Integrating the Risk Policy into ABC Control Rules

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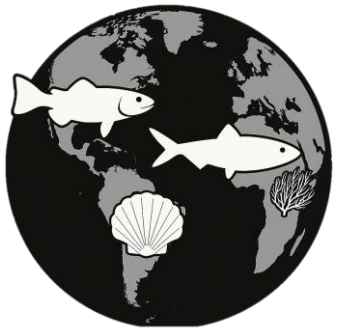
August 25, 2026
Groundfish Committee,
New England Fishery Management Council

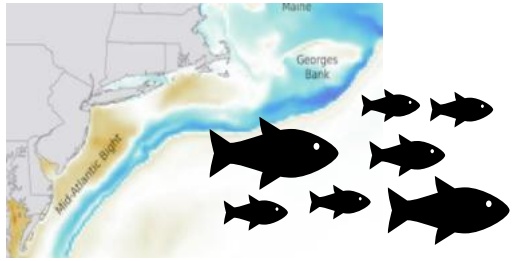
Approved Risk Policy Concept

1. Factor Weighting



Weights apply to all stocks

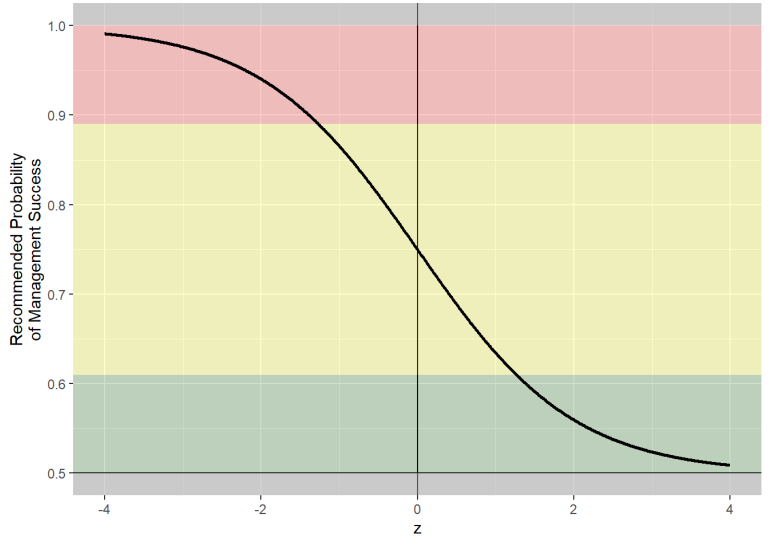
2. Factor Scoring (Data)



3. Factors Combined into a single Z-Score

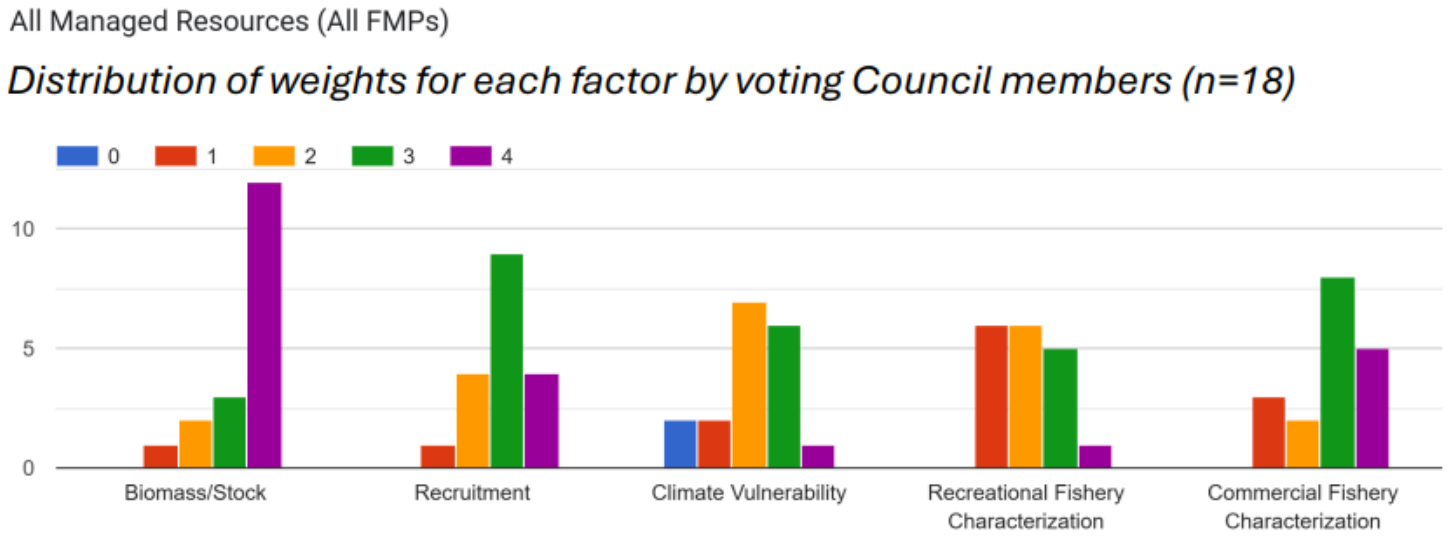
$$Z = \sum (w_i s_i)$$

4. Risk Tolerance



Factor Weighting

- Policy decision determining how influential each factor is in risk tolerance
- Weighting conducted and approved by the NEFMC in June, 2026



Least Important
Slightly Important
Important
Highly Important
Critically Important

	SSB/ Stock Status	Recruitment	Climate Vulnerability	Recreational	Commercial
Mean (0-4)	3.44	2.89	2.11	2.06	2.83
Normalized	0.26	0.22	0.16	0.15	0.21

Factor Scoring

- Objective characterization of the state of each stock
- Scoring will be conducted by Plan Development Teams

Lower Risk Tolerance ← → Higher Risk Tolerance

FACTOR	-4	-3	-2	-1	0	1	2	3	4
SSB / Stock Status	Below threshold		<75% but above Threshold		Neutral		Rebuilt		Well Above Target
Recruitment	Persistent Low Recruitment		Recent Low Recruitment		Average, No Trend		Recent Large Year Classes		Multiple Large Year Classes
Climate Vulnerability	High Negative Direction	High	Moderate, Negative Direction	Moderate	Low				
Commercial Fishery Characterization					Minimal stress	Low stress	Moderate stress	Elevated stress	High stress
Recreational Fishery Characterization					Minimal stress	Low stress	Moderate stress	Elevated stress	High stress

Demonstrated Factor Scoring: 22 groundfish stocks

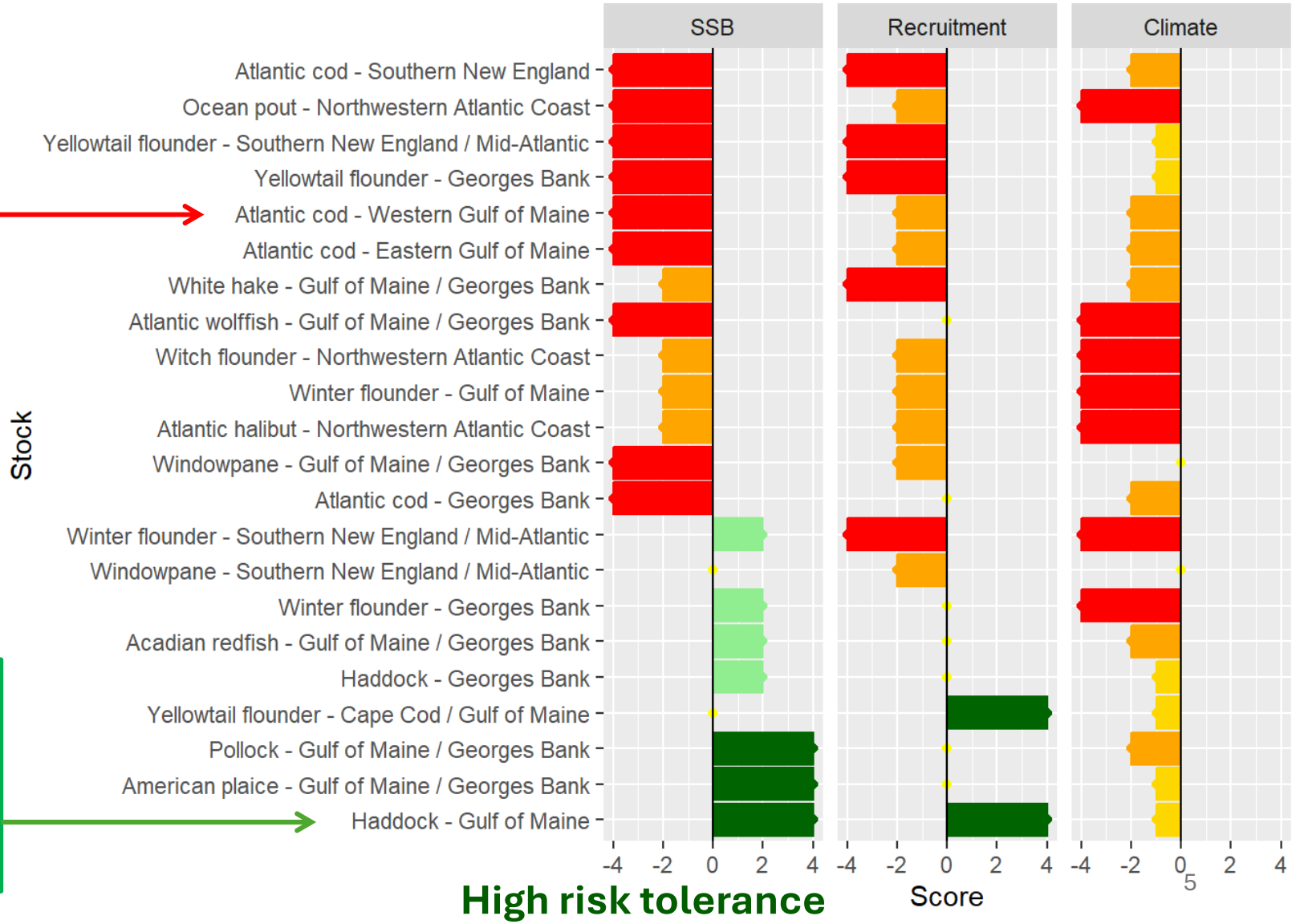
Cod, Western Gulf of Maine:

- SSB below threshold
- Low recent recruitment
- Moderate climate vulnerability and negative impact

Haddock, Gulf of Maine:

- SSB well above target
- Multiple large year classes
- Moderate climate vulnerability

Low risk tolerance

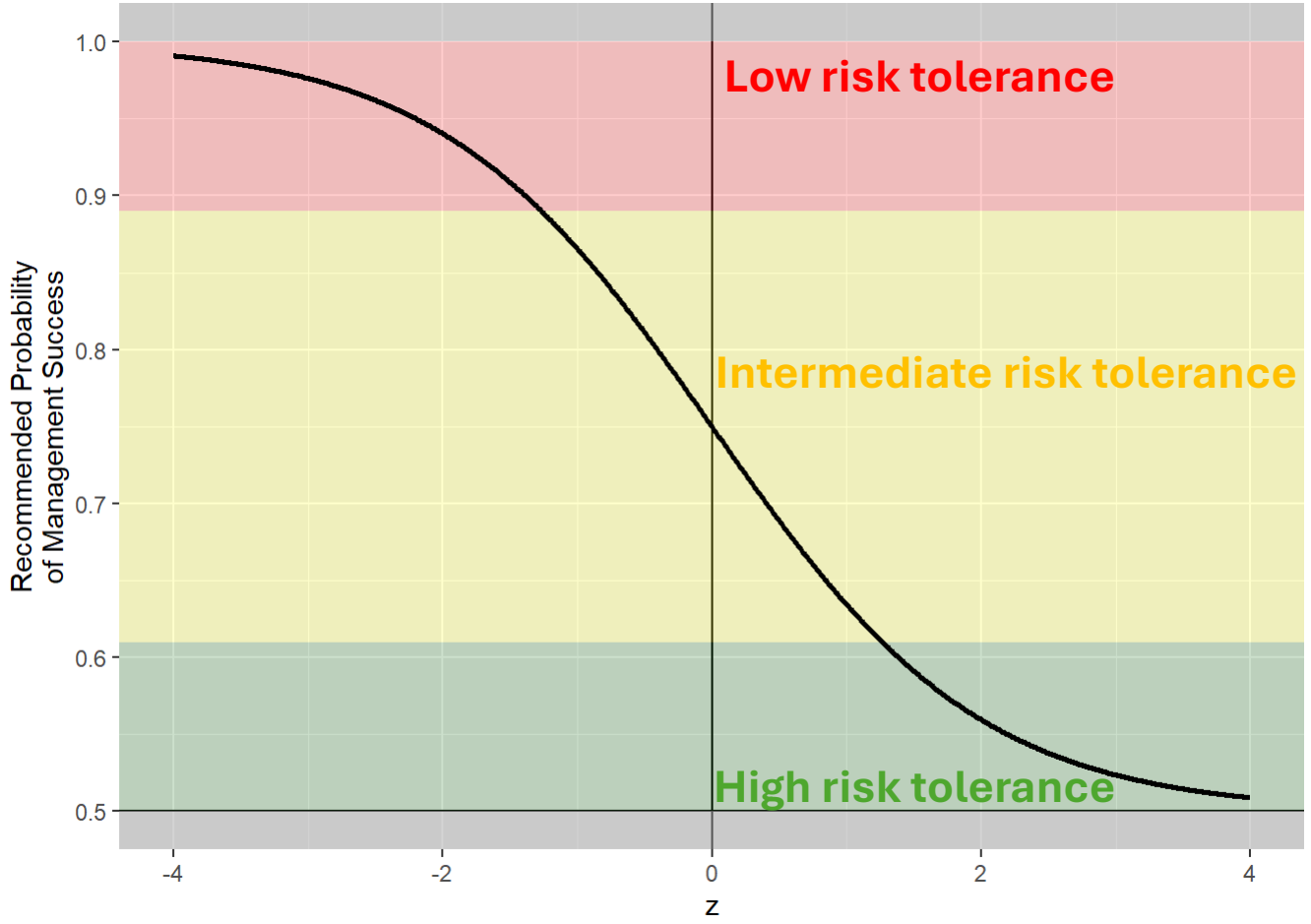


High risk tolerance

Recommended Probability of Management Success

- All 5 factors combined into a Z-score
- A logistic function calculates the recommended risk tolerance

