North-East Atlantic Commission

NEA(17)10

Presentation of the ICES Advice to the North-East Atlantic Commission

sal.27.neac

Atlantic salmon from Northeast Atlantic

ICES
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Science for sustainable seas

Terms of Reference

- NASCO informed ICES that the results of the NEAC Framework of Indicators applied in January 2017 did not indicate the need to update catch options, hence no new management advice for this fishery was requested by NASCO for 2017.

Revised terms of reference:

- describe the key events of the 2016 fisheries
- review and report on the development of age-specific stock conservation limits including updating the time series of the number of river stocks with established CL's by jurisdiction
- describe the status of the stocks including updating the time series of trends in the number of river stocks meeting CL's by jurisdiction
- provide information on the size, distribution and timing of the blue whiting fishery in the North East Atlantic area and any official observer information relating to bycatch which may indicate possible impact of this fishery on wild salmon

2.1 Key events of the 2016 fisheries

- No significant changes in the gear types used.
- No fishery for salmon has been prosecuted at the Faroes since 2000.
- Reported nominal catch in the NEAC area in 2016 is 1043 t (Tables 1, 2)
  - 187 t in Southern NEAC
  - 856 t in Northern NEAC .

Catches and locations	Southern NEAC	Northern NEAC	Faroes	Total NEAC
2016 reported nominal catch (t)	187	856	0	1043
% of NEAC total	18	82	0	100
Unreported catch (t)	28	270	-	298
Location of catches				
% in-river	42.0	65.8	-	61.6
% in estuaries	19.9	0	-	3.6
% coastal	38.1	34.2	-	34.9

Key events of the 2016 fisheries

- Unreported catches : 298 t in total.
- Location of catches :
  - Southern NEAC : 42% in-river , 20% estuarine, and 38% coastal.
  - Northern NEAC: 66% in-river, 0% estuarine, 34% coastal.

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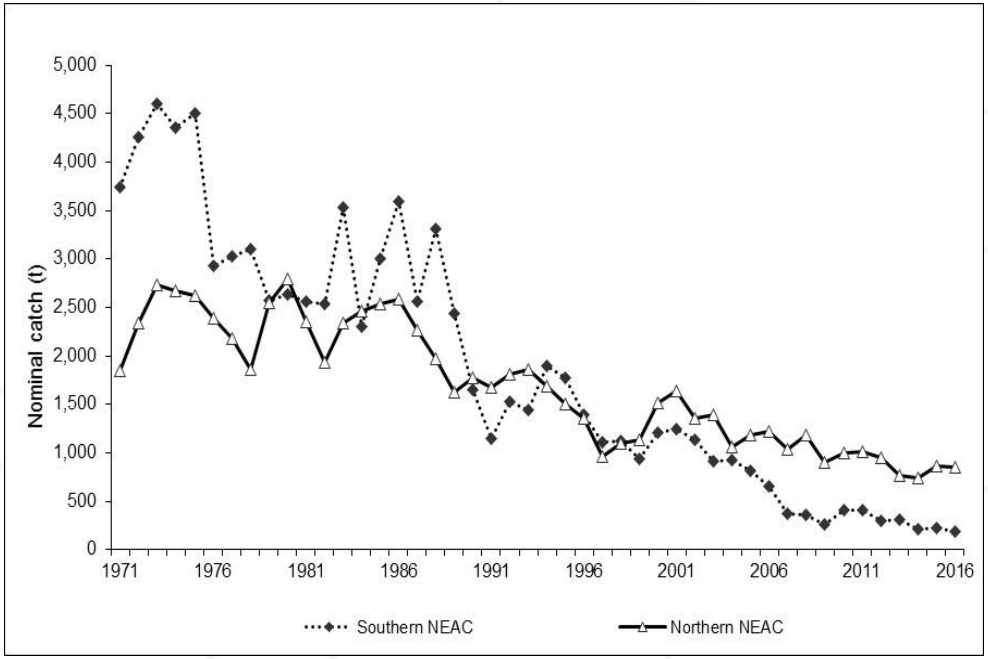
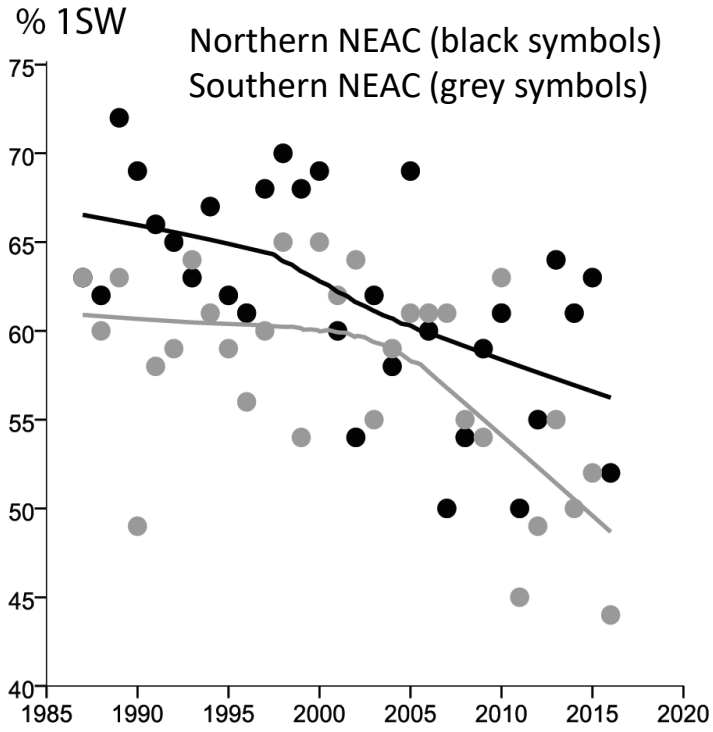
Key events of the 2016 fisheries

- General reduction in catches since the 1980s (Figure 1; Table 2); reflects the decline in fishing effort as a consequence of management measures, as well as a reduction in the size of stocks.
- Nominal catches for 2016 are among the lowest in the time-series in both areas.
- Catch in Southern NEAC, which constituted around two-thirds of the total NEAC catch in the early 1970s, has been lower than that in Northern NEAC since 1999 (Figure 1).



