Council

CNL(16)64

Presentation of the ICES Advice to the Council

REPORT OF ICES ADVISORY COMMITTEE

ON

NORTH ATLANTIC SALMON STOCKS

TO

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

June 6 to 9, 2016

CNL(16)9

Advice generated by ICES in response to terms of reference from NASCO

10.1 North Atlantic – catches, new threats/opportunities, other questions and research

10.2 North East Atlantic Commission – key events, catches, age-specific stock conservation limits, stock status, uncertainty and possible bias in the assessment of catch options for the Faroes catch advice

10.3 North American Commission – key events, catches, age-specific stock conservation limits, stock status

10.4 West Greenland Commission – key events, catches, stock status, contemporary and historical indices of salmon abundance, effects of modified fishery timing, temporal and spatial fishery patterns

Advice generated by ICES in response to terms of reference from NASCO

10.1 With respect to salmon in the North Atlantic:

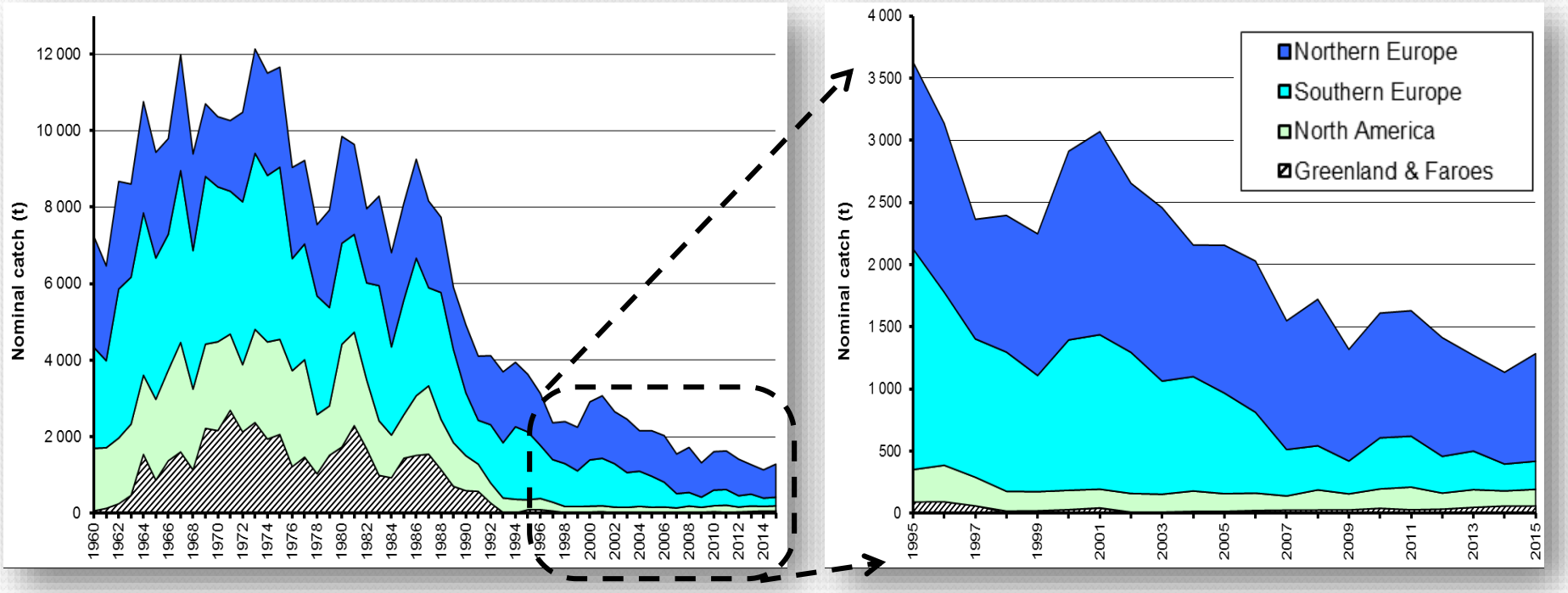
1. Provide an overview of salmon catches, unreported catches, catch and release, and production of farmed and ranched Atlantic salmon
2. Report on significant new or emerging threats to, or opportunities for, salmon conservation and management
3. Provide a review of examples of successes and failures in salmon restoration and rehabilitation and develop a classification of recommended activities under various conditions
4. Advise on possible effects of salmonid aquaculture on wild salmon: effects of sea lice; genetic interactions; wild salmon production
5. Provide a time series of the number of river stocks with conservation limits (CLs) and trends in numbers meeting CLs by jurisdiction
6. Provide a compilation of tag releases by country in 2015
7. Summary of data deficiencies, monitoring needs and research requirements

1. Overview of salmon catches

Nominal catch in 2015 in the North Atlantic = 1285 tonnes

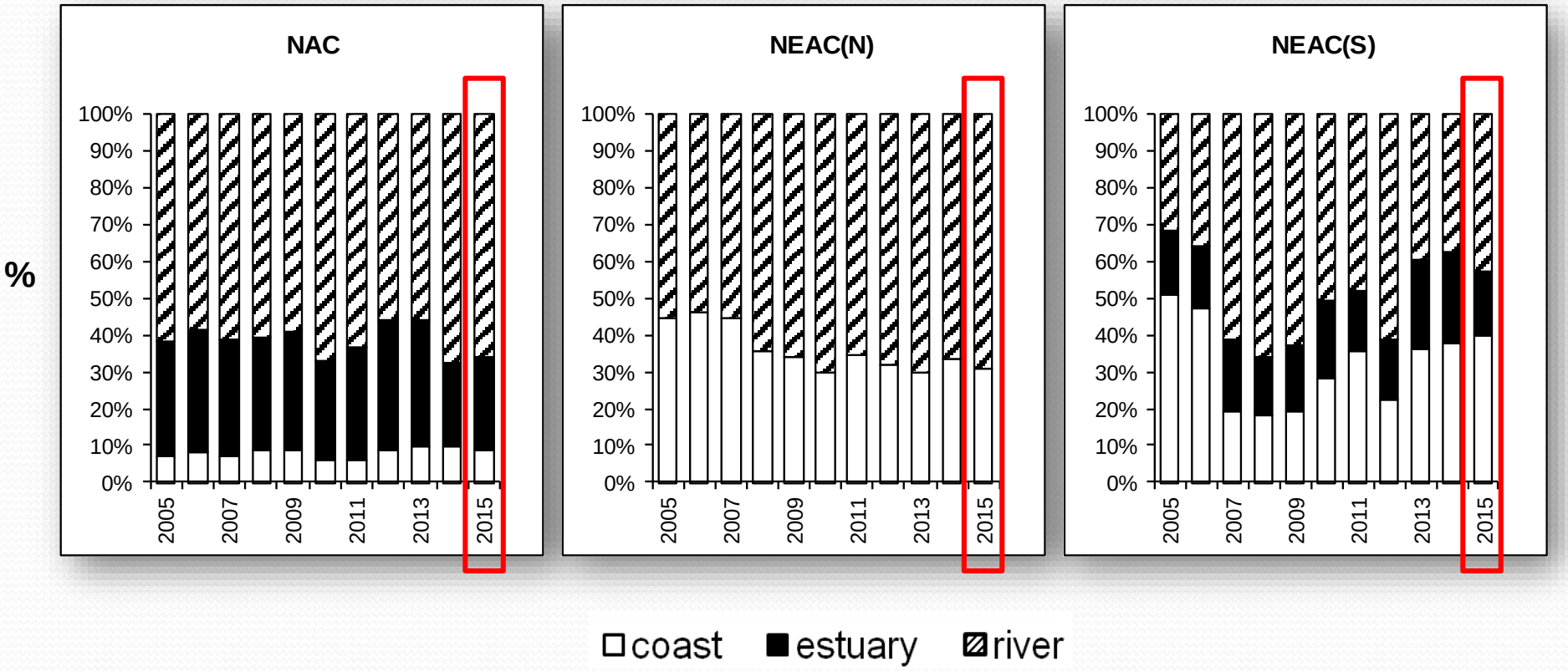
	NAC	W. Greenland	S. NEAC	N. NEAC	(NEAC Total)	N. Atlantic
Catch	**137 t**	**57 t**	**226 t**	**865 t**	**(1091 t)**	**1285 t**
% of annual	10%	5%	19%	66%	(85%)	
Lowest*	5th	19th	2nd	3rd	(3rd)	3rd

*Rank in 56 year time series



1. Partitioning of nominal catch by fishing location

- Majority of nominal catch in 2015 was taken in rivers
- Higher proportion of catches from coastal areas in NEAC compared to NAC; higher proportion from rivers in NAC



1. Nominal catch by fishing location

North American Commission

- Total catch relatively constant 2005-2015
- Relatively small coastal catch
- Majority taken in river fisheries

