ICES advice for North Western Waters stocks for 2019

Ghislain Chouinard, ICES ACOM vice-chair

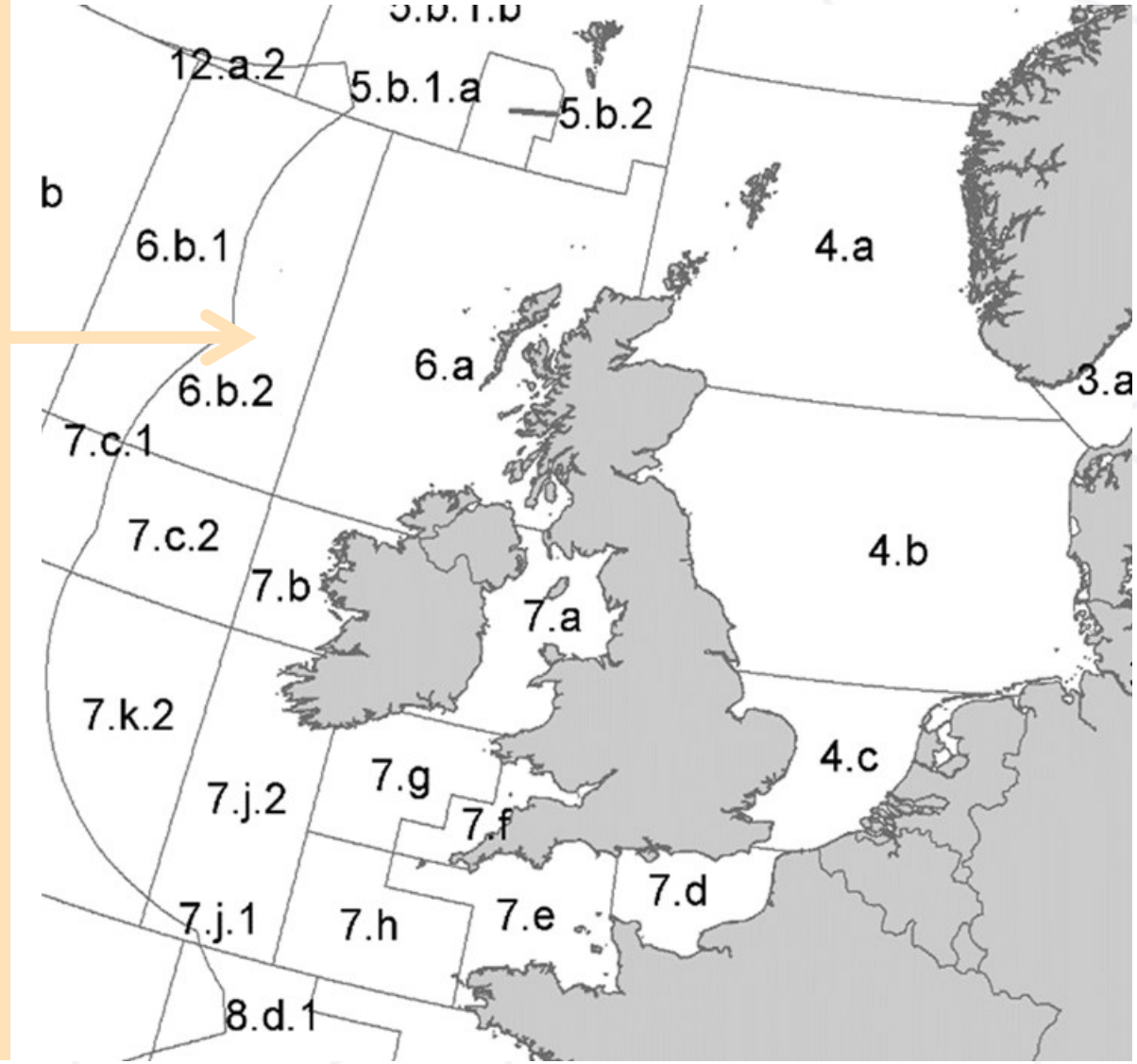
For NWWAC (Ghent, July 3 2018)

West of Scotland & Rockall (6.a & 6.b)

- Cod 6.a (advice from 2017)
- Cod 6.b (advice from 2017)
- Haddock 4, 6.a, sub. 20
- Haddock 6.b
- Saithe 3.a, 4, 6
- Norway pout 6.a
- Whiting 6.a
- Whiting 6.b
- Megrim 4.a, 6.a
- Ling (advice from 2017)

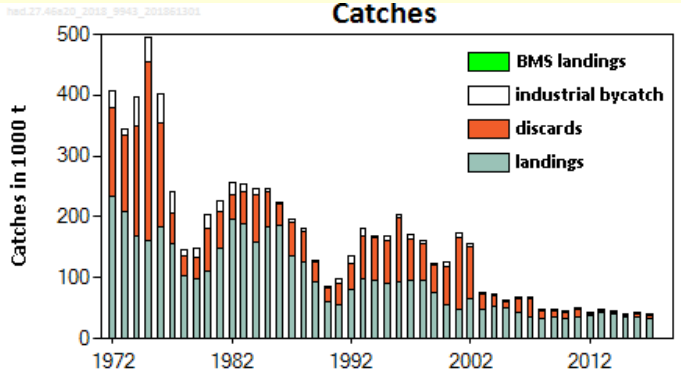
IN AUTUMN:

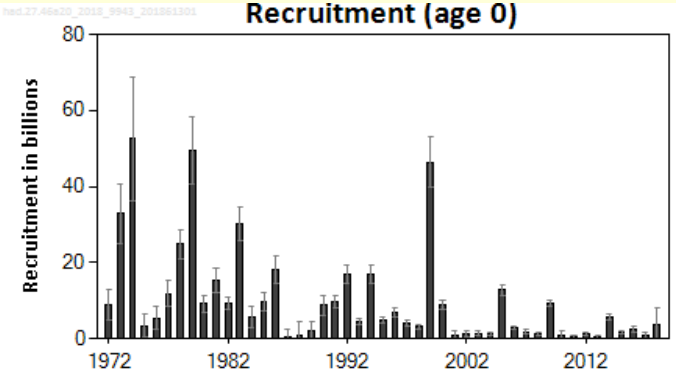
- **Anglerfish (3.a,4,6)**
- **Megrim (6.b)**
- ***Nephrops* / Skates and rays**

