CNL(14)59

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 3 to 6, 2014

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

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

10.2 North East Atlantic Commission – catches, stock status, catch advice, (by-catch)

10.3 North American Commission – catches, stock status, catch advice

10.4 West Greenland Commission – catches, stock status, catch advice, (management objectives)

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

10.1 With respect to salmon in the North Atlantic:

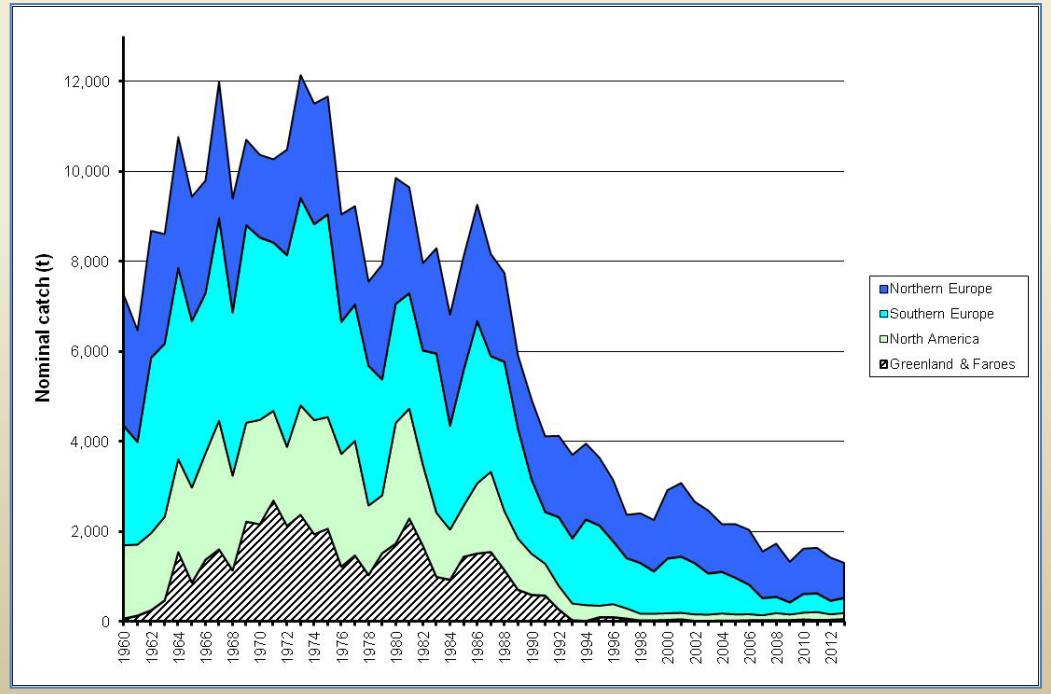
1. Provide an overview of salmon catches, unreported catches, catch and release, and production of farmed and ranched Atlantic salmon
2. Report on significant new or emerging threats to, or opportunities for, salmon conservation and management
3. Report on progress in review of salmon restoration and rehabilitation activities
4. Provide a review of the stock status categories used by NASCO and advise on common approaches
5. Provide a compilation of tag releases by country in 2013
6. Summary of data deficiencies, monitoring needs and research requirements

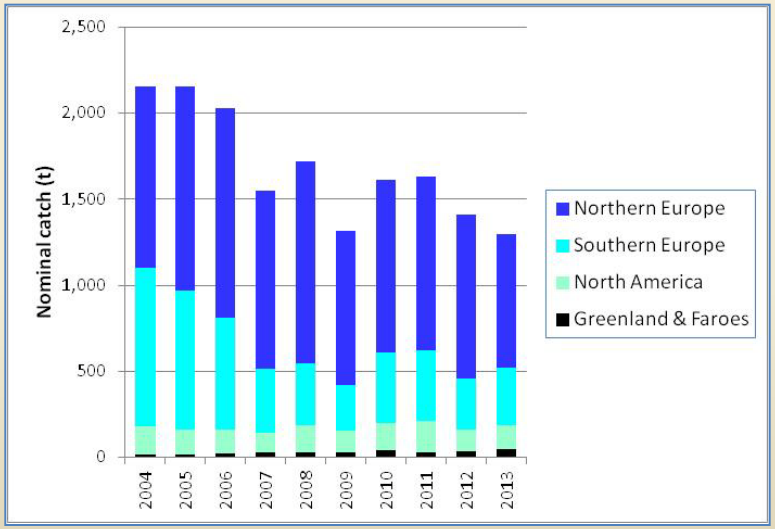
Overview of salmon catches

Nominal catch in 2013 in the North Atlantic = 1296 t

NAC	W. Greenland	S. NEAC	N. NEAC	NEAC Total	N. Atlantic
141 t	47 t	329 t	778 t	1107 t	1296 t
11%	4%	25%	60%	85%	
4th lowest	17th lowest	2nd lowest	Lowest	Lowest	Lowest

