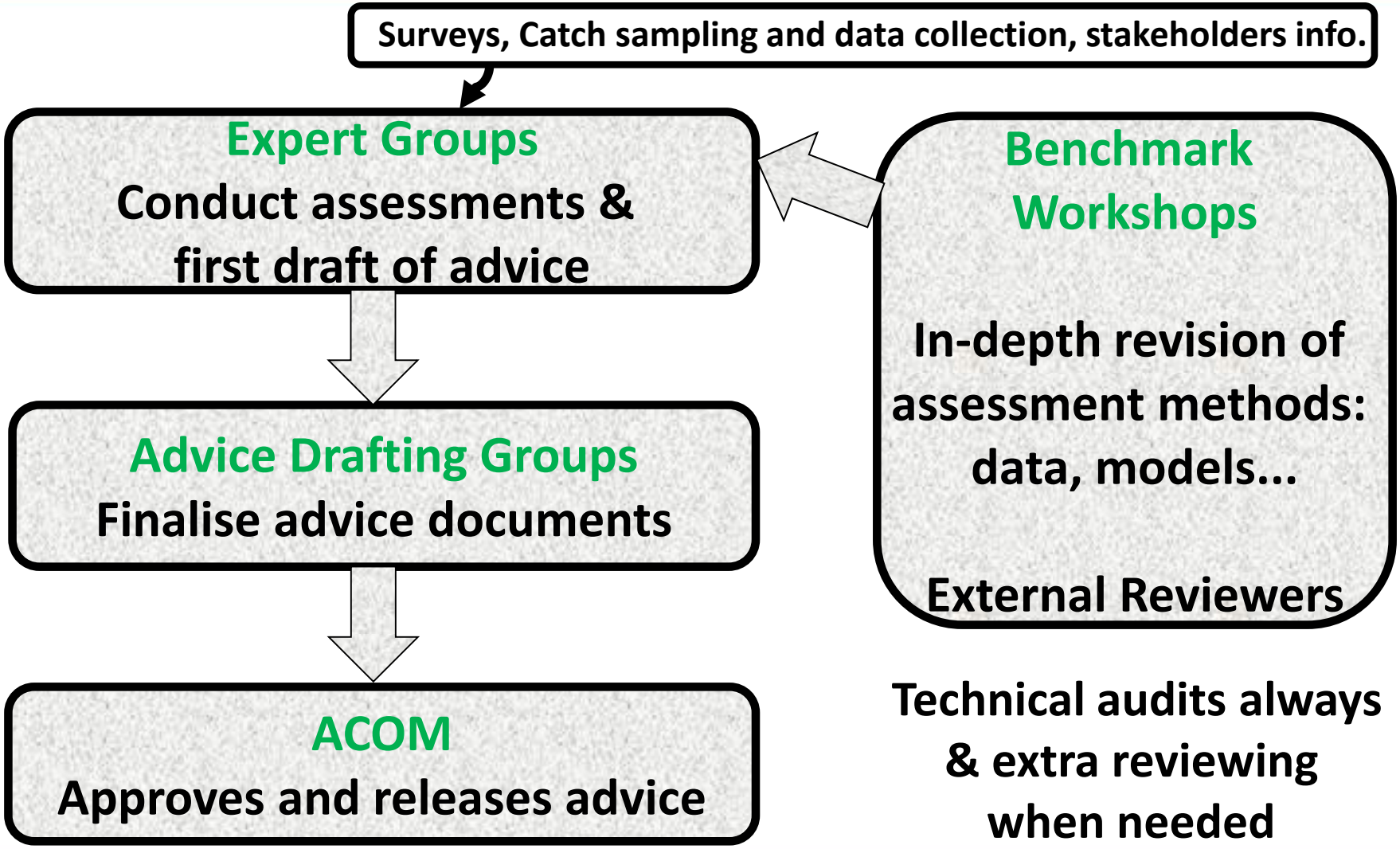


# ICES Advice for 2017

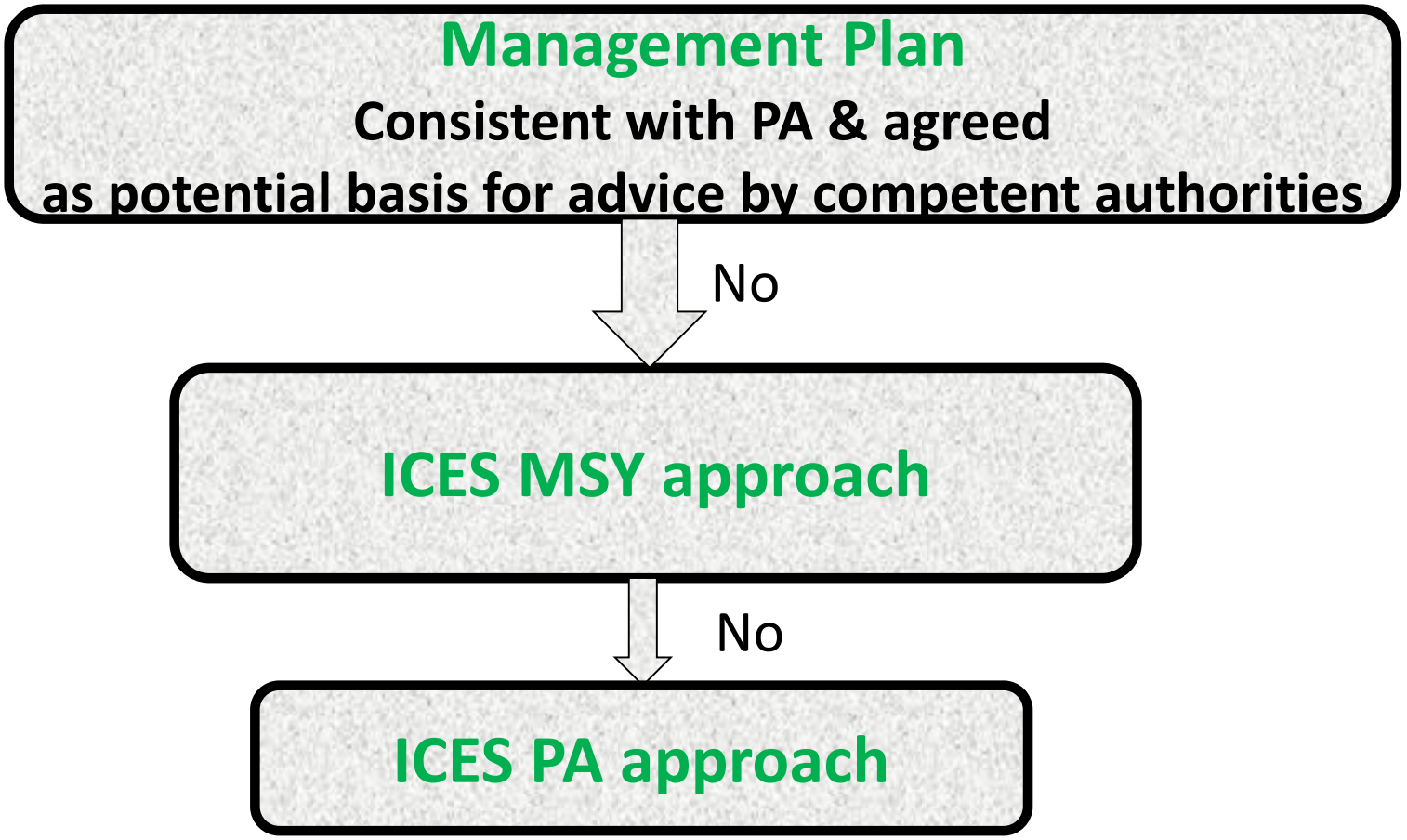
*Ghislain Chouinard, ICES ACOM vice-chair*

**For NWWAC (Edinburgh, July 5, 2016)**

# Steps in Advisory Process



# Basis for ICES Advice




All options in Outlook Table

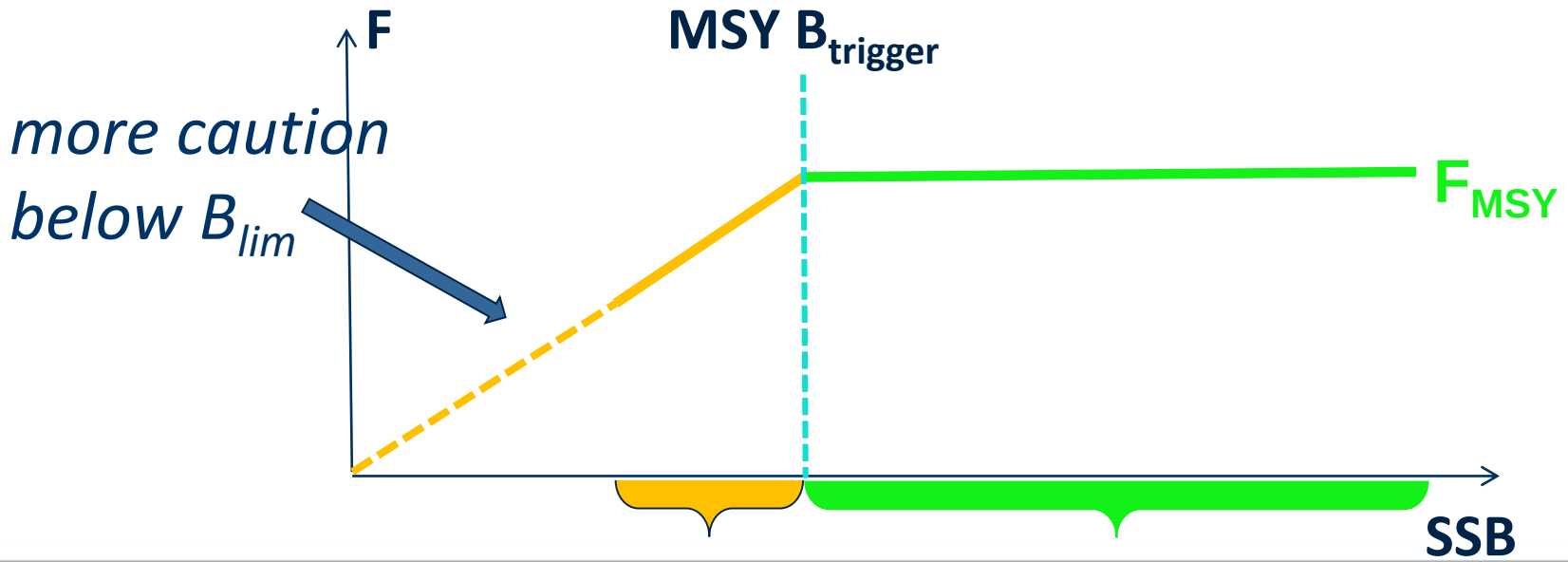
# Basis for ICES Advice

| 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<br>MSY approach being developed |
| 4 | Stocks with reliable catch and biological data | Precautionary approach<br>MSY approach being developed |
| 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 and 4, 2014-2015)**

**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
- ✓ Now in the process of developing MSY proxy reference points for stocks in categories 3 & 4
- ✓ Done for some stocks in North Western Waters

# Category 3 (stocks with abundance index)

Advice based on previous advice [or recent catch or landings], modified according to index information (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 if status in relation to reference points unknown --- exceptions if significant increases in stock size or reductions in exploitation)

- Advice does not change every year

# Terminology: Wanted & Unwanted catch

**For stocks under EU landing obligation in 2017:**

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

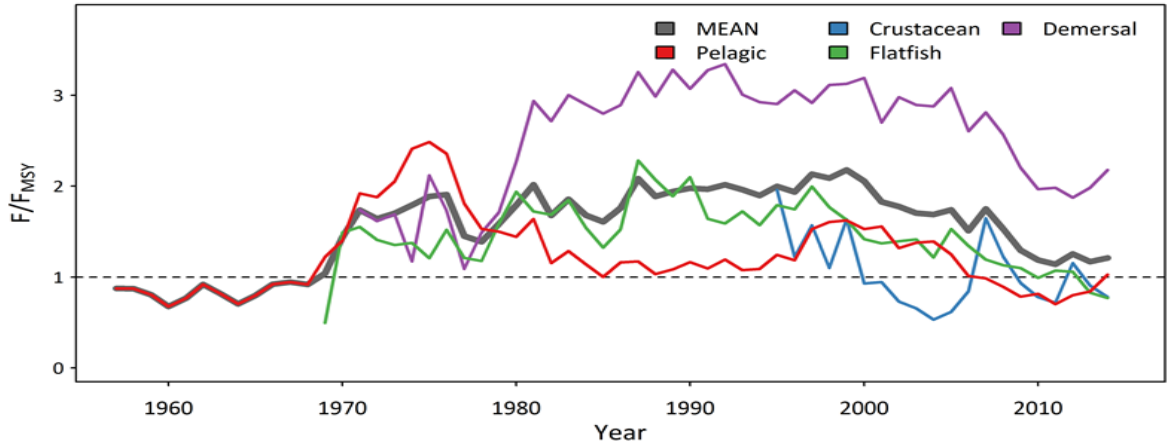
This split, based on the past performance of the fishery, is expected to evolve and the relative magnitude of these components will change.

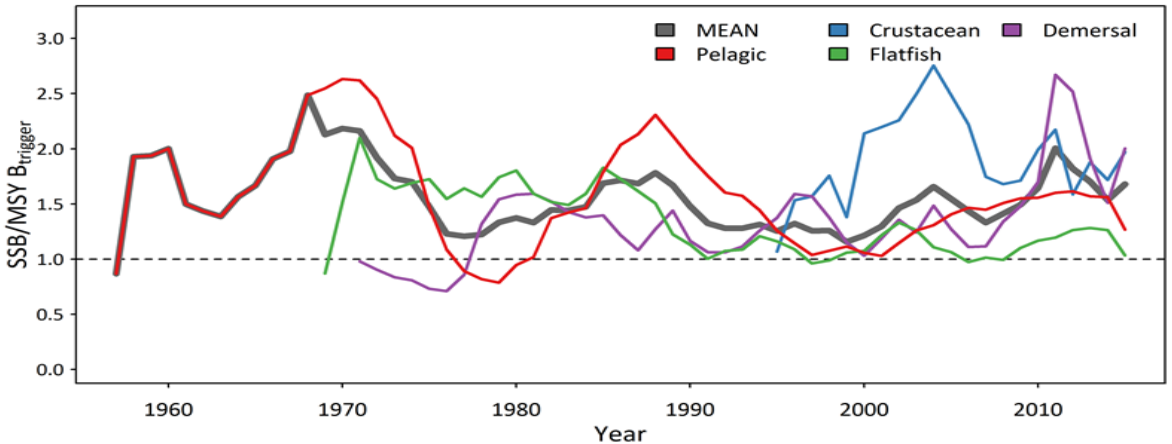
# New in 2016

- ✓ *Revamped reference codes for ICES areas from latin to modern hierarchy references (e.g. from Subarea IV to Subarea 4).*
  - *Consistency with other areas*
  - *More amenable to queries.*
- ✓ *Produced requested advice on MSY proxies for selected Western Waters stocks and a framework for classification of stock status based on these.*
  - *Now used in the stock status table where no MSY reference points exist*
- ✓ *Produced requested advice on $F_{MSY}$ ranges for selected stocks in ICES subareas 5 to 10*
  - *Range of $F_{MSY}$ to deliver no more than a 5% reduction in long-term yield compared with MSY*
  - *Reference point values for some stocks were defined or revised. (**red font indicates a revision with ↓ or ↑** - no arrows indicates new)*

# New in 2016

- ✓ ***Produced an Ecosystem overview for the Celtic Seas Ecoregion***
  - ***Objective to provide a concise up-to-date, evidence-based overview of each of the ICES ecoregions including the main human activities and their effects***



# Work in autumn 2016

***WKLIFE 6 (October 5-9, 2016, Lisbon):***

- Develop an operational advisory framework for stocks in categories 3-6, focusing on advice rules that will provide precautionary advice consistent with the objectives of achieving MSY.

***WKIrish - WKIrish2 (Belfast, September 26-29, 2016)***

- Benchmarking process started in 2015 to disentangle the potential drivers that are important to consider for stock assessments and management plans for Irish Sea fisheries.
- Scoping meeting held in September 2015, data evaluation this year.
- Two meeting in 2017 - Stock assessment benchmark and synthesis

**All advice available online at:**

http://www.ices.dk

*Click on*

**Follow 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

***Advice online***

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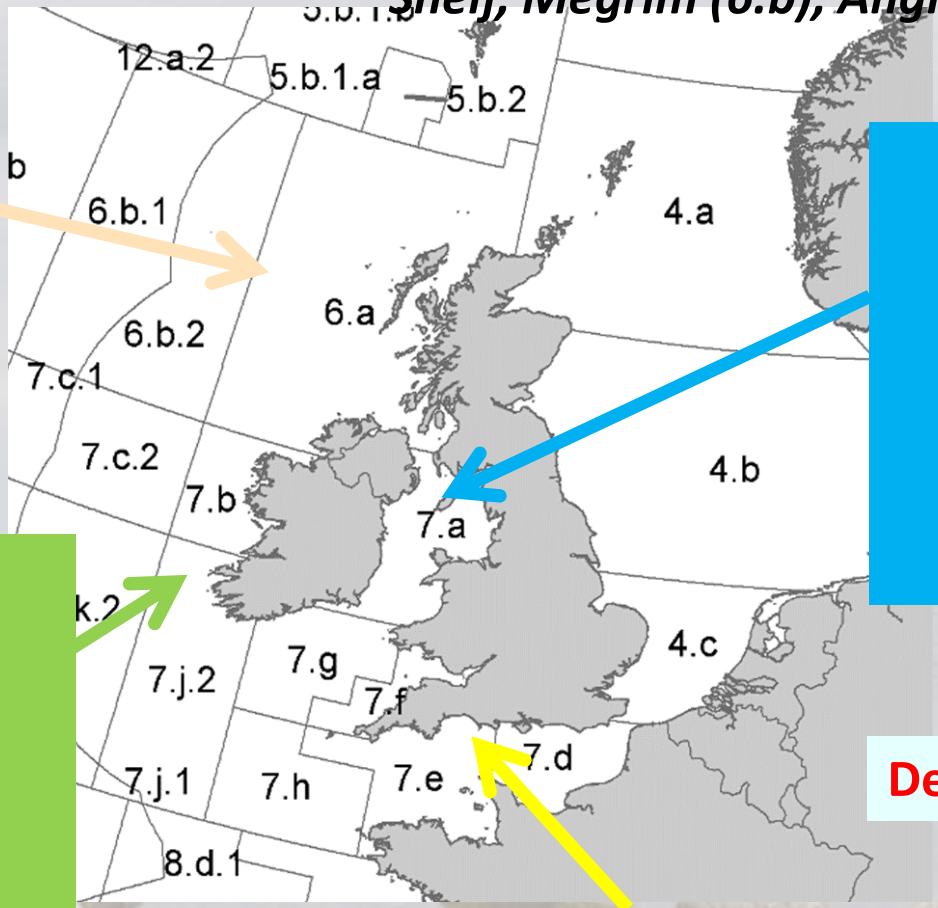
## *ADVICE IN AUTUMN FOR: Nephrops, Haddock Northern Shelf, Megrim (6.b), Anglerfish (3.a,4,6)*

**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)
- *Nephrops* (FUs11-12-13)




**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
- Sea bass
- *Nephrops* (FUs 16-17-20-22)

**Deep-sea species**

**Channel**

- Cod (4, 7.d, Skagerrak)
- Plaice (7.d)
- Plaice (7.e)
- Sole (7.d)
- Sole (7.e)

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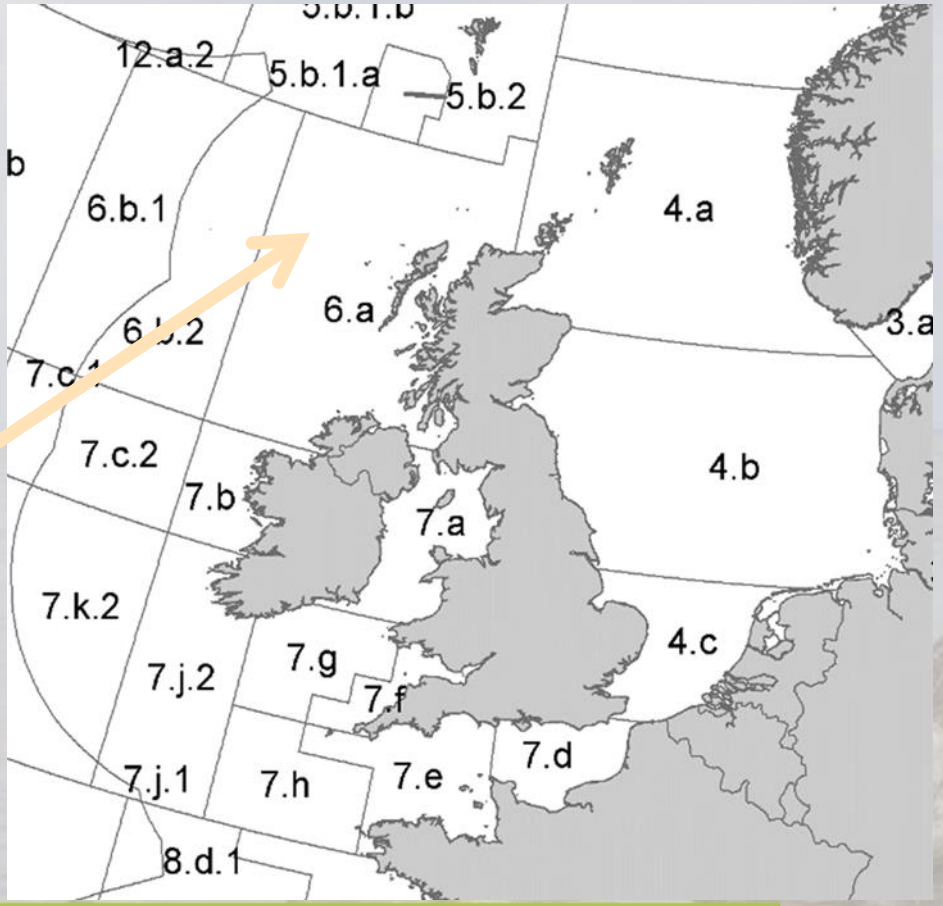
# West of Scotland & Rockall (6.a & 6.b)

- Cod (6.a; 6.b)
- Haddock (6.b)
- Whiting (6.a; 6.b)
- Megrim (4.a-6.a)
- Pollack (6-7)

**IN AUTUMN:**

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



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

## Summary

| Area | Stock | Advice 2017 | Advice 2016 | Catch 2015 |
|---|---|---|---|---|
| West of Scotland - Rockall | Haddock 6.b | 4690 | 3932 | 2972 |
| | Whiting 6.a | 0 | 0 | 1620 |

# Advice given for multiple years in 2015
## West of Scotland & Rockall (6.a & 6.b)

| Stock | Advice 2016 (tonnes) | Advice 2017 (tonnes) | Advice 2018 (tonnes) |
|---|---|---|---|
| Cod in Division 6.a (west of Scotland) | 0 | 0 | |
| Whiting in Division 6.b (Rockall) | 11 | 11 | 11 |
| Cod in Division 6.b (Rockall) | 17 | 17 | |
| Megrim (Lepidorhombus spp.) Divisions 4.a and 6.a | 8 567 | 8 567 | |
| Pollack in Subarea 6 and 7 | 4200 | 4200 | |
| Sea bass in 6.a, 7.b and 7.j (west of Scotland and Ireland) | 5 | 5 | |

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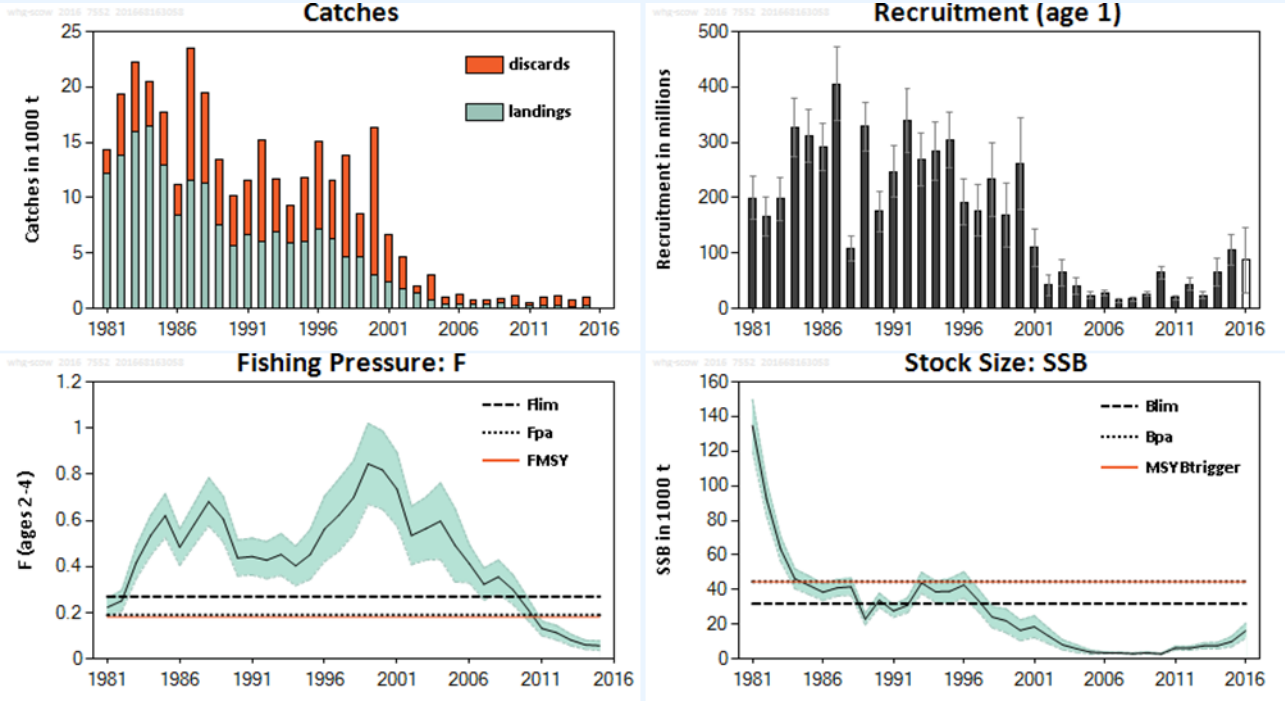
# Whiting in Division 6.a (West of Scotland)

