SEO Demersal Shelf Rockfish Stock Assessment for 2020

...

Kellii Wood, Ben Williams, & Mike Jaenicke

November 2019

Stock Assessment

DSR Complex:

Yelloweye
(*S. ruberrimus*)

Quillback
(*S. maliger*)

Tiger
(*S. nigrocinctus*)

China
(*S. nebulosus*)

Canary
(*S. pinniger*)

Copper
(*S. caurinus*)

Rosethorn
(*S. helvomaculatus*)

Images: Google Images

Stock Assessment

N

0 40 80 160 240
Kilometers

EYKT
1995, 1997, 1999
2003, 2009, 2015
2017, **2019**

NSEO
1994,
2016,
2018

CSEO
1994, 1995,
1997, 2003,
2007, 2012,
2016, **2018**

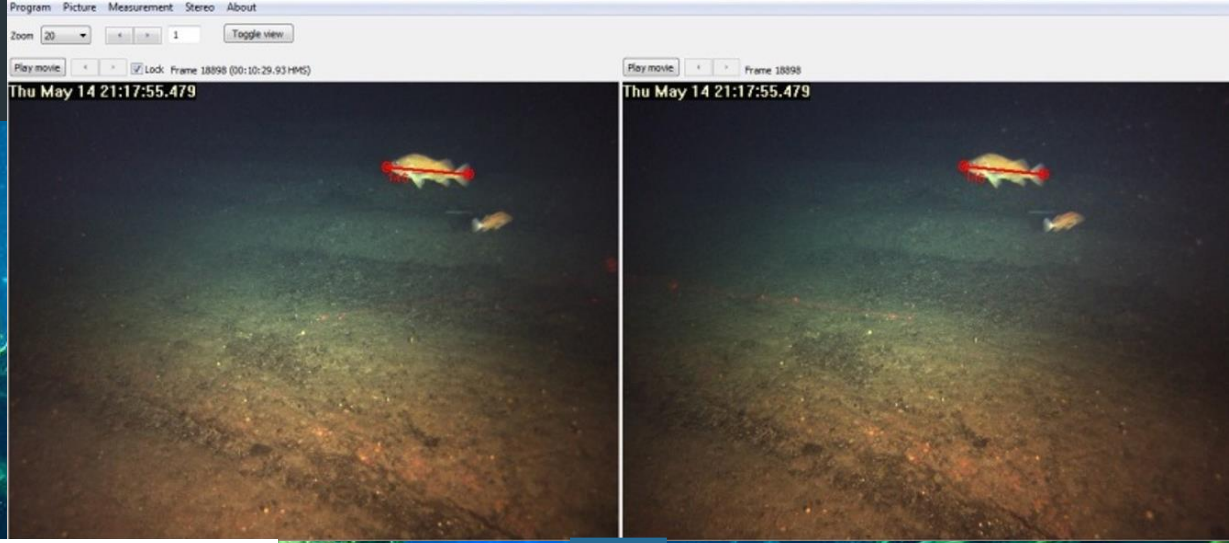
SSEO
1994, 1999, 2005,
2013, **2018**

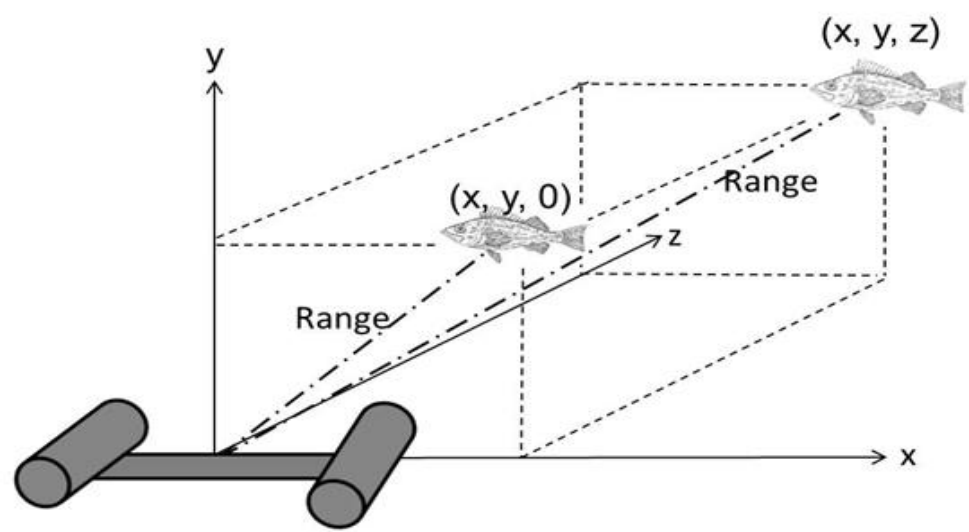
Juneau

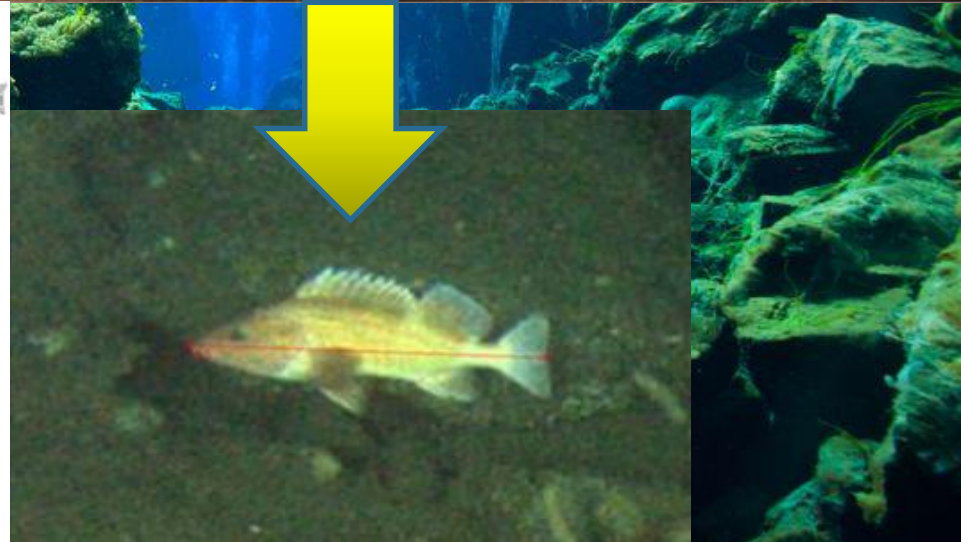
Dixon Entrance

Prince Rupert

