GOA Dusky Rockfish

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Overview

- Dusky: Tier 3a
  - Single-sex, age structured assessment
  - Uses GLMM estimator (VAST) for trawl survey biomass index
  - No model changes – 15.5 (2018) presented here, 15.5 (2015) for some comparisons
  - Recommending model 15.5 (2018)

(General) SSC/Plan Team comments

(the really really paraphrased versions)

- *"follow new model naming conventions" SSC Dec 2016*
  - Welcome to dusky rockfish Model 15.5 (2018) !
- *"investigate alternative projection methods that incorporate uncertainty…two-step approach using F to find catch to then fix catch"*
  - We will try this with the proposed standardized software/code, hopefully for the next full assessment.
- *"balance improved model fit with model complexity and parsimony" SSC Dec 2017*
  - No proposed changes this year, will keep this guidance in mind for the future. We feel the dusky model is a nice balance of complexity and parsimony right now.

(General) SSC/Plan Team comments

- *"…examine ecosystem & fishery indicators for indications of a decline early to allow more reaction time..."* (SSC Dec 2017)
- *"work with ESR analysts to identify … indicators … based on mechanistic hypotheses."* (SSC Oct 2018)
- *"do consider ecosystems"* - everyone
  - Examined ESR for indicators about dusky, no big red flags found.
  - Looking forward to continuing to improve use of and dialogue about stock and ecosystem determinations for dusky rockfish.

(Dusky specific) SSC/Plan Team comments

"Work on VAST methods" (SSC, October 2017)

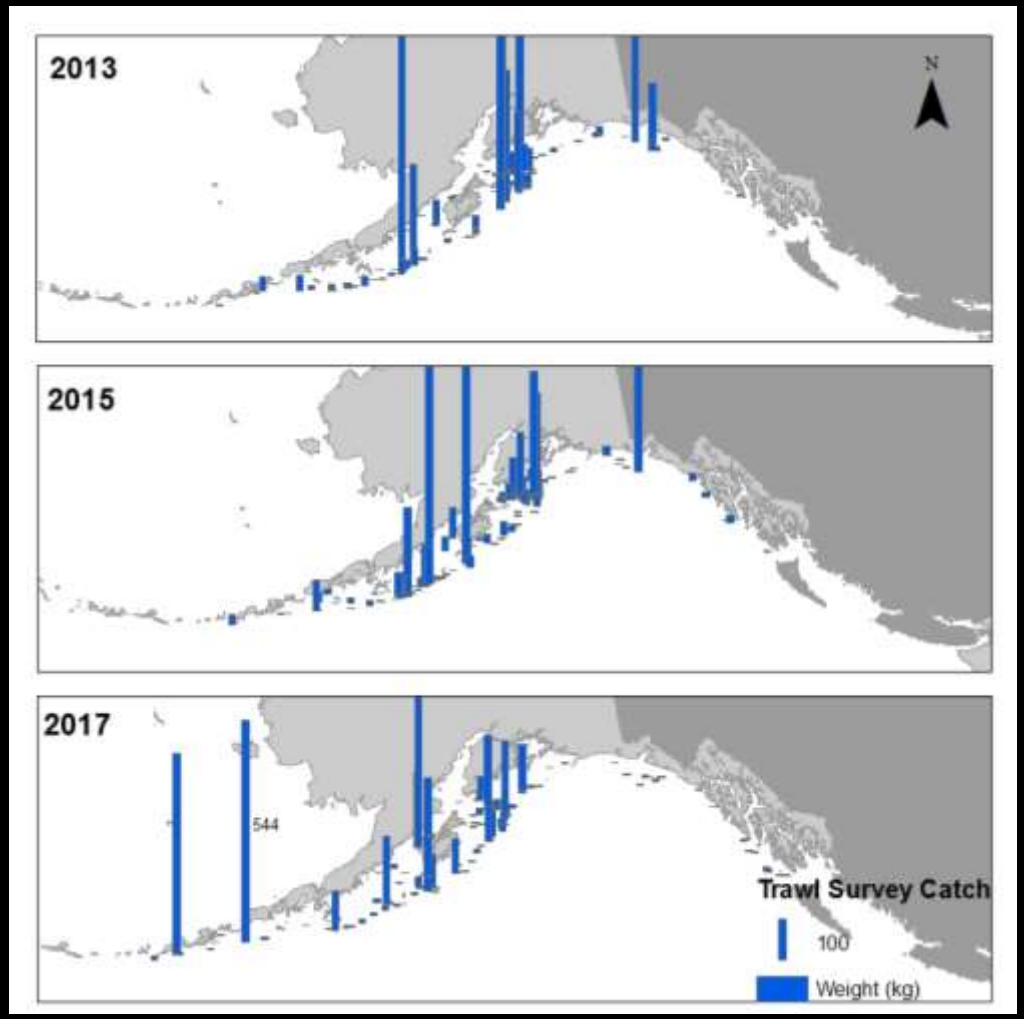
- A working group is currently investigating the criteria for use of the geostatistical generalized linear mixed model within assessments performed by the AFSC. The dusky model is the only current assessment using these methods (unless others come forth in 2018), and the recommendations from the working group will be important for us to consider when they become available.
- New Thorson paper (Guidance for decisions using the VAST package in stock, ecosystem, habitat, and climate assessments). I sleep with it under my pillow.

GOA Dusky Rockfish

- New data to model:
  - 2016, 2017, 2018* catch (*projected)
  - 2017 trawl survey biomass
  - 2015, 2017 survey age comps
  - 2014, 2016 fishery age comps
  - 2015, 2017 fishery length comps

Dusky catches in recent Trawl Surveys

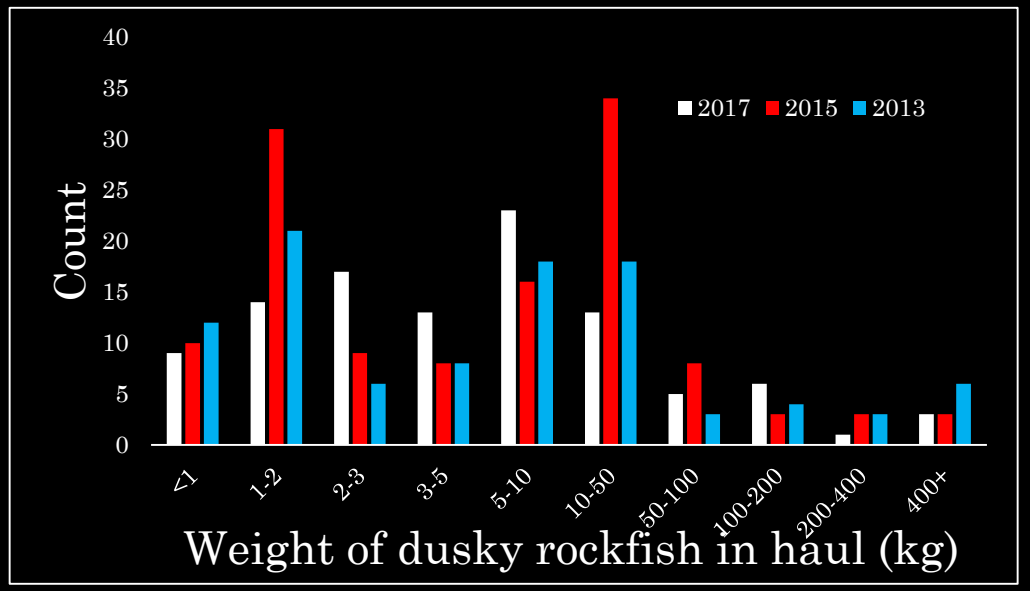
- 2017 survey year
  - 2 vessels, 576 stations attempted
- 2017 trawl survey only sampled to 700 m but this still covers dusky depth range well



Dusky catches in Recent Trawl Surveys

- Dusky's caught in:
  - 98 hauls in 2013
  - 125 hauls in 2015
  - 104 hauls in 2017
- Only a couple big hauls in 2017

