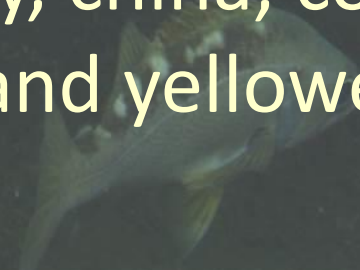# GOA Other Rockfish

Cindy Tribuzio and Katy Echave

Auke Bay Laboratories

Other Rockfish (OR) Complex

- Two sub-groups within the complex, based on life history, spatial distribution and fishery and survey characteristics

- Demersal sub-group: canary, china, copper, quillback, rosethorn, tiger and yelloweye rockfish

- Slope sub-group: 20 remaining species

OR Complex

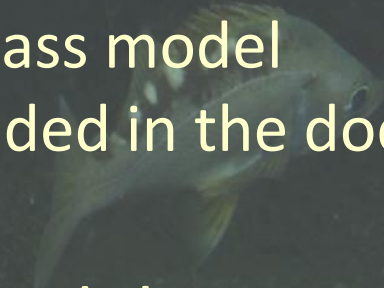| WGOA & CGOA	EGOA (WY)	EGOA (EY/SEO)
Aurora rockfish	Aurora rockfish	Aurora rockfish
Blackgill rockfish	Blackgill rockfish	Blackgill rockfish
Bocaccio	Bocaccio	Bocaccio
Canary rockfish	Canary rockfish	
Chilipepper rockfish	Chilipepper rockfish	Chilipepper rockfish
China rockfish	China rockfish	
Copper rockfish	Copper rockfish	
Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish
Greenstriped rockfish	Greenstriped rockfish	Greenstriped rockfish
Harlequin rockfish	Harlequin rockfish	Harlequin rockfish
	Northern rockfish	Northern rockfish
Pygmy rockfish	Pygmy rockfish	Pygmy rockfish
Quillback rockfish	Quillback rockfish	
Redbanded rockfish	Redbanded rockfish	Redbanded rockfish
Redstripe rockfish	Redstripe rockfish	Redstripe rockfish
Rosethorn rockfish	Rosethorn rockfish	
Sharpchin rockfish	Sharpchin rockfish	Sharpchin rockfish
Shortbelly rockfish	Shortbelly rockfish	Shortbelly rockfish
Silvergray rockfish	Silvergray rockfish	Silvergray rockfish
Splitnose rockfish	Splitnose rockfish	Splitnose rockfish
Stripetail rockfish	Stripetail rockfish	Stripetail rockfish
Tiger rockfish	Tiger rockfish	
Vermilion rockfish	Vermilion rockfish	Vermilion rockfish
Widow rockfish	Widow rockfish	Widow rockfish
Yelloweye rockfish	Yelloweye rockfish	
Yellowmouth rockfish	Yellowmouth rockfish	Yellowmouth rockfish
Yellowtail rockfish	Yellowtail rockfish	Yellowtail rockfish
26 Species	27 Species	20 Species
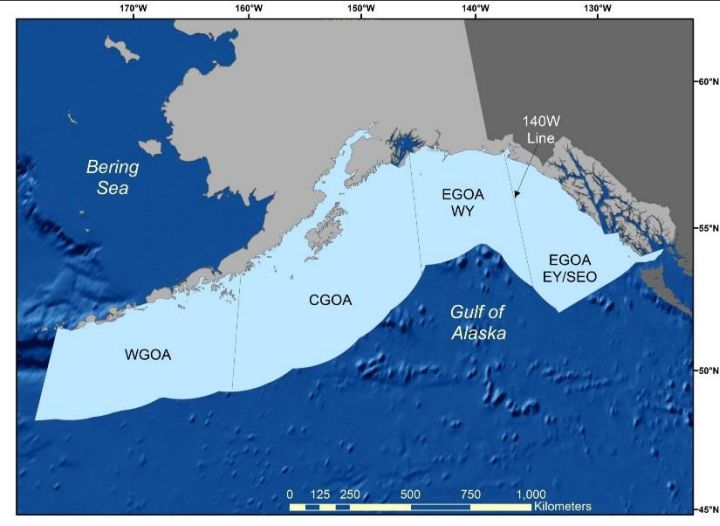
2019 OR Assessment

- Tier 4: Sharpchin
- Tier 5: 17 slope sub-group species
- Tier 6: 7 demersal, 2 slope species

- Changes to the input data
  - Catch updated through Oct 1, 2019
  - NMFS bottom trawl survey data updated
  - Updated random effects biomass model
  - Inside waters catch table included in the document

