
SEO Demersal Shelf Rockfish Stock Assessment for 2022

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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:
East Yakutat (EYKT)
Northern Southeast Outside (NSEO)
Central Southeast Outside (CSEO)
Southern Southeast Outside (SSEO)

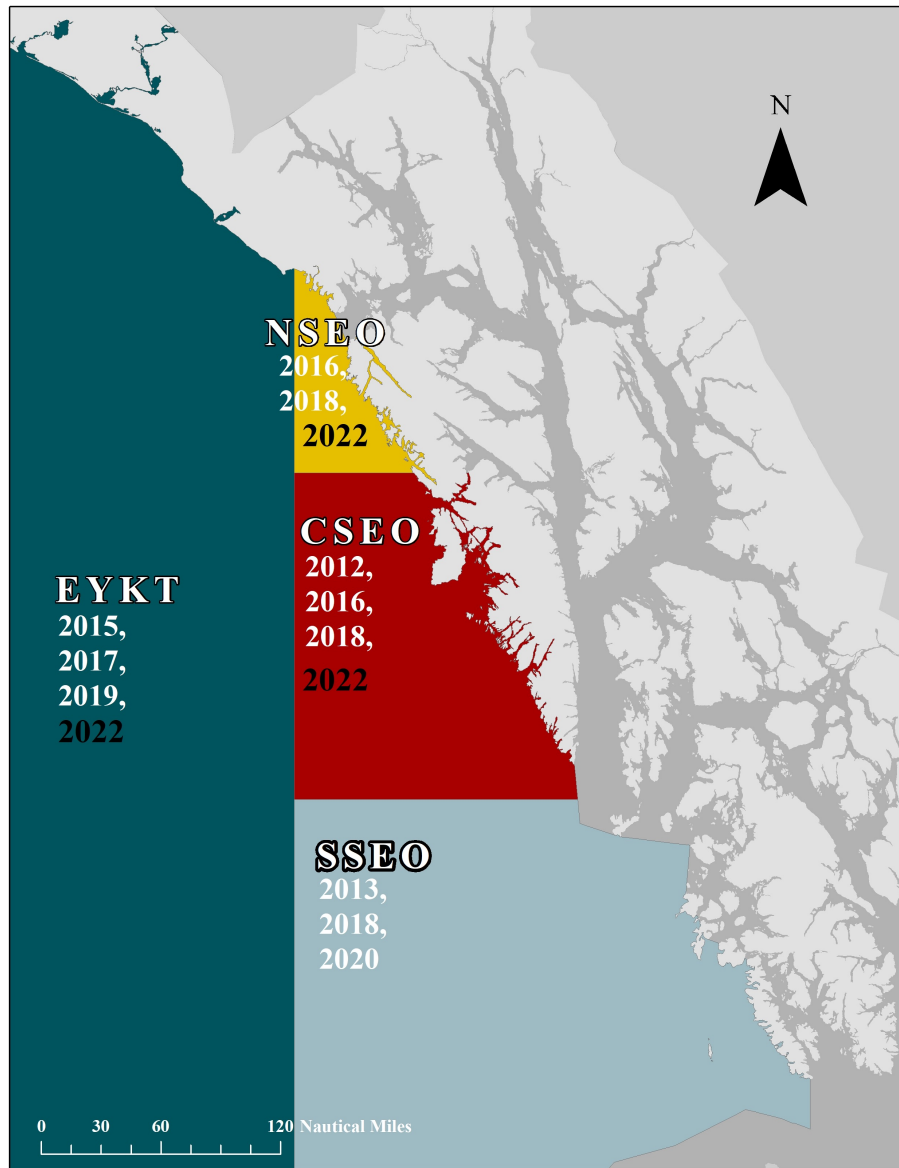
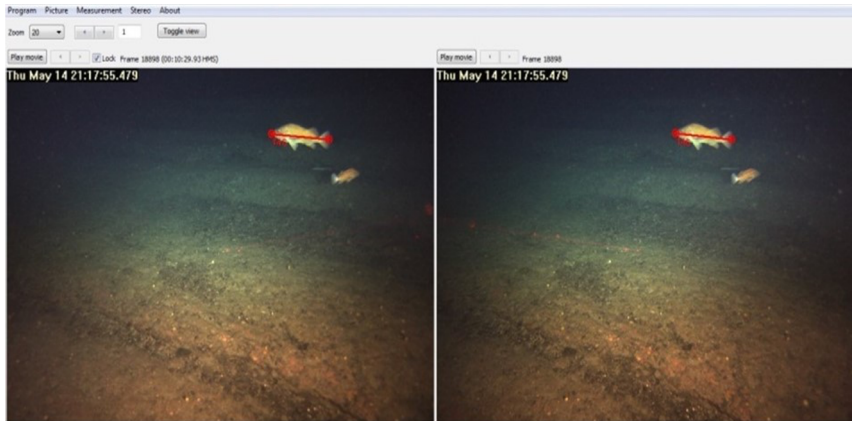
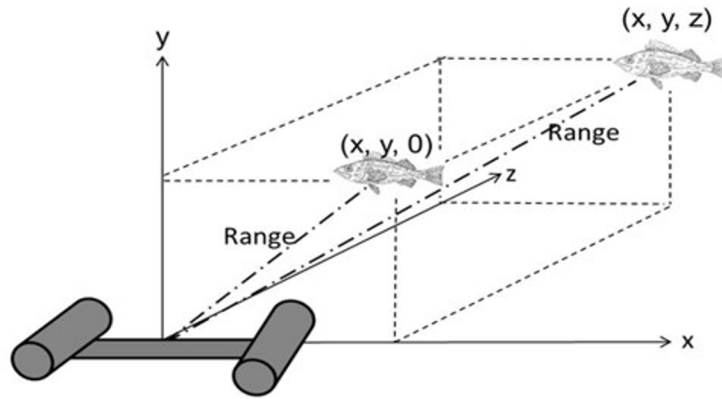


