Chapter 1: Assessment of the Walleye Pollock Stock in the Eastern Bering Sea

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Tables

Table 1: Catch from the Eastern Bering Sea by area, the Aleutian Islands, the Donut Hole, and the Bogoslof Island area, 1979–2018 (2018 values through October 15th 2018). The southeast area refers to the EBS region east of 170W; the Northwest is west of 170W. Note: 1979–1989 data are from Pacfin, 1990–2018 data are from NMFS Alaska Regional Office, and include discards. The 2018 EBS catch estimates are preliminary.

	Eastern Bering Sea					
Year	Southeast	Northwest	Total	Aleutians	Donut Hole	Bogoslof I.
1979	368,848	566,866	935,714	9,446		
1980	437,253	521,027	958,280	58,157		
1981	714,584	258,918	973,502	55,517		
1982	713,912	242,052	955,964	57,753		
1983	687,504	293,946	981,450	59,021		
1984	442,733	649,322	1,092,055	77,595	181,200	
1985	604,465	535,211	1,139,676	58,147	363,400	
1986	594,997	546,996	1,141,993	45,439	1,039,800	
1987	529,461	329,955	859,416	28,471	1,326,300	377,436
1988	931,812	296,909	1,228,721	41,203	1,395,900	87,813
1989	904,201	325,399	1,229,600	10,569	1,447,600	36,073
1990	640,511	814,682	1,455,193	79,025	917,400	151,672
1991	653,555	542,109	1,195,664	98,604	293,400	316,038
1992	830,559	559,741	1,390,299	52,362	10,000	241
1993	1,094,429	232,173	1,326,602	57,138	1,957	886
1994	1,152,575	176,777	1,329,352	58,659		556
1995	1,172,306	91,941	1,264,247	64,925		334
1996	1,086,843	105,939	1,192,781	29,062		499
1997	819,889	304,544	1,124,433	25,940		163
1998	971,388	132,515	1,103,903	22,054		8
1999	782,983	206,698	989,680	1,010		29
2000	839,177	293,532	1,132,710	1,244		29
2001	961,977	425,220	1,387,197	825		258
2002	1,160,334	320,442	1,480,776	1,177		1,042
2003	933,191	557,588	1,490,779	1,649		24
2004	1,090,008	390,544	1,480,552	1,158		0
2005	802,154	680,868	1,483,022	1,621		0
2006	827,207	660,824	1,488,031	1,745		0
2007	728,249	626,253	1,354,502	2,519		0
2008	482,698	507,880	990,578	1,278		9
2009	358,252	452,532	810,784	1,662		73
2010	255,132	555,075	810,207	1,285		176
2011	747,890	451,151	1,199,041	1,208		173
2012	618,869	586,343	1,205,212	975		71
2013	695,667	575,098	1,270,765	2,964		57
2014	858,240	439,180	1,297,419	2,375		427
2015	696,249	625,331	1,321,581	915		733
2016	1,167,088	185,571	1,352,659	1,257		1,005
2017	1,178,112	181,162	1,359,274	1,507		186
2018	1,020,904	325,711	1,346,615	1,778		133
Avg.	788,905	414,351	1,203,256	25,481	697,696	30,505

Table 2: Time series of 1964–1976 catch (left) and ABC, TAC, and catch for EBS pollock, 1977–2018 in t. Source: compiled from NMFS Regional office web site and various NPFMC reports. Note that the 2018 value is based on catch reported to October 25th 2018 plus an added component due to bycatch of pollock in other fisheries.

Year	Catch	Year	ABC	TAC	Catch
1964	174,792	1977	950,000	950,000	978,370
1965	230,551	1978	950,000	950,000	979,431
1966	261,678	1979	1,100,000	950,000	935,714
1967	550,362	1980	1,300,000	1,000,000	958,280
1968	702,181	1981	1,300,000	1,000,000	973,502
1969	862,789	1982	1,300,000	1,000,000	955,964
1970	1,256,565	1983	1,300,000	1,000,000	981,450
1971	1,743,763	1984	1,300,000	1,200,000	1,092,055
1972	1,874,534	1985	1,300,000	1,200,000	1,139,676
1973	1,758,919	1986	1,300,000	1,200,000	1,141,993
1974	1,588,390	1987	1,300,000	1,200,000	859,416
1975	1,356,736	1988	1,500,000	1,300,000	1,228,721
1976	1,177,822	1989	1,340,000	1,340,000	1,229,600
		1990	1,450,000	1,280,000	1,455,193
		1991	1,676,000	1,300,000	1,195,664
		1992	1,490,000	1,300,000	1,390,299
		1993	1,340,000	1,300,000	1,326,602
		1994	1,330,000	1,330,000	1,329,352
		1995	1,250,000	1,250,000	1,264,247
		1996	1,190,000	1,190,000	1,192,781
		1997	1,130,000	1,130,000	1,124,433
		1998	1,110,000	1,110,000	1,102,159
		1999	992,000	992,000	989,680
		2000	1,139,000	1,139,000	1,132,710
		2001	1,842,000	1,400,000	1,387,197
		2002	2,110,000	1,485,000	1,480,776
		2003	2,330,000	1,491,760	1,490,779
		2004	2,560,000	1,492,000	1,480,552
		2005	1,960,000	1,478,500	1,483,022
		2006	1,930,000	1,485,000	1,488,031
		2007	1,394,000	1,394,000	1,354,502
		2008	1,000,000	1,000,000	990,578
		2009	815,000	815,000	810,784
		2010	813,000	813,000	810,206
		2011	1,270,000	1,252,000	1,199,041
		2012	1,220,000	1,200,000	1,205,212
		2013	1,375,000	1,247,000	1,270,768
		2014	1,369,000	1,267,000	1,297,420
		2015	1,637,000	1,310,000	1,321,581
		2016	2,090,000	1,340,000	1,352,707
		2017	2,800,000	1,345,000	1,343,217
		2018	2,592,000	1,364,341	1,34xxxxx
		2019	2,163,000	1,397,000	1,34xxxxx
1977–2017 mean			1,455,902	1,241,006	1,188,382

Table 3: Estimates of discarded pollock (t), percent of total (in parentheses) and total catch for the Aleutians, Bogoslof, Northwest and Southeastern Bering Sea, 1991–2018. SE represents the EBS east of 170W, NW is the EBS west of 170W, source: NMFS Blend and catch-accounting system database. 2018 data are preliminary. Note that the higher discard rates in the Aleutian Islands and Bogoslof region reflect the lack of directed pollock fishing.

	Discarded pollock					Total (retained plus discard)				
	Aleut. Is.	Bog.	NW	SE	Total	Aleut. Is.	Bog.	NW	SE	Total
1991	5,231 (5%)	20,327 (6%)	48,257 (9%)	66,792 (10%)	140,607 (9%)	98,604	316,038	542,109	653,555	1,610,306
1992	2,986 (6%)	240 (100%)	57,581 (10%)	71,194 (9%)	132,002 (9%)	52,362	241	559,750	830,559	1,442,912
1993	1,740 (3%)	308 (35%)	26,107 (11%)	83,986 (8%)	112,141 (8%)	57,138	886	232,180	1,094,429	1,384,633
1994	1,373 (2%)	11 (2%)	16,084 (9%)	88,098 (8%)	105,566 (8%)	58,659	556	176,777	1,152,575	1,388,567
1995	1,380 (2%)	267 (80%)	9,715 (11%)	87,492 (7%)	98,855 (7%)	64,925	334	91,941	1,172,306	1,329,506
1996	994 (3%)	7 (1%)	4,838 (5%)	71,368 (7%)	77,208 (6%)	29,062	499	105,939	1,086,843	1,222,342
1997	618 (2%)	13 (8%)	22,557 (7%)	71,032 (9%)	94,220 (8%)	25,940	163	304,544	819,889	1,150,536
1998	162 (1%)	3 (39%)	1,581 (1%)	14,291 (1%)	16,037 (1%)	22,054	8	132,515	969,644	1,124,221
1999	480 (48%)	11 (39%)	1,912 (1%)	26,912 (3%)	29,315 (3%)	1,010	29	206,698	782,983	990,719
2000	790 (64%)	20 (67%)	1,942 (1%)	19,678 (2%)	22,430 (2%)	1,244	29	293,532	839,177	1,133,983
2001	380 (46%)	28 (11%)	2,450 (1%)	14,874 (2%)	17,732 (1%)	825	258	425,220	961,977	1,388,280
2002	779 (66%)	12 (1%)	1,441 (tr)	19,430 (2%)	21,661 (1%)	1,177	1,042	320,442	1,160,334	1,482,995
2003	468 (28%)	19 (79%)	2,959 (1%)	13,795 (1%)	17,241 (1%)	1,649	24	557,588	933,191	1,492,453
2004	287 (25%)	0 (100%)	2,781 (1%)	20,380 (2%)	23,448 (2%)	1,158	0	390,544	1,090,008	1,481,710
2005	324 (20%)	0 (89%)	2,586 (tr)	14,838 (2%)	17,748 (1%)	1,621	0	680,868	802,154	1,484,643
2006	311 (18%)	0 (50%)	3,677 (1%)	11,877 (1%)	15,865 (1%)	1,745	0	660,824	827,207	1,489,776
2007	425 (17%)	0 (%)	3,769 (1%)	12,334 (2%)	16,528 (1%)	2,519	0	626,253	728,249	1,357,021
2008	81 (6%)	0 (%)	1,643 (tr)	5,968 (1%)	7,692 (1%)	1,278	9	507,880	482,698	991,865
2009	395 (24%)	6 (8%)	1,936 (tr)	4,014 (1%)	6,352 (1%)	1,662	73	452,532	358,252	812,519
2010	142 (12%)	53 (30%)	1,271 (tr)	2,511 (1%)	3,976 (tr)	1,235	176	555,075	255,132	811,618
2011	75 (6%)	23 (13%)	1,378 (tr)	3,456 (tr)	4,932 (tr)	1,208	173	451,151	747,890	1,200,422
2012	95 (10%)	0 (%)	1,191 (tr)	4,187 (1%)	5,473 (tr)	975	71	586,343	618,869	1,206,258
2013	108 (4%)	0 (1%)	1,226 (tr)	4,144 (1%)	5,478 (tr)	2,964	57	575,098	695,667	1,273,786
2014	138 (6%)	54 (13%)	1,787 (tr)	12,568 (1%)	14,547 (1%)	2,375	427	439,180	858,240	1,300,221
2015	19 (2%)	138 (19%)	2,419 (tr)	7,062 (1%)	9,638 (1%)	915	733	625,331	696,249	1,323,228
2016	59 (5%)	7 (1%)	998 (1%)	8,145 (1%)	9,209 (1%)	1,257	1,005	185,571	1,167,088	1,354,921
2017	17 (1%)	2 (1%)	1,357 (1%)	6,944 (1%)	8,321 (1%)	1,384	186	181,162	1,178,112	1,360,844
2018		2 (21%)	1,779 (1%)	8,261 (1%)	10,042 (1%)		9	328,722	1,045,138	1,373,868

Table 4: Total EBS shelf pollock catch recorded by observers (rounded to nearest 100 t) by year and season with percentages indicating the proportion of the catch that came from within the Steller sea lion conservation area (SCA), 1998–2018. The 2018 data are preliminary.

Year	A season	B-season	Total
1998	385,000 t (82%)	403,000 t (38%)	788,000 t (60%)
1999	339,000 t (54%)	468,000 t (23%)	807,000 t (36%)
2000	375,000 t (36%)	572,000 t (4%)	947,000 t (16%)
2001	490,000 t (27%)	674,000 t (46%)	1,164,000 t (38%)
2002	512,200 t (56%)	689,100 t (42%)	1,201,200 t (48%)
2003	532,400 t (47%)	737,400 t (40%)	1,269,800 t (43%)
2004	532,600 t (45%)	710,800 t (34%)	1,243,300 t (38%)
2005	530,300 t (45%)	673,200 t (17%)	1,203,500 t (29%)
2006	533,400 t (51%)	764,300 t (14%)	1,297,700 t (29%)
2007	479,500 t (57%)	663,200 t (11%)	1,142,700 t (30%)
2008	341,700 t (46%)	498,800 t (12%)	840,500 t (26%)
2009	282,700 t (39%)	388,800 t (13%)	671,500 t (24%)
2010	269,800 t (15%)	403,100 t (9%)	672,900 t (11%)
2011	477,600 t (54%)	666,600 t (32%)	1,144,200 t (41%)
2012	457,100 t (52%)	687,500 t (17%)	1,144,600 t (31%)
2013	472,200 t (22%)	708,100 t (19%)	1,180,300 t (20%)
2014	482,800 t (38%)	741,200 t (37%)	1,224,000 t (37%)
2015	490,400 t (15%)	765,900 t (45%)	1,256,300 t (33%)
2016	510,700 t (35%)	784,000 t (62%)	1,294,700 t (51%)
2017	555,300 t (51%)	750,800 t (54%)	1,306,100 t (53%)
2018	573,000 t (63%)	746,500 t (46%)	1,319,500 t (54%)

Table 5: Highlights of some management measures affecting the pollock fishery.

Year	Management
1977	Preliminary BSAI FMP implemented with several closure areas
1982	FMP implement for the BSAI
1982	Chinook salmon bycatch limits established for foreign trawlers
1984	2 million t groundfish OY limit established
1984	Limits on Chinook salmon bycatch reduced
1990	New observer program established along with data reporting
1992	Pollock CDQ program commences
1994	NMFS adopts minimum mesh size requirements for trawl codends
1994	Voluntary retention of salmon for foodbank donations
1994	NMFS publishes individual vessel bycatch rates on internet
1995	Trawl closures areas and trigger limits established for chum and Chinook salmon
1998	Improved utilization and retention in effect (reduced discarded pollock)
1998	American Fisheries Act (AFA) passed
1999	The AFA was implemented for catcher/processors
1999	Additional critical habitat areas around sea lion haulouts in the GOA and Eastern Bering Sea are closed.
2000	AFA implemented for remaining sectors (catcher vessel and motherships)
2001	Pollock industry adopts voluntary rolling hotspot program for chum salmon
2002	Pollock industry adopts voluntary rolling hotspot program for Chinook salmon
2005	Rolling hotspot program adopted in regulations to exempt fleet from triggered time/area closures for Chinook and chum salmon
2011	Amendment 91 enacted, Chinook salmon management under hard limits
2015	Amendment 110 (BSAI) Salmon prohibited species catch management in the Bering Sea pollock fishery (additional measures that change limits depending on Chinook salmon run-strength indices) and includes additional provisions for reporting requirements (see https://alaskafisheries.noaa.gov/fisheries/chinook-salmon-bycatch-management for update and general information)
2016	Measures of amendment 110 go into effect for 2017 fishing season; Chinook salmon runs above the 3-run index value so bycatch limits stay the same
2017	Due to amendment 110 about 45% of the TAC is taken in the A-season (traditionally only 40% was allowed).
2018	In-river estimates of Chinook salmon (three river index) fell below the threshold and therefore a lower PSC limit applies (from a performance standard of 47,491 to 33,318 and a PSC limit from 60,000 to 45,000 Chinook salmon overall). Additionally, squid have been recategorized as an ecosystem component.
2019	Some pollock sectors experienced high bycatch levels for chum and Chinook salmon and also for sablefish.

Table 6: BSAI pollock catch and ex-vessel data showing the total and retained catch (in kt), the number of vessels for all sectors and for trawl catcher vessels including ex-vessel value (million US$), price (US$ per pound), and catcher vessel shares. Years covered include the 2005-2007 average, the 2008-2010 average, the 2011-2013 average, and annual from 2014-2018.

	Avg 05-07	Avg 08-10	Avg 08-10	2014	2015	2016	2017	2018
All sectors								
Catch	1,444	872	1,227	1,300	1,323	1,355	1,361	1,381
Retained catch	1,427	866	1,221	1,285	1,314	1,346	1,353	1,370
Vessels #	110.3	121	120.3	121	120	122	118	115
Catcher vessels (trawl)								
Retained catch	768.3	459.0	640.8	668.5	687.1	703.9	710.4	718.3
Ex-vessel value	$214.18	$184.89	$229.62	$226.54	$227.42	$209.36	$205.54	$236.67
Ex-vessel price	$0.13	$0.18	$0.16	$0.16	$0.15	$0.14	$0.14	$0.16
CV share of catch	54%	53%	52%	52%	52%	52%	53%	52%
Vessels #	89	89	88	87	87	89	87	88

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; and ADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN).

Table 7: BSAI pollock first-wholesale market data including production (kt), value (million US$), price (US$ per pound) for all products and then separately for other categories (head and gut, fillet, surimi, and roe production). Years covered include the 2005-2007 average, the 2008-2010 average, the 2011-2013 average, and annual from 2014-2018.

	Avg 05-07	Avg 08-10	Avg 08-10	2014	2015	2016	2017	2018
	BSAI							
All products volume	498.25	355.99	487.56	525.54	520.94	534.89	523.94	532.44
All products value	$1,246.4	$1,133.4	$1,324.7	$1,301.4	$1,275.0	$1,351.5	$1,338.1	$1,378.6
All products price	$1.13	$1.44	$1.23	$1.12	$1.11	$1.15	$1.16	$1.17
At-sea value share	59%	58%	59%	58%	60%	60%	62%	59%
Fillets volume	162.7	113.9	159.55	175.78	167.01	161.29	156.95	167.63
Fillets price	$1.24	$1.73	$1.51	$1.374	$1.355	$1.412	$1.286	$1.370
Fillets value share	36%	38%	40%	41%	39%	37%	33%	37%
Surimi volume	173.05	100.99	153.27	171.33	187.74	190.82	196.73	196.53
Surimi price	$0.96	$1.63	$1.23	$1.105	$1.142	$1.194	$1.331	$1.259
Surimi value share	29%	32%	32%	32%	37%	37%	43%	40%
Roe volume	27.03	17.63	16.14	20.60	18.75	14.26	18.43	20.64
Roe price	$4.84	$4.14	$3.78	$2.915	$2.291	$2.844	$2.877	$2.892
Roe value share	23%	14%	10%	10%	7%	7%	9%	10%
At-sea price premium	$0.30	$0.32	$0.19	0.15	0.25	0.25	0.37	0.21

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region At-sea Production Reports; and ADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN).

Table 8: Alaska pollock U.S. trade and global market data showing global production (in kt) and the U.S. and Russian shares followed by U.S. export volumes (kt), values (million US$), export prices (US$ per pound), import values (million US$), and net exports (million US$). Subsequent rows show the breakout of export shares (of U.S. pollock) by country (Japan, China and Europe) and the share of U.S. export volume and value of fish (i.e., H&G and fillets), and other product categories (surimi and roe). Years covered include the 2005-2007 average, the 2008-2010 average, the 2011-2013 average, and annual from 2014-2019 (2019 through June).

	Avg 05-07	Avg 08-10	Avg 08-10	2014	2015	2016	2017	2018	2019*
Global pollock catch	2,854	2,662	3,241	3,245	3,373	3,476	3,488	-	-
U.S. share	52%	35%	40%	44%	44%	44%	44%	-	-
Russian share	37%	53%	49%	47%	48%	50%	50%	-	-
BSAI share	51%	33%	38%	40%	39%	39%	39%	-	-
Export volume	278.9	192.2	326.2	395	377.8	379.6	398	243.8	191.5
Export value	$867.4	$635.2	$943.6	$1,081.7	$1,038.2	$990.5	$1,007.6	$671.5	$586.8
Export price	$1.41	$1.50	$1.31	$1.24	$1.25	$1.18	$1.15	$1.25	$1.39
Import value	$173.40	$202.43	$166.58	$142.60	$130.48	$91.24	$74.98	$77.92	$53.70
Net exports	$694.00	$432.77	$777.03	$939.05	$907.76	$899.27	$932.51	$1,051.22	$533.07
Japan volume share	34%	27%	21%	22%	25%	20%	22%	23%	24%
Japan value share	38%	26%	19%	22%	26%	20%	23%	29%	27%
China volume share	3%	9%	13%	15%	13%	12%	15%	14%	14%
China value Share	2%	7%	11%	12%	11%	10%	13%	10%	9%
Europe volume share	34%	37%	39%	38%	36%	35%	33%	33%	29%
Europe value share	28%	37%	39%	39%	36%	35%	33%	33%	29%
Meat volume share	33%	46%	50%	54%	49%	49%	49%	49%	45%
Meat value share	27%	45%	48%	52%	46%	46%	47%	40%	39%
Surimi volume share	57%	46%	45%	41%	45%	47%	47%	43%	43%
Surimi value share	38%	33%	38%	34%	39%	42%	42%	39%	38%
Roe volume share	10%	8%	5%	6%	5%	4%	5%	9%	13%
Roe value share	35%	23%	14%	14%	15%	11%	11%	21%	23%

Notes: 2019 data thru June; Exports are from the US and are note specific to the BSAI region. 'Meat' includes fillets, H&G, minced and other non-surimi meat based products. Europe refers to Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom.

Source: FAO Fisheries & Aquaculture Dept. Statistics http://www.fao.org/fishery/statistics/en. NOAA Fisheries, Fisheries Statistics Division, Foreign Trade Division of the U.S. Census Bureau, http://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/index. U.S. Department of Agriculture http://www.ers.usda.gov/data-products/agricultural-exchange-rate-data-set.aspx.

Table 9: BSAI pollock fish oil production index (tons of oil per 100 tons of retained catch); 2005-2007 average, the 2008-2010 average, the 2011-2013 average, and annual from 2014-2018.

sector	Avg 05-07	Avg 08-10	Avg 08-10	2014	2015	2016	2017	2018
All sectors	1.25	2.03	1.76	2.19	1.84	2.06	1.92	1.93
Shoreside	2.07	2.58	2.00	2.42	1.94	2.28	2.09	2.07
At sea	0.30	1.41	1.50	1.94	1.72	1.82	1.74	1.77

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region At-sea Production Reports; and ADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN).

Table 10: Eastern Bering Sea pollock catch at age estimates based on observer data, 1979–2017. Units are in millions of fish.

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
1979	101.4	543.0	719.8	420.1	392.5	215.5	56.3	25.7	35.9	27.5	17.6	7.9	3.0
1980	9.8	462.2	822.9	443.3	252.1	210.9	83.7	37.6	21.7	23.9	25.4	15.9	7.7
1981	0.6	72.2	1,012.7	637.9	227.0	102.9	51.7	29.6	16.1	9.3	7.5	4.6	1.5
1982	4.7	25.3	161.4	1,172.2	422.3	103.7	36.0	36.0	21.5	9.1	5.4	3.2	1.9
1983	5.1	118.6	157.8	312.9	816.8	218.2	41.4	24.7	19.8	11.1	7.6	4.9	3.5
1984	2.1	45.8	88.6	430.4	491.4	653.6	133.7	35.5	25.1	15.6	7.1	2.5	2.9
1985	2.6	55.2	381.2	121.7	365.7	321.5	443.2	112.5	36.6	25.8	24.8	10.7	9.4
1986	3.1	86.0	92.3	748.6	214.1	378.1	221.9	214.3	59.7	15.2	3.3	2.6	0.3
1987	-	19.8	111.5	77.6	413.4	138.8	122.4	90.6	247.2	54.1	38.7	21.4	28.9
1988	-	10.7	454.0	421.6	252.1	544.3	224.8	104.9	39.2	96.8	18.2	10.2	3.8
1989	-	4.8	55.1	149.0	451.1	166.7	572.2	96.3	103.8	32.4	129.0	10.9	4.0
1990	1.3	33.0	57.0	219.5	200.7	477.7	129.2	368.4	65.7	101.9	9.0	60.1	8.5
1991	0.4	113.2	44.4	88.9	151.8	181.9	509.7	81.5	292.9	29.5	143.9	18.2	88.3
1992	2.0	88.2	670.8	130.3	82.9	110.2	136.2	254.8	102.7	152.5	57.9	45.4	13.7
1993	0.1	6.9	243.6	1,144.4	108.0	73.9	68.5	53.1	91.6	20.5	35.2	10.9	13.5
1994	1.2	35.6	58.6	347.4	1,067.2	180.5	57.7	18.7	12.4	20.2	9.2	10.2	7.6
1995	-	0.4	77.1	148.5	406.8	767.1	121.9	32.0	11.2	8.1	17.7	5.2	6.7
1996	-	16.7	51.9	82.6	161.5	362.8	481.6	186.0	32.6	14.1	8.4	8.7	4.5
1997	1.6	77.9	39.2	107.6	472.7	282.6	252.6	200.1	65.4	14.0	5.9	5.3	3.3
1998	0.2	42.3	85.6	70.9	154.8	697.0	202.0	131.0	107.5	29.1	6.1	6.2	2.4
1999	0.2	9.6	294.4	224.6	102.3	159.7	470.8	130.7	56.3	34.1	3.7	2.3	0.8
2000	-	15.3	80.3	425.8	347.0	105.2	170.4	357.6	86.0	29.5	22.3	5.3	1.3
2001	-	3.1	46.9	154.7	582.6	410.5	135.9	127.0	157.3	59.0	34.4	16.0	5.4
2002	0.9	47.0	108.6	213.4	287.4	602.3	270.2	100.6	86.3	96.8	33.9	15.3	11.0
2003	-	14.1	408.6	323.5	367.2	307.1	331.2	158.8	49.5	38.4	36.1	22.7	6.8
2004	-	0.5	90.1	825.4	483.7	239.0	168.5	155.2	63.2	15.5	18.6	26.8	8.9
2005	-	4.1	51.1	399.4	859.1	483.5	157.6	68.7	68.3	30.8	9.6	8.9	3.0
2006	-	10.0	83.2	293.3	615.3	592.6	283.6	109.9	49.5	40.7	17.0	8.3	8.4
2007	1.6	16.9	60.5	137.5	388.6	508.7	300.1	139.5	47.6	27.4	24.2	9.5	6.1
2008	-	25.9	57.6	79.4	148.8	308.4	242.0	149.3	82.5	21.8	18.4	14.0	8.9
2009	-	1.3	175.9	199.9	82.4	112.9	123.4	104.0	65.9	40.5	23.9	7.6	8.2
2010	1.0	27.2	30.8	557.9	220.6	55.0	42.5	56.6	52.9	31.8	16.0	8.8	6.2
2011	0.4	11.4	192.8	115.6	809.5	284.4	64.1	37.7	38.3	40.2	25.3	12.8	1.8
2012	-	23.7	117.8	943.8	173.7	433.1	139.9	37.0	17.6	14.7	16.2	13.8	7.8
2013	1.7	0.8	65.3	342.1	955.5	195.2	155.9	69.1	20.1	13.3	12.5	12.0	7.9
2014	-	39.6	31.4	168.6	397.4	752.2	210.3	86.3	29.2	9.0	4.6	4.7	4.5
2015	-	15.7	633.2	194.8	229.1	385.2	509.4	88.2	43.0	17.2	3.2	2.2	3.3
2016	-	0.5	91.7	1,389.7	159.3	175.3	175.5	223.1	34.7	13.2	7.9	0.5	1.3
2017	-	2.0	29.8	551.4	894.6	214.7	147.5	123.2	96.3	21.5	7.8	6.3	0.6
2018	-	1,391.5	13,793.8	114,102.1	1,216,661.6	504,015.0	105,508.3	82,175.2	60,892.0	26,593.5	4,188.2	1,215.6	331.6
Avg.	6.2	88.0	545.7	3,223.0	30,796.8	12,913.2	2,838.8	2,165.8	1,586.1	697.5	127.5	42.0	16.2

Table 11: Numbers of pollock NMFS observer samples measured for fishery catch length frequency (by sex and strata), 1977–2017.

