Harvest Control Rule Discussion Recap

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Jan 2026

Recap of Past Plan Team discussions

- **June 2025 SSC HCR workshop**
  - held in response to CCTF recommendations; reviewed the growing suite of models for evaluating alternative HCRs and ecosystem caps.
  - Four priority HCRs and ecosystem caps identified by the SSC are currently being tested to assess performance under changing climate and ecosystem conditions.
  - HCRs 1, 5 & 10, 7

- **Groundfish Plan Team and Crab Plan Team discussions (Sep 2025, Nov 2025, Jan 2026):**
  - Summarized outcomes from the June SSC HCR workshop and reviewed the suite of models available to evaluate alternative HCRs and ecosystem caps.
  - GPT/CPT discussions focused on
    - HCR 5/10 (fix Catch at high biomass to preserve ecosystem productivity and age class diversity)
    - HCR 7 : quantitative methods to adjust for risk table (CPT) or state ABC buffers (CPT) using environmental forecasts

Discussion Topics for Jan 20, 2026

Where and when to adjust for productivity impacts (assessment, HCRs, TAC, or not at all)?

What are the triggers for when to use alternative HCRs?

- Triggers for when to use alternative HCRs.
- How to implement indicator-based adjustments (e.g., annual covariates vs. 5-year running averages).
- Guidance to avoid double dipping across environmental covariates (e.g., if used in the model, HCR, and TAC).

Discuss governance workplan guidance:

- Evaluate how adjustments and buffers are currently set, and whether environmentally linked HCRs outperform the current or static approaches.
- Assess whether interim steps (e.g., female SSB–based ABC methods) are needed before full implementation.
- Include fallback “meta-rules” for exceptional circumstances.
- how much certainty in projections is needed to slow fishing or act early / fish harder when non-fishing mortality may dominate.
- Identify frequency of regular updates: e.g., May update for CPT might include a quick review of how crab demographics are represented across CLIM models.

Is there addition evaluation criteria and guidance needed?

- Improve realism by including demographic processes beyond recruitment (e.g., growth).
- Use a range of performance indicators.
- Consider outcomes under differing levels of projection uncertainty and environmental coupling (how the environment affects demographics).

Where things go next…

- Today we will generate some recommendations and suggestions for the development and implementation of the Climate Workplan in terms of the HCRs.
- SSC will review our recommendations and then make recommendations for the Workplan Design
- Staff will develop the workplan
- This will be then reviewed by the Council in June

Do the Plan Teams want to comment on the recommendations or workplan structure before Sept?

Discussion Points summarized (from 1/20/26)

https://docs.google.com/document/d/1vNa0LcR8THlgCu8ppiADPeJBvxFsmzGNo9QUNase9i8/edit?tab=t.0

Draft Summary of JGPT Discussions

Jan 20, 2025

Recommendations are in BLUE

Governance considerations for the workplan

The Team recommends that triggers for considering alternative Harvest Control Rules (HCRs) be grounded in elements of the existing Risk Table framework. In particular, alternative HCRs should be used to address issues not already captured by the assessment model (e.g., environmental or ecosystem considerations already included in the model should not be double counted).

Additional triggers for considering alternative HCRs could include evidence that the standard HCR is not performing as intended, such as:

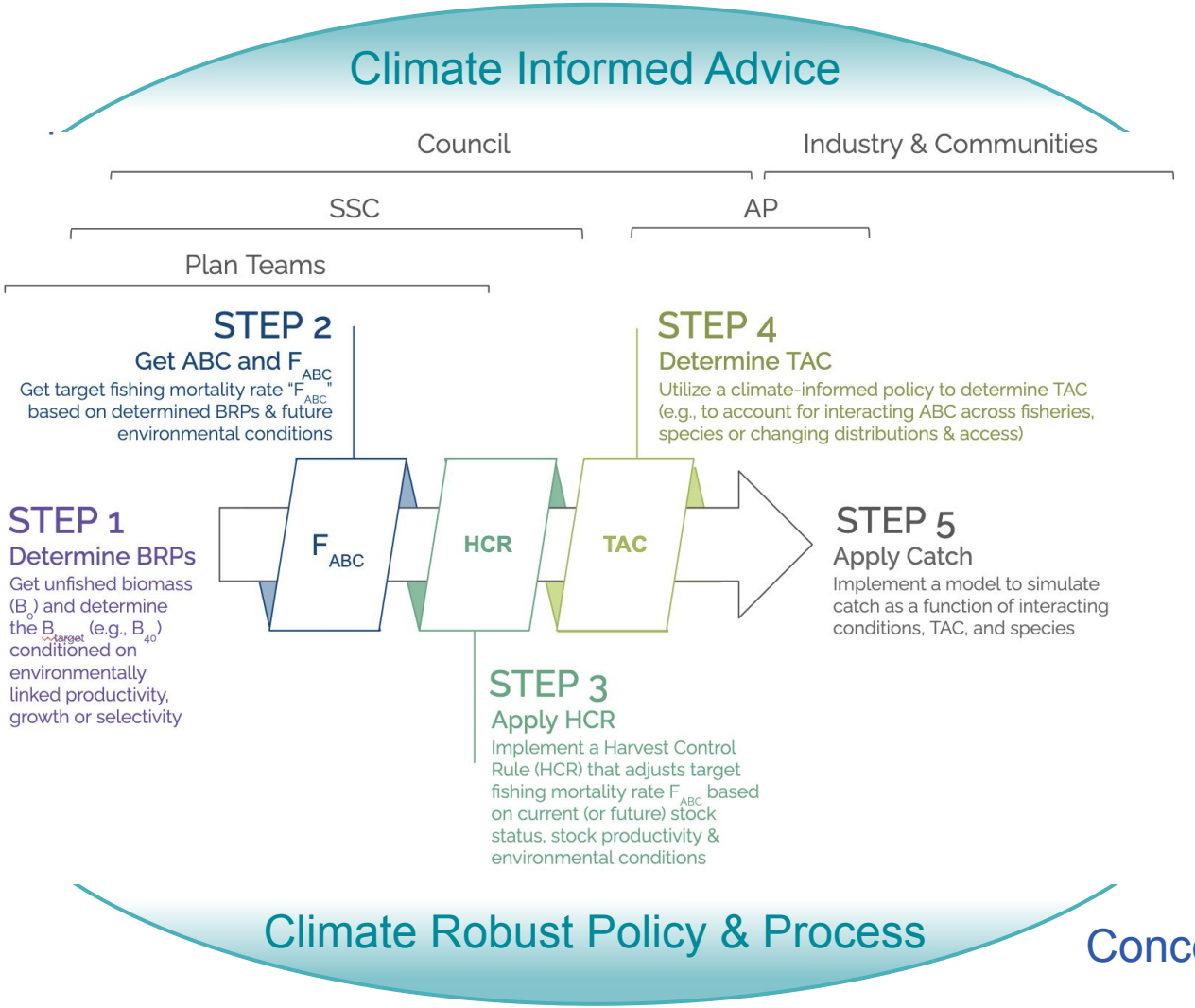
- Multiple successive years of spawning stock biomass (SSB_y) below SSB_target,
- Persistent declines in recruitment,
- Or other concerning trends identified through stock assessments or environmental monitoring.

