BSAI OTHER ROCKFISH

GROUNDFISH PLAN TEAM
NOV 2024

JANE SULLIVAN AND IVONNE ORTIZ

BIENNIAL ASSESSMENT IN EVEN YEARS (UPDATE IN 2024)

TIER 5 RANDOM EFFECTS MODEL (MODEL 22)

RECOMMENDATIONS FOR 2025/26:

- BIOMASS 40,559 T (-26% FROM 52,733 T IN 2023/24)
- OFL 1,406 T (-16% FROM 1,680 T IN 2023/24)
- ABC 1,054 T (-16% FROM 1,260 T IN 2023/24)

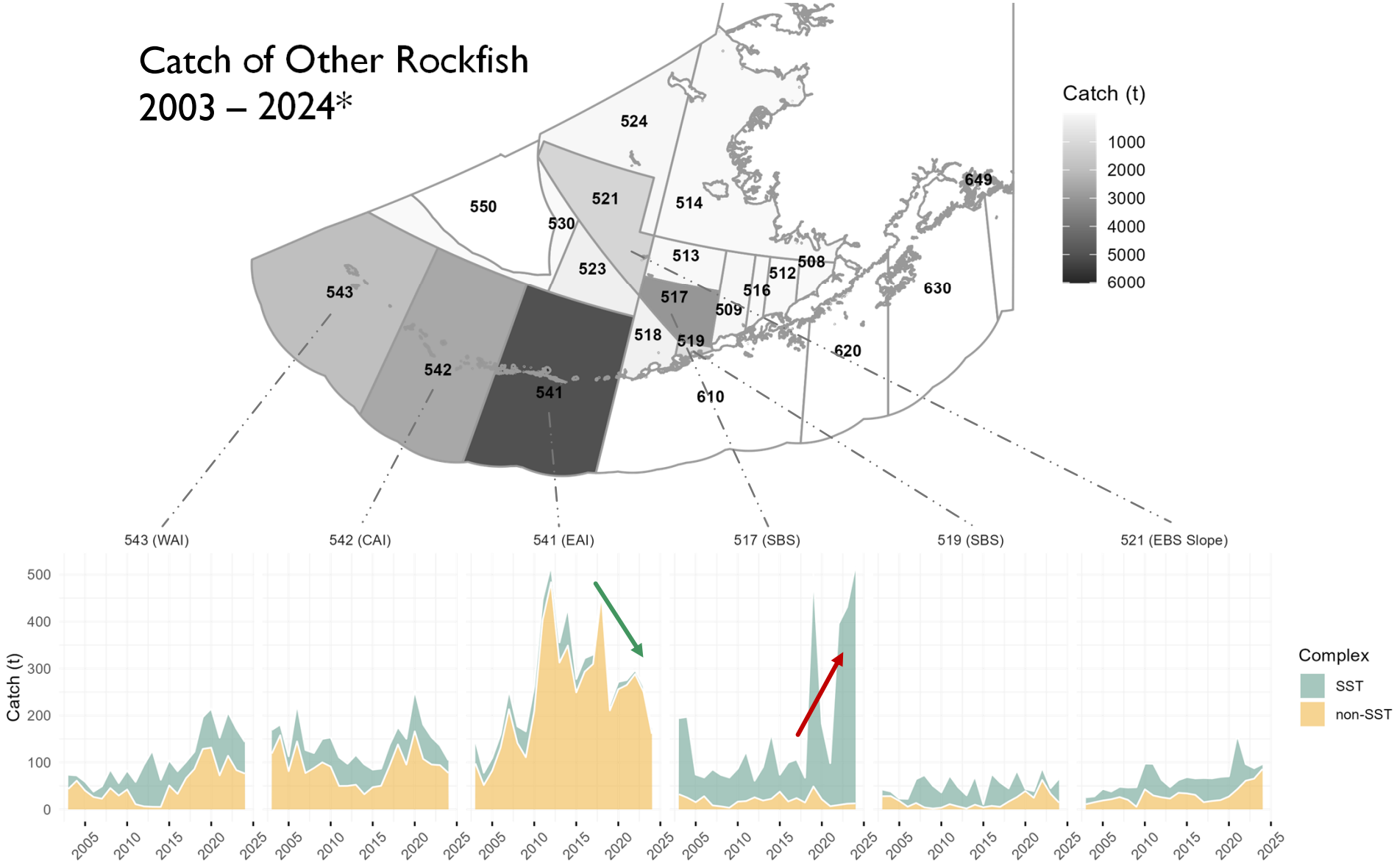
Photo courtesy of Andrea Munoz-Ledo

WHO ARE THE "OTHER" ROCKFISH?

- Everybody *except* POP, northern, shortraker, and rougheye/blackspotted rockfish
- Shortspine thornyhead (**SST**), dusky, and at least 11 other *Sebastes* and *Sebastolobus* spp. (**non-SST**)

