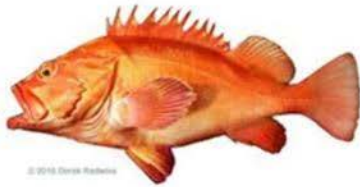

SEO Demersal Shelf Rockfish Stock Assessment for 2021

Kellii Wood, Rhea Ehresmann,
and Mike Jaenicke

November 2020



DSR COMPLEX



Yelloweye
(*S. ruberrimus*)



Quillback
(*S. maliger*)



Tiger
(*S. nigrocinctus*)



China
(*S. nebulosus*)



Canary
(*S. pinniger*)



Copper
(*S. caurinus*)



Rosethorn
(*S. helvomaculatus*)

Stock Assessment Survey

Four Management Areas:

Eastern Yakutat (EYKT)

Northern Southeast Outside (NSEO)

Central Southeast Outside (CSEO)

Southern Southeast Outside (SSEO)

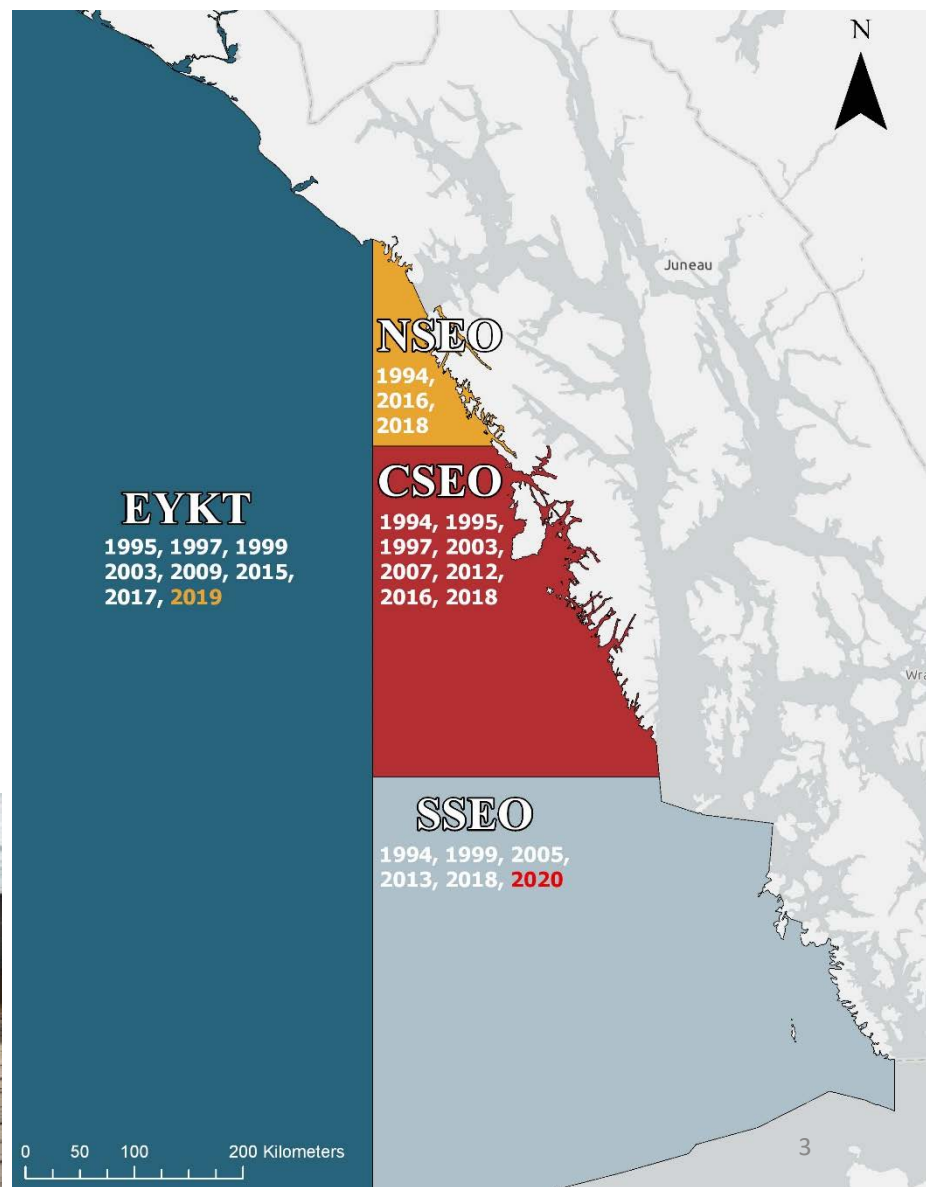
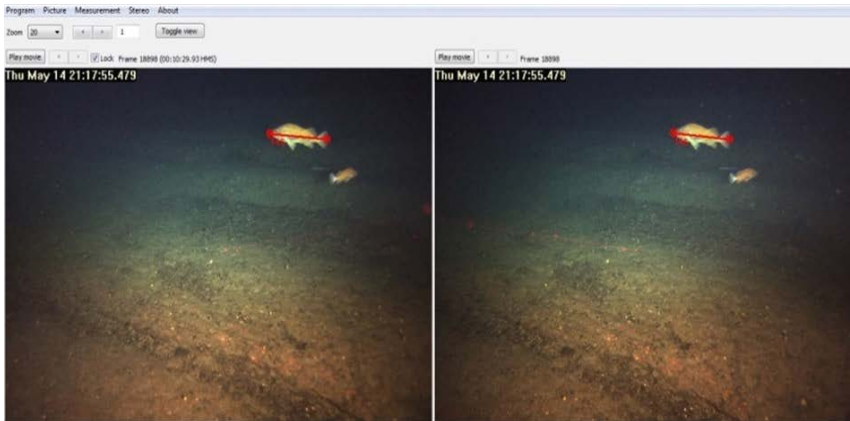
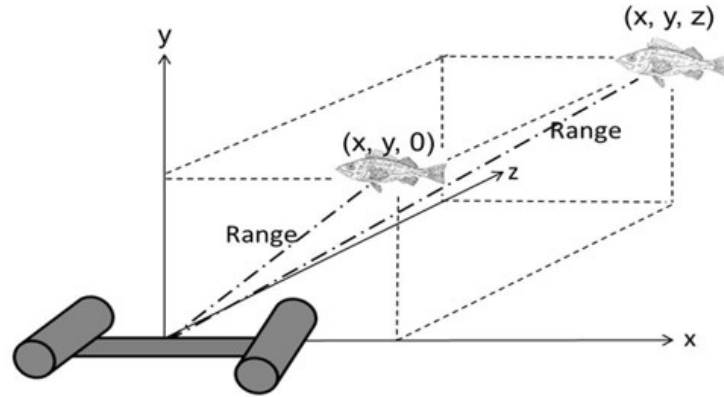