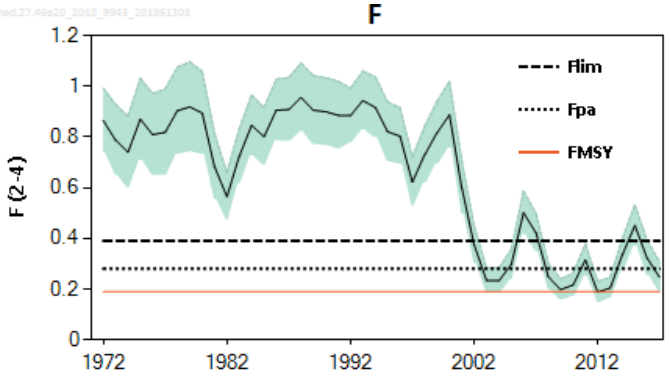


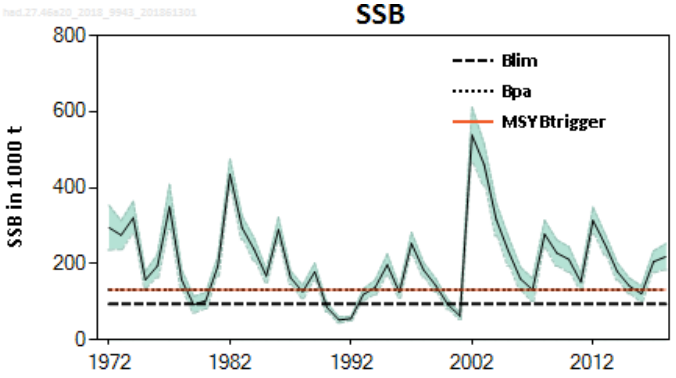
Haddock in the North Sea, West of Scotland, Skagerrak (4, 6.a and Subdiv. 20)

Advice for 2019: MSY: Catch ≤ 35 761 t









		Fishing pressure				Stock size			
		2015	2016	2017		2016	2017	2018	
Maximum sustainable yield	F_{MSY}	✗	✗	✗	Above	MSY $B_{trigger}$	✗	✓	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	✗	o	✓	Harvested sustainably	B_{pa},B_{lim}	o	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Spawning stock mostly above MSY $B_{trigger}$ since 2002.
- Fishing pressure above F_{MSY} in 2017.
- Recruitment since 2000 at low level.
- Decline in advised catch due to reducing to F_{MSY} and low recruitment.

Haddock in the North Sea, West of Scotland, Skagerrak (4, 6.a and Subdiv. 20)

Catch (2017) : 39 875 t (18 % discards)

F(2018) = 0.226 (TAC constraint – 48 990 t)

SSB(2019) = 228 314t > $MSY_{Btrigger}$ (132 000t) F_{MSY}= 0.194

Basis	Total catch (2019)	Wanted catch * (2019)	Unwanted catch * (2019)	IBC ** (2019)	HC ** catch (2019)	F_{total} (2019)	F_{wanted} (2019)	$F_{unwanted}$ (2019)	F_{IBC} (2019)	SSB (2020)	% SSB change ***	% TAC change ^	% Advice change ^^
ICES advice basis													
MSY approach: F_{MSY}	35761	31247	4477	38	35723	0.194	0.165	0.029	0.0002	202935	-11.10%	-27%	-27%
Other scenarios													
F = MAP $F_{MSY\ lower}$	31088	27179	3871	38	31049	0.167	0.142	0.025	0.0002	207855	-9.00%	-37%	-37%
F = MAP $F_{MSY\ upper}$	35761	31247	4477	38	35723	0.194	0.165	0.029	0.0002	202935	-11.10%	-27%	-27%
F = 0	41	0	0	41	0	0	0	0	0.0002	241100	5.60%	-100%	-100%
F_{pa}	49031	42757	6238	36	48995	0.274	0.23	0.041	0.0002	189049	-17.20%	-0.04%	0.09%
F_{lim}	65872	57259	8578	35	65837	0.384	0.33	0.058	0.0002	171644	-25%	34%	34%
SSB (2020) = B_{lim}	131208	110964	20217	26	1E+05	1.02	0.86	0.153	0.0002	94000	-59%	169%	168%
SSB (2020) = B_{pa} = MSY $B_{trigger}$	103336	88861	14444	30	1E+05	0.68	0.58	0.103	0.0002	132000	-42%	111%	111%
Rollover TAC	49026	42752	6238	36	48990	0.27	0.23	0.041	0.0002	189054	-17.20%	0%	0.07%

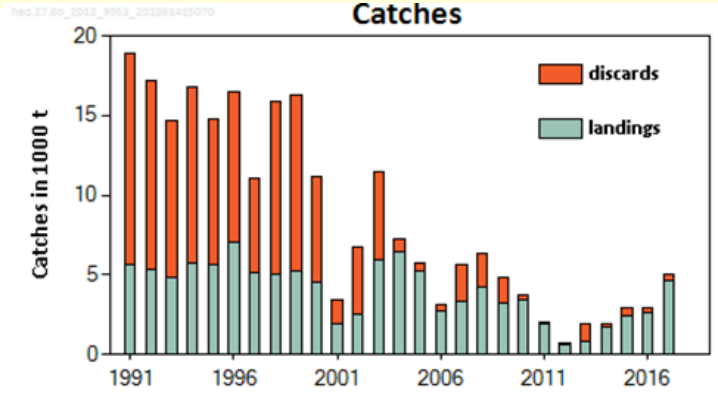
*** SSB 2020 relative to SSB 2019.

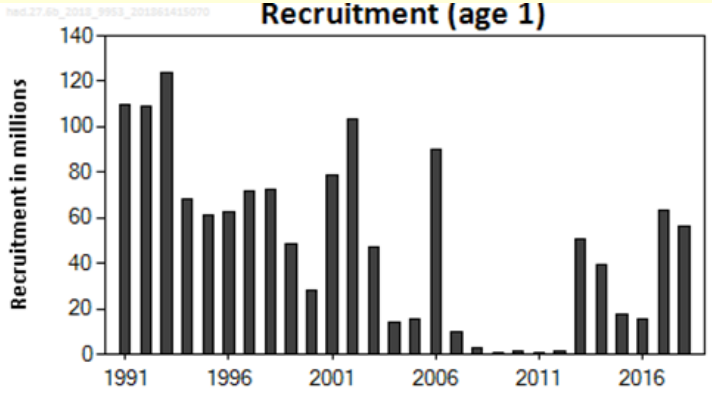
^ Human Consumption catch in 2019 relative to TAC in 2018: Subdivision 20 (2 569 t) + Subarea 4 (41 767 t) + Division 6.a (4 654 t) = 48 990 t.