Length Frequency samples							
	A Season		B Season SE		B Season NW		
Year	Males	Females	Males	Females	Males	Females	Total
1977	26,411	25,923	4,301	4,511	29,075	31,219	121,440
1978	25,110	31,653	9,829	9,524	46,349	46,072	168,537
1979	59,782	62,512	3,461	3,113	62,298	61,402	252,568
1980	42,726	42,577	3,380	3,464	47,030	49,037	188,214
1981	64,718	57,936	2,401	2,147	53,161	53,570	233,933
1982	74,172	70,073	16,265	14,885	181,606	163,272	520,273
1983	94,118	90,778	16,604	16,826	193,031	174,589	585,946
1984	158,329	161,876	106,654	105,234	243,877	217,362	993,332
1985	119,384	109,230	96,684	97,841	284,850	256,091	964,080
1986	186,505	189,497	135,444	123,413	164,546	131,322	930,727
1987	373,163	399,072	14,170	21,162	24,038	22,117	853,722
1991	160,491	148,236	166,117	150,261	141,085	139,852	906,042
1992	158,405	153,866	163,045	164,227	101,036	102,667	843,244
1993	143,296	133,711	148,299	140,402	27,262	28,522	621,490
1994	139,332	147,204	159,341	153,526	28,015	27,953	655,370
1995	131,287	128,389	179,312	154,520	16,170	16,356	626,032
1996	149,111	140,981	200,482	156,804	18,165	18,348	683,890
1997	124,953	104,115	116,448	107,630	60,192	53,191	566,527
1998	136,605	110,620	208,659	178,012	32,819	40,307	707,019
1999	36,258	32,630	38,840	35,695	16,282	18,339	178,044
2000	64,575	58,162	63,832	41,120	40,868	39,134	307,689
2001	79,333	75,633	54,119	51,268	44,295	45,836	350,483
2002	71,776	69,743	65,432	64,373	37,701	39,322	348,347
2003	74,995	77,612	49,469	53,053	51,799	53,463	360,390
2004	75,426	76,018	63,204	62,005	47,289	44,246	368,188
2005	76,627	69,543	43,205	33,886	68,878	63,088	355,225
2006	72,353	63,108	28,799	22,363	75,180	65,209	327,010
2007	62,827	60,522	32,945	25,518	75,128	69,116	326,054
2008	46,125	51,027	20,493	23,503	61,149	64,598	266,894
2009	46,051	44,080	19,877	18,579	50,451	53,344	232,379
2010	39,495	41,054	19,194	20,591	40,449	41,323	202,106
2011	58,822	62,617	60,254	65,057	51,137	48,084	345,971
2012	53,641	57,966	45,044	46,940	50,167	53,224	306,982
2013	52,303	62,336	37,434	44,709	49,484	49,903	296,168
2014	55,954	58,097	46,568	51,950	46,643	46,202	305,414
2015	55,646	56,507	45,074	41,218	46,237	43,084	287,766
2016	57,478	59,000	10,264	9,016	72,973	69,669	278,400
2017	55,965	64,728	15,871	14,136	70,285	66,026	287,011
2018	57,156	64,639	35,811	32,842	56,243	49,671	296,362

Table 12: Number of EBS pollock measured for weight and length by sex and strata as collected by the NMFS observer program, 1977-2018

Weight-length samples							
	A Season		B Season SE		B Season NW		
	Males	Females	Males	Females	Males	Females	Total
1977	1,222	1,338	137	166	1,461	1,664	5,988
1978	1,991	2,686	409	516	2,200	2,623	10,425
1979	2,709	3,151	152	209	1,469	1,566	9,256
1980	1,849	2,156	99	144	612	681	5,541
1981	1,821	2,045	51	52	1,623	1,810	7,402
1982	2,030	2,208	181	176	2,852	3,043	10,490
1983	1,199	1,200	144	122	3,268	3,447	9,380
1984	980	1,046	117	136	1,273	1,378	4,930
1985	520	499	46	55	426	488	2,034
1986	689	794	518	501	286	286	3,074
1987	1,351	1,466	25	33	72	63	3,010
1991	2,712	2,781	2,339	2,496	1,065	1,169	12,562
1992	1,517	1,582	1,911	1,970	588	566	8,134
1993	1,201	1,270	1,448	1,406	435	450	6,210
1994	1,552	1,630	1,569	1,577	162	171	6,661
1995	1,215	1,259	1,320	1,343	223	232	5,592
1996	2,094	2,135	1,409	1,384	1	1	7,024
1997	628	627	616	665	511	523	3,570
1998	1,852	1,946	959	923	327	350	6,357
1999	5,318	4,798	7,797	7,054	3,532	3,768	32,267
2000	11,346	12,457	7,736	7,991	7,800	12,463	59,793
2001	14,411	14,965	9,064	8,803	10,460	10,871	68,574
2002	13,564	14,098	7,648	7,213	13,004	12,988	68,515
2003	15,535	14,857	10,272	10,031	10,111	9,437	70,243
2004	7,924	7,742	4,318	4,617	6,868	6,850	38,319
2005	7,039	7,428	6,426	6,947	4,114	5,139	37,093
2006	6,566	7,381	6,442	7,406	3,045	4,006	34,846
2007	6,640	6,695	7,081	7,798	3,202	4,305	35,721
2008	4,501	4,865	5,855	6,264	2,236	2,624	26,345
2009	4,033	4,382	4,655	4,511	1,723	1,934	21,238
2010	4,258	4,536	3,883	4,125	2,012	2,261	21,075
2011	5,845	6,388	4,954	4,647	5,929	6,456	34,219
2012	5,494	5,979	4,923	5,346	4,507	4,774	31,023
2013	5,689	6,525	4,844	4,920	3,599	4,313	29,890
2014	5,675	5,871	4,785	4,652	4,753	5,180	30,916
2015	5,310	5,323	4,648	4,194	4,365	4,064	27,904
2016	5,312	5,725	1,077	909	6,872	6,635	26,530
2017	5,238	6,047	1,586	1,343	6,575	6,254	27,043
2018	5,583	6,174	3,430	3,172	5,506	4,850	28,715

Table 13: Numbers of pollock fishery samples used for age determination estimates by sex and strata, 1977–2017, as sampled by the NMFS observer program.

	A Season		B Season SE		B Season NW		
	Males	Females	Males	Females	Males	Females	Total
1977	1,229	1,344	137	166	1,415	1,613	5,904
1978	1,992	2,686	407	514	2,188	2,611	10,398
1979	2,647	3,088	152	209	1,464	1,561	9,121
1980	1,854	2,158	93	138	606	675	5,524
1981	1,819	2,042	51	52	1,620	1,807	7,391
1982	2,030	2,210	181	176	2,865	3,062	10,524
1983	1,200	1,200	144	122	3,249	3,420	9,335
1984	980	1,046	117	136	1,272	1,379	4,930
1985	520	499	46	55	426	488	2,034
1986	689	794	518	501	286	286	3,074
1987	1,351	1,466	25	33	72	63	3,010
1991	420	423	272	265	320	341	2,041
1992	392	392	371	386	178	177	1,896
1993	444	473	503	493	124	122	2,159
1994	201	202	570	573	131	141	1,818
1995	298	316	436	417	123	131	1,721
1996	468	449	442	433	1	1	1,794
1997	433	436	284	311	326	326	2,116
1998	592	659	307	307	216	232	2,313
1999	540	500	730	727	306	298	3,100
2000	629	667	293	254	596	847	3,286
2001	563	603	205	178	697	736	2,982
2002	672	663	247	202	890	839	3,513
2003	653	588	274	262	701	671	3,149
2004	547	561	221	245	698	600	2,872
2005	599	617	420	422	490	614	3,162
2006	528	609	507	568	367	459	3,038
2007	627	642	552	568	485	594	3,468
2008	513	497	538	650	342	368	2,908
2009	404	484	440	432	240	299	2,299
2010	545	624	413	466	418	505	2,971
2011	581	808	404	396	582	660	3,431
2012	517	571	485	579	480	533	3,165
2013	666	703	525	568	401	518	3,381
2014	609	629	413	407	475	553	3,086
2015	653	642	511	493	508	513	3,320
2016	488	599	157	125	929	969	3,267
2017	604	778	179	163	777	753	3,254
2018	569	662	366	358	621	591	3,167

Table 14: NMFS total pollock research catch by year in t, 1964–2018.

Year	Bering Sea	Year	Bering Sea	Year	Bering Sea
1964	0	1982	682	2000	313
1965	18	1983	508	2001	241
1966	17	1984	208	2002	440
1967	21	1985	435	2003	285
1968	7	1986	163	2004	363
1969	14	1987	174	2005	87
1970	9	1988	467	2006	251
1971	16	1989	393	2007	333
1972	11	1990	369	2008	168
1973	69	1991	465	2009	156
1974	83	1992	156	2010	226
1975	197	1993	221	2011	1322
1976	122	1994	267	2012	219
1977	35	1995	249	2013	183
1978	94	1996	206	2014	308
1979	458	1997	262	2015	256
1980	139	1998	121	2016	198
1981	466	1999	299	2017	226
				2018	

Table 15: Survey biomass estimates (age 1+, t) of Eastern Bering Sea pollock based on design-based area-swept expansion methods from NMFS bottom trawl surveys 1982–2018.

	Survey biomass			
Year	Strata 1-6	Strata 8-9	Total	%NW
1982	2,858,400	54,469	2,912,869	2%
1983	5,921,380	-	5,921,380	-
1984	4,542,405	-	4,542,405	-
1985	4,560,122	637,881	5,198,003	12%
1986	4,835,722	-	4,835,722	-
1987	5,111,645	386,788	5,498,433	7%
1988	7,003,983	179,980	7,183,963	3%
1989	5,906,477	643,938	6,550,415	10%
1990	7,107,218	189,435	7,296,653	3%
1991	5,067,092	62,446	5,129,538	1%
1992	4,316,660	209,493	4,526,153	5%
1993	5,196,453	98,363	5,294,816	2%
1994	4,977,639	49,686	5,027,325	1%
1995	5,409,297	68,541	5,477,838	1%
1996	2,981,680	143,573	3,125,253	5%
1997	2,868,734	693,429	3,562,163	19%
1998	2,137,049	550,706	2,687,755	20%
1999	3,598,688	199,786	3,798,474	5%
2000	4,985,064	118,565	5,103,629	2%
2001	4,145,746	51,108	4,196,854	1%
2002	4,755,668	197,770	4,953,438	4%
2003	8,106,358	285,902	8,392,261	3%
2004	3,744,501	118,473	3,862,974	3%
2005	4,731,068	137,548	4,868,616	3%
2006	2,845,553	199,827	3,045,380	7%
2007	4,158,234	179,986	4,338,220	4%
2008	2,834,093	189,174	3,023,267	6%
2009	2,231,225	51,185	2,282,410	2%
2010	3,550,981	186,898	3,737,878	5%
2011	2,945,641	166,672	3,112,312	5%
2012	3,281,223	206,005	3,487,229	6%
2013	4,297,970	277,433	4,575,403	6%
2014	6,552,849	877,104	7,429,952	12%
2015	5,944,325	450,034	6,394,359	7%
2016	4,698,430	211,650	4,910,080	4%
2017	4,688,500	125,873	4,814,373	3%
2018	3,015,612	97,185	3,112,797	3%
Average	4,484,154	224,241	4,708,394	5%

Table 16: Sampling effort for pollock in the EBS from the NMFS bottom trawl survey 1982–2018.

Year	Number of Hauls	Lengths	Aged	Year	Number of Hauls	Lengths	Aged
1982	329	40,001	1,611	1999	373	32,532	1,385
1983	354	78,033	1,931	2000	372	41,762	1,545
1984	355	40,530	1,806	2001	375	47,335	1,641
1985	434	48,642	1,913	2002	375	43,361	1,695
1986	354	41,101	1,344	2003	376	46,480	1,638
1987	356	40,144	1,607	2004	375	44,102	1,660
1988	373	40,408	1,173	2005	373	35,976	1,676
1989	373	38,926	1,227	2006	376	39,211	1,573
1990	371	34,814	1,257	2007	376	29,679	1,484
1991	371	43,406	1,083	2008	375	24,635	1,251
1992	356	34,024	1,263	2009	375	24,819	1,342
1993	375	43,278	1,385	2010	376	23,142	1,385
1994	375	38,901	1,141	2011	376	36,227	1,734
1995	376	25,673	1,156	2012	376	35,782	1,785
1996	375	40,789	1,387	2013	376	35,908	1,847
1997	376	35,536	1,193	2014	376	43,042	2,099
1998	375	37,673	1,261	2015	376	54,241	2,320
				2016	376	50,857	1,766
				2017	376	47,873	1,623
				2018	376	48,673	1,486

Table 17: Bottom-trawl survey estimated numbers *millions* at age used for the stock assessment model. Note that in 1982–84 and 1986 only strata 1–6 were surveyed. Note these estimates are based on design-based procedures.

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1982	1,235	2,944	3,310	4,340	1,489	203	140	67	42	26	16	10	3	1	1	13,827
1983	4,798	734	1,656	2,980	6,689	2,042	371	198	89	77	58	20	8	7	3	19,731
1984	435	363	538	1,535	1,905	4,451	853	189	88	31	21	8	5	6	3	10,431
1985	5,340	430	1,492	692	2,653	2,011	1,501	298	79	64	23	8	9	1		14,600
1986	2,774	678	533	1,875	1,135	1,890	1,653	1,501	471	72	33	15	1	4	1	12,636
1987	379	759	1,032	780	4,741	1,297	1,202	479	1,521	237	71	28	5	2	2	12,535
1988	1,455	809	1,898	3,582	1,562	5,048	1,497	1,133	647	1,536	145	87	18	24	12	19,453
1989	972	304	467	1,564	3,884	875	3,474	534	663	258	812	142	124	63	87	14,223
1990	2,076	395	142	894	1,808	6,076	1,221	3,008	304	537	82	770	67	50	68	17,498
1991	3,025	899	326	103	629	591	1,964	740	1,594	417	563	116	349	49	44	11,408
1992	1,566	444	2,303	375	409	681	616	896	401	770	272	338	146	116	92	9,424
1993	2,553	382	835	3,752	818	657	340	467	634	390	343	251	197	109	130	11,856
1994	1,667	752	580	1,622	4,394	770	200	173	193	364	222	310	117	113	187	11,663
1995	2,231	206	385	1,940	2,615	4,293	1,824	481	294	184	346	139	256	101	145	15,439
1996	1,488	318	126	253	897	1,311	1,213	415	103	111	75	141	46	83	110	6,691
1997	2,502	361	84	100	1,459	992	731	923	160	82	62	67	111	36	123	7,793
1998	678	614	300	176	303	1,740	500	353	284	71	33	12	26	30	70	5,190
1999	1,123	1,038	966	1,041	589	1,031	2,554	680	322	301	110	47	19	27	93	9,939
2000	1,105	422	532	1,811	1,792	915	765	2,492	975	512	217	146	45	20	86	11,835
2001	1,812	1,051	569	542	1,369	1,432	615	305	908	651	249	199	79	28	76	9,885
2002	788	400	812	1,164	1,206	1,585	825	404	552	1,036	516	228	135	40	43	9,734
2003	535	150	969	1,680	2,021	1,862	2,495	1,411	646	839	1,714	740	278	146	105	15,591
2004	389	249	160	1,305	1,301	999	588	636	314	196	195	352	150	36	28	6,897
2005	353	119	226	1,042	2,940	1,981	1,035	470	357	262	70	148	241	92	95	9,431
2006	862	66	69	279	910	1,218	799	387	221	190	91	57	82	110	109	5,450
2007	1,945	66	165	463	1,436	1,691	1,231	887	377	168	157	137	62	78	151	9,014
2008	525	117	96	183	516	1,036	820	582	371	148	124	95	43	24	149	4,829
2009	791	220	462	499	289	417	558	435	316	152	101	33	33	17	69	4,391
2010	471	91	244	2,822	1,288	403	343	364	383	263	227	82	50	29	62	7,121
2011	1,128	114	212	340	1,779	872	252	141	221	221	185	142	60	28	76	5,770
2012	1,145	207	362	2,940	729	1,192	406	162	122	167	139	122	102	36	65	7,895
2013	1,189	116	223	903	4,639	1,099	695	245	83	76	100	75	70	38	50	9,602
2014	2,121	581	222	236	1,306	5,343	2,840	644	358	133	51	73	74	34	92	14,108
2015	1,056	670	2,161	538	1,083	2,043	4,110	1,221	295	141	18	17	29	18	36	13,435
2016	703	412	653	3,280	1,331	886	1,245	1,828	358	140	45	11	11	4	7	10,915
2017	574	242	451	2,346	2,834	1,231	844	758	893	256	91	33	5	2	7	10,565
2018	864	373	167	353	2,571	1,452	492	361	366	281	89	14	2		6	7,391
2019	1,449	388	333	363	1,111	4,294	1,774	418	298	171	98	43	16	3	1	10,761
Avg	1,476	486	686	1,334	1,853	1,787	1,173	702	429	303	204	138	81	42	65	10,697

Table 18: Mean EBS pollock body mass (kg) at age as observed in the summer NMFS bottom trawl survey, 1982–2018.

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1982	0.032	0.075	0.167	0.349	0.429	0.666	1.023	1.124	1.202	1.378	1.588	1.626	1.881	1.802	2.668
1983	0.017	0.141	0.240	0.360	0.493	0.578	0.727	1.074	1.126	1.020	1.121	1.130	1.558	1.115	1.936
1984	0.014	0.072	0.264	0.359	0.483	0.617	0.757	1.018	1.220	1.407	1.528	1.689	1.345	1.468	2.079
1985	0.014	0.104	0.264	0.410	0.514	0.649	0.784	0.926	1.428	1.132	1.298	1.727	1.629	1.614	2.570
1986	0.012	0.102	0.183	0.356	0.462	0.638	0.718	0.851	1.012	1.291	1.322	1.149	2.295	2.165	2.422
1987	0.017	0.110	0.262	0.354	0.432	0.525	0.705	0.795	0.896	1.005	1.198	1.400	1.740	2.020	2.275
1988	0.018	0.108	0.296	0.355	0.457	0.521	0.601	0.754	0.851	1.002	1.203	1.216	1.712	0.952	1.802
1989	0.016	0.092	0.168	0.385	0.455	0.529	0.629	0.673	0.927	0.924	1.046	1.078	1.124	1.187	1.284
1990	0.013	0.102	0.153	0.378	0.505	0.572	0.612	0.723	0.794	1.049	1.079	1.137	1.081	1.287	1.386
1991	0.019	0.108	0.157	0.354	0.486	0.579	0.695	0.740	0.873	0.911	1.093	1.201	1.266	1.425	1.924
1992	0.014	0.113	0.285	0.371	0.512	0.625	0.780	0.841	0.900	0.990	1.107	1.260	1.393	1.350	1.391
1993	0.012	0.072	0.314	0.456	0.503	0.553	0.663	0.796	0.977	1.029	1.153	1.257	1.392	1.550	1.699
1994	0.015	0.086	0.223	0.474	0.573	0.635	0.716	0.976	1.172	1.128	1.200	1.331	1.433	1.521	1.698
1995	0.013	0.088	0.145	0.380	0.486	0.628	0.654	0.801	0.939	1.172	1.136	1.308	1.353	1.434	1.683
1996	0.017	0.081	0.142	0.340	0.506	0.597	0.733	0.815	0.972	1.059	1.299	1.393	1.437	1.548	1.659
1997	0.016	0.053	0.181	0.363	0.439	0.591	0.707	0.806	0.974	1.023	1.163	1.311	1.289	1.474	1.598
1998	0.016	0.070	0.173	0.334	0.474	0.523	0.698	0.837	0.925	0.997	1.081	1.359	1.357	1.750	1.804
1999	0.014	0.080	0.210	0.356	0.422	0.560	0.635	0.776	0.985	1.014	1.116	1.202	1.624	1.757	1.924
2000	0.010	0.063	0.228	0.376	0.456	0.530	0.650	0.709	0.782	0.956	1.160	1.212	1.342	1.500	1.868
2001	0.016	0.069	0.169	0.374	0.505	0.601	0.674	0.771	0.857	0.911	1.099	1.207	1.412	1.396	1.688
2002	0.011	0.097	0.252	0.390	0.536	0.650	0.678	0.808	0.891	0.928	0.939	1.097	1.189	1.370	1.835
2003	0.021	0.106	0.334	0.437	0.567	0.671	0.729	0.833	0.889	0.957	0.967	1.021	1.029	1.132	1.184
2004	0.019	0.099	0.297	0.481	0.556	0.680	0.756	0.791	0.942	0.951	1.038	1.048	1.123	1.343	1.438
2005	0.018	0.079	0.220	0.404	0.528	0.605	0.702	0.801	0.874	0.913	1.014	1.064	1.098	1.193	1.321
2006	0.009	0.081	0.156	0.387	0.524	0.612	0.723	0.811	0.914	1.045	1.100	1.184	1.279	1.257	1.375
2007	0.012	0.095	0.276	0.427	0.547	0.671	0.777	0.846	0.926	1.078	1.126	1.110	1.328	1.301	1.423
2008	0.014	0.054	0.232	0.413	0.522	0.643	0.762	0.867	0.934	1.071	1.222	1.206	1.379	1.544	1.577
2009	0.010	0.113	0.223	0.408	0.551	0.675	0.840	0.914	0.960	1.173	1.170	1.440	1.449	1.546	1.784
2010	0.018	0.078	0.237	0.404	0.546	0.678	0.899	0.984	1.021	1.124	1.157	1.274	1.457	1.559	1.966
2011	0.015	0.112	0.229	0.429	0.551	0.646	0.802	1.004	1.105	1.152	1.249	1.306	1.431	1.463	1.671
2012	0.013	0.080	0.205	0.362	0.535	0.669	0.805	0.948	1.211	1.239	1.296	1.343	1.440	1.658	1.913
2013	0.017	0.069	0.222	0.421	0.495	0.624	0.834	0.978	1.093	1.225	1.297	1.343	1.468	1.609	1.730
2014	0.016	0.100	0.212	0.367	0.489	0.610	0.667	0.905	0.996	1.126	1.327	1.332	1.382	1.497	1.664
2015	0.019	0.093	0.287	0.387	0.518	0.601	0.727	0.814	1.048	1.081	1.329	1.585	1.366	1.579	1.773
2016	0.023	0.083	0.234	0.435	0.512	0.607	0.695	0.777	0.842	0.922	1.079	1.096	1.395	1.708	1.839
2017	0.022	0.098	0.200	0.397	0.529	0.598	0.691	0.743	0.824	0.830	0.960	0.856	1.336	1.506	1.701
2018	0.020	0.073	0.204	0.375	0.501	0.614	0.706	0.752	0.843	0.883	0.965	0.963	1.133	1.175	1.218
2019	0.016	0.089	0.234	0.435	0.546	0.639	0.711	0.792	0.844	0.926	0.898	0.978	0.948	1.401	1.854
Avg	0.016	0.089	0.223	0.391	0.504	0.611	0.728	0.847	0.973	1.053	1.161	1.248	1.392	1.478	1.753

Table 19: Biomass (age 1+) of Eastern Bering Sea pollock as estimated by surveys 1979–2018 (millions of t). Note that the bottom-trawl survey data only represent biomass from the survey strata (1–6) areas in 1982–1984, and 1986. For all other years the estimates include strata 8–9. DDC indicates the values obtained from the Kotwicki et al. Density-Dependence Correction method and the VAST columns are for the standard survey area including the Northern Bering Sea (NBS) extension. AT survey data prior to 1994 represent estimates from the surface to 3m off bottom.

