Risk Policy Working Group: Sub-Group Feedback on Factors

August 19, 2025

Order of Presentations

Presentations	Working Group Members
Recruitment	Lisa, Jason
Assessment Type	Dan, Moira
Commercial Fishery Characterization	Megan, Dan, Joe
Recreational Fishery Characterization	Megan, Moira
Fish Condition	Jonathon, Joe
Indicators	Max Grezlik

Sub-Group Objectives

- Review feedback an reflect on the Risk Policy factors, data sources, and scoring methods (some combination of these).

- Develop input and recommendations for possible changes to factors, data sources, and scoring methods.

- Anticipate continued discussion by the working group on topic discussed today.

Recruitment Scoring

Lisa Kerr and Jason McNamee
Risk Policy Working Group
August 2025

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):

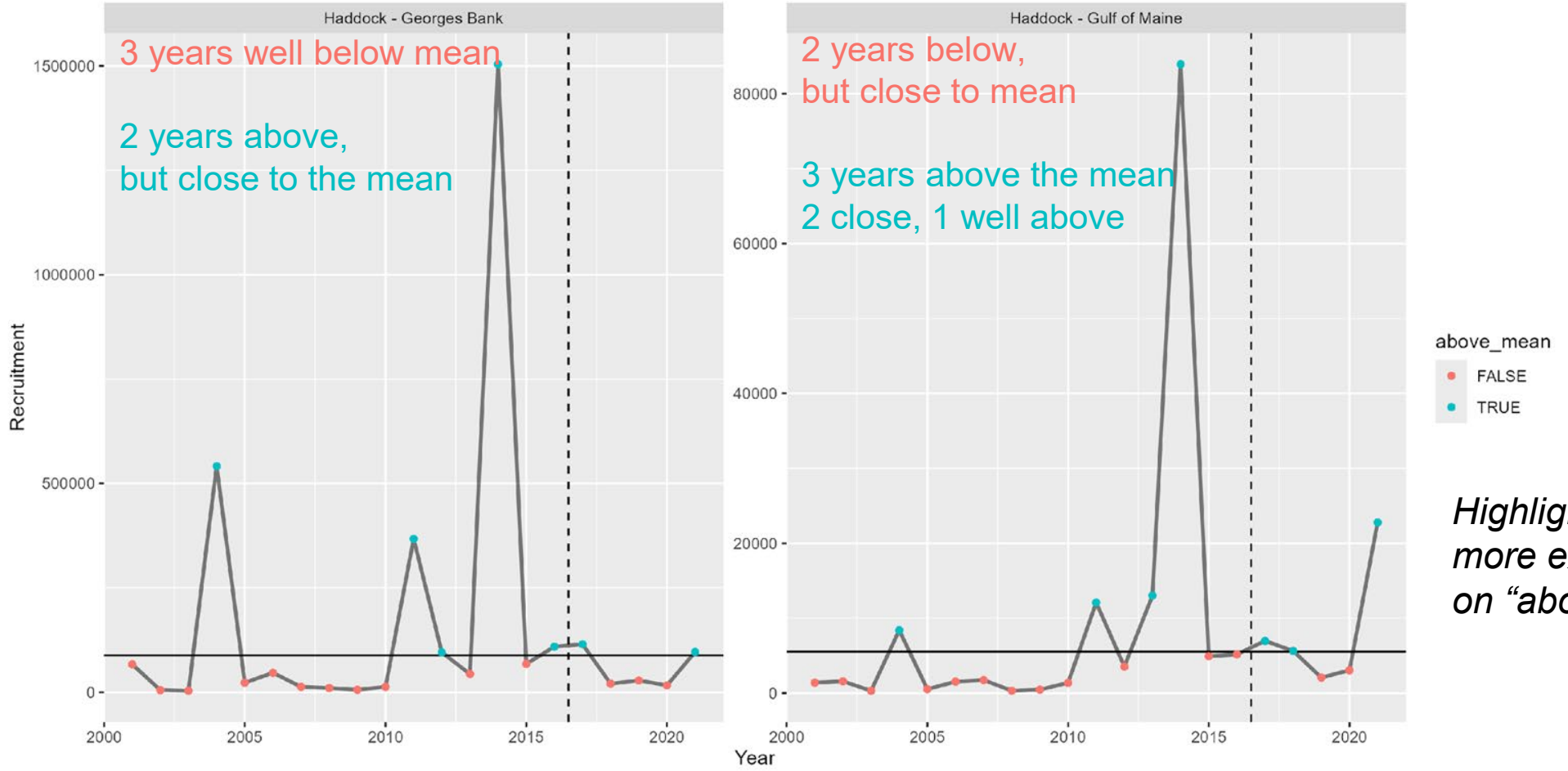
- What does “multiple” large year classes mean? We assumed 3 or more.
- How far above or below the mean is considered “large” or “small?”
- What is appropriate time frame to characterize "average"? We used the full time series.
- How close to the mean is considered “average” (i.e., score = 0).
- What 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