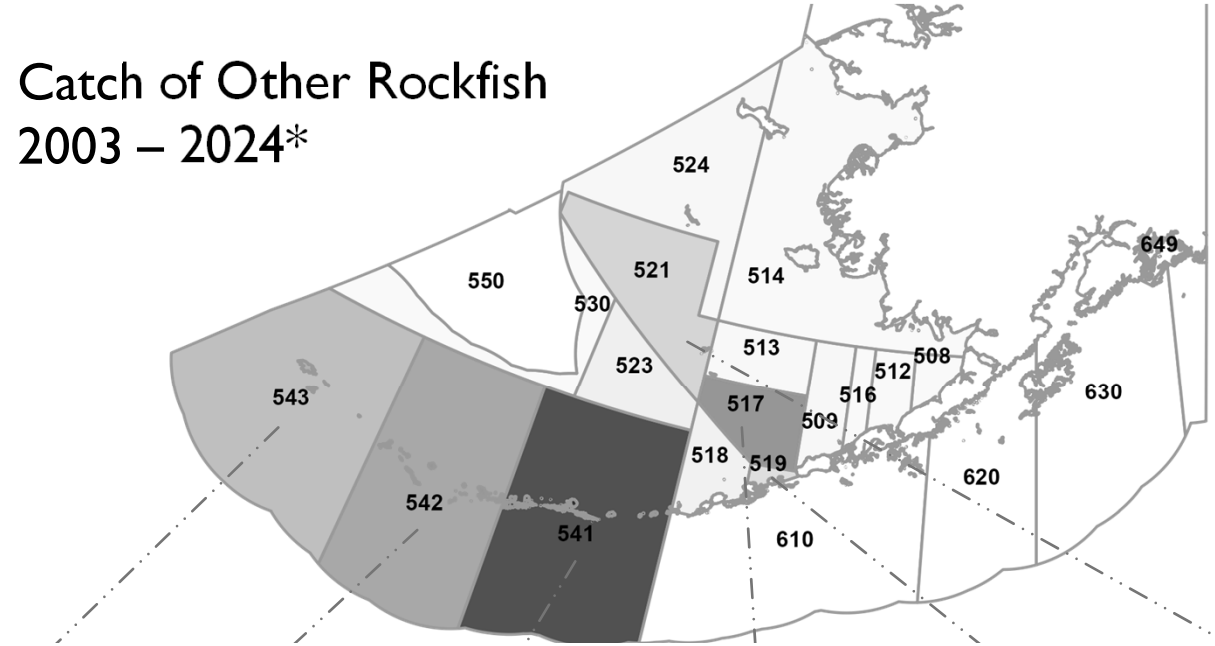
Photos courtesy of Aaron Baldwin

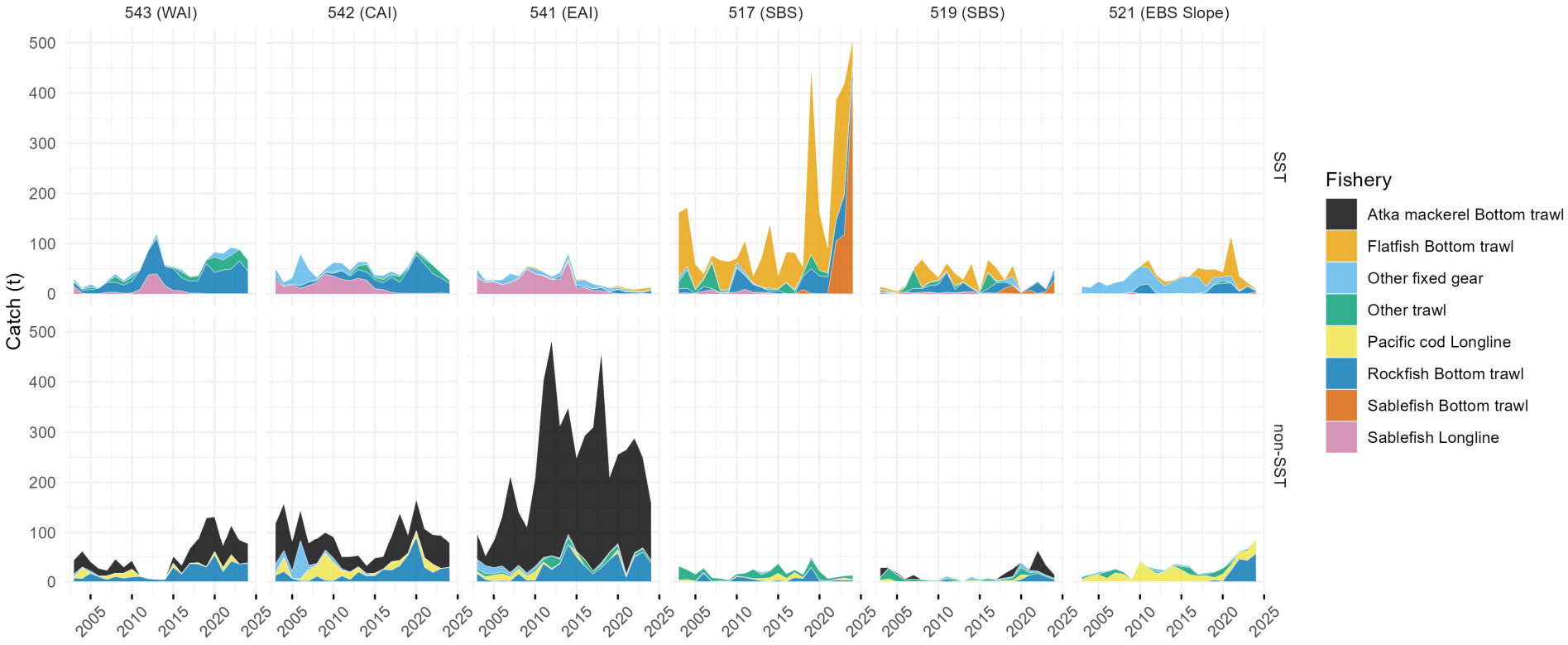
Catch of Other Rockfish
2003 – 2024*

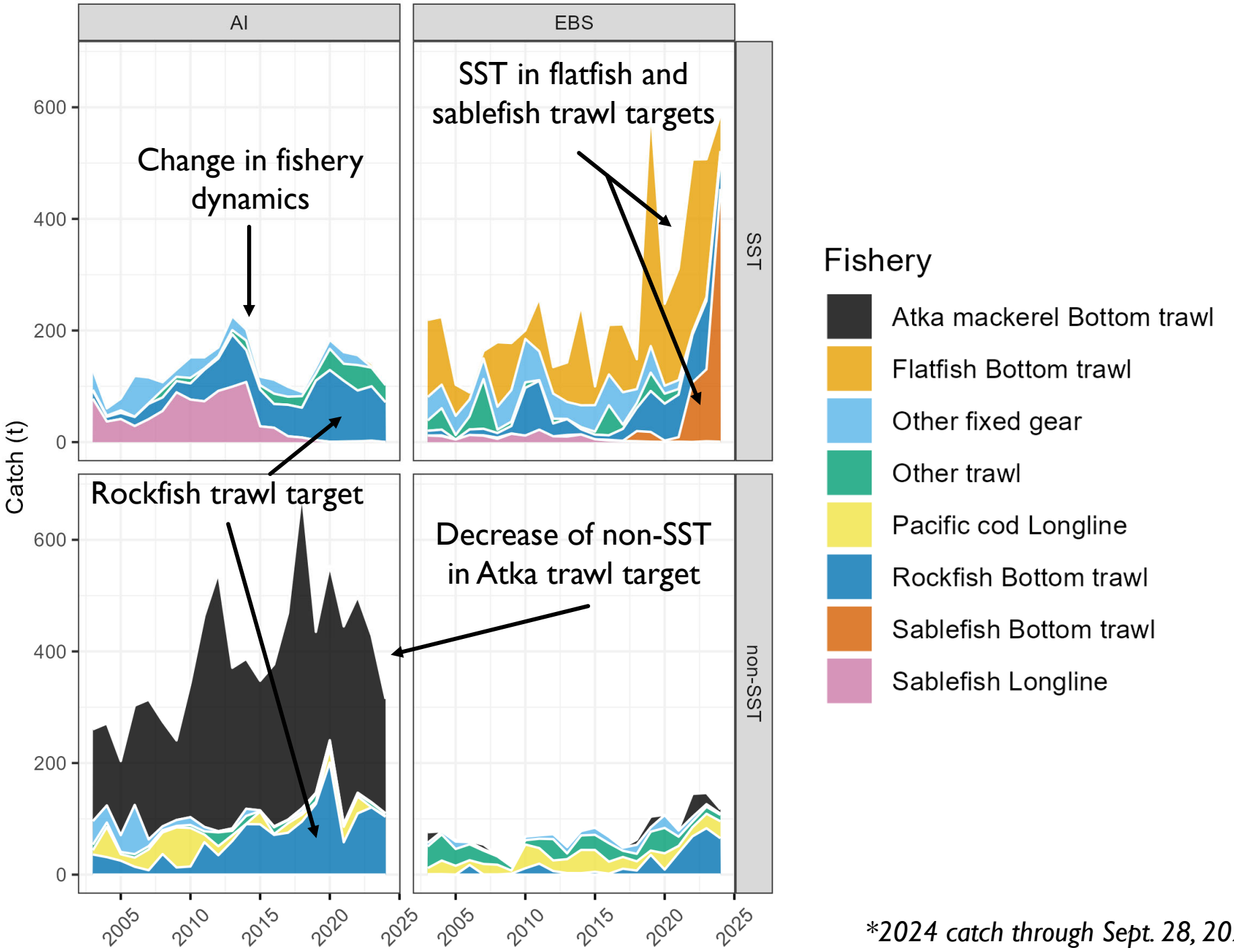


**2024 catch through Sept. 28, 2024*

Catch of Other Rockfish
2003 – 2024*







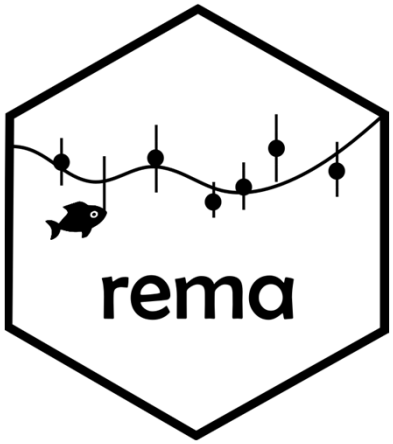
**2024 catch through Sept. 28, 2024*

Other Rockfish catches are often rare events but can add up in high volume fisheries

This photo is an example of a single dusky mixed in with mostly northern rockfish and some Atka mackerel and POP taken during the AI trawl survey

Photo taken by Andrea Munoz-Ledo

ANALYTICAL APPROACH



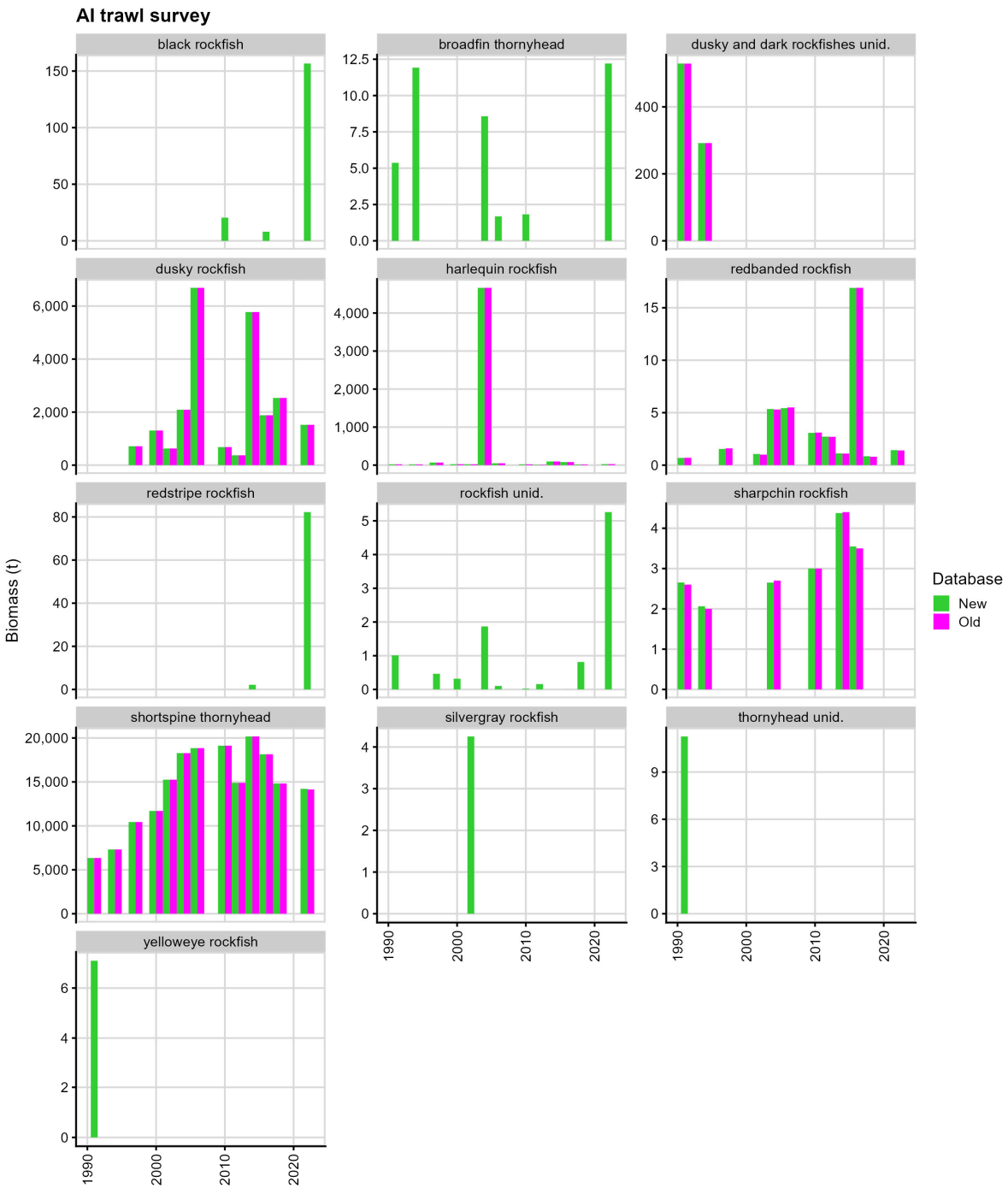
- Split into SST and non-SST
  - SST *M* = 0.03, non-SST *M* = 0.09