	Bottom trawl survey			AT	
Year	DDC	VAST	VAST + NBS	Survey	age 3+
1979				7.458	22%
1980					
1981					
1982	4.069	3.802	3.819	4.901	95%
1983	8.409	9.601	9.825		
1984	6.409	6.927	6.986		
1985	8.25	7.828	8.199	4.799	97%
1986	6.826	7.275	7.399		
1987	7.892	7.708	7.787		
1988	11.088	10.901	10.922	4.675	97%
1989	9.796	10.34	10.482		
1990	11.9	11.615	11.674		
1991	7.39	7.336	7.515	1.454	46%
1992	6.211	6.625	6.699		
1993	7.089	7.777	7.937		
1994	7.1	7.348	7.432	3.640	85%
1995	9.107	6.481	6.544		
1996	4.08	3.916	4.067	2.955	97%
1997	5.019	4.834	5.031	3.591	70%
1998	3.51	3.648	4.038		
1999	5.455	5.129	5.185	4.202	95%
2000	7.355	7.937	8.024	3.614	95%
2001	5.44	6.035	6.106		
2002	6.771	6.842	7.028	4.330	82%
2003	13.508	10.846	11.468		
2004	5.106	5.423	5.743	4.016	99%
2005	6.696	6.905	7.018		
2006	3.886	4.004	4.016	1.887	98%
2007	6.145	6.411	6.438	2.288	89%
2008	3.994	4.246	4.258	1.407	76%
2009	2.99	2.929	2.934	1.323	78%
2010	5.132	5.174	5.183	2.651	65%
2011	3.949	4.539	4.604		
2012	4.614	4.729	4.771	2.299	71%
2013	6.115	6.096	6.166		
2014	10.331	11.889	12.508	4.727	65%
2015	8.587	9.604	10.878		
2016	6.608	7.216	9.776	4.829	97%
2017	6.256	6.941	8.694		
2018	4.187	4.002	5.596	2.499	97%
Avg	6.683	6.780	7.101	3.141	

Table 20: Number of (age 1+) hauls and sample sizes for EBS pollock collected by the AT surveys. Sub-headings E and W represent collections east and west of 170W (within the US EEZ) and US represents the US sub-total and RU represents the collections from the Russian side of the surveyed region.

	Hauls				Lengths				Otoliths				Number aged			
Year	E	W	US	RU	E	W	US	RU	E	W	US	RU	E	W	US	RU
1979			25				7,722				0				2,610	
1982	13	31	48		1,725	6,689	8,687		840	2,324	3,164		783	1,958	2,741	
1985			73				19,872				2,739				2,739	
1988			25				6,619				1,471				1,471	
1991			62				16,343				2,062				1,663	
1994	25	51	76	19	4,553	21,011	25,564	8,930	1,560	3,694	4,966	1,270	612	932	1,770	455
1996	15	42	57		3,551	13,273	16,824		669	1,280	1,949		815	1,111	1,926	
1997	25	61	86		6,493	23,043	29,536		966	2,669	3,635		936	1,349	2,285	
1999	41	77	118		13,841	28,521	42,362		1,945	3,001	4,946		946	1,500	2,446	
2000	29	95	124		7,721	36,008	43,729		850	2,609	3,459		850	1,403	2,253	
2002	47	79	126		14,601	25,633	40,234		1,424	1,883	3,307		1,000	1,200	2,200	
2004	33	57	90	15	8,896	18,262	27,158	5,893	1,167	2,002	3,169	461	798	1,192	2,351	461
2006	27	56	83		4,939	19,326	24,265		822	1,871	2,693		822	1,870	2,692	
2007	23	46	69	4	5,492	14,863	20,355	1,407	871	1,961	2,832	319	823	1,737	2,560	315
2008	9	53	62	6	2,394	15,354	17,748	1,754	341	1,698	2,039	177	338	1,381	1,719	176
2009	13	33	46	3	1,576	9,257	10,833	282	308	1,210	1,518	54	306	1,205	1,511	54
2010	11	48	59	9	2,432	20,263	22,695	3,502	653	1,868	2,521	381	652	1,598	2,250	379
2012	17	60	77	14	4,422	23,929	28,351	5,620	650	2,045	2,695	418	646	1,483	2,129	416
2014	52	87	139	3	28,857	8,645	37,502	747	1,739	849	2,588	72	845	1,735	2,580	72
2016	37	71	108		10,912	24,134	35,046		880	1,514	2,394		876	1,513	2,388	
2018	36	55	91		11,031	18,654	29,685		1,105	1,515	2,620		–	–	–	

Table 21: Mid-water pollock biomass (near surface down to 3m from the bottom unless otherwise noted) by area as estimated from summer acoustic-trawl surveys on the U.S. EEZ portion of the Bering Sea shelf, 1994–2018 (Honkalehto et al. 2015). CVs for biomass estimates were assumed to average 25% (inter-annual variability arises from the 1-dimensional variance estimation method). Note last column reflects biomass to 0.5m from bottom (as used in the model).

		Area	Biomass				
Year	Date	$(\text{nmi})^2$	SCA	E170-SCA	W170	3m total	0.5m total
1994	9 Jul - 19 Aug	78,251	0.312	0.399	2.176	2.886	3.64
1996	20 Jul - 30 Aug	93,810	0.215	0.269	1.826	2.311	2.955
1997	17 Jul - 4 Sept	102,770	0.246	0.527	1.818	2.592	3.591
1999	7 Jun - 5 Aug	103,670	0.299	0.579	2.408	3.285	4.202
2000	7 Jun - 2 Aug	106,140	0.393	0.498	2.158	3.049	3.614
2002	4 Jun - 30 Jul	99,526	0.647	0.797	2.178	3.622	4.33
2004	4 Jun - 29 Jul	99,659	0.498	0.516	2.293	3.307	4.016
2006	3 Jun - 25 Jul	89,550	0.131	0.254	1.175	1.560	1.887
2007	2 Jun - 30 Jul	92,944	0.084	0.168	1.517	1.769	2.288
2008	2 Jun - 31 Jul	95,374	0.085	0.029	0.883	0.997	1.407
2009	9 Jun - 7 Aug	91,414	0.070	0.018	0.835	0.924	1.323
2010	5 Jun - 7 Aug	92,849	0.067	0.113	2.143	2.323	2.651
2012	7 Jun - 10 Aug	96,852	0.142	0.138	1.563	1.843	2.299
2014	12 Jun - 13 Aug	94,361	0.426	1.000	2.014	3.439	4.727
2016	12 Jun - 17 Aug	100,674	0.516	1.005	2.542	4.063	4.829
2018	12 Jun - 22 Aug	98,300	0.218	0.462	1.439	2.120	2.499

Table 22: AT survey estimates of EBS pollock abundance-at-age (millions), 1979–2018. Age 2+ totals and age-1s were modeled as separate indices.

	Age										Age	
Year	1	2	3	4	5	6	7	8	9	10+	2+	Total
1979	69,110	41,132	3,884	413	534	128	30	4	28	161	46,314	115,424
1982	108	3,401	4,108	7,637	1,790	283	141	178	90	177	17,805	17,913
1985	2,076	929	8,149	898	2,186	1,510	1,127	130	21	15	14,965	17,041
1988	11	1,112	3,586	3,864	739	1,882	403	151	130	414	12,280	12,292
1991	639	5,942	967	215	224	133	120	39	37	53	7,730	8,369
1994	983	4,094	1,216	1,833	2,262	386	107	97	54	175	10,224	11,207
1996	1,800	567	552	2,741	915	634	585	142	39	129	6,303	8,103
1997	13,251	2,879	440	536	2,327	546	313	291	75	152	7,557	20,808
1999	607	1,780	3,717	1,810	652	398	1,548	526	180	228	10,839	11,446
2000	460	1,322	1,230	2,588	1,012	327	308	950	278	241	8,256	8,716
2002	723	4,281	3,931	1,435	839	772	389	149	184	637	12,617	13,340
2004	83	313	1,216	3,118	1,637	568	291	281	121	255	7,800	7,883
2006	525	217	291	654	783	659	390	145	75	149	3,364	3,888
2007	5,775	1,041	345	478	794	729	407	241	98	114	4,246	10,021
2008	71	2,915	1,047	166	161	288	235	136	102	98	5,147	5,218
2009	5,197	816	1,733	277	68	84	117	93	65	84	3,337	8,533
2010	2,568	6,404	984	2,295	446	73	33	37	38	81	10,390	12,958
2012	177	1,989	1,693	2,710	280	367	113	36	25	93	7,305	7,482
2014	4,751	8,655	969	1,161	1,119	1,770	740	170	79	80	14,743	19,494
2016	353	1,185	4,546	4,439	1,194	487	557	650	130	114	13,302	13,655
2018	450	517	249	621	2,268	944	198	112	107	104	5,120	5,570
Avg.	2,359	2,437	1,514	1,676	1,052	558	396	255	103	171	8,161	10,520
Med.	665	1,551	1,131	1,622	877	516	311	147	88	121	7,679	9,369

Table 23: An abundance index derived from acoustic data collected opportunistically aboard bottom-trawl survey vessels (AVO index; Honkalehto et al. 2014). Note values in parentheses are the coefficients of variation from using 1-D geostatistical estimates of sampling variability (Petitgas, 1993). See Honkalehto et al. (2011) for the derivation of these estimates. The column "CV_{AVO}" was assumed to have a mean value of 0.30 for model fitting purposes (scaling relative to the AT and BTS indices).

Year	AT scaled biomass index	AVO index	CV_{AVO}
2006	1.560 (4%)	0.555 9%	26%
2007	1.769 (4%)	0.638 14%	44%
2008	0.997 (8%)	0.316 20%	33%
2009	0.924 (9%)	0.285 42%	62%
2010	2.323 (6%)	0.679 13%	44%
2011	$-no\,survey-$	0.543 11%	29%
2012	1.843 (4%)	0.661 9%	32%
2013	$-no\,survey-$	0.694 6%	20%
2014	3.439 (5%)	0.897 5%	22%
2015	$-no\,survey-$	0.953 5%	23%
2016	4.063 (2%)	0.776 5%	19%
2017	$-no\,survey-$	0.730 5%	18%
2018	2.499 (2%)	0.672 5%	17%

Table 24: Pollock sample sizes assumed for the age-composition data likelihoods from the fishery, bottom-trawl survey, and AT surveys, 1964–2018. Note fishery sample size for 1964–1977 was fixed at 10.

Year	Fishery	BTS	ATS
1978	39		
1979	39		
1980	39		
1981	39		
1982	39	105	
1983	39	126	
1984	39	118	
1985	39	125	
1986	39	88	
1987	39	105	
1988	39	76	
1989	39	80	
1990	39	82	
1991	401	71	
1992	453	82	
1993	569	90	
1994	338	74	43
1995	572	75	
1996	254	90	32
1997	582	78	49
1998	426	82	
1999	519	90	67
2000	526	101	70
2001	390	107	
2002	513	110	72
2003	453	107	
2004	457	108	51
2005	482	109	
2006	469	102	47
2007	529	97	39
2008	464	82	35
2009	362	87	26
2010	602	90	34
2011	561	113	
2012	541	116	44
2013	625	120	
2014	513	137	79
2015	668	151	
2016	588	115	61
2017	587	105	
2018	545	100	25
2019		100	

Table 25: Mean weight-at-age (kg) estimates from the fishery (1991–2017; plus projections 2018–2020) showing the between-year variability (middle row) and sampling error (bottom panel) based on bootstrap resampling of observer data.

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1964–90	0.007	0.170	0.303	0.447	0.589	0.722	0.84	0.942	1.029	1.102	1.163	1.212	1.253	1.286	1.312
1991	0.007	0.150	0.286	0.476	0.604	0.728	0.839	0.873	1.014	1.127	1.129	1.251	1.240	1.308	1.249
1992	0.007	0.179	0.394	0.462	0.647	0.701	0.812	0.982	1.031	1.210	1.226	1.272	1.199	1.340	1.430
1993	0.007	0.331	0.497	0.610	0.650	0.754	0.904	1.039	1.211	1.232	1.391	1.538	1.610	1.646	1.584
1994	0.007	0.233	0.405	0.651	0.728	0.747	0.707	1.057	1.395	1.347	1.347	1.391	1.394	1.301	1.341
1995	0.007	0.153	0.377	0.498	0.735	0.840	0.856	0.986	1.220	1.315	1.388	1.477	1.390	1.297	1.341
1996	0.007	0.293	0.323	0.427	0.679	0.794	0.949	0.953	1.020	1.096	1.362	1.500	1.520	1.710	1.598
1997	0.007	0.187	0.315	0.471	0.559	0.747	0.893	1.072	1.091	1.243	1.346	1.443	1.668	1.423	1.383
1998	0.007	0.191	0.368	0.589	0.627	0.621	0.775	1.029	1.169	1.253	1.327	1.452	1.414	1.523	1.537
1999	0.007	0.188	0.405	0.507	0.643	0.701	0.728	0.891	1.037	1.250	1.248	1.431	0.990	0.516	1.236
2000	0.007	0.218	0.353	0.526	0.629	0.731	0.782	0.806	0.966	1.007	1.242	1.321	1.101	1.165	1.466
2001	0.007	0.227	0.327	0.503	0.669	0.788	0.958	0.987	1.063	1.115	1.314	1.435	1.563	1.433	1.467
2002	0.007	0.231	0.386	0.509	0.666	0.795	0.910	1.029	1.104	1.095	1.288	1.448	1.597	1.343	1.683
2003	0.007	0.276	0.489	0.547	0.649	0.767	0.862	0.953	1.081	1.200	1.200	1.206	1.362	1.377	1.699
2004	0.007	0.135	0.409	0.583	0.640	0.758	0.889	0.924	1.035	1.162	1.110	1.160	1.333	1.281	1.213
2005	0.007	0.283	0.346	0.508	0.642	0.741	0.882	0.954	1.062	1.096	1.225	1.276	1.251	1.174	1.373
2006	0.007	0.174	0.305	0.447	0.606	0.755	0.853	0.952	1.065	1.114	1.219	1.234	1.282	1.399	1.462
2007	0.007	0.155	0.346	0.506	0.641	0.781	0.962	1.098	1.182	1.275	1.304	1.477	1.500	1.738	1.520
2008	0.007	0.208	0.330	0.520	0.652	0.774	0.903	1.049	1.119	1.282	1.421	1.524	1.553	1.921	1.660
2009	0.007	0.136	0.340	0.526	0.704	0.879	1.002	1.125	1.399	1.490	1.563	1.614	1.814	1.996	2.230
2010	0.050	0.175	0.383	0.489	0.664	0.915	1.119	1.261	1.371	1.587	1.659	1.924	1.923	2.079	2.316
2011	0.031	0.205	0.290	0.509	0.665	0.808	0.976	1.225	1.346	1.518	1.585	1.621	2.176	1.754	2.287
2012	0.029	0.142	0.270	0.410	0.643	0.824	0.974	1.172	1.306	1.519	1.614	1.644	1.717	2.040	2.086
2013	0.095	0.144	0.289	0.442	0.564	0.782	1.131	1.284	1.426	1.692	1.834	1.806	1.960	2.187	2.207
2014	0.014	0.193	0.316	0.455	0.617	0.751	0.894	1.154	1.310	1.370	1.692	1.815	1.733	1.658	2.236
2015	0.025	0.181	0.404	0.461	0.570	0.690	0.786	0.888	1.146	1.203	1.355	1.914	1.450	1.617	2.627
2016	0.025	0.181	0.407	0.531	0.557	0.648	0.732	0.801	0.943	1.044	1.206	0.672	1.075	1.822	1.567
2017	0.025	0.191	0.404	0.498	0.651	0.694	0.750	0.827	0.893	0.911	1.018	1.085	0.377	0.678	0.751
2018	0.025	0.186	0.380	0.466	0.573	0.734	0.810	0.855	0.904	1.045	0.983	1.200	0.517	0.375	1.235
2019	0.025	0.186	0.282	0.371	0.457	0.545	0.655	0.774	0.908	1.041	1.210	1.351	1.540	1.700	1.867
Avg	0.016	0.199	0.360	0.506	0.640	0.762	0.888	1.021	1.158	1.263	1.370	1.453	1.493	1.542	1.687
CV	NA	25%	16%	11%	7%	8%	12%	13%	13%	14%	13%	18%	19%	23%	24%
Sampling CV (from bootstrap), ages 1 and 2 were excluded															
1991			7.6%	5.0%	1.8%	1.8%	1.6%	2.9%	1.6%	4.2%	2.6%	4.9%	2.4%	6.0%	3.4%
1992			3.3%	3.8%	4.6%	5.0%	2.4%	2.0%	2.8%	2.3%	3.3%	3.4%	8.3%	4.7%	4.9%
1993			1.5%	0.6%	2.4%	4.6%	5.4%	3.6%	2.0%	3.0%	3.3%	4.6%	5.2%	8.3%	5.1%
1994			7.6%	1.8%	0.9%	2.3%	6.2%	10.7%	5.1%	4.5%	4.7%	4.1%	5.6%	10.3%	6.8%
1995			4.7%	3.5%	1.8%	1.0%	2.2%	3.5%	6.7%	6.6%	3.9%	8.8%	4.7%	32.4%	9.6%
1996			7.9%	7.6%	3.3%	1.8%	1.0%	1.8%	3.4%	4.9%	10.6%	7.8%	6.6%	4.2%	13.9%
1997			8.2%	2.4%	1.4%	1.7%	1.5%	1.8%	3.1%	5.5%	10.1%	7.5%	14.3%	7.5%	6.1%
1998			6.3%	5.7%	3.3%	1.2%	2.6%	2.8%	2.0%	4.7%	7.7%	9.9%	12.5%	12.6%	10.9%
1999			1.1%	1.3%	2.0%	1.8%	0.8%	2.3%	3.2%	3.6%	12.8%	12.4%	45.9%	110.0%	23.7%
2000			3.7%	1.0%	1.0%	2.1%	1.5%	1.0%	2.7%	5.6%	4.1%	9.7%	47.0%	67.1%	35.8%
2001			4.3%	2.9%	1.2%	1.5%	2.8%	2.4%	1.8%	4.4%	4.9%	6.2%	8.9%	9.8%	31.8%
2002			3.5%	1.7%	1.7%	1.0%	1.4%	2.5%	2.9%	2.5%	4.5%	4.5%	6.4%	25.2%	15.9%
2003			1.0%	1.9%	1.4%	1.4%	1.3%	2.0%	3.4%	4.7%	4.4%	5.4%	10.0%	20.4%	13.2%
2004			4.1%	0.9%	1.3%	2.0%	1.7%	1.8%	2.9%	6.6%	5.4%	4.6%	10.4%	12.8%	7.4%
2005			4.8%	1.1%	0.8%	1.1%	2.0%	3.0%	2.7%	4.9%	7.2%	5.5%	21.6%	22.6%	24.3%
2006			4.4%	1.6%	0.9%	1.0%	1.5%	2.6%	3.2%	3.2%	8.1%	10.6%	8.7%	10.8%	8.4%
2007			2.7%	2.0%	1.0%	0.9%	1.3%	1.9%	3.3%	4.4%	4.3%	7.7%	10.4%	6.7%	5.7%
2008			3.2%	2.2%	1.5%	0.9%	1.3%	1.8%	2.3%	5.4%	6.2%	5.7%	5.2%	12.0%	6.3%
2009			1.6%	1.7%	3.7%	2.0%	1.8%	2.3%	2.7%	3.7%	7.3%	6.4%	5.0%	15.2%	4.0%
2010			6.8%	0.7%	1.4%	3.5%	2.7%	2.9%	2.5%	3.0%	4.5%	4.5%	6.4%	6.1%	5.3%
2011			1.8%	2.5%	0.7%	1.3%	3.1%	3.3%	3.7%	3.4%	3.9%	5.5%	14.5%	8.3%	9.2%
2012			3.0%	0.6%	2.4%	1.0%	2.2%	4.5%	6.3%	7.1%	5.5%	6.1%	8.2%	11.0%	22.5%
2013			3.0%	1.2%	0.7%	2.4%	2.2%	2.9%	5.2%	5.5%	5.7%	5.9%	6.9%	10.5%	6.5%
2014			5.5%	1.7%	1.1%	0.7%	1.7%	2.4%	4.3%	9.7%	9.6%	10.1%	8.8%	16.5%	6.9%
2015			0.6%	1.8%	1.4%	0.9%	0.8%	2.4%	3.6%	6.2%	13.5%	11.6%	12.8%	14.6%	17.7%
2016			2.9%	0.3%	1.7%	1.5%	1.8%	1.4%	4.9%	7.0%	10.4%	108.5%	65.8%	39.0%	70.8%
2017			7.4%	0.9%	0.6%	1.3%	1.5%	1.6%	1.8%	5.1%	8.0%	13.6%	110.0%	113.2%	111.1%
2018			6.5%	2.6%	0.5%	0.9%	1.8%	2.3%	2.5%	4.1%	15.0%	50.4%	105.9%	110.2%	65.4%

```
## Error in eval(expr, envir, enclos): object 'profmod_names' not found

## Error in round(x$sdnr_bts, 2): non-numeric argument to mathematical function

## Error in UseMethod("xtable"): no applicable method for 'xtable' applied to an object of clas


## Error in eval(expr, envir, enclos): object 'mod_scen' not found

## Error in tab_fit(modlst, mod_scen): object 'mod_scen' not found

## Error in UseMethod("xtable"): no applicable method for 'xtable' applied to an object of clas


## Error in `align<-.xtable`(`*tmp*`, value = switch(1 + is.null(align), : "align" must have le
```

Table 26: Pollock sample sizes assumed for the age-composition data likelihoods from the fishery, bottom-trawl survey, and AT surveys, 1964–2018. Note fishery sample size for 1964–1977 was fixed at 10.

Year	Fishery	BTS	ATS
1978	39		
1979	39		
1980	39		
1981	39		
1982	39	105	
1983	39	126	
1984	39	118	
1985	39	125	
1986	39	88	
1987	39	105	
1988	39	76	
1989	39	80	
1990	39	82	
1991	401	71	
1992	453	82	
1993	569	90	
1994	338	74	43
1995	572	75	
1996	254	90	32
1997	582	78	49
1998	426	82	
1999	519	90	67
2000	526	101	70
2001	390	107	
2002	513	110	72
2003	453	107	
2004	457	108	51
2005	482	109	
2006	469	102	47
2007	529	97	39
2008	464	82	35
2009	362	87	26
2010	602	90	34
2011	561	113	
2012	541	116	44
2013	625	120	
2014	513	137	79
2015	668	151	
2016	588	115	61
2017	587	105	
2018	545	100	25
2019		100	

Table 27: Pollock sample sizes assumed for the age-composition data likelihoods from the fishery, bottom-trawl survey, and AT surveys, 1964–2018. Note fishery sample size for 1964–1977 was fixed at 10.

Year	Fishery	BTS	ATS
1978	39		
1979	39		
1980	39		
1981	39		
1982	39	105	
1983	39	126	
1984	39	118	
1985	39	125	
1986	39	88	
1987	39	105	
1988	39	76	
1989	39	80	
1990	39	82	
1991	401	71	
1992	453	82	
1993	569	90	
1994	338	74	43
1995	572	75	
1996	254	90	32
1997	582	78	49
1998	426	82	
1999	519	90	67
2000	526	101	70
2001	390	107	
2002	513	110	72
2003	453	107	
2004	457	108	51
2005	482	109	
2006	469	102	47
2007	529	97	39
2008	464	82	35
2009	362	87	26
2010	602	90	34
2011	561	113	
2012	541	116	44
2013	625	120	
2014	513	137	79
2015	668	151	
2016	588	115	61
2017	587	105	
2018	545	100	25
2019		100	

Table 28: Pollock sample sizes assumed for the age-composition data likelihoods from the fishery, bottom-trawl survey, and AT surveys, 1964–2018. Note fishery sample size for 1964–1977 was fixed at 10.

Year	Fishery	BTS	ATS
1978	39		
1979	39		
1980	39		
1981	39		
1982	39	105	
1983	39	126	
1984	39	118	
1985	39	125	
1986	39	88	
1987	39	105	
1988	39	76	
1989	39	80	
1990	39	82	
1991	401	71	
1992	453	82	
1993	569	90	
1994	338	74	43
1995	572	75	
1996	254	90	32
1997	582	78	49
1998	426	82	
1999	519	90	67
2000	526	101	70
2001	390	107	
2002	513	110	72
2003	453	107	
2004	457	108	51
2005	482	109	
2006	469	102	47
2007	529	97	39
2008	464	82	35
2009	362	87	26
2010	602	90	34
2011	561	113	
2012	541	116	44
2013	625	120	
2014	513	137	79
2015	668	151	
2016	588	115	61
2017	587	105	
2018	545	100	25
2019		100	

Table 29: Estimated billions of EBS pollock at age (columns 2–11) from the 2018 assessment model.