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

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

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

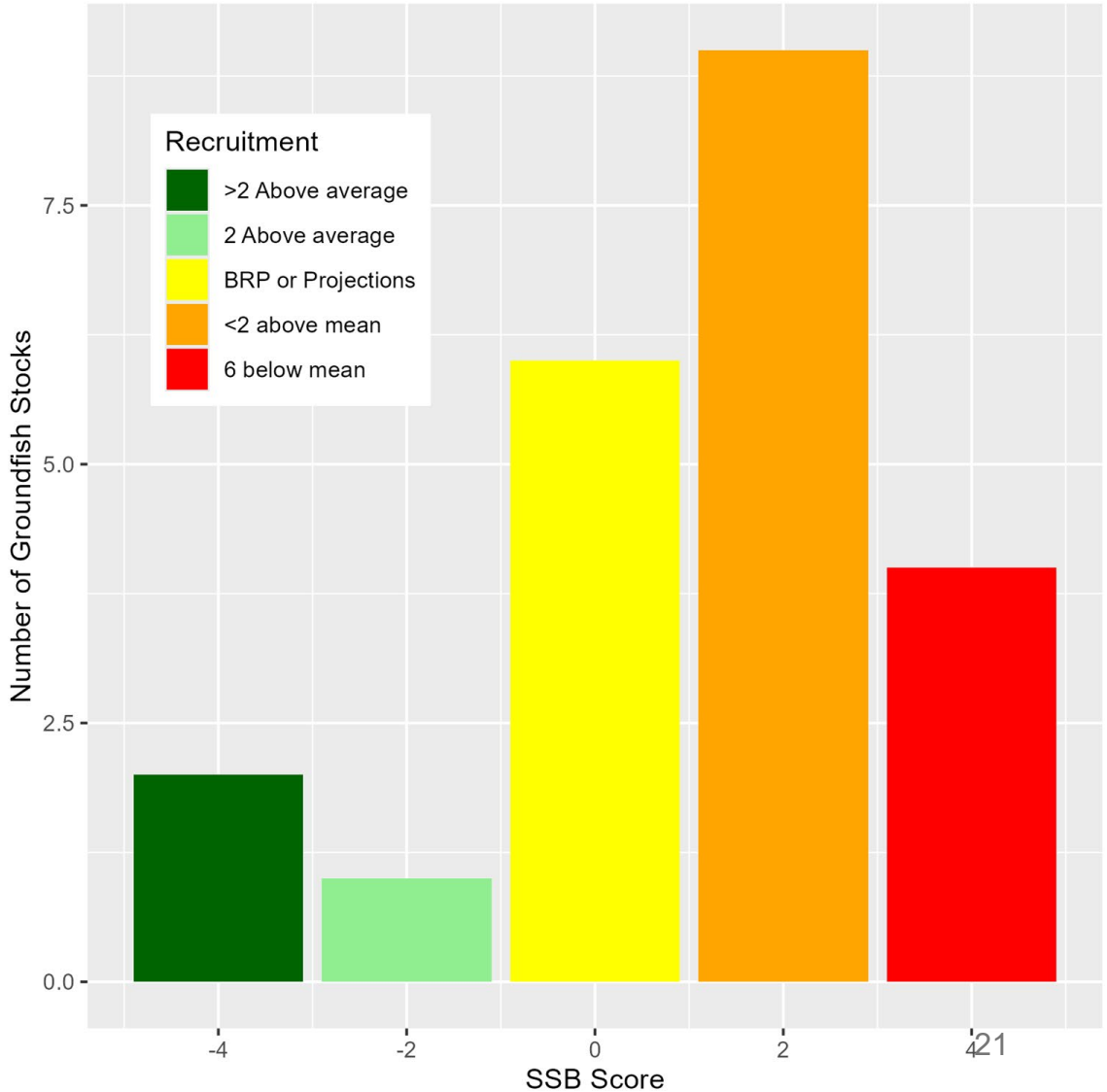
Overlap With Other Factors

- 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*)