Photo credit: ADF&G

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

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

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

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

*Based on the total biomass of yelloweye rockfish.

Tier 6 Stock Assessment: Other DSR Species

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

OFL & ABC

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

Other DSR - Tier 6

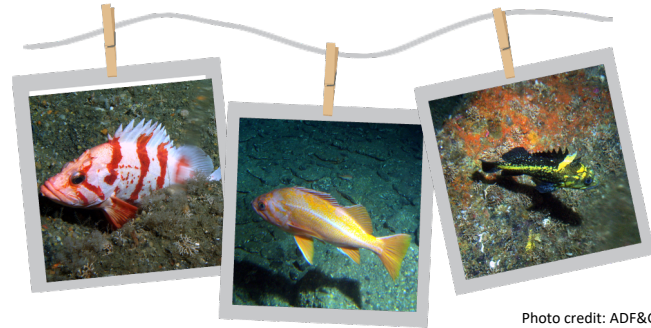


Photo credit: ADF&G

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

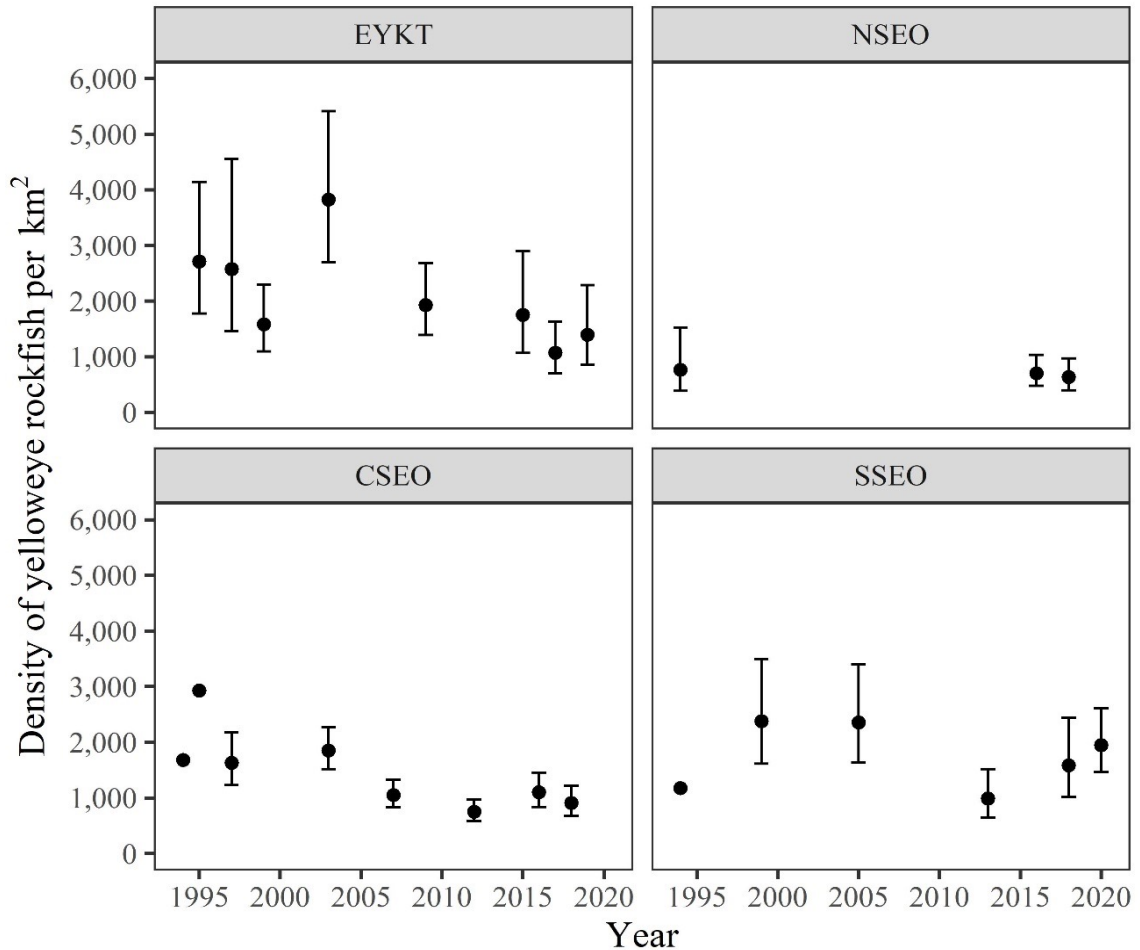
*As per correspondence with the Division of Subsistence in **August of 2021**, household subsistence surveys have not been updated since 2015 due to lack of funding.