Stock Assessment







Stock Assessment

Tier 4 Stock Assessment –
based on the total of biomass of yelloweye rockfish:

- Density of yelloweye by mgmt area
- Recent avg. weight of yelloweye by mgmt area
- Area of rocky habitat by mgmt area

$$YE\ Biomass_{a,y_1} = Avg\ Wt_{y_1} * Habitat(km^2)_a * Density\ YE(n/km^2)_{a,y_2}$$

$$where\ a = area(EYKT, NSEO, CSEO, SSEO), y_1 = current\ year, and\ y_2 = year\ of\ last\ ROV\ survey$$

$$Total\ YE\ Biomass = \sum_{a_i}^{4} YE\ Biomass_i$$

Stock Assessment

Tier 6 Stock Assessment – Other DSR:

Quillback, Tiger, China, Canary, Copper, & Rosethorn

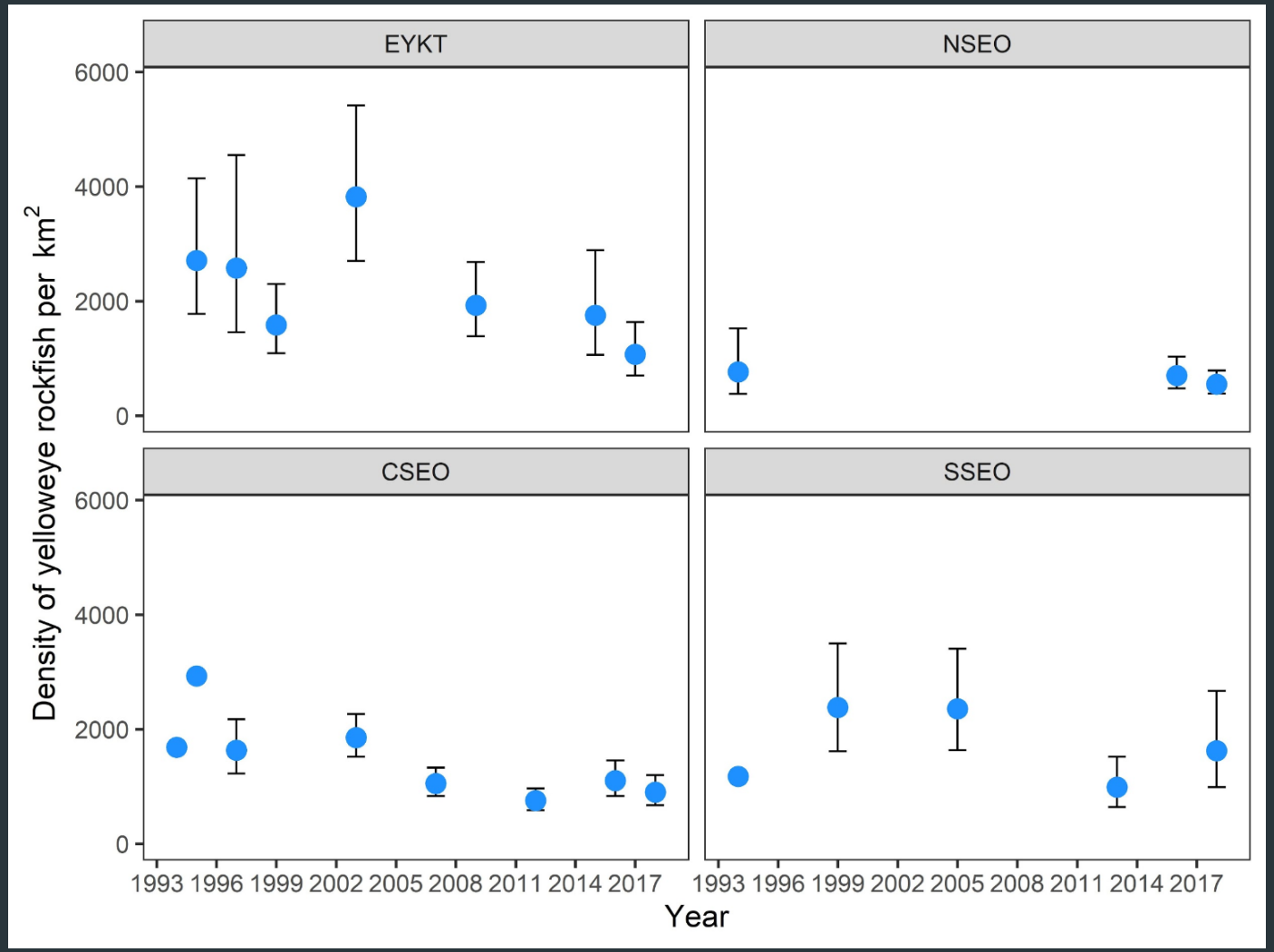
- Derive OFL & ABC from estimates from commercial, sport (recreational), and subsistence* (2010–2014).