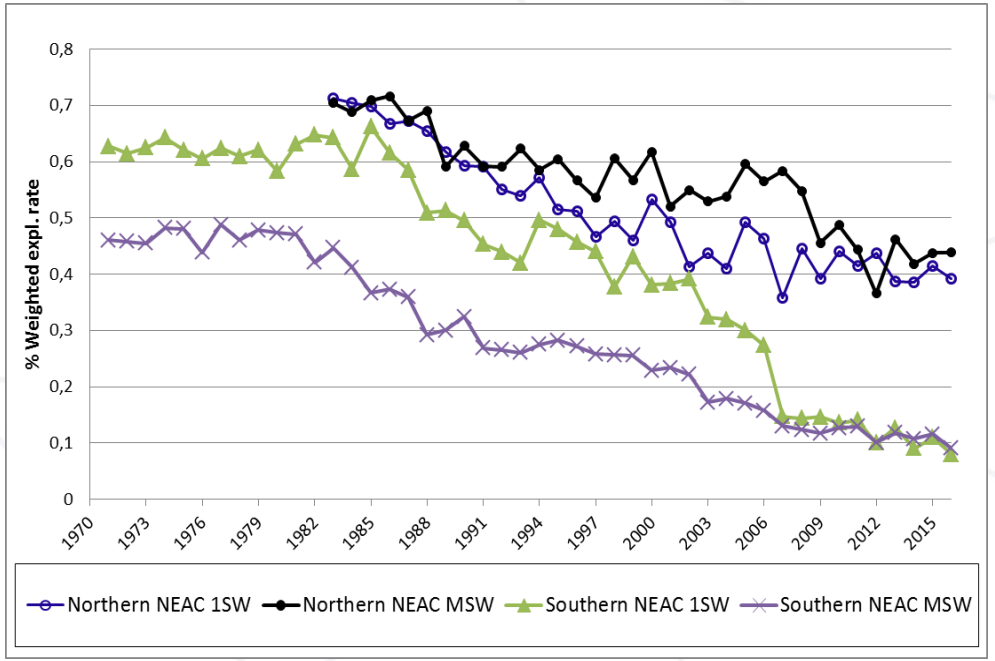
Key events of the 2016 fisheries

- Percentages of catch that are 1SW salmon:
  - Northern NEAC : 52% in 2016 (Figure 2).
  - Southern NEAC : 44% n 2016.
  - Declining trend of 1SW fish in the catch in both areas; reduction for Southern NEAC has been particularly marked in the last 10 to 15 years (Figure 2).



Key events of the 2016 fisheries

- Exploitation rates have been continually decreasing over the time period in both the Northern and Southern NEAC areas (Figure 3).
- Exploitation rates have become similar on 1SW and MSW salmon with higher exploitation rates in Northern NEAC at just over 40% compared to 10% in Southern NEAC.



Origin and composition of the catches

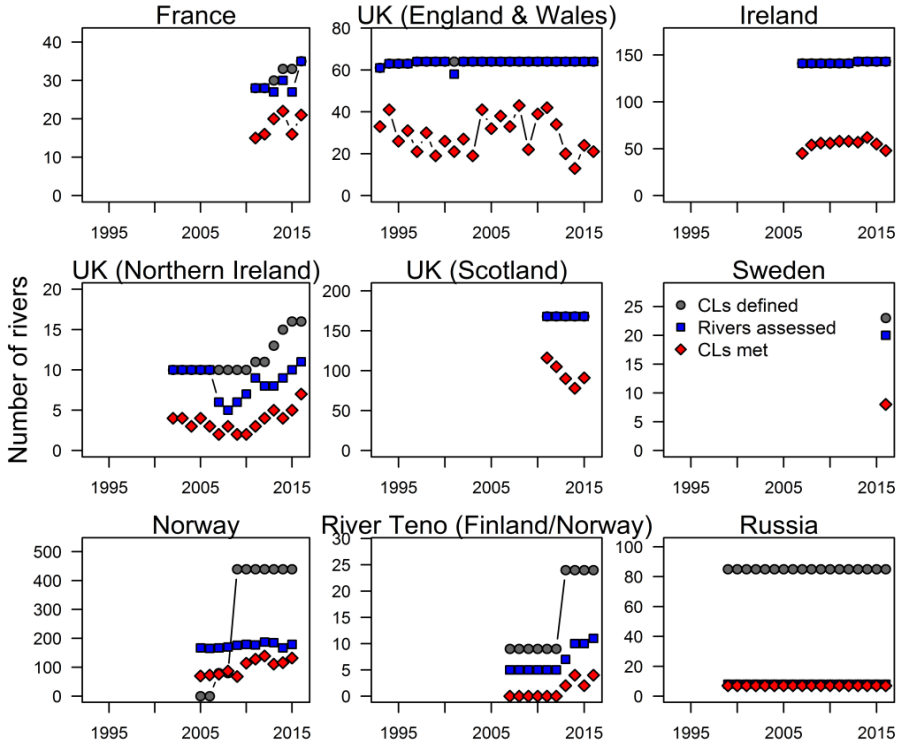
- New information on origin of fish from UK (Scotland) and UK (England and Wales) that are caught in the coastal fishery that operates on the northeast coast of England obtained using genetic stock identification.
  - Results from 2011 samples of catches were in close agreement with previous estimates based on tagging studies and estimates of stock status; small increase in the proportion of salmon from UK (England and Wales) (0.50 to 0.63) and a corresponding small decrease in proportion of salmon from UK (Scotland) (0.50 to 0.37).
- In coastal fisheries in northern Norway (2011 and 2012), the incidence of Russian origin salmon in the catches varied strongly within season and among fishing regions:
  - Averaging 17% in the coastal catches in Finnmark County
  - Nearly 50% in Varangerfjord close to the border.
  - No new information was provided on stock origin in these fisheries from recent years.

