Risk Policy
Working Group Meeting

Webinar

January 23, 2026

**New England
Fishery Management
Council**

Today's Meeting

- **Decisions on factors to develop, the goals of each factor.**

- Start a sub-group group to test the mechanisms of the Risk Policy (e.g. shape of the curve).

- Outlook for 2026 and beyond.

- Start: Discussion on longer-term specifications, and process for updating Risk Policy.

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AGENDA

12:00 p.m.   **Welcome and Introductions, Meeting Logistics**
- Meeting objectives and expectations, Ms. Megan Ware
  - Need final recommendations of factors that will be considered for approval at June 2026 Council Meeting.

12:10 p.m.   **Risk Policy Outlook for 2026 and Other Updates**
- Review Work Plan for the Risk Policy, Mr. Jonathon Peros

12:30 p.m.   **Risk Policy Concept – Recommended Changes**
- Discuss and advise on possible modifications to the Risk Policy, including factors and questions, data sources.
  - Review Risk Policy factors, goals of each factor, data for scoring:
    - Affirm the goals of each factor, score range/directional relationship with risk.
    - Decide if the factor should be used in 2026 implementation.
    - If included, initial discussion about any changes to factor score ranges, data used to score factors.
  - Council staff implementation input.

2:30 p.m.   **Review Risk Policy Mechanisms and Next Steps**
- Discuss and advise on possible modifications to the Risk Policy mechanisms, including factors and questions, data sources.
- Revisit the Shape of the Curve.
  - Stand up a technical sub-group to explore implications of the share of the curve, scaling, and score ranges.

3:00 p.m.   **Review Progress and Discuss Next Steps**
- Recap decisions, review short-term work plan
- Discussion on longer-term specifications and Risk Policy
- Consider process for updating the Risk Policy over time (timeframe)

4:00 p.m.   **Other Business and Adjourn**

2025 Focus of Risk Policy and Working Group

- New Risk Policy became effective on January 1, 2025.
- Two phases (use and development) are happening concurrently.

- Alpha Phase (Use): Risk policy matrix, qualitative application.
- Beta Phase: Simulation testing, weightings exercise, incorporate input and revise concept. Connection to HCRs. Quantitative application.
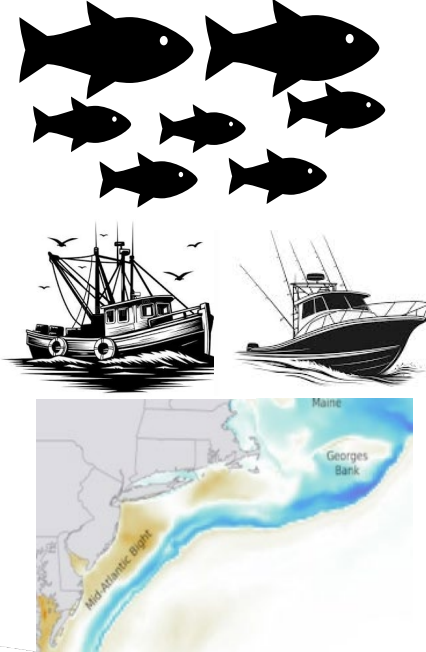
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Risk Policy Concept + ABC Control Rules

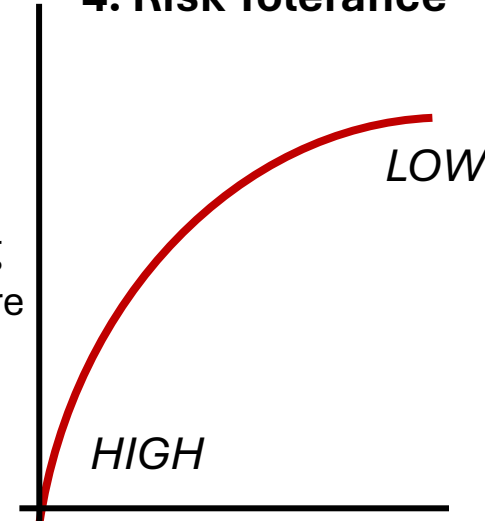**1. Global Weighting**

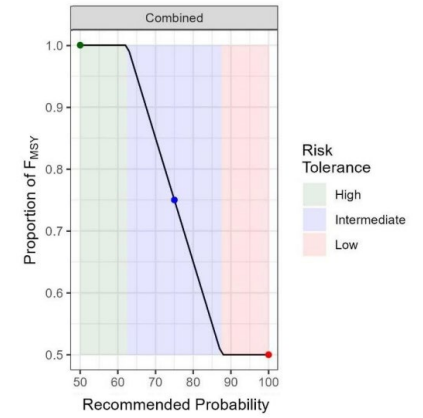*Weights apply to all stocks*

2. Scoring (data)

3. Z-Score

Stock conditions that require increased caution produce higher values, implying a greater need to ensure that overfishing is avoided.

4. Risk Tolerance

LOW

HIGH

5. Set ABC using Risk Policy + HCR (TBD, being developed)

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Risk Policy Workplan Overview (Beta Phase)

- Deliverable: Updated Risk Policy Concept Document.
  - Procedural document that outlines what the Risk Policy is, and how to apply it.

- Target Date: 2026 June Council meeting.
  - Enough time for PDTs, SSC to apply the Risk Policy in upcoming specification setting.

- Description: Add/change/revise the concept document based on results of simulation testing and other feedback.

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Risk Policy Workplan Details (Beta Phase)

	January	February	March	April	May	June
Meetings – Input - Decisions						
RPWG: Confirm Factors w/ goal/intent	TODAY!					
NEFMC January	Update					
RPWG: Refining Concept						
SSC: Check-in						
NEFMC: Check-in, feedback						
RPWG: Refining Concept, Prepare June						
NEFMC June: Approval, weightings						Decision
Work – Refinement – Implementation						
Support Factor Development • Scoring and Data • Accessibility • Process			**RPWG members and Implementation Team:** Applegate, Miller, Garrison, Peros, O'Keefe			Approval of Concept document
Refine Risk Policy Mechanics • Shape of Curve • Range of Scores • Scaling			**Risk Policy Mechanics sub-group:** Kerr, McNamee, Lawson, Peros, Ware, Brothers			Approval of Concept document
Prepare for Weightings exercise						Weightings

Risk Policy Concept – Factors and Recommended Changes

12:30pm – Including slides from UMAINE presentation on November 14, 2025

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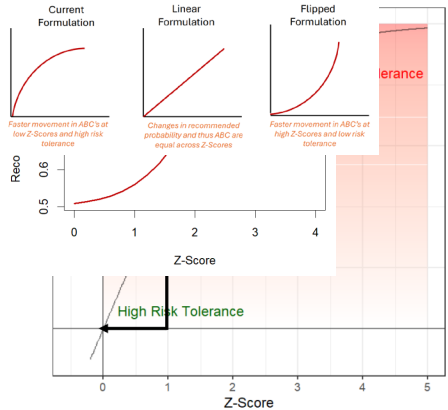
...tions for this Agenda Topic

...factors to discuss today.

...rs planned, take the time we need.

- ~20 minutes per factor, can add more if needed.

- **By the end of this meeting, we need:**

1) **What factors are in for June 2026.**

2) **Agreement on the goal/intent of those factors.**

- Details of data, implementation, can be worked out in Feb/March.

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Overview of Factors, Recommendations

Factor	RPWG, sub-group Recommendation	Keep for 2026?
Biomass/Stock Status	Use. No changes proposed at this time.	✔
Recruitment	Use. Lisa/Jason worked on adjustments. *Pursue those now or later?*	✔
Assessment Type and Uncertainty	Do not use right now (2026).	❌
Climate Vulnerability	Use. No change, stay with CVA 1 (Hare et al). Consider outputs of CVA 2.	✔
Fish Condition	Do not use right now (2026).	❌
Commercial Fishery	Use. Changes to data used to determine scores. Consider trends.	✔
Recreational Fishery	Use. Changes to data used to determine scores. Consider trends.	✔

Starting points for discussion, RPWG needs to weigh in today!

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Clarify the objectives of each factor

For each factor there are several important questions:

MUST →

- **Type of risk:** What kind of uncertainty or risk is the factor meant to capture?
- **Relationship to Risk:** What kind of change in the factor increase or decrease risk tolerance?
- **Directionality from Neutral:** Relative to neutral, does the factor increase or decrease risk tolerance, or both?
- **Neutral Position:** What factor conditions is a default or neutral level of risk tolerance?

Explicit answers for each factor will help:

- UMaine team evaluate the Risk Policy performance
- UMaine team execute simulations
- Working Group refine or finalize scoring rubrics
- Improve clarity and transparency of the Risk Policy

SSB/Stock Status Factor

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Stock Status: Goals

- **Risk associated** with current productivity of the stock
- **Relationship to Risk:** As status (SSB/SSBMSY) increases, risk tolerance increases
- **Neutral Position:** Just below management target, Score = 0
- **Directionality from Neutral:** Two way, can increase and decrease risk tolerance
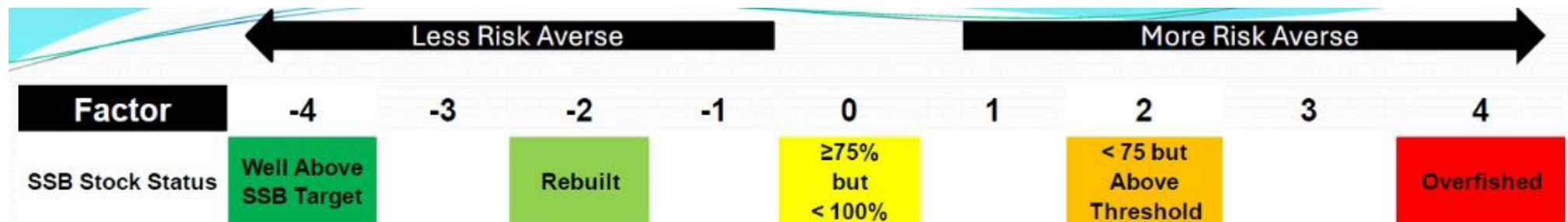
Review of the Scoring Rubric:

- Recommended for inclusion in Risk Policy Concept for June 2026.

Score	-4	-2	0	2	4
	Well Above SSB Target	Rebuilt	≥75% but < 100%	< 75% but Above Threshold	Overfished
Description	≥ 150% SSB target	≥ SSB target but < 150% SSB target	≥75% SSB target but < 100% SSB target OR Unknown status and positive 5-year trend	< 75% SSB target OR Unknown status and 5-year trend is neutral/no trend	Below SSB threshold OR Unknown status and negative 5-year trend

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Recruitment Factor

Lisa Kerr and Jason McNamee
Risk Policy Working Group
With Slides from August 2025

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Discussion from August 2025

- Dr. Kerr and Dr. McNamee reviewed of the recruitment factor and scoring difficulties, developed an alternative option for scoring this factor.

