MEMORANDUM

To: Risk Policy Working Group

From: Jonathon Peros (Council Staff) and Angelia Miller (Maris Collaborative)

Date: March 6, 2026

Subject: Draft Risk Policy Factor Scoring Instructions for SSB/Stock Status, Recruitment, and Climate Vulnerability

Purpose

We worked to draft and develop factor scoring instructions that will be used by Plan Development Teams (PDTs) following Council updates to the Risk Policy Concept. The draft instruction document (Appendix 1) focuses on scoring for the Spawning Stock Biomass (SSB) / Stock Status, Recruitment, and Climate Vulnerability factors. This document was also shared with the Small-Mesh Multispecies (Whiting) PDT for discussion at their meeting on March 3, 2026.

Key components and recommendations

- For each factor, we expanded the information in the second column of the Factor table within the Factor, Use, and Mechanism Matrix for Recommendations and Input document, and identified its goal and directional relationship to risk. Each factor also includes a long-form description of the steps taken to score the factor and the steps of the scoring rubric, as well as the visual matrix representation.
- We drafted a flow chart for the Biomass (SSB) / Stock status factor to account for the various assessment products that could be available and how the PDTs should use them to score this factor. In cases where data updates are available in lieu of an updated stock assessment, we recommend considering another step that would adjust the score from an analytical or empirical assessment using information from the data update. The concept we propose is to shift the score one step in either direction depending on the direction of the slope of 5-year linear regression of abundance. Additionally, we recommend constraining the score ranges in these cases to –4 to 4 or 0 to 4 for supplemented analytical or empirical assessments, respectively.
- We referenced the quantile-based approach as proposed by the recruitment sub-group and supported by the full Risk Policy Working group at their Jan. 23, 2026,

meeting, and included the steps to calculate and qualify the "recruitment regimes." We also maintained the 5-bin rubric proposed by the sub-group and supported by the full working group in the guidance. The guidance proposes to account for analytical or empirical assessments under the same binning criteria which is based on "recruitment regimes" within a baseline time series.

- For the Climate Vulnerability factor, we affirmed that the factor should be scored based on the results from A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast U.S. Continental Shelf (Hare et. al 2016), and included the results of that scoring at the species level within the instructions document due to the stationary nature of the factor and its supporting document. When feasible, the PDTs should use expert opinion to score at the stock level. The full working group may wish to weigh in on approaches to score at this higher resolution.

Outstanding questions and areas for follow-up:

- **Data Updates:** Data updates are emerging products from the Northeast Fishery Science Center, and have the potential to be used with the Council's Risk Policy. While the content of these products is still being developed and discussed at the regional level (NRCC AWG), outputs to date could be used to score or supplement factor scores. Another option would be to use results of Data Updates directly with Harvest Control Rules (e.g. ABC CRs), and not integrate them with the Risk Policy. Ostensily, these products offer more recent information than the last full assessment, which is valuable to the Council's assessment of risk.
- **Biomass (SSB) / Stock Status:** We propose to use data updates to adjust an assessment-based factor score based on the direction of the slope or trend over the most recent 5-years of abundance indices. As such, there is a need to define the meaning of an increasing, decreasing, or neutral trend, and the magnitude or significance of that trend.
    - How should "meaningful in magnitude" be defined within the instructions document and quantified by PDTs?
- **Recruitment:** Council staff are considering ways to assemble and score this factor when data may not be readily available from a Data Update or assessment. For example, staff may be able to utilize existing age-length keys and recent fishery independent surveys to develop data products that fit with the quantile approach or could be scored using alternative guidance. The focus would be on capturing recent data and information in the Risk Policy if it is not available from other sources.

- **Climate Vulnerability:** There is ongoing work is this area by the NEFSC (CVA 2.0). Council staff are engaging with the Center, and have requested stock level scoring products. In the short-term, guidance can be developed around how PDT's can move from the species level to the stock level when scoring this factor.

Appendix I:

New England Fishery Management Council

DRAFT RISK POLICY SCORING INSTRUCTIONS

SSB/Recruitment/Climate Vulnerability

Data/Version

March 3, 2026

Scoring Instructions:

Responsibility for Scoring and Guidance
All scoring shall be conducted by the relevant Plan Development Team (PDT). Scoring should be objective, evidence-based, and applied consistently by PDTs. PDTs are required to follow the procedures, criteria, and guidance outlined in this document when conducting scoring.

