

SSC Report to NEFMC

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Atlantic Herring OFLs and ABCs: FY 2027-2031 & Dynamic Reference Points Workshop next steps

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NEFMC Meeting
September 15, 2026



New England Fishery
Management Council

SSC meeting August 11-12 in New Bedford

- Discussed Risk Policy
- Social Sciences Subcommittee updates
- **Recommended overfishing limits and acceptable biological catches for Atlantic herring for FY2027 to FY2031**
- **Confirm recommendations from SSC workshop on dynamic reference points and develop next steps**



Atlantic Herring OFLs and ABCs



Terms of reference

- A. Consider the information provided by the Council's Atlantic Herring Plan Development Team (PDT) and ASMFC's Technical Committee (TC) on the most recent stock assessment for Atlantic herring and its peer review, and information on stock projections.
- B. Recommend OFLs and ABCs for Atlantic herring for fishing years (FY) 2027-2031 that will prevent overfishing, are consistent with the Council's Atlantic herring ABC control rule and rebuilding plan, and consider the Council's Risk Policy Statement and Concept.



Atlantic Herring



- **Assessment:** The 2026 management track assessment (first use of the Woods Hole Assessment model for management advice)
- **Stock Status:** overfished, overfishing is not occurring (no change)
- **Notes:** substantial uncertainties in projections, and the interaction with reference points within the ABC control rule; Council's Risk Policy indicated a low risk tolerance.
- **Recommendation:** The following OFLs and ABCs, decreased from present levels (FY2026: OFL = 23,491 mt, ABC = 13,165 mt)

Fishing Year	OFL (mt)	ABC (mt)
2027 - 2031	13,165 mt	10,532 mt



Atlantic Herring



Rationale for a precautionary approach

- Stock remains in poor condition, persistent low recruitment.
- Substantial uncertainty in rebuilding trajectory using the projections.
- Projections treated as context rather than values to use in catch setting, consistent with peer review.
- Differing methods for estimating reference points using WHAM and prior model (ASAP) outputs (e.g., treatment of Canadian catch for estimating F_{MSY}); ABC control rule uses the ASAP method for F_{MSY} .



Atlantic Herring



Findings

- Used the FY 2026 ABC as the FY 2027-2031 OFL, set ABC at 80% of OFL.
- Recommendation aims to prevent overfishing and is informed by the Council's ABC control rule.
- Considered the assessment, its peer review, PDT/TC projections, and the Council's Risk Policy.
- Used interim constant catch rather than applying the control rule due to issues with the projections identified in the peer review.
- ABC reduction and out years consistent with the intent of the Risk Policy and control rule.



Atlantic Herring



Findings cont.

- A constant interim ABC provides a reasonable bridge until an updated assessment and/or additional technical work provides greater confidence in projections, and an understanding of the interaction between the control rule and new assessment framework.

Alternate Approaches Considered

- Setting ABC at 75% or 70% of OFL - no stronger scientific rationale for these options. 80% recognizes the socioeconomic challenges.
- Averaging outcomes of the projection options. - *see minority report*



Atlantic Herring



Research Recommendations

- Continue developing spatiotemporal (e.g., VAST) models to integrate surveys, including information on age-1 herring.
- Further evaluate projection methods (e.g, recruitment, NAA random effects).
- Investigate the interactions between annual recruitment, covariates and random effects (NAA) in WHAM.
- Evaluate control rule performance with WHAM, treatment of Canadian catch and fleet selectivity.
- Reexamine stock distribution and structure.
- Reassess the stock as soon as possible.



Atlantic Herring



Summary

- Constant OFL and ABC as an interim approach; revisit specifications when updated assessment information or more technical work resolves uncertainties in projections, new reference points, and their interaction with the herring ABC control rule.
- Priority research:
 - Improve ability to integrate age-1 herring population information into modelling.
 - Understand why poor recruitment persists for improved modeling.
 - Performance of control rule with WHAM.
 - Spatial distribution of herring.

Fishing Year	OFL (mt)	ABC (mt)
2027 - 2031	13,165 mt	10,532 mt



Dynamic Reference Points Workshop Next Steps

Terms of Reference

- A. Consider the outcomes of the SSC workshop on dynamic reference points, and make any refinements to the recommendations for indicators, candidate stocks, and other recommendations for next steps.

