ICES advice for 2012

cod-haddock-whiting-plaice-sole hake-anglerfish-megrims-*Nephrops*

North Western Waters RAC

5 July 2011 – Dublin

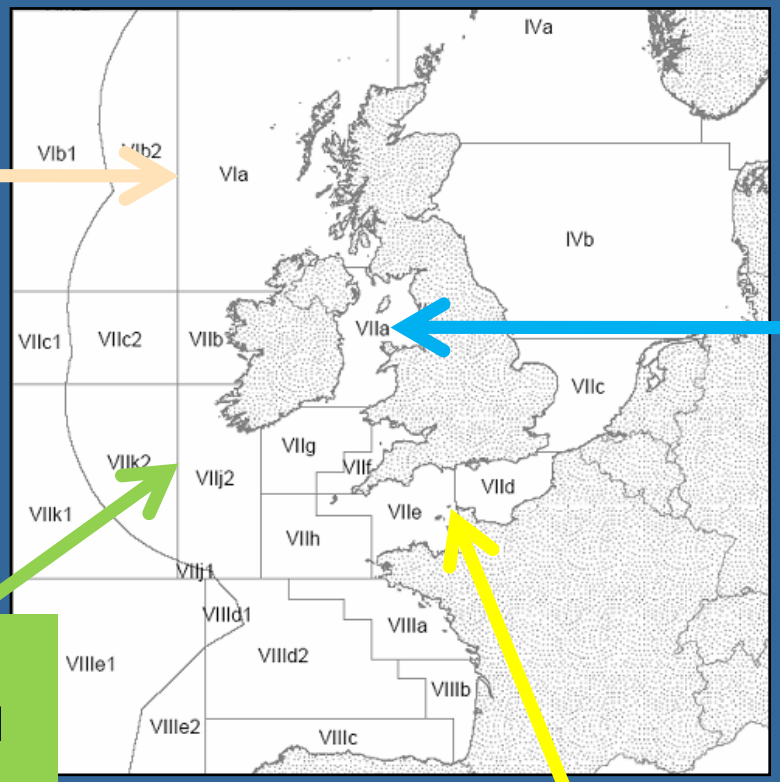
Manuela Azevedo
ACOM Vice-chair

ICES CIEM

Stocks

West of Scotland & Rockall (VIab)

- Cod (VIa; VIb)
- Haddock (VIa; VIb)
- Whiting (VIa; VIb)
- Anglerfish (IIa,IIIa,IV,VI)
- Megrim (IVa-VIa; VIb)
- Saithe (IV, IIIa, VI)
- Nephrops (FUs11-12-13)



Irish Sea (VIIa)

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

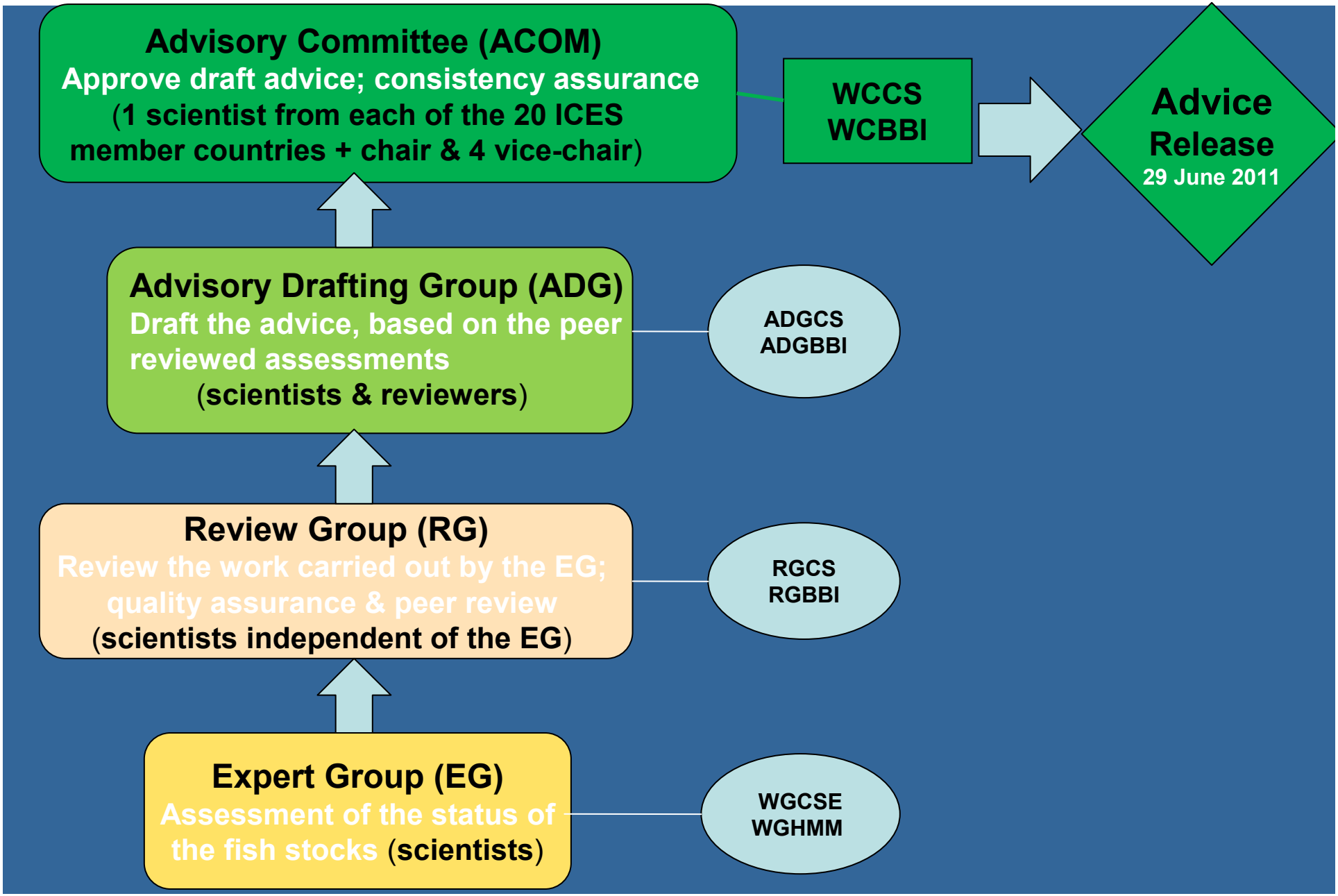
Celtic Sea & West, Southwest Ireland

- Cod (VIIe-k)
- Haddock (VIIb-k)
- Whiting (VIIe-k)
- Plaice (CS; VIIh-k; VIIbc)
- Sole (CS; VIIh-k; VIIbc)
- Northern hake
- Anglerfish (VIIb-k, VIIIab)
- Megrim (VIIb-k, VIIIabd)
- Pollack (VI,VII)
- Nephrops FUs 16-17-20-22)

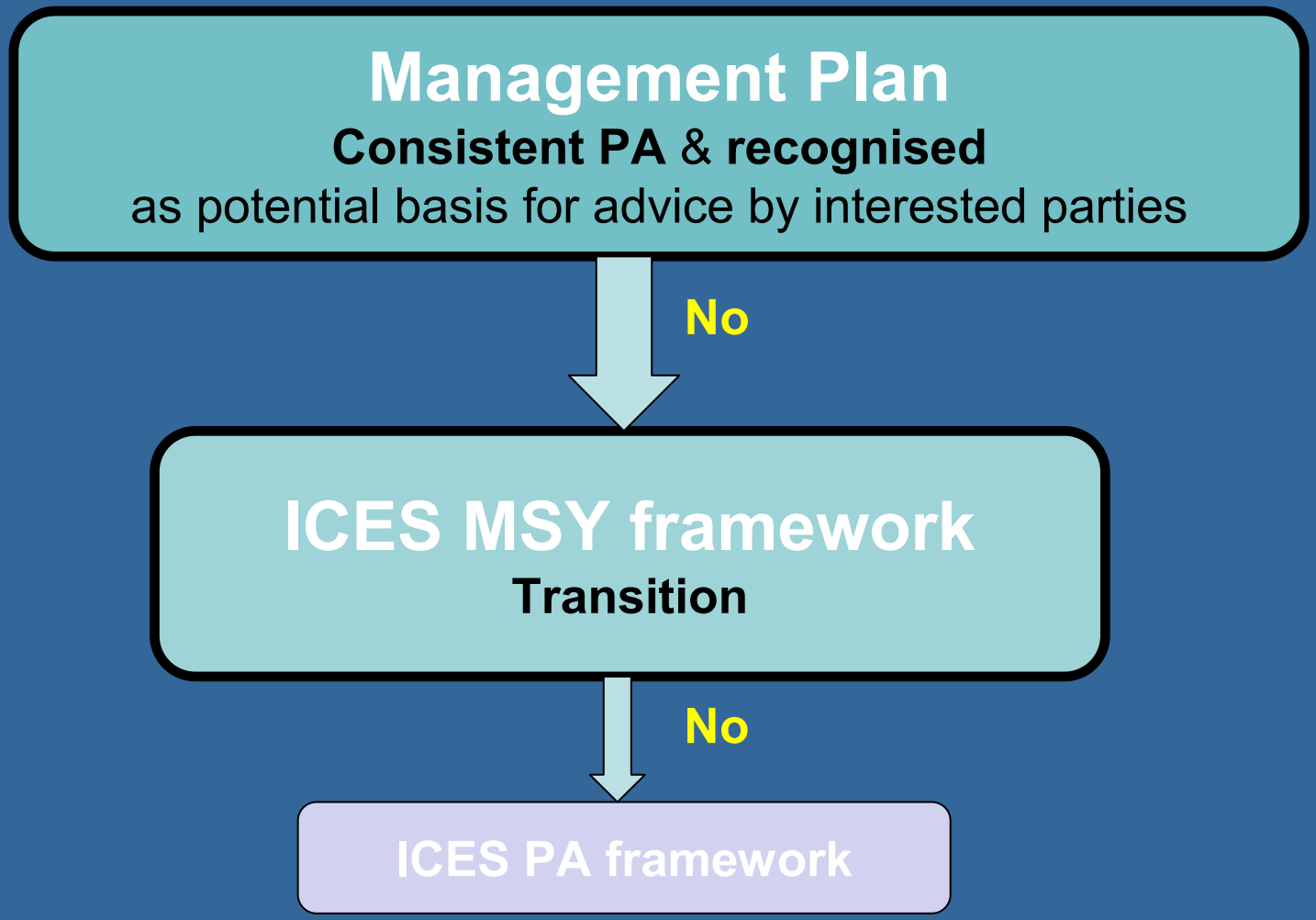
English Channel

- Cod (IV, VIId, Skagerrak)
- Plaice (VIId)
- Plaice (VIIe)
- Sole (VIId)
- Sole (VIIe)

Advisory Process



Basis for ICES Advice for 2012



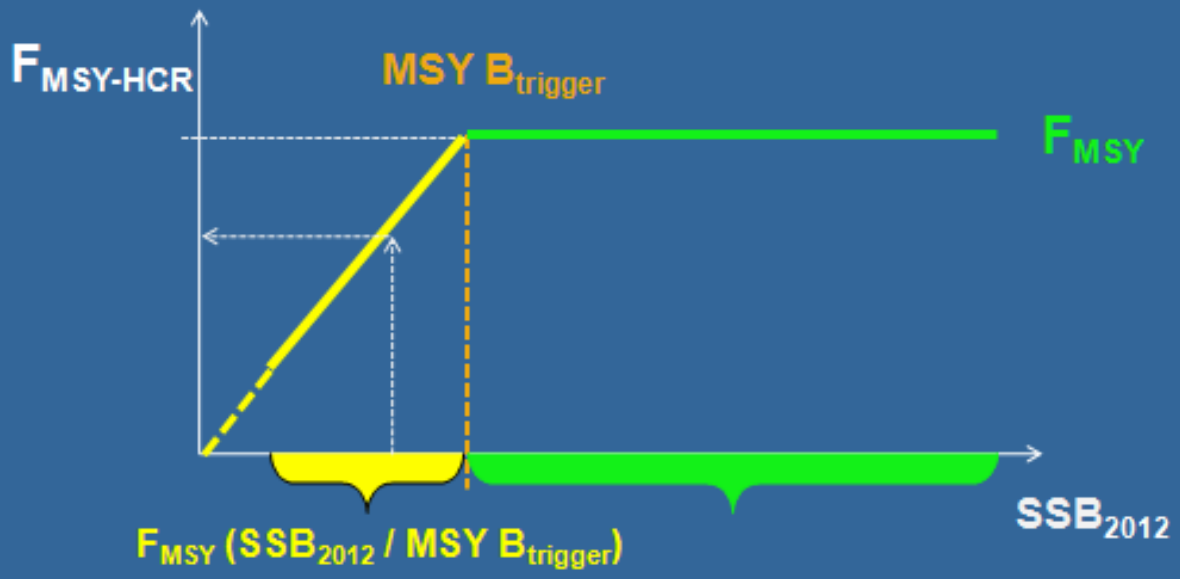
All options in Outlook Table for 2012

ICES MSY framework

Revisited in 2011: http://www.ices.dk/advice/icesadvice.asp

Same principles, concept & framework:

- ✓ **Maximize long term average yield**
- ✓ **Safeguard against low SSB**
- ✓ **Stepwise transition to ICES MSY Harvest Control Rule by 2015**



ICES MSY Transition

Moving from Current F_{2010} to F_{MSY} in 2015 in 5 steps

$F_{MSY\text{-}HCR\ transition}$ 2012 =

"Minimum { 0.6 F(2010) + 0.4 $F_{MSY\text{-}HCR}$(2012); F_{pa}}"

$F_{MSY\text{-}HCR\ transition}$ 2013 = "Min{0.4 F(2010) + 0.6 $F_{MSY\text{-}HCR}$(2013); Fpa}"

$F_{MSY\text{-}HCR\ transition}$ 2014 = "Min{0.2 F(2010) + 0.8 $F_{MSY\text{-}HCR}$(2014); Fpa}"

$F_{MSY\text{-}HCR\ transition}$ 2015 = "Min{0.0 F(2010) + 1.0 $F_{MSY\text{-}HCR}$(2015); Fpa}"

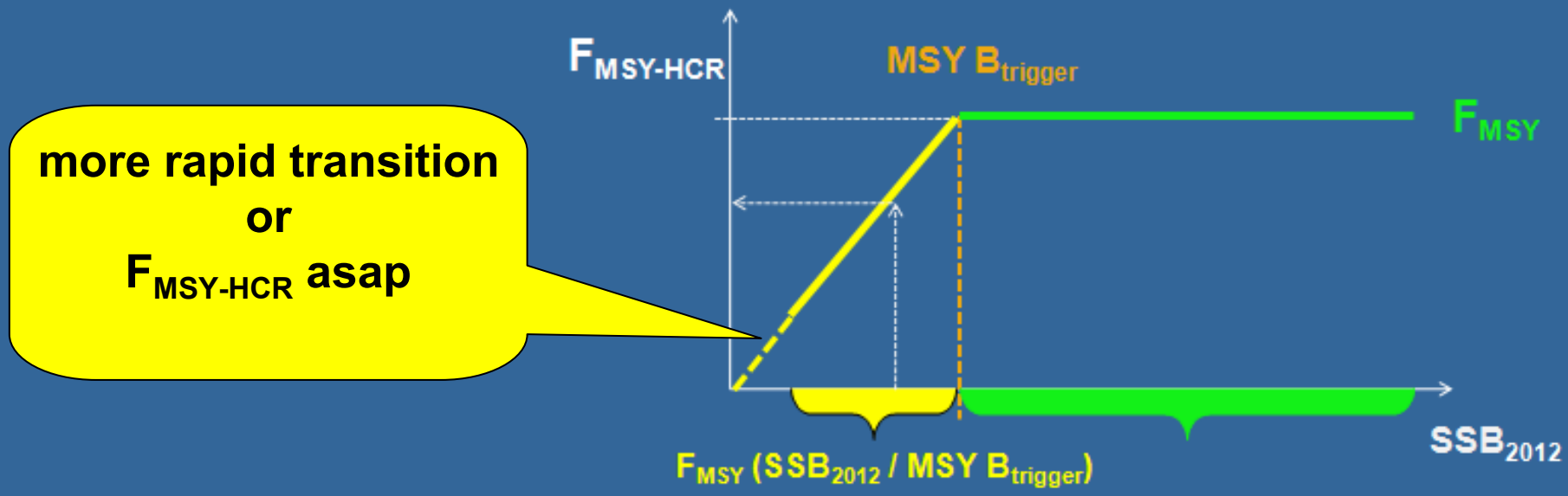
$F_{MSY\text{-}HCR}$

ICES MSY Transition does not apply when:

i) F_{2011} below F_{MSY} & SSB_{2012} above MSY $B_{trigger}$

F at F_{MSY}

ii) SSB is small, further decline predicted (low R)



Stocks without population size estimates

	No Overfishing	Overfishing or Unknown Exploitation Status
Decreasing stock trend	**Reduce** catch	**Reduce** catch
Stable stock trend or **No trend information**	**Do not allow** catches to increase	**Do not allow** catches to increase
Increasing stock trend	**Do not allow** catches to increase	**Do not allow** catches to increase

Intended to move in the direction of MSY

- **Catches are already very low:** *No increase in catch until there is evidence that this will be sustainable*
- **New stocks:** *catches should not be allowed to increase*

Overview by species/stocks

Stock	F_{MSY}	MSY $B_{trigger}$	Catch/Land 2012
Cod West Scotland	0.19	22 000 t	lowest possible
Cod Rockall	nd	nd	no increase
Cod Celtic Sea	0.40	8 800	< 10 000 t
Cod Irish Sea	0.40	10 000	0

Stock	F_{MSY}	MSY $B_{trigger}$	Catch/Land 2012
Haddock WScotland	0.30	30 000 t	< 10 200 t
Haddock Rockall	0.30	9 000	< 3 300
Haddock VIIb-k	nd	nd	no increase; technical measures
Haddock Irish Sea	nd	nd	reduce; technical measures

Overview by species/stocks

Stock	F_{MSY}	MSY $B_{trigger}$	Catch/Land 2012
Whiting WScotland	nd	nd	reduce; improve selection pattern in *Nephrops* fleet
Whiting Rockall	nd	nd	no increase
Whiting Celtic Sea	nd	nd	no increase; technical measures to reduce discard rates
Whiting Irish Sea	nd	nd	Reduce to lowest possible; technical measures to reduce discard rates

Overview by species/stocks

Stock	F_{MSY}	MSY $B_{trigger}$	Catch/Land 2012
Plaice SW Ireland	0.24	nd	reduce
Plaice W Ireland	nd	nd	no increase
Plaice Celtic Sea	nd	nd	reduce; technical measures
Plaice Irish Sea	nd	nd	no increase; tech measures
Plaice W Channel	0.19	2 400 t	< 1440 t
Plaice E Channel	nd	nd	no increase

Stock	F_{MSY}	MSY $B_{trigger}$	Catch/Land 2012
Sole SW Ireland	0.31	nd	no increase
Sole W Ireland	nd	nd	no increase
Sole Celtic Sea	0.31	2 200 t	< 1 060 t
Sole Irish Sea	0.16	3 100	< 200
Sole W Channel	0.27	2 800	< 740
Sole E Channel	0.29	8 800	< 5 600

Overview by species/stocks

Stock	F_{MSY}	MSY $B_{trigger}$	Catch/Land 2012
Hake – Northern	0.24	nd	< 51 900 t
Angler VIIb-k & VIIIabd	nd	nd	reduce
Angler IIa,IIIa, IV, VI	nd	nd	reduce
Megrim IVa, VIa	nd	nd	no increase
Megrim Rockall	nd	nd	no increase
Megrim VIIb-k & VIIIabd	nd	nd	reduce
Pollack VI, VII	nd	nd	no increase

Overview by species/stocks

FU	HR (F_{MSY})	MSY $B_{trigger}$	Catch/Land 2012
VI: 11 North Minch	12.5%	465 million	< 3 200 t
12 Sout Minch	12.3	1 016	< 5 500
13 Firth Clyde	16.4	579	< 4 200
13 Sound of Jura	14.5	nd	< 900
VII: 14 Irish Sea E	9.8	nd	< 960
15 Irish Sea W	17.1	3 billion	< 9 800
16 Porcupine	nd	nd	no increase
17 Aran Grounds	10.5	nd	< 1 100
19 Ireland	nd	nd	reduce
22 Celtic Sea	10.9	nd	< 2 300
20-21 Celtic Sea	nd	nd	reduce