- **Model 22**: Two-survey multivariate version of the random effects (REMA) model
  - Bottom trawl surveys in the Aleutians (AI), S. Bering Sea (SBS), eastern Bering Sea (EBS) slope (ended in 2016), and EBS shelf (non-SST only)
  - AFSC longline survey (LLS) relative population weights (RPW) for SST on the EBS slope (~65% of total biomass)

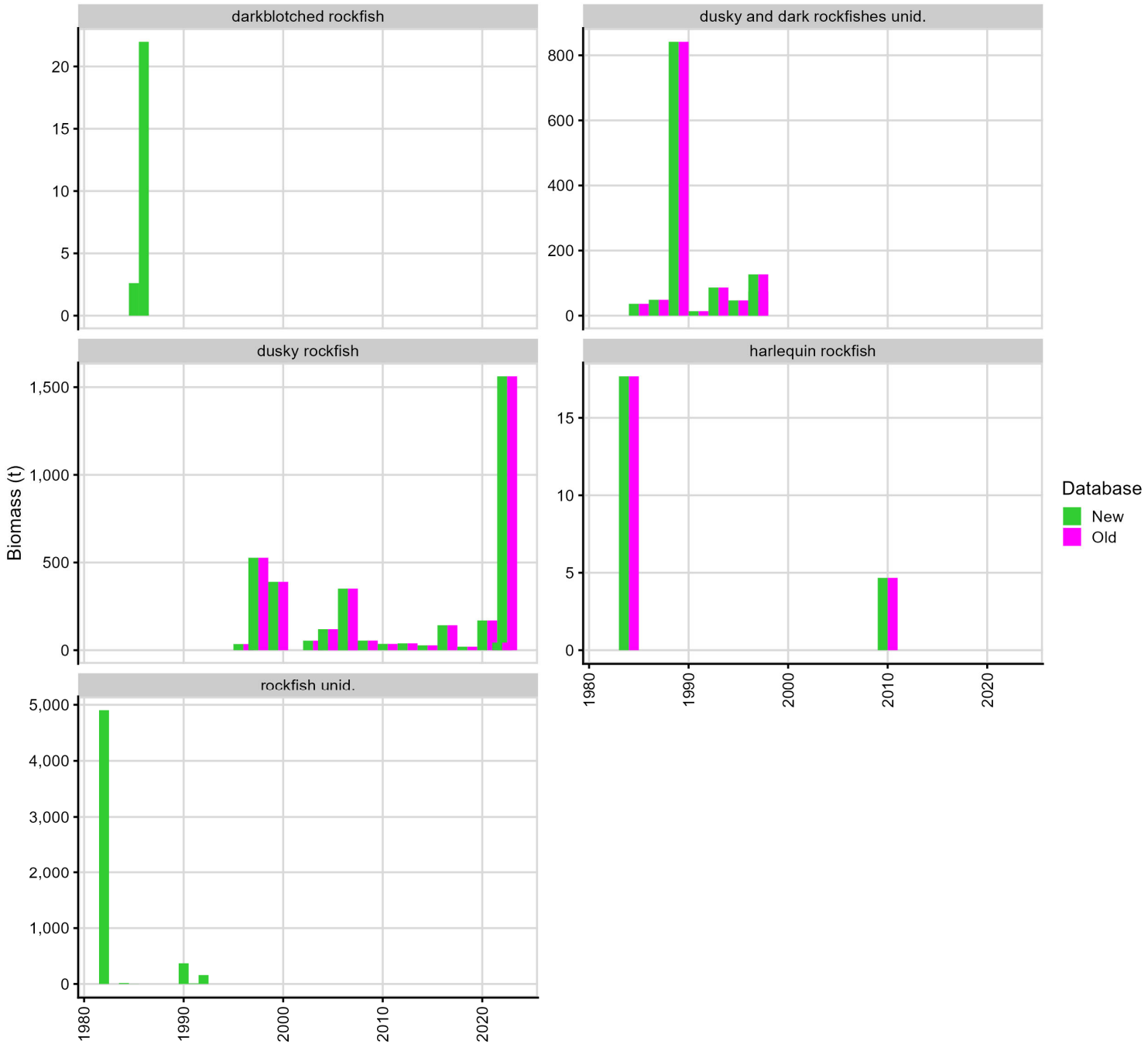
DATA UPDATES (TRAWL SURVEY BIOMASS)

ZACK OYAFUSO, EMILY MARKOWITZ, NED LAMAN, DUANE STEVENSON, MATT CALLAHAN

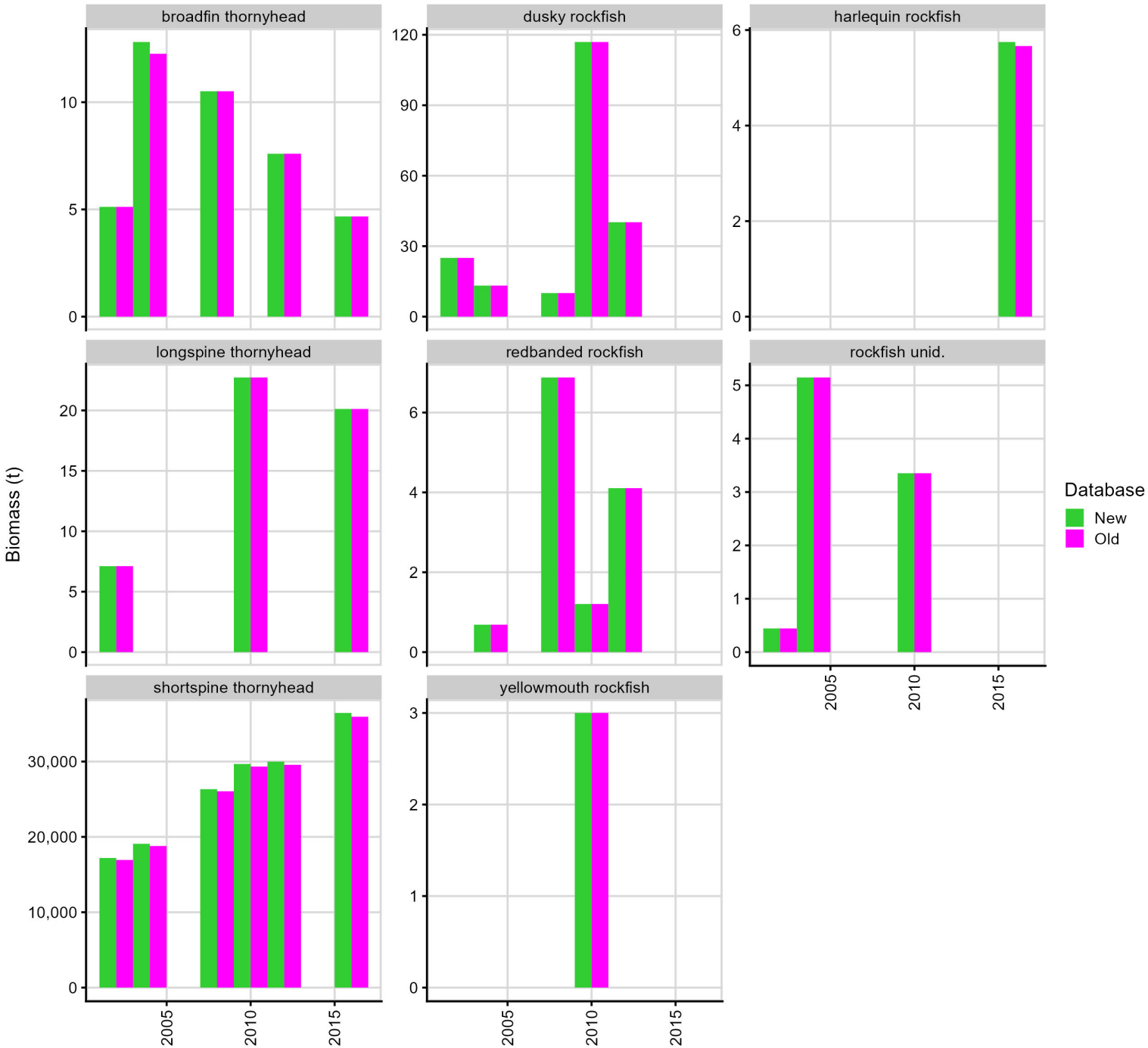
In 2024, the Groundfish Assessment Program updated their database tables, which historically were limited to a predefined set of species that did not include biomass estimates for all Other Rockfish species. The new database now includes biomass estimates for all species. All surveys exhibited small changes in biomass/variance estimates for some species in some years due to rounding.


