

NORTHERN ROCK SOLE

BY

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CHANGES IN THE ASSESSMENT BETWEEN 2018 AND 2019

Partial assessment for 2019, the assessment model was not run to include the new 2019 survey biomass and 2018 age composition information from the survey and fishery.

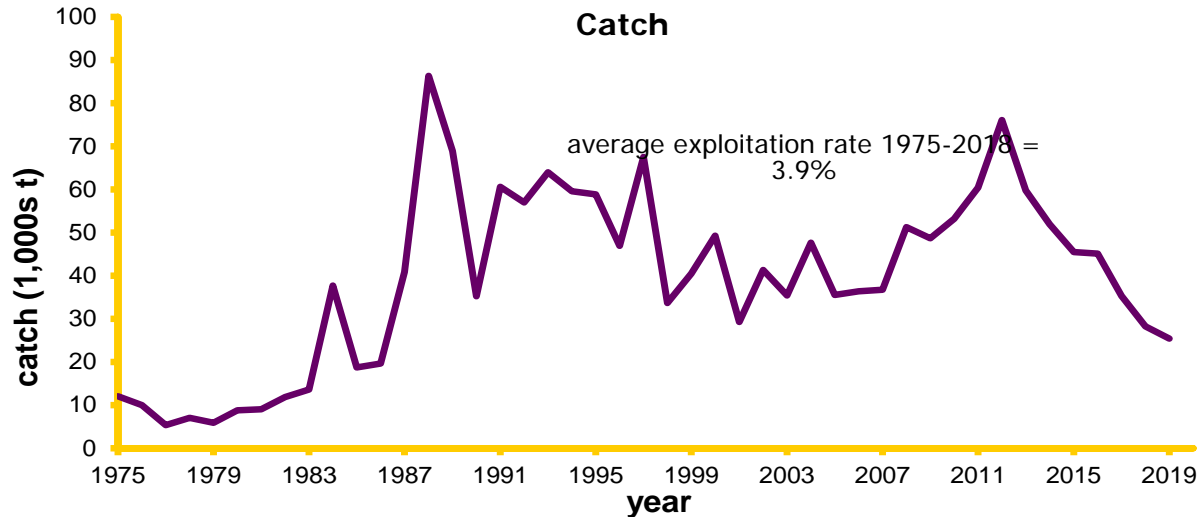
No change in the methodology.

2018 assessment estimated northern rock sole in a declining trend.