Use of Best Available Information
PDTs shall begin the scoring process with data and procedures identified for each factor. In most cases, this includes the newest stock assessment, the State of the Ecosystem reports, and information from the most recent fishing year. However, data may not be consistently available across all stocks. The scoring guidance acknowledges these scenarios and outlines the supplemental criteria needed to complete the scoring.

Documentation of Deviations in PDT Scoring
If during the scoring process a PDT determines that deviation from the scoring guidelines is necessary (e.g. lack of information, a data point falls between two scores, or available information is at the species level and not the stock level), the PDT should use what it deems to be the best available information to complete the risk policy scoring for that factor, and the deviation from the scoring procedures must be clearly documented. Such documentation shall be provided in a memorandum to the appropriate Council body (e.g., the Scientific and Statistical Committee (SSC)), including a justification for the deviation and an explanation of its potential implications.

NOTE: The directionality of Scoring Rubrics in this Appendix may change based on RPWG recommendations (e.g. more risk tolerant scoring would be positive, and less risk tolerant scores would be negative).

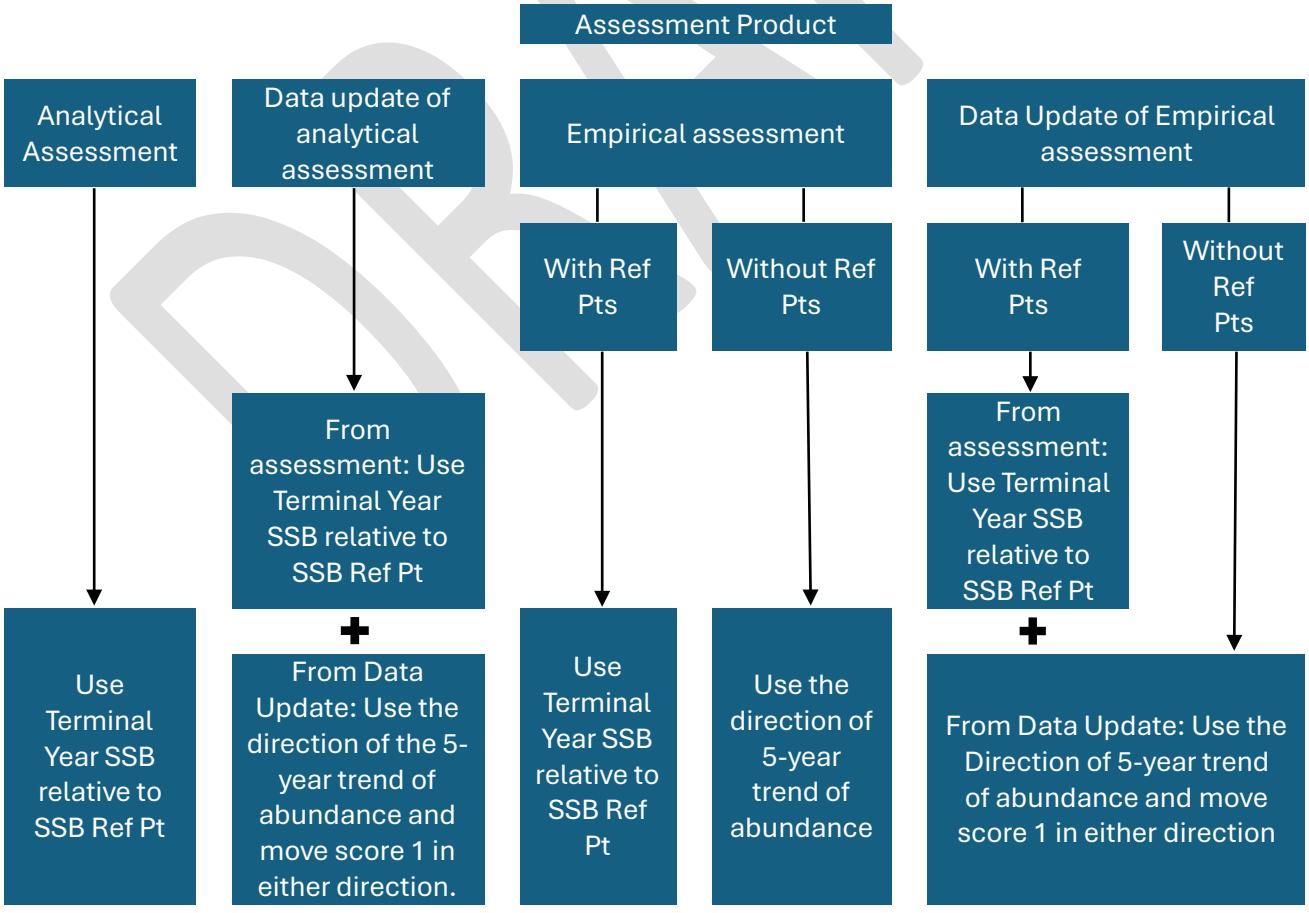
Biomass (SSB) / Stock Status

Goal: To determine the acceptable level of risk based on the current productivity of a stock.

Relationship to risk tolerance: As stock size increases relative to reference points (i.e. SSB/SSB_{MSY}), risk tolerance increases. Lower stock levels correspond to reduced risk tolerance, indicating a need for more cautious management.

How to score: Use the most recent stock assessment, the assessment product flow chart (Figure 1), and the scoring criteria (Figure 2) provided below. When scoring stocks with an analytical assessment or where there is an empirical assessment that estimates reference points, base the factor score on the terminal year SSB relative to the SSB reference point. When stock status is unknown and there is a lack of reference points, base the factor score on the directionality (slope of a linear regressions) of a 5-year trend of abundance indices. Data updates should be used to supplement the score for an analytical or empirical assessment in any case; factor scores based on the assessments are shifted by 1 in either direction depending on the direction of the 5-year trend of abundance.

Figure 1. A flow chart for which data products to use and how when scoring SSB / Stock Status.



SSB / Stock Status Scoring Rubric (Figure 2):

Analytical assessments / Empirical assessments with reference points (score in parenthesis)

- **Well above target. (-4)** The terminal year SSB is greater than 150% of the SSB target (SSB_{MSY}).