West of Scotland & Rockall (VIa & VIb)

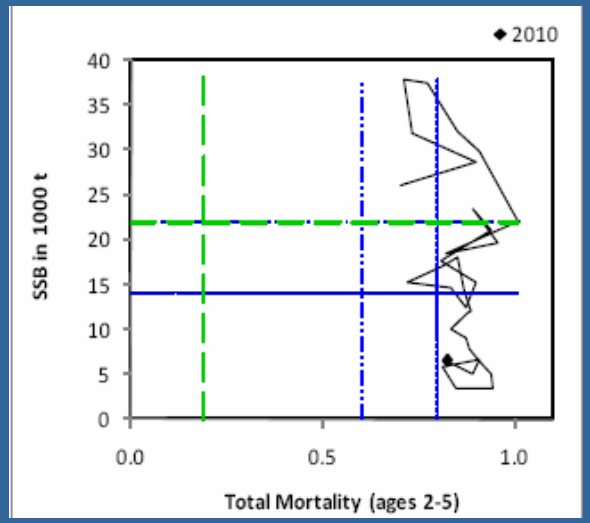
- Cod
- Haddock
- Whiting
- Anglerfish
- Megrim
- Saithe
- Pollack
- Nephrops (FUs 11-12-13)

Cod in Division VIa (West of Scotland)

Advice for 2012: catches in 2012 should be reduced to the lowest possible

F (Fishing Mortality)	2008 -2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
Qualitative evaluation	✗	Above poss. reference points

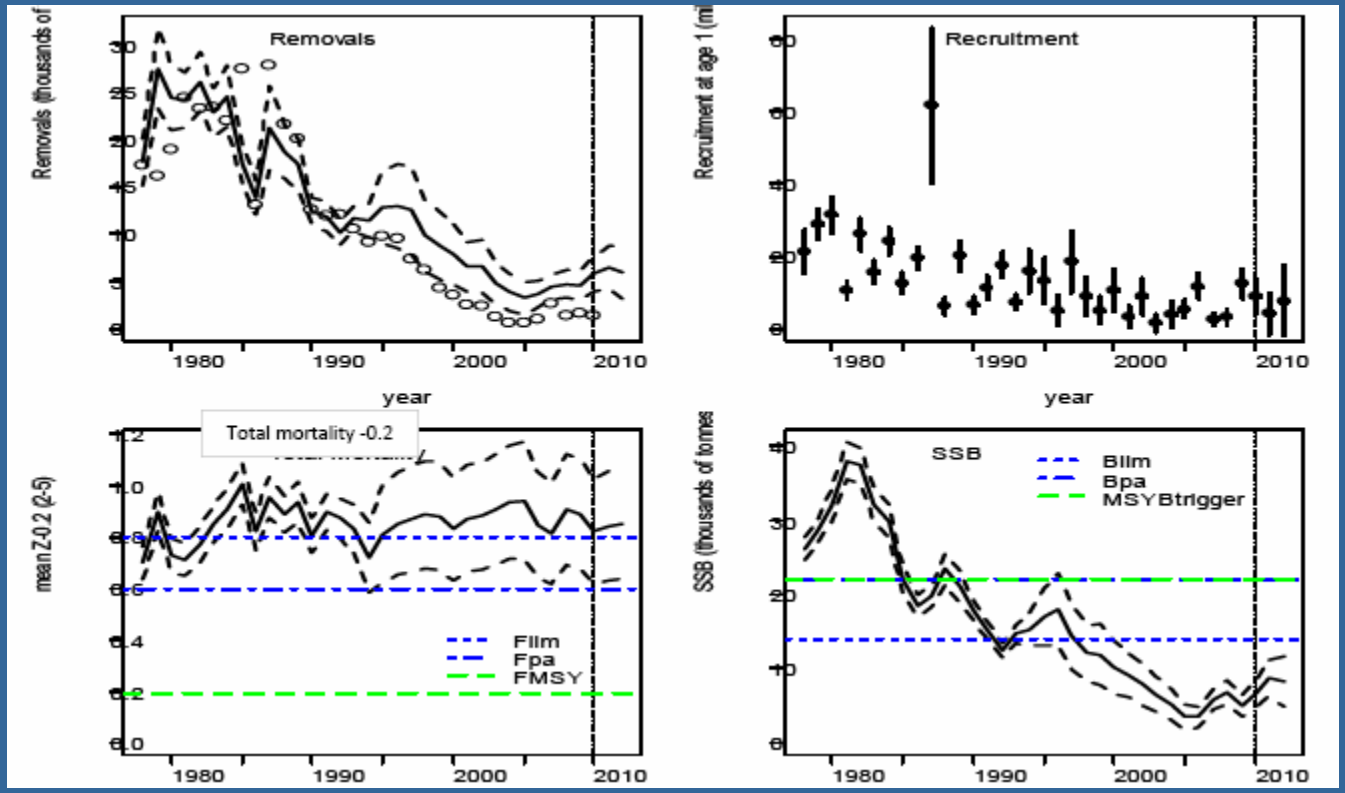
SSB (Spawning-Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	✗	✗	✗	Below trigger
Precautionary approach (B_{pa},B_{lim})	✗	✗	✗	Below B_{lim}



B_{lim}=14 & MSY $B_{trigger}$= 22 th t

F_{MSY}=0.19

Cod in Division VIa (West of Scotland)



Total mortality is **high**

SSB increased since 2006 (lowest) but remains well **below** B_{lim}

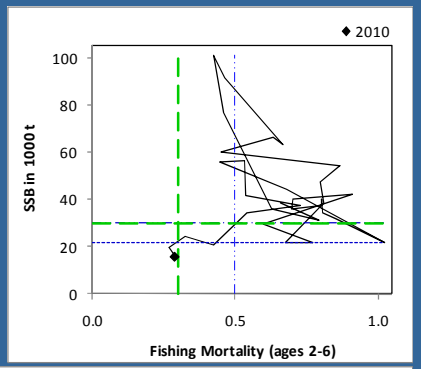
Recruitment **low** for many years

Haddock in Division VIa (West of Scotland)

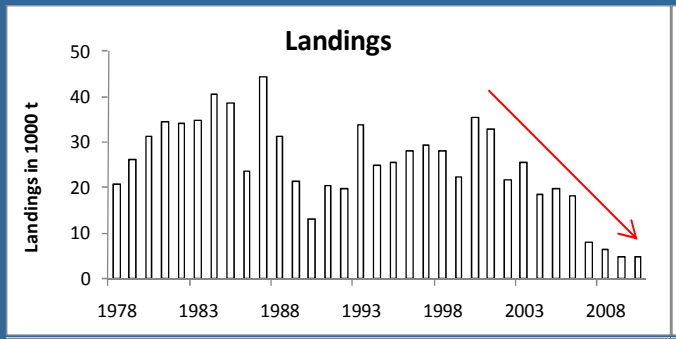
MSY: Landings in 2012 no more than 10 200 t. The selection pattern should be improved in the Nephrops (TR2) fleet to reduce discards

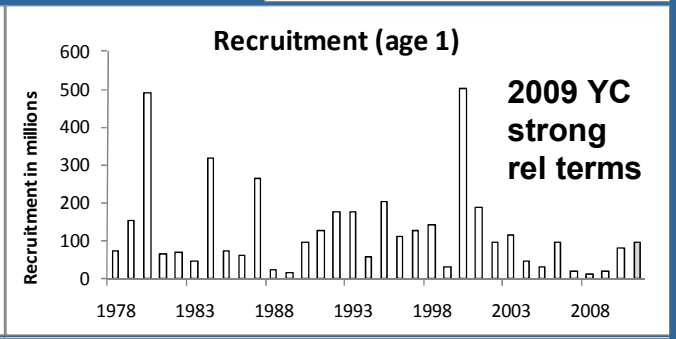
F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✓	✓	At target
Precautionary approach (F_{pa},F_{lim})	✓	✓	✓	Harvested sustainably

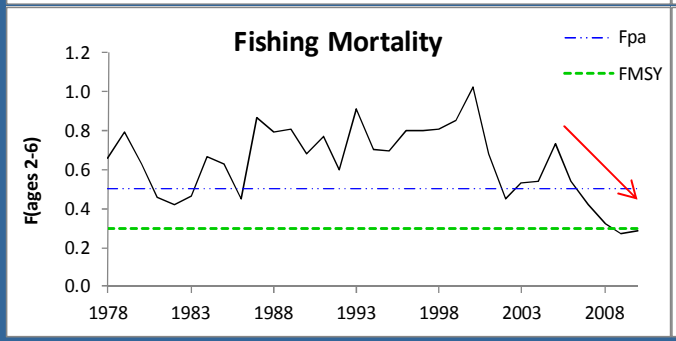
SSB (Spawning-Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	✗	✗	✗	Below trigger
Precautionary approach (B_{pa},B_{lim})	✗	✗	✗	Reduced reproductive capacity

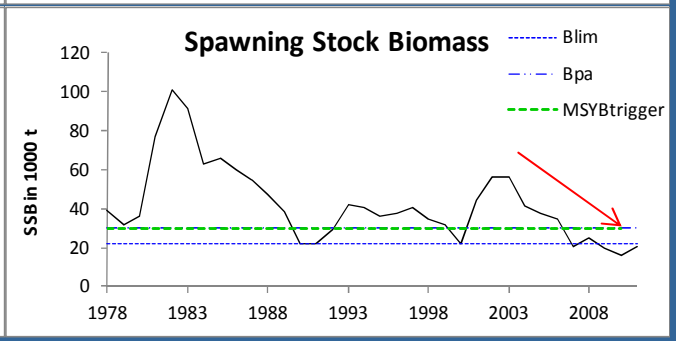


MSY $B_{trigger}$= 30 th t
F_{MSY}=0.30









MP under development

Haddock in Division VIa (West of Scotland)

Discards 2010 – **51%** (catch of 5 830 t)
Splitting discards by fleet shows that *Nephrops* vessels (TR2) are responsible for **~88% of all discards** while landing only 21 tonnes, less than 1% of the total landings (2882 tonnes).

The short-term forecast is presented in terms of total removals. These are then divided into landings (55%), discards (36%), and unallocated removals (9%), using the most recent assessment to calculate the average proportions of these catch components over the last three years.

Basis: F(2011) = F_{sq} = F(2008–2010) = 0.29 ; SSB (2012) = 31.3; R(2012) = TSA model estimate = 105.1 million, R (2013) = GM = 82.7 million; Removals (2011) = 8.21.

Rationale	Human Consumption landings (2012) [3]	Basis	F Total (2012)	F HC (2012)	F Disc (2012)	F Unallocated (2012)	Catch Total (2012)	Discards (2012)	Unallocated removals (2012)	SSB (2013)	%SSB change [1]	%TAC change [2]
MSY framework	**10.2**	**F_{MSY} (F_{sq}*1.025)**	**0.30**	**0.17**	**0.11**	**0.03**	**18.6**	**6.7**	**1.7**	**40.7**	**+30%**	**+410%**
Precautionary approach	15.7	F_{pa} (=F_{sq}*1.71)	0.50	0.28	0.18	0.05	28.6	10.3	2.6	34.2	+9%	+684%
Management plan	2.506	TAC + 25% (F_{sq} *0.227)	0.07	0.04	0.02	0.01	4.5	1.6	0.4	50.0	+59%	+25%
Zero catch	0.0	F = 0	0.00	0.00	0.00	0.00	0.0	0.0	0.0	53.0	+69%	-100%
Status quo	1.5	TAC - 25% (F_{sq} *0.135)	0.04	0.02	0.01	0.00	2.7	1.0	0.2	51.2	+63%	-25%
	2.0	No TAC change (F_{sq} *0.18)	0.05	0.02	0.02	0.01	3.7	1.3	0.3	50.6	+61%	0%
	2.5	TAC + 25% (F_{sq} *0.23)	0.07	0.04	0.02	0.01	4.5	1.6	0.4	50.0	+59%	+25%
	10.0	F_{sq}*1	0.29	0.00	0.11	0.03	18.1	6.5	1.6	41.0	+31%	+399%

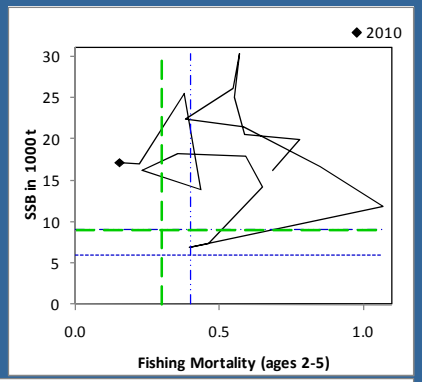
Weights in '000 tonnes.

Haddock in Division VIb (Rockall)

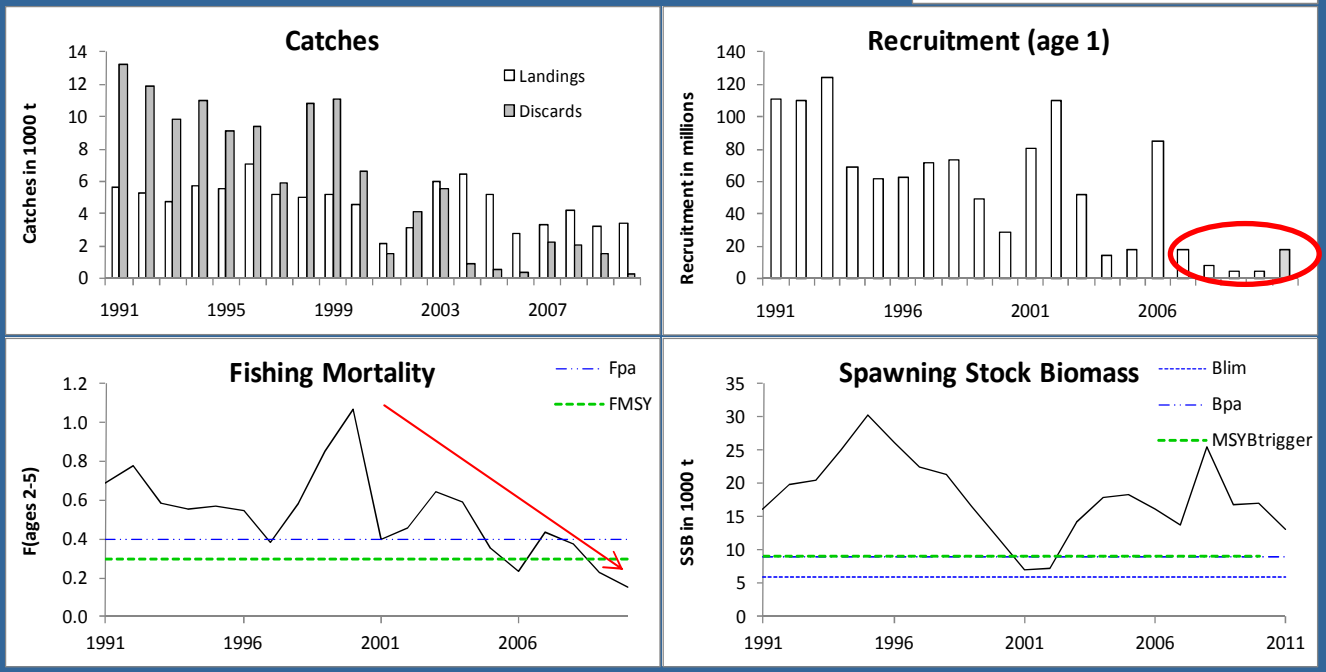
MSY: Landings in 2012 should be no more than 3 300 t

F (Fishing Mortality)	2008	2009	2010
MSY (F_{MSY})	✗	✓	✓ Below target
Precautionary approach (F_{pa},F_{lim})	✓	✓	✓ Harvest sustainably

SSB (Spawning-Stock Biomass)	2009	2010	2011
MSY ($B_{trigger}$)	✓	✓	✓ Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓ Full reproductive capacity



MSY $B_{trigger}$= 9 th t
F_{MSY}=0.30



MP under development

Haddock in Division VIb (Rockall)

- Last years the **discards** are significantly reduced as a result of the small number of young haddock in the population: discard ratio ~ 47% (1991–2009) and 34% in the recent period (1999–2009); in 2010 ~8%
- Estimates of discards in the EU is a main uncertainty in the assessment and forecasts

Basis: $F_{2011} = F_{sq} = F(2008–2010) = 0.25$; SSB (2012) = 10 118; R (2011, 2012) = 18 353 thousands; Landings (2011) = 3466; Total catch (2011) = 4002.

Rationale	Human consumption (2012)	Basis	F (2012)	Catch Total (2012)	SSB (2013)	%SSB change [1]	%TAC change [2]
MSY framework	**3.3**	**F_{MSY} (F_{sq} *1.2)**	**0.30**	**4.0**	**9.6**	**-5%**	**-11%**
Precautionary approach	3.8	B_{pa} (F_{sq} *1.44)	0.36	4.6	9.0	-11%	+3%
Zero catch	0.0	F=0	0.00	0.0	13.7	+35%	-100%
Status quo	0.7	F_{sq} *0.2	0.05	0.8	12.9	+27%	-82%
	2.1	$F_{0.1}$ (F_{sq} *0.7)	0.18	2.6	11.1	+10%	-43%
	2.4	F_{sq} *0.8	0.20	2.9	10.8	+6%	-36%
	2.7	F_{sq} *0.9	0.23	3.2	10.5	+3%	-29%
	2.9	F_{sq}	0.25	3.5	10.2	+0%	-23%
	3.2	-15% TAC (F_{sq}*1.12)	0.28	3.8	9.8	-3%	-15%
	3.7	0% TAC (F_{sq}*1.4)	0.35	4.5	9.1	-10%	0%
	4.2	F_{pa} (F_{sq}*1.6)	0.40	5.1	8.6	-15%	+12%
	4.3	+15% TAC (F_{sq}*1.68)	0.42	5.2	8.4	-17%	+15%
	4.9	F_{sq} *2.0	0.50	6.0	7.7	-24%	+30%

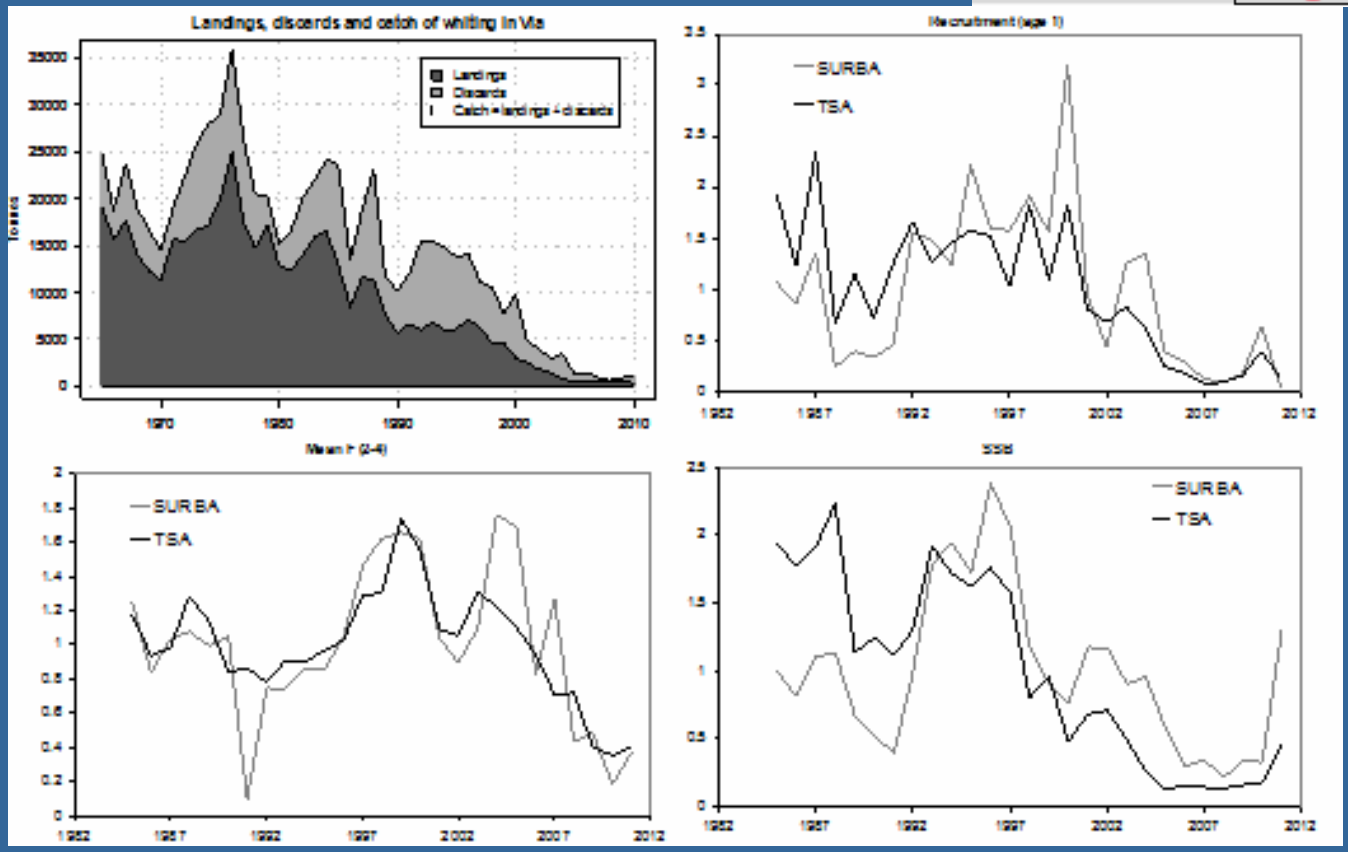
Weights in '000 tonnes.

