ICES advice for North Western Waters stocks for 2018

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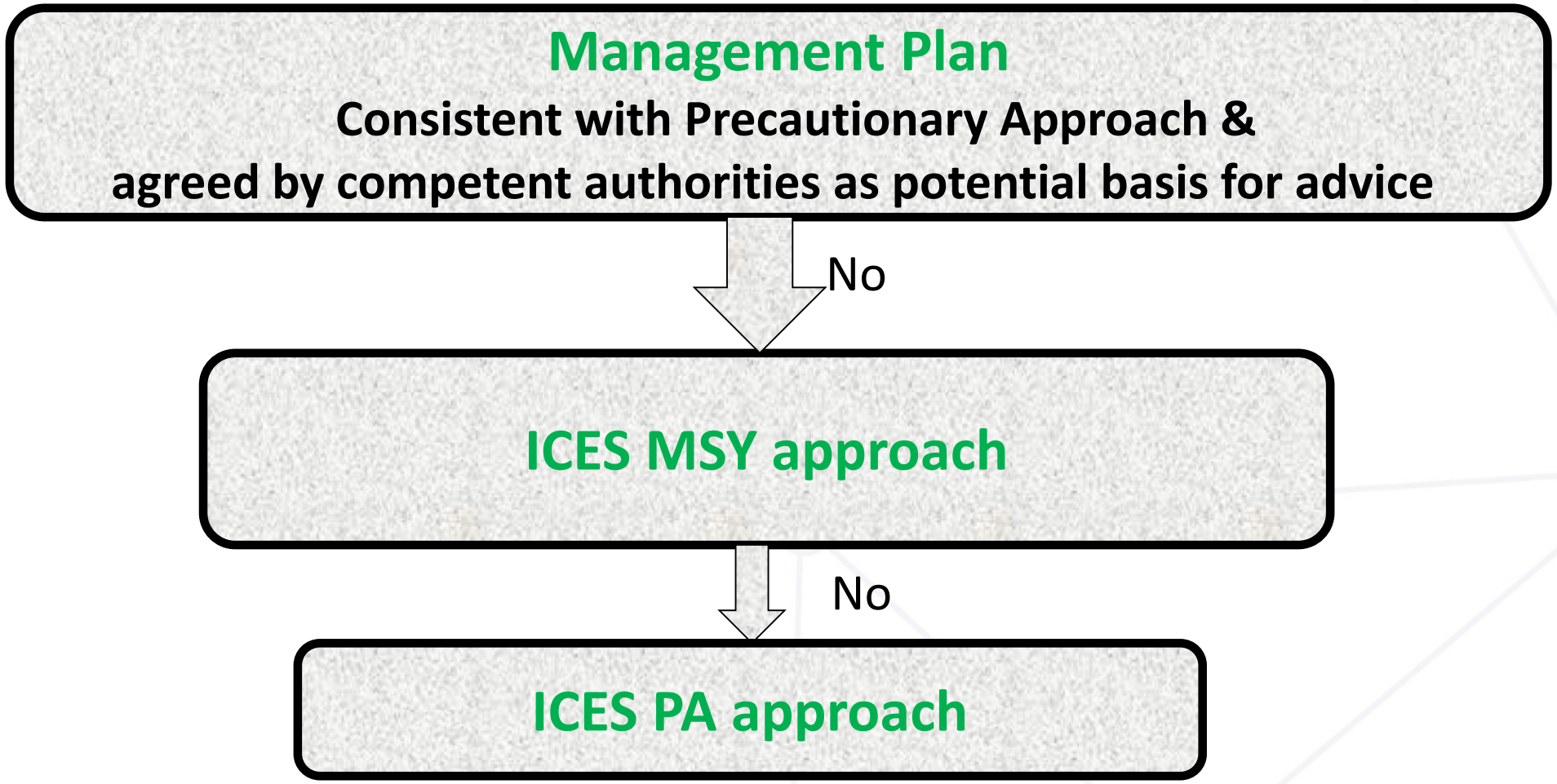
For NWWAC (Edinburgh, July 4, 2017)

ICES
CIEM

Science for sustainable seas

Basis of ICES Advice



All options available in catch advice document

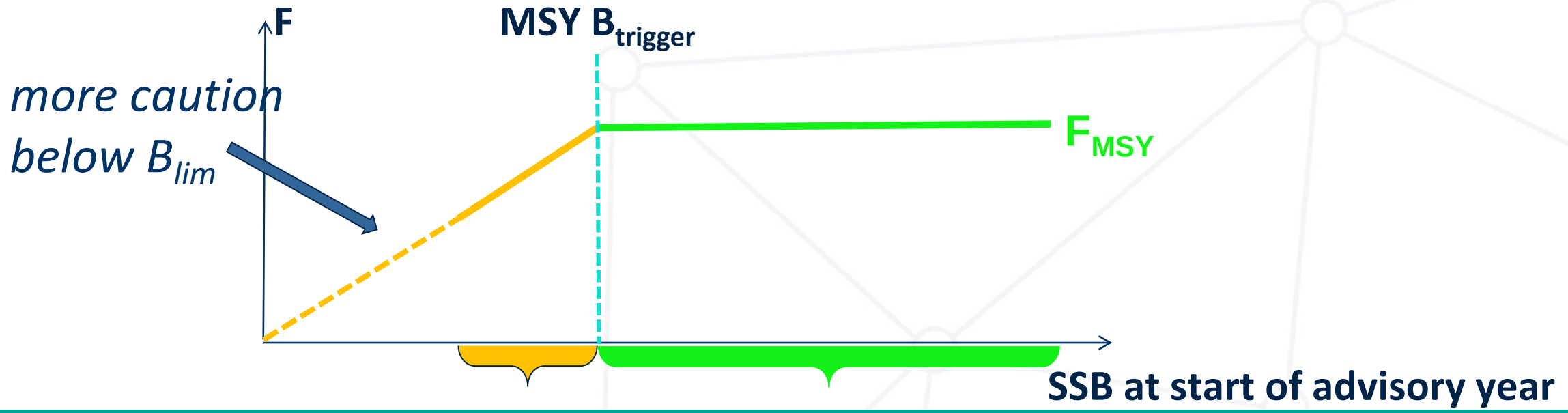
Basis of ICES Advice

Stock categories (based on available knowledge)		Advice basis
1	Stocks with an accepted analytical assessment and forecast	MSY approach
2	Stocks with an analytical assessment and forecast accepted for trends only	MSY approach
3	Stocks with abundance or biomass indices indicative trends	Precautionary approach MSY proxy reference points
4	Stocks with reliable catch and biological data	Precautionary approach MSY proxy reference points
5	Only landings available	Precautionary approach
6	Only landings available and largely discarded	Precautionary approach

ICES MSY approach (Category 1 stocks)

- ✓ **Maximize long term average yield**
- ✓ **Safeguard against low SSB**
- ✓ **Stay within precautionary boundaries (WKMSYREF 2, 3 & 4, 2014-15)**

ICES MSY Advice Rule (AR):



Advice framework for stocks in categories 3-6

- ✓ Implemented since 2012
- ✓ Various approaches depending on available information
- ✓ Advice Rules providing quantitative advice are available for all stock categories
- ✓ Developed MSY proxy reference points for stocks in categories 3 & 4
- ✓ Done for selected stocks in Western Waters (EU special request, 2016)
- ✓ Done for other stocks where data available and methods suitable in 2017
  - ➢ Used to determine stock status - or

Category 3 (stocks with abundance index)

Advice based on previous advice [or recent catch or landings], modified according to index information; typically last 5-year index trend:

$$\textbf{\textit{Advice}} = (\text{previous advice}) \times \frac{\text{average index last 2 years}}{\text{average index 3 previous years}}$$

also incorporating:

1. Uncertainty cap (20% change limit, to dampen noise)
2. Precautionary buffer (20% reduction considered every 3 years if status in relation to reference points unknown --- exceptions if significant increases in stock size or reductions in exploitation)

- Advice often does not change every year

Catch advice

- **ICES advice:**

A. if discards can be quantified

➔ ***catch advice***

B. if discards unknown (possibly qualitative information)

➔ ***catch advice*** if information indicates discard rate < 5% (discards negligible in the context of precision of advice)

➔ ***landings advice*** if information very uncertain or discard rate considered to be > 5%

Terminology: Wanted & Unwanted catch

For stocks under the EU landing obligation:

To provide clear linkage to previous advice on catch and landings the advised catches are split into two components, termed wanted catch and unwanted catch.

- **“Wanted catch”** is used to describe fish that would be landed in the absence of the EU landing obligation.
- **“Unwanted catch”** refers to the component that was previously discarded.

This split, based on the past performance of the fishery, is expected to evolve and the relative magnitude of the components will change.

Developments in 2016-2017

- ✓ *Progress on WKIRISH benchmark*
  - *WKIrish2 (26-29 September 2016, Belfast): Data evaluation workshop*
  - *WKIrish3 (30 January–3 February 2017): Stock assessment benchmark*
    - *Resulted in updated assessments for cod, haddock, plaice, whiting and herring.*
  - *WKIrish4 (tentative for late 2017, Dublin) Stakeholder engagement workshop for input into ecosystem modelling and integrated assessment including the stocks above and sole.*
  - *WKIrish5 (tentative for early 2018) Integrated assessment of the Irish sea*

All advice available online at:

http://www.ices.dk

Click on

Follow Our Advisory process ➔ Latest advice

In addition to advice items, "Introduction to ICES Advice" document describes principles and advice basis

For advice release dates, follow link:

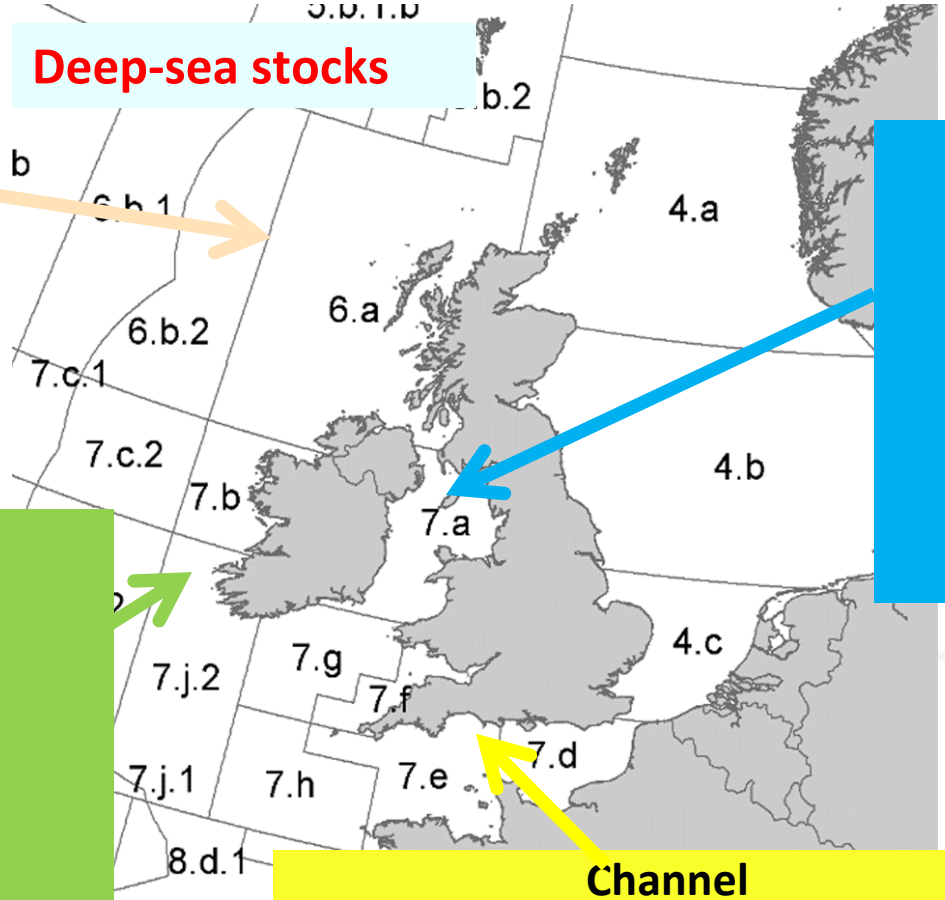
Follow Advisory process ➔ Advice requests and advice release dates

North Western Waters stocks

West of Scotland & Rockall (6.ab)

- Cod (6.a; 6.b)
- Haddock (6.a; 6.b)
- Whiting (6.a; 6.b)
- Anglerfish (3.a,5,6)
- Megrim (4.a-6.a; 6.b)
- Saithe 3.a 4, 6
- *Nephrops* (FUs11-12-13)

Deep-sea stocks



Irish Sea (7.a)

- Cod
- Haddock
- Whiting
- Plaice
- Sole
- *Nephrops* (FUs 14-15-19)

Celtic Sea & West, Southwest Ireland

- Cod (7.e-k)
- Haddock (7.b-k)
- Whiting (7.e-k)
- Plaice (CS; 7.h-k; 7.bc)
- Sole (CS; 7.h-k; 7.bc)
- Northern hake
- Anglerfish (7.b-k, 8.abd)
- Megrim (7.b-k, 8.abd)
- Pollack (6,7)
- Sea bass (6.a, 7.b,7.j; 4bc,7ad–h)
- *Nephrops* (FUs 16-17-20-22)

Channel

- Cod (4, 7.d, Skagerrak)
- Plaice (7.d; 7.e)
- Sole (7.d; 7.e)
- Brill (3.a, 4, 7.de)
- Witch (3.a, 4, 7.d)
- Lemon sole (3.a, 4, 7.d)
- Striped red mullet (3.a, 4, 7.d)

ADVICE IN AUTUMN FOR:
Nephrops, Megrim (6.b),
Anglerfish (3.a,4,6)
Some skates and rays
Striped red mullet (6,8,7.a-c,e-k)
Boarfish (6,8)
Red gurnard (3-8)
Sea bass (4bc,7.ad–h)

North Western Waters
Advice given for multiple years in 2016

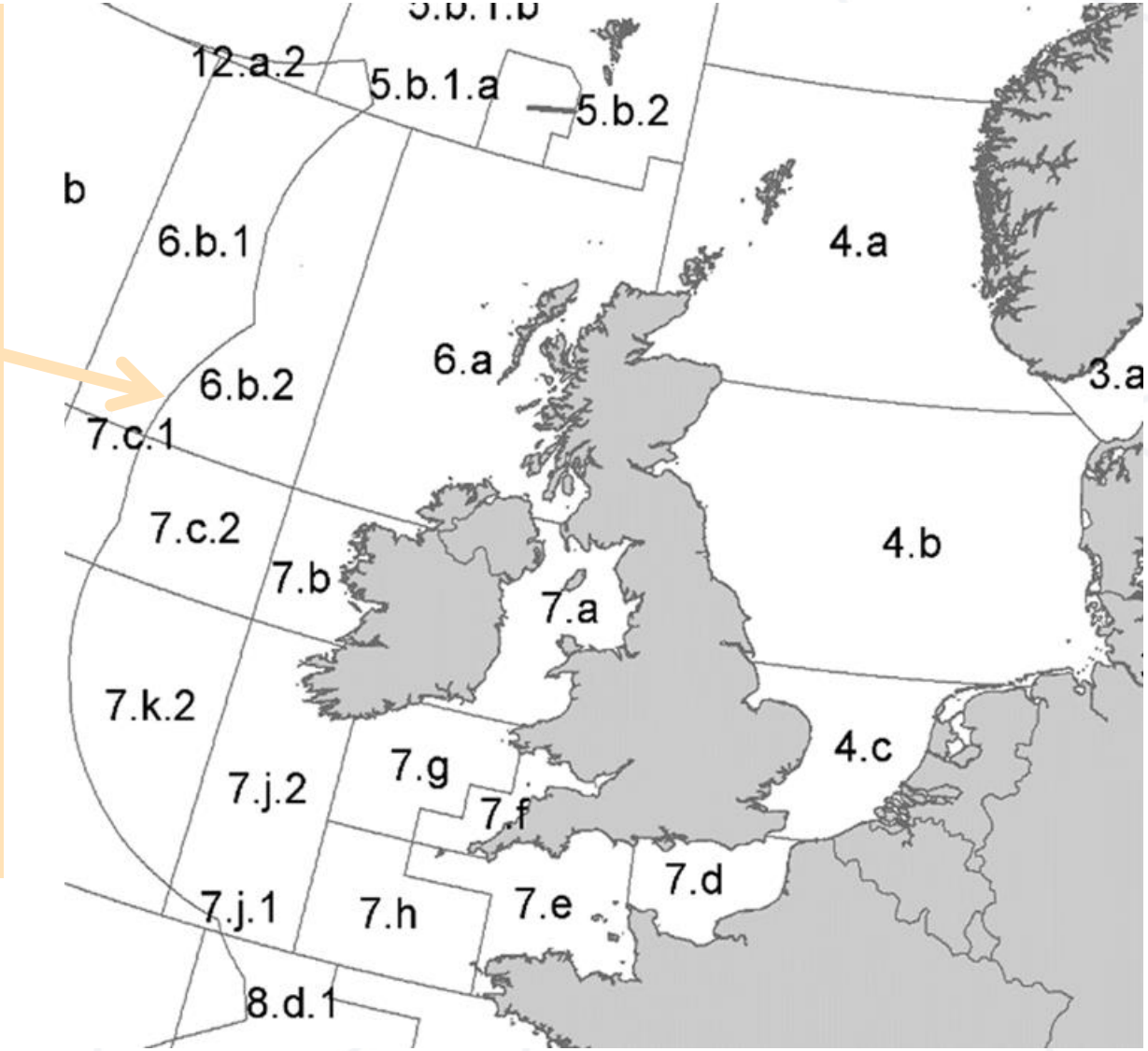
Area	Stock	Advice 2017 (tonnes)	Advice 2018 (tonnes)
West of Scotland	Whiting in Division 6.a	Catch = 0	Catch = 0
	Whiting in Division 6.b	Catch ≤ 11	Catch ≤ 11
Celtic Seas	Anglerfish (*L. piscatorius*) in Divisions 7.b–k and 8.abd	Landings ≤ 26 691	Landings ≤ 26 691
	Anglerfish (*L. budegassa*) in Divisions 7.b–k and 8.abd	Landings ≤ 10 757	Landings ≤ 10 757
Irish Seas	Sole in the Irish Sea (7.a)	Catch = 0	Catch = 0
Deep stocks	Blue ling in subareas 6 and 7 and Division 5.b	Catch ≤ 11 314	Catch ≤ 10 763
	Black scabbardfish in the Northeast Atlantic	Catch ≤ 5 894	Catch ≤ 5 894
	Alfonsinos in the Northeast Atlantic	Landings ≤ 280	Landings ≤ 280
	Greater forkbeard in the Northeast Atlantic	Landings ≤ 1 682	Landings ≤ 1 682
	Orange roughy in the Northeast Atlantic	Catch = 0	Catch = 0
	Roundnose grenadier in Subareas 6 and 7, and Div 5.b and 12.b	Catch ≤ 3 325 + 572 (12.b)	Catch ≤ 3 399 + 572 (12.b)
	Tusk in Rockall (6.b)	Catch ≤ 350	Catch ≤ 350

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

- Cod (6.a; 6.b)
- Haddock (4, 6.a and Sub. 20; 6.b)
- Megrim (4.a,6.a)
- Saithe (3.a 4, 6)

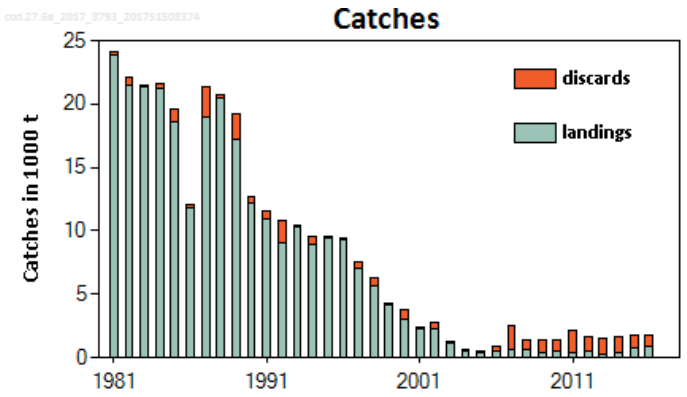
IN AUTUMN:

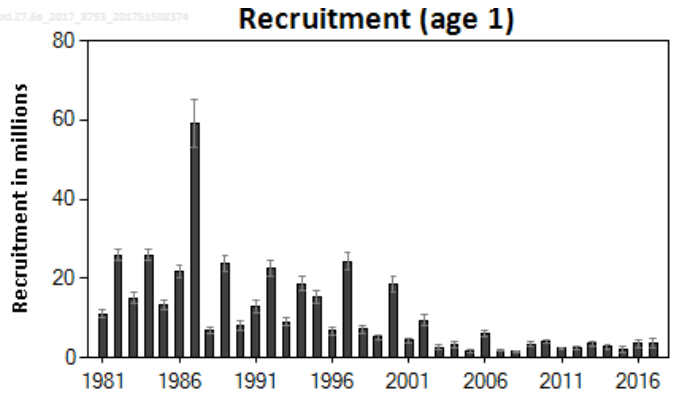
- **Anglerfish (3.a,4,6)**
- **Megrim (6.b)**
- ***Nephrops* (FUs11-12-13)**

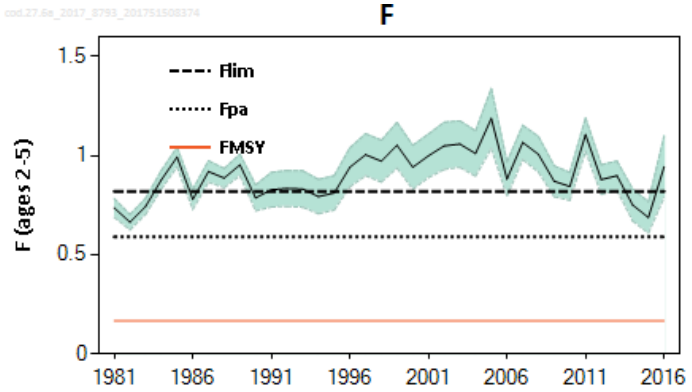


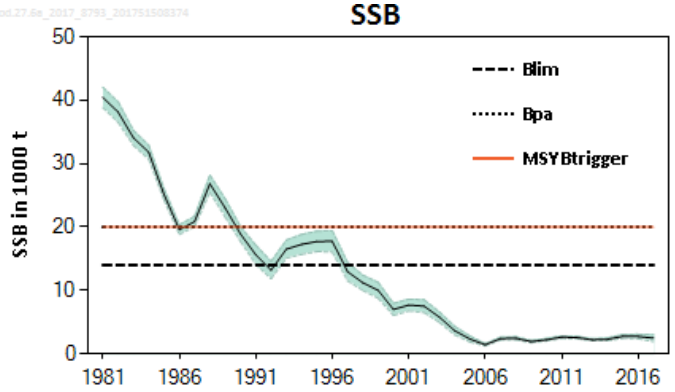
Cod in the West of Scotland (6.a)

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

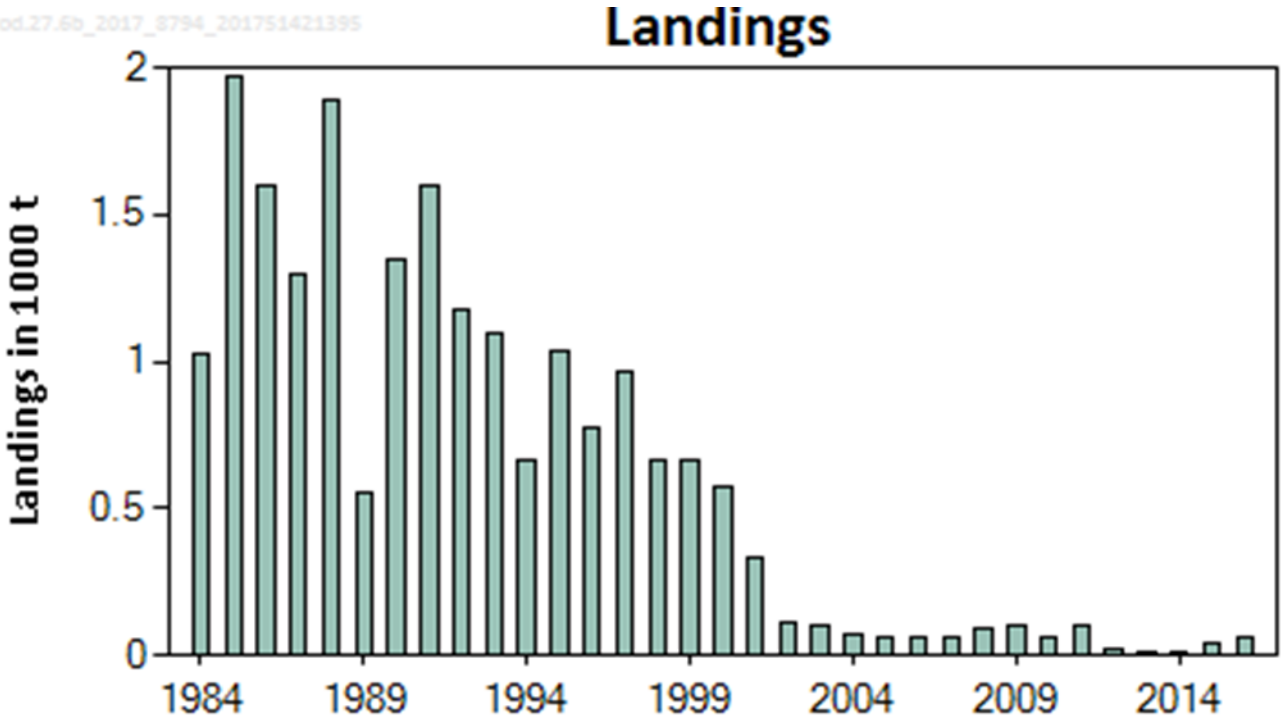
Basis	Total catch (2018)	Landings (2018)	Discards (2018)	F_{total} (2018)	$F_{landings}$ (2018)	$F_{discards}$ (2018)	SSB (2019)	% SSB change *
ICES advice basis								
MSY approach: F=0	0	0	0	0	0	0	5324	88
Other options								
$F = F_{MSY}$	498	166	332	0.17	0.076	0.094	4654	64
F_{pa}	1464	478	986	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

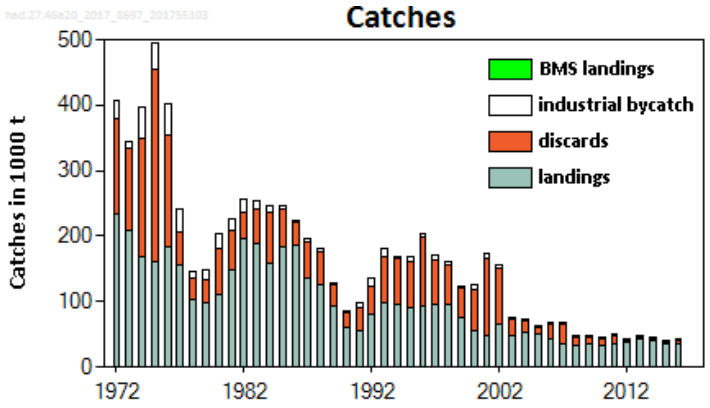


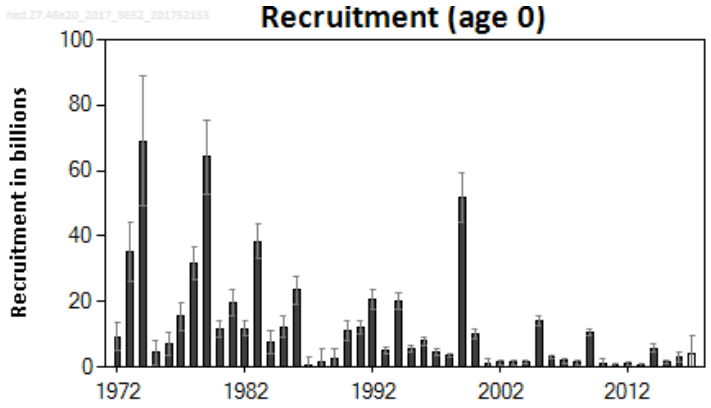
	Fishing pressure					Stock size				
		2014	2015	2016			2015	2016	2017	
Maximum sustainable yield	F_{MSY}	?	?	?	Undefined	MSY $B_{trigger}$	?	?	?	Undefined
Precautionary approach	F_{pa},F_{lim}	?	?	?	Undefined	B_{pa},B_{lim}	?	?	?	Undefined
Management plan	F_{MGT}	–	–	–	Not applicable	SSB_{MGT}	–	–	–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

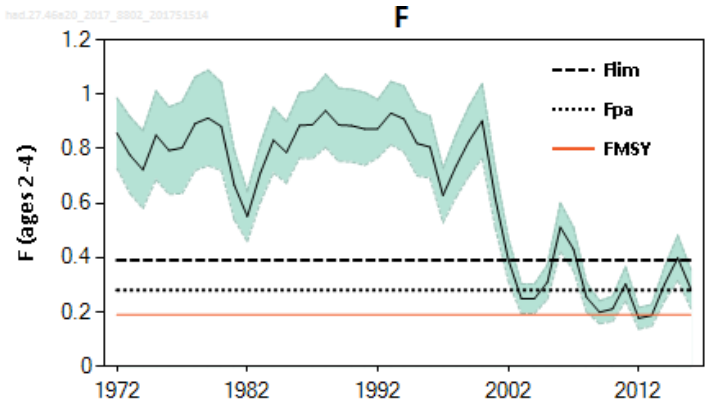
- Catch in 2016 =74 t.
- Limited information available on cod at Rockall.
- Stock identity is unknown.
- Advice based on precautionary reduction of recent advised catch.