- Approaches extreme values slowly
- More responsive in between
- High and low risk tolerance are hard to achieve but stable

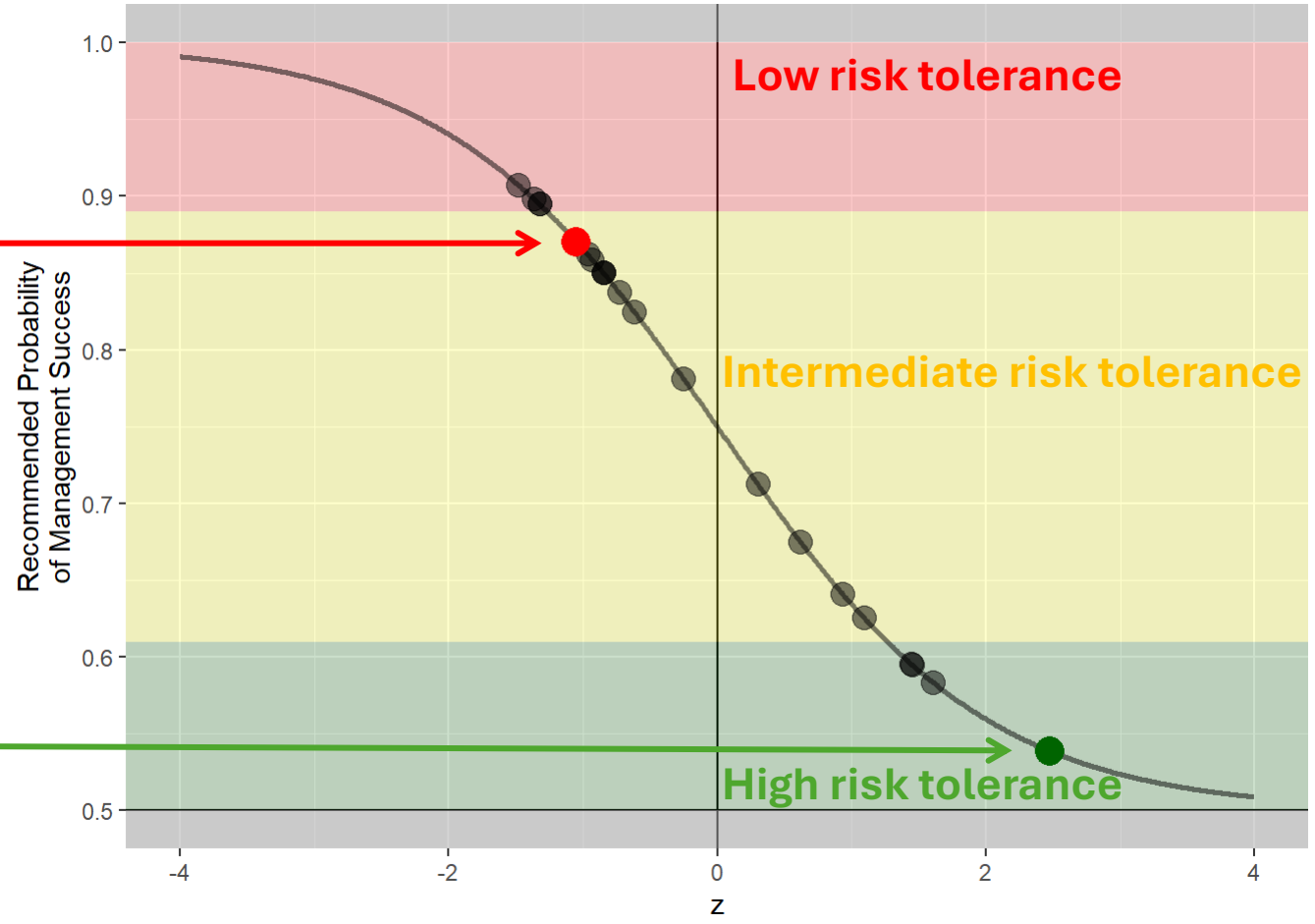


Recommended Probability of Management Success

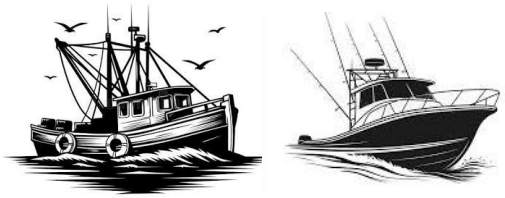
Assumed an intermediate score of 2 for both fishery factors

Cod, Western Gulf of Maine

Haddock, Gulf of Maine



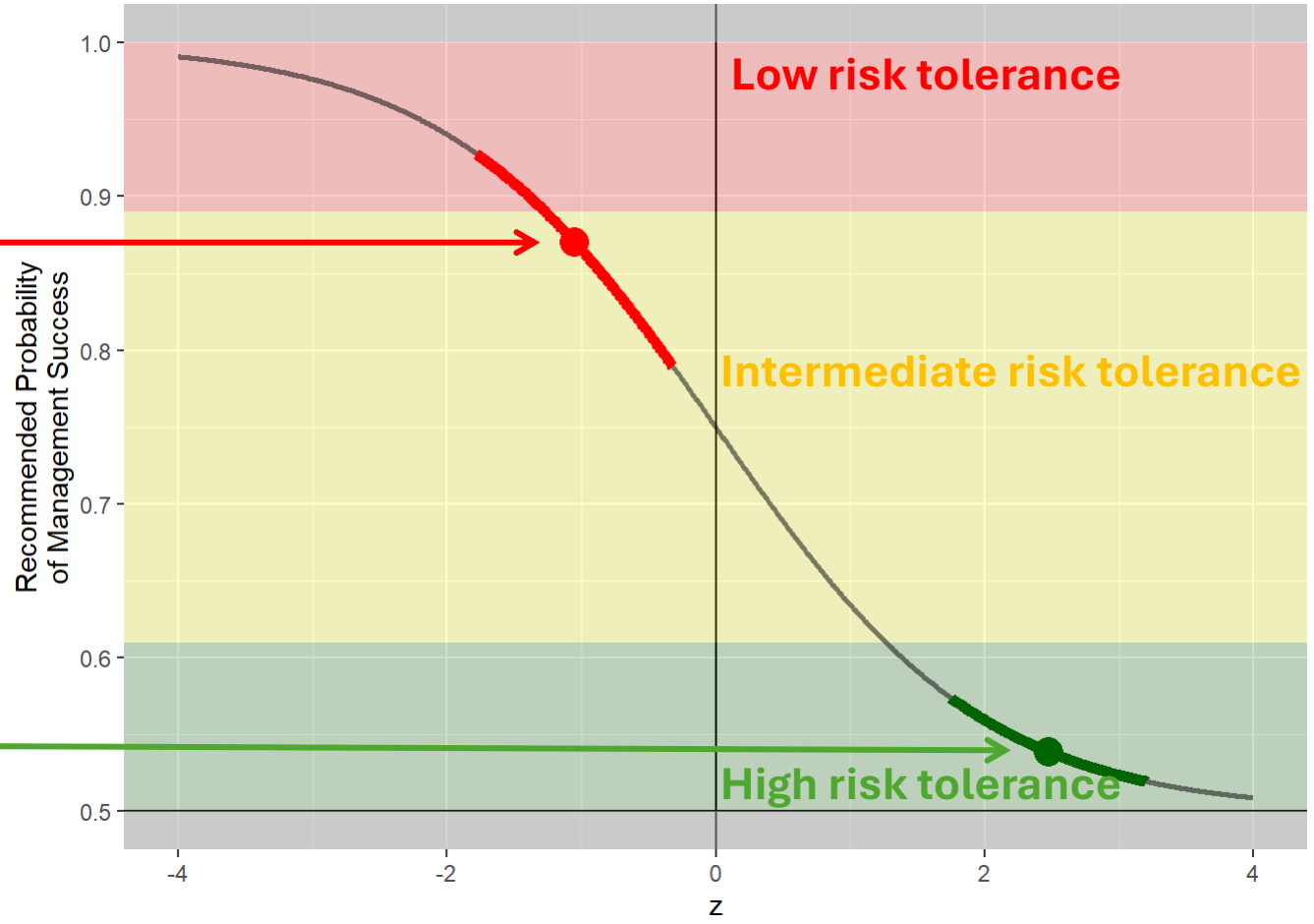
Influence of Two Fishery Factors



- ● Intermediate assumption for both fishery factors
- — Minimum to maximum assumption for both fishery factors

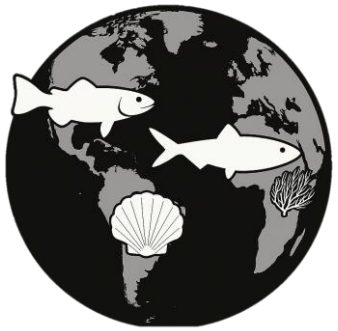
Cod, Western Gulf of Maine

Haddock, Gulf of Maine



Risk Policy Concept and ABC Control Rules

1. Factor Weighting



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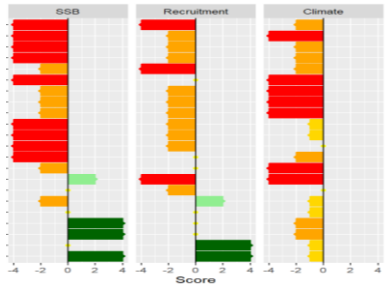
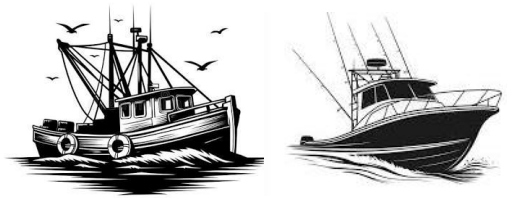
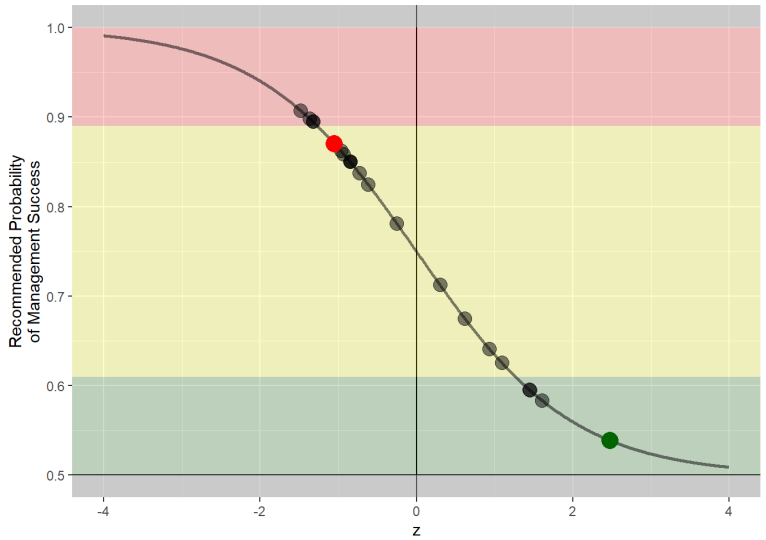
2. Factor Scoring (Data)





3. Factors Combined into a single Z-Score

4. Risk Tolerance



5. Set ABC using Risk Policy Integrated Control Rule

Low Risk Tolerance = ABC Farther from OFL

High Risk Tolerance = ABC Closer to OFL

Acceptable Biological Catch (ABC) Control Rules

Current Groundfish ABC Control Rules

A. ABC should be determined as the catch associated with 75% of FMSY.
   - Typical of stock with analytical assessments

B. If fishing at 75% of FMSY does not achieve the mandated rebuilding requirements for overfished stocks, ABC should be determined as the catch associated with the fishing mortality that meets rebuilding requirements (Frebuild).
   - Stepped is common. $F_{Rebuild}$ (e.g., 70% of F40) during rebuilding plans

C. For stocks that cannot rebuild to BMSY in the specified rebuilding period, even with no fishing, the ABC should be based on incidental bycatch, including a reduction in bycatch rate (i.e., the proportion of the stock caught as bycatch).
   - Not commonly applied