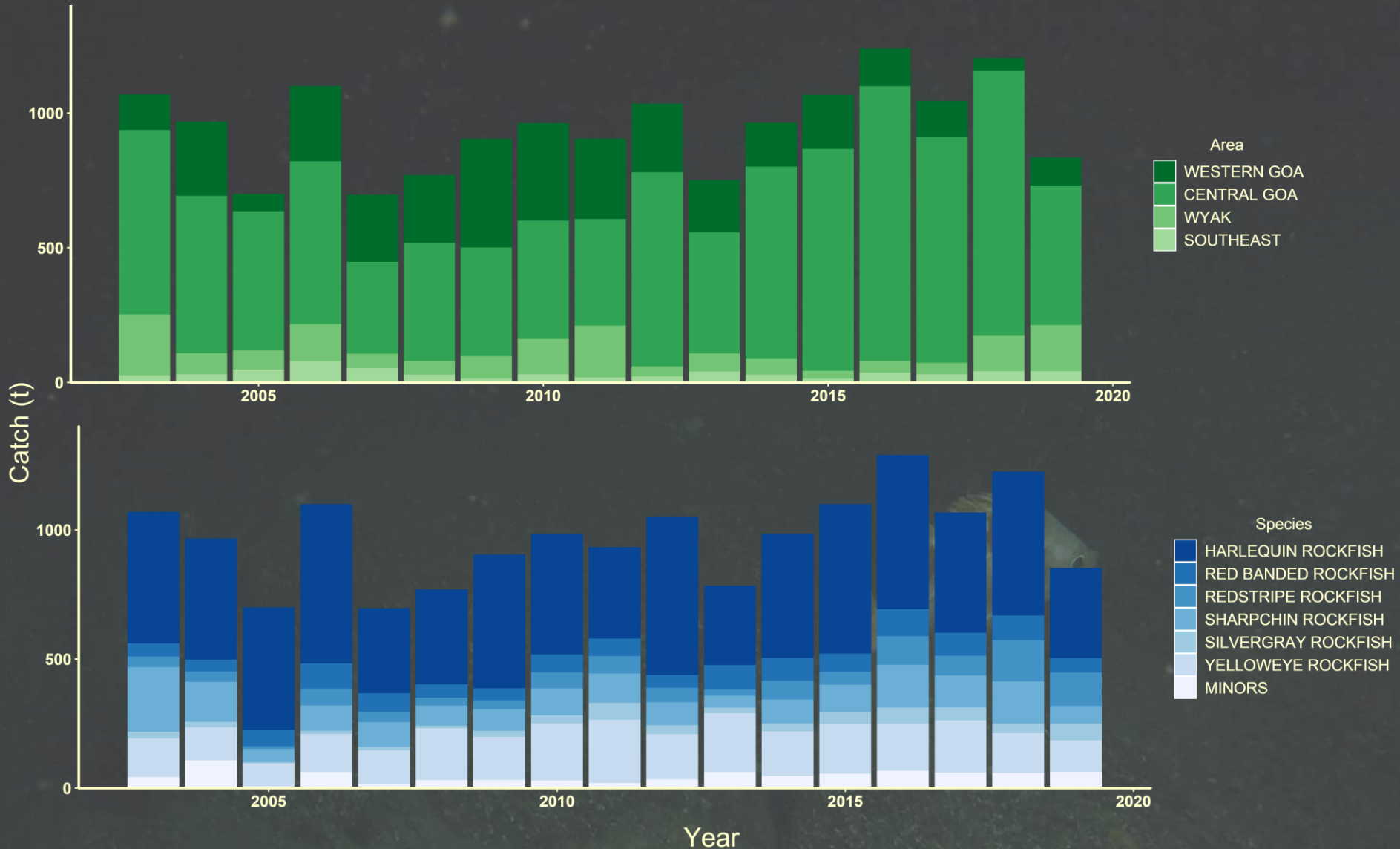- Changes in assessment methodology
  - None

GOA Other Rockfish Catch

- Well below ABCs for all areas in GOA

Area			2019		
		OFL	ABC	TAC	Catch
WGOA/CGOA			1,737	1,737	621
EGOA	WY		368	368	172
	EY/SE		3,489	200	42
Total		7,356	5,594	2,305	835*