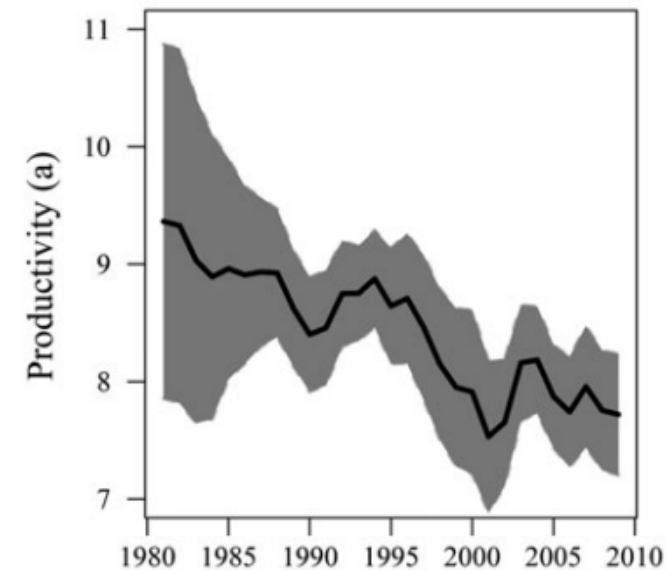


The Challenge

- Ocean conditions are changing
- For some stocks, changes in productivity have resulted
- Stationarity assumptions → unrealistic reference points and rebuilding timelines
- ***How can management adapt?***



On The Water



Bell et al. 2014



What are Biological Reference Points?

Biological Reference Points (BRPs) are the benchmarks used to:

- Determine stock status
- Inform management action (e.g., ABCs)
- Define rebuilding targets (SSB_{MSY} or proxies)

BRPs can be derived either analytically (model-based) or empirically

Traditional (“static”) BRPs ***assume stationarity in stock productivity***

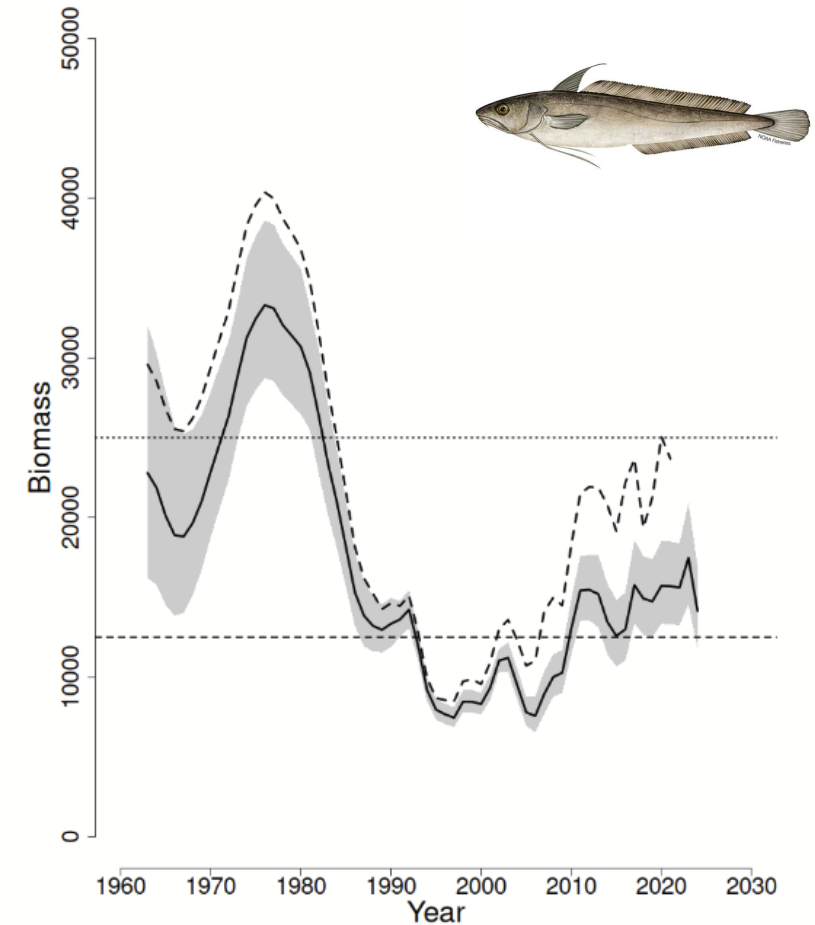


Figure 1: Trends in spawning stock biomass (SSB) of White Hake between 1963 and 2024 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{Threshold}$ ($\frac{1}{2} SSB_{MSY}$ proxy; horizontal dashed line) as well as SSB_{Target} (SSB_{MSY} proxy; horizontal dotted line) based on the 2025 assessment. The approximate 90% lognormal confidence intervals are shown.