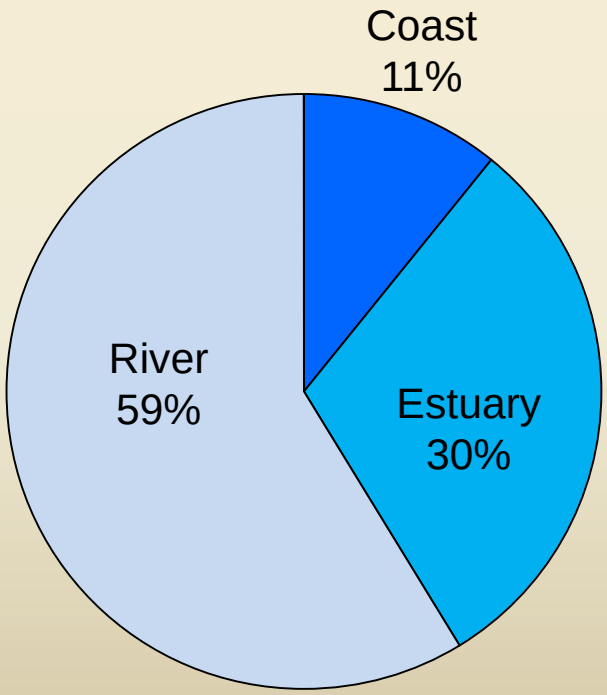
Rank in 54 year time series



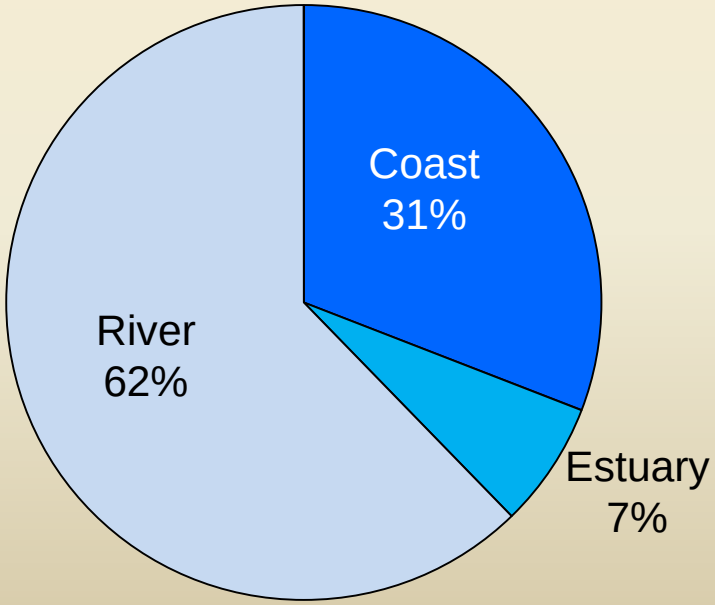


Partitioning of nominal catch into areas fished

- Majority of nominal catch in 2013 was taken in rivers
- Higher proportion of catches from coastal areas in NEAC compared to NAC; higher proportion from estuaries in NAC



NAC



NEAC

Nominal catch by area fished

North American Commission

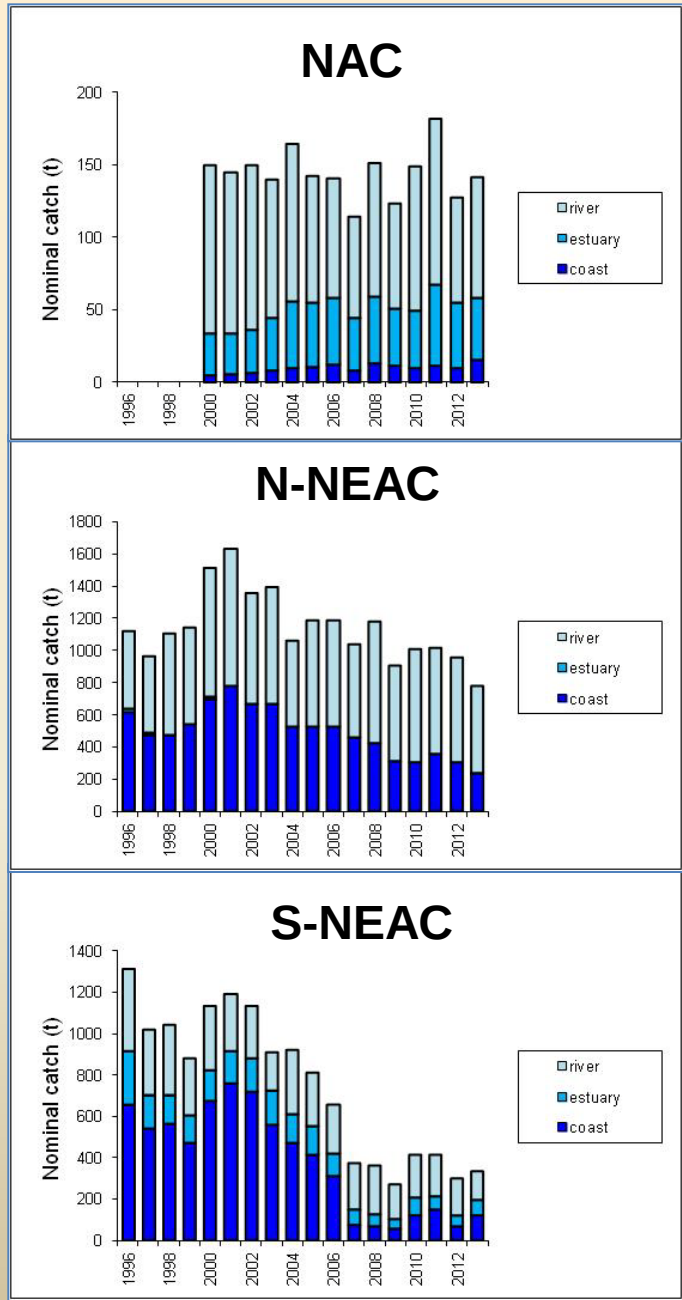
- Total catch relatively constant
- Relatively small coastal catch
- Majority taken in river fisheries

Northern NEAC

- Mainly coastal & river fisheries
- Negligible estuary catch
- Increasing proportion in rivers (71% in 2013)

Southern NEAC

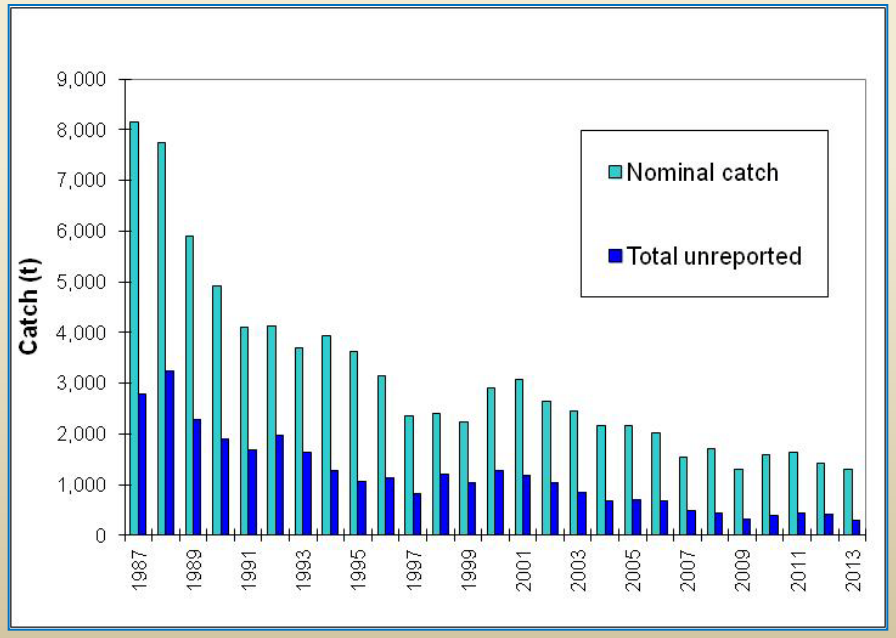
- Large declines in coastal fisheries
- Majority of catch since 2007 taken in rivers (but reduced to 42% in 2013 from 62% in 2012)