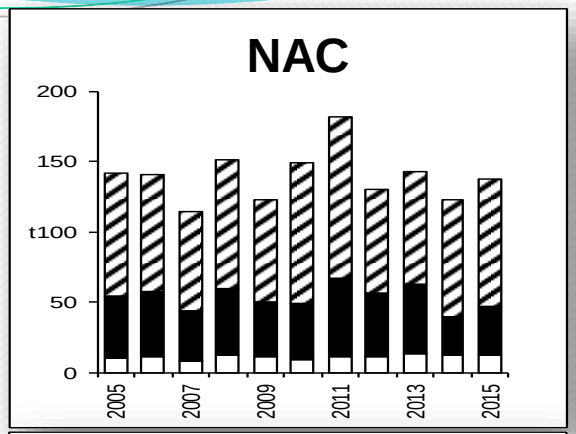
Northern NEAC

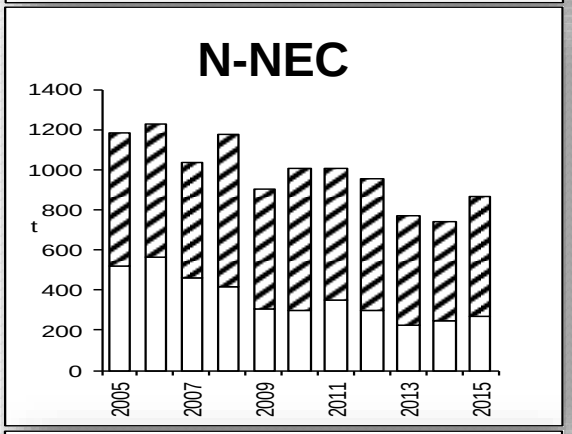
- Mainly river & coastal fisheries
- Negligible estuary catch
- Increasing % in rivers; reducing % on coast

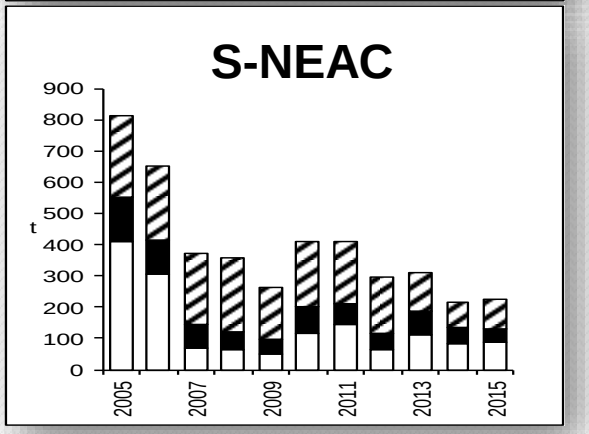
Southern NEAC

- Decline in coastal fisheries
- Since 2007, largest proportion taken in rivers

Northern NEAC	Southern NEAC
Finland	Ireland
Norway	France
Russia	UK (Scotland)
Sweden	UK (Northern Ireland)
Iceland (north-east regions)	UK (England & Wales)
	Iceland (south-west regions)





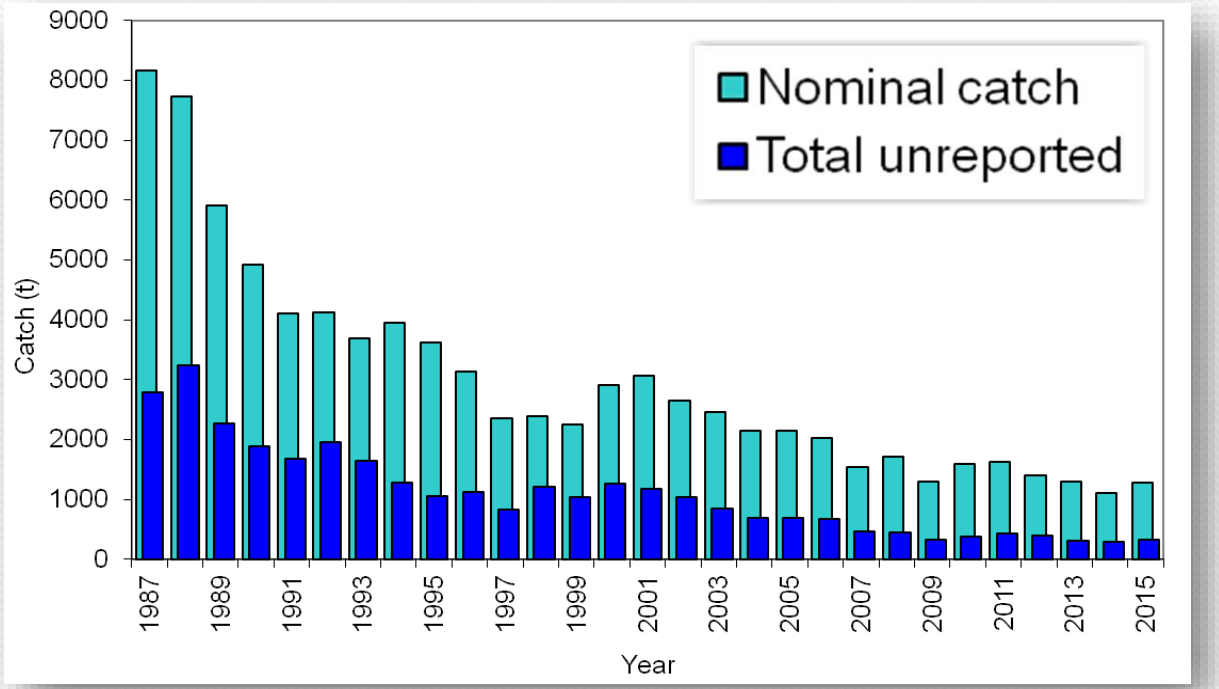


1. Unreported Catches

	NAC	NEAC	WGC	Total
2015	**17 t**	**298 t**	**10 t**	**325 t**
2014	21 t	256 t	10 t	287 t

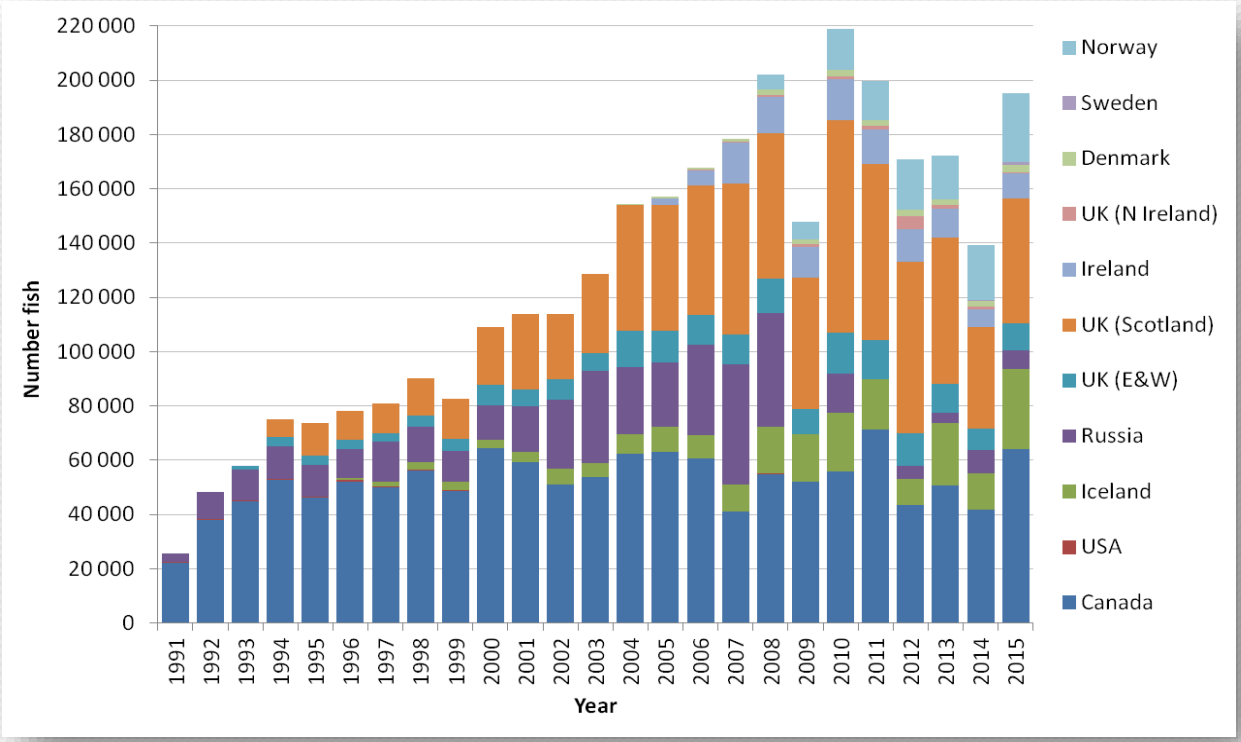
- No unreported estimates from Russia, Saint Pierre & Miquelon or Spain in 2015
- Unreported catches declined from peak values (~3,000 t) in late 1980s to ~700 t in 2005-2006 (last years when reports available from all areas)
- Unreported catch 19-34% of total catch between1987 and 2011 – 20% in 2015