Density Estimates



Area	Year	Number transects	Number YE ^b	Meters surveyed	Encounter rate (YE/m)	Density (YE/km ²)	Lower CI (YE/km ²)	Upper CI (YE/km ²)
EYKT ^a	1995	17	330	22,896	0.014	2,711	1,776	4,141
	1997	20	350	19,240	0.018	2,576	1,459	4,549
	1999	20	236	25,198	0.009	1,584	1,092	2,298
	2003	20	335	17,878	0.019	3,825	2,702	5,415
	2009	37	215	29,890	0.007	1,930	1,389	2,682
	2015	33	251	22,896	0.008	1,755	1,065	2,891
	2017	35	134	33,960	0.004	1,072	703	1,635
	2019	33	288	33,653	0.009	1,397	850	2,286
NSEO	1994 ^c	13	62	17,622	0.004	765	383	1,527
	2016	36	125	34,435	0.004	701	476	1,033
	2018	30	95	29,792	0.003	637	395	969
CSEO	1994 ^c	-	-	-	-	1,683	-	-
	1995	24	235	39,368	0.006	2,929	-	-
	1997	32	260	29,273	0.009	1,631	1,224	2,173
	2003	101	726	91,285	0.008	1,853	1,516	2,264
	2007	60	301	55,640	0.005	1,050	830	1,327
	2012	46	118	38,590	0.003	752	586	966
	2016	32	160	30,726	0.005	1,101	833	1,454
	2018	35	193	33,700	0.006	910	675	1,216
SSEO	1994 ^c	13	99	18,991	0.005	1,173	-	-
	1999	41	360	41,333	0.009	2,376	1,615	3,494
	2005	32	276	28,931	0.010	2,357	1,634	3,401
	2013	31	118	30,439	0.004	986	641	1,517
	2018	32	345	31,073	0.011	1,582	1,013	2,439
	2020	33	349	32,828	0.011	1,949	1,459	2,604

Sub/ROV Density Estimates (95% CI)