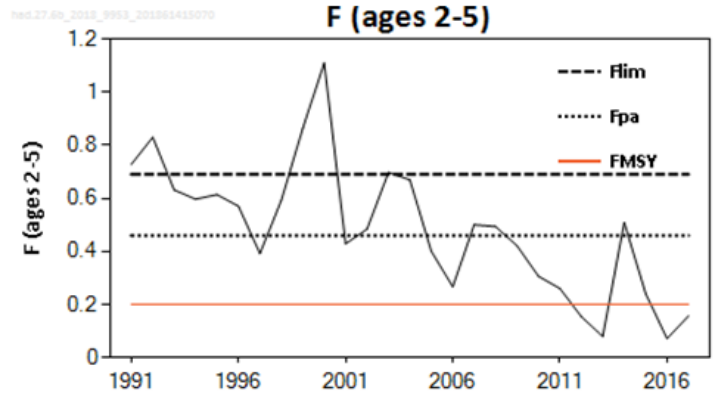
^^ Total catch 2019 relative to advice value 2018 (48 990 t).

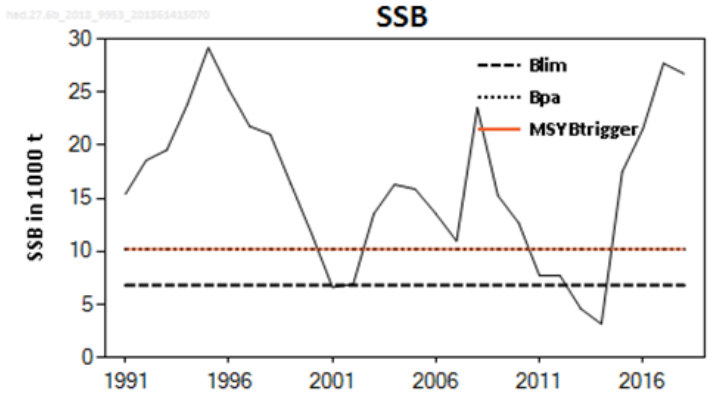
Haddock at Rockall (6.b)

Advice for 2020, 2021: MSY: Catch ≤ 10 469 t



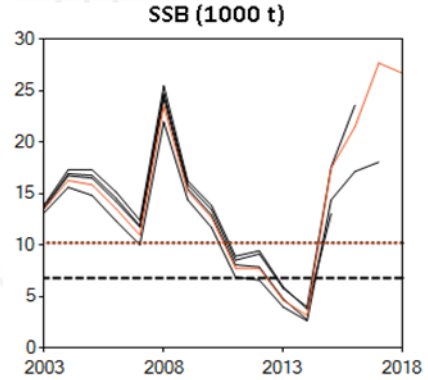






		Fishing pressure				Stock size			
		2015	2016	2017		2016	2017	2018	
Maximum sustainable yield	F_{MSY}	✗	✓	✓	Below	MSY $B_{trigger}$	✓	✓	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa},B_{lim}	✓	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	–		B_{MGT}	–	–	–

- Increase in spawning stock since 2014,well above MSY $B_{trigger}$.
- Fishing pressure reduced below F_{MSY} in 2016-2017.
- Recruitment in 2017and 2018 is estimated to be above average.



Haddock at Rockall (6.b)

Catch (2017) : 5 006 t (8% discards)

F(2018) = 0.195 (EU TAC + estimated 1000 t from Russia + discards= 7472t);

SSB (2019)= 37 465t > $MSY_{Btrigger}$ (10 200 t) F_{MSY}= 0.20

Basis	Total catch * (2019)	Wanted catch**	Unwanted catch**	F_{total} (2019)	F_{wanted} (2019)	$F_{unwanted}$ (2019)	SSB -2020	% SSB change ***	% Advice change ^^
ICES advice basis									
MSY approach: F_{MSY}	10469	8932	1537	0.2	0.157	0.043	42258	12.8	103
Other scenarios									
Proposed management strategy^^^	9408	8034	1374	0.177	0.138	0.039	43356	15.7	82
F = 0	0	0	0	0	0	0	59316	58	-100
F_{pa}	20446	17280	3166	0.46	0.36	0.1	31982	-14.6	296
F_{lim}	26877	22535	4342	0.69	0.54	0.15	25431	-32	421
SSB (2020) = B_{lim}	45990	36857	9133	2.441	1.91	0.531	6800	-82	791
SSB (2020) =B_{pa}=$MSYB_{trigger}$	42313	34361	7982	1.811	1.417	0.394	10200	-73	720
F = F_{2018}	10230	8730	1500	0.195	0.152	0.043	42505	13.5	98
MSY F_{lower}	7129	6099	1030	0.13	0.102	0.028	45720	22	38
MSY F_{upper}	10469	8932	1537	0.2	0.157	0.043	42258	12.8	103

*** SSB 2020 relative to SSB 2019.

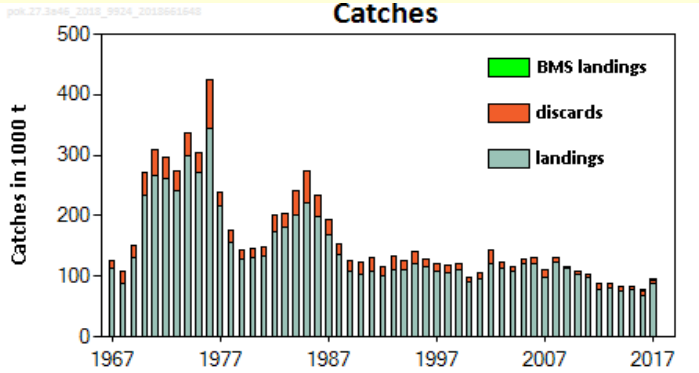
^ Total catch in 2019 relative to EU TAC in 2018 (5 163 t).

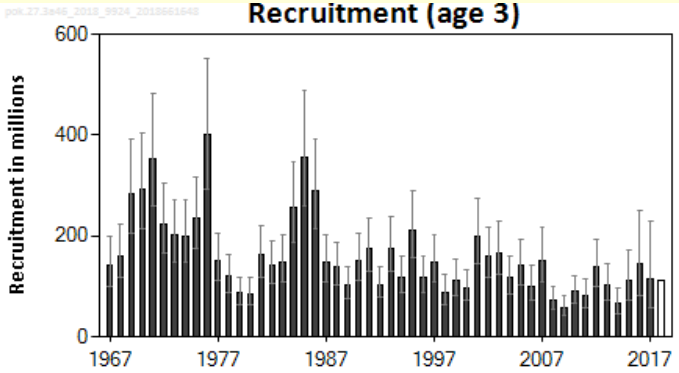
^^ Advice value for 2019 relative to advice value for 2018 (5 163 t).