*Catch as of Oct 1, 2019

GOA Other Rockfish Catch

Note: Catch by species now available back to 2010 (Thank-you!!!)
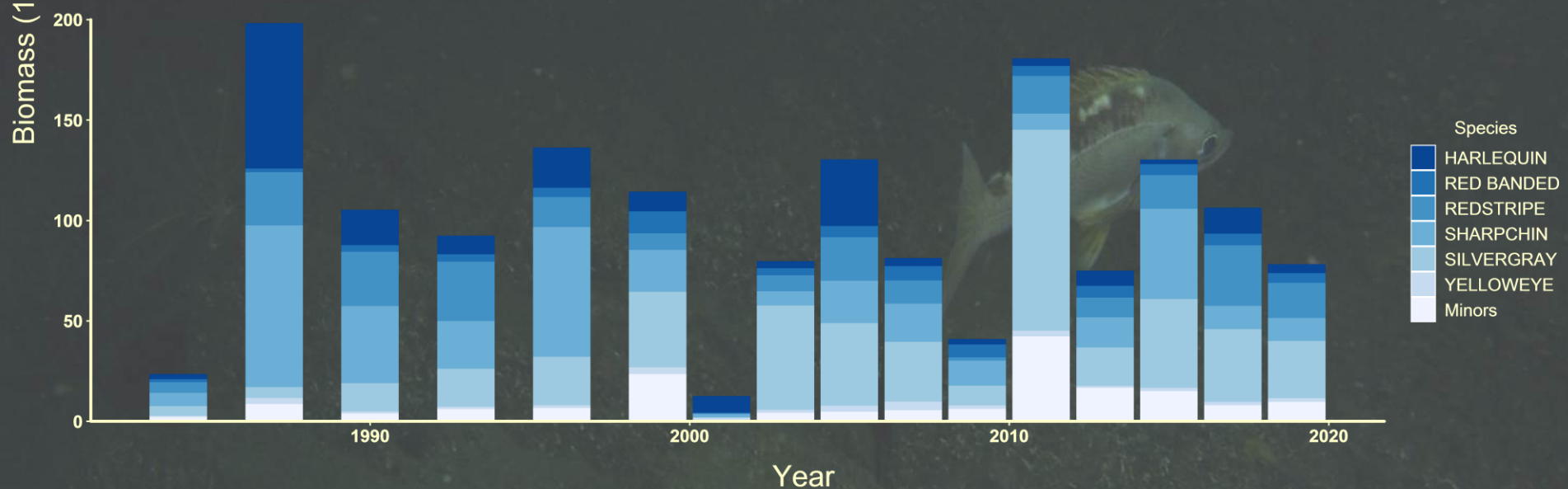
GOA Other Rockfish Catch

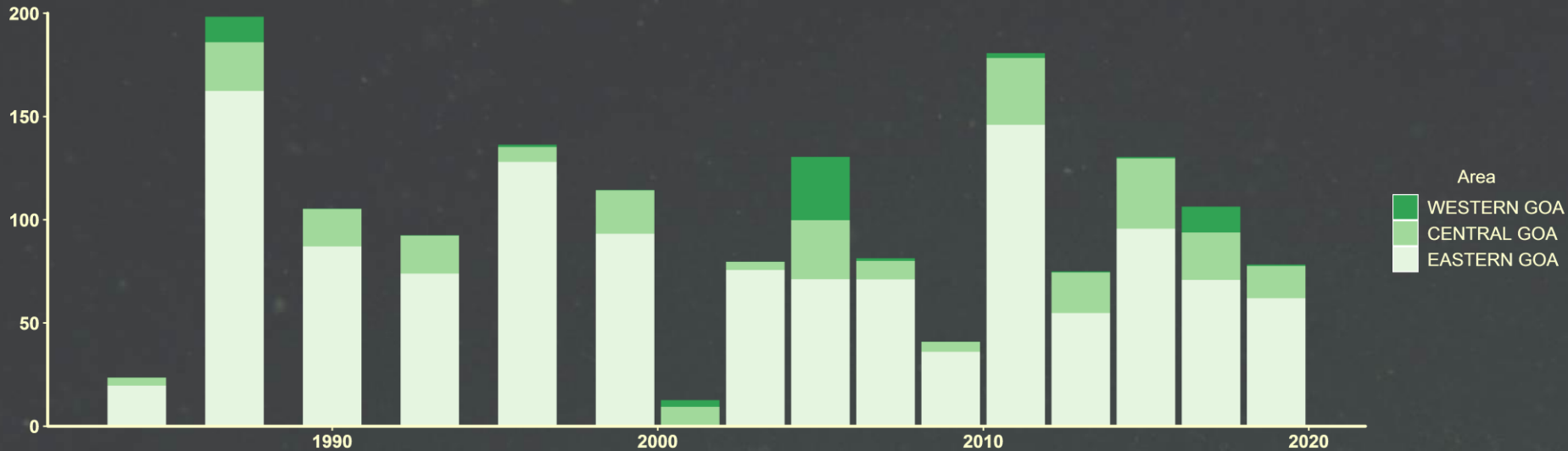Catch estimates from federally managed fisheries in Prince William Sound (PWS, NMFS Area 649) and Southeast (SE, NMFS Area 659)

- SE does not include the DSR species
- These catches do not count against the TAC

Year	PWS	SE
2013	20.0	16.1
2014	11.2	10.4
2015	22.5	11.1
2016	39.2	12.0
2017	9.6	16.1
2018	11.2	12.0
2019	9.2	11.6