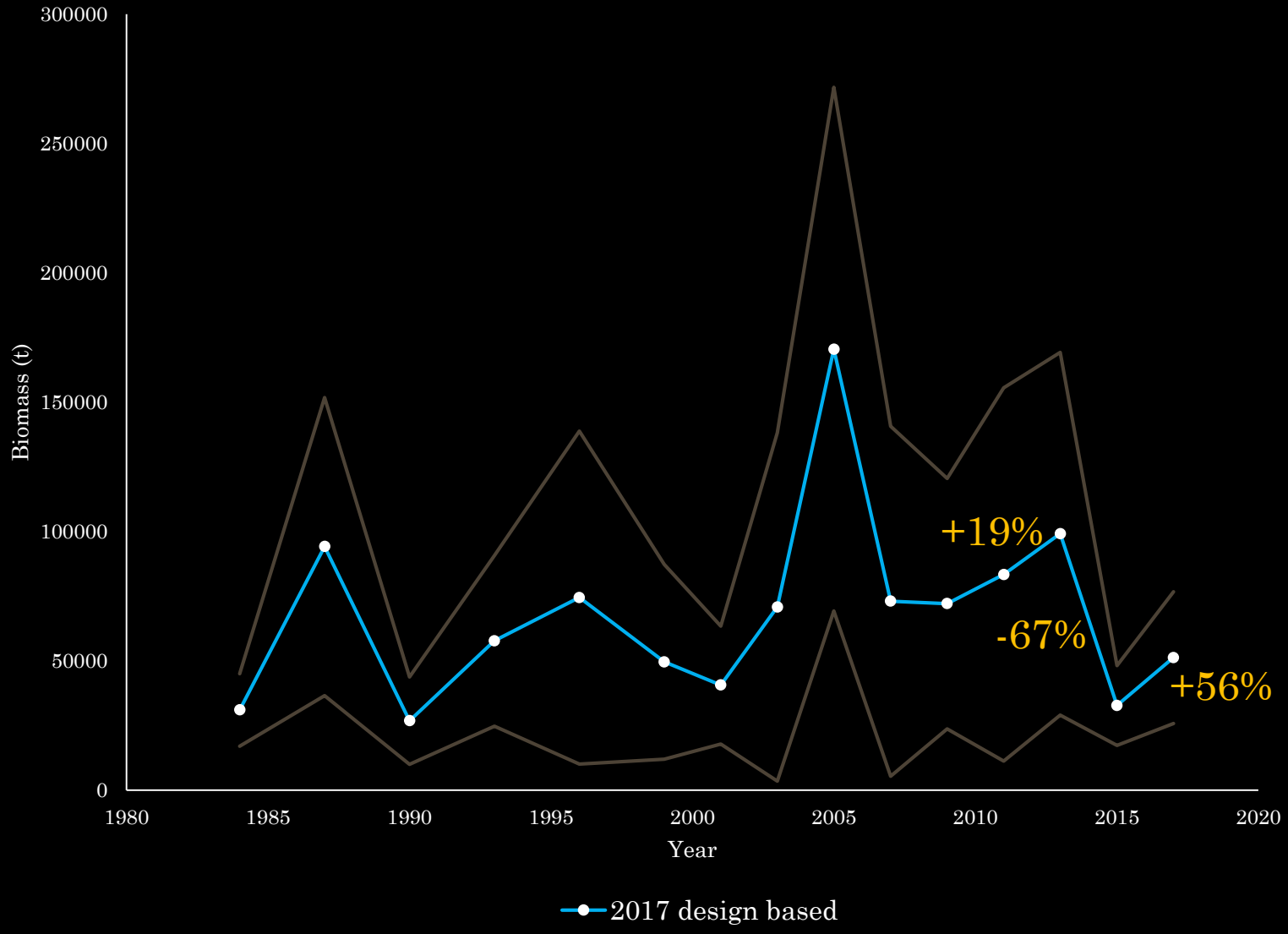
Frequency of haul sizes:



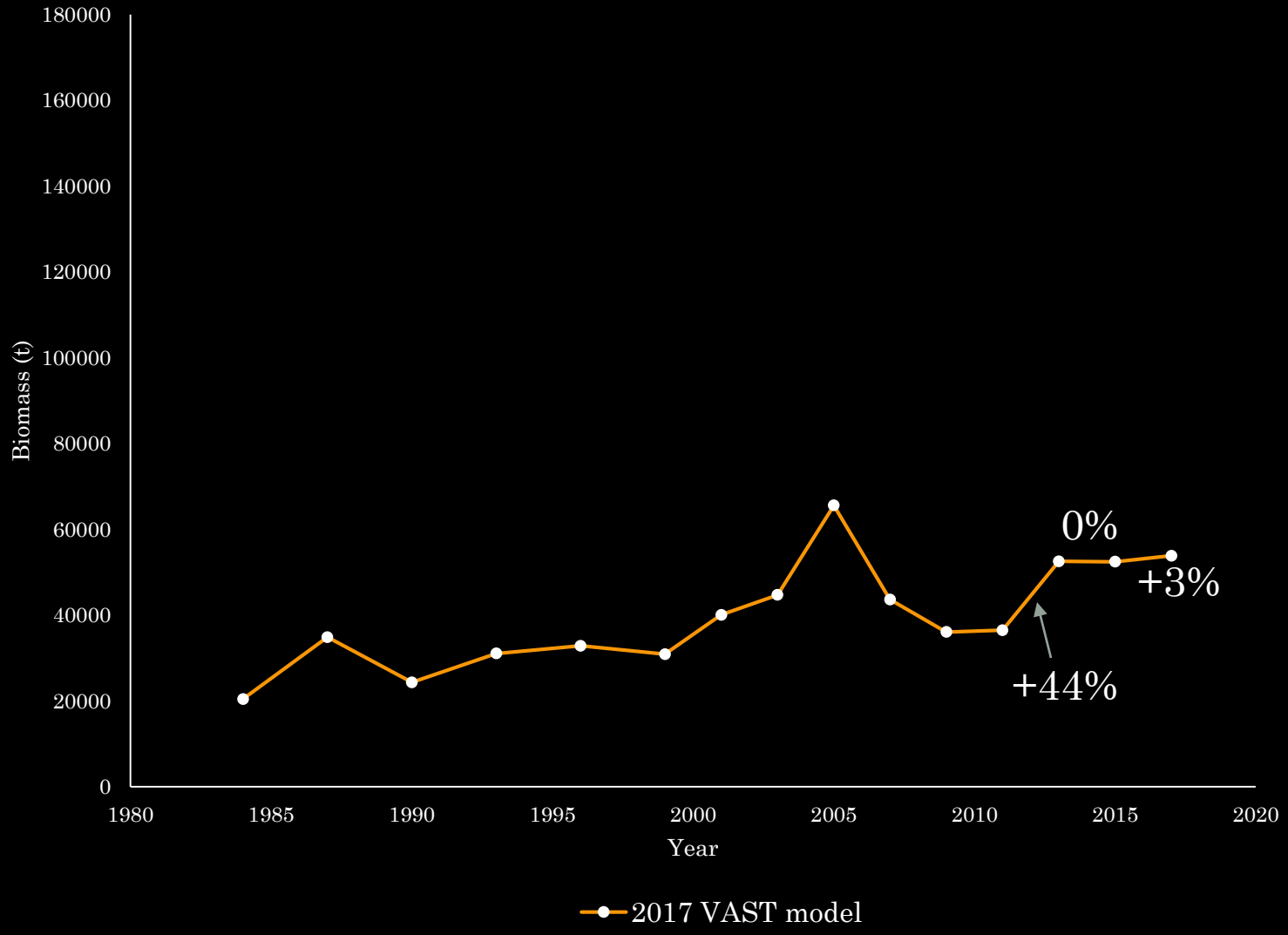
Hauls by area and year:

	WGOA	CGOA		EGOA		Total Dusky	Total
Year	Shumagin	Chirikof	Kodiak	EEY/SEO	WY	Hauls	Hauls
2013	16	22	46	4	10	98	592
2015	17	32	61	4	11	125	836
2017	13	23	47	11	10	104	576