AI trawl survey
black rockfish
broadfin thornyhead
dusky and dark rockfishes unid.
dusky rockfish
harlequin rockfish
redbanded rockfish
redstripe rockfish
rockfish unid.
sharpchin rockfish
shortspine thornyhead
silvergray rockfish
thornyhead unid.
yelloweye rockfish
Biomass (t)
Database
New
Old
1990
2000
2010
2020

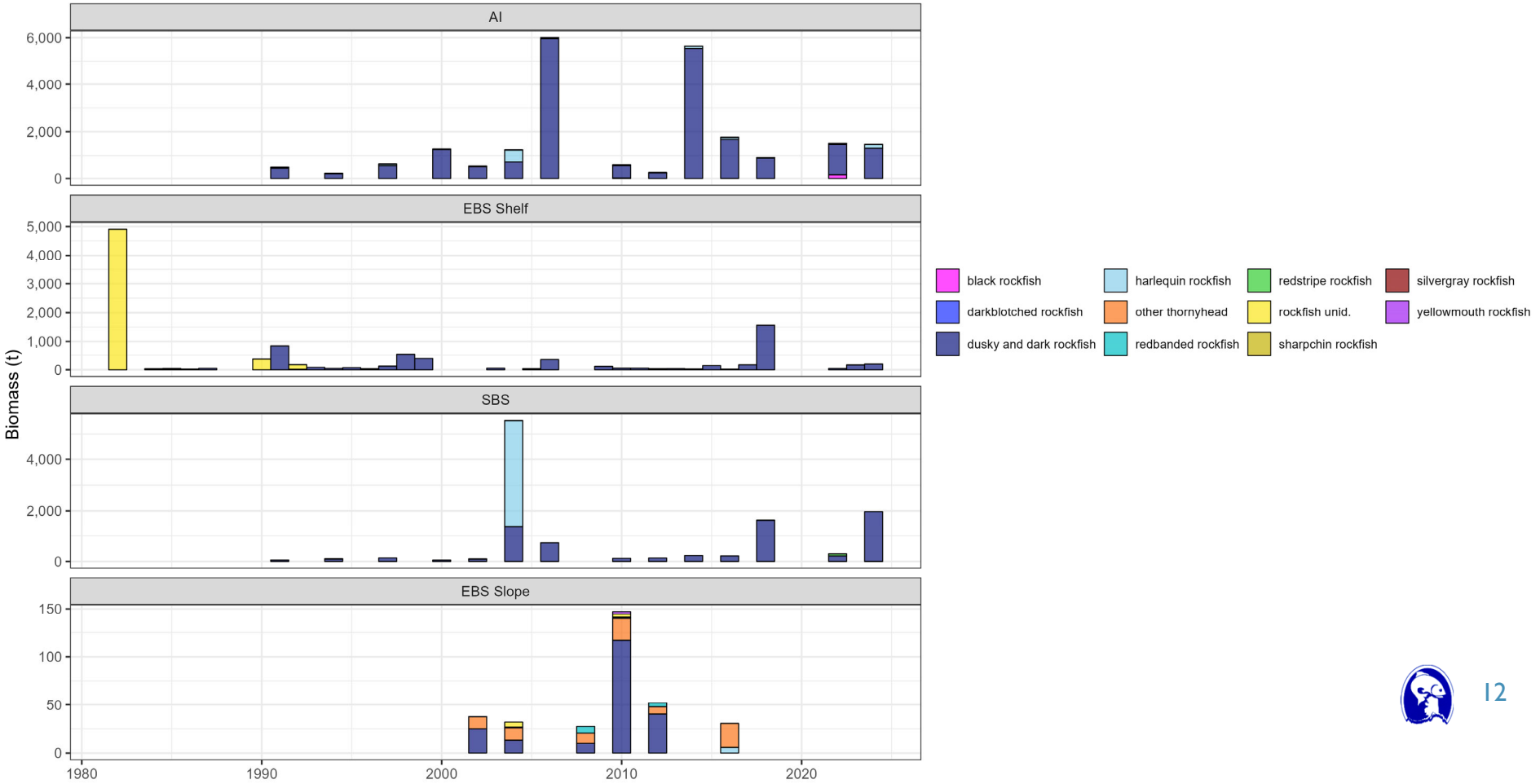
EBS Shelf trawl survey



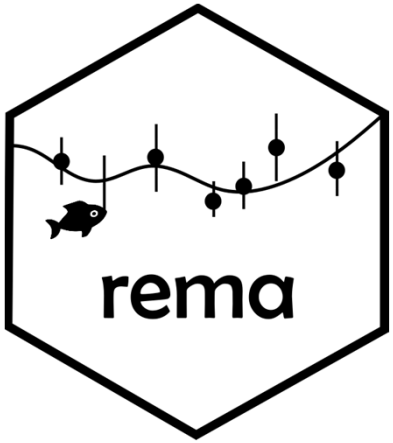
EBS Slope trawl survey

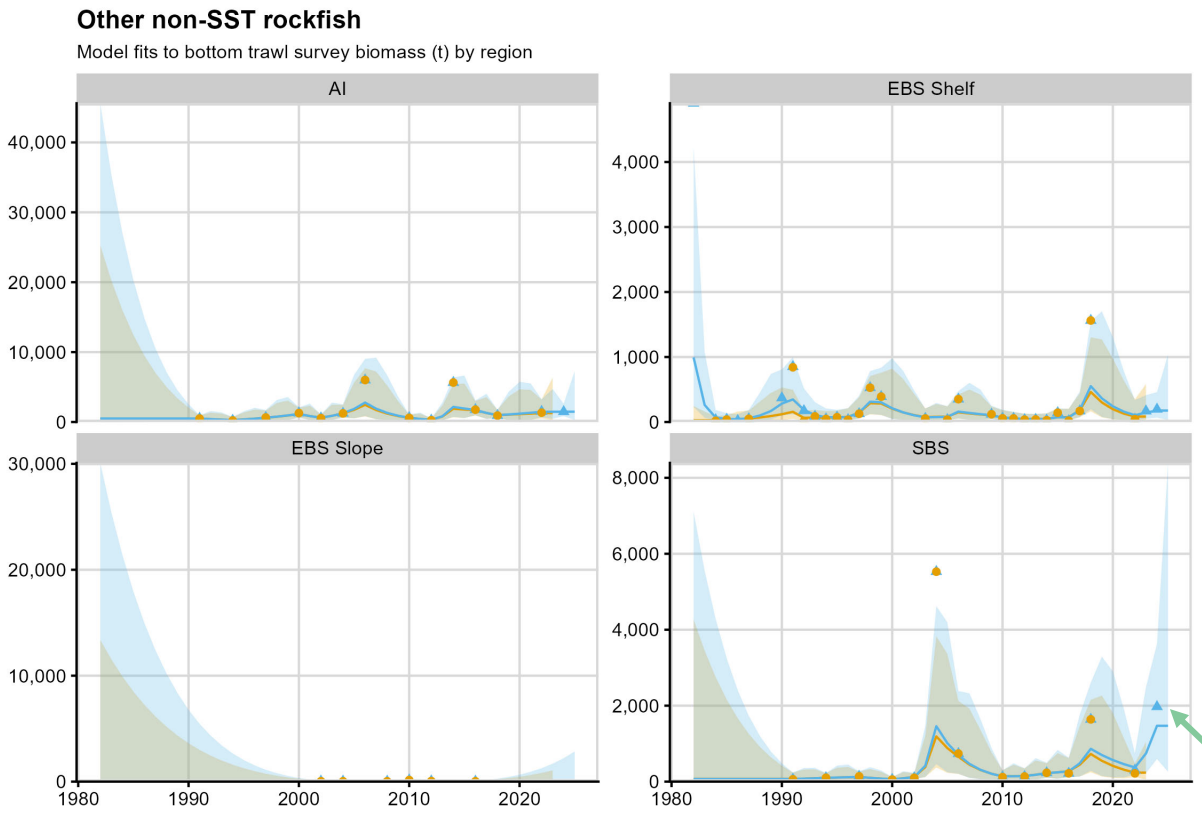