Illegal net seized in UK (England & Wales)
photo courtesy of Environment Agency



1. Catch and release (C&R) fishing

- C&R figures are not included in nominal catch
- Practice increasing: 9 countries reporting in 2015; also practiced in some other countries, though not reported
- Ranged from 19% (Norway & Sweden) to 84% (UK-Scotland)
- Data incomplete for many countries, as not a reporting requirement
- In 2015 >195 000 fish released (4th highest in 25 yrs; highest in 2010 >218 000)

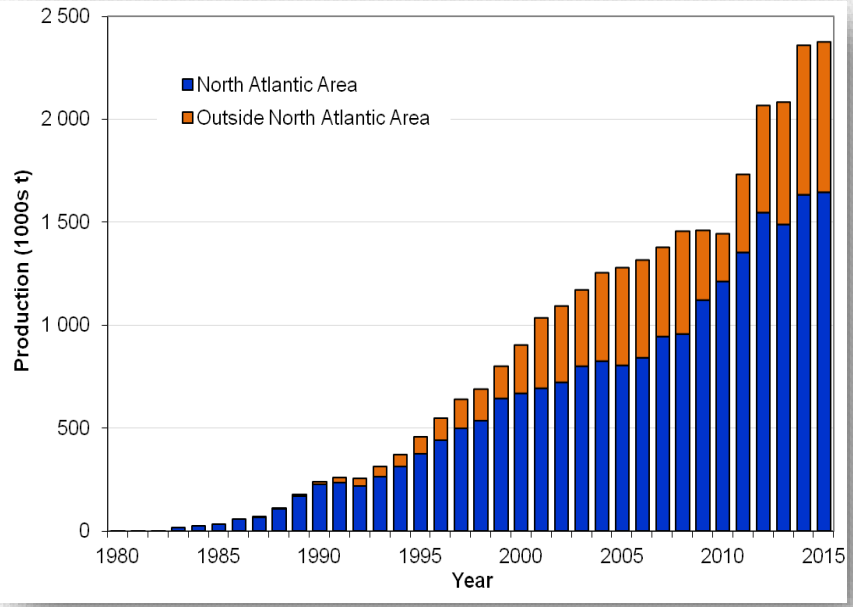


1. Farming and Sea Ranching

Farmed production in 2015

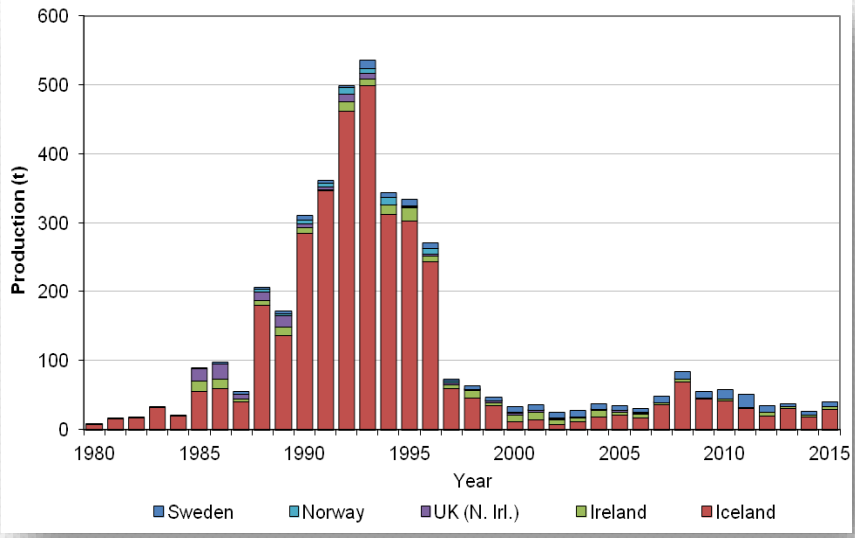
- North Atlantic = 1648 kt (72% of global)
  80% Norway; 11% UK (Scotland)
- Worldwide = 2374 kt
  > 1 million t produced since 2001
  > 2 million t since 2012

Nominal catch in 2015 ~ 0.05%
of global farm production



Sea ranching in 2015

- 40t (27t in 2014) Iceland, Sweden, Ireland
- Very small quantities elsewhere - no data

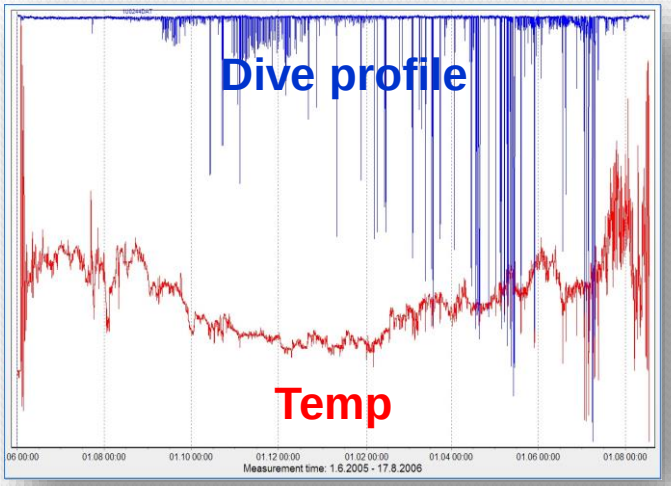


2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Ocean migration and feeding areas of Data Storage Tagged (DST) Icelandic hatchery smolts Guðjónsson *et al.* (2015) Can. J. Fish. Aquat. Sci. 72:1087-1098

- Little known of Icelandic salmon marine feeding areas since closure of ocean fishery - 1932
- 2005-2006: 598 hatchery smolts released in west Iceland with internal DSTs, measuring depth & temperature at 1 hour intervals
- Five returned in 2006 and two in 2007: (6 full data and 1 partial data)

- Depth: Close to surface; some diurnal behaviour; deeper dives during day light
- Short-deep dives (>100 m) during later part of ocean migration
- Sea surface temperatures from 6 to 15°C
- Temperature & solar noon used to estimate locations (using “Hidden Markov Model for fish geolocation” inc. est. swim speeds)