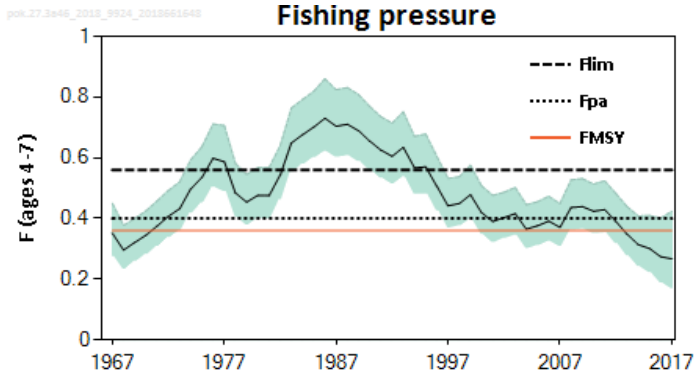
^^^F_{HCR} derived from a two-step process

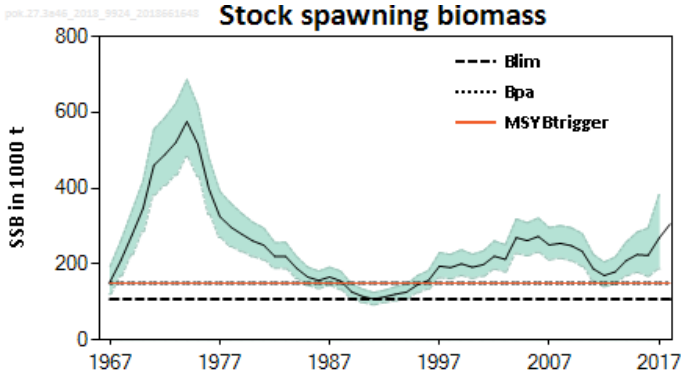
Saithe in the North Sea, Rockall and West of Scotland, Skagerrak and Kattegat (4,6,3.a)

Advice for 2019: MSY: Catch ≤ 139 978 t









		Fishing pressure				Stock size			
		2015	2016	2017		2016	2017	2018	
Maximum Sustainable Yield	F_{MSY}	✓	✓	✓	Below	MSY $B_{Trigger}$	✓	✓	✓ Above trigger
Precautionary Approach	F_{pa}, F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa}, B_{lim}	✓	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Spawning stock fluctuated without trend and has been above MSY $B_{trigger}$ since 1996.
- Fishing pressure reduced below F_{MSY} since 2013.
- Recruitment below long-term average since 2003.

Assessment includes commercial index (French, German and Norwegian trawlers)

Saithe in the North Sea, Rockall and West of Scotland, Skagerrak and Kattegat (4,6,3.a)

Catch (2017) : 95 165 t (7% discards);7 116 t (L) in Rockall/West of Scotland
F(2018) = 0.267 (Average exploitation pattern (2015-2017), scaled to 2017);
SSB (20189)= 339 997 t> $MSY_{Btrigger}$ (150 000 t) F_{MSY}= 0.36

Basis	Total catch (2019)	Wanted catch* (2019)	Unwanted catch* (2019)	Wanted catch*# 3a4	Wanted catch*# 6	F_{total} (2019)	F_{wanted} (2019)	$F_{unwanted}$ (2019)	SSB (2020)	% SSB change **	% TAC change	% advice change ^
ICES advice basis												
MSY approach: F_{MSY}	139978	130275	9704	118029	12246	0.358	0.33	0.025	334963	-1.48	21	18.2
Other scenarios												
F = MAP^^ $F_{MSY\ lower}$	87775	81781	5994	74094	7687	0.21	0.2	0.015	386491	13.7	-24	-26
F = MAP $F_{MSY\ upper}$	181445	168651	12794	152798	15853	0.492	0.46	0.035	294229	-13.5	56	53
F = 0	0	0	0	0	0	0	0	0	475333	40	-100	-100
F_{pa}	154490	143719	10771	130210	13510	0.4	0.38	0.028	320712	-5.7	33	30
F_{lim}	201664	187381	14282	169768	17614	0.56	0.52	0.04	274466	-19.3	74	70
SSB2020 = B_{lim} = B_{lim}	383055	352742	30313	319584	33158	1.58	1.47	0.111	107000	-69	230	220
SSB2020 = B_{pa}= B_{pa}	334056	308568	25488	279563	29005	1.21	1.12	0.085	150000	-56	188	182
SSB2020 = $B_{Trigger}$= MSY $B_{trigger}$	334056	308568	25488	279563	29005	1.21	1.12	0.085	150000	-56	188	182
F = F_{2018}	108758	101271	7487	91752	9519	0.27	0.25	0.019	365832	7.6	-6.3	-8.2
TAC_{2018}	116008	108019	7989	97865	10154	0.29	0.27	0.02	358570	5.5	0	-2.1