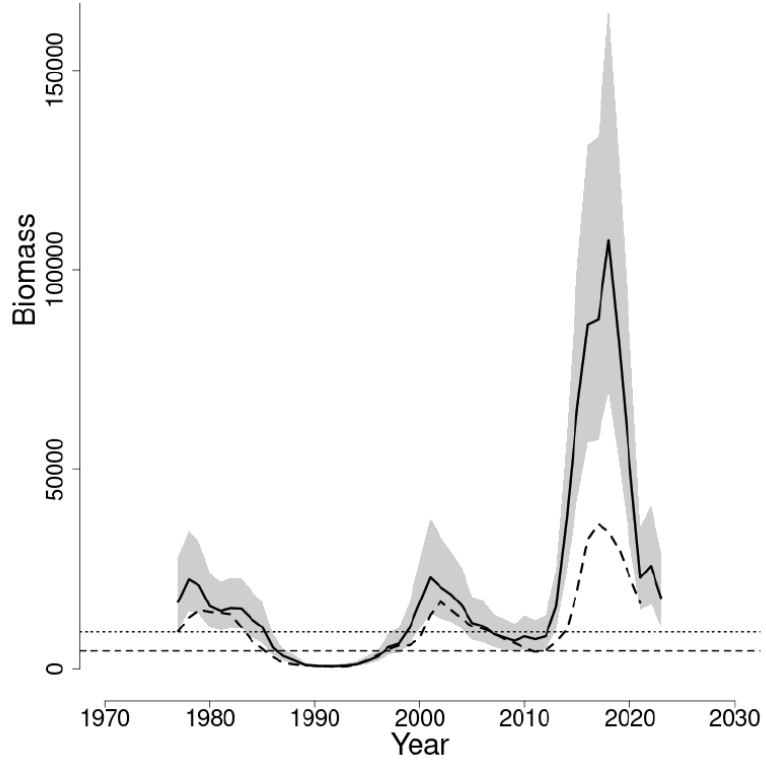
D. Interim ABCs should be determined for stocks with unknown status according to case-by-case recommendations from the SSC.
   - Typical of stocks with empirical assessments and unknown status

Setting Catch Advice (ABC)

- Fishing mortality rate (F) should remain below F_{MSY}
- Overfishing Limit (OFL) is the expected catch when fishing at F_{MSY}
- Scientific estimates of F_{MSY} and current biomass are inherently uncertain
- To account for this scientific uncertainty the Acceptable Biological Catch (ABC) is set below the OFL

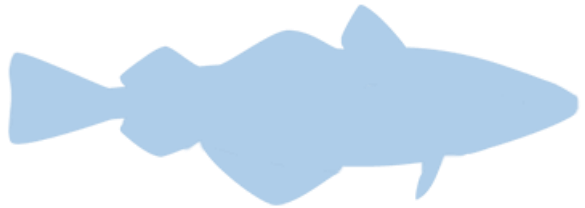
	2024
F_{MSY} *proxy*	0.32 (0.29 - 0.35)
SSB_{MSY} (mt)	9,185 (5,587 - 15,100)
MSY (mt)	2,045 (1,241 - 3,371)
Median recruits (age 1) (000s)	2,831
Overfishing	No
Overfished	No

Gulf of Maine Haddock Assessment Results (2024)

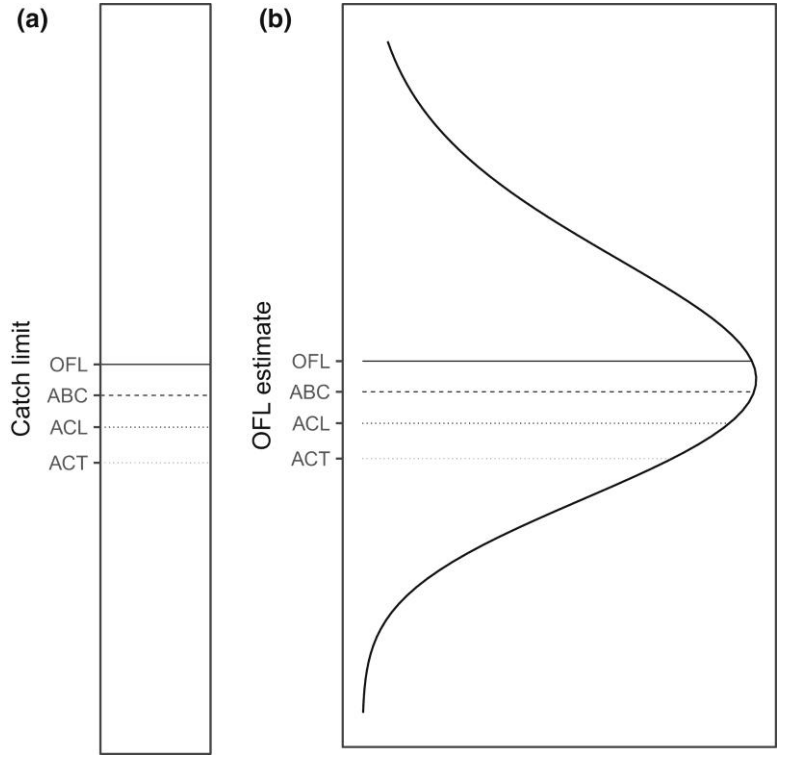


Two distinct approaches for determining the scientific uncertainty buffer

a) A simple percentage buffer
   - For example: the ABC is 75% of the OFL

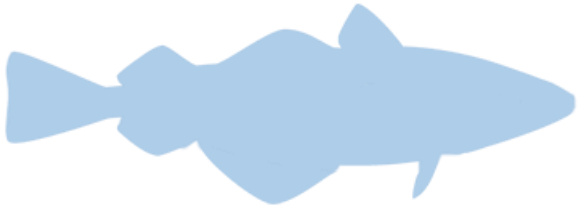


b) A distribution/probability-based approach
   - ABC is determined by an acceptable probability of overfishing (e.g., P* = 0.25)



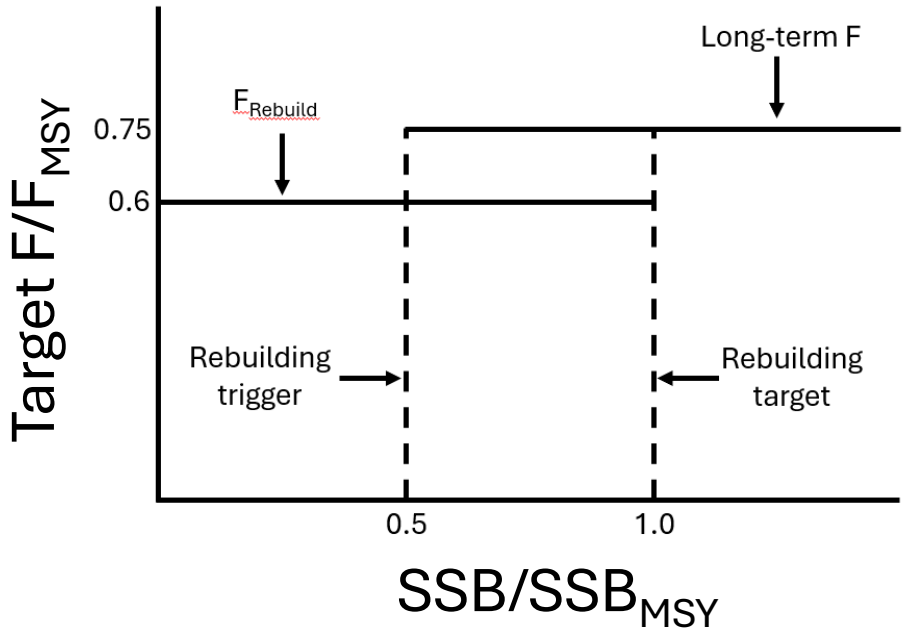
Both are used by the NEFMC and can quantitatively integrate the revised Risk Policy

a) Percentage buffer (e.g., groundfish status-quo)



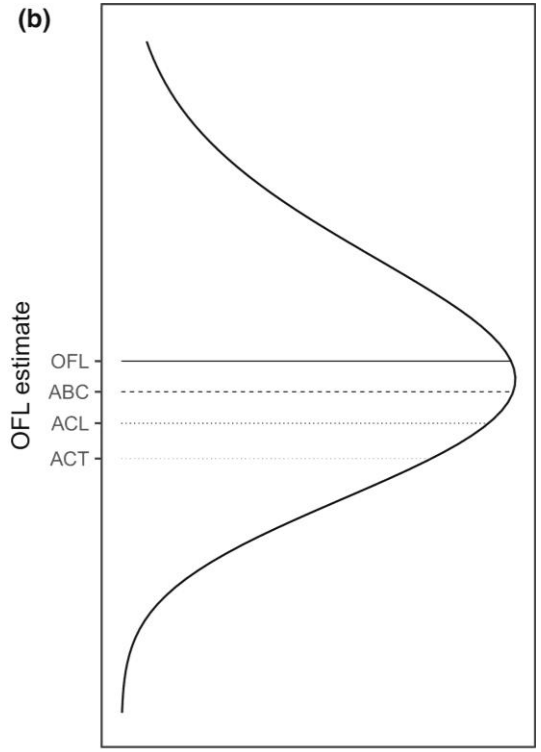
- Risk tolerance and the magnitude of scientific uncertainty are not explicitly considered
- Both are implicitly incorporated into a scientific uncertainty buffer between the OFL and ABC
- Buffer is relatively static across stocks and over time

- Default: ABC = 75% of OFL
- Larger buffer during rebuilding plans (e.g., ABC = 60% OFL)



b) Probability-based approach (e.g., P*)

- Broadly applied across Council regions, but the details and implementation vary widely
- Explicitly defines an uncertainty assumption (i.e., scientific uncertainty in OFL)
- Explicitly defines an acceptable probability of overfishing (i.e., risk tolerance = P*)
- Assumed uncertainty distribution and specified risk tolerance interact to define the ABC
- Each council region considers depleted stocks and rebuilding plans differently



Integrating the Risk Policy into ABC Control Rules Could:

- Directly incorporate a wider range of criteria when setting catch advice, with an opportunity to add more risk factors.
  - Climate impacts on stock dynamics
  - Socioeconomic considerations and importance
  - Broader ecosystem considerations (future consideration)
  - Assessment type and performance (future consideration)

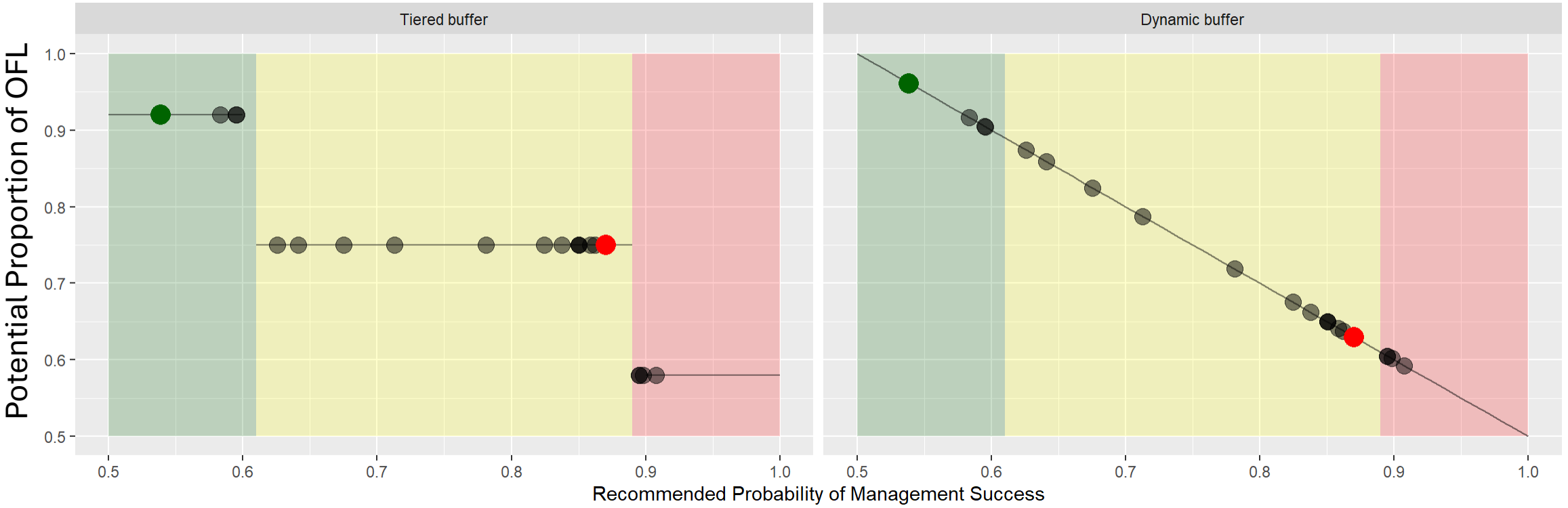
- Allow ABC's that are closer to the OFL and farther from the OFL
  - Might lead to more fishing opportunities and faster rebuilding
- Provide objective criteria defining when to move in each direction
- There are many potential options