Year	1	2	3	4	5	6	7	8	9	10+
1964	6.37	3.46	2.18	0.47	0.20	0.39	0.18	0.06	0.04	0.22
1965	21.10	2.58	2.17	1.54	0.29	0.13	0.24	0.11	0.04	0.16
1966	15.10	8.56	1.62	1.53	0.96	0.18	0.08	0.16	0.07	0.13
1967	25.64	6.13	5.38	1.14	0.96	0.61	0.12	0.05	0.10	0.13
1968	22.18	10.38	3.80	3.51	0.66	0.56	0.35	0.07	0.03	0.13
1969	26.22	8.98	6.41	2.47	2.03	0.38	0.33	0.21	0.04	0.10
1970	23.55	10.61	5.52	4.06	1.45	1.20	0.23	0.19	0.12	0.08
1971	14.44	9.49	6.37	3.29	2.32	0.80	0.67	0.12	0.10	0.10
1972	11.80	5.80	5.56	3.57	1.72	1.15	0.40	0.33	0.06	0.09
1973	27.07	4.74	3.29	2.90	1.73	0.82	0.54	0.19	0.14	0.06
1974	19.90	10.89	2.61	1.59	1.29	0.76	0.36	0.24	0.08	0.08
1975	17.11	8.02	5.79	1.12	0.67	0.54	0.32	0.15	0.09	0.06
1976	13.39	6.91	4.53	2.61	0.51	0.31	0.25	0.15	0.07	0.06
1977	14.33	5.42	3.99	2.25	1.22	0.24	0.15	0.12	0.07	0.06
1978	25.52	5.81	3.17	2.19	1.15	0.61	0.12	0.07	0.06	0.06
1979	62.85	10.35	3.43	1.74	1.11	0.55	0.29	0.06	0.04	0.06
1980	26.99	25.50	6.26	1.99	0.91	0.53	0.26	0.14	0.03	0.04
1981	32.74	10.96	15.82	3.94	1.08	0.45	0.25	0.12	0.07	0.03
1982	16.27	13.30	6.89	10.80	2.36	0.58	0.24	0.13	0.07	0.05
1983	48.57	6.61	8.41	4.91	7.04	1.42	0.35	0.14	0.08	0.07
1984	13.50	19.74	4.18	6.05	3.32	4.48	0.88	0.22	0.09	0.09
1985	33.01	5.49	12.51	3.01	4.14	2.09	2.78	0.54	0.13	0.11
1986	12.37	13.42	3.48	8.98	2.08	2.71	1.27	1.70	0.33	0.15
1987	6.89	5.03	8.51	2.50	6.15	1.37	1.69	0.78	1.06	0.30
1988	5.66	2.80	3.20	6.14	1.76	4.18	0.90	1.11	0.50	0.88
1989	11.74	2.30	1.78	2.24	4.21	1.13	2.63	0.54	0.68	0.85
1990	50.11	4.77	1.46	1.27	1.51	2.70	0.70	1.56	0.33	0.95
1991	25.80	20.37	3.03	1.04	0.82	0.86	1.53	0.38	0.85	0.72
1992	21.55	10.49	12.91	2.19	0.71	0.50	0.50	0.78	0.21	0.78
1993	44.55	8.76	6.63	8.98	1.48	0.44	0.27	0.23	0.34	0.40
1994	14.90	18.11	5.57	4.71	5.69	0.97	0.26	0.14	0.12	0.39
1995	10.27	6.06	11.52	4.07	3.20	3.33	0.58	0.15	0.08	0.29
1996	22.50	4.18	3.86	8.46	2.89	2.02	1.80	0.33	0.08	0.22
1997	30.81	9.15	2.65	2.82	6.15	1.97	1.16	0.89	0.16	0.16
1998	15.18	12.53	5.79	1.93	2.00	4.15	1.22	0.64	0.47	0.16
1999	16.37	6.17	7.95	4.20	1.36	1.35	2.49	0.73	0.36	0.34
2000	25.44	6.66	3.93	5.66	2.92	0.92	0.87	1.46	0.43	0.41
2001	34.67	10.34	4.23	2.84	3.83	1.87	0.58	0.50	0.80	0.49
2002	23.18	14.10	6.58	3.08	1.96	2.32	1.02	0.32	0.27	0.73
2003	14.19	9.42	8.96	4.77	2.10	1.20	1.18	0.52	0.16	0.55
2004	6.45	5.77	6.00	6.32	3.23	1.24	0.62	0.58	0.26	0.39
2005	4.59	2.62	3.67	4.35	3.97	1.96	0.70	0.32	0.30	0.36
2006	11.62	1.87	1.67	2.66	2.87	2.19	1.04	0.38	0.18	0.38
2007	24.83	4.72	1.19	1.18	1.73	1.61	1.09	0.53	0.20	0.30
2008	13.10	10.09	3.00	0.84	0.76	0.96	0.78	0.54	0.27	0.26
2009	48.60	5.33	6.42	2.17	0.55	0.43	0.45	0.37	0.26	0.27
2010	20.77	19.76	3.39	4.61	1.42	0.33	0.22	0.23	0.19	0.27
2011	12.66	8.45	12.58	2.48	2.93	0.86	0.19	0.12	0.12	0.25
2012	11.02	5.15	5.37	9.14	1.71	1.44	0.41	0.09	0.06	0.18
2013	51.47	4.48	3.27	3.88	5.97	1.10	0.67	0.19	0.04	0.11
2014	49.80	20.93	2.85	2.37	2.58	3.58	0.65	0.34	0.09	0.07
2015	13.63	20.25	13.32	2.07	1.60	1.56	1.98	0.33	0.17	0.08
2016	9.02	5.54	12.90	9.35	1.35	0.98	0.83	1.00	0.16	0.12
2017	15.54	3.67	3.53	9.45	5.74	0.86	0.57	0.46	0.54	0.15
2018	17.42	6.32	2.34	2.59	6.51	3.45	0.46	0.30	0.25	0.38
2019	18.49	7.08	4.03	1.72	1.82	3.82	2.09	0.26	0.17	0.37

Table 30: Estimated millions of EBS pollock caught at age (columns 2–11) from the 2018 assessment model.

Year	1	2	3	4	5	6	7	8	9	10+
1964	8.83	37.81	85.23	62.33	27.25	52.61	22.95	7.08	4.32	25.21
1965	28.82	29.09	98.55	214.84	39.55	16.30	30.52	13.39	4.21	18.42
1966	20.66	101.17	79.02	194.23	119.33	21.77	9.13	17.36	7.74	13.62
1967	65.07	139.49	556.59	214.17	183.49	113.38	21.55	9.27	18.06	23.00
1968	64.20	263.20	395.64	663.06	121.64	100.57	63.23	12.16	5.31	24.02
1969	91.29	256.37	811.01	447.80	361.41	67.21	57.36	38.15	7.49	18.42
1970	141.01	490.35	938.35	810.70	317.46	262.02	52.16	48.79	31.95	22.00
1971	121.29	619.18	1349.50	839.26	670.18	229.95	193.48	41.08	35.81	38.75
1972	88.80	511.16	1438.60	1075.34	540.90	359.27	126.98	116.91	21.73	35.74
1973	180.79	523.04	1002.09	1005.04	622.01	295.21	196.17	74.58	60.27	25.71
1974	115.94	1465.56	966.32	596.59	491.58	287.51	135.22	96.85	33.46	34.44
1975	66.02	744.07	1991.21	375.05	221.84	177.93	104.24	51.55	34.92	21.90
1976	37.22	524.71	1300.30	837.17	159.52	95.22	76.76	46.00	22.70	22.17
1977	28.51	362.58	905.08	614.42	350.86	68.88	41.90	34.13	21.43	18.69
1978	41.88	352.64	711.53	600.41	349.71	183.55	36.85	22.67	19.79	20.85
1979	82.69	428.74	645.05	444.46	350.94	179.42	94.41	18.91	12.27	19.47
1980	24.48	554.05	812.19	465.11	271.03	166.00	79.98	42.54	8.69	13.36
1981	16.92	126.90	1080.03	661.67	252.53	107.90	59.91	29.53	16.05	8.06
1982	4.55	87.19	228.60	1115.88	380.09	97.74	39.83	22.65	11.30	9.09
1983	9.45	39.04	209.23	369.37	862.23	208.23	50.35	20.74	11.88	10.69
1984	2.13	93.56	103.71	396.60	427.27	631.86	126.12	30.66	12.79	13.67
1985	4.33	26.33	342.11	181.31	419.89	328.05	420.23	80.33	19.48	16.57
1986	1.27	57.11	93.89	581.22	196.49	374.49	190.99	235.35	46.32	20.89
1987	0.43	14.44	187.62	110.32	437.09	138.47	170.70	91.39	120.58	32.42
1988	0.40	9.97	153.72	392.84	194.60	549.03	139.92	162.10	73.01	120.18
1989	0.70	7.62	57.27	171.04	491.48	160.06	460.43	87.89	99.69	120.19
1990	3.53	21.40	44.72	134.96	301.37	553.62	162.77	360.00	72.40	192.40
1991	1.68	94.83	62.24	77.60	127.29	167.00	413.93	86.85	243.12	204.81
1992	1.72	71.78	686.67	166.09	99.00	123.68	165.77	278.58	84.31	305.87
1993	1.94	19.95	231.35	1120.92	142.37	76.34	69.25	58.59	91.85	101.73
1994	0.47	32.09	69.61	339.10	1043.36	165.26	53.15	27.53	23.00	73.90
1995	0.27	9.68	89.09	143.63	409.09	779.85	116.86	29.23	14.73	52.14
1996	0.69	14.49	48.18	141.80	194.75	392.03	527.23	100.98	22.50	51.03
1997	0.96	59.33	40.98	99.56	467.65	288.48	264.46	219.90	48.11	44.05
1998	0.37	43.14	100.48	76.13	154.63	682.31	205.30	137.59	114.11	37.07
1999	0.29	11.74	266.78	219.57	103.72	157.51	451.68	126.89	61.14	57.44
2000	0.47	11.70	81.73	422.79	349.63	114.50	166.03	335.54	82.39	72.13
2001	0.68	15.97	62.57	168.78	612.36	422.06	131.73	111.78	166.01	96.79
2002	0.51	32.65	124.91	215.54	298.11	631.47	282.19	88.00	69.39	161.86
2003	0.32	17.00	372.94	349.38	369.64	309.18	349.66	152.16	43.00	124.31
2004	0.12	7.73	111.48	831.45	511.22	257.76	164.79	150.10	59.74	78.82
2005	0.08	3.66	65.21	404.70	885.08	478.69	161.43	70.14	62.50	66.01
2006	0.23	3.82	65.48	288.69	608.95	631.64	288.83	102.08	44.31	86.57
2007	0.49	10.96	48.21	135.54	378.25	492.64	315.62	141.84	49.85	74.04
2008	0.25	21.50	70.06	84.91	155.22	307.81	238.84	157.43	76.93	69.99
2009	0.81	7.66	168.02	210.71	91.18	119.47	124.69	101.19	70.55	74.86
2010	0.28	25.15	39.01	564.24	226.34	61.74	47.05	55.48	46.25	64.31
2011	0.22	13.97	204.44	147.26	859.85	274.77	59.08	37.18	36.41	73.29
2012	0.19	10.01	113.42	946.19	196.29	469.11	129.75	29.22	18.12	54.95
2013	0.77	6.09	64.96	351.48	982.77	193.69	180.22	59.80	13.41	35.39
2014	0.69	28.15	50.83	182.02	404.98	785.48	182.53	97.35	25.59	22.46
2015	0.21	19.19	605.33	207.88	238.69	386.44	548.11	91.76	52.07	26.55
2016	0.10	2.98	120.65	1390.91	173.78	181.24	176.46	244.34	37.99	28.16
2017	0.16	1.74	29.27	578.93	937.82	201.63	140.48	113.28	121.47	34.48
2018	0.14	2.00	13.18	113.53	1172.76	544.57	102.18	65.69	49.32	67.05
2019	0.22	3.39	34.39	112.93	471.76	871.69	655.97	78.17	48.30	92.85

Table 31: Estimated EBS pollock age 3+ biomass, female spawning biomass, and age 1 recruitment for 1964–2018. Biomass units are thousands of t, age-1 recruitment is in millions of pollock.

Year	SSB	CV.SSB	Recruitment	CV.Rec...	Age.3..Biomass	CV..
1964	526	27	6,366	38	1,773	22
1965	623	23	21,098	25	2,158	20
1966	724	22	15,096	32	2,314	20
1967	911	20	25,641	26	3,549	17
1968	1,128	19	22,184	28	4,060	17
1969	1,382	19	26,223	26	5,153	16
1970	1,615	18	23,549	27	5,801	15
1971	1,707	17	14,438	33	6,247	13
1972	1,619	17	11,803	34	5,933	13
1973	1,357	19	27,070	19	4,759	14
1974	1,004	22	19,903	19	3,504	16
1975	852	20	17,106	18	3,617	12
1976	865	16	13,390	17	3,555	10
1977	900	13	14,333	14	3,491	9
1978	912	12	25,518	10	3,358	8
1979	886	11	62,846	6	3,275	8
1980	1,003	9	26,989	8	4,125	7
1981	1,663	6	32,743	7	7,944	5
1982	2,549	5	16,265	10	9,176	5
1983	3,201	5	48,568	6	10,508	4
1984	3,477	5	13,503	10	10,299	4
1985	3,736	4	33,005	6	12,201	4
1986	3,922	4	12,372	10	11,432	3
1987	4,006	4	6,891	10	11,889	3
1988	3,948	3	5,664	10	11,059	3
1989	3,498	3	11,739	7	9,245	3
1990	2,777	3	50,105	3	7,344	3
1991	2,064	4	25,804	5	5,834	3
1992	2,206	3	21,552	6	9,260	3
1993	3,120	3	44,550	4	11,538	3
1994	3,461	3	14,903	6	11,226	3
1995	3,630	3	10,272	7	12,670	3
1996	3,584	3	22,497	5	10,763	3
1997	3,382	3	30,810	4	9,417	3
1998	3,114	3	15,179	6	9,464	3
1999	3,141	3	16,370	5	10,431	3
2000	3,169	3	25,443	4	9,621	3
2001	3,190	3	34,670	3	9,367	3
2002	3,008	3	23,181	4	9,711	3
2003	3,168	3	14,185	5	11,637	2
2004	3,264	3	6,454	7	10,953	2
2005	2,993	3	4,593	8	9,151	2
2006	2,449	3	11,620	5	6,997	3
2007	2,026	3	24,830	4	5,644	3
2008	1,507	4	13,098	6	4,604	3
2009	1,593	4	48,604	4	5,757	3
2010	1,826	4	20,773	6	6,057	3
2011	2,178	3	12,661	7	8,465	3
2012	2,482	4	11,018	9	8,360	3
2013	2,726	4	51,471	7	8,165	4
2014	2,576	5	49,803	9	7,480	4
2015	2,623	5	13,627	17	10,489	5
2016	3,353	6	9,023	25	13,318	6
2017	3,780	7	15,545	18	11,909	7
2018	3,392	9	17,420	20	9,622	8
2019	2,310	10	18,493	21	6,840	9

```
## Error in data.frame(..., check.names = FALSE): arguments imply differing number of rows: 55

## Error in names(t3) <- c("Year", "Current", "CV", "2017", "CV", "2016", : object 't3' not fou

## Error in seq.default(2, length(t3[1, ]), 2): object 't3' not found

## Error in xtable(t3, caption = cap, label = paste0("tab:", tablab[32]), : object 't3' not fou
```

Table 32: Estimated EBS pollock age 3+ biomass, female spawning biomass, and age 1 recruitment for 1964–2018. Biomass units are thousands of t, age-1 recruitment is in millions of pollock.

Year	SSB	CV.SSB	Recruitment	CV.Rec...	Age.3..Biomass	CV..
1964	526	27	6,366	38	1,773	22
1965	623	23	21,098	25	2,158	20
1966	724	22	15,096	32	2,314	20
1967	911	20	25,641	26	3,549	17
1968	1,128	19	22,184	28	4,060	17
1969	1,382	19	26,223	26	5,153	16
1970	1,615	18	23,549	27	5,801	15
1971	1,707	17	14,438	33	6,247	13
1972	1,619	17	11,803	34	5,933	13
1973	1,357	19	27,070	19	4,759	14
1974	1,004	22	19,903	19	3,504	16
1975	852	20	17,106	18	3,617	12
1976	865	16	13,390	17	3,555	10
1977	900	13	14,333	14	3,491	9
1978	912	12	25,518	10	3,358	8
1979	886	11	62,846	6	3,275	8
1980	1,003	9	26,989	8	4,125	7
1981	1,663	6	32,743	7	7,944	5
1982	2,549	5	16,265	10	9,176	5
1983	3,201	5	48,568	6	10,508	4
1984	3,477	5	13,503	10	10,299	4
1985	3,736	4	33,005	6	12,201	4
1986	3,922	4	12,372	10	11,432	3
1987	4,006	4	6,891	10	11,889	3
1988	3,948	3	5,664	10	11,059	3
1989	3,498	3	11,739	7	9,245	3
1990	2,777	3	50,105	3	7,344	3
1991	2,064	4	25,804	5	5,834	3
1992	2,206	3	21,552	6	9,260	3
1993	3,120	3	44,550	4	11,538	3
1994	3,461	3	14,903	6	11,226	3
1995	3,630	3	10,272	7	12,670	3
1996	3,584	3	22,497	5	10,763	3
1997	3,382	3	30,810	4	9,417	3
1998	3,114	3	15,179	6	9,464	3
1999	3,141	3	16,370	5	10,431	3
2000	3,169	3	25,443	4	9,621	3
2001	3,190	3	34,670	3	9,367	3
2002	3,008	3	23,181	4	9,711	3
2003	3,168	3	14,185	5	11,637	2
2004	3,264	3	6,454	7	10,953	2
2005	2,993	3	4,593	8	9,151	2
2006	2,449	3	11,620	5	6,997	3
2007	2,026	3	24,830	4	5,644	3
2008	1,507	4	13,098	6	4,604	3
2009	1,593	4	48,604	4	5,757	3
2010	1,826	4	20,773	6	6,057	3
2011	2,178	3	12,661	7	8,465	3
2012	2,482	4	11,018	9	8,360	3
2013	2,726	4	51,471	7	8,165	4
2014	2,576	5	49,803	9	7,480	4
2015	2,623	5	13,627	17	10,489	5
2016	3,353	6	9,023	25	13,318	6
2017	3,780	7	15,545	18	11,909	7
2018	3,392	9	17,420	20	9,622	8
2019	2,310	10	18,493	21	6,840	9

Table 33: Summary of model 16.1 results and the stock condition for EBS pollock. Biomass units are thousands of t.

Component	base
B_{2020}	1,900
$CV_{B_{2020}}$	0.13
B_{MSY}	1,902
$CV_{B_{MSY}}$	0.24
B_{2020}/B_{MSY}	99%
B_0	5,140
$B_{35\%}$	1,791
SPR rate at F_{MSY}	30%
Steepness	0.63
Est. $B_{2018}/B_{2018,nofishing}$	0.53
B_{2018}/B_{MSY}	122%

Table 34: Summary results of Tier 1 2018 yield projections for EBS pollock.

Component	base
2020 fishable biomass (GM)	4,987,000
Equilibrium fishable biomass at MSY	3,658,000
MSY R (HM)	0.555
2020 Tier 1 ABC	2,769,000
2020 Tier 1 F_{OFL}	0.698
2020 Tier 1 OFL	3,481,000
MSY R (HM)	0.472
Recommended ABC	2,354,000

Table 35: Tier 3 projections of EBS pollock catch for the 7 scenarios.

Catch	Scenario.1	Scenario.2	Scenario.3	Scenario.4	Scenario.5	Scenario.6	Scenario.7
2018	1,350	1,350	1,350	1,350	1,350	1,350	1,350
2019	2,163	1,350	1,403	976	0	2,659	2,163
2020	1,534	1,350	1,148	855	0	1,589	1,534
2021	1,170	1,527	1,023	795	0	1,203	1,434
2022	1,182	1,322	1,020	808	0	1,262	1,337
2023	1,265	1,320	1,061	847	0	1,371	1,394
2024	1,358	1,382	1,127	904	0	1,470	1,477
2025	1,401	1,411	1,164	940	0	1,505	1,508
2026	1,423	1,428	1,190	966	0	1,520	1,521
2027	1,417	1,418	1,196	976	0	1,505	1,506
2028	1,416	1,417	1,201	984	0	1,501	1,501
2029	1,399	1,400	1,193	981	0	1,480	1,480
2030	1,393	1,393	1,191	981	0	1,475	1,475
2031	1,399	1,399	1,195	985	0	1,483	1,483

Table 36: Tier 3 projections of EBS pollock ABC (given catches in Table 35) for the 7 scenarios.

ABC	Scenario.1	Scenario.2	Scenario.3	Scenario.4	Scenario.5	Scenario.6	Scenario.7
2018	2,310	2,310	1,490	1,033	0	2,853	2,853
2019	2,163	2,163	1,403	976	0	2,659	2,659
2020	1,534	1,791	1,148	855	0	1,589	1,859
2021	1,170	1,527	1,023	795	0	1,203	1,434
2022	1,182	1,322	1,020	808	0	1,262	1,337
2023	1,265	1,320	1,061	847	0	1,371	1,394
2024	1,358	1,382	1,127	904	0	1,470	1,477
2025	1,401	1,412	1,164	940	0	1,505	1,508
2026	1,423	1,428	1,190	966	0	1,520	1,521
2027	1,417	1,419	1,196	976	0	1,505	1,506
2028	1,416	1,417	1,201	984	0	1,501	1,501
2029	1,399	1,400	1,193	981	0	1,480	1,480
2030	1,393	1,393	1,191	981	0	1,475	1,475
2031	1,399	1,399	1,195	985	0	1,483	1,483

Table 37: Tier 3 projections of EBS pollock fishing mortality for the 7 scenarios.

F	Scenario.1	Scenario.2	Scenario.3	Scenario.4	Scenario.5	Scenario.6	Scenario.7
2018	0.251	0.251	0.251	0.251	0.251	0.251	0.251
2019	0.465	0.268	0.280	0.188	0.000	0.603	0.465
2020	0.458	0.333	0.280	0.188	0.000	0.537	0.458
2021	0.414	0.460	0.280	0.188	0.000	0.487	0.527
2022	0.412	0.429	0.280	0.188	0.000	0.496	0.509
2023	0.418	0.424	0.280	0.188	0.000	0.510	0.514
2024	0.423	0.426	0.280	0.188	0.000	0.520	0.521
2025	0.426	0.427	0.280	0.188	0.000	0.524	0.524
2026	0.426	0.427	0.280	0.188	0.000	0.523	0.523
2027	0.426	0.426	0.280	0.188	0.000	0.521	0.521
2028	0.426	0.426	0.280	0.188	0.000	0.520	0.520
2029	0.424	0.424	0.280	0.188	0.000	0.518	0.518
2030	0.424	0.424	0.280	0.188	0.000	0.517	0.517
2031	0.424	0.424	0.280	0.188	0.000	0.516	0.516

Table 38: Tier 3 projections of EBS pollock spawning biomass (kt) for the 7 scenarios.

SSB	Scenario.1	Scenario.2	Scenario.3	Scenario.4	Scenario.5	Scenario.6	Scenario.7
2018	3,559	3,559	3,559	3,559	3,559	3,559	3,559
2019	3,004	3,126	3,119	3,178	3,302	2,922	3,004
2020	2,346	2,708	2,715	2,931	3,445	2,134	2,346
2021	2,149	2,455	2,594	2,897	3,701	1,950	2,110
2022	2,225	2,357	2,666	3,020	4,055	2,037	2,093
2023	2,345	2,403	2,793	3,186	4,422	2,148	2,167
2024	2,429	2,456	2,902	3,329	4,755	2,213	2,220
2025	2,475	2,488	2,976	3,432	5,028	2,244	2,246
2026	2,490	2,496	3,015	3,494	5,240	2,249	2,250
2027	2,482	2,484	3,024	3,523	5,401	2,235	2,235
2028	2,470	2,471	3,022	3,534	5,517	2,222	2,222
2029	2,455	2,455	3,012	3,533	5,599	2,208	2,208
2030	2,455	2,455	3,013	3,541	5,678	2,210	2,210
2031	2,464	2,464	3,022	3,554	5,748	2,220	2,220

Table 39: Bycatch estimates (t) of FMP species caught in the BSAI directed pollock fishery, 1997–2018 based on then NMFS Alaska Regional Office reports from observers (2018 data are preliminary).