Photo credit: ADF&G

Video Review Process



**Stereo Camera
EventMeasure**



**Snout to Tail Length
Measurement**

Biomass Calculation* - Tier 4

Average weight of
yelloweye by
management area



Commercial
fisheries port
sampling data

Area of rocky
habitat by
management area



Bathymetry and
historic catch
locations

Density of
yelloweye by
management area



ROV stock
assessment
survey

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

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

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

Tier 6 Stock Assessment: Other DSR Species

Quillback, Tiger, China, Canary, Copper, and Rosehorn.

OFL & ABC

Derived from commercial, recreation, and subsistence* (2010 to 2014) fishery estimates.

Other DSR - Tier 6

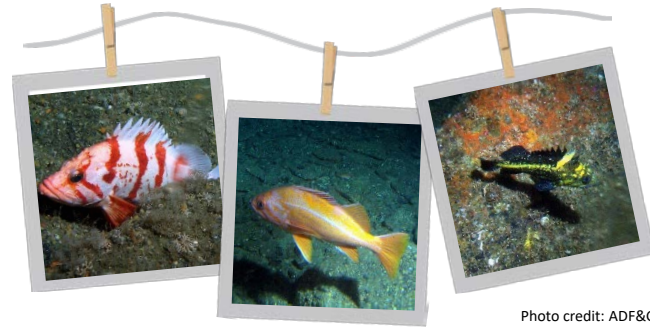



Photo credit: ADF&G

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

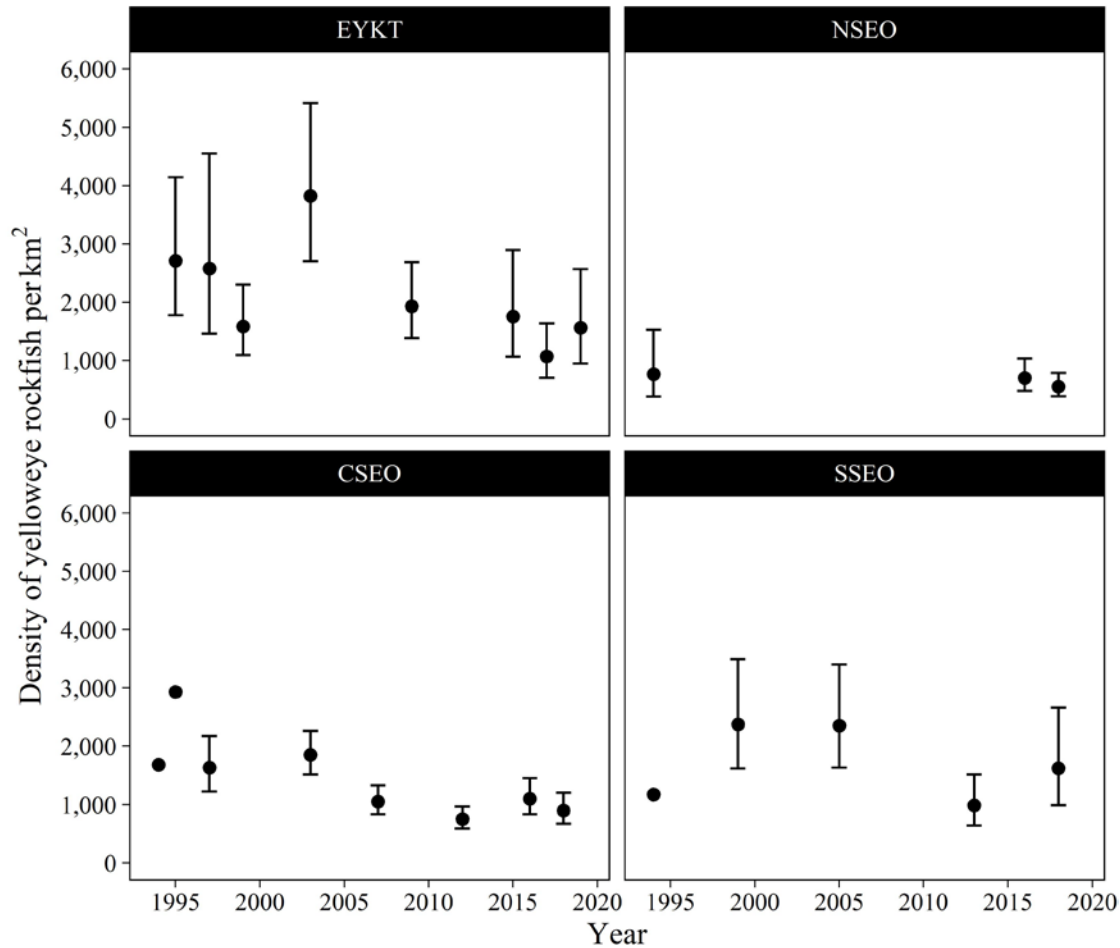
*As per correspondence with the Division of Subsistence in **August of 2020**, household subsistence surveys have not been updated since 2015 due to lack of funding.