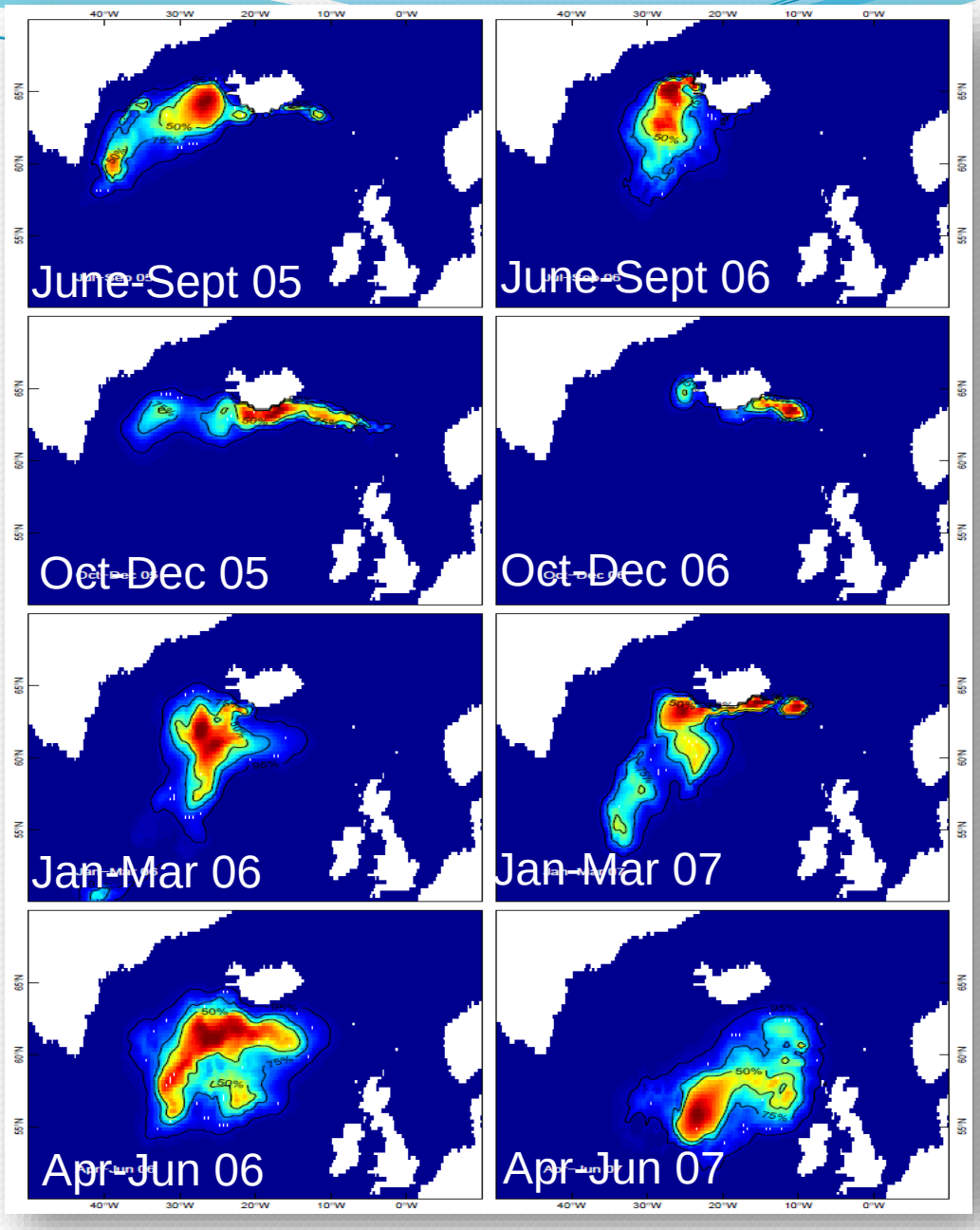


Probability densities of likely locations for each year quartile:

- Summer - southwest of Iceland
- Autumn - migrating east: Faroes
- Late winter - south & west (back to the Irminger Sea)
- Returned back to river

Results support use of DST to study migration, behaviour and feeding areas of salmon at sea

Hidden Markov Model for fish geolocation inc. est. swim speeds

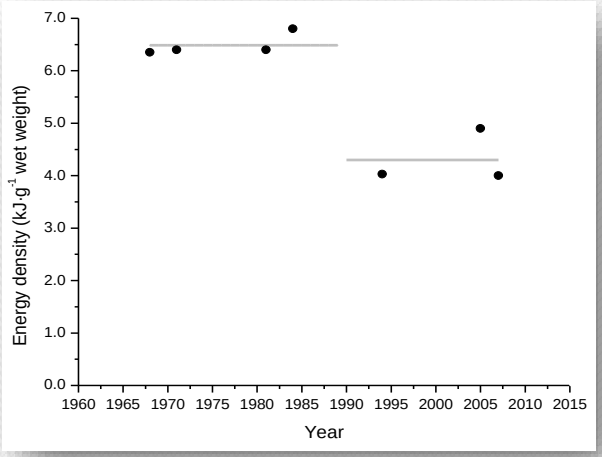


2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Changing trophic structure and energy dynamics in the Northwest Atlantic: implications for Atlantic salmon feeding at West Greenland

Renkawitz *et al.* (2015) *Marine Ecology Progress Series* 538:197-211

- Changes in climate forcing and energy cascades through the Atlantic ecosystem have caused a phase shift in productivity, altering trophic pathways, influencing growth, survival and abundance of many species, including Atlantic salmon (Chaput *et al.*, 2005; Mills *et al*., 2013)
- To investigate possible effects on salmon: contemporary stomachs contents (2006 and 2011) compared with historic estimates (1960s – 70s)
- Primary prey (contemporary and historic): capelin (*Mallotus villosus*) and amphipods (*Themisto* sp.) > 60% diet
- Contemporary samples 12% less total biomass & 21% less capelin biomass
- From 1968 to 2008 size of capelin decreased by 12% and energy content by ~34%
- Estimates of total energy consumption: lower by 20–58% (contemporary: historic)



Capelin energy density estimates pre (6.49 kJ/g) and post (4.30 kJ/g) 1990
Lines = period means

- **Higher trophic level productivity (inc. salmon) impacted by changes to capelin in the NW-Atlantic**

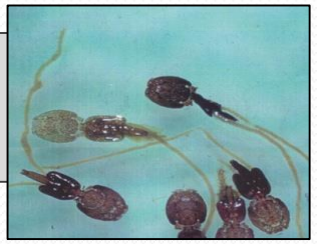
2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Diseases and parasites:
Update on Red Vent Syndrome (RVS or Anisakiasis)

- Reports since 2004 (NEAC & NAC) of salmon returning with swollen / bleeding vents
- Linked to the presence of the nematode worm, *Anisakis simplex* (Beck *et al*., 2008)
  - 2007: Regions within NEAC observed notable increases
  - 2008: Levels in NEAC typically reduced
  - 2013: Reports form UK (England & Wales) and France suggested increases again
- 2015: UK (England & Wales) levels on the rivers Tyne and Dee were at or close to the highest values recorded. On the river Lune - lower end of observed levels (small *n*)
- 2015: Ireland, reports of a high prevalence in the Galway weir salmon fishery
- No clear indication that RVS affects survival or spawning success
- Indications of progressive healing in freshwater (ICES, 2014)

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

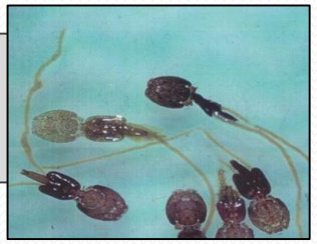
Diseases and parasites:
Update on sea lice investigations in Norway



- Surveillance program for sea lice on wild salmon smolts and sea trout at localities along Norwegian coast continued in 2015
- Further development:
  - Weekly sea lice counts at fish farms, coupled with detailed hydrodynamic model
  - The model predicts sea lice distribution and infection pressure on wild salmonids
  - Verified by field sampling
  - Predictions and observations in good agreement

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Diseases and parasites:
Update on sea lice investigations in Norway



2015:

- General increase in infection levels observed, though low at some stations
- In four regions (*Hordaland, Sogn og Fjordane, Møre og Romsdal, Nordland*) migrating smolts “probably negatively affected” by lice
- Sea lice developing resistance to chemical control, with multi-resistant sea lice now present in all areas
- Alternative methods (inc. mechanical removal) are increasingly being used
- Increased application of alternative methods is expected to reduce future use of chemicals

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Diseases and parasites:
Ulcerative dermal necrosis (UDN) in Sweden and Russia – 2015

Sweden – <u>northern Baltic</u>:

- Sick and dead salmon infected with the fungus *Saprolegnia* observed
- Swedish National Veterinary Institute found deformations typical of UDN

Russia:

- Mass mortality of adult salmon - Kola River (Murmansk)
- Samples analysed (Murmansk, Moscow & Norwegian Veterinary Institute, Oslo)
- No common disease or pathogens identified, though symptoms fit UDN

Noting:

- *There is no definitive diagnostic test to confirm UDN*
- Outbreaks have coincided with large spawning runs, i.e. dense populations
- It was not possible to quantify total mortality in either case
- Past events have shown no adverse effect on subsequent juvenile densities
- Impact of 2015 events on spawning stocks to be assessed autumn 2016

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Progress with implementing the Quality Norm for Norwegian salmon populations

- 2013: Quality Norm for Wild Populations of Atlantic Salmon ("Kvalitetsnorm for ville bestander av Atlantisk laks") adopted in Norway (ICES 2014)
- Progress in 2014:
  - Preliminary classification established according to conservation limit (CL) and harvest potential (HP) dimensions
- 2016: First classifications on populations based on both CL-HP and Genetic Integrity dimensions of the Quality Norm
  - 104 populations considered:
    - 23 (22%) in good or very good condition
    - 29 (28%) in moderate condition
    - 52 (50%) in poor or very poor condition

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Progress on development of reference points for Atlantic salmon in Canada that conform to the Precautionary Approach

- Following review of the Wild Atlantic Salmon Conservation Policy (DFO, 2009), science advice was requested for review / development of benchmarks / reference points conforming to the Precautionary Approach
- New management measures are founded on the status of populations in individual rivers, prescribed by **three status zones**:

  Healthy zone – populations not in peril by sustainable exploitation

  Cautious zone – abundance less than optimal but not alarming: exploitation rate set to favour rebuilding

  Critical zone – populations at low abundance and in peril: exploitation rate held to the lowest possible level

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Progress on development of reference points for Atlantic salmon in Canada that conform to the Precautionary Approach

Reference values categorizing status:

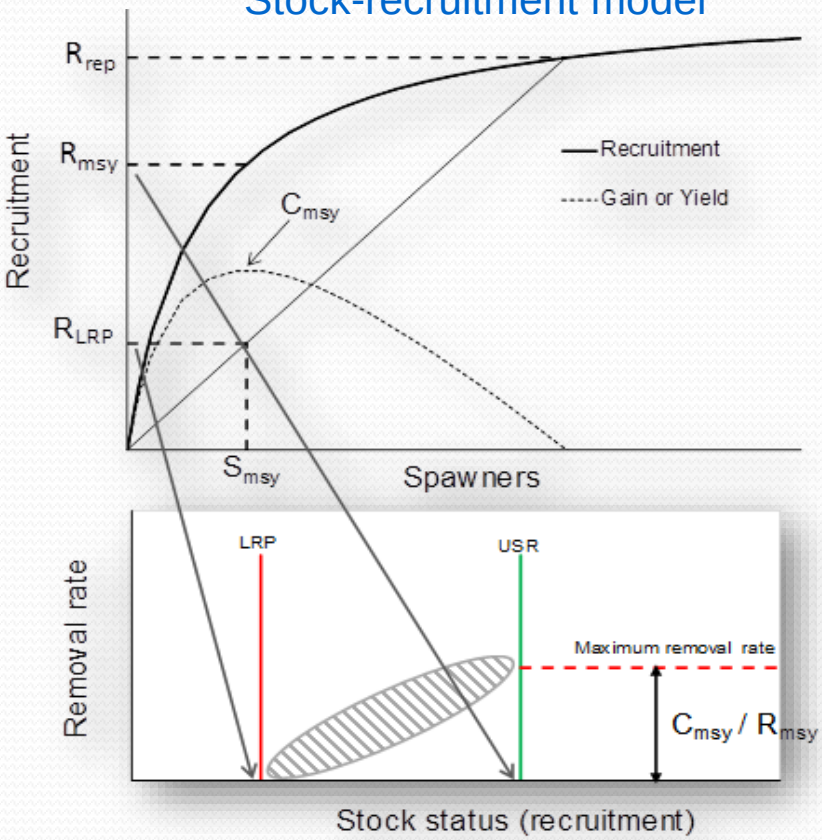
Genetic limit reference point:
90% chance of maintaining genetic diversity within 100 years

Demographic limit reference point:
Spawner abundance with >75% chance of achieving 50% R_{MAX}

Upper stock reference:
Egg deposition rate corresponding to the 95th percentile of S_{MSY}

Management targets:
Discretion of managers, e.g. to favour catch and release: R_{max} – must be greater than upper stock reference

Stock-recruitment model

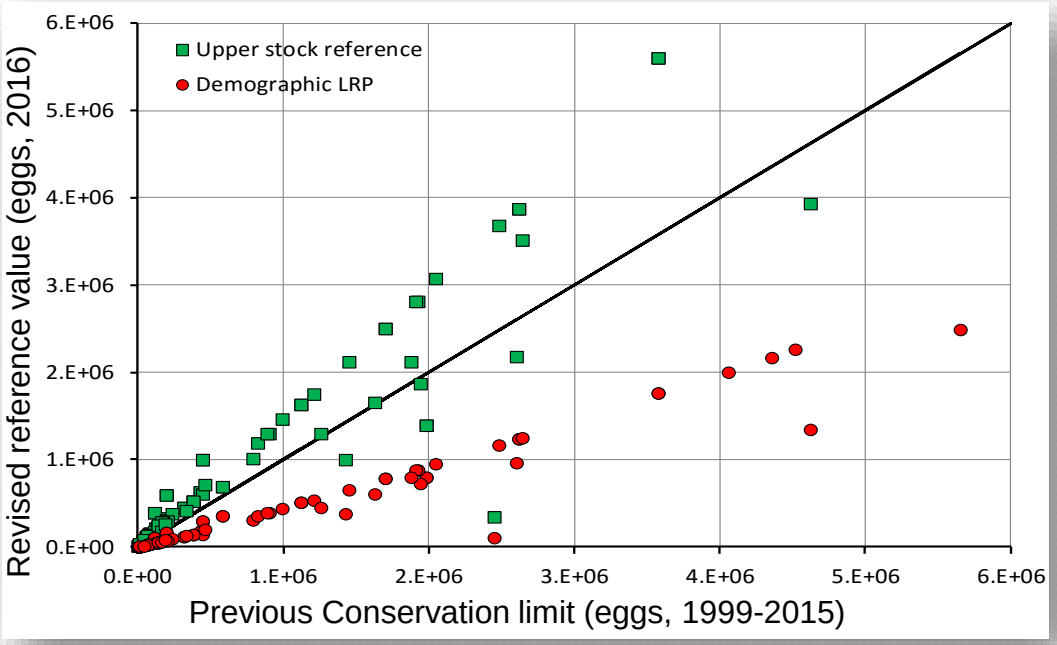


PA framework

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Progress on development of reference points for Atlantic salmon in Canada that conform to the Precautionary Approach

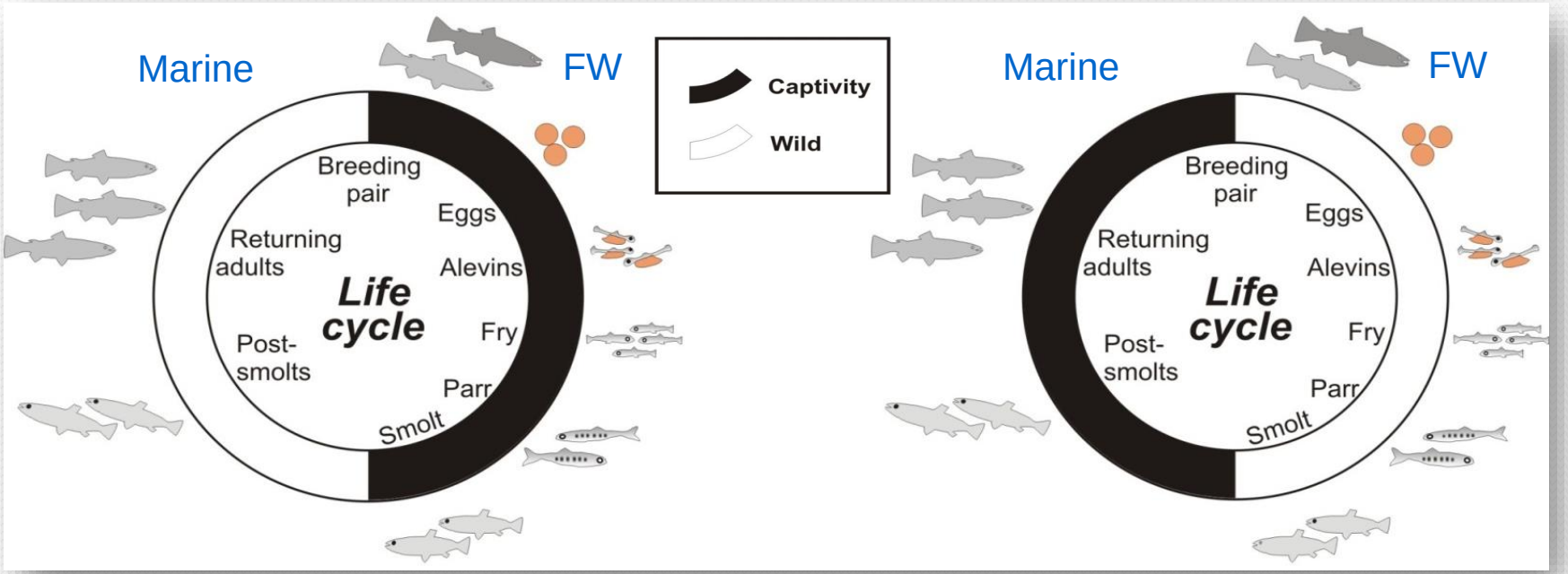
- Revised reference points for 105 rivers in Québec defined
- Previous CLs correspond to the mid-range between demographic limit RP and the upper stock RP



2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Review of proposed Smolt to Adult Supplementation (SAS)

In response to low salmon returns to the Northwest Miramichi River (New Brunswick, Canada) 2012 to 2014, a group of non-governmental organizations proposed a Smolt to Adult stock supplementation program



Juvenile supplementation programs

SAS programs

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Review of proposed Smolt to Adult Supplementation (SAS)

A science review undertaken by DFO (Canada) to address:

- Genetic risks: short and long-term
- Ecological risks
- Criteria and metrics to assess risks
- Conditions under which SAS may pose negligible risk to wild salmon fitness
- Risk assessment of SAS activity on the Miramichi River, NB-Canada

Findings based on literature:

- Adaptive genetic changes associated with captivity (relaxation of natural selection) can occur rapidly
- Any immediate benefits may be offset by reduced mean fitness of progeny

Conclusions:

- If SAS is to be conducted it should include adequate monitoring and assessment:
  - to address vast knowledge gaps
  - to facilitate decision-making regarding how SAS might provide desired benefits to wild salmon populations

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Progress in stock assessment models:
Embedding Atlantic salmon stock assessment within an integrated Bayesian life cycle modelling framework