The Team supports the exploration of alternative HCRs for setting **ABC**, but not for **OFL** at this time.

Governance considerations for the workplan

- Alternatives apply to **ABC**, not **OFL**
- Evaluate F_ABC, HCRs, and TAC jointly and separately
- Use Risk Table logic to trigger alternative HCRs
- Avoid double counting ecosystem info
- Triggers: repeated low SSB, poor recruitment, abnormal trends
- Use MSE to test performance and governance choices
- Need to clarify roles
- Possibly use shadow models
- Consider species-specific cases - need to prioritize

Climate workplan will provide the roadmap

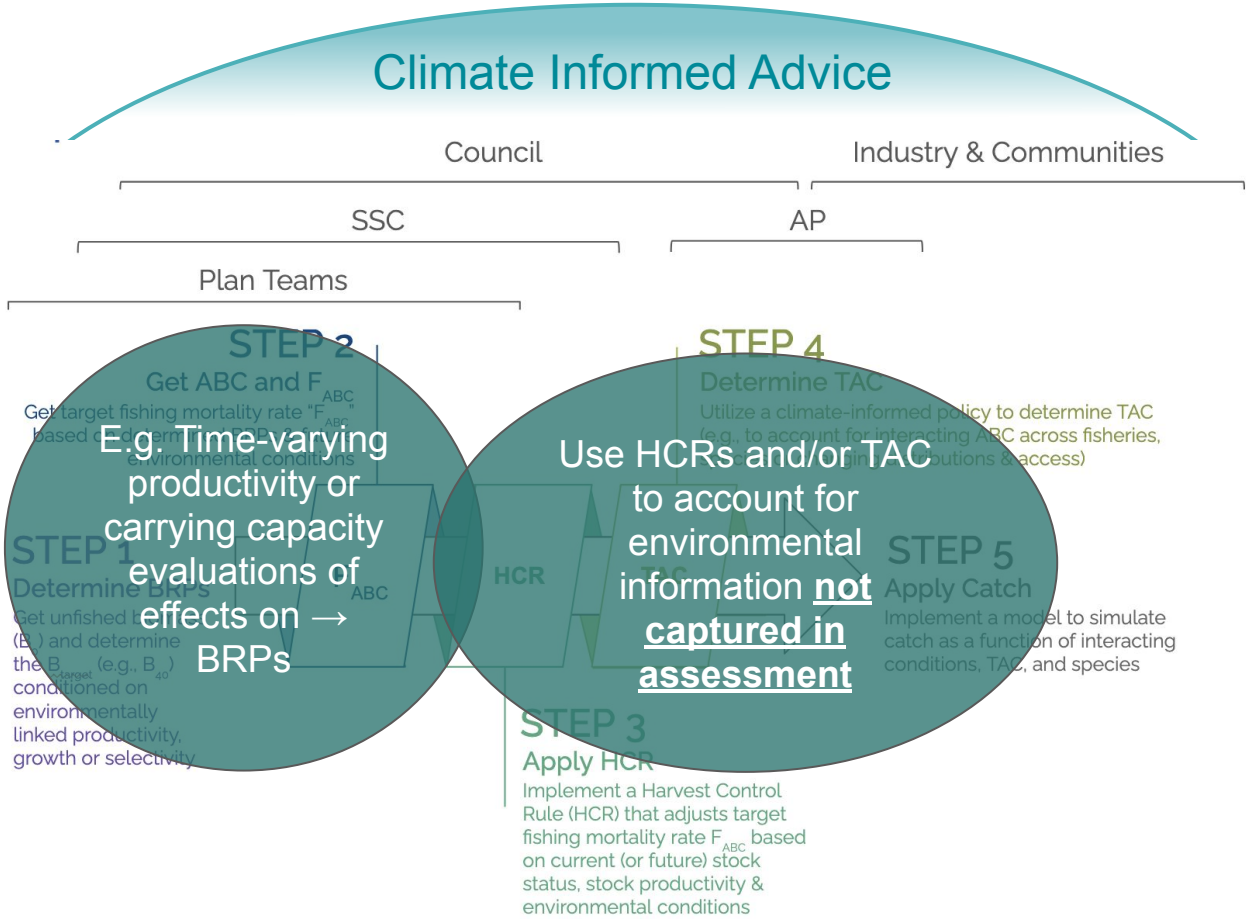


ACLIM GOA-CLIM

Hoslman et al. in prep

Conceptual Model

Climate workplan will provide the roadmap



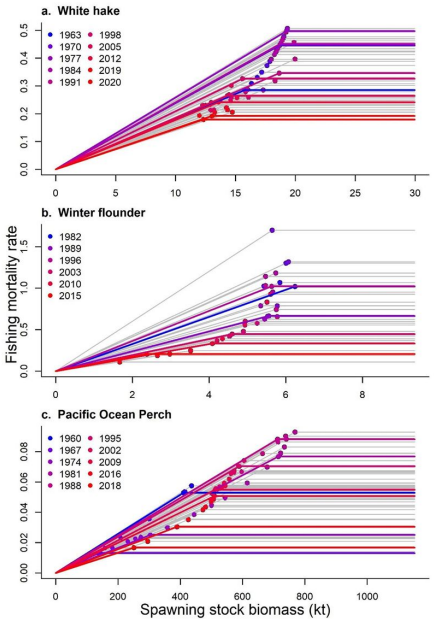
ACLIM GOA-CLIM

Hoslman et al. in prep

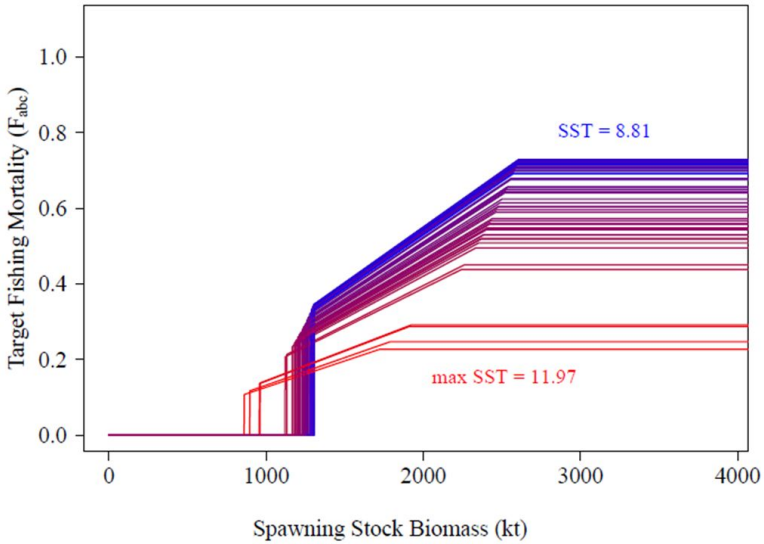
Conceptual Model

Alternative HCRs to consider

Status quo control rule, but with time-varying estimates of reference points (ala Collie et al (in review), Spencer et al (in prep))