Year	Pacific.Cod	Flathead.Sole	Rock.Sole	Yellowfin.Sole	Arrowtooth.Flounder	Pacific.Ocean.Perch	Atka.Mackerel	Sablefish	Greenland.Turbot	Alaska.Plaice	Skates	Squid	Sharks	Sculpin	All.other	Total
1997	8,263	2,350	1,523	606	985	428	83	2	124	0	NA	1,369	NA	NA	1,693	17,426
1998	6,255	2,048	770	1,745	1,713	617	10	2	174	0	NA	544	NA	NA	1,732	15,609
1999	3,220	1,885	1,059	350	273	121	158	7	30	0	NA	419	NA	NA	1,428	8,950
2000	3,433	2,510	2,688	1,466	979	21	2	12	52	0	NA	355	NA	NA	5,999	17,518
2001	3,879	2,199	1,673	594	530	574	41	21	68	0	NA	1,730	NA	NA	3,880	15,191
2002	5,883	1,844	1,886	768	607	542	221	34	70	0	NA	1,312	NA	NA	2,298	15,466
2003	5,968	1,500	1,418	210	618	935	762	48	40	6	571	788	294	81	1,020	14,258
2004	6,437	2,104	2,554	841	557	394	1,053	17	18	8	841	977	187	150	469	16,605
2005	7,413	2,352	1,125	63	651	652	678	11	31	45	732	1,150	169	131	502	15,704
2006	7,291	2,862	1,361	256	1,089	736	789	9	65	11	1,308	1,399	512	169	630	18,486
2007	5,630	4,226	510	86	2,795	625	315	12	107	3	1,287	1,169	245	190	731	17,929
2008	6,971	4,315	2,150	552	1,715	336	15	5	85	58	2,756	1,452	144	281	442	21,277
2009	7,875	4,666	7,591	271	2,202	114	25	3	44	173	3,856	209	100	292	294	27,716
2010	6,965	4,358	2,242	1,056	1,466	231	57	2	26	119	1,886	277	26	258	296	19,264
2011	10,040	4,886	8,481	1,083	1,589	660	894	1	25	74	2,352	177	66	315	544	31,186
2012	10,061	3,968	6,701	1,496	745	712	263	1	53	137	2,018	495	55	286	507	27,502
2013	8,958	3,147	6,319	2,087	965	611	70	0	21	148	1,751	117	43	219	241	24,697
2014	5,212	2,554	4,359	1,954	737	1,299	117	0	29	318	809	1,477	75	190	422	19,552
2015	8,303	2,260	1,709	863	403	2,516	192	0	41	99	824	2,206	52	187	342	19,995
2016	4,975	1,628	1,142	882	282	3,272	69	19	29	39	461	1,164	58	124	517	14,663
2017	5,951	956	1,825	608	208	4,818	64	102	18	46	509	1,887	93	81	323	17,489
2018	4,264	1,038	1,145	788	263	4,091	546	447	30	104	583	1,644	63	58	322	15,384

Table 40: Bycatch estimates (t) of pollock caught in the other non-pollock EBS directed fisheries, 1997–2018 based on then NMFS Alaska Regional Office reports from observers.

Year	Pacific.Cod	Yellowfin.Sole	Rock.Sole	Flathead.Sole	Other.flatfish	Other.fisheries	Total
1997	33,658	24,100	9,123	2,983	75	14	69,955
1998	10,468	15,339	3,960	2,369	342	941	33,421
1999	21,131	8,701	5,207	4,040	406	1,197	40,684
2000	14,508	13,425	5,480	6,467	228	520	40,631
2001	11,570	16,502	4,577	4,337	270	488	37,748
2002	15,255	14,489	9,942	1,934	210	51	41,884
2003	15,926	11,578	4,924	2,983	381	260	36,055
2004	18,650	10,383	8,975	5,162	625	198	43,996
2005	14,109	10,312	7,235	3,662	1,133	220	36,674
2006	15,168	5,966	6,986	2,663	1,109	144	32,038
2007	20,319	4,020	3,245	3,417	616	276	31,895
2008	9,533	9,827	4,930	4,102	713	17	29,124
2009	7,875	7,036	6,171	3,160	324	13	24,582
2010	6,409	5,156	6,097	2,997	316	85	21,062
2011	8,987	8,673	6,931	1,473	704	306	27,077
2012	8,381	11,199	6,703	903	824	413	28,425
2013	9,096	20,171	7,327	2,010	1,948	238	40,792
2014	11,508	24,700	11,270	4,106	1,986	202	53,775
2015	9,076	21,281	9,381	2,632	1,615	429	44,417
2016	9,093	22,323	11,848	1,666	1,274	450	46,657
2017	8,345	23,433	5,617	1,956	1,315	512	41,180
2018	6,262	20,371	5,182	2,608	668	117	35,210

Table 41: Bycatch estimates (t) of non-target species caught in the BSAI directed pollock fishery, 2003–2018, based on observer data as processed through the catch accounting system (NMFS Regional Office, Juneau, Alaska).

Year	Scypho.jellies	Misc.fish	Eulachon.Osmerid	Sea.star	Eelpouts	Grenadier	Sea.pen	Lanternfish	Snails	All.other
2003	5,591	98	9	88	1	20	0	0	0	1
2004	6,490	87	20	7	0	14	0	0	0	1
2005	5,084	146	12	9	1	14	1	0	6	2
2006	2,657	147	92	8	20	15	1	9	0	6
2007	2,150	198	136	4	118	27	3	5	0	6
2008	3,711	103	4	6	7	27	1	0	0	6
2009	3,703	58	4	4	2	3	1	0	0	1
2010	2,153	116	0	4	0	1	1	0	0	1
2011	6,571	216	2	18	0	1	2	0	0	1
2012	2,454	124	1	3	0	0	2	0	0	1
2013	4,734	101	0	2	0	0	1	0	0	2
2014	11,036	40	2	5	2	0	3	0	0	4
2015	4,748	87	21	28	9	1	2	0	0	2
2016	2,185	70	5	48	22	3	1	0	0	2
2017	5,776	46	3	4	18	2	0	0	0	0

Table 42: Bycatch estimates of prohibited species caught in the BSAI directed pollock fishery, 1997–2018 based on the AKFIN (NMFS Regional Office) reports from observers. Herring and halibut units are in t, all others represent numbers of individuals caught. Data for 2018 are preliminary.

Year	Bairdi.Crab.	Blue.King.Crab	Chinook.Salmon	Golden.King.Crab	Halibut.catch	Herring	Non.Chin..salmon	Opilio.Crab	Other.King.Crab	Red.King.Crab.
1991	249,836	0	31,702	0	525	3,095	23,304	1,681,668	14,937	535
1992	1,042,484	0	28,760	0	1,651	630	39,741	3,558,922	12,675	7,885
1993	387,357	0	32,533	0	634	519	239,384	215,733	394	9,342
1994	149,066	0	29,816	0	611	1,528	84,718	302,281	34	666
1995	46,286	0	8,800	0	157	798	14,509	59,936	521	2,013
1996	18,554	0	50,282	0	229	1,168	74,423	42,329	198	2,572
1997	6,525	0	43,329	0	160	1,088	61,504	88,589	156	0
1998	38,100	0	50,835	0	200	749	59,570	55,197	1,836	9,560
1999	1,077	0	10,331	0	84	784	44,586	12,783	2	0
2000	173	0	3,967	0	91	481	56,715	1,807	103	0
2001	86	0	30,118	0	195	224	52,857	2,179	5,136	38
2002	651	0	32,249	0	151	108	77,101	1,669	81	5
2003	723	8	42,146	0	86	947	178,224	607	0	52
2004	1,078	4	48,171	1	93	1,064	439,122	633	0	8
2005	592	0	64,018	1	100	421	695,006	1,913	0	0
2006	964	0	77,883	0	119	219	290,862	2,547	0	25
2007	826	0	104,078	3	274	345	82,410	2,713	0	7
2008	798	8	18,507	3	253	124	13,161	4,322	0	27
2009	849	0	8,163	0	254	64	41,833	2,999	0	34
2010	838	28	7,320	0	135	189	12,731	4,337	0	16
2011	2,929	25	24,100	0	258	345	185,279	4,405	0	3
2012	1,137	0	9,850	0	313	2,166	20,115	2,851	0	2
2013	1,576	6	11,454	4	129	958	123,792	3,746	0	0
2014	885	0	14,425	0	134	151	218,067	3,330	0	7
2015	1,179	0	17,583	0	117	1,387	236,185	2,942	0	0
2016	468	0	21,222	0	98	1,425	338,818	833	0	6
2017	327	0	29,517	0	76	957	466,484	288	0	22
2018	898	0	13,503	0	48	304	280,424	276	0	14

Table 43: Ecosystem considerations for BSAI pollock and the pollock fishery.

Indicator	Observation	Interpretation	Evaluation
Ecosystem effects on EBS pollock			
Prey availability or abundance trends			
Zooplankton	Stomach contents, AT and ichthyoplankton surveys, changes mean wt-at-age	Data improving, indication of increases from 2004–2009 and subsequent decreasees (for euphausiids in 2012 and 2014)	Variable abundance-indicates important recruitment (for prey)
Predator population trends			
Marine mammals	Fur seals declining, Steller sea lions increasing slightly	Possibly lower mortality on pollock	Probably no concern
Birds	Stable, some increasing some decreasing	Affects young-of-year mortality	Probably no concern
Fish (Pollock, Pacific cod, halibut)	Stable to increasing	Possible increases to pollock mortality	
Changes in habitat quality			
Temperature regime	Cold years pollock distribution towards NW on average	Likely to affect surveyed stock	Some concern, the distribution of pollock availability to different surveys may change systematically
Winter-spring environmental conditions	Affects pre-recruit survival	Probably a number of factors	Causes natural variability
Production	Fairly stable nutrient flow from upwelled BS Basin	Inter-annual variability low	No concern
Fishery effects on ecosystem			
Fishery contribution to bycatch			
Prohibited species	Stable, heavily monitored	Likely to be safe	No concern
Forage (including herring, Atka mackerel, cod, and pollock)	Stable, heavily monitored	Likely to be safe	No concern
HAPC biota	Likely minor impact	Likely to be safe	No concern
Marine mammals and birds	Very minor direct-take	Safe	No concern
Sensitive non-target species	Likely minor impact	Data limited, likely to be safe	No concern
Fishery concentration in space and time	Generally more diffuse	Mixed potential impact (fur seals vs Steller sea lions)	Possible concern
Fishery effects on amount of large size target fish	Depends on highly variable year-class strength	Natural fluctuation	Probably no concern
Fishery contribution to discards and offal production	Decreasing	Improving, but data limited	Possible concern
Fishery effects on age-at-maturity and fecundity	Maturity study (gonad collection) underway	NA	Possible concern

Table 44: Details and explanation of the decision table factors selected in response to the Plan Team requests (as originally proposed in the 2012 assessment).

Term	Description	Rationale
$P\left[F_{2019} > F_{MSY}\right]$	Probability that the fishing mortality in 2019 exceeds F_{MSY}	OFL definition is based on F_{MSY}
$P\left[B_{2020} < B_{MSY}\right]$	Probability that the spawning biomass in 2020 is less than B_{MSY}	B_{MSY} is a reference point target and biomass in 2020 provides an indication of the impact of 2019 fishing
$P\left[B_{2021} < B_{MSY}\right]$	Probability that the spawning biomass in 2021 is less than B_{MSY}	B_{MSY} is a reference point target and biomass in 2023 provides an indication of the impact of fishing in 2019 and 2020
$P\left[B_{2020} < \bar{B}\right]$	Probability that the spawning biomass in 2020 is less than the 1978–2018 mean	To provide some perspective of what the stock condition might be relative to historical estimates after fishing in 2019.
$P\left[B_{2023} < \bar{B}\right]$	Probability that the spawning biomass in 2023 is less than the long term mean	To provide some perspective of what the stock condition might be relative to historical estimates after fishing in 2019.
$P\left[B_{2023} < B_{2019}\right]$	Probability that the spawning biomass in 2023 is less than that estimated for 2019	To provide a medium term expectation of stock status relative to 2019 levels
$P\left[B_{2021} < B_{20\%}\right]$	Probability that the spawning biomass in 2021 is less than $B_{20\%}$	$B_{20\%}$ had been selected as a Steller Sea Lion lower limit for allowing directed fishing
$P\left[p_{a_5,2021} > \bar{p}_{a_5}\right]$	Probability that in 2023 the proportion of age 1–5 pollock in the population exceeds the long-term mean	To provide some relative indication of the age composition of the population relative to the long term mean.
$P\left[D_{2020} < D_{1994}\right]$	Probability that the diversity of ages represented in the spawning biomass (by weight) in 2020 is less than the value estimated for 1994	To provide a relative index on the abundance of different age classes in the 2020 population relative to 1994 (a year identified as having low age composition diversity)
$P\left[D_{2023} < D_{1994}\right]$	Probability that the diversity of ages represented in the spawning biomass (by weight) in 2023 is less than the value estimated for 1994	To provide a medium-term relative index on the abundance of different age classes in the population relative to 1994 (a year identified as having low age composition diversity)
$P\left[E_{2019} > E_{2018}\right]$	Probability that the theoretical fishing effort in 2019 will be greater than that estimated in 2018.	To provide the relative effort that is expected (and hence some idea of costs).

Table 45: Outcomes of decision (expressed as chances out of 100) given different 2019 catches (first row, in kt). Note that for the 2017 and later year-classes average values were assumed. Constant Fs based on the 2019 catches were used for subsequent years.

	10	500	1000	1250	1387	1500	1750	2000
$P\left[F_{2019} > F_{MSY}\right]$	1	0	0	0	20	0	0	0
$P\left[B_{2020} < B_{MSY}\right]$	55	42	44	46	75	48	50	53
$P\left[B_{2021} < B_{MSY}\right]$	48	32	35	37	72	40	43	46
$P\left[B_{2020} < \bar{B}\right]$	100	100	100	100	100	100	100	100
$P\left[B_{2023} < \bar{B}\right]$	72	52	56	59	89	63	66	69
$P\left[B_{2023} < B_{2019}\right]$	26	14	16	18	43	20	22	24
$P\left[B_{2021} < B_{20\%}\right]$	3	1	2	2	8	2	2	2
$P\left[p_{a_5,2021} > \bar{p}_{a_5}\right]$	75	61	64	67	85	69	71	73
$P\left[D_{2020} < D_{1994}\right]$	0	0	0	0	0	0	0	0
$P\left[D_{2023} < D_{1994}\right]$	6	2	2	3	26	3	4	5
$P\left[E_{2019} > E_{2018}\right]$	9	0	0	0	83	0	1	4

Figures

Pollock catch estimates (t) from the Eastern Bering Sea by season and region. The A-season is defined as from Jan-May and B-season from June-October.

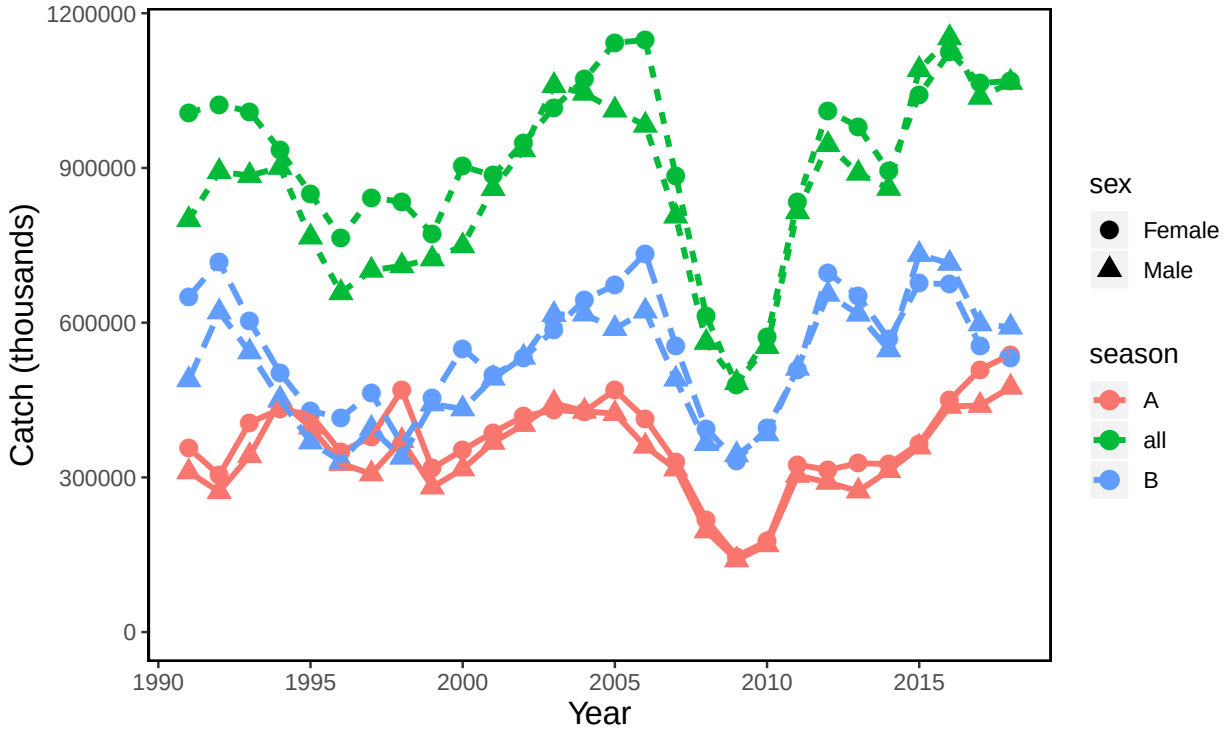

Figure 1: Estimate of EBS pollock catch numbers by sex for the A season (January-May) and B seasons (June-October) and total.

A-season EBS fleet-wide nominal pollock catch (kg) per hour of fishing recorded by NMFS scientific observers.

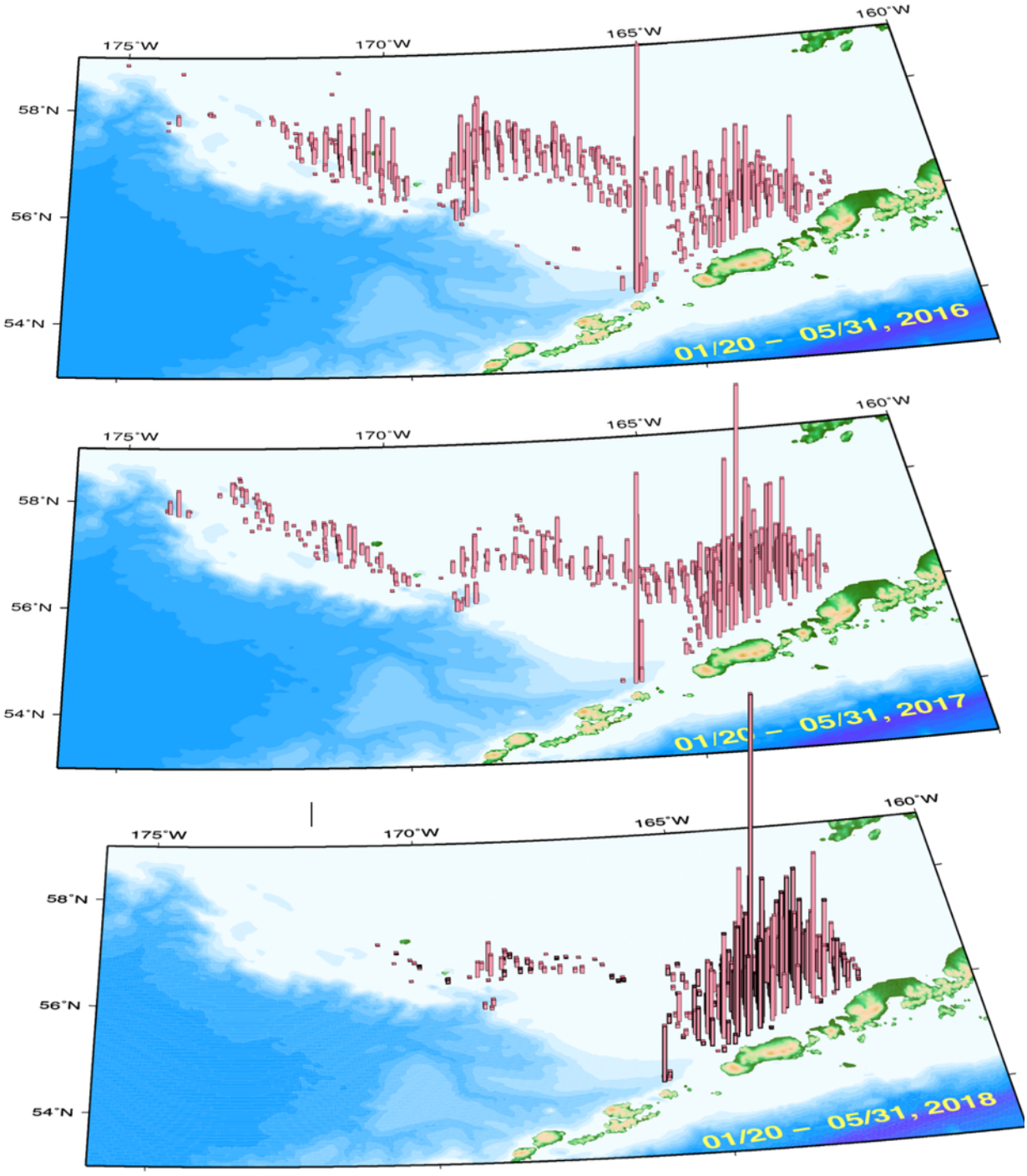

Figure 2: EBS pollock catch distribution during A-season, 2017–2019. Column height is proportional to total catch.

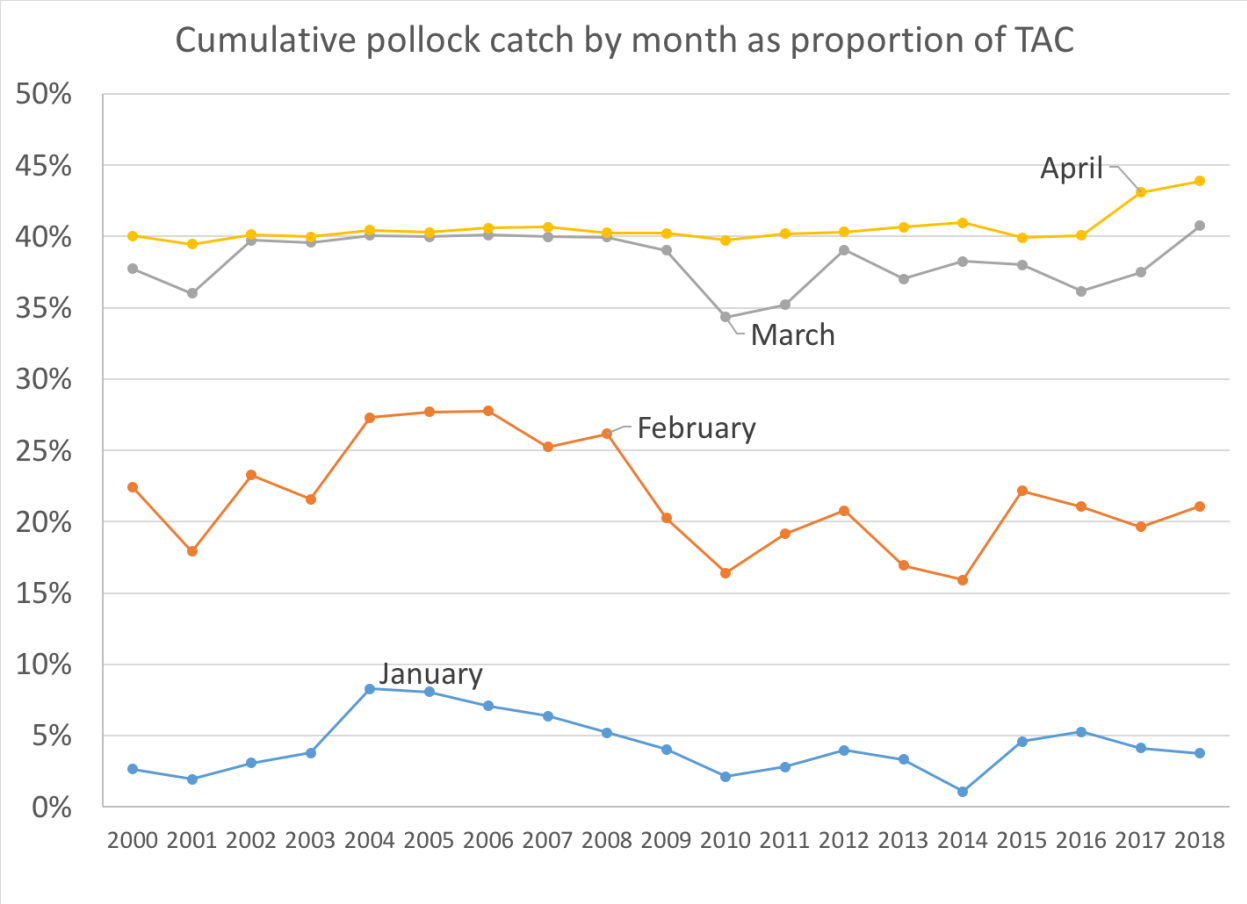

Figure 3: Proportion of the annual EBS pollock TAC by month during the A-season, 2000–2019. The higher value observed since 2017 was due to Amendment 110 of the FMP to allow greater flexibility to avoid Chinook salmon.