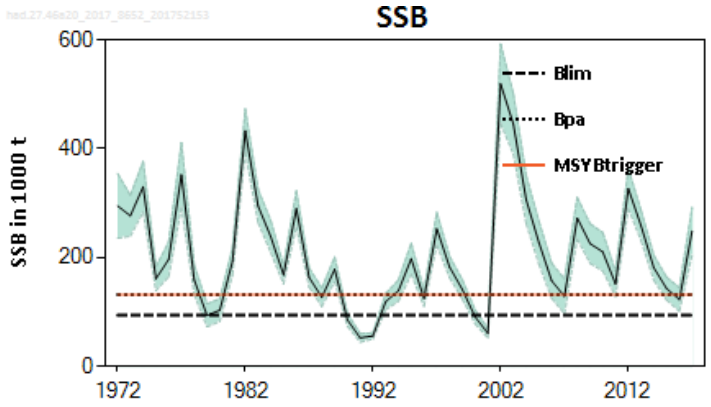
Haddock in the North Sea, West of Scotland, Skagerrak (4, 6.a and Subdiv. 20)

Advice for 2018: MSY: Catch ≤ 51 037 t









		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	F_{MSY}	✗	✗	✗	Above	MSY $B_{trigger}$	✓	✗	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	o	✗	o	Increased risk	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 2016.
- Recruitment in recent years slightly higher but below the long-term average.

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

Catch (2016) : 42 745 t (17 % discards)

F(2017) = 0.183 (TAC constraint (wanted catch); F for entire catch)

SSB(2018) = 229 910t > $MSY_{Btrigger}$ (132 000t) F_{MSY}= 0.194

Basis	Total catch (2018)	Wanted catch (2018)	Unwanted catch (2018)	IBC** (2018)	F_{total} (2018)	F_{wanted} (2018)	$F_{unwanted}$ (2018)	F_{IBC} (2018)	SSB (2019)	% SSB change ***	% TAC change ^
ICES advice basis											
MSY approach: F_{MSY}	51037	43555	7482	0	0.194	0.163	0.028	0	266941	16%	11%
Other options											
F = 0	0	0	0	0	0	0	0	0	315692	37%	−100%
F_{pa}	70025	59630	10395	0	0.27	0.24	0.039	0	249102	8%	51%
F_{lim}	94171	79935	14236	0	0.38	0.33	0.054	0	226609	−1%	103%
SSB (2019) = B_{lim}	205519	167418	38101	0	1.26	1.08	0.179	0	94000	−43%	325%
SSB (2019) = B_{pa}	184980	153374	31606	0	0.98	0.84	0.138	0	132000	−36%	289%
SSB (2019) = MSY $B_{trigger}$	184980	153374	31606	0	0.98	0.84	0.138	0	132000	−36%	289%
F = F_{2017}	48332	41259	7074	0	0.183	0.16	0.026	0	269491	17%	4.70%

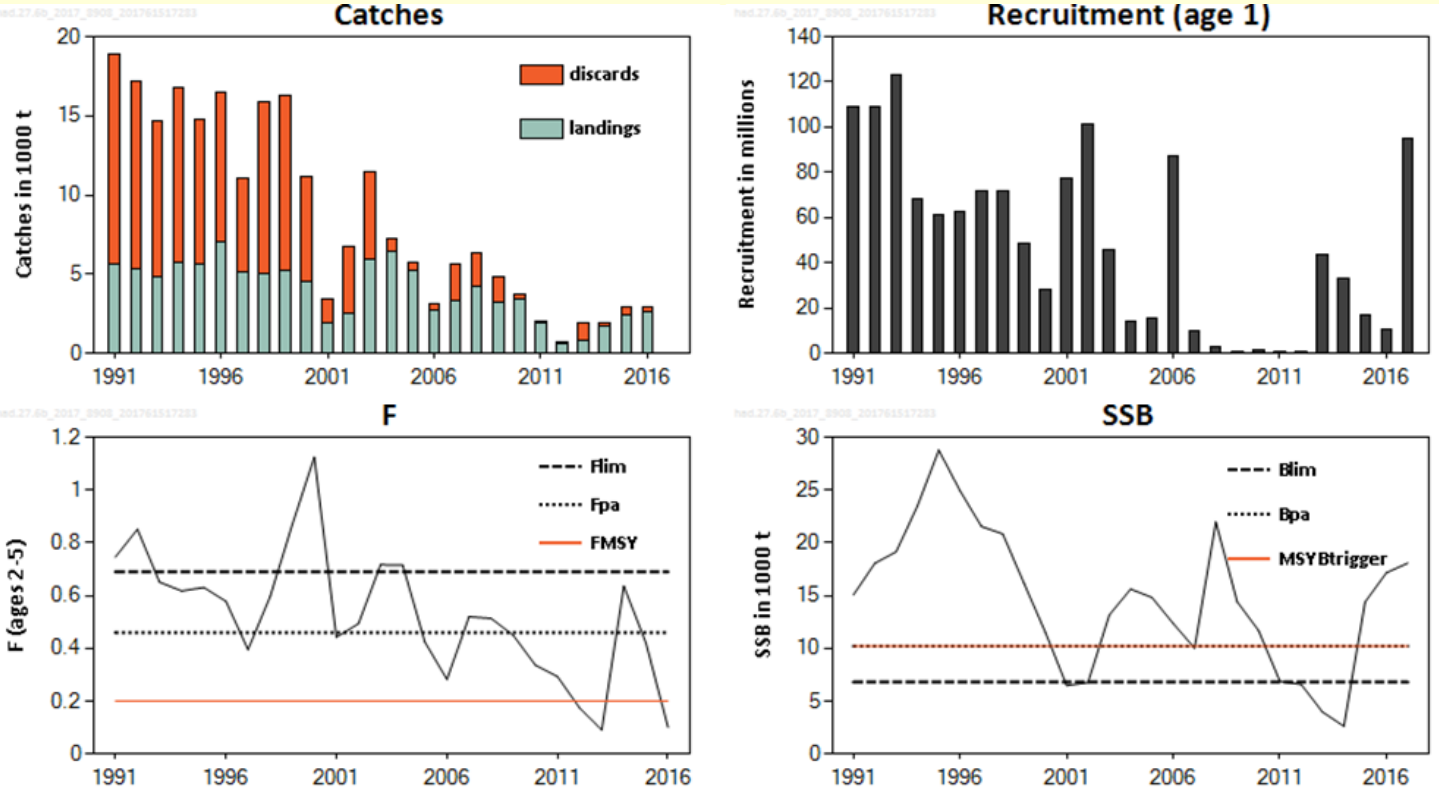
** Industrial bycatch (IBC) is based on the average proportion of the total catch for 2014–2016. Values are small, but not zero.

*** SSB 2019 relative to SSB 2018.

^ Wanted catch in 2018 relative to TAC in 2017: Subdivision 20 (2069 t) + Subarea 4 (33 643 t) + Division 6.a (3697 t) = 39 409 t.

Haddock at Rockall (6.b)

Advice for 2018: MSY: Catch ≤ 5 163 t



		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
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

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

Haddock at Rockall (6.b)

Catch (2016) : 2886 t (10 % discards)

F(2017) = 0.31 (EU TAC + estimated 2000 t from Russia= 6690 t);

SSB (2018)= 18 066 t > $MSY_{Btrigger}$ (10 200 t) F_{MSY}= 0.20

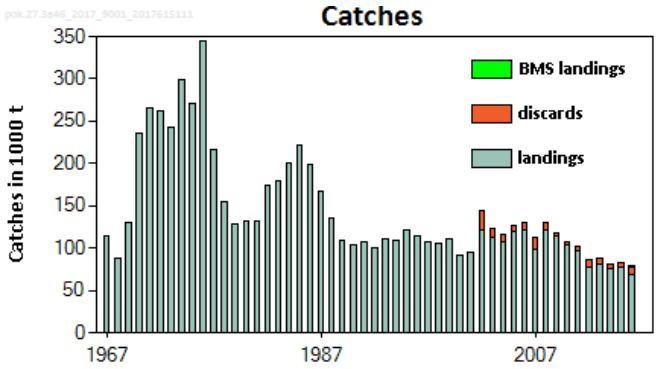
Basis	Total catch (2018)*	Wanted catch (2018)	Unwanted catch (2018)	F_{total} (2018)	F_{wanted} (2018)	$F_{unwanted}$ (2018)	SSB (2019)	% SSB change ***	% TAC change ^
ICES advice basis									
MSY approach: F_{MSY}	5163	4202	961	0.2	0.158	0.043	40244	123	-10
Other options									
Proposed management strategy^^	5068	4127	941	0.197	0.155	0.042	40341	123	8.1
F = 0	0	0	0	0	0	0	45580	152	-100
F_{pa}	10577	8509	2069	0.46	0.36	0.097	34729	92	126
F_{lim}	14463	11517	2946	0.69	0.54	0.146	30826	70	208
SSB (2019) = B_{lim}	39296	27515	11781	5.31	4.17	1.12	6800	-62	738
SSB (2019) = B_{pa}=MSY $B_{trigger}$	35707	25666	10041	3.83	3.03	0.81	10200	-43	661
F = F_{2017}	7600	6155	1445	0.31	0.25	0.065	37750	109	62

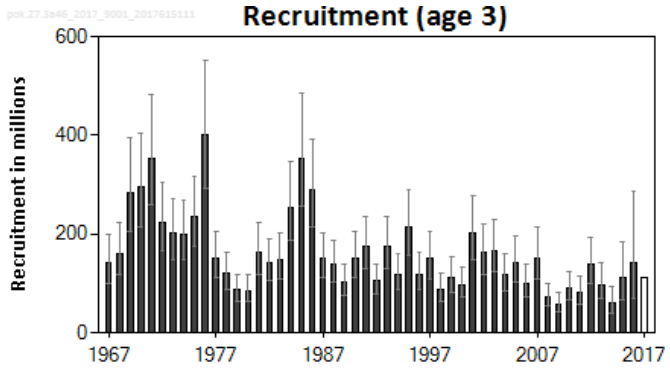
* Total catch include EU, non EU (Russian, Norway etc.) “wanted catch” (landings) and discards

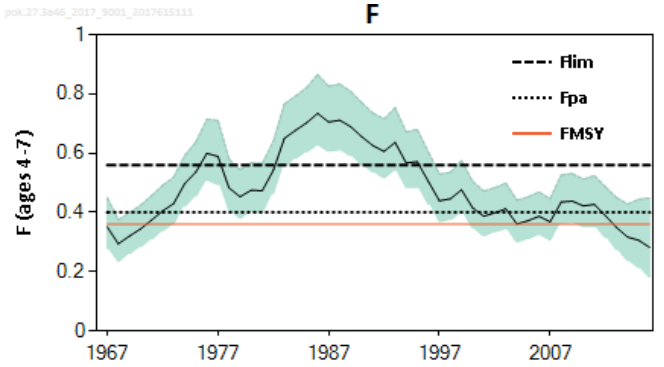
*** SSB 2019 relative to SSB 2018.

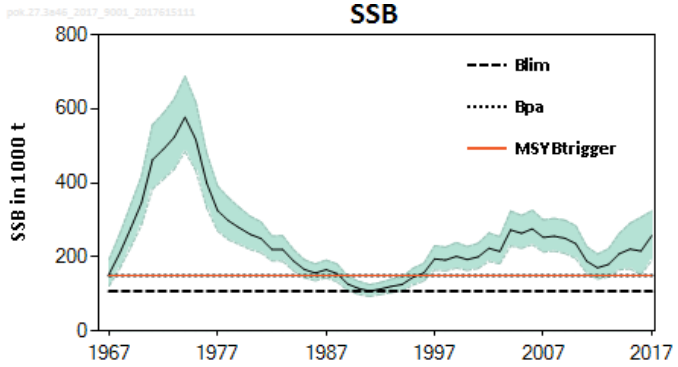
Saithe in the North Sea, Rockall and West of Scotland, Skagerrak and Kattegat (4,6,3.a)

Advice for 2018: MSY: Catch ≤ 118 460 t









	Fishing pressure				Stock size			
		2013	2014	2015		2015	2016	2017
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 (2016) : 78 715 t (13% discards);7 458 t (L) in Rockall/West of Scotland

F(2017) = 0.381 (TAC constraint for wanted catch; F for total catch);

SSB (2018)= 272 061t > $MSY_{Btrigger}$ (150 000 t) F_{MSY}= 0.36

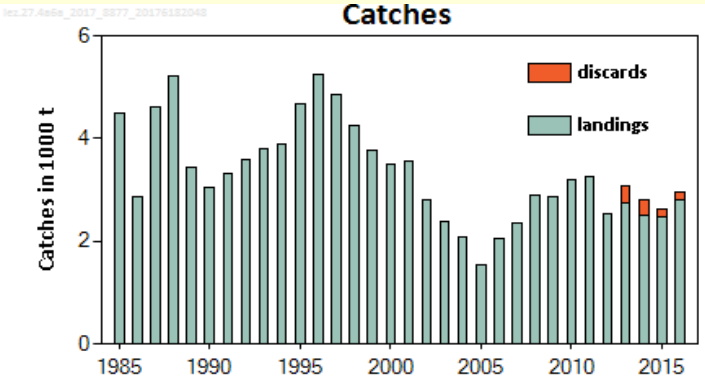
Basis	Total catch (2018)	Wanted catch (2018)	Unwanted catch (2018)	Wanted catch 3a4	Wanted catch 6	F_{total} (2018)	F_{wanted} (2018)	$F_{unwanted}$ (2018)	SSB (2019)	% SSB change **	% TAC change ***
ICES advice basis											
MSY approach: F_{MSY}	118460	103731	14729	93980	9751	0.36	0.32	0.04	279689	2.8	−2.4
Other options											
F = 0	0	0	0	0	0	0	0	0	394153	45	−100
F_{pa}	130786	114463	16323	103704	10759	0.4	0.36	0.045	267945	−1.5	7.6
F_{lim}	171024	149404	21620	135360	14044	0.56	0.5	0.063	229853	−15.5	41
SSB (2019) = B_{lim}	310073	267552	42521	242402	25150	1.4	1.25	0.157	107000	−61	152
SSB (2019) = B_{pa}	259758	225247	34511	204073	21174	1.03	0.91	0.115	150000	−45	112
SSB (2019) = MSY $B_{trigger}$	259758	225247	34511	204073	21174	1.03	0.91	0.115	150000	−45	112
F = F_{2017}	124816	109286	15530	99013	10273	0.38	0.34	0.043	273559	0.55	2.8
TAC_{2017}	121516	106331	15185	96336	9995	0.37	0.33	0.041	276208	1.52	0
F = $F_{MSY\ lower}$	75093	65865	9228	59673	6192	0.21	0.189	0.024	321353	18.1	−38
F = $F_{MSY\ upper}$ with AR	153765	134418	19347	121783	12635	0.49	0.44	0.055	246136	−9.5	26

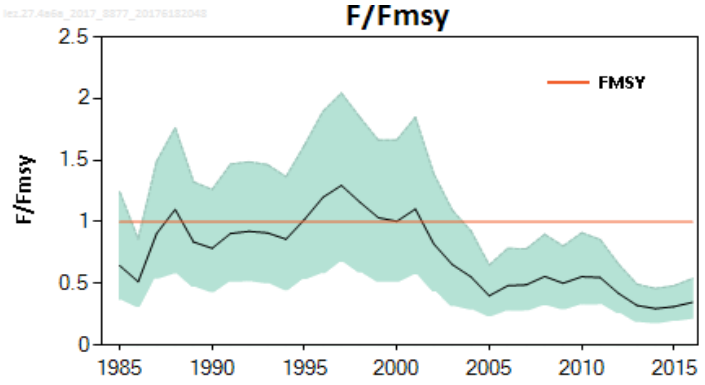
** SSB 2019 relative to SSB 2018.

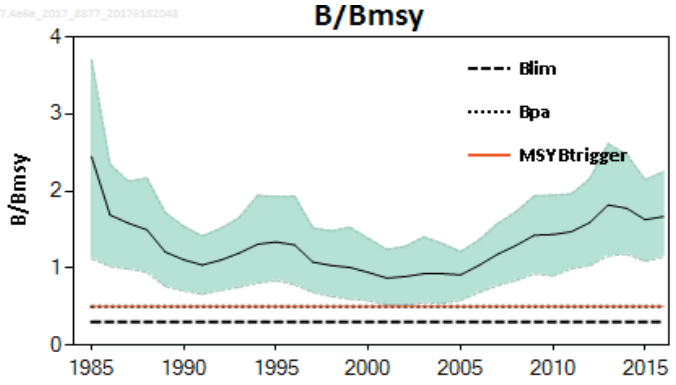
*** Wanted catch in 2018 relative to TAC, minus top-up for fleets under landing obligation in 2017 (106 331 t).

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

Advice for 2018: MSY: Catch ≤ 7 800 t







		Fishing pressure				Stock size				
		2014	2015	2016			2014	2015	2016	
Maximum Sustainable Yield	F_{MSY}	✓	✓	✓	Below	MSY $B_{trigger}$	✓	✓	✓	Above trigger
Precautionary approach	F_{pa}, F_{lim}	✓	✓	✓	Below possible reference points	B_{pa}, B_{lim}	✓	✓	✓	Full reproductive capacity
Management plan	F_{MGT}	-	-	-	Not applicable	SSB_{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.

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

Catch (2016) : 2959 t (6 % discards)

F(2017) = 0.33 (Recent average fishing pressure (2014-2016); 2772 t.)

SSB (2018) > $MSY_{Btrigger}$

Basis	Total catch (2018)	Wanted catch* (2018)	Unwanted catch* (2018)	Fishing mortality F_{2018}/F_{MSY}	Stock size B_{2019}/B_{MSY}	Probability** of $Biomass_{2019}$ falling below MSY $B_{trigger}$	Probability** of $Biomass_{2019}$ falling below B_{lim}	% SSB change **	% TAC change ***
ICES advice basis									
MSY approach: F_{MSY}	7800	7217	583	1	1.4	0.067	0	-16	-6.3
Other options									
F = 0	0	0	0	0	0.0173	0	1.79	108	0
SSB (2019) = B_{lim}	30000	27756	2244	3.8	0.3	0.98	0.53	-82	260
SSB (2019) = B_{pa}	25450	23546	1904	3.3	0.5	0.94	0.28	-70	206
SSB (2019) = MSY $B_{trigger}$	15350	14202	1148	1.96	1	0.51	0.0053	-40	84
F = F_{2017}	2772	2565	207	0.33	1.66	0	0	0	-67

** SSB 2019 relative to SSB 2018.

*** Wanted catch in 2018 relative to TAC in 2017 (8321 t).

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

^ Maximum level of permissible bycatches when the advice is "no targeted fisheries and bycatches should be minimized".

^^ The value used as TAC was 8321 tonnes, which corresponds to the 2017 TAC for Subareas 4and 6.

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

SUMMARY

Area	Stock	Advice 2018	Advice 2017	Catch 2016
West of Scotland - Rockall	Cod 6.a	0	0	1745
	Cod 6.b	14	17	74
	Haddock 4, 6.a, sub. 20	51 037	39461	42745
	Haddock 6.b	5 163	4690	2 886
	Saithe 3.a, 4, 6	118 460	140653	78 715
	Megrim 4.a, 6.a	7 800	8567	2 959

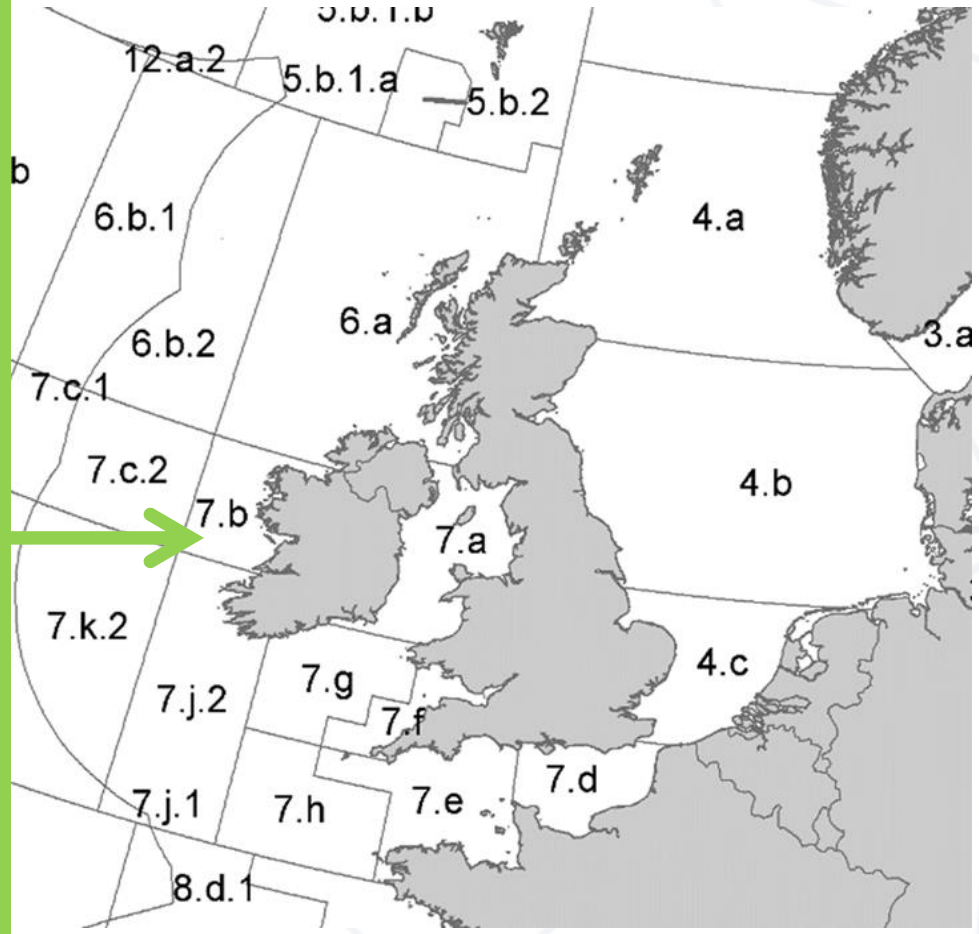
Colours indicate that the value for the Advice for 2018 is either above (green) or below (red) the Advice for 2017 or the Catch in 2016

Celtic Sea & West, Southwest Ireland

- Cod (7.e-k)
- Haddock (7.b-k)
- Whiting (7.bc,e-k)
- Sole (7.bc; 7.fg; 7.h-k;)
- Plaice (7.bc, 7.fg; 7.h-k;)
- Pollack (6,7)
- Northern hake
- Sea bass (6.a, 7.b, 7.j)
- Megrim (7.b-k, 8.abd)

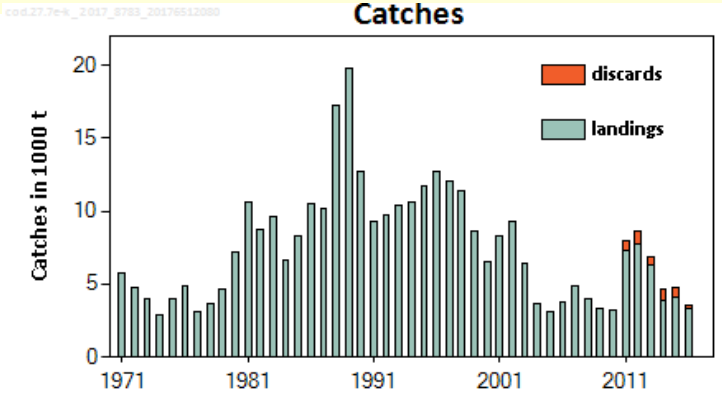
IN AUTUMN:

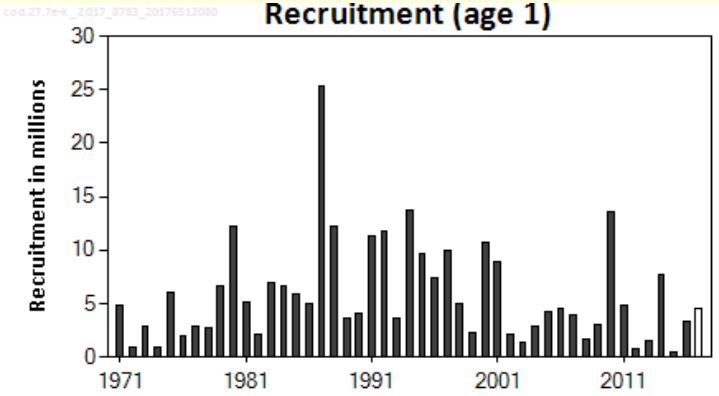
- ***Nephrops* (FUs 16-17-20-22)**
- **Sea bass (4.bc, 7.a, 7.d-h)**
- **Striped red mullet (6,8,7.a-c,e-k)**
- **Boarfish (6,8)**
- **Red gurnard (3-8)**

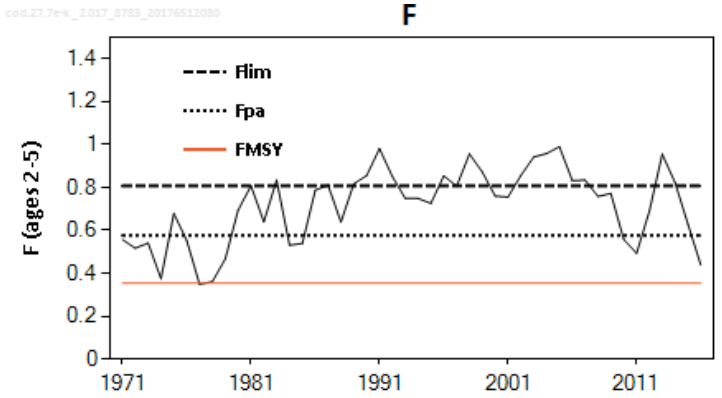


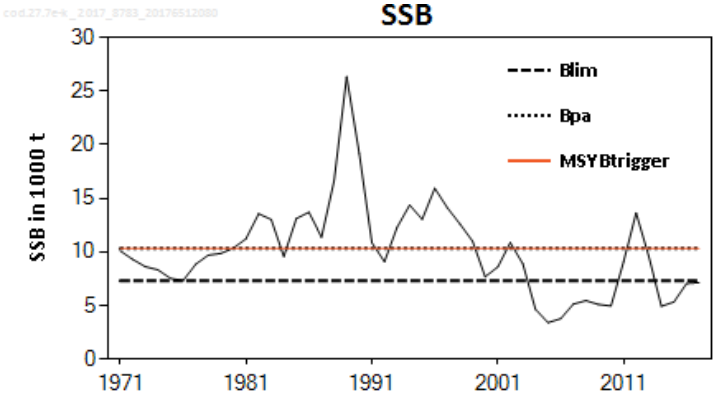
Cod in the western English Channel and southern Celtic Seas(7.e–k)

Advice for 2018: MSY: Catch ≤ 3 428 t (Landings ≤ 3 076 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}	✗	○	✓	Harvested sustainably	B_{pa},B_{lim}	✗	✗	✗ Reduced reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Spawning stock below B_{lim} in 2017 but expected to be above B_{lim} in 2018.
- Fishing pressure reduced but above F_{MSY} in 2016.
- Recruitment variable, weak recently.
- Caught in mixed fisheries with haddock and whiting.