## Advice for 2017 and 2018, PA:

Zero catch




| | | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 | |
| Maximum Sustainable Yield | $F_{MSY}$ | ✓ | ✓ | ✓ | Appropriate | 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 | $SSB_{MGT}$ | - | - | - Not applicable |

* Downward revision of the stock biomass relative to the previous assessment

* Fishing mortality very low

* Rec very low since 2002 but higher in recent years

* SSB increasing, remains < $B_{lim}$

* Majority of the catches are discarded

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# Whiting in Division 6.a (West of Scotland)

Catch (2015) ~ 1 620 t (~ 86% discarded)

F(2016) = F(2013-2015) = 0.07; SSB (2017) = 18.7 kt < $MSY_{Btrigger}$ (44.6 kt) $F_{MSY}$ = 0.18

| Rationale | Catch total (2017) | Wanted catch* (2017) | Unwanted catch (2017) | Basis | F Total (2017) | F wanted catch (2017) | F unwanted catch (2017) | SSB (2018) | % TAC change* | % SSB change |
|---|---|---|---|---|---|---|---|---|---|---|
| Precautionary approach | 0 | 0 | 0 | Zero catch | 0 | 0 | 0 | 16966 | −100 | −9 |
| Other options | 377 | 181 | 199 | $TAC_{2016}$ −15% | 0.025 | 0.011 | 0.014 | 16539 | −15 | −12 |
| | 444 | 213 | 234 | $TAC_{2016}$ | 0.029 | 0.013 | 0.016 | 16464 | 0 | −12 |
| | 510 | 245 | 269 | $TAC_{2016}$ +15% | 0.034 | 0.015 | 0.019 | 16388 | 15 | −12 |
| | 991 | 475 | 523 | $F_{2016}$ | 0.067 | 0.030 | 0.037 | 15847 | 123 | −15 |
| | 4083 | 1907 | 2102 | $F_{lim}$ | 0.270 | 0.120 | 0.150 | 12593 | 795 | −33 |
| | 2799 | 1342 | 1479 | $F_{pa}$ | 0.190 | 0.084 | 0.106 | 13874 | 530 | −26 |
| | 1114 | 534 | 589 | $F_{MSY} \times SSB_{2017}/MSY\ B_{trigger}$ | 0.075 | 0.034 | 0.042 | 15709 | 151 | −16 |

Weights in tonnes. *Wanted catch (2017) for the stock (VIa) relative to 2016 TAC for Subarea VI (213 t)

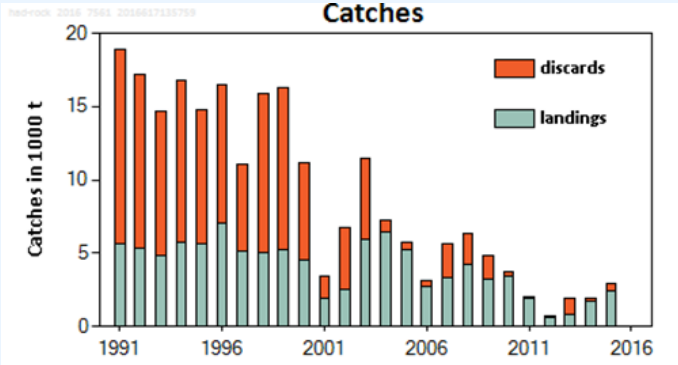
SSB expected to remain below $B_{lim}$ in 2019, even with no catch in 2017 and 2018

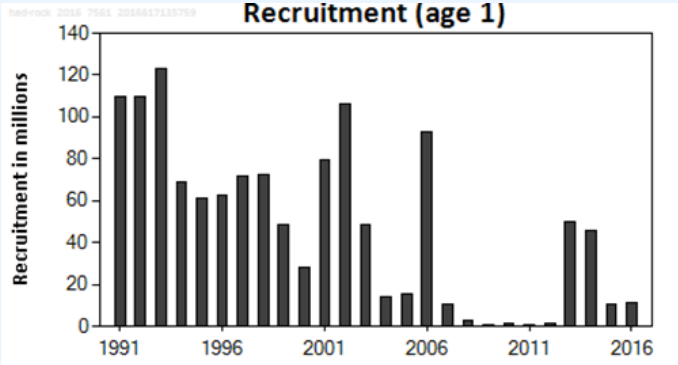
- The increase in mesh size (from 100 to 120 mm since 2010) and the large SMPs in *Nephrops* fishery have likely contributed to the observed reduction in F
- Could become a major 'choke species' for the 6.a Nephrops fishery in the context of Landing Obligation

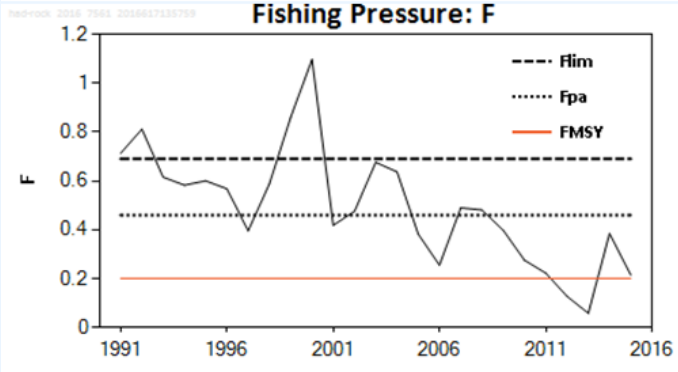
# Haddock in Division 6.b (Rockall)

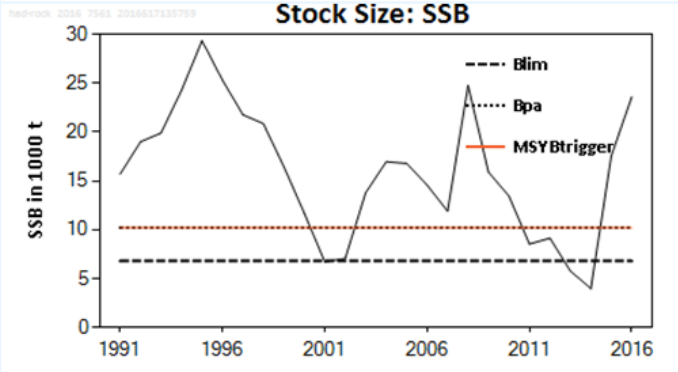
**Advice for 2017, MSY:** Catch ≤ 4 690 t

If no LO: Landings ≤ 4 130 t, assuming discard rates as in last 10- year average




* Fishing mortality has declined, although it increased in 2014 (but estimate uncertain)
* Better recruitment in 2013-2014 but low again in 2015
* SSB in 2015 above MSY $B_{trigger}$

| | Fishing pressure | | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2014 | 2015 | 2016 | |
| 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 aplicable | $SSB_{MGT}$ | – | – | – | Not aplicable |

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# Haddock in Division 6.b (Rockall)

Catch 2015 ~ 2 972 (discards: 18%)

F(2016) = Catch constraint = 0.14; SSB (2017) = 25 kt > MSY $B_{trigger}$ (10.2 kt - ↑) $F_{MSY}$=0.2

| Rationale | Catch (2017) | Wanted catch* (2017) | Unwanted catch* (2017) | Basis | F total (2017) | F wanted catch* (2017) | F unwanted catch* (2017) | SSB (2018) | %SSB change** | %TAC change *** |
|---|---|---|---|---|---|---|---|---|---|---|
| MSY approach | 4.69 | 4.13 | 0.56 | $F_{MSY}$ | 0.20 | 0.15 | 0.05 | 23.5 | -0.07 | 15 |
| Precautionary approach | 9.47 | 8.33 | 1.14 | $F_{pa}$ | 0.46 | 0.36 | 0.12 | 18.1 | -0.28 | 131 |
| Proposed management strategy | 4.54 | 4.00 | 0.54 | $F_{HCR}$^ | 0.19 | 0.13 | 0.04 | 23.7 | -0.06 | 11 |
| Zero catch | 0.00 | 0.00 | 0.00 | F = 0 | 0.00 | 0.00 | 0.00 | 28.9 | 0.15 | -100 |
| Other options | 3.34 | 2.94 | 0.40 | −15% $catch_{2016}$ ^^ | 0.14 | 0.10 | 0.03 | 25.0 | -0.01 | -18 |
| | 3.93 | 3.46 | 0.47 | $Catch_{2016}$ ^^ | 0.16 | 0.13 | 0.04 | 24.4 | -0.03 | -4 |
| | 4.69 | 4.13 | 0.56 | average $F_{2011–2015}$ | 0.2012 | 0.15 | 0.05 | 23.5 | -0.07 | 15 |
| | 4.52 | 3.98 | 0.54 | +15% $catch_{2016}$ ^^ | 0.19 | 0.13 | 0.04 | 23.7 | -0.06 | 10 |
| | 16.87 | 14.76 | 2.11 | $SSB_{2018}=B_{pa}=MSY_{B\ trigger}$ | 1.08 | 0.82 | 0.27 | 10.2 | -0.60 | 310 |
| | 20.31 | 17.70 | 2.61 | $SSB_{2018}=B_{lim}$ | 1.57 | 1.18 | 0.39 | 6.8 | -0.73 | 391 |
| | 12.75 | 11.19 | 1.56 | $F_{lim}$ | 0.69 | 0.53 | 0.17 | 14.5 | -0.43 | 211 |

Weights in tonnes.

**SSB 2018 relative to SSB 2017

^ F = 0.2 followed by TAC constraint: $TAC_{2017} = TAC_{F=0.2} + 0.2 \times (TAC_{2016} - TAC_{F=0.2})$

* Relative to ICES advised catches for 2016 (3932, from ICES MSY approach)

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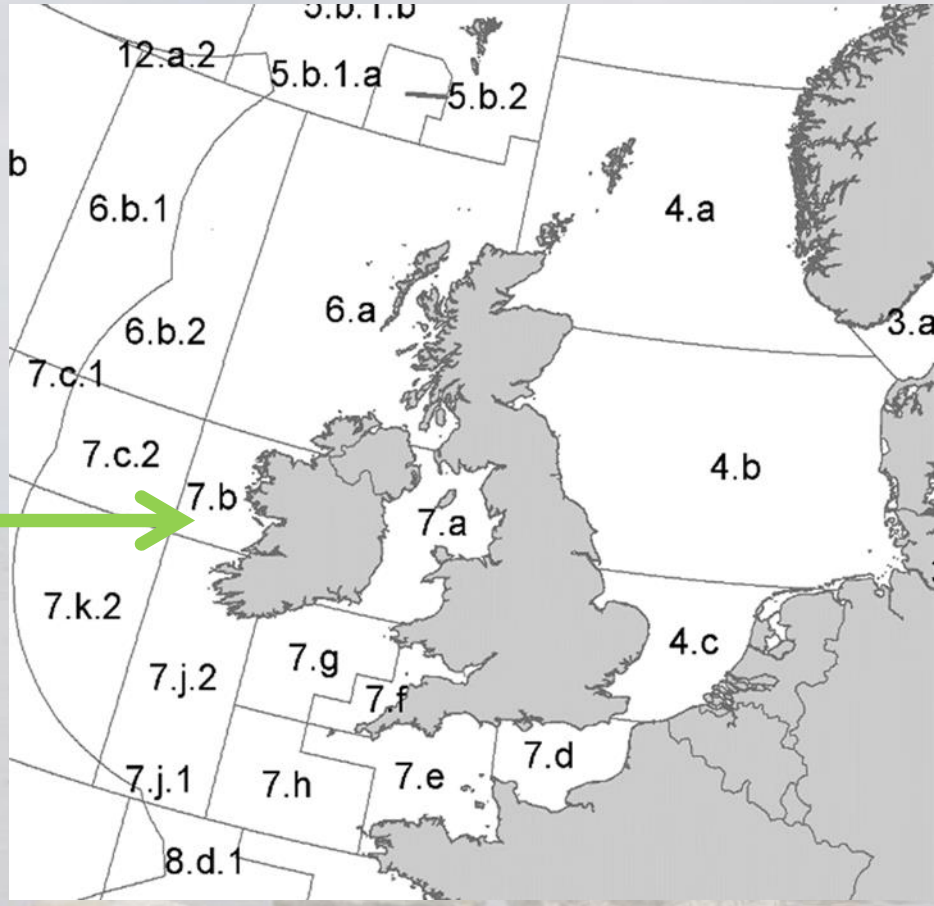
# Celtic Sea & West, Southwest Ireland

- Cod (7.e-k)
- Haddock (7.b-k)
- Whiting (7.e-k)
- Sole (CS; 7.h-k; 7.bc)
- Plaice (CS; 7.h-k; 7.bc)
- Anglerfish (7.b-k, 8abd)
- Pollack (6,7)

- Northern hake
- Sea bass (4.bc, 7.a, 7.d-h; 6.a, 7.b, 7.j)
- Megrim (7.b-k, 8.abd)

**IN AUTUMN:**

- ***Nephrops*** **(FUs 16-17-20-22)**

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# Celtic Sea & West, Southwest Ireland

# Summary

| Area | Stock | Advice 2017 | Advice 2016 | Catch 2015 | Notes |
|---|---|---|---|---|---|
| Celtic Sea | Cod 7.e-k | 1447 | 3569 | 4720 | |
| | Haddock 7.b-k | 12444 | 8590 | 15239 | |
| | Whiting 7.bc,e-k | 25125 | 19076 | 19275 | |
| | Sole 7.fg | 806 | 760 | 856 | |
| | Sole 7.h-k | 223 | 205 | 248 | |
| | Plaice 7.fg | 1500 | 1500 | 1251 | |
| | Plaice 7.h-k | 86 | 135 | 114 | Landings |
| | White Anglerfish 7.b-k, 8.ab,d | 26691 | 26691 | 25266 | Landings |
| | Black-bellied Anglerfish 7.b-k, 8.ab,d | 10757 | 10757 | 10319 | Landings |
| | Northern hake 4,6,7, 3.a, 8ab,d | 123777 | 109592 | 105900 | |
| | Sea Bass 4.bc, 7.a, 7.d.h | 0 | 541 | 2040 | |
| | Megrim 7.b-k, 8.ab,d | 16021 | 18216 | 13076 | |

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# Advice given for multiple years in 2015
## Celtic Sea & West, Southwest Ireland

| Stock | Advice 2016 (tonnes) | Advice 2017 (tonnes) | Advice 2018 (tonnes) |
|---|---|---|---|
| Sole in Divisions 7.bc (west of Ireland) | 30 | 30 | |
| Plaice in Division 7.bc (west of Ireland) | 30 | 30 | |

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

***Analysis assumes:***

- "fleets' stocks shares" in line with single-species advice for 2017 and historical proportion of stock landings taken by each fleet
- same fleet behaviour (fishing pattern, species catchability) in 2016 and 2017 as in 2015
- fishing opportunities calculated for catches and all fish caught count against TAC

***Six example mixed fisheries scenarios:***

*min*: each fleet stops fishing when its first stock share exhausted

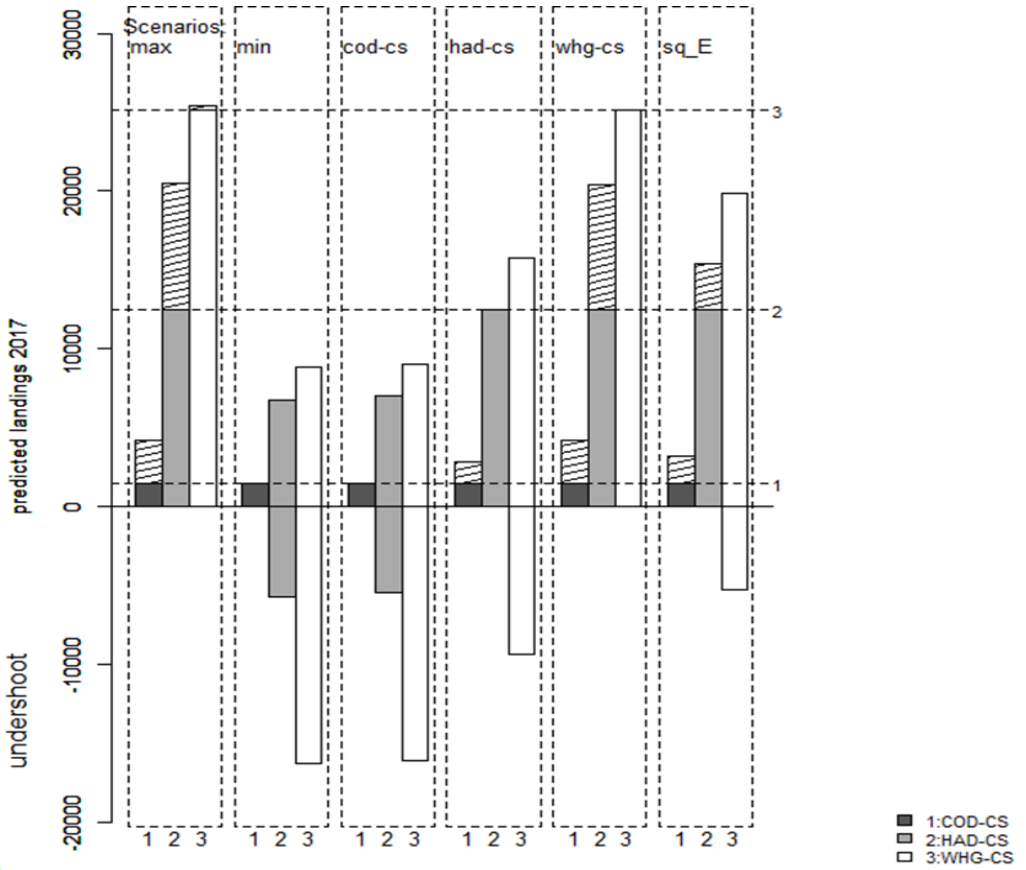
*max*: each fleet stops fishing when its last stock share exhausted

*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 2015




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

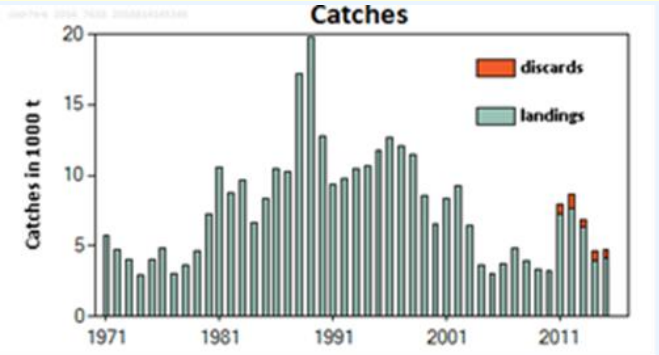
* Single-species advice: cod is most limiting and whiting less limiting

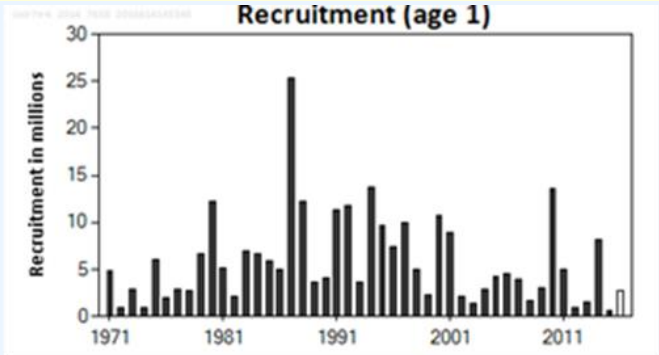
- **For cod**: F(2017) ≤ $F_{MSY}$ only for “min” and “cod”;
  F(2017) > $F_{pa}$ for “SQ_effort” and “max”
- **For haddock**: F(2017) ≤ $F_{MSY}$ for “min”, “cod” and “had”
- **For whiting**: F(2017) ≤ $F_{MSY}$ for all except “max”

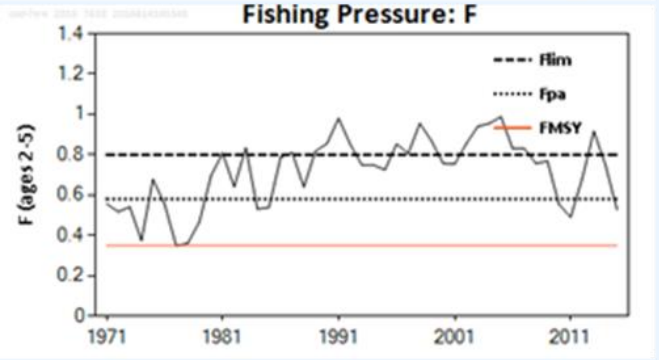
# Cod in Divisions 7.e–k (Celtic Sea cod)

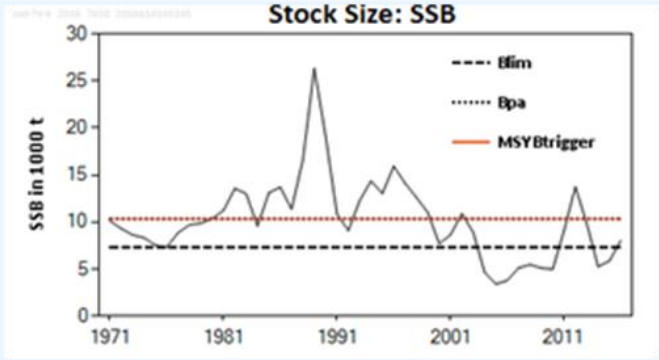
**Advice for 2017, MSY:** Wanted catch ≤ 1 447t

- total catch can not be quantified (variable discard rates in recent past)




* New $F_{MSY}$ value (0.35↑)

* F above $F_{MSY}$ (whole time series); upward revision in 2016

* Rec weak recently: except 2013 yc above average

* SSB close to $B_{lim}$ in last 3 years (below in 2013-2014)

| | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 |
| Maximum sustainable yield | $F_{MSY}$ | ✗ | ✗ | ✗ Above | MSY $B_{trigger}$ | ✗ | ✗ | ✗ Below trigger |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | ✗ | o | ✓ Harvested sustainably | $B_{pa}$, $B_{lim}$ | ✗ | ✗ | o Increased risk |
| Management plan | $F_{MGT}$ | - | - | - Not applicable | $SSB_{MGT}$ | - | - | - Not applicable |

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# Cod in Divisions 7.e–k (Celtic Sea cod)

Catch (2015) ~ 4 720 t ( ~12% discards)

F(2016) = F(2013-15)=0.73; SSB(2017)= 6.2 kt < MSY $B_{trigger}$ (10.3 kt) $F_{MSY}$=0.35↑

| Rationale | Wanted catch (2017) | Basis | F (wanted catch*) | SSB(2018) | % SSB change** | % TAC change*** |
|---|---|---|---|---|---|---|
| MSY approach | 1447 t | $F_{MSY} \times SSB_{2017}/MSY\ B_{trigger}$ | 0.21 | 8312 | 34 | −68 |
| Zero catch | 0 t | F = 0 | 0 | 9929 | 60 | −100 |
| Other options^ | 2270 t | $F_{MSY}$ | 0.35 | 7402 | 19 | −50 |
| | 4090 t | $F_{2016}$ | 0.73 | 5427 | −12 | −10 |
| | 3880 t | $TAC_{2016}$ −15% | 0.68 | 5651 | −9 | −15 |
| | 4565 t | $TAC_{2016}$ | 0.86 | 4917 | −21 | 0 |
| | 5250 t | $TAC_{2016}$ + 15% | 1.06 | 4206 | −32 | 15 |
| | 4362 t | $F_{lim}$ | 0.80 | 5137 | −17 | −4 |
| | 3436 t | $F_{pa}$ | 0.58 | 6129 | −1 | −25 |
| | 2356 t | $SSB_{2018} = B_{lim}$ | 0.37 | 7307 | 18 | −48 |
| | | $SSB_{2018} = B_{pa} = MSY\ B_{trigger}$ | | | | |

Weights in tonnes

*** Wanted catch 2017 relative to TAC 2016 (4565)

- Forecast sensitive to incoming recruitment assumptions
- Landings from southern part of Division 7.a (33E2-3) allocated to this stock

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# Cod in Divisions 7.e–k (Celtic Sea cod)

## Mixed Fisheries Options

| ***Mixed-fisheries options (ICES, 2016b)*** | | | | | | |
|---|---|---|---|---|---|---|
| Rationale | Wanted catch (2017) | Basis | F (wanted catch*) | SSB (2018) | % SSB change** | % TAC change*** |
| *Maximum* | 4236 t | A | 0.77 | 5270 | −15 | −7 |
| *Minimum* | 1420 t | B | 0.21 | 8340 | 34 | −69 |
| *Cod* | 1447 t | C | 0.21 | 8310 | 34 | −68 |
| *Haddock* | 2826 t | D | 0.45 | 6791 | 9 | −38 |
| *Whiting* | 4216 t | E | 0.76 | 5291 | −15 | −8 |
| *Status quo effort* | 3187 t | F | 0.53 | 6398 | 3 | −7 |

Weights in tonnes

*** Wanted catch 2017 relative to TAC 2016

- Mixed fisheries analysis (cod/haddock/whiting): cod most restrictive stock; the cod TAC limits catches of haddock and whiting.
- Many scenarios result in $F_{2017}>F_{MSY}$; “max” and “whiting” result in $F_{2017}>F_{pa}$