** SSB 2020 relative to SSB 2019.

*** Total catch in 2019 relative to TAC in 2018 (116 008 t).

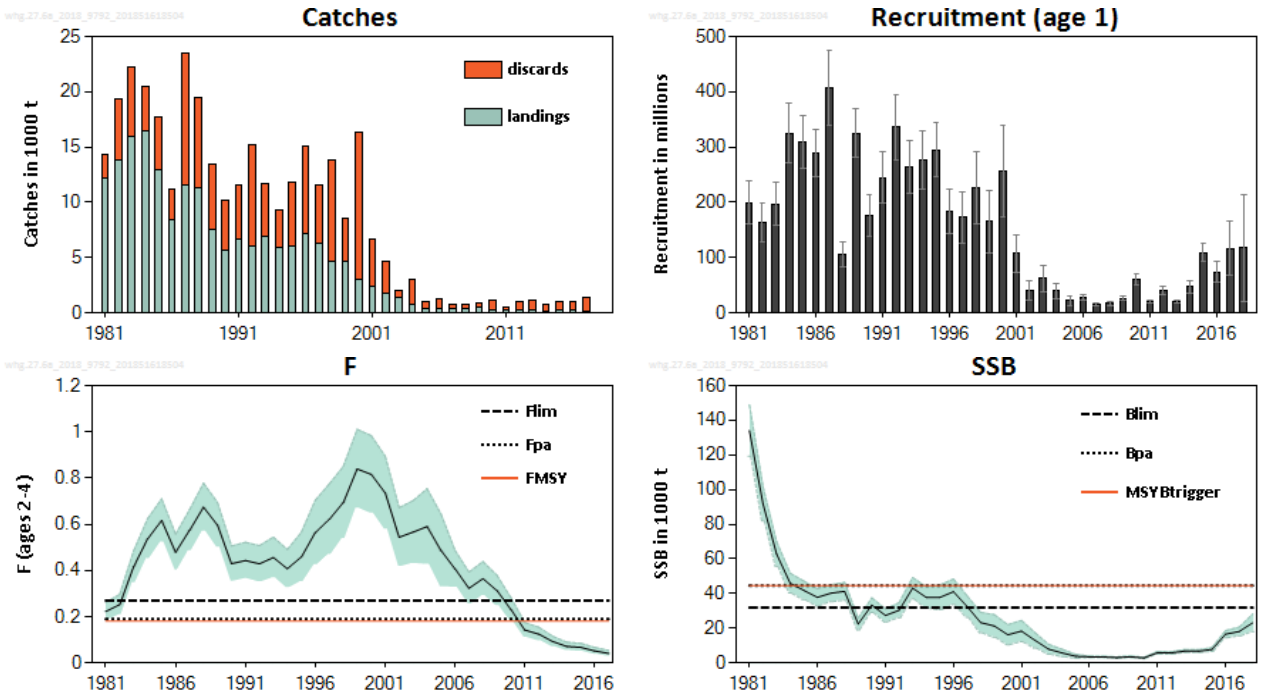
Wanted catch split according to the average in 1993–1998, i.e. 90.6% in Subarea 4 and Subdivision 3.a.20 and 9.4% in Subarea 6.

^ Total catch 2019 relative to advice value 2018 (118 460 t).

^^ Proposed EU multiannual plan (MAP) for the North Sea (EU, 2016)

Whiting in division 6.a

Advice for 2019 and 2020: MSY: Catch = 0 t



		Fishing pressure				Stock size			
		2015	2016	2017		2016	2017	2018	
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below	MSY $B_{trigger}$	✗	✗	✗ Below trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa},B_{lim}	✗	✗	✗ Reduced reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- SSB has been increasing since 2010 but remains very low, below B_{lim}
- Fishing mortality well below F_{MSY}.
- Recruitment very low since 2002 but has increased in recent years.
- Majority of the catches are discarded

Whiting in division 6.a

Catch (2017) : 1 723 t (90% discards)

F(2018) = 0.053 (Average F (2015–2017); 1 283 t);

SSB (2019)= 26 646 t < B_{lim} (31 900 t) F_{MSY}= 0.18

Basis	Total Catch (2019)	Wanted catch* -2019	Unwanted catch* (2019)	F_{total} (2019)	F_{wanted} (2019)	$F_{unwanted}$ (2019)	SSB (2020)	% TAC change **	% SSB change ***	% Advice ^^
ICES advice basis										
Precautionary approach	0	0	0	0	0	0	24 239	-100	-9	
Other scenarios										
$F_{MSY\ lower}$	3152	1184	1968	0.15	0.052	0.098	20 760	456	-22	
F_{MSY}	3730	1400	2330	0.18	0.063	0.117	20 131	557	-24	
F_{2018}	1171	441	730	0.053	0.0185	0.035	22 939	107	-13.9	
F_{lim}	5368	2010	3358	0.27	0.094	0.176	18 359	844	-31	
F_{pa}	3919	1471	2448	0.19	0.066	0.124	19 925	591	-25	
$F_{MSY} \times SSB_{2019}/MSY\ B_{trigger}$	2305	867	1438	0.108	0.037	0.07	21 688	307	-18.6	
$F_{MSY\ lower} \times$ SSB (2019)/M	1937	729	1208	0.09	0.031	0.058	22092	242	-17	
$SSB_{2020=}B_{pa=}MSY_{Btrigger}$^										
$SSB_{2020}=B_{lim}$^										

** Wanted catch in 2019 compared with the TAC of Subarea 6 (213 t). Note the stock area is only Division 6.a.

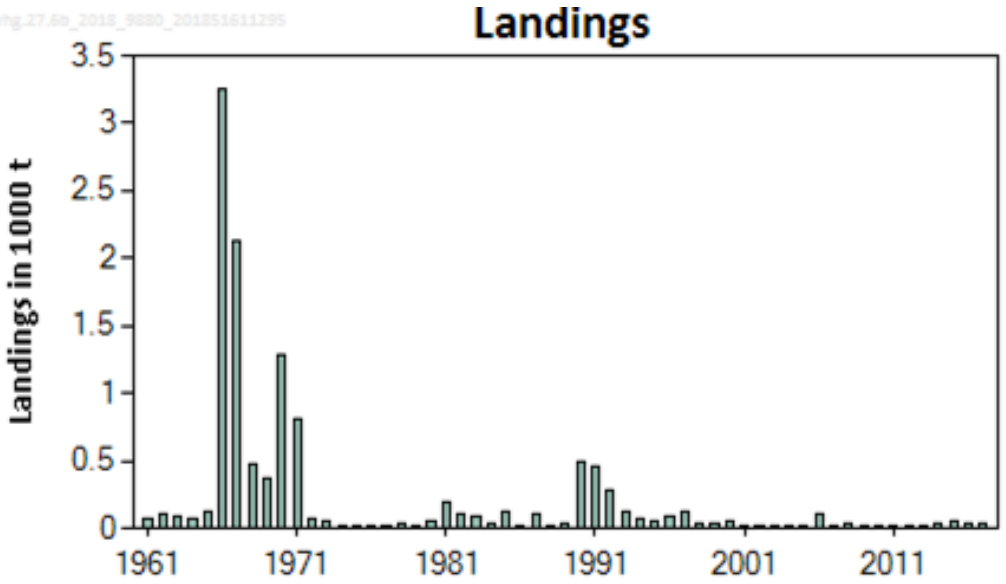
*** SSB 2020 relative to SSB 2019.

^ The B_{lim}, B_{pa}, and MSY $B_{trigger}$ option was left blank because $SSB_{2020}=B_{lim}$ and $SSB_{2020=}B_{pa=}MSY_{Btrigger}$ cannot be achieved in 2020 even with zero catch advice.

^^ Advice value for 2019 relative to advice value for 2018. This is not provided because the advice in 2018 was zero.