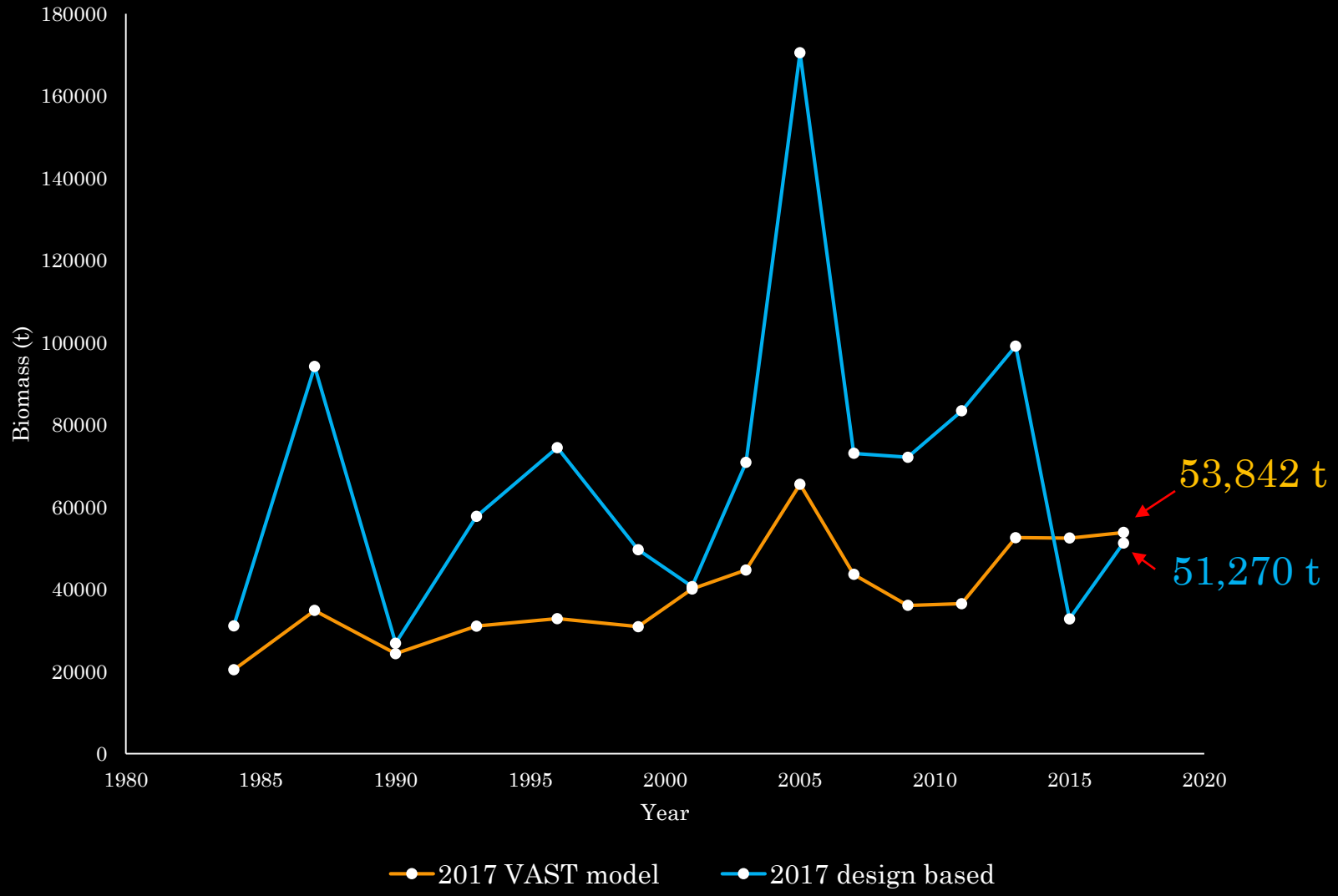
Dusky Trawl Survey Design Based Biomass



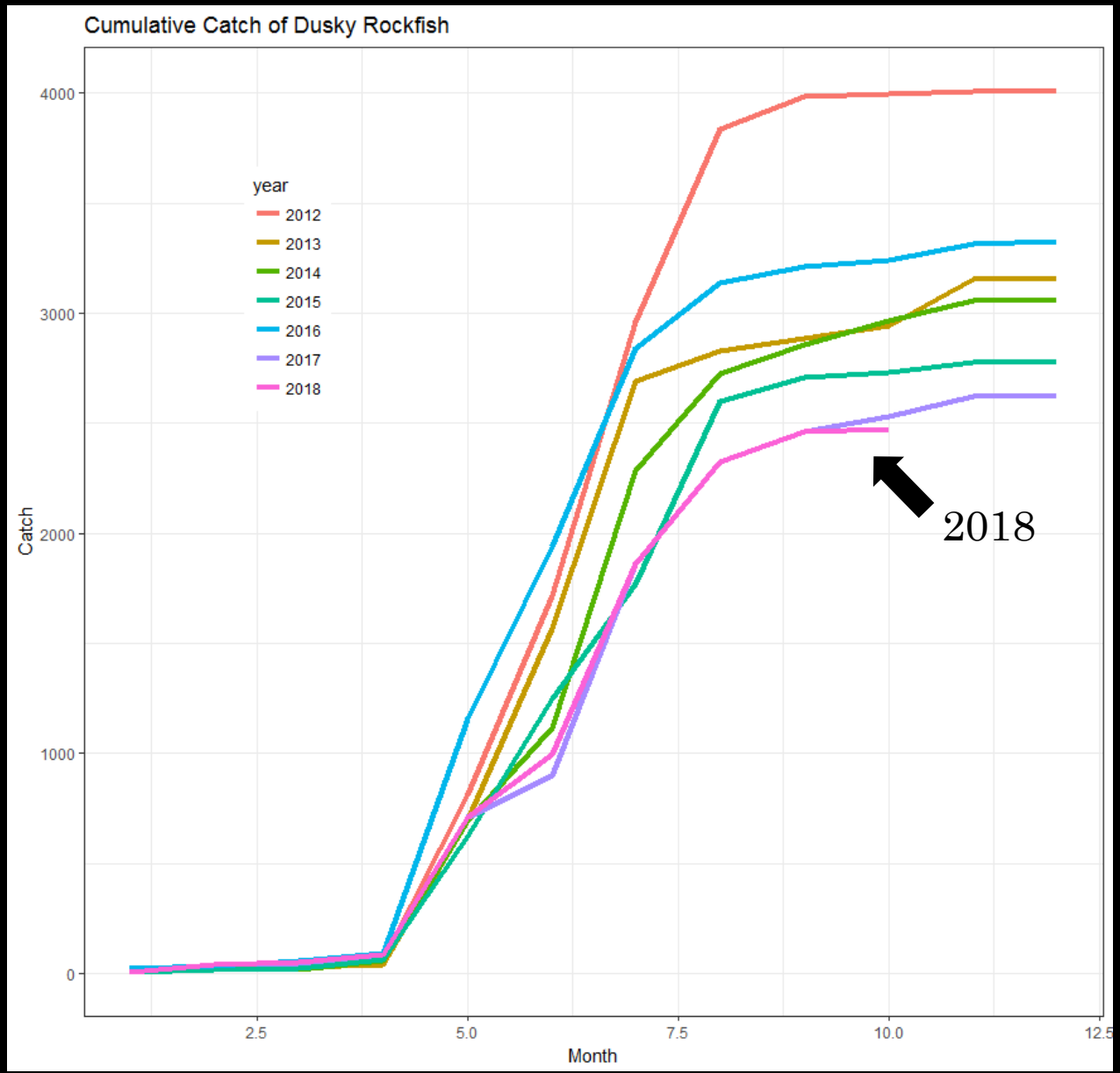
Dusky Trawl Survey VAST Biomass



Dusky Trawl Survey Biomass

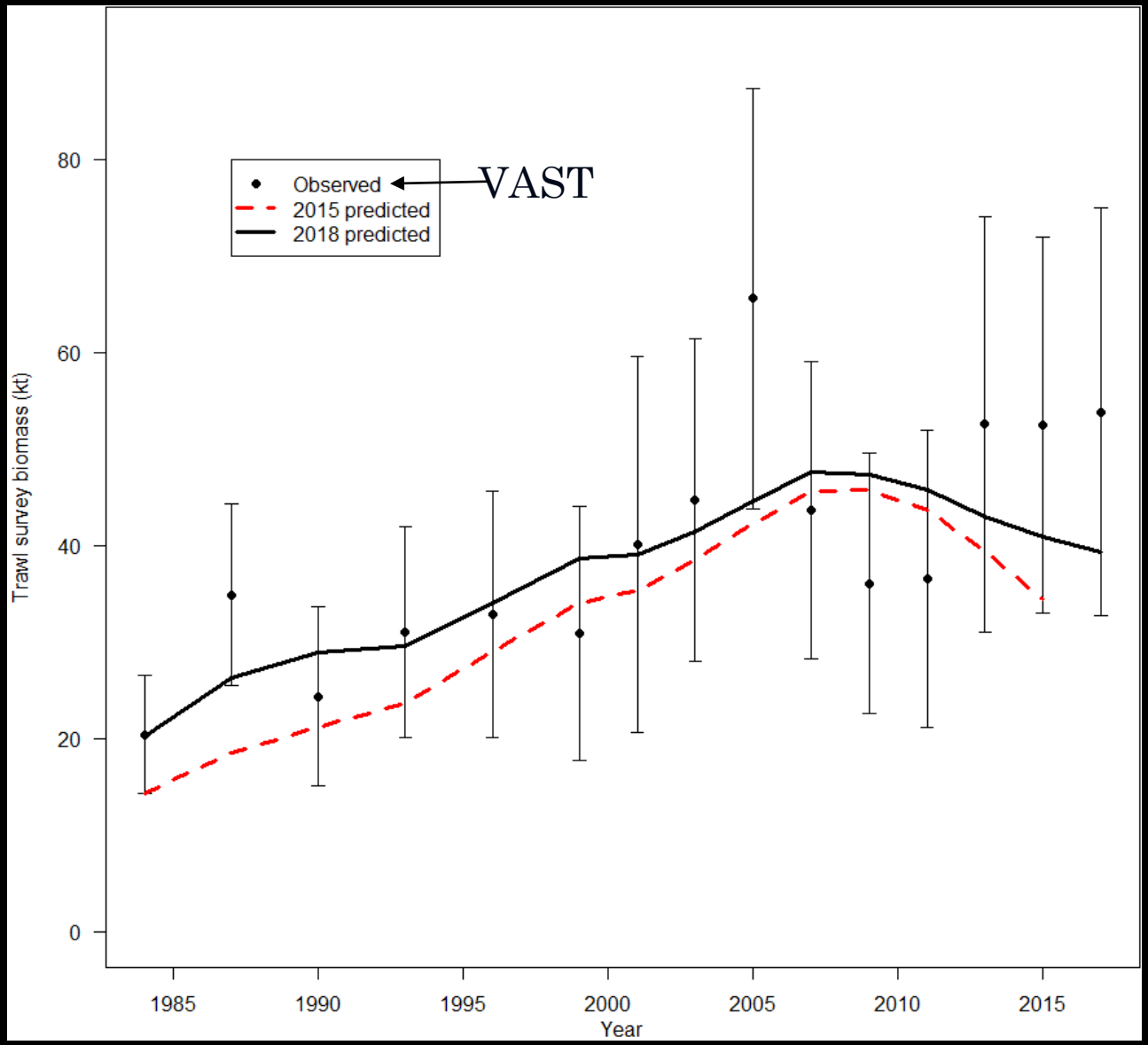


Cumulative catch