2.2 Review and report on the development of age-specific stock conservation limits including updating the time series of the number of river stocks with established CL's by jurisdiction

- River-specific conservation limits (CLs) derived for salmon stocks in most countries in the NEAC area (France, Ireland, UK (England and Wales), UK (Northern Ireland), Finland, Norway, and Sweden).
- Preliminary results available for a small number of rivers in Russia.
- In UK (Scotland) stocks are assessed against CLs at the scale of individual rivers or groups of small rivers.
- Where sufficient numbers of CL estimates are available for individual rivers, these are summed to provide estimates at a country level. For countries that do not have sufficient river-specific CLs (Russia, UK (Scotland) and Iceland), an interim approach based on the establishment of pseudo-stock–recruitment relationships for national salmon stocks has been developed.

Update of time series of the number of river stocks with established CL's by jurisdiction

- For nine jurisdictions, time-series indicating definition of river-specific CLs, number of rivers annually assessed against CLs, and number of rivers that annually meet or exceed CLs (based on spawners) are provided in Figure 4.
- Figure illustrates the increase in the number of CLs established within individual jurisdictions and the increasing number of jurisdictions (nine as of 2016) with CLs defined.

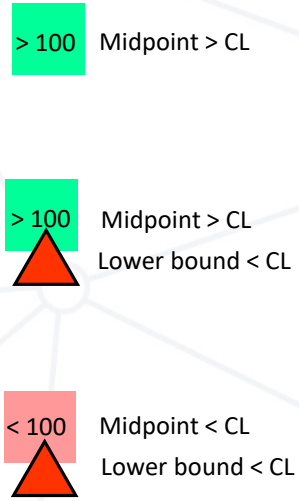


2.3 Status of stocks including updating the time series of trends in the number of river stocks meeting CL's by jurisdiction

- National stocks within NEAC are combined into two groups for the provision of management advice for the distant-water fisheries at West Greenland and the Faroes.
  - Northern group (Northern NEAC) : Russia, Finland, Norway, Sweden, and the northeastern regions of Iceland.
  - Southern group (Southern NEAC) : UK (Scotland), UK (England and Wales), UK (N. Ireland), Ireland, France, and the southwestern regions of Iceland.
- Assessments by NEAC subarea are provided for two sea age groups : 1SW and MSW salmon
- Recruitment, (pre-fishery abundance ; PFA) : abundance at 1 January of first winter at sea
  - by sea age group (maturing 1SW and non-maturing 1SW (MSW) salmon) and
  - by stock complex (Northern NEAC and Southern NEAC) and individual country
  - interpreted relative to the spawner escapement reserve (SER; CL adjusted for natural mortality)

2.3 Status of stocks including updating the time series of trends in the number of river stocks meeting CL's by jurisdiction

- full reproductive capacity : if the lower bound of the 90% confidence interval of the estimate of spawners is above the CL (equivalent to a probability of at least 95% of meeting the CL).
- at risk of suffering reduced reproductive capacity: if the lower bound of the confidence interval is below the CL, but the midpoint is above the CL.
- suffer reduced reproductive capacity: if the midpoint is below the CL.



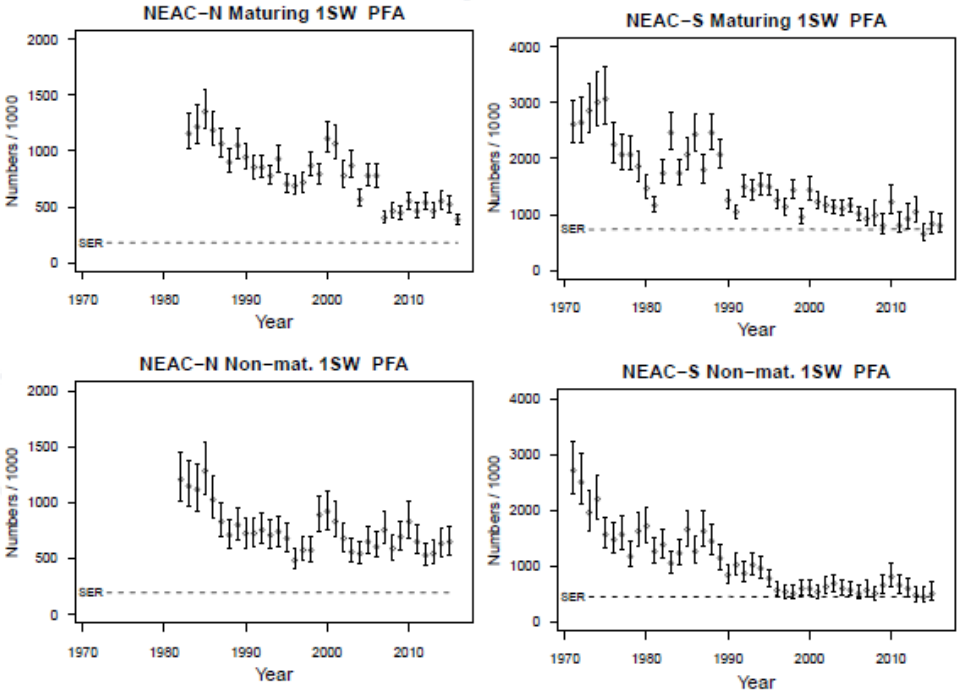
Status of stocks – prefishery abundance relative to SER

Northern NEAC (left panels)

- PFAs of maturing 1SW and non-maturing 1SW show general decline over time period; more marked decline in maturing 1SW stock (Figure 5).
- Both sea age complexes at full reproductive capacity (i.e. meeting the SER with at least 95% probability) throughout the time-series.