Whiting at Rockall (6.b)

Advice for 2019, 2020, 2021: PA: Catch ≤ 9 t



Advised catches for 2018 issued in 2015		11 tonnes
Discard		Uncertain
Precautionary buffer	Applied	0.8
Wanted catch advice		9 tonnes
% Advice change*		-20%

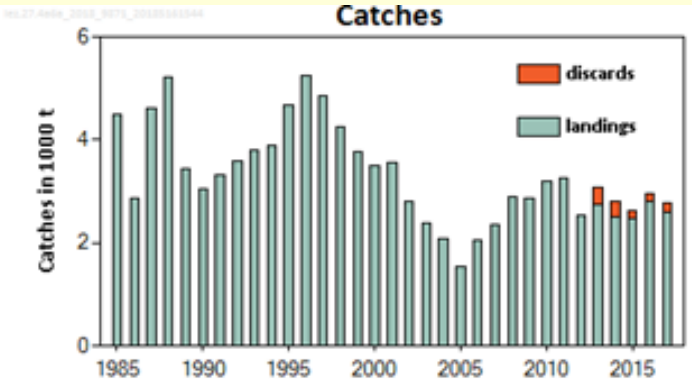
* Advice value for 2019 relative to advice value for 2016

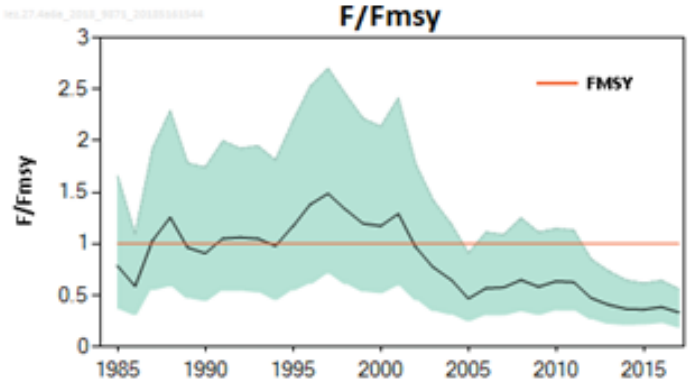
		Fishing pressure				Stock size				
		2015	2016	2017			2015	2016	2017	
Maximum sustainable yield	F_{MSY}	?	?	?	Unknown	MSY $B_{trigger}$	?	?	?	Unknown
Precautionary approach	F_{pa},F_{lim}	?	?	?	Unknown	B_{pa},B_{lim}	?	?	?	Unknown
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	–	Not applicable
Qualitative evaluation	-	?	?	?	Unknown	-	?	?	?	Unknown

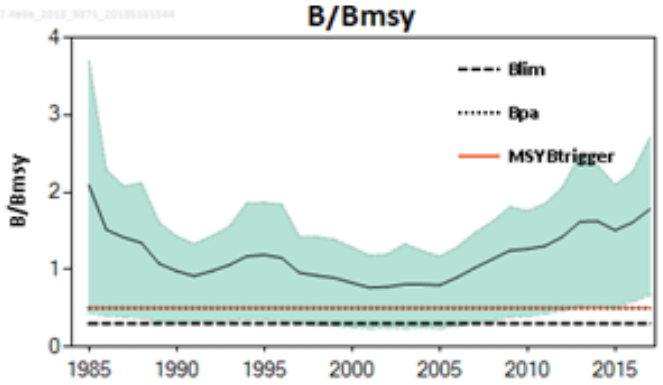
- Only landings data are available
- Decline in effort but fishing pressure is unknown

Megrim in the northern North Sea and West of Scotland (4.a and 6.a)

Advice for 2019: MSY: Catch ≤ 8 250 t







		Fishing pressure				Stock size			
		2015	2016	2017		2016	2017	2018	
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below	MSY $B_{trigger}$	✓	✓	✓ Above
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Below possible reference points	B_{pa},B_{lim}	✓	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Increase in spawning stock since the mid-2000s and is above MSY $B_{trigger}$.
- Fishing pressure reduced well below F_{MSY} since mid-2000.
- Bycatch in the mixed demersal trawl in 6a and 4a.
- Advice is for 2 species:*L. whiffiagonis* and *L. boscii* combined.
- *L. boscii* negligible in catches.
- Separate advice for Division 6b in autumn.

Megrim in the northern North Sea and West of Scotland (4.a and 6.a)

Catch (2017) : 2788 t (7 % discards)

F(2018) = 0.36 (Recent average fishing pressure (2015-2017); 2787 t.)

SSB (2019) > $MSY_{Btrigger}$

Basis	Total catch (2019)	Wanted catch* (2019)	Unwanted catch* (2019)	Fishing mortality F_{2019}/F_{MSY}	Stock size B_{2020}/B_{MSY}	Probability** of $Biomass_{2020}$ falling below $MSY_{Btrigger}$	Probability** of $Biomass_{2020}$ falling below B_{lim}	% B change ***	% TAC change ^	% Advice change ^^
ICES advice basis										
MSY approach: F_{MSY}	8250	7745	505	1	1.41	0.058	0	-15	3.7	5.8
Other scenarios										
$F=F_{MSY\ lower}$	6300	5914	386	0.77	1.51	0.04	0	-9	-20.8	-19.2
$F=F_{MSY\ upper}$	8250	7745	505	1	1.42	0.062	0	-15	3.7	5.8
F = 0	0	0	0	0	1.82	0.01	0	9	-100	-100
B (2020) = B_{lim}	32150	30182	1968	3.91	0.34	0.02	0.49	-79	304	312
B (2020) = MSY B_{pa}	16450	15443	1007	2	1.02	0.5	0.01	-39	107	111
B (2020) = MSY $B_{trigger}$	16450	15443	1007	2	1.02	0.5	0.01	-39	107	111
$F = F_{2018}$	2787	2616	171	0.33	1.66	0	0	0	-65	-64

** Probabilities are based on bootstrap sampling and based on a two- and three-year projection of F and B, respectively.

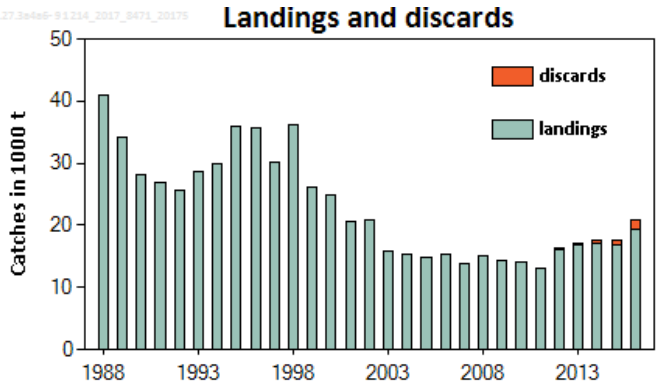
*** Biomass 2020 relative to biomass 2019.