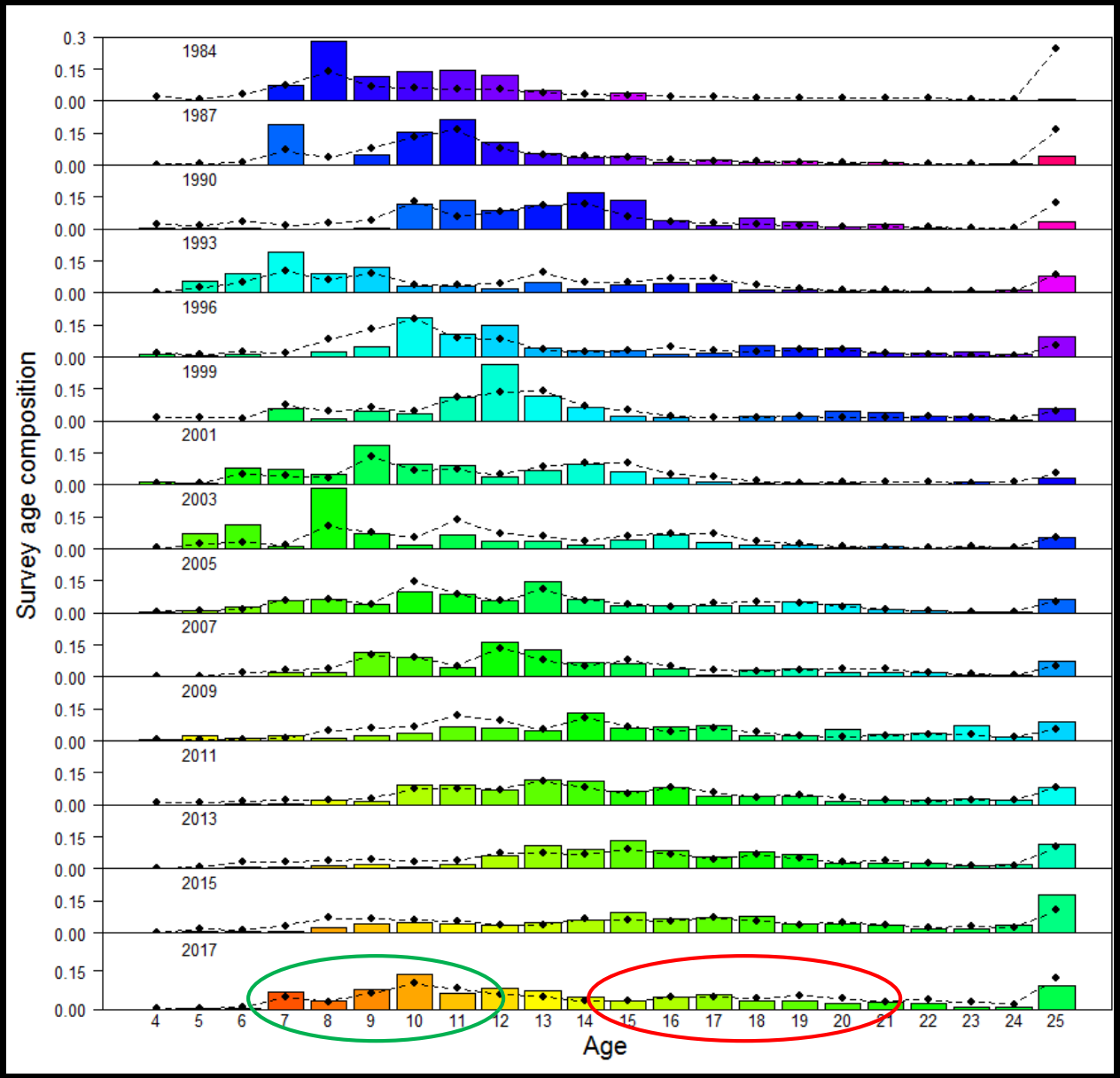


Model Results

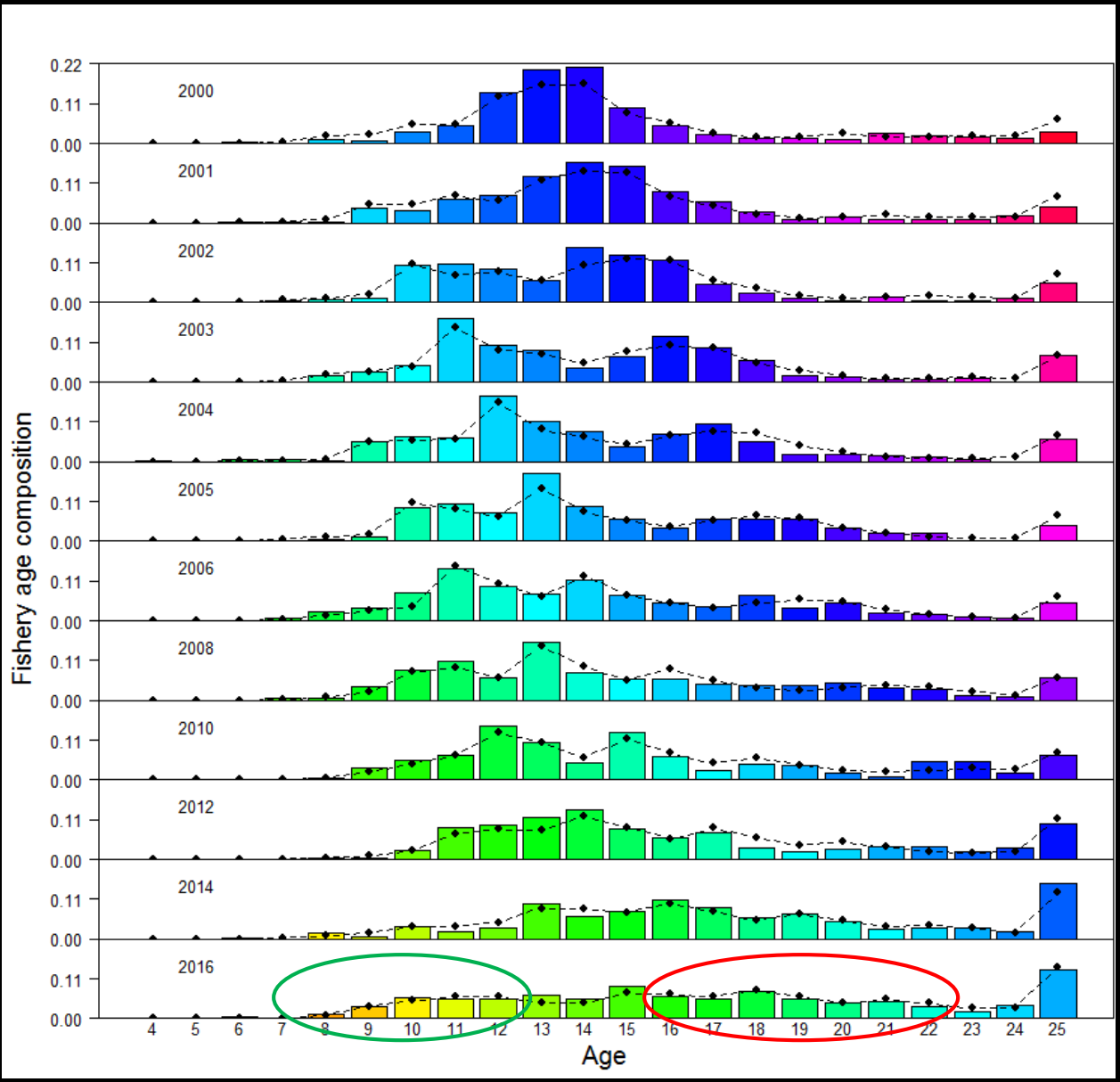
Geospatial survey index fits



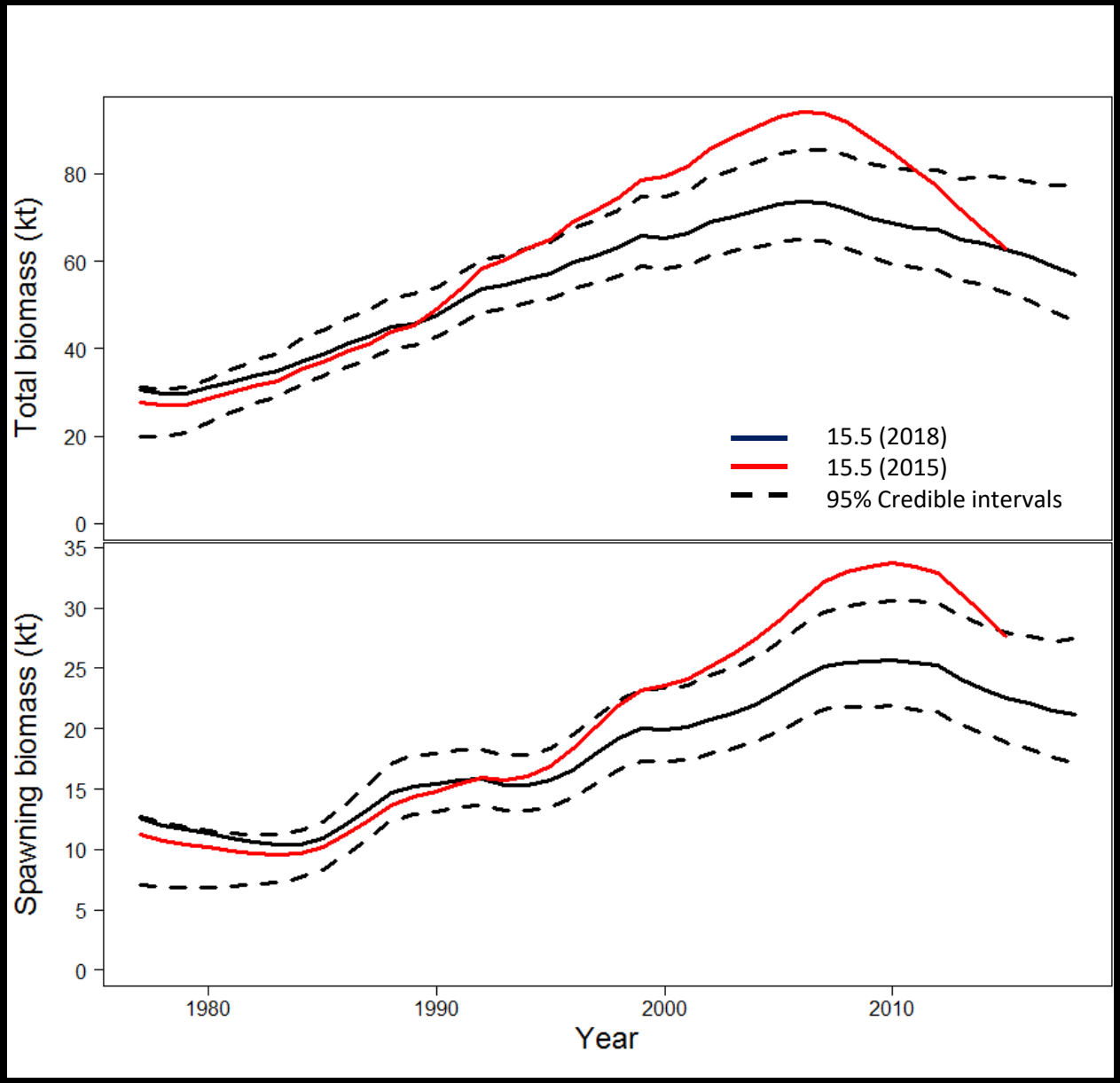
Survey age comps



Fishery age comps



Total & Spawning Biomass