2025 Management Track Assessment White Hake *draft working paper for peer review only*



What are *Dynamic* Reference Points?*

MSY: The largest long-term average catch/yield that can be taken “*under prevailing ecological, environmental conditions and fishery technological characteristics (e.g., gear selectivity), and the distribution of catch among fleets.*”

But what if those conditions change?

Dynamic Reference Points (DRPs) are time-varying BRPs that adjust for changes in stock productivity

- Account for the impacts of broad and persistent ecosystem change or regime shifts → enable more responsive management.

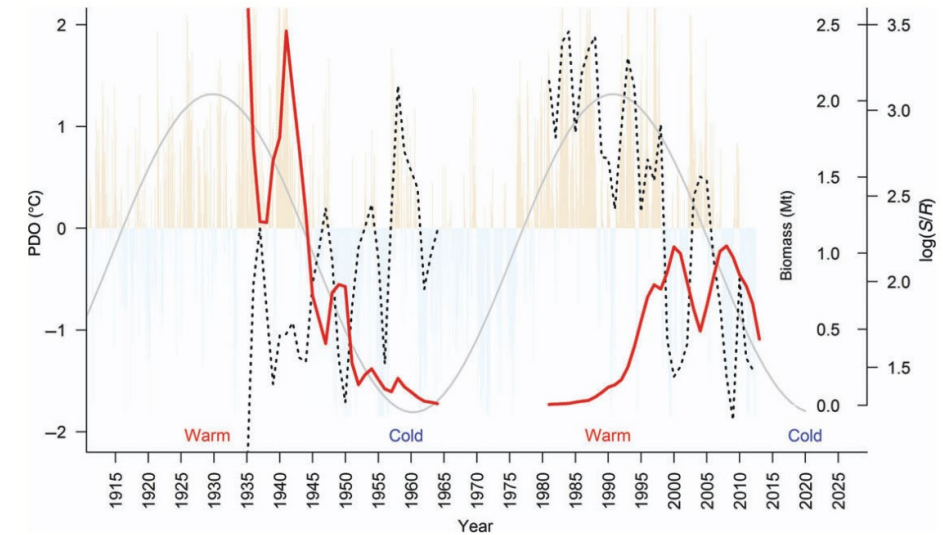


Figure 4. The PDO index indicating positive (pink) and negative (light blue) monthly values; the 60-year periodic component of the PDO projected to 2020 (grey line; Zwolinski and Demer, 2012); the assessment estimated sardine biomass (red); and the predicted logarithmic stock – recruitment ratio (dashed line).

Zwolinski, J. P., et al. (2014). *Environmental and parental control of Pacific sardine recruitment in the California Current ecosystem*. *ICES Journal of Marine Science*, 71(8), 2198–2207. <https://doi.org/10.1093/icesjms/fst173>