- **Rebuilt. (-2)** The terminal year SSB is greater than the SSB target but not more than 150% of the SSB target.
- **Neutral. (0)** The analytical assessment estimated a terminal year SSB that is greater than 75% but less than 100% of the SSB target
- **Less than 75% but above threshold. (2)** The analytical assessment estimated a terminal year SSB that is less than 75% of the SSB target.
- **Below threshold. (4)** The analytical assessment estimated a terminal year SSB below the SSB threshold ($0.5*SSB_{MSY}$).

Empirical assessments without reference points (not to exceed a score of 0)

- **Neutral. (0)** The stock status is unknown and there is a positive trend over the most recent 5 years of abundance indices.
- **Less than 75% but above threshold. (2)** The stock status is unknown and there is either no trend or a neutral trend over the most recent 5 years of abundance indices.
- **Below threshold. (4)** The stock status is unknown and there is a negative trend over the most recent 5 years of abundance indices.

Data Updates

- **Shift left one score. (-1)** There is a positive trend over the most recent 5 years of abundance indices.
- **Shift right one score. (+1)** There is a negative trend over the most recent 5 years of abundance indices.
- For data updates of empirical assessments, the score range is confined to 0-4, following the scoring rubric available for empirical assessments.

Directionality	**Meaning**	**Data Update Adjustment for Analytical and Empirical Assessments**
Increasing	Slope > 0 and meaningful in magnitude	-1
Decreasing	Slope < 0 and meaningful in magnitude	+1
Neutral / No Trend	Slope ≈ 0 or inconsistent direction	No change

*Figure 2. The scoring rubric for the **SSB / Stock Status Factor**. Gray boxes within a numerical score column are unavailable to use when scoring SSB / Stock Status.*

Numerical Score	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**
Categorical Score	**Well Above Target**		**Rebuilt**		**Neutral**		**< 75% but above Threshold**		**Below threshold**
Analytical or Empirical assessments with ref pts	≥ 150% SSB target		≥ SSB target but < 150% SSB target		≥75% SSB target but < 100% SSB target		< 75% SSB target		Below SSB threshold
Data updates of analytical or empirical assessments with ref pts	Move right one score if there is a negative trend; Move left one score if there is a positive trend; Cannot go above or below the range of -4 to 4								
Empirical assessments without ref pts					Unknown status and positive 5-year trend		Unknown status and 5-year trend is neutral / no trend		Unknown Status and negative 5-year trend
Data updates of analytical or empirical assessments without ref pts					Move right one score if there is a negative trend; Move left one score if there is a positive trend; Cannot go above or below the range of 0 to 4				

Recruitment

Goal: To identify the risk to the population associated with uncertainty in future recruitment and how that interacts with the fishery.