Potential Risk Policy Integrated ABC Control Rules

Potential Percentage of OFL Approach

Cod, WGOM

Haddock, GOM

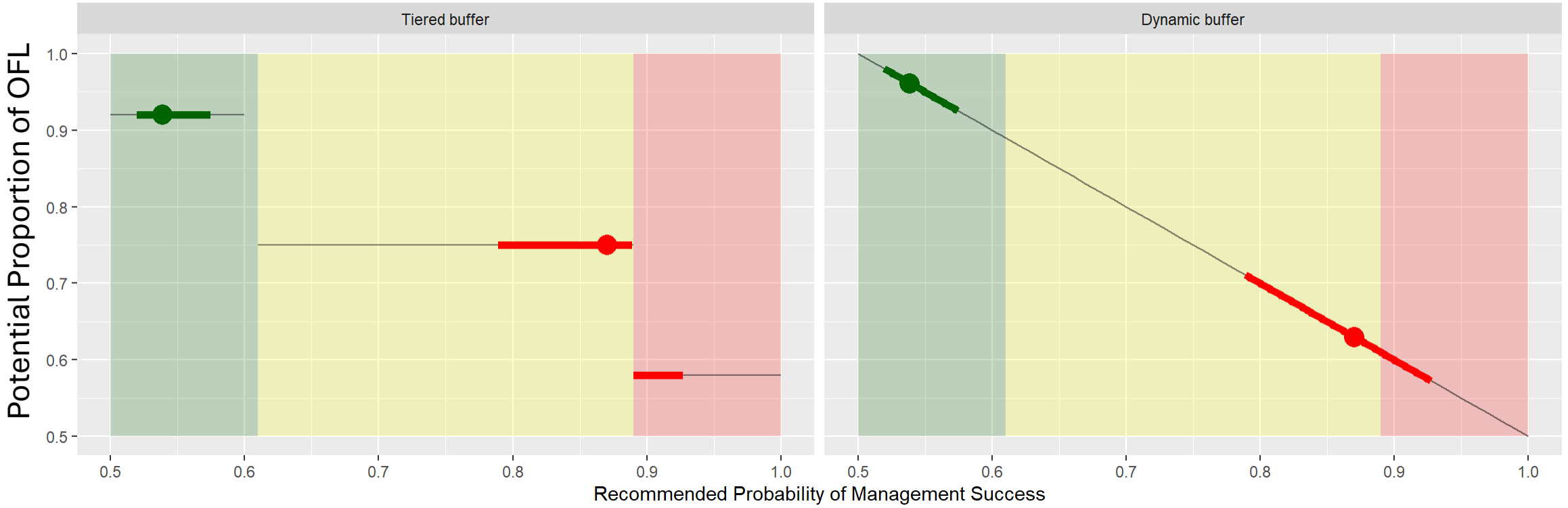


- The rule could apply a continuously changing buffer (right), or fixed proportions in discrete risk tiers (left)
- For both, ABC = 75% of OFL at intermediate risk tolerance and the proportion changes according to the results of the Risk Policy
- Both require additional policy decisions (e.g., range of buffers)

Potential Percentage of OFL Approach

Cod, WGOM

Haddock, GOM

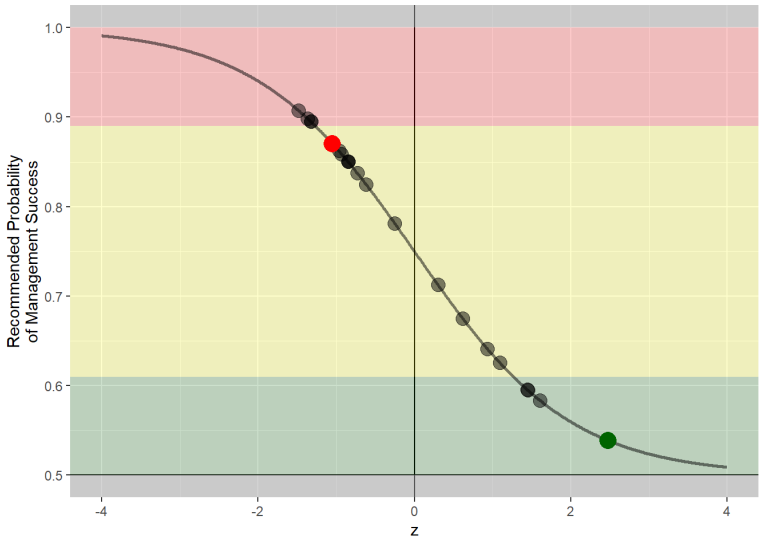


- Socioeconomic outlook directly incorporated into control rules

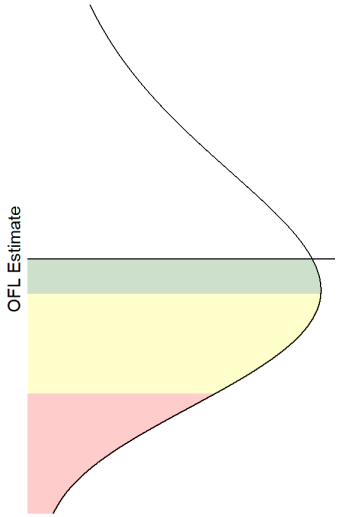
- ● Intermediate assumption for both fishery factors
- — Minimum to maximum assumption for both fishery factors

Potential Probability-Based Approach

- For catch limits, management success is avoiding overfishing
- Risk Policy could inform the acceptable probability of overfishing (P*)
- The exact buffer between the ABC and OFL would also depend the assumed distribution around the OFL (i.e., the magnitude of scientific uncertainty)



P* informed by Risk Policy



Risk Policy Concept and ABC Control Rules

Risk Policy with Five Factors

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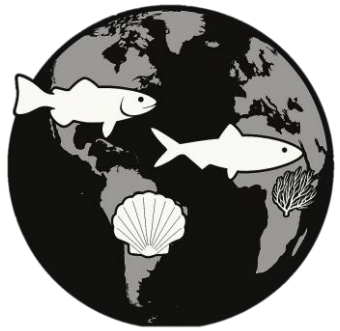

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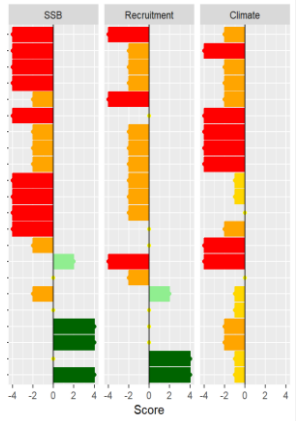

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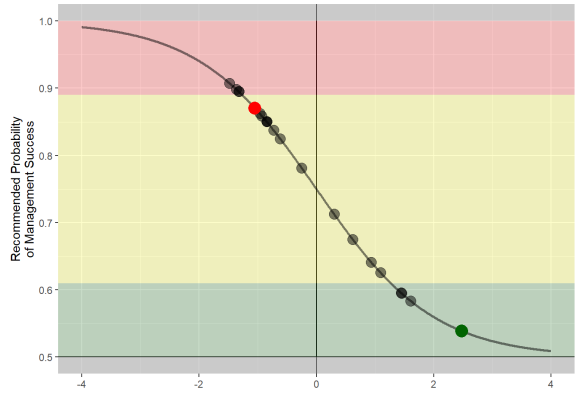
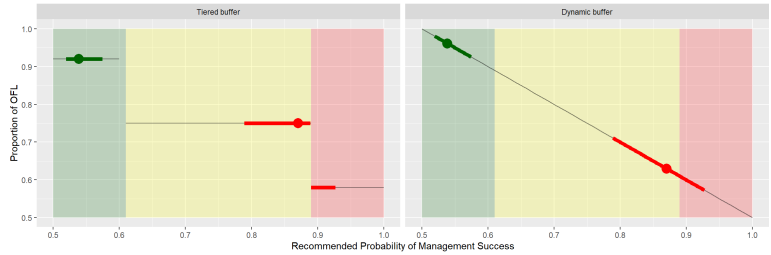


4. Risk Tolerance

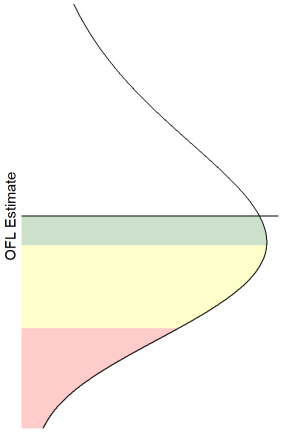
Potential Risk Policy Integrated ABC Control Rules