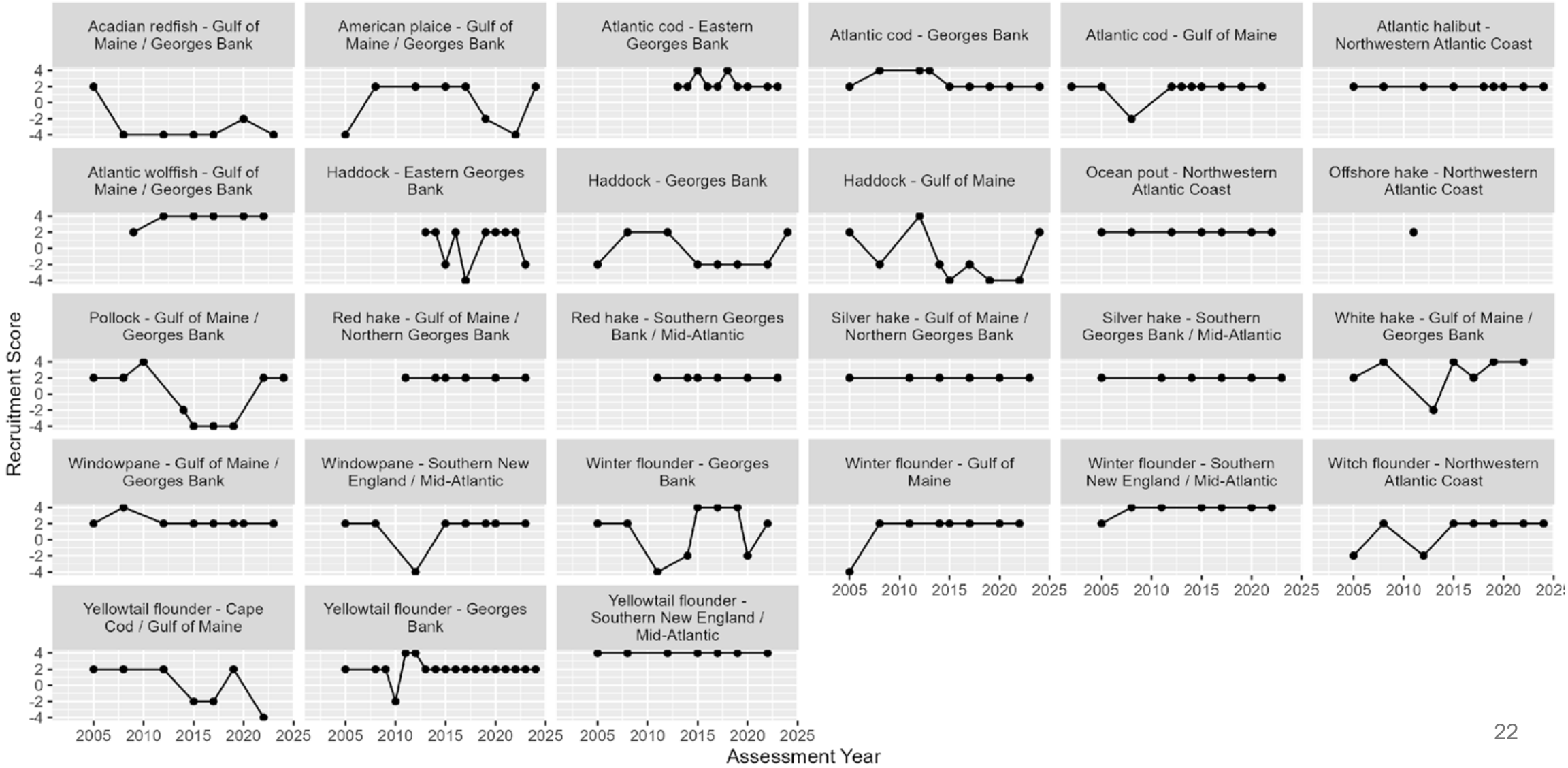
Extra Slides

How will data updates align with this ? No recruitment updates?

2) Recruitment– Draft Current Scores



2) Recruitment – Trends over time



Assessment Type/Performance

Dan & Moira

3) Assessment Performance – Scoring Methods

We used the most recent stock assessment report to characterize:

- The assessment type
- Magnitude of retrospective pattern
- Number of uncertainties listed

- We applied the rubric determine Factor Scores for each stock

- We have not scored this dynamically over time

Score	0	1	2	3	4
	Analytical	Analytical, Minor Retro	Analytical, Major Retro	Empirical	Empirical, Missing Survey Data
Description	Analytical assessment with no retrospective pattern, **OR** state-space model with limited sources of uncertainty as described in assessment report	Analytical assessment with minor retrospective pattern **OR** state-space model with at least two significant sources of uncertainty as described in assessment report	Analytical assessment with major retrospective pattern **OR** state-space model with at least three significant sources of uncertainty as described in assessment report	Empirical assessment approach	Empirical assessment approach with missing data in one of the three most recent years

3) Assessment Performance – Scoring Difficulties

The rubric was straightforward to follow, but we had to make two assumptions:

- For models like ASAP, that are analytical, but not state-space, the only determining criteria was the level of retrospective pattern
- For state-space analytical models (e.g., WHAM), the only determining was the number of uncertainties listed in the assessment report