Quantity (Tier 6 for other DSR only)	As estimated or *specified last* year and *recommended this* year for:	
	2019	**2020**
OFL (t)	**26**	**26**
ABC (t)	**20**	**20**

*As per correspondence with the Division of Subsistence in July of 2019, household subsistence surveys have not been updated since 2015 due to lack of funding.

Area	Year	# transects	# YE[b]	Meters surveyed	Encounter rate (YE/m)	Density (YE/km^2)	Lower CI (YE/km^2)	Upper CI (YE/km^2)	CV
EYKT[a]	1995	17	330	22,896	0.014	2,711	1,776	4,141	0.20
	1997	20	350	19,240	0.018	2,576	1,459	4,549	0.28
	1999	20	236	25,198	0.009	1,584	1,092	2,298	0.18
	2003	20	335	17,878	0.019	3,825	2,702	5,415	0.17
	2009	37	215	29,890	0.007	1,930	1,389	2,682	0.17
	2015	33	251	22,896	0.008	1,755	1,065	2,891	0.25
	2017	35	134	33,960	0.004	1,072	703	1,635	0.21
CSEO	1994[c]					1,683			0.10
	1995	24	235	39,368	0.006	2,929			0.19
	1997	32	260	29,273	0.009	1,631	1,224	2,173	0.14
	2003	101	726	91,285	0.008	1,853	1,516	2,264	0.10
	2007	60	301	55,640	0.005	1,050	830	1,327	0.12
	2012	46	118	38,590	0.003	752	586	966	0.13
	2016	32	160	30,726	0.005	1,101	833	1,454	0.14
	2018	**35**	**193**	**33,700**	**0.006**	**898**	**672**	**1,199**	**0.14**
NSEO	1994[c]	13	62	17,622	0.004	765	383	1,527	0.33
	2016	36	125	34,435	0.004	701	476	1,033	0.20
	2018	**30**	**95**	**29,792**	**0.003**	**553**	**388**	**788**	**0.16**
SSEO	1994[c]	13	99	18,991	0.005	1,173			0.29
	1999	41	360	41,333	0.009	2,376	1,615	3,494	0.20
	2005	32	276	28,931	0.010	2,357	1,634	3,401	0.18
	2013	31	118	30,439	0.004	986	641	1,517	0.22
	2018	**32**	**345**	**31,073**	**0.011**	**1,624**	**988**	**2,667**	**0.25**

Sub & ROV Density Estimates (95% CI)



Updates to Model Input Data and Methods

Input Data: new avg wts from port sampling

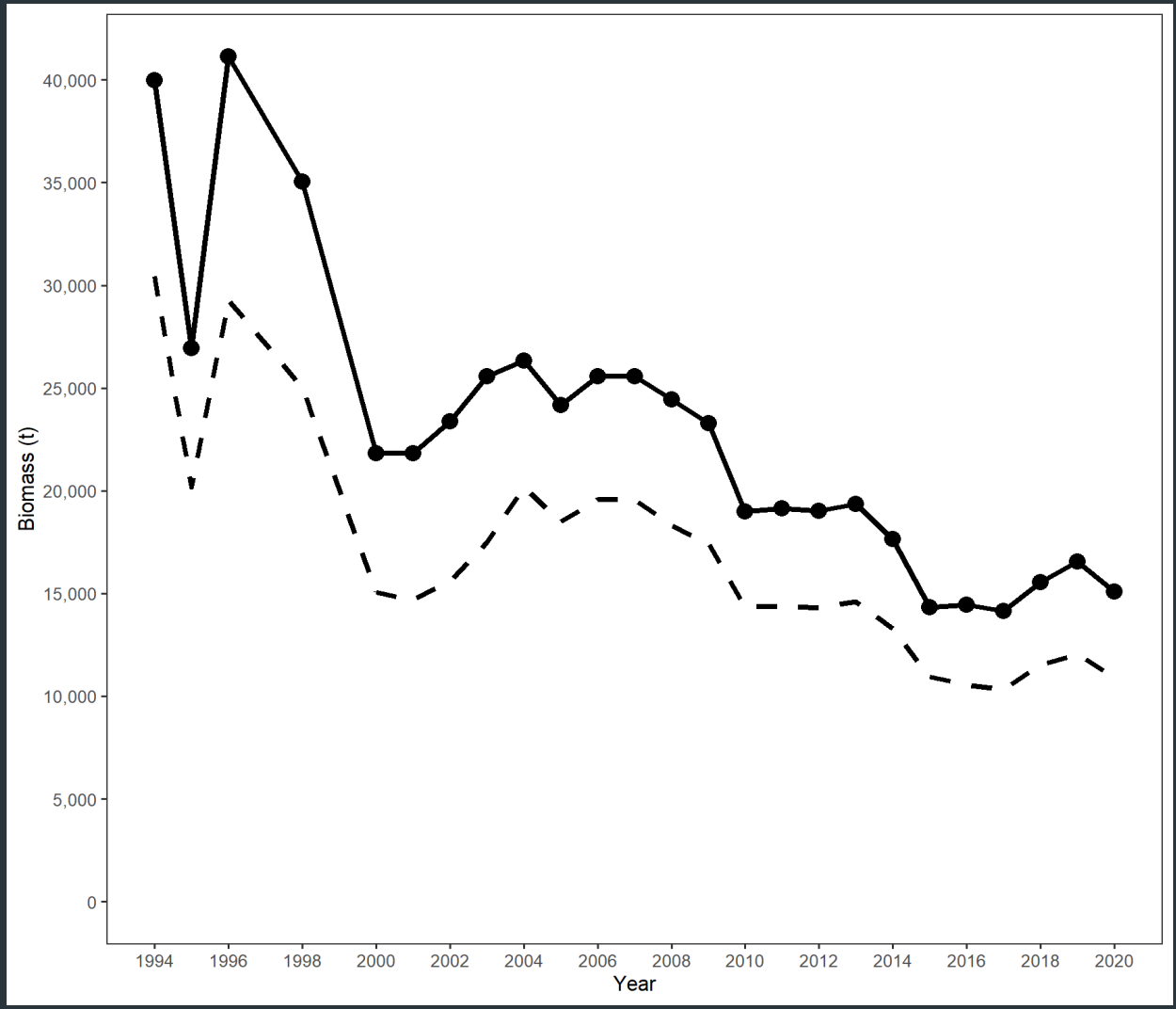
Methodology: Tier 4 Yelloweye + Tier 6 calculations for other DSR