Catchability - q

2018 model:

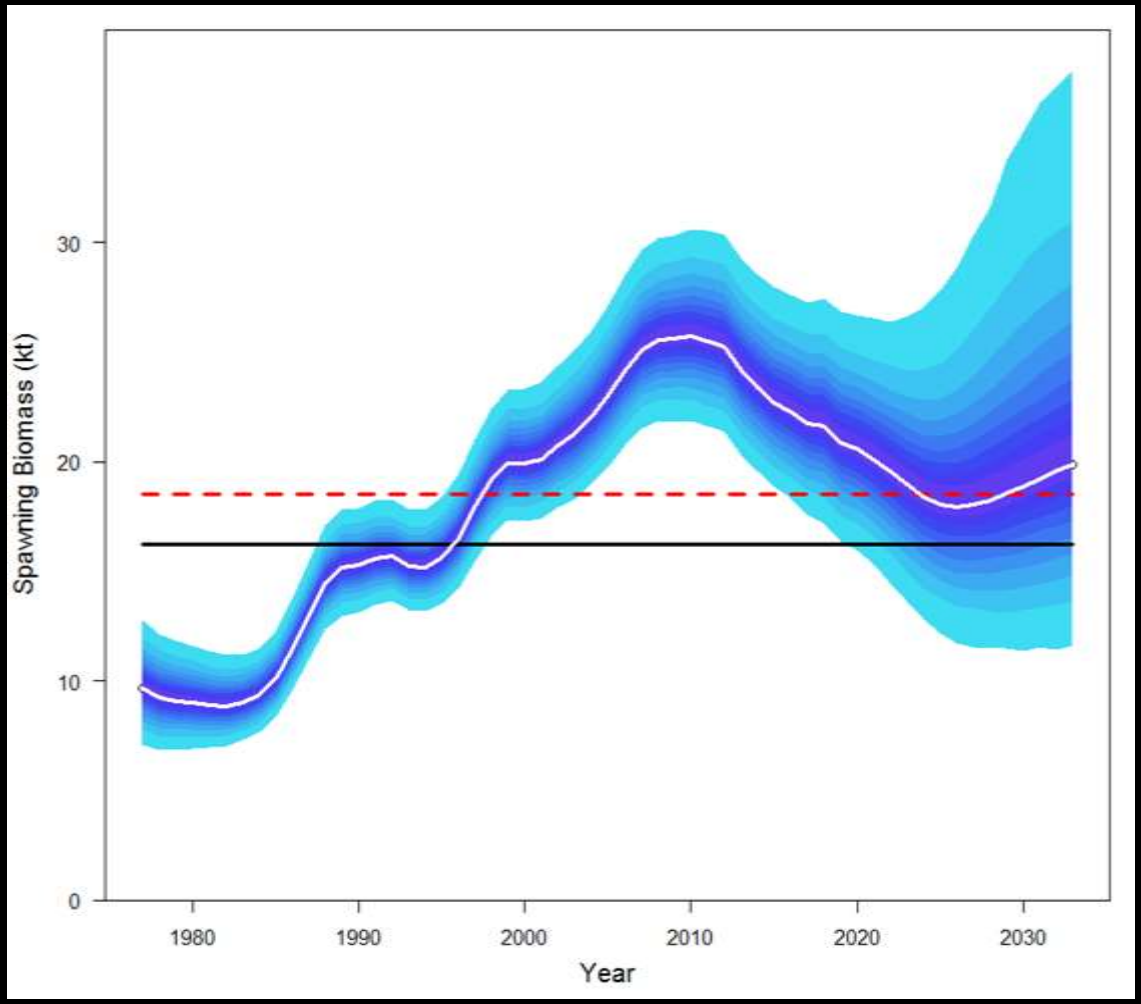
- Trawl catchability: 0.81
- Sigr: 0.83
- log_mean_rec: 0.89

2015 model:

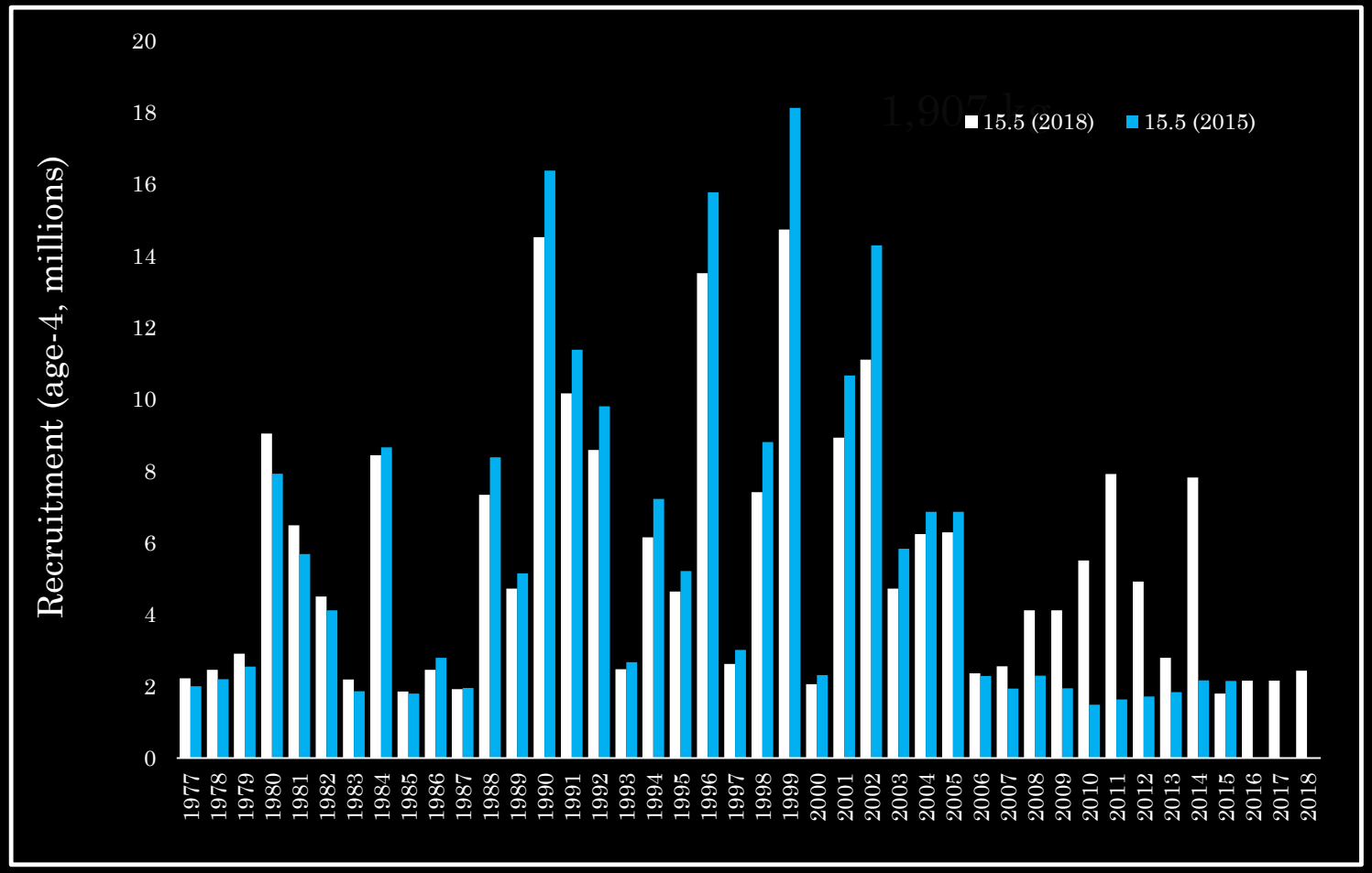
- Trawl catchability: 0.59
- Sigr: 0.92
- log_mean_rec: 0.76