3) Assessment Performance– Potential Issues

- There is not objective guidance informing which uncertainties are listed in stock assessment reports
- There is wide variation among stocks, that is unlikely to reflect meaningful differences
- The rubric does not consider that model results are “rho-adjusted” when there is a major retrospective pattern
- The rubric does not consider the magnitude of uncertainty in assessment results (e.g., estimated uncertainty bands SSB or R)
- It is possible to have an empirical assessment that performs well

Revised Assessment Type/Performance

Score	0	1	2	3	4
	Analytical, No/Minor Retro	Emperical with stock status	Analytical, Major Retro	Emperical without stock status	Emperical, Missing Survey Data
Description	Analytical assessment with no or minor retrospective pattern	Empirical/Index Based Assessment with complete stock status determination	Analytical assessemnt with major retrospective patterns that requires rho adjustments	Empirical/Index Based Assessment without stock status determination(s)	Empirical/Index Based Assessment with missing survey data in one of the three most recent years

Lingering Questions for the Working Group

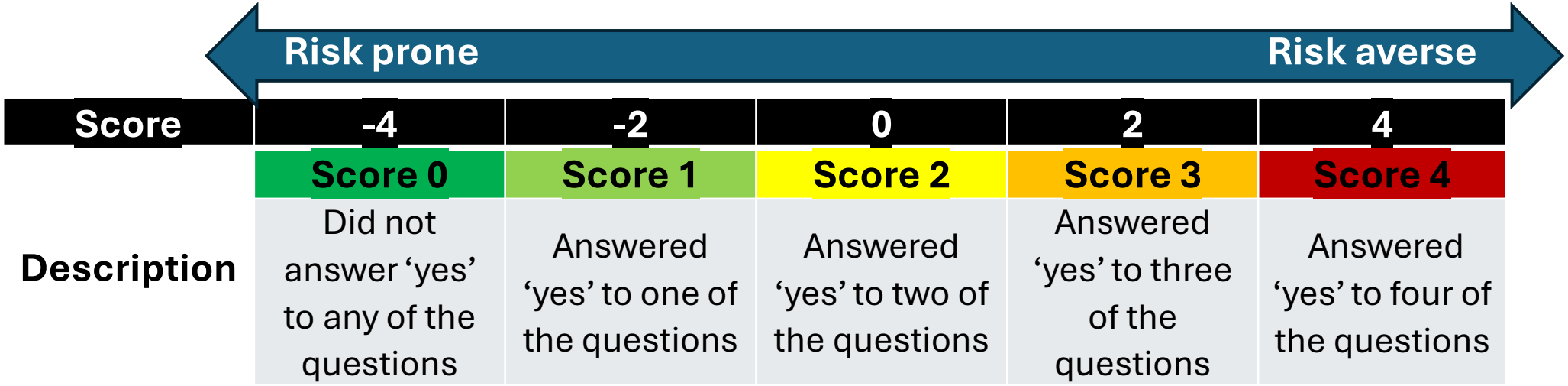
- where to include empirical/index model with stock status determinations?
- should we account for longer time period between assessments (move on spot to right if more than x years?
- should we account for changes in stock status either better or worse from last assessment?
- what is there is only a data update and no new management track assessment?