Assessment includes French trawler commercial index.

Cod in the western English Channel and southern Celtic Seas(7.e–k)

Catch (2016) : 3519 t (6 % discards)

F(2017) = 0.44 (Recent average fishing pressure (2014-2016, scaled to 2016);

SSB (2018)= 8 755 t < $MSY_{Btrigger}$ (10 300 t) F_{MSY}= 0.35

Basis	Total catch (2018)^	Landings (2018)	Discards (2018)	$F_{landings}$ (2018)	SSB (2019)	% SSB change *	% TAC change **
ICES advice basis							
MSY approach : FMSY × SSB2018/MSY Btrigger	3428	3076	352	0.3	12009	37	8.7
Other options							
F = 0	0	0	0	0	15663	79	-100
F_{pa}	5938	5328	610	0.58	9395	7.3	88
F_{lim}	7506	6734	772	0.8	7800	-10.9	138
SSB (2019) = B_{lim}	8004	7181	823	0.88	7300	-16.6	154
SSB (2019) = $B_{pa=}$ MSY $B_{trigger}$	5062	4542	520	0.47	10300	17.6	61
F = F_{2017}	4760	4271	489	0.44	10615	21	51
F = F_{MSY}	3944	3539	405	0.35	11468	31	25

*SSB 2019 relative to SSB 2018.

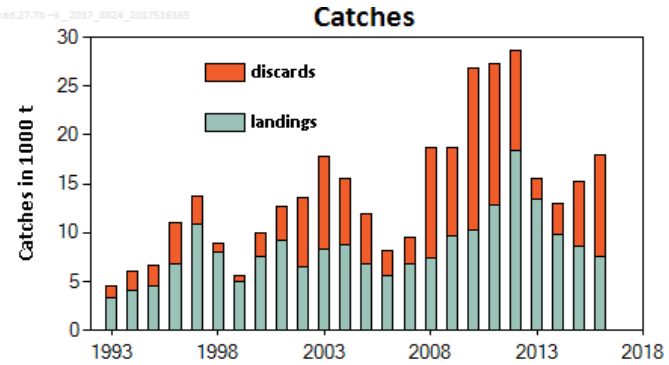
** Landings in 2018 relative to TAC in 2017 (2 830t).

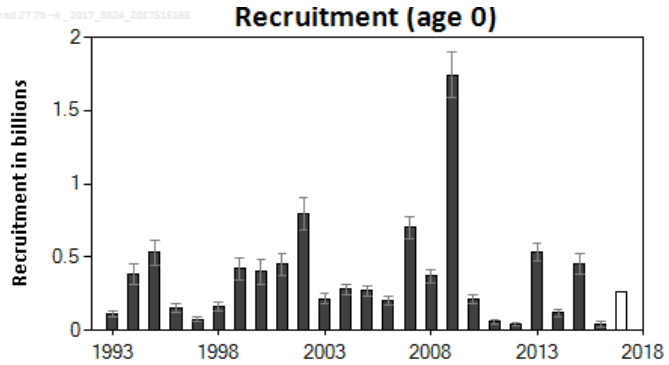
^ Total catch derived from the landings and discards catches ratio.

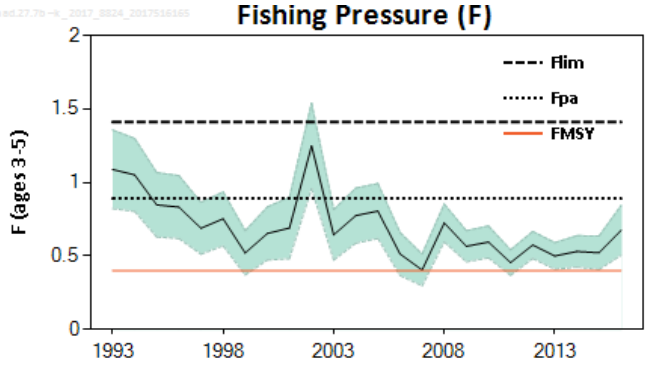
- Advice provided on catch for 2018 (previously for wanted catch)
- Forecast sensitive to incoming recruitment
- Stock includes the south of Division 7.a (rectangles 33E2-3)

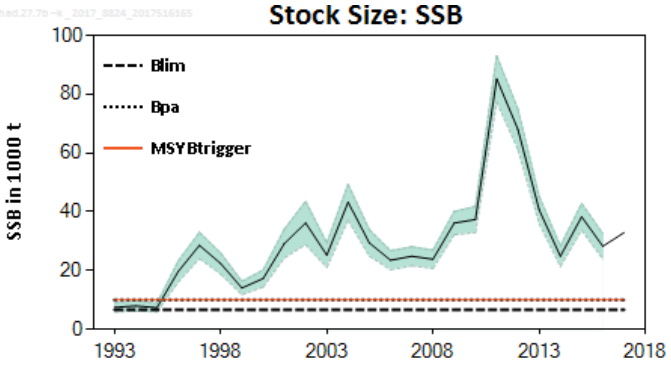
Haddock in the southern Celtic Seas and English Channel (7.b–k)

Advice for 2018: MSY: Catch ≤ 8 358 t (Landings = 5 911 t)









		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum Sustainable Yield	F_{MSY}	✗	✗	✗	Above	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 peaked in 2011, remains well above MSY $B_{trigger}$.
- 2009 year-class very strong, 2016 recruitment below average.
- Fishing pressure above F_{MSY}.
- Increased discarding in recent years (discards now larger than catch).

Assessment includes commercial index from the Irish fleet.

Haddock in the southern Celtic Seas and English Channel (7.b–k)

Catch (2016) : 17 931 t (58 % discards)

F(2017) = 0.58 (Recent average fishing pressure (2014-2016);

SSB (2018)= 20 257 t > $MSY_{Btrigger}$ (10 000 t) F_{MSY}= 0.40

Basis	Total catch (2018)	Landings (2018)	Discards (2018)	F_{total} (2018)	$F_{Landings}$ (2018)	$F_{Discards}$ (2018)	SSB (2019)	% SSB change *	% TAC change **
ICES advice basis									
MSY approach:	8358	5911	2446	0.4	0.36	0.044	24953	23	-24
Other options									
F = 0	0	0	0	0	0	0	32908	62	-100
F_{pa}	15622	10817	4805	0.89	0.79	0.1	18170	-10.3	40
F_{lim}	20959	14206	6753	1.41	1.25	0.16	13311	-34	83
SSB (2019) = B_{lim}	28588	18494	10094	2.7	2.4	0.31	6700	-67	139
SSB (2019) = B_{pa}= MSY $B_{trigger}$	24702	16415	8287	1.93	1.71	0.22	10000	-51	112
F = F_{2017}	11267	7908	3359	0.58	0.51	0.06	22218	9.7	2

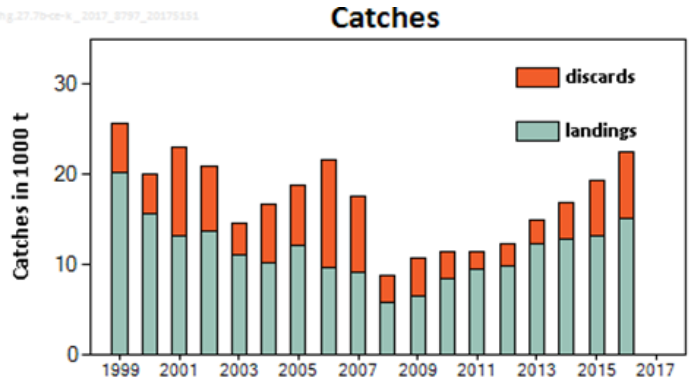
* SSB 2019 relative to SSB 2018.

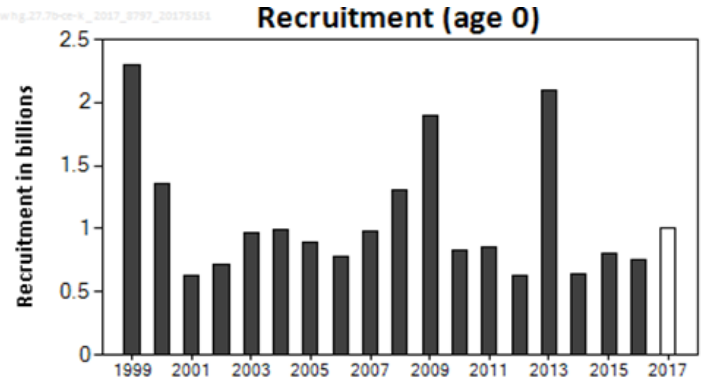
** Landings in 2018 relative to TAC in 2017 (7 751 t).

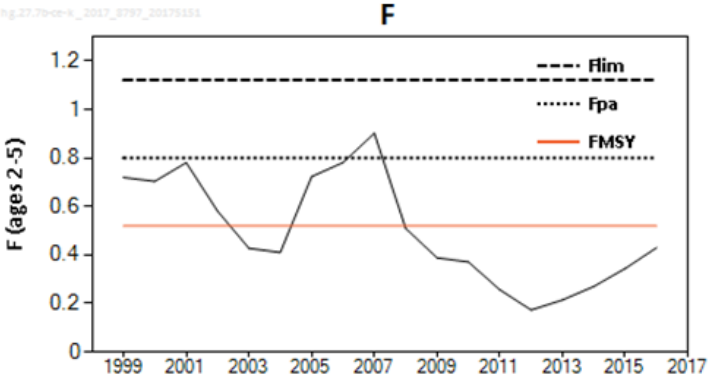
- **No evidence of improved selectivity of young fish due to the introduction of square-mesh panels in 2012.**
- **Stock includes the south of Division 7.a (rectangles 33E2-3)**

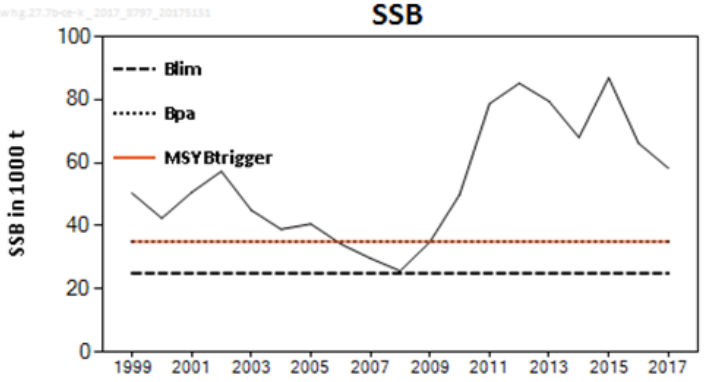
Whiting in the southern Celtic Seas and western English Channel (7.b–c and 7.e–k)

Advice for 2018: MSY: Catch ≤ 19 429 t









		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
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 above MSY $B_{trigger}$ since 2009.
- F below F_{MSY} since 2008 but increasing.
- Recruitment below average since 2010 except for 2013.
- Caught in mixed fisheries with cod and haddock.

Whiting in the southern Celtic Seas and western English Channel (7.b–c and 7.e–k)

Catch (2016) : 22 457 t (32 % discards)

F(2017) = 0.43 (Recent average fishing pressure (2014-2016), scaled to 2016);

SSB (2018)= 48 763 t > $MSY_{Btrigger}$ (35 000 t) F_{MSY}= 0.40

Basis	Total catch (2018)	Wanted catch (2018)	Unwanted catch (2018)	F_{total} (2018)	F_{wanted} (2018)	$F_{unwanted}$ (2018)	SSB (2019)	% SSB change **
ICES Advice basis								
MSY approach: F_{MSY}	19429	13759	5670	0.52	0.36	0.162	46685	-4.3
Other options								
F = 0	0	0	0	0	0	0	63499	30
F_{pa}	26923	18784	8139	0.8	0.55	0.25	40416	-17
F_{lim}	33753	23165	10589	1.12	0.77	0.35	34852	-28
SSB (2019) = B_{lim}	46510	30624	15886	2	1.38	0.625	25000	-49
SSB (2019) = B_{pa}	33569	23050	10520	1.11	0.77	0.35	35000	-28
SSB (2019) = MSY $B_{trigger}$	33569	23050	10520	1.11	0.77	0.35	35000	-28
F = F_{2017}	16640	11842	4798	0.43	0.3	0.134	49055	0.6

** SSB 2019 relative to SSB 2018.

- No evidence of improved selectivity of young fish due to the introduction of square-mesh panels in 2012.
- Stock includes south of Division 7.a (33E2-3)
- Mismatch between the assessment area and TAC area – (7.d not part of stock)

Celtic Sea & West, Southwest Ireland

Mixed fisheries – Celtic Sea gadoids (cod, haddock, whiting)

Analysis assumes:

- “fleets’ stocks shares” in line with single-species advice for 2018 and historical proportion of stock landings taken by each fleet
- same fleet behaviour (fishing pattern, species catchability) in 2017 as in 2016
- fishing opportunities calculated for catches and all fish caught count against TAC

Mixed fisheries scenarios examined:

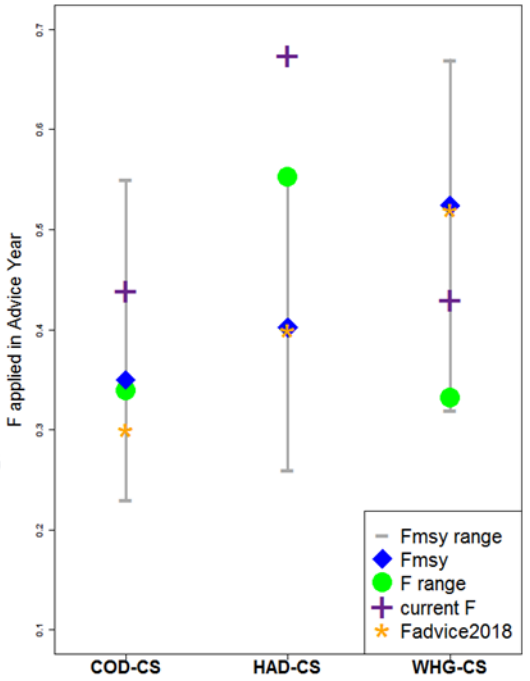
- min: each fleet stops fishing when its first stock share exhausted
- max: each fleet stops fishing when its last stock share exhausted
- cod: each fleet stops fishing when its cod stock share exhausted
- haddock: each fleet stops fishing when its haddock stock share exhausted
- whiting: each fleet stops fishing when its whiting stock share exhausted
- Status quo effort: effort equal to 2016
- Value: based on average effort by fleet and economic importance of the stock
- Range: minimizes the sum of difference in catches using the F_{MSY} ranges

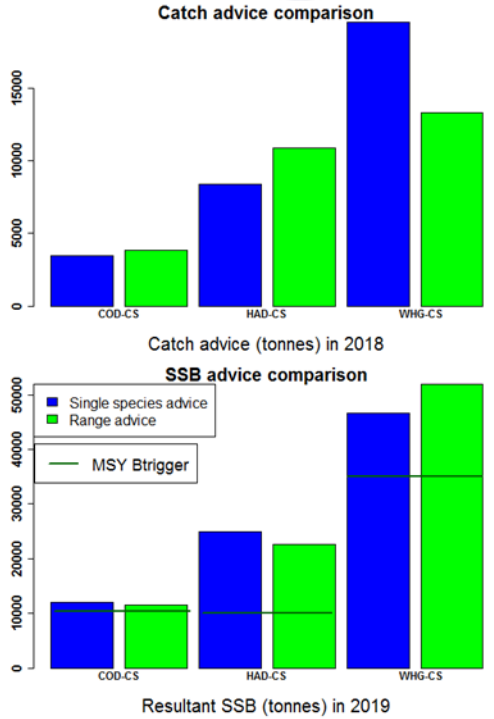
Celtic Sea & West, Southwest Ireland

Mixed fisheries – Celtic Sea gadoids (cod, haddock, whiting)

- Individual stock objectives can not all be achieved simultaneously (with current fishing patterns).

- Single-species advice:
  - Haddock is most limiting.
  - Cod is limiting for a quarter of fleets.
  - Whiting is the least restrictive quota).

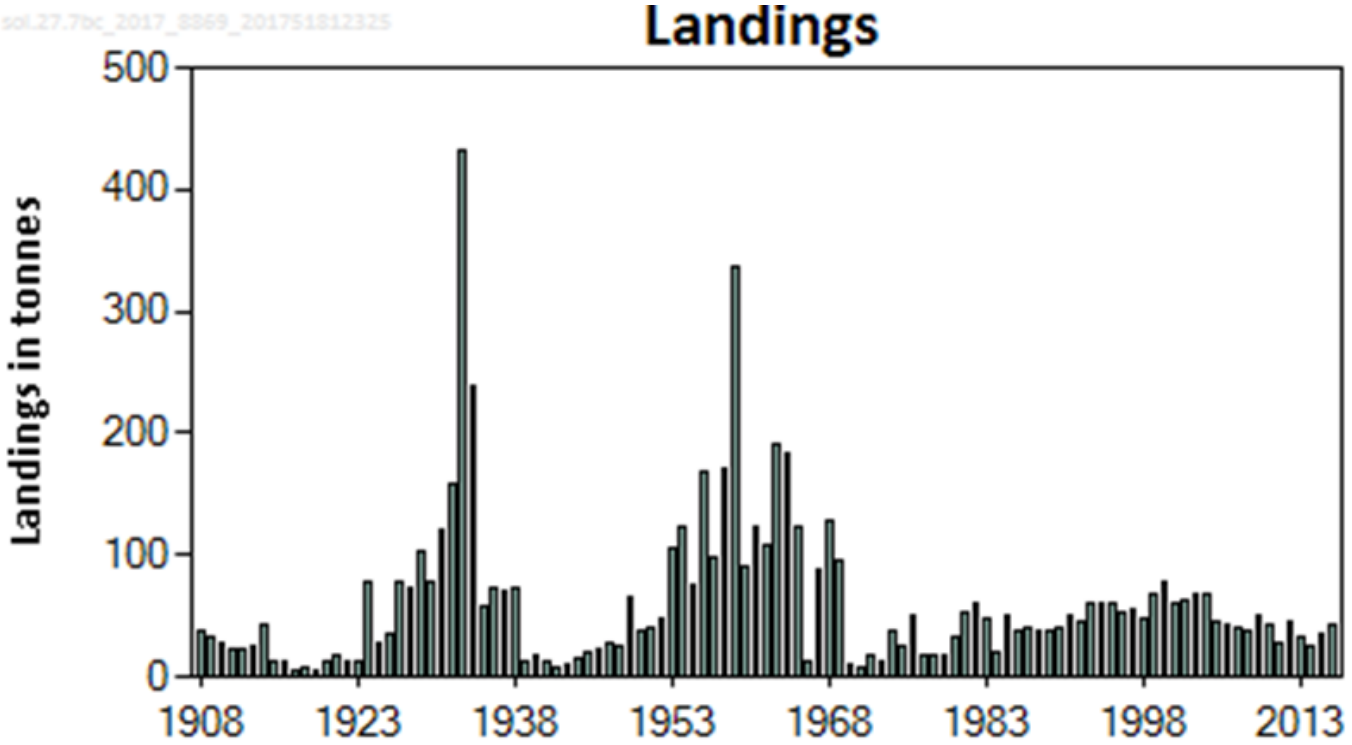




'Range' scenario

Sole in the West of Ireland (7.bc)

Advice for 2018, 2019 and 2020: PA: Catch ≤ 24 t

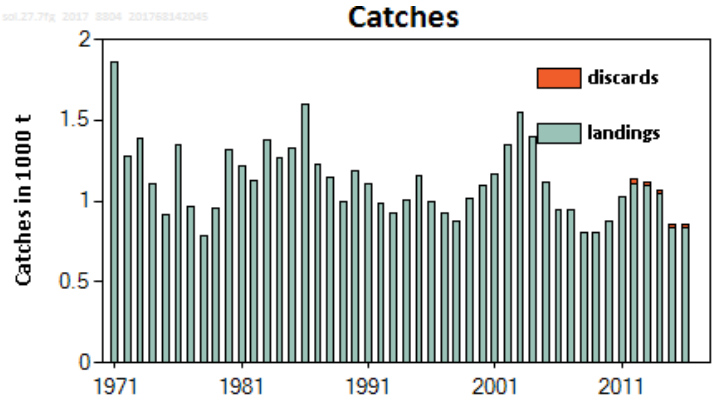


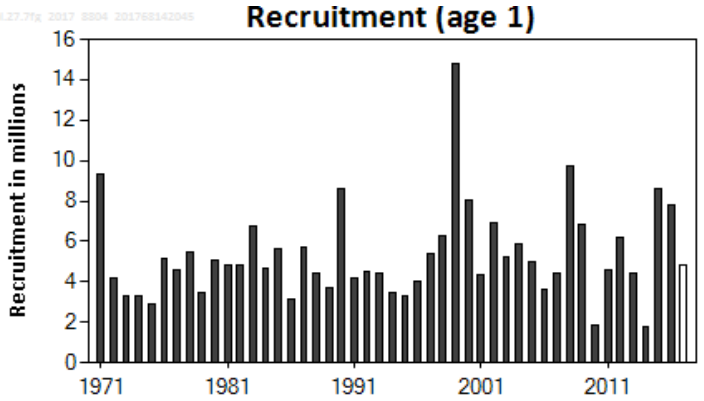
	Fishing pressure					Stock size				
		2014	2015	2016			2015	2016	2017	
Maximum sustainable yield	F_{MSY}	?	?	?	Unknown	MSY $B_{trigger}$	?	?	?	Unknown
Precautionary approach	F_{pa},F_{lim}	?	?	?	Unknown	B_{pa},B_{lim}	?	?	?	Unknown
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	–	Not applicable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

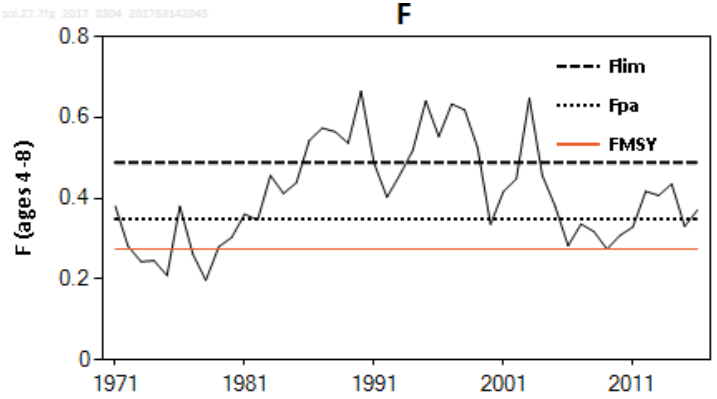
- State of the stock unknown.
- Landings in 2016, 43 t; discards considered negligible.
- Precautionary reduction advised.

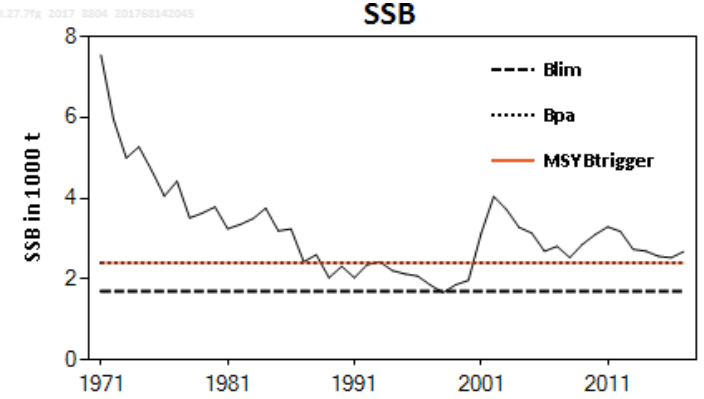
Sole in the Bristol Channel, Celtic Sea (7.f and 7.g)

Advice for 2018: MSY: Catch ≤ 931 t









		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum Sustainable Yield	F_{MSY}	✗	✗	✗	Above	MSY $B_{Trigger}$	✓	✓	✓ Above trigger
Precautionary Approach	F_{pa}, F_{lim}	○	✓	○	Increased risk	B_{pa}, B_{lim}	✓	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Spawning stock above MSY $B_{trigger}$ since 2001.
- Fishing pressure has been at or above F_{MSY} since 2009.
- Recruitment in 2015 and 2016 estimated to be well above average.

Assessment includes commercial beam trawl indices (Belgium, UK).