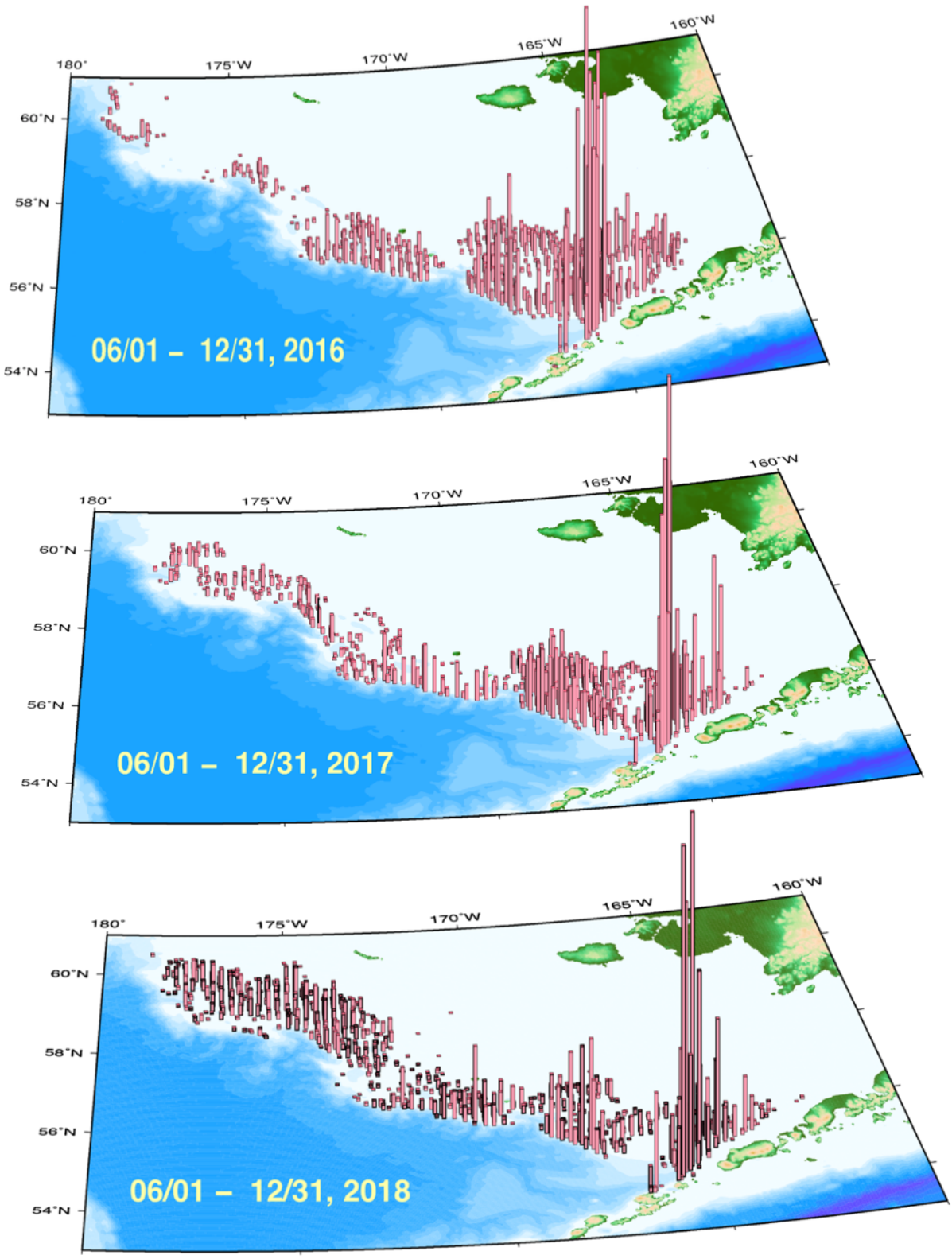

Figure 4: EBS pollock catch distribution during B-season, 2017–2019. Column height is proportional to total catch. Note that directed fishery for pollock generally is finished prior to October; the labels are indicative full-year catches.

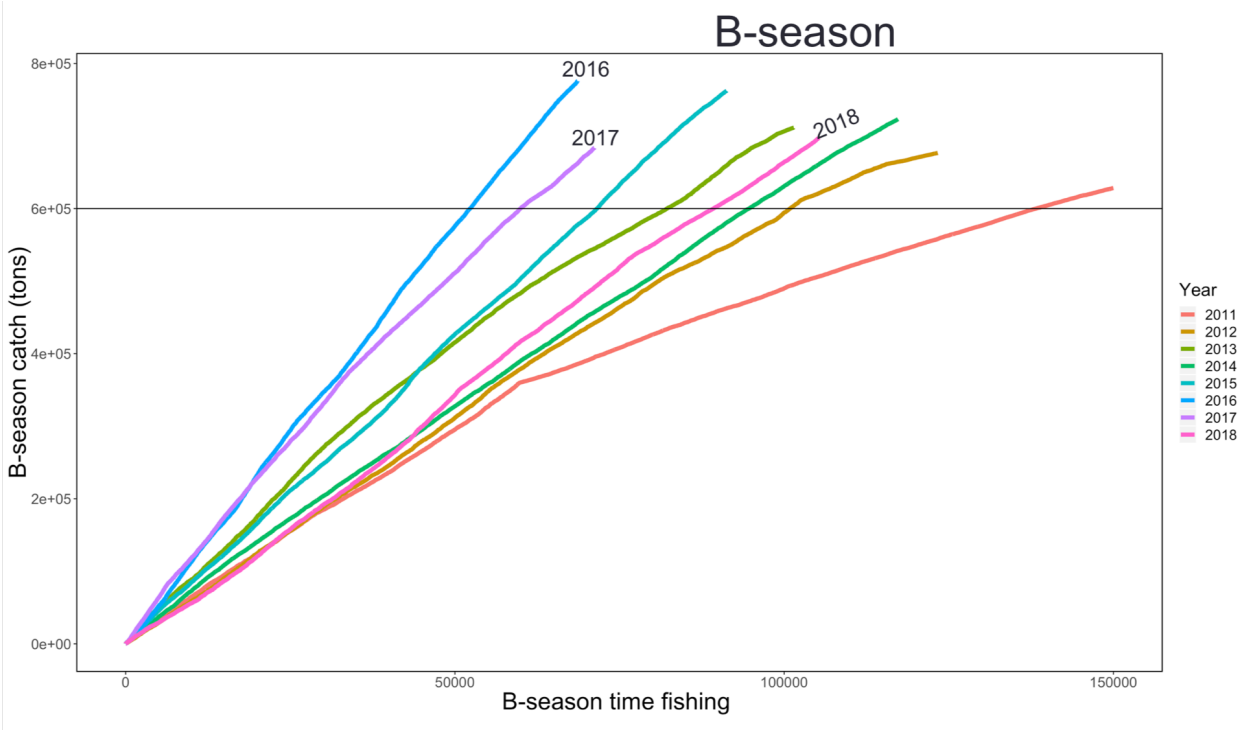

Figure 5: B-season EBS fleet-wide nominal pollock catch (kg) per hour of fishing recorded by NMFS scientific observers.

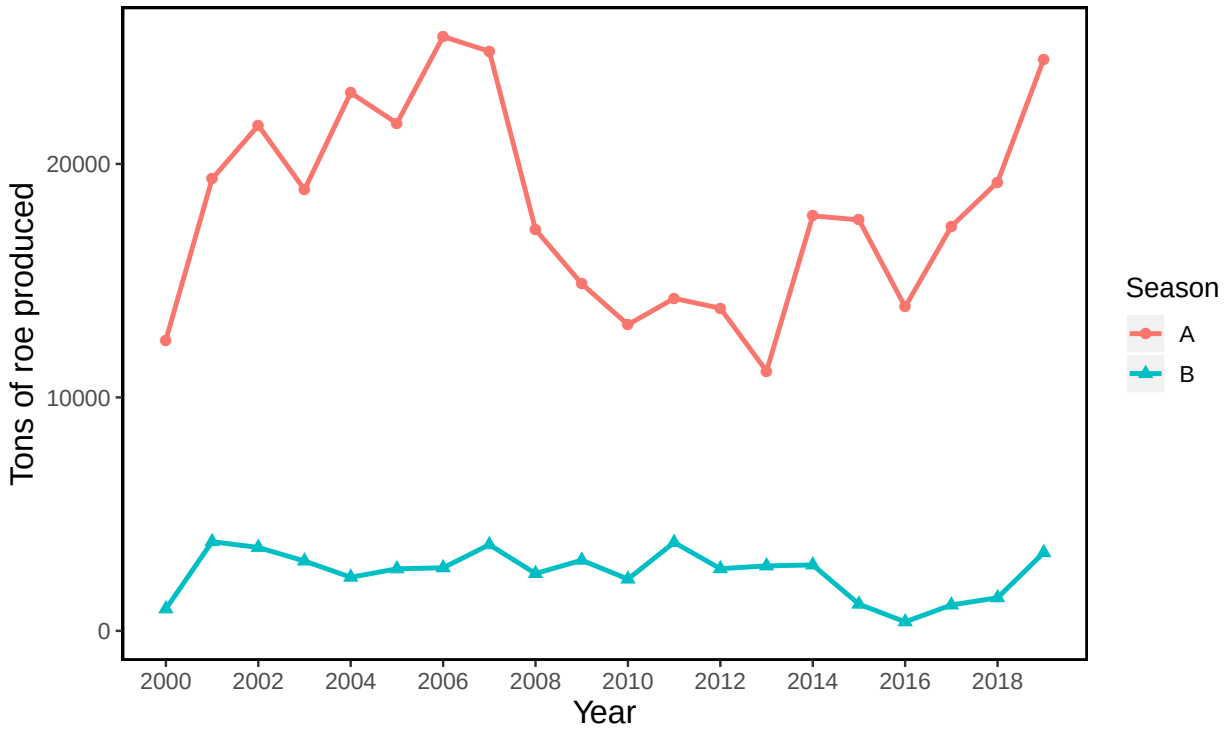

Figure 6: EBS pollock roe production in A and B seasons , 2000-2019.

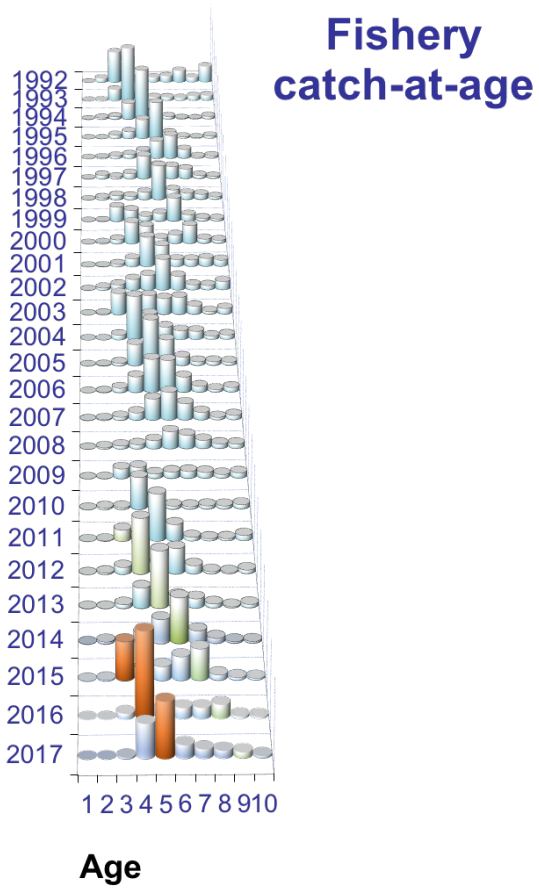

Figure 7: EBS pollock fishery estimated catch-at-age data (in number) for 1992–2018. Age 10 represents pollock age 10 and older. The 2008 year-class is shaded in green.

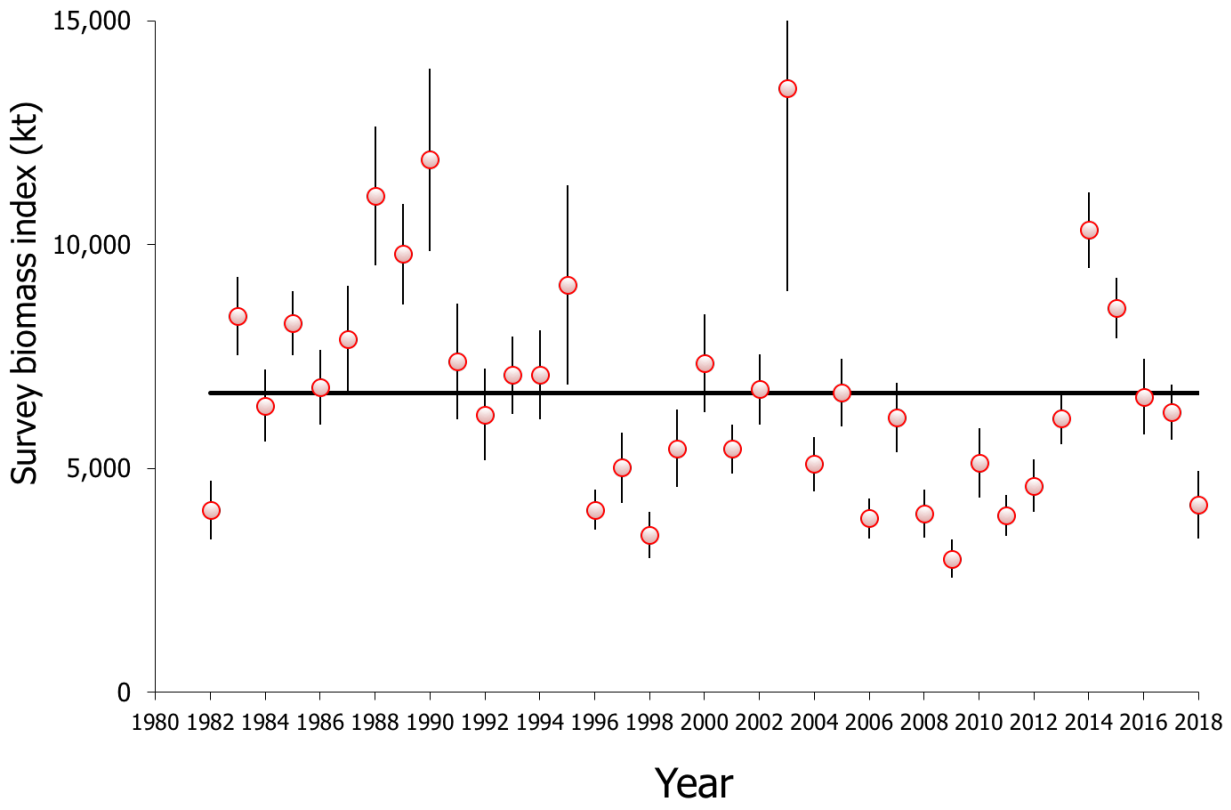

Figure 8: Bottom-trawl survey biomass estimates with error bars representing 1 standard deviation (density-dependent correction method; DDC) for EBS pollock. Horizontal line represents the long-term mean. Note these values differ from the design-based versions in Table 19.

Bottom and surface temperatures for the Bering Sea from the NMFS summer bottom-trawl surveys (1982–2018). Dashed lines represent mean values.

Bottom trawl survey pollock catch in kg per hectare for 2016 - 2018. Height of vertical lines are proportional to station-specific pollock densities by weight (kg per hectare) with constant scales for all years.

Pollock abundance levels by age and year as estimated directly from the NMFS bottom-trawl surveys (1990–2018). The 2006

Pollock abundance at age estimates from the AT survey, 1979–2018; 2018 age estimates are preliminary using primarily BTS age data

EBS pollock ATS transects (superimposed) over bottom-trawl survey stations and density estimates (in both settings contoured in the yellow-red heat map) for 2018.

EBS pollock AVO transects (superimposed) over bottom-trawl survey stations and density estimates (in both settings contoured in the yellow-red heat map) for 2018.

Recent fishery average weight-at-age anomaly (relative to mean) by strata for ages 3–10, 2013–2017. Vertical shape reflects uncertainty in the data (wider shapes being more precise), colors are consistent with cohorts.

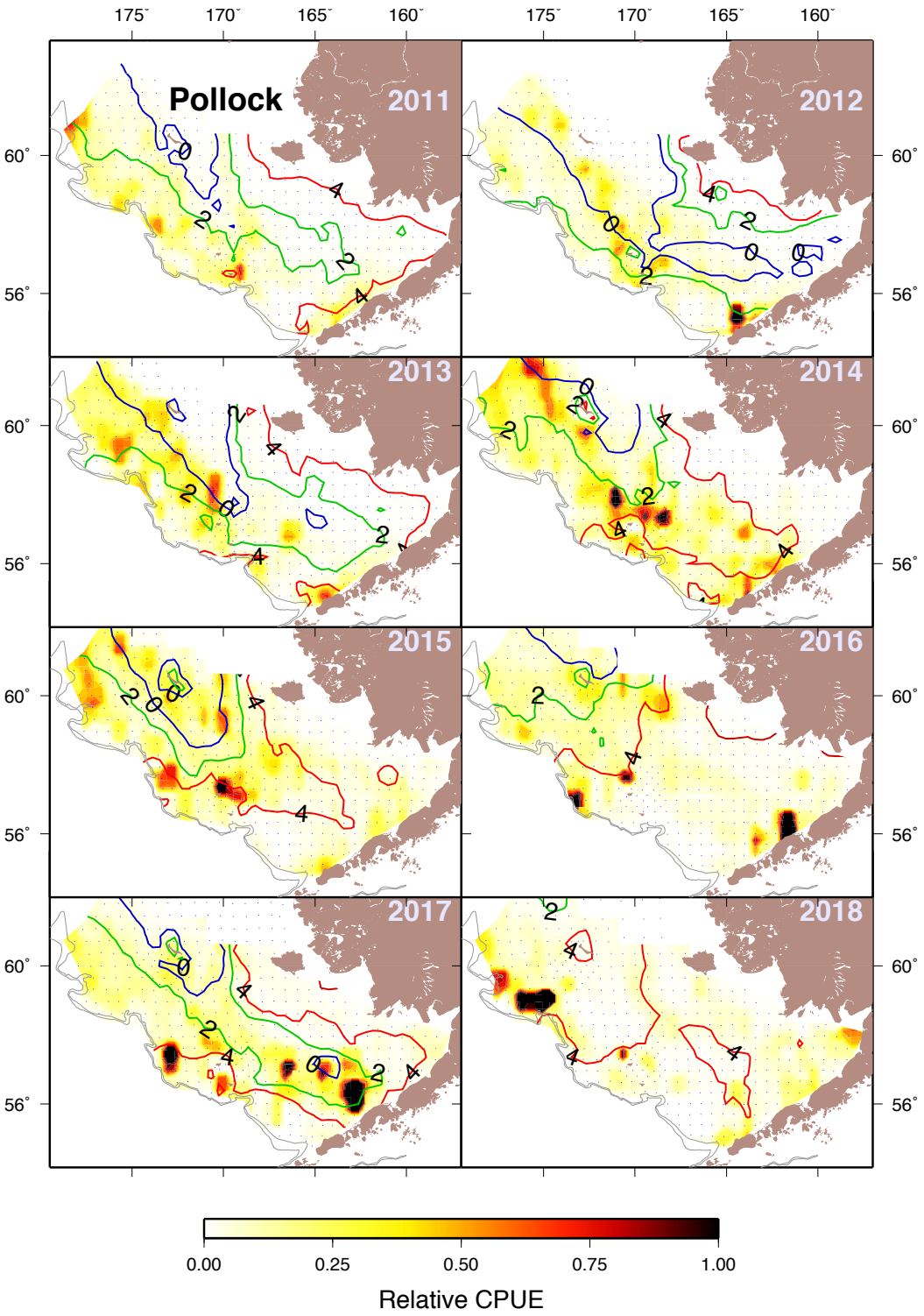

Figure 9: EBS pollock CPUE (shades = relative kg/hectare) and bottom temperature isotherms in degrees C; from the bottom trawl survey data 2011–2018.

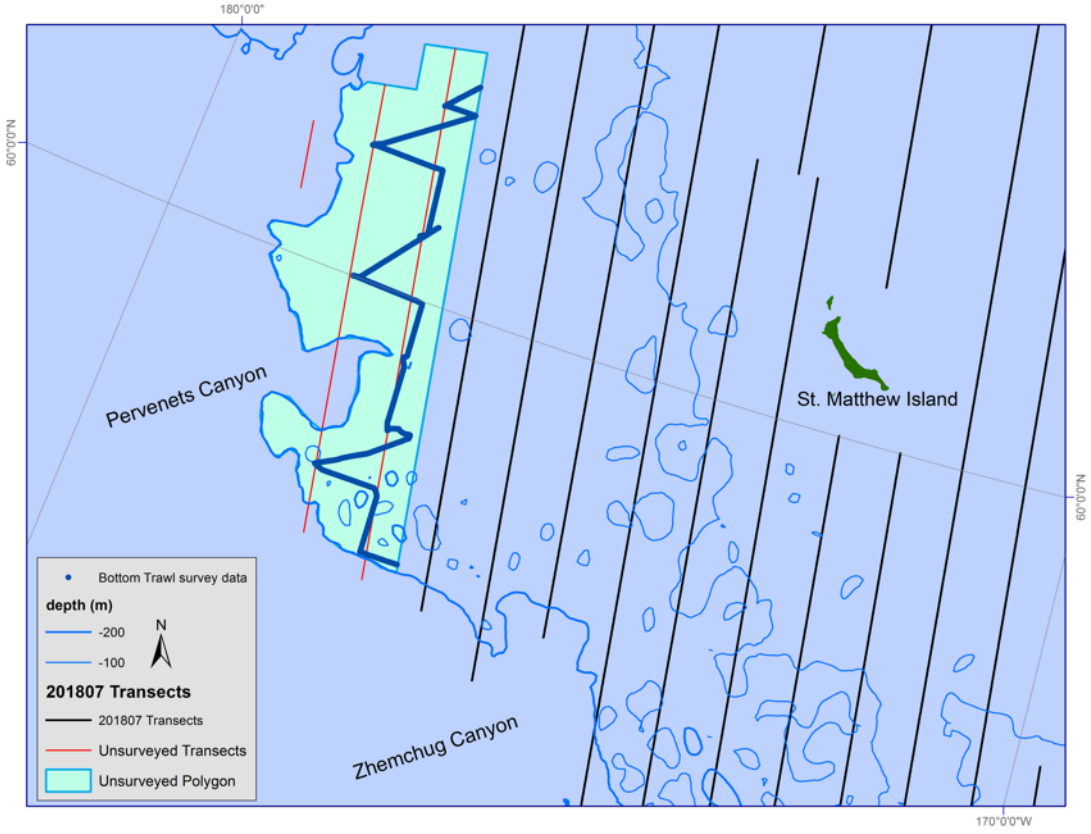

Figure 10: Map of survey area showing completed transects (black lines), unsurveyed transects (red lines), surveyed polygon (green shading), and the tracks of the bottom trawl vessels inside the unsampled area that were used to estimate acoustic backscatter in this area.