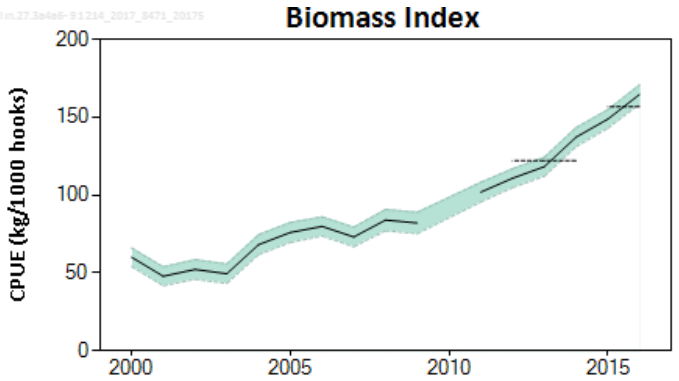
^ Total catch in 2019 relative to TAC in 2018 (7 958 t, which corresponds to the 2018 TAC for subareas 4 and 6).

^^ Advice value for 2019 relative to advice value for 2018 (7 800 t).

Ling in the Northeast Atlantic and Arctic Oceans (6–9, 12, and 14, 3.a and 4.a)

Advice for 2018 and 2019, PA: Catch ≤ 17 695 t (Landings ≤ 16 793 t)





		Fishing pressure				Stock size			
		2014	2015	2016		2014	2015	2016	
Maximum sustainable yield	$F_{MSY\ proxy}$	✗	✓	✓	Below	MSY $B_{trigger\ proxy}$	?	?	? Undefined
Precautionary approach	F_{pa},F_{lim}	?	✓	✓	Below possible reference points	B_{pa},B_{lim}	?	?	? Undefined
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable
Qualitative evaluation	-	–	–	–	Not applicable	-	↗	↗	↗ Increasing

Catch (2016) =20 867 t (Discards = 1598 t)

Index A (2015–2016)		157
Index B (2012–2014)		122
Index ratio (A/B)		1.28
Uncertainty cap	Applied	1.2
Advised catch for (2016–2017)		14746 tonnes
Discard rate		0.051
Precautionary buffer	Not applied	
Catch advice*		17695 tonnes
Landings advice**		16793 tonnes
* [recent advised catch] × [uncertainty cap].		

- Landings have been stable for the last five years.
- Increase in discards in the last three years.
- Catch per unit effort (cpue) based on the Norwegian longline fleet shows a positive trend since 2004.

Deep-sea stocks

SUMMARY

Stock	Advice 2019	Advice 2018	Catch 2017	TAC 2018
Haddock 4, 6.a, sub. 20	35761	48990	39875	48990
Haddock 6.b	10 469	5 163	5006	5163
Saithe 3.a, 4, 6	139 978	118 460	95165	116008
Whiting 6.a	0	0	1723	213
Whiting 6.b	9	11	89	
Megrim 4.a, 6.a	8 250	7 800	2788	*

Colours indicate that the value for the Advice for 2019 is either above (green) or below (red) the Advice for 2018 and above (green shade) or below (red shade) the Catch in 2017

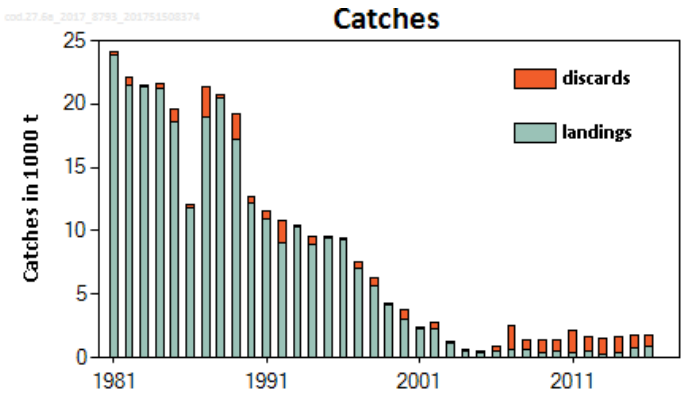
West of Scotland & Rockall (6.a & 6.b)

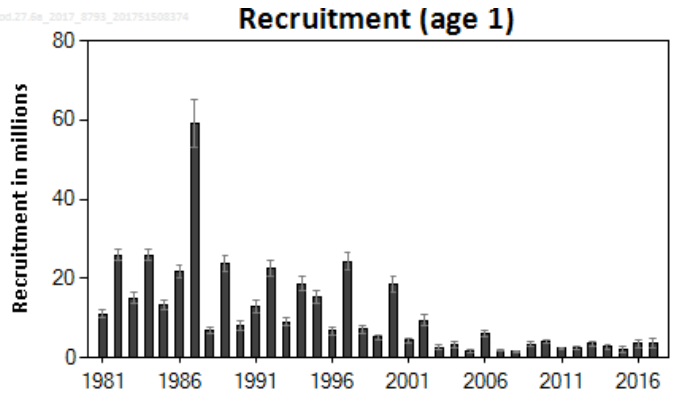
ICES advice provided in 2017

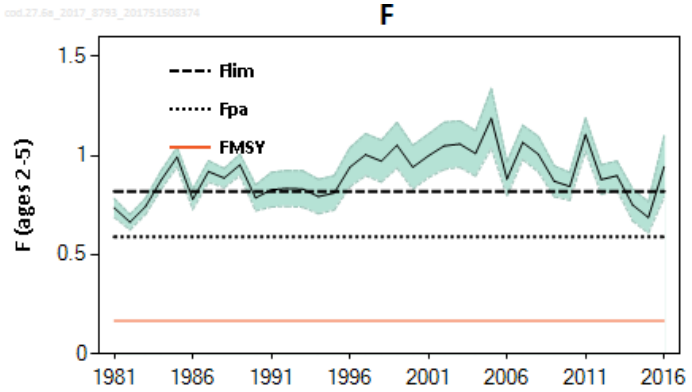
Stock	Advice 2018 (tonnes)	Advice 2019 (tonnes)
Cod in Division 6.a	Catch = 0	Catch = 0
Cod in Division 6.b	Catch ≤ 14	Catch ≤ 14
Ling in the Northeast Atlantic	Catch ≤ 17 695	Catch ≤ 17 695