- Identified the need iteration on some of the details, such as:
  - Specifying the underlying goal of the recruitment factor in the risk policy process
  - Identify metrics to use in scoring that align with goals
  - Provide clear guidance for interpretation of metrics used scoring

RPWG: Determine the goal/intent of the recruitment factor, decide how to further develop scoring.

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Recruitment: Interpreted Goals

- **Risk associated** with future productivity of the stock
- **Relationship to Risk:** As recruitment increases, risk tolerance increases
- **Neutral Position:** Average recruitment, Score = 0
- **Directionality from Neutral:** Two way, can increase and decrease risk tolerance

Aspects of Current NEFMC Recruitment Scoring

- Characterize recent recruitment trends and variability
  - Have recent trends been high, average, low?

- Characterize data availability on recruitment
  - Is there information on recruitment?

- How have recent changes in recruitment been accounted for?
  - Projections
  - Reference points

Score	-4	-2	0	2	4
	Multiple Large Year Classes	Recent Large Year Class	Average, No Trend	Recent Low Recruitment	Persistent Low Recruitment
Description	There have been multiple large (meaning above average) recruitment events in the last five years	There has been two large (meaning above average) recruitment events in the last five years	Recruitment in the last five years is average OR recent changes in recruitment have been accounted for in reference points and/or stock projections	Low (meaning below average) recruitment in at least two of the last five years OR there is no information on recruitment	Persistent low (meaning below average) recruitment for more than five years

Alternaitve: Quantile-Based Approach To Recruitment Scoring

One approach for addressing some of these issues: a quantile based approach.

Proposed 3 step process:

1. Data Preparation
   1. Use a time series of recruitment estimates (from assessments or surveys) for a stock of interest.
      1. Make decision on whether you want to smooth or transform data to reduce noise (e.g., log-transform, 3-year moving average).

Quantile-Based Approach To Recruitment Scoring

2. Calculate Quantiles

1. Compute the **lower quantile (e.g., 0.25 or 25th percentile)** and **upper quantile (e.g., 0.75 or 75th percentile)** of the recruitment time series.
2. These quantiles serve as thresholds to define "low," "average," and "high" recruitment regimes:
   1. **Below-average recruitment**: recruitment < 25th percentile
   2. **Average recruitment**: between 25th and 75th percentiles
   3. **Above-average recruitment**: recruitment > 75th percentile

3. Classify Years

1. Assign each year in the time series to one of the three categories.
2. Classification allows for identifying persistent low or high recruitment periods.

Possible Revision

- Do we only stick with magnitude (low, average, high)
- Or do we account for complexities of what is accounted for in assessment?

		Recruitment		
		Low Recr	Average Recr	High Recr
Trust	Low Trust	4	2	0
	Average Trust	2	0	-2
	High Trust	0	-2	-4

Score	-4	-2	0	2	4
	Multiple Large Year Classes	Recent Large Year Class	Average, No Trend	Recent Low Recruitment	Persistent Low Recruitment
Description	There have been multiple large (meaning above average) recruitment events in the last five years	There has been two large (meaning above average) recruitment events in the last five years	Recruitment in the last five years is average OR recent changes in recruitment have been accounted for in reference points and/or stock projections	Low (meaning below average) recruitment in at least two of the last five years OR there is no information on recruitment	Persistent low (meaning below average) recruitment for more than five years

Stock Assessment Factor Sub-Group

Dan Salerno, Dr. Cate O'Keefe, Dr. Jamie Cournane, Jonathon Peros

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Stock Assessment: Goals

- **Risk associated** with stock assessment performance and uncertainties
- **Relationship to Risk:**
  - As assessment uncertainties increase, risk tolerance decreases.
  - Stocks with empirical assessments have less risk tolerance.
- **Neutral Position:** Analytical assessment, score of 0
- **Directionality from Neutral:** One way, only decreases risk tolerance

Factor	-4	-3	-2	-1	0	1	2	3	4
Assessment Type, Performance					Analytical	Analytical, Minor Retro	Analytical, Major Retro	Empirical	Empirical, Missing Data

Less Risk Averse ← → More Risk Averse

Sub-Group Discussion and Recommendations

- Drop the stock assessment factor (for June 2026), and continuing to develop this factor for future use.
  - Originally the RPWG was looking at this factor to differentiate between analytical and empirical assessments while also considering uncertainty from retrospective patterns and missing survey data.
  - The stock assessment factor is still very important and should be considered for longer-term incorporation, particularly with unknowns around assessment cycles and data updates.
- Revisit the stability language in the Risk Policy concept to ensure that it is relevant to new changes to the stock assessment process. This should include adjusting the stability definition to include management stability that allows for incremental changes in specification setting based on assessment trends..
- See Doc.4a in meeting materials.

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Proposed Updates to Climate and Ecosystem Factors

Climate Vulnerability ✓

Fish Condition ✗

Joe Carracappa, Geoff Smith, Jonathon Peros, Andy Applegate, Michelle Bachman

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Fish Condition: Goals

- **Risk associated** with ecosystem productivity
- **Relationship to Risk:** As fish condition decreases, risk tolerance decreases
- **Neutral Position:** Neutral or average condition, Score = 2
- **Directionality from Neutral:** Two way, can increase and decrease risk tolerance

	Less Risk Averse					More Risk Averse			
Factor	-4	-3	-2	-1	0	1	2	3	4
Fish Condition						Good	Above Average	Neutral	Below Average	Poor Condition

Sub-Group Discussion and Recommendations

- The sub-group does not recommend using fish condition as a factor due to:
  - Concerns about fish condition being a strong proxy capturing risks related to environmental and habitat change, and;
  - Correlation with other factors such as recruitment (a separate factor).

- An ecosystem characterization factor should capture risks related to changes in habitat, current habitat conditions, and trophic relationships that are not addressed in other assessment processes (i.e., stock assessments or climate vulnerability assessments).
  - Support for ecosystem characterization as a factor of the Risk Policy. Include in future.

- Other factor ideas that were discussed where: Forage field index, primary predator/biomass, and productivity anomaly (R/SSB).

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Climate Vulnerability: Goals

- **Risk associated** with climate change
- **Relationship to Risk:** As climate vulnerability increases, risk tolerance decreases
- **Neutral Position:** No to low climate vulnerability, Score = 0
- **Directionality from Neutral:** One way, only decreases risk tolerance

Factor	-4	-3	-2	-1	0	1	2	3	4
Climate Vulnerability					Low	Moderate	Moderate, Negative Direction	High	High, Negative Direction

Less Risk Averse ← | → More Risk Averse

Sub-Group Discussion

- Short term, continue to use the climate vulnerability analysis (Hare et al.). Support for using this at full WG, recognition it is becoming dated.
- Final CVA 2.0 product in fall 2026.
  - This could require revisiting the scoring of the climate vulnerability factor.
  - To what extent does the climate vulnerability factor incorporate issues
  - around risk of habitat loss / reduced area of suitable habitat? Is it important
  - to include habitat considerations in a separate factor?

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Proposed Updates to Commercial and Recreational Fishery Factors

Geoff Smith

Dan Salerno

Bill Lucey

Kevin St. Martin

Megan Ware

Jonathon Peros
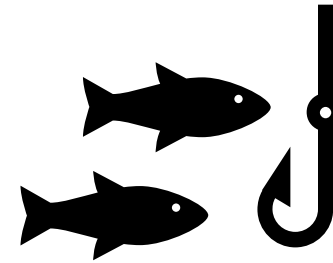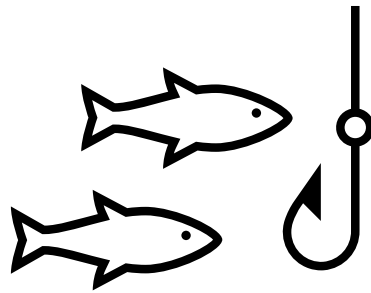
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Commercial Fishery Factor

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Commercial Fishery: Goals

- **Risk associated** with socioeconomic health of the commercial fishery

- **Relationship to Risk:** As socioeconomic stress increases, risk tolerance increases

- **Neutral Position:** No socioeconomic stress, Score = 0

- **Directionality from Neutral:** One way, can only increase risk tolerance
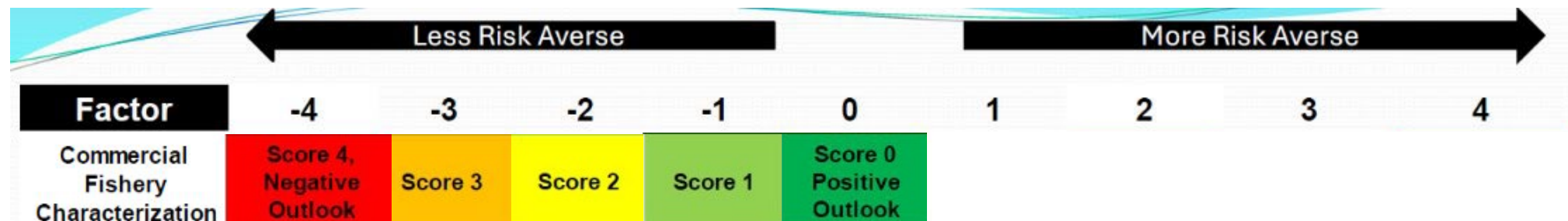
Comm Factor: Where We Were

- **Participation:** Has the annual number of active permits declined by 10% or more since the year in which last specs package was voted on?

- **What's Coming In:** Has revenue per vessel declined by 10% or more since the year in which the last specs package was vote on?

- **Consolidation:** Is greater than 75% of revenue concentrated in less than 25% of permits?

- **Cost:** Since the year in which the last specs package was voted on, have fuel cost increases exceeded inflation?

- **Impacts on other Fisheries:** Is quota for this species needed to support a sub-ACL to allow catch of another species?

- **Concentration:** Does more than 75% of the FMP revenue come from 1 port?

*For every "yes" answer, add -1 to the score

Score	-4	-3	-2	-1	0
Description	Combined tally equals -4 or higher	Combined tally equals -3	Combined tally equals -2	Combined tally equals -1	Combined tally equals 0

Feedback from Previous RPWG Meetings

- Not totally clear on how consolidation and concentration connect to risk tolerance and scoring. Should they be removed?