Model Input Data and Methods



DATA INPUT

Ave weights from port sampling

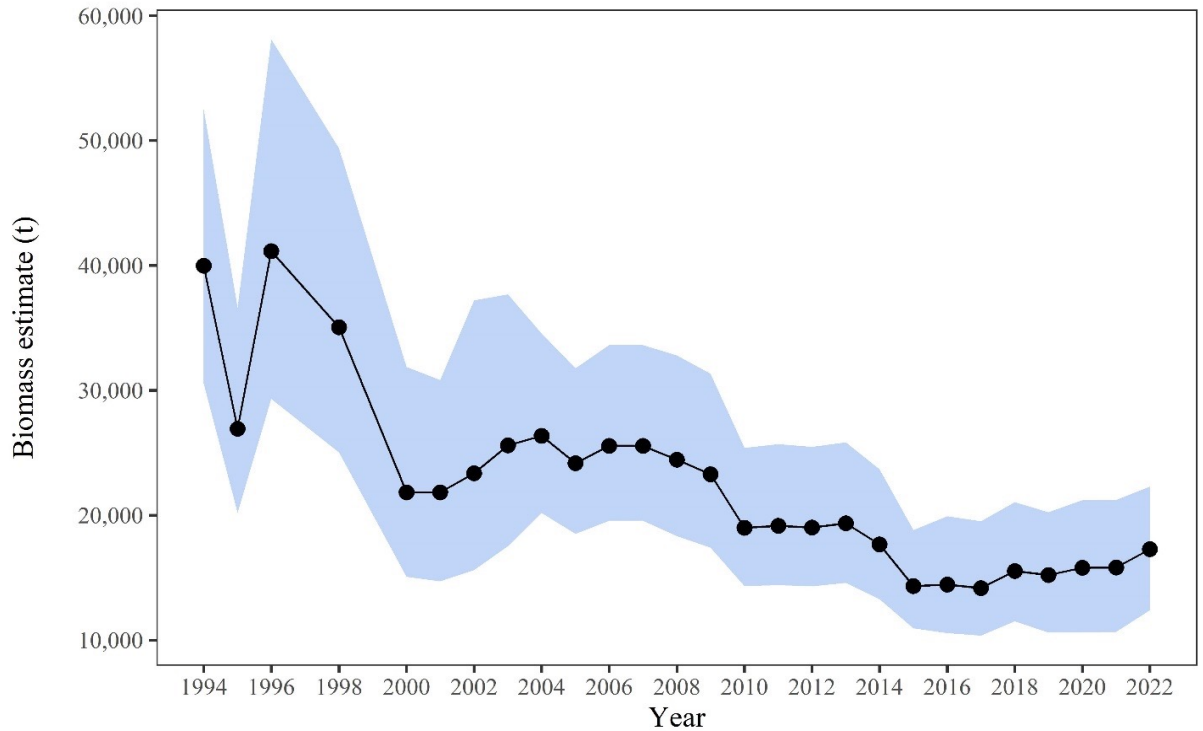


METHODOLOGY

Tier 4 yelloweye rockfish + Tier 6 other DSR calculations

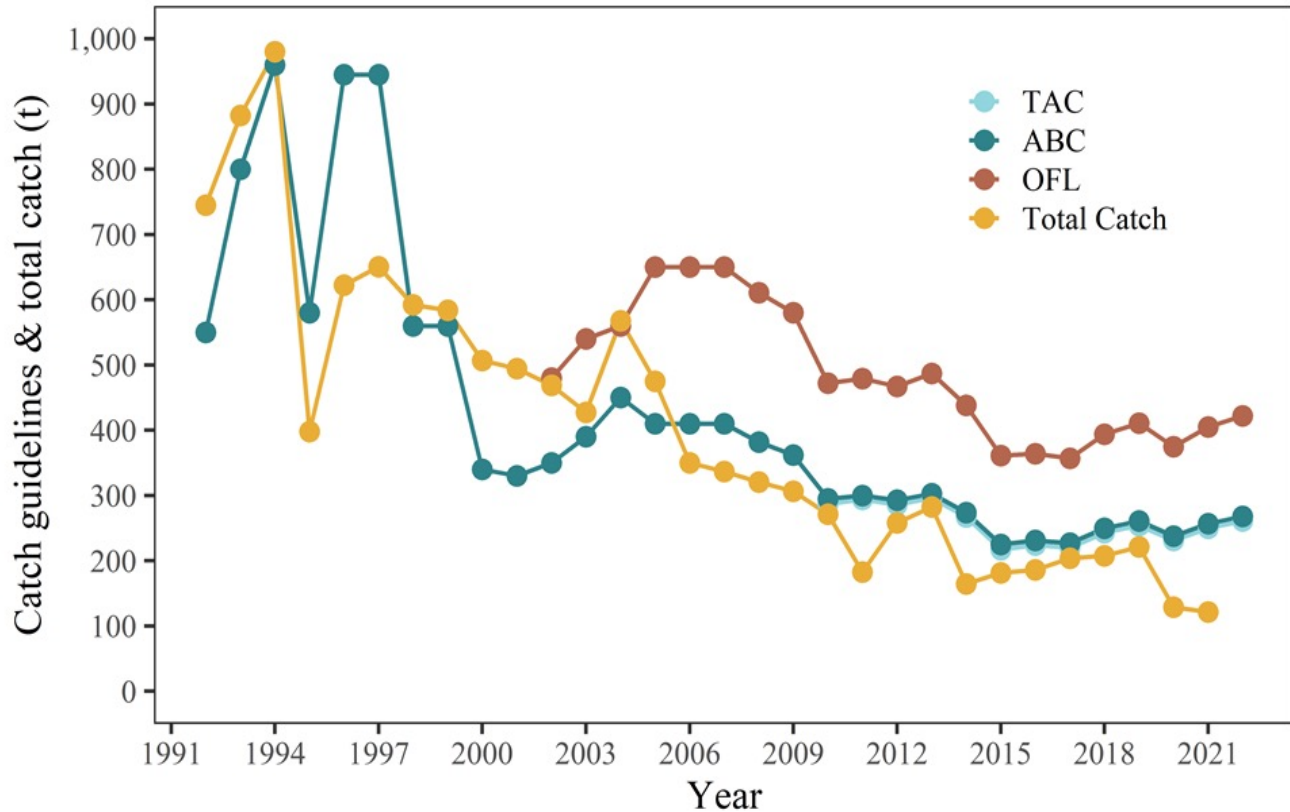
Quantity	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2021	2022	2022	2023
M (natural mortality rate)	0.02	0.02	0.02	0.02
Tier	4	4	4	4
Yelloweye Biomass (t)	10,648		12,388	
$F_{OFL} = F_{35\%}$	0.032	0.032	0.032	0.032
$maxF_{ABC}$	0.026	0.026	0.026	0.026
F_{ABC}	0.020	0.020	0.020	0.020
DSR OFL (t)	405	405	422	422
DSR max ABC (t)	328	328	342	342
Recommended ABC (t)	257	257	268	268
Status	As determined last year for:		As determined this year for:	
	2019	2020	2020	2021
Overfishing	No	n/a	No	n/a