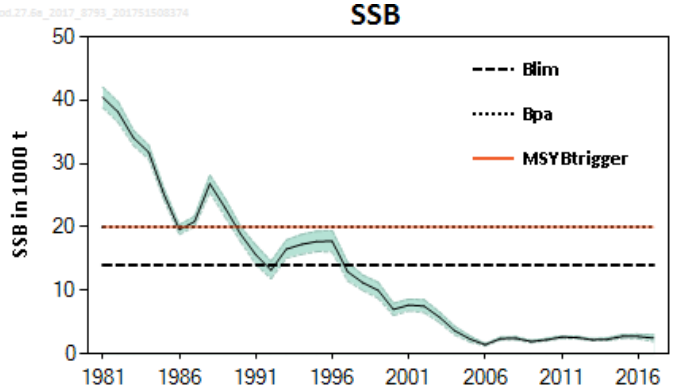
Cod in the West of Scotland (6.a)

Advice for 2018 and 2019, MSY: Catch = 0 t









		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum Sustainable Yield	F_{MSY}	⊗	⊗	⊗	Above	MSY $B_{Trigger}$	⊗	⊗	⊗ Below trigger
Precautionary Approach	F_{pa}, F_{lim}	o	o	⊗	Harvested unsustainably	B_{pa}, B_{lim}	⊗	⊗	⊗ Reduced reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Very high discarding (average 2014-2016 is 60%).
- Fishing mortality above F_{lim}.
- Spawning-stock biomass (SSB) has been below B_{lim} since 1997.
- Recruitment has been low since 2001 and is considered impaired.

Cod in the West of Scotland (6.a)

Catch (2016) : 1745 t (49 % discards)

F(2017) = 0.79 ($F_{Average}$ (2014-2016); SSB(2018) = 2 835 t < B_{Lim} (14 000 t) F_{MSY}= 0.17

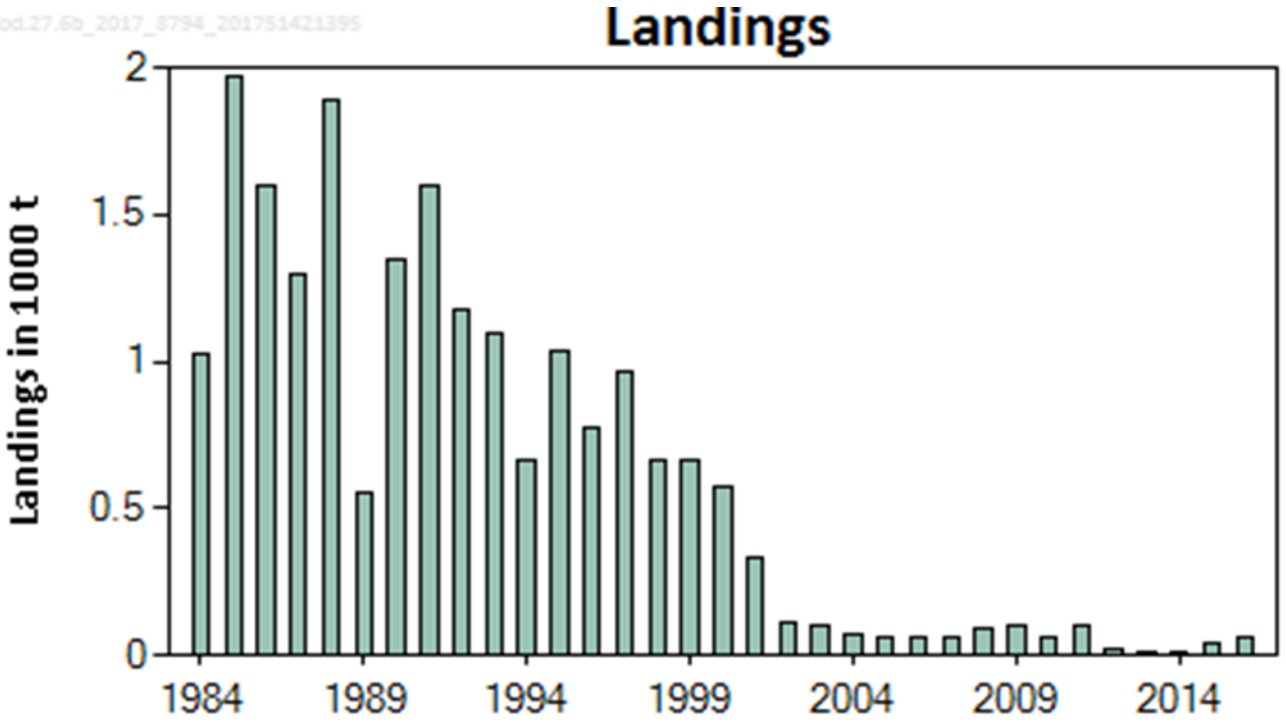
Basis	Total catch (2018)	Landings (2018)	Discards (2018)	F_{total} (2018)	$F_{landings}$ (2018)	$F_{discards}$ (2018)	SSB (2019)	% SSB change *
ICES advice basis								
MSY approach: F=0	0	0	0	0	0	0	5324	88
Other options								
$F = F_{MSY}$	498	166	332	0.17	0.076	0.094	4654	64
F_{pa}	1464	478	986	0.59	0.27	0.32	3365	18.7
F_{lim}	1866	602	1264	0.82	0.37	0.45	2831	-0.151
$F = F_{2017}$	1826	590	1236	0.79	0.36	0.43	2886	1.77
$SSB(2019)=B_{lim}$**								
$SSB(2019)=B_{pa=MSY}$ $B_{trigger}$**								

* SSB 2019 relative to SSB 2018.

** The B_{lim}, B_{pa}, and MSY $B_{trigger}$ options were left blank because B_{lim}, B_{pa}, and MSY $B_{trigger}$ cannot be achieve in 2019, even with zero advice.

Cod at Rockall (6.b)

Advice for 2018, 2019 and 2020: PA: Catch ≤ 14 t



	Fishing pressure					Stock size				
		2014	2015	2016			2015	2016	2017	
Maximum sustainable yield	F_{MSY}	?	?	?	Undefined	MSY $B_{trigger}$	?	?	?	Undefined
Precautionary approach	F_{pa},F_{lim}	?	?	?	Undefined	B_{pa},B_{lim}	?	?	?	Undefined
Management plan	F_{MGT}	–	–	–	Not applicable	SSB_{MGT}	–	–	–	Not applicable
Qualitative evaluation	-	?	?	?	Unknown	-	?	?	?	Unknown

- Catch in 2016 =74 t.
- Limited information available on cod at Rockall.
- Stock identity is unknown.
- Advice based on precautionary reduction of recent advised catch.