Whiting in Division VIa (West of Scotland)

MSY: Catches in 2012 should be reduced. The selection pattern should be improved in the *Nephrops* (TR2) fleet.

F (Fishing Mortality)		
	2008 - 2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
Qualitative evaluation	✓	At poss. reference points

SSB (Spawning-Stock Biomass)		
	2009 - 2011	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	✗	Below poss. reference points

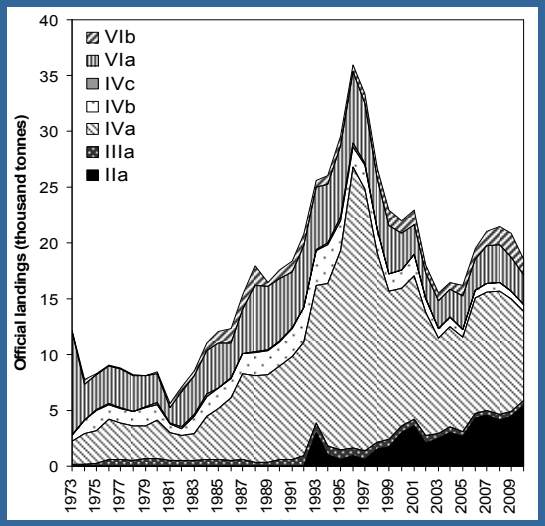


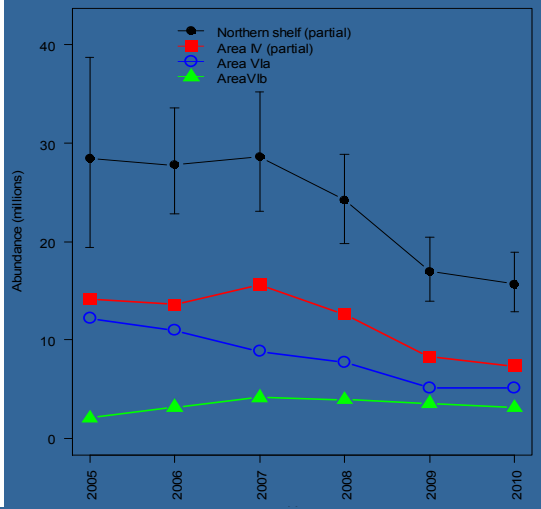
Anglerfish (*Lophius piscatorius* & *L. budegassa*) in Divisions IIa and IIIa, and Subareas IV and VI

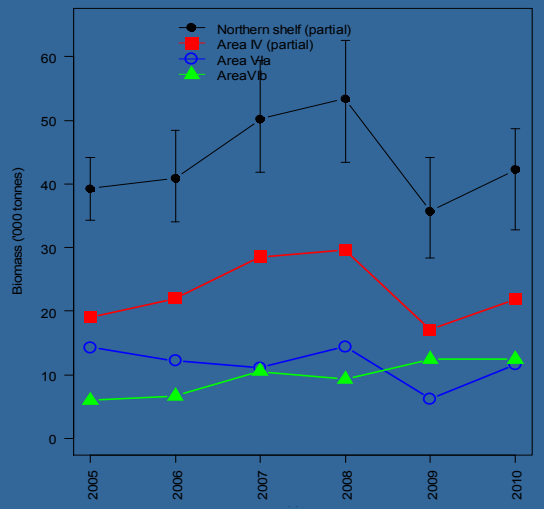
Advice 2012: Catches should be reduced

	F (Fishing Mortality)	
	2008 -2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
	SSB (Spawning-Stock Biomass)	
	2008 - 2010	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	→	Stable

Recent dedicated anglerfish surveys (SCO-IV-VI-AMISS-Q2) in Division IVa and Subarea VI indicate a **decline in trends of abundance in 2007–2009 and stable biomass in recent years**.



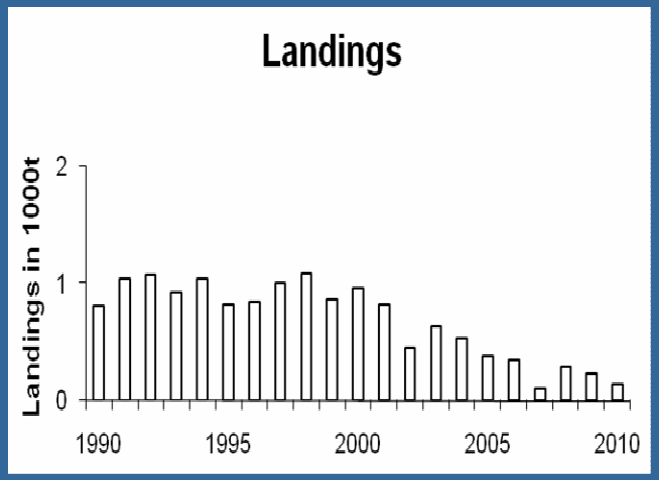


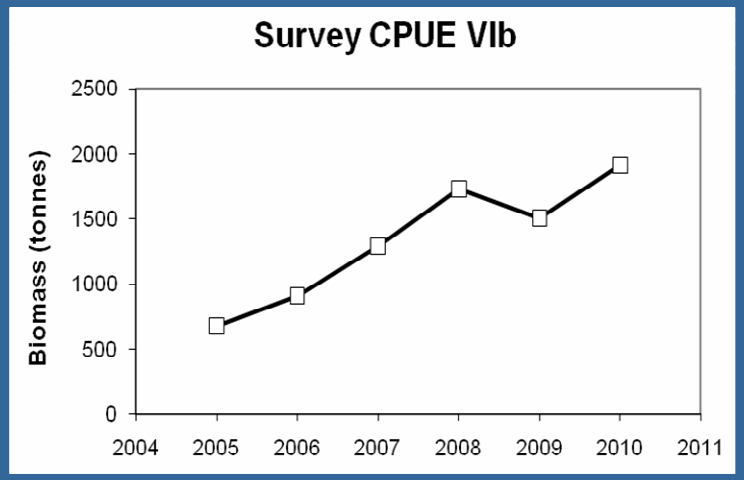


Megrim (*Lepidorhombus* spp) in Rockall

Advice 2012: No increase in catch

F (Fishing Mortality)	2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
SSB (Spawning Stock Biomass)	**2010**	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	↗	increasing





Celtic Sea, West & Southwest Ireland

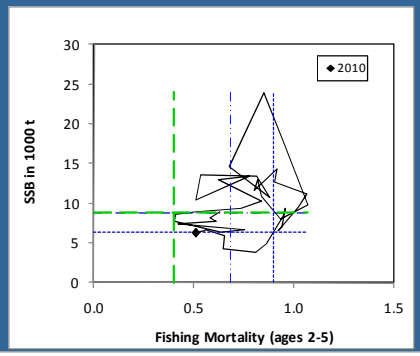
- Cod (VIIe-k)
- Haddock (VIIb-k)
- Northern hake
- Anglerfish (VIIb-k, VIIIab)
- Megrim (VIIb-k, VIIIabd)
- Plaice (CS; VIIh-k; VIIbc)
- Sole (CS; VIIh-k; VIIbc)
- Whiting (VIIe-k)
- Nephrops FUs 16-17-20-22

Cod in Divisions VIIe–k (Celtic Sea cod)

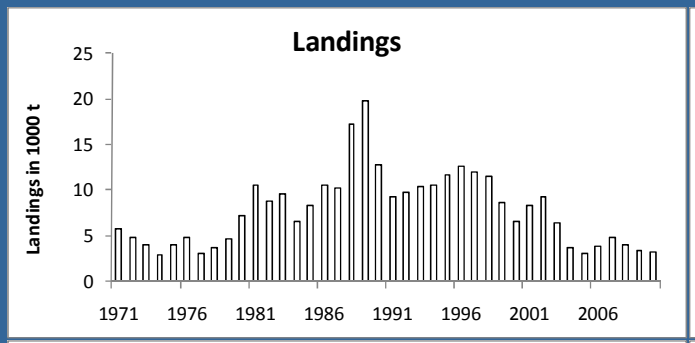
MSY: F in 2012 be set at F_{MSY} = 0.40, resulting in landings of 10 000 t in 2012.

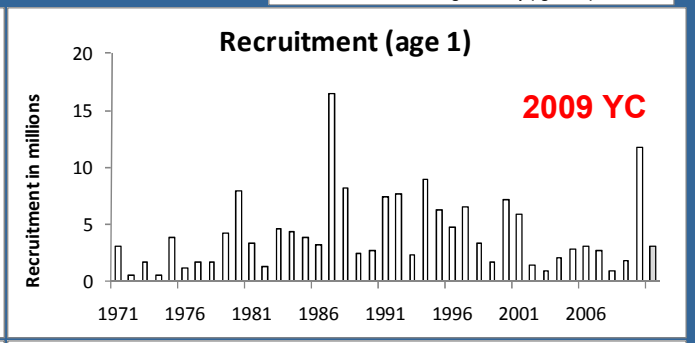
F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	✓	✓	✓	Harvested sustainably

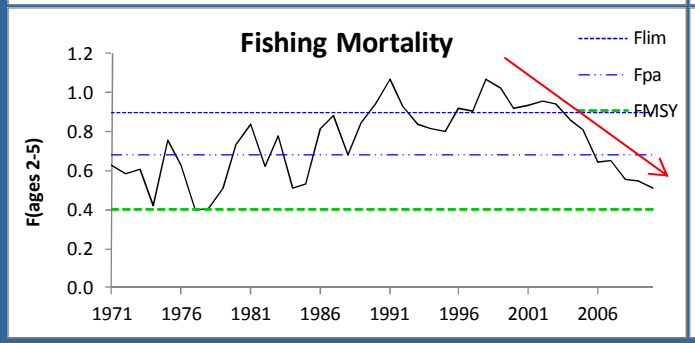
SSB (Spawning-Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	✗	✗	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity

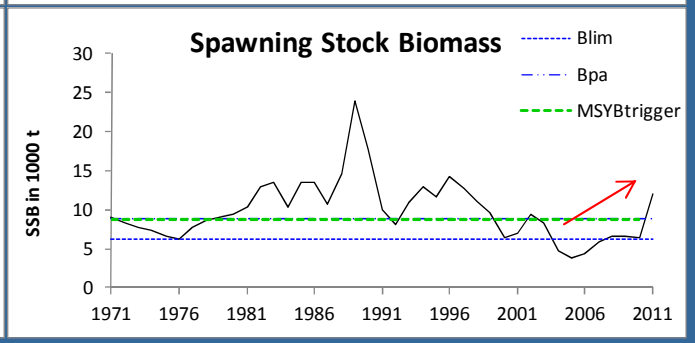


MP under development by the NWWRAC









Discard rates have increased in some fleets in 2010, and this discard information is incomplete in the assessment

Cod in Divisions VIIe–k (Celtic Sea cod)

Basis: F(2011) = F_{sq} = mean($F_{2008-2010}$) rescaled to F_{2010} = 0.51; SSB(2012) = 21.2 kt; R (2011) = GM (1971–2008) = 3022 (thousands); landings (2011) = 10.5 kt.

Rationale	Landings (2012)	Basis	F (2012)	SSB (2013)	%SSB change [1)]	% TAC change [2)]
MSY framework	10.0	F_{MSY} (F_{sq}*0.78)	0.40	21.9	+3%	+149%
MSY transition	11.3	(F_{2010}*0.6+F_{MSY}*0.4)	0.47	20.4	-4%	+180%
Precautionary Approach	14.7	F_{pa} (F_{sq}*1.33)	0.68	16.1	-24%	+266%
Zero catch	0	F=0	0.00	34.6	+63%	-100%
Status quo	11.2	F_{sq} * 0.9	0.46	20.5	-3%	+177%
	12.1	F_{sq}	0.51	19.4	-9%	+200%
	12.9	F_{sq} * 1.1	0.56	18.3	-14%	+221%
	3.420	TAC-15% (F_{sq}*0.24)	0.12	30.3	+43%	-15%
	4.023	TAC (F_{sq}*0.27)	0.14	29.5	+39%	0%
	4.626	TAC+15% (F_{sq}*0.31)	0.16	28.7	+36%	+15%

Weights in '000 tonnes.

Because of the large 2009 year class is now entering the fishery, which was not anticipated in last year's advice or TAC, there will be a large inconsistency between the TAC set for 2011 (4023 t) and the predicted landings for that year, assuming the current fishing mortality (10 500 t). Therefore, in the absence of any effort limitation and/or TAC revision, **high discarding will occur**

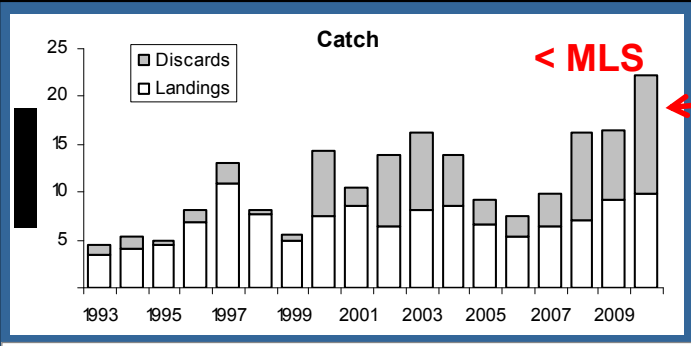
Haddock in Divisions VIIb–k

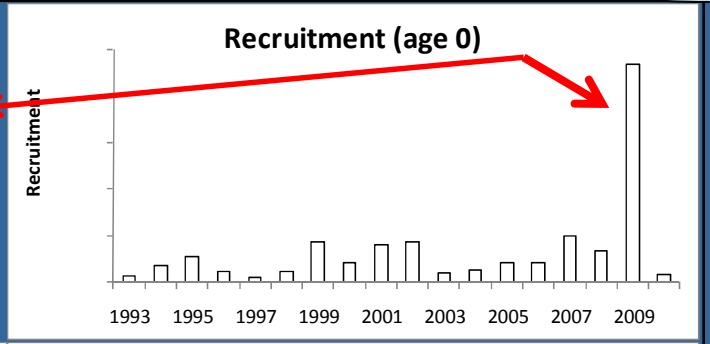
Advice 2012: No increase in catch and technical measures to mitigate the increased discarding of recruiting YC

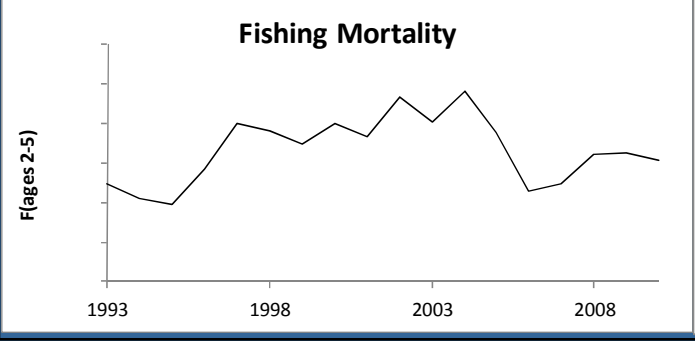
F (Fishing Mortality)	2008	2009	2010
MSY (F_{MSY})	?	?	? Unknown
Precautionary approach (F_{pa},F_{lim})	?	?	? Unknown
Qualitative evaluation	→	→	→ Stable

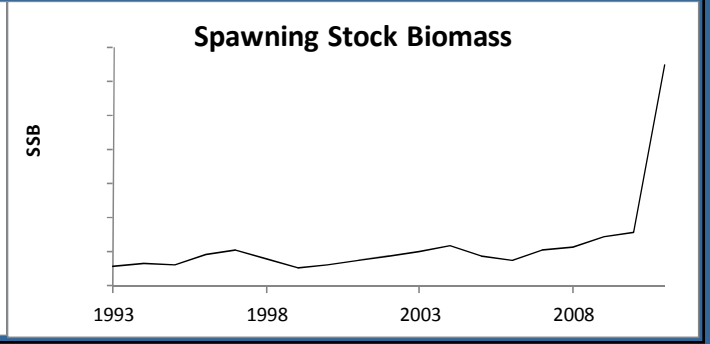
SSB (Spawning-Stock Biomass)	2009	2010	2011
MSY ($B_{trigger}$)	?	?	? Unknown
Precautionary approach (B_{pa},B_{lim})	?	?	? Unknown
Qualitative evaluation	↗	↗	↗ Strong increase

Discarding is a serious problem!
These fish become of marketable size from age 2 onwards:
they are likely to be discarded due to a restrictive TAC.
Over last 10 years: **70% discarded**







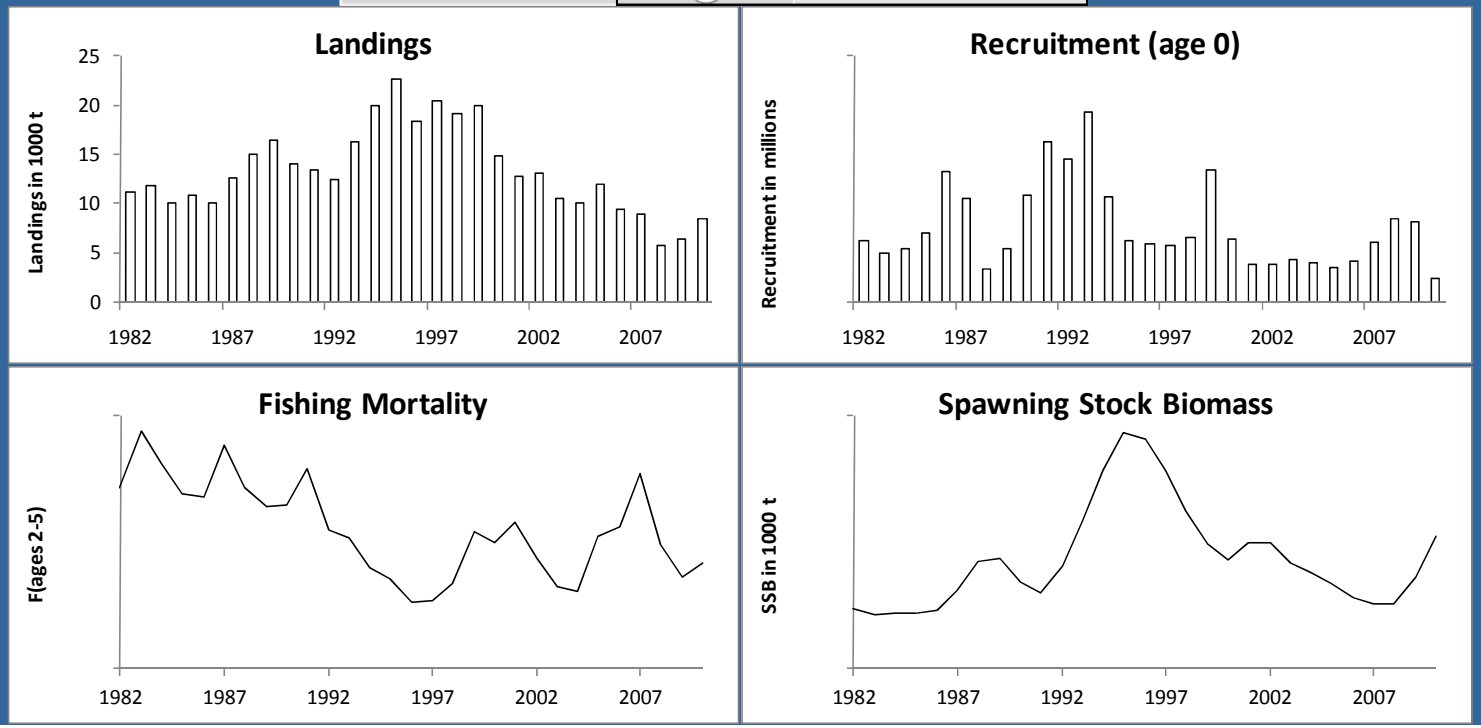


Whiting in Divisions VIIe–k

Advice 2012: No increase in catch and technical measures to reduce discard rates

F (Fishing Mortality)		
		2008 - 2010
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown

SSB (Spawning Stock Biomass)		
		2008 - 2010
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	↗	Increasing



Plaice Celtic Sea (VIIf,g)

Advice 2012: Catches should be reduced. Discards exceed landings and technical measures should be introduced to reduce discard rates

F (Fishing Mortality)				
	2008	2009	2010	
MSY (F_{MSY})	?	?	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	?	?	Unknown
Qualitative evaluation	↘	↘	✗	Above poss. reference points
SSB (Spawning Stock Biomass)				
	2009	2010	2011	
MSY ($B_{trigger}$)	?	?	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	?	?	Unknown
Qualitative evaluation	→	→	✗	Below poss. reference points

62% discards in 2010 (700 t)

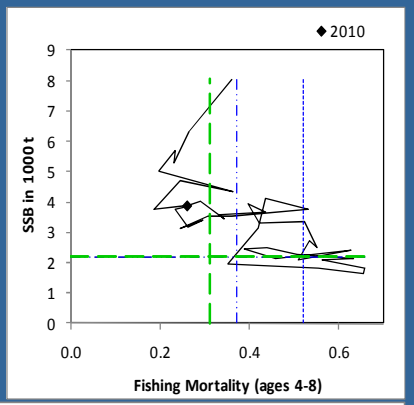
Discards are substantial and have ranged from 30% to 70% in number (mainly below the minimum landing size);
In 2011 discards were included in the assessment for the first time, although the time series of discard data available is short

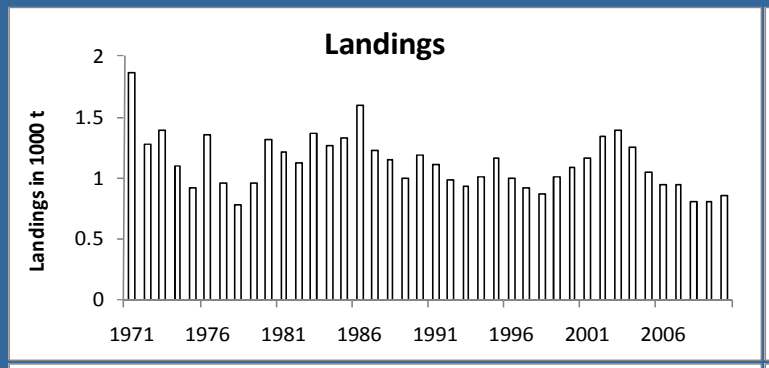
Sole in Celtic Sea (VIIf,g)

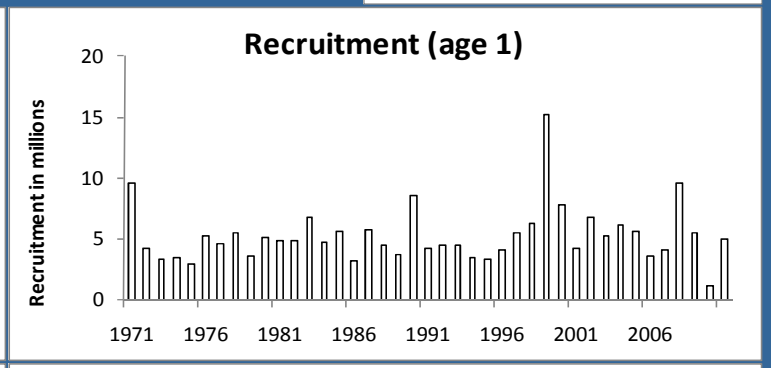
MSY: Landings in 2012 should be no more than 1060 t

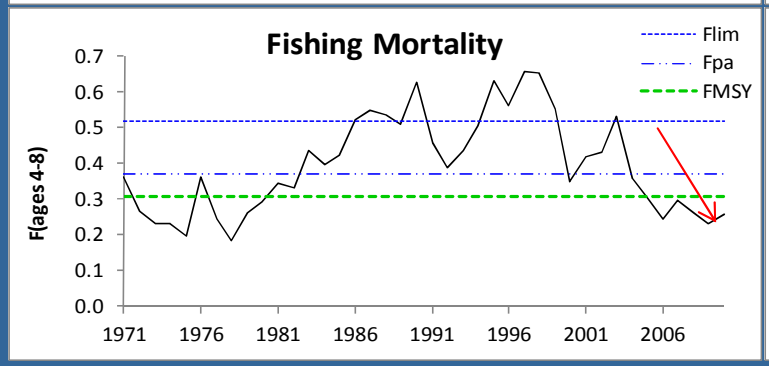
F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✓	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	✓	✓	✓	Harvest sustainably

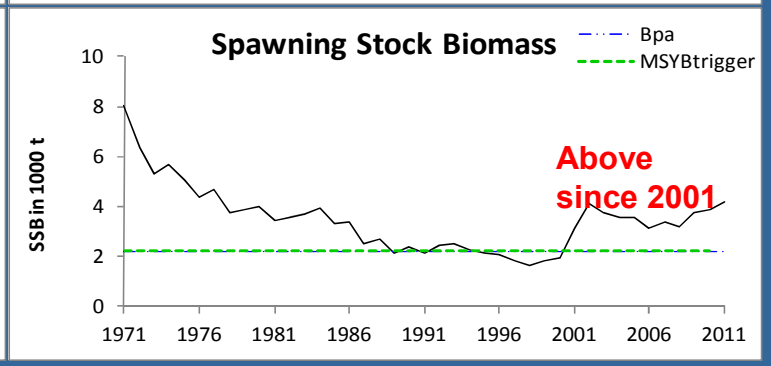
SSB (Spawning Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity











Sole in Celtic Sea (VIIf,g)

Basis: F(2011) = F_{sq} = mean(F2008–2010) = 0.25; SSB(2012) = 4100 t; R (2011) = GM (1972–2008) = 5025 (thousands); Landings (2011) = 960 t.

Rationale	Landings (2012)	Basis	F (2012)	SSB (2013)	%SSB change [1)]	% TAC change [2)]
MSY framework	**1060**	**F_{MSY} (F_{sq} * 1.24)**	**0.31**	**3600**	**-11%**	**-15%**
Precautionary Approach	1230	F_{pa} (F_{sq} * 1.48)	0.37	3400	-16%	-1%
Zero catch	0	F=0	0.00	4800	+17%	-100%
Status quo	800	F_{sq} * 0.9	0.23	3900	-4%	-35%
	880	F_{sq}	0.25	3800	-6%	-29%
	960	F_{sq} * 1.1	0.28	3700	-8%	-23%
	1030	F_{sq} * 1.2	0.30	3600	-10%	-17%
	1060	TAC – 15% (F_{sq} * 1.24)	0.31	3600	-11%	-15%
	1241	TAC_{sq} (F_{sq} * 1.50)	0.37	3400	-16%	0%
	1430	TAC – 15% (F_{sq} * 1.78)	0.44	3200	-21%	+15%

Weights in tonnes.

Anglerfish (*Lophius piscatorius* and *L. budegassa*) Divisions VIIb–k and VIIIa,b,d

Advice 2012: Catches should be reduced

Lophius piscatorius

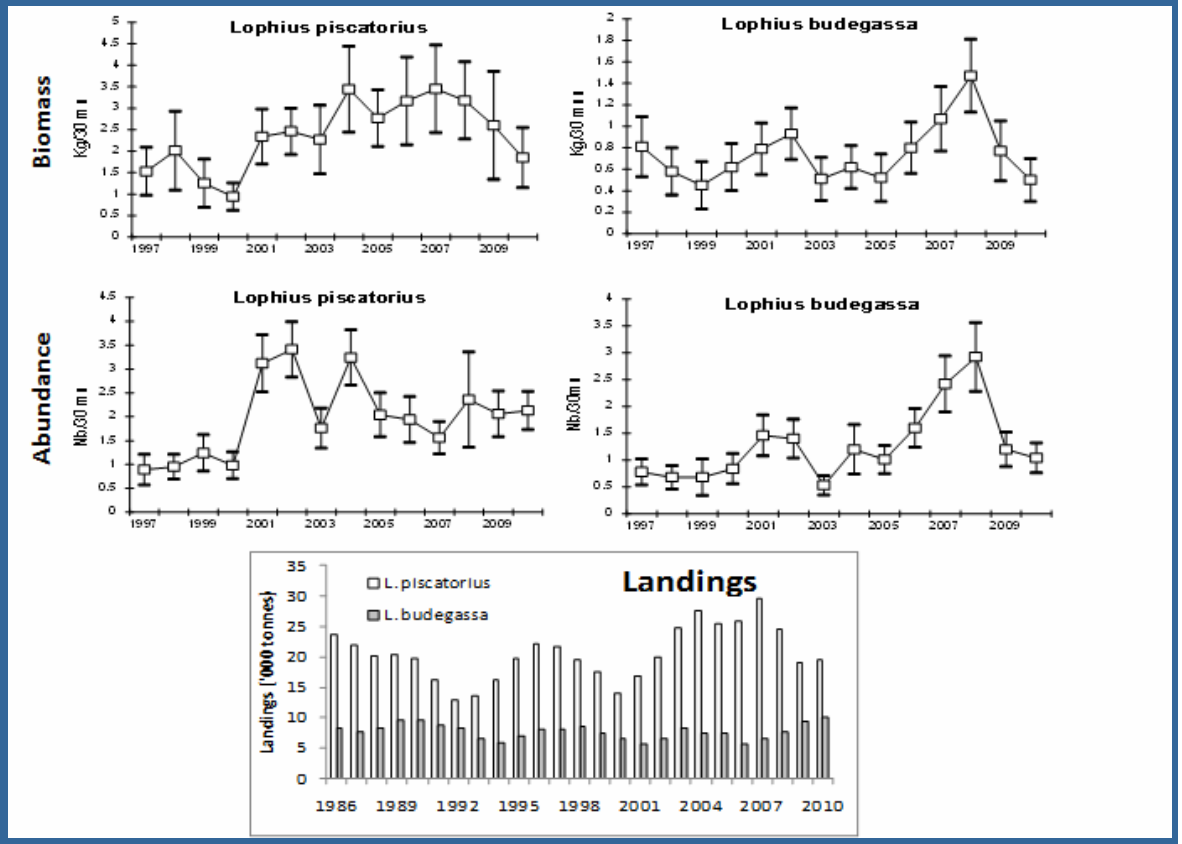
F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	?	?	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	?	?	Unknown

SSB (Spawning-Stock Biomass)	2008	2009	2010	
MSY ($B_{trigger}$)	?	?	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	?	?	Unknown
Qualitative evaluation	→	↘	↘	Decreasing

Lophius budegassa

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	?	?	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	?	?	Unknown

SSB (Spawning-Stock Biomass)	2008	2009	2010	
MSY ($B_{trigger}$)	?	?	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	?	?	Unknown
Qualitative evaluation	↗	↘	↘	Decreasing

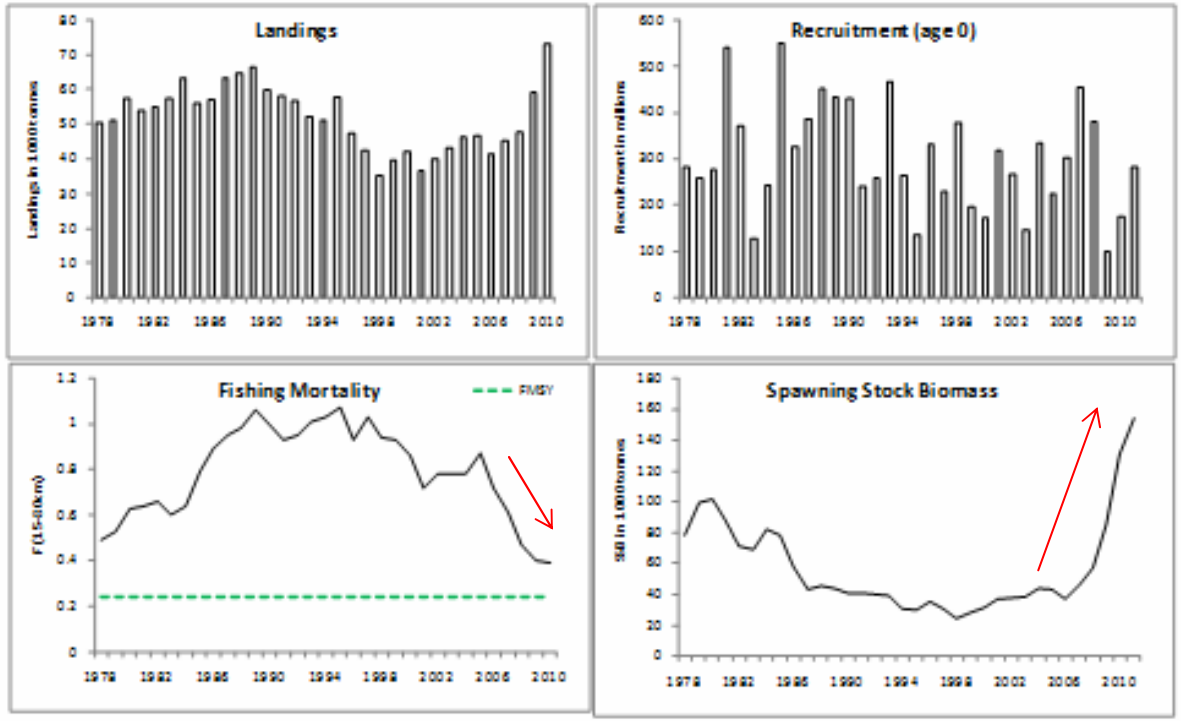


Ageing; lack of discard data

Hake – Northern stock

MSY: landings in 2012 should be no more than 51 900 t

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined
SSB (Spawning Stock Biomass)	**2009**	**2010**	**2011**	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined
Qualitative evaluation	↗	↗	✓	Above poss. reference points



Basis: F (2011) = MeanF_{08-10} = 0.42; SSB (2012) = 131; R (2011) = 281 mln (GM 1978-2010); Landings (2011) = 77.4; Discards (2011) = 1.8.

Rationale	Human Consumption landings (2012)	Basis	F Total (2012)	F HC (2012)	F Disc (2012)	Disc. (2012)	Catch Total (2012)	SSB (2013)	%SSB change [1]	%TAC change [2]
MSY framework	39.4	F_{MSY} (F_{sq}*0.57)	0.24	0.20	0.04	1.6	41.0	138	+6%	-28%
MSY transition	**51.9**	**0.6*F_{2010}+0.4*F_{MSY} (F_{sq}*0.78)**	**0.33**	**0.28**	**0.05**	**2.1**	**54.0**	**125**	**-4%**	**-6%**
Recovery Plan	46.839	-15% TAC (F_{sq}*0.69)	0.29	0.25	0.04	1.9	48.7	131	0%	-15%

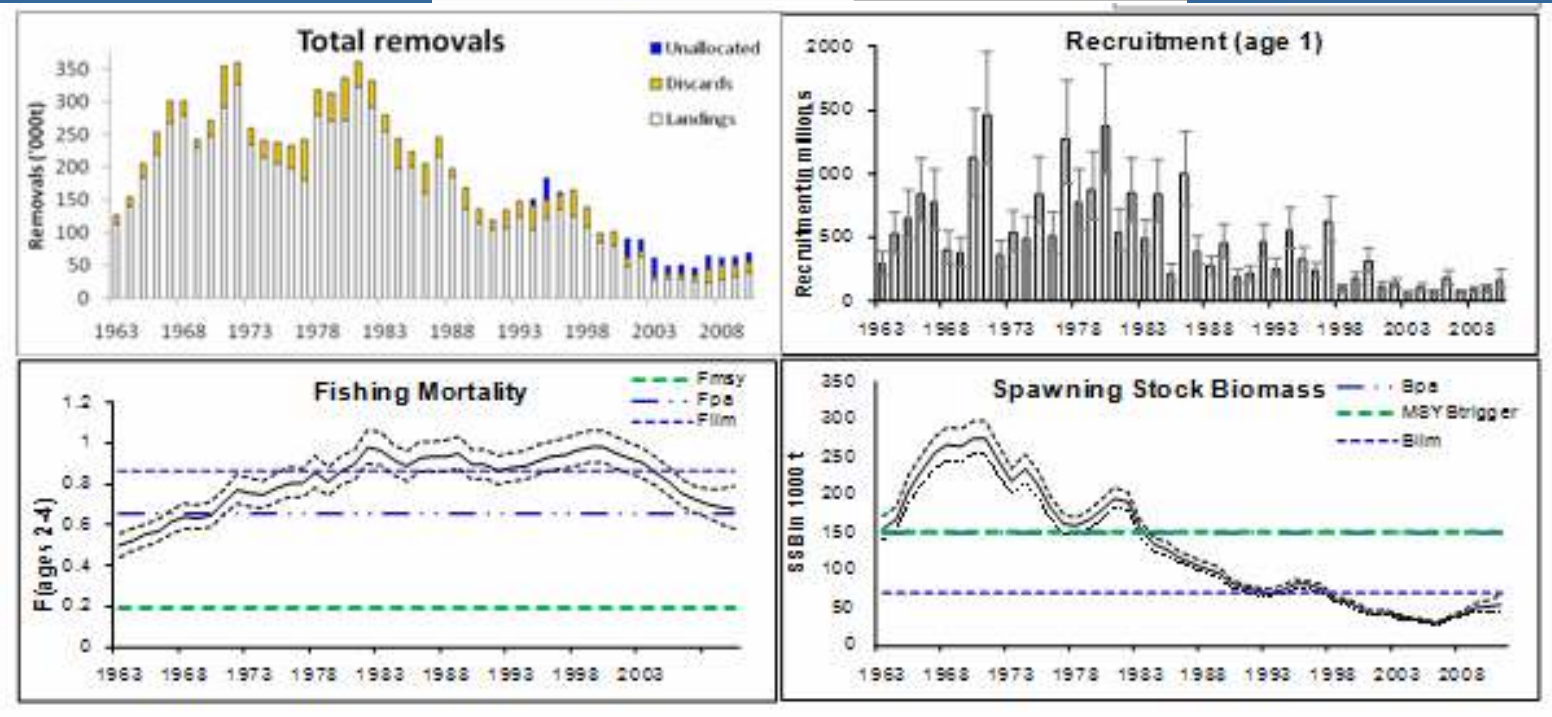
English Channel (VIId & VIIe)

- Cod (IV, VIId, Skagerrak)
- Plaice (VIId)
- Plaice (VIIe)
- Sole (VIId)
- Sole (VIIe)

Cod NS (EU/Norway MP):

Landings in 2012 shoud be no more than 31800 t

F (Fishing Mortality)	2008	2009	2010
MSY (F_{MSY})	✗	✗	✗ Above target
Precautionary approach (F_{pa},F_{lim})	o	o	o Increased risk
Management plan (F_{MP})	✗	✗	✗ Above target
SSB (Spawning-Stock Biomass)	**2009**	**2010**	**2011**
MSY ($B_{trigger}$)	✗	✗	✗ Below trigger
Precautionary approach (B_{pa},B_{lim})	✗	✗	✗ Reduced reproductive capacity
Management plan (SSB_{MP})	✗	✗	✗ Below trigger



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Plaice VIId: no increase

F (Fishing Mortality)	2008-2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
Qualitative evaluation	↘	Indications of reduction
SSB (Spawning-Stock Biomass)	**2009-2011**	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	↗	Slight increase, from lowest level

Plaice VIIe: < 1 440 t

F (Fishing Mortality)	2008	2009	2010
MSY (F_{MSY})	✗	✗	✗ Above target
Precautionary approach (F_{pa},F_{lim})	?	?	? Undefined
SSB (Spawning Stock Biomass)	**2009**	**2010**	**2011**
MSY ($B_{trigger}$)	✗	✓	✓ Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	? Undefined

Sole VIId: < 5 600 t

F (Fishing Mortality)	2008	2009	2010
MSY (F_{MSY})	✗	✗	✗ Above trigger
Precautionary approach (F_{pa},F_{lim})	✓	o	o Risk harvested unsustainably
SSB (Spawning-Stock Biomass)	**2009**	**2010**	**2011**
MSY ($B_{trigger}$)	✓	✓	✓ Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓ Full reproductive capacity