DETAILED NON-SST SURVEY BIOMASS



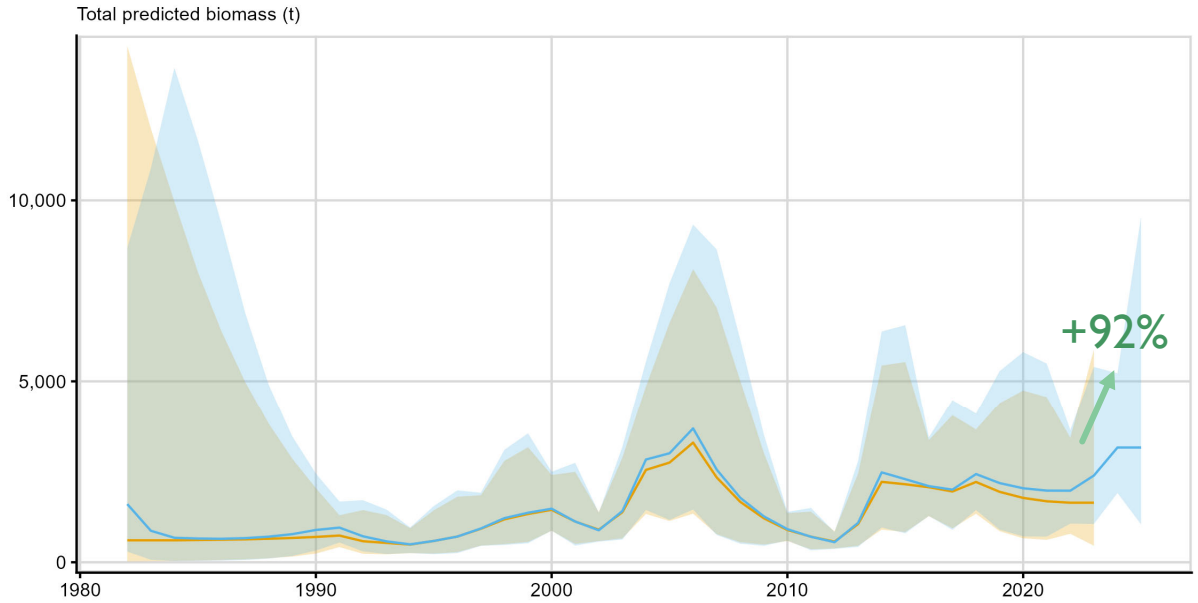
RESULTS





Indices for non-SST are highly variable and uncertain

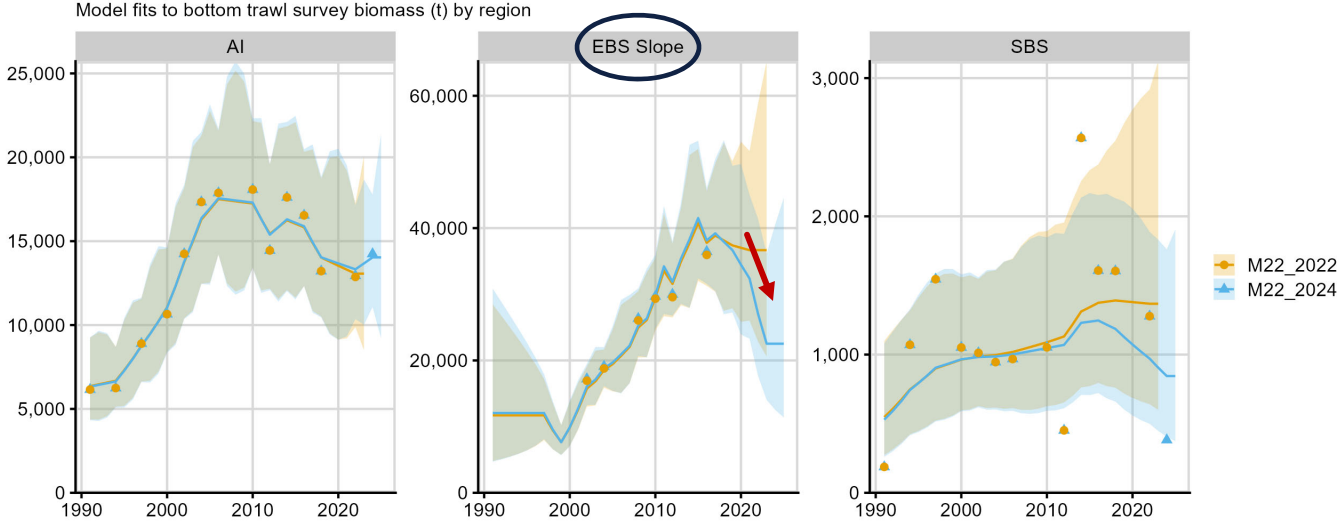
All dusky rockfish



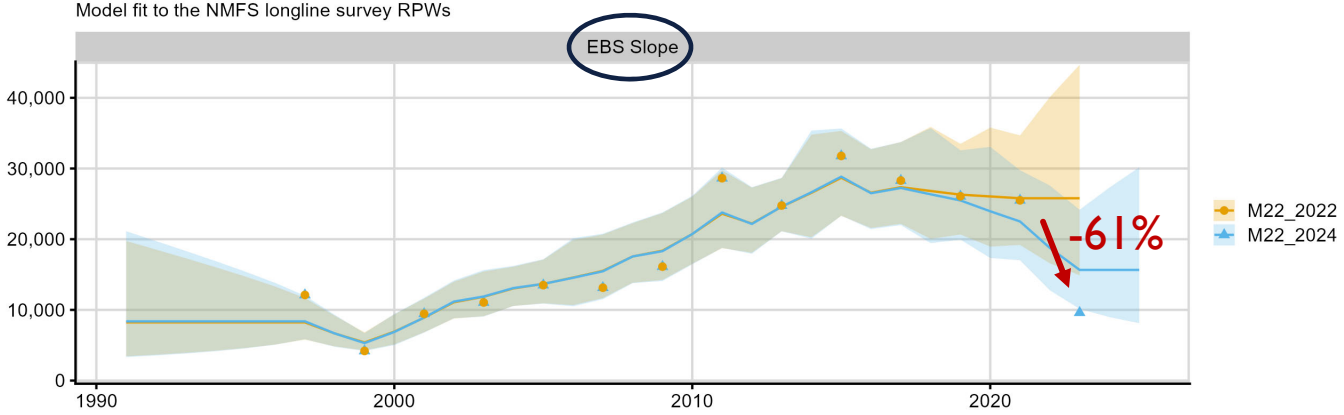
M22_2022=1,635 t
M22_2024=3,151 t

Shortspine thornyhead (SST)

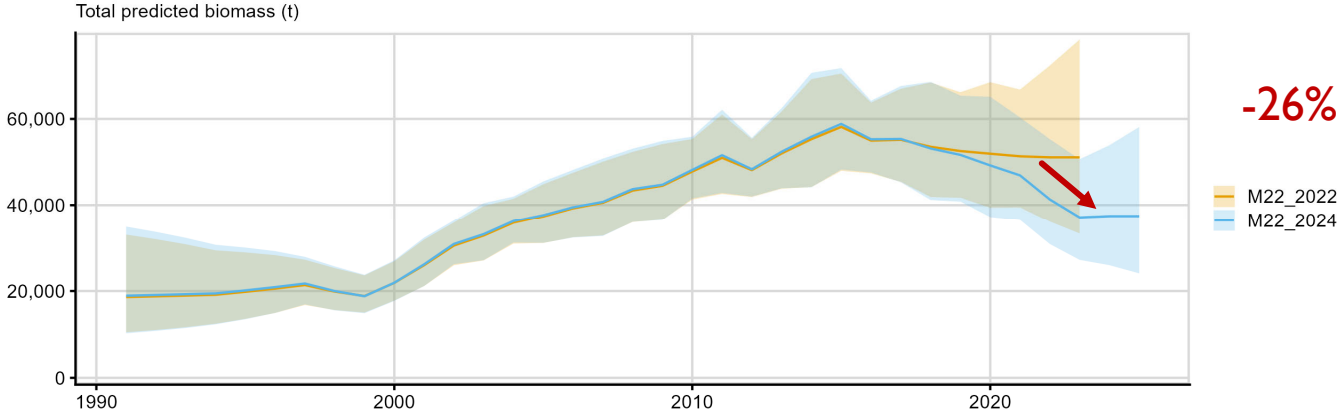
Model fits to bottom trawl survey biomass (t) by region



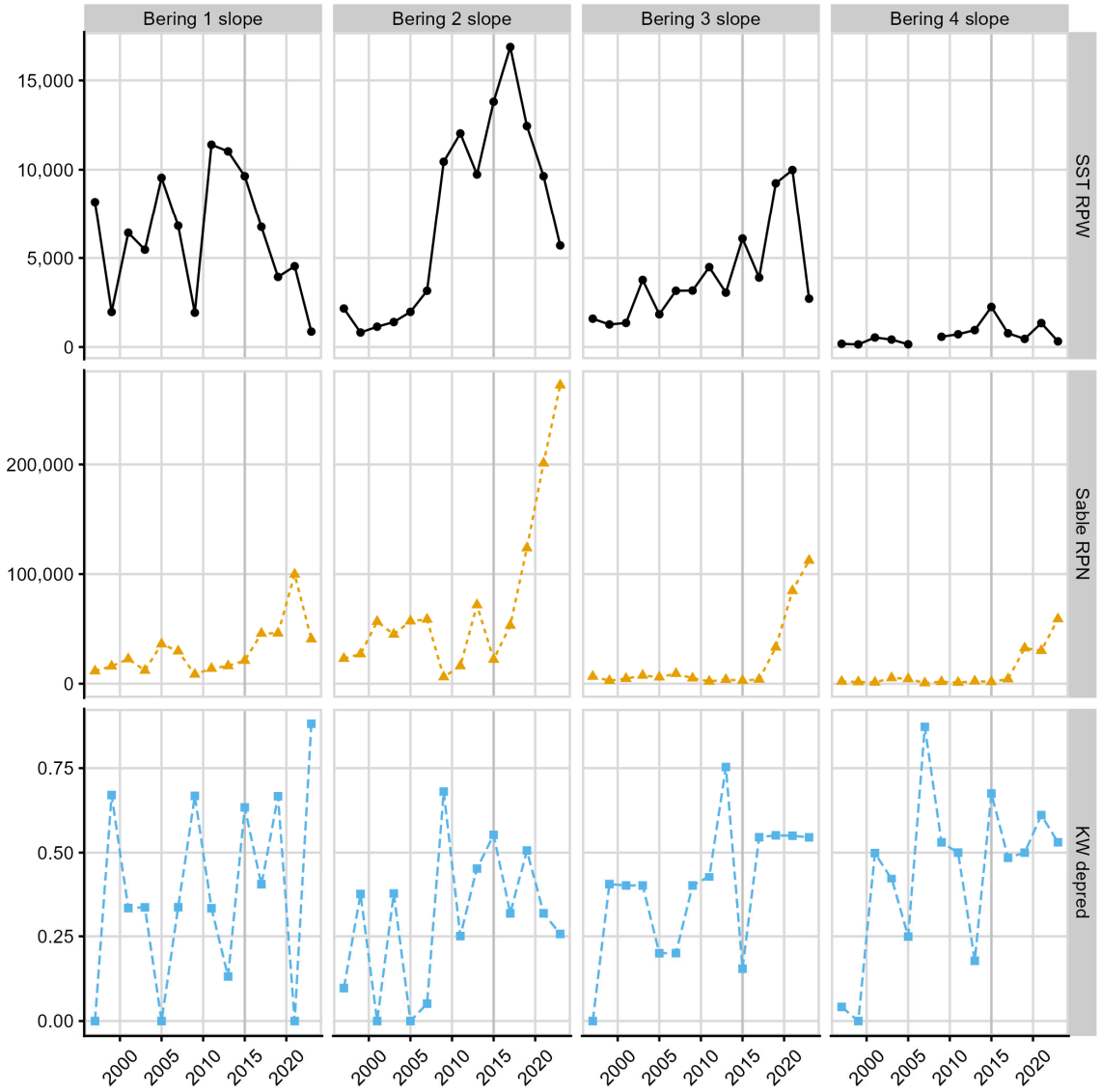
Model fit to the NMFS longline survey RPWs

