UPDATING M: GOA OTHER ROCKFISH EXAMPLE

CINDY A TRIBUZIO, SEPTEMBER GROUNDFISH PLAN TEAM 2022

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OUTLINE

- PT requested updating natural mortality (M) for many rockfish species
- Outline
  - Quick catch update
  - Introduce Sullivan et al. 2022
  - GOA OROX example
  - Action items

ROLLED OVER SPECS

2021 Assessment (2022 – 2023)

Full Complex	W GOA	Central GOA	Eastern GOA		Total
			West Yakutat	E Yakutat/ Southeast	
Area ABC (t)	396		312	2,454	3,162
OFL (t)					4,146

2019 Assessment (for 2020 – 2021)

Full Complex	W GOA	Central GOA	Eastern GOA		Total
			West Yakutat	E Yakutat/ Southeast	
Area ABC (t)	940		369	2,744	4,053
OFL (t)					5,320

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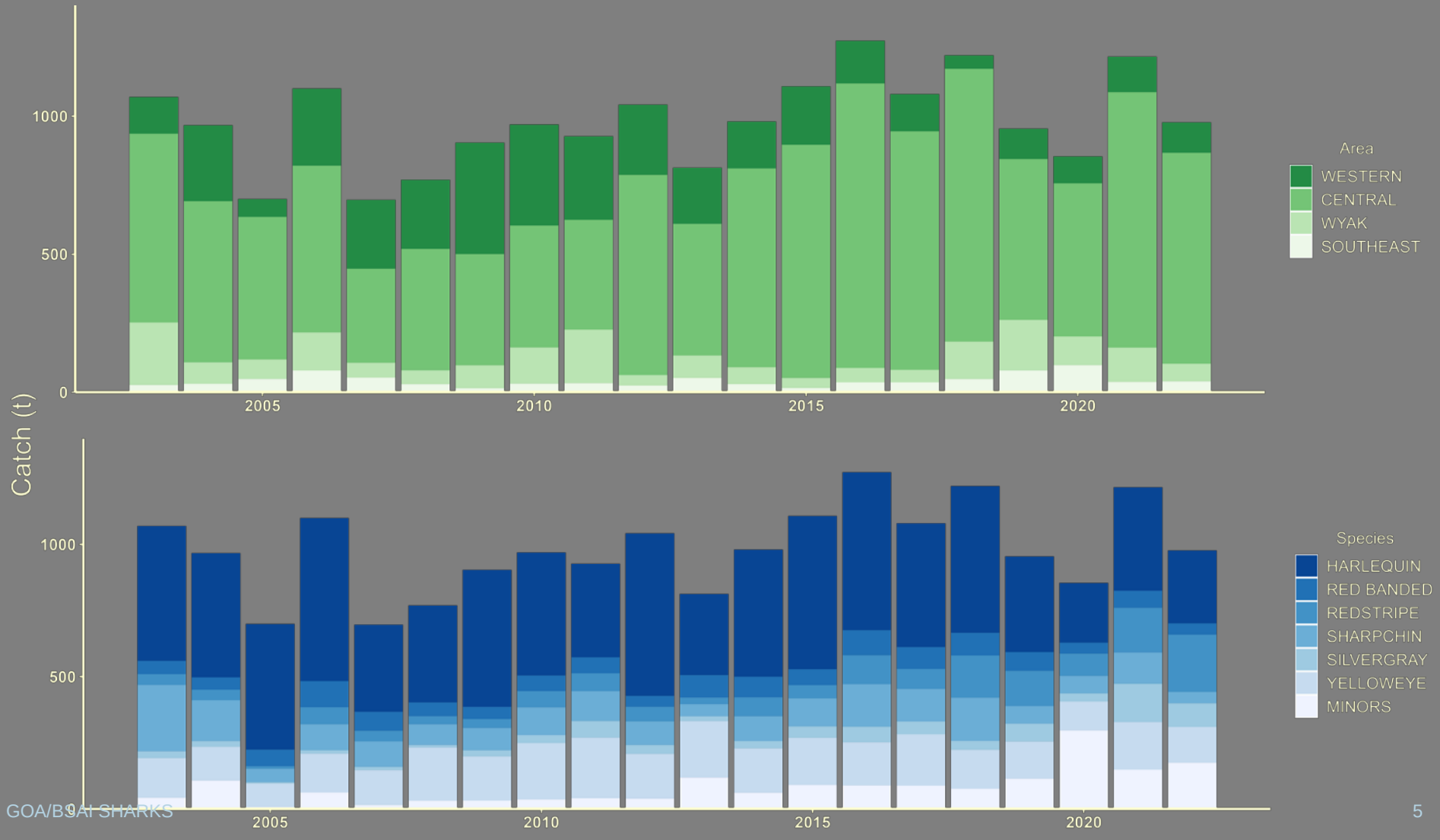