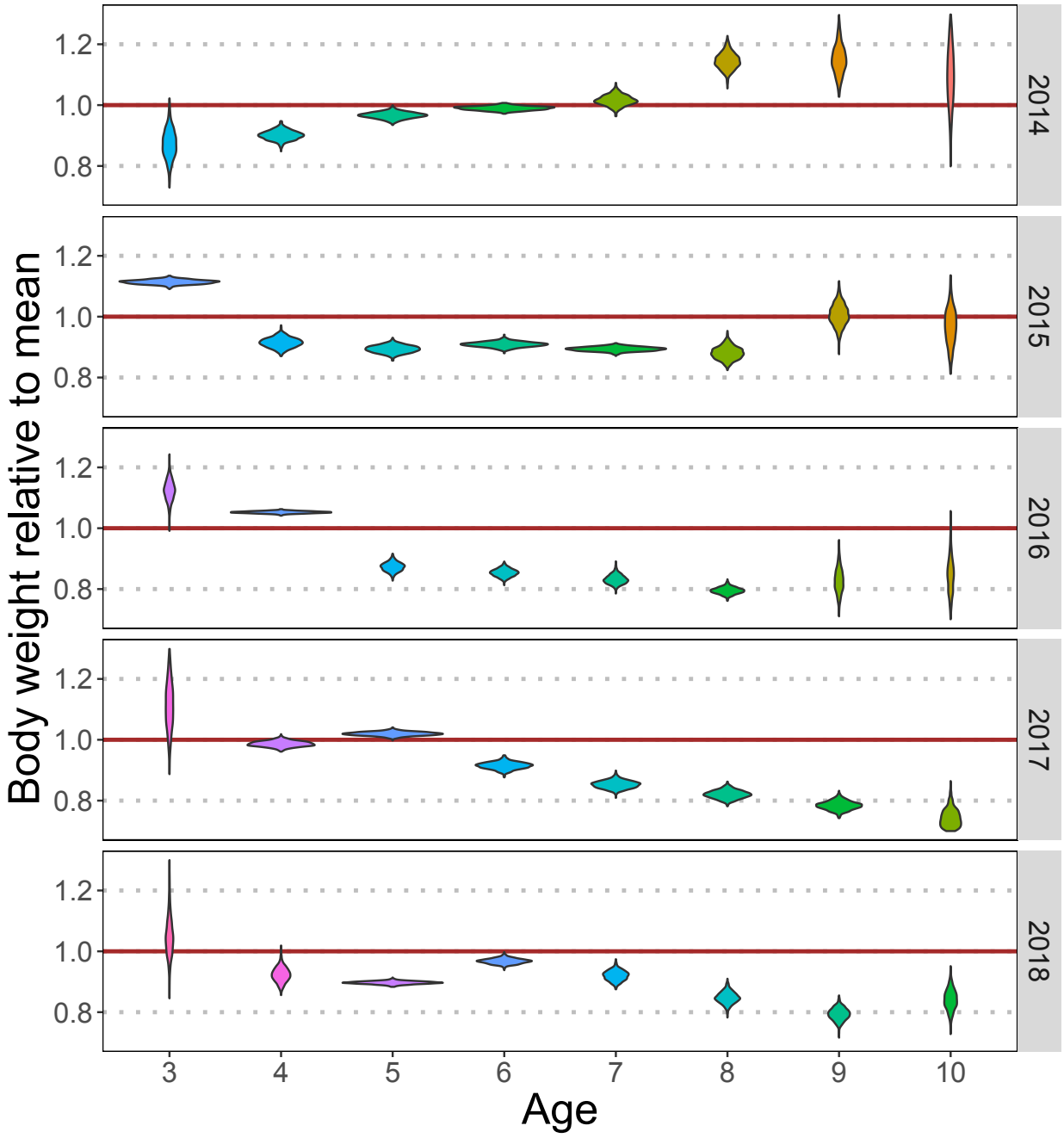

Figure 11: Fishery average weight-at-age anomaly (relative to mean) across strata and combined for all ages (3–10), and available years (1991–2017). Vertical shape reflects uncertainty in the data (wider shapes being more precise), colors are consistent with cohorts.

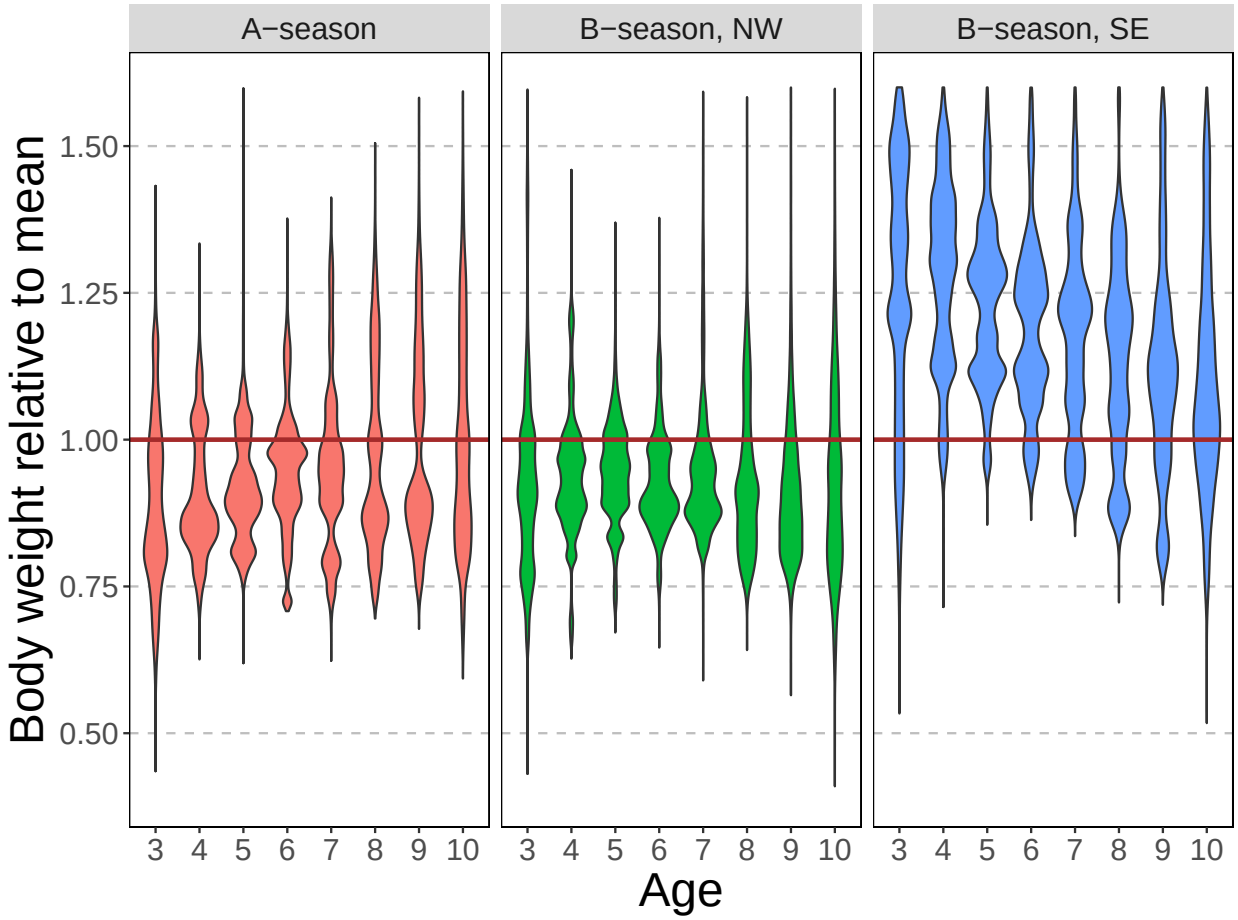

Figure 12: Recent fishery average weight-at-age anomaly (relative to mean) for ages 3–10 by strata (years 1991–2017 combined). Vertical shape reflects uncertainty in the data (wider shapes being more precise).

EBS pollock fishery body mass (given length) anomaly (standardized by overall mean body mass at each length) by month based on some over 700 thousand fish measurements from 1991–2018.

EBS pollock body mass (given length) anomaly (standardized by overall mean body mass at each length) by year and season/area strata, 1991–2018, aggregated by strata.

EBS pollock body mass (given length) anomaly (standardized by overall mean body mass at each length) by year and season/area strata shown as mean values with a fitted loess smooth trend, 1991–2018.

EBS pollock model evaluation results of three model fits to different treatment of bottom trawl survey sampling.

EBS pollock model evaluation results comparing model 16.1 (which assumes a Ricker stock-recruitment relationship) with that where a prior mean steepness of 0.67 and CV of 15% applied to a Beverton-Holt stock recruit relationship.

EBS pollock model fits to the Japanese fishery CPUE.

Model results of predicted and observed AVO index. Error bars represent assumed 95% confidence bounds of the input series.

EBS pollock model fit to the BTS biomass data (density dependence corrected estimates), 1982–2018.

EBS pollock model fit to the ATS biomass data, 1994–2018.

Selectivity at age estimates for the EBS pollock fishery.

Model estimates of bottom-trawl survey selectivity, 1982–2018.

Pairwise plot of selected EBS pollock parameters and output from 3 million MCMC iterations thinned such that 5 thousand draws were saved as an approximation to the multivariate posterior distribution. Note that the figures on the diagonal represent the marginal posterior distributions. Key: lnR0 is the parameter that scales the stock-recruit relationship, B_Bmsy is estimated B_{2017}/B_{MSY}, DynB0 is the ratio of spawning biomass estimated for in 2018 over the value estimated that would occur if there had been no fishing, B18 is the spawning biomass in 2018, and B_Bmean is $B_{2018}/\bar{B}$.

Estimated spawning exploitation rate (defined as the percent removal of egg production in a given spawning year).

Estimated instantaneous age-specific fishing mortality rates for EBS pollock.

Estimated spawning biomass relative to annually estimated F_{MSY} values and fishing mortality rates for EBS pollock.

Recruitment estimates (age-1 recruits) for EBS pollock for all years since 1964 (1963–2017 year classes) for Model 16.1. Error bars reflect 90% credible intervals based on model estimates of uncertainty.

EBS pollock productivity as measured by logged recruits per spawning biomass, log(R/S), as a function of spawning biomass with a linear fit (bottom) and over time, 1964–2018 (top).

Retrospective patterns for EBS pollock spawning biomass showing the point estimates relative to the terminal year (top panel) and approximate confidence bounds on absolute scale (+2 standard deviations).

Projected fishing mortality and spawning biomass relative to 2018 values under constant catch of

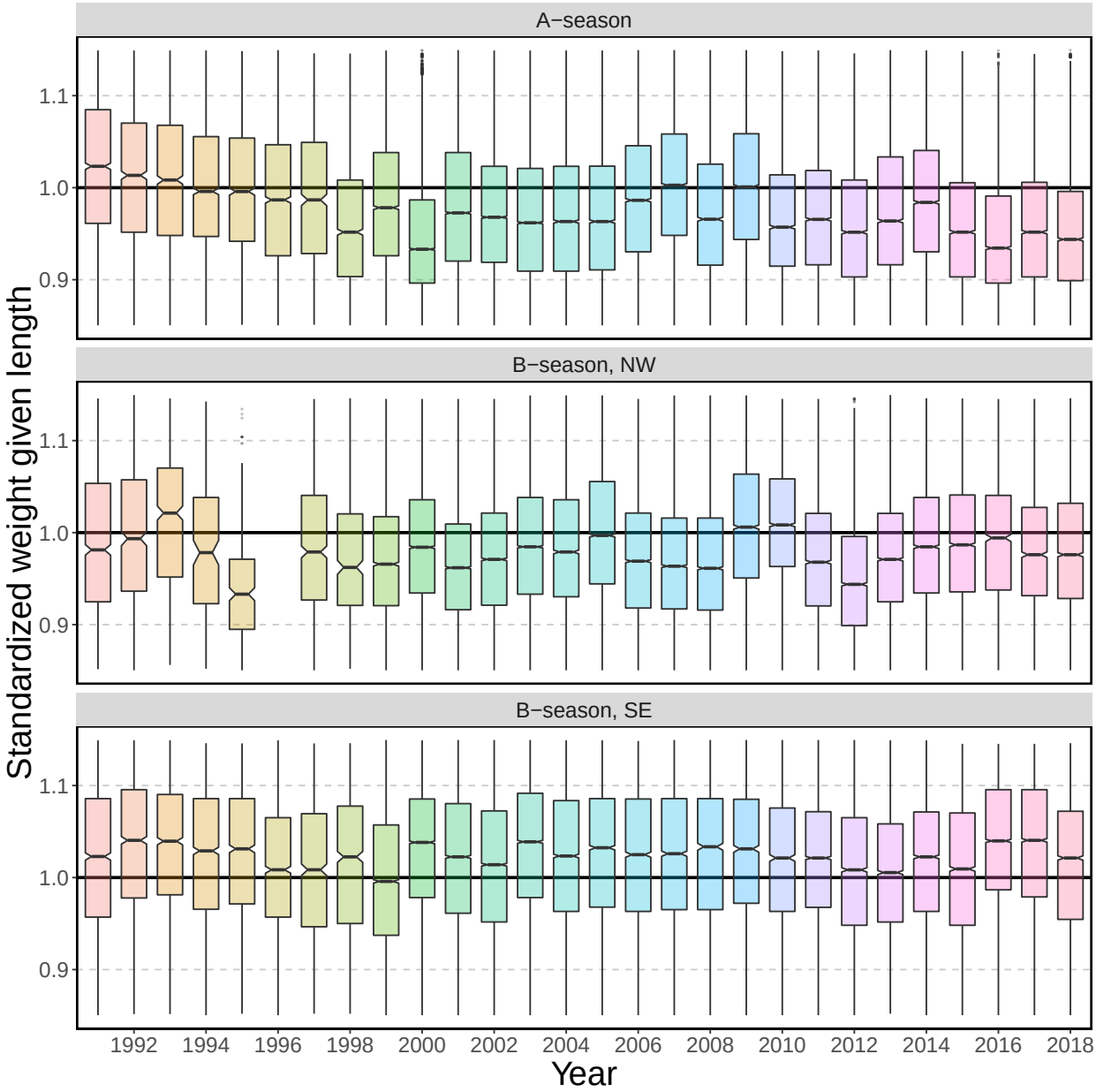

Figure 13: EBS pollock fishery body mass (given length) anomaly (standardized by overall mean body mass at each length) by year and season/area strata, 1991–2018.

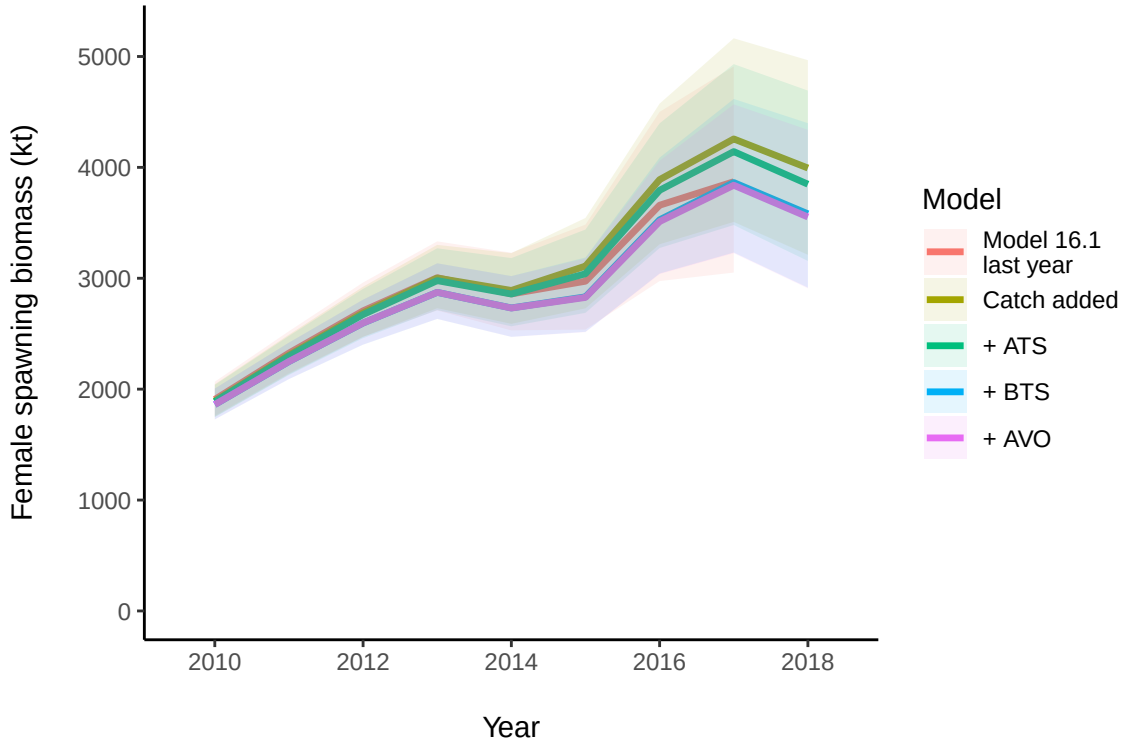

Figure 14: Model runs comparing last year's assessment with the impact of sequentially addint new data (first 2018 catch and 2017 fishery catch-at-age, then the acoustic trawl survey (ATS), bottom trawl survey (BTS) and the acoustic AVO data for model 16.1.

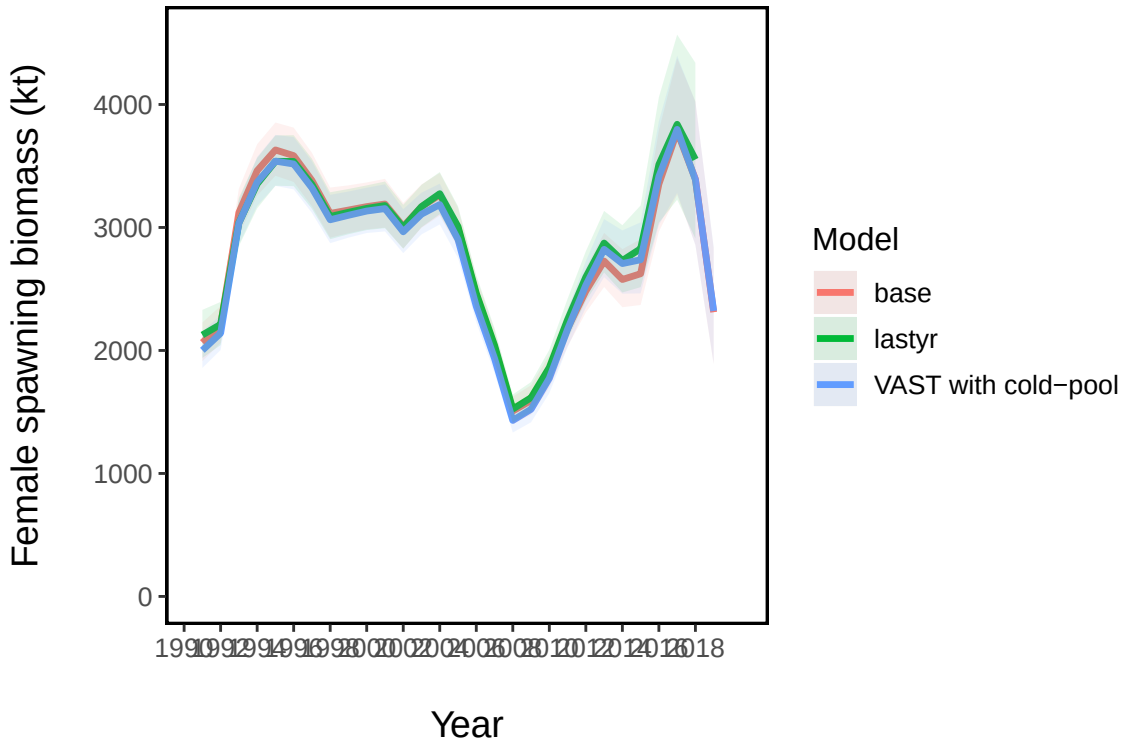

Figure 15: EBS pollock model evaluation results of female spawning biomass comparing model (and data) alternatives. Note that the 'with NBS' model is almost identical to model 16.1.

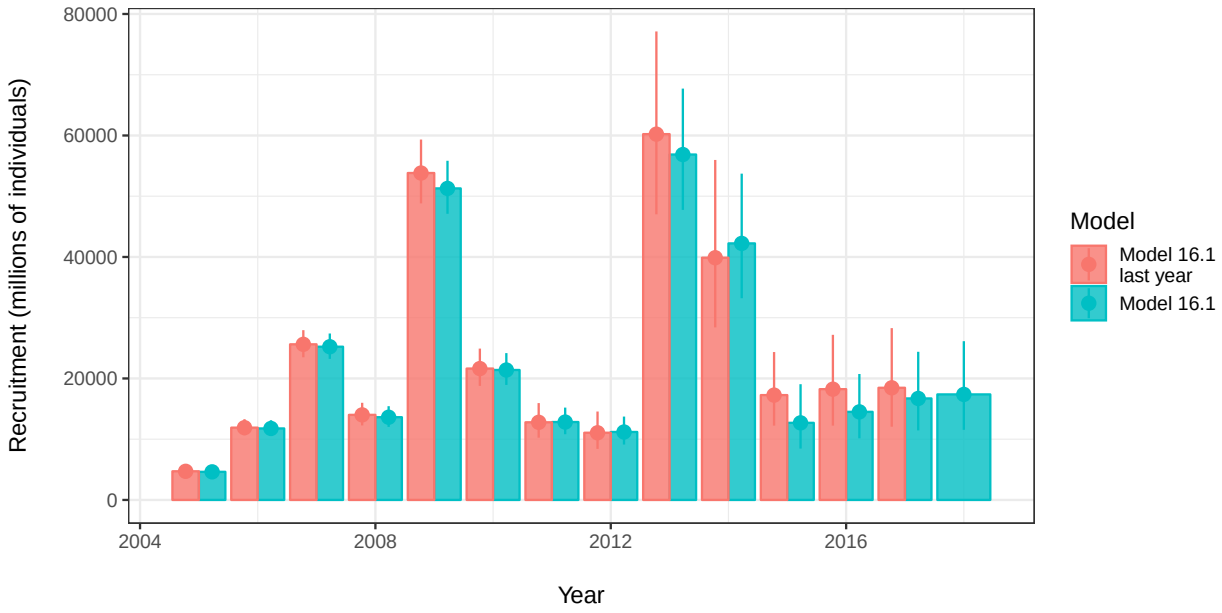

Figure 16: EBS pollock model evaluation results of recruitment comparing last year's model with this year.

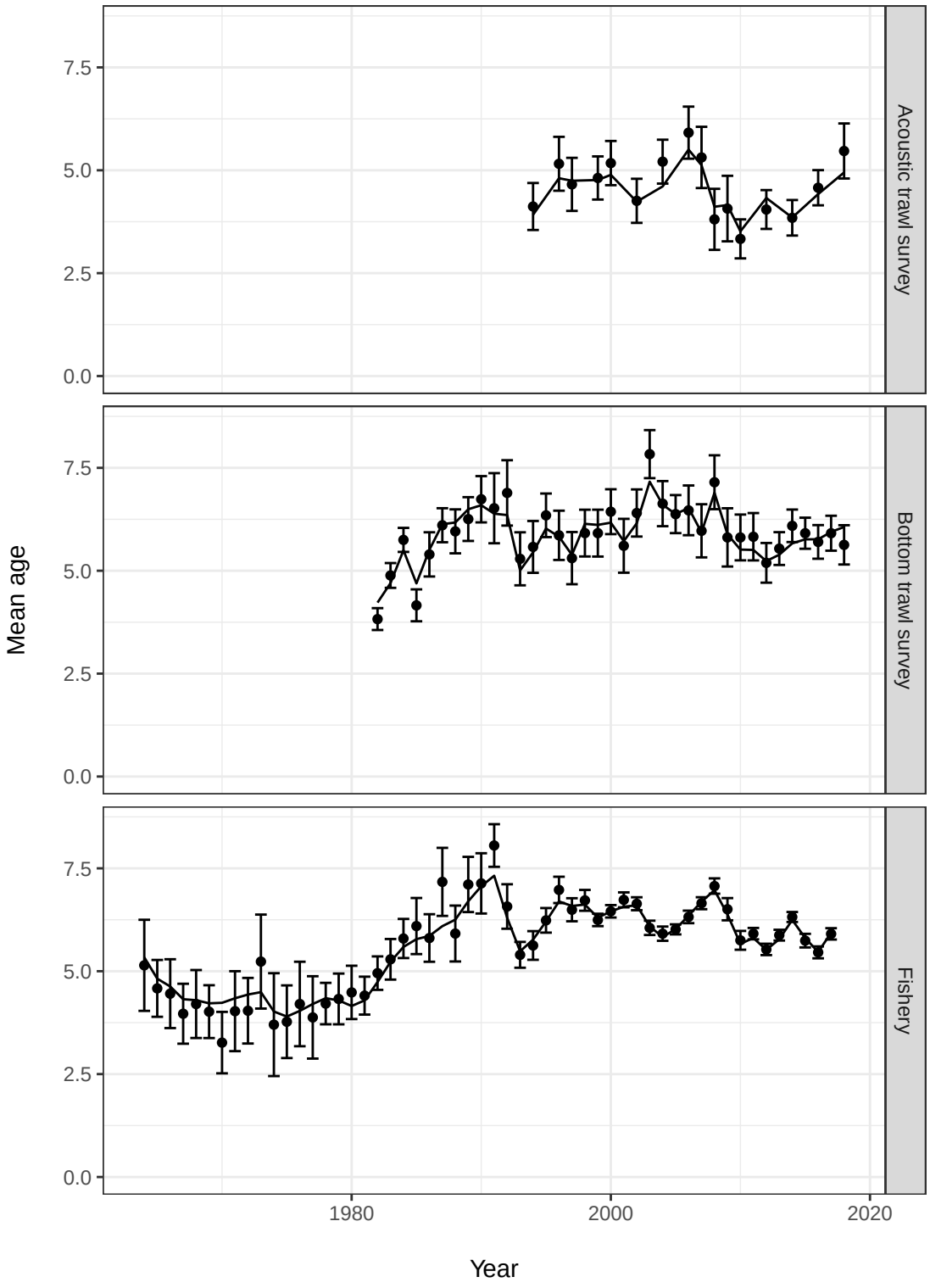

Figure 17: EBS pollock model fits to observed mean age for the Acoustic trawl survey (top)

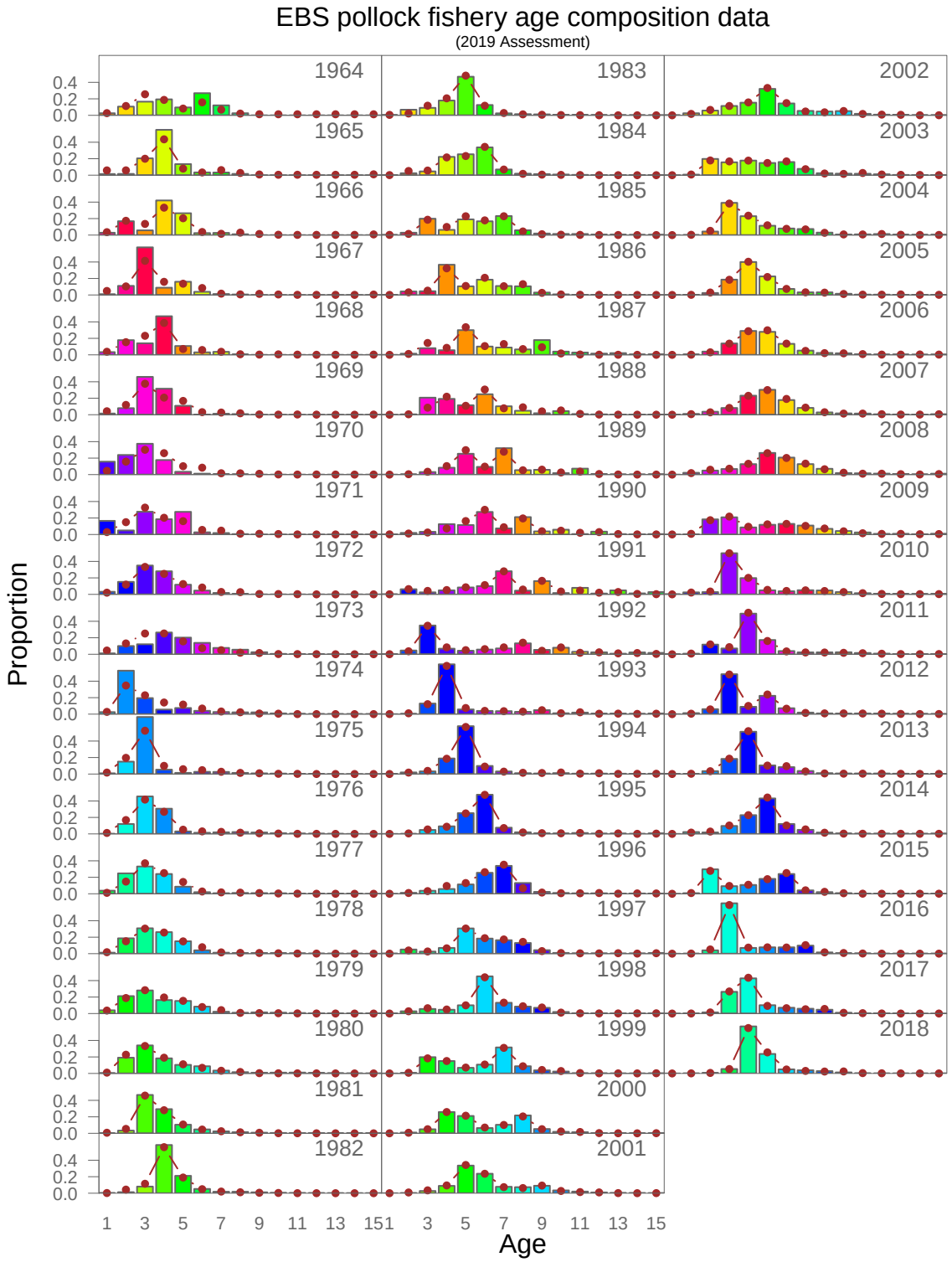

Figure 18: Model fit (dots) to the EBS pollock fishery proportion-at-age data (columns; 1964–2017). The 2017 data are new to this year's assessment. Colors coincide with cohorts progressing through time.