- General comments to pare down number of variables

- Four categories suggested during last call: quota usage, participation, value, effort

- Keep rec and comm factors separate (as opposed to combine into one factor)

- Note from sub-group: given we are focused on June 2026 vote at Council, we took this as a first iteration with the potential to add complexity after initial implementation

Comm Fishery Factor – Proposed Revisions

1. **Quota Usage:** Has greater than 80% of the quota been caught in at least two of the three last years?
2. **Fishing Community:** Has the number of primary and secondary ports combined declined by any amount over the last five years?
3. **Value:** Has revenue in the fishery (FMP level) had a declining trend over the last five years? For groundfish, instead consider if stock revenue contributes to 10% or more of overall groundfish fishery revenue?
4. **Constraining stock within FMP or on another FMP:** Is quota for this species limiting the execution of other fisheries?
5. **AP Input:** Do comments from the AP <u>within the current fishing year</u> suggest the above trends still hold (no change), socio-economic health in fishery has improved (move one to right), or socio-economic health in fishery has further declined (move one to left)?

*For every "yes" answer, add -1 to the score

Score	-4	-3	-2	-1	0
Description	Combined tally equals -4 or higher	Combined tally equals -3	Combined tally equals -2	Combined tally equals -1	Combined tally equals 0

Comm Fishery Factor – Proposed Revisions

1. **Quota Usage: Has greater than 80% of the quota been caught in at least two of the three last years?**
   - Yes = indicates choke stock, high availability, and/or large impacts from quota reductions so willing to take on more risk
   - Will need to identify what quota we mean for each fishery
2. **Fishing Community: Has the number of primary and secondary ports combined declined by any amount over the last five years?**
   - Yes = indicates decline in fishing community health so willing to accept more risk
   - Significant sub-group discussion on importance of fishing communities and how to measure their health (number of ports, north/south movement, expansion/contraction)
   - Investigate communities at sea as a future iteration

*For every "yes" answer, add -1 to the score

Score	-4	-3	-2	-1	0
Description	Combined tally equals -4 or higher	Combined tally equals -3	Combined tally equals -2	Combined tally equals -1	Combined tally equals 0

Comm Fishery Factor – Proposed Revisions

3. **Value: Has revenue in the fishery (FMP level) had a declining trend over the last five years? For groundfish, instead consider if stock revenue contributes to 10% or more of overall groundfish fishery revenue?**
   - Yes=sign of economic stress (or for groundfish economic importance) so willing to accept higher risk
   - For groundfish, focus on portion of stock revenue to total fishery revenue because it shows relative importance (e.g. redfish, pollock have not been not choke stocks but are important to fishery revenue)

4. **Constraining stock within FMP or on another FMP: Is quota for this species limiting the execution of other fisheries?**
   - Yes=willing to accept higher risk because of multi-species implications
   - Want something that covers flatfish with scallops and white hake in groundfish
   - Recommend we develop an initial list of fisheries/stocks this would apply to, and can refine as needed

*For every "yes" answer, add -1 to the score

Score	-4	-3	-2	-1	0
Description	Combined tally equals -4 or higher	Combined tally equals -3	Combined tally equals -2	Combined tally equals -1	Combined tally equals 0

Comm Fishery Factor – Proposed Revisions

5. **AP Input:** Do comments from the AP within the current fishing year suggest the above trends still hold (no change), socio-economic health in fishery has improved (move one to right), or socio-economic health in fishery has further declined (move one to left)?

- Want to acknowledge that APs are an important source of information
- Many of the other data inputs could have lags in data; how do we incorporate information from the current fishing year?

*For every "yes" answer, add -1 to the score

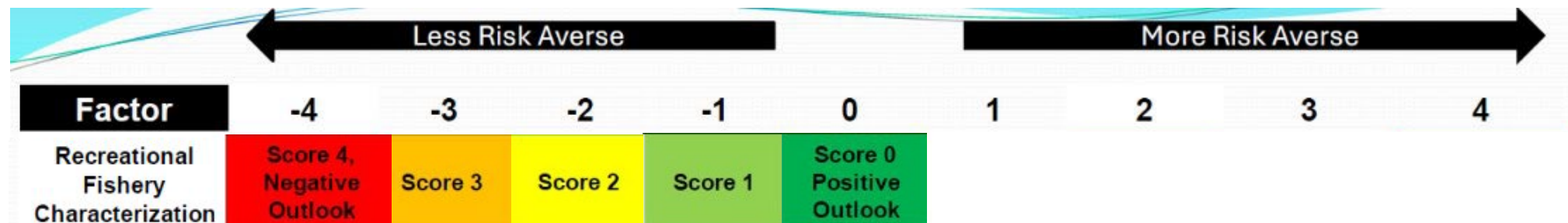| Score	-4	-3	-2	-1	0
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Comm Fishery Factor – Proposed Revisions

1. **Quota Usage:** Has greater than 80% of the quota been caught in at least two of the three last years?
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5. **AP Input:** Do comments from the AP <u>within the current fishing year</u> suggest the above trends still hold (no change), socio-economic health in fishery has improved (move one to right), or socio-economic health in fishery has further declined (move one to left)?

*For every "yes" answer, add -1 to the score

Score	-4	-3	-2	-1	0
Description	Combined tally equals -4 or higher	Combined tally equals -3	Combined tally equals -2	Combined tally equals -1	Combined tally equals 0

Recreational Fishery Factor

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Recreational Fishery : Goals

- **Risk associated** with socioeconomic status of the recreational fishery

- **Relationship to Risk:** As socioeconomic stress increases, risk tolerance increases

- **Neutral Position:** No socioeconomic stress, Score = 0

- **Directionality from neutral:** One way, can only increase risk tolerance

Less Risk Averse					More Risk Averse			
Factor	-4	-3	-2	-1	0	1	2	3	4
Recreational Fishery Characterization	Score 4, Negative Outlook	Score 3	Score 2	Score 1	Score 0 Positive Outlook				

Rec Factor: Where We Were

1. Is recreational fleet diversity from the SOE report increasing over last five years?

2. Are the number of angler trips in New England which are not targeting striped bass or tuna consistent or increasing?

3. Is the PSE for total catch consistently below 30 in the last three years?

4. Has there been consistency in recreational regs such that there was no change within the last 12 months that resulted in a 20% or greater increase or decrease in projected catch?

Score	-4	-3	-2	-1	0
Description	Answered "yes" to four questions	Answered "yes" to three questions	Answered "yes" to two questions	Answered "yes" to one questions	Answered 'yes' to none of the questions

Feedback From Previous RPWG Meetings

- Maintain a factor focused on recreational fishery

- Fleet diversity has been a consistent theme

- Acknowledge that striped bass and tuna can overwhelm recreational fishery metrics in Northeast and they aren't managed by NEFMC (e.g. recreational engagement scores)

- Sub-group: felt good about the variables but investigated the direction in terms of adding risk tolerence

Recreational Fishery Factor

1. Is recreational fleet diversity from the SOE report increasing over last five years?

2. Are the number of angler trips in New England which are not targeting striped bass or tuna consistent or increasing?

3. Is the PSE for total catch consistently below 30 in the last three years?
   - Answering 'yes' increases risk tolerance bc MRIP estimates have lower uncertainty

4. Has there been consistency in recreational regs such that there was no change within the last 12 months that resulted in a 20% or greater increase or decrease in projected catch?
   - Answering 'yes' increases risk tolerance bc more certainty in catch projections

Score	-4	-3	-2	-1	0
Description	Answered "yes" to four questions	Answered "yes" to three questions	Answered "yes" to two questions	Answered "yes" to one questions	Answered 'yes' to none of the questions

Recreational Fishery Factor

1. Is recreational fleet diversity from the SOE report increasing over last five years?
   - Answering 'yes' suggests good socio-economic health; under comm factor it is socio-economic stress that leads to increased risk tolerance

2. Are the number of angler trips in New England which are not targeting striped bass or tuna consistent or increasing?
   - Answering 'yes' suggests good socio-economic health; under comm factor it is socio-economic stress that leads to increased risk tolerance

3. Is the PSE for total catch consistently below 30 in the last three years?
   - Answering 'yes' increases risk tolerance bc MRIP estimates have lower uncertainty

4. Has there been consistency in recreational regs such that there was no change within the last 12 months that resulted in a 20% or greater increase or decrease in projected catch?
   - Answering 'yes' increases risk tolerance bc more certainty in catch projections

Score	-4	-3	-2	-1	0
Description	Answered "yes" to four questions	Answered "yes" to three questions	Answered "yes" to two questions	Answered "yes" to one questions	Answered 'yes' to none of the questions

Recreational Fishery Factor – Proposed Update

1. Is recreational fleet diversity from the SOE report ~~increasing~~ <mark>decreasing</mark> over last five years?

    *   Answering 'yes' suggests socio-economic stress in rec fishery so increase risk tolerance

2. Are the number of angler trips in New England which are not targeting striped bass or tuna ~~consistent or increasing~~ <mark>decreasing</mark>?

    *   Answering 'yes' suggests socio-economic stress in rec fishery so increase risk tolerance

3. Is the PSE for total catch consistently below 30 in the last three years?

    *   Answering 'yes' increases risk tolerance bc MRIP estimates have lower uncertainty

4. Has there been consistency in recreational regs such that there was no change within the last 12 months that resulted in a 20% or greater increase or decrease in projected catch?

    *   Answering 'yes' increases risk tolerance bc more certainty in catch projections

Score	-4	-3	-2	-1	0
Description	Answered "yes" to four questions	Answered "yes" to three questions	Answered "yes" to two questions	Answered "yes" to one questions	Answered 'yes' to none of the questions

Recreational Fishery Factor – Proposed Update

1. Is recreational fleet diversity from the SOE report decreasing over last five years?

2. Are the number of angler trips in New England which are not targeting striped bass or tuna decreasing?

3. Is the PSE for total catch consistently below 30 in the last three years?

4. Has there been consistency in recreational regs such that there was no change within the last 12 months that resulted in a 20% or greater increase or decrease in projected catch?

Add a RAP Question?