SUMMARY

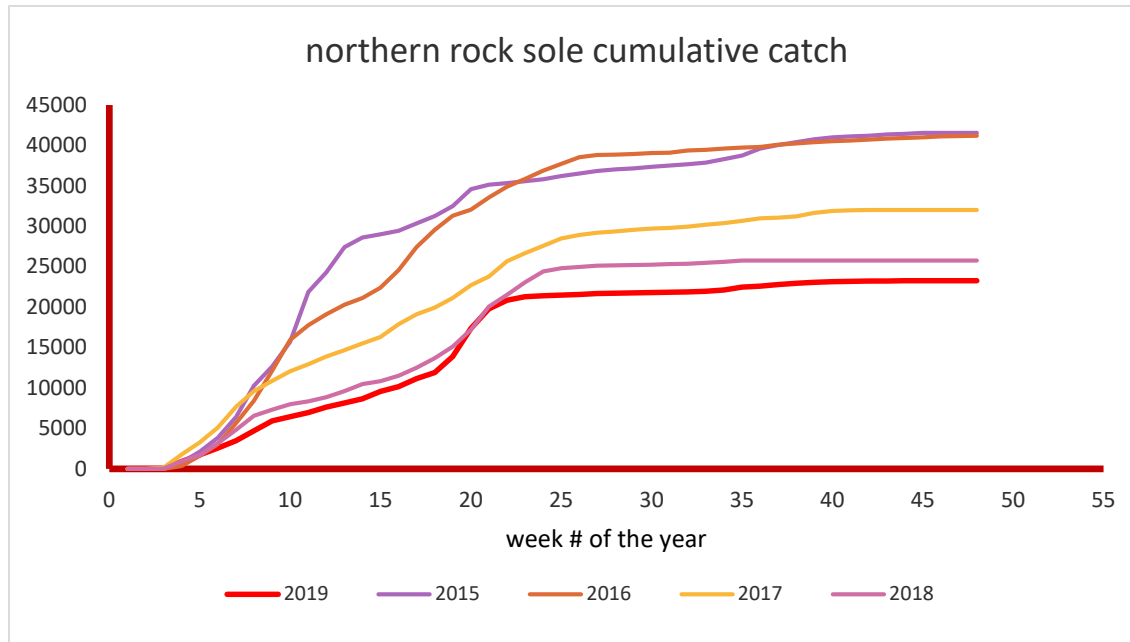
Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2019	2020	2020	2021
M (natural mortality rate)	0.15	0.15	0.15	0.15
Tier	1a	1a	1a	1a
Projected total (age 6+) biomass (t)	828,000	1,001,400		
Female spawning biomass (t)	417,800	338,300	380,600	356,000
Projected				
B_0	515,680		515,680	
B_{MSY}	186,000	186,000	186,000	186,000
F_{OFL}	0.147	0.147	0.147	0.147
$maxF_{ABC}$	0.144	0.144	0.144	0.144
F_{ABC}	0.144	0.144	0.144	0.144
OFL (t)	122,000	147,500	157,300	236,800
maxABC (t)	118,900	143,700	153,300	230,700
ABC (t)	118,900	143,700	153,300	230,700
	As determined last year for:		As determined this year for:	
Status	2017	2018	2018	2019
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