Commercial Fishery Factor

Dan, Joe, Megan

Commercial Fishery (current)

- Is revenue concentrated in ports (look at top 3 ports by revenue) with low catch diversity?
- Is the market value decreasing (i.e. price per pound)?
- Does information from the most recent fishing year suggest any warning signs about the fishery?
- Fishery specific Qs:
  - Scallops: Is LPUE decreasing?
  - Groundfish: Are lease prices decreasing?
  - Monkfish: Is DAS usage decreasing?
- If quota for this species is needed to catch another species, move one box to the left



Score	-4	-2	0	2	4
	Score 0	Score 1	Score 2	Score 3	Score 4
Description	Did not answer 'yes' to any of the questions	Answered 'yes' to one of the questions	Answered 'yes' to two of the questions	Answered 'yes' to three of the questions	Answered 'yes' to four of the questions

Feedback We've Heard

- Data points don't match what Council members view as most important socio-economic elements
- Some species have specific questions, others don't
- Ambiguity on what 'warning signs' means
- Data ideas:
  - Trends in active permits
  - Ex-vessel value of fishery
  - Number of trips
  - Discard rate
  - Trends in crew, age of vessels
  - Costs
  - Annual percent change in price per pound
  - Fishery disaster declared?

Scale of Scoring

- What are we assessing: socio-economic health of the fishery
- Typically the Council has been willing to take on more risk if socio-economic health of the fishery is declining/compromised
  - If socio-economic health of fishery is good, does it make sense that it leads to greater precaution?
- Suggestion to modify scale to -4 to 0
  - Means a fishery showing signs of socio-economic stress increases risk tolerance
  - A score of zero means maintaining risk tolerance/no influence on risk tolerance (stability)

Revised Commercial Fishery Factor

- **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

Revised Commercial Fishery Factor

- **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?

Notes:

-Participation is identifying if fishery is expanding, contracting, or still

-Went with "last specs package" timeframe since this is when most decisions are made

-10% decline might not be the right value. If specs are set more frequently in some FMPs (scallops) vs. others (red crab), might want different percent reductions. Otherwise we are judging FMPs differently

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

Revised Commercial Fishery Factor

- **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?

Notes:

-Some consolidation may be good if biomass cannot support current effort. But at some point too much consolidation is often risky if those few are impacted. Percent values can be modified.

-Focused on fuel cost since annual data on this. Many NEFMC fisheries don't use bait. Not meant to be a comprehensive cost, just an indicator.

-Considered NEFSC cost survey data, but several years between surveys and some FMPs have low participation rates.

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

Revised Commercial Fishery Factor

- **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?

Notes:

-“Impacts on other Fisheries” carried over from original

-High level of spatial concentration/dependence of a fishery makes it more vulnerable (e.g. what if a storm damaged the port of New Bedford – big impacts to scallops, groundfish)

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

Other Things We Discussed

- Flexibility in substitute target species
  - Would a lot of species get an answer of ‘yes’?
- Trip level catch diversity
- Changes in price per pound
- Different components of a fishery (e.g. NGOM, IFQ, LA in scallops)

- *Assuming equal importance of each data element in this factor

Recreational Fishery Factor

Moira, Megan

Recreational Fishery Factor (current)

1. Is recreational fleet diversity from the SOE report declining over last five years?
2. Are the number of angler trips targeting the species declining over the last five years? Targeting means MRIP “target” or “secondary target”
3. Is the PSE for total catch greater than 30 in the last three years?
4. Has there been a change in the recreational regs within the last 12 months?

