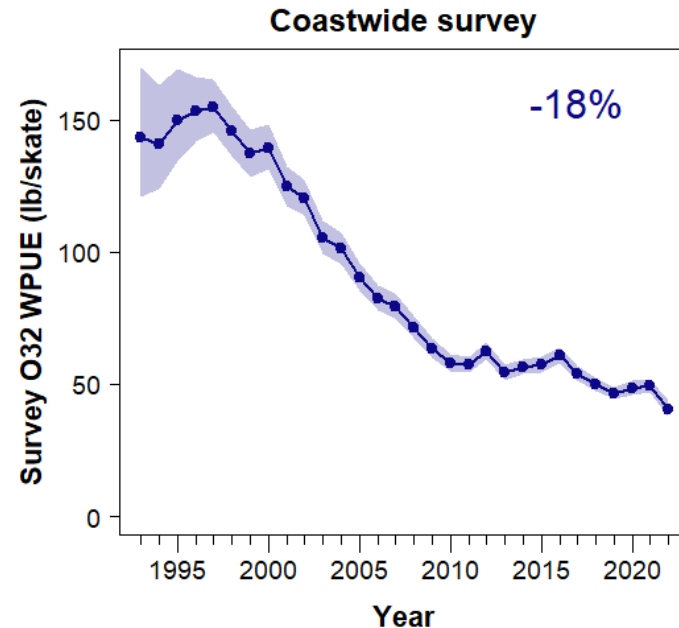
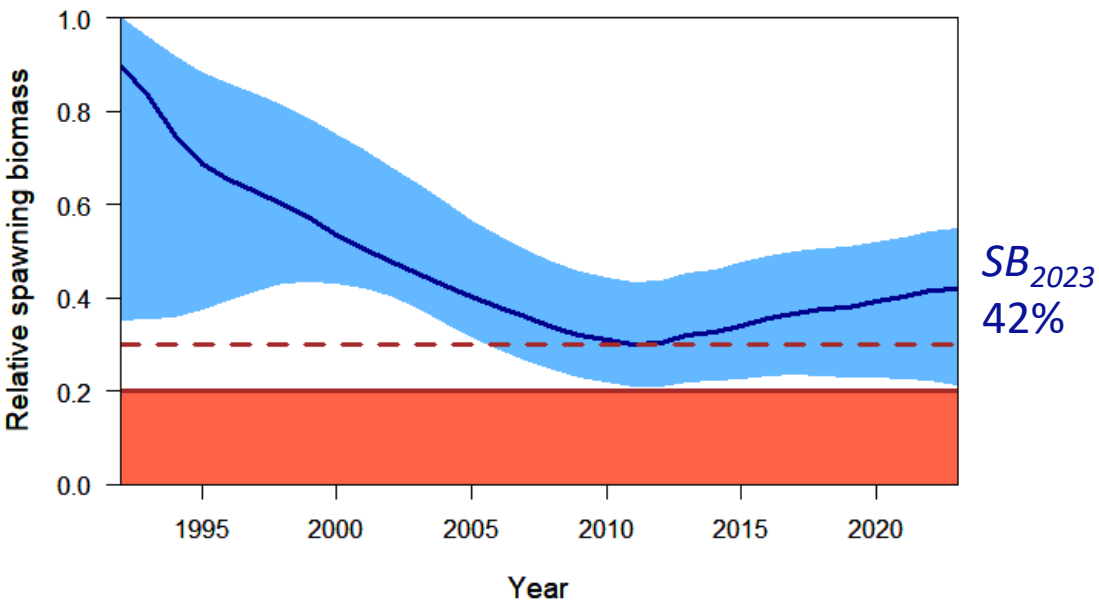
**IPHC-2023-SRB023-R**, para. 25. *The SRB **RECOMMENDED** that the Commission re-evaluate the target objective for long-term coastwide female spawning stock biomass given that estimated 2023 female spawning biomass (and associated WPUE), which was well-above the current target B36%, in part triggered harvest rate reductions from the interim harvest policy. Such ad-hoc adjustments limited the value of projections and performance measures from MSE.*



# Potential new/replacement objective

## 2022 Stock Assessment Results

- Relative Spawning Biomass was above 36% in 2023
- 2022 FISS & Commercial WPUE lowest observed since 1993
- Productivity updated in stock assessment to be more consistent with data
  - Interim reference fishing intensity produced a 52.3 Mlb mortality limit





# MSE Results

- Compare 2022 and 2023 OMs with similar MSE simulations
- SPR=43%

Performance Metric		2022 OM	2023 OM
Long-term	Biological Sustainability		
	P(RSB<20%)	PASS	PASS
	Fishery Sustainability		
	P(RSB<36%)	0.48	0.35
Short-term	Median average TCEY	59.0	59.2
	Median AAV TCEY	18.8%	17.0%
	Additional		
	P(SB <sub>2026-2035</sub> < SB <sub>2023</sub> )	0.17	0.29



# Potential new/replacement objective

- If low catch-rates and WPUE are a concern
  - May be prudent to consider an absolute biomass or WPUE objective
- Could be added to priority objectives or replace  $B_{36\%}$  objective
- A control rule could be added to the MP to reduce fishing intensity when absolute spawning biomass is low
  - Work in congruence with the 30:20 control rule
- Possibly a topic for MSAB to consider



# MSE tasks necessary to complete an HSP document

- Evaluation of MP elements
  - *Focus on coastwide TCEY and incorporate uncertainty in TCEY distribution*
  - Multi-year assessment with an empirical rule in non-assessment years
  - Define a reference fishing intensity (i.e. SPR)
- Secretariat work with MSAB and SRB
  - Define exceptional circumstances
  - Define actions if exceptional circumstance declared
  - *Potential new objective related to absolute biomass*
- Possibly evaluate additional MP elements
  - Constraints on changes in the coastwide TCEY
  - Methods to smooth stock distribution
  - Specific distribution procedures