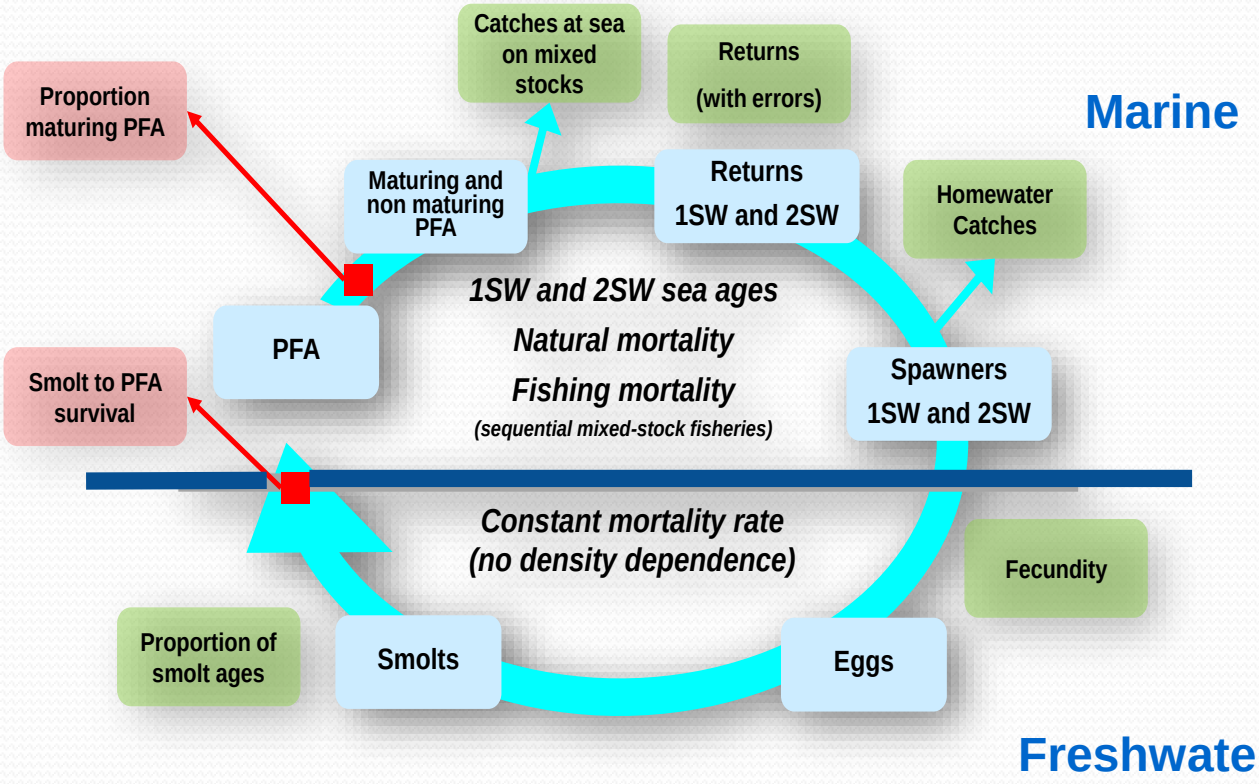
- A hierarchical Bayesian integrated life cycle model was developed by Massiot-Granier *et al.* (2014) and Massiot-Granier (2014) – part of EU-FP7 "ECOKNOWS"
- Considered an improvement on the stock assessment approach currently used
- Applied to the stock units in the Southern NEAC complex

S-NEAC stock units
Ireland
France
UK (Scotland)
UK (Northern Ireland)
UK (England & Wales)
Iceland (south-west)

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Progress in stock assessment models:
Embedding Atlantic salmon stock assessment within an integrated Bayesian life cycle modelling framework

Stock assessment fully integrated in an age and stage-based life cycle model



2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Progress in stock assessment models:
Embedding Atlantic salmon stock assessment within an integrated Bayesian life cycle modelling framework

2016: Model applied for the first time to the NAC complex:

- Six stock units
- Incorporates:
  - dynamics of both 1SW and 2SW age groups
  - a time-trend for the proportion of fish maturing
  - survivals: fresh water, first and second years at sea
- Aligns with the dynamics of the European stock model
- Critical step in harmonizing assessment models across the North Atlantic

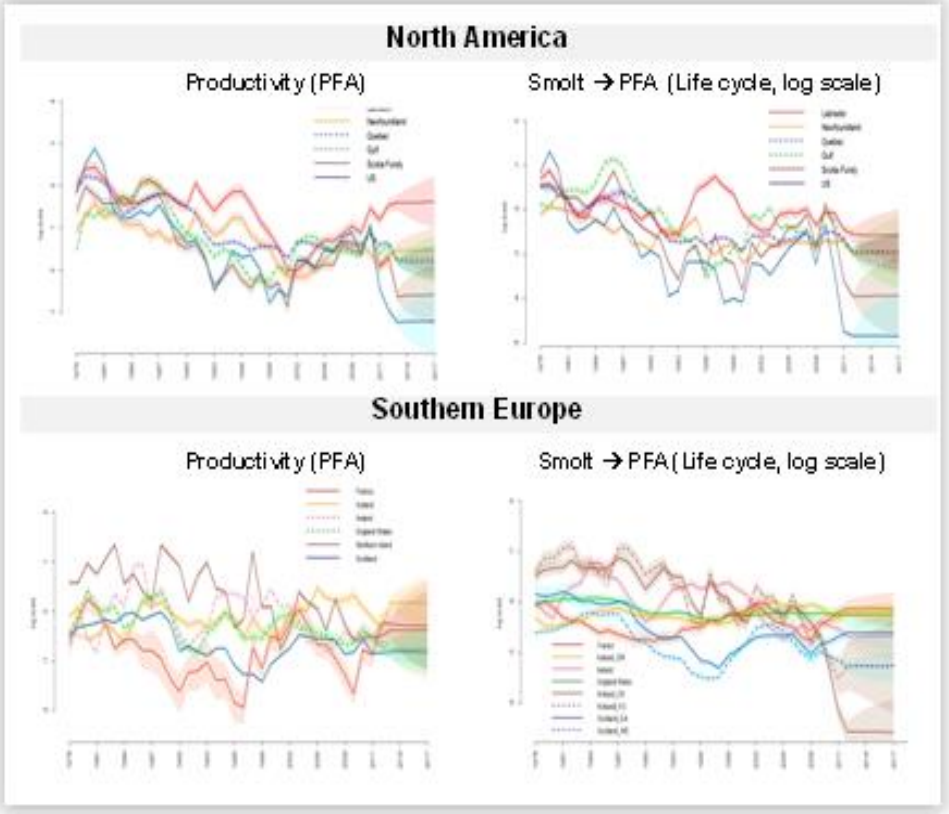
NAC stock units
Labrador
Newfoundland
Québec
Scotia-Fundy
Gulf
USA

2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

Progress in stock assessment models:
Embedding Atlantic salmon stock assessment within an integrated Bayesian life cycle modelling framework

Future plans:

- Improve traceability and routines to interpret results
- Detailed comparison with PFA forecasting models currently used
- Extend to Northern NEAC stock units
- ICES “benchmarking” process will be necessarily prior to implementation