Unreported Catches

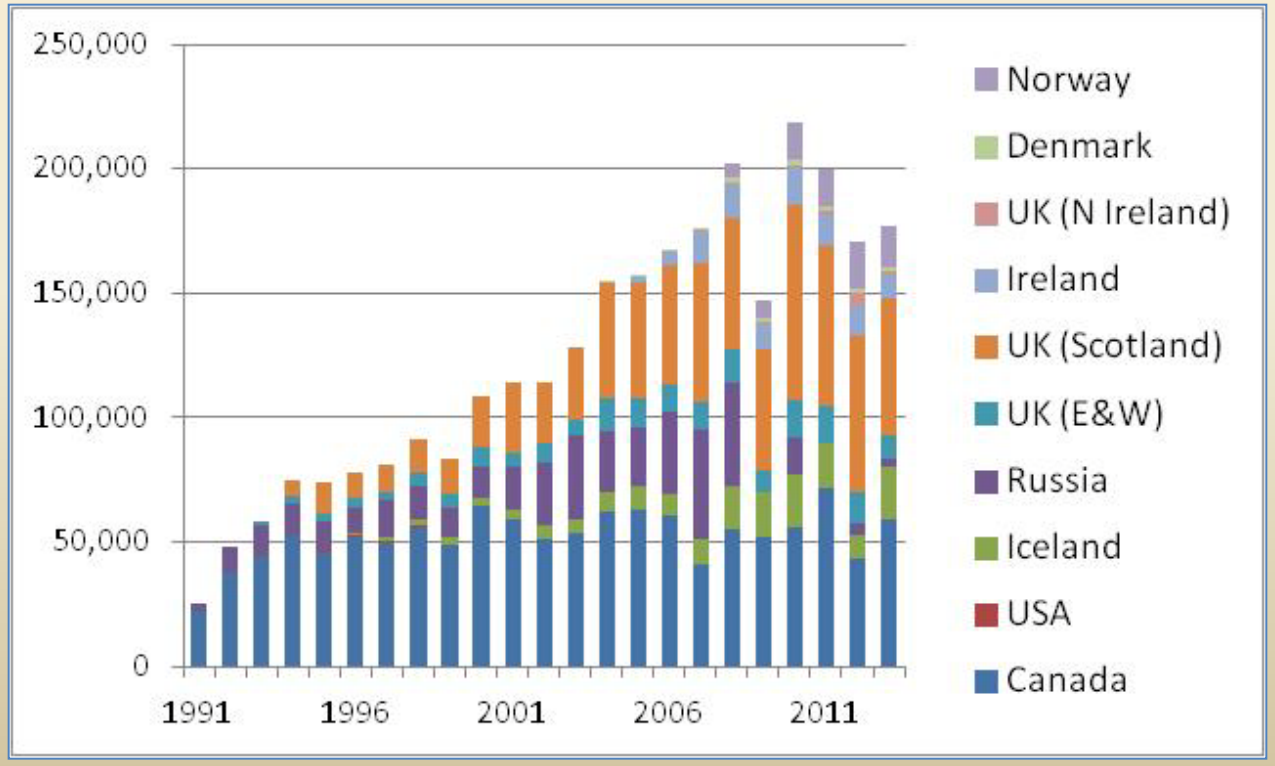
NAC	NEAC	WGC	Total
24 t	272 t	10 t	306 t

- No unreported estimates from Russia, St. P&M or Spain in 2013
- Unreported catches declined from peak values of 3,000 t in late 1980s to about 700 t in 2005-2006 (last years when reports available from all areas)
- Unreported catch 23-34% of total catch from 1987 to 2006 (19% in 2013)

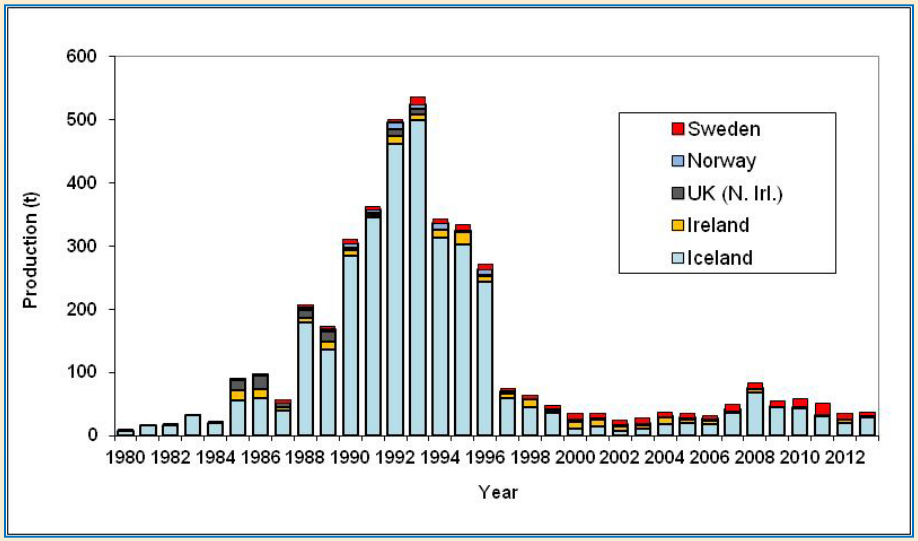


Catch and release (C&R) fishing

- Not included in nominal catch
- Practice increasing in popularity – 9 countries reporting in 2013; may also be practiced in other countries, but not reported
- Ranged from 15% for Norway (minimum figure) to 80% in UK (Scotland)
- Data incomplete for many countries, not a reporting requirement
- In 2013, >174 000 fish were released