5. Determine Scientific Uncertainty Buffer

a) Risk Policy Informed Proportion of OFL



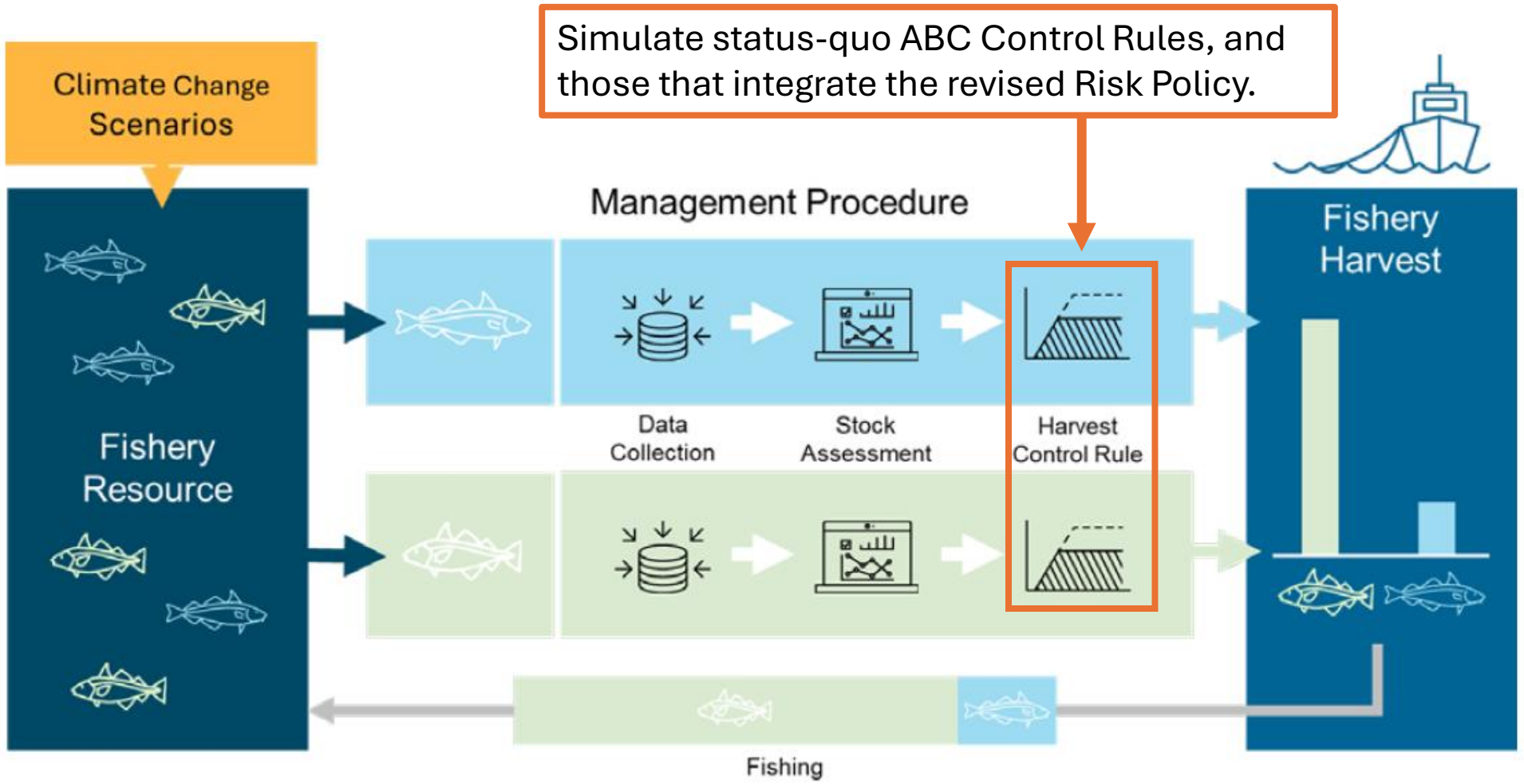
Risk Policy Informed P*



b) Probability-based approach

Goals of Simulation Testing

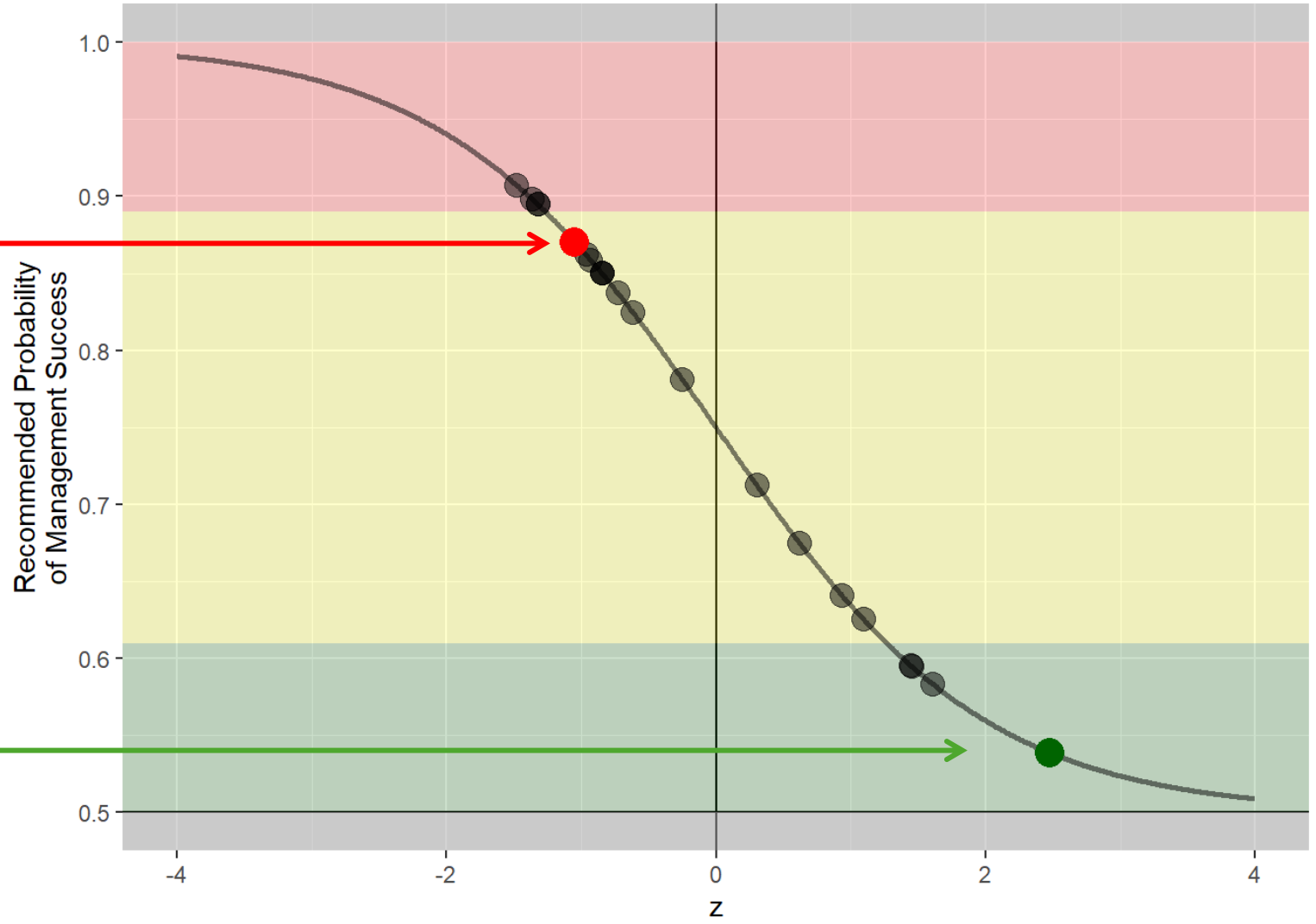
Use management strategy evaluation to test the performance of Risk Policy integrated **ABC Control Rules**



Two Focal Stocks with Varied Risk Policy Results

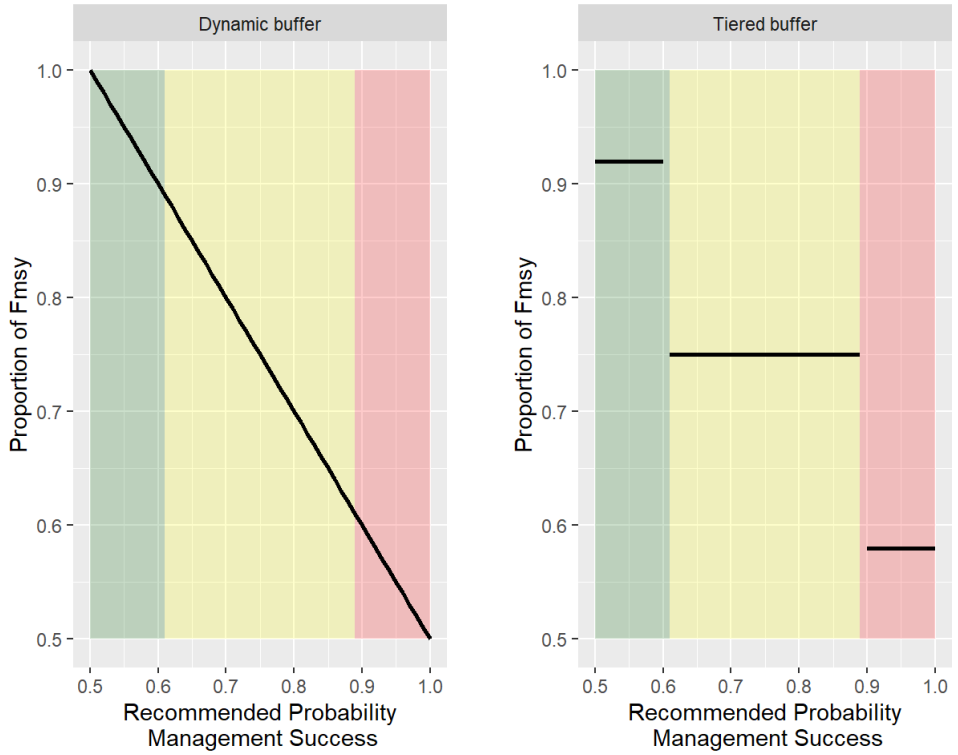
Cod, Western Gulf of Maine:
- Overfished
- Low Risk Tolerance

Haddock, Gulf of Maine:
- SSB well above target
- High Risk Tolerance

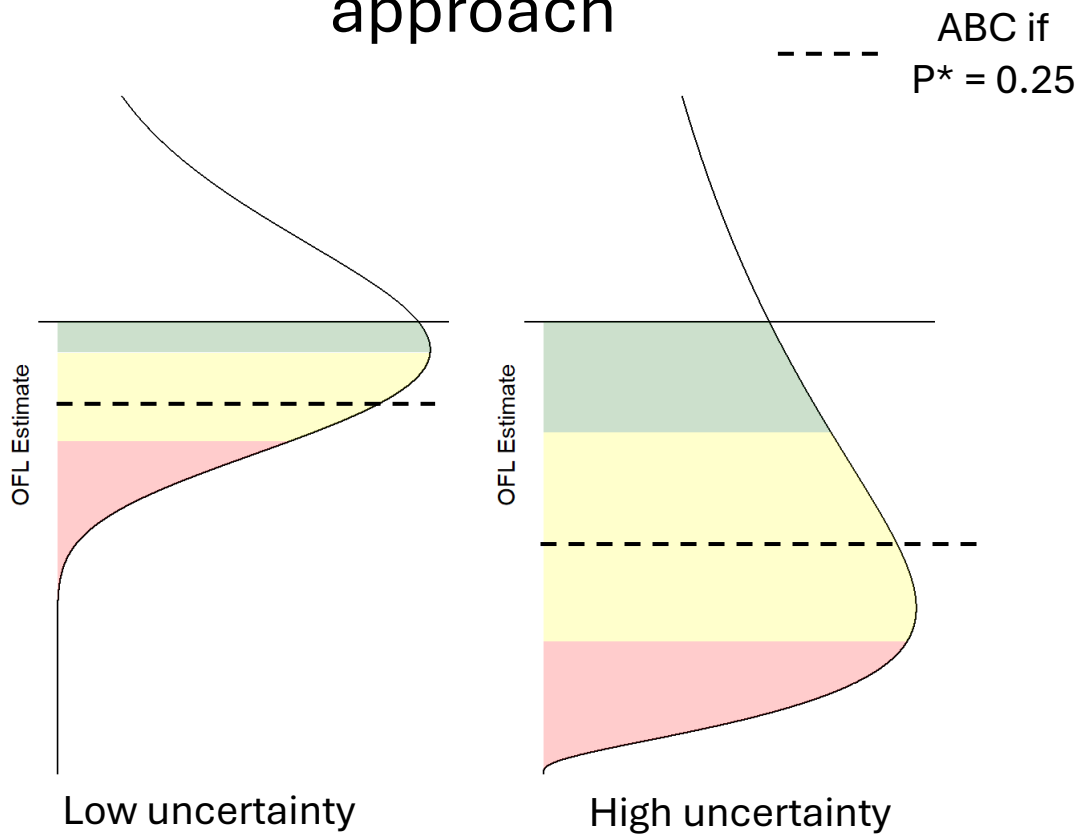


Four Potential Risk Policy Integrated Options

Percentage of OFL approaches



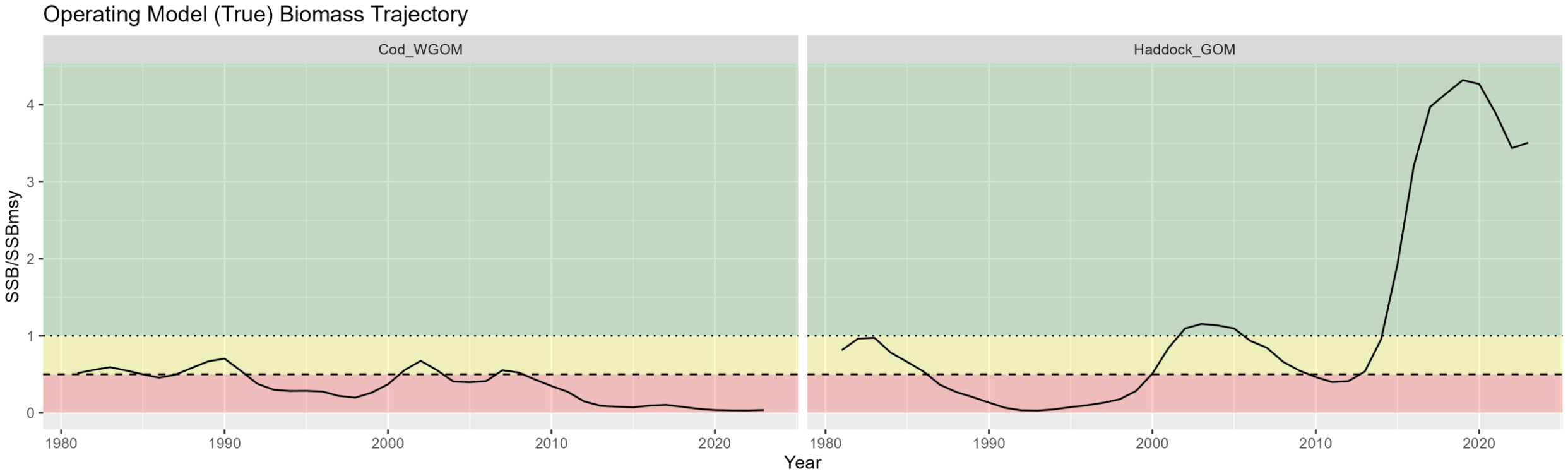
Probability-based approach

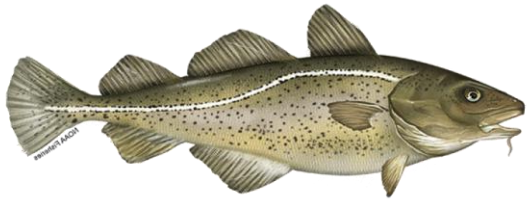


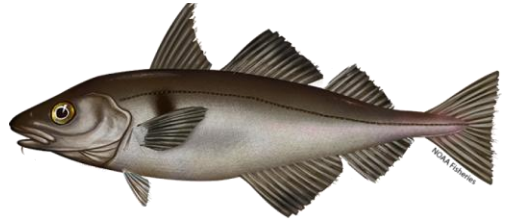
Draft Results to illustrate different ABC Control Rules

- Explore how the Risk Policy performs in different contexts
- Illustrate different potential ABC Control Rules and their mechanics
- Results are preliminary with ongoing development of operating models (assumed population dynamics) and alternative management procedures (ABC Control Rules)

Key differences between operating models



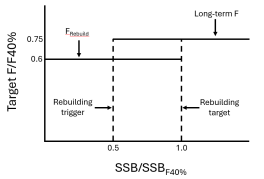


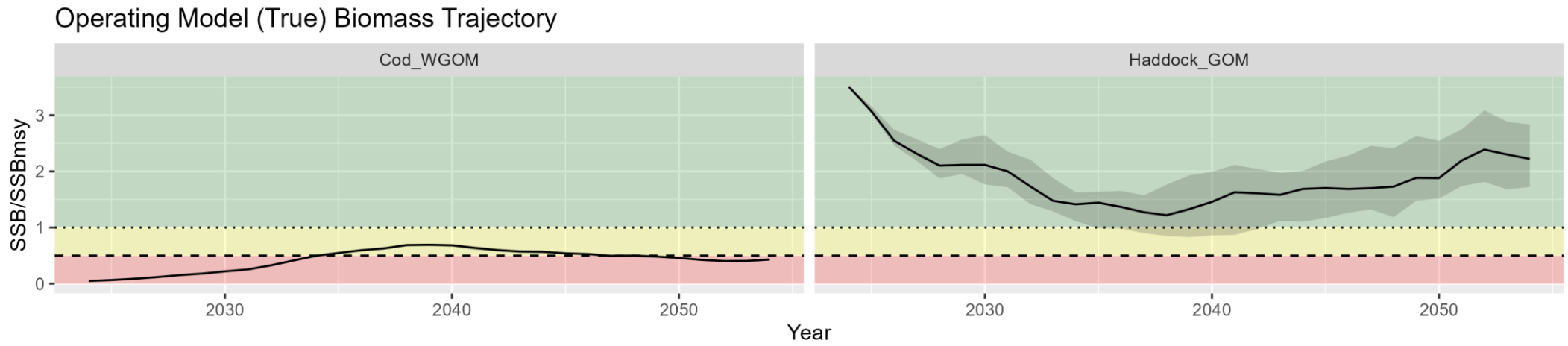


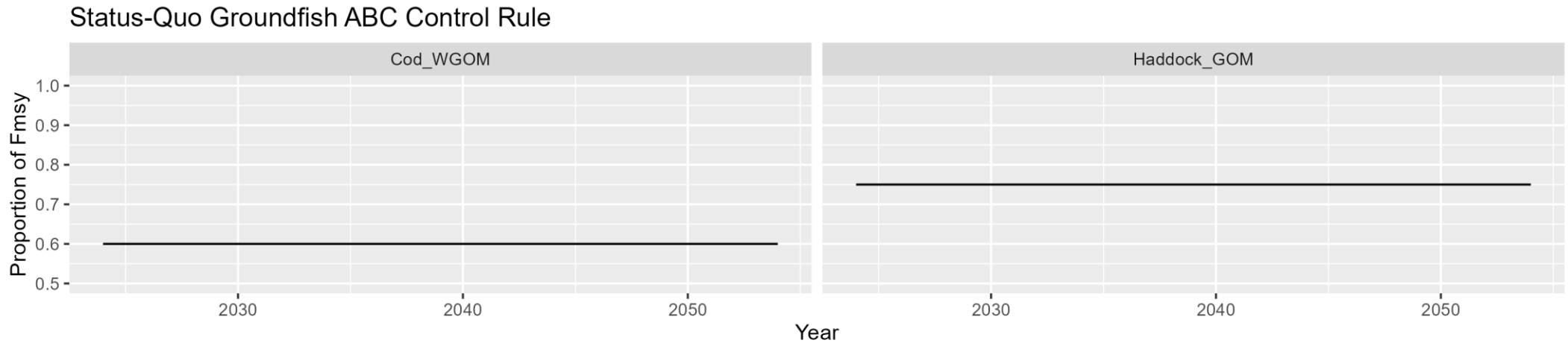
- Depleted biomass
- Recruitment declines with temperature