Density Estimates



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
	2019	33	288	33,653	0.009	1,562	951	2,566	0.25
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)



Model Input Data and Methods



DATA INPUT

2019 weights from
port sampling

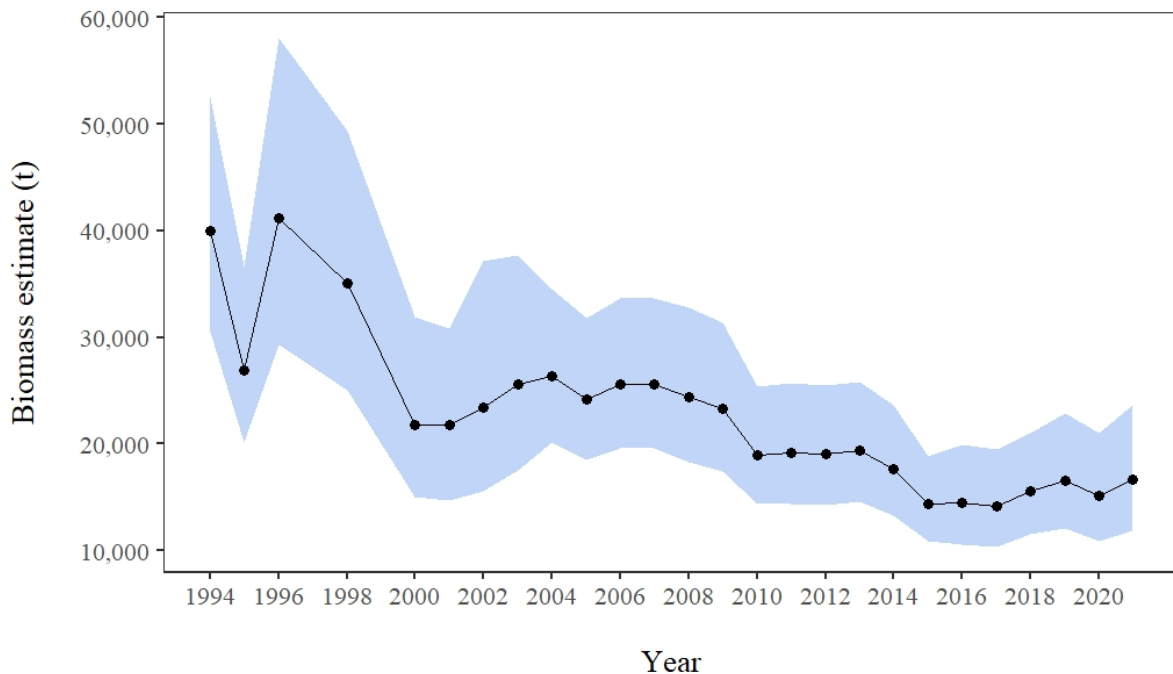


METHODOLOGY

Tier 4 yelloweye
rockfish + Tier 6 other
DSR calculations

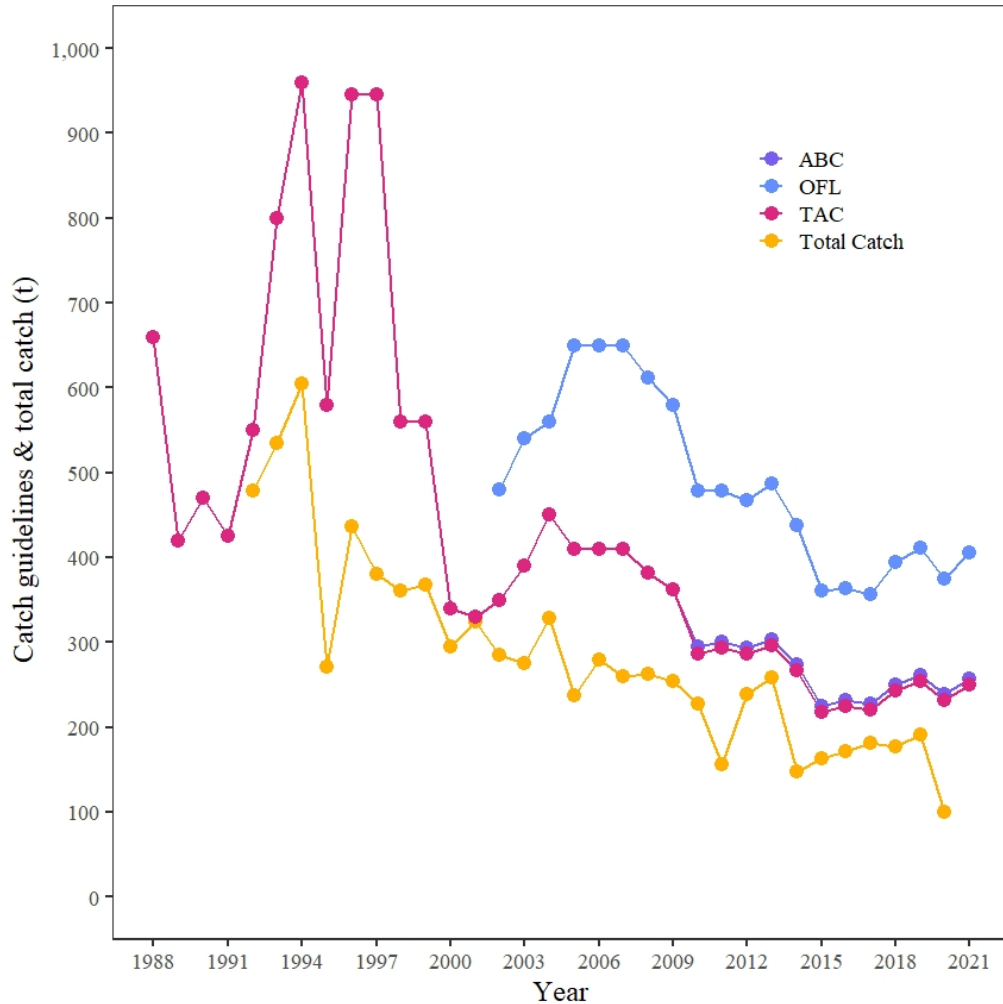
Quantity	An estimated or <i>specified</i> last year for:		As estimated or <i>recommended</i> this year for:	
	2020	2021	2021	2022
M (natural mortality rate)	0.02	0.02	0.02	0.02
Tier	4	4	4	4
Yelloweye Biomass (t)	10,903		11,852	
$F_{OFL}=F_{35\%}$	0.032	0.032	0.032	0.032
$maxF_{ABC}$	0.026	0.026	0.026	0.026
F_{ABC}	0.02	0.02	0.02	0.02
DSR OFL (t)	375	375	405	405
DSR max ABC (t)	303	303	328	328
DSR ABC (t)	238	238	257	257
Status	As determined last year for:		As determined this year for:	
	2018	2019	2019	2020
Overfishing	No	n/a	No	n/a