Farming and Sea Ranching

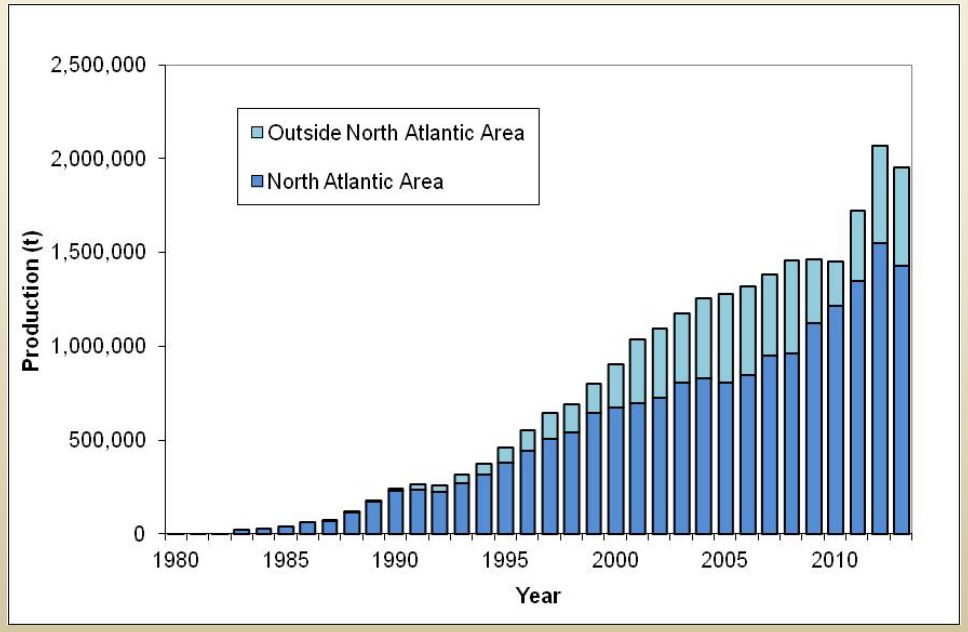


Farmed production in 2013

- North Atlantic = 1 429 kt (73%)
  - 79% from Norway
  - 11% from UK (Scotland)
- Worldwide = 1 951 kt

> 1 million t produced since 2002

~1500 times the 2013 nominal catch



Sea ranching in 2013

- 36 t – Iceland, Sweden & Ireland
- Inclusion of Swedish data is new
- Very small quantities elsewhere, but no data for 2012

Report on significant new or emerging threats to, or **opportunities** for, salmon conservation and management

Quantifying uncertainty in datasets using the 'NUSAP' approach

- Extends the classical notational system for quantitative scientific information (no [N], unit [U] and std. deviation [S]) with two additional qualifiers – expert judgment of the reliability (the assessment [A]) and an evaluation reflecting the origin and status of the information (the pedigree [P])
- May have potential in communicating fishery assessments and associated management advice
- ICES considered the intent laudable, but considered the approach subjective and likely to result in detailed outputs
- Currently unclear how it might be implemented and how much it would assist stakeholders / managers

Report on significant new or emerging threats to, or **opportunities** for, salmon conservation and management

Interactions between wild and farmed salmon

1. Genetic introgression on Magaguadavic River, Bay of Fundy (Bourret *et al*., 2011)

   - Evidence of introgression between wild fish and farm escapees from long-term study (1980-2005) with significant alteration of genetic integrity of stocks and possible loss of adaptation

2. Genetic investigations in Norway (Glover *et al.,* 2012; Glover *et al.,* 2013)

   - Similar evidence of gradual changes in gene pools of wild salmon from a number of rivers as a result of introgression - based on studies on 21 rivers using both microsatellite and SNP techniques

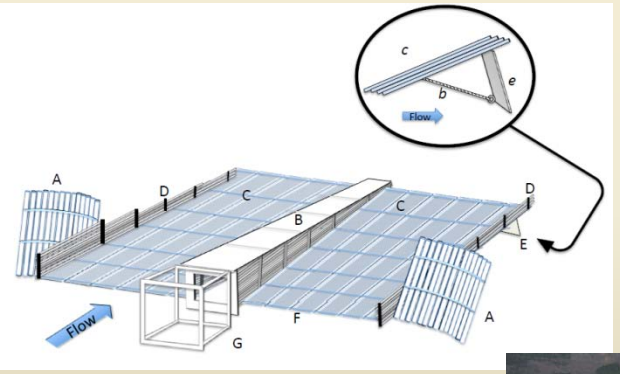
   - On many rivers, considerable efforts now made to remove farm escapees from spawning populations (netting, angling, culling by divers)

   - New portable trap (Resistance Board weir trap) trialed for first time on River Etneelva (one of largest on Norwegian west coast)

Report on significant new or emerging threats to, or **opportunities** for, salmon conservation and management

Resistance Board weir trap

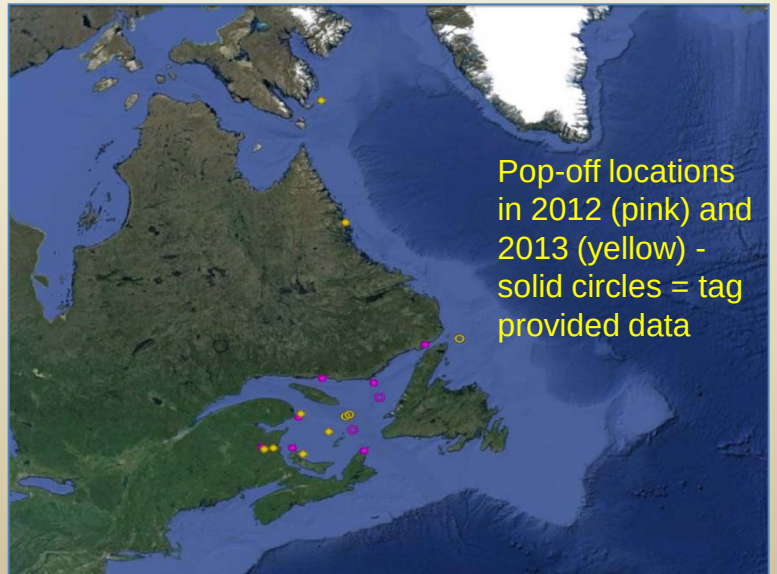
- >2000 fish trapped
- 85% of ascending salmon captured
- 92% of ascending farmed salmon removed
- Useful new management tool (also provides reliable data on run)



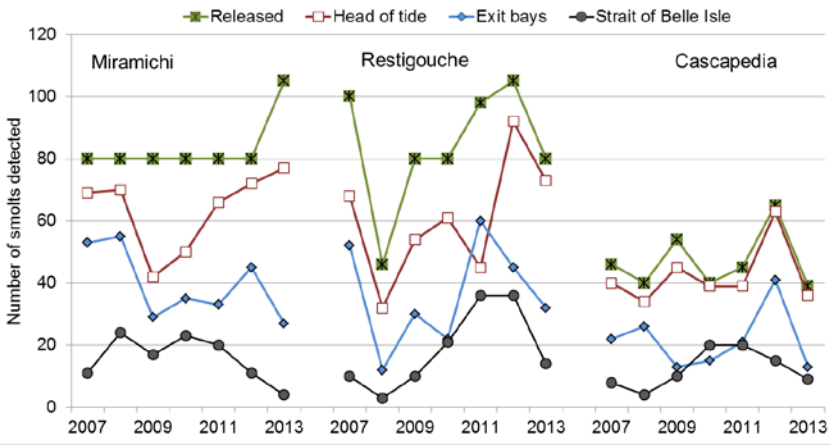
Report on significant new or emerging threats to, or **opportunities** for, salmon conservation and management