- Biomass well above target
- Recruitment is highly variable

Future Projections: Status-Quo ABC Control Rule

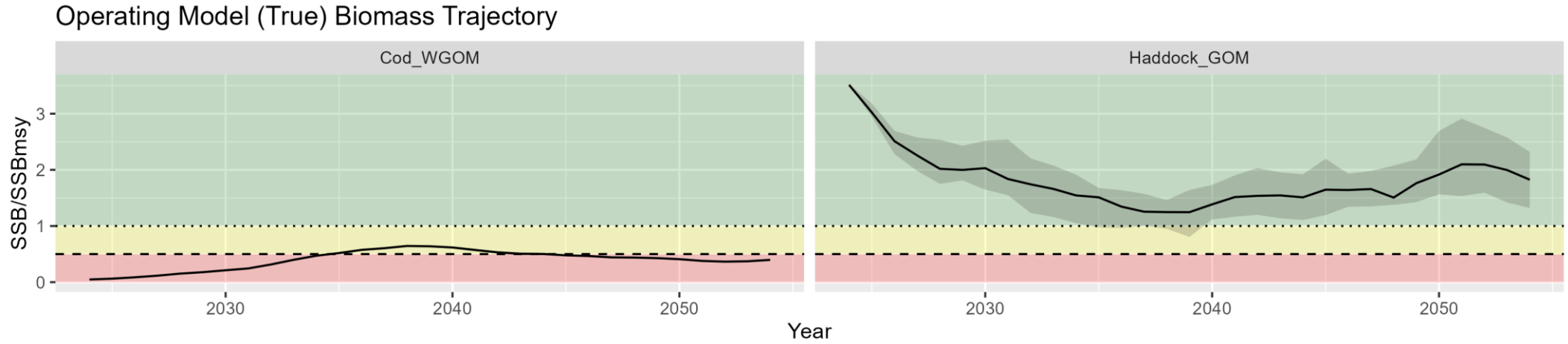


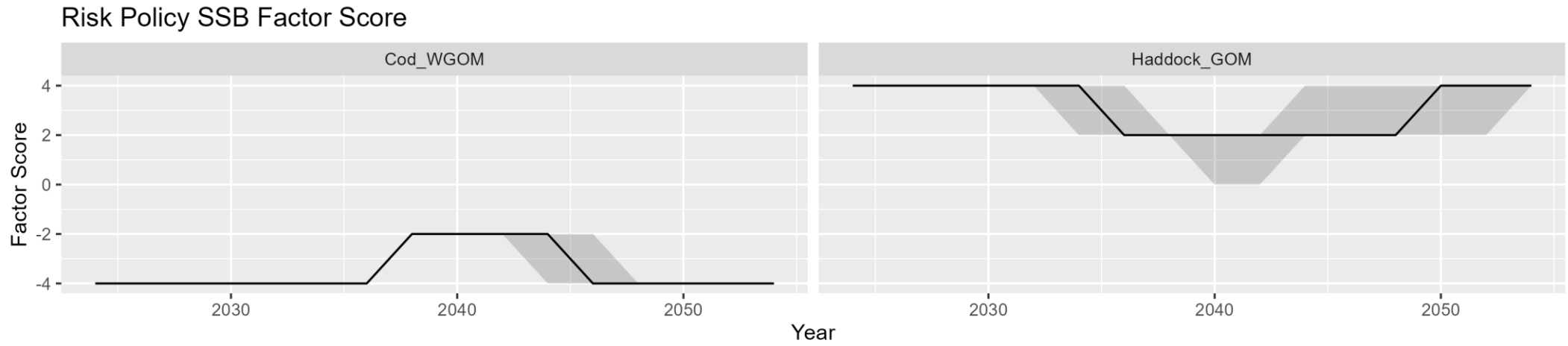




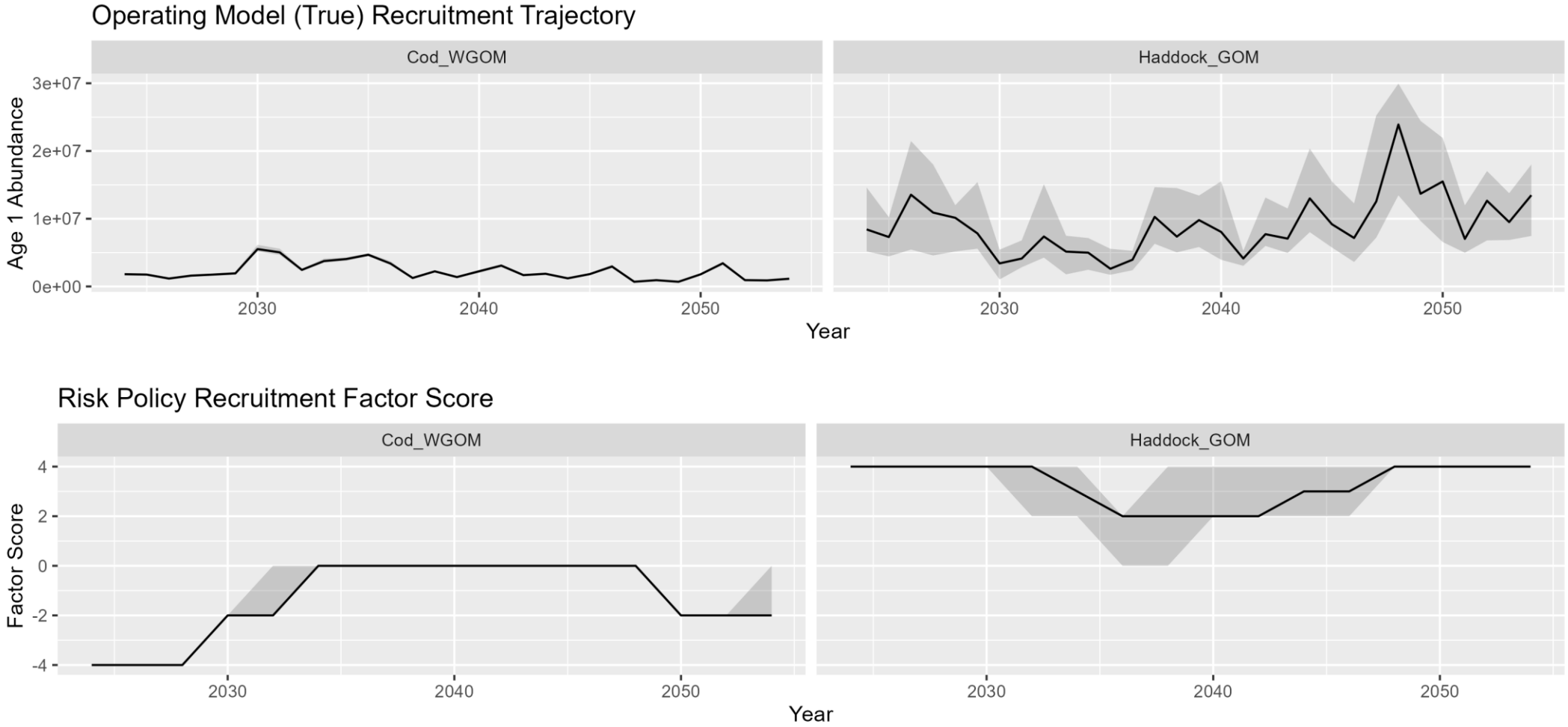
- Cod remains depleted, never exits rebuilding plan, stays at 60% Fmsy
- Haddock fluctuates but never becomes depleted, stays at 75% Fmsy

Future Projections: Risk Policy, SSB

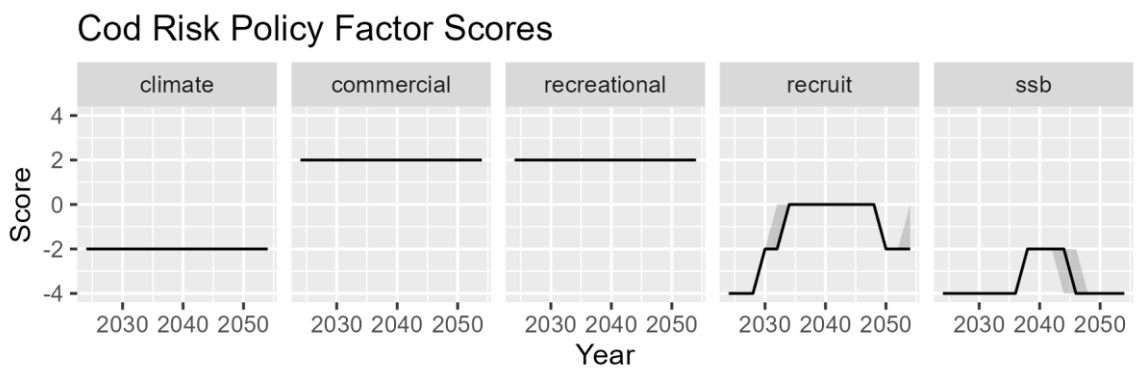


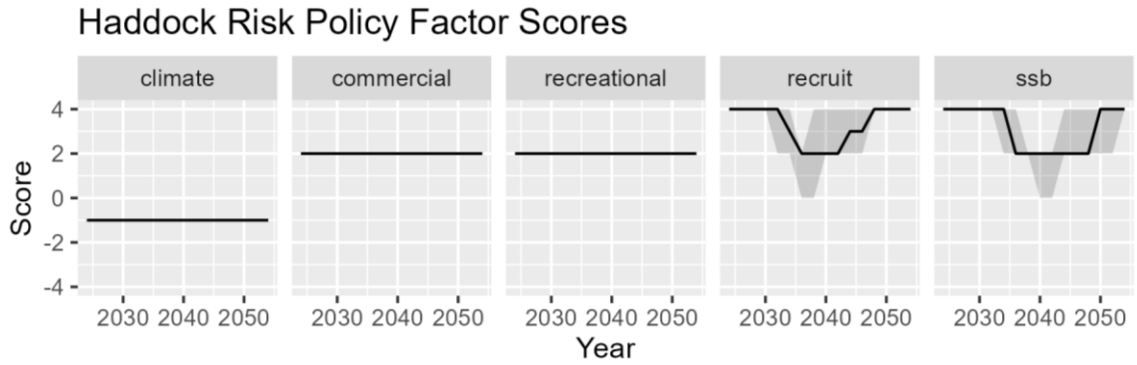


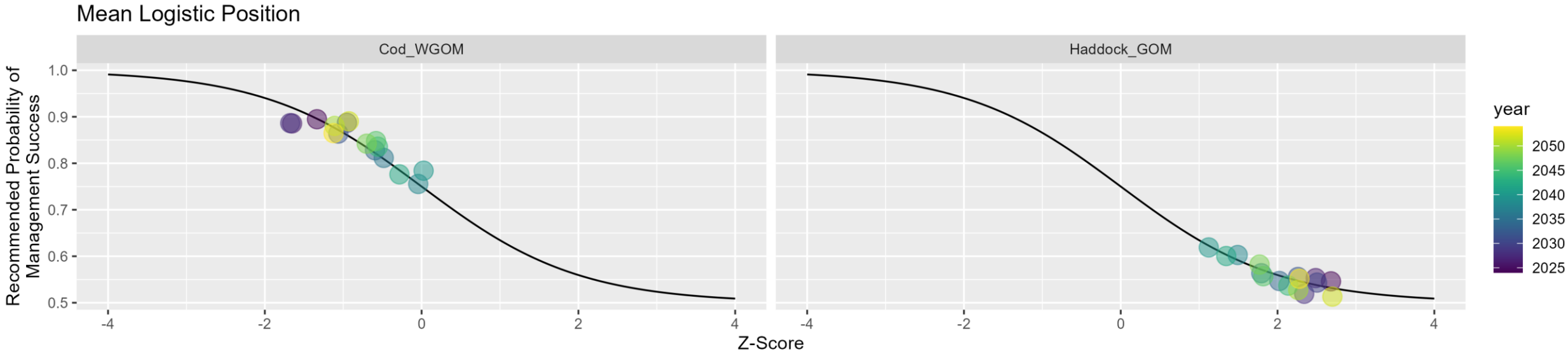
Future Projections: Risk Policy, Recruitment