Score	-4	-2	0	2	4
	Score 0	Score 1	Score 2	Score 3	Score 4
Description	Did not answer ‘yes’ to any of the questions	Answered ‘yes’ to one of the questions	Answered ‘yes’ to two of the questions	Answered ‘yes’ to three of the questions	Answered ‘yes’ to four of the questions

Proposed Revisions – Recreational 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?
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

Proposed Revisions – Recreational 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?

Notes:

- Consistent scoring with commercial fishery factor; changed wording to match new range of scoring
- Concern that MRIP data on targeted trips not reliable for some species/stocks. Look at broader trends, taking out striped bass and tuna trips which make up a significant portion of rec trips.
- Should we exclude other species? Bluefish?

Score	-4	-3	-2	-1	0
	Score 0	Score 1	Score 2	Score 3	Score 4
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

Proposed Revisions – Recreational Factor

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?

Notes:

- Changed wording given new scoring range
- Focus on major regulatory changes, not minor updates

Score	-4	-3	-2	-1	0
	Score 0	Score 1	Score 2	Score 3	Score 4
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

Other Ideas

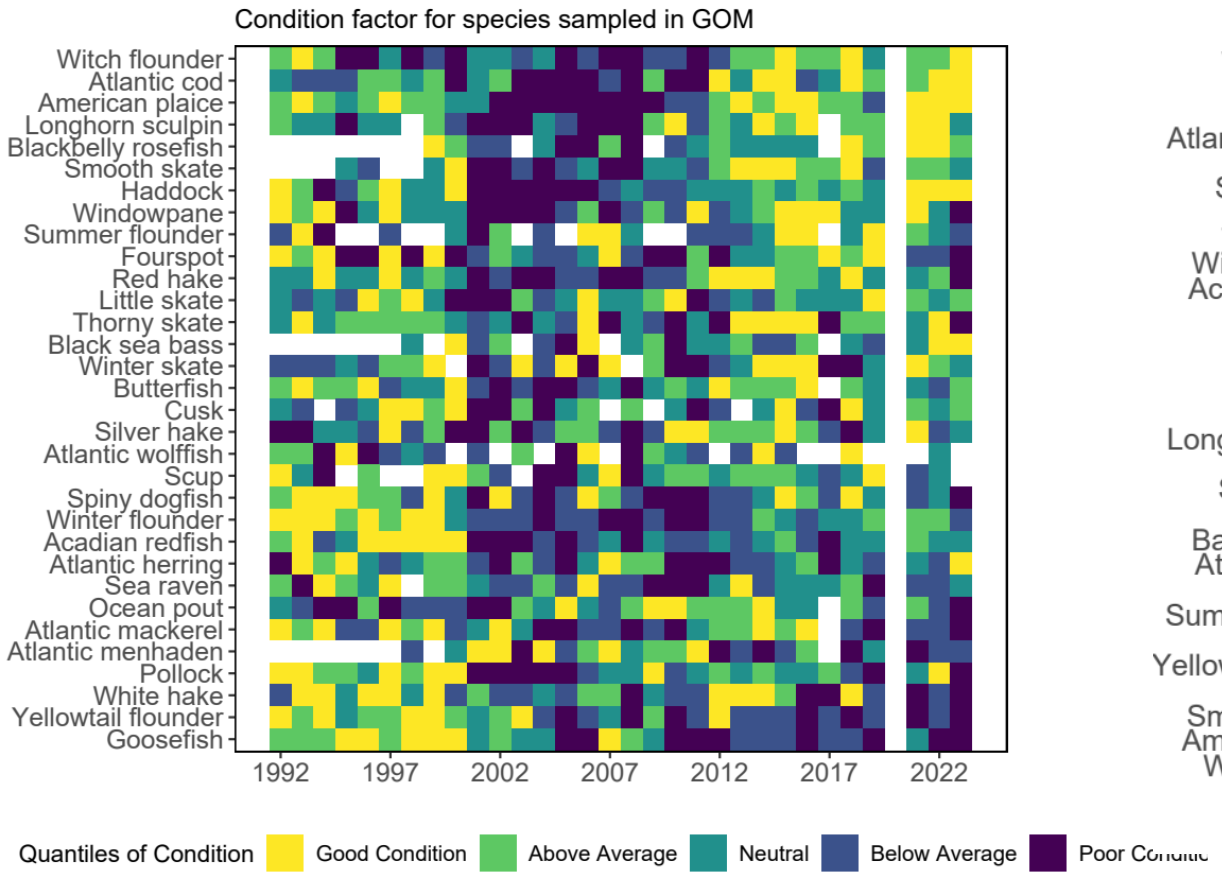
- Presence of management uncertainty buffer for rec fishery
  - If this leads to greater risk tolerance, does this counteract the purpose of the management uncertainty buffer?
- Catch target vs. sub-ACL for rec fishery
  - Council comments generally leading to greater precaution with a catch target vs. sub-ACL for a rec fishery. Should we include?