*Definition refined during workshop planning and the workshop itself



June 1-2 Workshop Goals

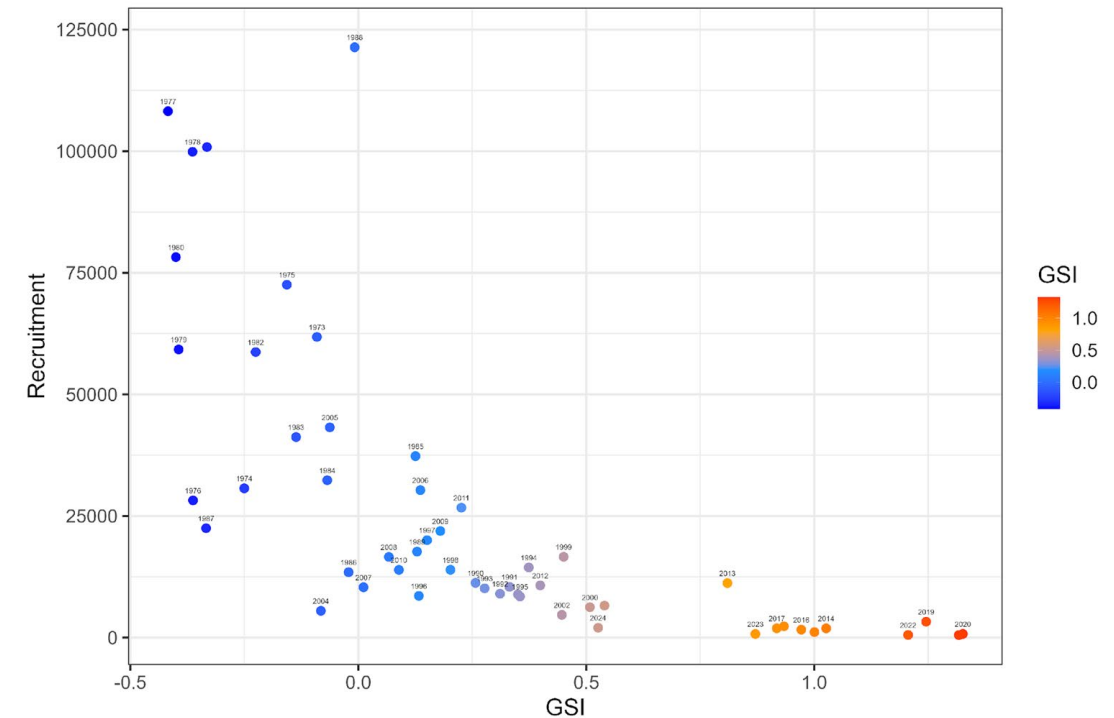
1. Establish a **shared understanding** of current approaches and recommendations from regional and national workshops on defining dynamic biological reference points, including the challenges of implementation and human dimensions.
2. Recommend ways to evaluate the effectiveness of existing reference points for NEFMC stocks to **determine when it may be more appropriate** to use dynamic reference points.
3. **Evaluate alternative approaches to defining reference points** that can account for non-stationarity, appropriateness of methods for NEFMC stocks (given data), and potential challenges in application.
4. **Identify tradeoffs, pathways and potential stocks** for implementing dynamic reference points within the current scientific process to inform management.



Where We Are in 2026

- It has been challenging to account for changes in productivity in the assessment and management processes.
- There have been efforts to revise reference points to reflect changing productivity for some stocks.
- No consistent framework for revising reference points as conditions shift.