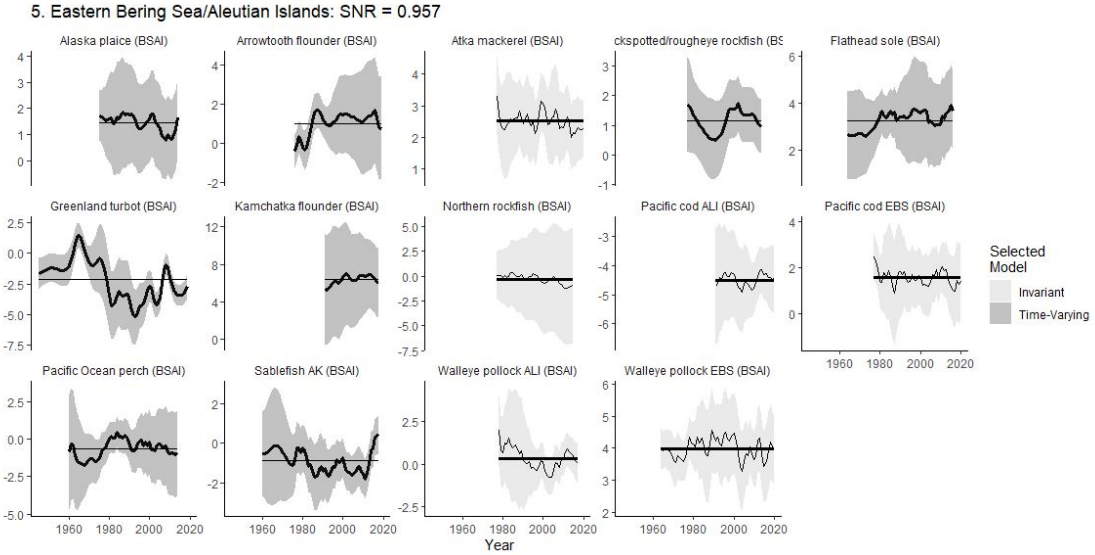
Collie et al (in review)



Spencer et al (in prep)

Estimation of time-varying productivity

- Productivity change is a key motivation for new HCRs
- Update tests for time-varying productivity
- Use Rachel Marshall's 2024 framework and code



Marshall et al 2024, DOI: 10.1111/faf.12862

Climate Informed Advice

Council

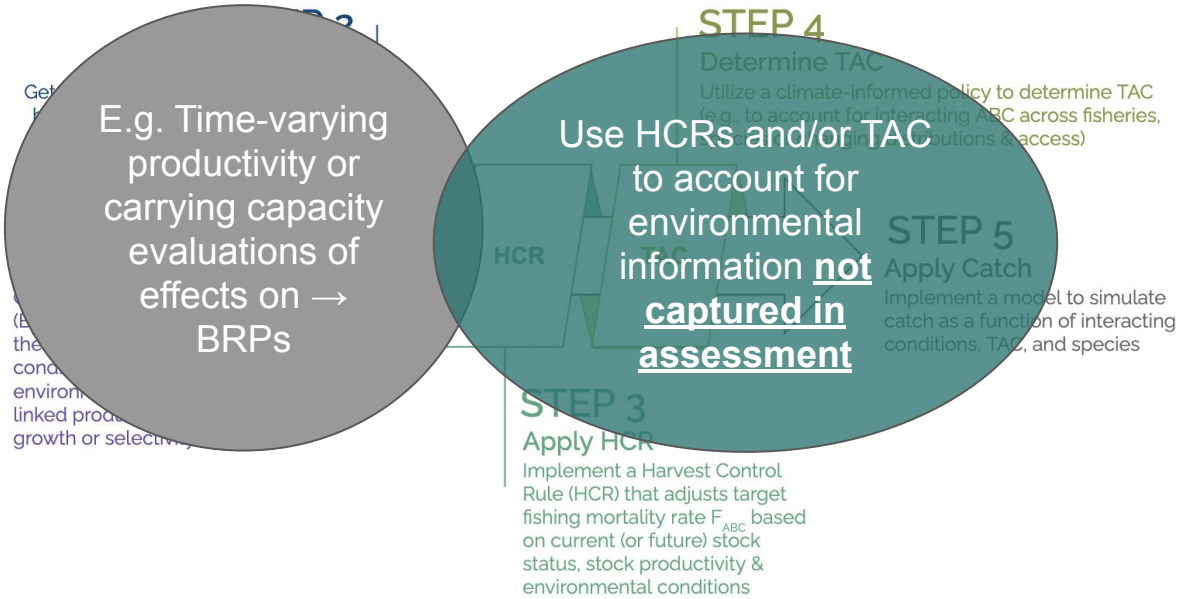
Industry & Communities

SSC

AP

Plan Teams

Climate workplan will provide the roadmap



ACLIM GOA-CLIM

Hoslman et al. in prep

Climate Robust Policy & Process

Conceptual Model

Governance considerations for the workplan

- Recommendations
  - Workplan Sections Evaluate F_ABC, HCRs, and TAC jointly and separately
  - Alternatives apply to ABC, not OFL
  - Use Risk Table logic to trigger alternative HCRs
  - Avoid double counting ecosystem info

- Considerations/ potential suggestions
  - The team recommends HCR 7 and 10 as prioritized alternatives
  - Support continued development including those with smoothed curves and alternative shapes
  - Use MSE to test performance and governance choices
  - Need to clarify roles
  - Possibly use shadow models
  - Consider species-specific cases - need to prioritize