2019 CATCH = 25,435 T (AVERAGE 1975-2019 EXPLOITATION RATE = 3.9%)

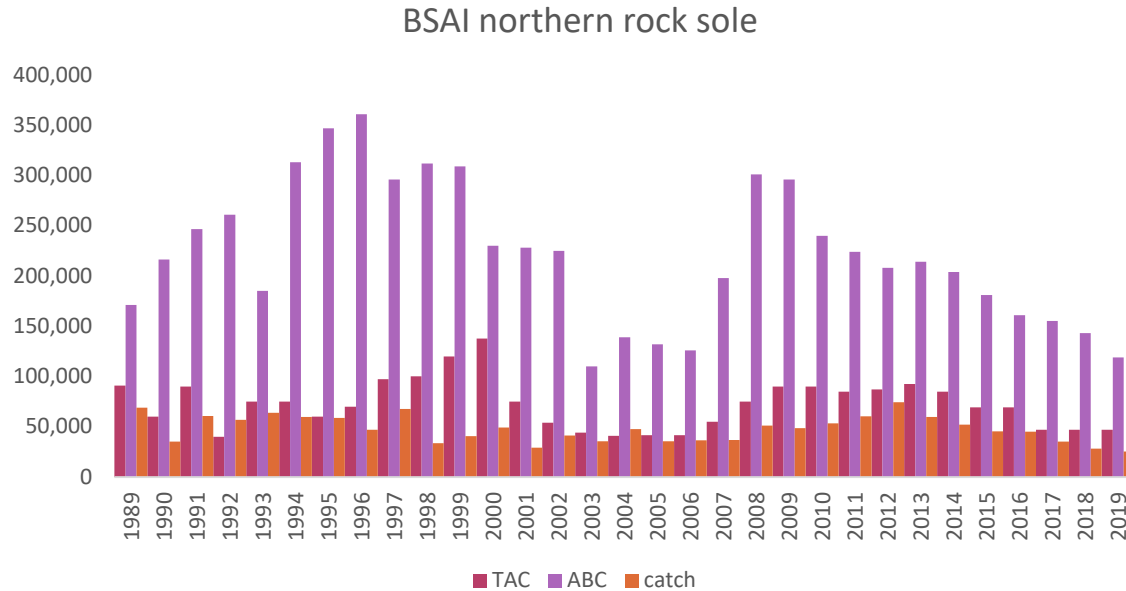


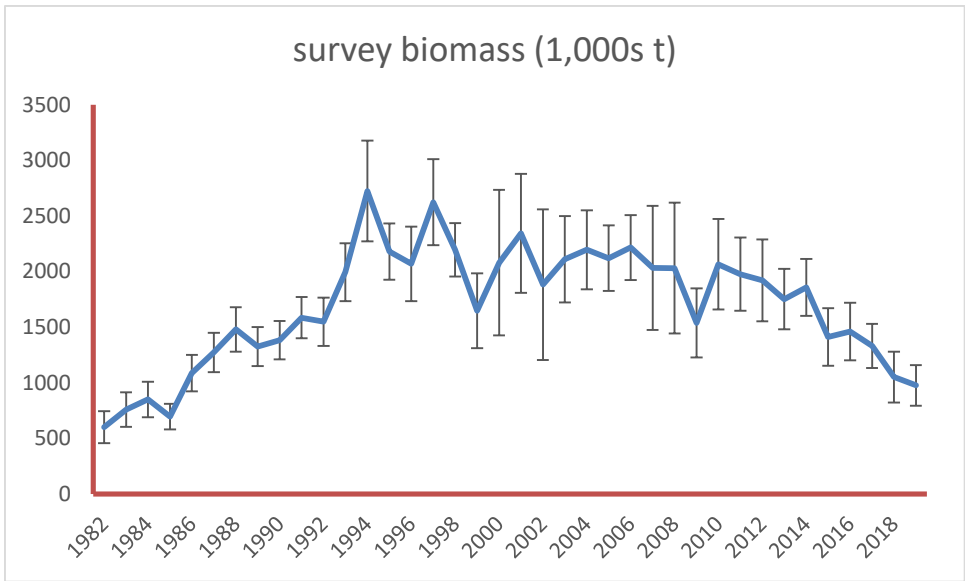
Long-term average is 39,300 t. Retention rates were 96% in 2018.