	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
Quantity	2019	2020	2020	2021
M (natural mortality rate)	0.02	0.02	0.02	0.02
Tier	4	4	4	4
Yelloweye Biomass (t)	12,029		10,903	
$F_{OFL} = F_{35\%}$	0.032	0.032	0.032	0.032
$maxF_{ABC}$	0.026	0.026	0.026	0.026
F_{ABC}	0.02	0.02	0.02	0.02
DSR OFL (t)	411	411	375	375
DSR max ABC (t)	333	333	303	303
ABC (t)	261	261	238	238
Status	As determined last year for:		As determined this year for:	
	2017	2018	2018	2019
Overfishing	No	n/a	No	n/a

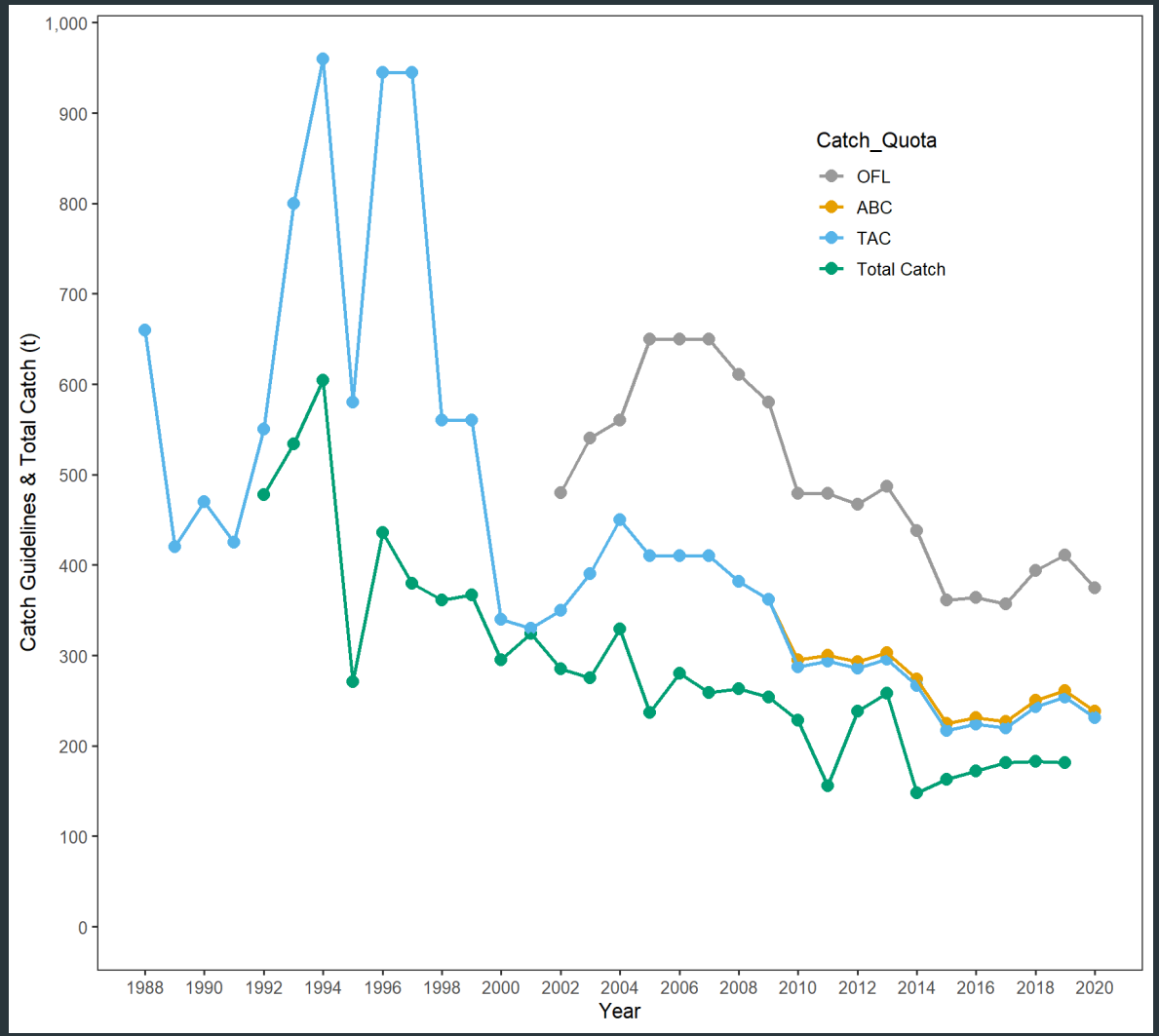
YE Biomass
Biomass Point Estimate
vs
Lower 90% CI