GOA Other Rockfish Biomass

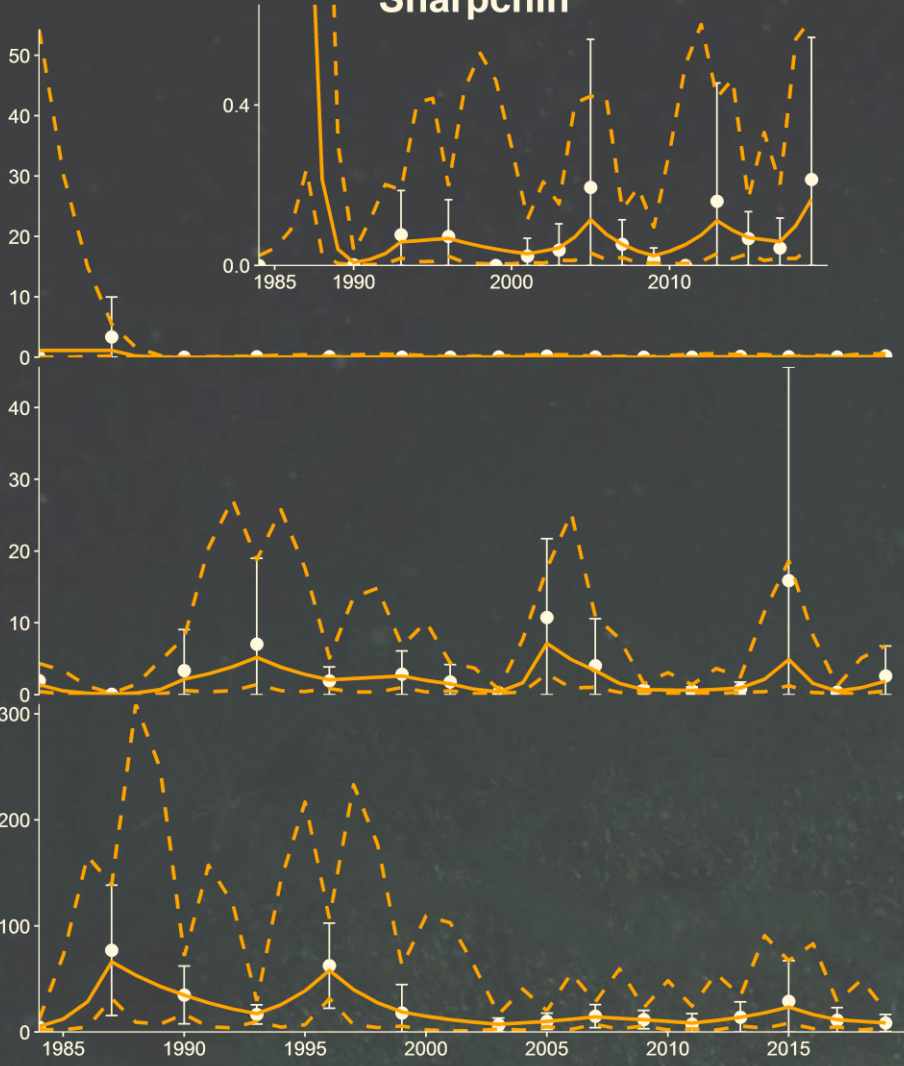# Random Effects Biomass

- Two models (all slope sub-group species):
  - Model 15.1 Tier 4 sharpchin rockfish
  - Model 15.1 Tier 5 – 17 species
- Both models run by area
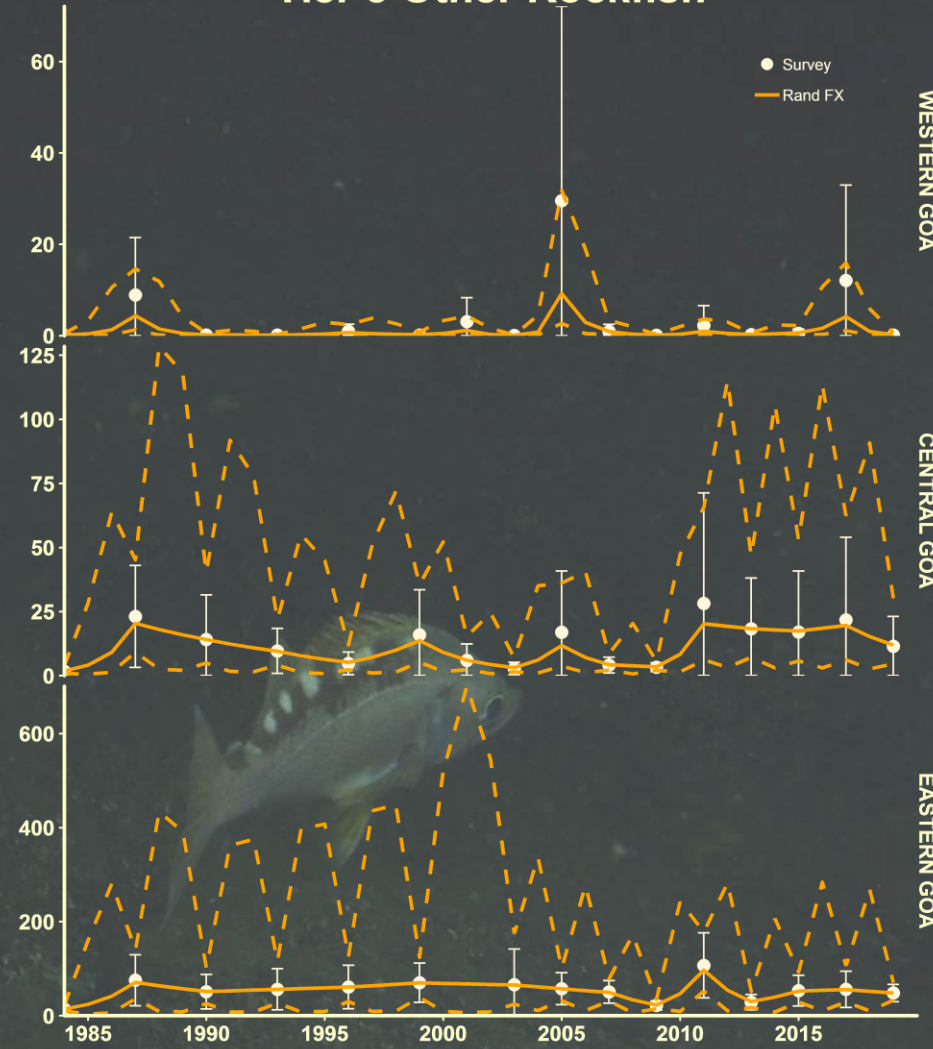- Tier 5 models run as a group, and by M grouping

Random Effects Biomass

Harvest Recommendations

- Tier 4/5 status quo method (all slope sub-group)

Model	Group	Tier	2017 RE Biomass	F_{OFL}	OFL	F_{ABC}	ABC
15.1	Sharpchin	4	10,826	$F_{35\%} = 0.079$	855	$F_{40\%} = 0.065$	704
	M=0.05 Group	5	28,850				
	M=0.06 Group	5	5,653				
	M=0.07 Group	5	3,123				
15.1	M=0.092 Group	5	3,982				
	M=0.1 Group	5	18,255				
	Tier 5 Biomass	5	59,861	F = Wted M = 0.070	4,190	$F_{ABC} = 0.75*F_{OFL}$	3,143
Total Tier 4/5 Gulf Wide					**5,045**		**3,847**
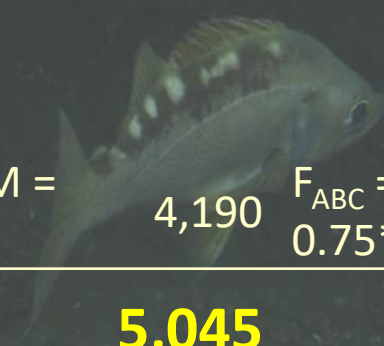
Harvest Recommendations
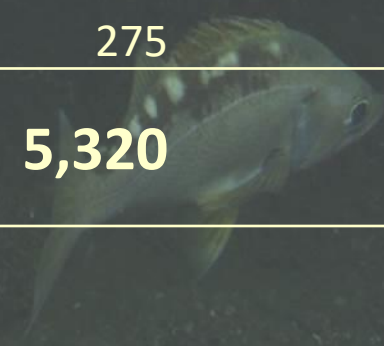
- Tier 6 status quo method