NORTHERN ROCK SOLE 2019 CUMULATIVE CATCH BY WEEK

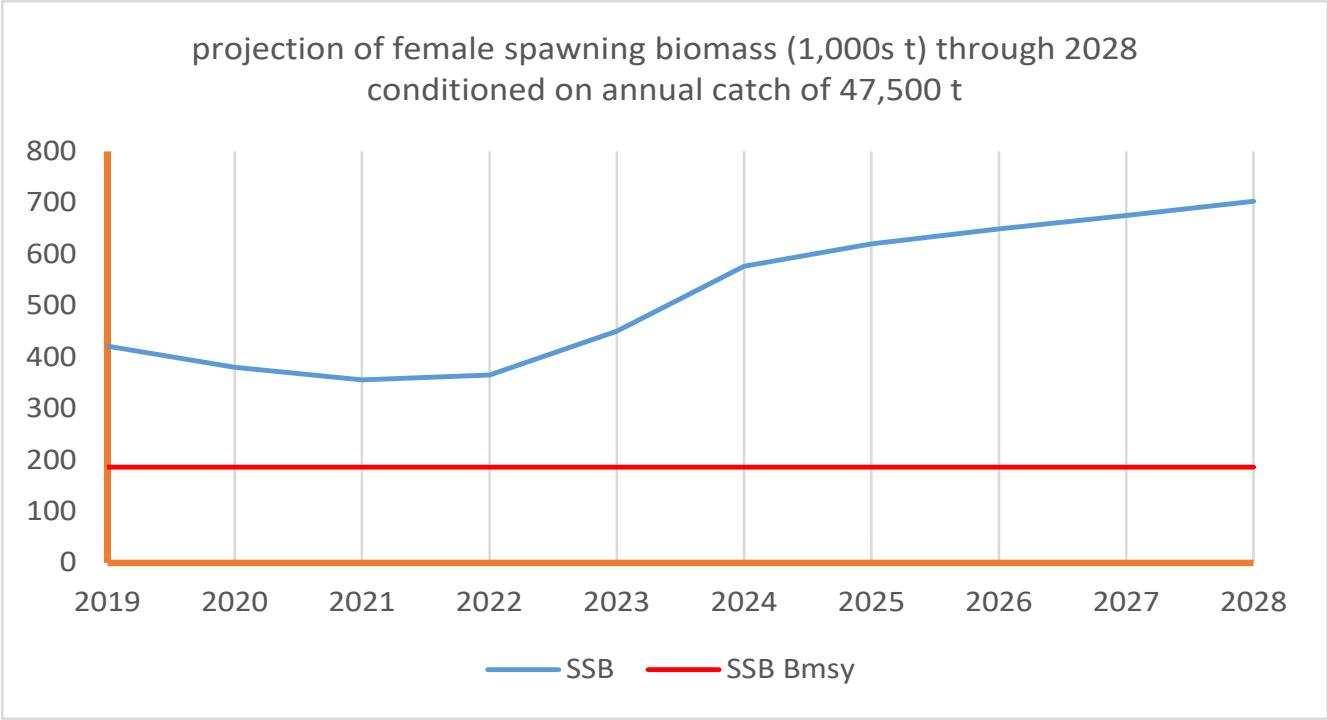


BSAI northern rock sole catch, TAC and ABC

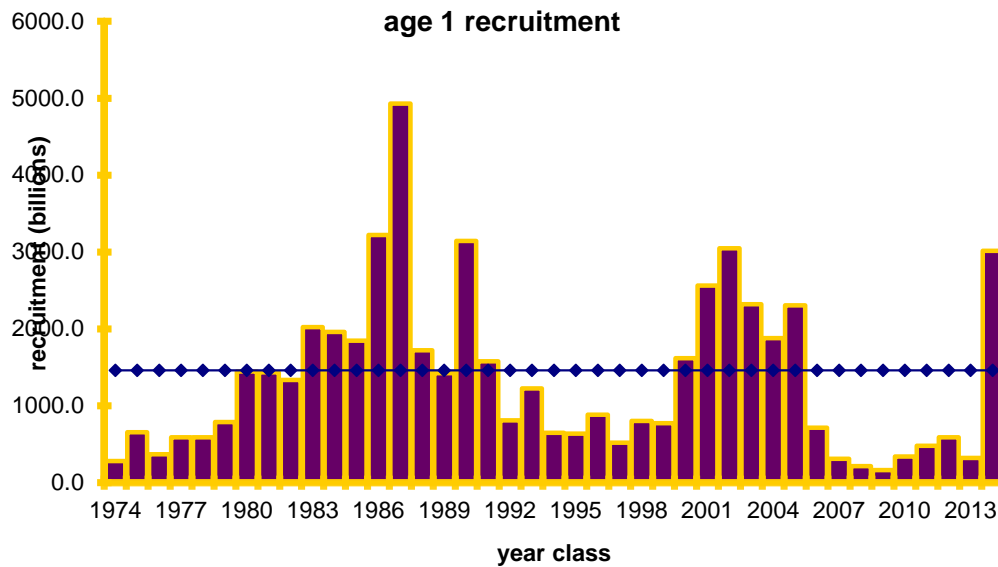




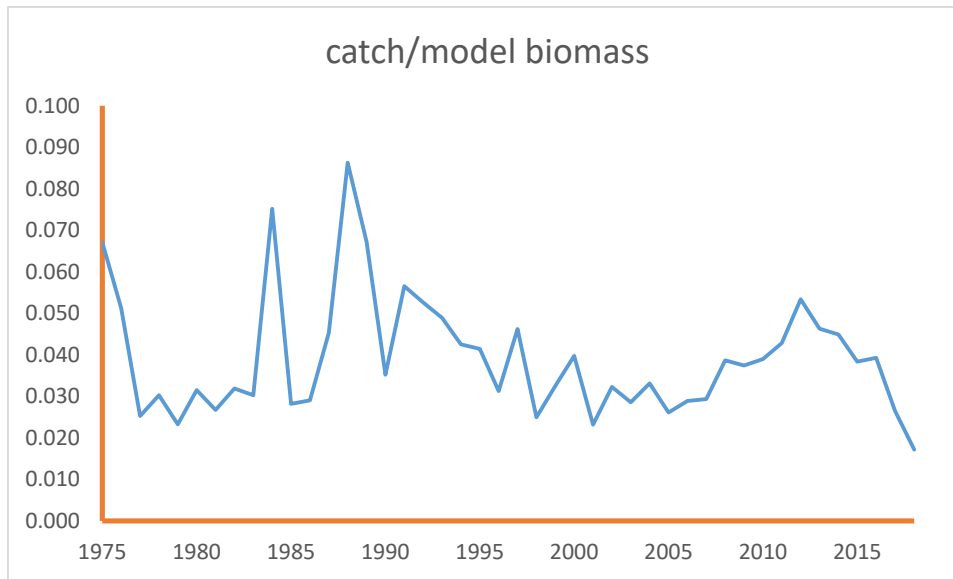