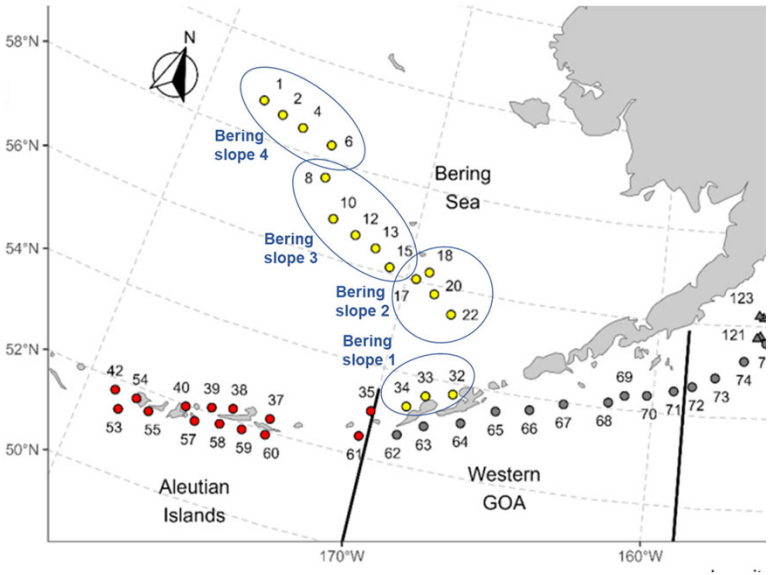


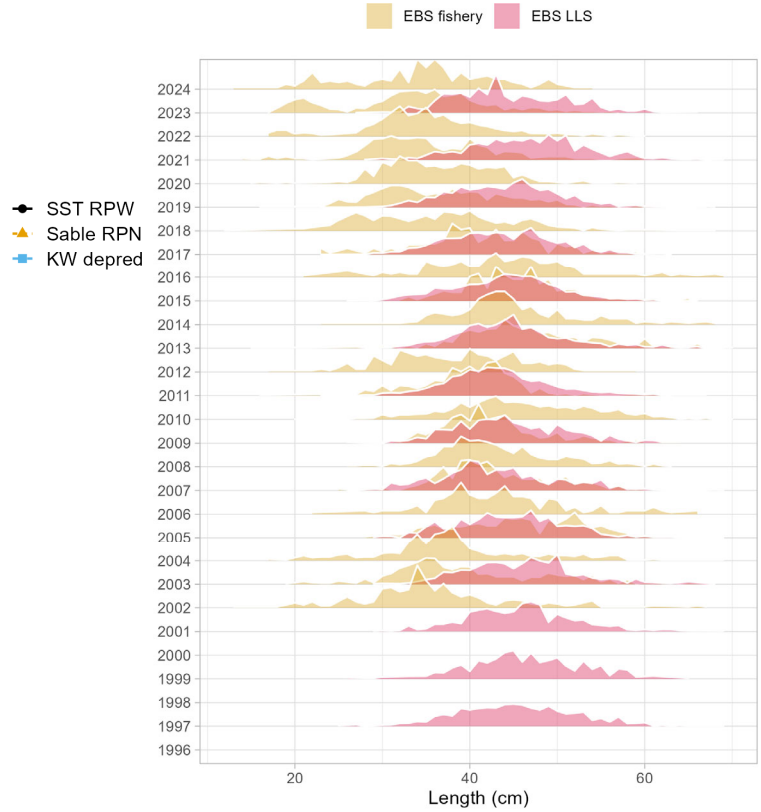
Total predicted biomass (t)



Large drop in the 2023 longline survey: We found no consistent issues in 2023 that were cause for concern (e.g., evidence of hook competition, increased KW depredation, change in selectivity)







$F_{OFL} = M, F_{ABC} = 0.75 \times M$

- Recommend Model 22
- Recommended ABC = max ABC
- BSAI-wide ABC and OFL = SST + non-SST
- Apportioned to AI and EBS using ratio of estimated biomass in BS and AI

	SST	non-SST	Total Other Rockfish
M	0.03	0.09	-
Biomass	37,408	3,151	40,559
F_{OFL}	0.03	0.09	-
F_{ABC}	0.0225	0.0675	-
OFL	1,122	284	1,406
ABC	842	213	1,054
AI ABC	316	99	415
BS ABC	526	113	639

Quantity	As estimated or *specified last* year for: 2024	2025	As estimated or *recommended this* year for: 2025	2026
M (natural mortality rate) for SST	0.03	0.03	0.03	0.03
M for non-SST	0.09	0.09	0.09	0.09
Tier	5	5	5	5
RE Model Combined Biomass (t)	52,733	52,733	40,559	40,559
F_{OFL} (*F=M*) for SST	0.03	0.03	0.03	0.03
F_{OFL} (*F=M*) for non-SST	0.09	0.09	0.09	0.09
$maxF_{ABC}$ for SST	0.0225	0.0225	0.0225	0.0225
$maxF_{ABC}$ for non-SST	0.0675	0.0675	0.0675	0.0675
F_{ABC} for SST	0.0225	0.0225	0.0225	0.0225
F_{ABC} for non-SST	0.0675	0.0675	0.0675	0.0675
OFL (t)	1,680	1,680	**1,406**	**1,406**
maxABC (t)	1,260	1,260	**1,054**	**1,054**
ABC (t)	1,260	1,260	**1,054**	**1,054**
Status	As determined *last* year for: 2022	2023	As determined *this* year for: 2023	2024
Overfishing	No	No	No	n/a

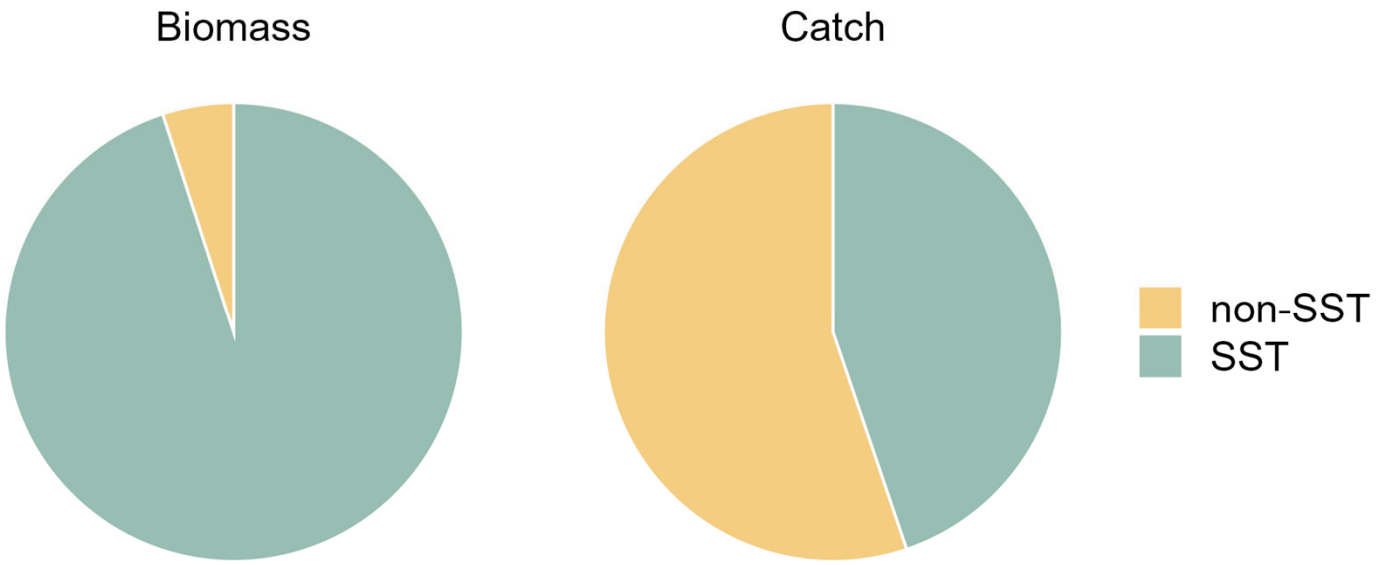
Summaries for Plan Team

The following table gives the projected biomass in the year harvest specifications were recommended, OFL, ABC, TAC and estimated catch to date for 2021-2024.