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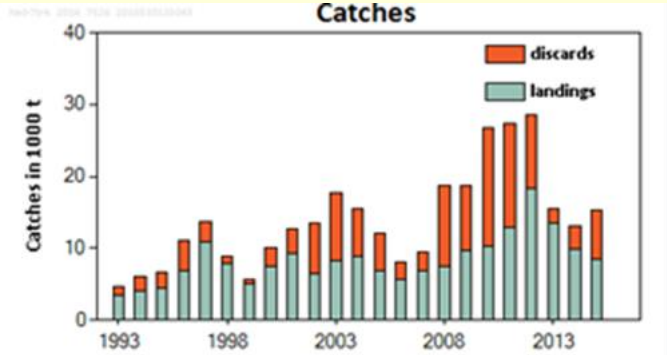
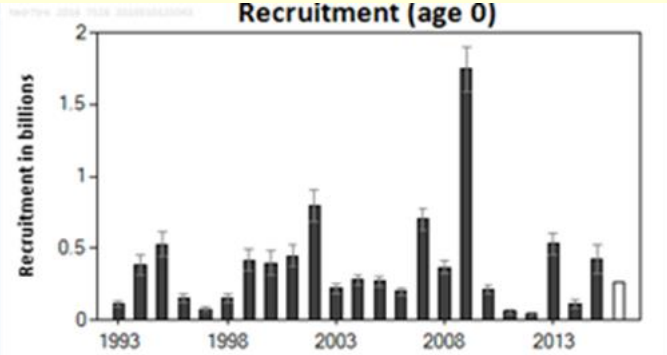
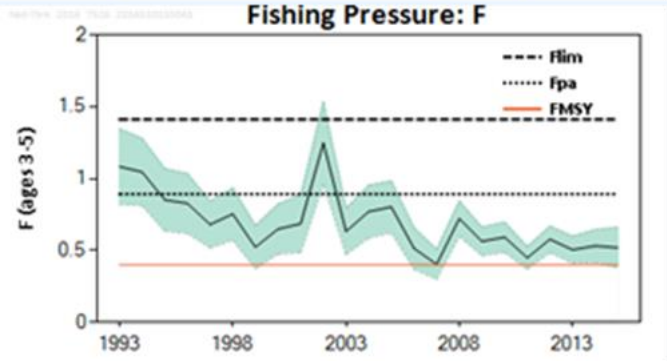
# Haddock in Divisions 7.b–k

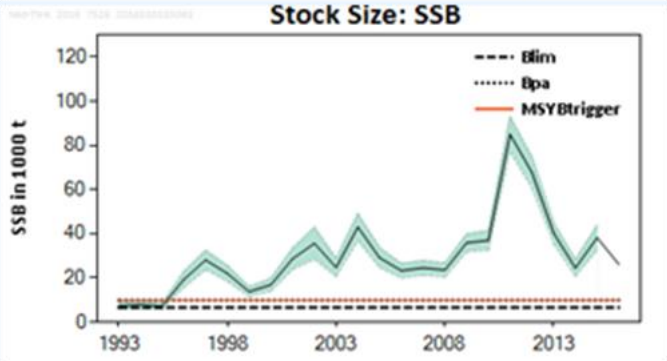
**Advice for 2017, MSY:** Catch ≤ 12 444 t

➔ Landings ≤ 7 751 t, assuming discard rates as average of 1993-2015




| | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 |
| 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 |

* F above $F_{MSY}$

* Rec:
2009 very strong,
2010-2012 low,
2013 and 2015 above average

* SSB peaked in 2011, then declined

* increased discarding in recent years (➔ catch options are based on discard rates of full time-series

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# Haddock in Divisions 7.b–k

Catch (2015) ~ 15 240t ( ~ 44% discards)

F(2016) = F(2013-2015) = 0.52; SSB(2017) = 33.6 kt > MSY $B_{trigger}$ (10 kt) $F_{MSY}$=0.40

| Rationale | Catch (2017) | Wanted catch* (2017) | Unwanted catch* (2017) | Basis | F catch (2017) | F wanted catch (2017)** | F unwanted catch (2017) | SSB (2018) | % SSB change*** | % TAC change^ |
|---|---|---|---|---|---|---|---|---|---|---|
| MSY approach | 12 444 | 7751 | 4693 | $F_{MSY}$ | 0.40 | 0.36 | 0.04 | 34 408 | +3 | +7 |
| Zero catch | 0 | 0 | 0 | F = 0 | 0.00 | 0.00 | 0.00 | 47 070 | +40 | −100 |
| Other options | 42 212 | 24 727 | 17 485 | $B_{lim}$ | 2.94 | 2.63 | 0.31 | 6700 | −80 | +241 |
| | 38 199 | 22 710 | 15 489 | $B_{pa}$ | 2.23 | 1.99 | 0.23 | 10 000 | −70 | +213 |
| | 38 199 | 22 710 | 15 489 | $B_{trigger}$ | 2.23 | 1.99 | 0.23 | 10 000 | −70 | +213 |
| | 13 291 | 8271 | 5020 | $SSB_{2017}$ | 0.43 | 0.39 | 0.05 | 33 560 | 0 | +14 |
| | 9879 | 6169 | 3709 | −15% $TAC_{2016}$ | 0.31 | 0.27 | 0.03 | 36 991 | +10 | −15 |
| | 11 643 | 7258 | 4385 | $TAC_{2016}$ | 0.37 | 0.33 | 0.04 | 35 213 | +5 | 0 |
| | 13 414 | 8347 | 5068 | +15% $TAC_{2016}$ | 0.44 | 0.39 | 0.05 | 33 436 | +0 | +15 |
| | 30 712 | 18 617 | 12 094 | $F_{lim}$ | 1.41 | 1.26 | 0.15 | 16 683 | −50 | +157 |
| | 23 076 | 14 181 | 8895 | $F_{pa}$ | 0.89 | 0.8 | 0.09 | 23 919 | −29 | +95 |

Weights in tonnes.

*Wanted catch 2017 relative to TAC 2016 (7258 t)

- No evidence of improved selectivity of young fish due to the introduction of square-mesh panels in 2012.
- Landings in south of Division VIIa (33E2-3) allocated to this stock

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# Haddock in Divisions 7.b–k

## Mixed Fisheries Options

| ***Mixed-fisheries options (ICES, 2016b)*** | | | | | |
|---|---|---|---|---|---|
| Rationale | Catch (2017) | Basis | F (catch) | SSB (2018) | % SSB change** |
| *Maximum* | 20 505 | A | 0.75 | 26 418 | −21 |
| *Minimum* | 6743 | B | 0.20 | 40 169 | 20 |
| *Cod* | 6968 | C | 0.21 | 39 940 | 19 |
| *Haddock* | 12 444 | D | 0.40 | 34 408 | 3 |
| *Whiting* | 20 456 | E | 0.75 | 26 467 | −21 |
| *Status quo effort* | 15 415 | F | 0.52 | 31 440 | −6 |

Weights in tonnes.

*Wanted catch 2016 relative to TAC 2015 (8342 t)

- Mixed fisheries (cod/haddock/whiting): Scenarios “whiting”, “SQeffort” and “max” result in $F_{2017} > F_{MSY}$ for haddock

- Cod limits catches of haddock

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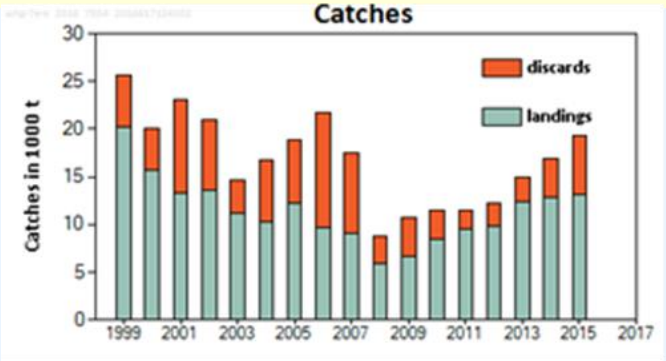
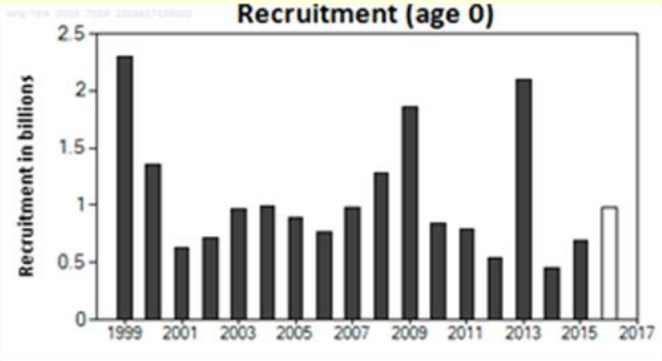
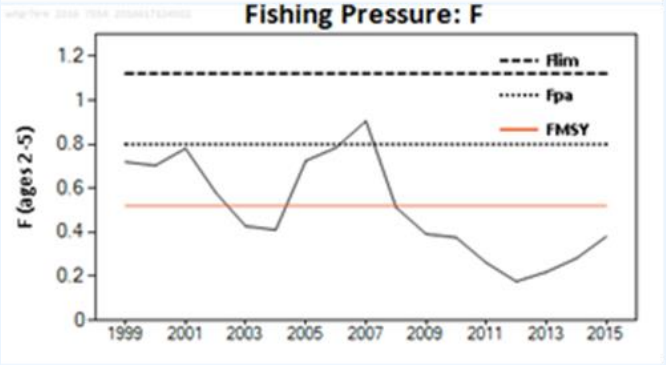
# Whiting in Divisions 7.bc,e–k

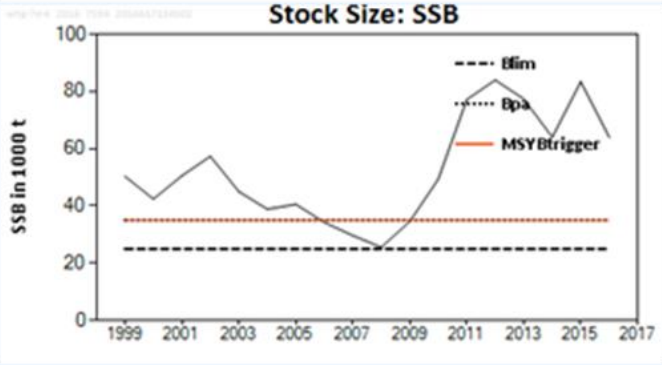
**Advice for 2017, MSY:** Catch ≤ 25 125 tonnes

Partially under the EU landing obligation, not able to advise on landings




* F below $F_{MSY}$ since 2008 but increasing
* Rec very high in 2013 but below average before and after
* SSB increased until 2011, remains above $MSYB_{trigger}$
* Mixed fisheries (cod, haddock, whiting); high discards

| | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 | |
| Maximum sustainable yield | $F_{MSY}$ | ✓ | ✓ | ✓ Appropriate | 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 |

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# Whiting in Divisions 7.bc,e–k

Catch (2015) ~ 19 275 t ( ~ 32% discards)

F(2016) = F(2013-2015) = 0.29; SSB(2017) = 58 kt > MSY $B_{trigger}$ (35 kt ↓)  $F_{MSY}$ = 0.52 ↑

| Rationale | Catch (2017) | Wanted catch (2017) | Unwanted catch (2017) | Basis | F catch (2017) | F wanted catch (2017) | F unwanted catch (2017) | SSB (2018) | % SSB change** |
|---|---|---|---|---|---|---|---|---|---|
| MSY approach | 25 125 | 19 825 | 5300 | FMSY | 0.52 | 0.36 | 0.16 | 49 360 | -15 |
| Zero catch | 0 | 0 | 0 | F = 0 | 0 | 0 | 0 | 71 218 | 23 |
| Other options | 42 013 | 32 424 | 9589 | F = Flim | 1.12 | 0.78 | 0.34 | 35 449 | -39 |
| | 34 159 | 26 673 | 7486 | F = Fpa | 0.8 | 0.56 | 0.24 | 41 809 | -28 |
| | 42 578 | 32 829 | 9750 | SSB2018=B trigger= Bpa | 1.15 | 0.8 | 0.35 | 35 000 | -39 |
| | 15 344 | 12 215 | 3129 | SSB2017 | 0.28 | 0.2 | 0.09 | 57 746 | 0 |
| | 55 765 | 41 739 | 14 026 | SSB2018=B lim | 2.02 | 1.41 | 0.61 | 25 000 | -57 |
| | 15 836 | 12 602 | 3234 | F2016 | 0.29 | 0.21 | 0.09 | 57 320 | -1 |

Weights in tonnes

**SSB (2018) relative to SSB (2017)

- SMP since 2012 but no evidence yet of selectivity improvements
- Landings in south of Division 7.a (33E2-3) allocated to this stock (minor)
- Mismatch between the assessment area and TAC área – (7.d not part of stock)

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# Whiting in Divisions 7. bc,e–k

## Mixed Fisheries Options

| ***Mixed-fisheries options (ICES, 2016b)*** | | | | | |
|---|---|---|---|---|---|
| Rationale | Catch (2017) | Basis | F (catch) | SSB (2018) | % SSB change** |
| *Maximum* | 25 393 | A | 0.53 | 49 133 | -15 |
| *Minimum* | 8 861 | B | 0.15 | 63 397 | 10 |
| *Cod* | 9 020 | C | 0.16 | 63 258 | 10 |
| *Haddock* | 15 829 | D | 0.29 | 57 325 | -1 |
| *Whiting* | 25 125 | E | 0.52 | 49 360 | -15 |
| *Status quo effort* | 19 842 | F | 0.39 | 53 866 | -7 |

Weights in tonnes

**SSB (2018) relative to SSB (2017)

- Mixed fisheries (cod/haddock/whiting): whiting is least limiting for whiting, only “max” scenario results in $F_{2017} \sim F_{MSY}$
- Cod and haddock limits catches of whiting

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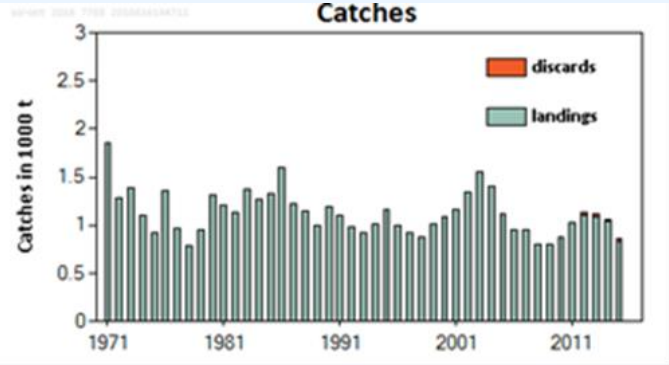
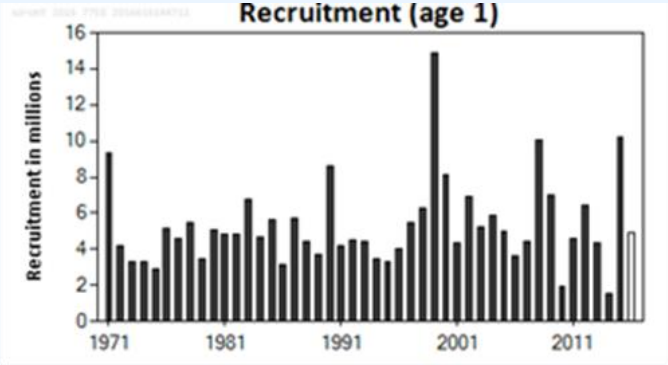
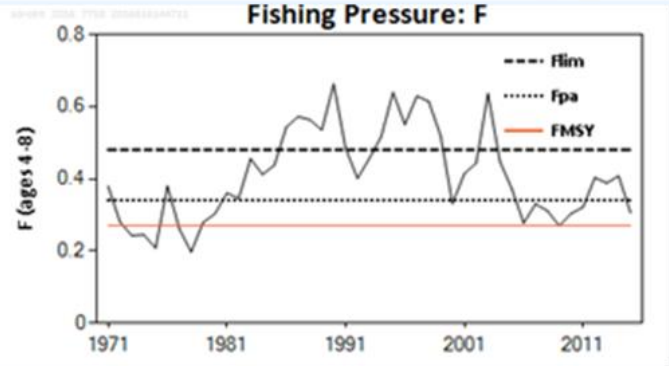
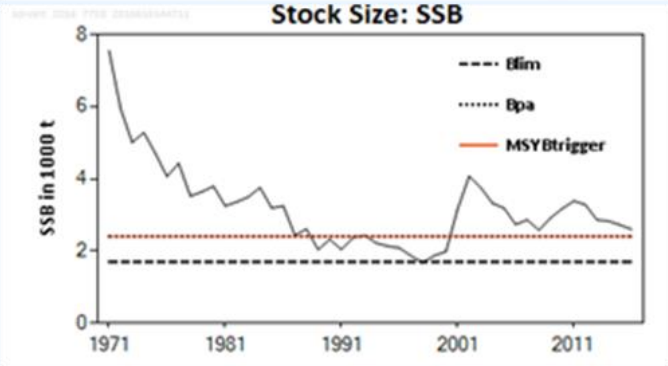
# Sole in Celtic Sea (7.fg)

**Advice for 2017, MSY:** Catch ≤ 806 t.




* F declined in 2015 but remains above $F_{MSY}$

* Rec fluctuates around average but high in 2015

* SSB above MSY $B_{trigger}$

| | | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 | |
| Maximum Sustainable Yield | $F_{MSY}$ | ✗ | ✗ | ✗ | Above | MSY $B_{trigger}$ | ✓ | ✓ | ✓ | Above trigger |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | o | o | ✓ | Harvested sustainably | $B_{pa}$, $B_{lim}$ | ✓ | ✓ | ✓ | Full reproductive capacity |
| Management Plan | $F_{MGT}$ | - | - | - | Not applicable | $SSB_{MGT}$ | - | - | - | Not applicable |

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# Sole in Celtic Sea (7.fg)

Catch (2015) ~ 856t ( ~ 3% discards)

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

F(2016) = 0.3 (TAC constraint); SSB(2017) = 2 595 t > MSY $B_{trigger}$ (2 400 t ↑) $F_{MSY}$=0.27 ↓

| Rationale | Total catch (2017)* | Wanted catch** (2017) | Basis | F Wanted catch (2017) | SSB (2018) | %SSB change*** | % TAC change^ |
|---|---|---|---|---|---|---|---|
| MSY approach | 806 | 782 | $F_{MSY}$ | 0.27 | 2947 | 11 | 3 |
| Precautionary approach | 985 | 955 | $F_{pa}$ | 0.34 | 2781 | 5 | 26 |
| Zero catch | 0 | 0 | F = 0 | 0 | 3703 | 40 | -100 |
| Other options | 682 | 662 | $TAC_{2016}$ – 15% | 0.22 | 3062 | 16 | -12 |
| | 876 | 850 | $F_{2016}$ | 0.3 | 2881 | 9 | 12 |
| | 803 | 779 | $TAC_{2016}$ | 0.27 | 2950 | 11 | 3 |
| | 924 | 896 | $TAC_{2016}$ + 15% | 0.32 | 2837 | 7 | 19 |
| | 1309 | 1270 | $F_{lim}$ | 0.48 | 2480 | -6 | 68 |
| | 1396 | 1354 | $SSB_{2018}$ = MSY $B_{trigger}$ = $B_{pa}$ | 0.52 | 2400 | -9 | 79 |
| | 2154 | 2089 | $SSB_{2018}$ = $B_{lim}$ | 0.88 | 1700 | -36 | 177 |

Weights in tonnes

*** SSB 2018 relative to SSB 2017.

^ Total catch 2017 relative to TAC 2016.

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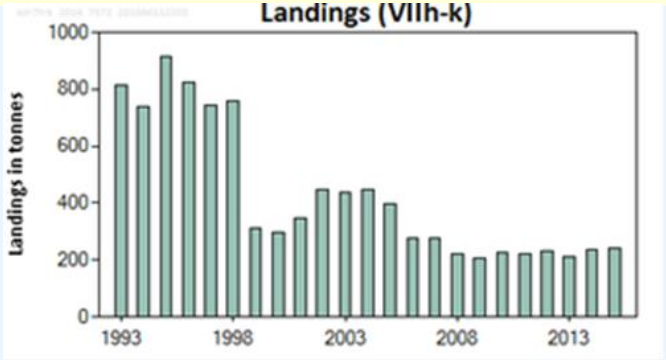
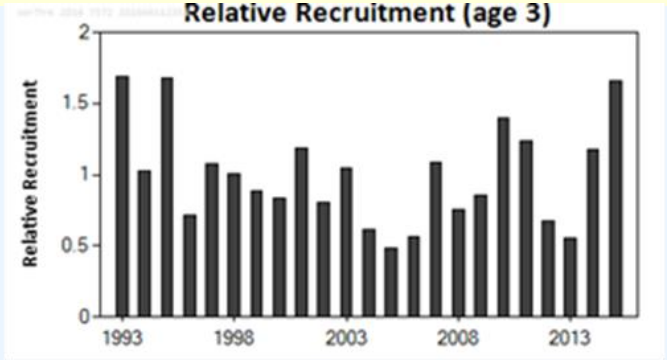
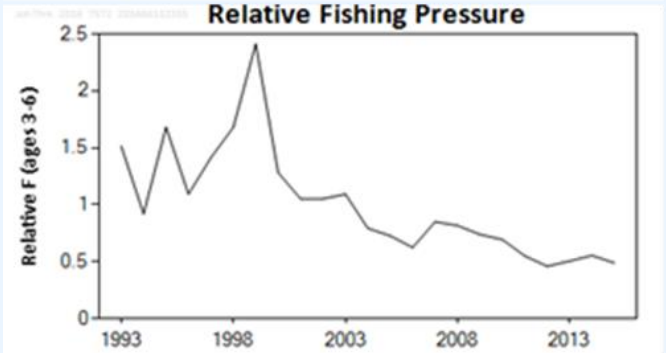
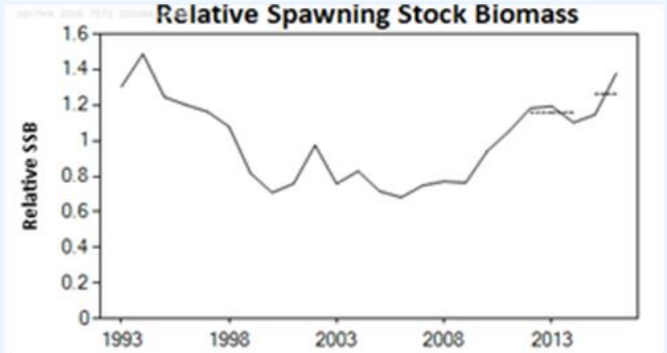
# Sole in Divisions 7.h-k (Celtic Sea South; Southwest of Ireland)

**Advice for 2017, PA:** Catch ≤ 223 t.




| | | Fishing pressure | | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 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 | - | ✓ | ✓ | ✓ | Near lowest relative F and increasing stock size | - | → | ↗ | ↗ | Increasing |

* Assessment (gives trends) based on commercial data from Div 7.jk:

SSB: increase since 2005; F stable in recent years, lower than during 1990s

* Div 7.h: only landings data ➔ no assessment of trends

* **Category 3** stock based on SSB assessment trend

Result applied to the catch from Div VII h-k

# Sole in Divisions 7.h-k (Celtic Sea South; Southwest of Ireland)

| | | |
|---|---|---|
| Index A (2 last years: 2015-16) | | 1.26 |
| Index B (3 preceding years : 2012-14) | | 1.16) |
| **Index ratio** (A/B) | | **1.09** |
| Uncertainty cap | Not applied | - |
| **Recent advised catch (for Div 7.h-k)** | | **205 tonnes** |
| Discard rate | | Negligible |
| **Precautionary buffer** | **Not Applied** | - |
| **Catch advice (for Div 7 h-k)*** | | **223 tonnes** |

***Recent advised catch x index ratio**

Precautionary buffer not applied because of decreasing trend in fishing pressure and increase in stock size.

Discards are considered to be negligible.