2019 survey biomass is down 7%. Assessment model in 2018 estimated a downward trend since 2008.



AGE 1 RECRUITMENT FROM ASSESSMENT MODEL



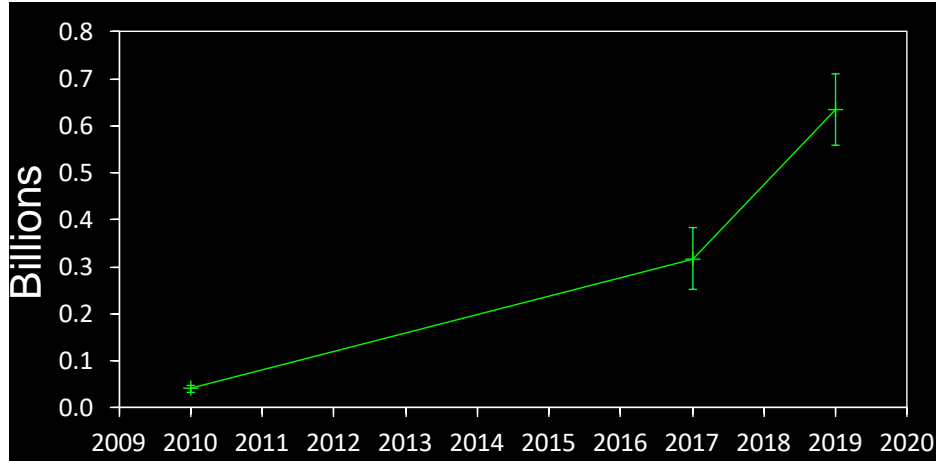
Annual catch/model estimate of total biomass