    - All of the demersal sub-group
    - Two slope sub-group species

Tier 6 Model 17.1	Maximum Catch (t) 2003-2016			
	Western GOA	Central GOA	West Yakutat	E Yak/ Southeast
aurora rockfish	0	0.67	0.15	0
canary rockfish	0.57	1.15	0.14	NA
China rockfish	0.03	1.08	0.23	NA
copper rockfish	<0.01	0.19	0.02	NA
quillback rockfish	0.73	24.65	1.32	NA
rosethorn rockfish	0.26	0.69	1.73	NA
Shortbelly rockfish	<0.01	0	0	0
tiger rockfish	0.70	4.15	1.00	NA
yelloweye rockfish	59.16	135.63	40.55	NA
Total Tier 6 ABC		172		34
Total Tier 6 OFL		275		

Harvest Recommendations

| Model	Tier	2019 Random Effects Biomass	F_{OFL}	OFL	F_{ABC}	ABC
15.1	4	10,825	$F_{35\%} = 0.079$	855	$F_{40\%} = 0.065$	704
15.1	5	59,861	$F_{OFL} = $ Wted $M = 0.070$	4,190	$F_{ABC} = 0.75*F_{OFL}$	3,143
17.1	6			275		206
All Tiers Combined				**5,320**		**4,053**

Risk Matrix

Assessment-related considerations
Level 1: Typical to moderately increased uncertainty/min or unresolved issues in assessment.