Biomass Point Estimate vs Lower 90% CI

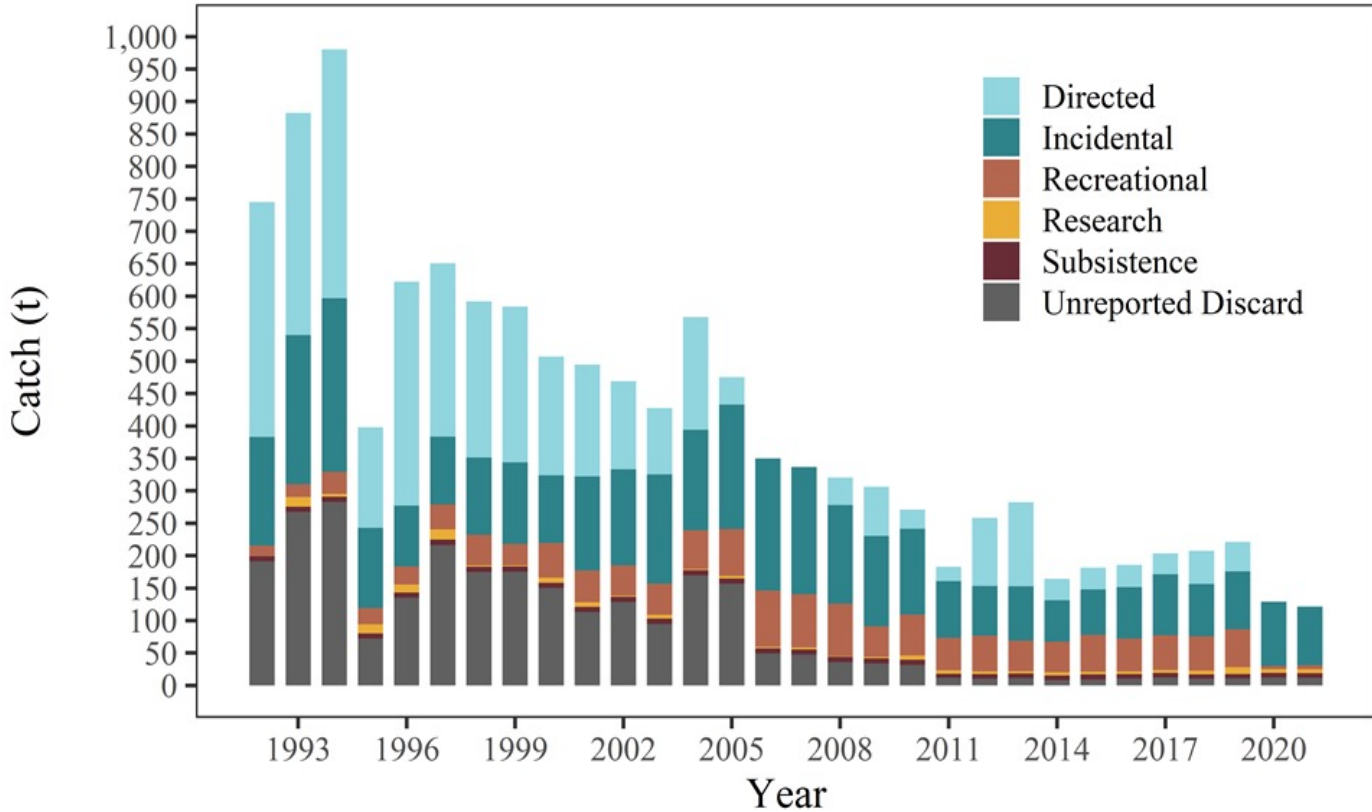


Species	Year	Biomass Lower 90% CI	Biomass Point Estimate	OFL Lower 90% CI	OFL Point Estimate	ABC Lower 90% CI	ABC Point Estimate	TAC ¹ Lower 90% CI	TAC ¹ Point Estimate
DSR	2020	10,620	15,782	375	509	238	322	231	315
	2021	10,648	15,800	405	560	257	354	250	347
	2022	12,388	17,273	422	579	268	365	261	358