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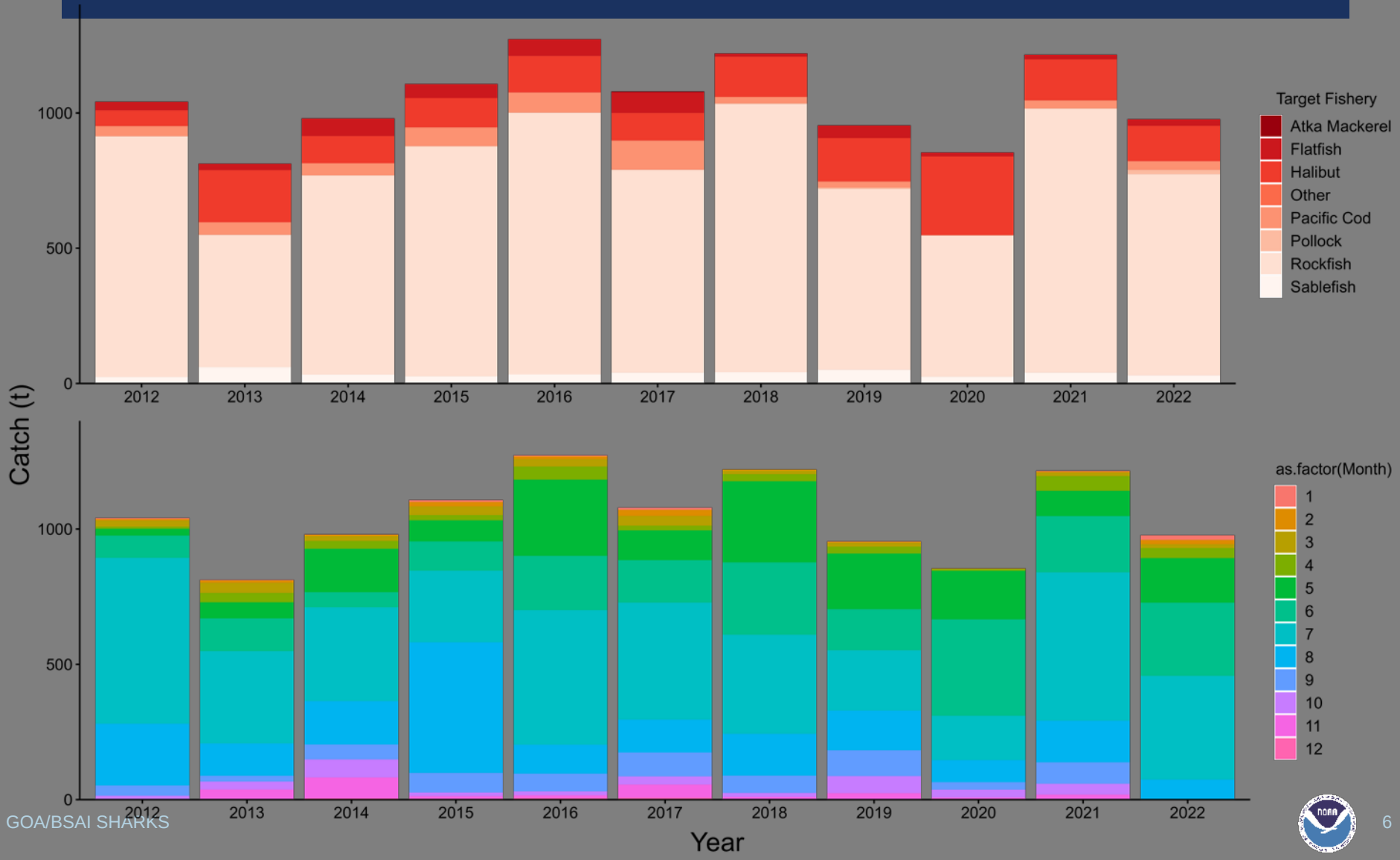

UPDATING NATURAL MORTALITY (*M*)

Sullivan et al. 2002 Provided suite of M estimates for 11 rockfish species across BSAI and GOA

M methods were selected based on:

1) Recommended in *M* method reviews
2) Sebastes and Sebastolobus were used in method development
3) Reliable and empirically-derived input values from Alaska were used

Four methods:
life span (M_{tmax}), somatic growth (M_{VBGF}), reproductive biology (M_{GSI}), and metabolism (M_{temp}).

NEXT STEPS

Need to convert the suite of M values from Sullivan et al. 2022 into a stock assessment parameter

GOA OROX as an example

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- Option 2: Mean/median value
  - Equally weights all input data, which may not be appropriate
- Option 3: Weighted mean value with uncertainty
  - Accounts for uncertainty in data AND method

WEIGHTING M ESTIMATES (WT_M)

- Step 1: representiveness of data and/or biases
  - Replicates are normalized to sum to 1

- Step 2: applicability of method
  - weighted the *M* estimates by the applicability of the method, or other unique species-specific considerations.