Sole VIIe: < 740 t

F (Fishing Mortality)	2008	2009	2010
MSY (F_{MSY})	✗	✓	✓ Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	? Undefined
SSB (Spawning Stock Biomass)	**2009**	**2010**	**2011**
MSY ($B_{trigger}$)	✗	✗	✗ Below trigger
Precautionary approach (B_{pa},B_{lim})	?	?	? Undefined

Plaice VIIe– Western Channel

MSY: landings in 2012 should be no more than 1440 t

Discards are not included in the assessment. Discard rates of plaice in Division VIIe are much lower compared to other plaice stocks

Plaice – Western Channel

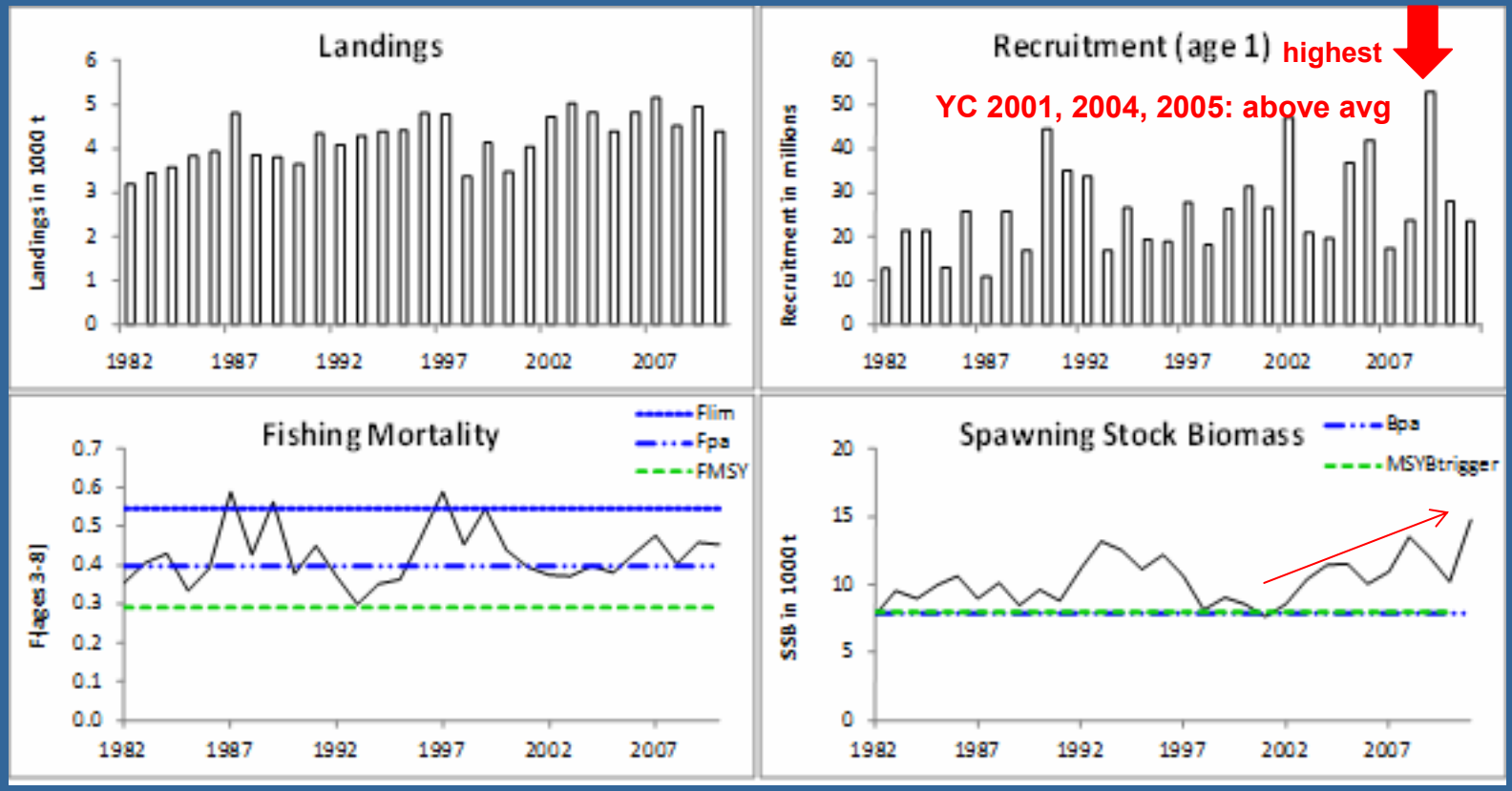
Basis: F(2011) = F_{sq} = mean(F2008-2010) rescaled to F2010 = 0.45; SSB(2012) = 3751 t; R (2011) = GM (1989-2008) = 5007 (Thousands); landings (2011) = 1755 t.

Rationale	Landings (2012)	Basis	F (2012)	SSB (2013)	%SSB change [1)]
MSY framework	840	F_{MSY} (F_{sq} * 0.42)	0.19	4620	+23%
MSY transition	**1440**	**(0.6*F_{2010}+0.4*F_{MSY}) = F_{sq}*0.78**	**0.35**	**4030**	**+7%**
Zero catch	0	F=0	0	5430	+45%
Status quo	980	F_{sq} * 0.5	0.23	4480	+19%
	1150	F_{sq} * 0.6	0.27	4310	+15%
	1320	F_{sq} * 0.7	0.32	4150	+11%
	1480	F_{sq} * 0.8	0.36	4000	+7%
	1630	F_{sq} * 0.9	0.41	3850	+3%
	1770	F_{sq} * 1.0	0.45	3710	-1%
	1910	F_{sq} * 1.1	0.50	3580	-5%

Weights in tonnes.

Sole VIId – Eastern Channel

MSY: landings in 2012 should be no more than 5600 t



Sole – Eastern Channel

Basis: F(2011) = TAC constraint = 0.36 ; R(2011) = GM(1982–2007) = 23 500; Landings(2011) = 4852; SSB(2012) = 15 000.

Rationale	Landings (2012)	Basis	F(2012)	SSB(2013)	%SSB change [1)]	%TAC Change [2)]
MSY framework	4300	F_{MSY}	0.29	15 000	0%	-11%
MSY transition	**5600**	**(F(2010)*0.6)+(F_{MSY}*0.4)**	**0.39**	**13 600**	**-9%**	**+15%**
Precautionary approach	5700	F_{pa}	0.40	13 600	-9%	+17%
Zero catch	0	F=0	0	19 700	+31%	-100%
Status quo	4000	F_{sq}*0.6	0.27	15 300	+2%	-17%
	4100	F_{sq}*0.62(TAC -15%)	0.28	15 200	+1%	-15%
	4600	F_{sq}*0.7	0.31	14 700	-2%	-5%
	5100	F_{sq}*0.8	0.36	14 100	-6%	+6%
	5600	F_{sq}*0.89(TAC +15%)	0.39	13 600	-9%	+15%
	6200	F_{sq}	0.44	13 000	-13%	+27%

Weights in tones.

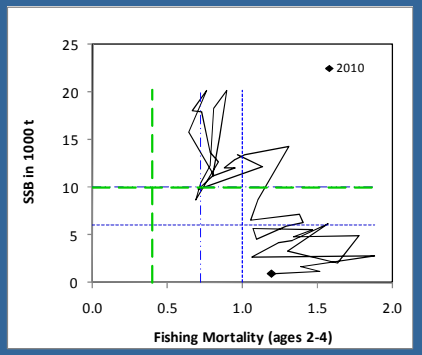
Irish Sea (VIIa)

- Cod
- Haddock
- Whiting
- Plaice
- Sole
- Nephrops

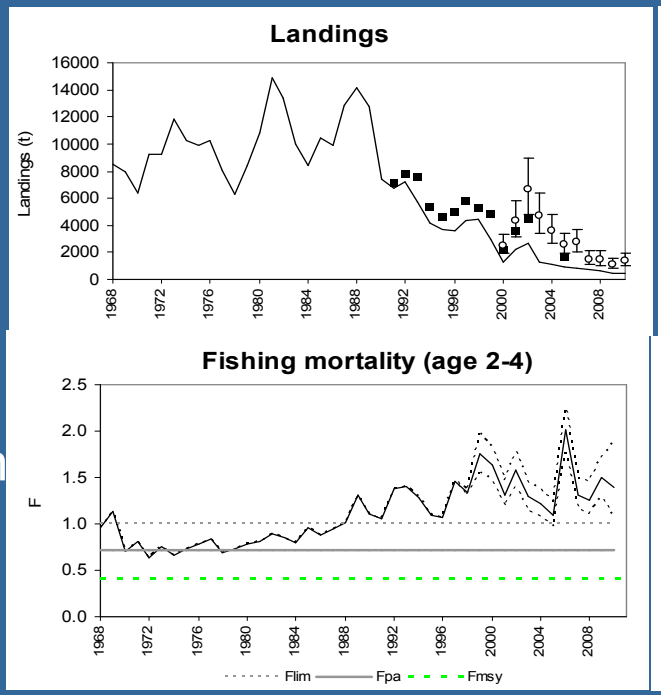
Cod in Division VIIa (Irish Sea)

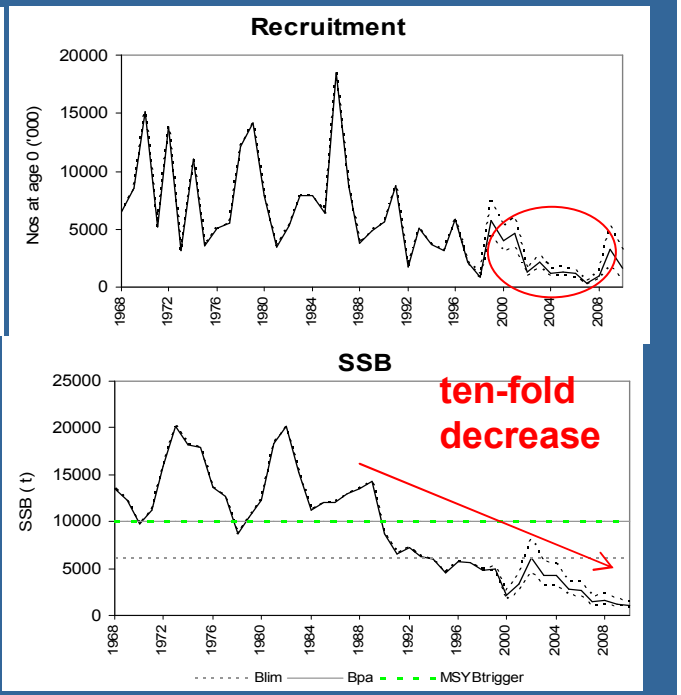
MSY: Zero catch in 2012

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	✗	✗	✗	Harvested unsustainably
SSB (Spawning-Stock Biomass)	**2009**	**2010**	**2011**	
MSY ($B_{trigger}$)	✗	✗	✗	Below trigger
Precautionary approach (B_{pa},B_{lim})	✗	✗	✗	Reduce reproductive capacity



F in recent years is uncertain (due to unaccounted mortality) but total mortality remain very high;

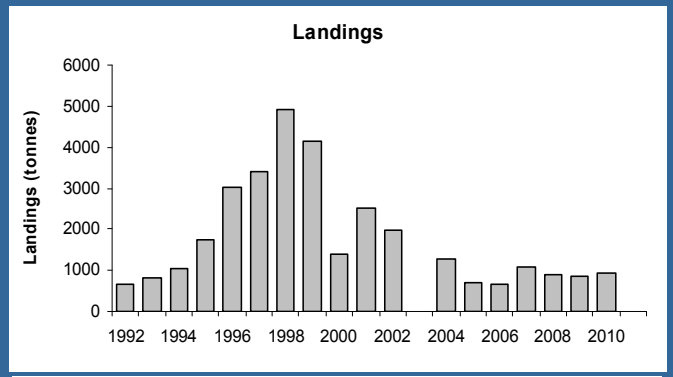


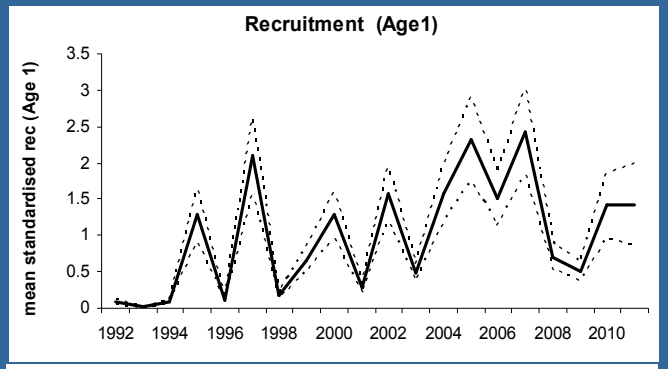


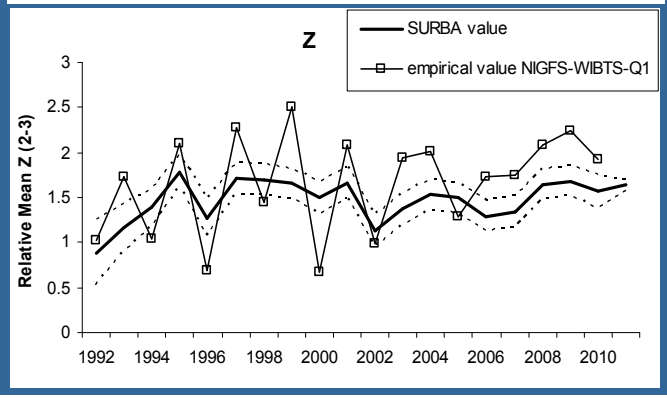
Haddock in Division VIIa (Irish Sea)

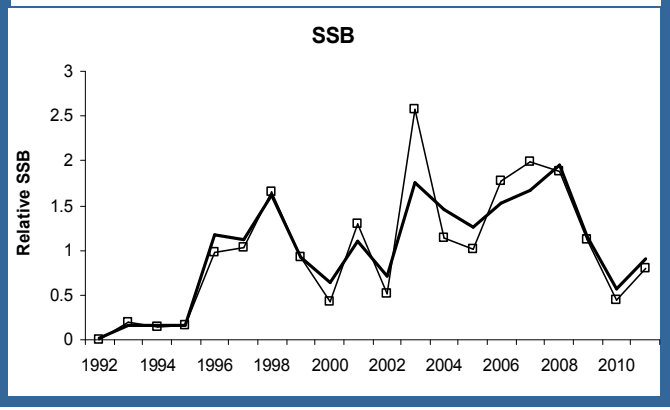
F (Fishing Mortality)		
	2008 -2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown

SSB (Spawning-Stock Biomass)		
	2009 - 2011	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	✗	Below poss. reference points





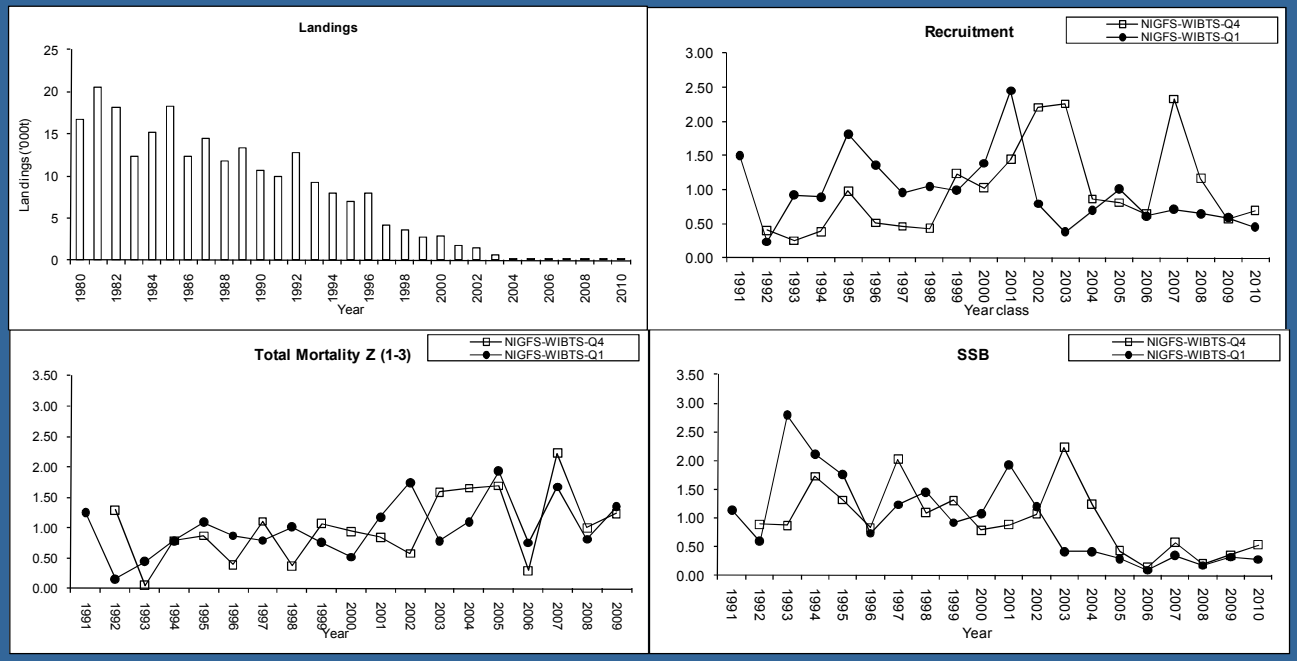




Whiting in Division VIIa (Irish Sea)

F (Fishing Mortality)	2008 - 2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
Qualitative evaluation	✗	Above poss. reference points

SSB (Spawning Stock Biomass)	2009 - 2011	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	✗	Below poss. reference points



Irish Sea

Plaice: no increase; tech measures

F (Fishing Mortality)		
	2008-2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
Qualitative evaluation	✓	Below poss. reference points
SSB (Spawning Stock Biomass)		
	2008-2010	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	✓	Above poss. reference points

Haddock: reduce; tech measures

F (Fishing Mortality)		
	2008 -2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
SSB (Spawning-Stock Biomass)		
	2009 - 2011	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	✗	Below poss. reference points

Whiting: reduce; tech measures

F (Fishing Mortality)		
	2008 - 2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
Qualitative evaluation	✗	Above poss. reference points
SSB (Spawning Stock Biomass)		
	2009 - 2011	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	✗	Below poss. reference points

Irish Sea

Haddock: reduce; tech measures

Discarding is a serious problem for this stock. The discard rates for all fleets in 2010 were **92-100%** for one-year-olds; **22–96%** for two-year-olds and **3–68%** for three-year-olds by number

Measures:
In order to minimise discards, a **square mesh panel** of at least 120 mm should be introduced for all fleets or selectivity devices that achieve equivalent or better improvements

Whiting: reduce; tech measures

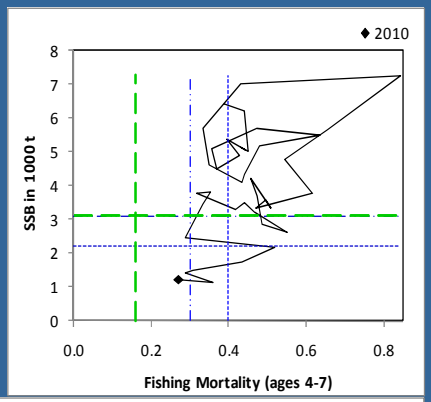
Measures:
- **spatial and temporal** changes in fishing practises;
- **technical measures** such as increased codend mesh size, square mesh panels, separator trawls, and increased top sheet mesh in towed gears

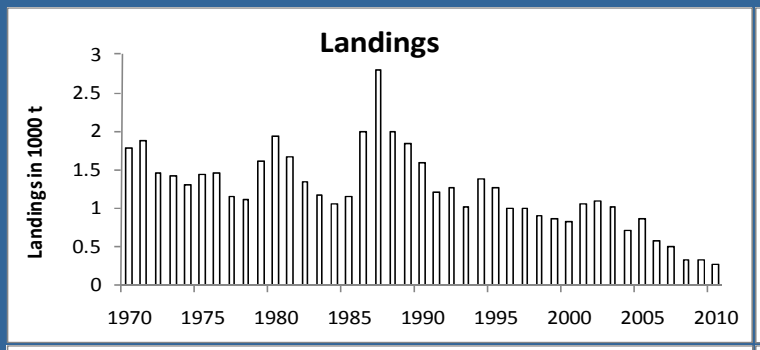
Sole in Division VIIa (Irish Sea)