Score	-4	-3	-2	-1	0
Description	Answered "yes" to four questions	Answered "yes" to three questions	Answered "yes" to two questions	Answered "yes" to one questions	Answered 'yes' to none of the questions

Risk Policy Concept – Mechanisms and Next Steps

2:30pm – Including slides from UMAINE presentation on November 14, 2025

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Key Risk Policy Mechanics and Implications

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1. Shape of the Curve
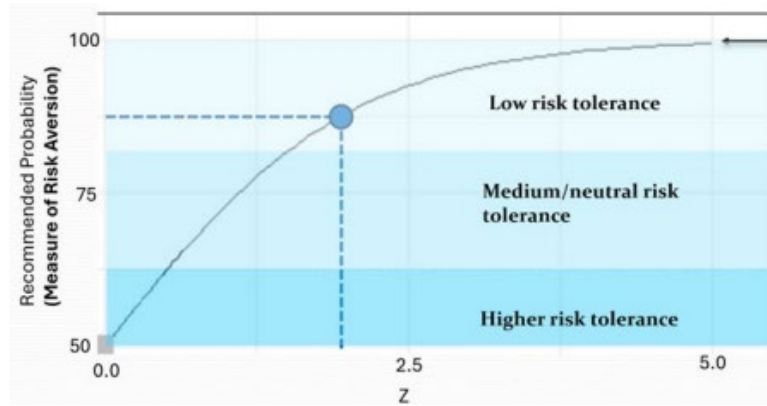
2. Z-Score Scaling

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

3. Range of Scores

Impacts
Decision Points
Recommendations

Staff Recommendation – Mechanics

- **Recap:** RPWG input at the last meeting (November), but some outstanding questions about how changes to the curve, scaling, and score ranges will influence Risk Policy outcomes.

- **Proposal:**
  - Form a sub-group to examine mechanics in more detail, report back to the RPWG in March, prior to SSC and Council check-in.
  - Sub-group continues to work between April Council and June Council.

- **Objectives:**
  - Consider how the mechanics impact outcomes.
  - Explore how Risk Policy works with Harvest Control Rules, create examples for the Council to see.

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From last time… Shape of the Curve

Mechanics	Information Considered in November.	Working Group Input Last Nov.
Shape of the curve	Issue: The truncated shape of the logistic curve at 50% results in non-intuitive results, with outcomes that are inconsistent with decision making: • Curve is steeper at low Z-scores, results are more responsive to high risk tolerance. • Curve is asymptote at high Z-scores, results are less responsive to low risk tolerance. 	WG generally liked the idea of using the full logistic curve, but did not have the opportunity to work through how changing the curve would effect the translation of a Z-Score to a recommended probability. Full logistic curve option (rec): Other options:

From last time... Z-Score Scaling and Score Ranges

Mechanics	Information Considered in November.	Working Group Input Last Nov.
Z-Score Scaling	Low scaling restricts the logistic curve to the linear portion and higher scaling allows access to the asymptote.	Z-scores should be able to access the full range of the logistic curve, rather than being limited to the more linear portion. Additional work to determine the scaling is needed.
Factor Score Ranges & Scaling	Scaling can influence the range of z-scores we can achieve, and some factors have different score ranges. This determines the possible Z-scores and recommended probabilities, and unequal score ranges lead to implicit weightings.	Consider revising the possible score ranges, in concert with revisions to Z-score scaling.

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Review Progress and Discuss Next Steps

3:00 PM

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Recap Decisions from Today...

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Discussion:

- Longer-term specifications (up to 5 years) and the Risk Policy.
- Process for updating the Risk Policy over time.
  - How often? How should it be done? Etc.

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Extra Slides

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Impacts and Decision Points

- **Impacts:** For most factors, rubric implies neutral should score 0
  - Z=0 leads to highest level of risk tolerance

- **Decision Points:**
  - What conditions should result in a neutral score? Decided for individual factors.
  - What factor score should represent neutral? Requires considering the Risk Policy holistically

UMaine Slides on Mechanics

November 14, 2025

**New England
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Overview

1) Risk Policy Mechanics and Implications:
- Shape of risk curve: faster movement at high risk tolerance (near the origin)
- Z-Score scaling: determines which parts of the curve are accessible
- Factor score ranges: implicit weighting with unequal score ranges across factors

2) Clarifying the Objectives of each Factor:
- Clear goal statement on intention of each factor (what type of uncertainty, risk is it meant to capture)
- Directional relationship with risk
- Definition of neutral state

3) Emerging Challenges:
- Appropriate alignment between factor conditions and neutral risk
- Resource limitation
- Interpretability: directionality changes throughout the process, "recommended probability"

Impacts of Truncated Logistic Curve

- Curve is steeper at low Z-Scores = more responsive at high risk tolerance

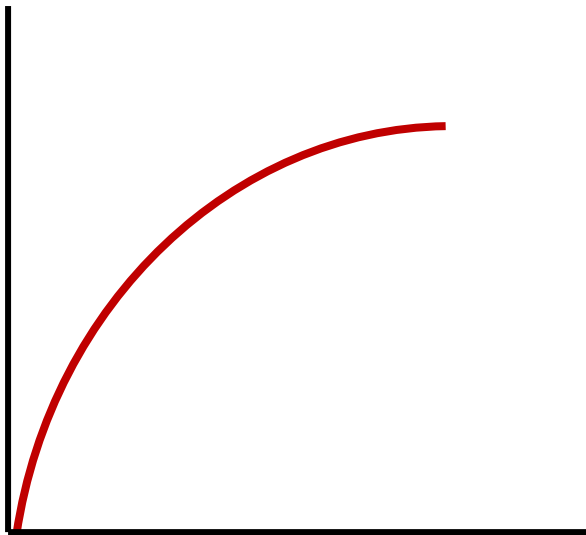- Curve is at asymptote at high Z-scores = less responsive at low risk tolerance

For ABC control rules, this could mean:

- Scientific uncertainty buffer changes rapidly when ABC is near the OFL
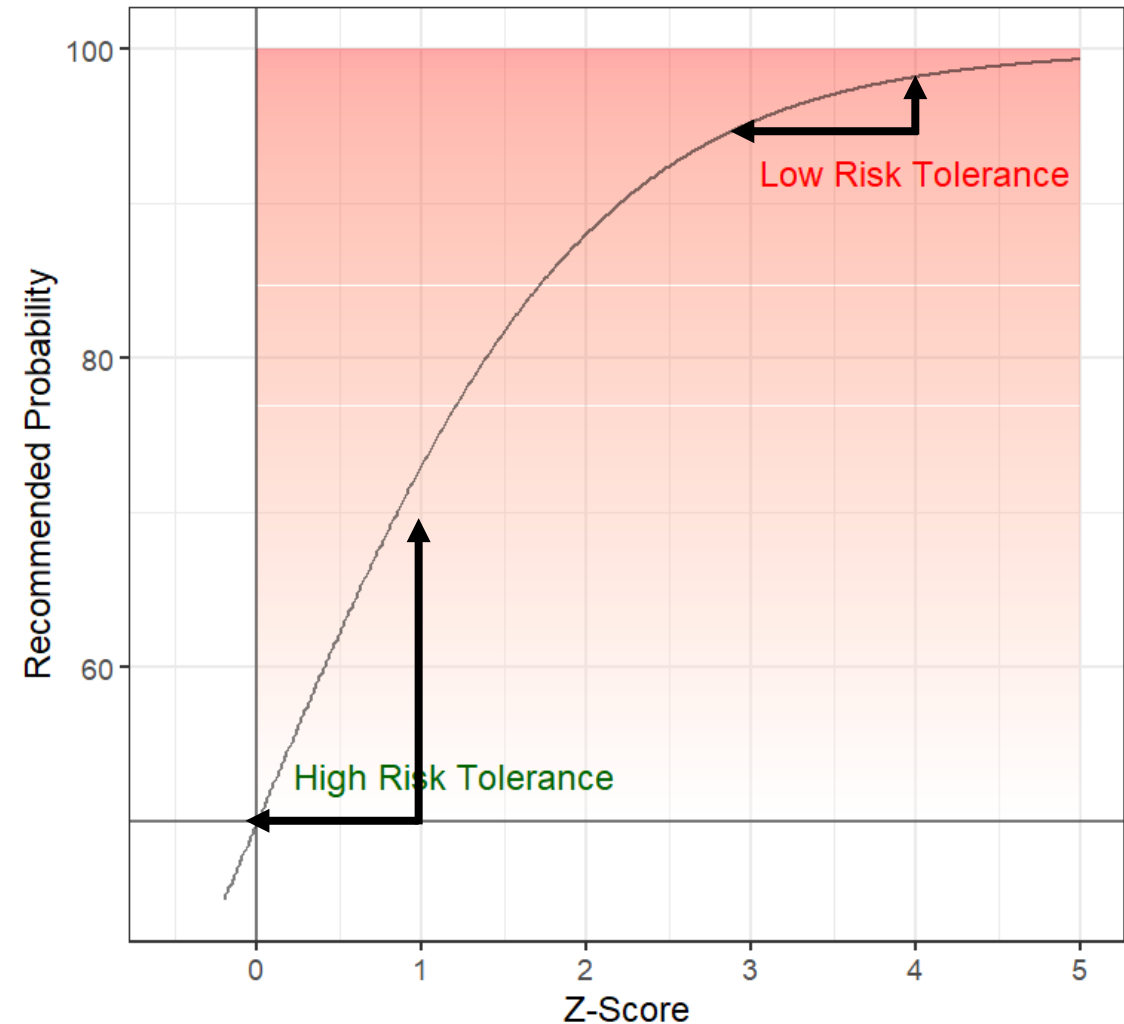
Potential alternative shapes

Current Formulation	Linear Formulation	Flipped Formulation

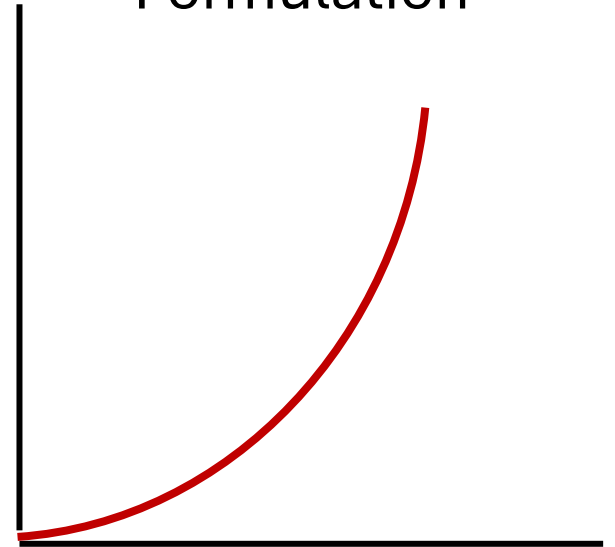*Faster movement in ABC's at low Z-Scores and high risk tolerance*
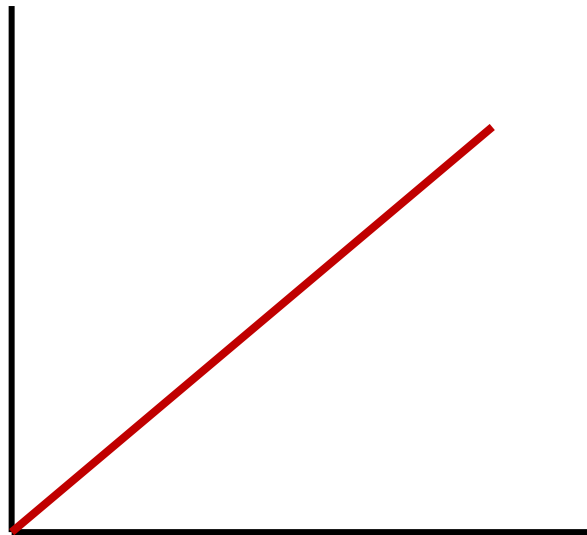
Changes in recommended probability and thus ABC are equal across Z-Scores