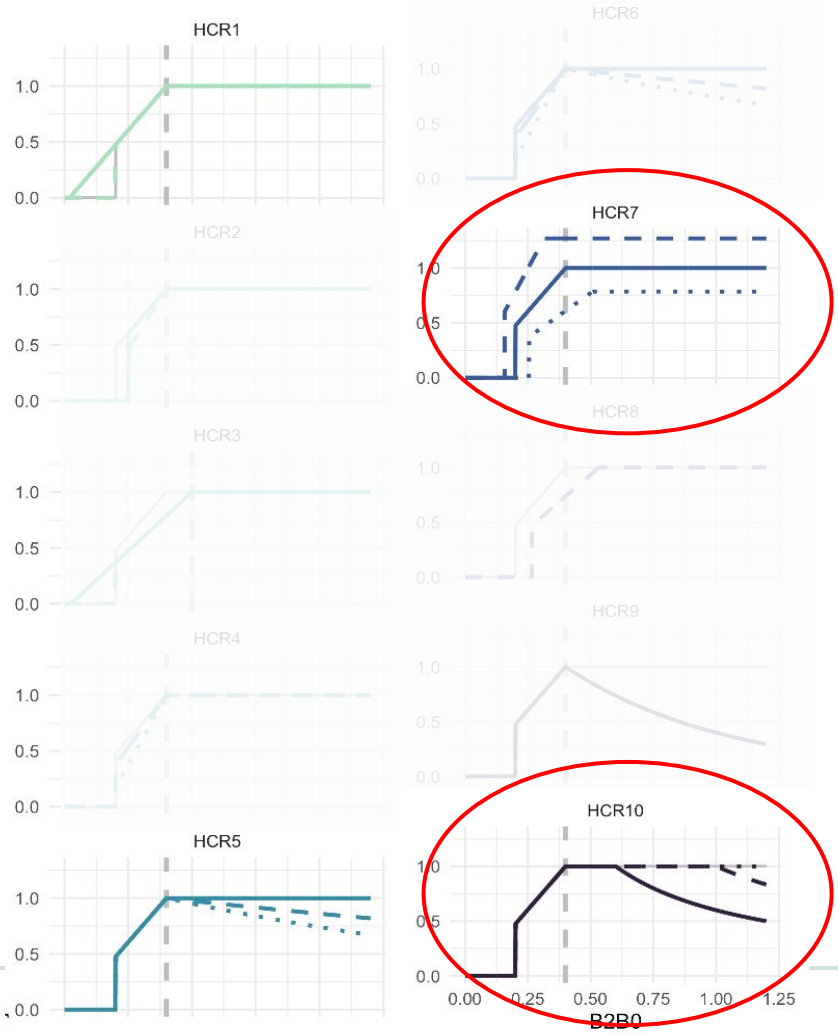
HCR set or missing HCRs

- HCR 7 limited without time-varying reference points
- Use status-quo HCR with updated reference points
- All alternatives revert to status quo when omega = 0
- Focus on HCR 7 and HCR 10
- Possible upgrades:
  - Omega on F_ABC (10–7 hybrid)
  - Higher F above B50/B60 for predation
  - Fixed catch / declining F above B40
  - Smoothed (sigmoidal) curves
  - PFMC & NEFMC alternatives

HCR Scenarios

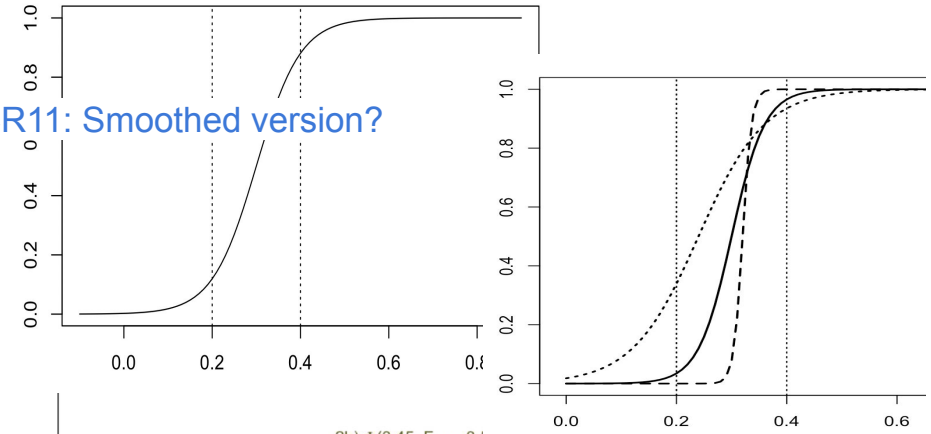
ACLIM2

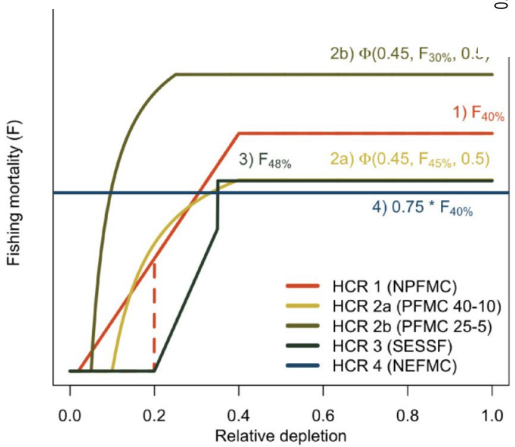
HCR	Name
ABC+HCR 1	Status quo
ABC+HCR 2	Lagged recovery to estimate emergency relief financing needs
ABC+HCR 3	Long-term resilience (stronger reserve) B_target
ABC+HCR 4	Environmental index informed sloping rate, e.g., MHW category alpha
ABC+HCR 5	Maximize productivity/ increased reserve (buffer shocks)
ABC+HCR 6	Combination of MHW (HCR4) + Maximize productivity (HCR5)
ABC+HCR 7	Risk Table Bridging, R/S variability covariate adjusted HCR
ABC+HCR 8	Adjust effective spawning biomass (simulate adjusted B_target)
ABC+HCR 9	Forecast informed version of HCR 5
ABC+HCR 10	Maximize productivity/increased reserve (HCR5), linear version (1/ B_target) with offset



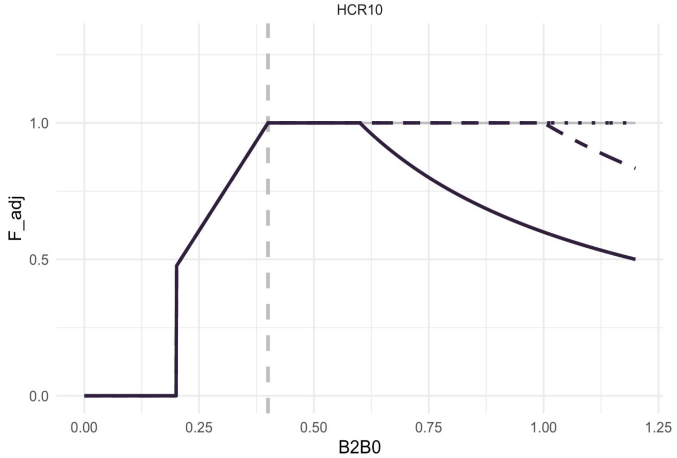
Alternative HCRs to consider

HCR11: Smoothed version?