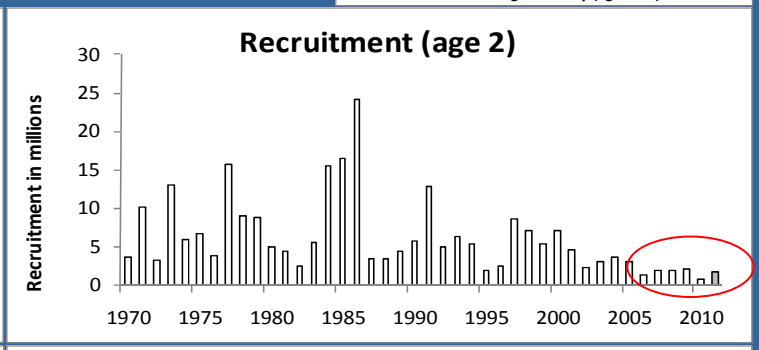
MSY: Landings should be no more than 200 t

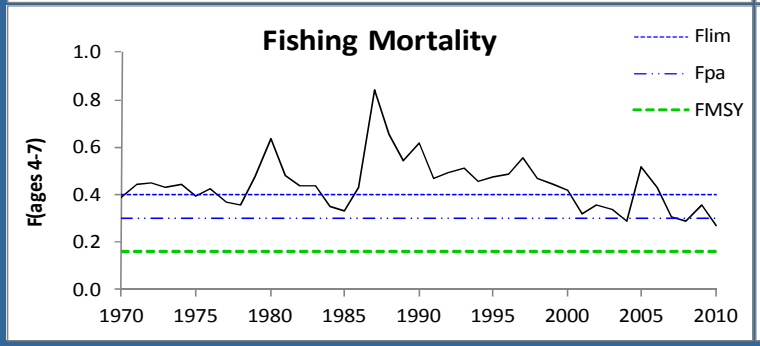
F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	✓	✗	✓	Harvested sustainably

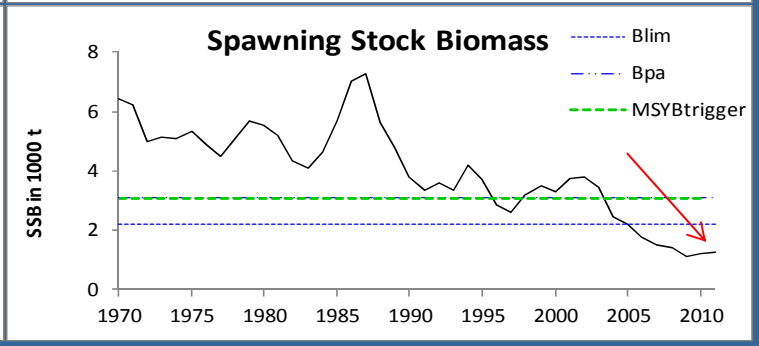
SSB (Spawning Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	✗	✗	✗	Below trigger
Precautionary approach (B_{pa},B_{lim})	✗	✗	✗	Reduced reproductive capacity











Sole in Division VIIa (Irish Sea)

Basis: F(2011) = F_{sq} = mean(F2008–2010) = 0.31; R(2011) = RCT3 = 1680 thousands; R(2012)=GM 2001-2009= 2520 thousands; Landings(2011) = 320 t; SSB(2012) =1280 t.

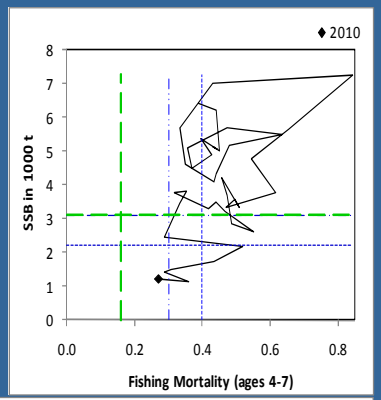
Rationale	Landings (2012)	Basis	F(2012)	SSB(2013)	%SSB change [1)]	%TAC Change [2)]
MSY framework	80	$F_{HCR-MSY} = F_{MSY}*SSB_{(2012)}/B_{trigger}$	0.07	1520	+23%	-80%
MSY transition	**200**	$0.6*F_{(2010)}+0.4*F_{HCR-MSY}$	**0.19**	**1390**	**+14%**	**-49%**
Zero catch	0	F=0	0.0	1600	+30%	-100%
Status quo	220	$F_{sq}*0.7$	0.21	1370	+12%	-43%
	170	$F_{MSY}(F_{sq}*0.52)$	0.16	1420	+16%	-56%
	280	$F_{sq}*0.9$	0.27	1310	+7%	-29%
	300	$F_{pa}(F_{sq}*0.98)$	0.3	1290	+5%	-23%
	300	F_{sq}	0.31	1290	+5%	-22%
	330	TAC – 15% (F_{sq} *1.1)	0.34	1260	+3%	-15%
	390	TAC_{sq} (F_{sq} *1.34)	0.41	1200	-2%	0%
	450	TAC + 15% (F_{sq} *1.59)	0.49	1140	-7%	+15%

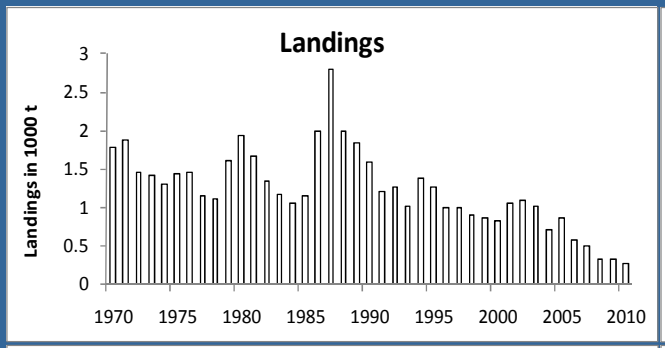
Weights in tonnes.

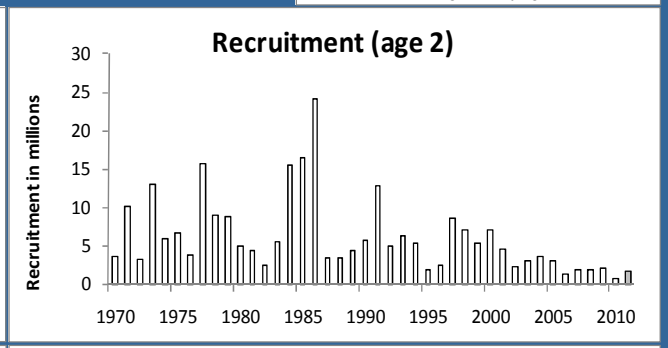
Sole in Division VIIa (Irish Sea)

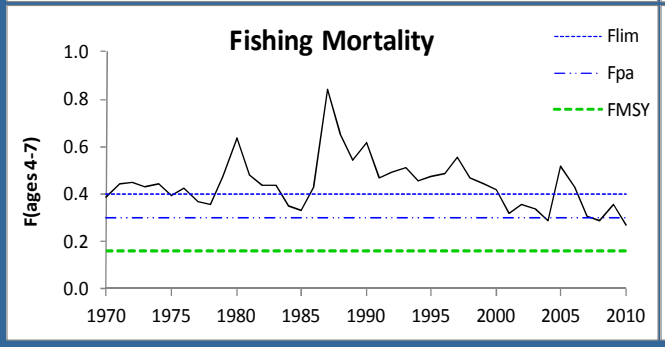
F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	✓	✗	✓	Harvested sustainably

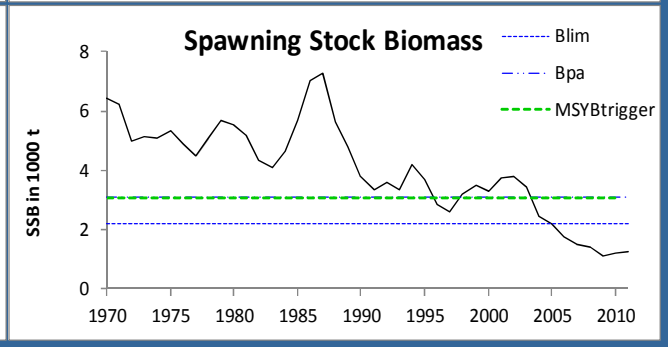
SSB (Spawning Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	✗	✗	✗	Below trigger
Precautionary approach (B_{pa},B_{lim})	✗	✗	✗	Reduced reproductive capacity



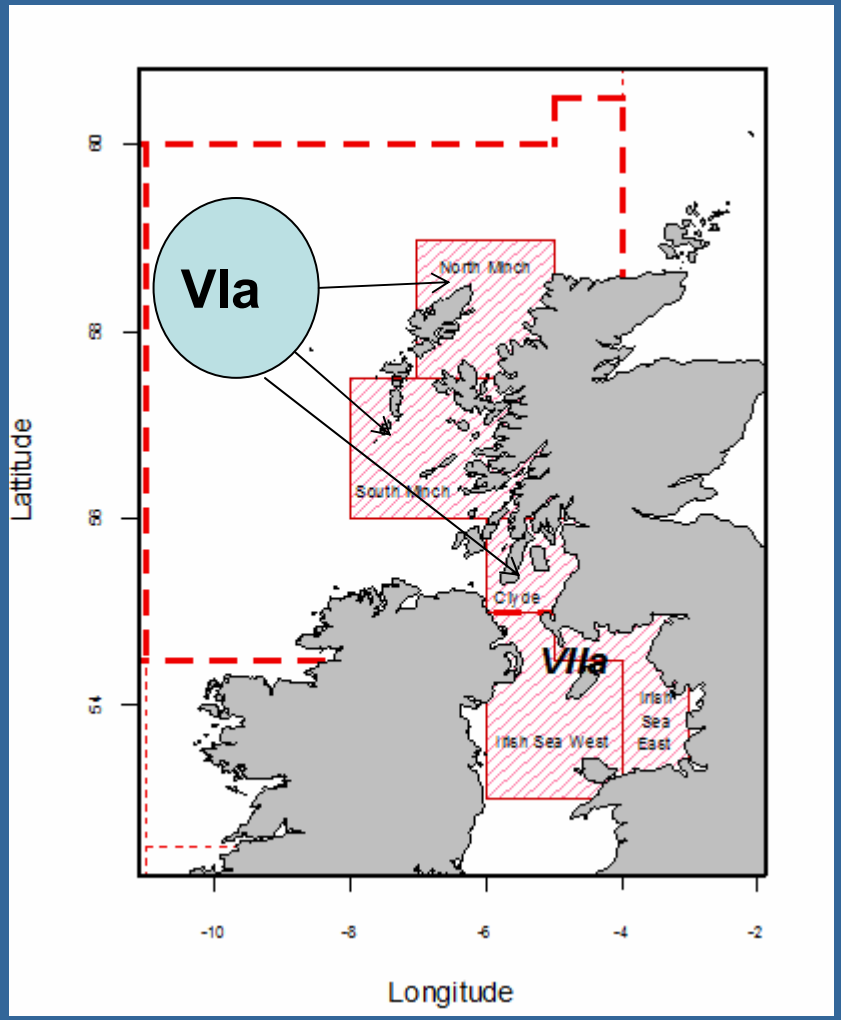








and the ***Nephrops ...***



FU 11 – North Minch

FU 12 – South Minch

FU 13 – Firth of Clyde & Sound of Jura

FU 11 – North Minch 2012: < 3 200 t

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

SSB (Spawning-Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Not defined

FU 12 – South Minch 2012: < 5 500 t

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

SSB (Spawning-Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Not defined

FU 13 – Firth of Clyde 2012: < 4 200 t

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

SSB (Spawning-Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Not defined

FU 13 – Sound of Jura 2012: < 900 t

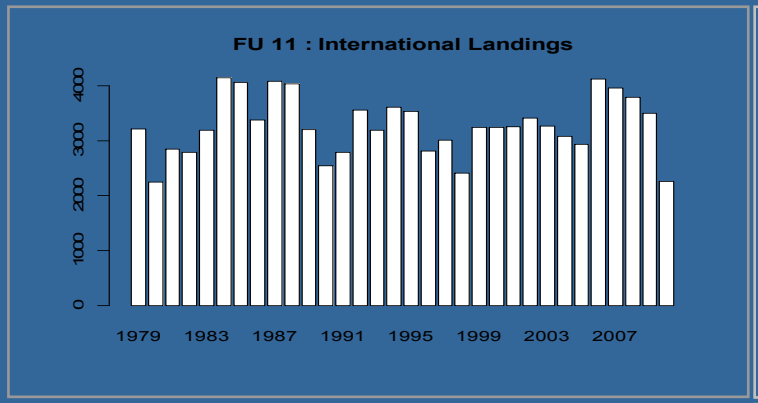
F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	?	✓	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

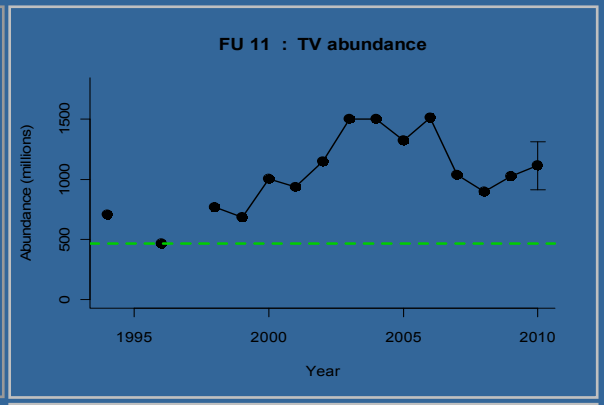
SSB (Spawning-Stock Biomass)	2009	2010	2011	
MSY ($B_{trigger}$)	?	?	?	Not defined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Not defined

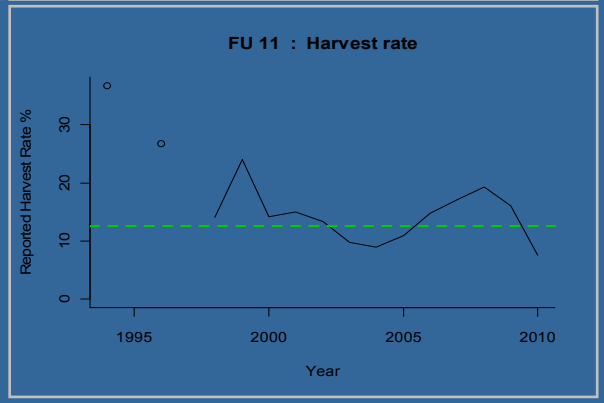
Nephrops in North Minch (FU 11)

F (Fishing Mortality)	2008	2009	2010
MSY (F_{MSY})	✗	✗	✓ Below target
Precautionary approach (F_{pa},F_{lim})	?	?	? Not defined

SSB (Spawning-Stock Biomass)	2009	2010	2011
MSY ($B_{trigger}$)	✓	✓	✓ Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	? Not defined



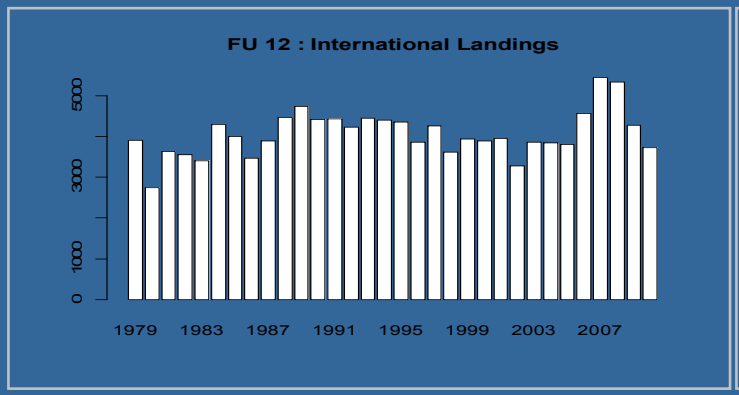


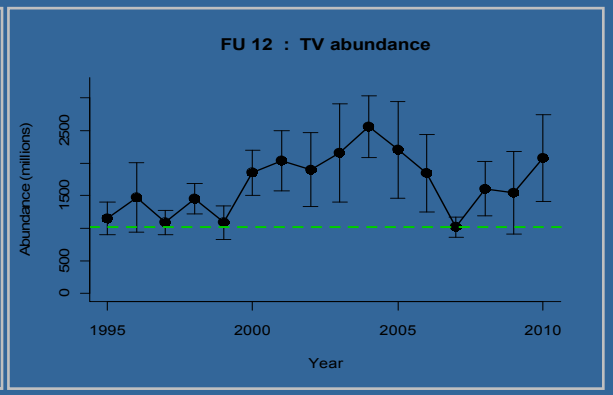


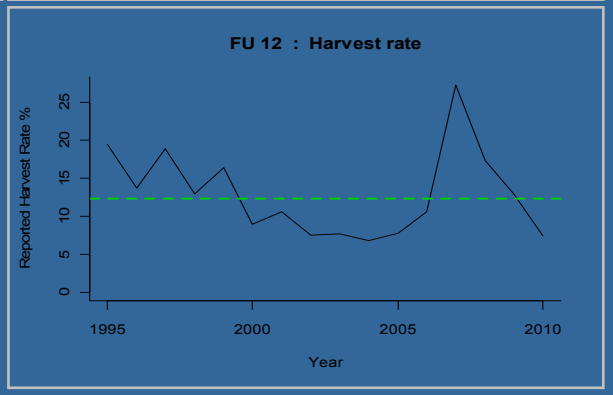
Nephrops in South Minch (FU 12)

F (Fishing Mortality)				
	2008	2009	**2010**	
MSY (F_{MSY})	✗	✗	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

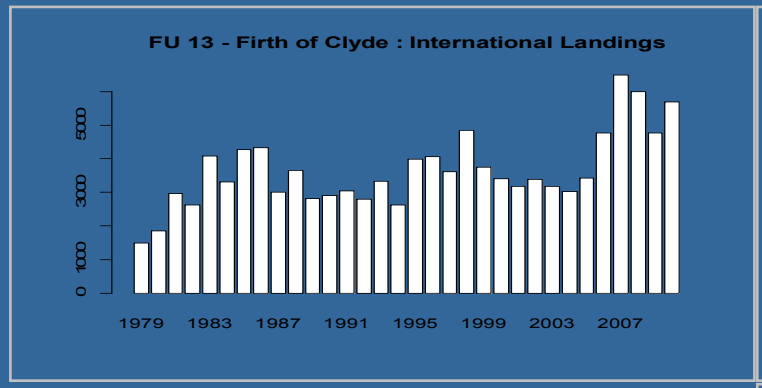
SSB (Spawning-Stock Biomass)				
	2009	2010	**2011**	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Not defined

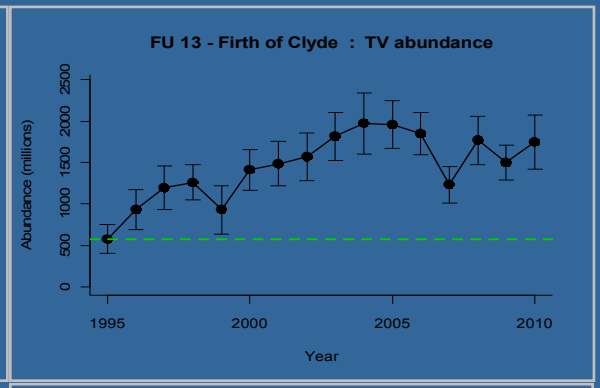


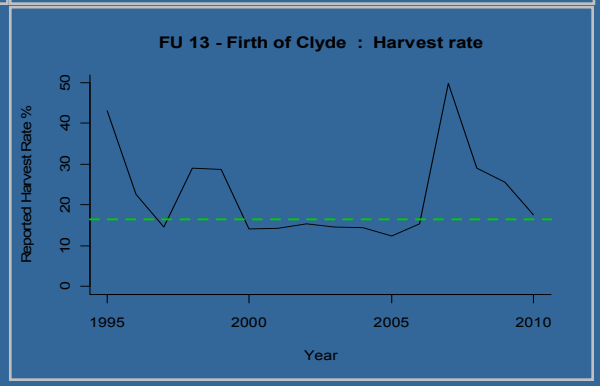




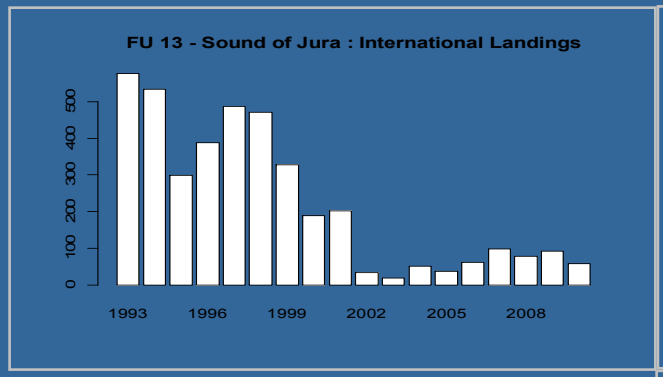
Nephrops in the Firth of Clyde + Sound of Jura (FU 13)