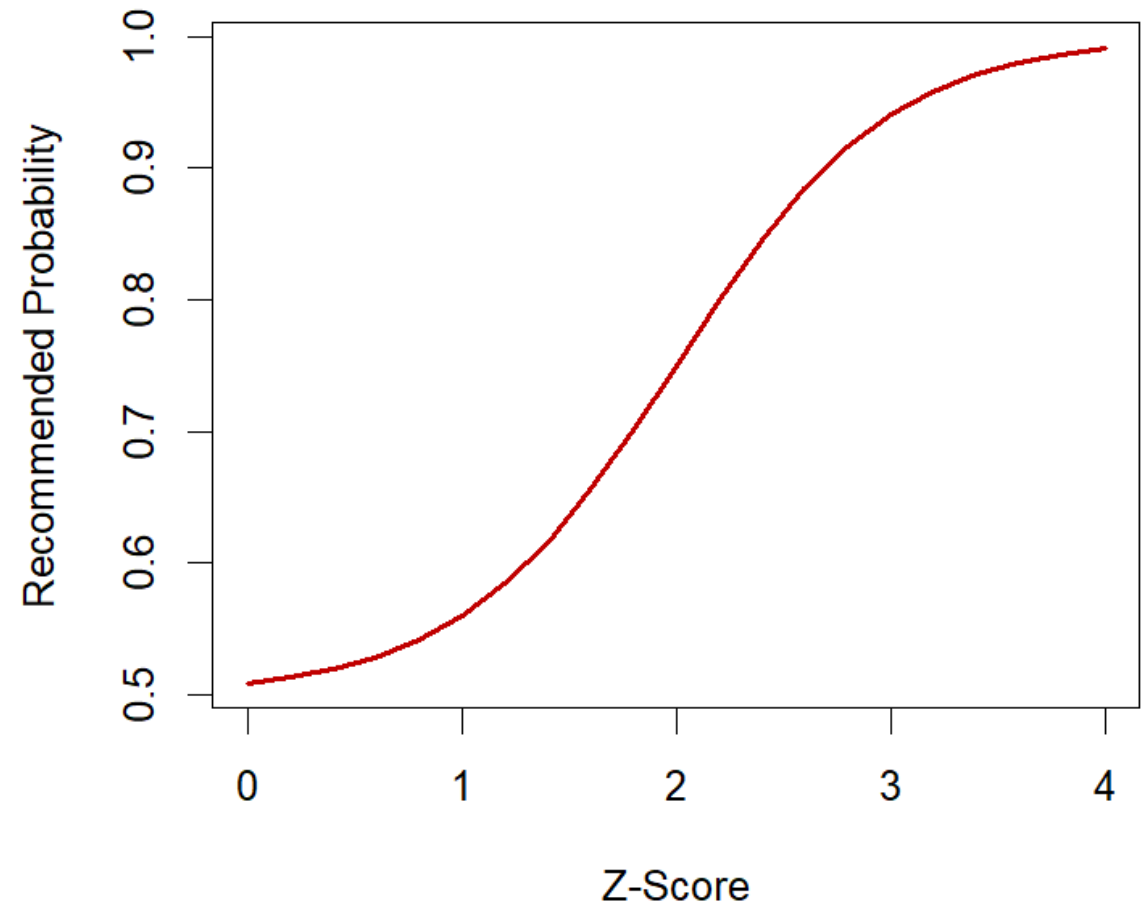*Faster movement in ABC's at high Z-Scores and low risk tolerance*

Option to use the full logistic curve

- Move quickly at intermediate Z-scores and risk tolerances and moves slowly at high and low risk tolerance

Decisions on Shape of the Curve

1. Should the Risk Policy be more responsive at high risk tolerance and less responsive at low risk tolerance? How it currently works.

2. Should the Risk Policy be more responsive at low risk tolerance and less responsive at high risk tolerance? Could be achieved by:
   - A different functional form
   - Inverting the directionality of scoring

3. Should the Risk Policy be more responsive at intermediate risk tolerance and less responsive at both high and low risk tolerance? Could use the entire logistic curve.

4. Should the rate of responsiveness be consistent across all risk tolerance levels? Could use a linear relationship or Z-Scores directly.

Summary and Recommendations

- **Impacts**: Faster rate of change (i.e., responsiveness) at high risk tolerance than at low risk tolerance.

- **Decision Points**:
    - Should the Risk Policy be more responsive at certain levels of recommended risk tolerance than others?
    - If so, for what level of risk tolerance does a faster rate of change align best with management goals?

- **Recommendation**: This is largely a management decision.

Z-Score Scaling

Impacts of Z-Score Scaling

This impacts:

- The effective shape
- The range of possible output values
- Differentiation between stocks
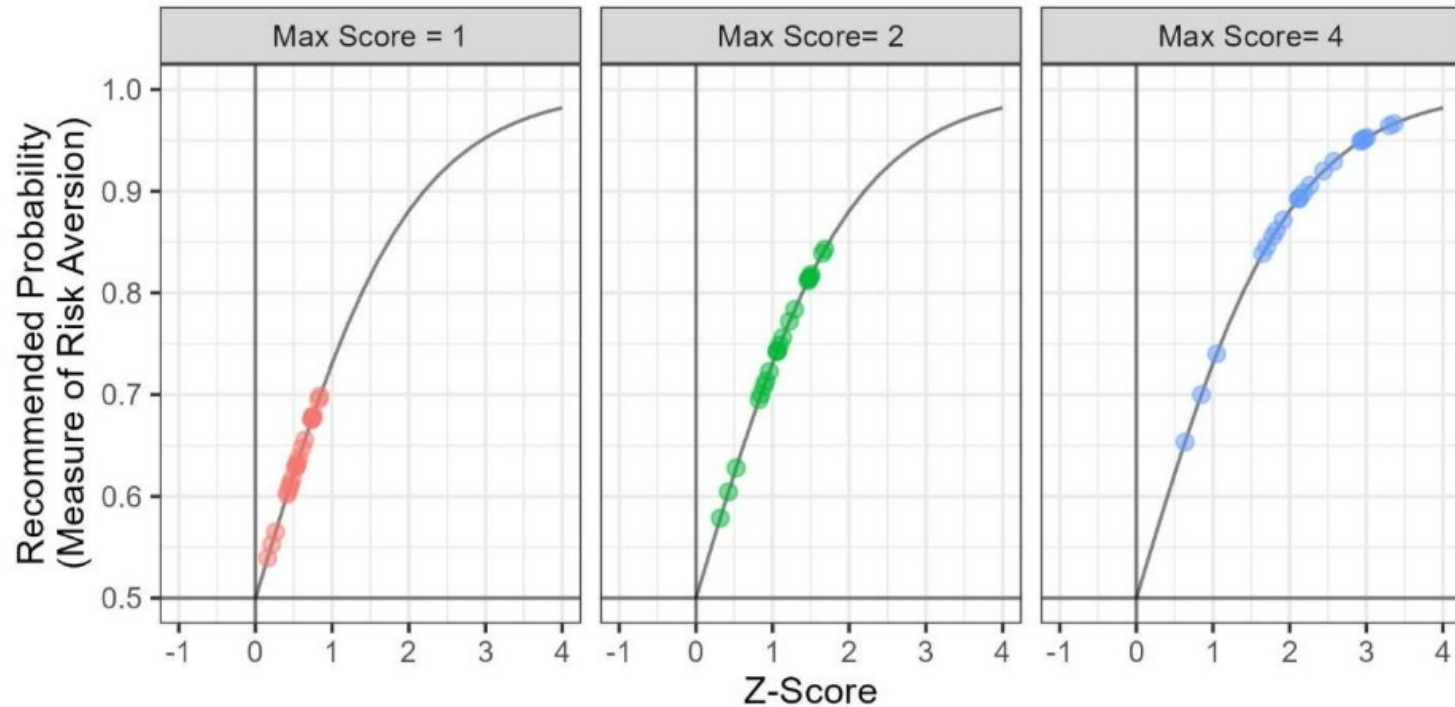
Low Scaling
uses only the
linear portion

High Scaling
accesses the
asymptote

Recommendations and Decision Points

- **Impacts:** Low scaling restricts the logistic curve to the linear portion and higher scaling allows access to the asymptote.

- **Decision Points**: Should Risk Policy be able to access the asymptote of the logistic curve (high Z-Score scaling) or be constrained to the linear portion (low Z-Score scaling)?

- **Recommendations**: Z-Score scaling should be high enough to access a broad range of "recommended probabilities," effectively using the shape of the preferred curve and increasing differentiation between stocks.
  - The magnitude of scaling should be explicitly selected.