2024 Research Track Assessment: SNE/MA Yellowtail Flounder

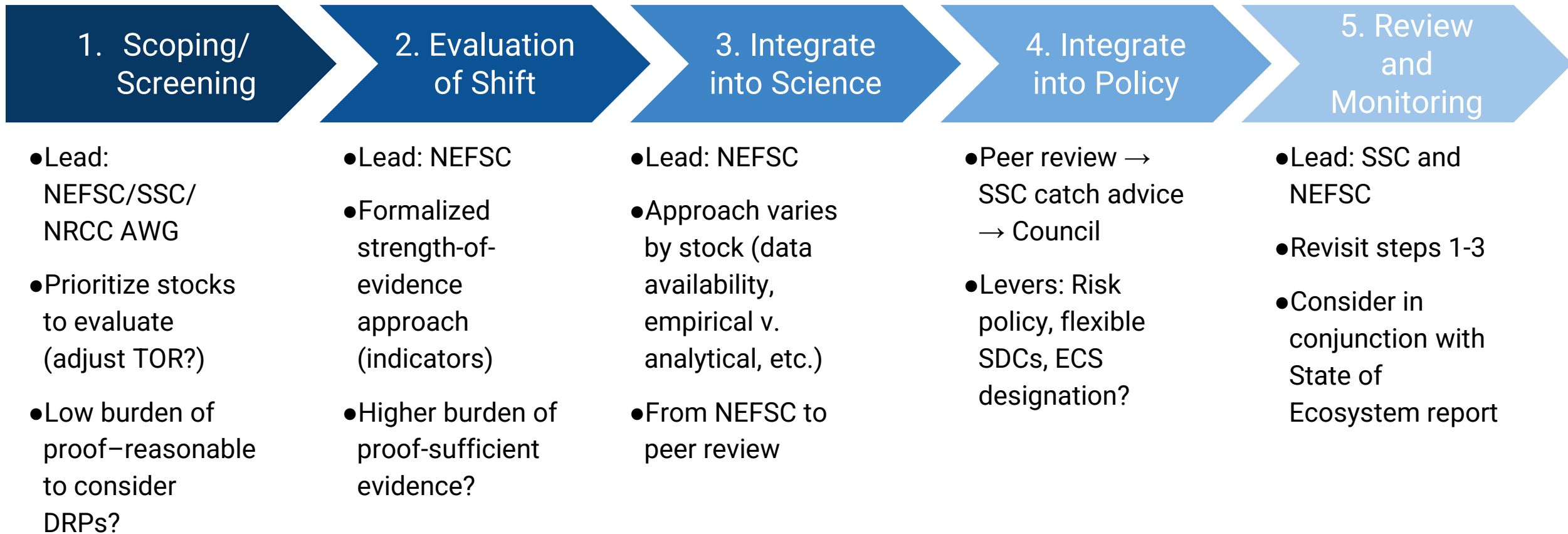


Workshop Outcomes

Intended Outcomes	Actual Outcomes
A preliminary suite of indicators and guidelines for evaluating whether to use dynamic BRPs and potentially candidate stocks.	Identified 21 indicators related to environment/biology, fishery, environmental, and management with guidelines for evaluation (p. 37).
Consensus on recommendations for developing, reviewing, and maintaining DRPs, building on existing CINAR, SSC8, and NS1 guidance (e.g., evaluation standards, evidence thresholds).	Developed a concept map describing five key steps: 1) scoping/screening; 2) evaluation of evidence; 3) integration into science; 4) integration into management; and 5) ongoing monitoring.
A stepwise implementation roadmap that aligns scientific advances with management, legal, and capacity constraints and identifies potential risks.	Discussed potential priority stocks: white hake, Georges Bank haddock, witch flounder.
A prioritized list of research recommendations that could advance our understanding of DRPs and future development of best practices for implementation.	Identified 14 recommendations for researching detecting productivity shifts, DRP approaches, and management implementation (p. 38-39).



Concept Mapping: From screening to implementation



Initial Discussion of STEP 2 Evaluation

Preliminary Indicators

- Refinements?
- Other stock-specific indicators could be identified.

 A. Ecology/Biology	 B. Fishery	 C. Environmental	 D. Management
1 Change in stock recruitment (or recruitment/SSB) 2 Spatiotemporal distribution of stock 3 Observed changes in a stock's recruitment 4 Increased stock variability 5 Ecosystem and Socioeconomic Profiles 6 State of the Ecosystem Report 7 Ecosystem indicators (generally and stock-specific) 8 Changing growth/maturity schedules (signs that stock under stress) 9 Ruling out alternative hypotheses	1 Quota usage (or CPUE?) 2 Landings and lack of response in biology 3 Persistent non-responsiveness to decreases in F 4 Market-driven changes 5 Effort location (stat area, VMS, port of landing) 6 Industry-provided info (FEK)	1 Temperature 2 Anomaly analysis 3 Environmental linkage desired but not required	1 Management implications (choke sp., etc.) 2 Management history 3 Decoupling of F and SSB



Recommendations for Research and Implementation

Detecting Productivity Shifts	Specific DRP Approaches	Management Implementation
• Develop guidance for which metrics to use to assess productivity • Identify indicators of an imminent regime shift→proactive approach • Investigate analytical approaches for using fishery and socioeconomic indicators to infer productivity shifts • Explore/analyze potential synchrony in stock dynamics) → enable proxies for data-poor stocks • Examine strategies to quantify whether fishing is a driver of stock health/decline	• Explore appropriate DRP approaches for empirical stocks • For data-limited stocks, consider applying economic reference points • Evaluate assumptions in models that are used for projections (e.g., numbers at age random effects) • Examine strategies for adjusting fishing mortality proxies (e.g. $F_{40\%}$) to ensure that they align with changes to biomass proxies • Conduct retrospective on how reference point have changed over time for certain stocks to lend context to current efforts • Investigate how to appropriately account for age composition in developing DRPs	• NOAA Fisheries to clarify whether transitioning to DRPs differs markedly from “routine” reference point changes for the purpose of setting SDCs • Examine management implications of revising BRPs for the ABC control rule process to foresee and address potential SSC/NEFMC implementation challenges • Investigate effect of different DRP methods on stability of catch (e.g., through simulation testing); explore strategies to coordinate DRPs with ABC control rules to avoid large interannual shifts in catch advice and resulting industry impacts



SSC Recommendations on August 11-12

- **Strong candidates** for near-term concept mapping - have 2027 assessments.
 - White hake. Prior contractual research to build on. Detecting recruitment shifts highly dependent on methods, but several signals point to likely productivity changes.
 - Atlantic cod stocks. 2023 research track work on environmental influence on vital rates. Expressed interest in Georges Bank and Southern New England cod, but all could benefit.
- **Establish SSC subgroup** to facilitate concept mapping for candidate stocks, collaborate with NEFSC analysts, help establish consistent approaches across stocks.
- Include natural mortality as an indicator to evaluate.