Assessment Considerations

- Bycatch only, limited life history information, mismatch of biomass/catch, poor survey sampling.
- Typical concerns for this complex
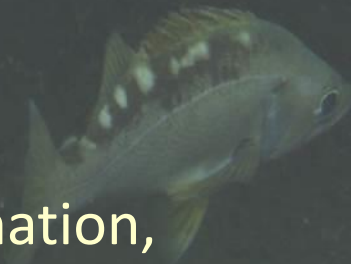
Risk Matrix

Assessment-related considerations	Population dynamics considerations
Level 1: Typical to moderately increased uncertainty/min or unresolved issues in assessment.	**Level 1:** Stock trends are typical for the stock; recent recruitment is within normal range.

Population Dynamics

- Biomass is characterized by large inter-survey swings and trends are difficult to detect.
- Typical for this complex

Risk Matrix

Assessment-related considerations	Population dynamics considerations	**Environmental/ ecosystem considerations**
Level 1: Typical to moderately increased uncertainty/min or unresolved issues in assessment.	Level 1: Stock trends are typical for the stock; recent recruitment is within normal range.	**Level 1:** No apparent environmental/ ecosystem concerns

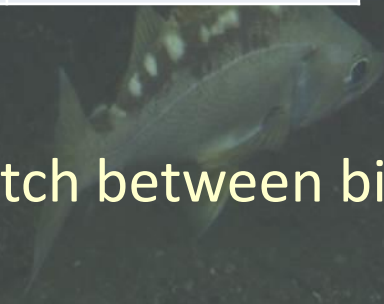## Environmental/Ecosystem Considerations (provided by Ellen Yasumiishi)

- Limited information for rockfish, especially this complex
- Indicators are unclear, some above others below average, all based on other species.

Risk Matrix

Assessment-related considerations	Population dynamics considerations	Environmental/ ecosystem considerations	**Fishery Performance considerations**
Level 1: Typical to moderately increased uncertainty/min or unresolved issues in assessment.	Level 1: Stock trends are typical for the stock; recent recruitment is within normal range.	Level 1: No apparent environmental/ ecosystem concerns	**Level 1:** No apparent fishery/resource-use performance and/or behavior concerns

Fishery Performance

- No directed fishing, spatial mismatch between biomass and catch
- Recent increase in retention, however, not indicative of increased catch or targeting

Risk Matrix

| Assessment-related considerations	Population dynamics considerations	Environmental/ ecosystem considerations	Fishery Performance considerations	**Overall score (highest of the individual scores)**
Level 1: Typical to moderately increased uncertainty/min or unresolved issues in assessment.	Level 1: Stock trends are typical for the stock; recent recruitment is within normal range.	Level 1: No apparent environmental/ ecosystem concerns	Level 1: No apparent fishery/resource-use performance and/or behavior concerns	**Level 1: Normal**

Area Allocation

Current

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**

Previous

Full Complex	W GOA	Central GOA	Eastern GOA		Total
			West Yakutat	E Yakutat/ Southeast	
Area ABC (t)	1,737		368	3,489	**5,594**
OFL (t)					**7,365**

OR W/CGOA Catch

Questions?