Score Ranges

Teeing-Up: Score Scaling

- Currently have scores ranging from -4 to 4
- But when we are doing calculations for the z-score, those get scaled down to a range of -1 to 1 (adopted from ASMFC template)

Decision Tool Question (Scoring scale)	Weight	Score
Biomass Stock Status (-4 to 4)	0.15	-4
Recruitment (-4 to 4)	0.15	-2
Assessment Type and Uncertainty (0-4)	0.14	1
Climate Vulnerability (0-4)	0.14	1
Fish Condition (0-4)	0.14	0
Commercial Economic Impact (-4 to 0)	0.14	-2
Rec Economic Impact and Diversity (-4 to 0)	0.14	-4
Z Score		-0.365
Recommended Probability		41%

Teeing-Up: Score Scaling

- Currently have scores ranging from -4 to 4 (at the extreme)
- But when we are doing calculations for the z-score, those get scaled down to a range of -1 to 1

| Decision Tool Question (Scoring scale)	Weight	Score	Score Scaled to 1
Biomass Stock Status (-4 to 4)	0.15	-4	-1
Recruitment (-4 to 4)	0.15	-2	-0.5
Assessment Type and Uncertainty (0-4)	0.14	1	0.25
Climate Vulnerability (0-4)	0.14	1	0.25
Fish Condition (0-4)	0.14	0	0
Commercial Economic Impact (-4 to 0)	0.14	-2	-0.5
Rec Economic Impact and Diversity (-4 to 0)	0.14	-4	-1
Z Score		-0.365	
Recommended Probability		41%	

Teeing-Up: Score Scaling

- Currently have scores ranging from -4 to 4 (at the extreme)
- But when we are doing calculations for the z-score, those get scaled down to a range of -1 to 1

Decision Tool Question (Scoring scale)	Weight	Score	Score Scaled to 1	Weighting x Score Scaled to 1
Biomass Stock Status (-4 to 4)	0.15	-4	-1	-0.15
Recruitment (-4 to 4)	0.15	-2	-0.5	-0.075
Assessment Type and Uncertainty (0-4)	0.14	1	0.25	0.035
Climate Vulnerability (0-4)	0.14	1	0.25	0.035
Fish Condition (0-4)	0.14	0	0	0
Commercial Economic Impact (-4 to 0)	0.14	-2	-0.5	-0.07
Rec Economic Impact and Diversity (-4 to 0)	0.14	-4	-1	-0.14
				Add up this column
Z Score		-0.365		-0.365
Recommended Probability		41%		

Teeing Up: Score Scaling

- Scaling can influence the range of z-scores we can achieve
- Maybe scaling to 2, or keeping it at 4 is more appropriate to get full range of potential z-scores
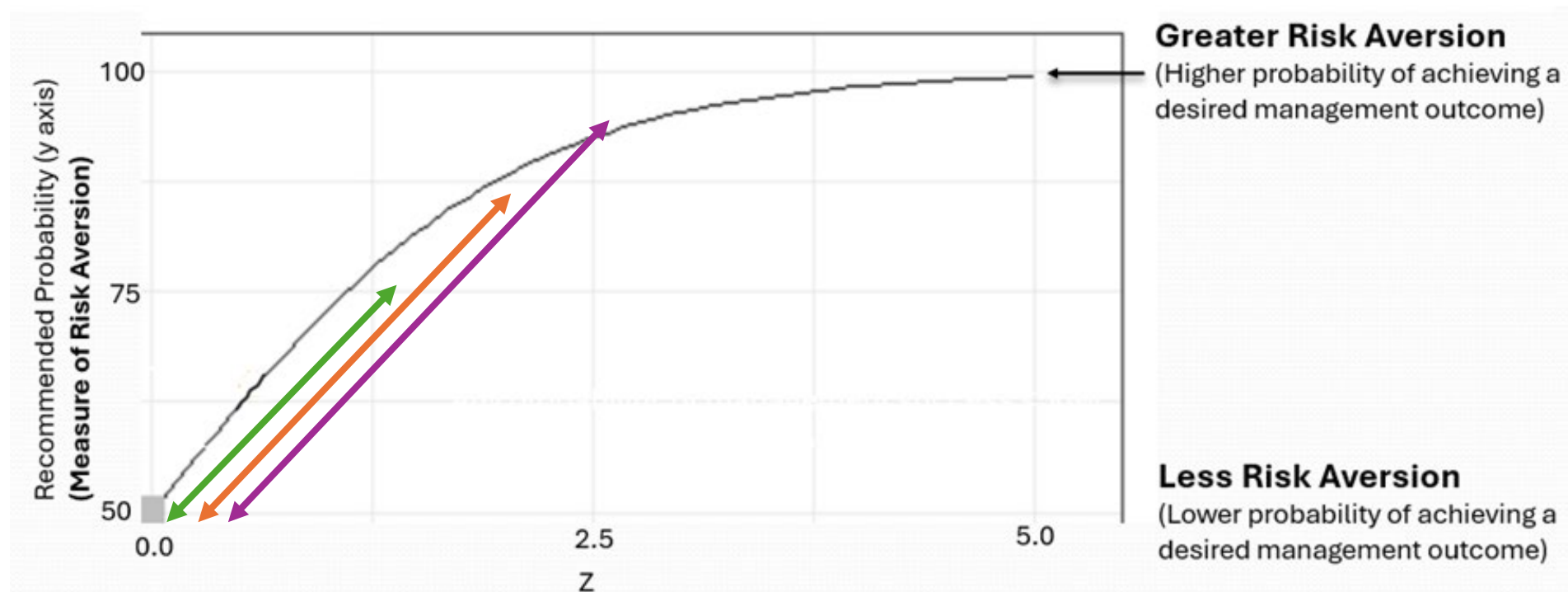
Factors have different score ranges

Designed so factors can increase and/or decrease risk tolerance.
But this assumes Neutral = 0, which should be considered carefully.

Four factors:
- Negative
- Large range
- Steps of 2

Three factors:
- Only positive
- Small range
- Steps of 1

| | ← Less Risk Averse | | | | | | | More Risk Averse → | |
Factor	-4	-3	-2	-1	0	1	2	3	4
SSB Stock Status	Well Above SSB Target		Rebuilt		≥75% but < 100%		< 75 but Above Threshold		Overfished
New Recruitment Factor	Multiple Large YCs		Recent Large YCs		Average, No trend		Recent Low Recruitment Or No info		Persistent Low Recruitment
Assessment Type, Performance					Analytical	Analytical, Minor Retro	Analytical, Major Retro	Empirical	Empirical, Missing Data
Climate Vulnerability					Low	Moderate	Moderate, Negative Direction	High	High, Negative Direction
Fish Condition					Good	Above Average	Neutral	Below Average	Poor Condition
Commercial Fishery Characterization	Score 0 Positive Outlook		Score 1		Score 2		Score 3		Score 4, Negative Outlook
Recreational Fishery Characterization	Score 0 Positive Outlook		Score 1		Score 2, or No Rec Fishery		Score 3		Score 4, Negative Outlook

Score ranges for the commercial and recreational fishery factors may be redefined to scale from -4 to 0, increments of 1 and inverse directionality

Impacts of factor score ranges

- Determines the possible Z-Scores and recommended probabilities
- Negative scores and truncated logistic curve lead to a loss of information and decreased differentiation between stocks
- Unequal score ranges lead to implicit weighting
- Assumption of Neutral = 0 may lead to misalignment between the intention of scoring rubrics and the results of logistic function
  - Z-Score of 0 = Recommended Probability of 0.5 = little or no buffer ABC-OFL
  - Neutral conditions might lead to the most risk tolerant value allowed
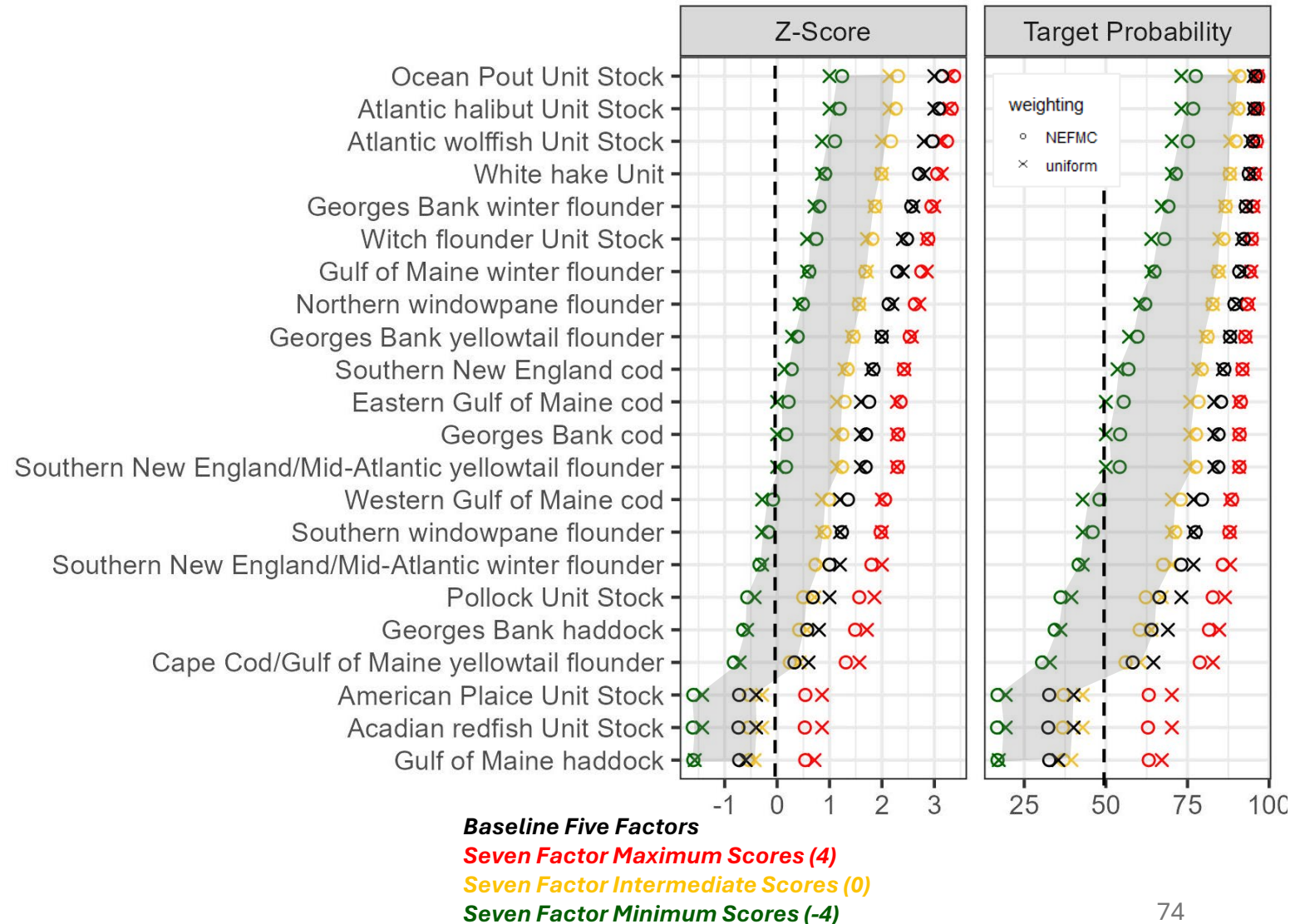
Potential Score Ranges for the Fishery Factors

Could range from:

- -4 to 4
- -4 to 0

Sensitivities highlight:

- Impact on Z-scores and recommended probabilities
- Potential loss of information

Baseline Five Factors
Seven Factor Maximum Scores (4)
Seven Factor Intermediate Scores (0)
Seven Factor Minimum Scores (-4)