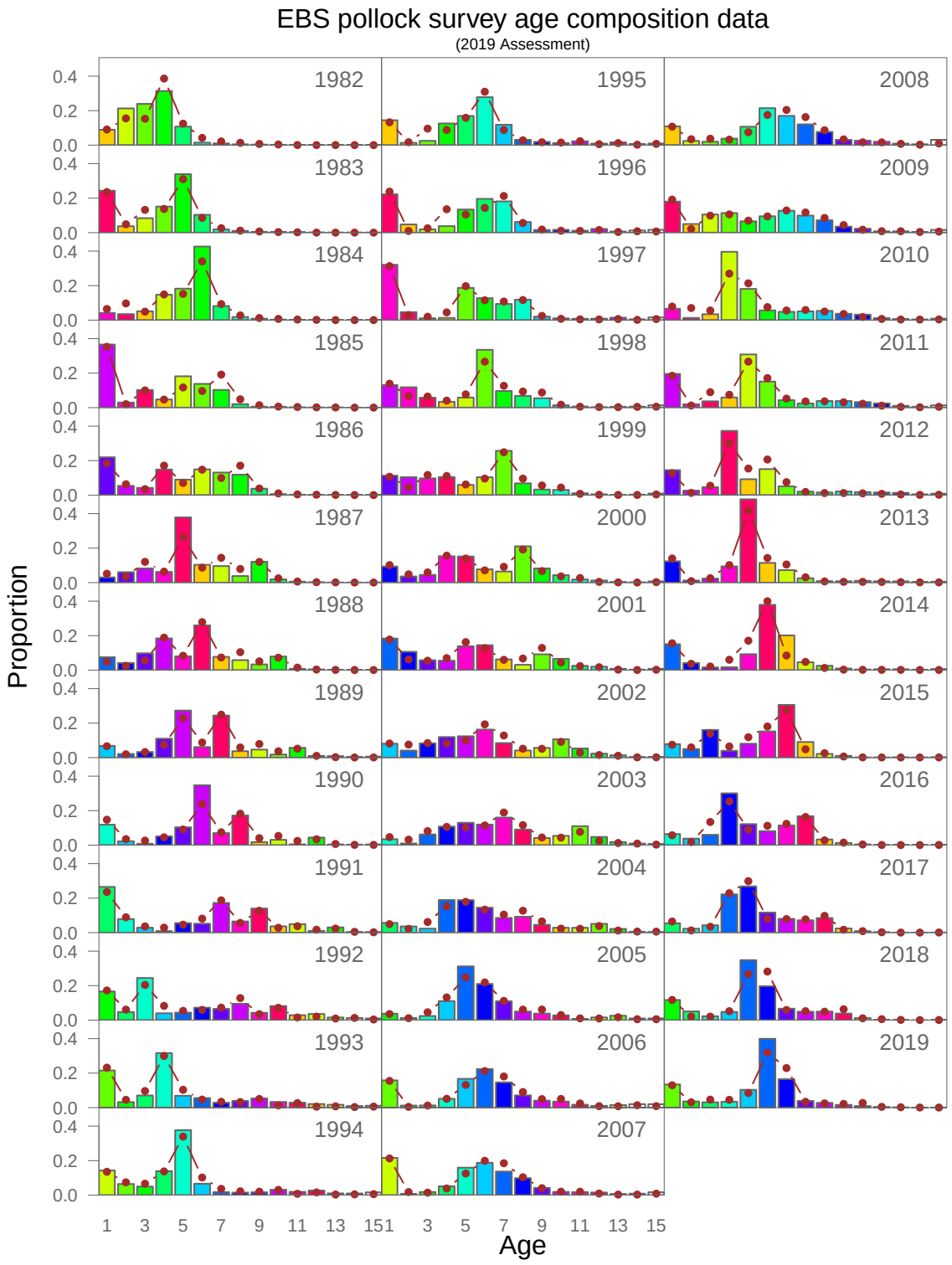

Figure 19: Model fit (dots) to the bottom trawl survey proportion-at-age composition data (columns) for EBS pollock. Colors correspond to cohorts over time. Data new to this assessment are from 2018.

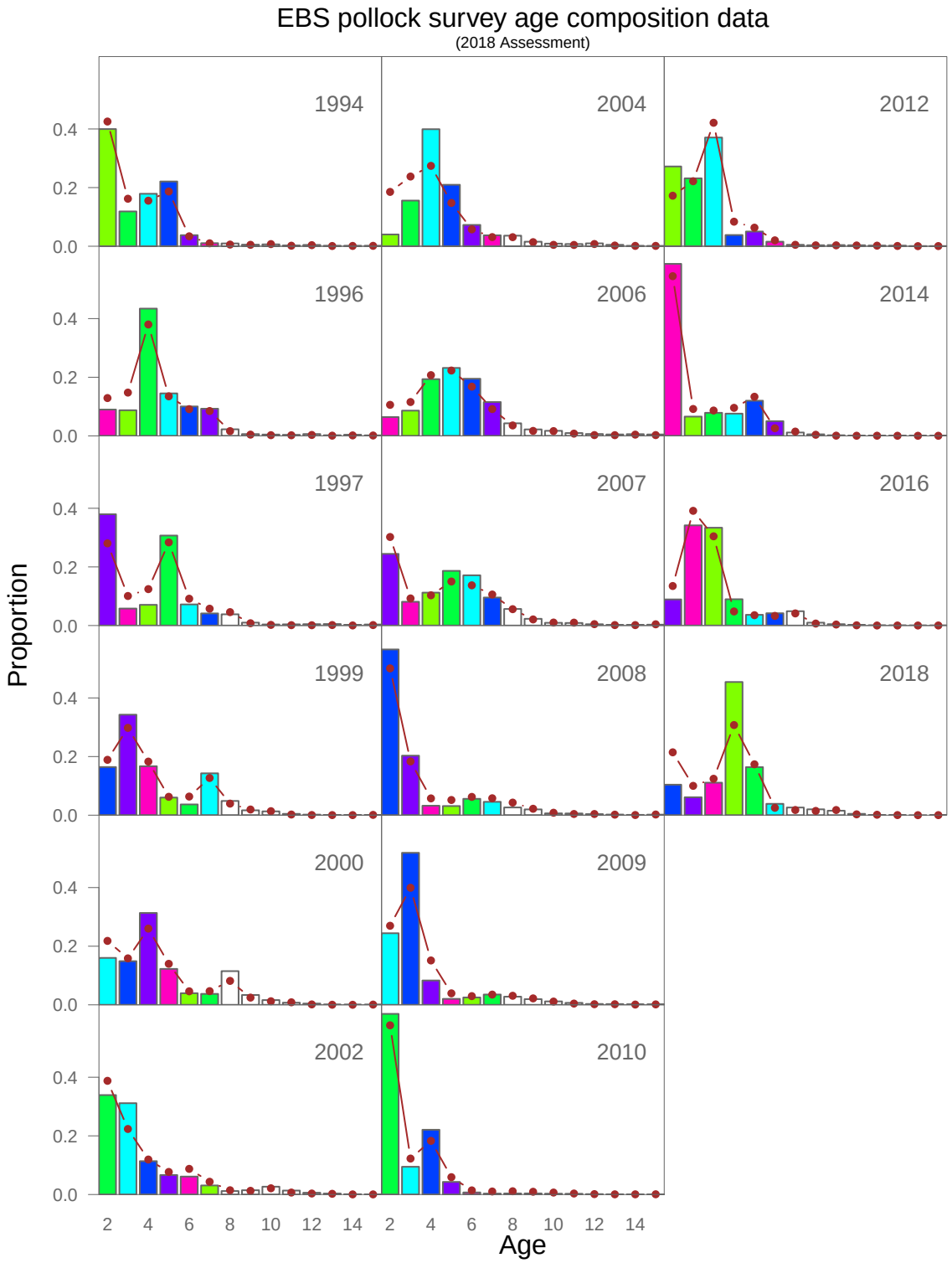

Figure 20: Model fit (dots) to the acoustic-trawl survey proportion-at-age composition data (columns) for EBS pollock. Colors correspond to cohorts over time (for years with consecutive surveys).

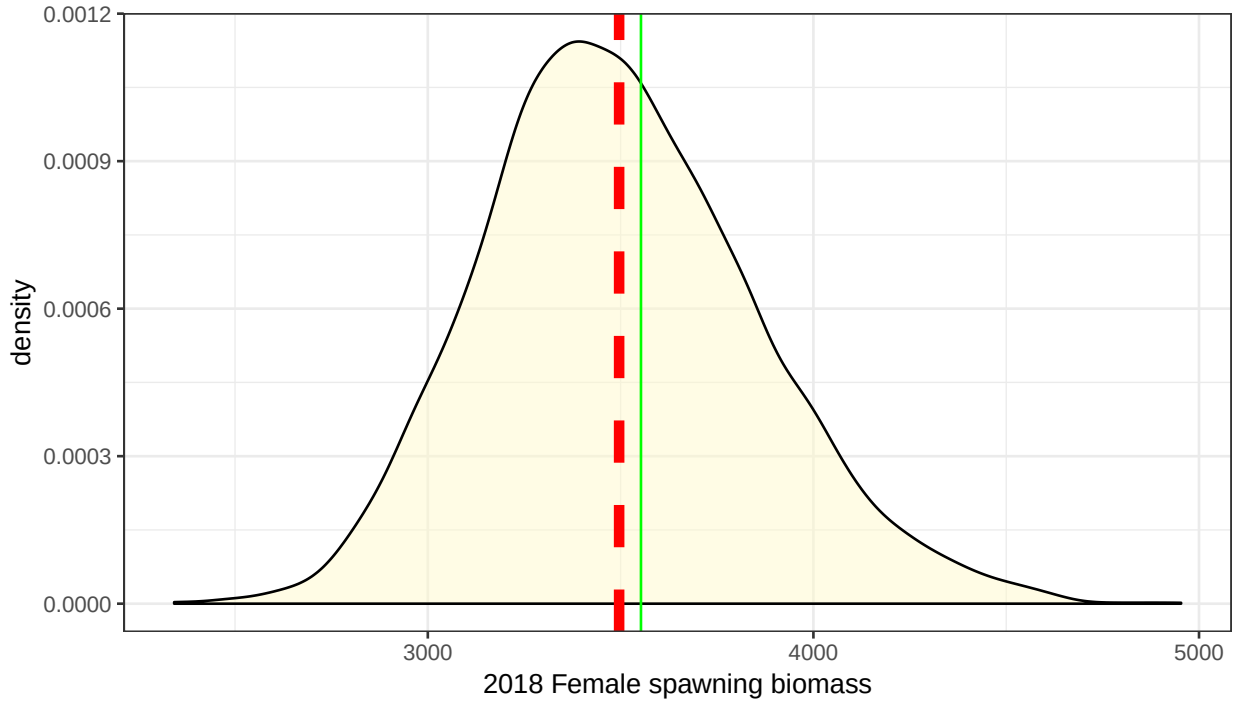

Figure 21: Integrated marginal posterior density (based on MCMC results) for the 2018 EBS pollock female spawning biomass compared to the point estimate (dashed red line). The mean of the posterior is shown in green (under the dashed line).

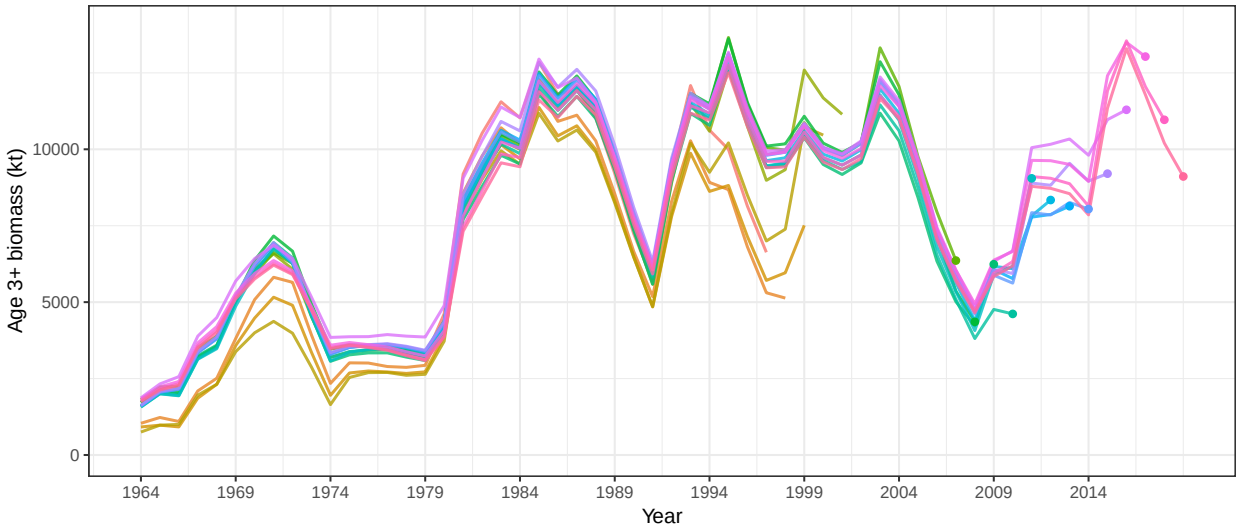

Figure 22: Comparison of the current assessment results with past assessments of begin-year EBS age-3+ pollock biomass.

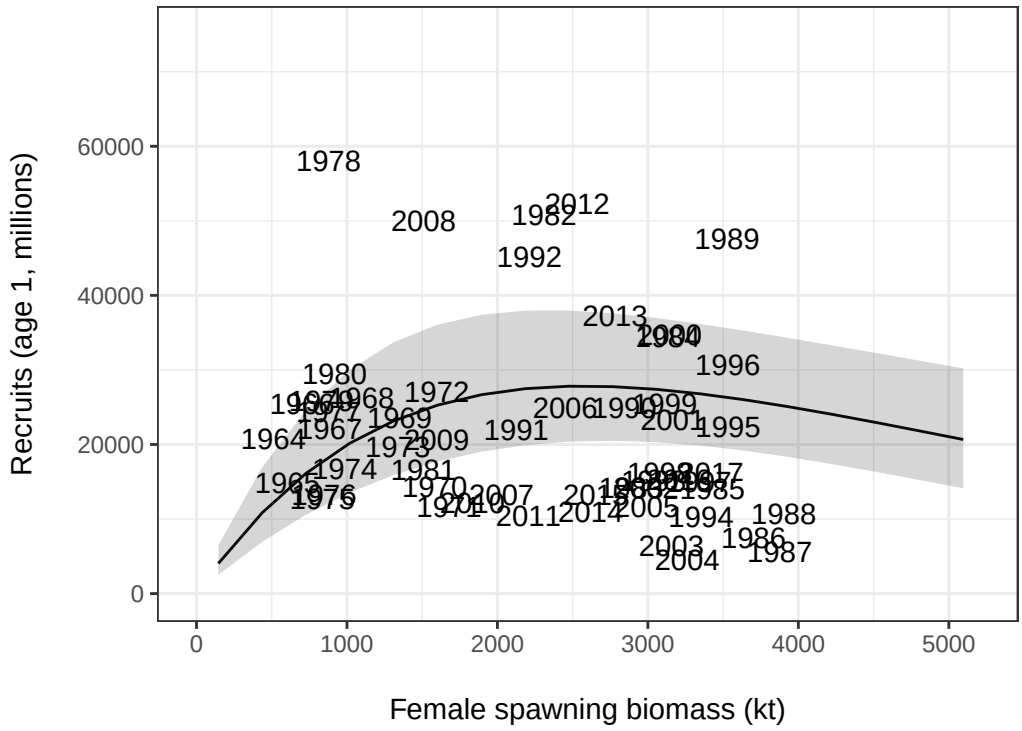

Figure 23: Stock-recruitment estimates (shaded represnts structural uncertainty) and age-1 EBS pollock estimates labeled by year-classes

1.35 million t, 2019–2023.

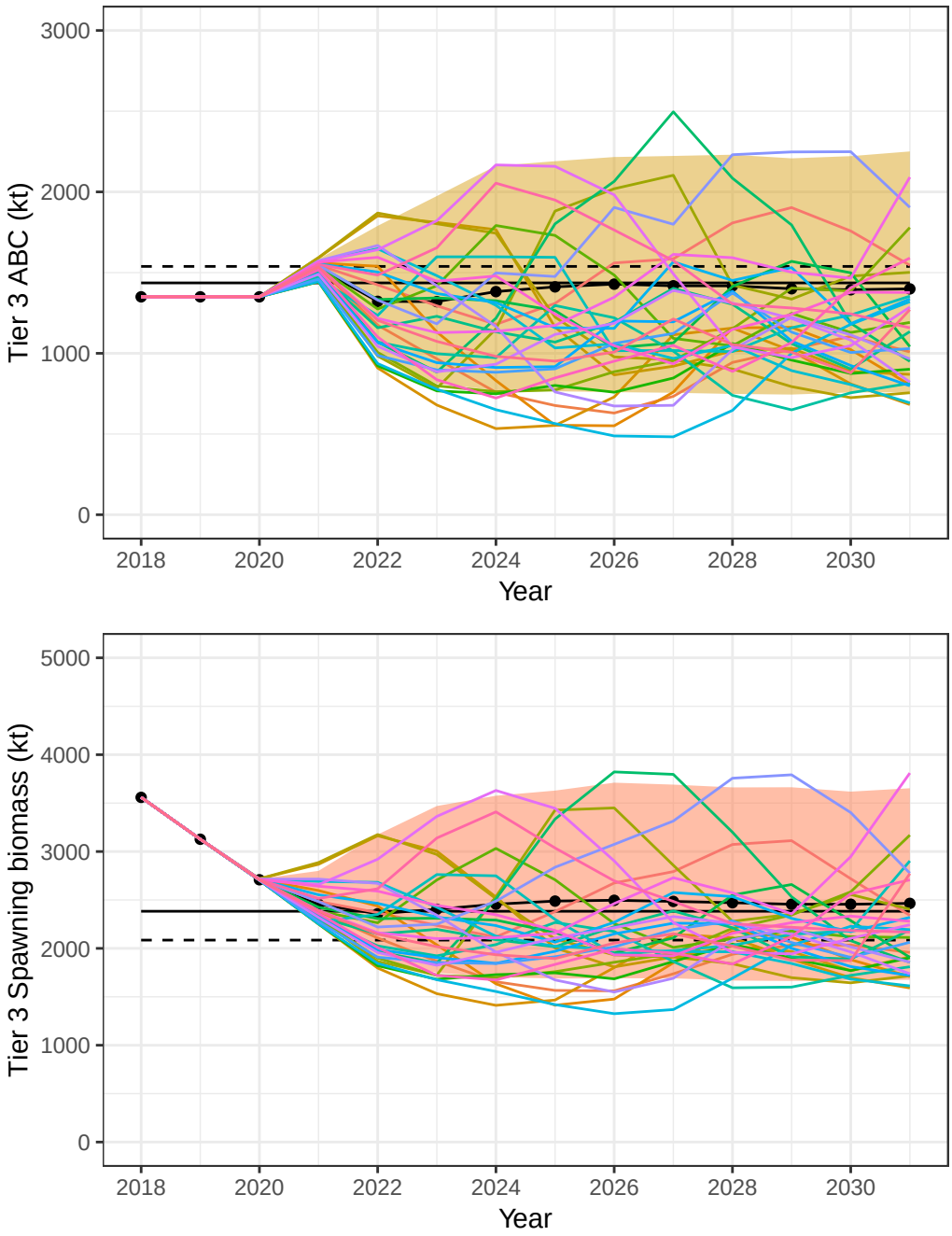

Figure 24: Projected EBS Tier 3 pollock yield (top) and female spawning biomass (bottom) relative to the long-term expected values under $F_{35\%}$ and $F_{40\%}$ (horizontal lines). $B_{40\%}$ is computed from average recruitment from 1978–2015. Future harvest rates follow the guidelines specified under Tier 3 Scenario 1.

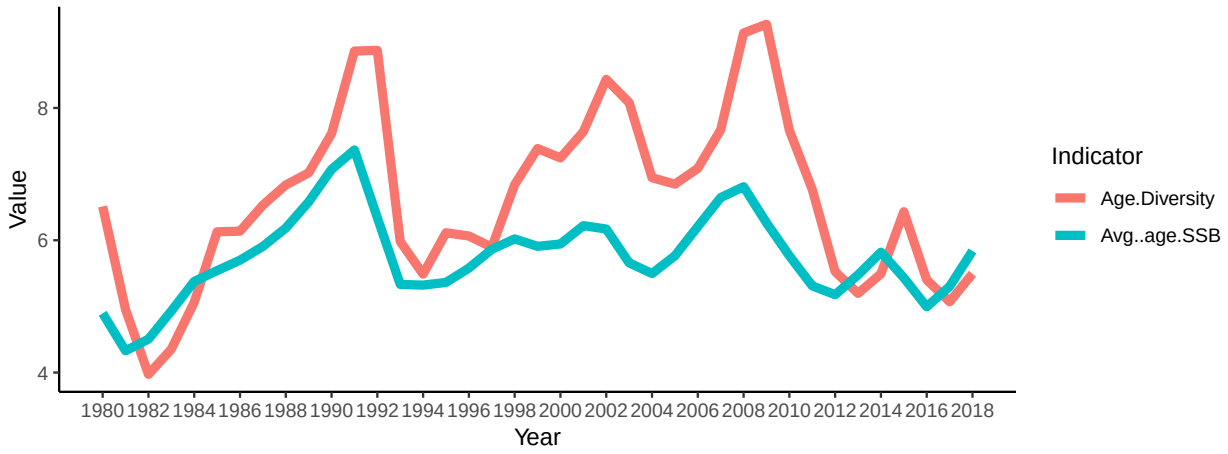

Figure 25: For the mature component of the EBS pollock stock, time series of estimated average age and diversity of ages (using the Shannon-Wiener H statistic), 1980–2018.

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