Sole in the Bristol Channel, Celtic Sea (7.f and 7.g)

Catch (2016) : 857 t (3 % discards)

F(2017) = 0.29 (Catch constraint : TAC 2017)

SSB (2018)= 3 112 t > $MSY_{Btrigger}$ (2 400 t) F_{MSY}= 0.27

Basis	Total catch ^ (2018)	Wanted catch* (2018)	Unwanted catch* (2018)	F_{wanted} (2018)	SSB (2019)	% SSB change **	% TAC change ***
ICES advice basis							
MSY approach: F_{MSY}	931	901	30	0.27	3441	10	10
Other options							
F = 0	0	0	0	0	4310	38	-100
F_{pa}	1138	1101	37	0.34	3249	4.4	35
F_{lim}	1514	1465	49	0.48	2901	-6.8	79
SSB (2019) = B_{lim}	2833	2741	92	1.18	1700	-45	235
SSB (2019) = B_{pa}= MSY $B_{trigger}$	2060	1993	67	0.72	2400	-23	144
F = F_{2017}	999	967	32	0.29	3378	8.5	18

** SSB 2019 relative to SSB 2018.

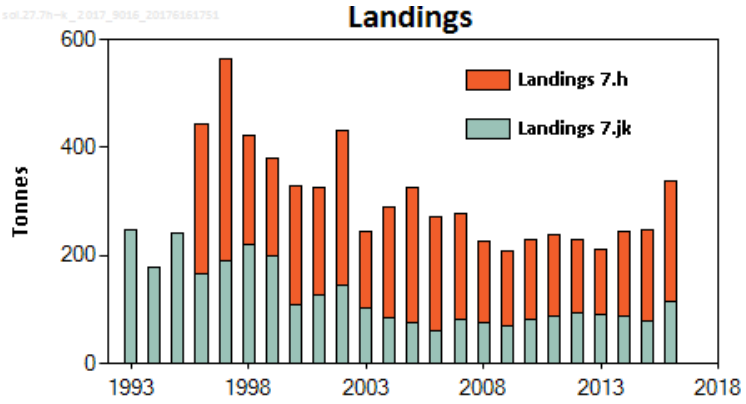
*** Total catch in 2018 relative to TAC in 2017 (845 t).

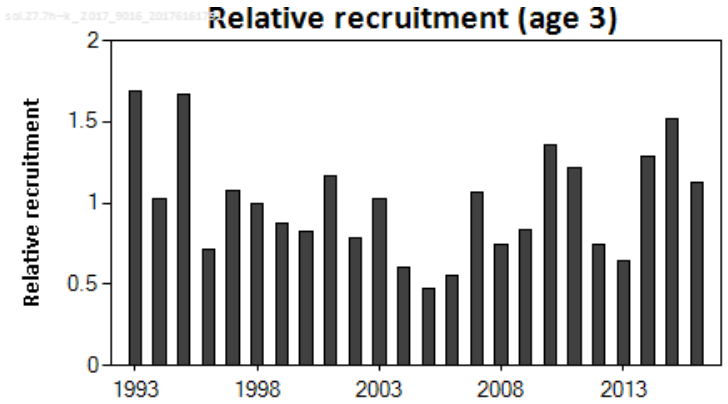
^Total catch derived from the wanted catch and the unwanted catches ratio.

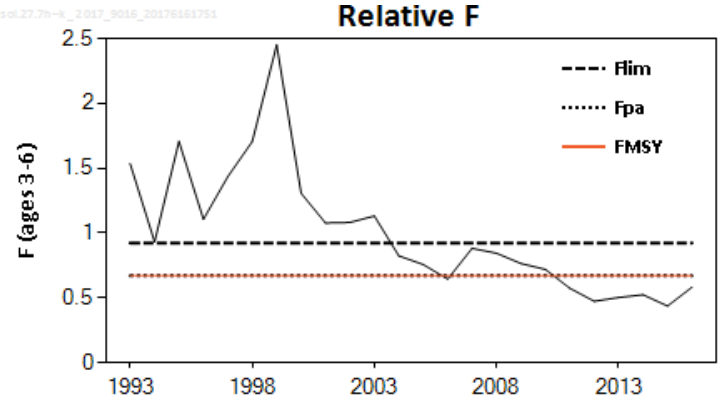
- Discards very low not included in assessment, but used to provide advice.

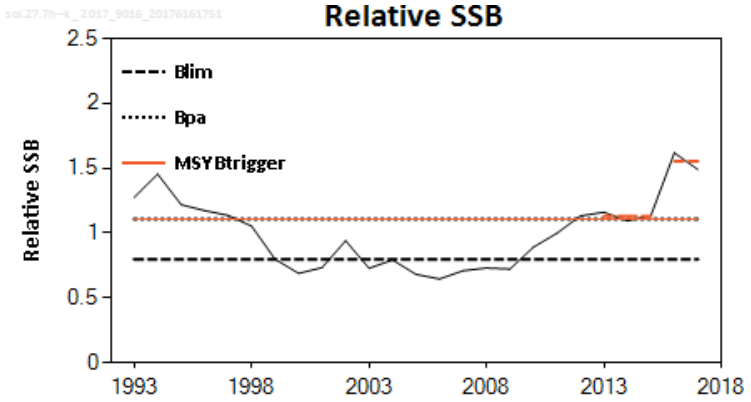
Sole in the Celtic Sea South, southwest of Ireland (7.h–k)

Advice for 2018: PA: Catch ≤ 268 t









		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	F_{MSY} proxy	✓	✓	✓	Below proxy	MSY $B_{trigger}$ proxy	✓	✓	✓ Above proxy
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

- Assessment based on commercial data (Irish trawlers) from 7.jk – used as trends for entire stock (Cat. 3).
- Spawning stock has increased since 2005 and is above MSY $B_{trigger}$ proxy.
- Recruitment fluctuates without trend.
- F below F_{MSY} proxy since 2012.

Sole in the Celtic Sea South, southwest of Ireland (7.h–k)

Catch (2016) = 329 t (negligible discards)

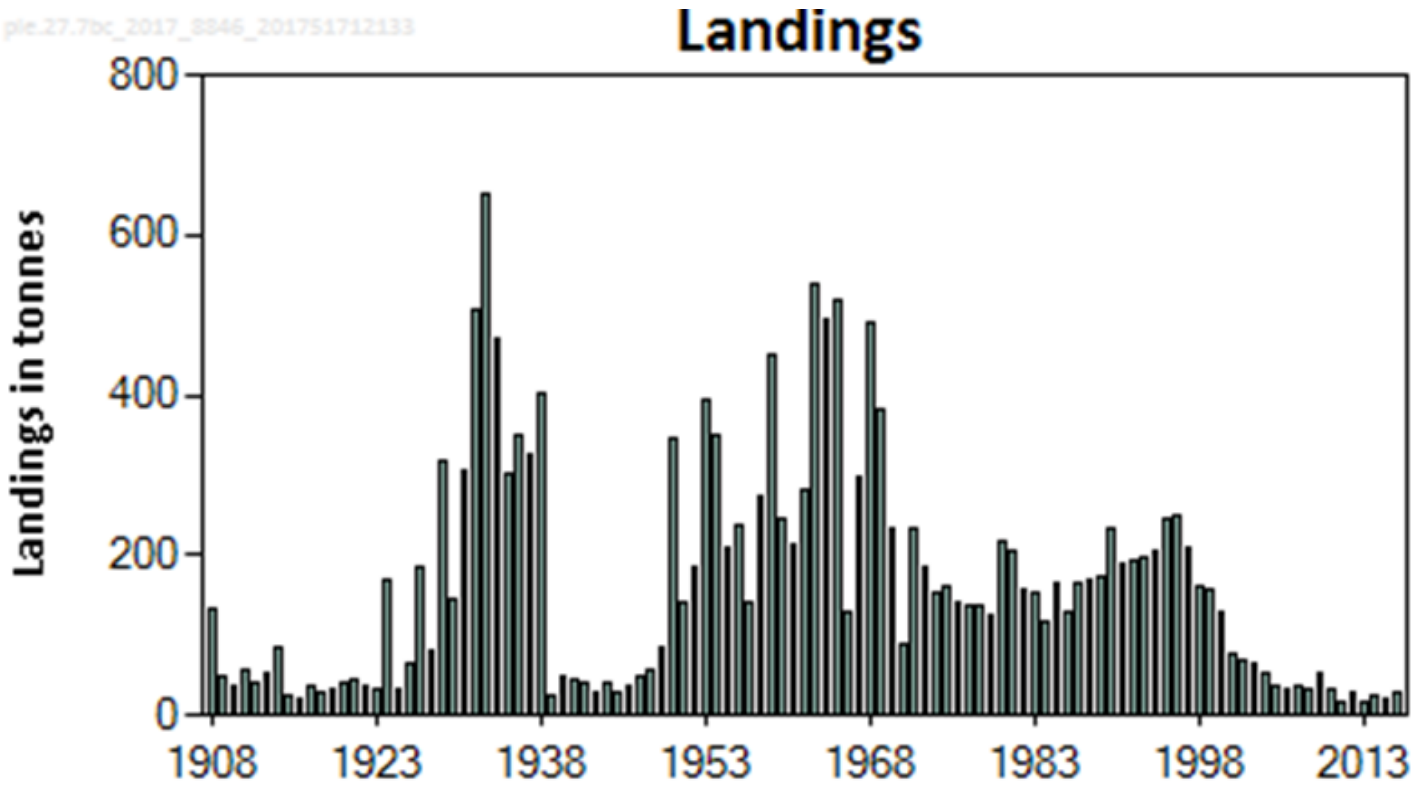
Index A (2016–2017)		1.55
Index B (2013–2015)		1.13
Index ratio (A/B)		1.38
Uncertainty cap	Applied	1.2
Advised catch for 2017		223 tonnes
Discard rate		Negligible
Precautionary buffer	Not applied	-
Catch advice**		**268 tonnes**

** advice for 2017 × uncertainty cap

- Precautionary buffer not applied because fishing mortality and the SSB are estimated to be below and above MSY reference point proxies respectively.
- Discards are considered to be negligible.

Plaice in the West of Ireland (7.bc)

Advice for 2018, 2019 and 2020: PA: Landings ≤ 24 t

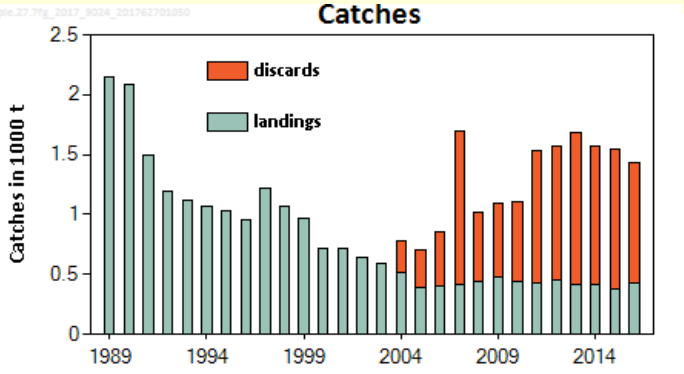


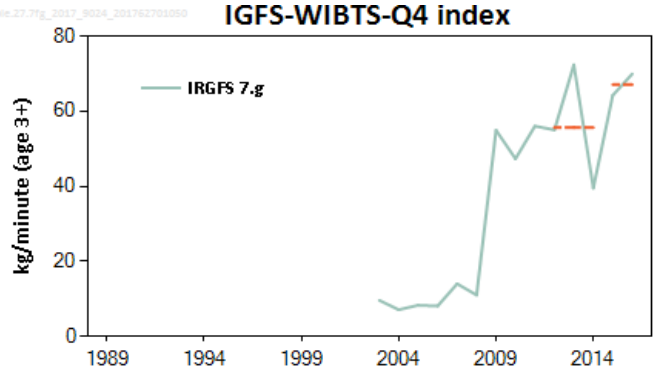
		Fishing pressure				Stock size				
		2014	2015	2016			2015	2016	2017	
Maximum sustainable yield	F_{MSY}	?	?	?	Unknown	MSY $B_{trigger}$	?	?	?	Unknown
Precautionary approach	F_{pa},F_{lim}	?	?	?	Unknown	B_{pa},B_{lim}	?	?	?	Unknown
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	–	Not applicable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

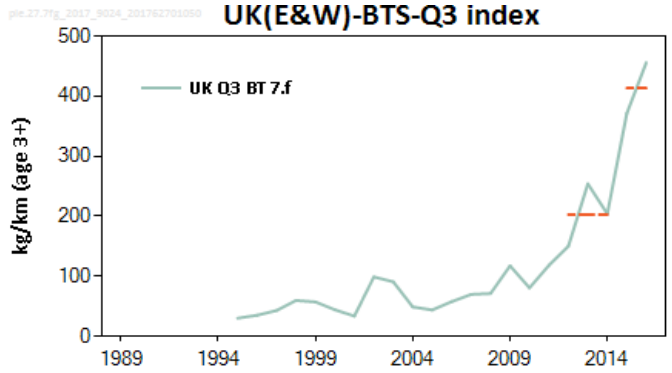
- State of the stock unknown.
- Landings in 2016, 29 t
- Discards rates uncertain.
- Precautionary reduction advised.

Plaice in the Bristol Channel, Celtic Sea (7.f and 7.g)

Advice for 2018: PA: Catch ≤ 1 800 t (Landings ≤ 511)







		Fishing pressure				Stock size			
		2013	2014	2015		2013	2014	2015	
Maximum Sustainable Yield	F_{MSY} proxy	✓	✓	✓	Below proxy	MSY $B_{trigger}$ proxy	✓	✓	✓ Above proxy
Precautionary Approach	F_{pa}, F_{lim}	✓	✓	✓	Below potential reference points	B_{pa}, B_{lim}	✓	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable
Qualitative evaluation	-	?	?	?	Unknown	-	↗	↘	↗ Increasing

- Assessment based on averaged survey trends (Category 3).
- Increase in survey indicators in the last 10 years.
- Stock and exploitation status based on MSY proxy reference points.
- Caught in mixed fishery, high discard rates (72% during 2014-2016)

Plaice in the Bristol Channel, Celtic Sea (7.f and 7.g)

Catch (2016) = 1 014 t (56% discards)

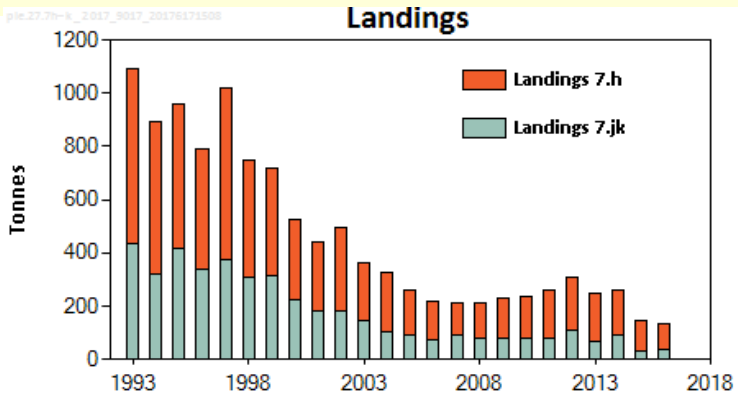
Index A (2015-2016)	IGFS : 67.0 ; UK-BTS : 413.3	
Index B (2012-2014)	IGFS : 55.6 ; UK-BTS : 202.7	
Index ratio (A/B)	IGFS : 1.21 ; UK-BTS : 2.0; Average : 1.62	
Uncertainty cap	Applied	1.2
Recent advised catch (2017)	1500 tonnes	
Discard rate (2012-2016)	0.72	
Precautionary buffer	Not applied	-
Catch advice**	**1800 tonnes**	
Landings corresponding to catch advice	511 tonnes	

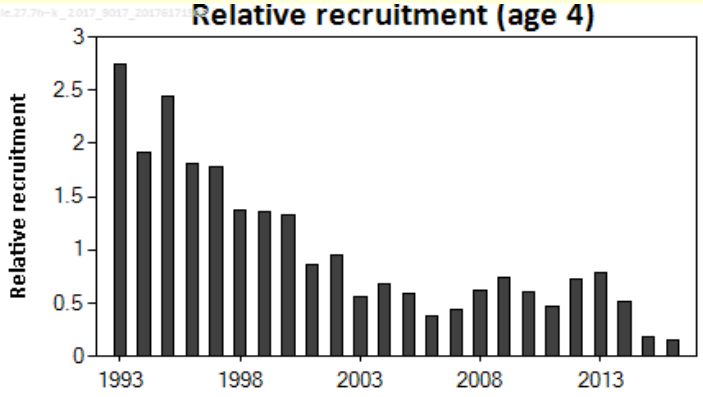
** [recent advised catch x uncertainty cap]

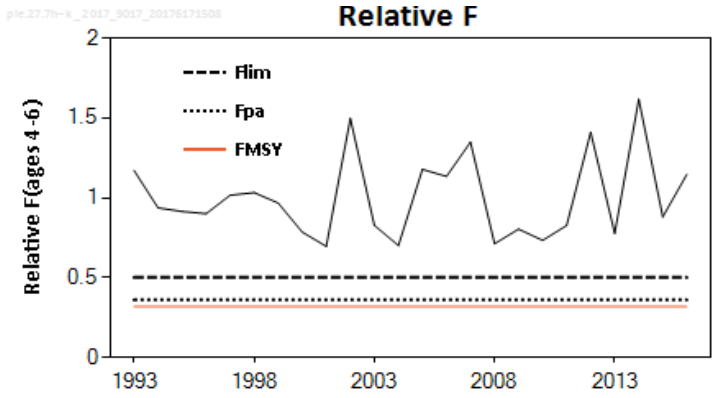
- High discards of plaice in mixed sole and plaice fishery: mismatch between selectivity and minimum landing size & relatively low market value of plaice.
- Some of the discarded plaice might also survive.

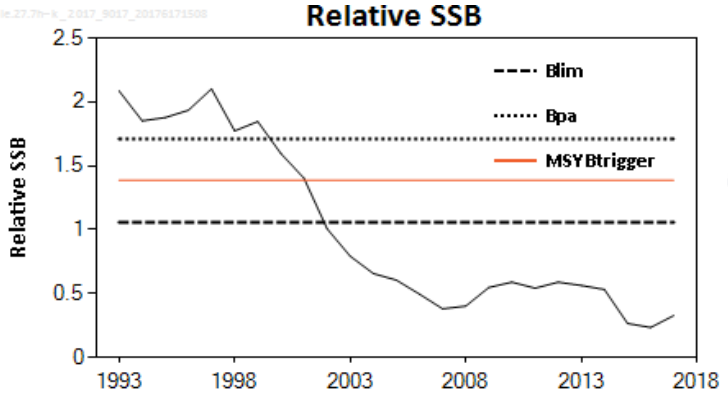
Plaice in the Celtic Sea South, southwest of Ireland (7.h-k)

Advice for 2018: PA: Catch = 0 t









	Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017
Maximum sustainable yield	F_{MSY} proxy	⊗	⊗	⊗ Above proxy	MSY $B_{trigger}$ proxy	⊗	⊗	⊗ Below proxy
Precautionary approach	F_{pa},F_{lim}	⊗	⊗	⊗ Harvested unsustainably	B_{pa},B_{lim}	⊗	⊗	⊗ Reduced reproductive capacity
Management plan	F_{MGT}	–	–	– Not applicable	B_{MGT}	–	–	– Not applicable

- Assessment based on commercial data (Irish trawlers) from 7.jk – used as trends for entire stock (Cat. 3).
- Spawning stock below B_{lim} since 2003.
- Recruitment low since 2002.
- Fishing pressure above F_{MSY}, highly variable with no trend.
- Proxy reference points determined.

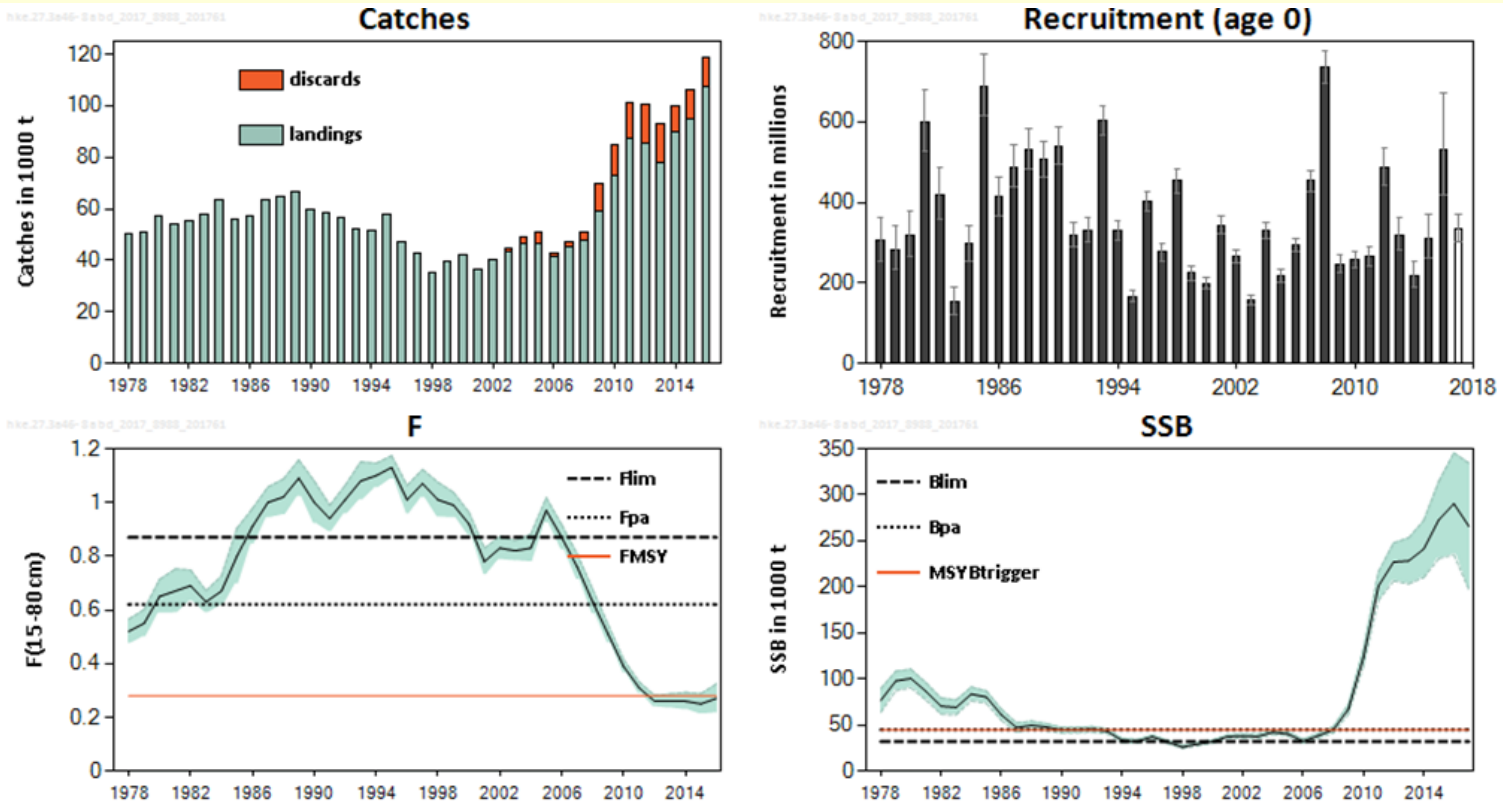
Plaice in the Celtic Sea South, southwest of Ireland (7.h-k)

Landings (2016) = 99 t (discards unknown for stock but about 30% in 7.jk)

- Given that SSB is estimated to be well below B_{lim} and is likely to remain so in 2018, the advice is for zero catch for 2018.
- Management measures should focus on reducing catches of small plaice.
- Because plaice is caught in distinct areas, restricting effort in areas where plaice are caught could also be effective.

Hake – Northern stock (3.a, 4, 6, 7, 8.abd)

Advice for 2018: MSY: Catch ≤ 115 335 t



		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	F_{MSY}	✓	✓	✓	At FMSY	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	SSB_{MGT}	–	–	– Not applicable

- Spawning stock increased significantly since 2006 and it is well above historical estimates.
- Fishing pressure below F_{MSY} since 2012.
- Recruitment for 2016 is above average.

Hake – Northern stock (3.a, 4, 6, 7, 8.abd)

Catch (2016) : 118 644 t (9 % discards)
F(2017) = 0.26 (Recent average fishing pressure (2014-2016));
SSB (2018)= 267 673> $MSY_{Btrigger}$ (45 000 t) F_{MSY}= 0.28

Basis	Total catch (2018)	Wanted catch (2018)	Unwanted catch,^ (2018)	F_{total} (2018)	F_{wanted} (2018)	$F_{unwanted}$ (2018)	SSB (2019)	% SSB change **	% Advice change ***
ICES advice basis									
F_{MSY}	115335	104060	11275	0.28	0.233	0.047	295193	11%	-7%
Other options									
F = 0	0	0	0	0	0	0	401929	51%	-100%
Fpa	211827	190172	21655	0.62	0.515	0.105	206120	-22%	71%
Flim	261716	234150	27566	0.87	0.723	0.147	160047	-40%	111%
SSB (2019) = Blim	383469	337722	45746	2.293	1.904	0.389	44975	-83%	210%
SSB (2019) = Bpa	395825	347392	48433	2.731	2.268	0.463	32001	-88%	220%
SSB (2019) = MSY Btrigger	395825	347392	48433	2.731	2.268	0.463	32001	-88%	220%
F = F2017	108119	97580	10540	0.259	0.215	0.044	301860	14%	-13%
EU Recovery Plan^^	104736	94539	10196	0.25	0.208	0.042	304987	15%	-15%

** SSB 2019 relative to SSB 2018.

*** Total catch 2018 relative to the catch advice for 2017 (123 777 t).

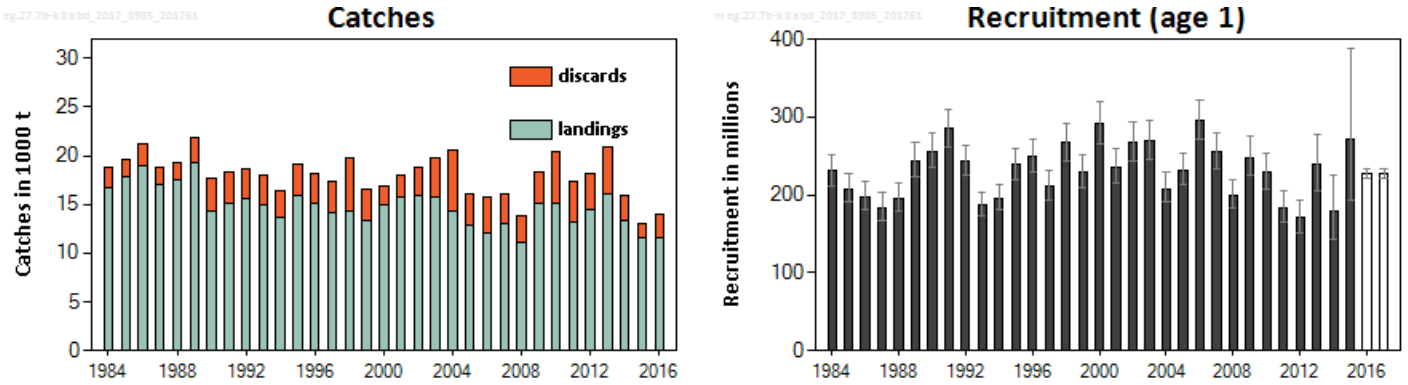
^ Unwanted catch includes forecasted unwanted catch (discards included in the assessment) and additional unwanted catch (the discards that were not included in the assessment, amounting to approximately 2.6% of the total catch).

^^ Catch option corresponds to F(2018)=0.25

- Discarding of juvenile hake can be substantial in some areas and fleets.
- Discarding of large individuals has increased in recent years because of quota restrictions in certain fleets.
- Expansion of the stock in the North Sea.

Megrim in the west and southwest of Ireland, Bay of Biscay (7.b–k, 8.a–b, and 8.d)

Advice for 2018: MSY: Catch ≤ 15 720 t (Landings ≤ 12 884 t)



		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum Sustainable Yield	F_{MSY}	✗	✗	✗	Above	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	SSB_{MGT}	–	–	– Not applicable

- Spawning stock has been above MSY $B_{trigger}$ since 2008.
- The fishing pressure has decreased since 2004 although it is still above F_{MSY}.
- Recruitment has been relatively stable throughout the time-series.

Assessment includes Spanish and Irish commercial indices.

Megrim in the west and southwest of Ireland, Bay of Biscay (7.b–k, 8.a–b, and 8.d)

Catch (2016) : 13 992 t (17 % discards)

F(2017) = 0.22 (Recent fishing pressure (2016));

SSB (2018)= 89 644> $MSY_{Btrigger}$ (41 800 t) F_{MSY}= 0.191

Basis	Total catch (2018)	Landings (2018)	Discards (2018)	F_{total} (2018)	SSB (2019)	% SSB change *	% Advice change **
ICES advice basis							
MSY approach: F_{MSY}	**15720**	**12884**	**2836**	**0.191**	**97909**	**9%**	**-2%**
Other options							
F = 0	0	0	0	0	116398	30%	-100%
F_{pa}	32592	26472	6120	0.45	78284	-13%	103%
F_{lim}	37007	29970	7037	0.53	73187	-18%	131%
SSB (2019) = B_{lim}	69111	54410	14701	1.44	37100	-59%	331%
SSB (2019) = B_{pa}	64809	51288	13521	1.26	41800	-53%	305%
SSB (2019) = MSY $B_{trigger}$	64809	51288	13521	1.26	41800	-53%	305%
F = F_{2017}	17871	14630	3241	0.22	95444	6%	12%

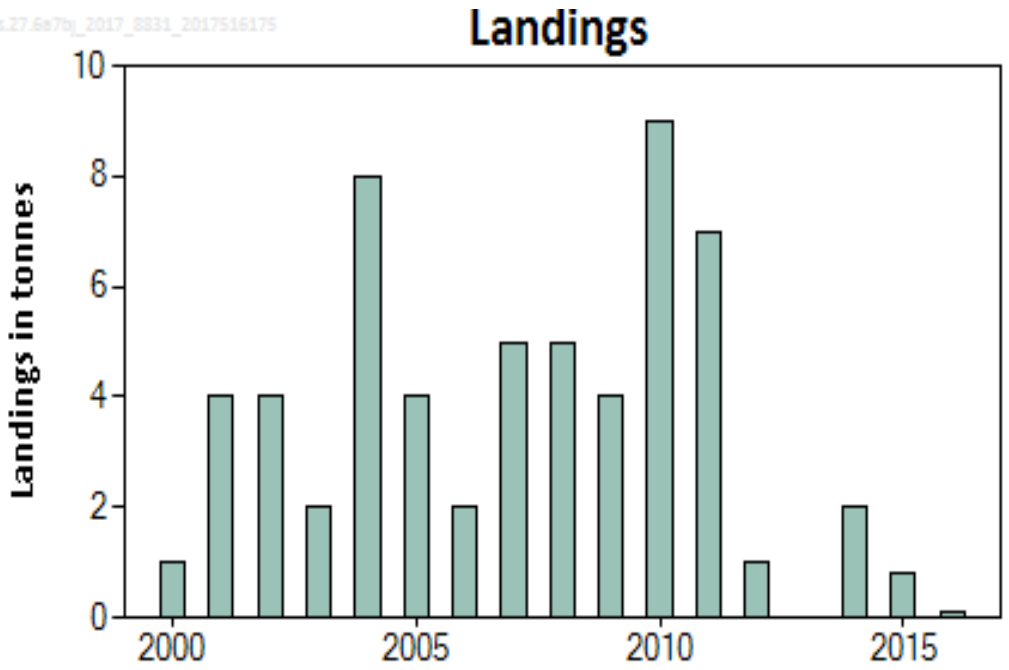
* SSB 2019 relative to SSB 2018.

** Catches in 2018 relative to the advised catch in 2017 (16 021 t).

- The ICES advice is for *L. whiffiagonis*, whereas the TAC is for *L. whiffiagonis* and *L. boscii* combined and includes 7.a and 8.e..

Seabass 6.a, 7.b, and 7.j

Advice for 2018, 2019 and 2020: PA: Catch ≤ 4 t

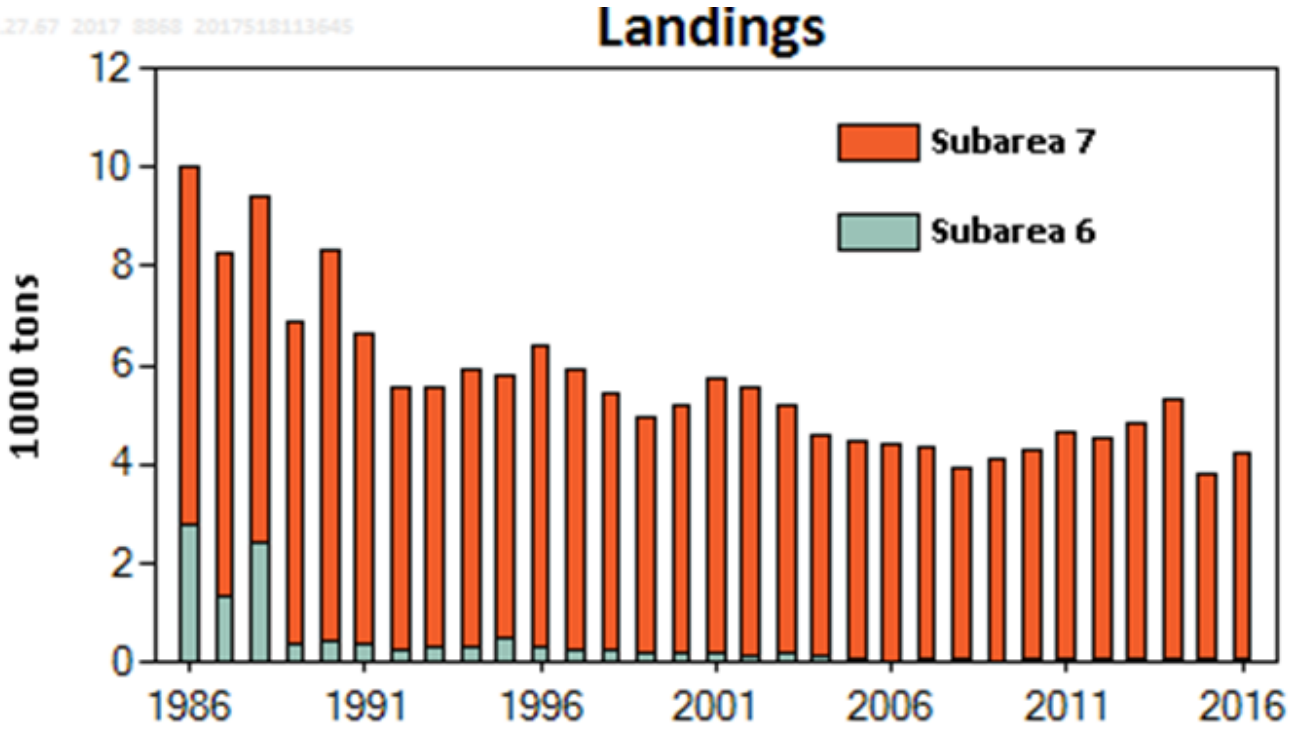


		Fishing pressure				Stock size				
		2014	2015	2016			2014	2015	2016	
Maximum sustainable yield	F_{MSY}	?	?	?	Undefined	$MSYB_{escapement}$	?	?	?	Undefined
Precautionary approach	F_{pa},F_{lim}	?	?	?	Undefined	B_{pa},B_{lim}	?	?	?	Undefined
Management plan	F_{MGT}	–	–	–	Not applicable	S_{SBMGT}	–	–	–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

- Limited information available on seabass in this area.
- Reported catches: 0.1 t in 2016.
- Stock identity is unknown.
- Advice based on precautionary reduction of recent advised catch.

Pollack in the Celtic Seas and the English Channel (6 and 7)

Advice for 2018, 2019 and 2020: PA: Catch ≤ 4 200 t



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

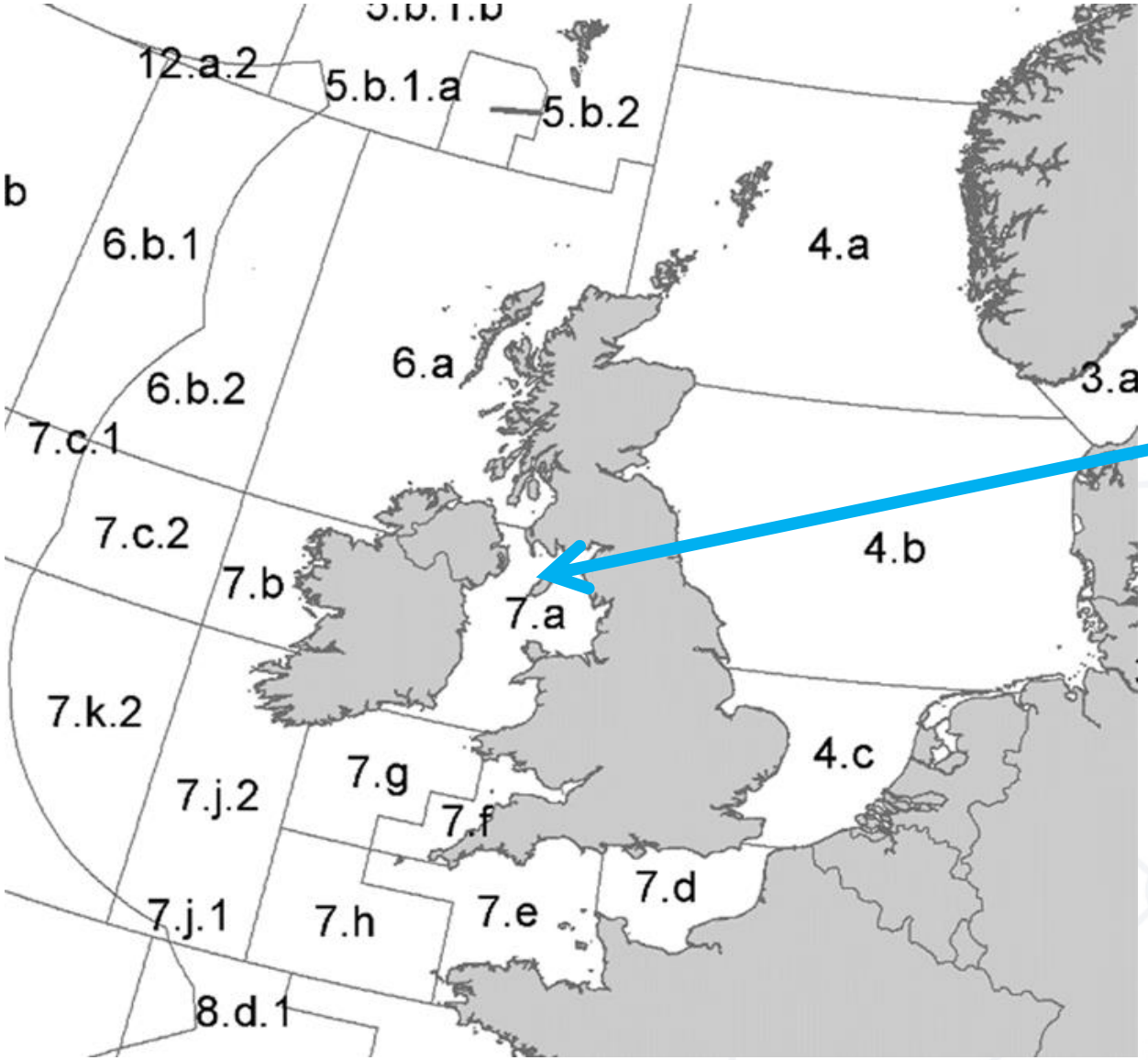
- Limited information available on pollack in this area.
- Commercial landings have been stable since the early 1990's.
- Recreational catch unknown, but thought to be significant.

Celtic Sea & West, Southwest Ireland

SUMMARY

Area	Stock	Advice 2018	Advice 2017	Catch 2016	Notes
Celtic Sea	Cod 7.e-k	3428	1447*	4722	*wanted catch
	Haddock 7.b-k	8558	12444	17931	
	Whiting 7.bc,e-k	19429	25125	22457	
	Sole 7.bc	24	30	43	
	Sole 7.fg	931	806	857	
	Sole 7.h-k	268	223	329	
	Plaice 7.bc	24	30	29	Landings
	Plaice 7.fg	1800	1500	1014	
	Plaice 7.h-k	0	86	99	
	Northern hake 4,6,7, 3.a, 8ab,d	115335	123777	118644	
	Megrim 7.b-k, 8.ab,d	15720	16021	13992	
	Seabass 6.a,7.b, 7.j	4	5	0.1	
	Pollack 6, 7	4200	4200	4205	

Irish Sea (7.a)



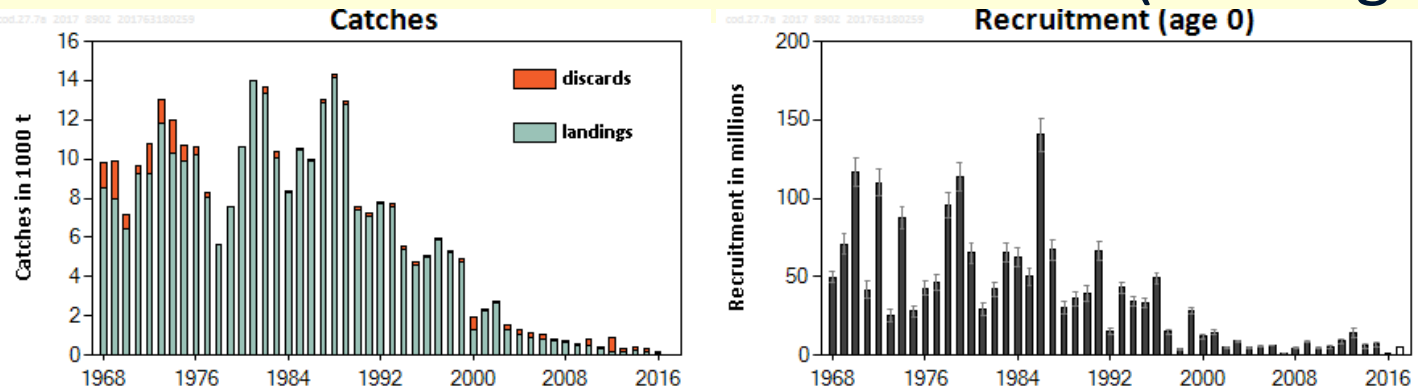
- Cod
- Haddock
- Whiting
- Plaice

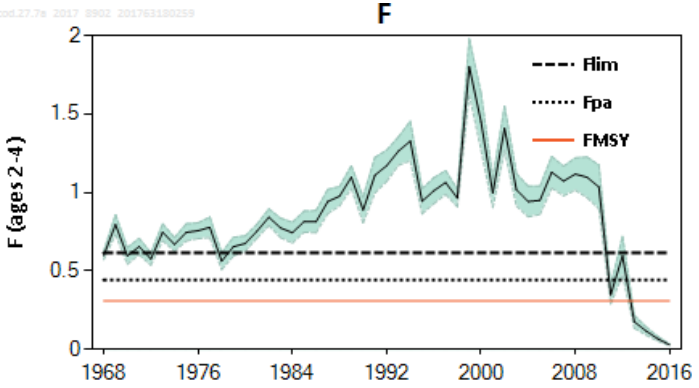
IN AUTUMN:

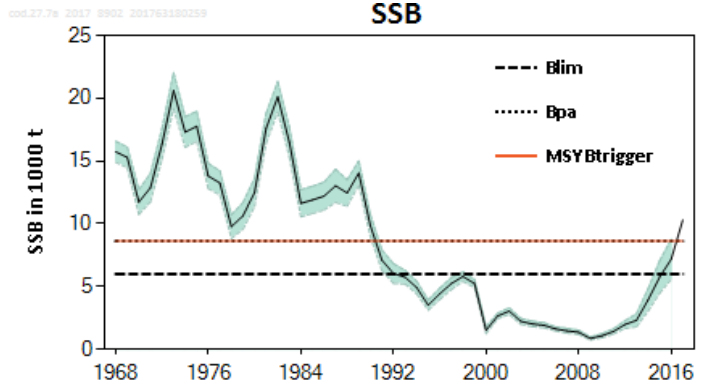
- ***Nephrops*** **(FUs 14-15-19)**

Cod in the Irish Sea (7.a)

Advice for 2018: MSY: Catch ≤ 1 073 t (Landings ≤ 695 t)







		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below	MSY $B_{trigger}$	✗	✗	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa},B_{lim}	✗	o	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Benchmark in 2017 (WKIRISH) results in significant change in perception.
- Spawning stock above MSY $B_{trigger}$ in 2017.
- Fishing pressure has declined and below F_{MSY} since 2013.
- Recruitment remains low, lowest in 2016.
- UK Fisheries Science Partnership survey is highest in 2017.

Cod in the Irish Sea (7.a)

Catch (2016) : 142 t (42 % discards)

F(2017) = 0.071 (Recent average fishing pressure (2014-2016));

SSB (2018)= 11 001 t > $MSY_{Btrigger}$ (8 616 t ↓) F_{MSY}= 0.309 ↓

Basis	Total catch (2018)	Landings (2018)	Discards (2018)	F_{total} (2018)	$F_{landings}$ (2018)	$F_{discards}$ (2018)	SSB (2019)	% SSB change *	% TAC change **
ICES advice basis									
MSY approach: F_{MSY}	1073	695	377	0.309	0.18	0.13	9570	-11	634
Other options									
F = 0	0	0	0	0	0	0	10903	1.7	-100
F = FSQ (F in 2017)	268	173	94	0.071	0.041	0.029	10566	-1.5	83
F_{pa}	1466	950	515	0.44	0.26	0.183	9095	-15	904
F_{lim}	1924	1248	676	0.61	0.36	0.25	8550	-20	1217
SSB (2019) = B_{lim}	3995	2597	1398	1.85	1.08	0.77	6000	-44	2636
SSB (2019) = B_{pa}= MSY $B_{trigger}$	1868	1212	656	0.59	0.35	0.25	8616	-19	1179

* SSB 2019 relative to SSB 2018.

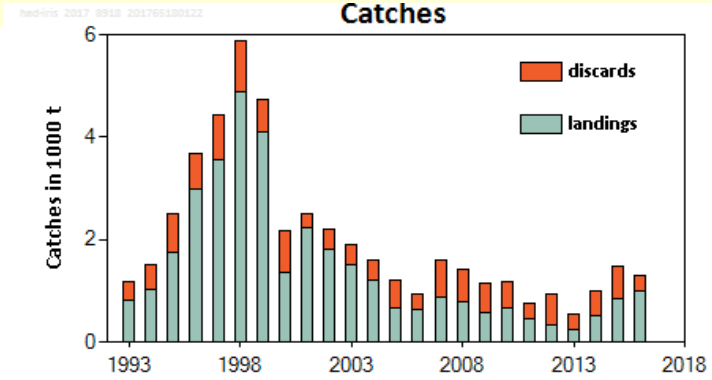
** Total catch in 2018 relative to TAC in 2017 (146 t).

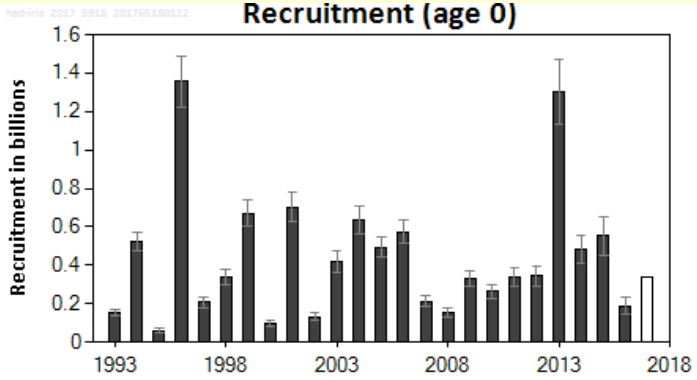
Landings from south of Division 7.a (rectangles 33E2-3) are not considered part of this stock (included in cod 7.e-k stock)

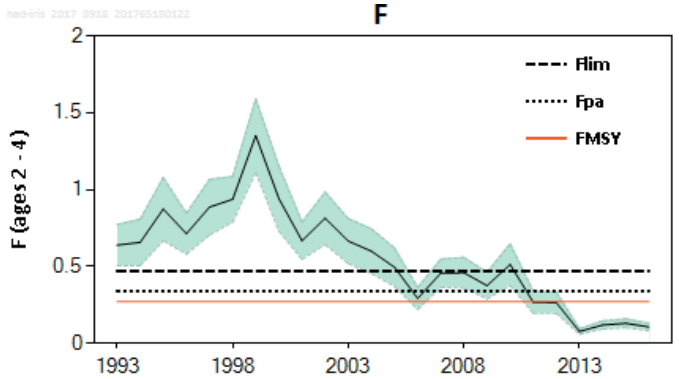
➔ This needs to be considered when setting catch options for 7.a and 7.e-k.

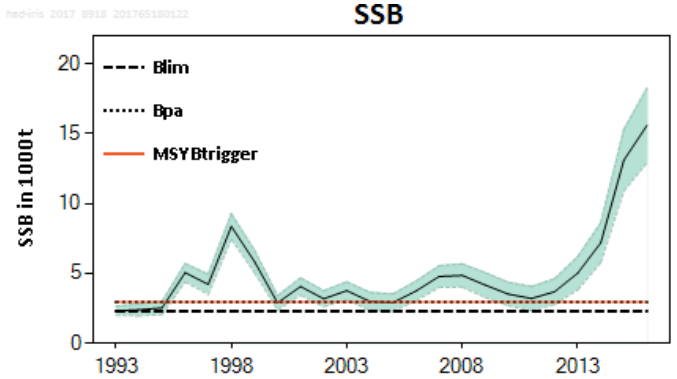
Haddock in the Irish Sea (7.a)

Advice for 2018: MSY: Catch ≤ 3 444 t









		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below	$MSYB_{Trigger}$	✓	✓	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa},B_{lim}	✓	✓	✓ Full reproductivity capacity
Management plan	F_{MGT}	–	–	–	Not applicable	S_{SBMGT}	–	–	– Not applicable

- Benchmark in 2017 (WKIRISH) – upgraded to category 1
- Spawning stock at highest level in 2017.
- Fishing pressure has declined and below F_{MSY} since 2012.
- Recruitment above average but variable.
- UK Fisheries Science Partnership survey is highest in 2017.

Haddock in the Irish Sea (7.a)

Catch (2016) : 1 306 t (23 % discards)

F(2017) = 0.26 (Catch constraint (TAC 2017 – rectangles 33E2-3));

SSB (2018)= 18 974 t > $MSY_{Btrigger}$ (2 944 t) F_{MSY}= 0.27

Basis	Total catch (2018)	Wanted catch (2018)	Unwanted catch (2018)	F_{total} (2018)	F_{wanted} (2018)	$F_{unwanted}$ (2018)	SSB (2019)	% SSB change **	% TAC change ***
ICES advice basis									
MSY approach: F_{MSY}	3444	2796	648	0.27	0.2	0.067	13406	-29	32
Other options									
F = 0	0	0	0	0	0	0	16567	-12.7	-100
F_{pa}	4234	3437	798	0.34	0.26	0.084	12721	-33	62
F_{lim}	5604	4546	1058	0.47	0.35	0.116	11551	-39	143
SSB (2019) = B_{lim}	18265	14603	3662	2.9	2.2	0.72	2300	-88	598
SSB (2019) = B_{pa}	17146	13751	3395	2.5	1.88	0.62	2944	-84	556
SSB (2019) = MSY $B_{trigger}$	17146	13751	3395	2.5	1.88	0.62	2944	-84	556
F = F_{2017}	3329	2702	626	0.26	0.2	0.064	13506	-29	27

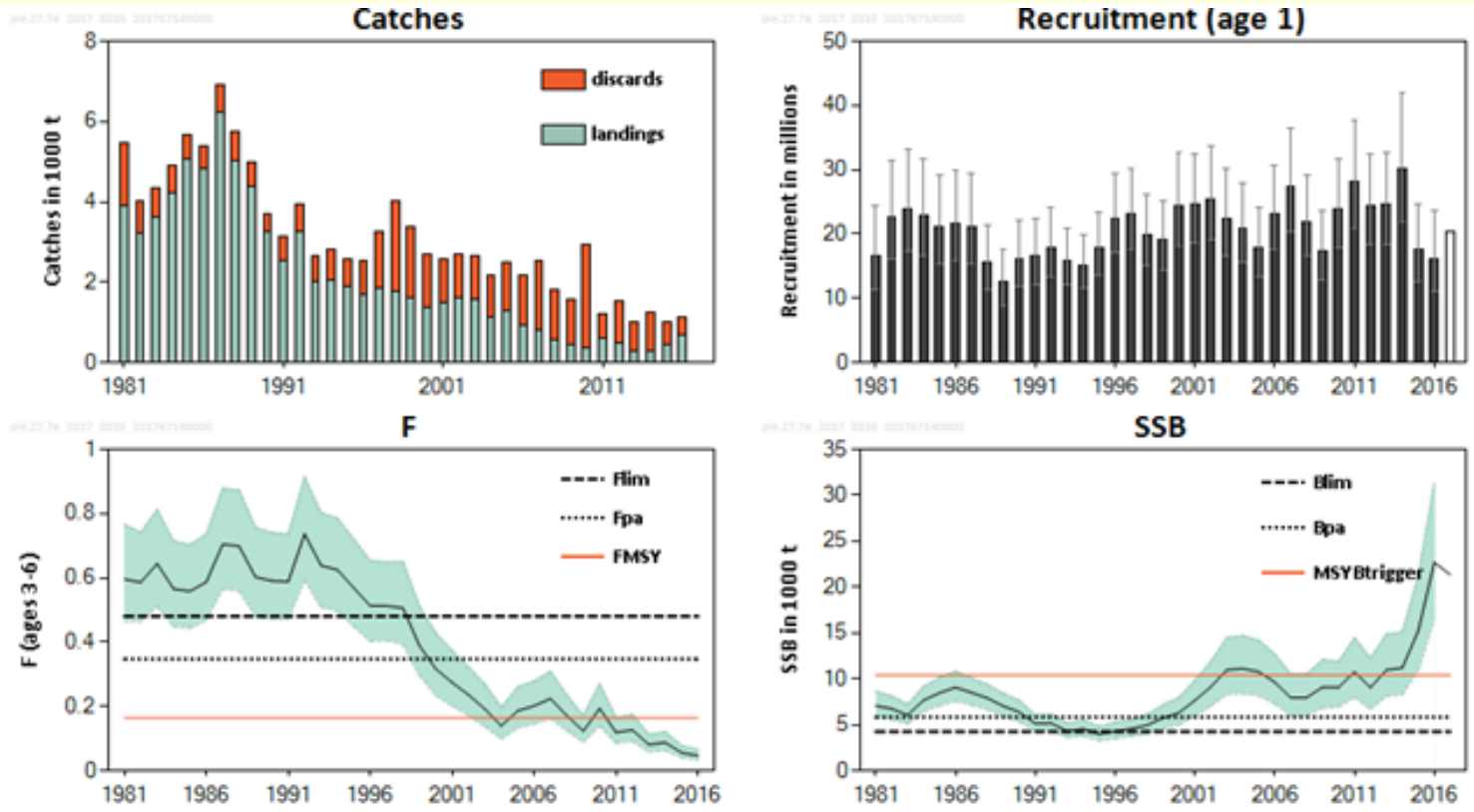
** SSB 2019 relative to SSB 2018.

*** Total catch in 2018 relative to TAC in 2017 (2 615 t).

Landings from south of Division 7.a (rectangles 33E2-3) are not considered part of this stock (included in haddock 7.b-k stock) ➔ This needs to be considered when setting catch options for 7.a and 7.b-k.

Plaice in the Irish Sea (7.a)

Advice for 2018: MSY: Catch ≤ 3 336 t (Landings ≤ 1 793 t)



		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
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

- Benchmark in 2017 (WKIRISH) – upgraded to category 1.
- Spawning stock increased since 2012 and is well above MSY $B_{trigger}$.
- Fishing pressure has declined and below F_{MSY} since 2011.
- Recruitment fluctuates without trend.
- Discarding high and variable.

Plaice in the Irish Sea (7.a)

Catch (2016) : 1 119 t (39 % discards)

F(2017) = 0.064 (Recent average fishing pressure (2014-2016));

SSB (2018)= 23 590 t > $MSY_{Btrigger}$ (10 392 t) F_{MSY}= 0.169

Basis	Total catch (2018)	Landings (2018)	Total discards * (2018)	F_{total} (2018)	$F_{Landings}$ (2018)	$F_{discards}$ ^ (2018)	SSB (2019)	% SSB change **	% TAC change ***
ICES advice basis									
MSY approach: F_{MSY}	3336	1793	1542	0.17	0.038	0.13	22941	-2.8	63
Other options									
F = 0	0	0	0	0	0	0	25859	9.6	-100
F_{pa}	6466	3496	2970	0.35	0.078	0.27	20209	-14	218
F_{lim}	8467	4597	3870	0.48	0.107	0.37	18466	-22	319
SSB(2019) = B_{lim}	25113	14215	10897	2.8	0.61	2.1	4250	-82	1195
SSB(2019) = B_{pa}	23198	13060	10138	2.2	0.5	1.74	5825	-75	1089
SSB(2019) = MSY $B_{trigger}$	17801	9875	7926	1.33	0.3	1.04	10392	-56	799
F = F_{2017}	1311	702	609	0.064	0.0142	0.05	24711	4.8	-36

* Dead + surviving discards

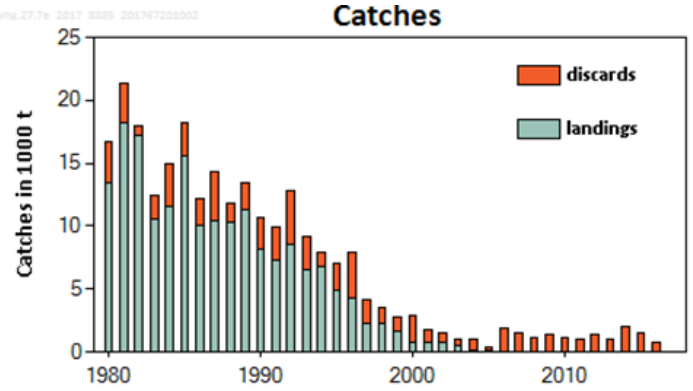
** SSB 2019 relative to SSB 2018.

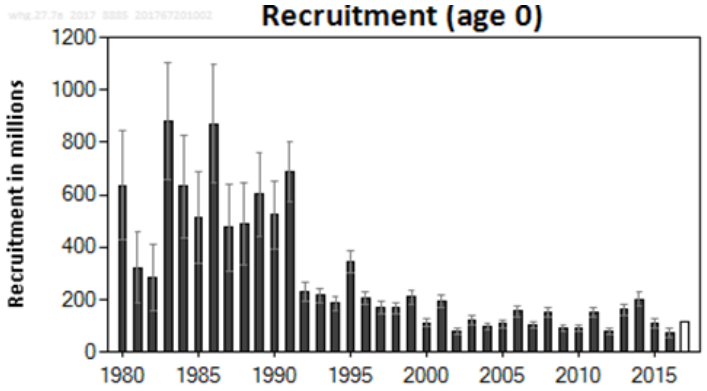
*** Landings in 2018 relative to TAC in 2017 (1098 t).

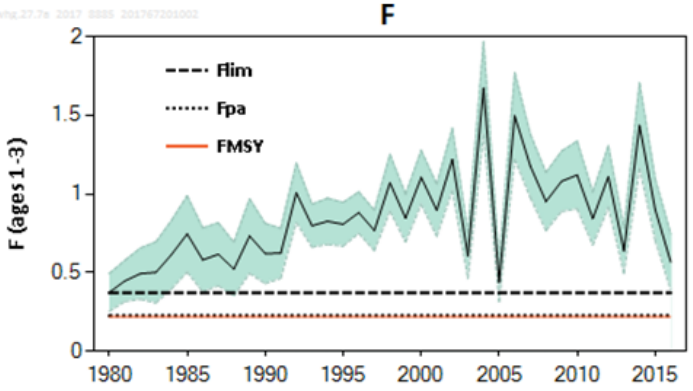
^$F_{Discards}$ concerns dead discards only

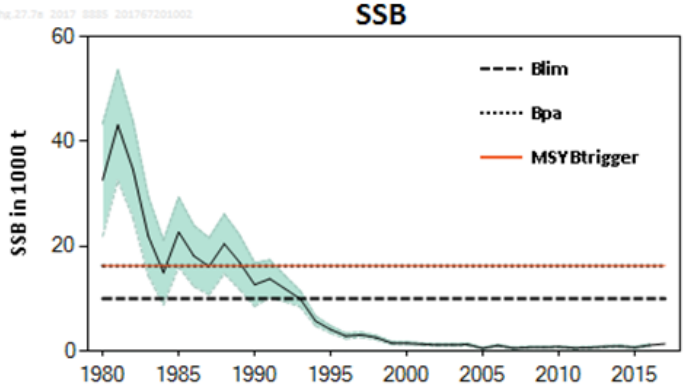
Whiting in the Irish Sea (7.a)

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}	⊗	⊗	⊗	Harvested unsustainably	B_{pa},B_{lim}	⊗	⊗	⊗ Reduced reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Benchmark in 2017 (WKIRISH) – upgraded to category 1.
- Spawning stock well below B_{lim} since the mid 1990's.
- Fishing pressure above F_{Lim}.
- Recruitment has been low since the early 1990's.
- The majority of whiting caught are discarded.

Whiting in the Irish Sea (7.a)

Catch (2016) : 780 t (98 % discards)

F(2017) = 0.97 (Recent average fishing pressure (2014-2016));

SSB (2018)= 877 t < B_{Lim} (10 000 t) F_{MSY}= 0.22

Basis	Total catch (2018)	Landings (2018)	Discards (2018)	F_{total} (2018)	$F_{Landings}$ (2018)	$F_{Discards}$ (2018)	SSB (2019)	% SSB change *	% TAC change **
ICES advice basis									
MSY approach	0	0	0	0	0	0	2103	140	-100
Other options									
$F_{MSY=}$ F_{pa}	413	46	367	0.22	0.0085	0.21	1702	94	-43
F = 0	0	0	0	0	0	0	2103	140	-100
F_{lim}	657	72	585	0.37	0.0144	0.36	1473	68	-10
SSB(2019)=B_{lim}^									
SSB(2019)=$B_{pa=}$ MSY $B_{trigger}$^									
F = F_{2017}	1406	147	1259	0.97	0.038	0.93	831	-5.2	84

* SSB 2019 relative to SSB 2018.

** Landings in 2018 relative to TAC in 2017 (80 t).

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

Landings from south of Division 7.a (rectangles 33E2-3) are not considered part of this stock (included in whiting 7.bce-k stock).

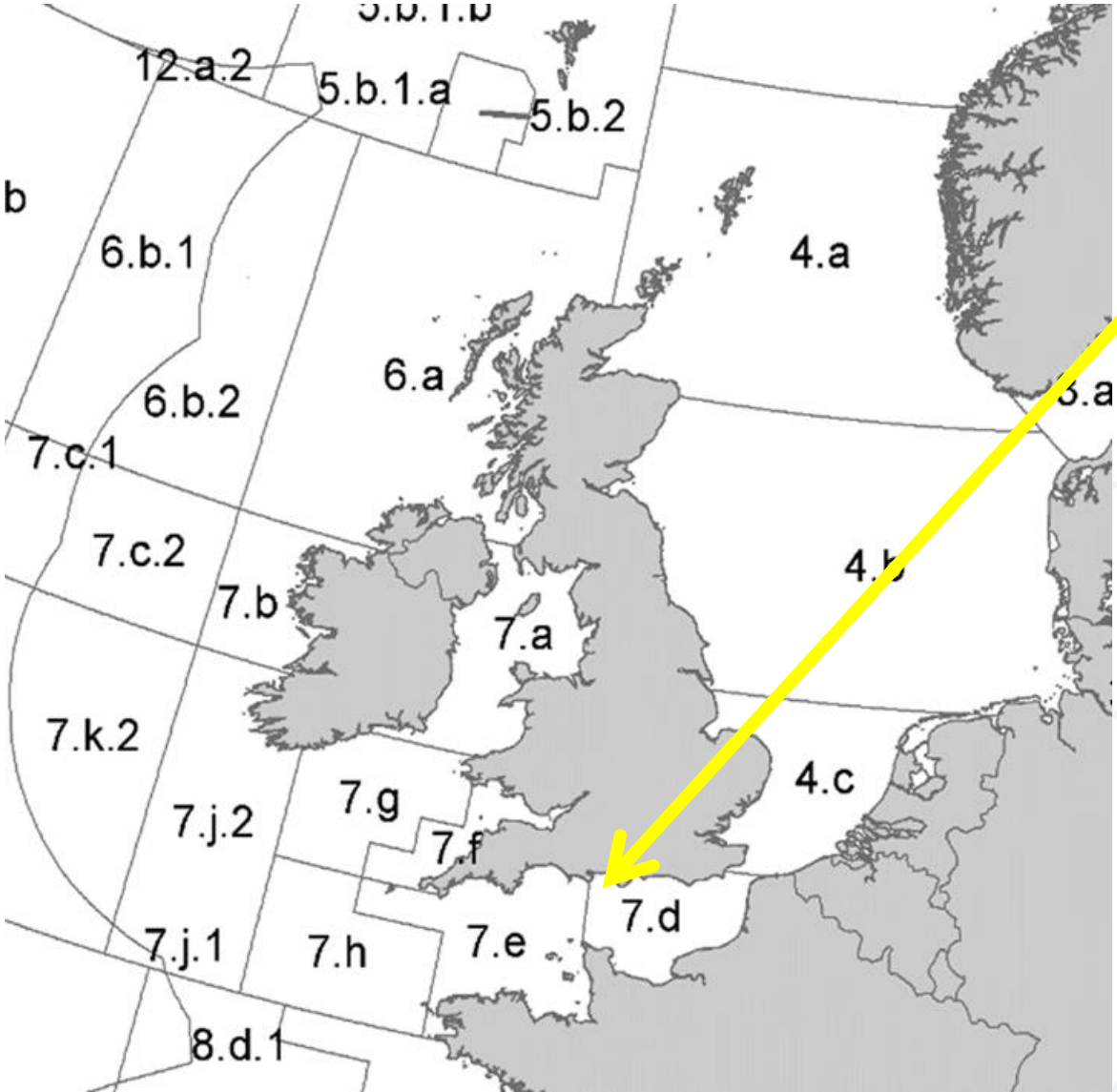
Irish Sea (7.a)

SUMMARY

Area	Stock	Advice 2018	Advice 2017	Catch 2016
Irish Sea	Cod 7.a	1073	0	142
	Haddock 7.a	3444	3061	1306
	Whiting 7.a	0	0	780
	Plaice 7.a	3336	1493	1119

Colours indicate that the value for the Advice for 2018 is either above (green) or below (red) the Advice for 2017 or the Catch in 2016

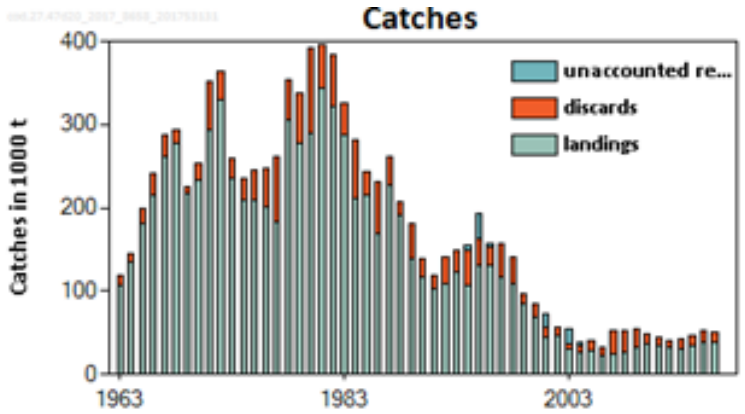
English Channel (Divisions 7.d and e)

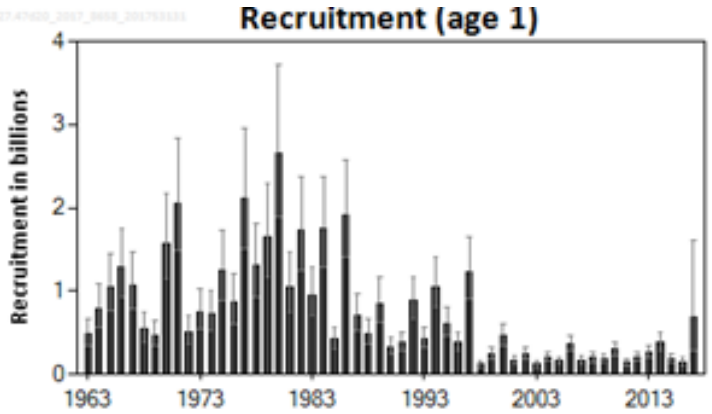


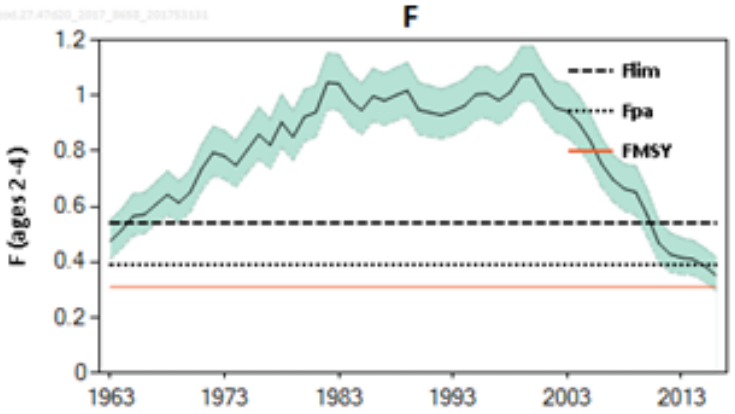
- Cod (4, 7.d, Skagerrak)
- Sole (7.d)
- Plaice (7.d)
- Sole (7.e)
- Plaice (7.e)
- Brill 4, 3.a. 7.de
- Lemon sole 4, 3.a, 7.d
- Striped red mullet 4, 3.a, 7.d
- Witch 4, 3.a , 7.d

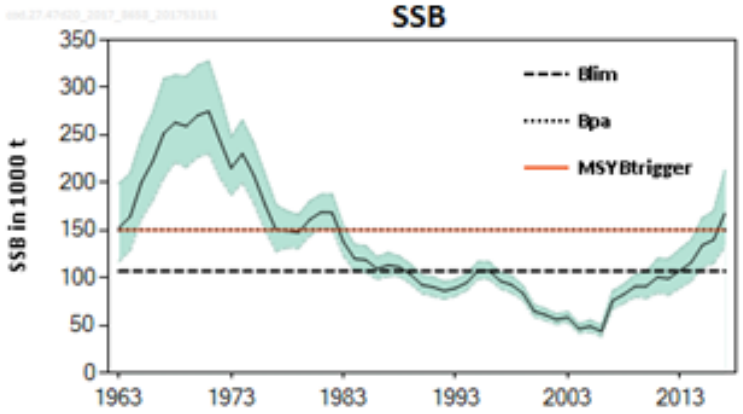
Cod in Subarea 4 and Divisions 7.d and 3.a West

Advice for 2018, MSY: Catch ≤ 59 888 t









		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
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	o	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Spawning stock has increased since 2006 and now above MSY $B_{trigger}$.
- Fishing pressure declined since 2000, but is estimated to be above F_{MSY}.
- Indications of increased recruitment in 2017.

Cod in Subarea 4 and Divisions 7.d and 3.a West

Catch (2016) : 50 544 t (24 % discards)

F(2017) = 0.35 (Assuming effort similar to 2016);

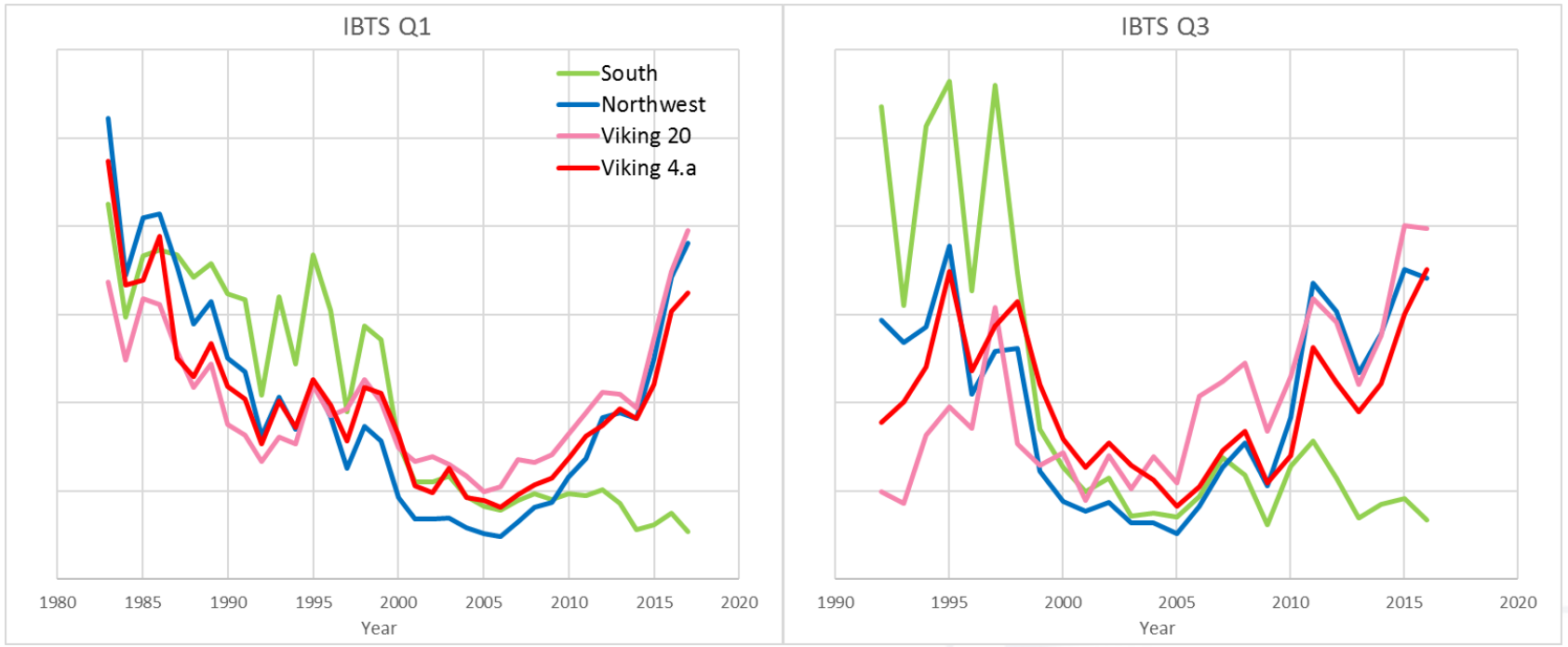
SSB (2018)= 204 267t > MSY $B_{trigger}$ (150 000 t ↓) F_{MSY}= 0.31↓

Basis	Total catch (2018)	Wanted catch* (2018)	Unwanted catch* (2018)	F_{total} (2018)	F_{wanted} (2018)	$F_{unwanted}$ (2018)	SSB (2019)	% SSB change **	% TAC change ***
ICES advice basis									
MSY approach: F_{MSY}	59888	41309	18579	0.31	0.2	0.108	216473	6	−12.2
Other options									
EU–Norway Management Strategy (MS) with previous reference points	74748	51393	23355	0.4	0.26	0.139	202395	−0.92	9.3
EU–Norway MS with new reference points	74748	51393	23355	0.4	0.26	0.139	202395	−0.92	9.3
F = 0	0	0	0	0	0	0	275777	35	−100
F_{pa}	73133	50297	22836	0.39	0.25	0.135	203811	−0.22	7
F_{lim}	95963	65753	30210	0.54	0.35	0.188	182048	−10.9	40
SSB (2019) = B_{lim}	178836	119859	58977	1.29	0.84	0.45	107000	−48	155
SSB (2019) = B_{pa}	130185	88465	41720	0.8	0.52	0.28	150000	−27	88
SSB (2019) = MSY $B_{trigger}$	130185	88465	41720	0.8	0.52	0.28	150000	−27	88
TAC (2017) – 15%	58613	39970	18643	0.3	0.195	0.104	217094	6.3	−15.0
TAC (2017) – 5%	65567	44672	20895	0.34	0.22	0.118	210182	2.9	−5.0
Constant TAC	69046	47023	22023	0.36	0.24	0.125	206804	1.24	0
TAC (2017) + 5%	72530	49374	23156	0.38	0.25	0.132	203532	−0.36	5
TAC (2017) + 15%	79508	54076	25423	0.42	0.28	0.148	196951	−3.6	15
F = F_{2017}	66900	46061	20839	0.35	0.23	0.123	209849	2.7	−2.0

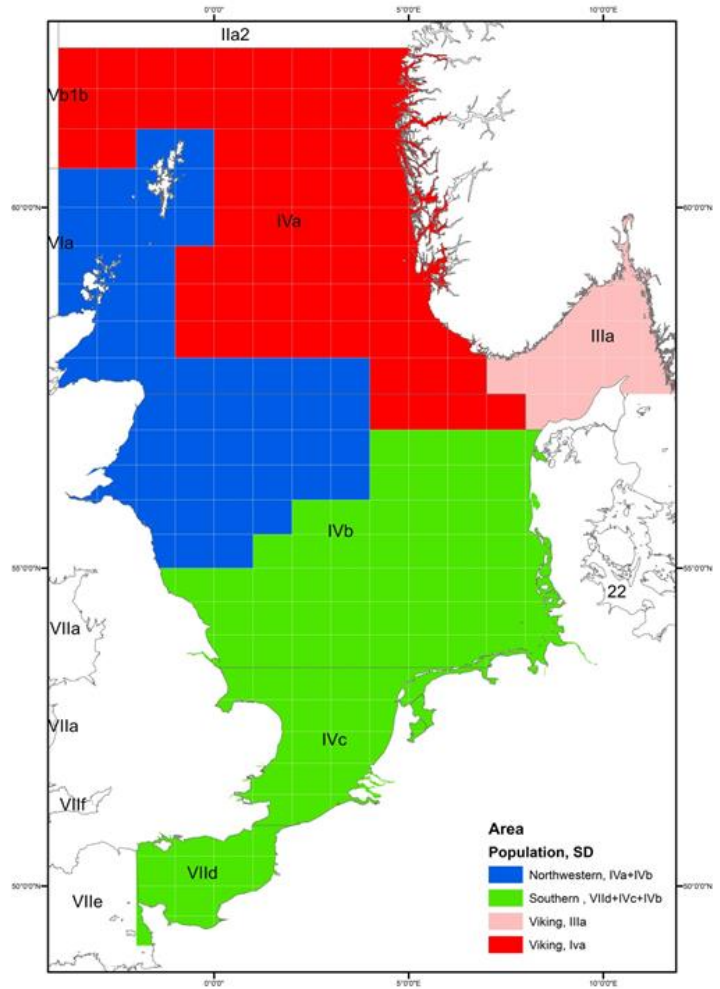
** SSB 2019 relative to SSB 2018.

*** Wanted catch in 2018 relative to TAC in 2017: North Sea (39 220 t) + Skagerrak (5744 t) + Eastern English Channel (2059 t) = 47 023 t.

Cod in Subarea 4 and Divisions 7.d and 3.a West



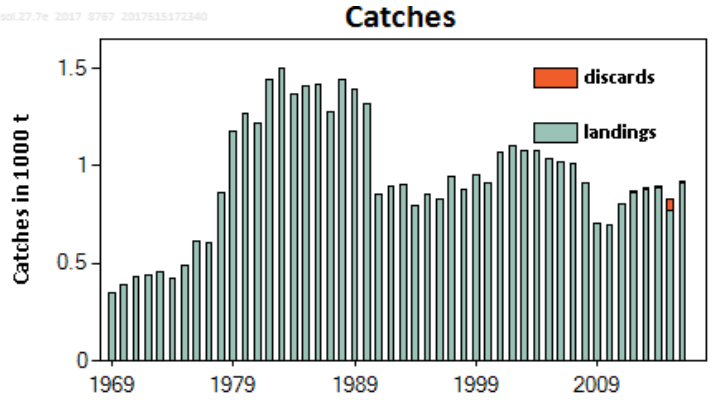
Biomass indices by sub region

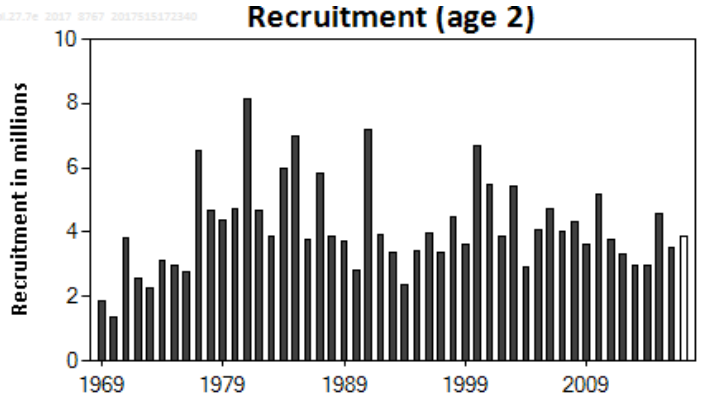


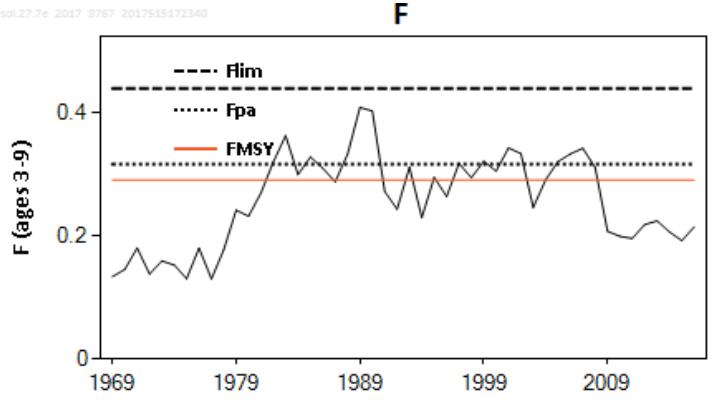
- **General increase in all areas apart from the southern area.**
- **Causes – climate change; biological, and/or fisheries effects ?**

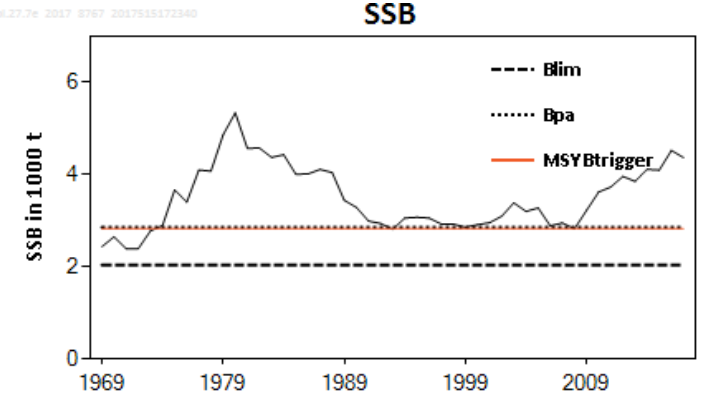
Sole in the western English Channel (7.e)

Advice for 2018: MSY: Catch ≤ 1 239 t









		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
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 biomass (SSB) has been above MSY $B_{trigger}$ since 1999.
- Fishing mortality (F) has been below F_{MSY} since 2009.
- Recruitment has been variable without an overall trend.

Assessment includes UK beam trawl and otter trawl commercial indices.

Sole in the western English Channel (7.e)

Catch (2016) : 924 t (1 % discards)

F(2017) = 0.21 (Recent average fishing pressure (2014-2016, scaled to 2016);

SSB (2018)= 4 354 t > $MSY_{Btrigger}$ (2 900 t) F_{MSY}= 0.29

Basis	Total catch^ (2018)	Wanted catch (2018)	Unwanted catch (2018)	F_{wanted} (2018)	SSB (2019)	% SSB change **	% TAC change ***
ICES advice basis							
MSY approach: F_{MSY}	1239	1202	36	0.29	4079	-6.3	5
Other options							
F = 0	0	0	0	0	5244	20	-100
F_{pa}	1349	1309	40	0.32	3977	-8.7	15
F_{lim}	1760	1708	52	0.44	3594	-17	49
SSB (2019) = B_{lim}	3501	3399	103	1.17	2000	-54	197
SSB (2019) = B_{pa}= MSY $B_{trigger}$	2511	2437	74	0.7	2900	-33	113
F = F_{2017}	949	922	28	0.21	4350	-0.083	-19
Management plan: F = 0.27 with 15% TAC constraint	1164	1130	34	0.27	4150	-4.7	-1.19

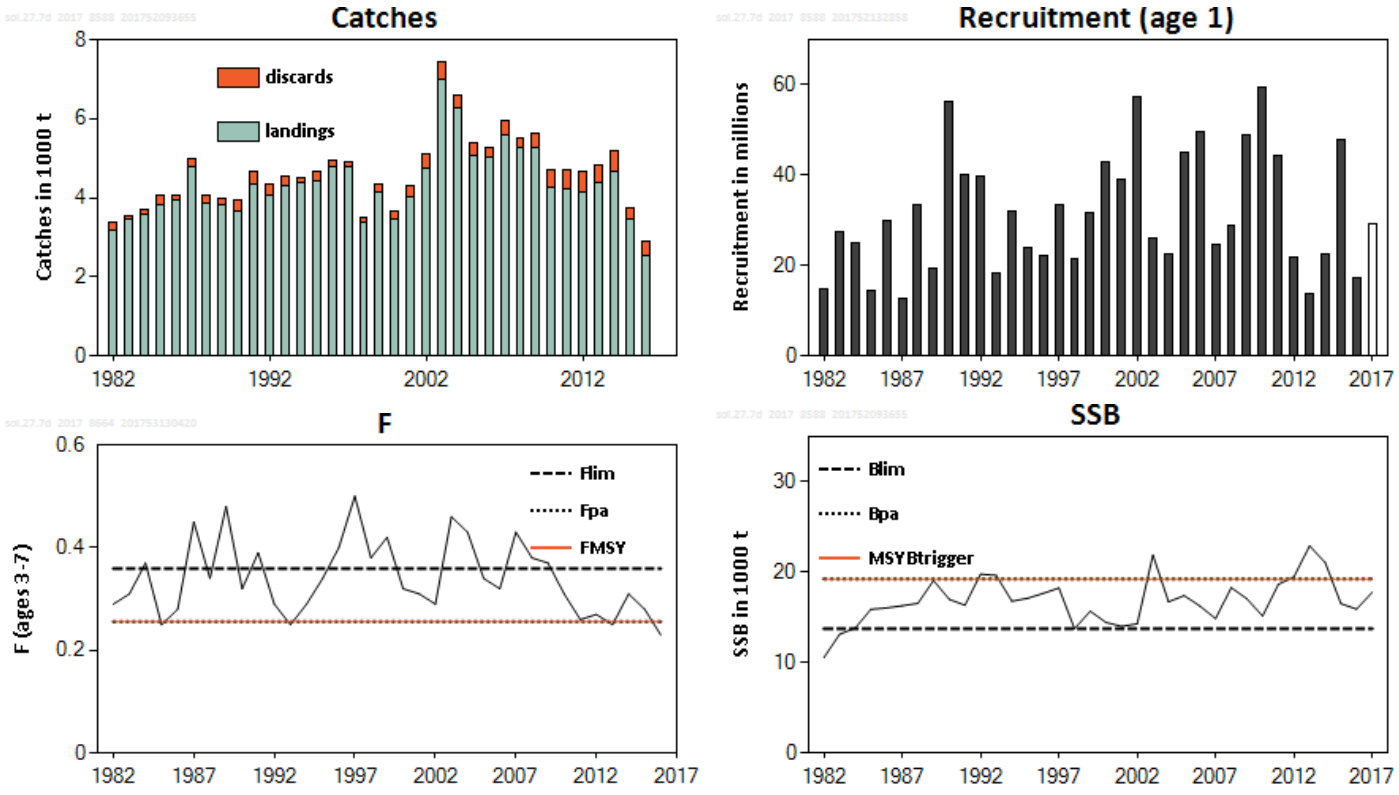
** SSB 2019 relative to SSB 2018.

*** Wanted catch in 2018 relative to TAC in 2017 (1178t).

^ Total catch derived from the wanted catch and the unwanted catches ratio.

Sole in the eastern English Channel (7.d)

Advice for 2018: MSY: Catch ≤ 3 866 t



		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	F_{MSY}	✗	✗	✓	Below	$MSY\ B_{trigger}$	✗	✗	✗ Below trigger
Precautionary approach	F_{pa},F_{lim}	o	o	✓	Harvested sustainably	B_{pa},B_{lim}	o	o	o Increased risk
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

- Benchmarked in 2017. Revised estimates.
- Spawning stock fluctuating between B_{lim} and MSY $B_{trigger}$.
- Fishing mortality has been decreasing since 2014 and is below F_{MSY} in 2016.
- Recruitment has been fluctuating without trend and was in 2012–2016 at the lowest of the time-series, with the exception of 2015.

Assessment includes commercial indices from Belgium, France and the UK.

Sole in the eastern English Channel (7.d)

Catch (2016) : 2 882 t (12 % discards)

F(2017) = 0.23 (Recent average fishing pressure (2014-2016, scaled to 2016);

SSB (2018)= 18 260 t < $MSY_{Btrigger}$ (19 251 t ↑) F_{MSY}= 0.256↓

Basis	Total catch (2018)	Wanted catch (2018)	Unwanted catch (2018)	F_{total} ages 3–7 (2018)	F_{wanted} ages 3–7 (2018)	$F_{unwanted}$ ages 1–3 (2018)	SSB (2019)	% SSB change **	% TAC change ***
ICES advice basis									
MSY approach: F_{MSY} × SSB (2018)/MSY $B_{trigger}$	3866	3429	437	0.243	0.22	0.07	18697	2	40
Other options									
Constant TAC	2769	2458	311	0.168	0.15	0.05	19820	9	0
TAC (2017) +15%	3184	2825	359	0.196	0.18	0.06	19395	6	15
TAC (2017) −15%	2354	2090	264	0.141	0.13	0.04	20245	11	-15
F = 0	0	0	0	0	-	-	22660	24	-100
F_{MSY}	4052	3593	459	0.256	0.23	0.07	18508	1	46
F_{pa}	4052	3593	459	0.256	0.23	0.07	18508	1	46
F_{lim}	5424	4803	621	0.359	0.32	0.1	17108	-6	96
SSB (2019) = B_{lim}	8731	7704	1027	0.657	0.59	0.19	13751	-25	215
SSB (2019) = B_{pa}	3325	2950	375	0.205	0.19	0.06	19251	5	20
SSB (2019) = MSY $B_{trigger}$	3325	2950	375	0.205	0.19	0.06	19251	5	20
F = F_{2017}	3698	3280	418	0.231	0.21	0.07	18869	3	34
Proposed NWWAC management strategy with current F_{MSY}	4052	3593	459	0.256	0.23	0.07	18508	1	46
Proposed NWWAC management strategy with F_{MSY} as specified in the plan	4654	4124	530	0.3	0.27	0.09	17893	-2	68

** SSB 2019 relative to SSB 2018.

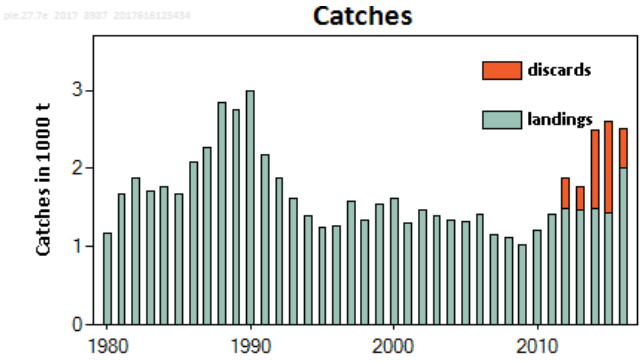
*** Total catch in 2018 relative to TAC in 2017 (2769 t).

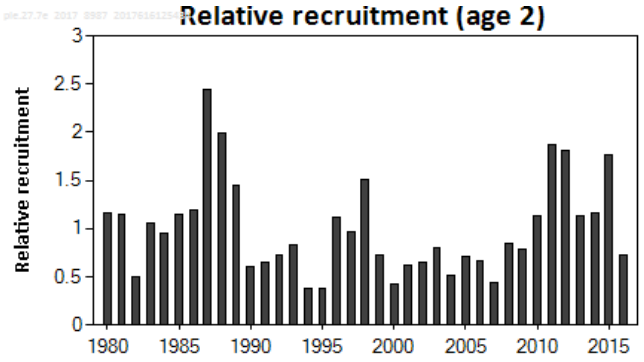
Plaice in the western English Channel (7.e)

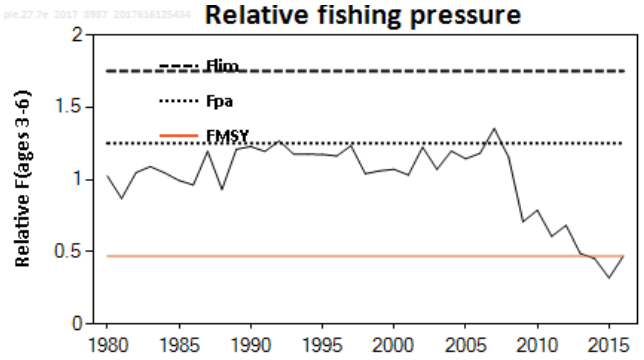
Advice for 2018, PA:

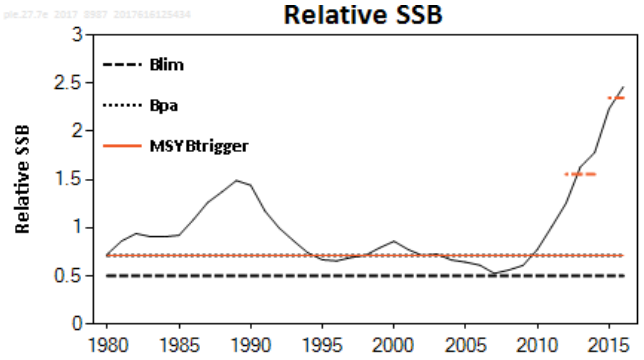
Division 7.e stock: Catch ≤ 3 257 t ; at recent discard rates: Landings ≤ 2 239 t

Catch of plaice in Div. 7.e* ≤ 2 946 t ; at recent discard rates: Landings ≤ 2 025 t









		Fishing pressure				Stock size			
		2014	2015	2016		2014	2015	2016	
Maximum Sustainable Yield	F_{MSY} proxy	✓	✓	✓	Below proxy	MSY $B_{Trigger}$ proxy	✓	✓	✓ Above proxy
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

- Assessment indicative of trends: discards not in assessment, but taken into account when producing advice. Includes UK-FSP survey.
- Spawning stock has increased since 2008 and at highest in time-series
- F declined substantially, at F_{MSY} in 2016.
- Recruitment has been fluctuating without trend.
- Proxy reference points determined.

***Plaice catches in Div. 7.d in Quarter 1 from various stocks: 35% from 7.d; 15% from 7.e; 50% from N Sea**

Plaice in the western English Channel (7.e)

Catch (2016) : 2 631 t (23 % discards)

Division 7.e plaice stock		
Index A (2015-2016)		2.3
Index B (2012-2014)		1.55
Index ratio (A/B)		1.51
Uncertainty cap	Applied	1.2
Recent advised catch (2017)		2 714 tonnes
Discard rate (2012-2016)		0.31
Precautionary buffer	Not applied	-
Catch advice**		3 257 tonnes
Landings corresponding to catch advice		2 239 tonnes
Plaice in Division 7.e		
Proportion of Division 7.e stock catches taken in Division 7.e (2003–2016)		0.9
Catch of plaice in Division 7.e corresponding to the advice for the stock		2 946 tonnes
Landings of plaice in Division 7.e corresponding to the advice for the stock		2 025 tonnes

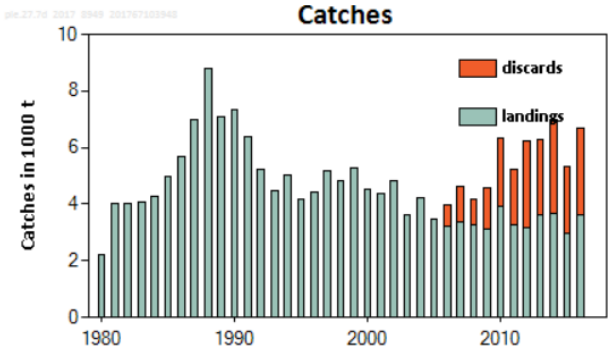
** [recent advised catch x uncertainty cap]

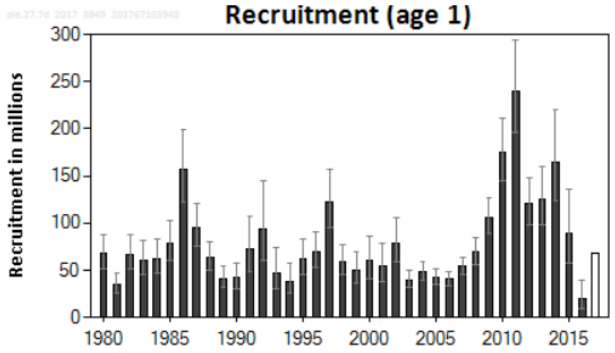
Plaice in the eastern English Channel (7.d)

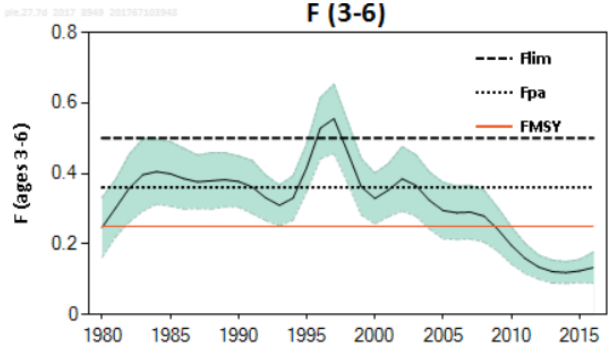
Advice for 2018, MSY:

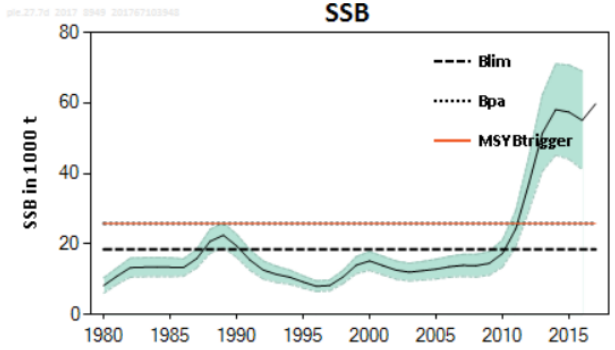
Division 7.d stock: Catch ≤ 10 592 t

Catch of plaice in Div. 7.d* ≤ 12 378 t ; at recent discard rates: Landings ≤ 8 335t









		Fishing pressure				Stock size			
		2013	2014	2015		2014	2015	2016	
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

- Part of the catches of plaice in Division 7.d are from the Western Channel and North Sea stocks.
- Spawning stock has increased since 2008 and has been above MSY $B_{trigger}$ since 2012.
- Fishing mortality has declined since the early 2000s and has been below F_{MSY} since 2009.
- Recruitment in 2016 is the lowest in the time-series.

***Plaice catches in Div. 7.d in Quarter 1 from various stocks: 35% from 7.d; 15% from 7.e; 50% from N Sea**

Plaice in the eastern English Channel (7.d)

Catch (2016) : 6 708 t - for the plaice 7d stock (46 % discards)
F(2017) = 0.133 (Recent fishing mortality (2016);
SSB (2018)= 55 798 t > $MSY_{Btrigger}$ (25 826 t) F_{MSY}= 0.25

Basis	Division 7.d plaice stock									Plaice in Division 7.d #				
	Total catch (2018)^	Wanted catch (2018)	Unwanted catch (2018)	F_{total} (2018)	F_{wanted} (2018)	$F_{unwanted}$ (2018)	SSB (2019)	% SSB change **	% change in wanted catch ***	Total catch (2018)	Wanted catch (2018)	Unwanted catch (2018)	% change in wanted catch^^	% change in the 7.d portion of the TAC ##
ICES advice basis														
MSY approach: F_{MSY}	10592	7132	3459	0.25	0.13	0.12	46483	−17	97	12378	8335	4042	80	62
Other options														
F = 0	0	0	0	0	0	0	57879	4	-100	0	0	0	−100	−100
F_{pa}	14602	9850	4752	0.36	0.187	0.173	42258	−24	172	17064	11511	5553	148	123
F_{lim}	19212	12987	6225	0.5	0.26	0.24	37469	−33	259	22451	15177	7275	227	193
SSB (2019) = B_{lim}	38522	26291	12231	1.35	0.7	0.65	18447	−67	627	45018	30724	14293	563	488
SSB (2019) = B_{pa}	30793	20932	9861	0.94	0.49	0.45	25826	−54	479	35986	24462	11524	427	370
MSY $B_{trigger}$	30793	20932	9861	0.94	0.49	0.45	25826	−54	479	35986	24462	11524	427	370
F = F_{2017}	5908	3971	1937	0.133	0.069	0.064	51483	−8	10	6905	4640	2264	0	−10

** SSB 2019 relative to SSB 2018.

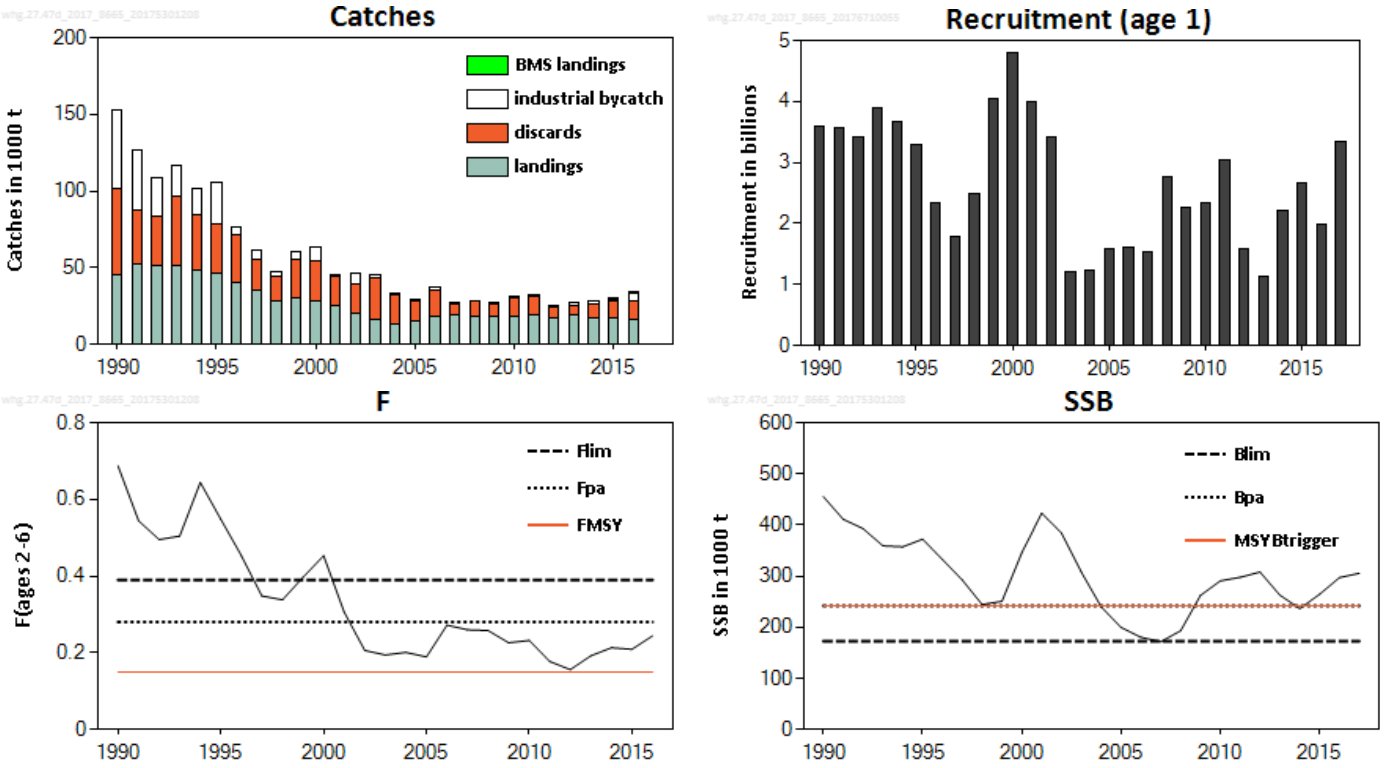
*** Wanted catch in 2018 relative to the ICES estimates of landings of the Division 7.d plaice stock in 2016 (3617.467 t).

^ Differences between the total catch and the sum of wanted and unwanted catches are due to rounding.

^^ Wanted catch in 2018 relative to the ICES estimates of landings of plaice in Division 7.d in 2016 (4637.567 t).

Whiting in the North Sea and eastern English Channel (4 and 7.d)

Advice for 2018, MSY: Catch ≤ 26 804 t



		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	F_{MSY}	✗	✗	✗	Above	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	SSB_{MGT}	-	-	-	Not applicable

- Spawning stock above MSY $B_{trigger}$.
- F remains above FMSY.
- Recruitment lower since 2003, higher estimate for 2017.
- EU-Norway management strategy no longer considered precautionary because of updated natural mortality values.
- Improved selectivity would maximize benefits from the fishery.

Whiting in the North Sea and eastern English Channel (4 and 7.d)

Catch (2016): 33 759 t (39 % discards and 14 % IBC)

F (2017)=F(2016)=0.244; SSB(2018) = 354 kt > $MSY_{Btrigger}$ (242)

F_{MSY}=0.15

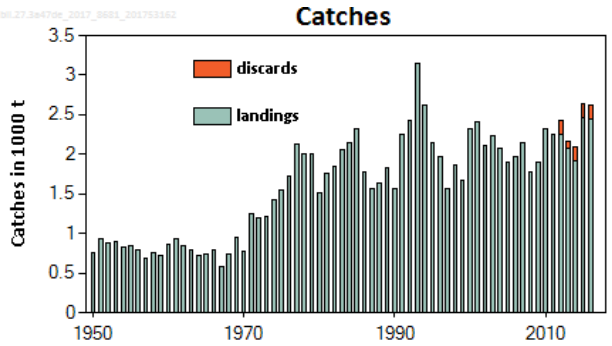
Basis	Total catch 2018	Total wanted catch 4+7d 2018	Total unwanted catch	Total IBC 2018	Wanted catch 4	Wanted catch 7d 2018 ***	Total F 2018	F (wanted catch) 2018	F (unwanted catch)	F(IBC) 2018	SSB 2019	% SSB change^	% TAC change (wanted catch)^^
ICES advice basis													
MSY approach:F_{MSY}	26804	13445	9429	3929	10757	2688	0.15	0.088	0.04	0.023	354527	0.10%	-33%
Other options													
F = 0 (IBC only)	4088	0	0	4088	0	0	0.023	0	0	0.023	372875	5.30%	-100%
F = F_{2017}	43207	23122	16271	3814	18499	4623	0.24	0.152	0.069	0.023	341306	-3.60%	16%
Rollover TAC	38040	20002	14187	3850	16003	3999	0.22	0.134	0.061	0.023	345534	-2.40%	0%
15% TAC decrease (27.4 only)	32901	17002	12012	3886	13603	3400	0.187	0.113	0.051	0.023	349648	-1.30%	-15%
15% TAC increase (27.4 only)	43179	23003	16362	3814	18403	4599	0.25	0.155	0.071	0.023	341420	-3.60%	15%
0.75 * F_{2017}	33156	17153	12119	3884	13723	3430	0.188	0.114	0.052	0.023	349443	-1.30%	-14%
1.25 * F_{2017}	51466	27840	19871	3756	22273	5567	0.3	0.19	0.087	0.023	334786	-5.50%	39%
F_{pa}	48334	26012	18545	3778	20811	5201	0.28	0.177	0.081	0.023	337293	-4.80%	30%
F_{lim}	66551	36644	26257	3650	29317	7327	0.39	0.25	0.115	0.023	322711	-8.90%	83%
SSB (2019) = B_{pa}=MSY $B_{trigger}$	167379	95493	68945	2941	76400	19094	1	0.67	0.31	0.023	241837	-31.70%	377%
SSB (2019) = B_{lim}	253557	145792	105430	2335	116641	29151	1.52	1.03	0.47	0.023	172741	-51.10%	629%
F_{mgt} =0.15 (European Norway Management Plan)	32901	17002	12012	3886	13603	3400	0.187	0.113	0.051	0.023	349648	-1.30%	-15%

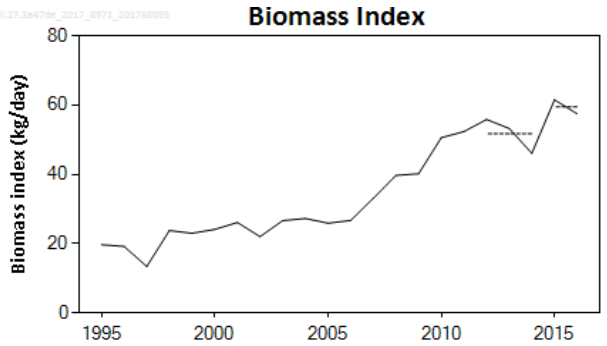
^ SSB 2019 relative to SSB 2018.

^^ Human consumption (HC; wanted catch) for Subarea 4 in 2018 relative to TAC for Subarea 4 and Division 2.a in 2017 (16 003 t).

Brill in the North Sea, Skagerrak and Kattegat, English Channel (4, 3.a, 7.de)

Advice for 2018 and 2019, PA: Catch ≤ 3 170 t (Landings ≤ 2 943 t)





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

Catch (2016) =2 621 t (7% discards)

Index A (2015–2016)		59 kg d^{-1}
Index B (2012–2014)		52 kg d^{-1}
Index ratio (A/B)		1.15
Uncertainty cap	Not applied	-
Advised catch for 2016–2017		2756 tonnes
Discard rate (2014–2016)		7.20%
Precautionary buffer	Not applied	-
Catch advice**		3170 tonnes
Landings corresponding to the catch advice***		2943 tonnes

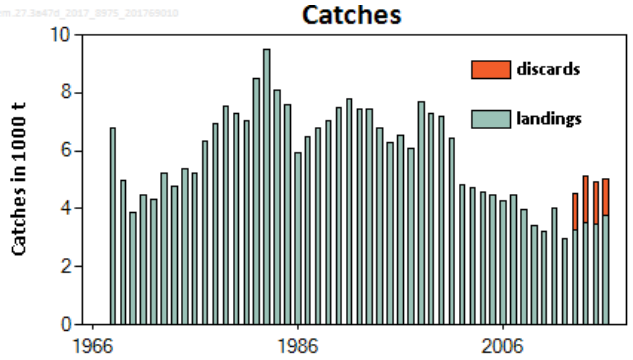
** Advised catch for 2016–2017 × index ratio.

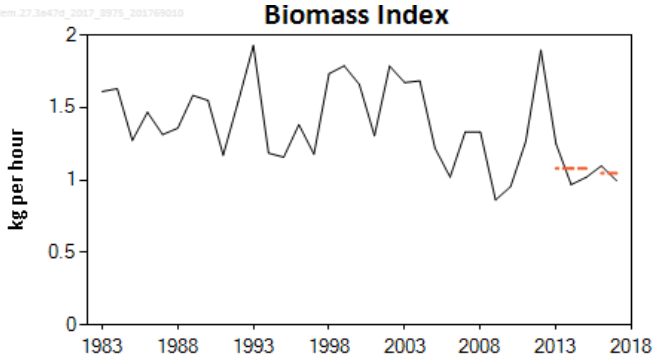
*** Advised catch for 2016–2017 × index ratio × (1 – discard rate).

- Landings have been stable for the last five years.
- Biomass index (Dutch beam trawl commercial index) has been gradually increasing.
- Proxy reference points calculated.

Lemon sole in the North Sea, Skagerrak and Kattegat, E-English Channel (4, 3.a, 7.d)

Advice for 2018 and 2019, PA: Catch ≤ 5 484t (Landings ≤ 3 924 t)





	Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017
Maximum sustainable yield	$F_{MSY\ proxy}$	✓	✓	✓ Below	MSY $B_{trigger\ proxy}$	✓	✓	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓ Below possible reference points	B_{pa},B_{lim}	✓	✓	✓ Above possible reference points
Management plan	F_{MGT}	–	–	– Not applicable	B_{MGT}	–	–	– Not applicable

Catch (2016) =5 012 t (25% discards)

Index A (2016–2017)	1.05 kg h^{-1}	
Index B (2013–2015)	1.08 kg h^{-1}	
Index ratio (A/B)	0.97	
Uncertainty cap	Not applied	-
Advised catch for 2016–2017	5655 tonnes	
Discard rate (2014–2016)	28.44%	
Precautionary buffer	Not applied	-
Catch advice**	5484 tonnes	
Landings corresponding to the catch advice***	3924 tonnes	

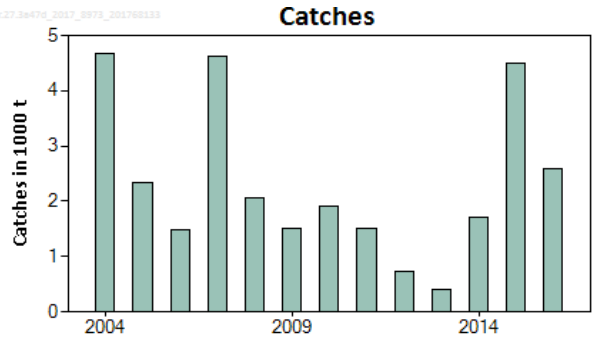
** [Advised catch for 2016–2017] × [index ratio].

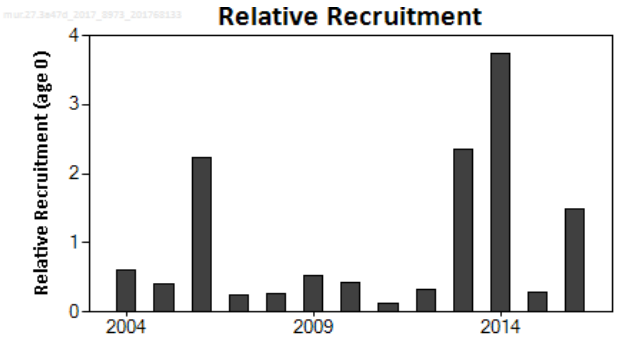
*** [Advised catch for 2016–2017] × [index ratio] × [1 –discard rate].

- Landings declined since late 1980's but increased recently.
- Biomass index has fluctuated without trend.
- Discard rates stable (25-30%).
- Proxy reference points calculated.

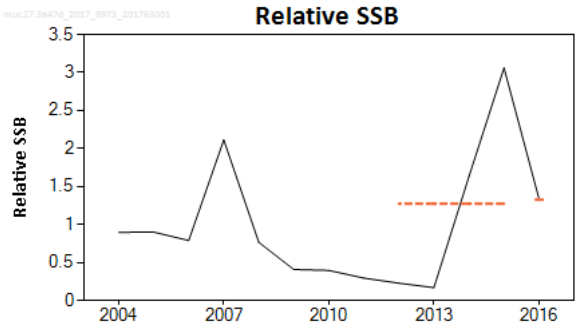
Striped red mullet in the North Sea, Skagerrak and Kattegat, E-English Channel (4, 3.a, 7.d)

Advice for 2018 and 2019, PA: Catch ≤ 465





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



Catch (2016) =2 579 t

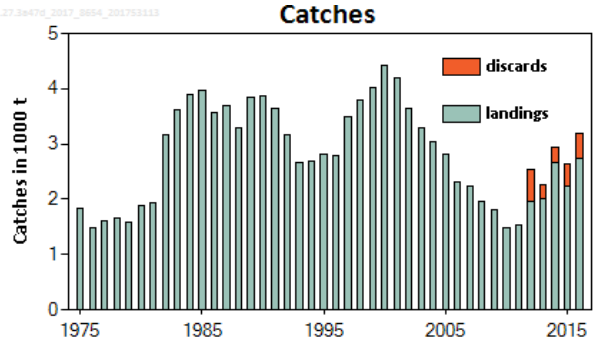
- Landings and biomass increased in 2014-2015.
- Strong recruitment in 2014.
- Biomass decrease in 2016.
- Discards negligible.
- Proxy reference point calculated.

Index A (2016)		2.2
Index B (2012–2015)		0.68
Index ratio (A/B)		1.05
Uncertainty cap	Not applied	-
Advised catch for 2016–2017		552 tonnes
Discard rate		Negligible
Precautionary buffer	Applied	0.8
Catch advice**		465 tonnes

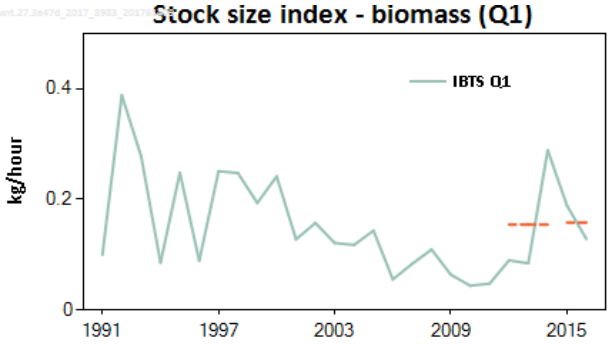
** [Advised catch for 2016–2017] × [uncertainty cap] × [precautionary buffer].

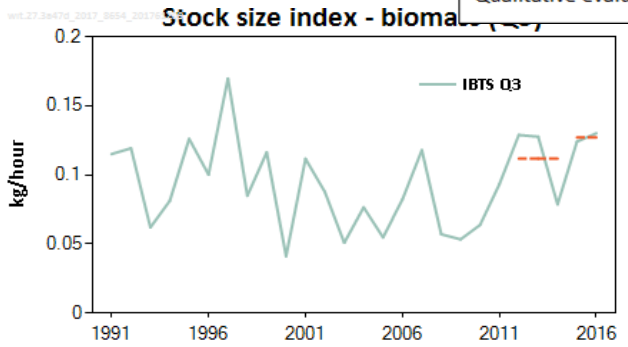
Witch in the North Sea, Skagerrak and Kattegat, E-English Channel (4, 3.a, 7.d)

Advice for 2018 and 2019, PA: Catch ≤ 2 390 (Landings ≤ 2 079 t)



		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	$F_{MSY\ proxy}$	✓	✓	✓	Below	MSY $B_{trigger\ proxy}$	✓	✓	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Below possible reference points	B_{pa},B_{lim}	✓	✓	✓ Above possible reference points
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable
Qualitative evaluation	-	–	–	–	-	-	–	–	– -





Catch (2016) =3 187 t (14% discards)

- Landings declined to the late 2000 but have increased since.
- Biomass indices have fluctuated without trend in the last 5 years.
- Proxy reference points estimated.

Index A (2015–2016)	Q1: 0.158 kg h^{-1}; Q3: 0.127 kg h^{-1}	
Index B (2012–2014)	Q1: 0.154 kg h^{-1}; Q3: 0.112 kg h^{-1}	
Index ratio (A/B)	Q1: 1.026 and Q3: 1.137; average:	
Uncertainty cap	Not applied	-
Advised catch for 2016–2017	2212 tonnes	
Discard rate (average 2014–2016)	0.13	
Precautionary buffer	Not applied	-
Catch advice**	2390 tonnes	
Landings corresponding to the catch advice***	2079 tonnes	

** [Advised catch for 2016–2017] × [average index ratio].

*** [Advised catch for 2016–2017] × [average index ratio] × [1 – discard rate].

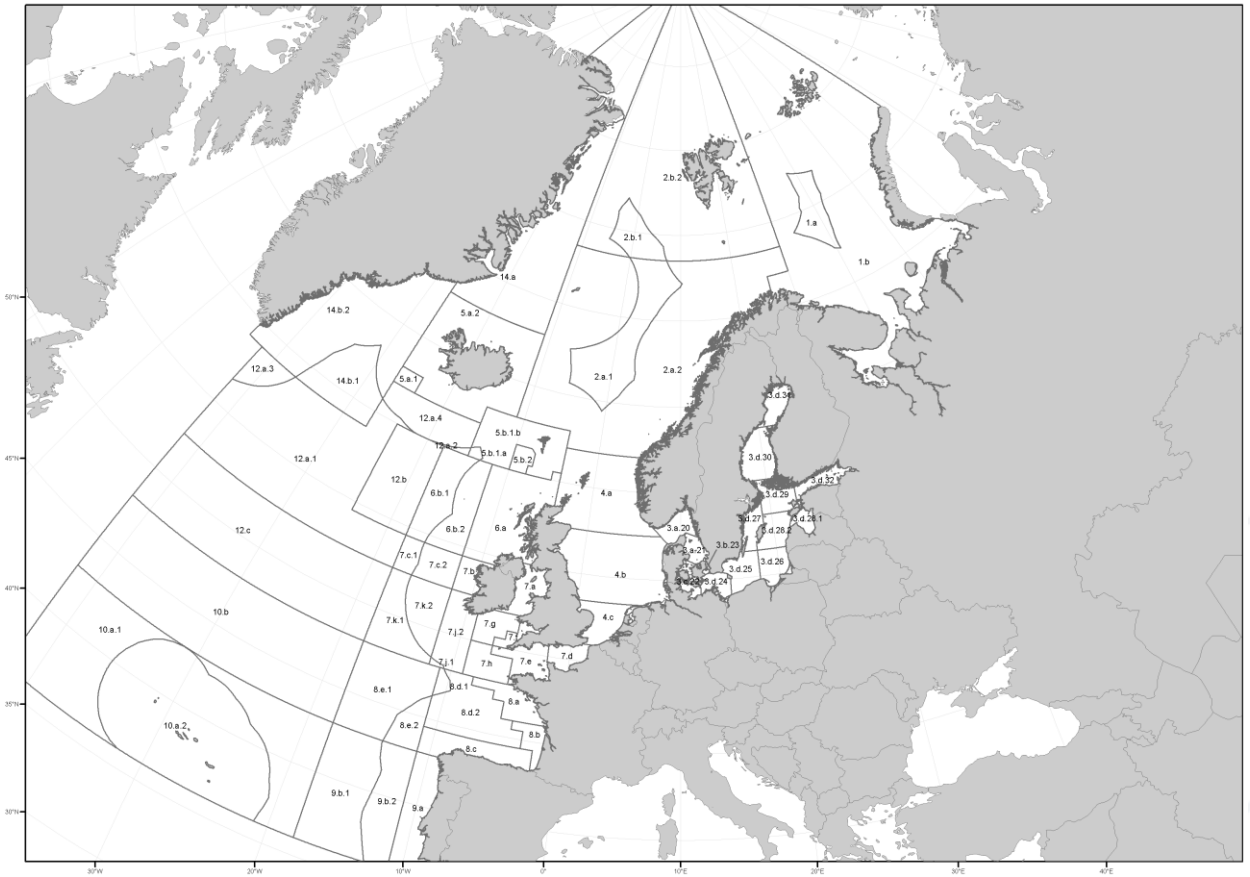
English Channel (Divisions 7.d and e)

SUMMARY

Area	Stock	Advice 2018	Advice 2017	Catch 2016
English Channel	Cod 3.a.20, 7.d. 4	59888	47359	50544
	Sole 7.d	3866	2487	2882
	Sole 7.e	1239	1198	924
	Plaice 7.d	10592	12805	6708
	Plaice 7.e	3257	2714	2631
	Whiting 4, 7.d	26804	23527	33759
	Brill 4, 3.a. 7.de	3170	2756	2621
	Lemon sole 4, 3.a, 7.d	5484	5655	5012
	Striped red mullet 4, 3.a, 7.d	465	552	2579
	Witch 4, 3.a , 7.d	2390	2212	3187

Colours indicate that the value for the Advice for 2018 is either above (green) or below (red) the Advice for 2017 or the Catch in 2016

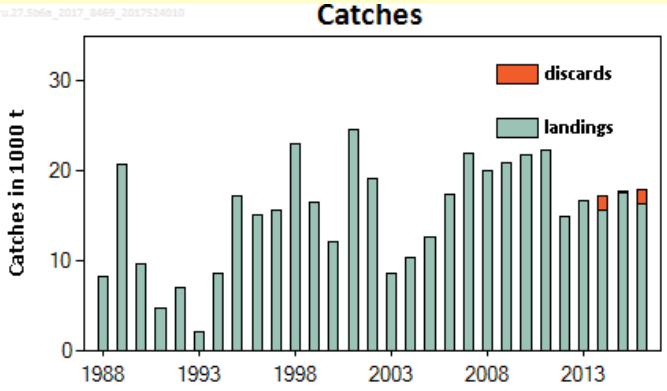
Deep-sea stocks

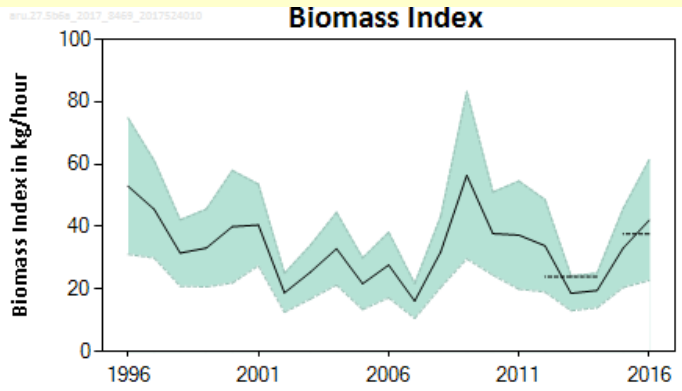


- Greater silver smelt in Faroes grounds and west of Scotland (5.b, 6.a)
- Greater silver smelt in other areas (7–10 and 12, 6.b)
- Ling in the Northeast Atlantic and Arctic Oceans (6–9, 12, and 14, 3.a and 4.a)
- Tusk in the Northeast Atlantic (4, 7–9, 3.a, 5.b, 6.a, and 12.b)

Greater silver smelt in Faroes grounds and west of Scotland (5.b, 6.a)

Advice for 2018 and 2019, PA: Landings ≤ 12 036 t





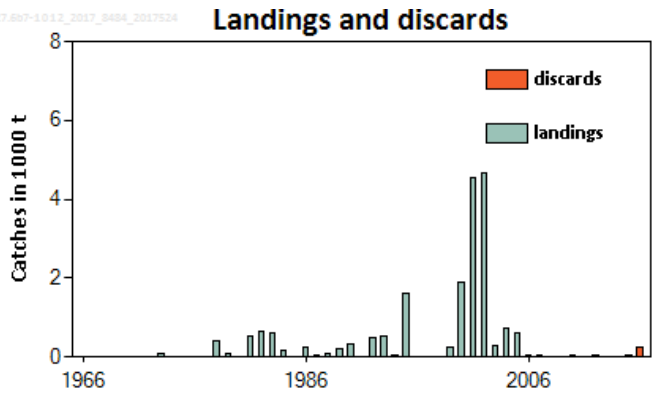
		Fishing pressure				Stock size			
		2014	2015	2016		2014	2015	2016	
Maximum Sustainable Yield	F_{MSY} Proxy	✓	✓	✓	Below	MSY $B_{trigger}$	?	?	? Undefined
Precautionary approach	F_{pa}, F_{lim}	✓	✓	✓	Below possible reference points	B_{pa}, B_{lim}	?	?	? Undefined
Management plan	F_{MGT}	–	–	–	Not applicable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

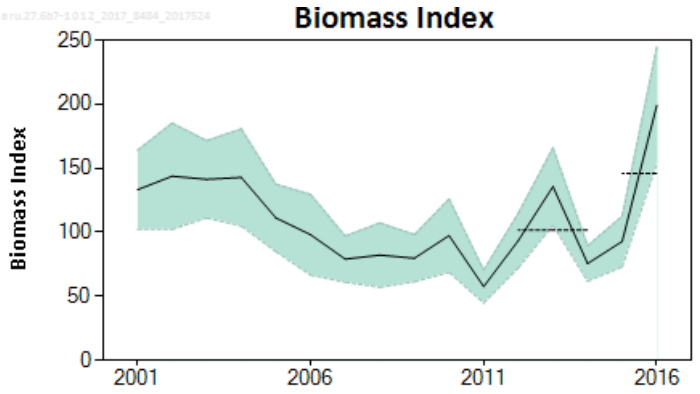
Index A (2015–2016)	38 kg h^{-1}	
Index B (2012–2014)	24 kg h^{-1}	
Index ratio (A/B)	1.56	
Uncertainty cap	Applied	1.2
Advised landings for years 2016–2017	10030 tonnes	
Discard rate	Unknown	
Precautionary buffer	Not	-
Landings advice*	12036 tonnes	

- Landings have ranged from about 15, 000 to 22, 000 t in the last ten years.
- Divisions 5.b and 6.a stock unit was defined in 2015.
- Biomass index from the summer survey on the Faroe Plateau in Division 5.b has increased since 2014.

Greater silver smelt in other areas (7–10 and 12, 6.b)

Advice for 2018 and 2019, PA: Landings ≤ 14 t





		Fishing pressure				Stock size				
		2014	2015	2016			2014	2015	2016	
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	-	↘	↗	↗	increasing

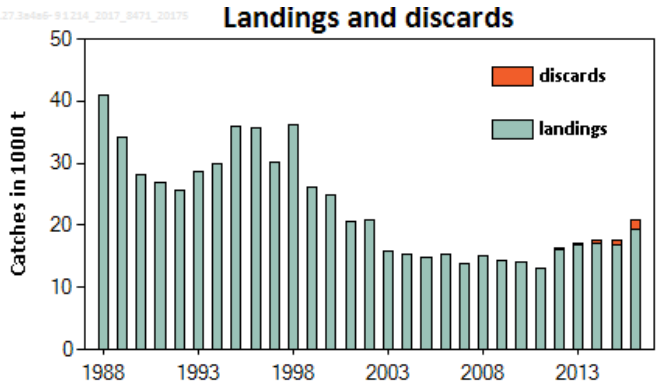
Index A (2015–2016)		145.9 kg [30 min]$^{-1}$
Index B (2012–2014)		101.6 kg [30 min]$^{-1}$
Index ratio (A/B)		1.4
Uncertainty cap	Applied	1.2
Advised landings for 2016 and 2017		15 tonnes
Discard rate		Unknown
Precautionary buffer	Applied	0.8
Landings advice*		14 tonnes

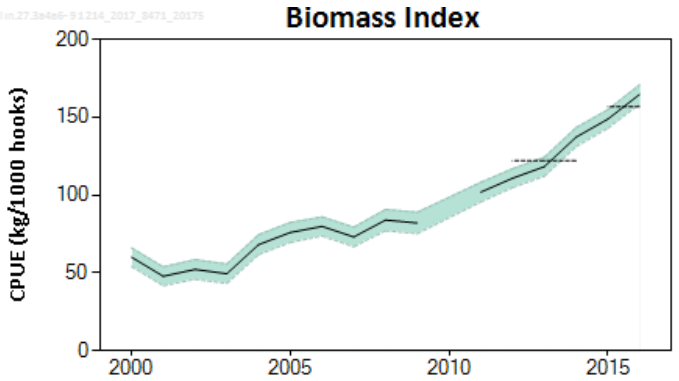
* [advice for 2016 and 2017] × [uncertainty cap] × [precautionary buffer].

- Catches in 2016 = 259 t, entirely discarded.
- Landings have been less than 50 t over the last 10 years.
- Spanish survey on the Porcupine Bank indicates an increase for the last two years.

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

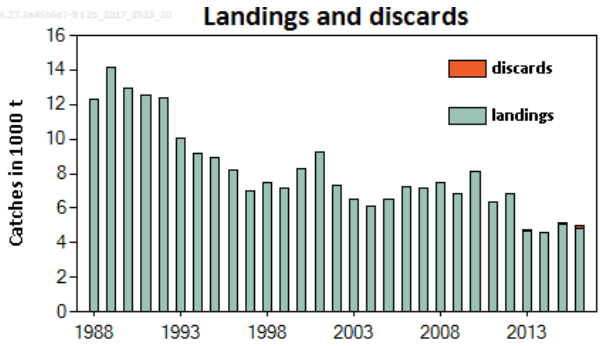
Catch (2016) =20 867 t (Discards = 1598 t)

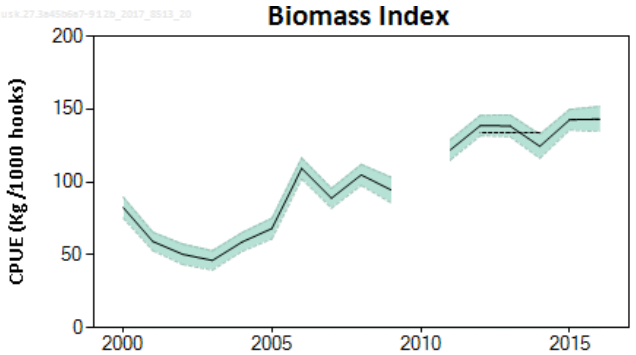
Index A (2015–2016)		157
Index B (2012–2014)		122
Index ratio (A/B)		1.28
Uncertainty cap	Applied	1.2
Advised catch for (2016–2017)		14746 tonnes
Discard rate		0.051
Precautionary buffer	Not applied	
Catch advice*		17695 tonnes
Landings advice**		16793 tonnes
* [recent advised catch] × [uncertainty cap].		

- 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.

Tusk in the Northeast Atlantic (4, 7–9, 3.a, 5.b, 6.a, and 12.b)

Advice for 2018 and 2019, PA: Catch ≤ 8 984 t)





		Fishing pressure				Stock size			
		2014	2015	2016		2014	2015	2016	
Maximum sustainable yield	F_{MSY} proxy	✓	✓	✓	Below	MSY $B_{trigger}$ proxy	✓	✓	✓ Above
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
Qualitative evaluation	-	–	–	–	Not applicable	-	–	–	– Not applicable

Catch (2016) =4 973 t (3% discards)

Index A (2015–2016)	143	
Index B (2012–2014)	134	
Index ratio (A/B)	1.07	
Uncertainty cap	Not applied	
Advised catch for (2016–2017)	8415 tonnes	
Discard rate	Negligible	
Precautionary buffer	Not applied	-
Catch advice*	8984 tonnes	

* [advised catch (2016–2017)] × [index ratio].

- Catches lower in the last 4 years.
- Catch per unit effort based on the Norwegian longline fleet shows a positive trend since 2004.

Deep-sea stocks

SUMMARY

Area	Stock	Advice 2018	Advice 2017	Catch 2016	Notes
Deep stocks	Greater silver smelt 5.b, 6.a	12036	10030	17993	
	Greater silver smelt 7-10,12 ,6.b	14	15	0	Landings
	Ling 6-9, 12, 14, 3.a, 4.a	17695	14746	20867	
	Tusk 4,7-9, 3.a, 5.b, 6.a, 12.b	8984	8415	4973	

Colours indicate that the value for the Advice for 2018 is either above (green) or below (red) the Advice for 2017 or the Catch in 2016

Thank you for your attention!

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