Unequal score ranges add implicitly weighting

Factors with bigger score ranges and larger increments are more influential

- Calculated risk policy output with equal ranges
  - Excluded fishery factors
- Outcome:
  - Keeps the range of Z-Scores above zero
  - Reduced the difference between the council and uniform weighting

Baseline Five Factors
Baseline Five Factors Equal Ranges
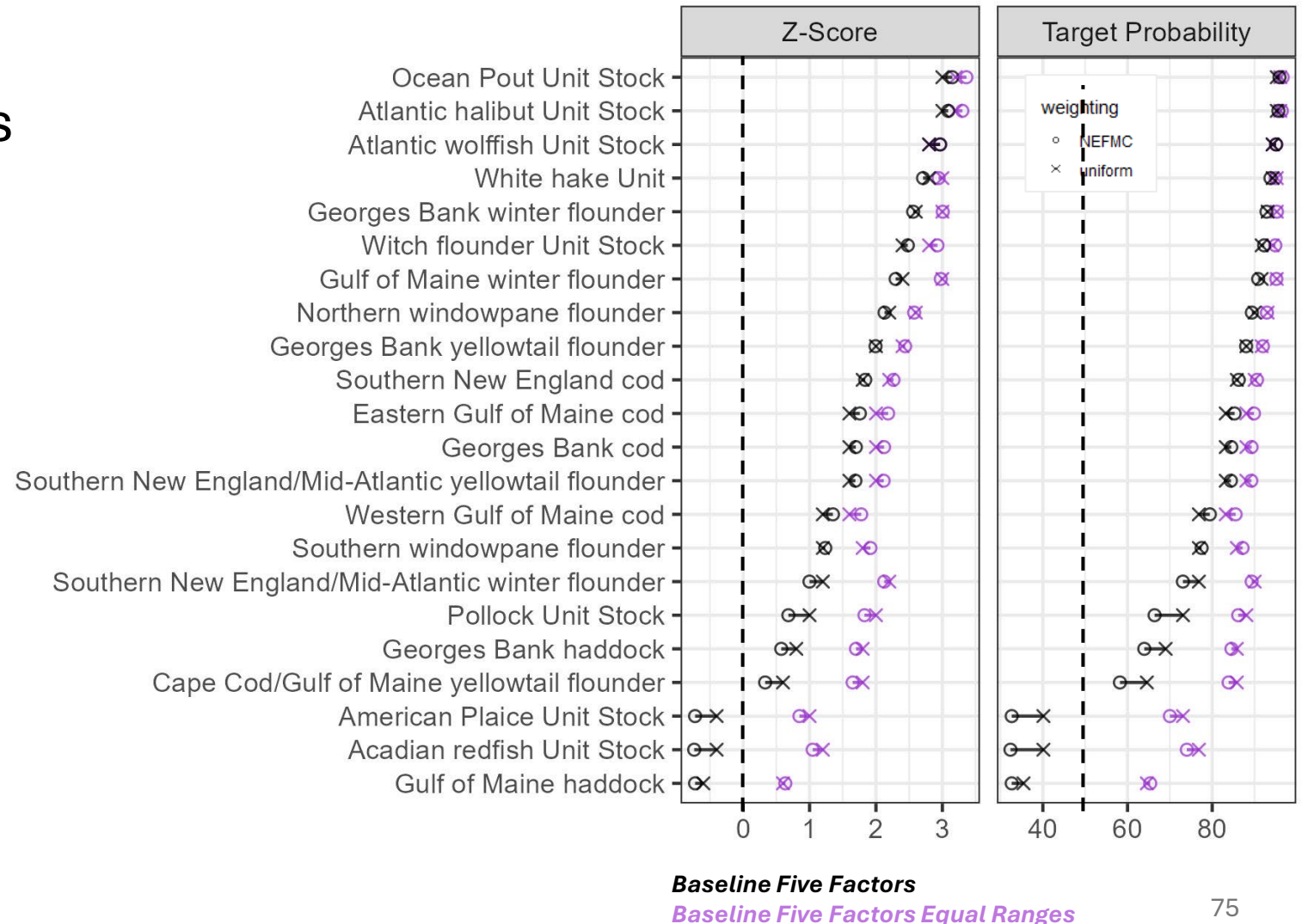
Score ranges determine the distribution of Z-Scores and Recommended Probabilities
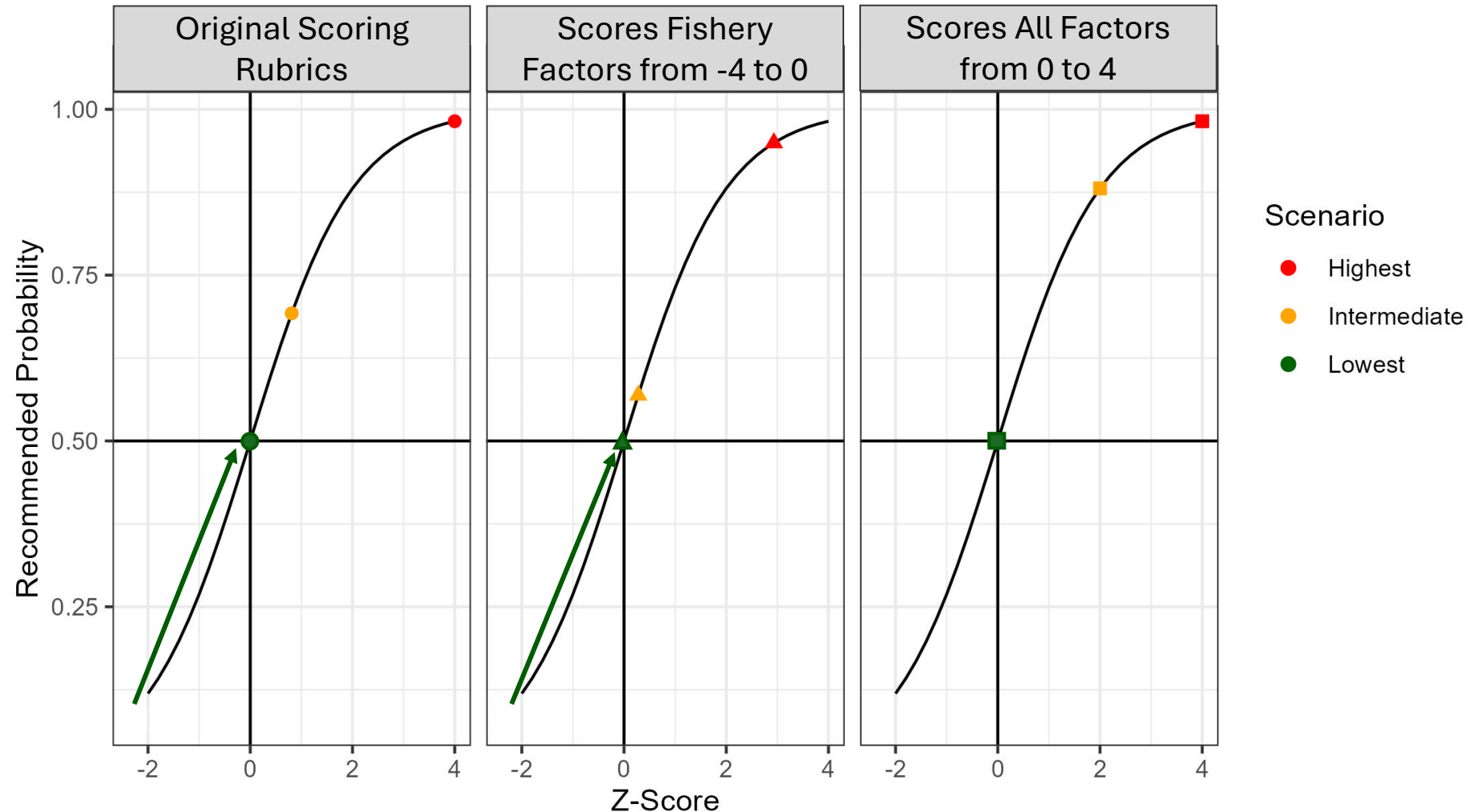
Recommendations and Decision Points

- **Impact of factor score ranges**:
  - Determines the distribution of Z-Scores and recommended probabilities
  - Negative scores combine with the truncated curve to decrease differentiation
  - Negative scores, unequal score ranges and unequal increments lead to implicit weighting of some factors

- **Decision Points**:
  - What range of recommended probabilities is appropriate for "neutral" conditions?
  - Should negative score ranges be used if the logistic curve is truncated at Z=0?
  - Should factors have unequal score ranges and different increments, which may allow them to impact risk tolerance in different but also carries implicit weighting?

- **Recommendations**:
  - Neutral conditions should not lead to recommended probabilities near 0.5

The decision on final score ranges is a nuanced decision that may need to balance complex tradeoffs and competing goals.

Recruitment Factor

Kerr & McNamee Slides, August 2025

New England Fishery Management Council

Risk Policy Scoring Demo

- A demonstration of the scoring method on groundfish stocks revealed areas where scoring the recruitment factor was challenging

- Identified the need iteration on some of the details, such as:
  - Specifying the underlying goal of the recruitment factor in the risk policy process
  - Identify metrics to use in scoring that align with goals
  - Provide clear guidance for interpretation of metrics used scoring

Aspects of Current NEFMC Recruitment Scoring

- Characterize recent recruitment trends and variability
  - Have recent trends been high, average, low?

- Characterize data availability on recruitment
  - Is there information on recruitment?

- How have recent changes in recruitment been accounted for?
  - Projections
  - Reference points

Score	-4	-2	0	2	4
	Multiple Large Year Classes	Recent Large Year Class	Average, No Trend	Recent Low Recruitment	Persistent Low Recruitment
Description	There have been multiple large (meaning above average) recruitment events in the last five years	There has been two large (meaning above average) recruitment events in the last five years	Recruitment in the last five years is average OR recent changes in recruitment have been accounted for in reference points and/or stock projections	Low (meaning below average) recruitment in at least two of the last five years OR there is no information on recruitment	Persistent low (meaning below average) recruitment for more than five years

Recruitment – Scoring Difficulties

There are aspects of the rubric that are open to interpretation, on the test run the team made assumptions (shown in red):

o What does "multiple" large year classes mean? We assumed 3 or more.

o How far above or below the mean is considered "large" or "small?"

o What is appropriate time frame to characterize "average"? We used the full time series.

o How close to the mean is considered "average" (i.e., score = 0).

o What do you do when conditions for multiple scores are met simultaneously ?