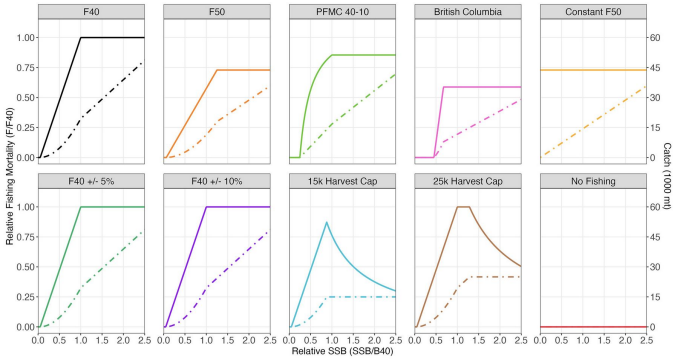




Adams et al. 2025



HCR10: Additional alternatives



Zahner et al. 2025

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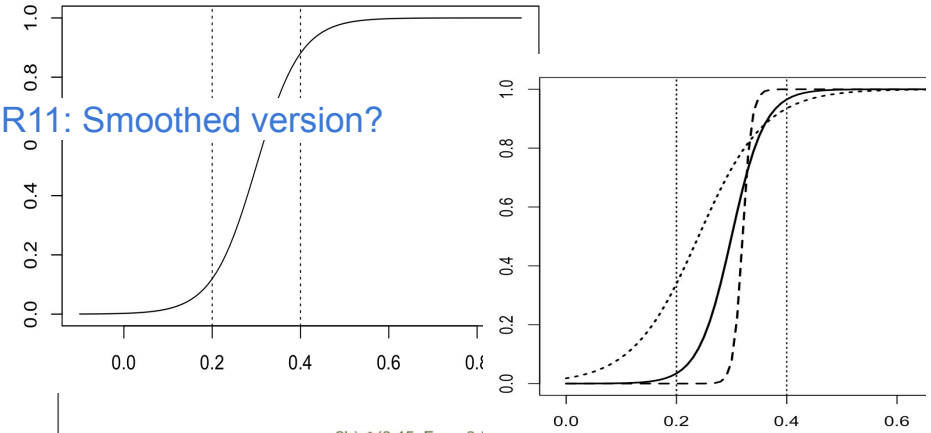
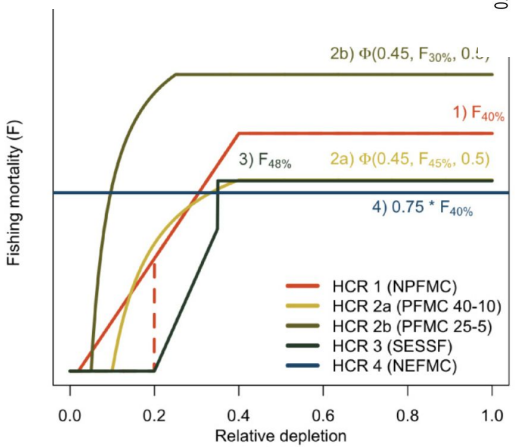
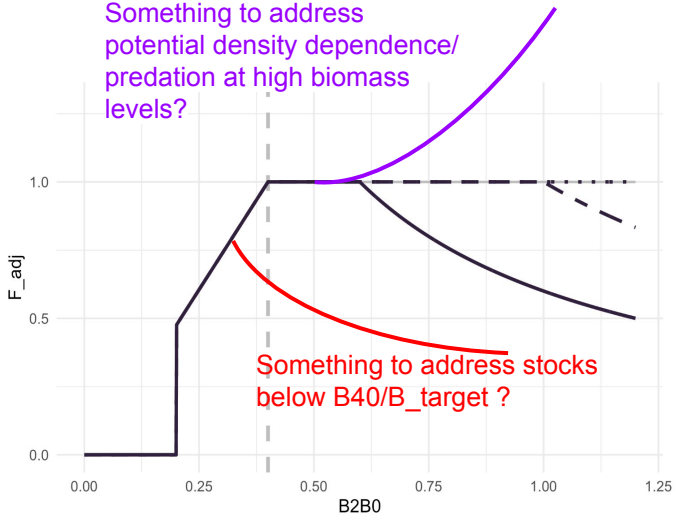




Adams et al. 2025

Something to address potential density dependence/ predation at high biomass levels?



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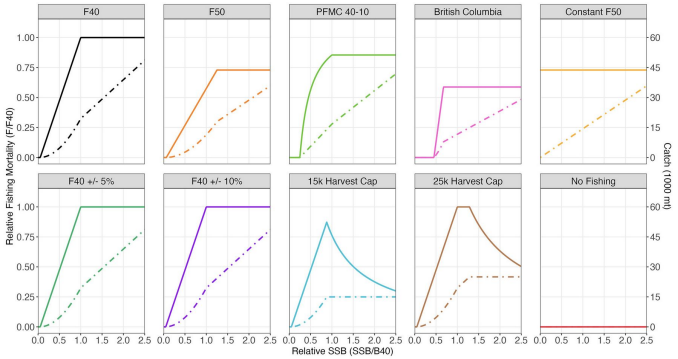