Biomass Point Estimate vs Lower 90% CI

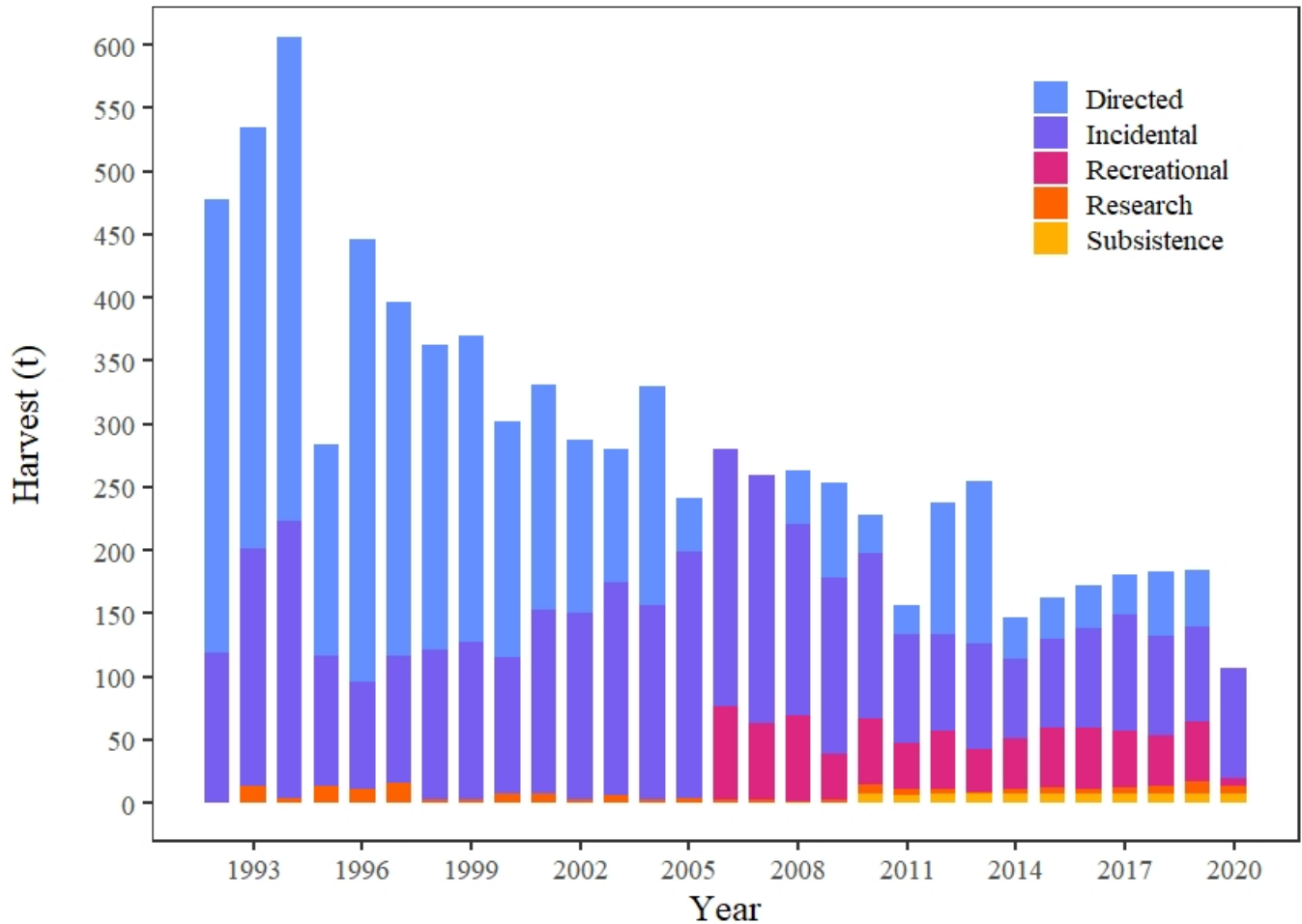


Species	Year	Biomass Lower 90% CI	Biomass Point Estimate	OFL Lower 90% CI	OFL Point Estimate	ABC Lower 90% CI	ABC Point Estimate	TAC ¹ Lower 90% CI	TAC ¹ Point Estimate
DSR	2018	11,508	15,531	394	523	250	331	243	324
	2019	12,032	16,543	411	555	261	351	254	344
	2020	10,903	15,085	375	509	238	322	231	315
	2021	11,852	16,693	405	560	257	354	250	347