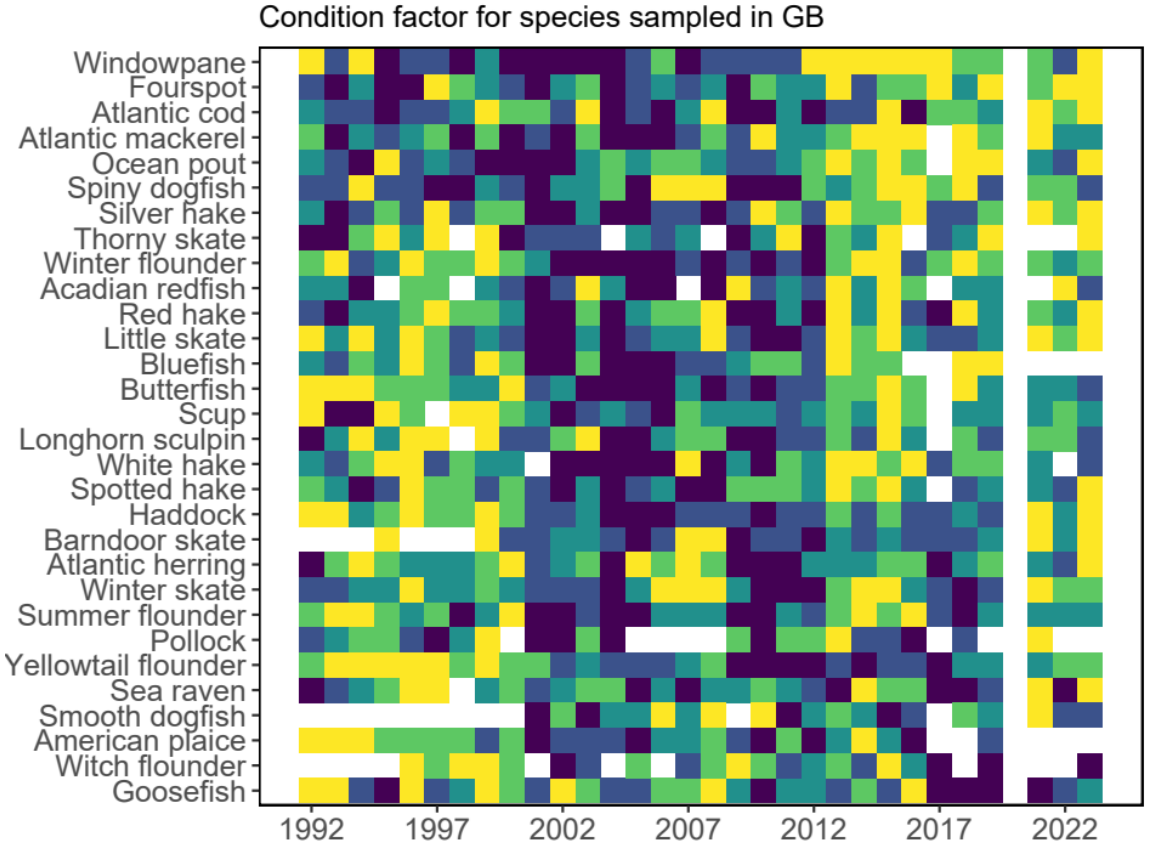
Fish Condition

Jonathon & Joe

Factor 5: Fish Condition

Data from State of the Ecosystem Report





Factor 5: Fish Condition

Score	0	1	2	3	4
	Good Condition	**Above Average**	**Neutral**	**Below Average**	**Poor Condition**
Description	In three most recent years of available data, majority of boxes are scored as "good condition"	In three most recent years of available data, majority of boxes are scored as "above average condition"	In three most recent years of available data, majority of boxes are scored as "neutral condition" **OR** no information on fish condition	In three most recent years of available data, majority of boxes are scored as "below average condition"	In three most recent years of available data, majority of boxes are scored as "poor condition"

Data Source: State of Ecosystem Report

Monkfish – Fish Condition from 2025 SOE

2022	Poor Condition	Below Average	Below Average
2023	Poor Condition	Neutral	Neutral
2024	Below Average	Below Average	Below Average

Discussion on approach

Feedback from Simulation Testing

- Difficulties, Challenges, Considerations:
  - Factor was straightforward to score using the rubric and the available data. However, it was not always easy to find a map of stock boundaries to determine which SOE EPUs should be considered.
  - Scores can fluctuate dramatically between successive years.
  - The theoretical relationship between mean condition and risk tolerance is unclear and may vary across stocks.
  - Assigning stocks to EPUs is not straight forward. For stocks that extend into multiple regions the rubric weights each region equally. Their distributions, however, are unlikely to be uniform throughout all regions.
- Dr. Brothers specifically noted the potential for interdependence across factors as a potential source for double counting.
  - Climate related shifts in productivity could be reflected in several factors (stock status, recruitment, climate vulnerability, and fish condition).
  - Stocks with empirical assessments will score lower than those with analytical models for SSB, recruitment, and assessment type/performance.