Species	Year	Biomass - Lower 90% CI	Biomass - Point Estimate	OFL - Lower 90% CI	OFL - Point Estimate	ABC - Lower 90% CI	ABC - Point Estimate	TAC[1] - Lower 90% CI	TAC[1] - Point Estimate
DSR	2018	11,508	15,531	394	523	250	331	243	324
	2019	12,032	16,543	411	555	261	351	254	344
	2020	10,903	15,085	375	509	238	322	231	315

YE Biomass Biomass Point Estimate vs Lower 90% CI



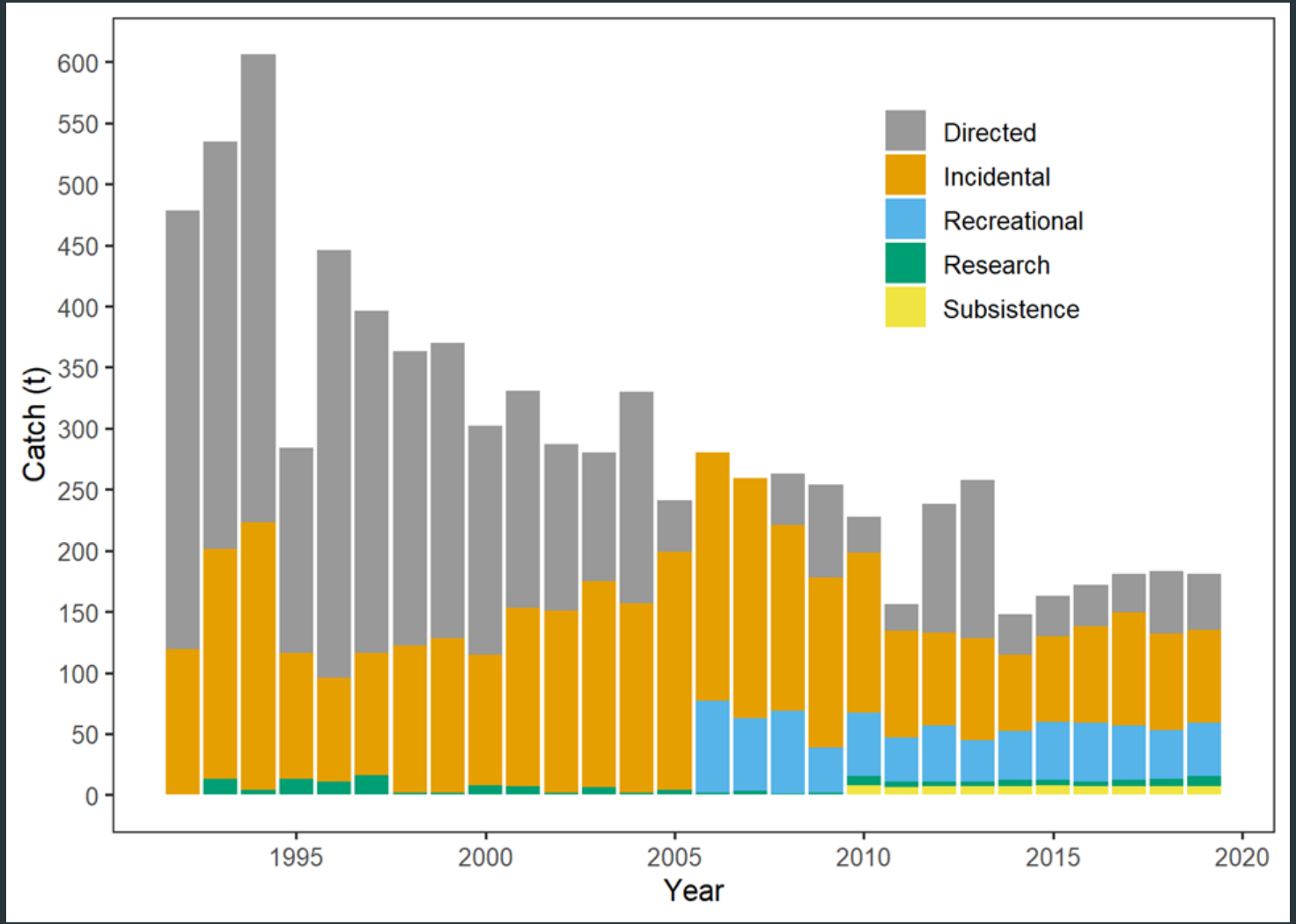
Catch Guidelines vs Total Catch



Risk Assessment Matrix

- The authors explored the risk table approach.
- Seeking guidance on application to a Tier 4 stock - as the questions appear geared toward age-structured assessments.
- Currently lacking adequate age data and have poor understanding of historical catch.