Tracking & acoustic tagging studies in Canada

- Collaborative tracking projects (ASF / OTN / DFO …) – 248 smolts acoustically tagged in 2013 in 4 rivers; also 41 kelts (11 of these with archival pop-up tags)
- Continued time series of 'survival' estimates at various locations – to help partition early marine mortality
- New study investigating interactions with striped bass in GoSL



Detection rates of tagged smolts at various locations for 3 rivers, 2007 - 2013



Report on significant new or emerging **threats** to, or opportunities for, salmon conservation and management

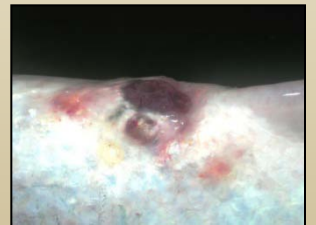
Diseases and parasites (1)

1. Testing for Infectious salmon anaemia (ISAv) & Infectious pancreatic necrosis (IPNv) viruses on fish at West Greenland

- ISAv & IPNv - fish pathogens of Atlantic salmon often with lethal effects
- Viruses transmitted through direct & indirect mechanisms, including contact with infected individuals and water
- Does occur naturally, but mainly a concern for aquaculture; potential for fish passing aquaculture sites to become infected
- Fish caught at WG tested for ISAv (n=1284, 2003-11) and IPNv (n=358, 2010)
- Single NA origin fish (0.08%) infected with ISAv; no fish tested positive for IPNv
- These pathogens at very low to non-detectable levels in wild salmon at WG

2. 'Red vent syndrome (RVS)

- Noted in Atl. salmon since 2005; linked to presence of nematode, *Anisakis simplex*
- No indication that RVS affects survival or spawning success
- Affected vents show signs of progressive healing in freshwater
- Incidence up again in 2013 in some S NEAC countries



Report on significant new or emerging **threats** to, or opportunities for, salmon conservation and management

Diseases and parasites (2)

3. Sea Lice monitoring - Norway

- Monitoring continued at various locations along the Norwegian coast in 2013
- In most areas, sea lice infestation levels were lower during the smolt migration period than in recent years
- However, sea lice continue to be regarded as a serious problem for wild salmonids, and particularly sea trout (Bjørn *et al*., 2013; Skilbrei *et al.,* 2013; Krkošek *et al.,* 2013)
- Recent study also suggested sea lice infestations may alter life-history characteristics – fish may delay their spawning migration and return as MSW fish (Vollset *et al.,* 2014)

Report on significant new or emerging threats to, or **opportunities** for, salmon conservation and management

Quality Norm for Norwegian salmon populations

- New management system adopted in 2013; work ongoing in 2014 to categorise the most important salmon populations using this new system
- Status of stocks is evaluated in two dimensions – one dimension is the CL attainment and harvest potential, the other measures genetic integrity
- Genetic integrity considers: species hydridisation, introgression from farm escapees and altered selection (e.g. due to selective harvest)

		Conservation limit attainment and harvest potential				
		Very bad	Bad	Moderate	Good	Very good
Genetic integrity	Very bad					
	Bad					
	Moderate					
	Good					
	Very good					

The worst classification in either of the dimensions determines the final classification of the stock

Report on significant new or emerging threats to, or **opportunities** for, salmon conservation and management

Developments in setting biological reference points

1. Stock-recruitment models in Québec

- Management in Québec based on use of BRPs from S-R models since 2000
- Procedures now being updated to reflect recent changes in population dynamics using new data sets (longer time series) and latest modelling approaches (part of wider management plan development in Québec)
- New (Bayesian) model uses data from 12 rivers over broader geographic scale and with further 15 years of data
- New approach to be implemented in 2015

2. Progress with setting river-specific CLs in Finland / Norway

- Information collected to set CLs for a number of Finnish tributaries of the River Teno / Tana and to update CLs for a number of Norwegian tributaries

Report on significant new or emerging threats to, or **opportunities** for, salmon conservation and management

Recovery potential for Canadian populations designated as endangered or threatened

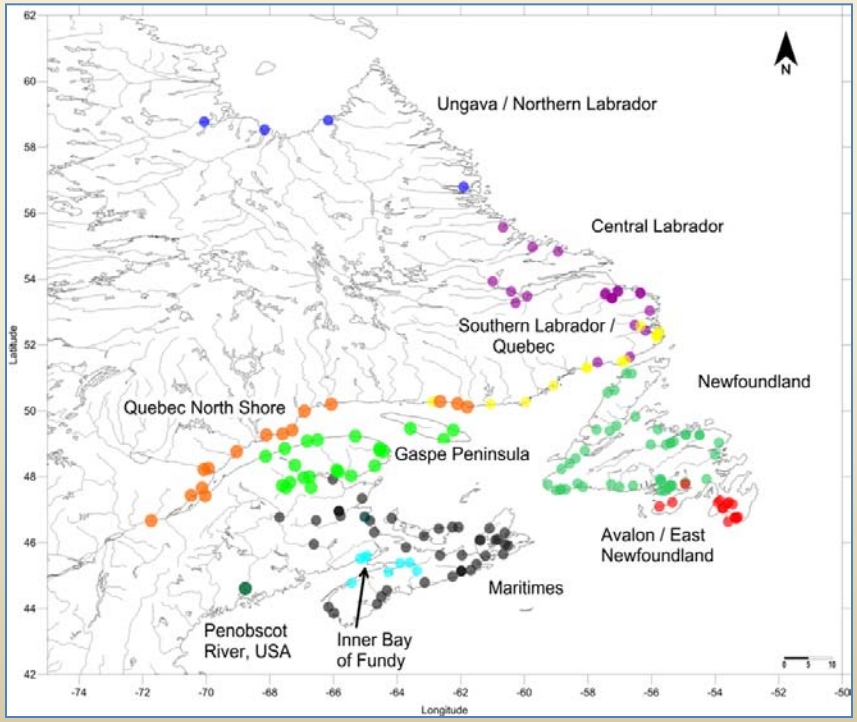
- Canadian salmon populations subdivided into 16 Designatable Units (DUs) based on genetic data, broad life-history patterns, environmental variables and geographic separation (COSEWIC)
- One DU (IBoF) listed as endangered since 2003; 5 other DUs assessed as either endangered or threatened in 2010
- Recovery Potential Assessments (RPAs) recently completed for these 5 DUs to meet requirements of Species at Risk Act and to inform management decisions (includes advice on population viability & recovery potential)
- E.G. Anticosti (DU 9) 'Endangered':