# An MP for the HSP (coastwide)

- Current interim management procedure
  - Account for mortality of all sizes and from all sources
  - Annual stock assessment with decision tables
  - Reference  $F_{SPR=43\%}$  determines coastwide mortality limit
- Investigations of MP elements
  - Biennial or triennial stock assessment with an empirical rule in non-assessment years
    - Empirical rule based on FISS WPUE
  - SPR level to meet objectives

	Assessment Frequency		
	Annual	Biennial	Triennial
SPR			



# Exceptional Circumstances

- An event that is beyond the expectations of the MSE evaluation
- Used to determine if specific actions should be taken to deviate from and re-examine the adopted harvest strategy

## IPHC-2023-SRB022-R (para. 28 and 29)

- Evaluate annually by comparing simulated MSE values to realized FISS estimates
- Clearly distinguish an exceptional Circumstance from unusual conditions
- Persistence necessary for an exceptional circumstance
- SRB reviews evidence of an Exceptional Circumstance and assists with response



# Defining Exceptional Circumstances (possibilities)

## Defining

- Coastwide all-sizes FISS observations are beyond simulated FISS index
- Persistent for two or more consecutive years
- A new understanding or perception of the stock

## Actions

- Identify why it occurred
- Decide what can be done to resolve it
- Conduct MSE simulations
- Consult with SRB and MSAB



# Additional MSE tasks

- Use MSE to examine management outcomes related to changes in the FISS design
  - Likely to have a large effect on TCEY variability
  - Recommended by the SRB

**SRB023–Rec.10 (para. 29)** The SRB **RECOMMENDED** evaluating fishing intensity and frequency of the stock assessment elements of management procedures and FISS uncertainty scenarios using the MSE framework. MP elements related to constraints on the interannual change in the TCEY and calculation of stock distribution may be evaluated for a subset of the priority management procedures as time allows.

**SRB023–Rec.22 (para. 64)** **NOTING** the presentation demonstrating how secondary FISS objectives influence choices for future FISS designs that may have already been endorsed by the SRB based only on primary objectives, the SRB **RECOMMENDED** that the MSE include some scenarios in which the FISS is skipped (as similarly requested above in [para. 29]) because of occasional (or functional) economic constraints on executing full FISS designs. Such simulation scenarios would provide some indication of the potential scale of impacts on MP performance of maintaining long-term revenue neutrality of the FISS



# Management Procedures to evaluate

## **PRIORITY**

- Annual and Multi-year stock assessment MPs
- Fishing intensity (SPR values)
- FISS design scenarios

## **SECONDARY**

- Constraints on the coastwide TCEY
- Stock distribution smoothing

## **ADDITIONAL**

- Elements related to maintaining SB above an absolute threshold
- TCEY distribution procedures



# Summary

- IPHC has a MSE framework for reasonably quick analysis
  - The 2023 OM is congruent to the 2022 stock assessment and is valid for a few years
- A fishery objective related to absolute spawning biomass or FISS WPUE may be useful
- An HSP document could be adopted at AM100 with the current interim harvest strategy
- Tasks to complete to bring forward a HSP document for adoption at AM101 can be done in 2024
  - Multi-year assessments and SPR values
  - Exceptional circumstances
- Additional evaluations of FISS survey designs using MSE to be done
  - As recommended by the SRB



# Recommendation/s

- 1) **NOTE** paper IPHC-2023-IM099-11 presenting outcomes of MSAB018 and SRB023, potential additions to the MSE Program of Work for 2023–2025, and potential edits to the Harvest Strategy Policy document.
- 2) **NOTE** that the SRB endorsed the 2023 operating model for use in MSE evaluations of MPs that would lead to the adoption of a harvest strategy, including assessment frequency, fishing intensity, and data monitoring.
- 3) **NOTE** the current priority objectives and **RECOMMEND** that the Secretariat, working with the MSAB and SRB, develop a new coastwide objective related to absolute spawning biomass or catch-rates, to either replace the current  $B_{36\%}$  objective or be added as a fifth priority objective.



# Recommendation/s

- 4) **NOTE** that the following decisions are necessary for the adoption of a harvest strategy policy at the 101<sup>st</sup> Annual Meeting of the IPHC (AM101):
- a) that the harvest strategy is related to a management procedure to determine the coastwide TCEY, and that the TCEY distribution is an independent negotiation that is part of the policy;
  - b) the evaluation of multi-year management procedures along with fishing intensity incorporating uncertainty in how the TCEY is distributed;
  - c) additional management procedure elements to evaluate including constraints on the coastwide TCEY, methods to smooth estimation of stock distribution, and, if desired, procedures to distribute the TCEY to IPHC Regulatory Areas;
  - d) the Secretariat to continue to work with the SRB and MSAB to define specific exceptional circumstances using FISS observations, biological observations, and new research;
  - e) the Secretariat to continue to work with the SRB and MSAB to prescribe the actions to take when an exceptional circumstance occurs;
  - f) edits and additions to the current harvest strategy policy document.



# Recommendation/s

- 5) **NOTE** that to understand how reductions in the FISS design may affect management outcomes, the evaluation of FISS design scenarios using the MSE framework was recommended by the SRB at SRB023.
- 6) **NOTE** that an interim harvest strategy policy document may be adopted at the 100<sup>th</sup> Annual Meeting of the IPHC (AM100) using the current interim management procedure for a coastwide TCEY along with edits and additions to the current harvest strategy policy document.



INTERNATIONAL PACIFIC

100 years

HALIBUT COMMISSION