Relationship to risk tolerance: As recruitment increases, risk tolerance increases. Lower recruitment corresponds to reduced risk tolerance, indicating a need for more cautious management.

How to score: The baseline for recruitment will be defined by either the estimated recruitment time series from the most recent analytical stock assessment or the survey time series of abundance indices from the most recent empirical stock assessment or data update.

1. Compute the **lower quantile (e.g., 0.25 or 25th percentile)** and **upper quantile (e.g., 0.75 or 75th percentile)** based on the baseline time series. The quantiles serve as thresholds to define recruitment regimes:
    i. **Below-average recruitment**: recruitment < 25th percentile
    ii. **Average recruitment**: between 25th and 75th percentiles
    iii. **Above-average recruitment**: recruitment > 75th percentile
2. Translate each of the last 5 years of the recruitment or survey index time series to quantile ranks based on the definitions above.
3. Summarize the 5-year period as a recruitment "state" based on the scoring rubric in Figure 3.

Recruitment Scoring Rubric (Figure 3):

- **Multiple large year classes.** Four years or more are within the "Above-average recruitment regime".
- **Recent large year classes.** Three years are within the "Above-average recruitment regime".
- **Average, no trend**. Three years are within the "Average recruitment regime" or if quantiles are variable among years. If there is no recruitment information, score as a neutral state (score = 0).
- **Recent low recruitment.** Three years are within the "Below-average recruitment regime".
- **Persistent low recruitment.** Four years or more years are within the "Below-average recruitment regime".

*Figure 3. The scoring rubric for the **Recruitment** Factor. Gray boxes within a numerical score column are unavailable to use when scoring Recruitment.*

Numerical score	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**
Categorical score	**Multiple Large Year Classes**		**Recent Large Year Class**		**Average, No Trend**		**Recent Low Recruitment**		**Persistent Low Recruitment**
Analytical Assessments and Empirical Assessments	Four years or more are within the "Above-average recruitment regime".		Three years are within the "Above-average recruitment regime".		Three years are within the "Average recruitment regime" or if quantiles are variable among years. If there is no recruitment information, score as a neutral state (score = 0).		Three years are within the "Below-average recruitment regime".		Four years or more years are within the "Below-average recruitment regime".

Climate Vulnerability

Goal: To assess the risk associated with climate change.

Relationship to risk tolerance: As climate vulnerability increases, risk tolerance decreases, indicating a need for more precautionary management for stocks that are more sensitive to climate-driven changes.

How to score: Use the results presented in Figure 3 and Figure 5 from Hare et al. 2016 to bin species. This has been done in Table 1.PDT should use expertise to score at stock level. For each species:

1. Assign the vulnerability criteria based on the Biological Sensitivity and Climate Exposure classifications.
    - **Low vulnerability:** When Climate Exposure is Low, moderate, or high, and the biological sensitivity column is Low.
    - **Moderate vulnerability:** When Climate Exposure is very high and biological sensitivity is low, or if biological sensitivity is moderate and climate exposure is high.
    - **High vulnerability:** When Climate Exposure is very high and biological sensitivity is moderate, or if climate exposure is high and biological sensitivity is high.
    - **Very High vulnerability:** When Climate Exposure is very high and biological sensitivity is high or very high, or if climate exposure is high and biological sensitivity is very high.
2. Identify the directional effect.
3. Apply the scoring rubric in Figure 4.

Climate Vulnerability Scoring Rubric (Figure 4):

- **Low Vulnerability.** Climate vulnerability is low, ignoring the directional effect column.
- **Moderate Vulnerability.** Climate vulnerability is moderate, ignoring the directional effect column; OR Climate vulnerability is low and the directional effect is negative.
- **Moderate Vulnerability, Negative Direction.** Climate vulnerability is moderate and the directional effect is negative.
- **High Vulnerability.** Climate vulnerability is high or very high, ignoring the directional effect column.
- **High Vulnerability, Negative Direction.** Climate vulnerability is high or very high, and directional effect is negative.