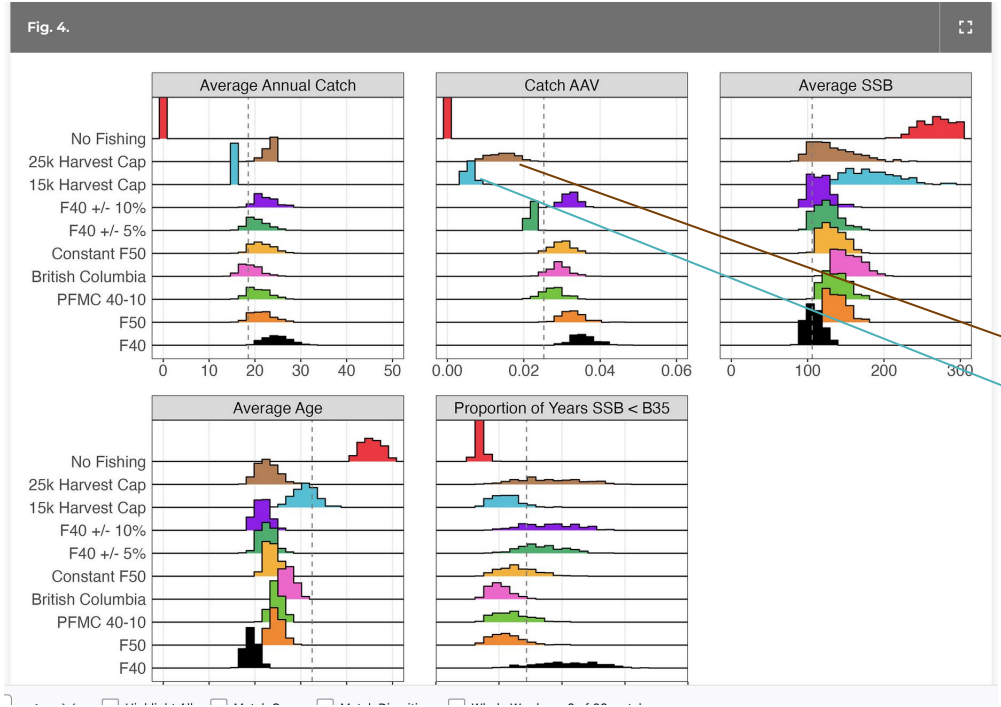
Zahner et al. 2025

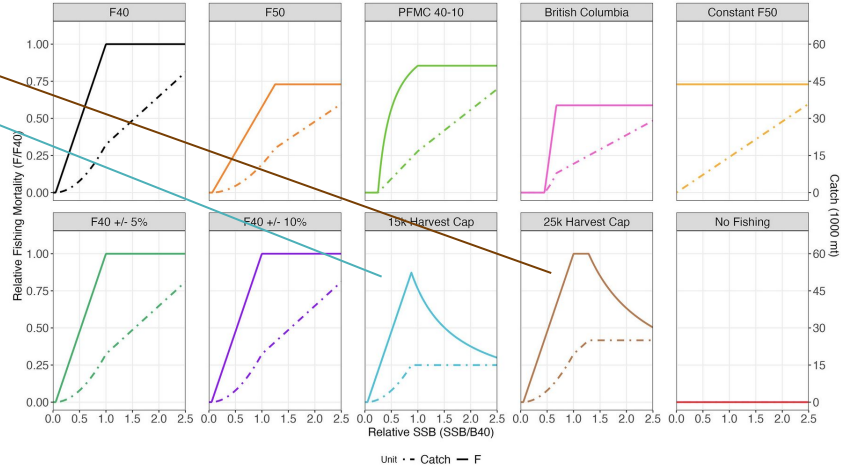
Example MSE approach (sablefish)

Table 4. Summary of performance metrics used to compare management strategies.

Metric name	Short name	Description	Equation
Average annual catch	Average catch	Average annual landed catch in metric tons.	$\bar{C} = \frac{\sum_{y=1}^{Y} C_y}{Y}$
Average annual catch variation	AAV	Average variation in catch in successive years.	$\overline{AAV} = \frac{\sum_{y=1}^{Y} \frac{\lvert C_y - C_{y-1} \rvert}{\bar{C}}}{Y}$
Average annual SSB	SSB	Average annual population spawning stock biomass in metric tons.	$\overline{SSB} = \frac{\sum_{y=1}^{Y} SSB_y}{Y}$
Average annual population age	Population age	Average age of a female individual in the population.	$\overline{N_A} = \frac{\sum_{y=1}^{Y} \frac{\sum_{a=2}^{A} a N_{y,a}}{\sum_{a=2}^{A} N_{y,a}}}{Y}$
Proportion of years SSB $< B_{35}^*$	Years of SSB $< B_{35}^*$	The proportion of years in which of SSB $< B_{35}^*$. $B_{35}^* = 105,000$ and is constant across scenarios (Goethel and Cheng 2024).	$P = \frac{\sum_{y=1}^{Y} \begin{cases} 1, & SSB < B_{35}^* \\ 0, & x \geq B_{35}^* \end{cases}}{Y}$

Note: $C_{y,a}$ is the landed catch in year y (in metric tons), SSB_y is spawning stock biomass (1000 mt) in year y, and $N_{y,a}$ is number of individuals (millions) of age a in year y. Y indicates the total number of years in the simulation period (75), and $\bar{C}$ is the average catch across the simulation period.



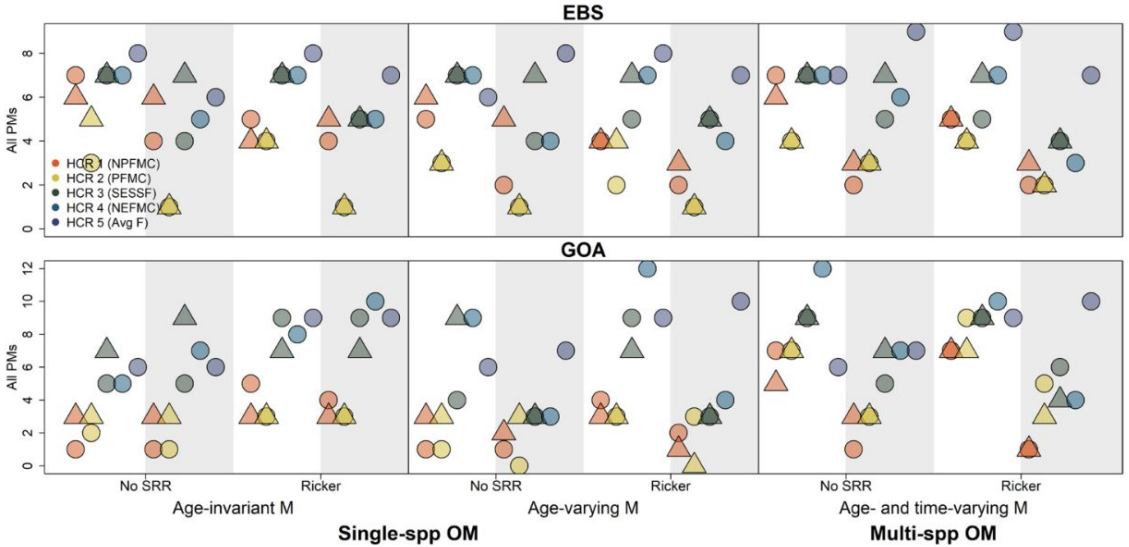


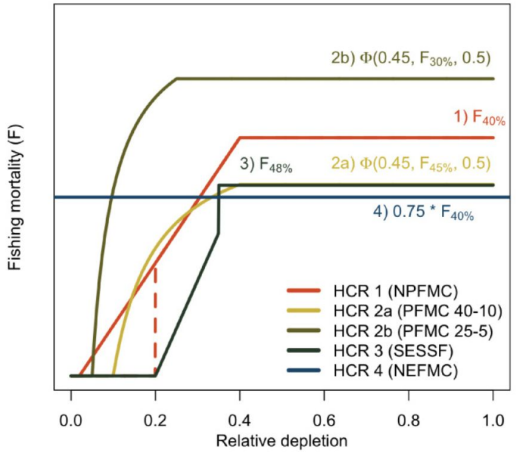
Zahner et al. 2025 Canadian Journal of Fisheries and Aquatic Sciences https://doi.org/10.1139/cjfas-2025-0115