  - Low probability of extinction
  - Under existing marine survival rates, probability of meeting recovery target in next 15 years was improved by reducing sport fishery mortality rates
  - Anticosti rivers rarely impacted by human activities, but large natural variation in water levels and geological structure of area could be limiting factors

Report on significant new or emerging **threats** to, or opportunities for, salmon conservation and management

Genetic Stock Identification

- North American genetic database has been developed using standardised markers across US & Canada (152 sample sites for microsatellites, also further SNP sites)
- Initially used to define regional groups



More recently used to assess stocks contributing to MSFs at:

- W. Greenland
- St. Pierre & Miquelon
- Labrador

For example, preliminary analysis of NA salmon from WG in 2011 indicated:

- Gaspé Peninsula (33%)
- Maritimes (27%)
- Labrador (15%)
- Québec upper north shore (10%)
- Other areas (small %'s)

Report on significant new or emerging threats to, or **opportunities** for, salmon conservation and management

Genetic stock identification of salmon caught in the Faroes salmon fishery

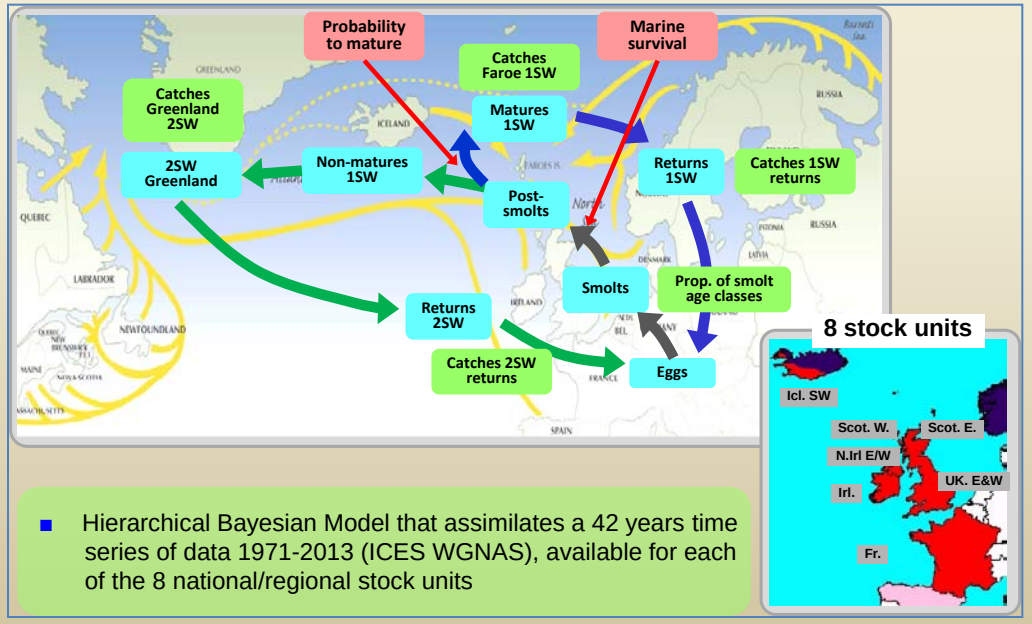
- Faroes fishery exploited salmon from Northern & Southern European stock complexes in the 1980s & 1990s & fishery could reopen if stocks recover
- NASCO has previously asked ICES to develop a risk-based framework for the provision of catch advice for this fishery, but data on stocks exploited is limited
- New DNA profiling and statistical genetic approaches provide an opportunity to look at historic scale samples – preliminary report on progress last year
- Scales from 1983-85 & 1991-93 available, but earlier samples unsuitable for analysis
- Preliminary results indicated 16% of salmon were probably of N. American origin (further analysis underway to confirm this)
- Remaining fish assigned using a mixed stock analysis using approach developed during SALSEA-Merge project
- Initial results indicate 2/3^{rds} from N. NEAC and 1/3rd from S. NEAC (N.B. previously approx 50:50 split)
- Further work to incorporate results in the NEAC assessment models

Report on significant new or emerging threats to, or **opportunities** for, salmon conservation and management

ECOKNOWS progress

- EU 7th framework (2010-2014) – developing Bayesian models in fisheries science
- Integrated life-cycle model provides methodological improvements over existing PFA forecasting model (e.g. separation of mortality in freshwater & marine phases)
- Has been successfully applied to E. Scotland stock complex (Massiot-Granier *et al.*, 2014)
- Multi-regional extension under development for whole Southern NEAC stock complex
- ECOKNOWS finishes in 2014 – options for continued development being explored

Integrated life cycle model developed for each unit of the S. NEAC stock complex



- Hierarchical Bayesian Model that assimilates a 42 years time series of data 1971-2013 (ICES WGNAS), available for each of the 8 national/regional stock units

Provide a review of examples of successes and failures in wild salmon restoration and rehabilitation and develop a classification of activities which could be recommended under various conditions or threats to the persistence of populations

- Working Group on Effectiveness of Recovery Actions for Atlantic Salmon [WGERAAS]
- Summary of ToRs:

1. Develop a classification system for recovery/ re-building programmes for Atl. salmon
2. Populate system by collecting data on such programmes from around the N. Atlantic
3. Summarise resulting data set to determine conditions under which various recovery / re-building actions are successful and when they are not
4. Provide recommendations on appropriate recovery / rebuilding actions for Atlantic salmon given threats to populations, status and life history.

- Further clarification from NASCO in 2013 identifying particular interest in case studies highlighting successes / failures and metrics used for evaluation
- WGERAAS granted an extension by ICES for further 2 years and met (for second time) 12-16 May 2014 (after the WGNAS meeting)
- Progress made with documenting case studies, development of database and approaches to reporting. All in early stages – work ongoing

NASCO has asked ICES to provide a review of the stock status categories currently used by the jurisdictions of NASCO, including within their Implementation Plans, and advise on common approaches that may be applicable throughout the NASCO area

Background

- ~2,500 rivers in N. Atlantic containing salmon over broad geographical area
- NASCO has developed a rivers database and NASCO parties are required to complete details for each of their rivers
- Information on status of stocks based on 7 categories

Review of stock status categories

NASCO RIVERS DATABASE CATEGORIES

LOST - Rivers in which there is no natural or maintained stock of salmon but which are known to have contained salmon in the past.

MAINTAINED - Rivers in which there is no natural stock of salmon, which are known to have contained salmon in the past, but in which a salmon stock is now only maintained through human intervention.

RESTORED - Rivers in which the natural stock of salmon is known to have been lost in the past but in which there is now a self-sustaining stock of salmon as a result of restoration efforts or natural recolonization.