Species	Year	Biomass	OFL	ABC	TAC	Catch
Other rockfish	2023	52,733	1,680	1,260	1,260	1,223
	2024	52,733	1,680	1,260	1,260	1,125*
	2025	40,559	1,406	1,054		
	2026	40,559	1,406	1,054		

*Catch updated through September 28, 2024 (accessed on October 1, 2024) Source: NMFS AKRO Catch Accounting System, AKFIN database

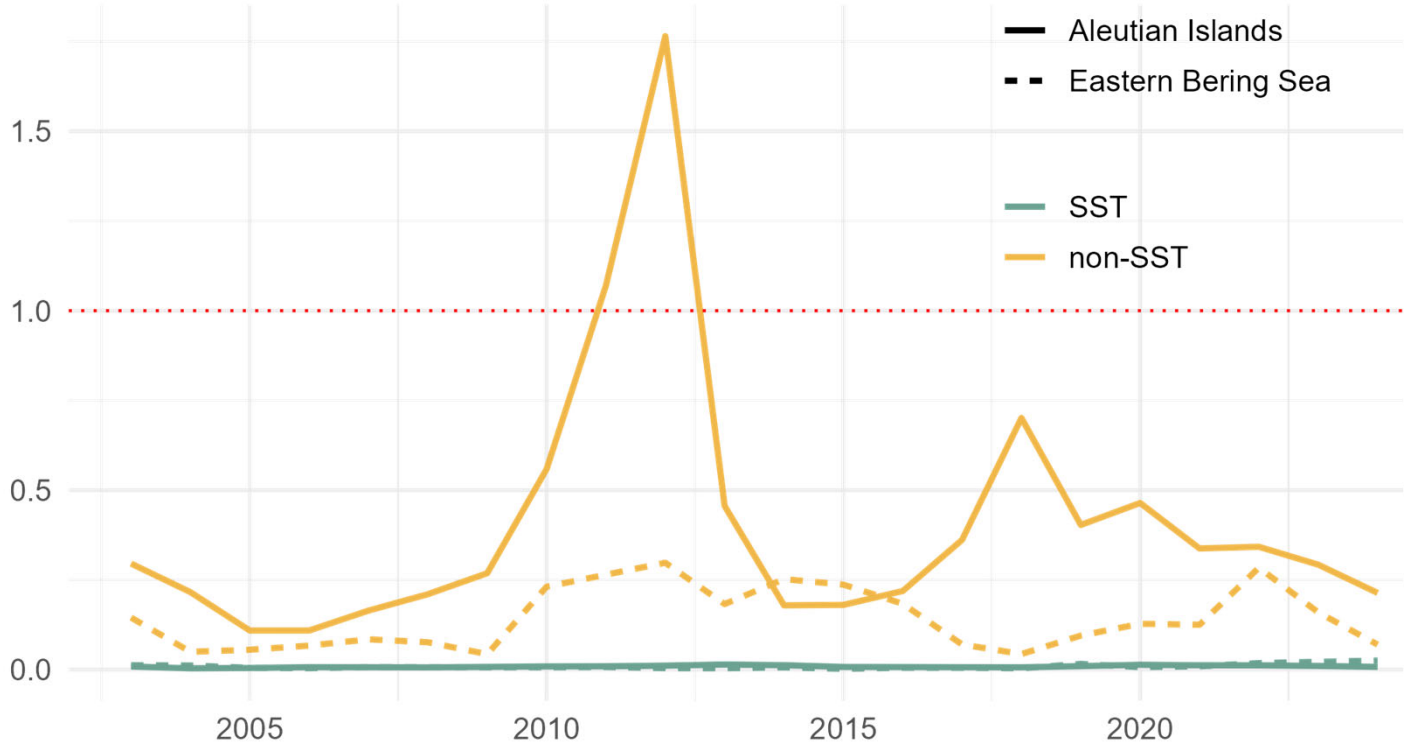
OTHER ROCKFISH SUMMARY



In 2023, SST estimated to be 94% of the estimated biomass but made up only 53% of the catch (higher than the average since 2003 = 44%).

ABC and OFL are for all species combined.

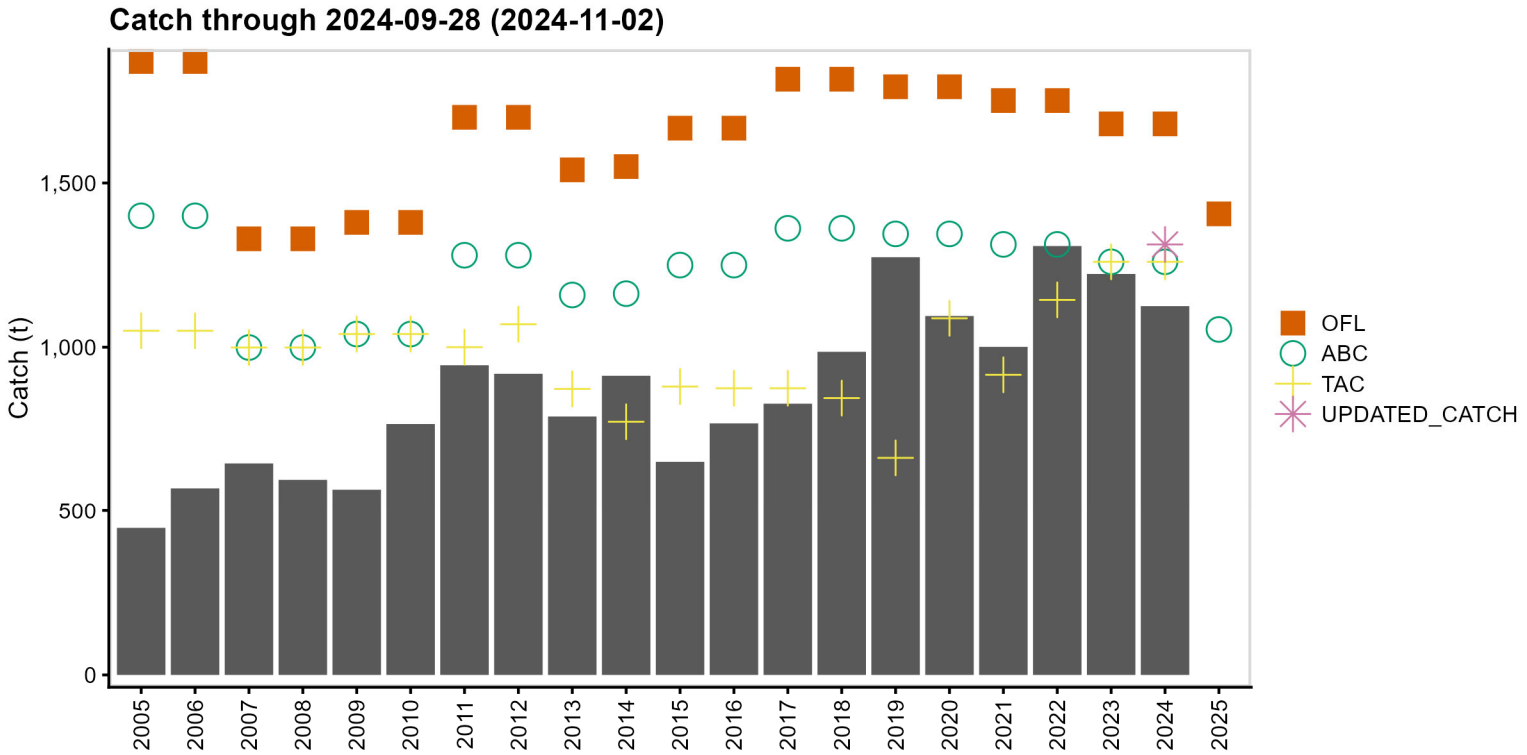
EXPLOITATION RATE (CATCH / BIOMASS)



High catch/biomass for non-SST, especially in AI
SST catch/biomass has doubled in the EBS in the last two years

RISK TABLE

Assessment-related considerations	*Population dynamics considerations*	*Environmental/ ecosystem considerations*	*Fishery Performance considerations*
Level 2: Increased concerns Large decrease in SST biomass highlights need for trawl survey on the EBS slope Highly variable non-SST biomass	**Level 2**: Increased concerns 61% decrease in SST in LLS RPWs is atypical for a long-lived species	**Level 1**: No apparent concern AI: temperatures cooling from marine heatwave conditions, but still above average EBS slope: above average temperatures since 2015	**Level 2**: Increased concerns Bycatch only Large increase in SST bycatch in EBS in sablefish trawl fishery Risk of approaching/exceeding OFL if not mitigated



Year	Catch	TAC	ABC	OFL
2019	1,274	663	1,345	1,793
2020	1,095	1,088	1,345	1,793
2021	1,001	916	1,313	1,751
2022	**1,308**	1,144	1,313	1,751
2023	**1,223**	1,260	1,260	1,680
2024	1,125*	1,260	1,260	1,680
2025			**1,054**	**1,406**

**2024 catch through Sept. 28, 2024*

DOCUMENT CORRECTION

- Table 16.1 management measures for 2003/2004 should state separate OFLs for BS and AI (will update accordingly)

QUESTIONS?