▪ E.g.: 2 years above the mean (Score = -2) and 2 years below the mean (Score = 2). We modified score = 2

Score	-4	-2	0	2	4
	Multiple Large Year Classes	Recent Large Year Class	Average, No Trend	Recent Low Recruitment	Persistent Low Recruitment
Description	There have been multiple large (meaning above average) recruitment events in the last five years 3+ years >mean	There has been two large (meaning above average) recruitment events in the last five years 2 years >mean	Recruitment in the last five years is average OR recent changes in recruitment have been accounted for in reference points and/or stock projections	Low (meaning below average) recruitment in at least two of the last five years OR there is no information on recruitment 4+ years < mean	Persistent low (meaning below average) recruitment for more than five years 6 years < mean

Recruitment – Scoring Difficulties

Estimated recruitment time series from most recent haddock assessments included in StockSmart (2022)

Different recruitment trends over the terminal 5 years, but each fits the criteria for both a score of -2 and 2

Highlights need for more explicit guidance on "above" and "below"
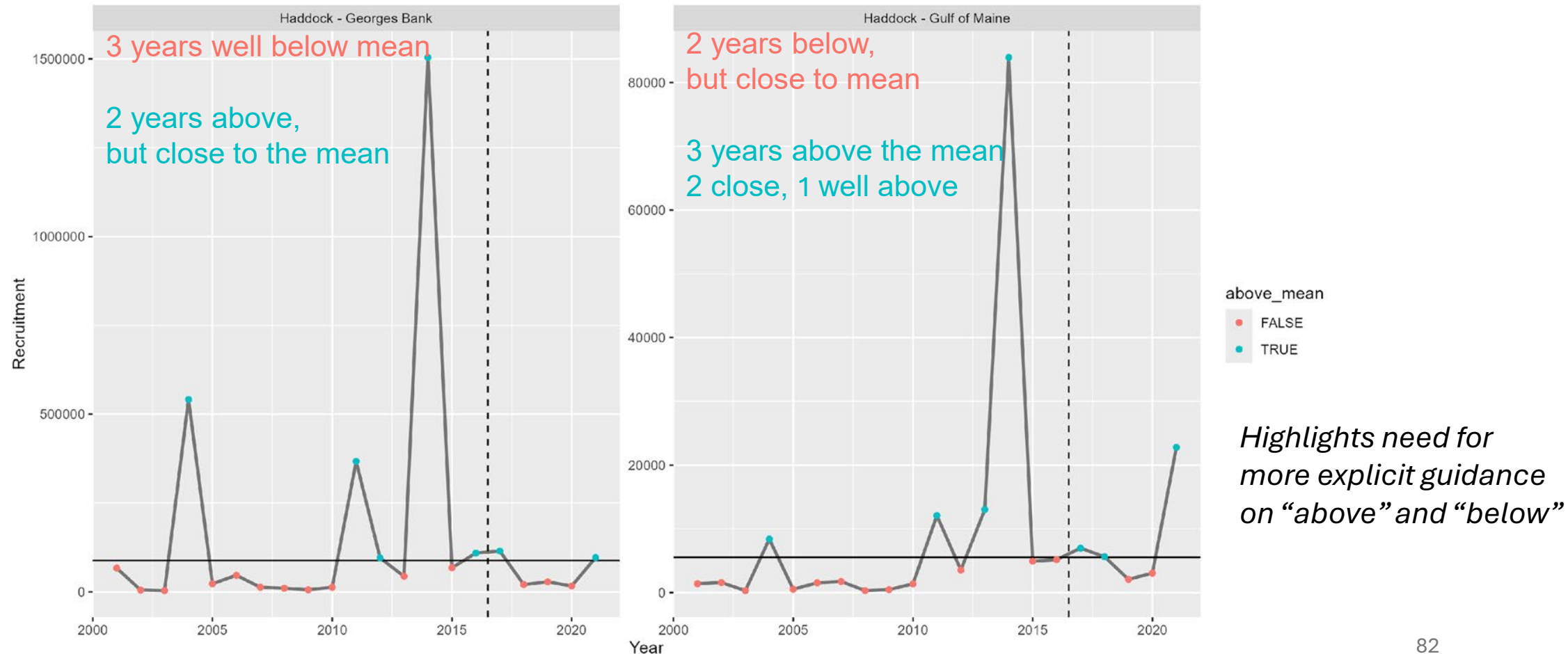
Recruitment – Scoring Difficulties

- Explicit criteria should be developed to identify when "recent changes in recruitment" have been accounted for in reference points and/or stock projections" (default score to 0).

- The team defaulted to 0 when:
  - Reference points assume recent average recruitment (e.g., SNE/MA yellowtail flounder)
  - Projections assume temporal auto-correlation in age-1 abundance (e.g., GOM haddock)
  - Projections assume a stock-recruit relationship (e.g., SNE Atlantic cod)

- The score defaults to 2 for an empirical assessment

Guidance should attempt to outline situations like this so scorers know what "accounted for" means

Score	-4	-2	0	2	4
	Multiple Large Year Classes	Recent Large Year Class	Average, No Trend	Recent Low Recruitment	Persistent Low Recruitment
Description	There have been multiple large (meaning above average) recruitment events in the last five years	There has been two large (meaning above average) recruitment events in the last five years	Recruitment in the last five years is average **OR** recent changes in recruitment have been accounted for in reference points and/or stock projections	Low (meaning below average) recruitment in at least two of the last five years **OR** there is no information on recruitment	Persistent low (meaning below average) recruitment for more than five years

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Recruitment – Potential Issues

- Defining "large recruitment events" as *above average* and "low recruitment" as *below average* allows for potential misinterpretation and potential multiple scores as shown for haddock

- Sporadic or variable recruitment should be carefully considered. The current rubric doesn't address this effectively.

- Developing guidance around a quantile-based approach to define above, below, and average recruitment explicitly could help.

Goal of Recruitment Scoring

- What is the risk associated with uncertainty in future recruitment to the fishery?
  - Are we trying to characterize process error?
    - Underlying stochasticity in recruitment
  - Are we trying to characterize observation error?
    - Uncertainty or error in our observations of recruitment
  - Are we trying to characterize future uncertainty?
    - Projections, reference points: projections of uncertainty forward?
  - All aspects?

- We believe we are trying to capture all of these, but it's important to be more direct about this as they have different impacts to the risk portfolio
  - Additionally important to better characterize so that we can determine if the element is already accounted for in some way in the assessment

What Do We Need Our Metrics To Do?

- Characterize process error
    - What is magnitude and trend over time (High, avg, low)
    - Inclusion of random effects?
    - Inclusion of environmental covariates?

- Characterize observation error
    - Is there data ? Empirical approach, Analytical approach
    - Is in highly uncertain?

- Project uncertainty forward
    - E.g. continue process error into future
    - Impact of environmental covariates into future

- By thinking through this question, we will be able to ask for what we need, and also to set guidance around what to do if the information is not available

How Are Recent Patterns Or Drivers Of Recruitment Being Accounted For In Assessment Process?

Itemize how you have accounted for recruitment drivers:

- Stock assessment:
  - Stock-recruit relationships used or some other process?
  - Random effects on recruitment?
  - Environmental drivers of recruitment incorporated?
- Projections
  - What are short-term recruitment assumptions?
  - What is life history timeframe of the species (i.e. projection is 3 years but species doesn't recruit to the fishery until its 6)?

How Are Recent Patterns Or Drivers Of Recruitment Being Accounted For In Assessment Process?

- Idea behind itemizing is so we can determine explicitly if and how assessment and projection process are accounting for recruitment uncertainty (so we don't double count)
    - We may need to request a more systematic presentation of these data/information elements in the reporting that comes from the NEFSC (this is likely true for the other factors as well)
    - This request should be comprehensive so that the PDTs can develop the needed scores

Quantile-Based Approach To Recruitment Scoring

One approach for addressing some of these issues: a quantile based approach.

Proposed 3 step process:

1. Data Preparation
   1. Use a time series of recruitment estimates (from assessments or surveys) for a stock of interest.
      1. Make decision on whether you want to smooth or transform data to reduce noise (e.g., log-transform, 3-year moving average).

Quantile-Based Approach To Recruitment Scoring

2. Calculate Quantiles

1. Compute the **lower quantile (e.g., 0.25 or 25th percentile)** and **upper quantile (e.g., 0.75 or 75th percentile)** of the recruitment time series.
2. These quantiles serve as thresholds to define "low," "average," and "high" recruitment regimes:
   1. **Below-average recruitment**: recruitment < 25th percentile
   2. **Average recruitment**: between 25th and 75th percentiles
   3. **Above-average recruitment**: recruitment > 75th percentile

3. Classify Years

1. Assign each year in the time series to one of the three categories.
2. Classification allows for identifying persistent low or high recruitment periods.

Next Steps: Revision

- Do we only stick with magnitude (low, average, high)
- Or do we account for complexities of what is accounted for in assessment?

		Recruitment		
		Low Recr	Average Recr	High Recr
Trust	Low Trust	4	2	0
	Average Trust	2	0	-2
	High Trust	0	-2	-4

Score	-4	-2	0	2	4
	Multiple Large Year Classes	Recent Large Year Class	Average, No Trend	Recent Low Recruitment	Persistent Low Recruitment
Description	There have been multiple large (meaning above average) recruitment events in the last five years	There has been two large (meaning above average) recruitment events in the last five years	Recruitment in the last five years is average OR recent changes in recruitment have been accounted for in reference points and/or stock projections	Low (meaning below average) recruitment in at least two of the last five years OR there is no information on recruitment	Persistent low (meaning below average) recruitment for more than five years

Final Thoughts On Recruitment Scoring

Some final considerations:

- **The scoring rubric currently has 5 years, is this the right number?**
  - Perhaps it's a reasonable starting point, but could be adjusted based on species life history

- **Should we take life history of the species into account and customize the recruitment scoring methods?**
  - Several areas where can be considered, but based on original guidance from the Exec Dir, may want to standardize

- **What do we do in situations that don't fit the guidance?**
  - Could offer some defaults but may want to iterate with PDTs

Overlap With Other Factors

- Another double counting concern is with respect to internal overlap within the risk policy scoring framework, such as:

  - Climate and ecosystem impacts
    - Hare et al. climate vulnerability includes some info on recruitment - but such an amalgamation of effects – probably not problematic

  - Assessment uncertainty
    - Retrospective pattern; recruitment process error patterns could contribute to retro
    - May need to think about type of assessment: state space (NAA, Rec random effects, did they make a rho adjustment on recruitment?)

  - Stock Status
    - How do short-term recruitment assumptions impact reference points (recent, long-term average)?

- Are there other areas? We should crosswalk the factors as a group and document whether there is or isn't (hopefully more *isn't* than *is*)