Southern NEAC (right panels)

- Both sea age complexes at full reproductive capacity in early part of time-series.
- In half the years since mid-1990s, non-maturing 1SW has been at risk of suffering reduced reproductive capacity.
- Maturing 1SW stock at risk of or suffering reduced reproductive capacity since 2009.



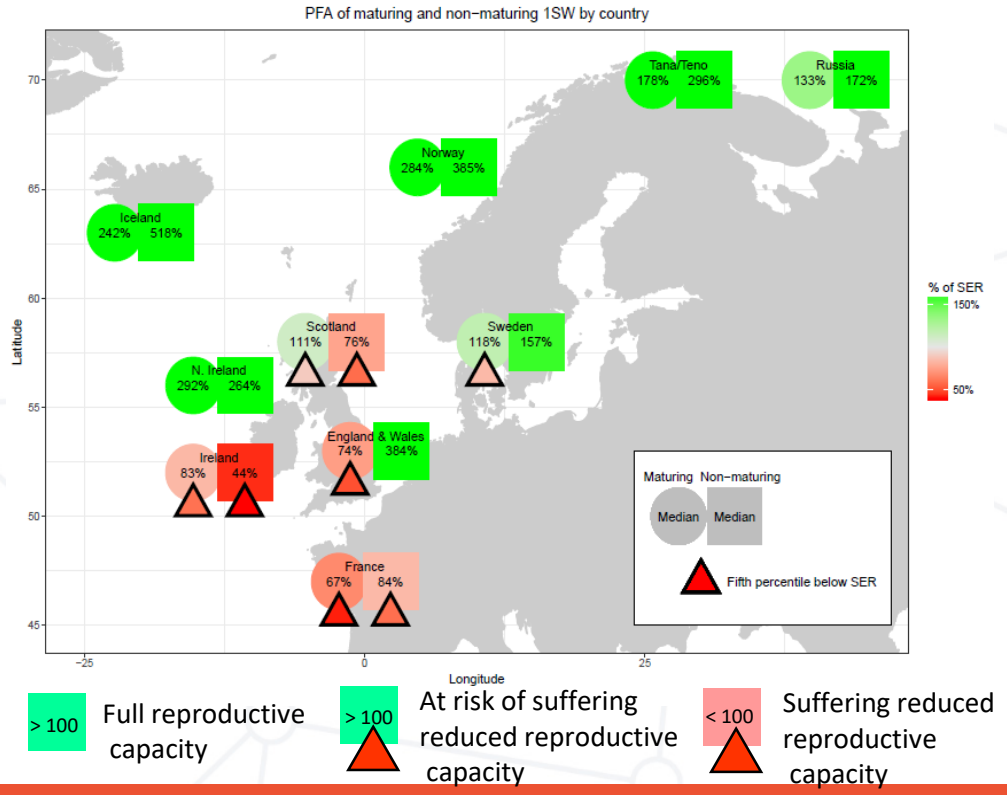
Status of stocks – prefishery abundance relative to SER, by country (Figure 6)

Northern NEAC in 2015 :

- maturing 1SW and non-maturing 1SW salmon at full reproductive capacity with exception of Sweden (maturing 1SW at risk of suffering reduced reproductive capacity).

Southern NEAC in 2015 :

- with exception of UK (N. Ireland), maturing 1SW at risk of (UK (Scotland)) or suffering reduced reproductive capacity.
- Non-maturing 1SW salmon, stocks in UK (Scotland), France, and Ireland are at risk of suffering reduced reproductive capacity, others are at full reproductive capacity.



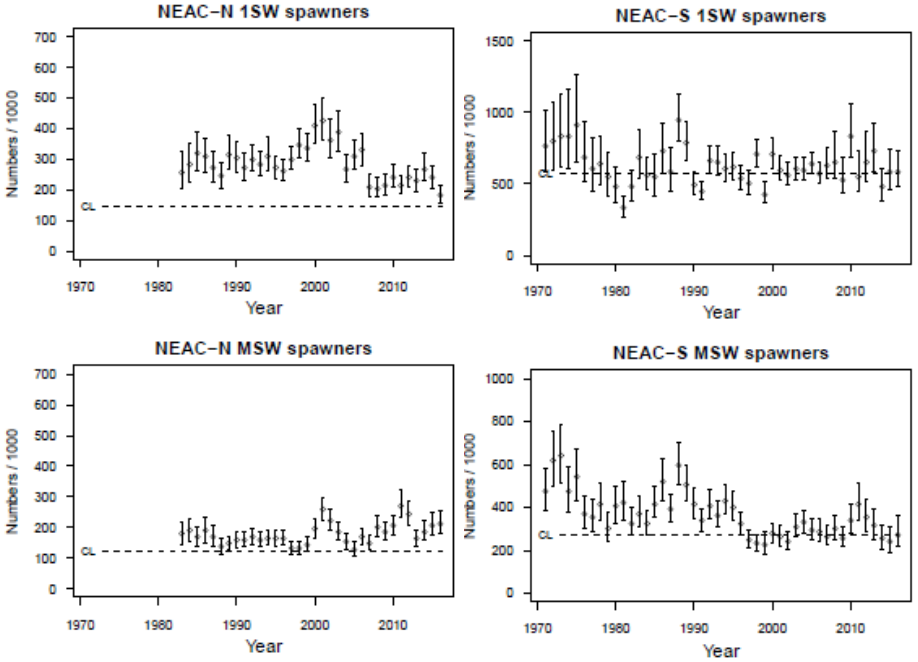
Status of stocks – spawners relative to CLs (Figure 5)

Northern NEAC (left panels)

- 1SW at full reproductive capacity throughout the time-series but at reduced levels since 2007. MSW spawners generally at full reproductive capacity with limited periods at risk of suffering reduced reproductive capacity. Since 2000, MSW spawners generally above values in early part of the time-series.

Southern NEAC (right panels)

- 1SW spawners at risk of or suffering reduced reproductive capacity for most of the time-series. MSW spawners at full reproductive capacity until 1996; afterward, either at risk of suffering reduced reproductive capacity or suffering reduced reproductive capacity almost every year.