Discussion on Possible Changes:

- Very difficult to find a single metric to fully characterize the risk for climate and ecosystem considerations.
  - Look at habitat quality is good enough for species to thrive, other changes in the environment.
  - Consider using multi-component factor that brings together multiple metrics → Commercial and Recreational factors.
- Keep recruitment factor separate vs. folding in with fish condition.
- Utilize metrics that have been subject to some level of review.
- Look at calculating some of this by stock area vs. EPU.
- Expect to use the CVA 2.0, and this will have a space and time component. Work may need to be done to think about how to assign a score (TBD).
- Talked about other ideas like temperature, depth. Andy Applegate presented ecosystem information to the working group in 2024 (Portsmouth meeting).
- EDAB is working to make ecosystem (e.g. SOE report) data more accessible. What should this look like to be more accessible (if that is an issue)?
- Starting point, anticipated additional work from Risk Policy Working Group.

Proposed Revisions – Fish Condition Factor

- Re-develop the factor to include more indicators to address the group theme “climate and ecosystem”.
- Consider the approach used for commercial and recreational characterization, with multiple data sources contributing to the factor.
  - Fish Condition – Working on this at the stock level.
  - Habitat
  - Something to address what drives changes in stock productivity.
- Call this new factor “ecosystem impacts.”

Factors and Sub-Groups

Sub-Group Reports	Working Group Members
Risk Policy Use Sub-Group (documentation and communication)	Jonathon, Moira, Melanie
SSB / Stock Status	Lisa, Jason
Recruitment	Lisa, Jason
Assessment Type	Dan, Moira
Climate Vulnerability	N/A, CVA 2.0 is moving forward.
Fish Condition	Joe, Jonathon
Commercial Fishery Characterization	Megan, Dan, Joe
Recreational Fishery Characterization	Megan, Moira
Scaling of weights and scores (for Z score)	Megan follow-up with Roger and Lisa