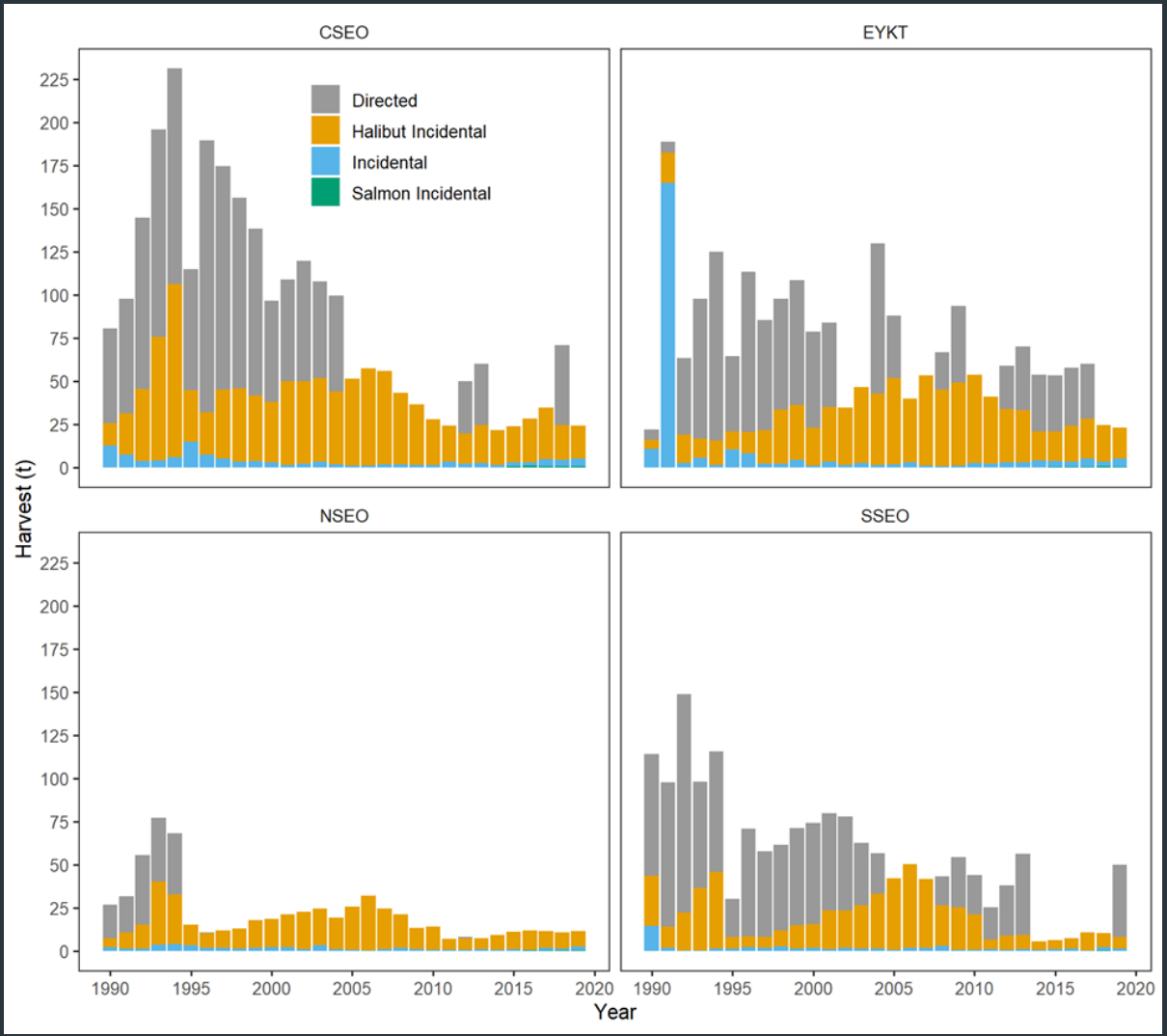
SEO DSR Catch by Sector



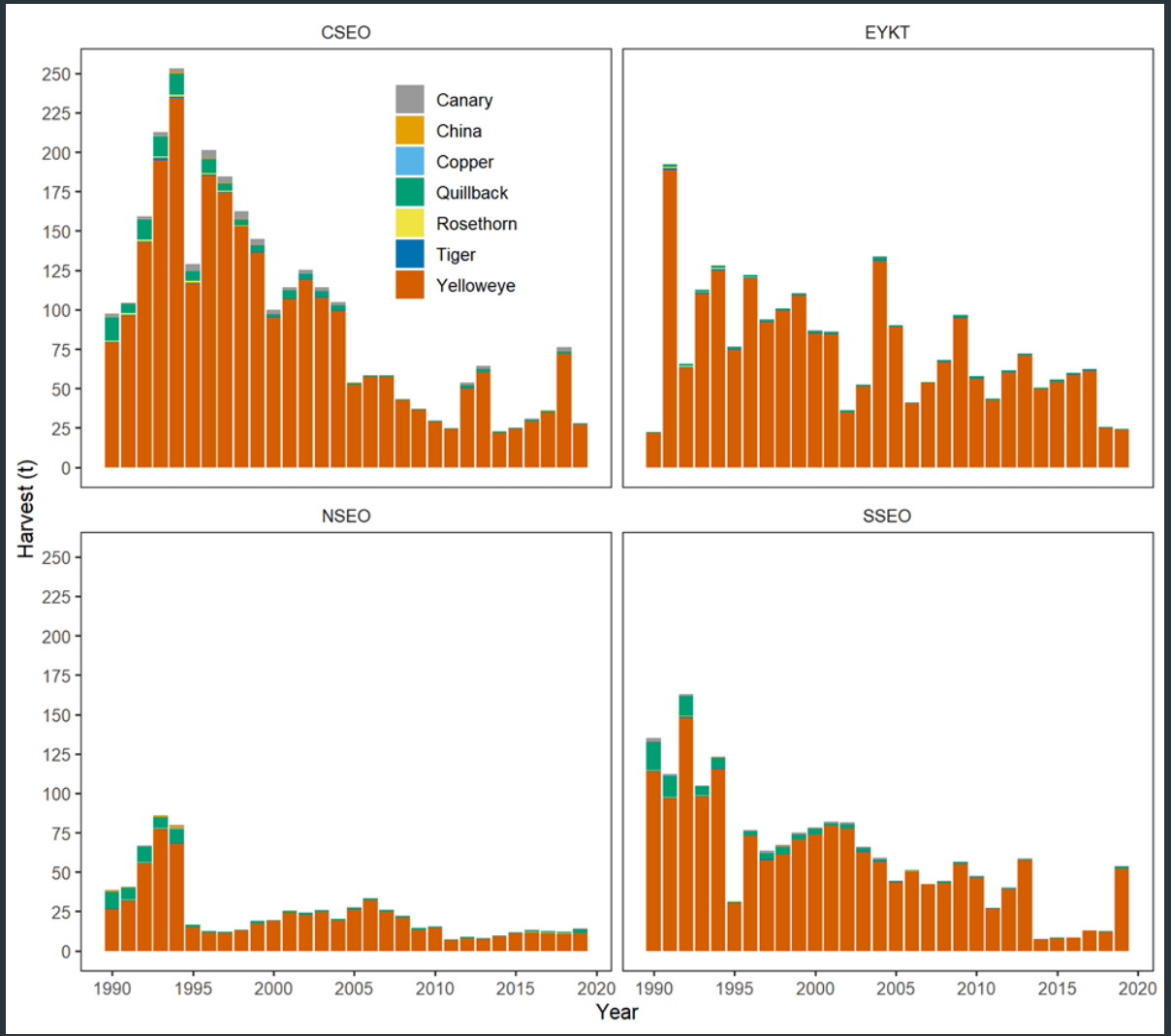
Directed and Incidental Commercial DSR Catch

Incidental commercial catch:

- Halibut fisheries
- Lingcod fisheries
- Sablefish fisheries
- Pacific cod fisheries
- Salmon troll fisheries (2015-present)