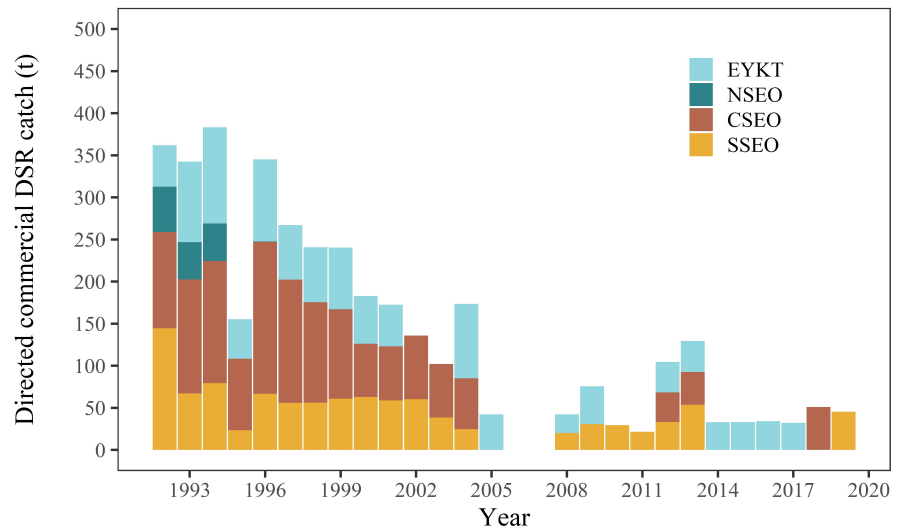
Catch Guidelines vs Total Catch



SEO DSR Catch by Sector

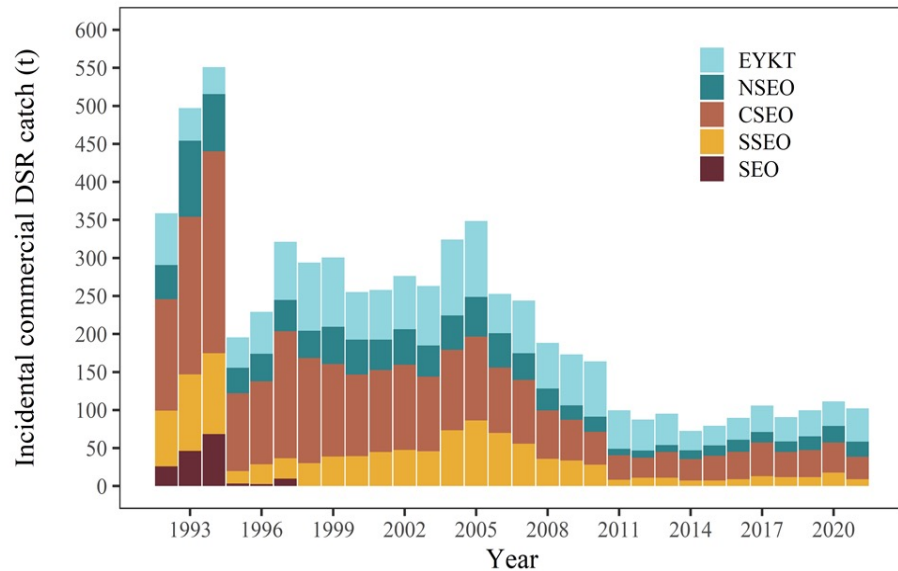


Directed and Incidental DSR Harvest by Management Area



Incidental Commercial Catch Includes:

- Halibut fisheries
- Lingcod fisheries
- Sablefish fisheries
- Pacific cod fisheries
- Salmon troll fisheries



Risk Assessment: Assessment Considerations

Assessment Related Considerations (**LEVEL 2**):

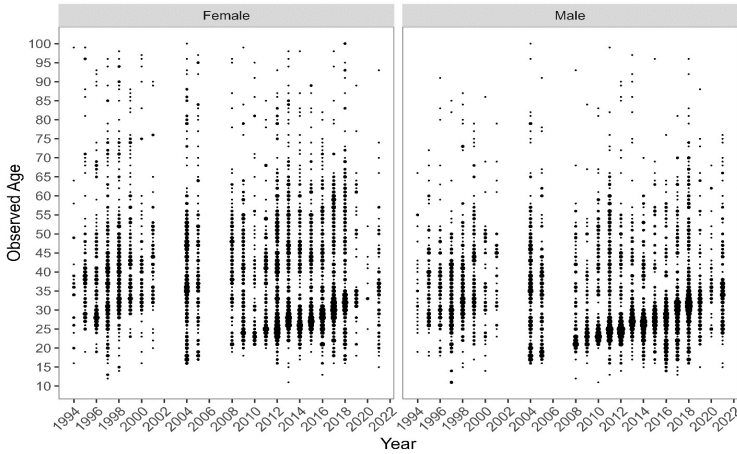
- No age-structured assessment
- Variability in habitat estimate, which is used for biomass estimate
- Years between surveyed management areas can be high

Risk Assessment: Population Dynamics Considerations

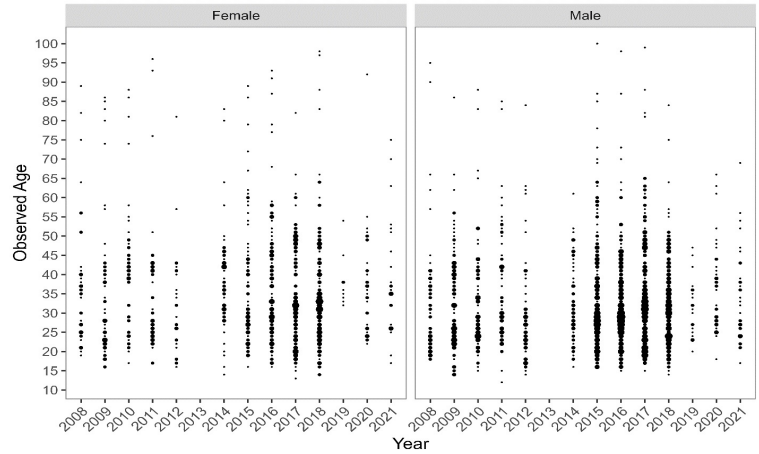
Population Dynamics Considerations (LEVEL 2):

- DSR are vulnerable to overexploitation and slow to recover
- 60% biomass decline since 1994 despite conservative management
- Trends in biological data show truncation of age classes
- Future recruitment is uncertain
- Current lack of age-structured assessment

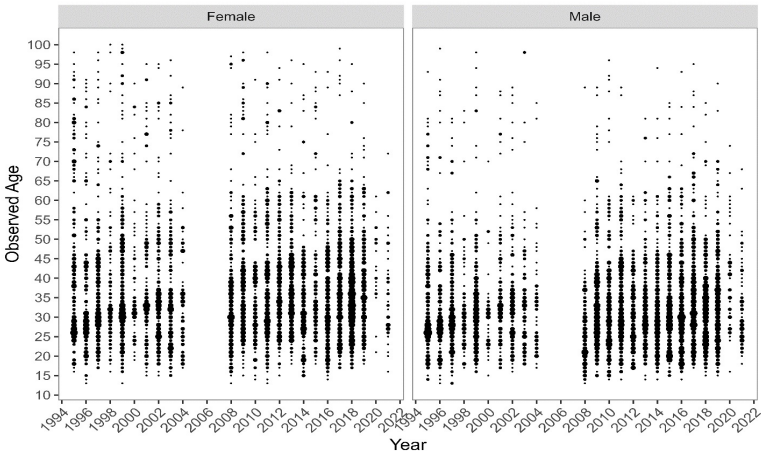
Yelloweye rockfish age compositions from SEO



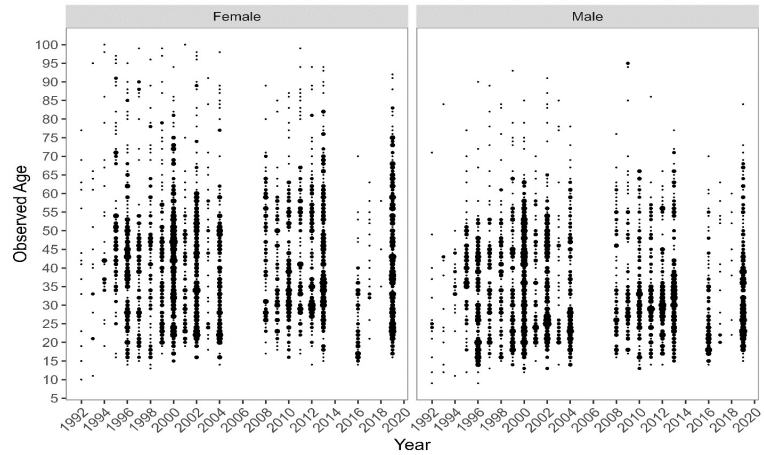
EYKT



NSEO



CSEO



SSEO

Risk Assessment: Environmental/Ecosystem Considerations

Environmental/Ecosystem Considerations (LEVEL 1):

- The prey base for yelloweye rockfish and the minor group is potentially average to good.
- No cause to suspect increased predation pressure on larval or adult DSR rockfish.
- Deeper ocean and surface temperatures will provide good spawning and juvenile habitat.

Risk Assessment: Fishery Performance Considerations

Fishery Performance Considerations (**LEVEL 2**):

- Recent fishery closures
- Conservation concerns
- Increases in bycatch harvests

Risk Assessment

Overall score = 2, substantially increased concern

There is a continued need to set the ABC below the max permissible.

<i>Assessment-related considerations</i>	<i>Population dynamics considerations</i>	<i>Environmental/ecosystem considerations</i>	<i>Fishery Performance considerations</i>	<i>Overall score (highest of the individual scores)</i>
Level 2: Substantially increased concerns	Level 2: Substantially increased concerns	Level 1: Normal	Level 2: Substantially increased concerns	Level 2: Substantially increased concerns



2022 Recommended ABC

268 t



Total Allowable Catch

268 t - 7t (Subsistence) = 261 t



Allocation

84% Commercial catch

16% Recreational catch



Allocation to Each Fishery

Commercial fishery: 219 t

Recreational fishery: 42 t

DSR Management Decisions

2021

Both commercial and recreational fisheries were closed in all marine waters of Southeast Alaska in 2021.

2022

Decision to be made early next year.





Future Research

1

Assessments

Age-structured assessment for next full assessment.

2

SEO Surveys

- CSEO/NSEO: May/June of 2022
 - EYKT: August of 2022
-

3

Habitat Work & Programmatic Review

- Update habitat for SEO
- Internal programmatic review



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Questions?

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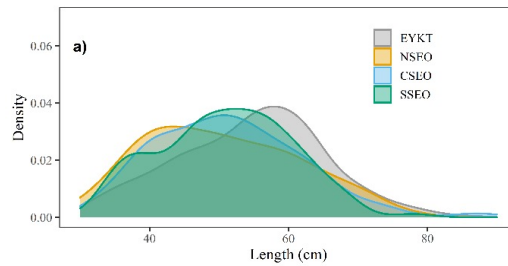
ADDITIONAL INFORMATION



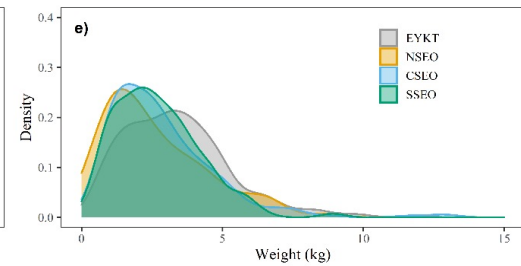
Length (cm) and Weight (kg) Distributions

ROV Survey vs Commercial Fishery

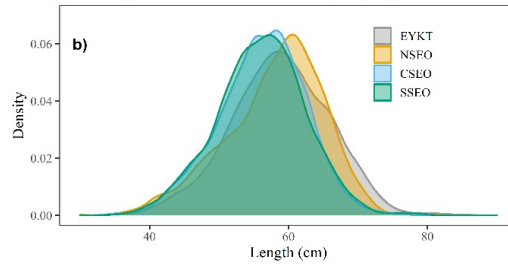
Yelloweye ROV Survey



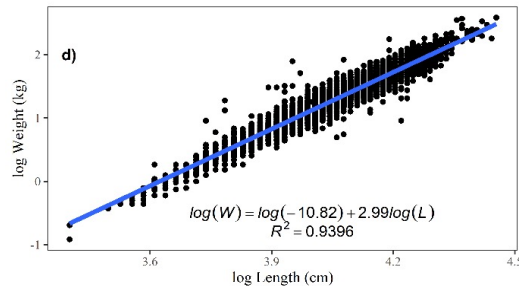
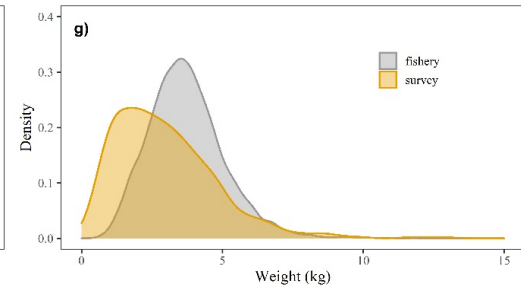
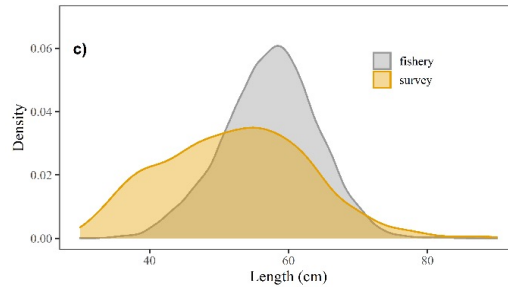
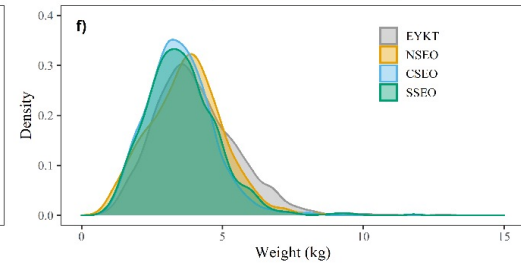
Yelloweye ROV Survey



Yelloweye Fishery (Directed & Halibut IFQ)



Yelloweye Fishery (Directed & Halibut IFQ)



Yelloweye rockfish length compositions