Dusky q from Trawlable/Untrawable Manuscript (Jones et al.): **0.64**

SB uncertainty



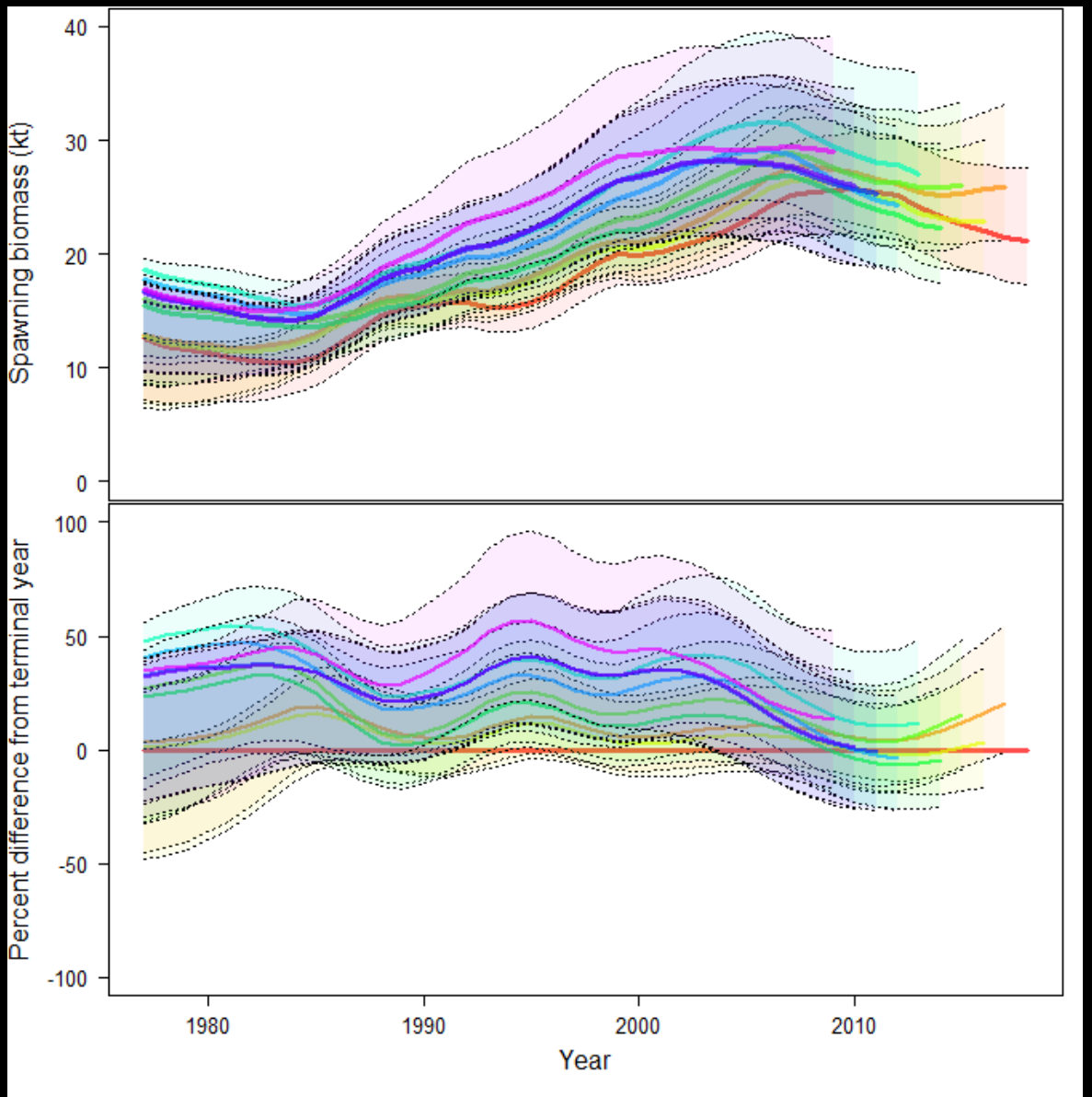
Recruitment



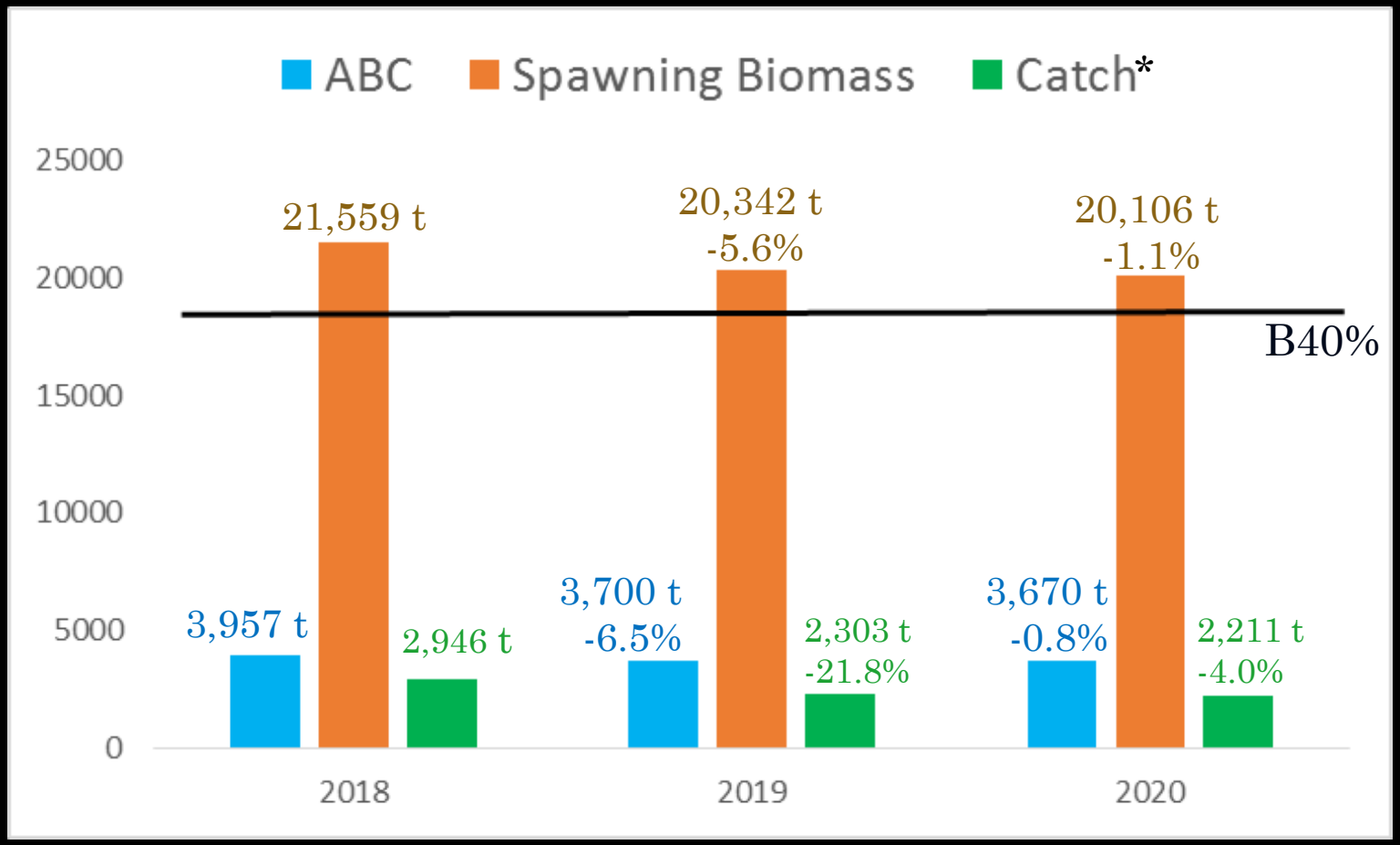
Retrospective

Mohn's rho – slight improvement

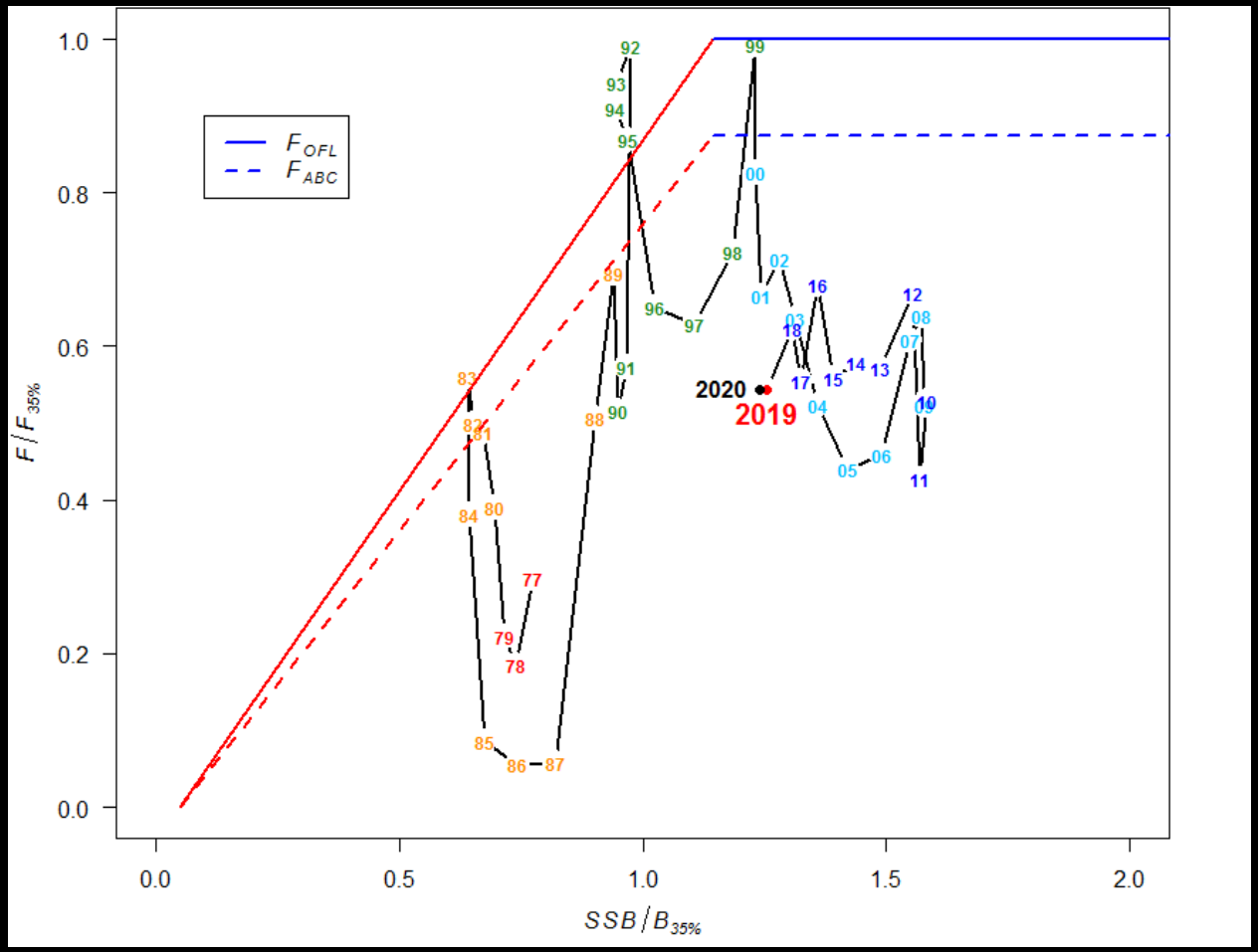
ρ 2018: 0.06
ρ 2015: 0.10



Dusky Rockfish 3 year summary



*Estimated catch of 2,946 t for 2018, and estimates of 2,303 t and 2,211 t used in place of maximum permissible ABC for 2019 and 2020



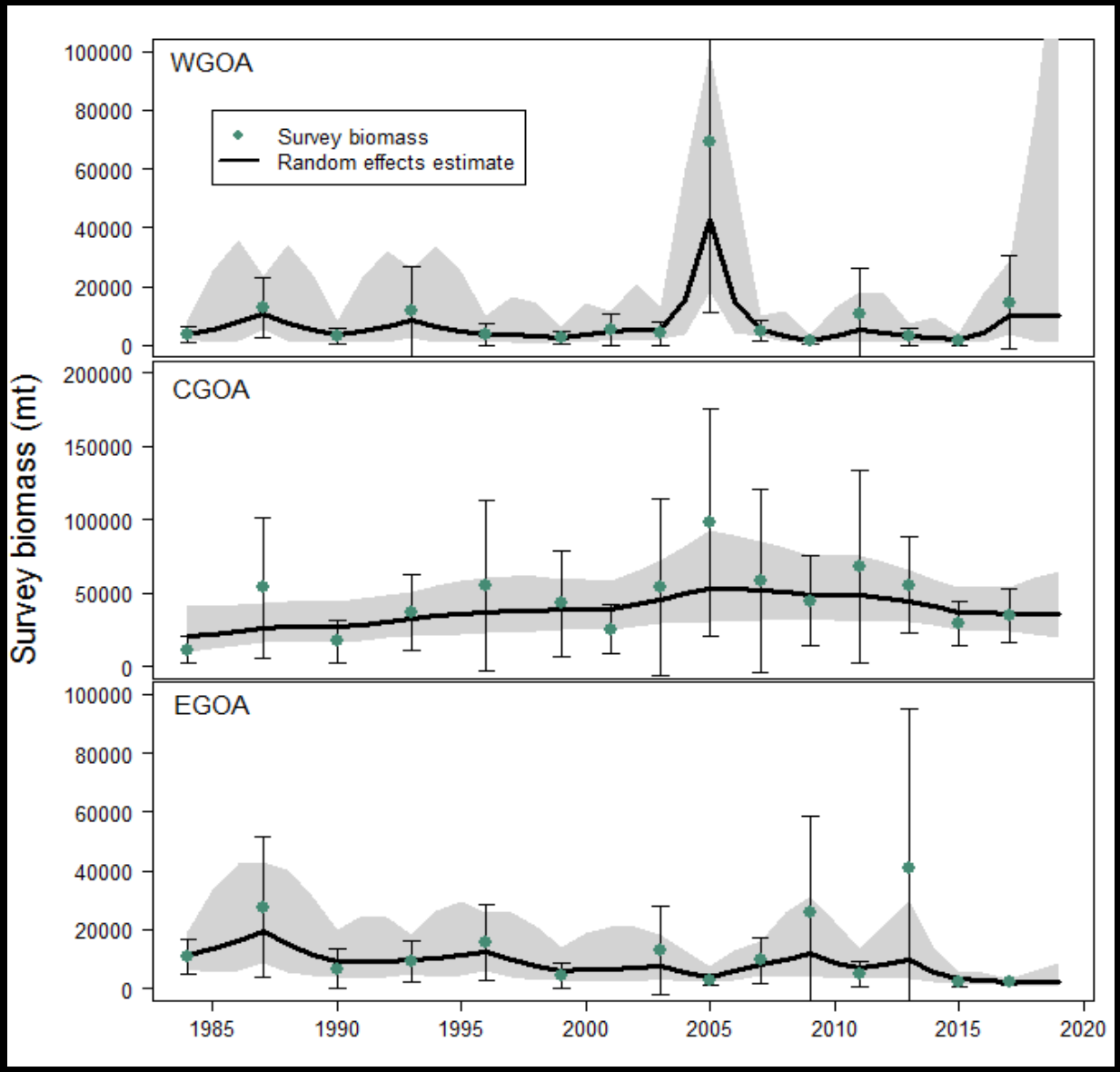
- Not overfished, not overfishing.
- Tier 3a.

Dusky Apportionment

	Western	Central	Eastern	[Eastern sub-areas]		Total
Area Apportionment	21.1%	74.7%	4.2%	W.Yak	EY/SE	100%
2019 ABC (t)	781	2,764	155	95	60	3,700
2020 ABC (t)	774	2,742	154	94	60	3,670