Example MSE approach (GOA) Adams et al. 2025

Can. J. Fish. Aquat. Sci.82: 1–19 (2025) | dx.doi.org/10.1139/cjfas-2024-0225

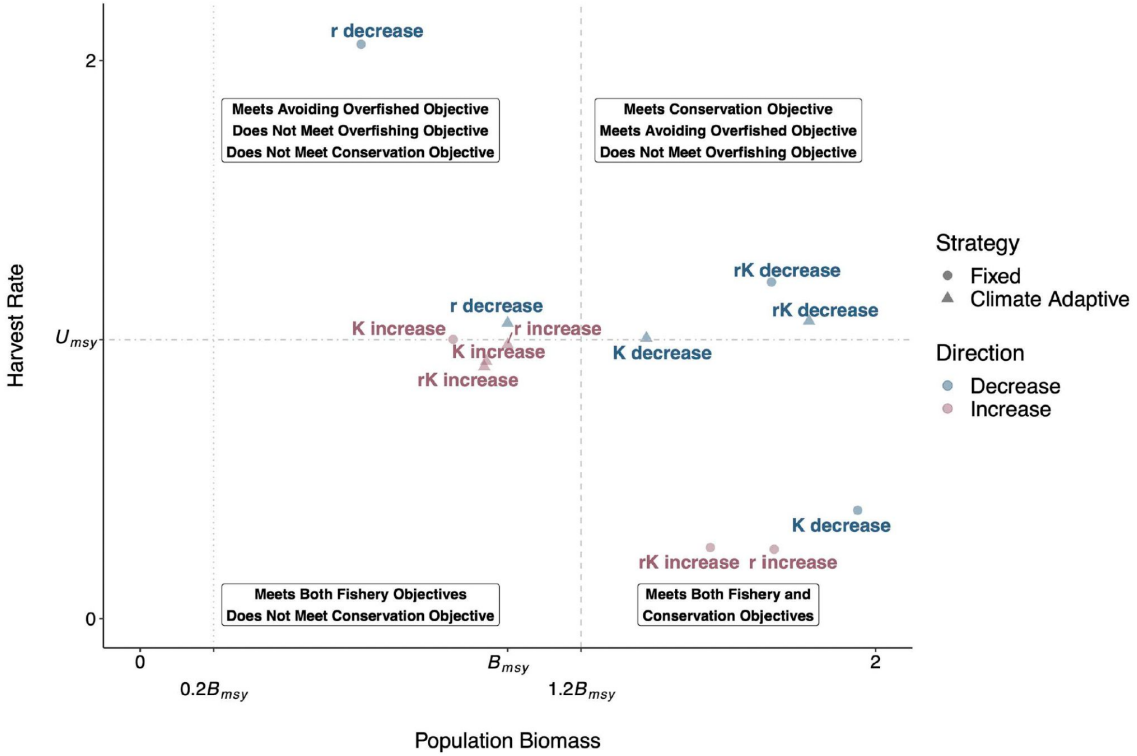
Fig. 10. Number of times a management strategy performed the best for performance metrics across operating methods (OMs) for pollock in the Eastern Bering Sea (EBS) and Gulf of Alaska (GOA) across scenarios. Estimation models that estimated *M* are indicated by the grey shading and harvesr control rules (HCR) using dynamic biomass reference points are indicated by the triangles. See Supplementary Fig. S8 for cod and arrowtooth flounder.





Samhouri et al. 2025

PLOS Clim 4(10): e0000624. https://doi.org/10.1371/journal.pclm.0000624



Triggers for application of an HCR

- Triggers could include environmental and non-environmental patterns
    - e.g. rapidly declining SSB, SSB<S_target for sustained periods, poor recruitment, abnormal trends
- Use Risk Table criteria
- Include industry/community signals
- Use environmental & productivity indicators
- Avoid using the same environmental info twice

Prioritization / species

- HCRs must be stock- or species-specific
- Consider grouping by guild or life history
- Use MSE instead of arbitrary 3–5 year rules
- Use Ianelli delta-TAC / ABC
- Consider cluster or guild-based approaches

e.g., https://jimianelli.github.io/ABC_TAC/

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High priority?

Low priority?