*Figure 4. The scoring rubric for the **Climate Vulnerability** factor. Gray boxes within a numerical score column are unavailable to use when scoring Climate Vulnerability.*

Numerical score	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**
Categorical score					**Low**	**Moderate**	**Moderate, Negative Direction**	**High**	**High Negative Direction**
Description					Climate vulnerability is low and ignoring the directional effect	Climate vulnerability is moderate and ignoring the directional effect column; OR Climate vulnerability is low and the directional effect is negative	Climate vulnerability is moderate and the directional effect is negative.	Climate vulnerability is high or very high, ignoring the directional effect column.	Climate vulnerability is high or very high, and the directional effect is negative.

Table 1 - Climate Vulnerability scores by species.

FMP	Fish Stock	Biological Sensitivity	Climate Exposure	Climate Vulnerability	Directional Effect	Score	Score Cat
Scallops	Atlantic Sea Scallop	High	High	High	Negative	4	High Vulnerability, Negative Direction
Groundfish	Atlantic Halibut	High	High	High	Negative	4	High Vulnerability, Negative Direction
Groundfish	Ocean Pout	High	High	High	Negative	4	High Vulnerability, Negative Direction
Groundfish	Atlantic Wolffish	High	High	High	Negative	4	High Vulnerability, Negative Direction
Groundfish	Witch Flounder	High	High	High	Negative	4	High Vulnerability, Negative Direction
Groundfish	Cusk	High	High	High	Negative	4	High Vulnerability, Negative Direction
Groundfish	Winter Flounder	High	Very High	Very High	Negative	4	High Vulnerability, Negative Direction
Groundfish	Acadian Redfish	Moderate	High	Moderate	Negative	2	Moderate Vulnerability, Negative Direction
Groundfish	Atlantic Cod	Moderate	High	Moderate	Negative	2	Moderate Vulnerability, Negative Direction
Groundfish	White Hake	Moderate	High	Moderate	Negative	2	Moderate Vulnerability, Negative Direction
Groundfish	Pollock	Moderate	High	Moderate	Negative	2	Moderate Vulnerability, Negative Direction
Groundfish	Haddock	Low	High	Low	Negative	1	Moderate Vulnerability
Groundfish	Yellowtail Flounder	Low	High	Low	Negative	1	Moderate Vulnerability
Groundfish	American Plaice	Low	High	Low	Negative	1	Moderate Vulnerability
Groundfish	Windowpane	Low	High	Low	Neutral	0	Low Vulnerability
Herring	Atlantic Herring	Low	High	Low	Negative	1	Moderate Vulnerability
Monkfish	Monkfish	Low	High	Low	Neutral	0	Low Vulnerability
Skates	Thorny Skate	High	High	High	Negative	4	High Vulnerability, Negative Direction
Skates	Barndoor Skate	Moderate	High	Moderate	Negative	2	Moderate Vulnerability, Negative Direction
Skates	Smooth Skate	Moderate	High	Moderate	Negative	2	Moderate Vulnerability, Negative Direction
Skates	Rosette Skate	Moderate	High	Moderate	Neutral	1	Moderate Vulnerability
Skates	Winter Skate	Low	High	Low	Negative	1	Moderate Vulnerability
Skates	Little Skate	Low	High	Low	Negative	1	Moderate Vulnerability
Skates	Clearnose Skate	Low	High	Low	Neutral	0	Low Vulnerability
Small Mesh	Silver Hake	Low	High	Low	Negative	1	Moderate Vulnerability
Small Mesh	Offshore Hake	Low	High	Low	Negative	1	Moderate Vulnerability
Small Mesh	Red Hake	Low	High	Low	Neutral	0	Low Vulnerability
Red Crab	Deep-sea Red Crab	Low	High	Low	Neutral	0	Low Vulnerability
Salmon	Atlantic Salmon	Very High	Very High	Very High	Negative	4	High Vulnerability, Negative Direction
Dogfish	Spiny Dogfish	Low	High	Low	Neutral	0	Low Vulnerability