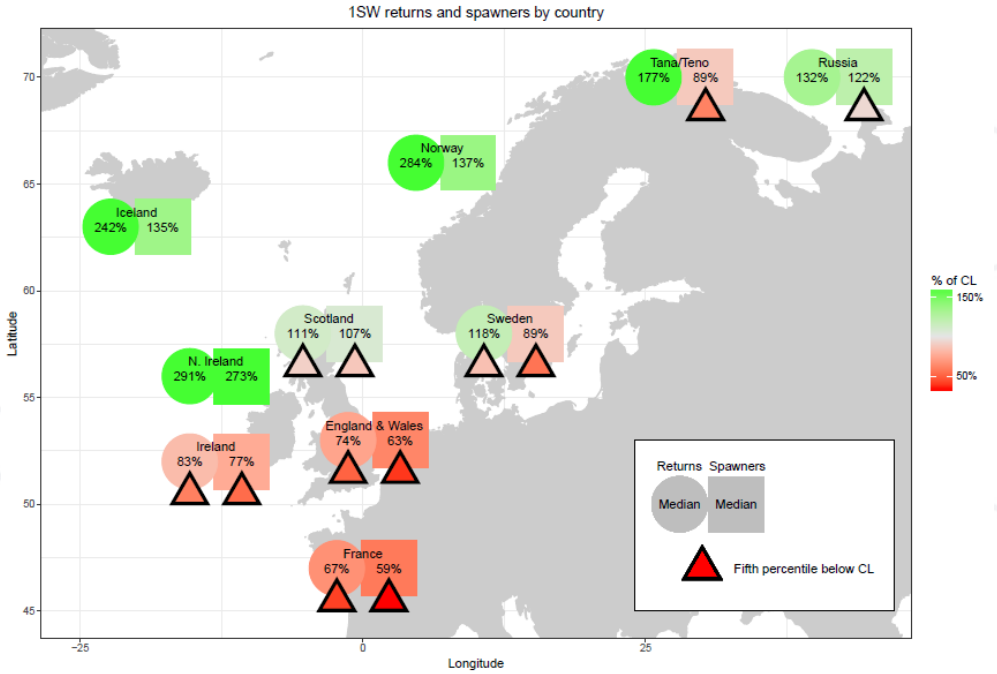
Status of stocks – 1SW spawners relative to CLs, by country (Figure 7)

Northern NEAC in 2016 :

- 1SW spawners at full reproductive capacity for Iceland and Norway, at risk of (Russia) or suffering (Sweden, Teno/Finland) reduced reproductive capacity

Southern NEAC in 2016 :

- with exception of UK (N. Ireland), maturing 1SW spawners at risk of (UK (Scotland)) or suffering reduced reproductive capacity.



> 100 Full reproductive capacity

> 100 At risk of suffering reduced reproductive capacity

< 100 Suffering reduced reproductive capacity

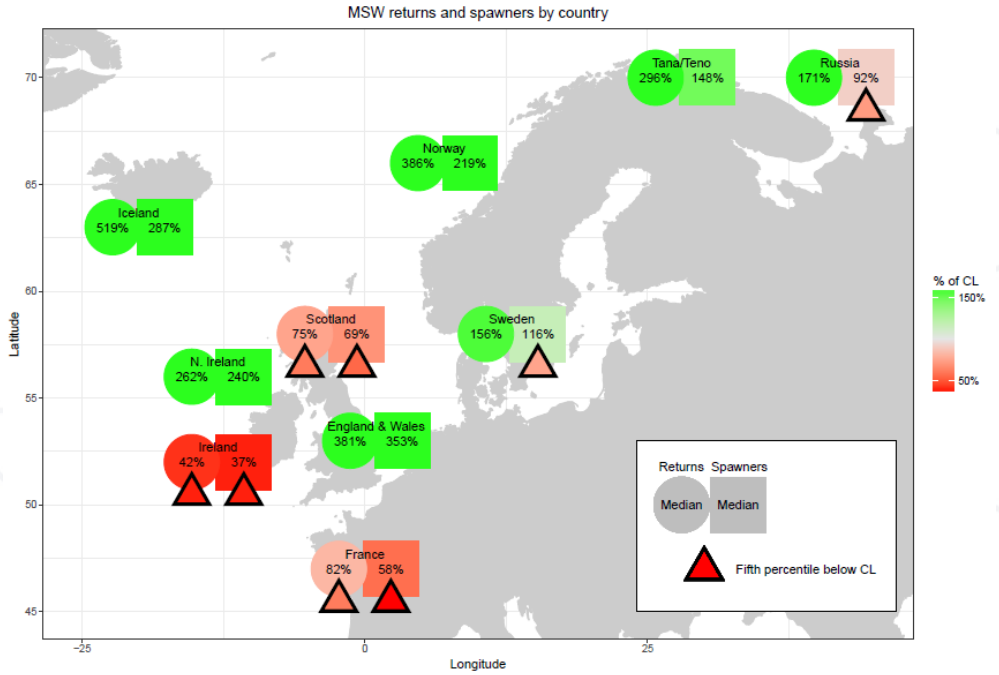
Status of stocks – MSW spawners relative to CLs, by country (Figure 8)

Northern NEAC in 2016 :

- MSW spawners at full reproductive capacity with exception of Sweden (at risk of) and Russia suffering reduced reproductive capacity.