Future Projections: Risk Policy Curve

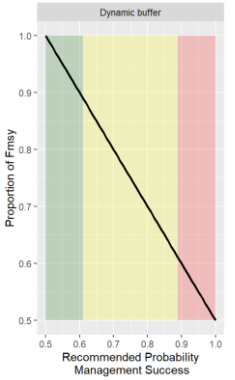


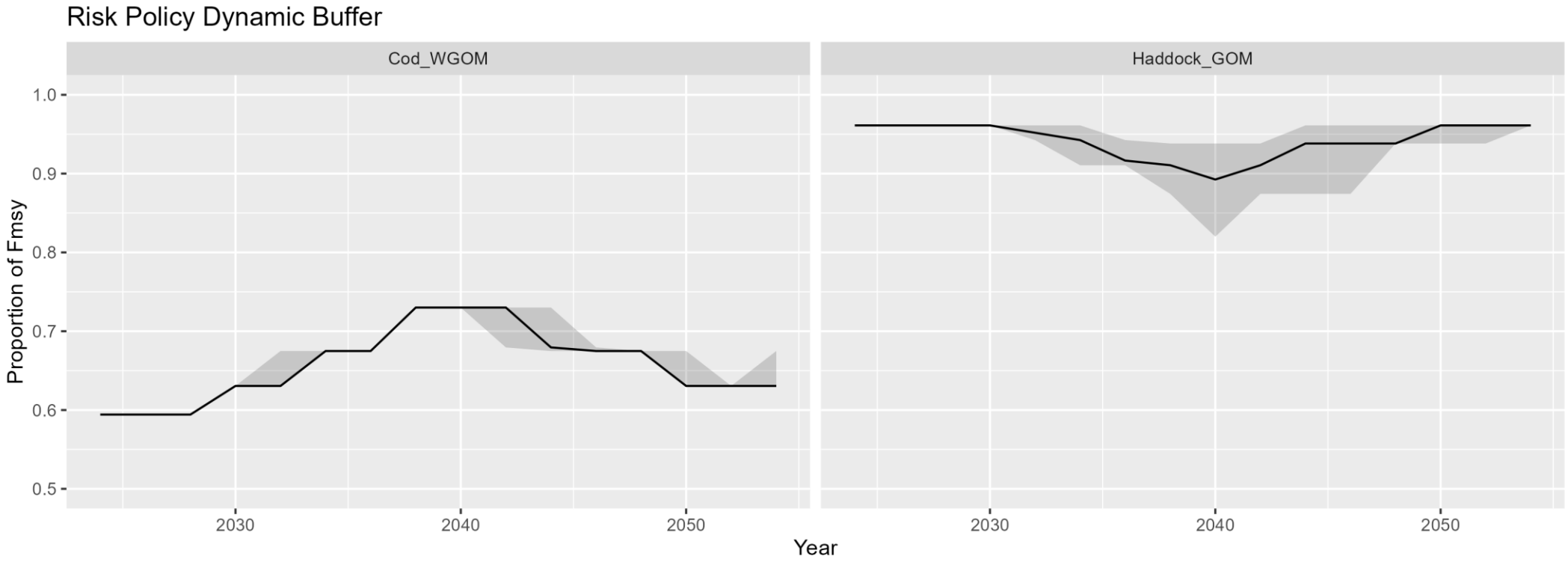




- SSB and Recruitment scores change overtime, other factors are fixed
- Both stocks start at extreme ends of the curve, move to the middle and then return

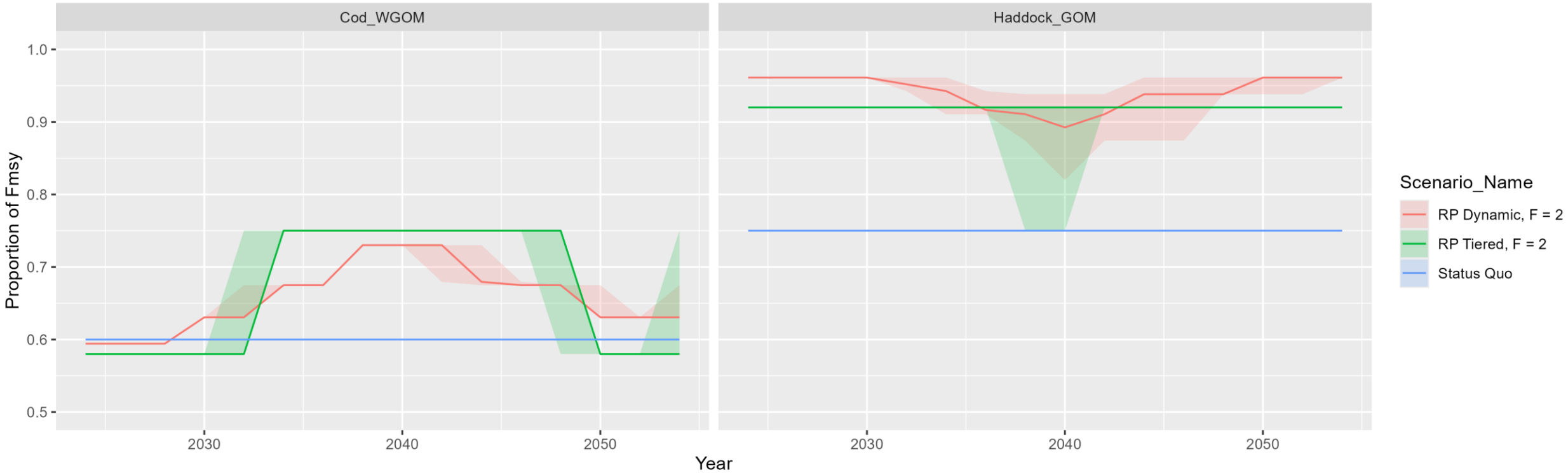
Future Projections: Dynamic Buffer





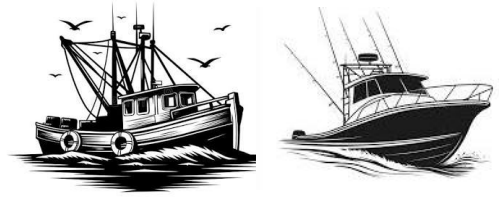
- Rebuilding plans are not incorporated (needs further consideration)
- For cod, the proportion of Fmsy increases despite the SSB never exceeding the biomass target (i.e., exiting rebuilding plan)

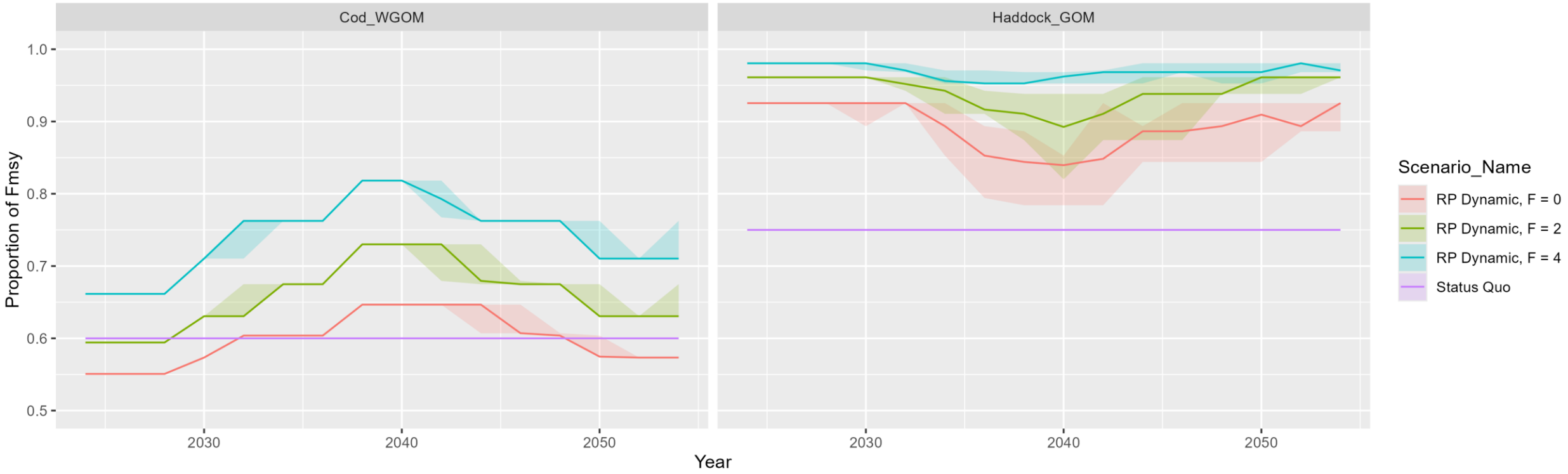
Uncertainty Buffers for ABC Control Rules



- **Status Quo** remains stable overtime
- **Dynamic buffer** changes frequently but in small increments with Risk Policy
- **Tiered buffer** changes infrequently but in large increments with Risk Policy
- Rebuilding plans are included in status-quo, but not the other two

Impact of fishery factor assumptions





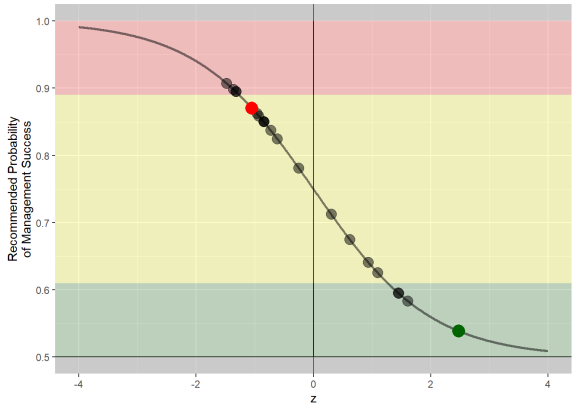
- Assumed scores for both fishery factors can considerably impact results of the Risk Policy Integrated ABC control rules
- Magnitude of impact depends on the position along Risk Policy curve

Probability-Based Approach

Risk Policy defines the “acceptable probability of overfishing” known as P*

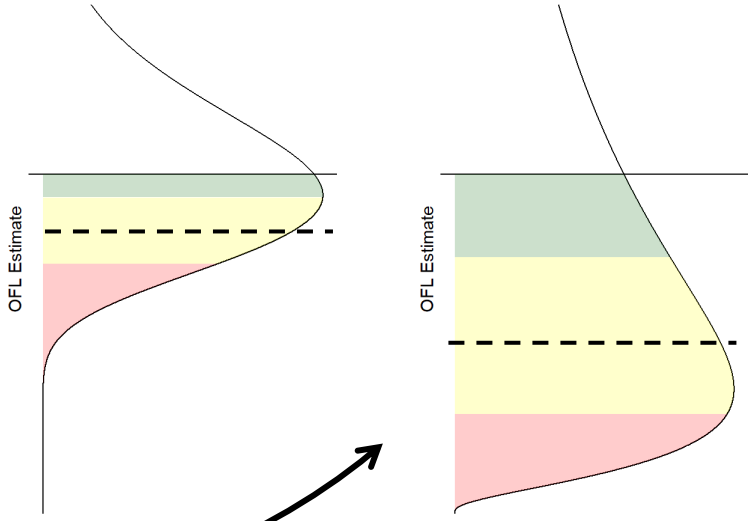
The ABC depends on both the defined P* and the assumed uncertainty distribution

---- P* = 0.25



Low Uncertainty (Low CV)

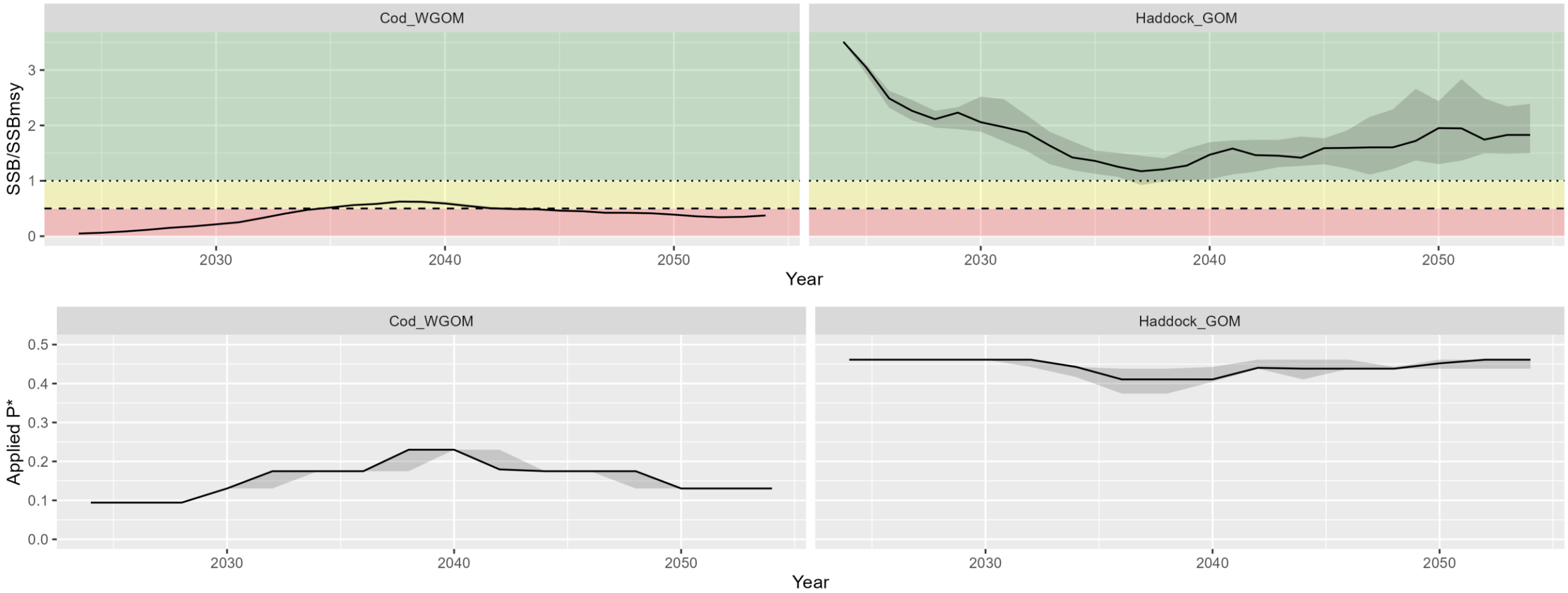
High Uncertainty (High CV)