Photo © ADFG
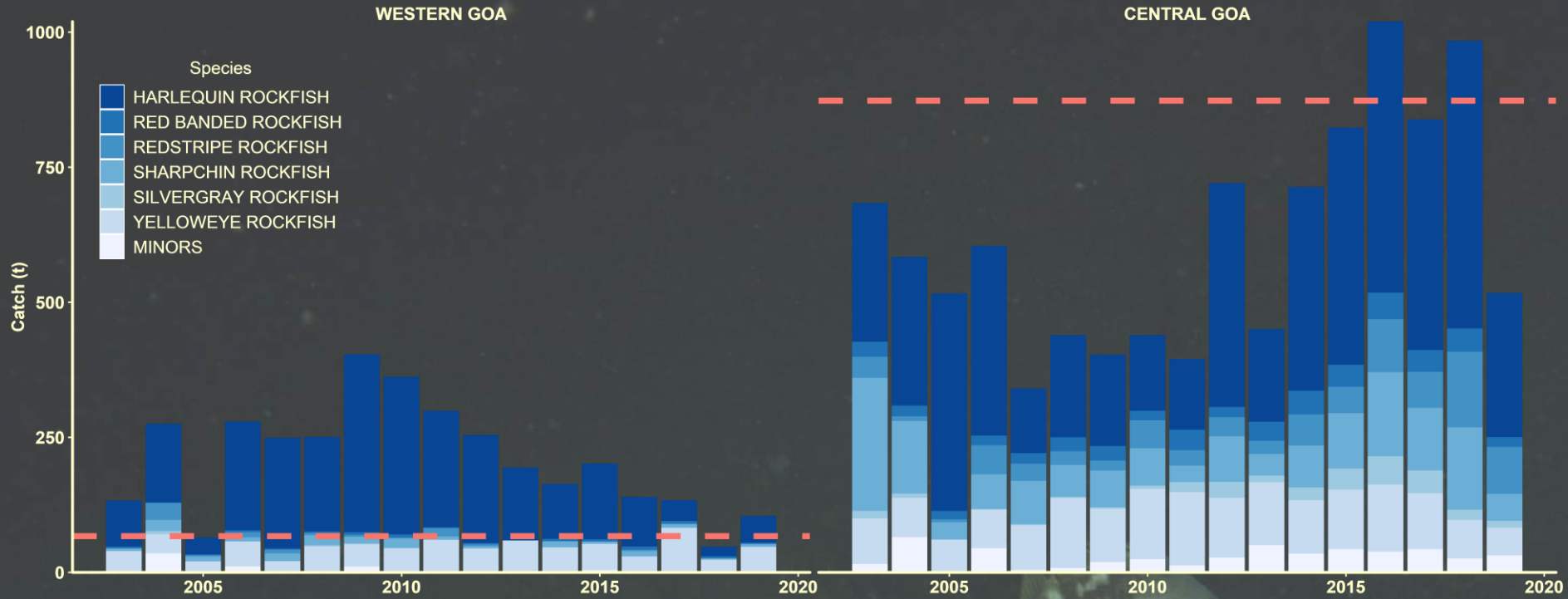
Plans for 2021 Assessment

- Investigate moving some species UP a Tier
  - Harlequin to Tier 4
  - Yelloweye to Tier 5 in WGOA/CGOA/WY

- Move some catch only species out of Tier 5 to Tier 6

- Discuss incorporating unidentified rockfish into assessment
  - Counts against OR TAC

- GOA-wide DSR???

GOA-wide DSR Next Steps

- Proposal to move demersal sub-group into the DSR assessment and make the DSR assessment GOA-wide (old news)

- Council Stock Structure and Spatial Management Policy

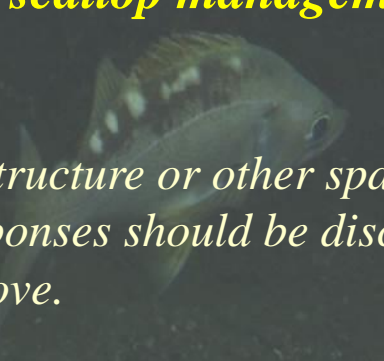- 2017 PT and SSC agree: Proceed to Step 2

Photo © ADFG

Step 2???

- Council is requested to initiate a regulatory amendment to modify 50 CFR Part 679 to accommodate changes to both the OR and DSR complexes

- Are there additional economic and management considerations to be addressed by staff?

EXAMPLE ABCs and OFL

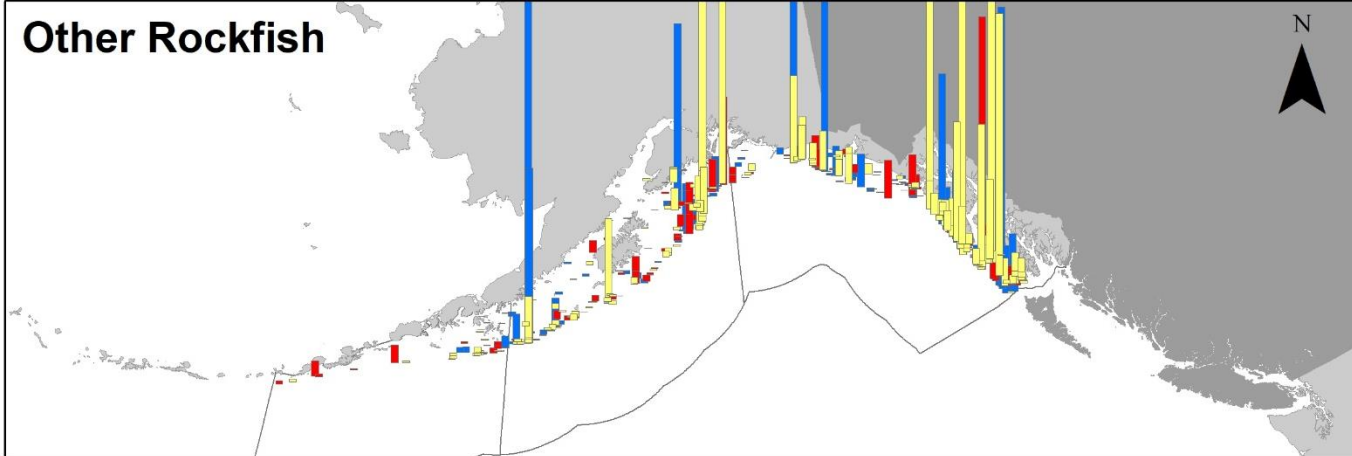| | Western GOA | Central GOA | Eastern GOA | | Total |
			West Yakutat	E Yakutat/ Southeast	
Area ABC (t)	46	125	34	238	**443**
OFL (t)					**648**