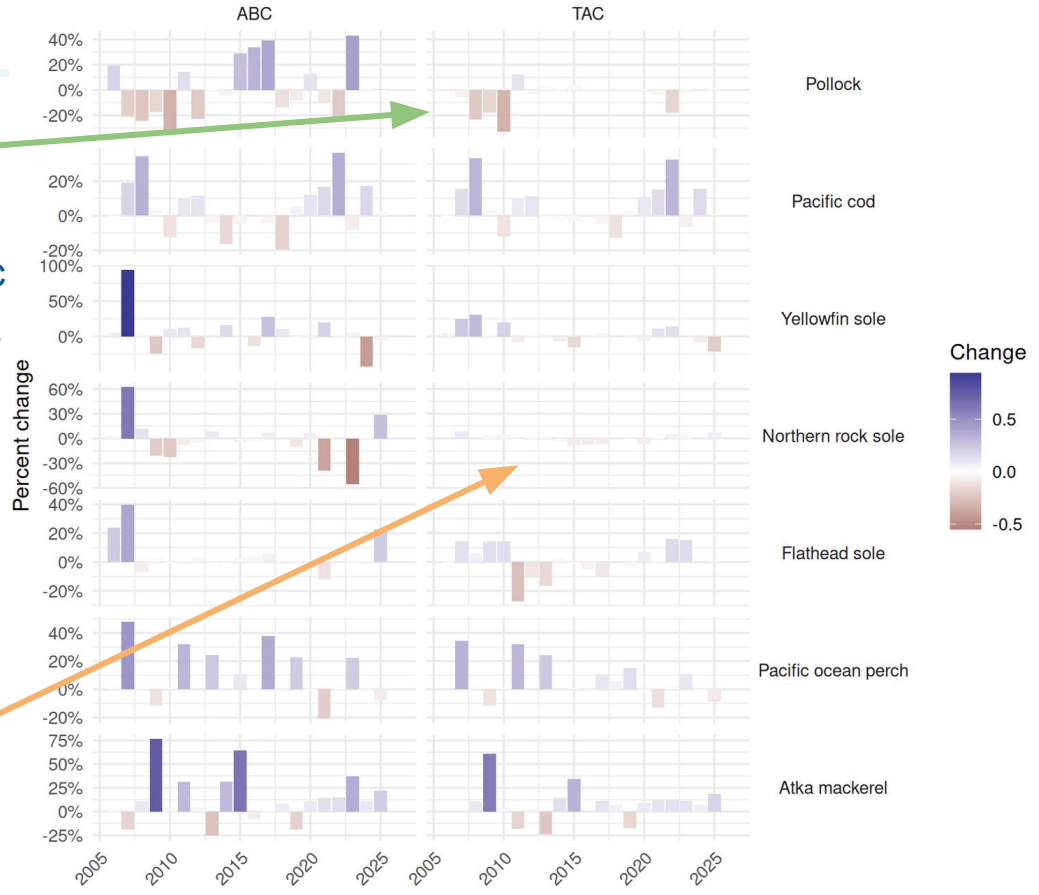


Figure 3: Percent changes between final (lag 1) and two-year (lag 2) values, scaled by the two-year ABC.

e.g., https://jimianelli.github.io/ABC_TAC/

How to set omegas and other terms?

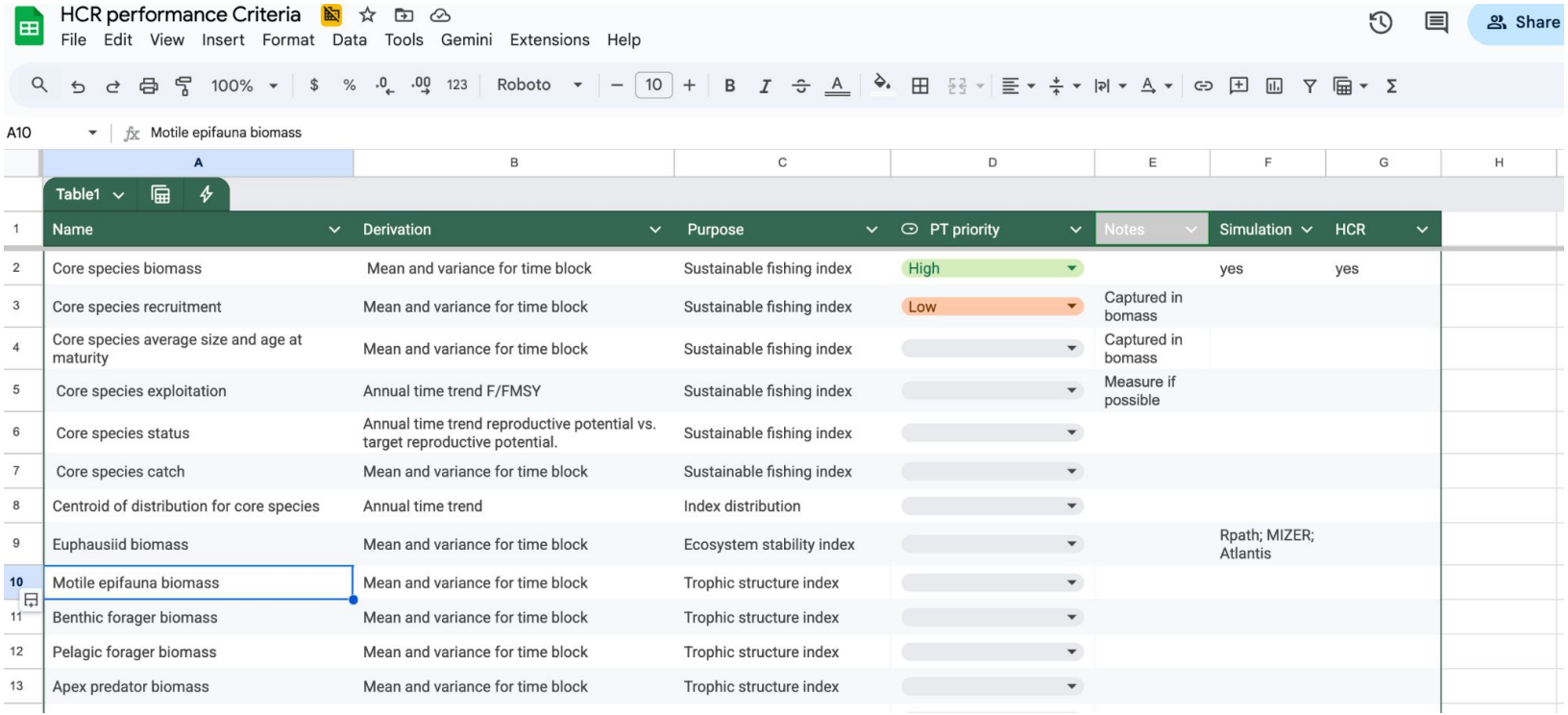
- Use Tier-1 S/R methods
- Use recruitment patterns over time
- Fit covariates during reference period (e.g., 1982–2012)

Performance indicators / evaluation criteria

- Compile full list of performance metrics
- Identify priority metrics
- Distinguish simulation vs. implementation metrics
- Who does this? GPT? Sub-team of the Climate workplan?

Evaluation Criteria

https://docs.google.com/spreadsheets/d/1FLyGtLX1UHaw66N0KTjfsZlq3dbRwNVJGYmcZ9Cizj8/edit?gid=0#gid=0



HCR performance Criteria

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Share

A10 Motile epifauna biomass

Table1

	Name	Derivation	Purpose	PT priority	Notes	Simulation	HCR
2	Core species biomass	Mean and variance for time block	Sustainable fishing index	High		yes	yes
3	Core species recruitment	Mean and variance for time block	Sustainable fishing index	Low	Captured in bomass		
4	Core species average size and age at maturity	Mean and variance for time block	Sustainable fishing index		Captured in bomass		
5	Core species exploitation	Annual time trend F/FMSY	Sustainable fishing index		Measure if possible		
6	Core species status	Annual time trend reproductive potential vs. target reproductive potential.	Sustainable fishing index				
7	Core species catch	Mean and variance for time block	Sustainable fishing index				
8	Centroid of distribution for core species	Annual time trend	Index distribution				
9	Euphausiid biomass	Mean and variance for time block	Ecosystem stability index			Rpath; MIZER; Atlantis	
10	Motile epifauna biomass	Mean and variance for time block	Trophic structure index				
11	Benthic forager biomass	Mean and variance for time block	Trophic structure index				
12	Pelagic forager biomass	Mean and variance for time block	Trophic structure index				
13	Apex predator biomass	Mean and variance for time block	Trophic structure index				