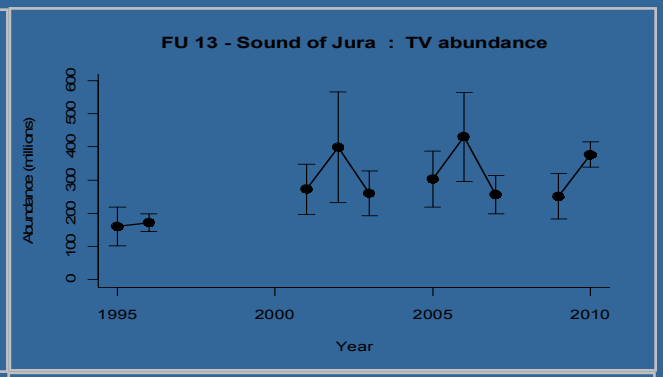


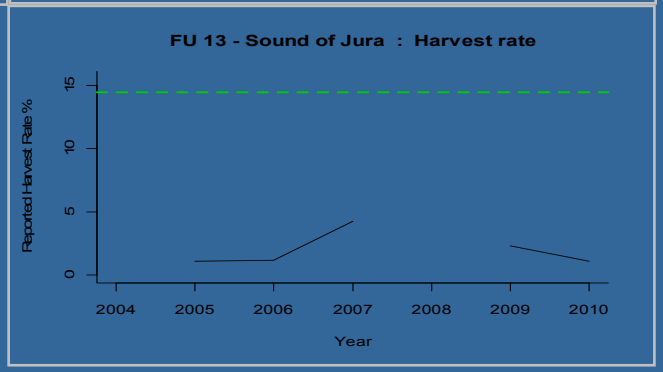


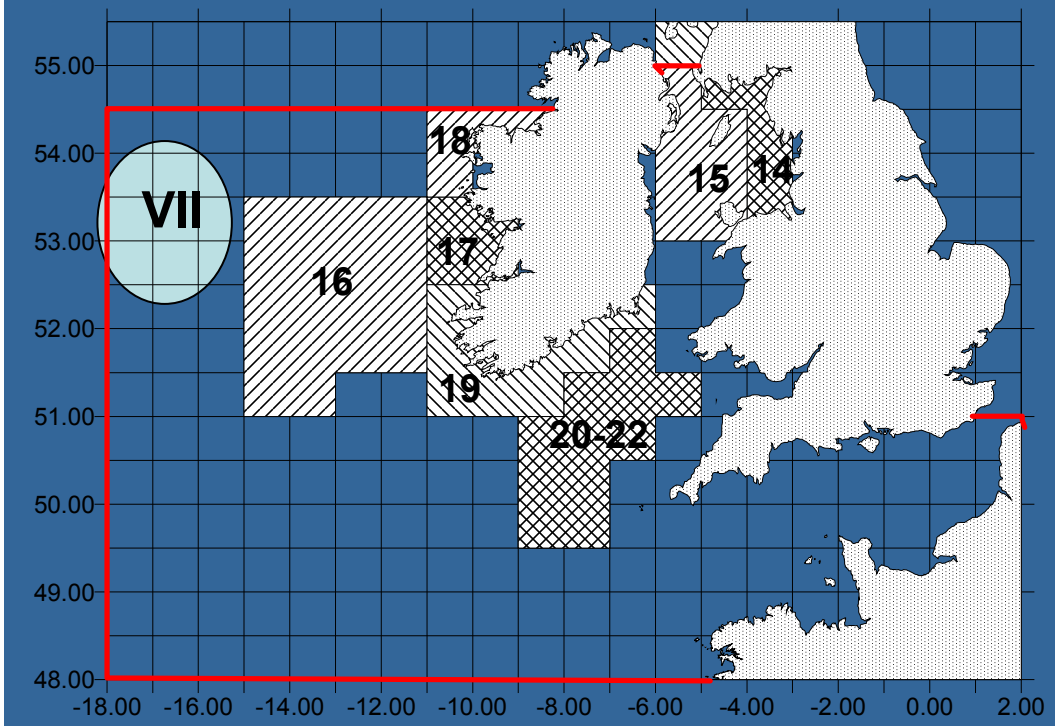


Nephrops in the Firth of Clyde + Sound of Jura (FU 13)









FU 14 – Irish Sea East

FU 15 – Irish Sea West

FU 16 – Porcupine Bank (VIIbcjk)

FU 17 – Aran Grounds (VIIb)

FU 19 – Ireland SW and SE

FU 20-22 – Celtic Sea (VIIgh)

FU 14 – Irish Sea East
2012: < 960 t

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✓	✓	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined
SSB (Spawning Stock Biomass)				
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined

FU 15 – Irish Sea West
2012: < 9 800 t

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined
SSB (Spawning Stock Biomass)				
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined

FU 16 – Porcupine Bank
2012: no increase

F (Fishing Mortality)	2008-2010	
MSY (F_{MSY})	?	Undefined
Precautionary approach (F_{pa},F_{lim})	?	Undefined
Qualitative evaluation	✗	High exploitation rate
SSB (Spawning Stock Biomass)		
MSY ($B_{trigger}$)	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	Undefined
Qualitative evaluation	↗	Increasing, from critically low abundance

FU 17 – Aran Grounds
2012: < 1 100 t

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✓	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined
SSB (Spawning Stock Biomass)				
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined

FU 19 – Ireland SW and SE
2012: reduce

F (Fishing Mortality)		
	2008-2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
SSB (Spawning Stock Biomass)		
	2008-2010	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	→	Stable

FU 20-21 – Celtic Sea
2012: reduce

F (Fishing Mortality)		
	2008 - 2010	
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
SSB (Spawning Stock Biomass)		
	2008 - 2010	
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative information	→	Stable

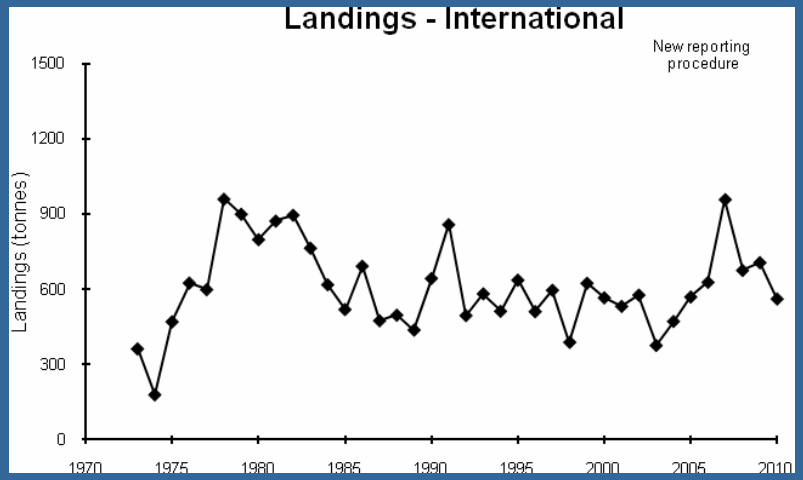
FU 22 – Celtic Sea
2012: < 2 300 t

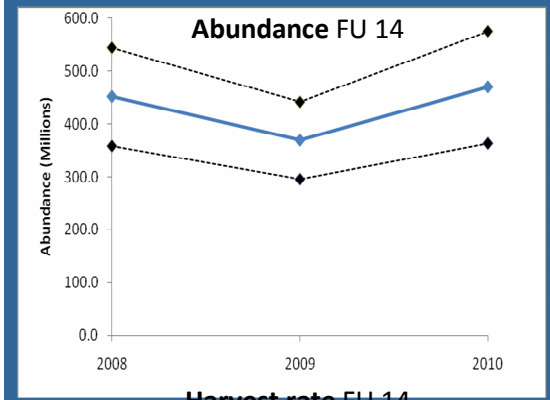
F (Fishing Mortality)				
	2008	2009	2010	
MSY (F_{MSY})	✗	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	?	Unknown
SSB (Spawning Stock Biomass)				
	2008	2009	2010	
MSY ($B_{trigger}$)	?	?	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	?	?	Unknown
Qualitative information	→	→	→	Stable

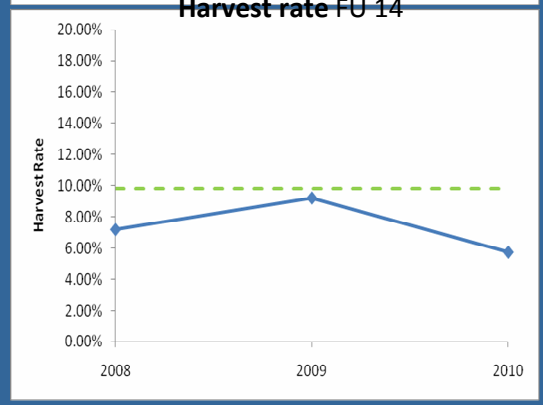
Nephrops in Irish Sea East (FU14)

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✓	✓	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

SSB (Spawning Stock Biomass)	2008	2009	2010	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined



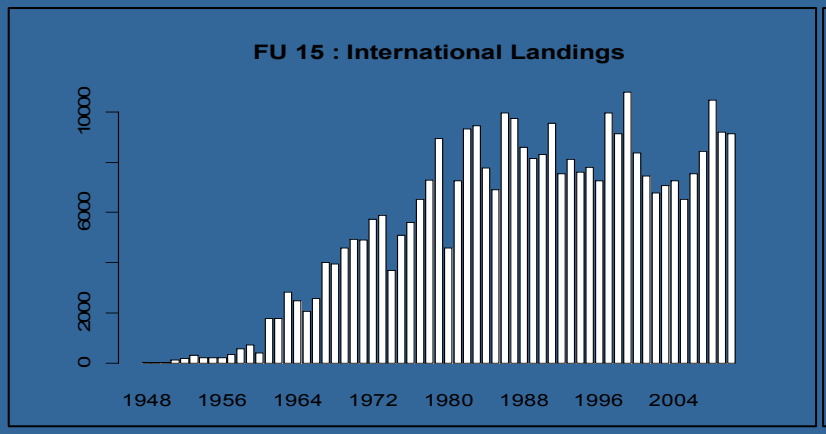


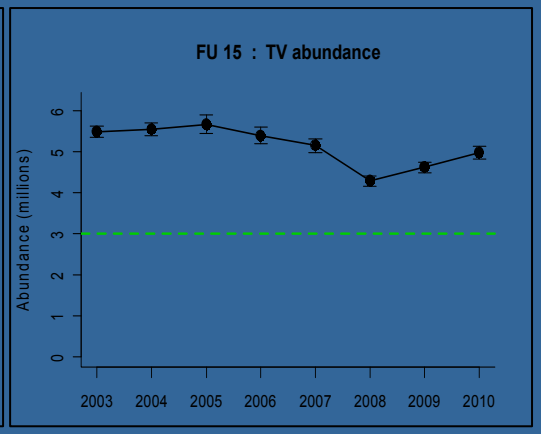


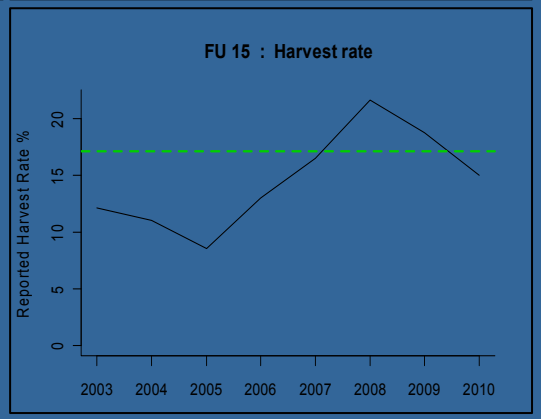
Nephrops in Irish Sea West (FU 15)

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✗	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

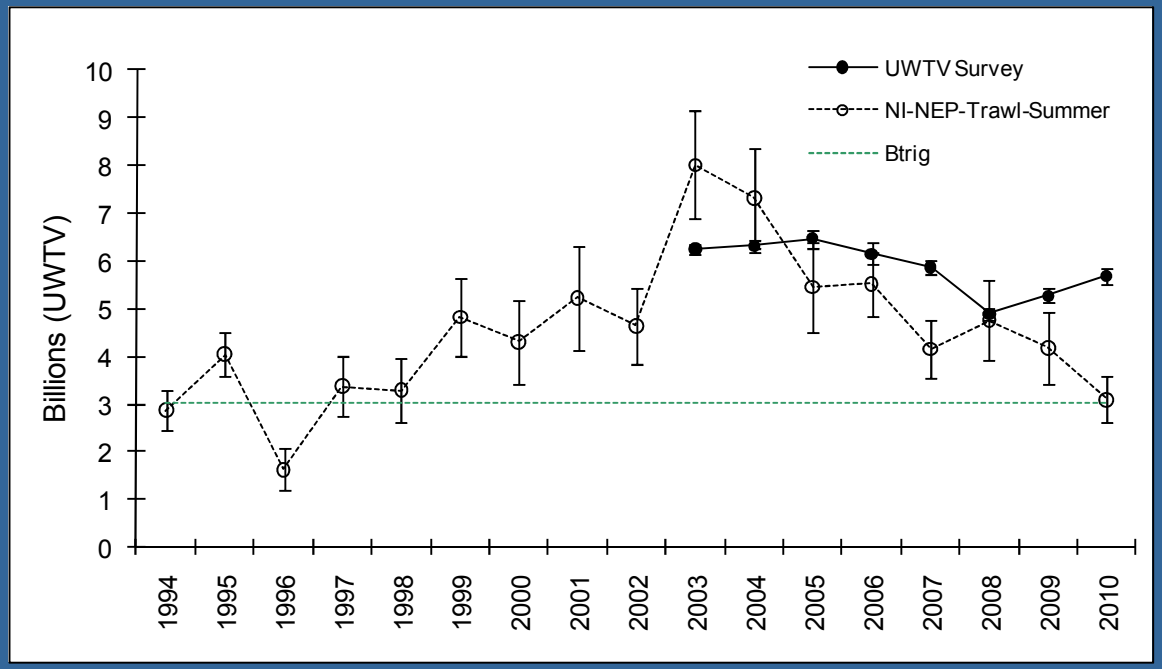
SSB (Spawning Stock Biomass)	2008	2009	2010	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined

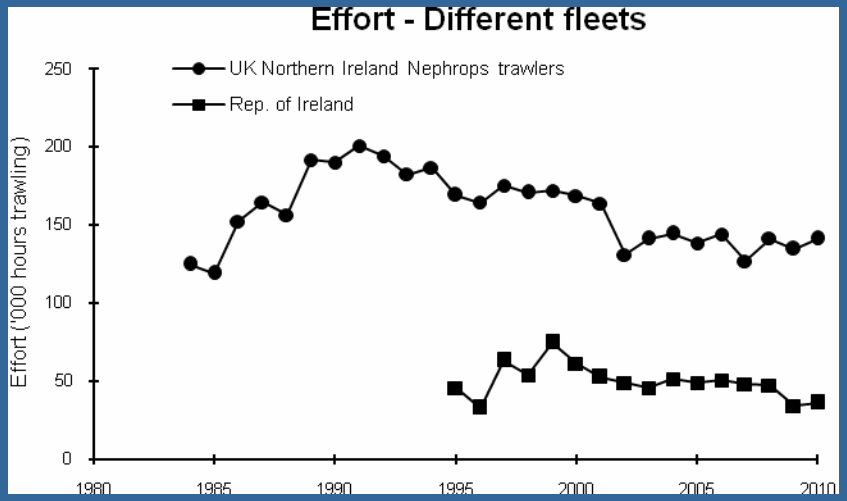




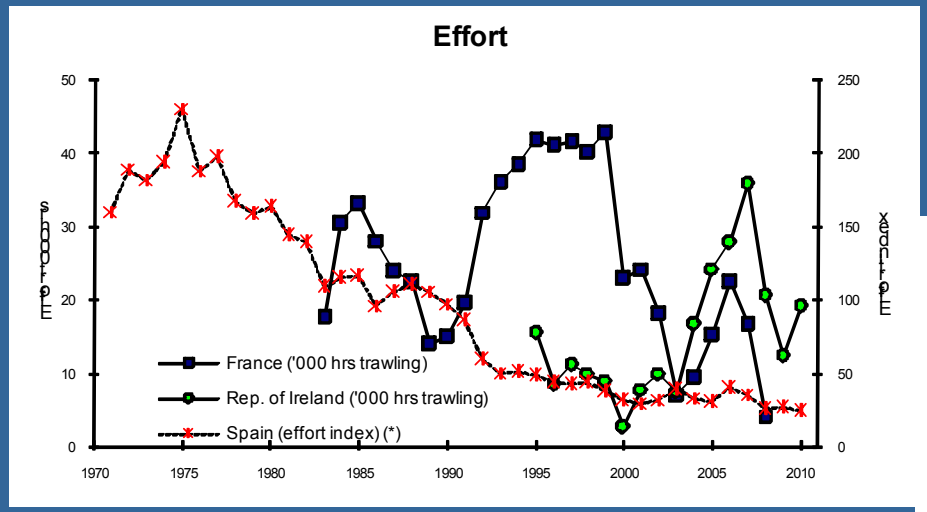


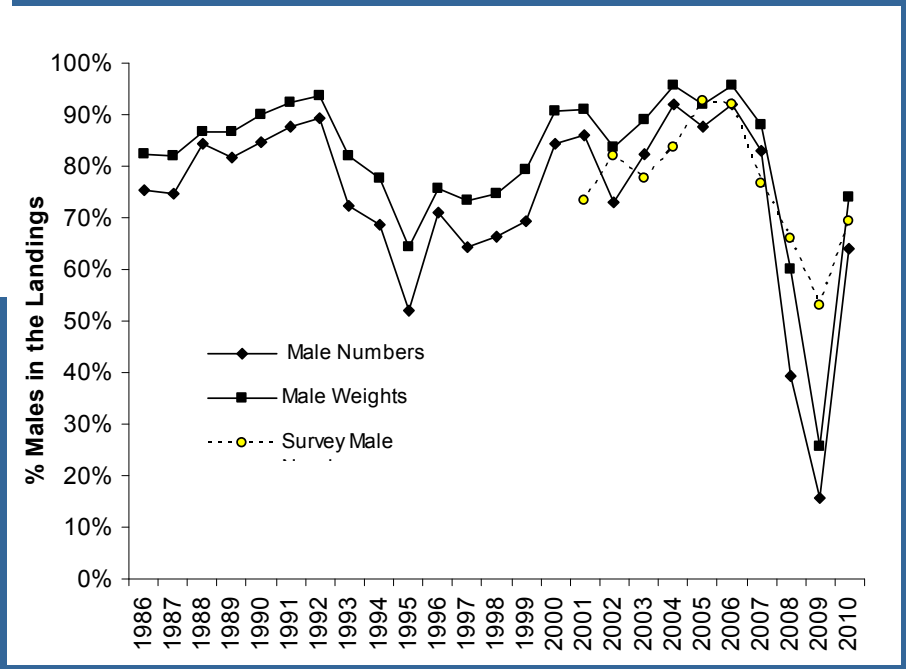
Nephrops in Irish Sea West (FU 15)





Nephrops on Porcupine Bank (FU 16)

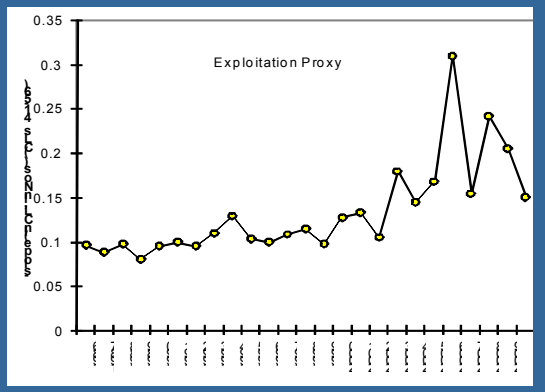




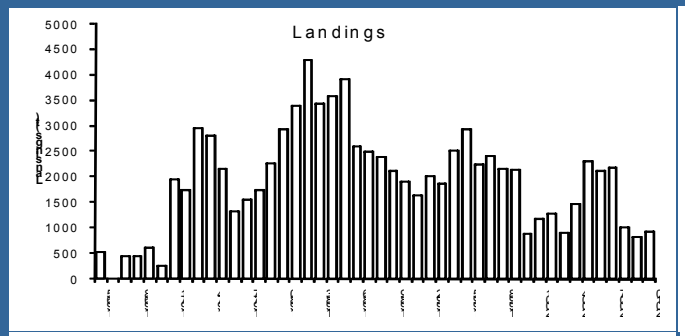
Nephrops on Porcupine Bank (FU 16)