Catch Guidelines vs Total Catch



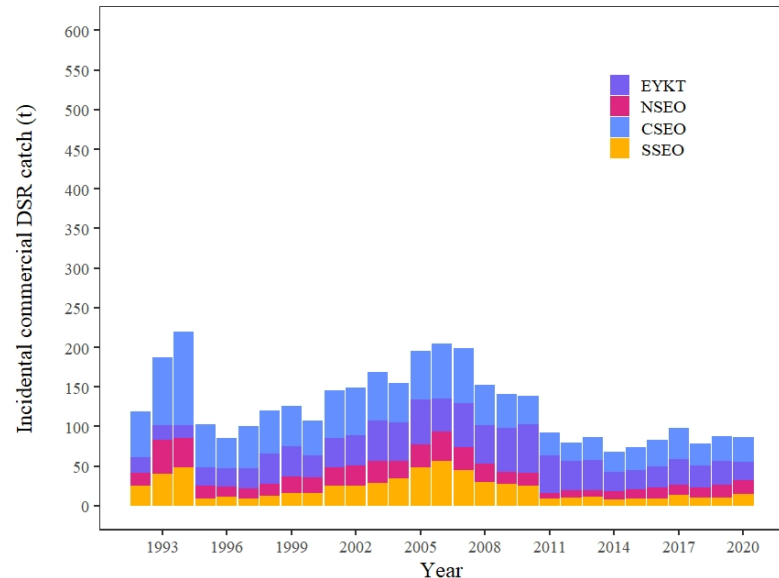
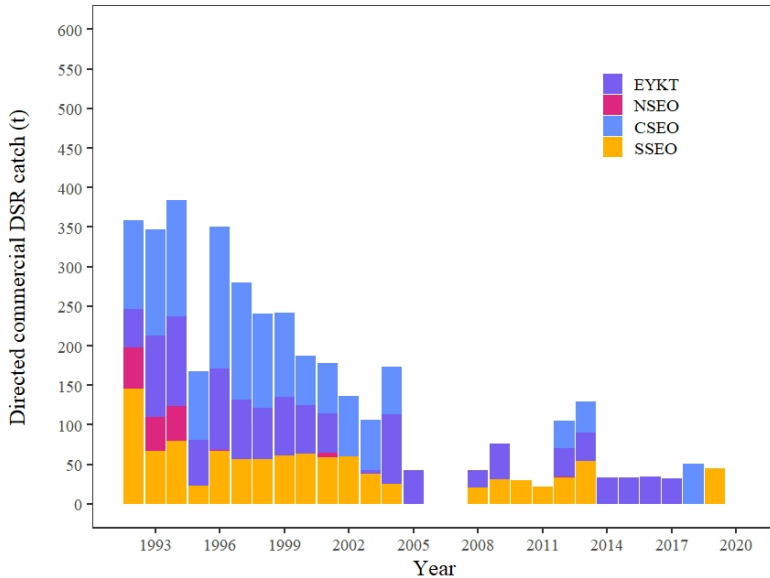
SEO DSR Catch by Sector



Directed and Incidental DSR Harvest by Management Area

Incidental Commercial Catch Includes:

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





2021 Recommended ABC

257 t



Total Allowable Catch

257 - 7t (Subsistence) = 250 t



Allocation

84% Commercial catch

16% Recreational catch



Allocation to Each Fishery

Commercial fishery: 210 t

Recreational fishery: 40 t

DSR Management Decisions

2020

- General decline in estimated YE biomass.
- Both commercial and recreational fisheries were closed in all marine waters of Southeast Alaska in 2020.

2021

- Decision to be made early next year.





Future Research

1

Assessments

- Age-structured assessment
 - Risk assessment in 2021
-

2

SEO Surveys

- SSEO: August of 2020
 - CSEO and NSEO: August of 2021
 - EYKT: August of 2022
-

3

Habitat Work & Programmatic Review

- Update habitat for SEO
- Survey stratification
- Internal programmatic review

SRI and SS-DL Tool

Statewide Rockfish Initiative (SRI) priorities:

- Manage at appropriate harvest levels or harvest rates.
- Maintain optimum spawning populations.
- Maintain and sustain fishing opportunity.



SS-DL Tool

Jason Cope – NWFSC/NOAA Fisheries

- Integrated statistical catch-at-age model.
- Leading stock assessment approach: **Stock Synthesis**.
- Flexible framework applied to more data-limited situations.
- Stock assessment tool.
- Can utilize age data.
- Working on indices of abundance.
- <https://github.com/shcaba/SS-DL-tool>



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Questions?

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