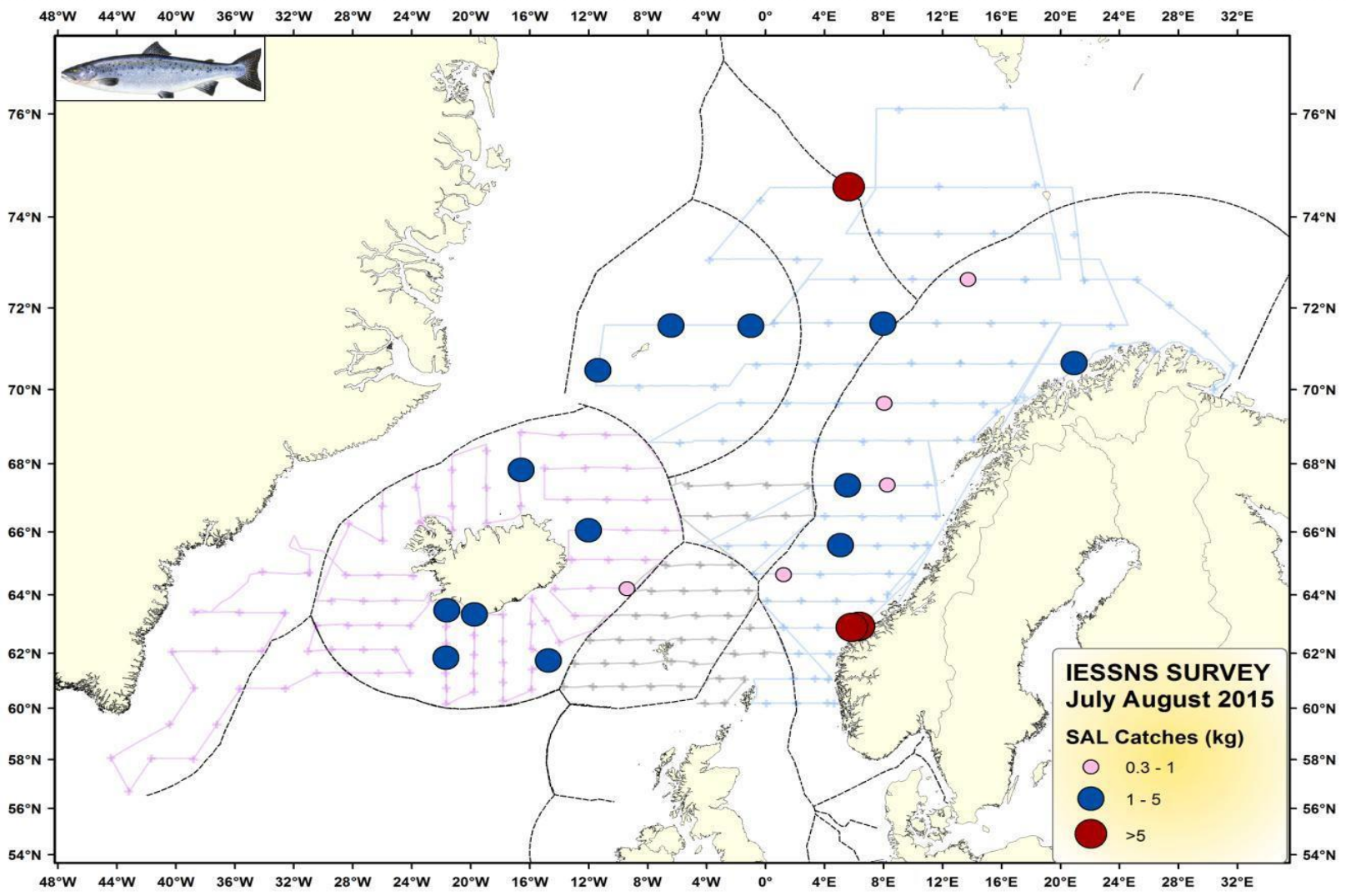


2. Report on significant new or emerging threats to, or opportunities for, salmon conservation & management

The International Ecosystem Survey of the Nordic Seas (IESSNS)

- A collaborative survey programme: Icelandic, Faroese and Norwegian RVs
- Annual surveys: July – August
- Targeting pelagic spp. with by-catch of post-smolt and adult salmon
- 2.7 million km^2 surveyed in 2015: overlap with known post-smolt distributions
- Opportunity to improve knowledge of salmon at sea
- 2015: 51 post smolts & adults caught
- Collected samples frozen for subsequent analysis
- Several analyses are currently under development at the Institute of Marine Research in Bergen, Norway
- Expected to provide information on distribution, size, sex, diet and stock origin

Distribution of salmon catches: trawl stations during IESSNS July & August 2015 (Nøttestad et al. 2015)



3. Review of examples of successes and failures in salmon restoration and rehabilitation:

Develop classification activities which could be recommended under various conditions or threats to the persistence of populations

The **Working Group on the Effectiveness of Recovery Actions for Atlantic salmon** (**WGERAAS**) met for a third and final time November 2015 – Chair Dennis Ensing, UK (N. Ireland)

- 15 case studies
- 568 individual river stocks compiled in the DBERAAS database*
- Analyses are ongoing

*DBERAAS: Database on Effectiveness of Recovery Actions for Atlantic Salmon

3. Review of examples of successes and failures in salmon restoration and rehabilitation:

Develop classification activities which could be recommended under various conditions or threats to the persistence of populations

Preliminary results:

Case studies: 5 achieved stated goals to effective recovery
9 failed to do so,
one reported “partial” success

Successes occurred in cases where:

- A limited number of stressors were present
- All stressors were successfully addressed
- Stocks were experiencing moderate to high marine survival
- Projects included robust project evaluation

‘**Stressors**’ most often reported as having *high* or *very high* impact:

- Climate change, barriers to migration, freshwater habitat degradation

‘**Actions**’ most often reported as having *high* or *very high* benefit:

- Improved connectivity, freshwater water quality, habitat restoration

Noting – the historic component of case studies & DBERAAS database

Final report due 2016

4. Possible effects of salmonid aquaculture on wild Atlantic salmon populations focusing on the effects of sea lice, genetic interactions and the impact on wild salmon production

Update findings of the 2005 ICES/NASCO symposium on the impacts of aquaculture, and the advice to OSPAR in 2010 and 2014

Given broad remit, ICES decided advice required input from a range of Expert Working Groups:

- WG Aquaculture (WGAQUA),
- WG Pathology and Diseases of Marine Organisms (WGPDMO)
- WG Application of Genetics in Fisheries and Mariculture (WGAGFM)
- WG North Atlantic Salmon (WGNAS)

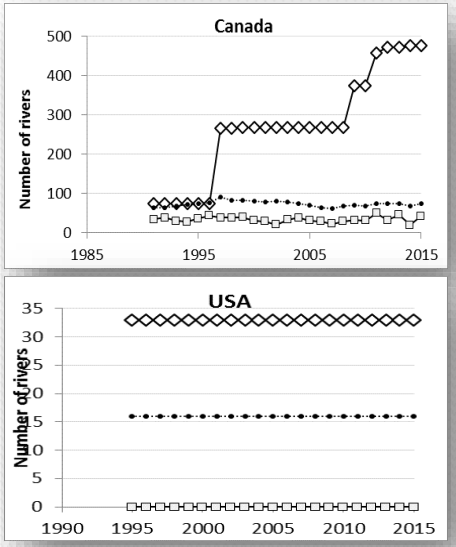
ICES Workshop: WKCULEF

- Co-chaired by Ole Torrissen (Norway) & Ian Russell (UK England & Wales)
- Copenhagen 1–3 March 2016
- Reported to ICES Advisory Committee
- Reviewed by ICES, independently to the other WGNAS questions
- **Addressed in NASCO Theme-based Special Session**

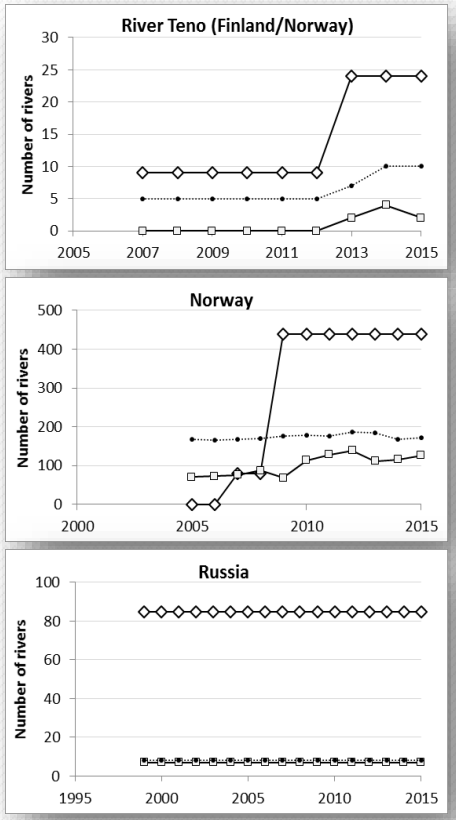
5. Time series of numbers of river stocks with established CLs and trends in numbers of stocks meeting CLs by jurisdiction

Conservation Limits

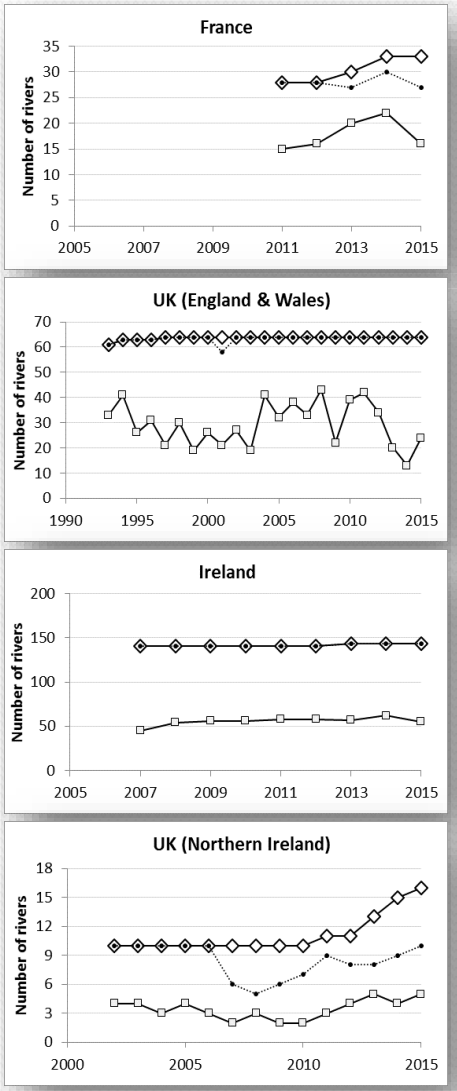
NAC



N NEAC



S NEAC



With established CLs | No. assessed against CL | No. meeting CL

5. Time series of numbers of river stocks with established CLs and trends in numbers of stocks meeting CLs by jurisdiction