Commercial DSR Harvest by Species



Recommended Allocation

2020 Recommended ABC = 238 mt

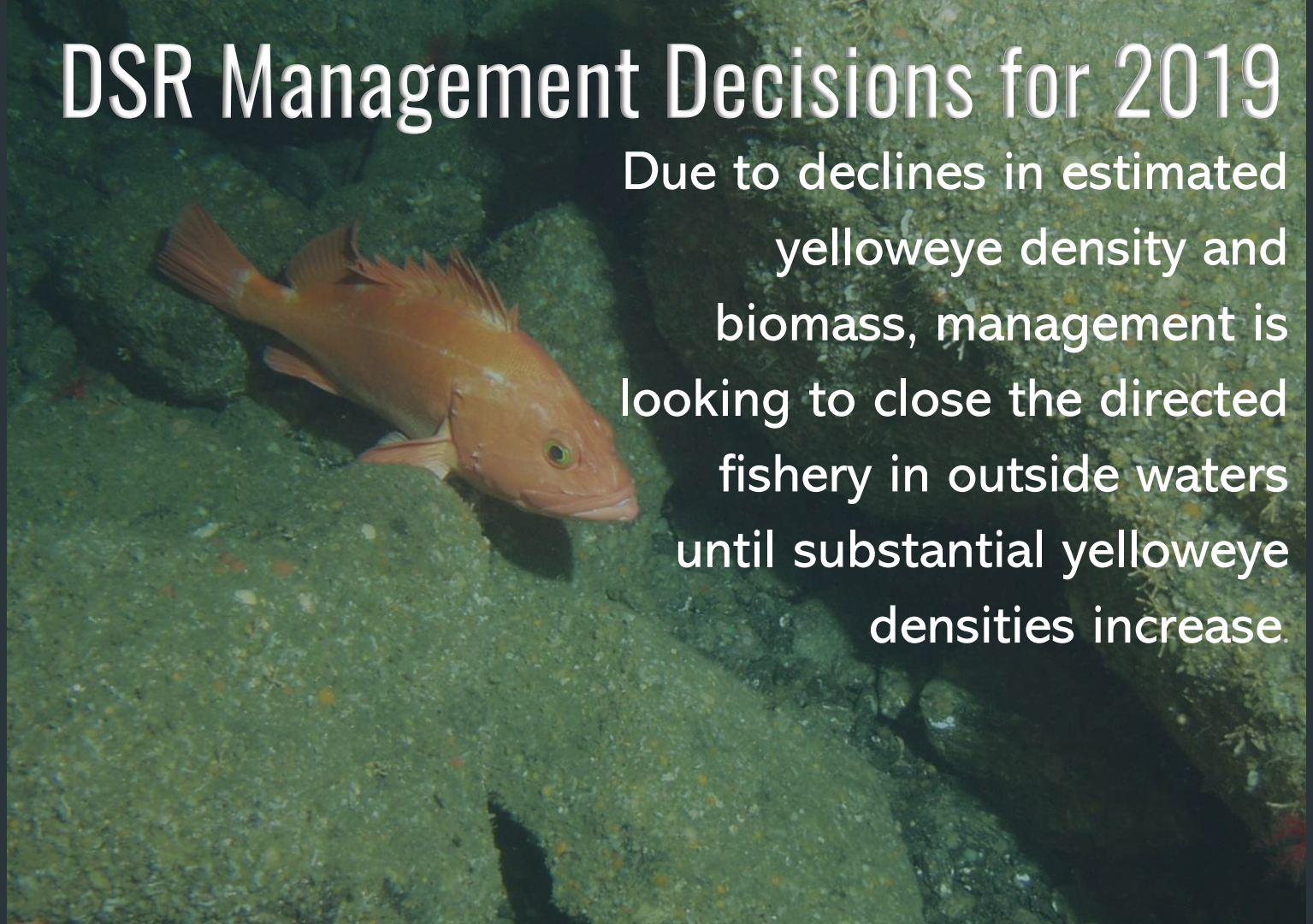
238 t– 7 t (Subsistence Catch) = 231 t

Allocation: 84% Commercial / 16% Sport

194 t to Commercial / 37 t to Sport



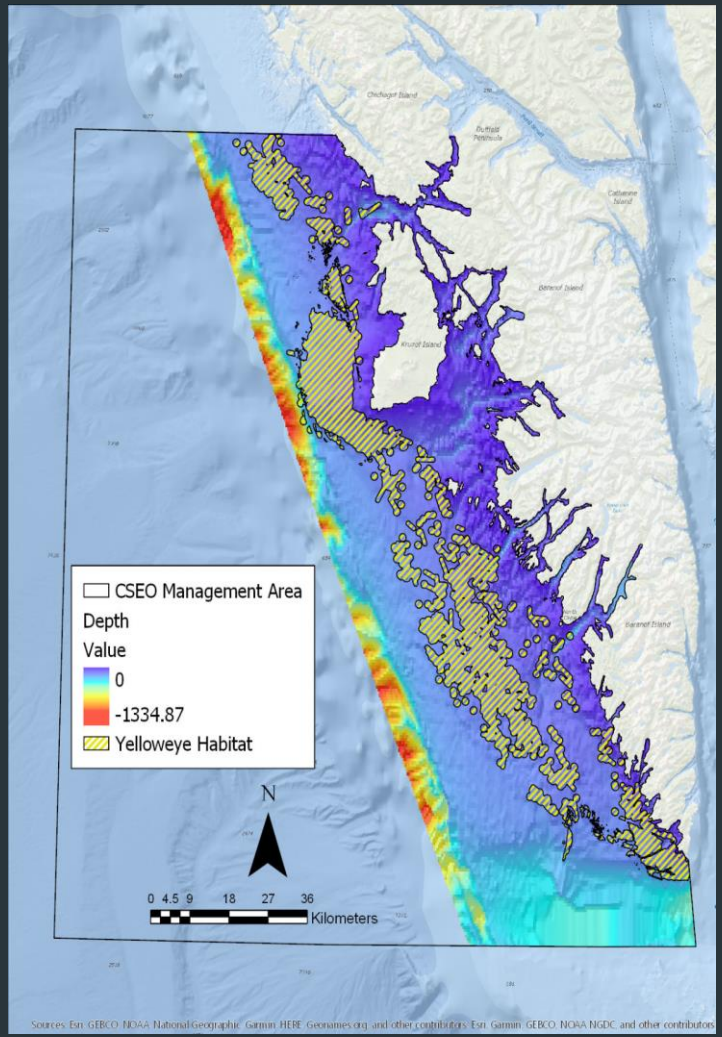

DSR Management Decisions for 2019



Due to declines in estimated yelloweye density and biomass, management is looking to close the directed fishery in outside waters until substantial yelloweye densities increase.

Future Research

- Age-structured assessment.
- Increase survey consistency for mgt areas.
- Survey video review and analysis of EYKT 2019/early 2020.
- SSEO survey in 2020.
- Updating habitat maps using available information from NOAA, USGS, and Alaska Longliners Fisheries Association (ALFA).
- Develop YE habitat suitability model for survey area stratification.
- ADF&G Statewide Rockfish Initiative



Funding

This presentation was prepared by the Alaska Department of Fish and Game using Federal funds under award NA14NMF4370066 from NOAA Fisheries AK Region, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA Fisheries or the U.S. Department of Commerce.

Questions?