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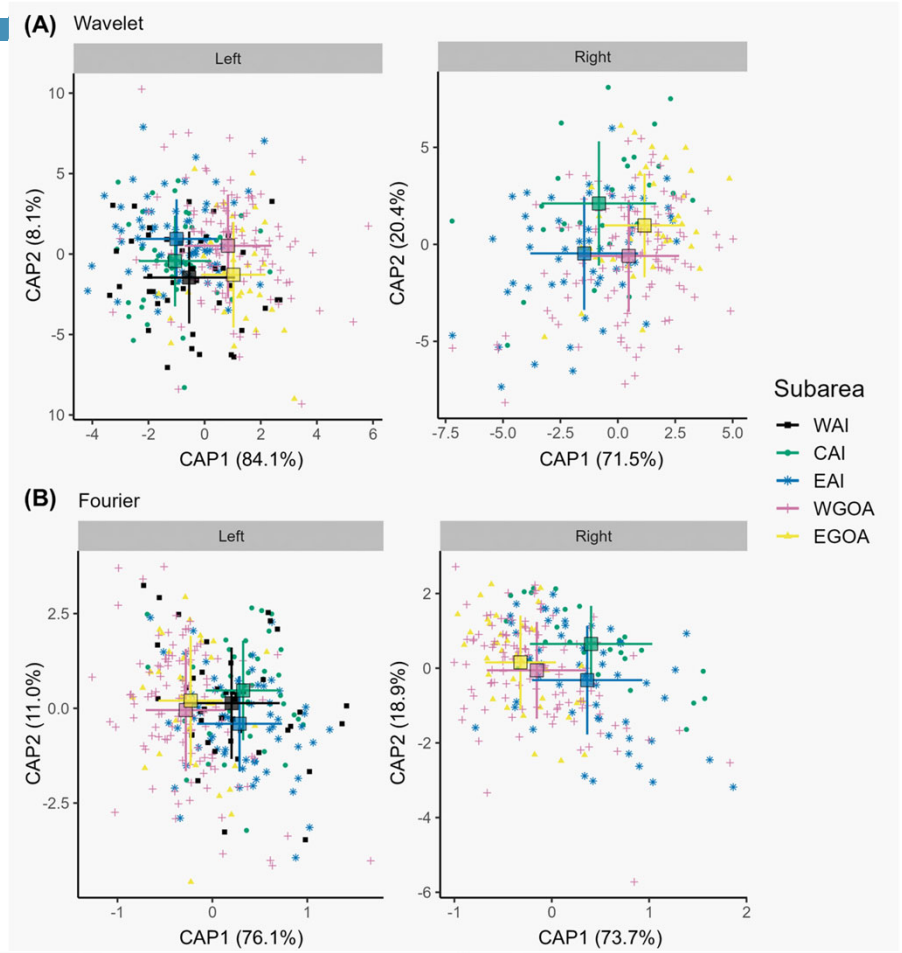
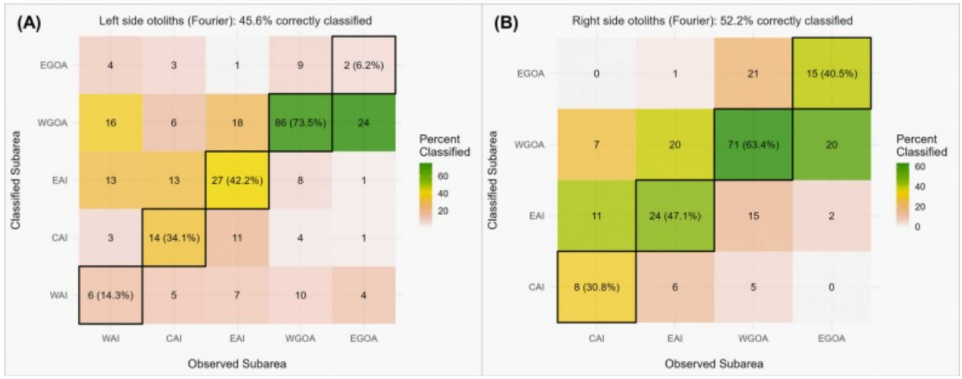
EXTRA SLIDES

TenBrink et al. 2024 - Otolith shape analysis to exmine dusky stock structure

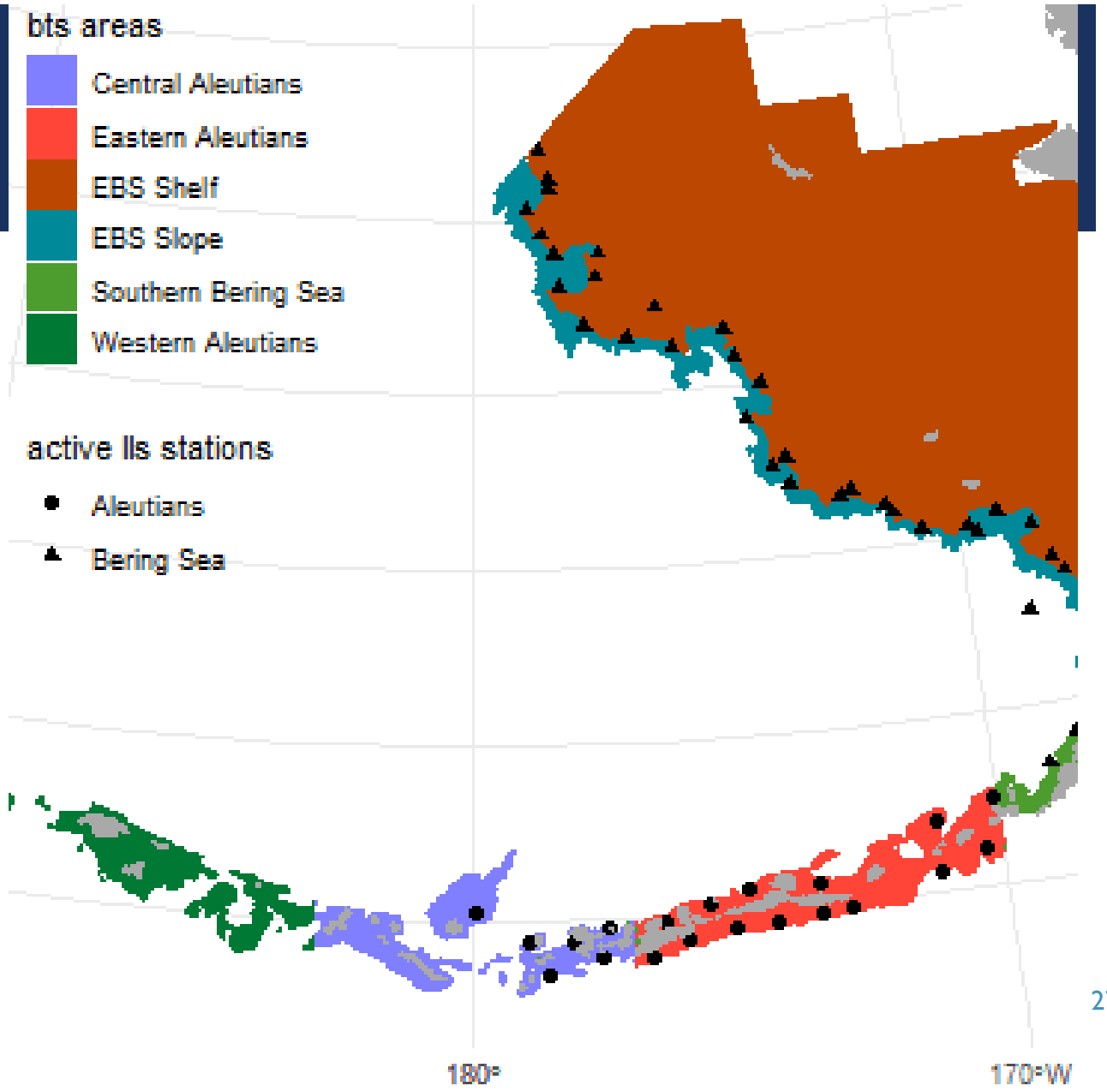
- Otolith shape varied, but the highest classification rates provided some support for current management paradigms
- Discriminatory power was variable, but generally low, suggesting minimal stock structure for dusky rockfish
- The subareas with the highest catches and biomass in each management region (subarea 541 in the EAI and subareas 630, 620, and 610 in the WGOA) have a low to moderate level of population connectivity, with a relatively high number of samples being classified in the other subarea if not correctly classified.
- If dusky rockfish in these subareas are connected, either through larval dispersal or adult migration, this could imply reduced management concern for subareas like EAI with high exploitation rates.





Why didn't we use LLS RPWs in the AI?

Spatial mismatch in the survey indices



FLOW CHART OF ASSESSMENT AND APPORTIONMENT:
SPLIT-SPLIT-SPLIT-LUMP-LUMP-LUMP-SPLIT