Generally:

- Variable degrees of CL attainment
- Number of rivers with defined CLs, and number of stocks meeting CLs increase with time
  - Defining CLs tends to be relatively easy
  - Monitoring CL achievement is dependent upon resources

UK (Scotland):

As part of the regulations to control the killing of wild salmon, stocks will be assessed annually at the district scale from 2016 season

Work is continuing to extend this analysis to the river scale

Iceland and Sweden:

Working towards developing river stock-specific CLs

Denmark, Germany and Spain:

Stocks not currently assessed against CLs

Reports from ICES expert groups relevant to North Atlantic salmon

ICES Working Group on the Science Requirements to Support Conservation, Restoration and Management of Diadromous Species (WGRECORDS)

Role: To co-ordinate work on diadromous species; organise expert groups, theme sessions & symposia

Reported on:

Ongoing:
The Working Group on Effectiveness of Recovery Actions for Atlantic Salmon (WGERAAS) Convener Denis Ensing (UK, N.Ireland)

Recent expert groups:
The Working Group on Data Poor Diadromous Fish (WGDAM)
Convenors Karen Wilson (USA) and Lari Veneranta (Finland)

***Workshop on sea trout (WKTRUTTA2*)**
Convenors Ted Potter (UK, England and Wales) & Johan Höjesjö (Sweden)
(further)

Reports from ICES expert groups relevant to North Atlantic salmon

Proposed Expert groups of relevance to NASCO:

Expert Group on Marine Sampling at West Greenland, Faroes and other marine areas relevant to salmon migrations

Facilitate development of marine projects (NASCO Telemetry Sub-Group of IASRB*) to examine ocean migrations of salmon in relation to changing environmental conditions and provide information on where significant mortality is occurring at sea (i.e. bottlenecks to survival)

Expert Group on Current Catch and Biological Sampling Procedures at West Greenland to provide feedback and analyses on the current catch and sampling programmes

May include phone surveys currently used to collect catch data and post season interviews, to integrate these with existing data and assessments

The potential for developing Internet surveys along with or to replace phone surveys, should also be examined and these should be integrated with current sampling and data collection.

***International Atlantic Salmon Research Board**

Reports from ICES expert group relevant to North Atlantic salmon

Theme sessions and symposia developed and proposed by WGRECORDS

Theme Session for the ICES Annual Science Conf. in 2016 – accepted by ICES:

Ecosystem changes and impacts on diadromous and marine species productivity. Conveners Katherine Mills (USA), Tim Sheehan (USA) and Mark Payne (Denmark)
(ASC - Riga, Latvia, 19-23 Sept, 2016)

Theme sessions proposed for 2017 and 2018:

From freshwater to marine and back again - population status, life histories and ecology of least known migratory fishes. Conveners Karen Wilson (USA) and Lari Veneranta (Finland) in 2017.

Further:

Options for mitigating against poor marine survival and low stock levels of migratory fish stocks including endangered fish species without jeopardising long term fitness of wild populations. Conveners to be announced (2018)

Reports from ICES expert group relevant to North Atlantic salmon

ICES ***Workshop on sea trout 2*** **(WKTRUTTA2)** February 2016
Co-chaired Ted Potter (UK) and Johan Höjesjö (Sweden)

Focused on development of models to help address key management questions and develop Biological Reference Points for sea trout

- Reviewed current monitoring and assessment programmes:
  - Data collection for sea trout in many countries is poor
  - Catch data often unreliable, or not a national requirement
  - Few index-river studies
  - Juvenile surveys are conducted, to varying extents, in most counties
- Approaches considered for setting BRPs:
  1. Based on catch data – to develop pseudo-stock-recruitment relationships
  2. Based on establishing “Trout Habitat Scores” for pristine/optimal juvenile pops.
- Recommendation: Establish a WG to further advance approaches and set a clearer method setting reference levels
- Final report due in the summer 2016

Reports from ICES expert group relevant to North Atlantic salmon

ICES and the International Year of the Salmon (IYS)

- 2002 workshop: '**Causes of Marine Mortality of Salmon in the North Pacific and North Atlantic Oceans and in the Baltic Sea**'
  - NASCO
  - ICES
  - North Pacific Anadromous Fish Commission (NPAFC)
  - North Pacific Marine Science Organization (PICES)
  - International Baltic Sea Fishery Commission (IBSFC)

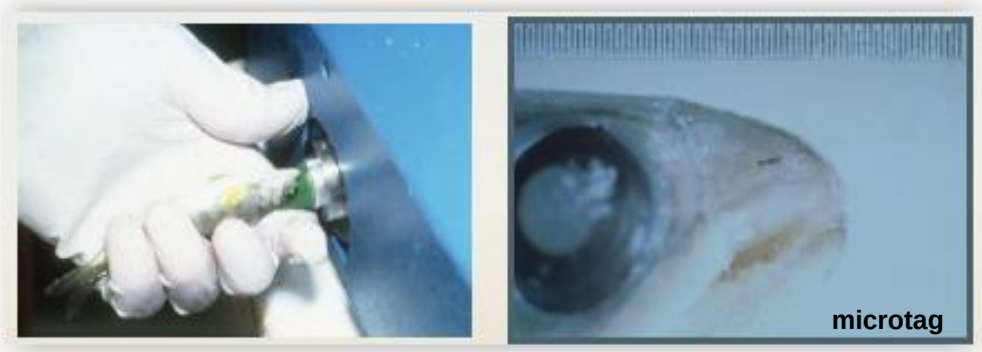
- NPAFC endorsed in principle, the concept of an IYS
- A multi-year (2016 – 2022) programme proposed
- An "intensive burst of internationally coordinated, interdisciplinary, stimulating scientific research on salmon, and their relation to people"

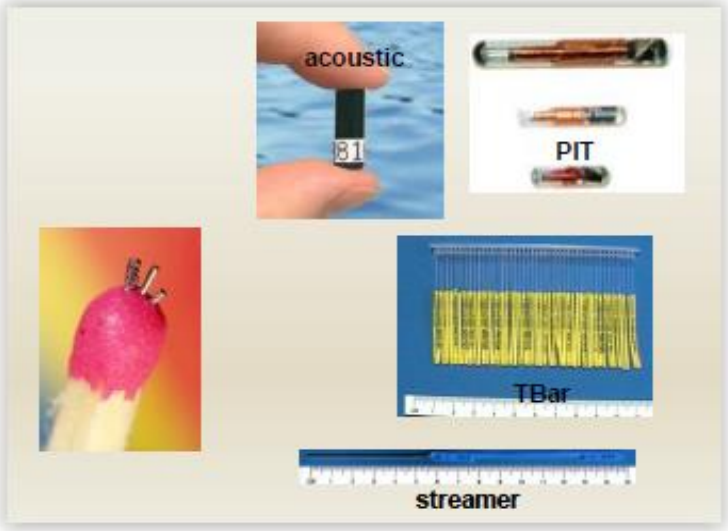
- ICES recognises this opportunity to raise awareness of the salmon globally and the issues facing these species
- Currently considering involvement and contribution to such an initiative and resources available to inform discussions with NPAFC

6. Provide a compilation of tag releases by country in 2014

- Compilation of releases of tagged, fin-clipped, and otherwise marked salmon in 2015 provided as a separate report (ICES 2016)
- Circa 3.8 million salmon released with marks in 2015 (4.2 million in 2014)
- Most marks applied to hatchery-origin juveniles (3.7 million)
- Adipose fin clips (3.0 million) and microtags (0.4 million) most common

Broad range of tag types
Increasing numbers of PIT, acoustic, radio, and DST tags being used





http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2016/WGNAS/ICES%20WGNAS%202016%20ADDENDUM.pdf

Relevant data deficiencies, monitoring needs and research requirements

The Working Group recommends that it should meet in 2017 to address questions posed by ICES and NASCO:

ICES HQ Copenhagen, Denmark:

28 March – 6 April 2017

Recommendations

Covered in Commission presentations

Stock annex

Full description of the assessment approaches used by ICES provided in a stock annex (separate to the WGNAS report):

http://ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2016/sal-nea_SA.pdf

Advice generated by ICES in response to terms of reference from NASCO

Supporting information and details in the report of the ICES Working Group on North Atlantic Salmon:
http://www.ices.dk/publications/library

Acknowledgements

Members (23) of participating countries (10) to the Working Group on North Atlantic Salmon, 30 March–8 April 2016, in ICES HQ, Copenhagen, Denmark

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