Southern NEAC in 2016 :

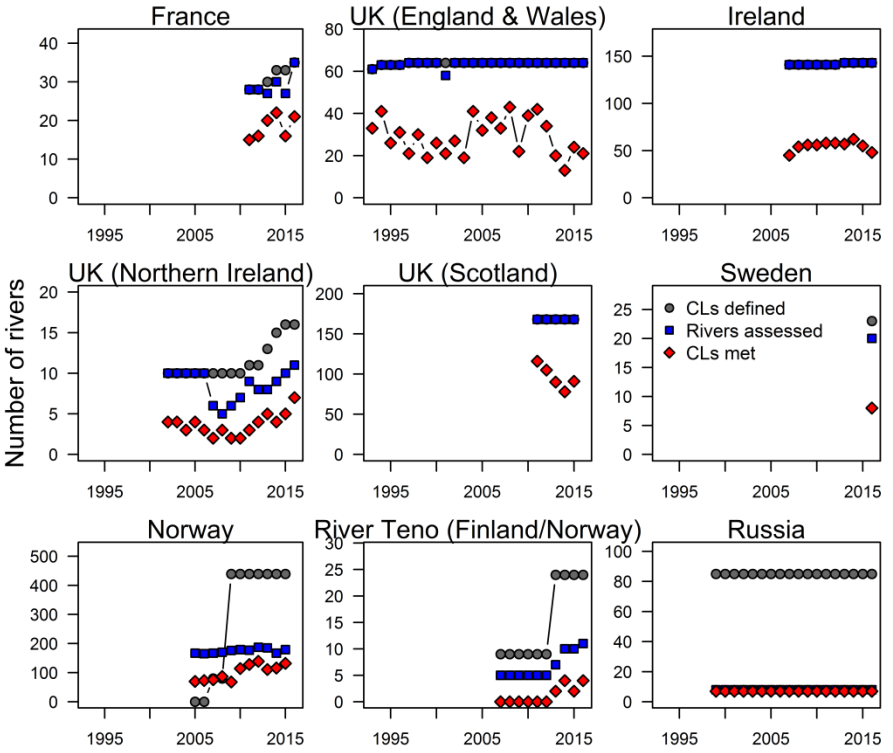
- MSW spawners in UK (England and Wales) and UK (N. Ireland) at full reproductive capacity; spawners in France, Ireland, and UK (Scotland) suffering reduced reproductive capacity.



Status of stocks – trends in attainment of CLs (Figure 4)

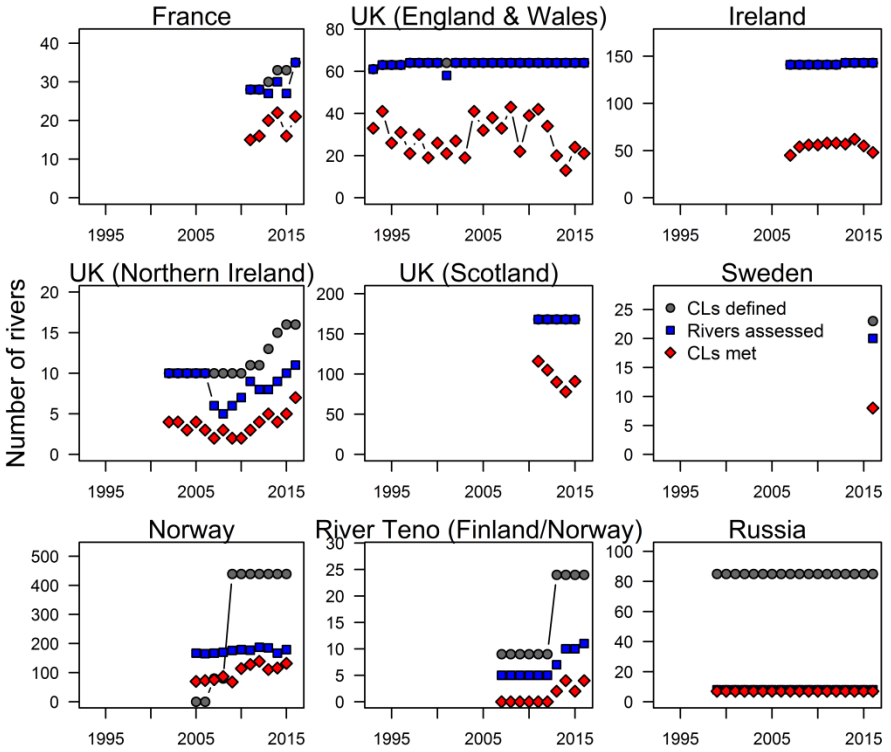
Attainment of CLs assessed based on spawners.

- France: percentage of stocks meeting CLs peaked in 2013 at 74%, declining to 60% in 2016.
- UK (England and Wales) : since 1995, mean of 46% of the rivers met CLs, but with downward trend from 2011 to 2016.
- Ireland: mean percentage of stocks meeting CLs 34% over the time-series, peak of 43% in 2014 and decline since.
- UK (N. Ireland): mean of 43% of rivers met CLs and upward trend from 2011, 64% of the assessed stocks attaining CLs in 2016.



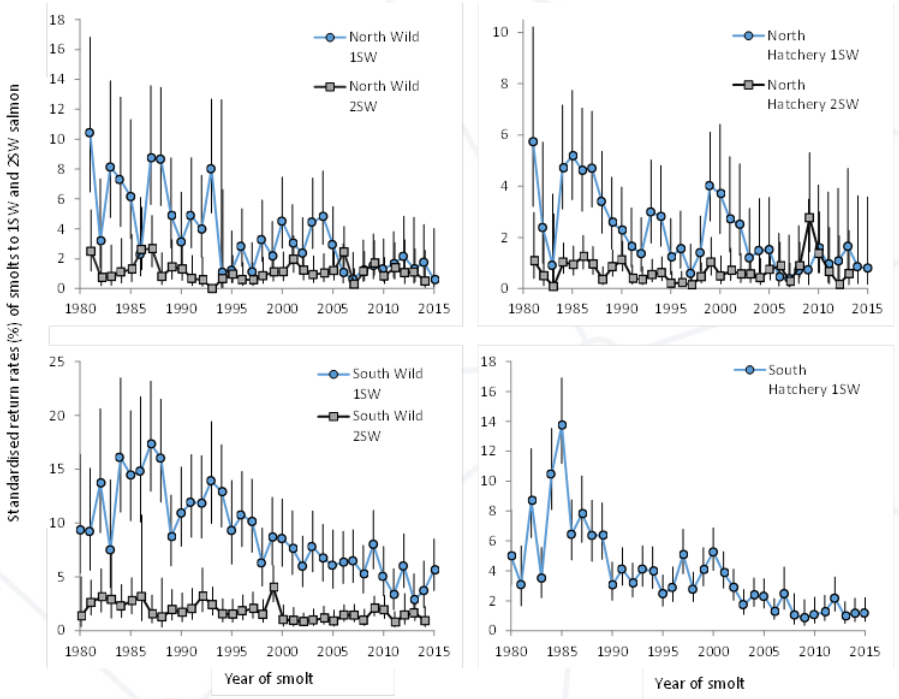
Status of stocks – trends in attainment of CLs (Figure 4)