MODELS FOR PREDICTING RECRUITMENT

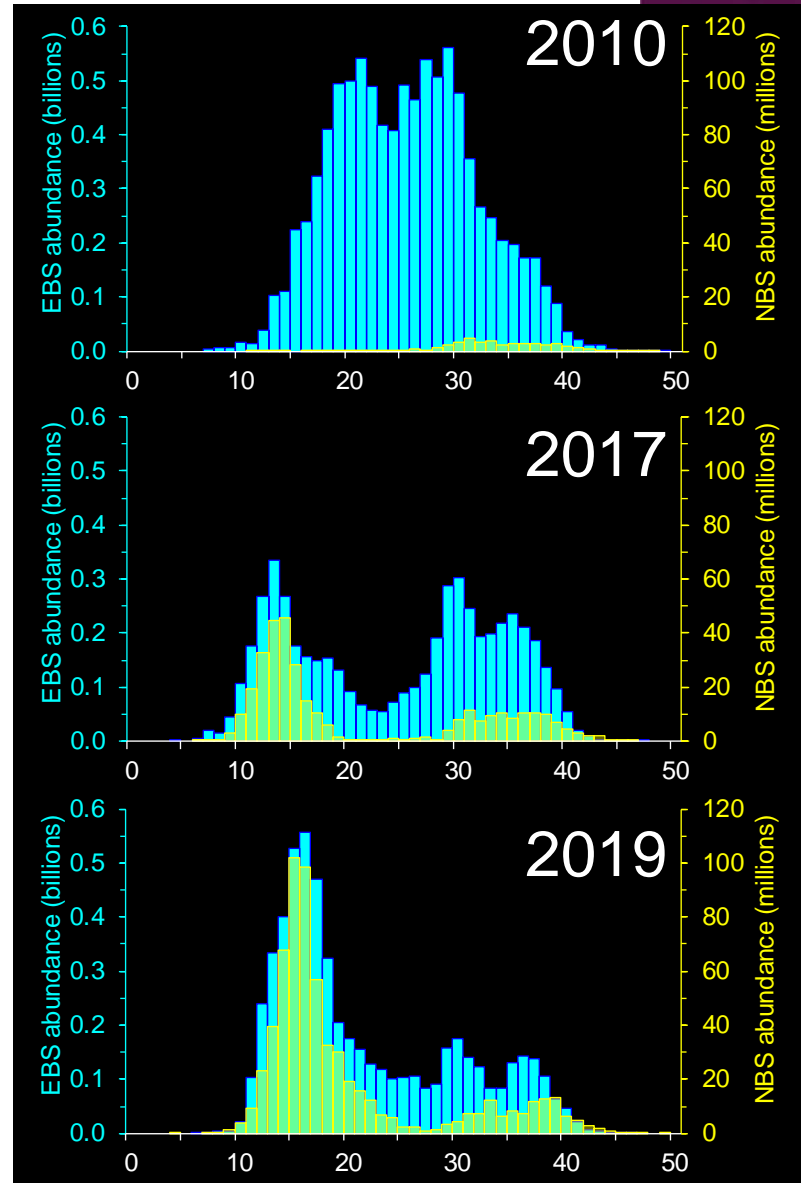
	Model	df	AICc	MSE (LOYO, log-scale)	MSE (1 step ahead, log-scale)	MSE (LOYO, real scale)	MSE (1 step ahead, real scale)
1	Ricker	3	67.8	0.69	0.85	725	635
2	Ricker + coldpool	4	66.5	0.73	0.86	678	539
3	Ricker + wind	4	67.9	0.67	0.81	703	625
4	Ricker + coldpool + wind	5	63.9	0.66	0.78	635	509
5	Ricker + coldpool*wind	6	65.0	0.64	0.85	622	514
6	Ricker + coldpool*wind (slope=0)	5	66.0	0.69	0.81	655	536
7	coldpool	3	57.8	0.60	0.69	545	600
8	wind	3	60.9	0.58	0.69	585	631
9	coldpool + wind	4	54.9	0.55	0.61	531	504
10	coldpool*wind	5	55.7	0.53	0.71	522	570
11	coldpool*wind (slope=0)	4	57.2	0.58	0.64	552	533
12	Categorical	4	45.5	0.41	0.47	456	412
13	Previous Year	NA	NA	0.46	0.45	533	382
14	Running Mean	NA	NA	0.62	0.74	637	638

NBS



NBS

+100%



Bering Sea Northern Rock Sole Distribution



Northern rock sole
(kg/ha)