METHOD UNCERTAINTY (HC)

- All *M* methods have uncertainty inherent in model
- Hamel and Cope (in review) proposed method for incorporating method uncertainty in *M* estimates
- Two versions:
  - Uninformed (constant CV): CV = 0.31
  - Informed: CV based on degrees of separation
    - CV = 0.31 for first order relationships
    - CV = 0.85 for >= second order

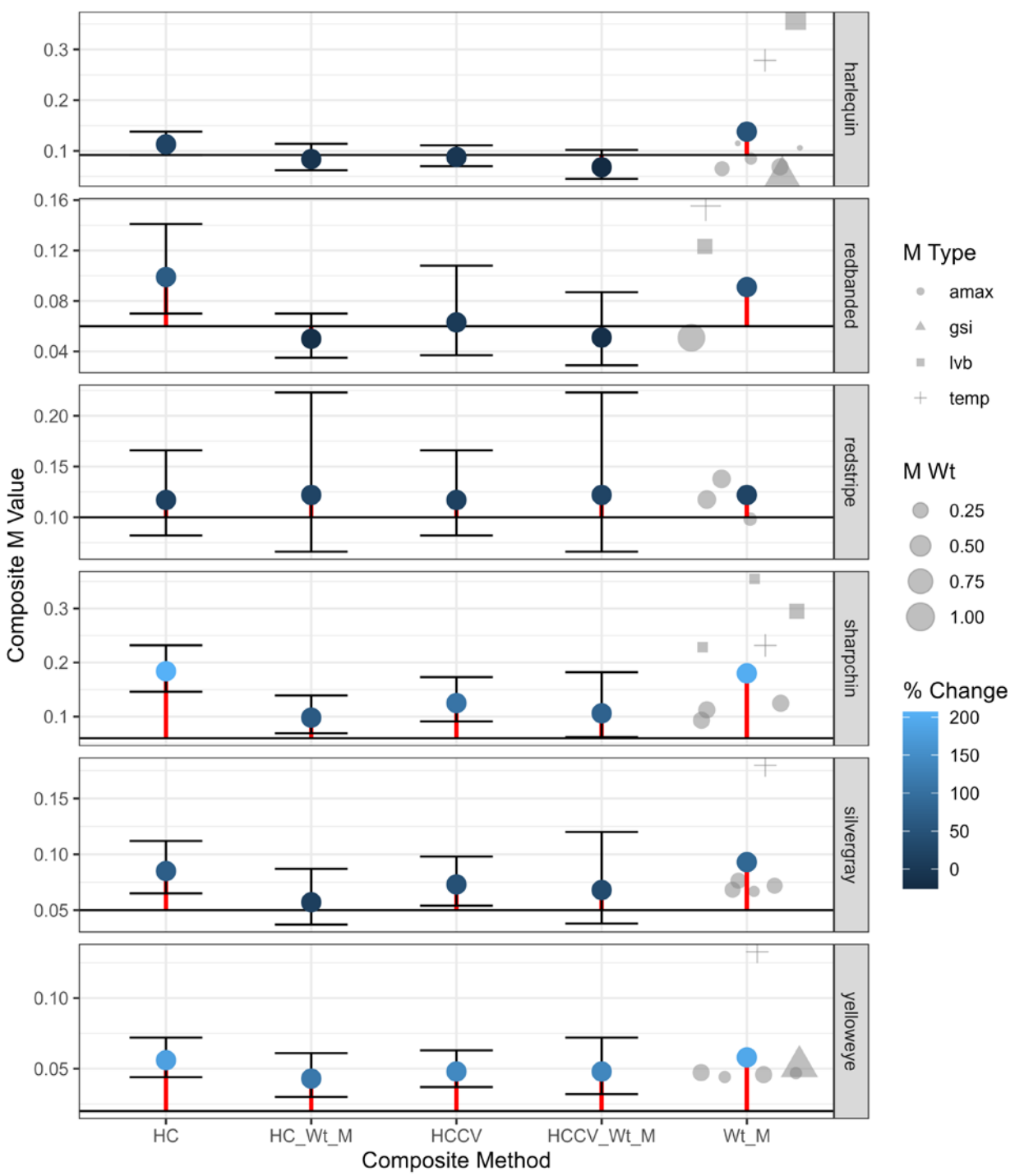
M MODELS

Five models compared

1) **Wt_M**: weighted mean across M values
2) **HC**: arithmetic mean with CV = 0.31
3) **HC_Wt_M**: Wt_M with CV = 0.31
4) **HCCV**: arithmetic mean with informed CV
5) **HCCV_Wt_M**: Wt_M with informed CV

GOA OROX

- Table 1: Sullivan et al. results and the first, second and final weighting
- Table 2: final *M* estimates for each model with uncertainty



UPDATING M ACTION ITEMS

- Recommend using a weighted mean approve which incorporates both representiveness of the data and applicability of method
- Recommend incorporating *M* method uncertainty
- Recommended model: HCCV_WtM (weighted mean with method uncertainty)