THREATENED WITH LOSS - Rivers in which there is a threat to the natural stock of salmon which would lead to loss of the stock unless the factor(s) causing the threat is (are) removed.

NOT THREATENED WITH LOSS - Rivers in which the natural salmon stocks are not considered to be threatened with loss (as defined in previous category).

UNKNOWN - Rivers in which there is no information available as to whether or not it contains a salmon stock.

NOT PRESENT BUT POTENTIAL - Rivers in which it is believed there has never been a salmon stock but which it is believed could support salmon if, for example, natural barriers to migration were removed.

NASCO has asked ICES to provide a review of the stock status categories currently used by the jurisdictions of NASCO, including within their Implementation Plans, and advise on common approaches that may be applicable throughout the NASCO area

Background

- NASCO has expressed concerns that the categorisation does not reflect the use of Conservation Limits and Management Targets in making management decisions
- Many approaches being used to categorise stocks (and species)
- ICES asked to review and consider common approaches

Review of stock status categories

Stock status categories used in Impl. Plans

Canada – based on CLs (annual assessments on ~75 rivers; approaching 1100 in database):

Category 1 – rivers <50% of their CL

Category 2 – rivers 50-100% of their CL

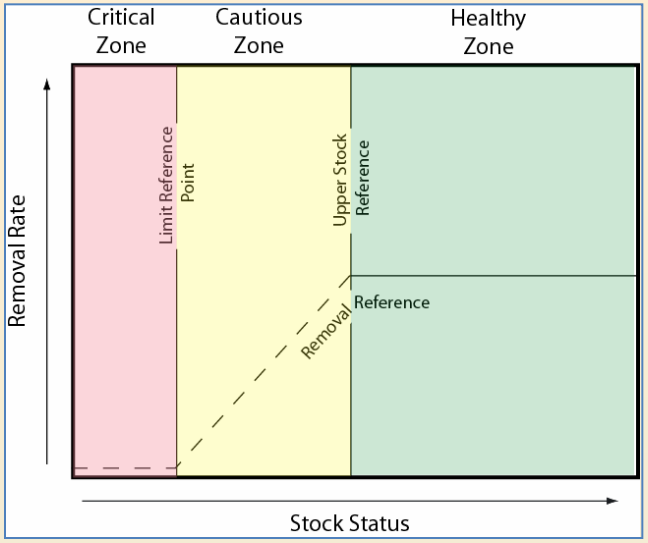
Category 3 – rivers at or >100% of their CL

Also (in development) PA reference points to define:

Critical zone

Cautious zone

Healthy zone



Canadian fisheries management framework consistent with PA

Ireland – CLs for all 141 salmon producing rivers, assessed annually. Categories determined on basis of 75% probability that CLs will be met, based on average of last 5 years:

Category 1 – stock CLs met – any surplus above CL may be used for harvest (angling & commercial)

Category 2 – stock <100% but >65% of CL – C&R fishing may be permitted

Category 3 – rivers <65% of their CL – no fishery advised

Review of stock status categories

Stock status categories used in Impl. Plans

Norway

- River-specific CLs derived for 439 out of approx 465 salmon producing rivers. Attainment assessed for ~200 rivers (~98% of catch). Advice on harvest based on MT, defined as when average probability of meeting CL in last 4 years >75%.
- Assessment also based on human impacts. Most influential factor in new category system – **Quality Norm** – is the genetic integrity of the population. Stocks categorised:

Critical or Lost	**Very Bad**	**Bad**
Moderately Influenced	**Good**	**Very Good**

Sweden

- No river-specific CLs.
- Rivers assessed using abundance of parr (in-river surveys) relative to juvenile habitat quality, with parr abundance expressed as a percentage of expected values:

  Category 1 – rivers with ave. ≥80% considered to be of good status

  Category 2 – rivers with 50-79% of intermediate status

  Category 3 – rivers <50% – poor status

Review of stock status categories

Stock status categories used in Impl. Plans

UK (England & Wales)

- River-specific CLs derived for 64 out of 80 salmon producing rivers.
- Annual assessment of attainment based on egg deposition. Mgmt objective is for egg deposition to exceed the CL in 4 years out of 5. Categories:

  Not at risk – if probability is >95% of meeting MO

  Probably not at risk – if probability is <95% but > 50% of meeting MO

  Probably at risk - if probability is < 50% but >5% of meeting MO

  At risk - if probability is <5% of meeting MO.
- Recovering rivers that do not yet have CLs set are deemed to be 'at risk'.

UK (N. Ireland)

- River-specific CLs derived for 12 out of 15 salmon producing rivers. Categories:

  Category 1 - All catchment / tributaries attaining CL and MT

  Category 2 - All catchment / tributaries partially attaining MT

  Category 3 - All catchment / tributaries failing to attain MT

  Category 4 - All catchment / tributaries where stock status is unknown

Review of stock status categories

Stock status categories used in Impl. Plans

USA

➢ Process for designating threatened and endangered stocks is specified in the US Endangered Species Act. Categories:.

Endangered – The Gulf of Maine Distinct Population Segment. This represents roughly 14 major salmon rivers.

Restoration – Historically, salmon occurred in most major watersheds south of the Androscoggin River (Maine) to the Housatonic River in the south (Connecticut). Currently, there are programs to restore self-sustained runs of salmon to three rivers and a legacy program in one river (the Connecticut).

ICES Reference Points

For assessment of status of stocks and advice on management of national components and geographical groupings where there are no specific MOs:

Full reproductive capacity - lower bound of CI of current estimate of spawners is above the CL

At risk of suffering reduced reproductive capacity - lower bound of CI is below the CL, but the midpoint is above

Suffering reduced reproductive capacity - midpoint is below the CL

Review of stock status categories

Other Classification Schemes (many apply to species rather than stocks)

- COSEWIC (Committee on Status of Endangered Wildlife in Canada) – 7 categories under Species at Risk Act:

Extinct	**Extirpated**	**Endangered**
Threatened	**Special Concern**	**Data Deficient**
Not at Risk		

- Texel-Faial scheme for classification of species under OSPAR (Convention for the Protection of the Marine Environment of the North-East Atlantic) – has been applied to Atlantic salmon.