The policy is a four step process:

1. *As soon as preliminary scientific information indicates that further stock structure separation or other spatial management measures may be considered, the stock assessment authors, Plan Teams (groundfish, crab, scallop), and SSC should advise the Council of their findings and any associated conservation concerns and reasonable timeframes to address the concern.*

2. ***With input from the agency, the public, and its advisory bodies, the Council (and NMFS) should identify the economic and management implications and potential options for management response to these findings and identify the suite of tools that could be used to achieve conservation and management goals. This suite of tools includes separate harvest specifications at the TAC, ABC, and/or OFL level. In the case of crab and scallop management, ADF&G needs to be part of this process.***

3. *To the extent practicable, further refinement of stock structure or other spatial conservation concerns and potential management responses should be discussed through the process described in recommendations 1 and 2 above.*

4. *Based on the best information available provided through this process, the SSC should continue to recommend OFLs and ABCs that prevent overfishing of stocks.*
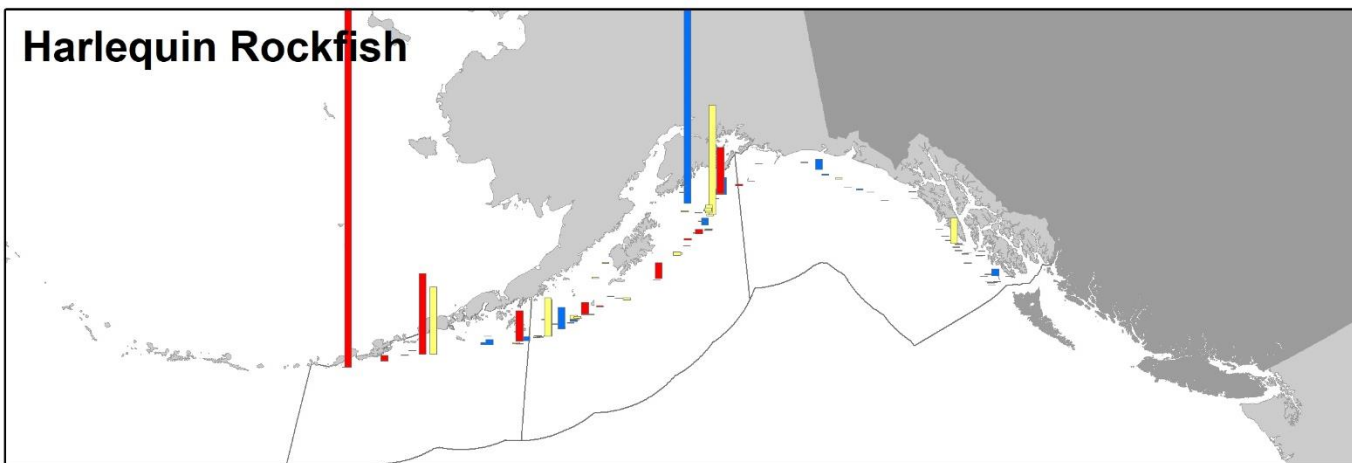
NS1 guidelines: "Where practicable, the group of stocks should have a **similar geographic distribution**, **life history characteristics**, and **vulnerabilities to fishing pressure** such that the impact of management actions on the stocks is similar. The vulnerability of individual stocks should be considered when determining if a particular stock complex should be established or reorganized, or if a particular stock should be included in a complex"

Other Rockfish

Harlequin Rockfish

Silvergray Rockfish

Weight (kg)

50   50   50

2015   2017   2019

Observed Fishery Mean (kg)
Harlequin Rockfish (1991 - 2018)

- •   1 - 1150
- •   1151 - 4362
- ●   4363 - 14629

Trawl Survey Mean (kg)
Harlequin Rockfish (1984-2019)

0   0 - 1   1 - 5   5 - 10   10 - 50   50 - 100   100 - 250   250 - 500   500 - 2,000

0   200   400   800   km

N