- UK (Scotland) : retrospective assessment conducted to 2011 indicated 57% mean attainment over the time-series. Progressive decline from 2011 (69%) to 2014 (46%), upturn to 54% in 2015.
- Norway : overall increasing trend in CL attainment, 39% of the assessed stocks in 2009 to 74% in 2015.
- River Teno (Finland/Norway) : none met CLs prior to 2013; since 2014, 20% to 40% met CLs.
- Russia (Murmansk region) : 88% of the assessed stocks have consistently met their CLs.



Status of stocks – return rates (Figure 8)

- Overall declining trend since 1980 of both wild and hatchery-origin smolts to 1SW returns for both Northern and Southern NEAC areas
- Results are consistent with the information on estimated returns and spawners as derived from the PFA model; returns are strongly influenced by factors in the marine environment.
- Declining trend not evident for 2SW wild components in either area, or for hatchery-origin smolts to 2SW in Northern NEAC.



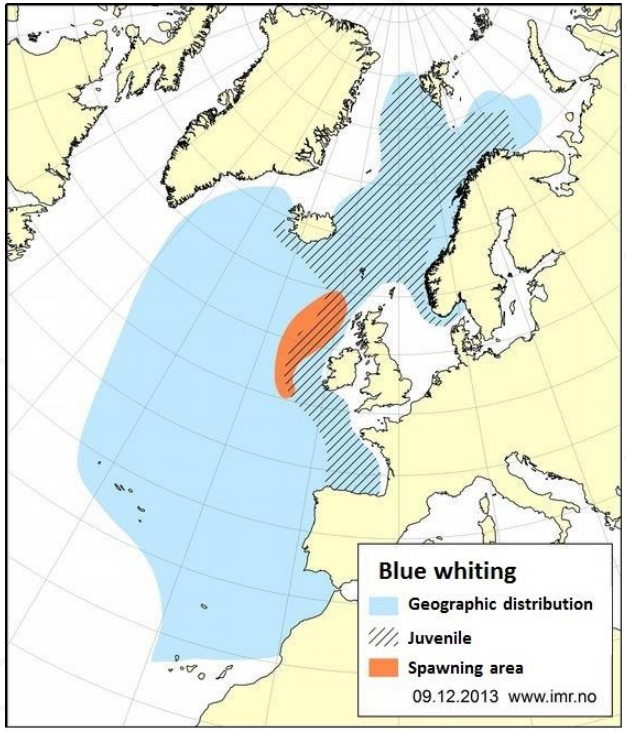
Status of stocks - Conclusion

- Despite management measures aimed at reducing exploitation in recent years, there has been little improvement in the status of stocks over time.
- This is mainly a consequence of continuing poor survival in the marine environment.

2.4 provide information on the size, distribution and timing of the blue whiting fishery and official observer information relating to bycatch which may indicate possible impact of this fishery on wild salmon

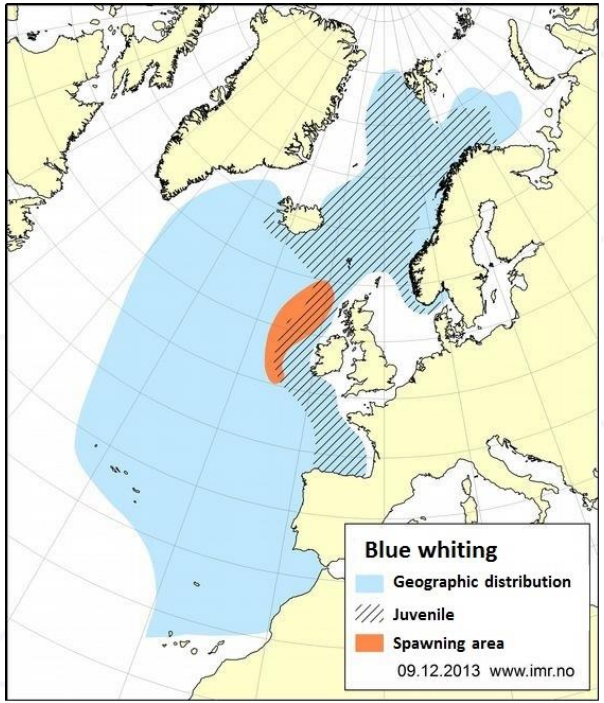
Background information

- Blue whiting (*Micromesistius poutassou*) is a small pelagic fish which spawns to the west of the British Isles in February and March.
- After spawning the fish disperse to feeding areas which covers a large part of the northeast Atlantic, but with most fish concentrated in the Norwegian Sea and the surrounding areas.



Size, distribution and timing of the blue whiting fishery

- Main fishery occurs at the spawning grounds when the fish are aggregated
- In January, southeast of the Faroes Islands, fish migrating southwards to the spawning areas.
- In February and March, the fishery moves to the west of Ireland and in April is located to the north and west of UK (Scotland).
- Interannual variation in the areas fished depending on the geographic distribution of spawning fish, nonetheless, the fishery occurs prior to smolt migration from rivers and distribution in northeast Atlantic feeding areas.