Global importance	**Regional Importance**	**Rarity**
Sensitivity	**Keystone Species**	**Decline**

- EU Habitats Directive – used for classification of species (& habitats) - Annexes
- Convention on the Conservation of European Wildlife (Bern Convention)
- IUCN Red Data Books / Lists) – Categories:

Extinct	**Extinct in the wild**	**Critically Endangered**
Endangered	**Vulnerable**	**Near Threatened**
Least Concern	**Data Deficient**	**Not evaluated**

Review of stock status categories

Stock status categories v NASCO categories. Alignments (very) tentative

NASCO criteria	Canada PA	Canada Imp. Plan	Ireland	Norway	Sweden	UK (E&W)	UK (N. Ire)	ICES
Lost				Critical or lost				
				Very Bad				
Threatened with loss	Critical zone	< 50% of CL		Bad	Bad status	At risk		Suffering reduced reproductive capacity.
			Closure <65% CL					
				Moderately influenced		Probably at risk	Failing to attain MTs	At risk of suffering reduced reproductive capacity
	Cautious zone	50% to 100% of CL						
			C&R 65% to 100% CL		Intermediate status	Probably not at risk	Partially attaining targets	
Not threatened with loss	Healthy zone	> 100% of CL	Harvest >100 % CL	Good	Good status	Not at risk	Attaining CLs and MTs	Full reproductive capacity
				Very Good				
Unknown						Rivers with no CLs	Stock status unknown	
Not present but potential								
Restored								
Maintained								

Review of stock status categories

Species status categories v NASCO categories. Alignments (very) tentative

NASCO criteria	Canada COSEWIC	USA ESA	IUCN	TEXEL FAIAL	EU Habitats Directive	Bern Convention
	Extinct (X)		Extinct (EX)			
Lost	Extirpated (XT)		Extinct in the wild (EW)			
Restored		Restoration				
			Critically endangered (CR)			
	Endangered (E)	Endangered	Endangered (EN)		Annex IV - Species needing strict protection	
Threatened with loss	Threatened (T)		Vulnerable (VU)	Decline	Annex V - Species where exploitation needs to be controlled	Annex III
	Special Concern (SC)		Near threatened (NT)	Very sensitive		
				Rare		
Not threatened with loss	Not At Risk (NAR)		Least Concern (LC)	Regional importance	Annex II - species needing SACs	
				Global importance		
				Keynote		
			Data Deficient (DD)			
Unknown	Data Deficient (DD)		Not evaluated (NE)			
Not present but potential						
Maintained						

Review of stock status categories

Issues arising (1)

- Both stock and species categorisation systems appear to have some relevance to current NASCO categories – at very low stock status levels the species criteria may provide a closer match.
- Many categorisation schemes best viewed as continuous scales - not strictly delineated matrices. Makes presentation / comparison tricky.
- NASCO categories “maintained”, “not present but potential” and “restored” are descriptive and have no close parallel with other stock or species classifications. They relate to a special category for stocks which have been, or might be, subject to special intervention possibly including stocking.
- NASCO categories “Threatened with loss” and “Not Threatened with loss”, relate more directly to stock status. However, these difficult to align with categories based on stock attainment indicators because the terminology is imprecise and these tend to encompass several categories in other systems.

Review of stock status categories

Issues arising (2)

- NASCO has recommended the development of CLs for all stocks. However, these have not yet been developed by some jurisdictions where alternative stock abundance indicators may be used in management.
- For stocks without CLs some degree of expert judgement still required.
- Where CLs have been developed, classification schemes and management frameworks have evolved somewhat differently in the way national management advice is presented and acted on in various jurisdictions.
- Nevertheless, ICES considered that it may be possible to develop a classification more closely reflecting the generally applied categories used for describing stock status and providing management advice (i.e. CLs).

Review of stock status categories

Preliminary (tentative) example of possible revised classification scheme

- ❑ Approaches would likely need to be developed to enable compliance with classification criteria to be averaged over appropriate time periods (relevant to frequency with which Rivers Database might be updated).
- ❑ Needs further development / consideration

Current NASCO criteria	CL or other stock indicator	Tentative categories linked with CL or other stock indicator
Lost	0% of CL	Lost
	<25% of CL	Critical condition
Threatened with loss	>25% but <50% of CL	Threatened with loss
	>50% but <75%	Not threatened with loss but actions should be taken to stop or reduce exploitation and rebuild
Not threatened with loss	>75% but<100%	Not threatened with loss, but effort should be managed with caution or C&R only
	approx 100 %	Not threatened with loss; effort or harvest fisheries should be managed with caution
	>100%	Not Threatened - harvest can proceed in line with identified surplus
Unknown		
Not present but potential		
Restored		
Maintained		

Reports from Expert Groups relevant to North Atlantic salmon

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

- Coordinate work on diadromous species; organise expert groups, theme sessions & symposia
- Theme session at 2014 ASC – analytical approaches for using telemetry data to assess marine survival

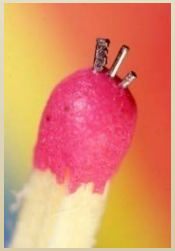
NASCO's ad hoc West Greenland Scientific WG

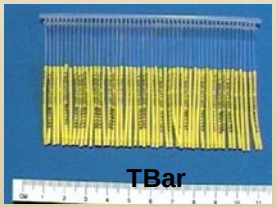
- Small group nominated by NASCO WGC to compile data on 2013 WG fishery in advance of NASCO inter-sessional meeting in London in mid April
- Data presented to WGNAS and available as Working Paper

Provide a compilation of tag releases by country in 2013

- Compilation of releases of tagged, fin-clipped, and otherwise marked salmon in 2013 provided as a separate report (ICES 2014)
- About 3.4 million salmon were released with marks in 2013 (down from 3.7 million in 2012)
- Most marks were applied to hatchery-origin juveniles (2.95 million)
- Since 2003, marks have been applied to farmed salmon in Iceland, these are included in the compilation

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





Identify relevant data deficiencies, monitoring needs & research requirements

1. NASCO Sub-Group on telemetry

- Established by Scientific Advisory Group of the IASRB - particular interest in partitioning mortality at sea
- Asked to develop an outline proposal for a large scale collaborative international telemetry programme to provide information on migration paths and estimates of mortality during different phases
- SG recognised the potential of using acoustic tracking / detector arrays (based on approaches used in Canada and US) and also satellite / archival pop-off tags, etc
- Recognised any such programme would be very challenging, but could provide important information; may be potential to link approach with other species

2. EU Data Collection Framework

- EU Member States required to collect information on salmon since 2007
- Recommendations from WKESDCF (2012) aimed to ensure such requirements consistent with assessment needs; ongoing discussions / advice via STECF
- New programme to apply from 2015 – details still being finalised

3. Stock annex

- Full description of the assessment approaches used by WGNAS now provided as an annex to the WG report

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 available at:
http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WGNAS/wgnas_2014.pdf?guardian-download=1400083057,8082,0,986c554d2c9792b5dd78cd8b24b3e0f4bbd3fbe4

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Members (21) of participating countries (12) to the Working Group on North Atlantic Salmon, 19-28 March 2014

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