	Percent (%) by area:			
ABC Year	WG	CG	EG	ABC
2019	21.1	74.7	4.2	3957
2016	3.7	88.5	7.8	4686
2014	5.8	65.3	28.9	5486
2012	8.0	75.2	16.8	5118
2010	12.9	64.2	22.9	5048
2008	19.2	69.4	11.4	4719
2006	26.5	60.0	13.5	4885
2005	8.0	67.0	24.0	4056

Apportionment



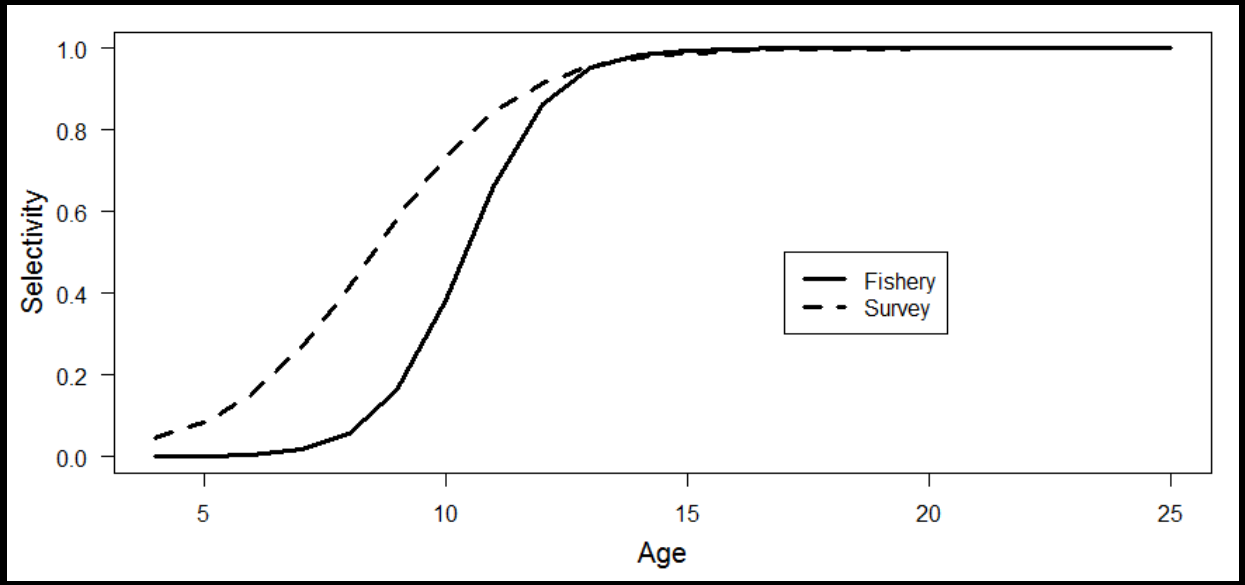
Dusky Summary & Research Priorities

- Will see if anything comes out of the rockfish CIE that would be beneficial for duskies.
- If we can get geostatistical model-based area-specific biomass estimates, could explore using them for apportionment instead of the RE model applied to the design-based estimator. (is there a group working on this?)
- Continue to track VAST discussions and test any recommended changes, as needed.