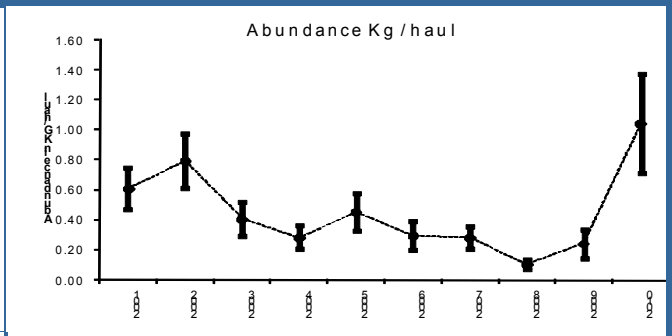
F (Fishing Mortality)		
	2008-2010	
MSY (F_{MSY})	?	Undefined
Precautionary approach (F_{pa},F_{lim})	?	Undefined
Qualitative evaluation	✗	High exploitation rate

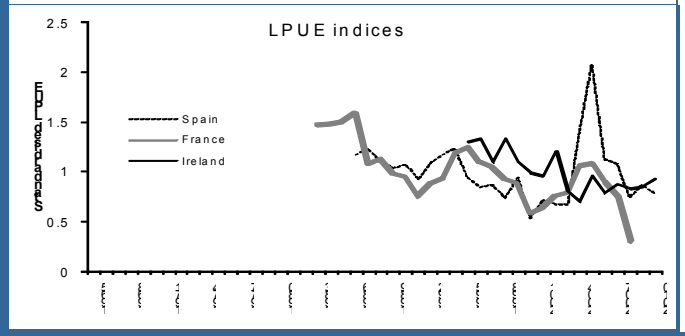
SSB (Spawning Stock Biomass)		
	2008-2010	
MSY ($B_{trigger}$)	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	Undefined
Qualitative evaluation	↗	Increasing, from critically low abundance

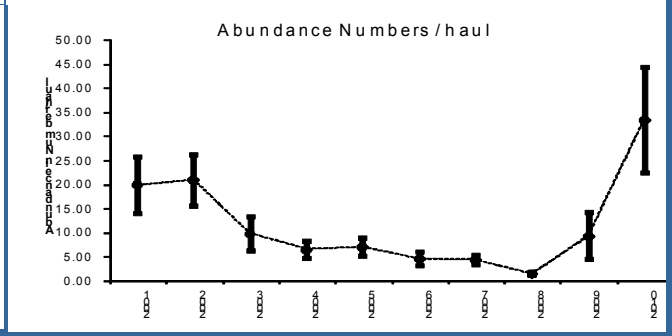


Nephrops on Porcupine Bank (FU 16)

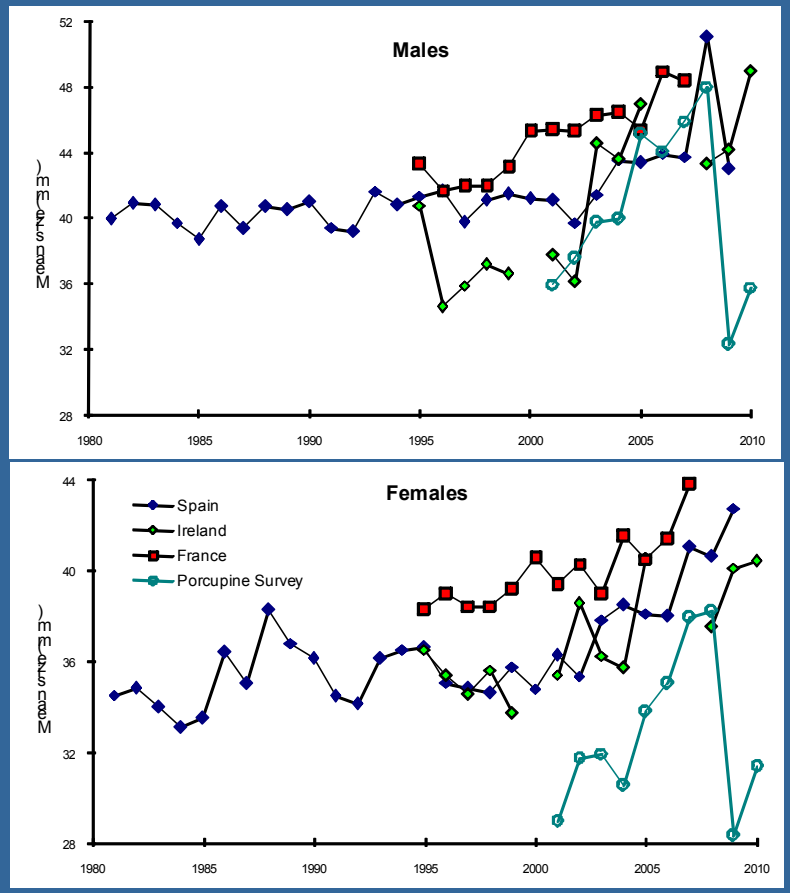


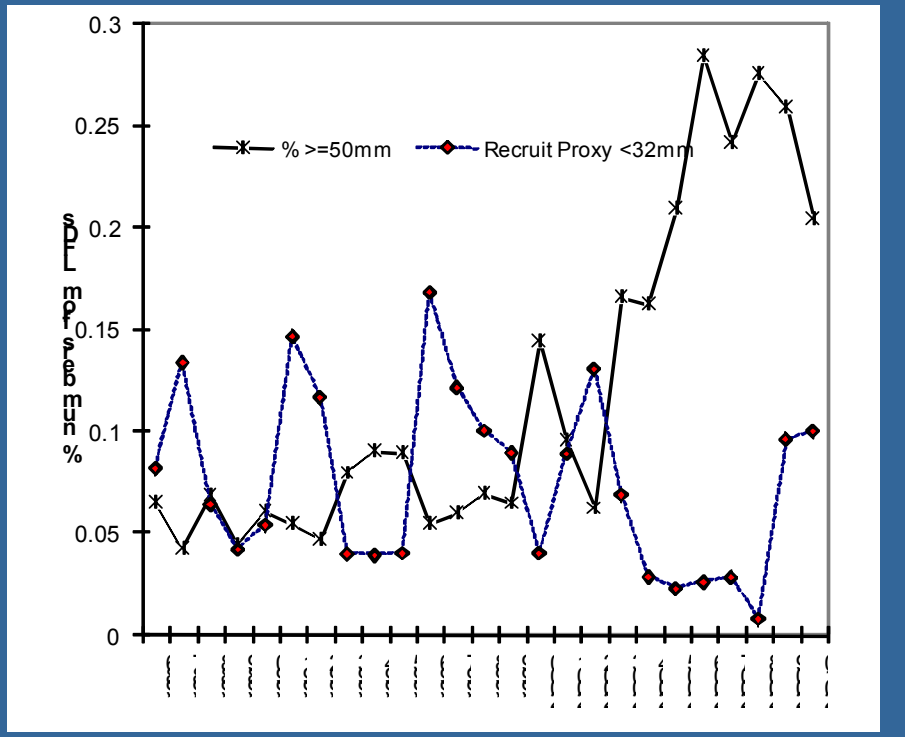






Nephrops on Porcupine Bank (FU 16)

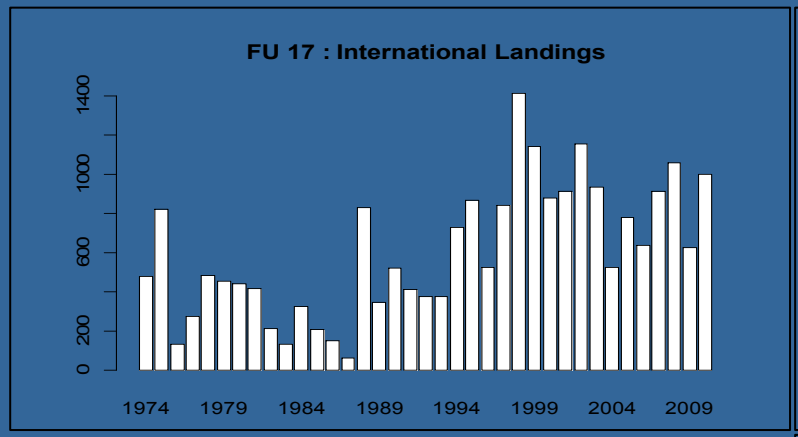


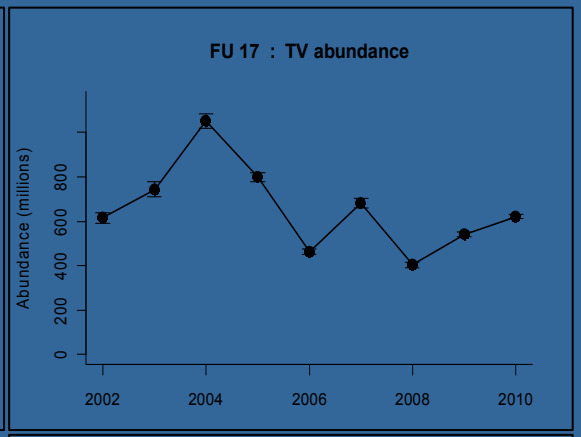


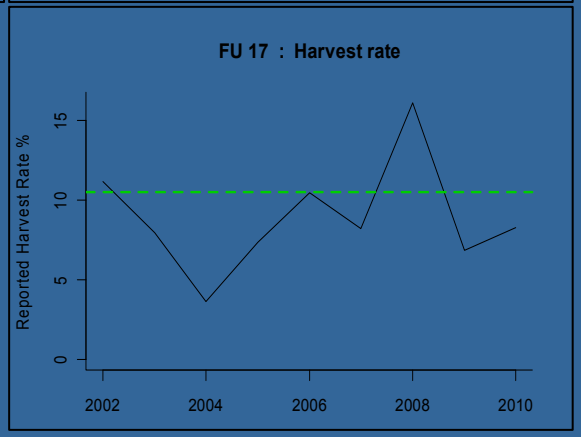
Nephrops on Aran Grounds (FU 17)

F (Fishing Mortality)	2008	2009	2010	
MSY (F_{MSY})	✗	✓	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

SSB (Spawning Stock Biomass)	2008	2009	2010	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Undefined

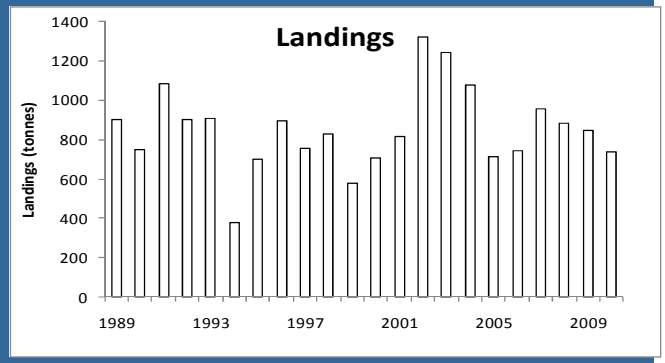


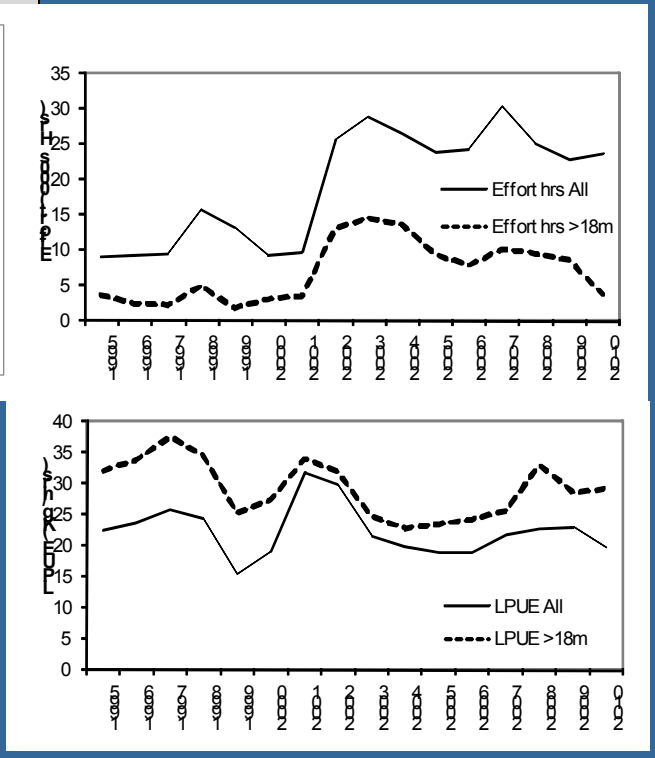




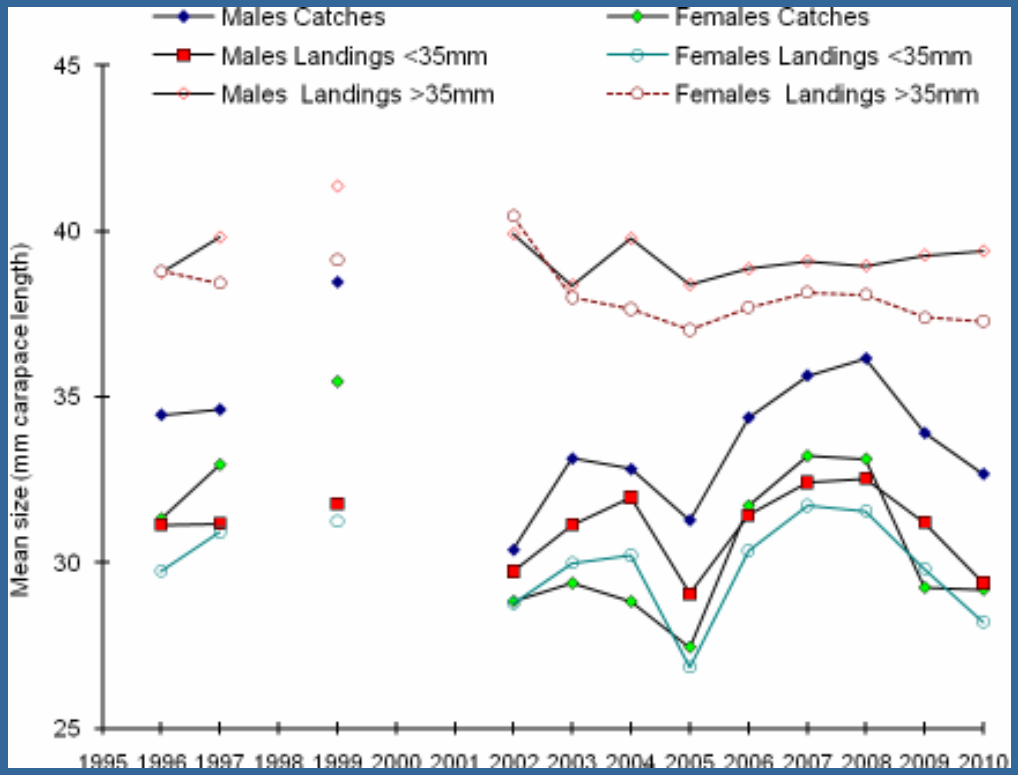
Nephrops off the south-eastern and south-western coasts of Ireland (FU 19)

F (Fishing Mortality)		
		2008-2010
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa},F_{lim})	?	Unknown
SSB (Spawning Stock Biomass)		
		2008-2010
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa},B_{lim})	?	Unknown
Qualitative evaluation	→	Stable

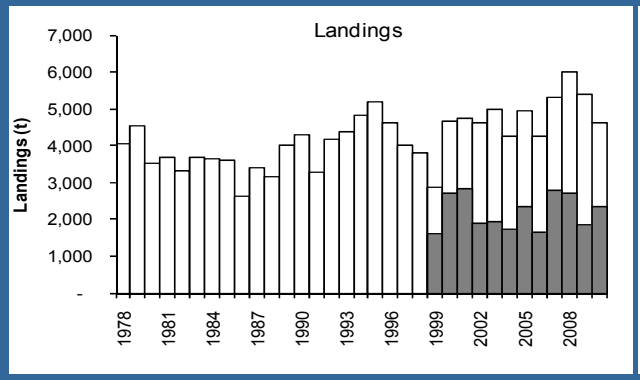


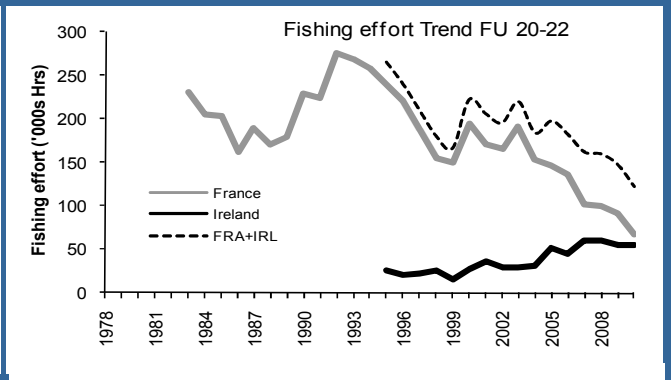


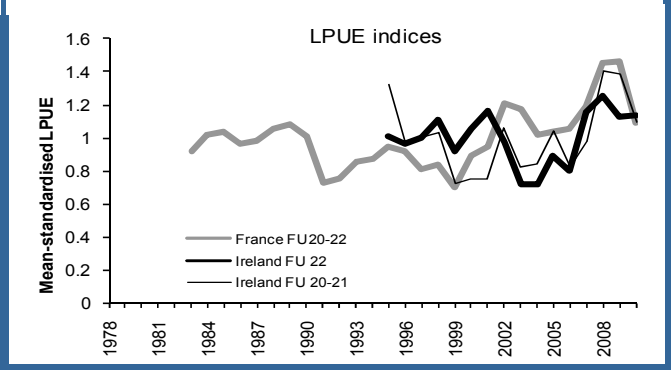
Nephrops off the south-eastern and south-western coasts of Ireland (FU 19)



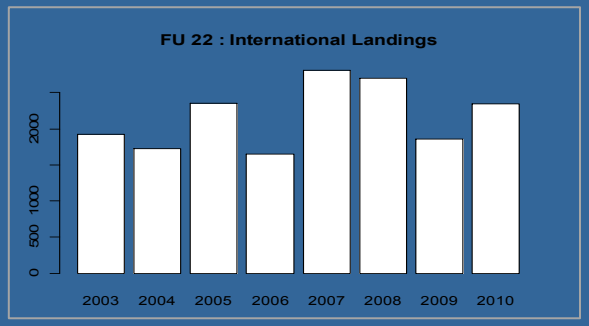
Nephrops in the Celtic Sea (FU 20–22)

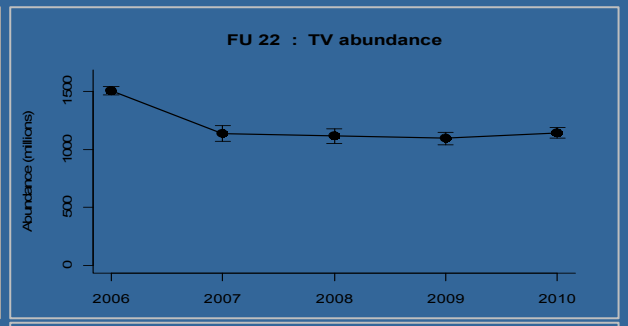


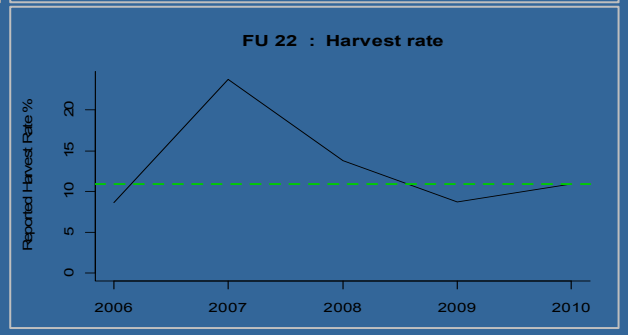




Nephrops in the Celtic Sea (FU 20–22)







ICES
CIEM

Thank you for your attention!
Comments and questions?