$F_{MSY}$ proxy defined in 2016 = 0.17

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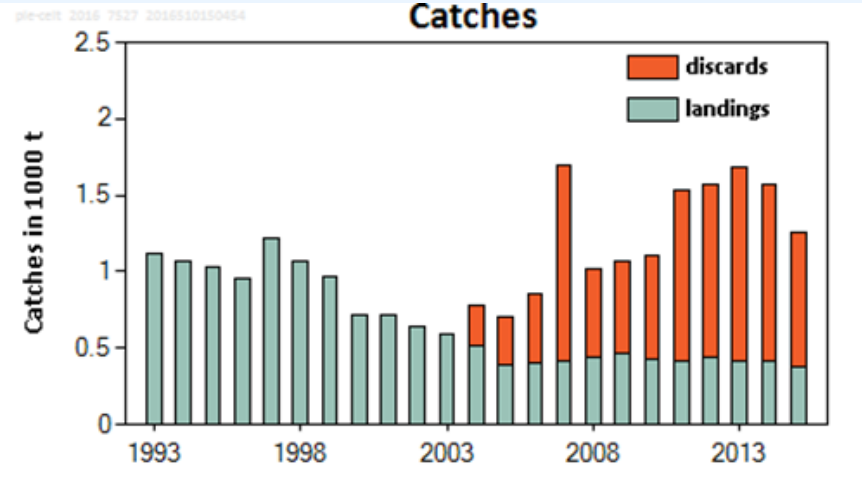
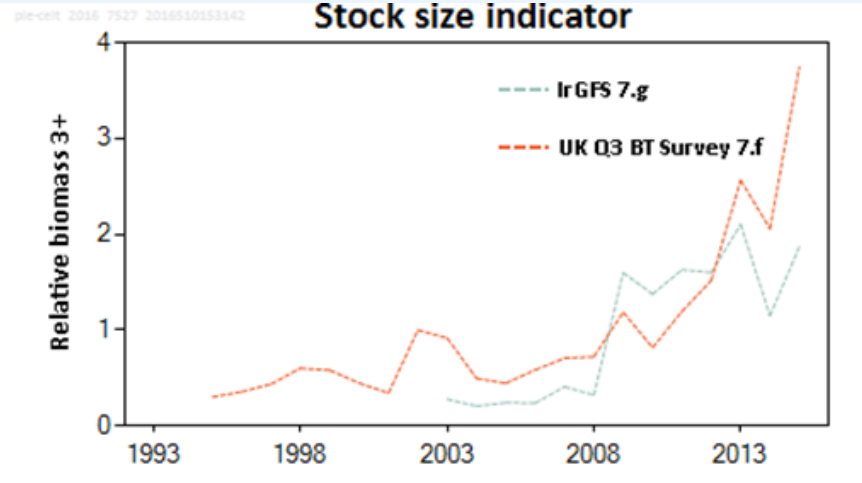
# Plaice Celtic Sea (7.fg)

**Advice for 2017, PA:** Catch ≤ 1 500 t

If no LO: Landings ≤ 405 t, assuming discard rates stay at last 3-year average




| | | Fishing pressure | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2013 | 2014 | 2015 | |
| Maximum Sustainable Yield | $F_{MSY\ proxy}$ | ✓ | ✓ | ? | Unknown | MSY $B_{trigger\ proxy}$ | ✓ | ✓ | ✓ | Above proxy |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | ✓ | ✓ | ? | Unknown | $B_{pa}$, $B_{lim}$ | ✓ | ✓ | ✓ | Above possible candidates ref. points |
| Management Plan | $F_{MGT}$ | - | - | - | Not applicable | $SSB_{MGT}$ | - | - | - | Not applicable |
| Qualitative evaluation | - | ? | ? | ? | Unknown | | ↗ | ↘ | ↗ | Increasing |

* Very high discarding (average 2013-2015 is 73%)

* **Category 3**,
- Surveys show different trends in recent years – (either stable or increasing)

* MSY proxy reference points defined in 2016

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# Plaice Celtic Sea (7.fg)

Catch (2015) ~ 1 251 tonnes ( ~ 70% discards)

* **Category 3**
  - no change in stock perception from last year
  - no PA buffer (applied in 2012, not considered necessary because stock considered to have either remained stable or has increased)

➔ Advice same as last year: Catch < 1500 t
If no LO and discard rates stay at last 3-year average: Landings < 405 t

* High discards of plaice in mixed sole and plaice fishery: mismatch between selectivity and minimum landing size & relatively low market value of plaice

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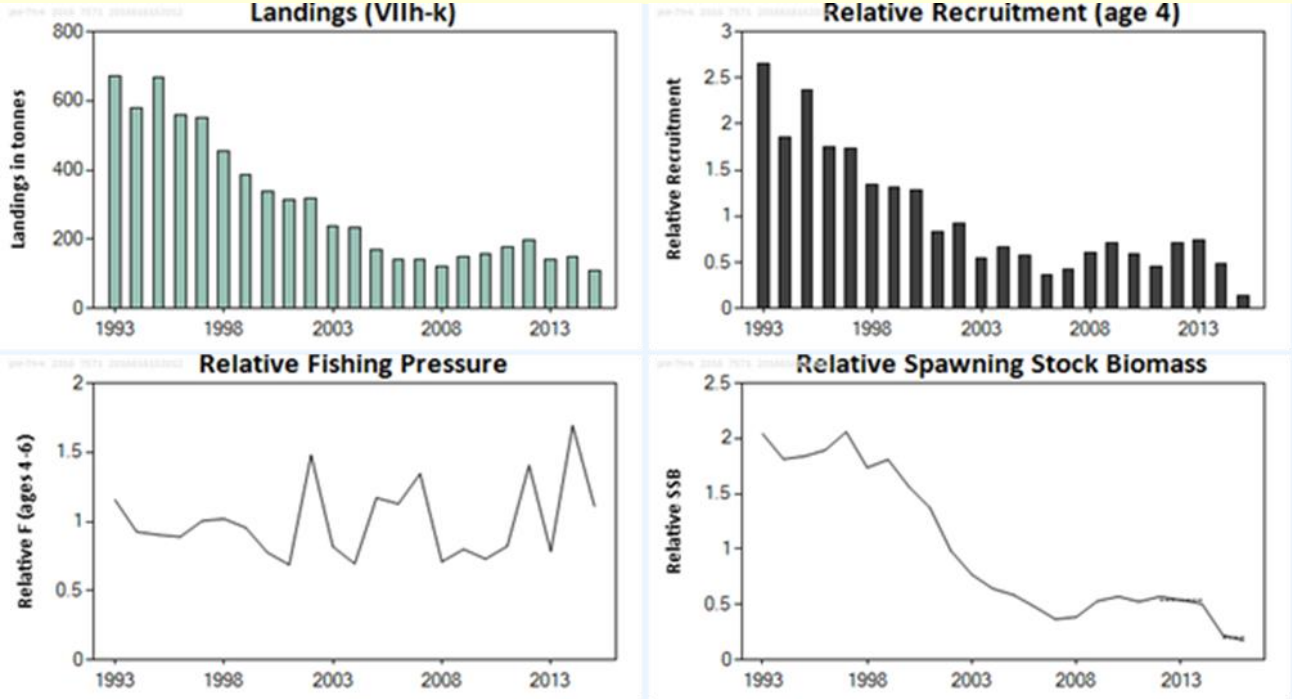
# Plaice in Divisions 7.h-k (Celtic Sea South; Southwest of Ireland)

## Advice for 2017, PA:

Landings ≤ 86 t; total catch cannot be quantified




| | Fishing pressure | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 | |
| Maximum sustainable yield | $F_{MSY}$ | ✗ | ✗ | ✗ | 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 | - | ✗ | ✗ | ✗ | Above possible reference points | - | → | ↘ | ✗ | Declined to the lowest observed |

$F_{MSY}$ proxy defined in 2016 = 0.25

* Assessment based on data from 7.jk:

SSB has decreased significantly from 1990s;

F variable with no trend;

Rec at lowest value in 2015

* 7.h: only landings available, stock trends unknown

* **Category 3**: trend from 7.jk assessment and landings from 7.h-k

* Data from 7.jk indicate high discards ~ 35% in weight

# Plaice in Divisions 7.h-k (Celtic Sea South; Southwest of Ireland)

Landings (2015) ~ 114 t

Discard rate in otter trawl in 7.jk ~ 35%; discard rates in 7.h unknown.

| | | |
|---|---|---|
| Index A (2015-16) | | 0.20 |
| Index B (2012-14) | | 0.54 |
| **Index ratio** (A/B) | | 0.37 |
| Uncertainty cap | Applied | 0.8 |
| **Recent advised landings for 2016** | | **135 tonnes** |
| Discard rate | | Unknown |
| Precautionary buffer | Applied | 0.8 |
| **Landings advice*** | | **86 tonnes** |

* **Category 3 [SSB trend from assessment]**
  - PA buffer applied (stock in undesirable state)
- Management should take into account that plaice is caught in a mixed fishery.
- Plaice caught in spatially distinct areas: restricting effort in those areas may be more effective than limiting landings.
- Management should focus on small plaice catches. An increase in mesh size could improve selection, but also affect catches of marketable fish.

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# Anglerfish *(Lophius piscatorius)* Div 7.b–k and 8.abd

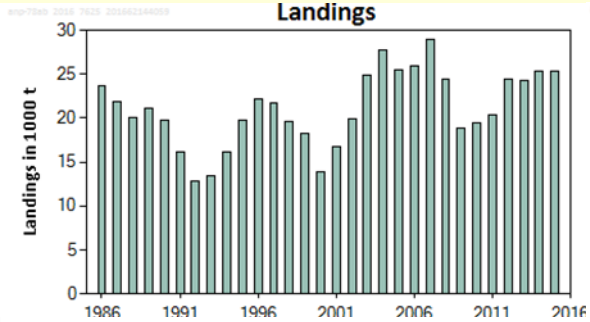
**Advice for 2017 and 2018 , PA:** Landings ≤ 26 691 t ;
total catch cannot be quantified

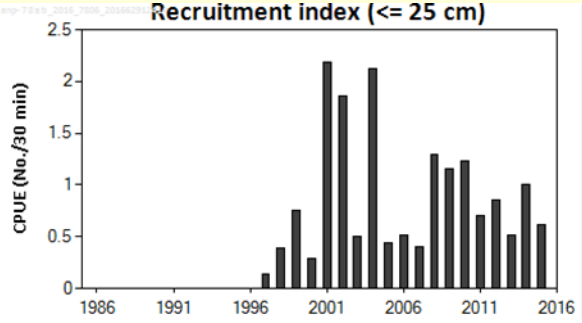
Management of 2 anglerfish species under a combined TAC prevents effective control of single-species exploitation rates and could lead to overexploitation of either species.

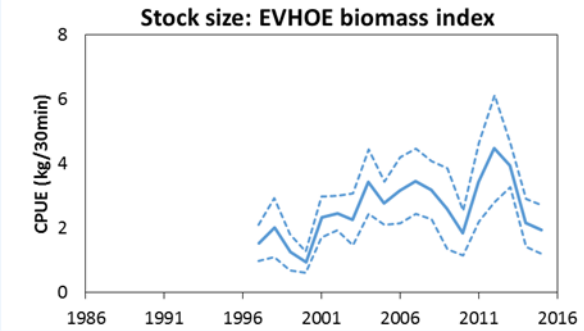
* Biomass and recruitment indices from survey

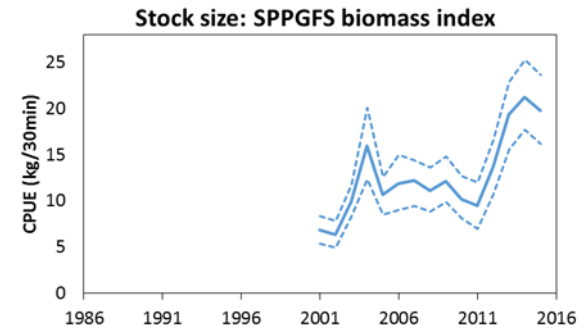
* **Category 3**

* No change in stock perspective from last year (also based on other information)

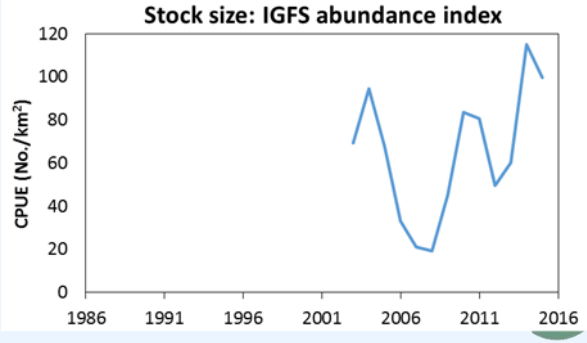



| | Fishing pressure | 2013 | 2014 | 2015 | Stock size | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| Maximum sustainable yield | $F_{MSY\ proxy}$ | ✓ | ✓ | ? Unknown | MSY $B_{trigger\ proxy}$ | ✓ | ✓ | ✓ Unknown |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | ✓ | ✓ | ? Unknown | $B_{pa}$, $B_{lim}$ | ✓ | ✓ | ✓ Unknown |
| Management plan | $F_{MGT}$ | - | - | - Not applicable | $SSB_{MGT}$ | - | - | - Not applicable |




* MSY proxy reference points defined in 2016

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# Anglerfish *(Lophius piscatorius)* Div 7.b–k and 8.abd

Landings (2015) ~ 25 300 tonnes
Discards known to take place but cannot be quantified

* **Category 3**

- Considering the various indicators:
  - no change in stock perception from last year
  - no PA buffer (never applied because of steady effort decrease since early 1990s)

➔ Advice as last year: Landings ≤ 26 691 t
Total catch can not be quantified (discarding non-negligible >5% ; data available in 2015 but could not be analyzed because of data submission issues.

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# Anglerfish *(Lophius budegassa)* Div 7.b–k and 8.abd

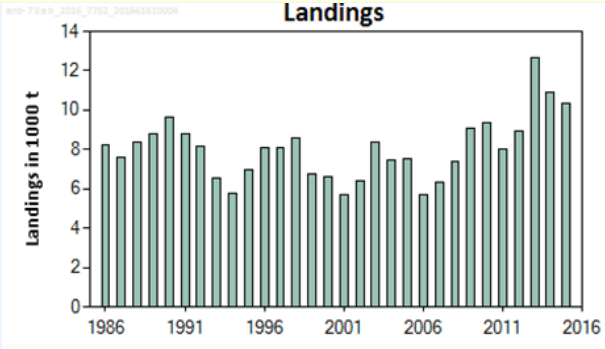
**Advice for 2017 and 2018, PA:** Landings ≤ 10 757 t ;
total catch cannot be quantified

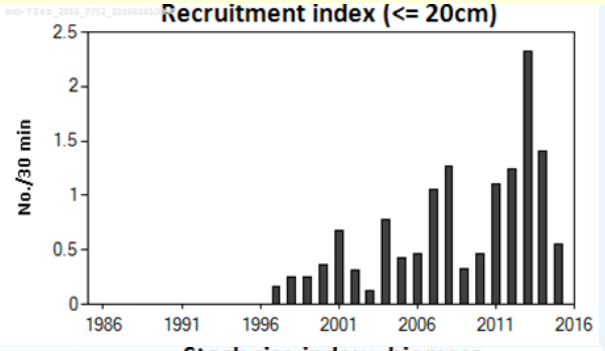
Management of 2 anglerfish species under a combined TAC prevents effective control of single-species exploitation rates and could lead to overexploitation of either species.

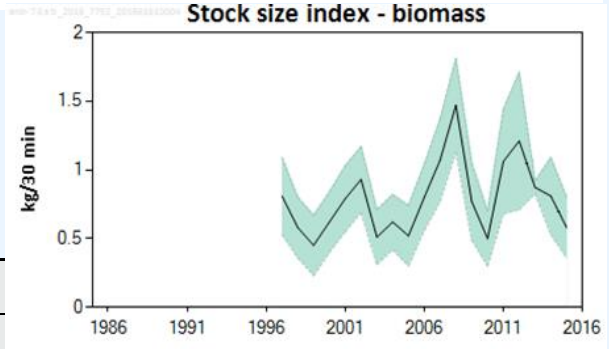
* Biomass and recruitment indices from survey

* Category 3

* No change in stock perspective from last year (also based on other information)




| | | Fishing pressure | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2014 | 2015 | 2016 | | | 2014 | 2015 | 2016 | |
| Maximum sustainable yield | $F_{MSY\ proxy}$ | ? | ? | ? | Undefined | MSY $B_{trigger\ proxy}$ | ? | ? | ? | 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 | - | ↘ | ↘ | ↘ | Decreasing |

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# Anglerfish *(Lophius budegassa)* Div 7.b–k and 8.abd

Landings (2015) ~ 10.3 kt
Discards known to take place but can not be quantified

* **Category 3**
  [survey trends (EVHOE), also information from commercial lpue]
  - no change in stock perception from last year
  - no PA buffer (never applied because of steady effort decrease since early 1990s)

➔ Advice as last year: Landings ≤ 10 757 t
Total catch can not be quantified (discarding non-negligible >5% ; data available in 2015 but could not be analyzed because of data submission issues.)

- Only trends-based assessment at this time due to uncertain growth parameters and uncertain discard estimates

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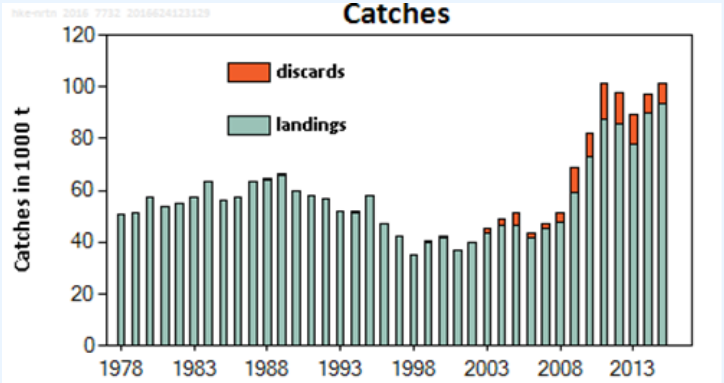
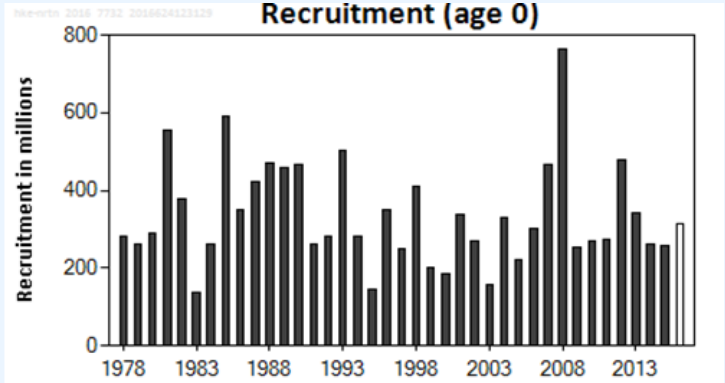
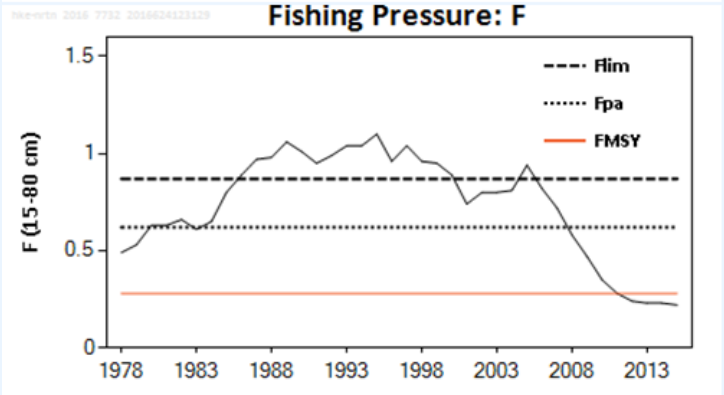
# Hake – Northern stock (3.a, 4, 6, 7, 8.abd)

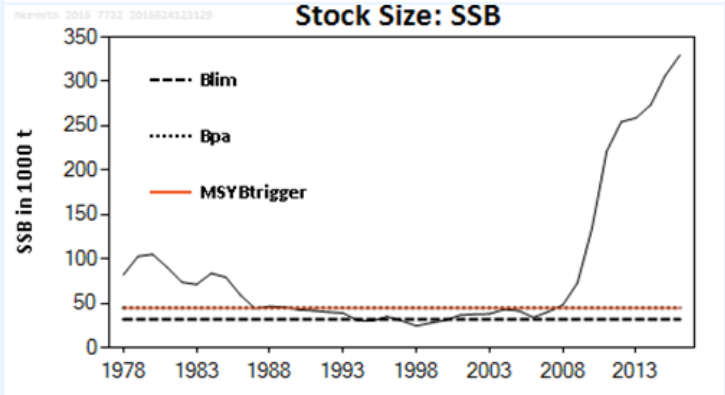
**Advice for 2017, MSY:** Catch ≤ 123 777 t

Only partially under LO, cannot advise on landings




* F
decreased significantly in last decade; below $F_{MSY}$ since 2011

* Rec
Around average since 2009

* SSB at highest value since start of assessment

| | Fishing pressure | 2013 | 2014 | 2015 | | Stock size | 2014 | 2015 | 2016 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Maximum sustainable yield | $F_{MSY}$ | ✓ | ✓ | ✓ | Appropriate | 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 |

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# Hake – Northern stock

Catch (2015) ~ 106 kt ( ~ 10% discards)

-Discards of large fish increased in recent years (quota restrictions for some fleets)

-Discards of juvenile hake also substantial in some areas and fleets

F (2016)= F(2013-15)=0.23; SSB(2017)= 322 kt > MSY Btrigger (45 kt ↓) $F_{MSY}$=0.28 ↑

| Rationale | Total catch (2017) | Wanted catch*** (2017) | Unwanted catch***,^ (2017) | Basis | F total (2017) | F Wanted catch (2017) | F Unwanted catch (2017) | SSB (2018) | % Advice change* | % SSB change** |
|---|---|---|---|---|---|---|---|---|---|---|
| MSY approach | 123777 | 111865 | 11912 | $F_{MSY}$ | 0.28 | 0.23 | 0.05 | 286717 | 13% | −11% |
| Recovery plan | 112549 | 101739 | 10810 | $F_{recovery\text{-}plan}$ | 0.25 | 0.21 | 0.04 | 297225 | 3% | −8% |
| Zero catch | 0 | 0 | 0 | F = 0 | 0 | 0.00 | 0.00 | 402891 | −100% | 25% |
| Other options | 11701 | 10595 | 1106 | $F_{sq} \times 0.1$ | 0.0225 | 0.02 | 0.00 | 391878 | −89% | 22% |
| | 34102 | 30867 | 3235 | $F_{sq} \times 0.3$ | 0.0676 | 0.06 | 0.01 | 370814 | −69% | 15% |
| | 55228 | 49973 | 5255 | $F_{sq} \times 0.5$ | 0.1126 | 0.09 | 0.02 | 350966 | −50% | 9% |
| | 75158 | 67985 | 7173 | $F_{sq} \times 0.7$ | 0.1577 | 0.13 | 0.03 | 332262 | −31% | 3% |
| | 93962 | 84966 | 8996 | $F_{sq} \times 0.9$ | 0.2027 | 0.17 | 0.04 | 314633 | −14% | −2% |
| | 102972 | 93098 | 9874 | $F_{sq} \times 1$ | 0.2253 | 0.19 | 0.04 | 306193 | −6% | −5% |
| | 120199 | 108639 | 11560 | $F_{sq} \times 1.2$ | 0.2703 | 0.22 | 0.05 | 290064 | 10% | −10% |
| | 225069 | 202925 | 22144 | $F_{pa}$ | 0.62 | 0.51 | 0.11 | 192244 | 105% | −40% |
| | 276261 | 248660 | 27601 | $F_{lim}$ | 0.87 | 0.72 | 0.15 | 144730 | 152% | −55% |
| | 383666 | 343082 | 40584 | SSB(2018) = MSY $B_{trigger} = B_{pa}$ | 2.00 | 1.65 | 0.35 | 45000 | 250% | −86% |
| | 397417 | 354765 | 42652 | SSB(2018) = $B_{lim}$ | 2.37 | 1.95 | 0.42 | 32000 | 263% | −90% |

* Total catch 2017 relative to the catch advice for 2016 (109 592 t). ;** SSB 2018 relative to SSB 2017.; *** “Wanted” and “unwanted” catch (landing and discards in absence of the EU LO obligation.; ^ Unwanted catch includes forecasted unwanted catch

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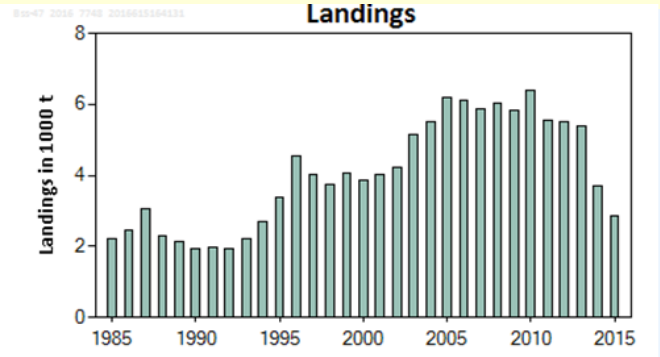
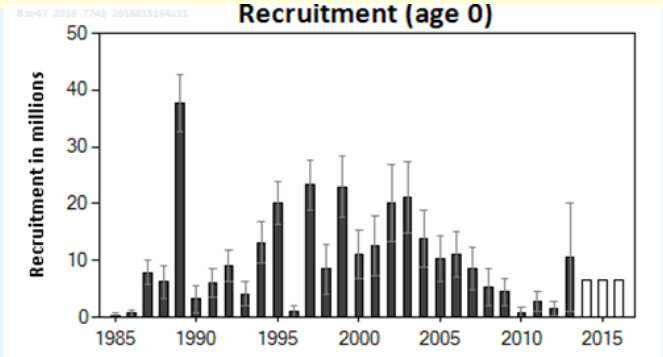
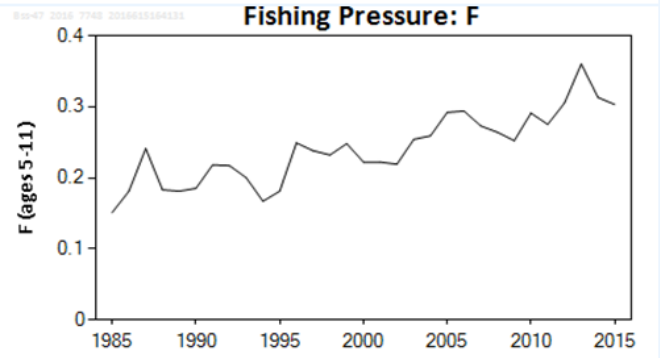
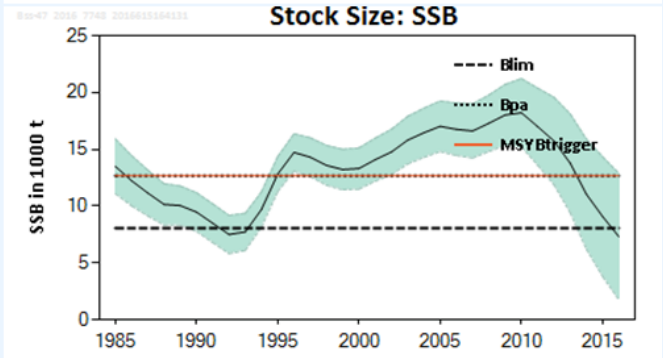
# Sea bass in 4.bc, 7.a,d-h

**Advice for 2017, Precautionary approach:** Total catch (commercial + recreational) 0 tonnes




| | | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 | |
| Maximum Sustainable Yield | $F_{MSY}$ | ? | ? | ? | Undefined | MSY $B_{trigger}$ | ✗ | ✗ | ✗ Below trigger |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | ? | ? | ? | Undefined | $B_{pa}$, $B_{lim}$ | o | o | ✗ Reduced reproductive capacity |
| Management plan | $F_{MGT}$ | - | - | - | Not applicable | $SSB_{MGT}$ | - | - | - Not applicable |
| Qualitative | | ✗ | ✗ | ✗ | Above candidate ref. point | | - | - | - Not applicable |

* Landings in graph only commercial fishery

* F is for commercial + recreational fishery (based on the available information: ~ 1500 t recreational landings in 2012)

* F increasing
* Recruitment poor since 2008
* Decreasing SSB, below BLim
* new: MSY Btrigger (12,673 t)

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# Sea bass in 4.bc, 7.a,d-h

Commercial landings 2015 ~ 2 040 t (discards not quantified ~ 5% in weight).
Recreational catch substantial, not fully quantified (surveys indicate annual landings ~ 1 500 t in 2012)
Zero catch in 2017 aiming to bring the stock above $B_{Lim}$ in the short term.

F (2016)= F(2015)= 0.30 (0.22 comm + 0.08 recreat); SSB(2017)= 6 219t < MSY Btrigger (8 000 t)
Weights in tonnes

$F_{MSY}$=Not defined

| Rationale | Total landings (2017) | Commercial landings (2017) | Recreational landings (2017) | Basis | Total F (2017) | Commercial F (2017) | Recreational F (2017) | SSB (2018) | %SSB Change * |
|---|---|---|---|---|---|---|---|---|---|
| Precautionary approach | 0 | 0 | 0 | F = 0 | 0 | 0 | 0 | 7 583 | 21.9 |
| MSY approach# | | | | $F_{MSY}$ | | | | | |
| Other options^ | 2 036 | 1475 | 560 | $F_{2016}$ | 0.30 | 0.22 | 0.08 | 5 845 | -6.0 |
| | | | | $SSB_{2018}=B_{lim}$ | | | | | |
| | | | | $SSB_{2018}=B_{pa}=MSY_{Btrigger}$ | | | | | |
| | 1 672 | 1212 | 460 | $0.8 \times F_{2016}$ | 0.24 | 0.18 | 0.07 | 6 152 | -1.1 |
| | 1 483 | 1074 | 408 | $0.7 \times F_{2016}$ | 0.21 | 0.15 | 0.06 | 6 312 | 1.5 |
| | 1 288 | 933 | 355 | $0.6 \times F_{2016}$ | 0.18 | 0.13 | 0.05 | 6 478 | 4.2 |
| | 882 | 639 | 243 | $0.4 \times F_{2016}$ | 0.12 | 0.09 | 0.03 | 6 824 | 9.7 |
| | 453 | 328 | 125 | $0.2 \times F_{2016}$ | 0.06 | 0.04 | 0.02 | 7 192 | 15.6 |

*SSB in 2018 relative to SSB in 2017.; # The MSY approach option was left blank because $F_{MSY}$ has not been appropriately defined. ;^The Blim, Bpa and MSY Btrigger options were left blank because Blim cannot be achieved in 2018 even with zero catch advice.

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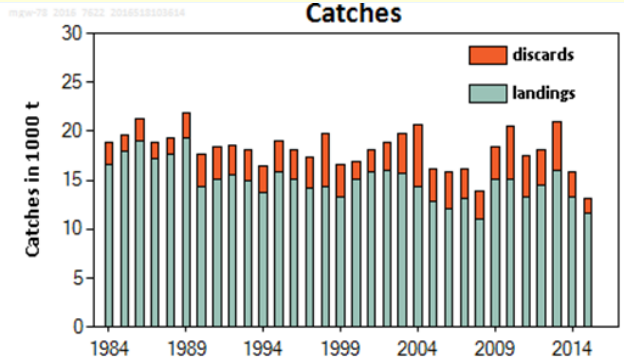
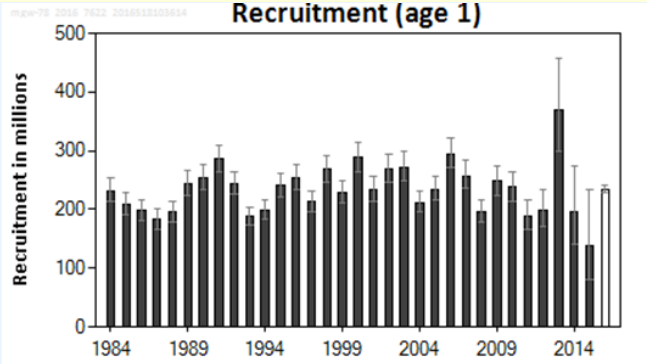
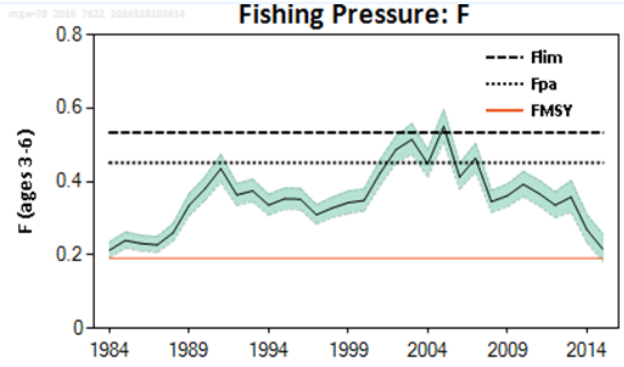
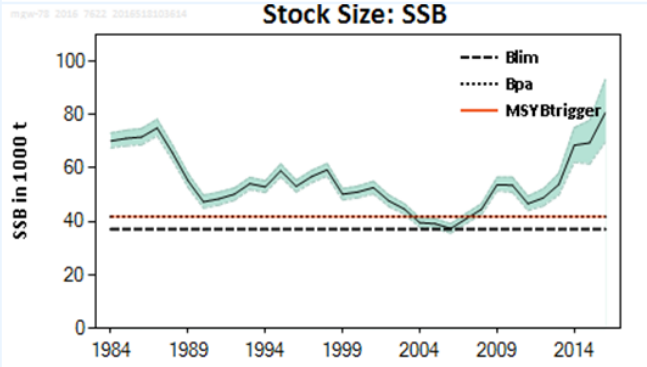
# Megrim in 7.b–k, 8.a–b, and 8.d (west and southwest of Ireland, Bay of Biscay)

**Advice for 2017, MSY:** Catch ≤ 16 021 t
Landings ≤ 13 709 t




* F is above $F_{MSY}$ but declining

* Rec 2015 below average

*SSB increasing and above $MSY_{Btrigger}$

| | | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2014 | 2015 | 2016 |
| 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 |

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

F (2016)= F(2015)= 0.22 SSB(2017)= 86 360 t > $MSY_{Btrigger}$ (41 800 t) $F_{MSY}$=0.191

Weights in tonnes

| Rationale | Total catch (2017) | Landings 2017 | Discards 2017 | Basis | F total (2017) | SSB (2018) | %SSB change | %TAC change |
|---|---|---|---|---|---|---|---|---|
| MSY approach | 16021 | 13709 | 2312 | $F_{MSY}$ | 0.191 | 90801 | 5 | −32 |
| Precautionary approach | 32607 | 27902 | 4705 | $F_{pa}$ | 0.45 | 71182 | −18 | 38 |
| Other options | 0 | 0 | 0 | F = 0 | 0.00 | 109941 | 27 | −100 |
| | 17540 | 15009 | 2531 | $F_{2016}$ | 0.22 | 89011 | 3 | −25 |
| | 36722 | 31423 | 5299 | $F_{lim}$ | 0.53 | 66414 | −23 | 57 |
| | 62293 | 53304 | 8989 | $SSB_{2018} = B_{lim}$ | 1.24 | 37100 | −57 | 166 |
| | 58131 | 49743 | 8388 | $SSB_{2018} = B_{pa}$ = | 1.09 | 41800 | −52 | 148 |
| | 19923 | 17048 | 2875 | $TAC_{2016}$ × | 0.25 | 86207 | 0 | −15 |
| | 23438 | 20056 | 3382 | $TAC_{2016}$ | 0.30 | 82047 | −5 | 0 |
| | 26953 | 23064 | 3889 | $TAC_{2016}$ × 1.15 | 0.36 | 77857 | −10 | 15 |

*The ICES advice is for *L. whiffiagonis*, whereas the TAC is for *L. whiffiagonis* and *L. boscii* combined.

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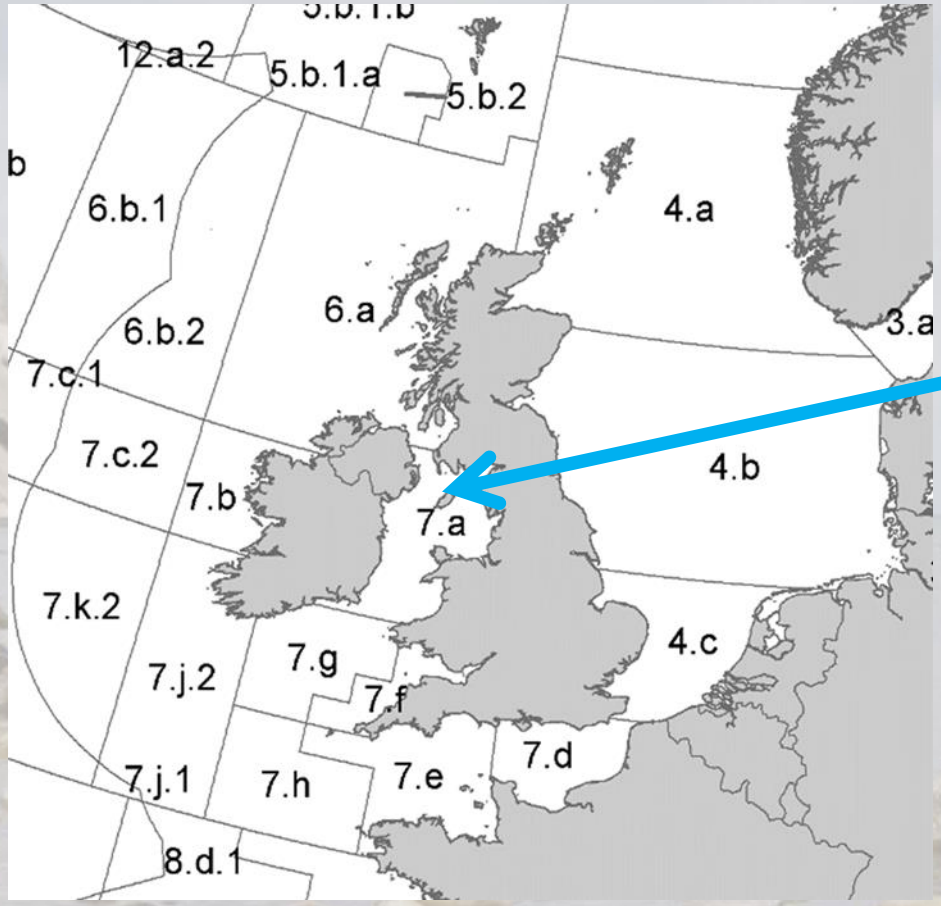
# Irish Sea (7.a)




- Cod
- Haddock
- Whiting
- Plaice
- Sole

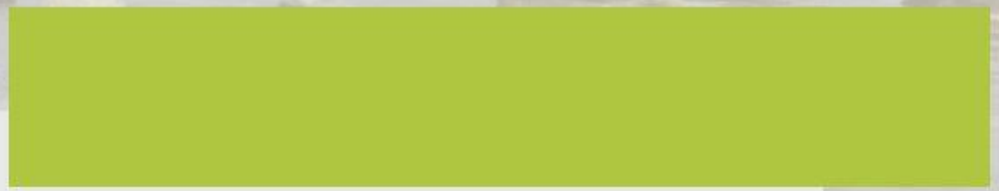
**IN AUTUMN:**

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

# Irish Sea (7.a)

## Summary

| Area | Stock | Advice 2017 | Advice 2016 | Catch 2015 |
|---|---|---|---|---|
| Irish Sea | Cod 7.a | 0 | 0 | 385 |
| | Haddock 7.a | 1286 | 1072 | 1485 |
| | Whiting 7.a | 0 | 0 | 1922 |
| | Plaice 7.a | 1493 | 1244 | 1005 |
| | Sole 7.a | 0 | 0 | 83 |



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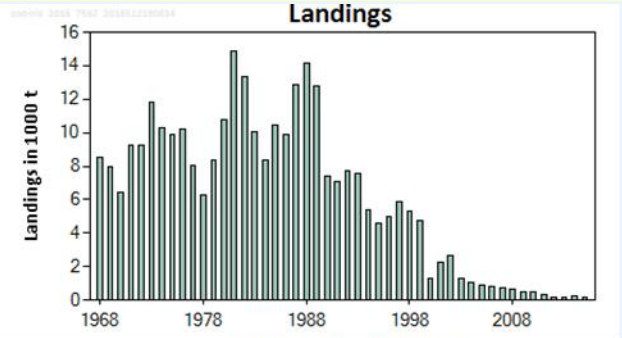
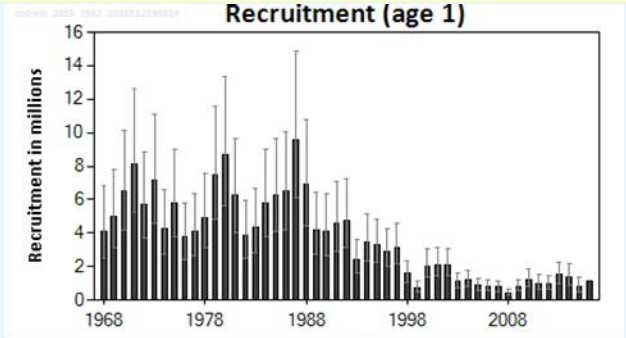
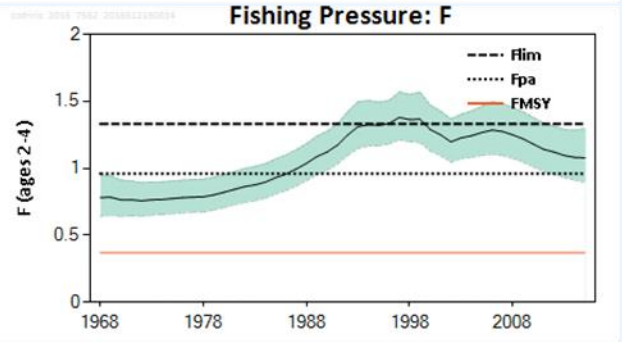
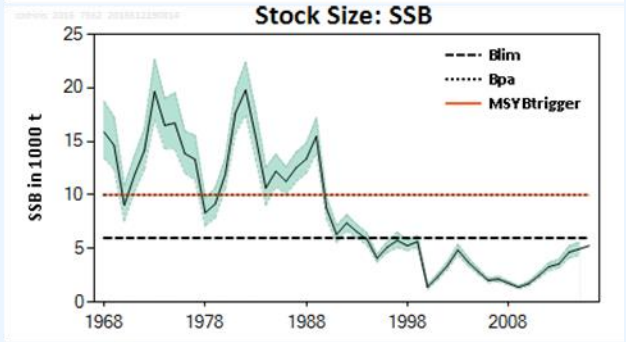
# Cod in Division 7.a (Irish Sea)

**Advice for 2017, MSY :** 0 tonnes




| | | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2014 | 2015 | 2016 |
| Maximum sustainable yield | $F_{MSY}$ | ✗ | ✗ | ✗ | Above | MSY $B_{trigger}$ | ✗ | ✗ | ✗ Below trigger |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | o | o | o | Increased risk | $B_{pa}$, $B_{lim}$ | ✗ | ✗ | ✗ Reduced reproductive capacity |
| Management Plan | $F_{MGT}$ | ? | ? | ? | Not applicable | $SSB_{MGT}$ | ? | ? | ? Not applicable |

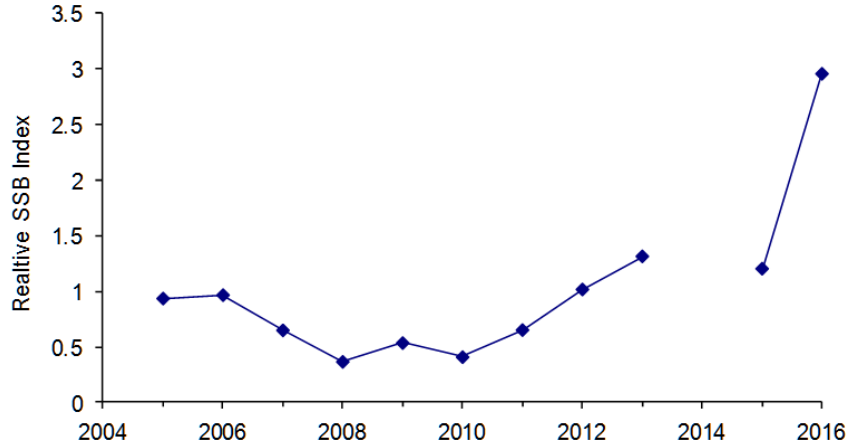
- F declining, above Fpa

- SSB increased recently but still below Blim

- Recruitment continues to be low

# Cod in Division 7.a (Irish Sea)

- Catch in 2015 – 385 tonnes
- Discard estimates not integrated in assessment due to the short time-series
- Model estimates removals much larger (20X) than reported landings, despite more accurate catch reporting
- Causes for discrepancy unclear, assessment has difficulty in fitting the latest survey results → uncertainty in assessment → no catch options are provided.
- Information from stakeholders – increase since 2010 in UK Fisheries-Science Partnership (FSP) survey




- Revised $F_{MSY}$ = 0.37 ↓

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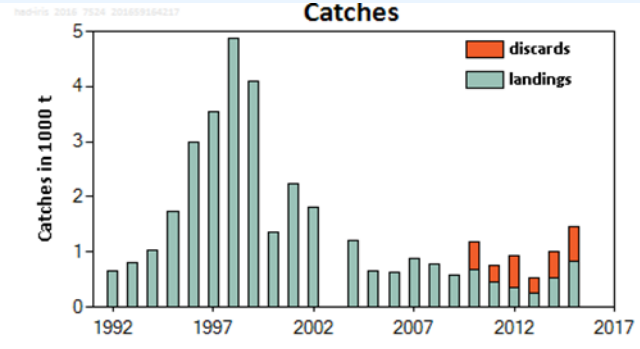
# Haddock in Division 7.a (Irish Sea)

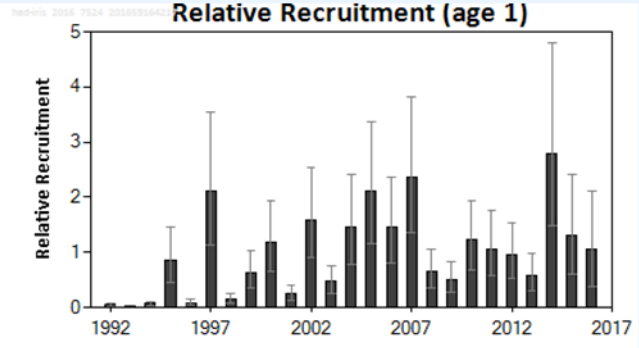
**Advice for 2017, Precautionary Approach:** Catch ≤ 1 286 t*

Stock is partially under the EU LO, ICES cannot advise on landings

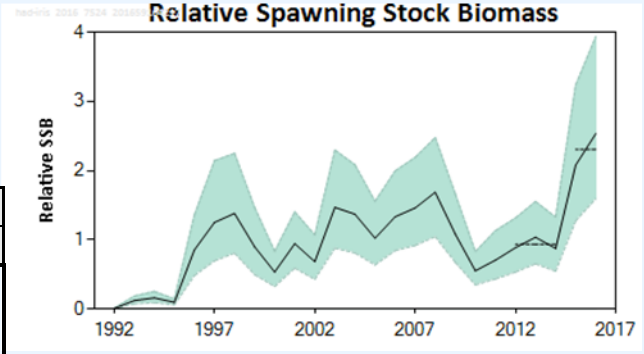
*Advice is for stock and does not include catches taken or reported in rectangles 33E2-3

- Assessment: survey-based, indicative of trends (Category 3)




- Strong 2013 year class led to SSB increase in 2015 and 2016




| | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 |
| Maximum sustainable yield | $F_{MSY}$ Proxy | ✓ | ✓ | ✓ Below proxy | MSY $B_{trigger}$ Proxy | ✓ | ✓ | ✓ Above proxy |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | ✓ | ✓ | ✓ Below candidate reference points | $B_{pa}$, $B_{lim}$ | ✓ | ✓ | ✓ Above candidate reference points |
| Management plan | $F_{MGT}$ | - | - | - Not applicable | $SSB_{MGT}$ | - | - | - Not applicable |
| Qualitative evaluation | - | - | - | - | - | ↗ | ↗ | ↗ Increasing |

-Exploited below $F_{MSY}$ proxy (defined in 2016)

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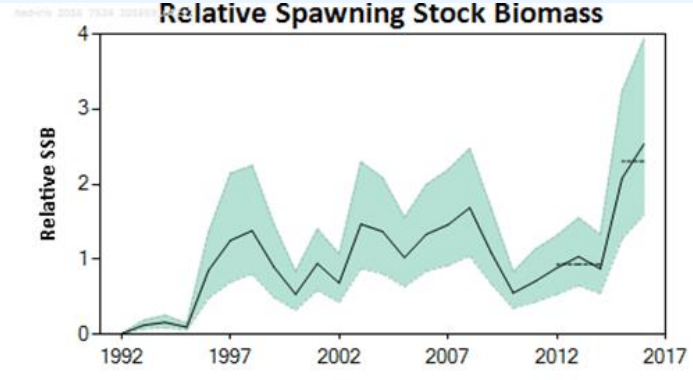
# Haddock in Division 7.a (Irish Sea)

Catch (201) ~ 1 485 t ( ~ 44% discards)

| | | |
|---|---|---|
| Index A (**2015–2016**) | | **2.31** |
| Index B (**2012–2014**) | | **0.93** |
| **Index ratio** (A/B) | | **2.48** |
| **Uncertainty cap** | **Applied** | **1.2** |
| **Recent advised catch (for 2016)** | | **1072 tonnes** |
| Discard rate (average 2013-2015) | | 47% |
| **Precautionary buffer** | **Not applied*** | - |
| **Catch advice (Recent advised catch x cap)** | | **1286 tonnes** |
| **Wanted catch corresponding to the catch advice** | | **682 tonnes** |




*Precautionary buffer not needed given the large increase in index

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.

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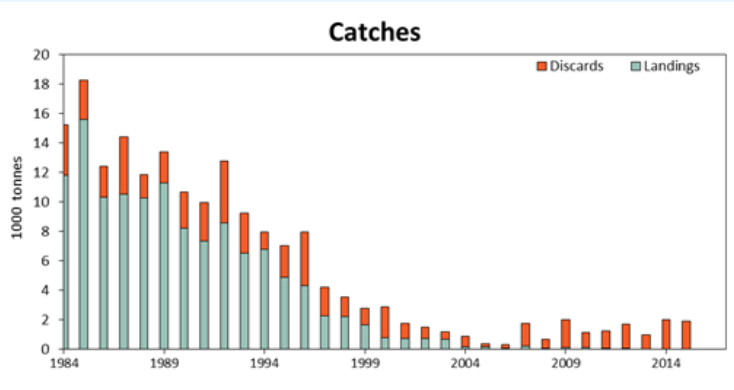
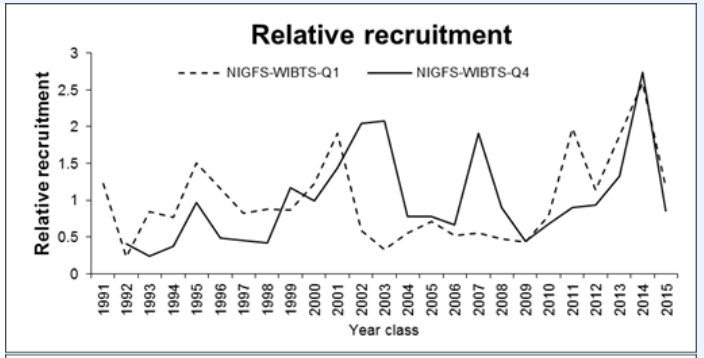
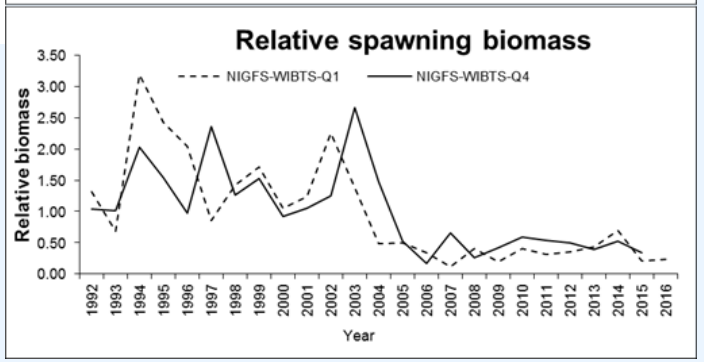
# Whiting in Division 7.a (Irish Sea)

**Advice for 2017, Precautionary Approach:** 0 tonnes

Assessment: survey-based, indicative of trends (Category 3)




Stock size very low. High 2014 year-class.

Catch(2015) ~ 1 900 tonnes (~ 99% discards)

Most whiting caught are discards in *Nephrops* fishery, below MLS ➔ could become major choke with LO

| | Fishing pressure | | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2014 | 2015 | 2016 | |
| Maximum Sustainable Yield | $F_{MSY}$ Proxy | ⊗ | ⊗ | ? | 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 | - | - | - | ⊗ | Likely above any candidate reference points | - | ⊗ | ⊗ | ⊗ | Likely below possible reference points |

$F_{MSY}$ proxy defined in 2016

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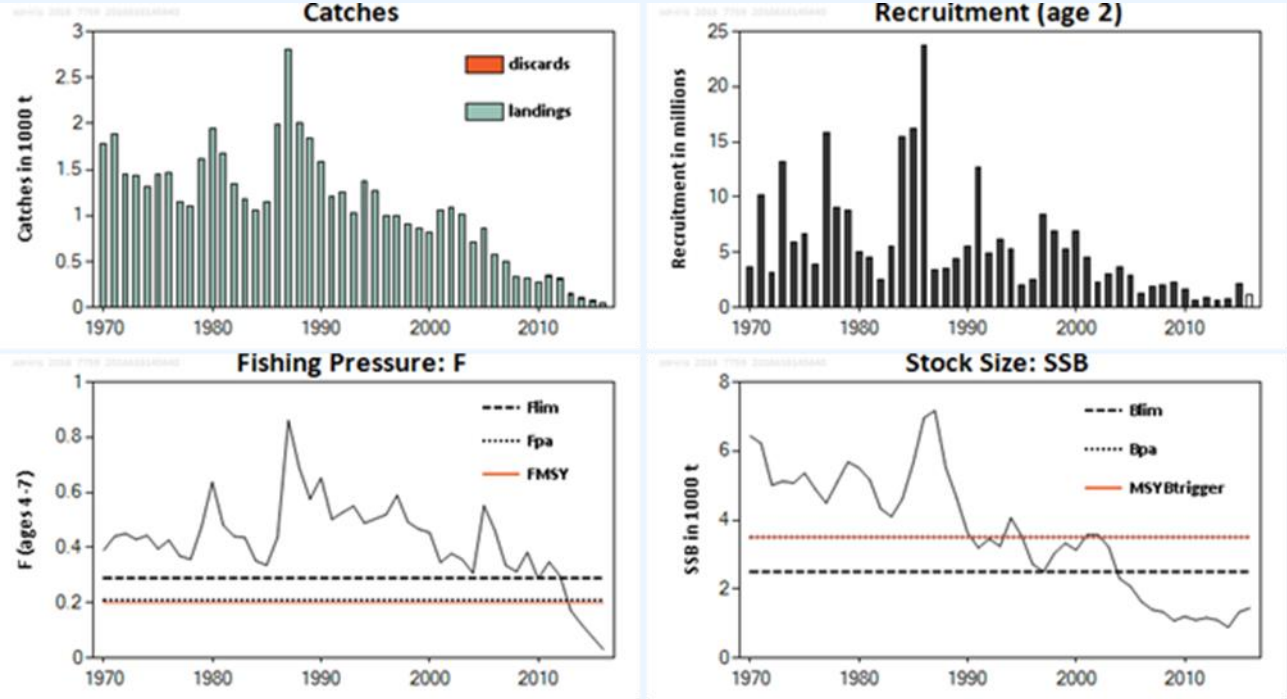
# Sole in Division 7.a (Irish Sea)

**Advice for 2017 and 2018, MSY:** 0 tonnes




* F : overall declining trend since late 1980s, below $F_{MSY}$ since 2013

* Recent recruitment at lowest in time series with increase in 2015

* SSB declined continuously and below Blim - increase in 2014-2016

| | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 |
| Maximum Sustainable Yield | $F_{MSY}$ | ✓ | ✓ | ✓ Below | MSY $B_{trigger}$ | ✗ | ✗ | ✗ Below trigger |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | ✓ | ✓ | ✓ Harvested sustainably | $B_{pa}$, $B_{lim}$ | ✗ | ✗ | ✗ Reduced reproductive capacity |
| Management Plan | $F_{MGT}$ | - | - | - Not applicable | $SSB_{MGT}$ | - | - | - Not applicable |

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# Sole in Division 7.a (Irish Sea)

Catch (2015) ~ 83 t (~ 8% discards)

Discards not included in assessment, but not expected to change stock perception

F(2016)=0.03 (TAC constraint); SSB(2017) = 1 662 t < $B_{lim}$ (2 500 t )

$F_{MSY}$ = 0.20 ↑

| Rationale | Total catches (2017) * | Wanted catch** (2017) | Basis^^ | F Wanted catch** (2017) | SSB (2018) | %SSB change *** | %TAC Change ^ |
|---|---|---|---|---|---|---|---|
| MSY approach | 0 | 0 | F = 0 | 0 | 1879 | 13 | -100 |
| Other Options | 160 | 147 | $F_{MSY} \times SSB_{(2017)}/MSY\ B_{trigger}$ | 0.095 | 1738 | 5 | 300 |
| | 33 | 30 | $TAC_{2016}$ – 25% | 0.019 | 1850 | 11 | -18 |
| | 37 | 34 | $TAC_{2016}$ – 15% | 0.021 | 1846 | 11 | -8 |
| | 43 | 40 | $TAC_{2016}$ | 0.025 | 1840 | 11 | 8 |
| | 50 | 46 | $TAC_{2016}$ + 15% | 0.029 | 1835 | 10 | 25 |
| | 52 | 48 | $F_{2016}$ | 0.03 | 1833 | 10 | 30 |
| | 320 | 294 | $F_{MSY}$ | 0.2 | 1596 | -4 | 700 |
| | 335 | 308 | Fpa | 0.21 | 1582 | -5 | 738 |
| | 446 | 410 | Flim | 0.29 | 1484 | -11 | 1015 |
| | | | $SSB_{2018}=B_{lim}$ | | | | |
| | | | $SSB_{2018}=B_{pa}=MSY_{Btrigger}$ | | | | |

* Total catch from Wanted catch forecast, based on 8% discard rate (2013-2015 average)

^ Total catch (2017) relative to TAC 2016 (40 t)

- Even with no catch in 2017, the stock will remain below $B_{lim}$ in 2018
- Given low SSB and Rec in last decade ➔ catch advice = 0 (MSY approach)
- Extra 7 t in 2016 for scientific purposes ➔ negligible impact

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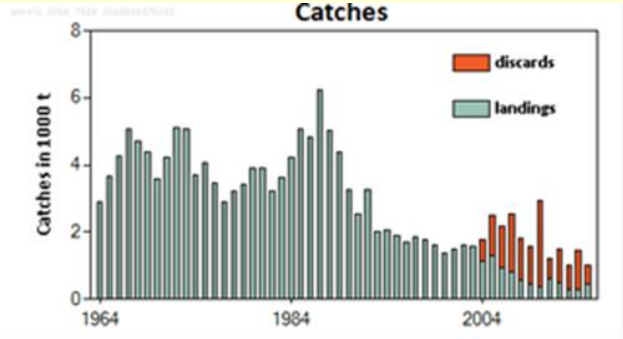
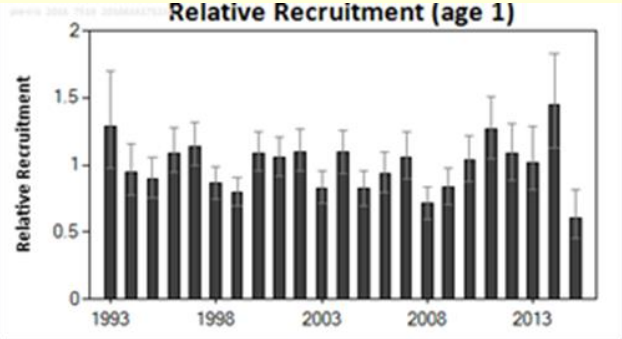
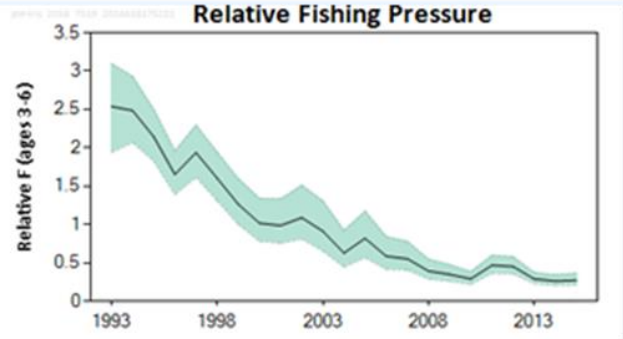
# Plaice in Division 7.a (Irish Sea)

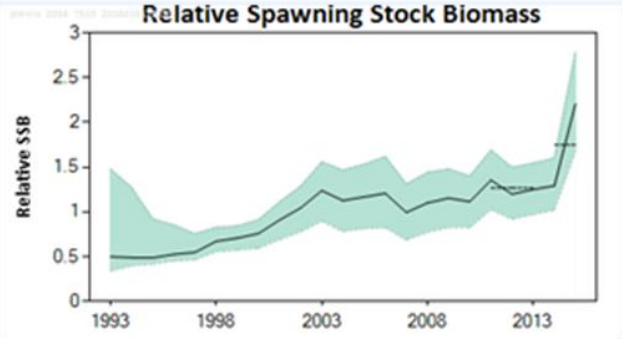
**Advice for 2017, Precautionary Approach:** Catch ≤ 1 493 t

If no LO: Landings ≤ 343 t, assuming discard rates stay at last 3-year average




| | | 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 possible candidates ref. points | $B_{pa}$, $B_{lim}$ | ✓ | ✓ | ✓ Above possible candidates ref. points |
| Management Plan | $F_{MGT}$ | - | - | - | Not applicable | $SSB_{MGT}$ | - | - | - Not applicable |
| Qualitative evaluation | - | ↘ | ↘ | → | Stable | - | → | ↗ | ↗ Increasing |

* Assessment indicative of trends (Category 3)

* SSB stable since 2003 but increase in 2015, high uncertainty in annual SSB estimates

* Harvest rate low, hence F considered below possible reference points

*MSY proxy reference points in 2016

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# Plaice in Division 7.a (Irish Sea)

Catch (2015) ~ 1 005 t ( ~56% discards)

* **Category 3**

[SSB trends from assessment model]

| | | |
|---|---|---|
| Index A (2014-15) | | 1.75 |
| Index B (2011-13) | | 1.27 |
| **Index ratio** (A/B) | | 1.38 |
| Uncertainty cap | Applied | 1.2 |
| **Recent advised landings for 2016** | | **1244 tonnes** |
| Discard rate (2013–2015 average) | | 0.7 |
| Precautionary buffer | Not Applied | - |
| **Catch advice*** | | **1493 tonnes** |
| **Wanted catch corresponding to the catch advice** | | **436 t** |

* Recent advised catch x Uncertainty cap

- Large portion of catch is discarded; recent gear selectivity measures seem to have little effect on plaice.

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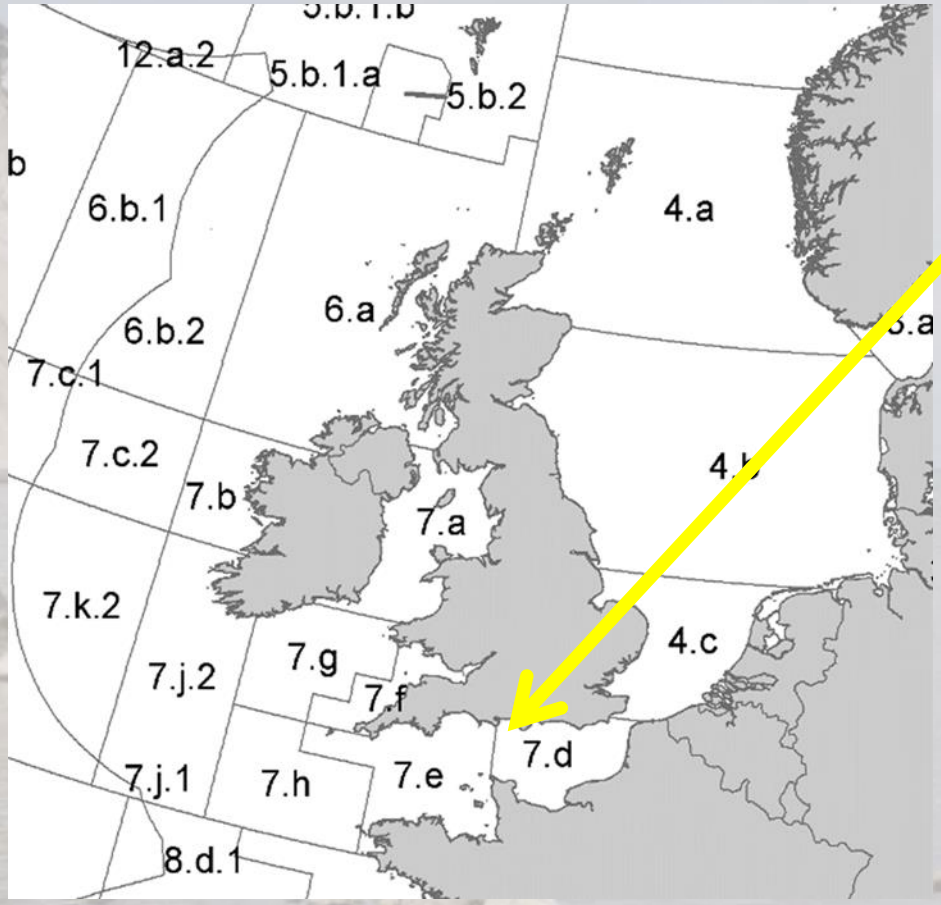
# English Channel (Divisions 7.d and e)

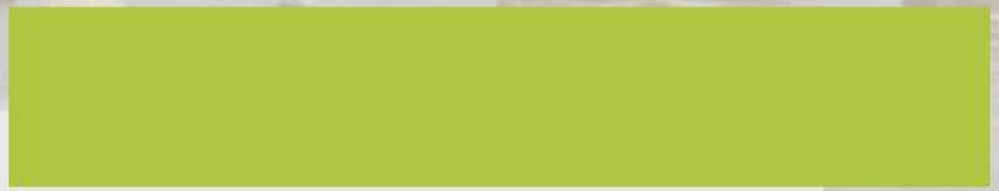



- Cod (4, 7.d, Skagerrak)
- Sole (7.d)
- Plaice (7.d)
- Sole (7.e)
- Plaice (7.e)

# English Channel (Divisions 7.d and e)

## Summary

| Area | Stock | Advice 2017 | Advice 2016 | Catch 2015 |
|---|---|---|---|---|
| English Channel | Cod 3.a.20, 7.d. 4 | 47431 | 49259 | 49841 |
| | Sole 7.d | 2487 | 2685 | 3702 |
| | Sole 7.e | 1198 | 1226 | 826 |
| | Plaice 7.d | 12805 | 16923 | 6548 |
| | Plaice 7.e | 2714 | 2262 | 2654 |



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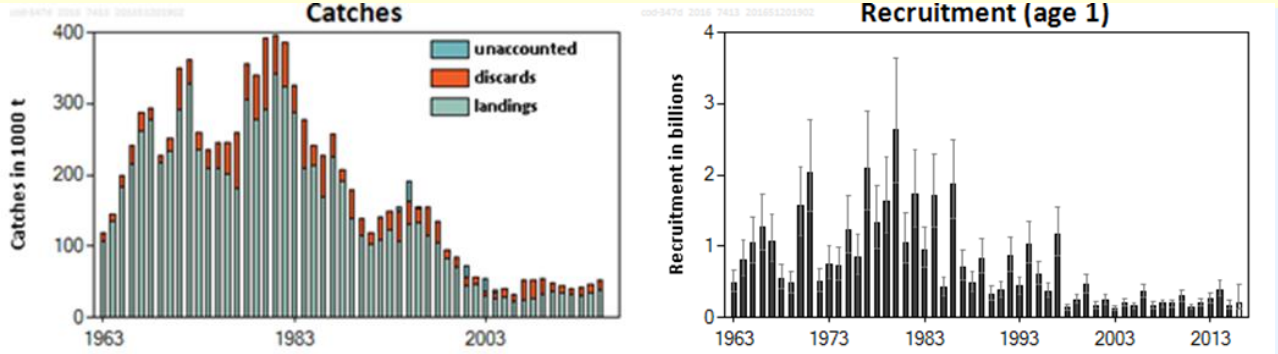
# Cod in Subarea 4 and Divisions 7.d and 3.a.20

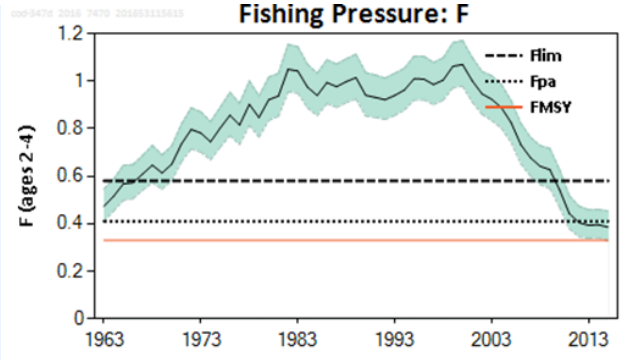
**Advice for 2017, MSY:** Catch ≤ 47 431 t

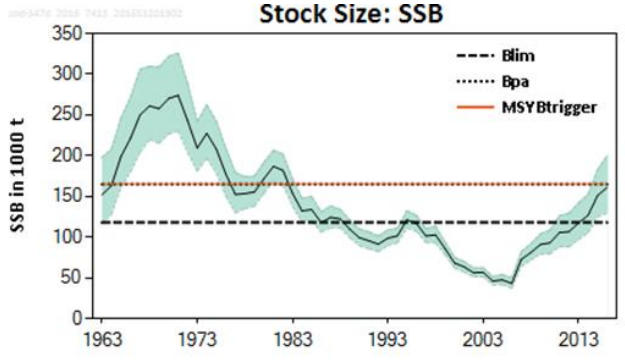
Landings ≤ 38 691 t, assuming discard rates as in 2015










| | | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 | |
| Maximum sustainable yield | $F_{MSY}$ | ✗ | ✗ | ✗ | Above | MSY $B_{trigger}$ | ✗ | ✗ | ✗ | Below trigger |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | ✓ | ✓ | ✓ | Harvested sustainably | $B_{pa}$, $B_{lim}$ | o | o | o | Increased risk |
| Management plan | $F_{MGT}$ | - | - | - | Not applicable | $SSB_{MGT}$ | - | - | - | Not applicable |

***Stock has increased despite low recruitment due to reduction in fishing pressure but F remains above $F_{MSY}$.**

***SSB increasing since 2006, now near $MSY_{Btrigger}$**

***New reference points in 2015 - until MP evaluated precautionary, advice follows MSY approach**

*** Catch of 49 800 t in 2015**

# Cod in Subarea 4 and Divisions 7.d and 3.a.20

F (2016)=F(2015)=0.39; SSB(2017) = 174 kt < MSY $B_{trigger}$ (165 kt) $F_{MSY}$=0.33

| Rationale | Total catch (2017) | Wanted catch* (2017) | Unwanted catch* (2017) | Basis | $F_{total}$ (2017) | $F_{wanted}$ (2017) | $F_{unwanted}$ (2017) | SSB (2018) | % SSB Change** | % TAC Change wanted catch*** |
|---|---|---|---|---|---|---|---|---|---|---|
| **MSY approach** | **47431** | **38691** | **8740** | **$F_{MSY}$** | **0.33** | **0.23** | **0.1** | **182807** | **5** | **–4** |
| EU–Norway Management Strategy (MS) with previous reference points | 55959 | 45612 | 10347 | Long-term phase | 0.4 | 0.28 | 0.12 | 173495 | 0 | 13 |
| EU–Norway MS with new reference points | 54046 | 44091 | 9955 | Long-term phase | 0.38 | 0.27 | 0.11 | 175637 | 1 | 9 |
| Zero catch | 0 | 0 | 0 | F = 0 | 0 | 0 | 0 | 237118 | 36 | −100 |
| Other options ^ | 57140 | 46551 | 10589 | $F_{pa}$ | 0.41 | 0.29 | 0.12 | 172171 | −1 | 15 |
| | 75810 | 61629 | 14181 | $F_{lim}$ | 0.58 | 0.41 | 0.17 | 151846 | −13 | 52 |
| | 107401 | 87011 | 20390 | SSB (2018) = $B_{lim}$ | 0.94 | 0.66 | 0.28 | 118000 | −32 | 115 |
| | 63653 | 51839 | 11814 | SSB (2018) = $B_{pa}$ | 0.47 | 0.33 | 0.14 | 165000 | −5 | 28 |
| | 63653 | 51839 | 11814 | SSB (2018) = MSY $B_{trigger}$ | 0.47 | 0.33 | 0.14 | 165000 | −5 | 28 |
| | 39518 | 32335 | 7183 | $TAC_{2016}$ – 20% | 0.27 | 0.19 | 0.08 | 191608 | 10 | −20 |
| | 41995 | 34356 | 7639 | $TAC_{2016}$ – 15% | 0.29 | 0.20 | 0.09 | 188858 | 8 | −15 |
| | 44478 | 36377 | 8101 | $TAC_{2016}$ – 10% | 0.31 | 0.22 | 0.09 | 186052 | 7 | −10 |
| | 46962 | 38398 | 8564 | $TAC_{2016}$ – 5% | 0.33 | 0.23 | 0.10 | 183206 | 5 | −5 |
| | 49454 | 40419 | 9035 | Constant TAC | 0.35 | 0.24 | 0.11 | 180305 | 3 | 0 |
| | 51939 | 42440 | 9499 | $TAC_{2016}$ + 5% | 0.37 | 0.26 | 0.11 | 177556 | 2 | 5 |
| | 54425 | 44461 | 9964 | $TAC_{2016}$ + 10% | 0.39 | 0.27 | 0.12 | 174736 | 0 | 10 |
| | 56914 | 46482 | 10432 | $TAC_{2016}$ + 15% | 0.41 | 0.29 | 0.12 | 171902 | −1 | 15 |
| | 59410 | 48503 | 10907 | $TAC_{2016}$ + 20% | 0.43 | 0.30 | 0.13 | 169100 | −3 | 20 |
| | 54214 | 44226 | 9988 | $F_{2016}$ | 0.39 | 0.27 | 0.12 | 175459 | 1 | 9 |

Weights in tonnes

* Wanted catch (2017) relative to 2016 TAC (40 419 t)

**Mixed fisheries options:** to be produced in autumn

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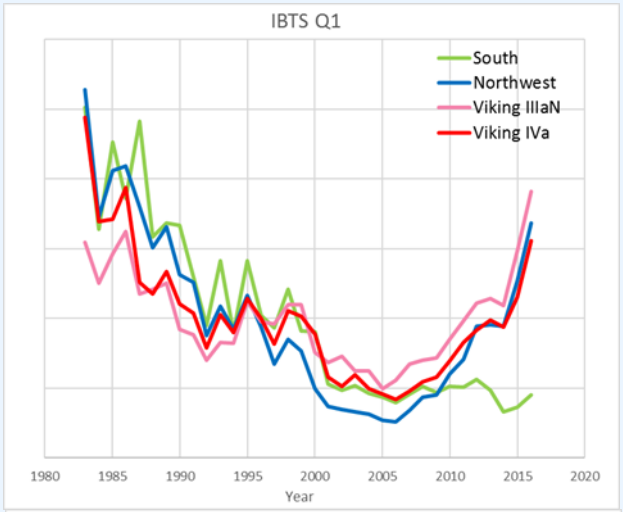
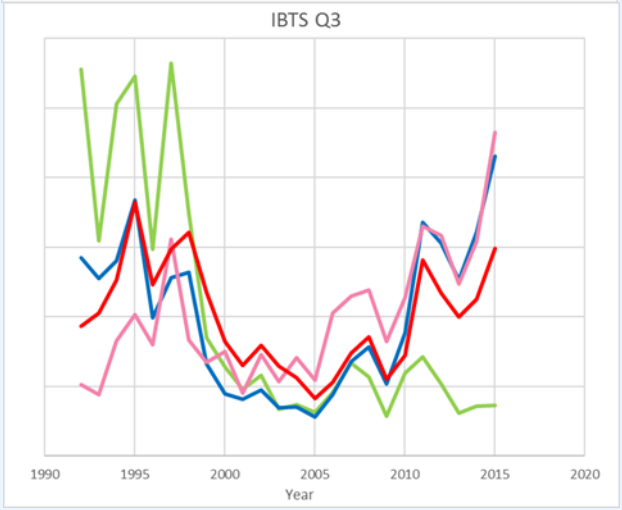
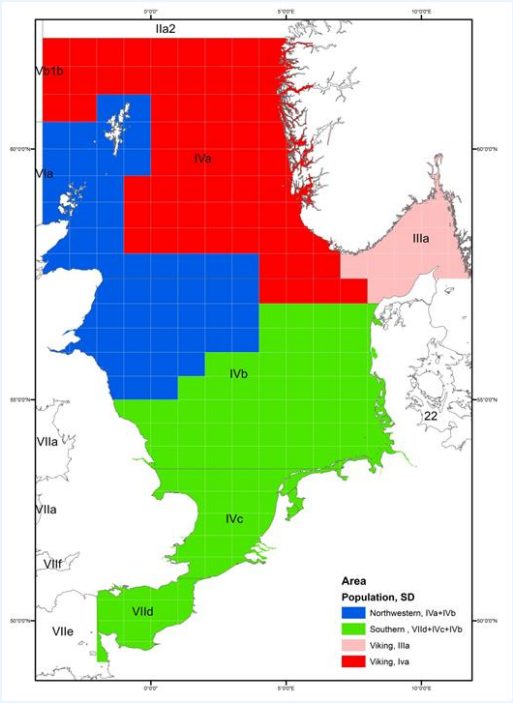
# Cod in Subarea 4 and Divisions 7.d and 3.a.20




Biomass indices by subregion




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

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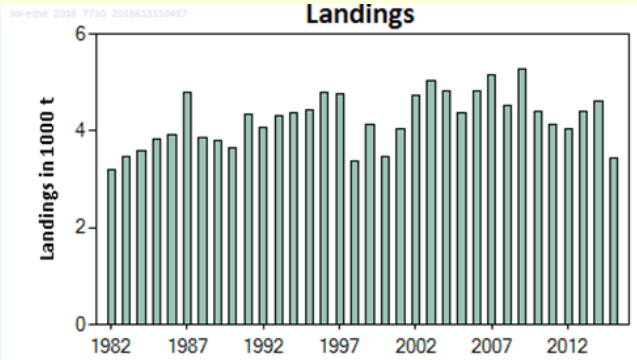
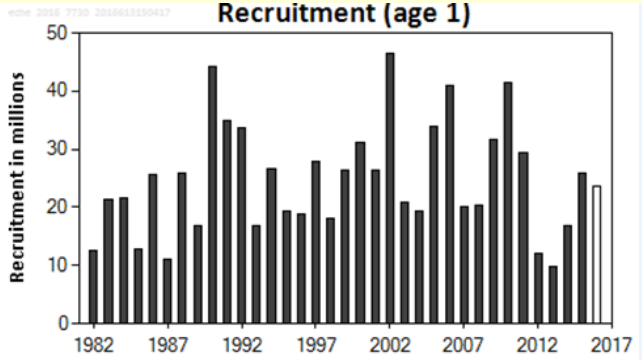
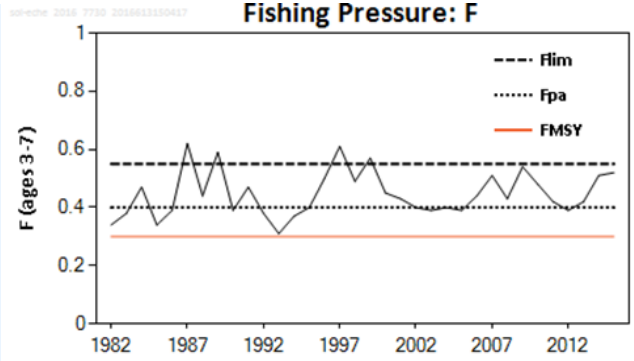
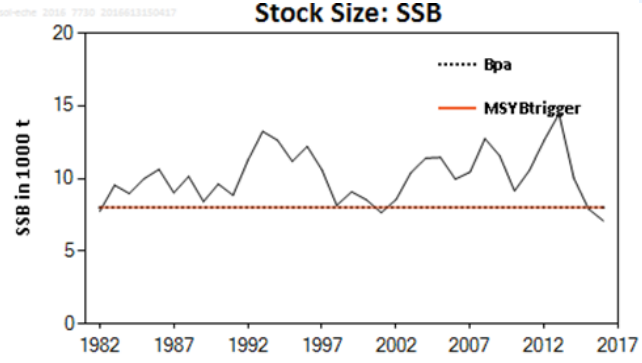
# Sole in Division 7.d – Eastern Channel

**Advice for 2017, MSY:** Catch ≤ 2 487 t




* F above $F_{MSY}$ and near $F_{lim}$ in 2015

* Recruitment in 2012-2014 among lowest in time series.
(most recent recruitment estimates can change significantly between assessments)

* SSB declined below MSY $B_{trigger}$

| | Fishing pressure | | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2014 | 2015 | 2016 | |
| Maximum sustainable yield | $F_{MSY}$ | ✗ | ✗ | ✗ | Above | MSY $B_{trigger}$ | ✓ | ✓ | ✗ | Below trigger |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | o | o | o | Increased risk | $B_{pa}$, $B_{lim}$ | ✓ | ✓ | o | Increased risk |
| Management plan | $F_{MGT}$ | - | - | - | Not applicable | $SSB_{MGT}$ | - | - | | Not applicable |

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# Sole in Division 7.d (Eastern Channel)

Catch (2015) ~ 3 700 t (discards ~ 7%)

Discards below MLS in 80 mm mixed flatfish beam-trawl fishery

F(2016) = F(TAC constraint) = 0.45; SSB(2017) = 7 853t < MSY $B_{trigger}$ (8 000 t) $F_{MSY}$=0.30

Weights in tonnes

| Rationale | Total catch (2017) | Wanted catch (2017) | Basis | $F_{wanted\ catch}$ (2017) | SSB (2018) | %SSB change | %TAC change * |
|---|---|---|---|---|---|---|---|
| **MSY approach** | **2487** | **2257** | **$(SSB_{2017}/MSY_{Btrigger}) \times F_{MSY}$** | **0.29** | **9440** | **20** | **−24** |
| $F_{MSY}$ | 2528 | 2294 | $F_{MSY}$ | 0.3 | 9400 | 20 | −22 |
| Precautionary approach | 3224 | 2926 | $F_{pa}$ | 0.4 | 8716 | 11 | −1 |
| | 4157 | 3773 | $F_{lim}$ | 0.55 | 7803 | −1 | 28 |
| Zero catch | 0 | 0 | F = 0 | 0 | 11887 | 51 | −100 |
| Other options | 3524 | 3198 | $F_{2016}$ | 0.45 | 8423 | 7 | 8 |
| | 3955 | 3590 | SSB > $B_{pa}$ | 0.52 | 8000 | 2 | 21 |
| | 3955 | 3590 | SSB > MSY $B_{trigger}$ | 0.52 | 8000 | 2 | 21 |
| | 2769 | 2513 | TAC −15% | 0.33 | 9162 | 17 | −15 |
| | 3258 | 2957 | Stable TAC | 0.41 | 8683 | 11 | 0 |
| | 3747 | 3401 | TAC + 15% | 0.48 | 8204 | 4 | 15 |

Total catch calculated from forecasted wanted catch, based on discard rate of 2014-2015 (9%)

- Total catch (2017) relative to 2016 TAC (3258 t)

**Mixed fisheries options:** to be produced in autumn

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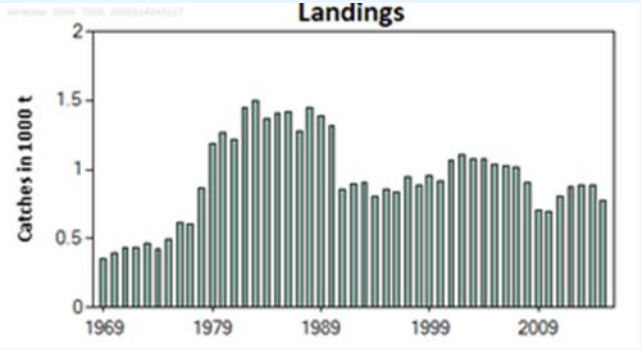
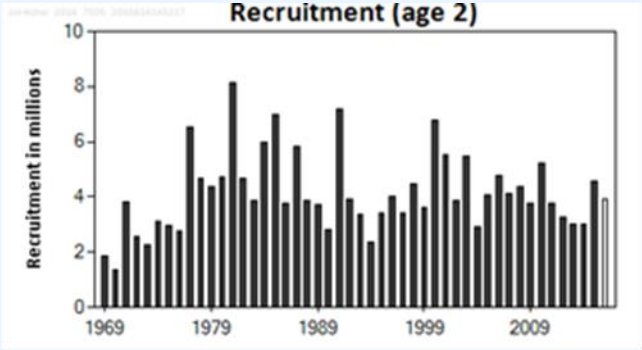
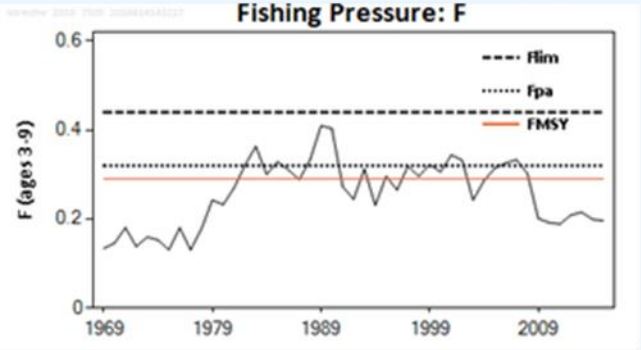
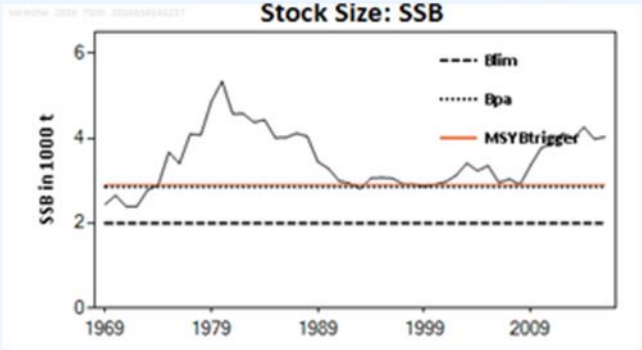
# Sole in Division 7.e – Western Channel

**Advice for 2017, MSY:** Catch < 1 198 t




* No trends in recruitment
* SSB above MSY $B_{trigger}$ since 1999
* F below $F_{MSY}$ since 2009

| | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2014 | 2015 | 2016 |
| Maximum sustainable yield | $F_{MSY}$ | ✓ | ✓ | ✓ Appropriate | MSY $B_{trigger}$ | ✓ | ✓ | ✓ Above $B_{trigger}$ |
| 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 |

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# Sole in Division 7.e (Western Channel)

**F(2016)= F(2013-15) scaled to F(2015)= 0.20; SSB(2017)= 4 143 t > MSY $B_{trigger}$ (2 900 t ↑)** **$F_{MSY}$= 0.29 ↑**

| Rationale | Total catches (2017) | Wanted catches (2017) | Basis | F wanted catch (2017) | SSB (2018) | %SSB change | %TAC Change* |
|---|---|---|---|---|---|---|---|
| MSY approach | 1198 | 1178 | $F_{MSY}$ | 0.29 | 3882 | −6 | 20 |
| Management plan | 1125 | 1106 | F = 0.27 with 15% TAC constraint | 0.27 | 3951 | −5 | 13 |
| Zero catch | 0 | 0 | F = 0 | 0 | 5026 | 21 | −100 |
| Other options | 526 | 517 | $F_{2016} \times 0.6$ | 0.12 | 4523 | 9 | −47 |
| | 688 | 677 | $F_{2016} \times 0.8$ | 0.16 | 4367 | 5 | −31 |
| | 846 | 832 | $TAC_{2016}$ − 15% | 0.20 | 4216 | 2 | −15 |
| | 1145 | 1126 | $TAC_{2016}$ + 15% | 0.28 | 3932 | −5 | 15 |
| | 996 | 979 | $TAC_{2016}$ | 0.24 | 4074 | −2 | 0 |
| | 845 | 831 | $F_{2016} \times 1.0$ | 0.20 | 4218 | 2 | −15 |
| | 1700 | 1672 | $F_{lim}$ | 0.44 | 3404 | −18 | 71 |
| | 1304 | 1282 | $F_{pa}$ | 0.32 | 3781 | −9 | 31 |
| | 2236 | 2199 | $SSB_{2018} = B_{pa}$ | 0.63 | 2900 | −30 | 125 |
| | 2236 | 2199 | $SSB_{2018}$ = MSY $B_{trigger}$ = $B_{pa}$ | 0.63 | 2900 | −30 | 125 |
| | 3206 | 3152 | $SSB_{2018} = B_{lim}$ | 1.07 | 2000 | −52 | 222 |

Weights in tonnes

* Management plan has target F = 0.27 with 15% TAC constraint
ICES has not evaluated management plan

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# Plaice in Division 7.d (Eastern Channel)

**Advice for 2017, MSY:**

**Division 7.d stock: Catch ≤ 12 805 t**

Landings ≤ 7 550 t, assuming discards stay at last 3-year average

**Plaice caught in Div 7.d ≤ 14 864 t** (assuming the proportion of plaice taken in Div 7.d that is from Division 7.e and Subarea 4 plaice stocks is as during 2003-2015):

Landings ≤ 8 764 t, assuming discard rates stay at last 3-year average

**Plaice mix during spawning period:**

- **part of the catches of plaice in Division 7.d are from the Western Channel and North Sea stocks**
- ***assessment and advice assume that 87% of the annual plaice catch in 7.d is from the 7.d plaice stock, and 13% from adjacent stocks***
- **assessment (for the stock) and advice (for the stock and for the area) account for this mixing**
- **new data are needed to determine if currently assumed mixing rates are still valid given the general increase of plaice stocks**

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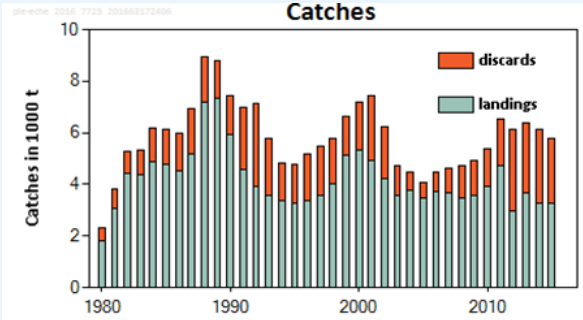
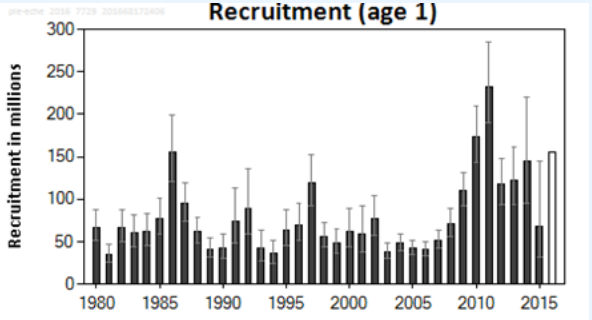
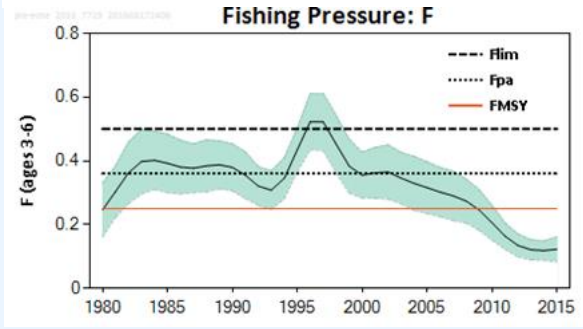
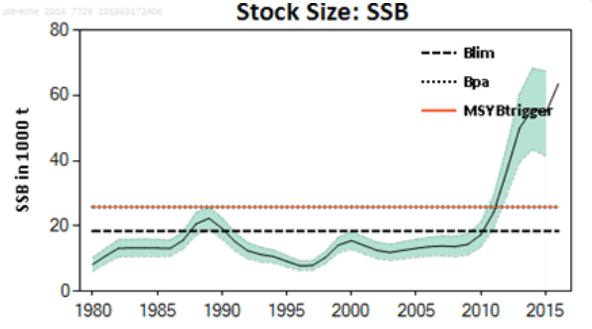
# Plaice in Division 7.d (Eastern Channel)




*F below $F_{MSY}$ since 2009

*SSB increasing

*Recruitment high since 2009

*Estimates of biomass and recruitment lower compared to the previous assessment

| | Fishing pressure | | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2014 | 2015 | 2016 | |
| Maximum sustainable yield | $F_{MSY}$ | ✓ | ✓ | ✓ | Appropriate | 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 |

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# Plaice in Division 7.d (Eastern Channel)

Catch of plaice in 7.d (2015) ~ 6 550 t (discards 43%)

* Large number of undersized plaice discarded with 80 mm mesh

F(2016)= F(TAC & prop in 7.d) =0..27; SSB(2017) = 61.1 kt > MSY Btrigger (25.8 kt) $F_{MSY}$ = 0.25

| Division 7.d plaice stock | | | | | | | | | | | Plaice in Division 7.d* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rationale | Total catch (2017) | Wanted catch (2017) | Unwanted catch (2017) | Basis | $F_{total}$ (2017) | $F_{wanted}$ (2017) | $F_{unwanted}$ (2017) | SSB (2018) | % SSB change | % change in wanted catch | Total catch (2017) | Wanted catch (2017) | Unwanted catch (2017) | % change in wanted catch |
| MSY approach | 12805 | 7550 | 5255 | $F_{MSY}$ | 0.25 | 0.135 | 0115 | 59077 | −3 | 155 | 14864 | 8764 | 6100 | 135 |
| Other options $ | 17607 | 10402 | 7205 | $F_P$ | 0.36 | 0.195 | 0.165 | 53543 | −12 | 252 | 20438 | 12075 | 8364 | 224 |
| | 23098 | 13678 | 9420 | $F_{lim}$ | 0.5 | 0.271 | 0.229 | 47334 | −23 | 363 | 26813 | 15878 | 10935 | 326 |
| | 6502 | 3824 | 2678 | $F_{2015}$ | 0.12 | 0.065 | 0.055 | 66476 | 9 | 29 | 7548 | 4439 | 3109 | 19 |
| | 5030 | 2957 | 2073 | Landings 2015 roll over | 0.09 | 0.05 | 0.042 | 68224 | 12 | 0 | 5839 | 3433 | 2406 | −8 |
| | 6034 | 3548 | 2486 | Landings 2015 + 20% | 0.11 | 0.06 | 0.051 | 67031 | 10 | 20 | 7004 | 4119 | 2886 | 11 |
| | 4025 | 2365 | 1660 | Landings 2015 − 20% | 0.07 | 0.039 | 0.033 | 69421 | 14 | −20 | 4672 | 2745 | 1927 | −26 |
| | 51007 | 30590 | 20417 | SSB > $B_{lim}$ | 1.66 | 0.897 | 0.761 | 18448 | −70 | 934 | 59209 | 35509 | 23700 | 853 |
| | 43346 | 25905 | 17441 | SSB > $B_{pa}$ | 1.23 | 0.663 | 0.563 | 25826 | −58 | 776 | 50317 | 30071 | 20246 | 707 |
| | 43346 | 25905 | 17441 | SSB > MSY $B_{trigger}$ | 1.23 | 0.663 | 0.563 | 25826 | −58 | 776 | 50317 | 30071 | 20246 | 707 |

**Mixed fisheries options:** to be produced in autumn

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# Plaice in Division 7.e (Western Channel)

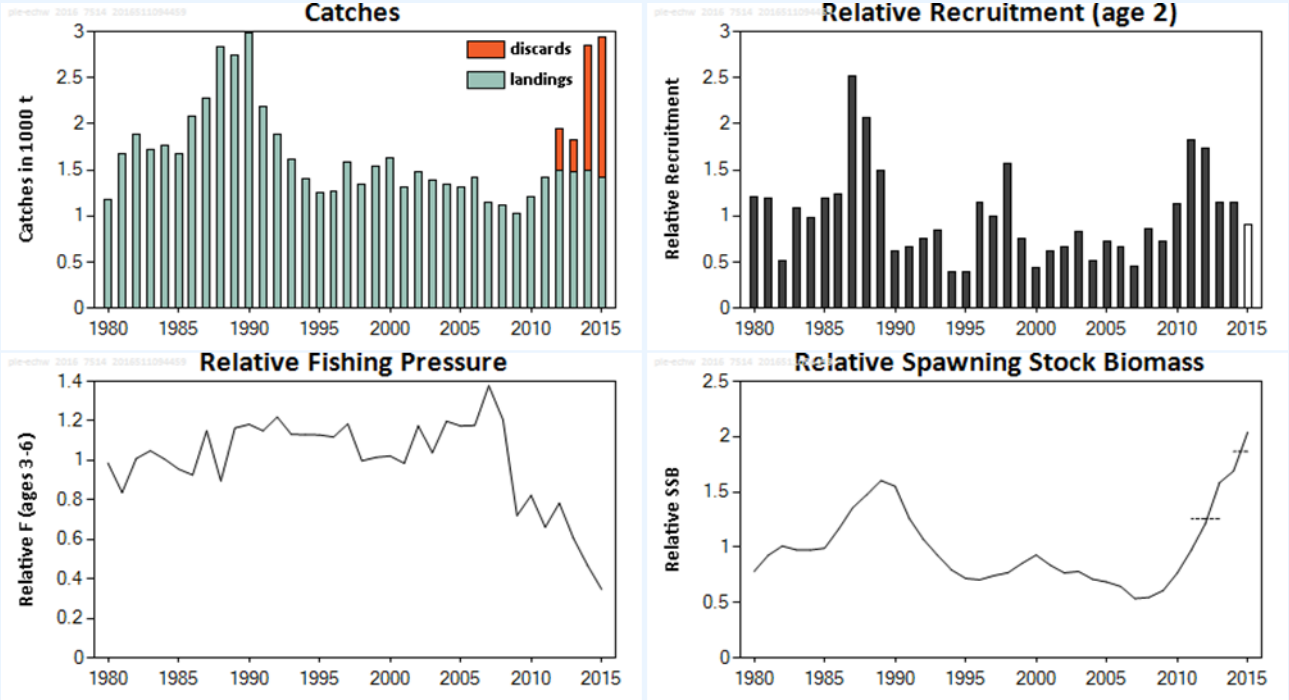
**Advice for 2017, MSY:**

**Division 7.e stock:** Catch ≤ 2 714 t ; at recent discard rates: Landings ≤ 1 391 t

**Catch of plaice in Div 7.e*** ≤ 2 454 t ; at recent discard rates: Landings ≤ 1 258 t

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

**Assessment is for stock**




*Discards not in assessment, but taken into account when producing advice

*F declined substantially

* SSB increased since 2008 and at highest in time-series

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# Plaice in Division 7.e (Western Channel)

| | 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 possible candidate reference points | $B_{pa}$, $B_{lim}$ | ✓ | ✓ | ✓ Above possible candidate reference points |
| Management plan | $F_{MGT}$ | - | - | - Not applicable | $SSB_{MGT}$ | - | - | - Not applicable |
| Qualitative evaluation | - | ↘ | ↘ | ↘ Decreasing | - | ↗ | ↗ | ↗ Increasing |

*MSY proxy reference points defined in 2016

*Stock in good condition

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# Plaice in Division 7.e (Western Channel)

| **Division 7.e plaice stock** | | |
|---|---|---|
| Index A (2014, 2015) | | 1.87 |
| Index B (2011, 2012, 2013) | | 1.26 |
| **Index ratio** (A/B) | | 1.48 |
| **Uncertainty cap** | Applied | 1.2 |
| **Recent advised catch for 2016 (for stock)** | | **2262 t** |
| Discard rate (2014–2015) | | 0.49 |
| Precautionary buffer | Not applied | - |
| **Catch advice (for stock)*** | | **2714 t** |
| Landings corresponding to the catch advice (for stock) | | 1391 t |
| | | |
| **Plaice in Division 7.e** | | |
| Proportion of Division 7.e stock catches taken in Division 7.d (2006–2015) | | 0.10 |
| **Catch of plaice in Division 7.e corresponding to the advice for the stock** | | **2454 t** |
| Landings of plaice in Division 7.e corresponding to the advice for the stock | | 1258 t |

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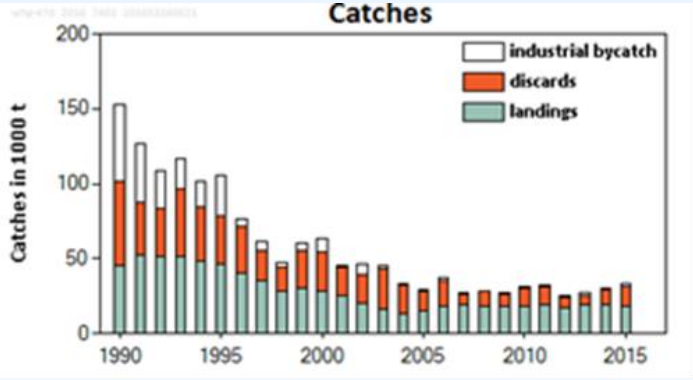
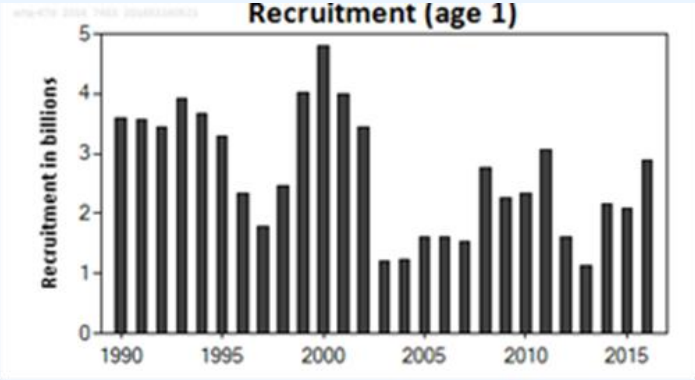
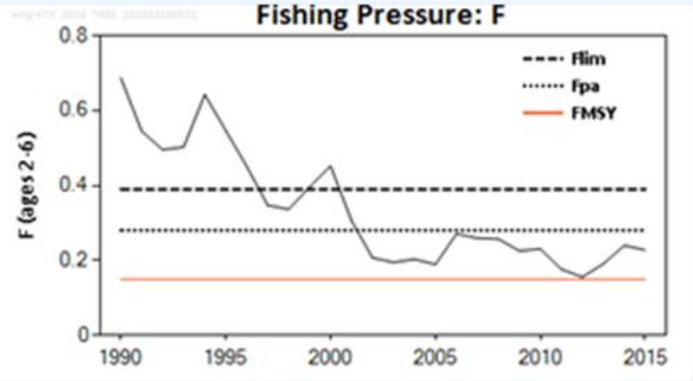
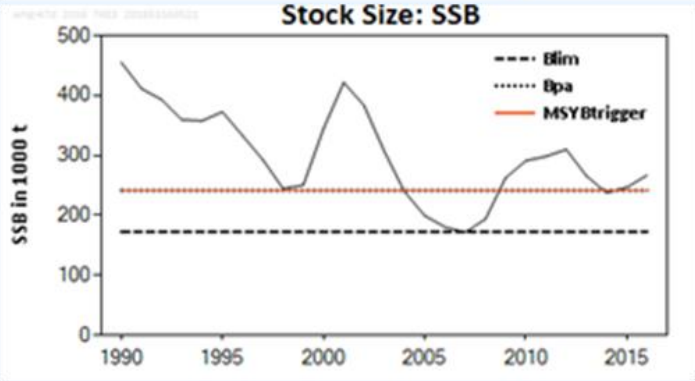
# Whiting in Subarea 4 and Division 7.d

## Advice for 2017, MSY: Catch ≤ 23 527 t




| | | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2014 | 2015 | 2016 |
| 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 |

* F declined but remains above $F_{MSY}$

* Recruitment low since 2003, higher in 2014-2015

*SSB has fluctuated around $MSY_{Btrigger}$

*With updated natural mortality values, EU-Norway management strategy no longer considered precautionary.

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# Whiting in Subarea 4 and Division 7.d

## Catch (2015) ~ 33 000 t ( ~ 40% discards and 6% IBC)

## F (2016)=F(2015)=0.228; SSB(2017) = 310 kt > $MSY_{Btrigger}$(242) $F_{MSY}$=0.15

| Rationale | Total catch (2017) | Total wanted catch 4 & 7.d (2017)* | Total unwanted catch (2017)* | Total IBC (2017) ** | Wanted catch in 4 (2017) *** | Wanted catch 7.d (2017) *** | Basis | $F_{total}$ (2017) | $F_{wanted}$ (2017) | $F_{unwanted}$ (2017) | $F_{IBC}$ (2017) | SSB (2018) | % SSB change ^ | % TAC change wanted catch ^^ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MSY approach** | **23.527** | **12.679** | **9.042** | **1.805** | **9.744** | **2.935** | **$F_{MSY}$** | **0.150** | **0.100** | **0.035** | **0.015** | **327.559** | **5.5** | **-29** |
| IBC only | 1.887 | 0.000 | 0.000 | 1.887 | 0.000 | 0.000 | No HC fishery | 0.015 | 0.000 | 0.000 | 0.015 | 345.826 | 11.4 | -100 |
| Other options | 43.128 | 24.025 | 17.372 | 1.731 | 18.465 | 5.561 | $F_{PA}$ | 0.280 | 0.196 | 0.069 | 0.015 | 311.140 | 0.3 | 35 |
| | 23.527 | 12.679 | 9.042 | 1.805 | 9.744 | 2.935 | EU-Norway Management strategy | 0.150 | 0.100 | 0.035 | 0.015 | 327.559 | 5.5 | -29 |
| | 27.184 | 14.796 | 10.596 | 1.791 | 11.371 | 3.424 | $0.75 \times F_{2015}$ | 0.174 | 0.118 | 0.041 | 0.015 | 324.495 | 4.6 | -17 |
| | 27.759 | 15.128 | 10.842 | 1.789 | 11.626 | 3.501 | 15% TAC decrease | 0.178 | 0.121 | 0.042 | 0.015 | 324.015 | 4.4 | -15 |
| | 35.900 | 19.926 | 14.216 | 1.758 | 15.314 | 4.612 | $F_{2015}$ | 0.228 | 0.158 | 0.055 | 0.015 | 317.115 | 2.2 | 12 |
| | 32.369 | 17.797 | 12.800 | 1.772 | 13.678 | 4.119 | Roll-over TAC | 0.209 | 0.144 | 0.050 | 0.015 | 320.152 | 3.2 | 0 |
| | 43.213 | 24.075 | 17.408 | 1.731 | 18.503 | 5.572 | $1.25 \times F_{2015}$ | 0.281 | 0.197 | 0.069 | 0.015 | 311.068 | 0.2 | 35 |
| | 36.980 | 20.467 | 14.759 | 1.754 | 15.730 | 4.737 | 15% TAC increase | 0.239 | 0.166 | 0.058 | 0.015 | 316.289 | 1.9 | 15 |
| | 59.714 | 33.626 | 24.420 | 1.668 | 25.843 | 7.783 | $F_{lim}$ | 0.390 | 0.278 | 0.097 | 0.015 | 297.247 | -4.2 | 89 |
| | 125.742 | 71.846 | 52.478 | 1.418 | 55.218 | 16.629 | $SSB > B_{PA}$, | 0.828 | 0.602 | 0.211 | 0.015 | 241.837 | -22.0 | 304 |
| | 125.742 | 71.846 | 52.478 | 1.418 | 55.218 | 16.629 | $SSB > MSY B_{trigger}$ | 0.828 | 0.602 | 0.211 | 0.015 | 241.837 | -22.0 | 304 |
| | 208.120 | 119.531 | 87.484 | 1.106 | 91.866 | 27.665 | $SSB > B_{lim}$ | 1.374 | 1.007 | 0.353 | 0.015 | 172.741 | -44.3 | 572 |

[Weights in ´000 tonnes]

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# Deep-sea stocks

## Summary

| Area | Stock | Advice 2017 | Advice 2016 | Catch 2015 | Notes |
|---|---|---|---|---|---|
| Deep stocks | Blue ling 5.b, 6, 7, | 11314 | 5050 | 2758 | |
| | Black Scabbardfish NEA | 5894 | 5894 | 6355 | |
| | Alfonsinos NEA | 280 | 280 | 365 | Landings |
| | Greater forkbeard NEA | 1682 | 2628 | 2175 | Landings |
| | Orange roughy NEA | 0 | 0 | 90 | |
| | Roundnose grenadier 6 ,7, 5.b ,12.b | 3325 | 5511 | 1480 | |

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# Advice given for multiple years in 2015
## Deep Sea stocks

| Stock | Advice 2016 (tonnes) | Advice 2017 (tonnes) |
|---|---|---|
| Tusk in Subareas 4, 7-9, and in Divisions 3a, 5b, 6a, and 12b (Northeast Atlantic) | 8 415 | 8 415 |
| Ling in Subareas 6-9, 12, and 14, and in Divisions 3a and 4a (other areas) | 14 746 | 14 746 |
| Greater silver smelt) in Subareas 7-10, 12, and Division 6b (other areas) 15 | 15 | 15 |

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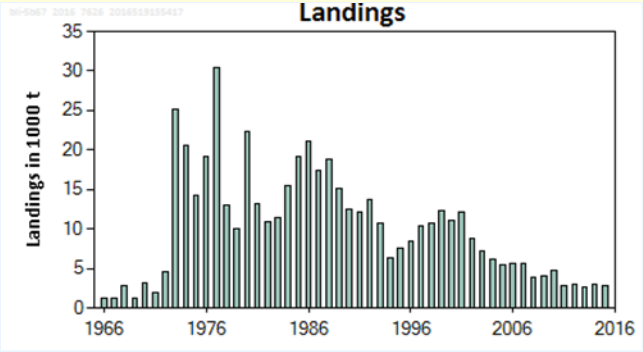
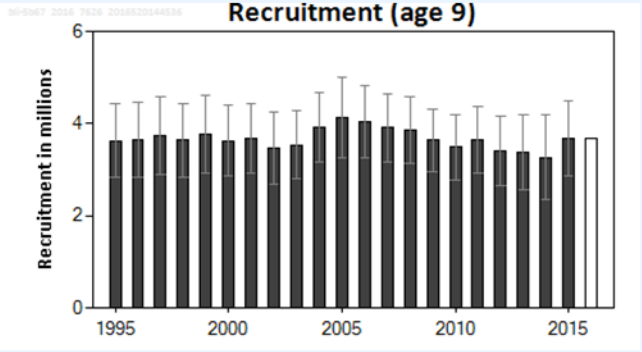
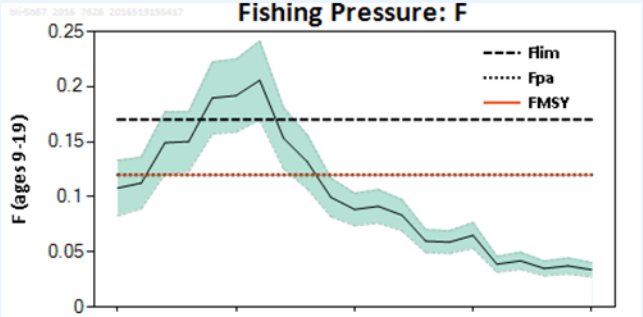
# Blue ling in subareas 6 and 7 and Division 5.b (Celtic Seas, English Channel, and Faroes grounds)

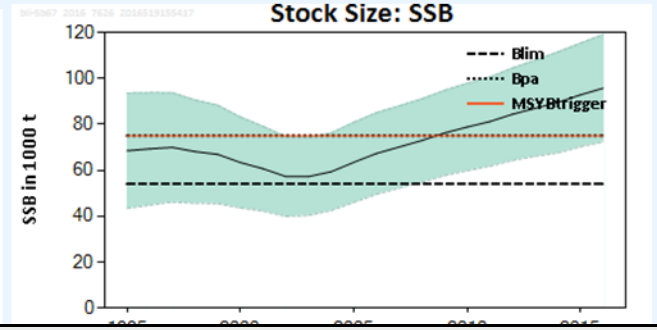
## Advice for 2017 and 2018, MSY:

Catch ≤ 11 314 t in 2017 and ≤ 10 763 t in 2018.




| | | 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 | $SSB_{MGT}$ | - | - | - Not applicable |

* a low level of fishing activity.

* Recruitment stable
SSB has increased since 2004

* SSB has increased since 2004

* Discards negligible

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# Blue ling in subareas 6 and 7 and Division 5.b (Celtic Seas, English Channel, and Faroes grounds)

* Increase in advised catch due to revision of $F_{MSY}$ from 0.07 to 0.12 and increase in stock size.

F (2016)=F(2015)=0.034; SSB(2017) = 99 kt > MSY $B_{trigger}$ (75 kt)

$F_{MSY}$=0.12 ↑

## Catch options for 2017

| Rationale | Catch (2017) | Basis | F (2017) | SSB (2018)* | % SSB change ** | % TAC change*** |
|---|---|---|---|---|---|---|
| MSY approach | 11314 | $F = F_{MSY}$ | 0.12 | 93738 | −5 | 124 |
| Precautionary approach | 11314 | $F_{pa}$ | 0.12 | 93738 | −5 | 124 |
| Zero catch | 0 | $F_{2017} = 0$ | 0 | 105002 | 6 | −100 |
| Other options | 15663 | $F_{lim}$ in 2017 | 0.17 | 89419 | −10 | 210 |
| | 29726 | $B_{pa}$ in 2018 | 0.35 | 75000 | −24 | 489 |
| | 51139 | $B_{lim}$ in 2018 | 0.70 | 54000 | −45 | 913 |
| | 29726 | MSY $B_{trigger}$ in 2018 | 0.35 | 75000 | −24 | 489 |
| | 3376 | $F_{sq}$ | 0.034 | 101638 | 3 | −33 |

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# Blue ling in subareas 6 and 7 and Division 5.b (Celtic Seas, English Channel, and Faroes grounds)

## Catch options for 2018

| Rationale | Catch (2018) | Basis | F (2018) | SSB (2019) | % SSB change** | % TAC change *** |
|---|---|---|---|---|---|---|
| MSY approach | 10763 | $F = F_{MSY}$ | 0.12 | 89367 | −5 | −5 |
| Precautionary approach | 10763 | $F_{pa}$ | 0.12 | 89367 | −5 | −5 |
| Zero catch | 0 | $F_{2017} = 0$ | 0 | 110882 | 3 | 0 |
| Other options | 14256 | $F_{lim}$ in 2018 | 0.17 | 81756 | −9 | −9 |
| | 17256 | $B_{pa}$ in 2019 | 0.22* | 75000 | −12 | −12 |
| | 29652 | $B_{lim}$ in 2019 | 0.41* | 54000 | −25 | −26 |
| | 17256 | MSY $B_{trigger}$ in 2019 | 0.22* | 75000 | −12 | −12 |
| | 3466 | $F_{sq}$ | 0.034 | 104203 | 3 | 3 |

*Same F used in 2017

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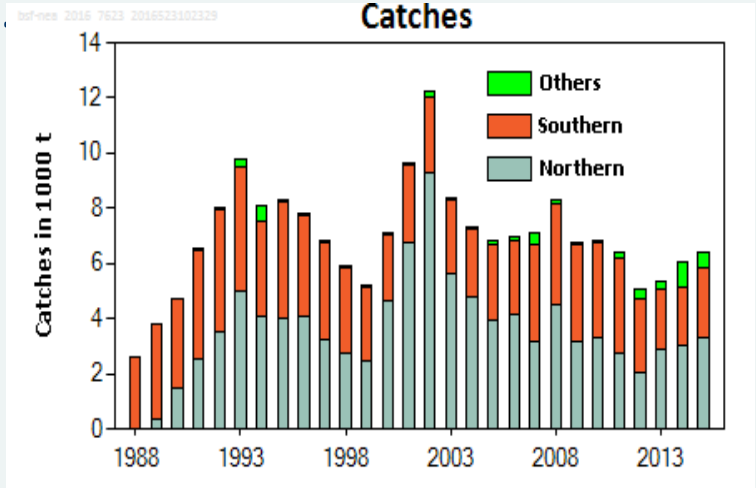
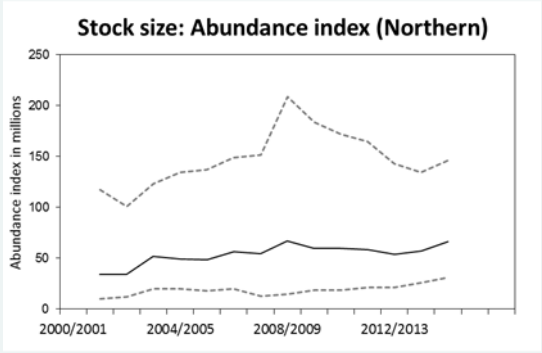
# Black scabbardfish in the Northeast Atlantic

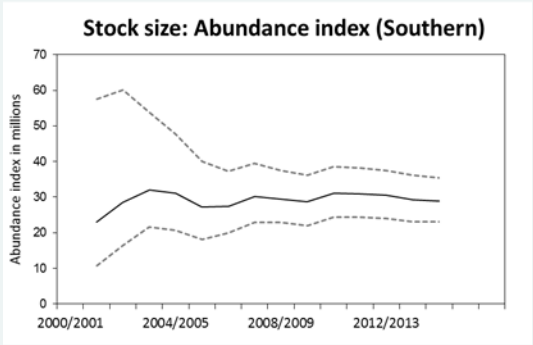
**Advice for 2017 and 2018, PA:** Catch ≤ 5894 ≤ 2802 t in 6 and 7,5.b ,12.b; ≤ 2726 t in 8 ,9.a; ≤ 366 tonnes in 1, 2, 4, 10, 3.a, 5.a.




Single stock, migrates through NE Atlantic: fish in southern part bigger than in north

Catches, abundance, harvest rate (North + South)




***Benchmarked in 2014***: Assessment estimates abundance trends for North and South separately

**Category 3**.

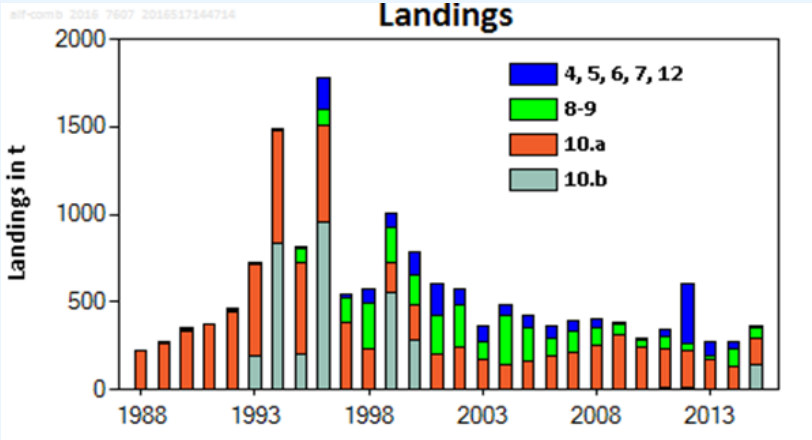
- Advice takes into account trends in both areas (separately), with an increase advised only if abundance increasing in both areas (to avoid local depletion).
- Both areas stable. No Precautionary buffer because HR decreasing and low

➔ Advice = recent catch (discards negligible)

# Alfonsinos (*Beryx spp.*) in Northeast Atlantic

## Advice for 2017 and 2018, Precautionary approach

Annual landings ≤ 280 t ; Discarding is known to take place




Landings 2015= 365 tonnes

| | | Fishing pressure | | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2013 | 2014 | 2015 | | |
| 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 |

- Two *Beryx* species : most catch in Azorean EEZ and in Mid-Atlantic Ridge
- Landings not indicative of stock abundance (aggregative behaviour of species)
- The new data do not change stock perception ➔ same advice given previously.
- Alfonsinos associated with seamounts, aggregative behaviour, possibly long-lived: can only sustain low exploitation rates.
- Exploitation of new seamounts should not be allowed.

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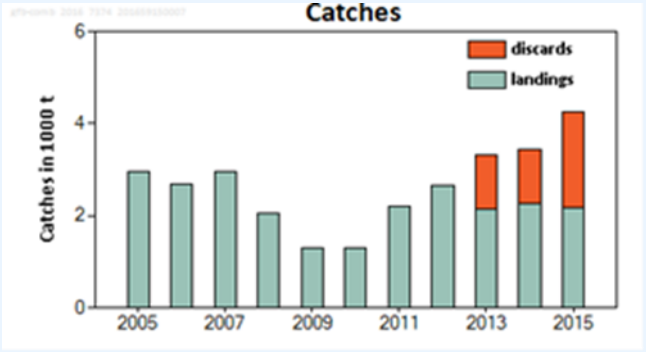
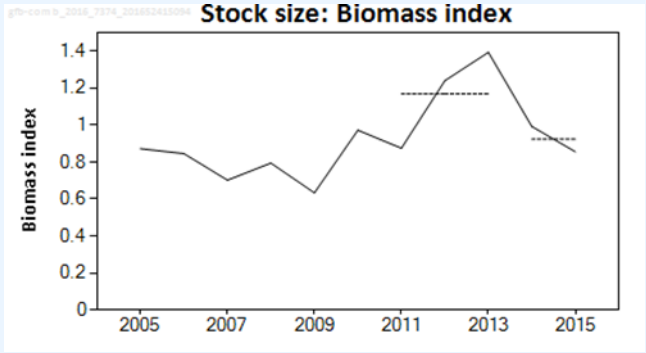
# Greater forkbeard in Northeast Atlantic

## Advice for 2017 and 2018, Precautionary approach DLS: Annual landings ≤ 1 682 t




| | | Fishing pressure | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2013 | 2014 | 2015 | |
| 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 | | ↗ | ↘ | ↘ | Decreasing |

Bycatch in fisheries targeting hake, megrim, monkfish, ling, deep-water species; most landings from 6 and 7

Total catch cannot be quantified; discards substantial but available for only part of fishery

**Category 3.** Biomass index based on 6 surveys

Trend in last 5 years: 21% decrease ➔ Uncertainty cap: 20% decrease

Precautionary buffer (decrease in index)

➔ Advised landings : 36% decrease over last advised catch

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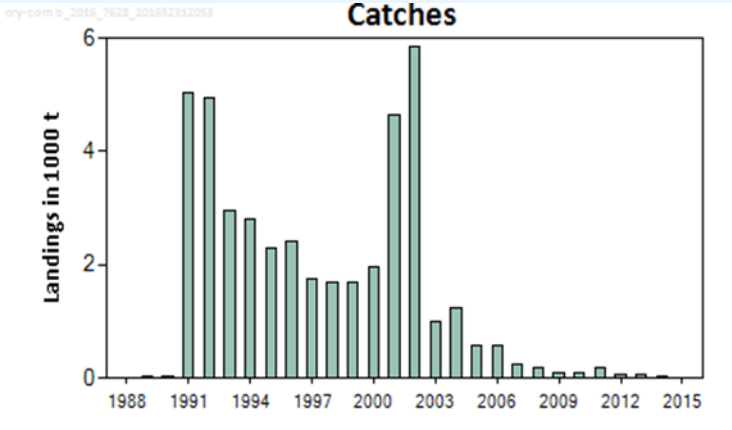
# Orange roughy in Northeast Atlantic

**Advice for 2017 and 2018, Precautionary approach:** 0 catch




| | | Fishing pressure | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2013 | 2014 | 2015 | |
| 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 | | ⊗ | ⊗ | ⊗ | Below possible ref. points |

- Catches have decreased in all areas, No directed EU fisheries since 2010.
- Due to its very low productivity, it can only sustain very low exploitation rates.
- No data available for assessment.

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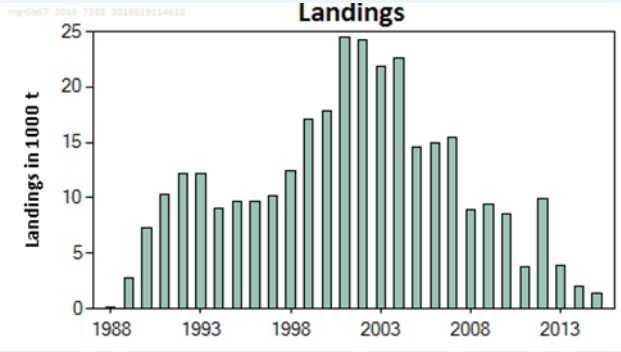
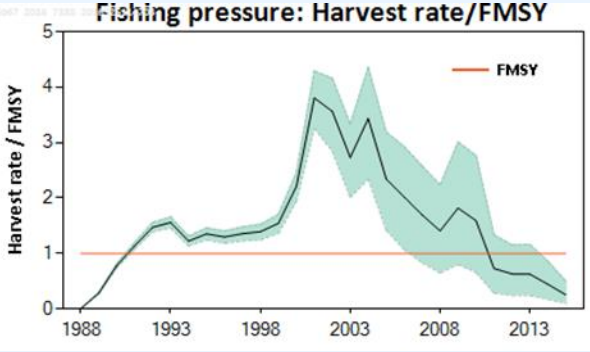
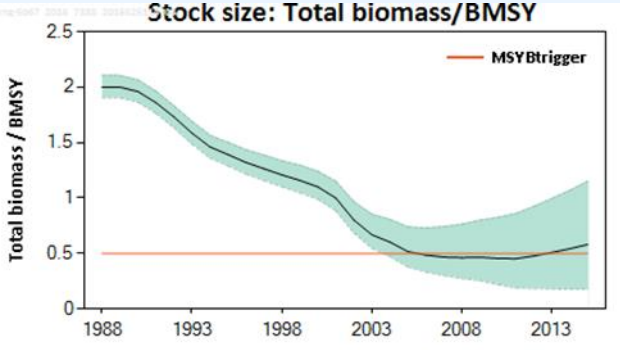
# Roundnose grenadier in Subareas 6 and 7, and Div 5.b and 12.b

**Advice for 2017 and 2018:**

- 6, 7, 5b , MSY: Catch ≤ 3 325 t in 2017, ≤ 3 399 t in 2018
  ➔ Landings (if discard rates at last 3-yr average) ≤ 3 052 in 2017, ≤ 3 120 in 2018
- 12b, PA: Catch ≤ 572 t annually ➔ Landings (if unchanged discard rates) ≤ 526 t




| | | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | | 2013 | 2014 | 2015 |
| Maximum sustainable yield | $F_{MSY}$ | ✓ | ✓ | ✓ | Below target | MSY $B_{trigger}$ | ✓ | ✓ | ✓ Above $B_{trigger}$ |
| Precautionary approach | $F_{pa}$, $F_{lim}$ | ✓ | ✓ | ✓ | Below possible reference points | $B_{pa}$, $B_{lim}$ | ✓ | ✓ | ✓ Above possible reference points |
| Management plan | $F_{MGT}$ | - | - | - | Not applicable | $SSB_{MGT}$ | - | - | - Not applicable |

- HR decreasing and below $F_{MSY}$ ;
- Biomass around MSY Btrigger since mid 2000s
- Slow growing, live > 50 years
- Caught in mixed fisheries with black scabbardfish and blue ling
- Catch from XIIb (approx 30% of total catch) considered uncertain (issues with species reporting and area misreporting) and **not used in assessment**. Improved fishery monitoring needed.

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# Roundnose grenadier in Subareas 6 and 7, and Div 5.b and 12.b

* Catch 2015 ~ 1,480 t (discards ~ 8%)

* Discards not included in assessment; discards were higher in the past

Landings (2016) = 701 t ; B(2015) > MSY Btrigger*

* Relative value from assessment method (production model)

**Advice for 6,7,5b :**

| Rationale | Landings (2017-2018) | Relative biomass (at the end of the year) (2017) | (2018) | Relative Harvest rate (2017) | (2018) | 2016-2017 % biomass change | 2016-2017 % TAC change |
|---|---|---|---|---|---|---|---|
| **MSY approach** | **3052 (2017)<br>3120 (2018)** | **0.66** | **0.67** | **1** | **1** | 2% | −25% |
| | | | | | | | |
| **Zero catch** | 0 | 0.75 | 0.82 | 0 | 0 | 9% | −100% |
| **Other options** | 1000 | 0.72 | 0.77 | 0.31 | 0.29 | 7% | −75% |
| | 2000 | 0.69 | 0.72 | 0.64 | 0.61 | 5% | −51% |
| | 3000 | 0.66 | 0.68 | 0.98 | 0.95 | 3% | −26% |
| | 4000 | 0.63 | 0.63 | 1.33 | 1.33 | 0% | −2% |
| | 5000 | 0.60 | 0.59 | 1.71 | 1.74 | −2% | 23% |
| | 6000 | 0.57 | 0.54 | 2.10 | 2.20 | −5% | 47% |
| | 7000 | 0.54 | 0.49 | 2.51 | 2.71 | −8% | 72% |
| | 8000 | 0.51 | 0.45 | 2.94 | 3.29 | −10% | 96% |

*Catch advice*: raise landings to catch assuming 8% (2013-2015 average) discard rate

**Division 12b** not part of assessment:

➔ Advice: Annual landings should not exceed 2015 with precautionary buffer (**526** t)

*Catch advice*: raise landings to catch assuming 8% (recent) discard ratet),

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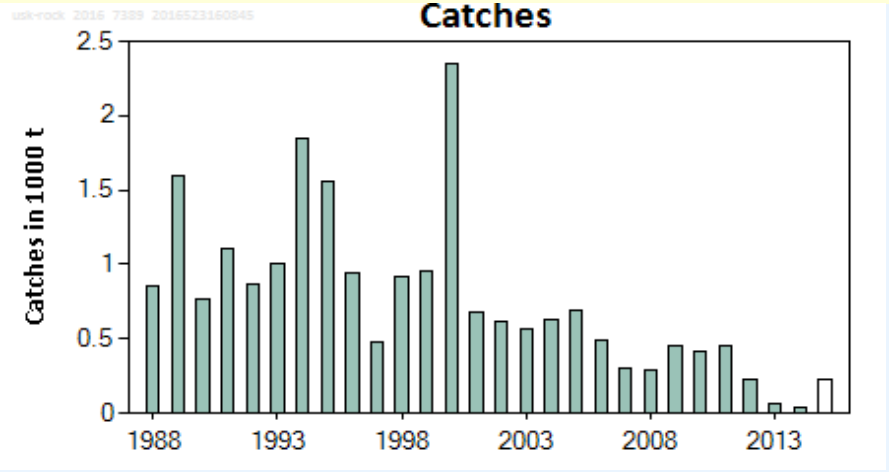
# Tusk in Div 6.b (Rockall)

## Advice for 2017 and 2018, Precautionary Approach:

Catch ≤ 350 t in each year; all catches are assumed to be landed.




**Category 5.**

- No assessment
- Only commercial catches are available
- PA buffer applied in 2012 and not re-applied because stock was exploited at a harvest rate below the FMSY proxy estimate and effort has decreased since.

| | | |
|---|---|---|
| **Recent advised catch** | | **350 tonnes** |
| **Discard rate** | | **Negligible** |
| **Precautionary buffer** | **Not applied** | **-** |
| **Catch advice** | | **350 tonnes** |

| | Fishing pressure | | | | Stock size | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | | 2013 | 2014 | 2015 | |
| Maximum sustainable yield | $F_{MSY\ proxy}$ | ✓ | ? | ? | Unknown | 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 |

* $F_{MSY}$ proxy defined in 2016

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Thank you!
Comments/Questions ?
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