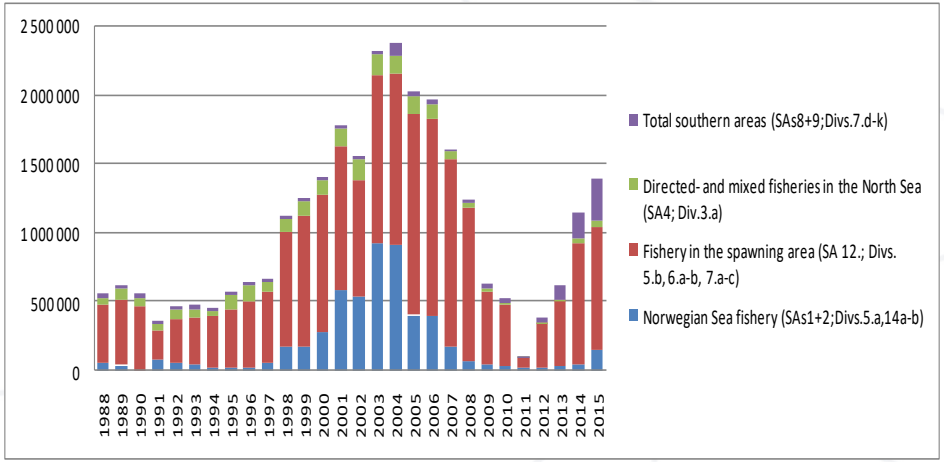


Size, distribution and timing of the blue whiting fishery

- Vessels are ocean-going trawlers capable of operating large pelagic trawls.
- Fleet concentrates fishing effort on large aggregations of fish, often found close to the continental slope and typically at depths of 250 to 600 m.
- Single catch can be as high as 800 tonnes and each vessel can store around 2000 tonnes.
- Most of the blue whiting are used for fishmeal production.

Size, distribution and timing of blue whiting fishery

- Largest landings in 2003 and 2004, with annual catches of more than 2 million tonnes (Figure 11).
- Annual landings fluctuated in recent decades, mainly due to natural fluctuations in stock biomass.
- A spring and summer fishery operated in years when coastal states did not agree on a management plan.
  - Blue whiting feeding in the Norwegian Sea were targeted; fish are more widely distributed and do not occur in the dense aggregations, fish are higher in the water column .
  - Longer trawling times and nets typically fished at depths of 50 to 400 m.



Information about the potential bycatch of salmon in blue whiting fishery

- ICES Secretariat queried relevant ICES expert group members from the main countries participating in the blue whiting fishery (Norway, Netherlands, Germany, and the Faroe Islands)
  - None of the representatives knew of any reports of bycatch of salmon in the fishery or had any data that might indicate that such bycatch had taken place.
- Information from screening programmes for blue whiting in the Icelandic EEZ.
  - Observers examined a portion of the catch of blue whiting for bycatch as it was landed.
  - In 2016, no Atlantic salmon were detected from these samples.
  - In 2015, 5 kg of Atlantic salmon were recorded as bycatch

Information about the potential bycatch of salmon in blue whiting fishery

- Information from investigations in Norway.
  - Fishers who collaborate with the Institute of Marine Research in Norway responded that they had not experienced bycatch of salmon in the blue whiting fishery (bycatch reported in mackerel and herring fisheries).
  - Norwegian Directorate for Fisheries: no formal reports of bycatch of salmon in blue whiting fishery by Norwegian vessels. Screening of blue whiting landings in 2012 to 2014, and partly in 2015, had not revealed any bycatch of salmon.
  - Norwegian reference fleet: subset of the fleet reporting detailed information about commercial catches, fishing effort, and bycatch.
    - Data from 2008 to 2016, > 200 commercial blue whiting catches (each > 1000 kg) from spawning grounds and the feeding areas.
    - No records of any salmon taken as bycatch.
    - Fleet targeting saithe, haddock, cod, ling, herring, capelin and/or redfish reported ~ 20 instances of salmon bycatch; size of bycaught salmon ranged from 0.4 to 7.1 kg.

Conclusions on bycatch of salmon in blue whiting fishery

- None of the information available to ICES suggests that salmon is a frequent bycatch in the blue whiting fishery
  - Much of blue whiting catch taken prior to salmon smolts emigrating to sea.
  - Blue whiting mainly captured at depth, while salmon are generally distributed in shallower waters.

Conclusions on bycatch of salmon in blue whiting fishery

Uncertainties remain.

- Essentially, there have not been independent observers on vessels during the fishery.
- Screening poses substantial practical and logistic difficulties
  - detecting small numbers of salmon in blue whiting catches > 2000 tonnes would be challenging
  - post-smolts and blue whiting are about the same size and fairly similar in appearance
- However, main portion of the fishery occurs in February and March
  - time at which there are no post-smolts at sea
  - any bycatch of salmon would be of adult size that would be more detectable by the fishing fleets.
- Detection of bycatch in the May–June fishery in the Norwegian Sea would be more challenging and post-smolts may be vulnerable in that time and location.

2.5 Relevant data deficiencies, monitoring needs, and research requirements

- The continuation and expansion of tracking programmes would be useful in the assessment of marine mortality on North Atlantic salmon stocks.
- In order to fully consider a life cycle model as an improvement and alternative to the current assessment and forecast model used for providing catch advice, improvements to data inputs and the incorporation of a number of alternative life history dynamics need to occur well ahead of the 2018 ICES meeting.
    - A workshop of jurisdictional experts should be convened to review current national input data in the light of reductions in fisheries, to incorporate improved data inputs and alternate population dynamic functions, to enable the running of the inference and forecast components, and to develop documentation related to the model.

Annexes

- Annex 1: glossary of terms
- Annex 2: general considerations, as per standard ICES advice

Acknowledgements

- Members of the ICES Working Group on North Atlantic salmon from 17 countries in the North Atlantic, and supporting scientific staff