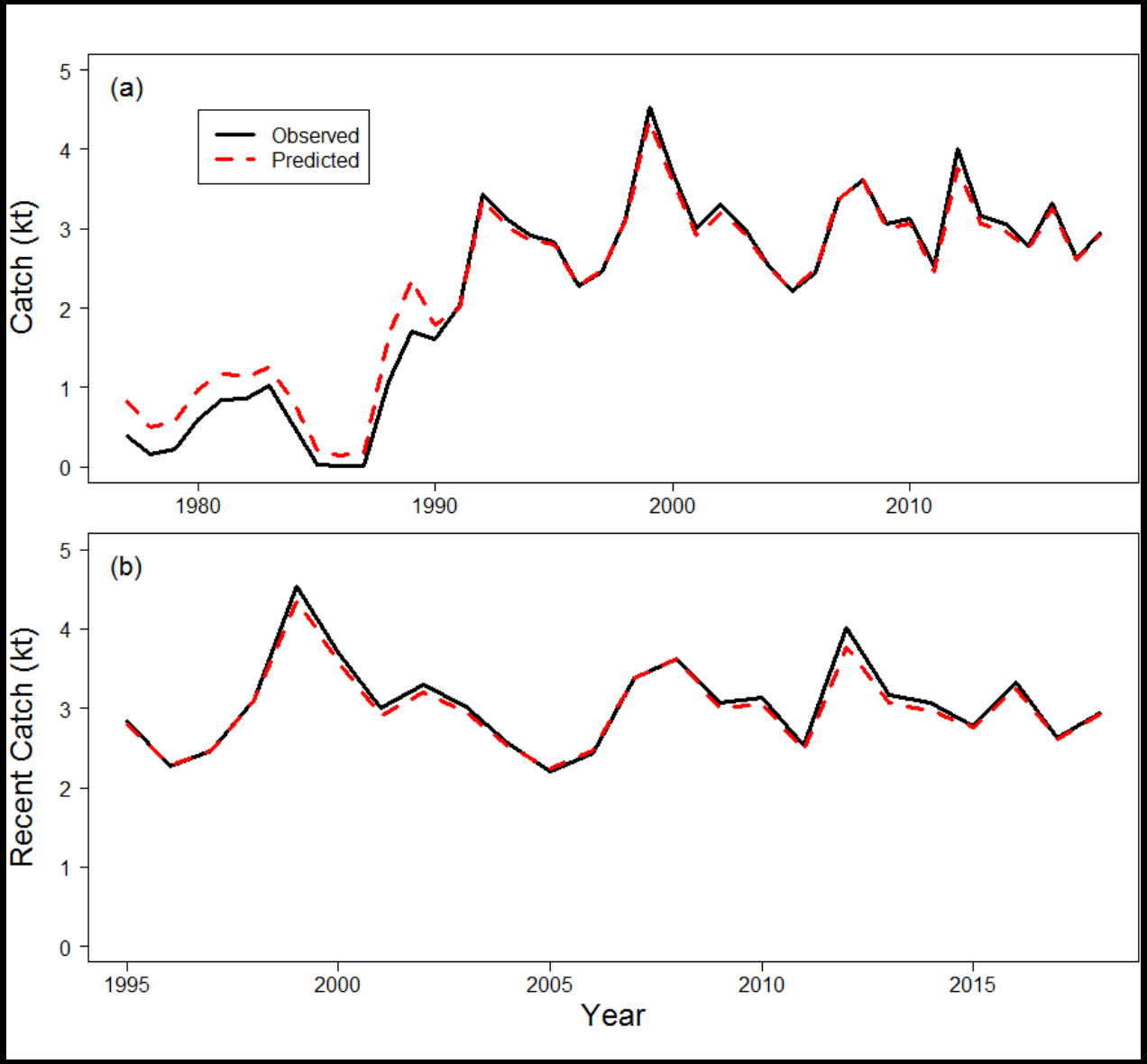
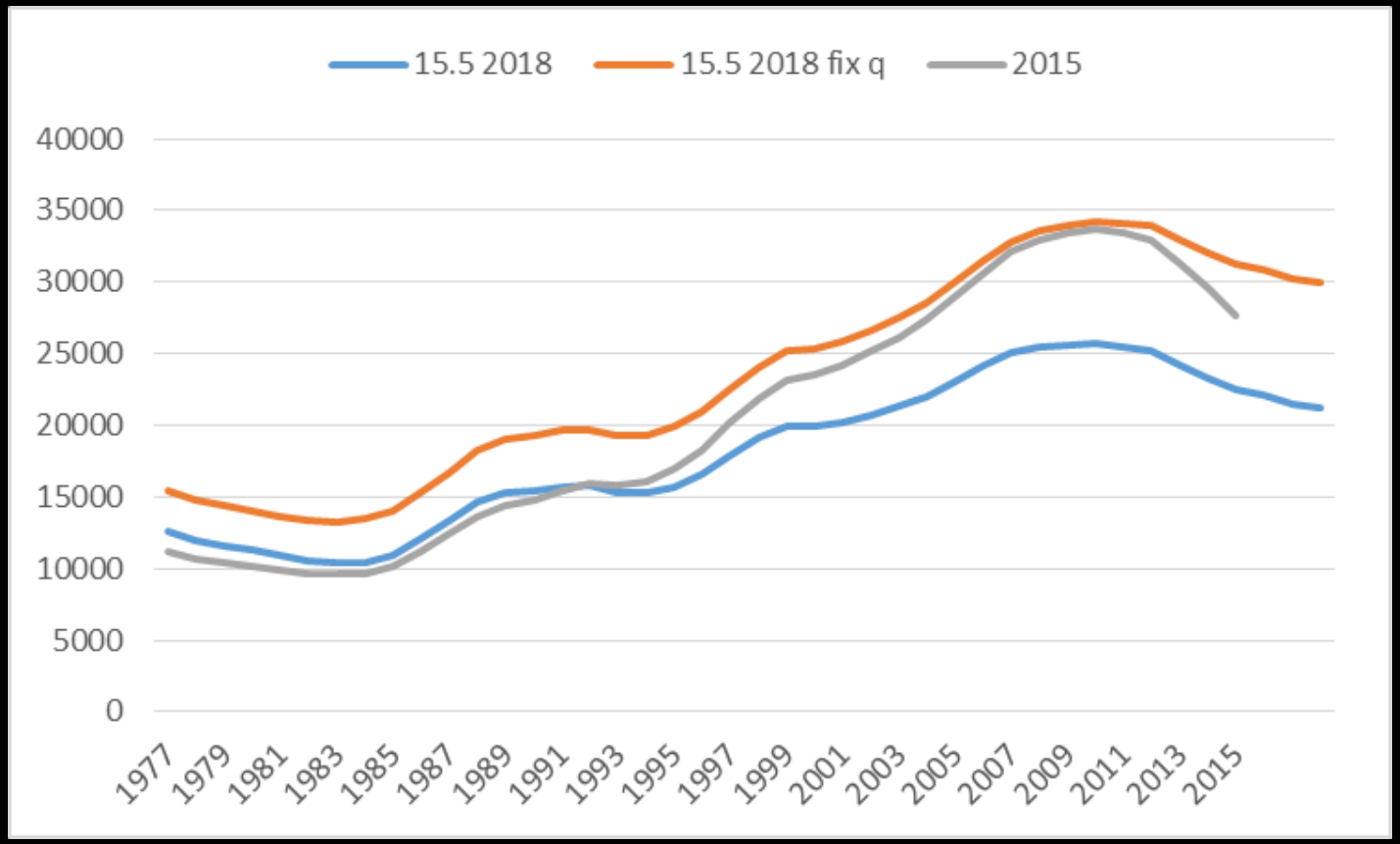
Fin.

Bonus slides follow…

Selectivity



Catch


(a)
Observed
Predicted
Catch (kt)
0
1
2
3
4
5
1980
1990
2000
2010
(b)
Recent Catch (kt)
0
1
2
3
4
5
1995
2000
2005
2010
2015
Year

Fix q for 2018 at 2015 value: