Eastern Bering Sea pollock stock assessment

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Fishing conditions

Pollock CPUE (by weight)

Catch rates by sector



Fishery data on pollock "condition"

• Relative [figure 26 updated in SAFE chapter]



Fishery data on pollock "condition"





Fishery weight-at-age

					Fisl	hery							Sur	vey						F	Pred	icteo	k				
	1970																	0.38 0.37 0.4 0.38 0.41	0.49 0.51 0.49 0.54 0.52	0.61 0.63 0.64 0.64 0.68	0.72 0.75 0.76 0.78 0.78	0.83 0.86 0.87 0.9 0.93	0.94 0.97 0.98 1 1.03	1.05 1.07 1.08 1.11 1.14	1.14 1.16 1.17 1.2 1.23		
	1980									0.18 0.21 0.22	0.34 0.34	0.41 0.54 0.43	0.78 0.77 0.6	1.05 1.02 0.93	1.19 1.45	1.4 1.41 1.27	1.57 1.67 1.47	0.36 0.41 0.36 0.41 0.38 0.38 0.36 0.35 0.41 0.42	0.65 0.7 0.5 0.6 0.55 0.48 0.52 0.52	0.77 0.8 0.79 0.84 0.7 0.81 0.76 0.67 0.66 0.62	0.93 0.92 1.09 0.94 1.04 0.91 0.99 0.89 0.85 0.75	1.02 1.07 1.2 1.23 1.14 1.25 1.08 1.11 1.06 0.94	1.16 1.35 1.34 1.42 1.33 1.41 1.2 1.28 1.15	1.29 1.42 1.48 1.52 1.6 1.49 1.53 1.36	1.34 1.38 1.53 1.55 1.65 1.69 1.75 1.6 1.67 1.43		
	1990	0.28	0.48	0.6	0.73	0.84	0.88	1.02	1.12	0.22 0.23 0.17 0.25 0.28 0.17 0.19 0.2 0.25	0.37 0.31 0.33 0.33 0.33 0.28 0.36 0.33 0.4	0.48 0.41 0.42 0.45 0.37 0.48 0.57 0.46	0.72 0.61 0.55 0.49 0.55 0.54 0.65 0.57	0.91 0.77 0.72 0.59 0.66 0.61 0.78 0.76	1.21 1.02 0.85 0.81 0.84 0.73 0.86 0.77	1.72 1.3 1.01 0.91 1.03 1.03 1.02 0.93	1.44 1.65 1.26 1.04 1 0.98 1.1 1.01	0.42 0.38 0.42 0.38 0.33 0.33 0.34 0.33 0.43	0.54 0.51 0.47 0.49 0.46 0.47 0.46 0.46	0.62 0.63 0.6 0.54 0.57 0.61 0.6 0.59	0.74 0.69 0.7 0.68 0.63 0.72 0.74 0.73	0.88 0.8 0.78 0.77 0.76 0.77 0.85 0.87	1.06 0.94 0.89 0.85 0.85 0.9 0.89 0.97	1.26 1.12 1.02 0.96 0.93 0.98 1.01 1.01	1.47 1.31 1.19 1.08 1.03 1.05 1.09 1.12		
Year	2000	0.49 0.39 0.34 0.33 0.37 0.4 0.35 0.33	0.61 0.65 0.51 0.45 0.48 0.59 0.51 0.53 0.5	0.65 0.73 0.73 0.68 0.56 0.62 0.64 0.63 0.67	0.77 0.75 0.84 0.75 0.62 0.7 0.73 0.73	0.93 0.73 0.85 0.95 0.89 0.78 0.73 0.73 0.78	1.06 1.07 0.96 1.07 1.04 0.89 0.81 0.99	1.2 1.38 1.23 1.03 1.1 1.17 1.04 0.97 1.06	1.24 1.32 1.3 1.1 1.24 1.25 1.25 1.01 1.13	0.25 0.21 0.17 0.15 0.19 0.21 0.22 0.22 0.22	0.41 0.4 0.36 0.3 0.28 0.33 0.35 0.4 0.36	0.46 0.54 0.48 0.49 0.38 0.45 0.39 0.47 0.62	0.55 0.67 0.58 0.53 0.52 0.53 0.52 0.52 0.73	0.65 0.62 0.76 0.67 0.81 0.62 0.72 0.72	0.78 1.05 0.79 0.82 0.78 0.89 0.88 0.76 1	0.99 1.17 0.91 0.98 1 1.08 1.04 0.92 0.98	1.11 1.28 1.02 0.97 1.29 1.01 1.03 1.03	0.49 0.41 0.33 0.38 0.44 0.41 0.4 0.38 0.38	0.61 0.61 0.51 0.42 0.48 0.53 0.51 0.51 0.53	0.65 0.74 0.72 0.6 0.53 0.58 0.64 0.62 0.67	0.78 0.84 0.81 0.71 0.63 0.69 0.75 0.75	0.92 0.97 0.93 0.92 0.81 0.73 0.79 0.9	1.04 1.03 1 0.96 1.03 1.01 0.91 0.83 0.94	1.14 1.16 1.13 1.08 1.06 1.12 1.1 1 0.97	1.17 1.24 1.24 1.2 1.17 1.14 1.21 1.19 1.14	And	omaly 0.4 0.2 0.0 –0.2
	2010	0.38 0.49 0.41 0.35 0.31 0.35 0.33 0.34	0.51 0.55 0.58 0.51 0.45 0.51 0.52 0.53	0.67 0.65 0.64 0.64 0.61 0.64 0.65 0.7	0.8 0.77 0.76 0.74 0.76 0.78 0.77 0.88	0.91 0.86 0.89 0.88 0.86 0.96 0.9 1	1.03 0.95 0.92 0.96 1.1 1.05 1.13	1.11 1.09 1.04 1.06 1.06 1.19 1.12 1.4	1.1 1.2 1.18 1.07 1.12 1.27 1.29 1.48	 0.27 0.34 0.28 0.23 0.18 0.29 0.22 0.22	0.4 0.42 0.52 0.39 0.46 0.49 0.49	0.54 0.65 0.54 0.64 0.64 0.69	0.68 0.71 0.75 0.68 0.81 0.73 0.81	0.71 0.89 0.89 0.86 0.79 0.93 0.86 1.01	0.9 0.87 0.93 0.93 0.87 1.06 0.95 1.07	1.01 1.12 1.12 0.99 1.06 1 0.99 1.12	1.05 1.24 1.03 1.22 1.17 1.31 1.15 1.36	0.43 0.47 0.34 0.33 0.36 0.3 0.3 0.34	0.52 0.55 0.49 0.45 0.51 0.53 0.53	0.65 0.64 0.65 0.66 0.64 0.65 0.73	0.79 0.77 0.74 0.74 0.77 0.79 0.79 0.89	0.9 0.87 0.83 0.85 0.96 0.93 1.01	1.02 1.01 0.95 0.94 1.03 1.09 1.15	1.05 1.12 1.1 1.08 1.06 1.11 1.16 1.3	1.08 1.15 1.21 1.17 1.18 1.21 1.23 1.35		
	2010	0.38 0.29 0.27 0.29 0.32 0.41 0.41 0.38	0.49 0.51 0.41 0.45 0.45 0.46 0.53 0.5 0.47	0.67 0.64 0.56 0.62 0.57 0.56 0.65 0.57	0.81 0.82 0.78 0.75 0.69 0.65 0.69 0.73	0.97 0.97 1.13 0.89 0.79 0.73 0.75 0.81	1.28 1.17 1.28 1.16 0.89 0.8 0.83 0.83	1.37 1.34 1.3 1.44 1.31 1.14 0.94 0.89 0.91	1.59 1.51 1.51 1.68 1.39 1.2 1.04 0.91 1.04	0.24 0.22 0.28 0.23 0.39 0.35 0.28 0.24 0.21	0.51 0.41 0.52 0.45 0.44 0.52 0.49 0.44	0.65 0.59 0.58 0.57 0.57 0.57 0.62 0.58	0.79 0.74 0.72 0.69 0.68 0.69 0.65 0.65	0.91 0.87 0.97 0.74 0.74 0.76 0.74	1.14 1.07 1.01 1.17 0.98 0.86 0.79 0.78 0.75	1.20 1.35 1.27 1.14 1.06 0.88 0.89 0.85	1.25 1.2 1.46 1.34 1.27 0.92 0.92 0.89	0.29 0.29 0.32 0.42 0.43 0.38 0.38 0.4	0.47 0.41 0.44 0.48 0.47 0.53 0.5 0.48	0.69 0.67 0.57 0.61 0.53 0.57 0.64 0.58	0.89 0.86 0.76 0.73 0.65 0.63 0.69 0.72	1.05 0.99 0.95 0.92 0.78 0.76 0.75 0.77	1.17 1.21 1.18 1.14 1.11 0.96 0.87 0.87 0.82	1.32 1.32 1.32 1.28 1.15 1.06 0.98 0.94	1.44 1.43 1.45 1.46 1.32 1.24 1.15 1.05		
	2020	0.42 0.39 0.39 0.44 0.49	0.57 0.52 0.48 0.51 0.48	0.64 0.63 0.57 0.57 0.52	0.76 0.72 0.69 0.72 0.61	0.88 0.76 0.84 0.8	0.96 0.96 0.84 0.88 0.92	1.01 1.01 1.01 0.98 0.96	1.06 1.04 1.13 0.97 1.05	0.29 0.28 0.35 0.32 0.33	0.51 0.44 0.45 0.42 0.48	0.64 0.59 0.58 0.53 0.58	0.71 0.67 0.64 0.62	0.82 0.77 0.76 0.78 0.7	0.9 0.85 0.85 0.92 0.95	0.9 0.96 0.94 0.98 1.01	0.99 1.23 0.97 1.02 1.04	0.47 0.4 0.39 0.45 0.48 0.4 0.38 0.38	0.58 0.52 0.46 0.5 0.47 0.67 0.53 0.51	0.65 0.64 0.59 0.58 0.53 0.66 0.8	0.75 0.71 0.7 0.7 0.61 0.72 0.79 0.92	0.89 0.81 0.77 0.81 0.73 0.79 0.85 0.92	0.93 0.95 0.87 0.88 0.84 0.91 0.91 0.97	0.98 0.98 1 0.97 0.9 1.01 1.02 1.03	1.08 1.03 1.03 1.1 0.99 1.06 1.12 1.13		
			4		6		8		10		4		6 Aç	ge	8		10		4		6		8		10		

	Age																									
		4		6		8		10			4		6		8		10			4		6		8		10
																								\bigcirc		
																			0.38	0.51	0.65	0.92	0.92	Q.97	1.03	1.13
																			0.38	0.53	0.8	0.79	0.85	0.91	1.02	1.12
					010					0.33	0.48	0.58	0.62	0.7	0.95	1.01	1.04		0.4	0.67	0.66	0.72	0.79	0.91	1.01	1.06
	0.49	0.48	0.52	0.61	0.8	0.92	0.96	1.05		0.32	0.42	0.53	0.64	0.78	0.92	0.98	1.02		0.48	0.47	0.53	0.61	0.73	0.84	0.9	0.99
	0.39	0.40	0.57	0.09	0.76	0.88	0.98	0.97		0.20	0.44	0.59	0.7	0.77	0.85	0.90	0.97		0.39	0.40	0.59	0.7	0.81	0.88	0.97	1.00
2020	0.39	0.52	0.63	0.72	0.8	0.96	1.01	1.04		0.28	0.44	0.50	0.7	0.77	0.95	0.06	1 22	C	0.4	0.52	0.64	0.71	0.81	0.95	0.98	1.03
2020	0.42	0.57	0.64	0.76	0.88	0.96	1.01	1.06		0.29	0.51	0.64	0.71	0.82	0.9	0.9	0.99		0.47	0.58	0.65	0.75	0.89	0.93	0.98	1.08
	0.38	0.47	0.57	0.73	0.81	0.85	0.91	1.04		0.21	0.44	0.58	0.66	0.76	0.75	0.85	0.89		0.41	0.48	0.58	0.72	0.77	0.82	0.94	1.05
	0.41	0.5	0.65	0.69	0.75	0.83	0.89	0.91		0.24	0.49	0.62	0.65	0.74	0.78	0.89	0.92		0.4	0.5	0.64	0.69	0.75	0.87	0.98	1.1
	0.41	0.53	0.56	0.65	0.73	0.8	0.94	1.04		0.28	0.52	0.57	0.69	0.76	0.79	0.88	0.92		0.38	0.53	0.57	0.63	0.76	0.87	1.06	1.24
	0.4	0.46	0.57	0.69	0.79	0.89	1.14	1.2		0.35	0.44	0.57	0.68	0.74	0.86	1.06	1.27		0.43	0.47	0.53	0.65	0.78	0.96	1.15	1.32
	0.32	0.45	0.62	0.75	0.89	1.16	1.31	1.39		0.39	0.45	0.57	0.69	0.74	0.98	1.14	1.34		0.42	0.48	0.61	0.73	0.92	1.11	1.28	1.46
	0.29	0.44	0.56	0.78	1.13	1.28	1.44	1.68		0.23	0.52	0.58	0.72	0.97	1.17	1.27	1.46		0.32	0.44	0.57	0.76	0.95	1.14	1.32	1.48
	0.27	0.41	0.64	0.82	0.97	1.17	1.3	1.51		0.28	0.41	0.59	0.74	0.87	1.01	1.35	1.2		0.29	0.41	0.6	0.8	0.99	1.18	1.32	1.43
al-age	0.29	0.51	0.67	0.81	0.97	1.22	1.34	1.51		0.22	0.51	0.65	0.79	0.91	1.07	1.16	1.25		0.29	0.47	0.67	0.86	1.06	1.21	1.32	1.44
$at a \sigma^{2010} -$	0.38	0.49	0.67	0.91	1.11	1.28	1.37	1.59		0.24	0.5	0.66	0.8	1.1	1.14	1.26	1.38		0.31	0.5	0.69	0.89	1.05	1.17	1.3	1.44
weigin-	0.34	0.53	0.7	0.88	1	1.13	1.4	1.48		0.24	0.51	0.69	0.81	1.01	1.07	1.12	1.36		0.34	0.53	0.73	0.89	1.01	1.15	1.3	1.3
woight	0.33	0.51	0.65	0.78	0.90	1.05	1.19	1.27		0.29	0.49	0.64	0.73	0.86	0.95	0.99	1.51		0.30	0.51	0.65	0.79	0.90	1.03	1.16	1.2
INTELY	0.31	0.45	0.61	0.76	0.86	0.96	1.06	1.12		0.18	0.46	0.6	0.68	0.79	1.06	1.06	1.17		0.33	0.45	0.6	0.77	0.85	0.94	1.06	1.18
Fichary	0.35	0.51	0.64	0.74	0.88	0.96	1.06	1.07		0.23	0.39	0.54	0.7	0.86	0.93	0.99	1.22		0.34	0.49	0.66	0.74	0.83	0.95	1.08	1.17
	0.41	0.58	0.64	0.76	0.89	0.92	1.04	1.18		0.28	0.52	0.6	0.75	0.89	0.93	1.12	1.03		0.4	0.57	0.65	0.74	0.87	1	1.1	1.2



Fishery catch-at-age



Survey work



FV *Alaska Knight* 2010-present 12th year FV Northwest Explorer 2023 1st year



Bottom-trawl survey

• Abundance at length



Survey abundance-at-age

• Eastern Bering Sea pollock

Vertical





E. Bering Sea bottom trawl survey



Acoustic survey-NOAA Ship





New survey this summer



Acoustic-trawl survey (ATS)

7,500 ·

Acoustic trawl index ^{2,200}

0 -





Opportunistic acoustic survey results



AVO index



Longitude

2005

2010

-180-175-170-165-16080-175-170-165-16080-175-170-165-160 'O index AV

Year

2015

2020

2025













27.7

10 12 14

EBS Pollock



Stock status



What about productivity estimates?

• Tier 1 versus Tier 3?



Female spawning biomass (kt)

...and estimation period length

Specified variability about the SRR



 σ_R

Summary

Aspects of SRR suggest Tier 3 more appropriate

- No fault of data extent, rather historical stock and recruitment estimates uninformative
- Tier 1
 - Relies on priors ($F_{MSY} \sim F_{35\%}$)
 - Production aspect near origin on limited observations
 - Risk aversion basis depends on uncertainty (pdf)
 - Tier 2 has same issues related to SRR







Tier 3 more appropriate?

- No fault of data extent, rather historical stock and recruitment estimates uninformative
- Tier 1
 - Relies on priors ($F_{MSY} \sim F_{35\%}$)
 - Production aspect near origin on limited observations
 - Risk aversion basis depends on uncertainty (pdf)
- Tier 2
 - Still relies on SRR / steepness at origin

Tier 1 version

	As estimated	or <i>specified</i>	As estimated or <i>recommendee</i>				
	<i>last</i> ye	ar for:	this year for:				
Quantity	2024	2025	2025	2026			
M (natural mortality rate, ages $3+$)	0.3	0.3	0.3	0.3			
Tier	1a	1a	1a	1a			
Projected total (age $3+$) biomass (t)	10,184,000 t	9,437,000 t	8,526,000 t	8,075,000 t			
Projected female spawning biomass (t)	3,518,000 t	3,255,000 t	3,118,000 t	3,342,000 t			
B_0	6,728,000 t	6,728,000 t	5,975,000 t	5,975,000 t			
B_{msy}	2,689,000 t	2,689,000 t	2,310,000 t	2,310,000 t			
F _{OFL}	0.422	0.422	0.523	0.523			
$maxF_{ABC}$	0.379	0.379	0.443	0.443			
F_{ABC}	0.33	0.33	0.402	0.402			
OFL	3,162,000 t	3,449,000 t	4,383,000 t	3,785,000 t			
maxABC	2,837,000 t	3,095,000 t	3,715,000 t	3,209,000 t			
ABC	2,313,000 t	2,401,000 t	2,417,000 t	2,036,000 t			
Status	2022	2023	2023	2024			
Overfishing	No	n/a	No	n/a			
Overfished	n/a	No	n/a	No			
Approaching overfished	n/a	No	n/a	No			

Tier 3 version

	As estimated	or specified	As estimated o	r recommended			
	<i>last</i> ye	ar for:	this year for:				
Quantity	2024	2025	2025	2026			
M (natural mortality rate, ages 3+)	0.3	0.3	0.3	0.3			
Tier	1a	1a	3a	3a			
Projected total (age $3+$) biomass (t)	10,184,000 t	9,437,000 t	8,526,000 t	8,075,000 t			
Projected female spawning biomass (t)	3,518,000 t	3,255,000 t	3,118,000 t	3,342,000 t			
B_0	6,728,000 t	6,728,000 t	5,902,000 t	5,902,000 t			
B _{msy}	2,689,000 t	2,689,000 t	2,066,000 t	2,066,000 t			
F _{OFL}	0.422	0.422	0.513	0.513			
$maxF_{ABC}$	0.379	0.379	0.394	0.394			
F _{ABC}	0.33	0.33	0.394	0.394			
OFL	3,162,000 t	3,449,000 t	2,957,000 t	2,496,000 t			
maxABC	2,837,000 t	3,095,000 t	2,417,000 t	2,036,000 t			
ABC	2,313,000 t	2,401,000 t	2,417,000 t	2,036,000 t			
Status	2022	2023	2023	2024			
Overfishing	No	n/a	No	n/a			
Overfished	n/a	No	n/a	No			
Approaching overfished	n/a	No	n/a	No			

Thanks

CIE review coming 1st half of 2025