P^*

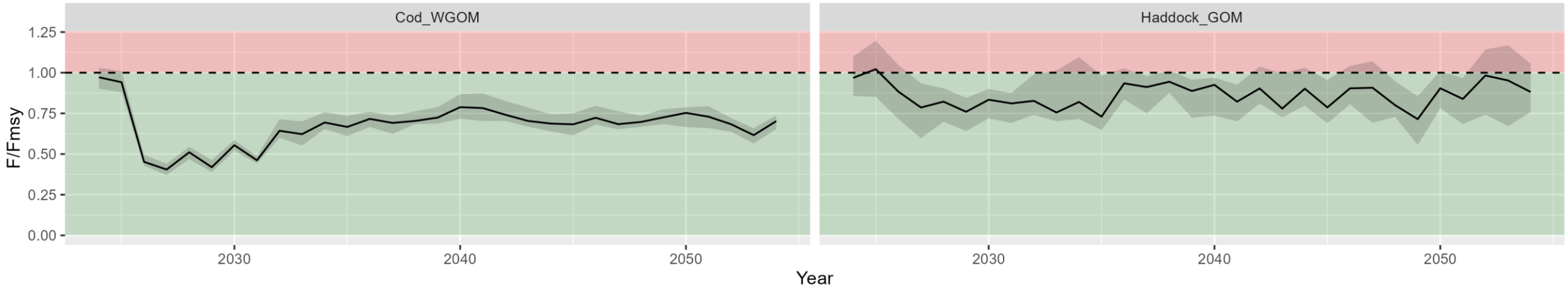
P* determines what percentile of the OFL distribution is used as the ABC

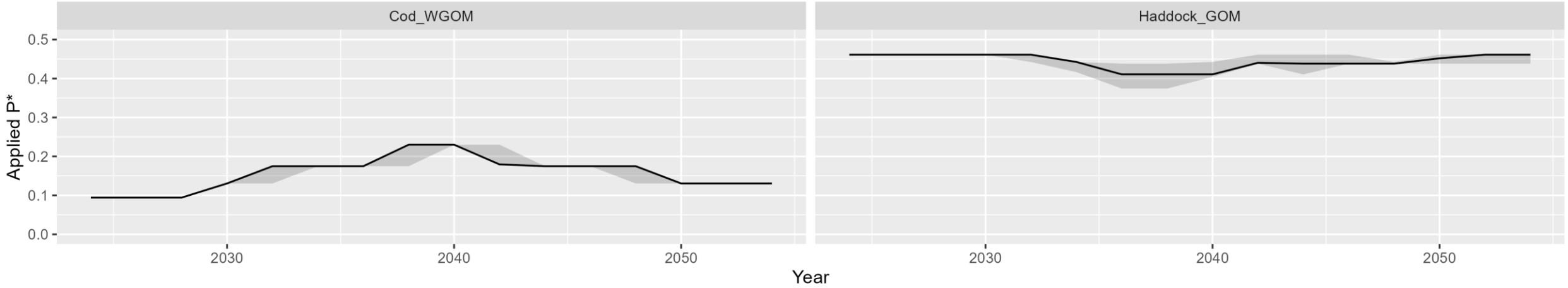
Future Projections: Applied P* (low uncertainty)



- Allowable probability of overfishing is derived directly from Risk Policy
- It ranges from 0 to 0.5, the legally available range
- This range could be constrained

Future Projections: Fishing mortality under P* (low uncertainty)

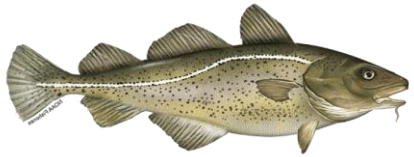




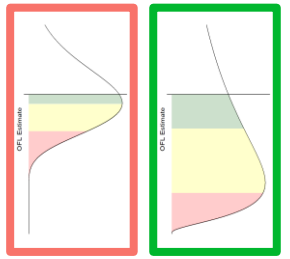
- Allowable probability of overfishing (P*) is low
- F is farther from F_{MSY}

- Allowable probability of overfishing (P*) is high
- F is closer to F_{MSY}

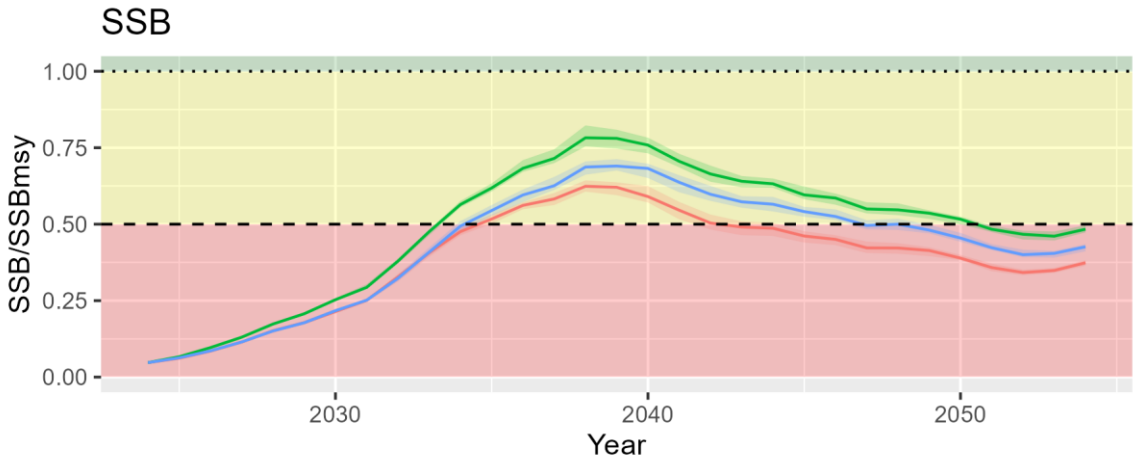
Future Projections: Impact of Uncertainty Assumption

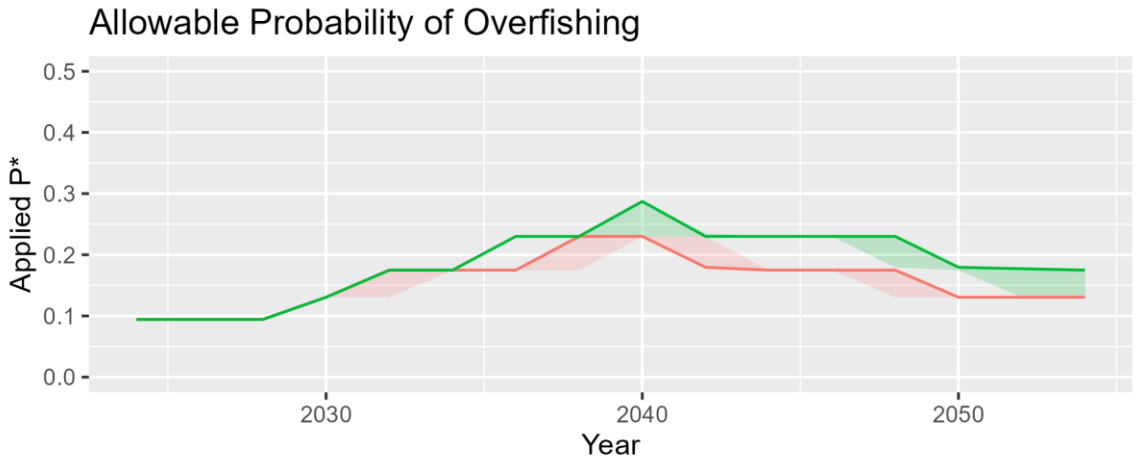


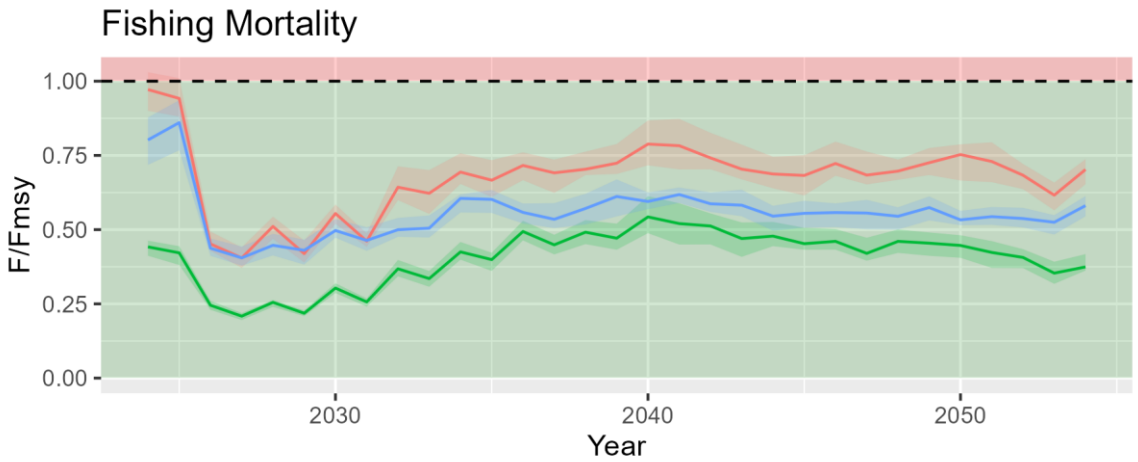
Cod only, because uncertainty assumption has a larger impact when P* is low

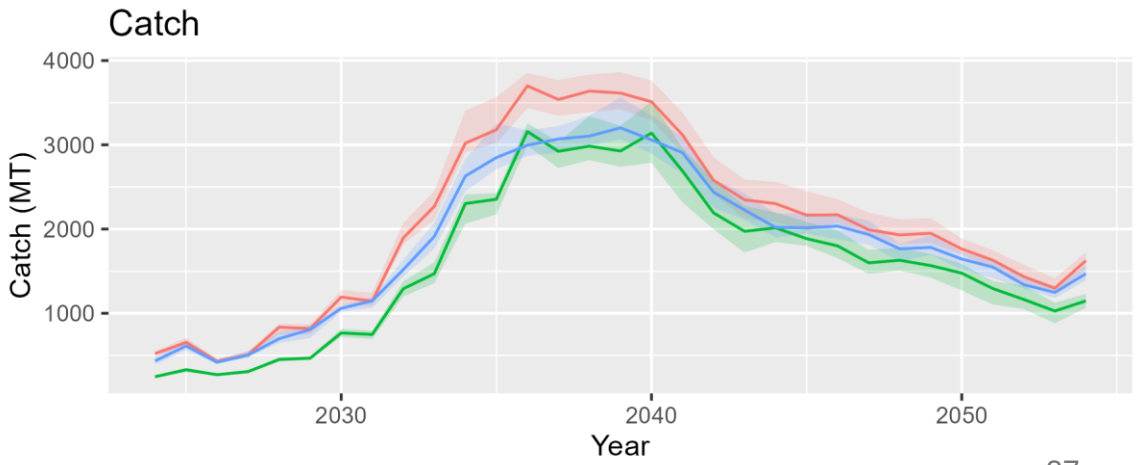


P* with low CV
P* with high CV
Status Quo (ABC = 60% F_{MSY})









Summary

- There are many ways to integrate the Risk Policy into ABC control rules
- These could improve upon current Groundfish control rules by:
  - Directly incorporating socioeconomic considerations
  - Allowing a broader range of scientific uncertainty buffers and objective guidance for implementing them
  - Defining an explicit relationship between the assumed risk tolerance and the scientific uncertainty buffer
- Percentage-based approaches are easier to understand and describe, but carry implicit assumptions and may be overly simplistic
- Probability-based options make these assumptions explicit and may be more flexible, but are complex and require additional decisions

Next Steps

- Collaborate with project Technical Advisory Team to refine operating models and alternative ABC Control Rules
- Catalog how other regions implement probability-based control rules
- Develop and test empirical ABC Control Rules that integrate the Risk Policy
- Consider how the Risk Policy and Rebuilding Plans interact within ABC Control Rules
- Present to the SSC for review and feedback on alternative Risk Policy integrated ABC Control Rule options

Questions and Feedback?